



# **APPIN MINE ANNUAL REVIEW FY21**



## Table of Contents

<b>1. STATEMENT OF COMPLIANCE.....</b>	<b>8</b>
<b>2. INTRODUCTION.....</b>	<b>11</b>
2.1 Background .....	11
2.2 Overview of Operations .....	11
2.3 Mine Contacts .....	12
<b>3. APPROVALS.....</b>	<b>12</b>
<b>4. OPERATIONS SUMMARY .....</b>	<b>14</b>
4.1 Mining.....	14
4.2 Mineral Processing.....	16
4.3 Ore and Product Stockpiles .....	16
4.4 Construction .....	17
4.5 Land Preparation.....	24
4.6 Exploration .....	25
<b>5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW .....</b>	<b>26</b>
<b>6. ENVIRONMENTAL PERFORMANCE .....</b>	<b>28</b>
6.1 Air Pollution .....	28
6.2 Erosion and Sediment .....	36
6.3 Surface Water .....	37
6.4 Contaminated Land .....	54
6.5 Threatened Fauna and Flora .....	56
6.6 Weeds.....	61
6.7 Blasting .....	61
6.8 Operational Noise.....	61
6.9 Visual, Stray Light.....	70
6.10 Aboriginal Heritage.....	70
6.11 Natural Heritage .....	70
6.12 Spontaneous Combustion .....	70
6.13 Bushfire .....	70
6.14 Mine Subsidence.....	71
6.15 Hydrocarbon Contamination .....	85
6.16 Hazardous Material Management.....	85
6.17 Methane Management.....	87
6.18 Public Safety .....	90
6.19 Waste Management .....	91



6.20 North Cliff .....	95
<b>7. WATER MANAGEMENT .....</b>	<b>98</b>
7.1 Water Licences .....	98
7.2 Compensatory Water .....	98
7.3 Groundwater .....	101
7.4 Water Supply and Use .....	102
7.5 Rainfall .....	103
<b>8. REHABILITATION .....</b>	<b>105</b>
8.1 Rehabilitation for the Reporting Period .....	105
8.2 Rehabilitation and Research .....	106
8.3 Further Development of the Final Rehabilitation Plan .....	107
<b>9. COMMUNITY .....</b>	<b>108</b>
9.1 Complaints .....	108
9.2 Community Engagement .....	110
9.3 IMC Community Partnerships Program (CPP) .....	112
<b>10. INDEPENDENT AUDIT .....</b>	<b>114</b>
10.1 Environmental Audits .....	114
10.2 Environmental Risk Register .....	115
<b>11. INCIDENTS, NON-COMPLIANCES AND EXCEEDANCES DURING THE REPORTING PERIOD .....</b>	<b>116</b>
<b>12. ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD .....</b>	<b>122</b>
12.1 Mine Operations .....	122
12.2 Exploration .....	122
12.3 Projects .....	123
12.4 Environmental Management .....	124
<b>13. REFERENCES AND ASSOCIATED DOCUMENTS .....</b>	<b>125</b>
13.1 Acronyms used in Annual Review .....	125
<b>13.2 Management Plans .....</b>	<b>127</b>
<b>14. PLANS .....</b>	<b>128</b>
Plan 1: Regional Location Plan .....	129
Plan 2: Appin Shaft Locality Plan .....	130
Plan 3: Appin East Mine Site .....	131
Plan 4: Appin West Mine Site .....	132
Plan 5: No. 1 and No. 2 Ventilation Shaft Site .....	133
Plan 6: No. 3 Ventilation Shaft Site .....	134



---

Plan 7: No. 6 Ventilation Shaft Site.....	135
Plan 8: WCCPP and Appin North Layout.....	136
Plan 9: Appin North Pit Top.....	137
Plan 10: West Cliff Coal Preparation Plant.....	138
Plan 11: North Cliff Site Plan.....	139
Plan 12: Land Preparation Plan – CWEA.....	140
Plan 13: CWEA Cultural Heritage Sites.....	141
Plan 14: Georges River Subsidence Areas.....	142
Plan 15: Appin Area 7 and 9 FY21 Surface Water Monitoring.....	143
Plan 16: Appin Area 7 and 9 – FY21 Gas Zones.....	144
Plan 17: Groundwater Monitoring Sites in Area 7 and 9.....	145
Plan 18: Mine Extraction Plan – FY21 and FY22.....	146
Plan 19: Biodiversity Offset Locations.....	147
<b>15. APPENDICES.....</b>	<b>148</b>
Appendix A: Annual Rehabilitation Report.....	148
Appendix B: 2020/21 EPA Annual Return for EPL 2504.....	149
Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs.....	150
Appendix D: Annual <i>Persoonia Hirsuta</i> Condition Monitoring Report.....	151
Appendix E: 2020/21 Appin West BioBank Site Annual Report.....	152
Appendix F: 2020/21 Ventilation Shaft No.6 Offset Annual Monitoring Report.....	153
Appendix G: 2020/21 Nepean River BioBank Site Annual Report.....	154
Appendix H: 2021 Cataract River BioBank Site Passive Management Annual Report.....	155
Appendix I: Rehabilitation Cost Estimate.....	156
Appendix J: Appin Mine Community Complaints Report FY21.....	157
Appendix K: EPBC Approval 2010/5350 Compliance Report.....	158
Appendix L: Project Approval 08_0150 Compliance Report.....	159
Appendix M: Independent Environmental Audit 2019 - Action Response Table.....	188
Appendix N: WaterNSW Special and Controlled Areas Consent F2020/1545 - Annual Statement of Compliance.....	189



## Figures

Figure 1: ROM production – Appin Mine (in million tonnes per annum [Mtpa])	15
Figure 2: FY21 Exploration, Appin Area	26
Figure 3: FY21 Monthly Monitoring for Insoluble Solids	32
Figure 4: Annual averages from FY12 to FY21 for insoluble solids	32
Figure 5: PM <sub>10</sub> Maximum 24-hour Moving Average at Appin East PF3	34
Figure 6: PM <sub>10</sub> Maximum 24-hour Moving Average at Appin East PF1	35
Figure 7: PM <sub>10</sub> Maximum 24-hour Moving Average at Appin North PF1	35
Figure 8: PM <sub>10</sub> Maximum 24-hour Moving Average at Vent Shaft 6 PF1	36
Figure 9: <i>P. hirsuta</i> condition and population within the Offset	58
Figure 10: FY21 GHG Emissions - Appin Mine	88
Figure 11: FY15 to FY21 GHG Emissions - Appin Mine	88
Figure 12: FY19 – FY21 Diversion and Landfill Comparison	93
Figure 13: FY21 rainfall data - Menangle (BOM site #68216)	103
Figure 14: FY15 - FY21 Annual Rainfall - Appin East (AE Mains P28 DustTrak II)	104
Figure 15: FY12 - FY21 Annual Rainfall - Menangle (BOM site #68216)	104
Figure 16: FY21 Community Complaints for Appin Mine	109
Figure 17: Community complaints from FY13 – FY21 for Appin Mine	109
Figure 18: FY22 planned exploration across the Appin mining domain	123

## Tables

Table 1: Annual Review Title Block	7
Table 2: Statement of Compliance	8
Table 3: Non-compliances	9
Table 4: Mine Contacts	12
Table 5: Project Approvals associated with Appin Mine	12
Table 6: Mining Leases and Licences associated with Appin Mine	12
Table 7: Exploration Licences/Authorisations associated with Appin Mine	13
Table 8: Area 7 Longwall Start and Finish Dates	14
Table 9: Area 9 Longwall Start and Finish Dates	15
Table 10: Production Summary	16
Table 11: Appin North Stockpiles Capacities	17
Table 12: Actions from Previous Annual Review	26
Table 13: Appin Mine Air Quality Monitoring Sites and their Function	29
Table 14: Fixed optical photometer long-term criteria	33
Table 15: Fixed optical photometer short-term criteria	33
Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine	40
Table 17: Summary of Compliance with EPL Discharge Volume Limits Across Appin Mine	50
Table 18: Noise Survey Points and Results	64
Table 19: Predicted vs Observed Impacts for Landscape Features for Area 7 and Area 9	74
Table 20: Predicted vs Observed Impacts for Aquatic Ecology for AA7	77
Table 21: Predicted vs Observed Impacts for Aquatic Ecology for AA9	77
Table 22: Predicted vs Observed Impacts for Terrestrial Ecology for AA7 and AA9	78
Table 23: Predicted vs Observed Impacts for Surface Infrastructure for Area 7 in FY21	80
Table 24: Predicted vs Observed Impacts for Surface Infrastructure for Area 9 in FY21	81
Table 25: Predicted vs Observed Impacts for Landscape Features for Area 5 during the reporting period	82



Table 26: Predicted vs Observed Impacts for Surface Water for Area 5.....	82
Table 27: Predicted vs Observed Impacts for Aquatic Ecology for Area 5.....	84
Table 28: Predicted vs Observed Impacts for Terrestrial Ecology for Area 5.....	84
Table 29: Summary of Dangerous Goods Storage at manifest quantities - Appin West .....	85
Table 30: Summary of Dangerous Goods Storage at manifest quantities - Appin North.....	86
Table 31: Explosives and Detonator Storage – Appin East .....	86
Table 32: Explosives and Detonator Storage – Appin West .....	86
Table 33: Summary of Greenhouse Emissions - Appin Mine .....	87
Table 34: Safety Risks and Control Mechanisms .....	90
Table 35: Main waste streams for Appin Mine.....	91
Table 36: Main waste quantities for Appin Mine .....	92
Table 37: CWEA – Capacity and Status.....	93
Table 38: Water Take – Appin Mine .....	98
Table 39: Compensatory Water – Groundwater Bores .....	99
Table 40: Compensatory Water – Farm Dams .....	100
Table 41: Potable Water Usage for Appin West .....	102
Table 42: Potable Water Usage for Appin East .....	102
Table 43: Water Usage Comparison – Appin North.....	103
Table 44: Rehabilitation Status (Cumulative) .....	106
Table 45: Environmental Audits undertaken during reporting period .....	114
Table 46: Non-compliances during the reporting period .....	116
Table 47: Exceedances of criteria during reporting period.....	119
Table 48: Regulatory action during reporting period.....	121
Table 49: Acronyms used in Annual Review .....	125
Table 50: Management Plans .....	127



**Table 1: Annual Review Title Block**


<b>Name of operation</b>	Appin Mine
<b>Name of operator</b>	South32 Illawarra Metallurgical Coal (IMC)
<b>Project approval #</b>	08_0150
<b>Name of holder of development consent / project approval</b>	Illawarra Coal Holdings Pty Ltd
<b>Mining lease #</b>	CCL 767, CCL 724, CL 388, CL 381, ML 1382, ML 1433, ML 1574, ML 1678, ML 1698, ML 1473, MPL 200, MPL 201
<b>Name of holder of mining lease</b>	Illawarra Coal Holdings Pty Ltd, Endeavour Coal Pty Ltd
<b>Water approvals #</b>	10WA117285, 10WA117999, 10WA103794, 10WA118778, 10WA118766
<b>Name of holder of water approvals</b>	Endeavour Coal Pty Ltd
<b>MOP/RMP start date</b>	1 October 2020
<b>MOP/RMP end date</b>	30 September 2024
<b>Annual Review start date</b>	1 July 2020
<b>Annual Review end date</b>	30 June 2021

**I, Chris Schultz certify that this audit report is a true and accurate record of the compliance status of South32 – Illawarra Metallurgical Coal – Appin Mine for the period 1 July 2020 – 30 June 2021 and that I am authorised to make this statement on behalf of Illawarra Coal Holdings Pty Ltd and Endeavour Coal Pty Ltd.**

Note.

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

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

<b>Name of authorised reporting officer</b>	Chris Schultz
<b>Title of authorised reporting officer</b>	Superintendent Environment (under Power of Attorney issued June 2020)
<b>Signature of authorised reporting officer</b>	
<b>Date</b>	27 September 2021



## 1. STATEMENT OF COMPLIANCE

**Table 2: Statement of Compliance**

<b>Approval</b>	<b>Purpose</b>	<b>Compliant?</b>
08_0150	Project Approval under Section 75J of the <i>EP&amp;A Act 1979</i> . <sup>1</sup>	No
EPBC 2010/5350	BSO Project Approval under Sections 130(1) and 133 of the <i>EPBC Act 1999</i> .	Yes
EPBC 2010/5722	Appin Mine Ventilation Shaft No. 6 Approval under Sections 130(1) and 133 of the <i>EPBC Act 1999</i> .	Yes
EPL 2504	Environment Protection Licence for Appin Mine	No
<b>WaterNSW Access Consent</b>		
F2020/1545 <sup>2</sup>	Special and Controlled Areas access	Yes
<b>Mining Lease / Sub-Lease</b>	<b>Number</b>	
Coal Lease	388	Yes
Mining Lease	1382	Yes
Mining Lease	1433	Yes
Mining Lease	1574	Yes
Mining Lease	1678	Yes
Mining Lease	1698	Yes
Consolidated Coal Lease	724	No
Consolidated Coal Lease	767	Yes
Coal Lease	381	Yes
Mining Purposes Lease	200	Yes
Mining Purposes Lease	201	Yes
Mining Lease	1473	Yes
<b>Water Approval / Access Licence</b>	<b>Number</b>	
Water Approval	10WA117285 - Mountbatten	Yes
Water Approval	10WA117999 – Brennans Creek Dam	Yes
Water Approval	10WA103794 - Brennans Creek Dam Diversion	Yes
Water Approval	10WA118778 – Appin	Yes
Water Approval	10WA118766 – West Cliff	Yes
Groundwater Access Licence	36481 – West Cliff	Yes
Groundwater Access Licence	36477 – Appin	Yes
Groundwater Access Licence	37464 – Appin	Yes
Surface Water Access Licence	35519 – Brennans Creek Dam	Yes
Surface Water Access Licence	30145 – Mountbatten	Yes

<sup>1</sup> A notice of Modification under Section 75W of the Environmental Planning and Assessment Act 1979 28 October 2016 incorporated the VS#6 Approval requirements into the Project Approval.

<sup>2</sup> Annual Statement of Compliance provided in Appendix N.





**Table 3: Non-compliances**

Relevant approval	Condition #	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
EPL 2504	Condition L3.1	Quantity of discharge to be within limits.	Non-compliant	Allowable discharge volume limit was exceeded at LDP 22.	Section 11
PA 08_0150	Condition 15 of Schedule 4	Surface water discharges to comply with discharge volume limits.			
PA 08_0150	Condition 2 of Schedule 4	Noise generated not to exceed noise criteria.	Non-compliant	Exceedance of noise criteria at AE-NS5 greater than 2 dBA.	Section 6.8 and Incidents, non-compliances and exceedances during the reporting period
PA 08_0150	Condition 11 of Schedule 4	Visible air pollution to be minimised.	Non-compliant	Visible dust emissions from Ventilation Shaft 6.	Incidents, non-compliances and exceedances during the reporting period
EPL 2504	Condition O3.1				
EPL 2504	Condition M2.2	Air quality monitoring equipment required to run continuously.	Non-compliant	Air quality monitoring unit AE-PF3 was not available for greater than 90% of the reporting period.	Incidents, non-compliances and exceedances during the reporting period
CCL 724	Schedule A	Compliance Report to be submitted by 15 August.	Non-compliant	Report submitted 30 September 2020.	Incidents, non-compliances and exceedances during the reporting period



Compliance status key for Table 3.

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>potential for serious environmental consequences, but is unlikely to occur; or</li> <li>potential for moderate environmental consequences, but is likely to occur</li> </ul>
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>potential for low environmental consequences, but is likely to occur</li> </ul>
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Refer to Section 11 for more detail regarding the non-compliances listed in Table 3.

The predictions and Statement of Commitments from the Bulli Seam Operations (BSO) Project Environmental Assessment (EA) are incorporated into the Appin Mine federal *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* and state *Environmental Planning and Assessment Act 1979 (EP&A Act)* Project Approval conditions. An assessment of compliance with the conditions of these approvals is considered to be an assessment of compliance against the predictions in the EA. Compliance with the state and federal conditions is assessed in the following documents:

- Appendix B: 2020/2021 EPA Annual Return for EPL 2504;
- Appendix K: EPBC Approval 2010/5350 Compliance Report;
- Appendix L: Project Approval 08\_0150 Compliance Report; and
- Appendix M: Appin Mine Independent Environmental Audit 2019 - Action Response Table.



## 2. INTRODUCTION

### 2.1 Background

This Annual Review for Appin Mine details the environment and community performance for the 12-month period ending 30 June 2021, and meets the requirements set out in the *Post approval requirements for State significant mining developments - Annual Review Guideline* (NSW DPE, October 2015).

The Annual Review has been prepared to meet the requirements of Condition 4 of Schedule 6 of the BSO Project Approval 08\_0150 (the Project Approval) and the NSW Resources Regulator requirement to submit an Annual Environmental Management Report (AEMR) under the Mining Leases for Appin Mine.

A copy of the report is publicly available via the South32 website under Bulli Seam Operations Annual Review: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

### 2.2 Overview of Operations

The NSW Government granted approval for the BSO Project in December 2011. The BSO Project combined the Appin Mine and West Cliff Colliery mining operations and provided for the continuation of coal mining operations to 31 December 2041. Appin Mine underground longwall mining operations have transitioned wholly to the Appin Area 9 (AA9) and Appin Area 7 (AA7) following completion of longwall mining activities at West Cliff in early 2016. The locations of all sites associated with Appin Mine are illustrated in Plan 1.

Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

Appin Mine consists of the merged Appin and Tower 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. Appin Colliery (located at Appin) commenced operations in 1962 and Tower Colliery (located at Douglas Park) commenced operation in 1978. The underground infrastructure, roadways, conveyor and ventilation systems were joined in 2003 to become Appin Mine. The original Appin Colliery (now Appin Colliery – East) is located adjacent to Appin Village, approximately 37 kilometres northwest of Wollongong.

Tower Colliery (now Appin Colliery - West) was officially opened in November 1978. Following the sinking of the access and ventilation shafts, underground development of the mine was undertaken from 1978 through to 1988 when longwall operations were introduced. Tower Colliery completed extraction of 20 longwall blocks between 1988 and September 2002. The mine was redeveloped underground to establish mining operations in the current longwall Area 7 and Area 9 mining domains.

Key areas associated with the current Appin operations include the Appin Colliery - East (Appin East) Pit Top site (Plan 3), the Appin Colliery - West (Appin West) Pit Top site (Plan 4), the Appin East No. 1 and No. 2 fan site (Plan 5), the Appin East No. 3 fan site (Plan 6), the Appin West No. 6 fan site (Plan 7) and the Douglas Park substation site (Plan 7).

Appin Colliery – North (formerly West Cliff Colliery) and the West Cliff Coal Preparation Plant (WCCPP) is located approximately 26 km northwest of Wollongong, NSW. Appin Colliery - North (Appin North) is operated by Endeavour Coal Pty Ltd.

IMC has conducted underground coal mining operations at Appin North since 1997. Prior to this, Appin North was operated by Kembla Coal and Coke Pty Limited (KCC). Longwall mining at Appin North concluded in early 2016. The last mining area, Area 5, was completed in February 2016 and consists of part of Consolidated Coal Lease (CCL) 767 and Coal Lease 381, which were both



transferred from Appin Colliery to Appin North in 1997. Appin North merged with Appin Mine in February 2016.

Key areas of the Appin North Site include the pit top (Plan 9), the Coal Wash Emplacement Area (CWEA) (Plan 8) and WCCPP (Plan 10) and the redundant North Cliff Mine site within the Dharawal National Park Area (Plan 11).

## 2.3 Mine Contacts

The site contacts for Appin Mine are provided in Table 4.

Table 4: Mine Contacts		
Position	Name	Number
General Manager Appin Mine	Andy Hyslop	(02) 4629 4752
Specialist Environment – Appin West and East	Simon Pigozzo	0402 480 559
Specialist Environment – Appin North and WCCPP	Polly Barlow	(02) 4640 4126
Superintendent Environment	Chris Schultz	(02) 4286 3384

## 3. APPROVALS

Table 5, Table 6 and Table 7 describe the Project Approvals, Mining Leases, Licences and Exploration Leases associated with Appin Mine.

Table 5: Project Approvals associated with Appin Mine		
Document	Issue Date	Expiry date
Appin Gas Drainage Project – Initial	Oct 2009	
Appin Gas Drainage Project – 2010	Dec 2010	
Appin Gas Drainage Project – 2012	Feb 2012	
Project Approval (NSW Government)	22 Dec 2011	31 Dec 2041
Project Approval ( <i>EPBC Act</i> )	15 May 2012	15 May 2042
No. 6 Ventilation Shaft (NSW Government)	4 May 2011	Now Consolidated into Project Approval
No. 6 Ventilation Shaft ( <i>EPBC Act</i> )	1 Apr 2011	1 Apr 2041

Table 6: Mining Leases and Licences associated with Appin Mine			
Mining Lease / Sub-Lease	Number	Issue Date	Expiry Date
Coal Lease	388	22 Jan 1992	22 Jan 2034
Mining Lease	1382	20 Dec 1995	20 Dec 2037
Mining Lease	1433	24 Jul 1998	23 Jul 2019 <sup>3</sup>
Mining Lease	1574	9 Jul 2008	30 Dec 2023
Mining Lease	1678	27 Sep 2012	26 Sep 2033

<sup>3</sup> ML 1433 renewal was applied for on 18 July 2018 and is pending.



**Table 6: Mining Leases and Licences associated with Appin Mine**

Mining Lease	1698	26 Jun 2014	25 Jun 2035
Consolidated Coal Lease	724	4 Jul 1991	18 Dec 2031
Consolidated Coal Lease	767	29 Oct 1991	8 Jul 2029
Coal Lease	381	24 Oct 1991	24 Oct 2033
Mining Purposes Lease	200	13 Jan 1982	13 Jan 2024
Mining Purposes Lease	201	13 Jan 1982	13 Jan 2024
Mining Lease	1473	20 Nov 2000	19 Nov 2021 <sup>4</sup>
Environment Protection Licence	2504	14 Feb 2001	No expiry
Water Approvals	10WA117999	15 Nov 2012	14 Nov 2027
	10WA103794	1 Jul 2011	30 Jun 2024
	10WA118778	1 Jul 2013	18 Feb 2028
	10WA118766	1 Jul 2013	24 Jun 2028
	10WA117285	15 Nov 2011	14 Nov 2026
Groundwater Access Licence	36481 – West Cliff	N/A	
Groundwater Access Licence	36477 - Appin	N/A	
Groundwater Access Licence	37464 – Appin	N/A	
Surface Water Access Licence	35519 – Brennans Creek Dam	N/A	
Surface Water Access Licence	30145 – Mountbatten	N/A	
Radiation Licence	5061052 – WCCPP/Appin East	26 Jul 2021	26 July 2022
WaterNSW Access Consent	F2020/1545	14 Mar 2020	13 Mar 2025

**Table 7: Exploration Licences/Authorisations associated with Appin Mine**

Exploration Licence/Authorisation	Site	Issue Date	Expiry Date
A199	West Cliff	27 Jun 1980	27 Jun 2024
A201	Appin	27 Jun 1980	27 Jun 2024
A248	Appin	13 May 1981	13 May 2021 <sup>5</sup>
A306	West Cliff	19 Jul 1983	27 Jun 2024
A312	Appin	10 Aug 1983	10 Aug 2023
A370	Appin	8 May 1986	27 Jun 2024
A395	Appin	23 Nov 1987	10 Aug 2023
A396	Appin/West Cliff	28 Jun 1988	27 Jun 2024
A397	West Cliff	4 Aug 1987	27 Jun 2024
A432	West Cliff	12 Feb 1991	31 Aug 2023
EL 4470	Appin	5 Jan 1993	5 Jan 2021 <sup>4</sup>
EL 8972	Appin	29 Apr 2020	29 Apr 2026

<sup>4</sup> ML 1473 renewal was applied for on 16 December 2020 and is pending.

<sup>5</sup> A248 and EL4470 renewal have been applied for and are pending approval.



## 4. OPERATIONS SUMMARY

### 4.1 Mining

#### 4.1.1 Longwall Status

Appin Mine underground longwall mining operations have transitioned wholly to AA7 and AA9 following completion of longwall mining activities at Appin North (West Cliff Area 5) in early 2016. Appin Mine extracts coal from the Bulli Seam within the Southern Coalfield. Appin Mine underground longwall mining operations are accessed from three surface locations: Appin North, Appin West and Appin East.

Longwall 708A progressed approximately 770 m to finish on 20 October 2019. LW708B commenced mining on 24 April 2020 and as at the end of this reporting period, had retreated 1800 m, with an estimated completion in December 2021.

Extraction of Longwall 903 commenced on 1 November 2019 and was completed in April 2021. On 20 May 2021 LW904 commenced and retreated approximately 195 m as of the end of June. LW904 is estimated to be complete in May 2022.

The start and finish dates for longwalls in the current Appin mining domain are provided in Table 8 and Table 9.

**Table 8: Area 7 Longwall Start and Finish Dates**

Longwall Number	Start Date	Finish Date
701	27 Oct 2007	9 May 2008
702	18 Sep 2008	20 Apr 2009
703	22 Oct 2009	3 Mar 2011
704	7 May 2011	29 Jul 2012
705	7 Sep 2012	27 Mar 2014
706	23 Apr 2014	28 Nov 2015
707A	7 Jan 2016	16 Aug 2016
707B	26 Sep 2016	19 Jun 2018
708A	2 Apr 2019	20 Oct 2019
708B	24 Apr 2020	Estimated Dec 2021

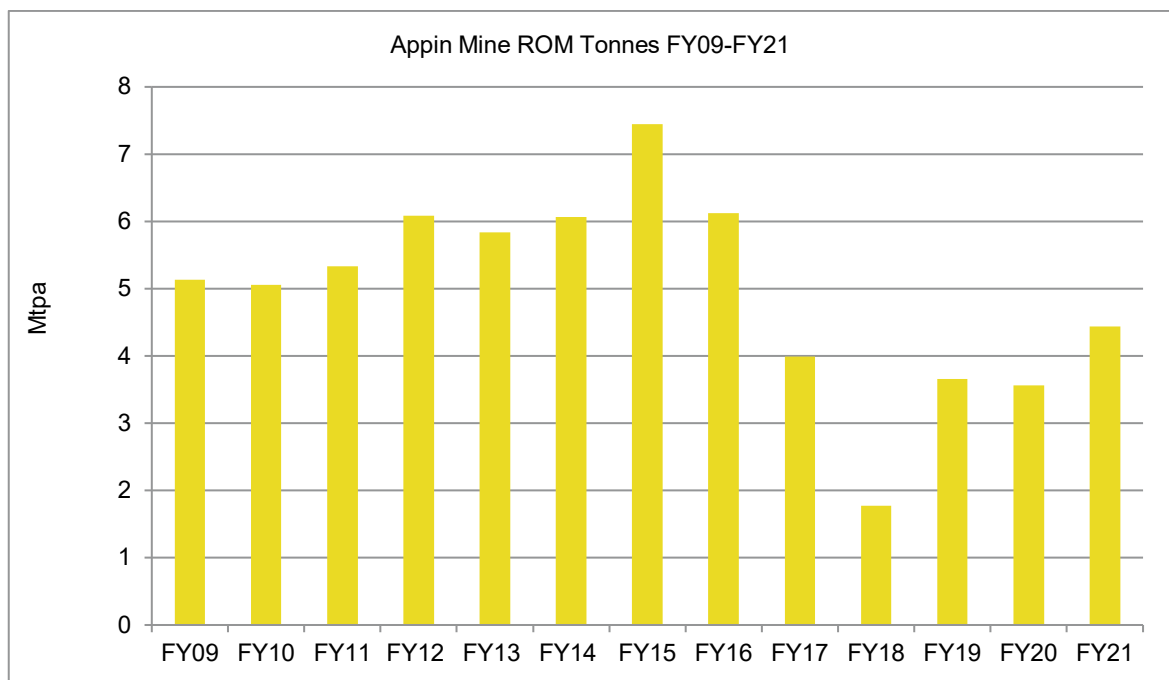


**Table 9: Area 9 Longwall Start and Finish Dates**

Longwall Number	Start Date	Finish Date
901	19 Jan 2016	8 Aug 2017
902	12 May 2018	3 Apr 2019
903	1 Nov 2019	7 Apr 2021
904	20 May 2021	Estimated May 2022

#### 4.1.2 Longwall Production

Appin Mine extracted 4.44 million tonnes of Run of Mine (ROM) coal via roadway development and longwall extraction methods for the reporting period, a 24% increase from the FY20 reporting period. The ROM production levels from FY09 through to the current reporting period are provided in Figure 1.



**Figure 1: ROM production – Appin Mine (in million tonnes per annum [Mtpa])**

The average yield for the reporting period was 85%. The production and waste summary for the reporting period is provided in Table 10.



**Table 10: Production Summary**

	<b>Approval Limit</b>	<b>Previous Reporting Period</b>	<b>This Reporting Period</b>	<b>Next Reporting Period<sup>6</sup></b>
Waste rock/Overburden	N/A	N/A	N/A	N/A
ROM Coal/Ore	10.5 Mt	3.561 Mt	4.437 Mt	4.715 Mt
Coarse Reject (Coal Wash Tonnes) <sup>7</sup>	N/A	0.622 Mt	0.736 Mt	0.950 Mt
Saleable Product	9.3 Mt <sup>8</sup>	3.180 Mt	3.690 Mt	3.906 Mt

## 4.2 Mineral Processing

Mineral processing facilities include the WCCPP, the CWEA and the Dendrobium Coal Preparation Plant (DCPP) (located at the Port Kembla Steelworks). The majority of ROM coal from Appin Mine is directed to the WCCPP for processing. The CWEA is used to emplace coal wash from the WCCPP and DCPP (if beneficial reuse options are not available). ROM coal is transported to the WCCPP by:

- coal trucks from the Appin East site, along Appin and Wedderburn Roads; and
- bulk coal winder at Appin North, transported underground from AA7 and AA9.

ROM coal from Appin Mine may also be transported to the DCPP via Mt Ousley on an 'as required' basis to maintain work continuity and maintain reduced stockpile sizes at the Appin sites.

Clean coal from the WCCPP is trucked to BlueScope Steel (Port Kembla Steel Works) coal handling facilities or to the Port Kembla Coal Terminal (PKCT) for distribution.

Daily road haulage volumes associated with both the Appin and WCCPP sites is available on the South32 website: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

## 4.3 Ore and Product Stockpiles

No coal is stockpiled at Appin West, as ROM coal is transported underground to Appin East or the WCCPP. The Appin West coal storage bins are currently under care and maintenance.

Appin East has a total raw coal stockpiling capacity of up to 50,000 tonnes. The stockpile is recovered with front-end loaders and transferred directly into the coal haulage trucks for transport by road to either the WCCPP or DCPP.

Appin North operates six primary coal stockpiles for both clean coal and raw coal. The stockpile capacities at Appin North are outlined in Table 11.

<sup>6</sup> Estimate.

<sup>7</sup> Total processing waste produced at WCCPP for Annual Review period only – does not include coal wash produced at Dendrobium CPP

<sup>8</sup> Transport Limit.





**Table 11: Appin North Stockpiles Capacities**

<b>Area</b>	<b>Capacities</b>
No.1 Stockpile	350,000 t nominal capacity – 300,000 t coking coal, 50,000 t Middlings coal
No.2 Stockpile	150,000 t nominal capacity – generally coking coal
No.3 Stockpile	400,000 t nominal capacity – generally coking coal
No.4 Stockpile <sup>9</sup>	450,000 t nominal capacity – generally Appin ROM coal
No.5 Stockpile	70,000 t nominal capacity – generally Appin ROM coal
No.6 Stockpile	30,000 t nominal capacity – generally Appin ROM coal

A Stockpile and Slope Stability Management Plan is in place to manage the stockpile operations. The plan is a framework where the operational risks and controls are documented. Risks associated with the stockpile operations are also detailed in the WCCPP Risk Register, which is reviewed regularly by the site management team to test the effectiveness of controls.

Monitoring and management reviews indicate that the current plan effectively controls all potential stockpile management issues effectively.

## **4.4 Construction**

The following construction activities were undertaken during the FY21 reporting period.

### **4.4.1 Appin East Compressor Condensate Separator Upgrades**

During the reporting period, IMC had identified that the performance of the condensate separator at the Appin East Compressor had reduced, and the 'Oil and Grease' content of the effluent was elevated. Due to the minimal throughput of the separator, and the large volume of surface water storage on the pit top, there were no downstream effects observed. Although the compressor systems have built-in active separators, the process of compressing air generates condensate as the air cools in the pipes and air dryers.

Condensate is a mixture of oil (lubricant) and water with particles that have been concentrated during the compression process. Historically, lubricants had a lower density versus water, and floated to the water surface much quicker than current lubricants do. Oil/water separators that were developed to work on this gravity type separation were suitable for old-style lubricants however are not as effective for newer synthetic lubricants.

To improve the operating standards of the pit top, IMC installed two condensate cleaners to replace the older style baffle plate separator. The cleaners use a proprietary adsorbent and polypropylene filter elements to separate all compressor lubricants without the need for condensate storage tanks or settling chambers.

The units were installed and commissioned in June 2021.

<sup>9</sup> Upgrade of the No. 4 stockpile pad commenced in FY20 and was completed in FY21.



**Plate 1: JORC™ Condensate Oil/Water Separators**

#### **4.4.2 Appin West Recirculation System**

Water pump-out capacity from the mine is roughly balanced with its water use and water make. With underground water storages reaching the ~90% capacity threshold in September 2020, the freeboard available to provide surge capacity for large rain events or pumping infrastructure failure was limited. Given the reduced underground storage capacity, any increase in the water balance may have resulted in production delays.

To overcome this production risk, IMC identified that recirculating water from the underground storage areas to the surface, treating it with sodium hypochlorite (disinfection) and supplying it back underground for use along two longwall maingate roadwater supplies, would reduce the reliance on the AW (Appin West) Water Treatment Plant (WTP) by 1.5 ML/day. This would allow the AW WTP to shift the focus to dewatering, and reducing the water storage levels underground, thus reducing risk to production.

This required the installation of a sodium hypochlorite dosing system on the Appin West surface, with the associated pipework to feed water into the existing process water tanks, ready for underground use, as shown in Plate 2.

This work was completed and commissioned in November 2020.



**Plate 2: Recirculation Line Dosing System**

#### **4.4.3 Appin West Warehouse Upgrades**

As part of an ongoing initiative to improve environmental standards with respect to chemical and hazardous goods storage, IMC modified and improved its dry-chemical and hazardous liquids storage areas throughout FY21.

This included the erection of 650 m<sup>2</sup> of undercover storage area in March, to protect dry chemicals from the elements (Plate 3), and the installation of a 20” self-bunded storage container in April, dedicated to hydrocarbon storage (Plate 4).



**Plate 3: Undercover Storage Area**



**Plate 4: Self-Bunded Storage Container**

#### **4.4.4 Water Treatment Plants**

##### **4.4.4.1 Appin North Permanent WTP**

In FY20 IMC committed to the construction of an ultrafiltration WTP at Appin North to allow for the treatment of groundwater pumped to the surface from Area 5, in addition to water from the CWEA underdrainage. The treated water will be directly discharged to Brennans Creek as permeate via LDP 40.

Construction of the WTP began in December 2020 with civil works and the pipeline installation from the WTP to the discharge location. This included the construction of a below ground ~2km pipeline along the Dam Road to the discharge location. Bulk earthworks commenced in March 2021 with concrete slabs being poured in April. Civil works continued to the end of June 2021, with major mechanical works, including the placement of brine tanks and mechanical equipment installation commencing in July 2021. The placement of water treatment tanks and state of construction as of August 2021 can be seen in Plate 5.



**Plate 5: Appin North WTP construction as at August 2021**

COVID 19 restrictions caused delays to equipment supply, contractor availability and construction activities during FY21. A variation to amend the date for completion from March 2021 to November 2021 was submitted to and approved by the Environment Protection Authority (EPA).

A Temporary WTP was commissioned in FY21. Details of the Temporary WTP construction are detailed in Section 4.4.4.2.

#### **4.4.4.2 Appin North Temporary WTP**

In FY21 IMC constructed a temporary WTP to allow for the treatment of groundwater pumped to the surface from Area 5. The treated groundwater is discharged to Brennans Creek as permeate via LDP 40.

This WTP was built to offset delays associated with the construction of the permanent WTP. Details on the construction of the permanent WTP are provided in Section 4.4.4.1.

Civil works for the Temporary WTP commenced in December 2020, with mechanical and electrical fittings commencing in February and March 2021 respectively. Commissioning commenced in April 2021 with the plant becoming operational on 27 May 2021. The temporary WTP is shown in Plate 6.



**Plate 6: Appin North Temporary WTP**

#### **4.4.4.3 Appin West WTP**

As reported in FY20, the EPA issued IMC with a Notice of Variation to EPL 2504 in March 2020. The EPA attached Special Condition E1.1 to the EPL, requiring the installation and operation of a water treatment plant at Appin North, and amplification of the Appin West water treatment plant to meet revised water quality concentration limits. The EPA specified concentration values that the WTPs must be designed to meet.

Throughout FY21, IMC conducted a range of blending trials to determine how to maximise the discharge of treated waters through LDP 24, to determine if blending with backwash waters could be achieved and still meet the revised water quality limits, and avoid amplification of the existing WTP. Trial results were communicated to the EPA to determine practical and achievable water quality concentration limits. Plant operation was amended in May 2021. The revised water quality limits for LDP 24 were achieved from May 2021, ahead of the required compliance date of 31 July 2021.

Details on the performance of the trials and the AW WTP during FY21 in discussed in Section 6.3.2

#### **4.4.5 Minor Improvement Projects**

Other improvement projects progressed throughout the FY include:

- EQUIS Environmental Data Management System

During the reporting period the new environmental data management system 'EQUIS' continued to be rolled out across IMC. The system allows for upload of field and laboratory data to the Cloud where it is assessed against various action levels and available to relevant users. Any result exceedances are automatically communicated to required stakeholders. This allows for early identification of trends or exceedance limits and appropriate reporting. The system also includes dashboard overviews of key data to provide a powerful visual tool



for users to easily monitor and respond to relevant results. The FY22 reporting period will see the EPL 14-day Report published through EQUiS.

- Appin North

- Upgrade of the Appin North bulk coal winder – planning was ongoing in FY21. Expected completion in FY23.
- Upgrade of the No. 4 stockpile pad to deliver geotechnical and environmental improvements - commenced in FY20 and completed in FY21. This includes the reconstruction of Pond 5 to improve capacity and operation.
- Pond 4a sediment clean out occurred in FY21.

Installation of the Appin North Gas Drainage Plant was planned to commence in FY21 for completion in FY22. However, at this point has not been progressed as it requires additional planning.

- Appin West

- IMC had identified some damage to the LDP 24 discharge line, between the LDP 24 monitoring location, and the end-of-pipe discharge point into Sandy Creek. The cracked pipe resulted in water damage to the bitumen in the carpark. The crack was located, the pipe was relined, and bitumen repaired in May 2021.
- As previously reported during the FY20 reporting period, IMC identified that the existing permeate tanks for IMS 1 and IMS 2a did not provide sufficient storage capacity if the AW WTP was offline. Additionally, the tanks were aging and required repairs.

The tank foundations commenced in November 2019, and tank construction progressed through the early part of 2020. At the completion of FY20, the tanks and pipework had been installed and the supply from the AW WTP connected. Commissioning of the system was completed in January 2021 and the tanks are now fully operational.

- Appin East

- During the reporting year, IMC located the source of two water leaks on the pit top. Both leaks were from lines that provide potable water (Sydney water) to the operations.
  - One of the lines, a leak in the bathhouse supply, was identified through water damage in the eastern carpark, and was located in March 2021. Small excavation works were required, and the issue rectified in June.
  - The second leak, in the pit top fire-line, was identified in June 2021 and is planned for repair in August 2021.
- Rail infrastructure replacement works were completed around the 'dolly-cart'. The age of the equipment led to some structural failures associated with the rail tracks, and these works were planned to coincide with the replacement of the drift winder cable. These works were completed in May 2021.
- Civil works were completed in March 2021 to construct some ballast storage bins to improve fugitive dust control/management and housekeeping.
- Civil works were completed in May 2021 to recontour 150 m of retaining wall around the coal stockpile area. The work increased stability and improved erosion and sedimentation control.
- IMC installed a STORM™ settling rate monitor in FY21. The STORM™ will be used to control the automatic dosing of both flocculant and coagulant into surface water directed to the Main Dam on the pit top. The installation of the STORM unit will allow for automated and variable dosing rates to accommodate for fluctuations in surface water



flow rate and changes in water quality. The unit is currently being commissioned and is expected to be fully operational in FY22.

- IMC identified increased vibration on Fan #3 duct work, caused by the failure of a portion of the weld, which was allowing the duct work to oscillate horizontally (approximately 10-20 mm). Repairs were undertaken as soon as practicable in June 2021, to ensure propagation of the crack would not occur and result in failure of the vent fan. More information on noise performance and the results of investigations into noise at this location is provided in Section 6.8.
- Appin Mine Ventilation and Access Project (AVMA)
  - Pre-feasibility studies and environmental assessments for the AVMA project were completed in FY21.
  - IMC are proposing to construct mine ventilation and access facilities at 345 Menangle Road, Menangle. The proposed ventilation shafts are known as Ventilation Shaft No. 7 (a downcast shaft that draws air into the mine) and Ventilation No. 8 (an upcast shaft that draws air out of the mine).
  - The proposed mine access infrastructure will support access to the mine for some of the IMC workforce and supplies. No coal handling infrastructure is proposed.
  - Community consultation was undertaken during the reporting period.
  - The modification application (MOD 3) to PA 08\_0150 was submitted to DPIE in July 2021.
- New air quality monitor installed at Ventilation Shaft 6
  - Following a review of air quality monitoring at Ventilation Shaft 6 in FY20, IMC installed a real-time air quality monitor at the site to measure impacts to air quality from the ventilation shaft, and to assist in air quality complaint or event investigations. The unit was installed and became operational in April 2021.

## **4.5 Land Preparation**

### **4.5.1 Mine Safety Gas Drainage**

There were no land preparation works relating to Mine Safety Gas Drainage during the FY21 reporting period.

### **4.5.2 Emplacement Operations**

The following works were undertaken during the reporting period:

- establishing growth medium for ~3 ha and seeding of ~2.5 ha in Stage 3; and
- continued deposition of coal wash.

The rehabilitated emplacement areas were inspected regularly to assess the progress and effectiveness of the rehabilitation. The monitoring program consists of quarterly inspections undertaken by an IMC Environmental representative, which are supplemented by an extensive annual monitoring program. The annual monitoring program was undertaken in Spring FY21. The report is provided in Appendix A: Annual Emplacement Rehabilitation Report.





## 4.6 Exploration

During the reporting period, 12 standard coal exploration boreholes were drilled in the Appin area. One of these holes (S2499) was drilled in the previous period but omitted from that report. Given that final rehabilitation occurred during the current period, it has been captured in the total of 12 boreholes in the current period. In addition to the twelve standard exploration holes, there were also three wedges drilled during the current reporting period; two from parent exploration holes in this reporting period, and the third from a parent hole that was reported on in the previous period.

Regarding these exploration holes:

- four were drilled in EL8972;
- three were drilled in EL4470;
- two were drilled in A248, including one of these with a wedge; and
- three were drilled in A396 (including one of these with a wedge, plus an additional wedge from a parent hole which was drilled and captured in the previous reporting period).

The holes drilled in EL8972, EL4470 and A248 are all situated to the north/north-west of CCL 767. The holes drilled under A396 correspond with the location of CCL 767.

Fifteen additional holes were also drilled in the Appin area for mining/approvals related purposes. These included four surface to in-seam (STIS) holes, eight holes for vent shaft investigations of varying depths and scopes, one steep slope geotechnical monitoring hole and two groundwater monitoring holes. All of these holes were drilled within the boundaries of CCL 767 with the exception of one STIS hole (S2507) that was drilled from A248/ML 1698 towards planned Appin mining operations.

Figure 2 shows the location of FY21 boreholes drilled in the Appin area. Note that due to the close spatial proximity of many of the mining/approvals related holes, there is a cluster of holes on this image that are indistinguishable from one another at the scale presented.

All of the exploration borehole sites were subject to a Review of Environmental Factors (REF), with the exception of some of the mining related holes conducted under the mining lease MOP. Landholder negotiations and access agreements were established prior to any exploration activity occurring.

Exploration site rehabilitation objectives are agreed with the landowner prior to works commencing. They are guided by the stipulations in the REF document and associated activity approvals prepared for each exploration campaign. Landholder approval of South32 IMC rehabilitation activities (via the ESF2 form) is sought for all exploration occurring across the wider Appin exploration domain. Of the drilling occurring in this reporting period, landholder approved rehabilitation is complete for three of the 12 exploration sites. Five of the sites are rehabilitated but require landholder sign-off and four are currently awaiting demobilisation or have rehabilitation in progress. The additional site containing the wedge drilled from the parent hole captured under last year's report, has also been rehabilitated but contains a standpipe on site that will require ongoing piezometer monitoring. This will undergo final remediation when monitoring is no longer required, usually once nearby mining has occurred.

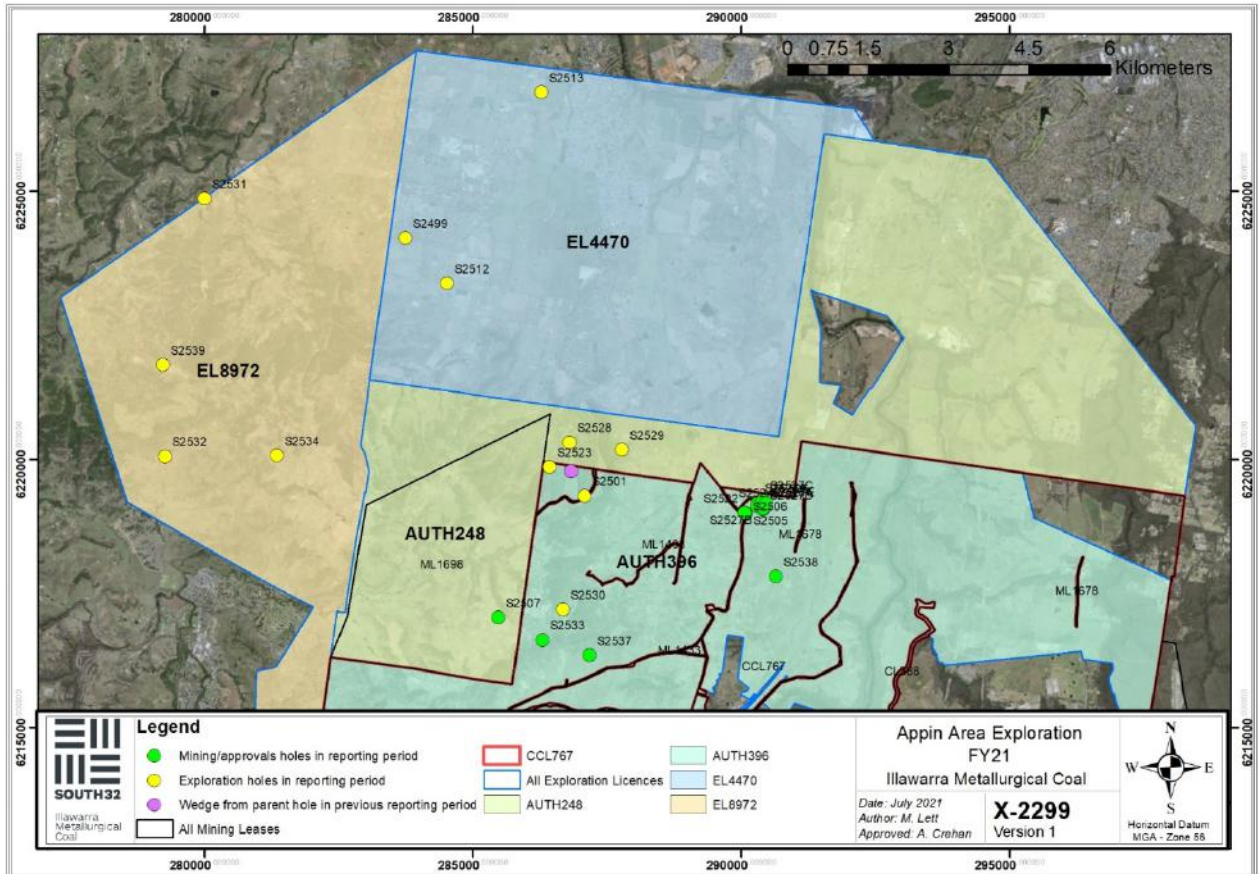


Figure 2: FY21 Exploration, Appin Area

## 5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Activities identified by IMC in the FY20 Annual Review to be completed in the FY21 reporting period are shown in Table 12.

No actions were identified by regulatory agencies relating to the FY20 Annual Review.

Table 12: Actions from Previous Annual Review

Action Required	Requested by	Where covered in this Annual Review
1. Upgrade of No. 4 stockpile pad completion	IMC	Section 4.4.5
2. Commissioning of Appin West Surface Water Tanks, and upgrades to underground piping infrastructure	IMC	Section 4.4.5
3. Construction of the Appin North Water Treatment Plant and improvements to the Appin West Water Treatment Plant	IMC	Section 4.4.3
4. Upgrade of Appin North bulk coal winder to commence	IMC	Section 4.4.5
5. Installation of Appin North Gas Drainage Plant	IMC	Section 4.4.5
6. Completion of Appin East surface water dosing automation	IMC	Section 4.4.5



7. Appin West LDP 23 filter modules routine maintenance	IMC	Section 6.3.2
8. Ventilation Shaft 6 weed management activities will be ongoing	IMC	Section 6.5.2
9. Appin Area 7 continuation of Longwall 708B	IMC	Section 6.14
10. Appin North legacy goaves methane extraction feasibility study completion	IMC	Section 6.17.4
11. Water balance study Stage 2 completion	IMC	Section 8.2
12. BCD LDP 10 and LDP 13 discharge valves will be replaced	IMC	Section 12.3
13. Continuation of exploration in Areas 7 and 9	IMC	Section 4.6
14. Commencement of exploration in EL 8972, CCL 767 (A396), A248, and EL 4470	IMC	Section 4.6
15. Drilling of Priority 1 boreholes: six in EL 8972, two in CCL 767 (A396), three in A248, and one in EL 4470	IMC	Section 4.6
16. Drilling of Priority 2 boreholes: five in EL 8972	IMC	Section 4.6
17. Commencement of work to decommission WCCPP 8000 t product bins	IMC	Section 12.3
18. Switchyard upgrades at multiple sites and locations across Appin Mine	IMC	Section 12.3
19. Construction of a new coal wash haul road at Appin North	IMC	Section 6.19.3
20. Pre-feasibility studies of future ventilation infrastructure required to support Appin Mine underground operations	IMC	Section 4.4.5
21. Upgrades to Appin East Diesel Underground Storage Tank	IMC	Section 6.4.1
22. Commence monitoring under the Georges River Aquatic Health Program	IMC	Section 6.3.3.312.4
23. Continue <i>Persoonia hirsuta</i> Research Program and submit final research report to the Department of Agriculture, Water and the Environment (DAWE)	IMC	Section 6.5.2.2
24. Progress approvals, planning and environmental assessments required to undertake the work described in the GRRP	IMC	Section 6.14.3
25. Continue to progress the current phase of the decarbonisation program	IMC	Section 6.17.4
26. Implement improvements from Air Quality Monitoring Plan Review (pending capital available)	IMC	Section 6.1



## **6. ENVIRONMENTAL PERFORMANCE**

### **6.1 Air Pollution**

#### **6.1.1 *Environmental Management***

Air quality is managed in accordance with the Appin Mine Air Quality, Greenhouse Gas and Energy Management Plan (AQMP), which details the air quality and emissions control measures for the project, compliance procedures, monitoring programs, evaluation protocols, notification and communication processes.

The AQMP was prepared to comply with the intent and requirements of Condition 12 of Schedule 4 of the Project Approval.

The AQMP incorporates:

- Collection and measurement of dust samples from strategically placed dust deposition gauges (DDGs) at representative sites:
  - The AQMP was amended in November 2020 to remove the use of DDGs from the air quality monitoring program. The revised AQMP was approved in December 2020 by DPIE. An application to vary EPL 2504 was submitted to the EPA, which was approved through a licence variation in January 2021. The DDGs were decommissioned at the end of January 2021.
- Use of real-time air quality monitors: fixed and portable Optical Photometers.
- Use of a High Volume Air Sampler (HVAS) to determine compliance with air quality criteria:
  - Similarly to the DDGs, amendments to the AQMP and EPL 2504 removed the requirement to use the HVAS. Further details are provided in Section 6.1.2.
- Visual inspections and audits.

Details of air quality monitoring locations for Appin Mine are provided in Table 13.



**Table 13: Appin Mine Air Quality Monitoring Sites and their Function**

Site ID	Location	Parameter	Measurement Method	Frequency?	Function
AE-DD14	SE zone of Stockpile Area at property Boundary	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at SE corner of Stockpile at property boundary Operational Control - Stockpile and internal roadway dust control measures performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AE-DD15	NE zone of stockpile area	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NW corner of Appin East pit top property boundary Amenity goal reference Operational Control - Site dust control performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AE-DD16	NW property boundary of pit top facility	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NW corner of Appin East pit top property boundary Amenity goal reference Operational Control - Site dust control performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AE-DD17	NE corner of pit top property boundary and coal stockpile vehicle entry/exit point	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NE corner of Appin East pit top property boundary Amenity goal reference Operational Control - Stockpile and public road dust control measures performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AE-DD18	SW zone of Stockpile Area	Particulate Matter – g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at SE corner of Stockpile Operational Control - Stockpile and internal roadway dust control measures performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AE-PF1	NE corner of pit top property boundary – coal stockpile vehicle entry/exit point	Particulate Matter: PM <sub>10</sub>	Real-time Photometer (fixed)	Continuous	Real-time monitoring of dust emissions at the coal stockpile area truck entry/exit point onto public roads Real-time Operational Control – Stockpile, internal roads and public road dust control measures performance reference monitor
AE-PF3	NW corner of Appin East pit top boundary between nearest residential receivers <sup>10</sup>	Particulate Matter: PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>4</sub> , PM <sub>10</sub>	Real-time Photometer (fixed)	Continuous	Amenity goal reference Real Time Operational Control Site dust control performance reference
AE-HV1	NW corner of Appin East pit top boundary between nearest residential receivers	Particulate Matter - PM <sub>10</sub> and TSP monitor	High Volume Air Sampler	As Required	Amenity goal reference Review against land acquisition levels Real Time Operational Control Site dust control performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AW-DD1	Appin West pit top – adjacent mine access road, employee car park and EDL power plant	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at Appin West pit top Operational Control – Site and road dust control measures performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
AW-DD2	Appin West property boundary at Mine Entrance Point off Douglas Park Drive	Particulate Matter g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at the Appin West Mine Gate Entrance Point and the public road Amenity goal reference Operational Control – Site and mine access road dust control measures performance reference
	<b>DECOMMISSIONED JANUARY 2021</b>				
W-DD1	Appin North southern property boundary at the Wedderburn Rd and-Appin Rd junction	Particulate Matter – g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at the Wedderburn Rd and-Appin Rd junction

<sup>10</sup> Relocated to NW corner of Appin East pit top on the southern end of the helipad in June 2021.



**Table 13: Appin Mine Air Quality Monitoring Sites and their Function**

Site ID	Location	Parameter	Measurement Method	Frequency?	Function
<b>DECOMMISSIONED JANUARY 2021</b>					Operational Control – Mine entrance road and coal truck dust control measures performance reference Amenity goal reference
W-DD3	Appin North pit-top south site	Particulate Matter – g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Operational Control – Site dust control performance reference for the Appin North pit-top south site
<b>DECOMMISSIONED JANUARY 2021</b>					
W-DD8	Brennans Creek Dam	Particulate Matter – g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Operational Control – Site dust control performance reference. Indicator for dust deposition rates between the emplacement area activities and the nearest Appin township residential area Baseline and historical dust deposition trends related to the expansion of the emplacement area north towards the nearest residential receivers. Amenity goal reference
<b>DECOMMISSIONED JANUARY 2021</b>					
W-DD10	Appin North property boundary between the product stockpiles adjacent to Wedderburn Road and the Dharawal State Conservation Area boundary	Particulate Matter – g/m <sup>2</sup> /month Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Site dust control performance reference for product stockpiles and Wedderburn Road coal truck transport corridor.
<b>DECOMMISSIONED JANUARY 2021</b>					
W-PF1	Appin North southern property boundary at the Wedderburn and Appin Road intersection	Particulate Matter: PM <sub>10</sub>	Real-time Photometer (Fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the Wedderburn Road and Appin Road intersection. Real-time Operational Control – Roadway dust emissions.
VS6-PF1 <sup>11</sup>	Ventilation Shaft 6	Particulate Matter: PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>4</sub> , PM <sub>10</sub>	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of particulate matter at the Ventilation Shaft 6 site (from the ventilation shaft, Hume Highway and other ambient sources). Long term trends and general amenity. Not used for assessment of compliance.

<sup>11</sup> A hire unit was utilised at this location from April 2020 to May 2021. The permanent unit was installed in May 2021.



## 6.1.2 **Environmental Performance**

Results of air quality monitoring are reported online every 14 days, in accordance with Section 66 (6) of the *Protection of the Environment Operations (POEO) Act*, and Condition 11 of Schedule 6 of the Project Approval; and on an annual basis to the EPA via the EPA Annual Return (Appendix B: 2020/21 EPA Annual Return for EPL 2504) and in the Annual Review. The online report is available on the South32 website: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

A comprehensive summary of all air monitoring results for Appin Mine is provided in this section. Graphs of long-term trends are provided in Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs.

IMC decommissioned the DDGs and HVAS in January 2021. Both dust assessment techniques are limited in that they can only provide historical time-averaged data. Instead, IMC will use the monitoring results from the optical photometers for comparison with health and amenity criteria. The photometers will continue to provide real-time monitoring results which can be easily correlated with site operations and wind direction.

### 6.1.2.1 **Dust Deposition Gauge Monitoring**

A network of dust deposition gauges (DDGs) have been utilised at Appin Mine (installed over the period of 2012 – 2014). The DDGs are classified as operational (i.e. located adjacent to areas from which dust will potentially be generated to determine site performance) and non-operational (located near the property boundary to indicate potential impacts on sensitive receivers and used as an amenity goal reference).

The DDGs have provided a long-term baseline of deposition in the area however do not feed into dust control actions or provide timely information regarding air quality conditions at a fine time scale. The existing data set from the site did not indicate that any of the operational sites or activities at Appin Mine were a cause for concern for particulate exposure to residents in the area.

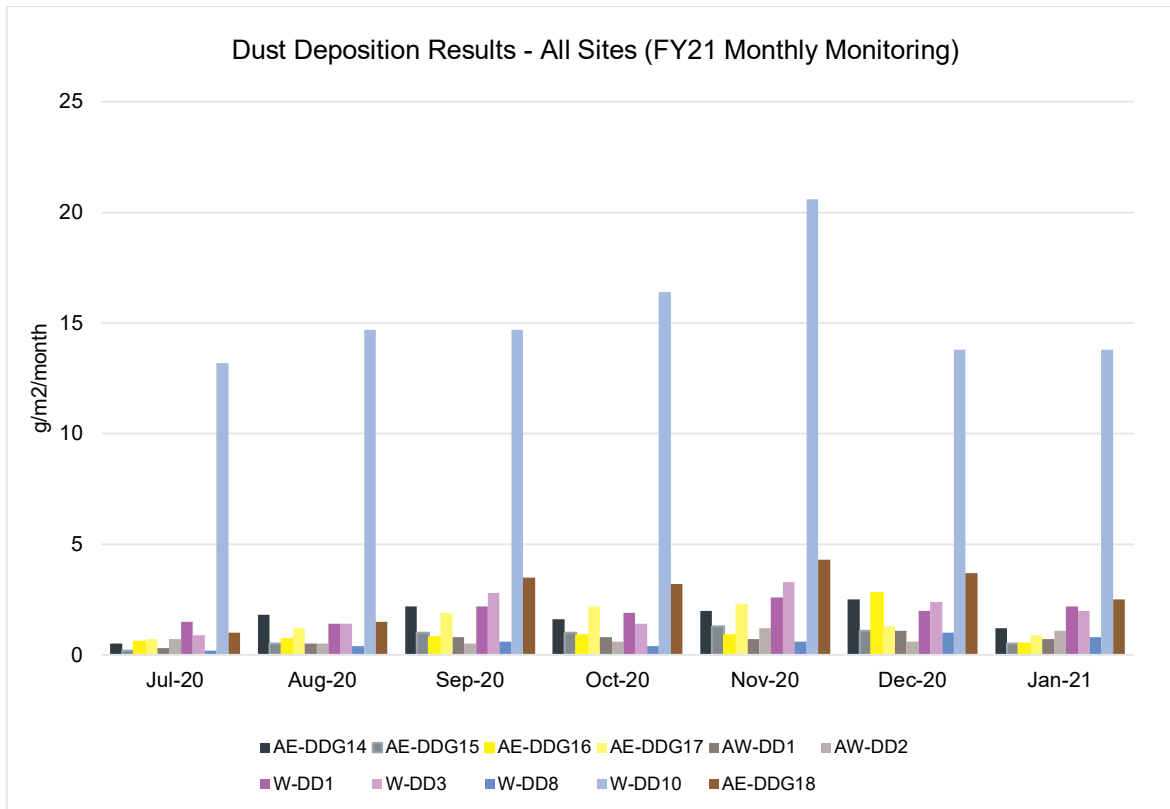
The network of DDGs was decommissioned in January 2021.

The Appin West, Appin East, and Appin North sites' non-operational gauges had a long-term criteria/amenity goal of 4 g/m<sup>2</sup>/month for deposited dust during the reporting period. Elevated dust deposition was recorded at some sites during FY21 (see Figure 3). The increase was seen at several sites, indicating that external weather impacts on the project were observed.

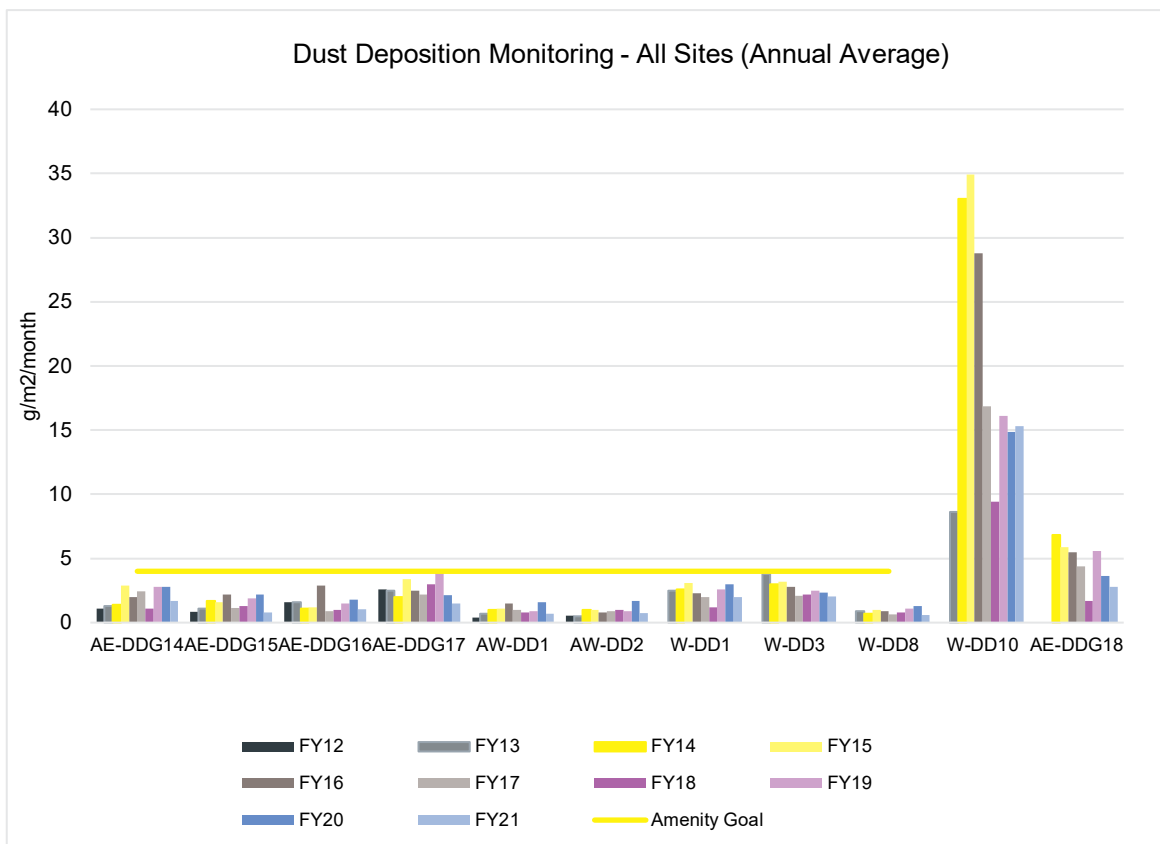
Long-term trends are consistent across all sites. Compliance with the long-term criteria for deposited dust was achieved at all non-operational gauges.

W-DD10 and AE-DDG18 are operational gauges located within the mine site (i.e. on operational land). These gauges provide an indication of effectiveness of the sites dust control measures, and the long-term criteria for deposited dust do not apply at these sites. The long-term trends are reasonably consistent across reporting periods, with an ongoing improvement evident.

Dust deposition monitoring results for FY12 to FY21 are shown in Figure 4.



**Figure 3: FY21 Monthly Monitoring for Insoluble Solids**



**Figure 4: Annual averages from FY12 to FY21 for insoluble solids**





### 6.1.2.2 **Real-time Monitoring**

The fixed optical photometer (AE-PF3) located at the Appin East Pit Top is used to provide an indication of compliance against both the long-term criteria and short-term criteria for particulate matter (as listed in Table 14 and Table 15).

The optical photometers; AE-PF1 (located at the coal haulage exit at Appin East), and W-PF1 (located adjacent to Wedderburn Road) are used to inform operational activities and are not used for assessment of compliance.

As described in the AQMP, alerts from these monitors are sent by text-message to the Environment Specialist when levels  $\geq 40 \mu\text{g}/\text{m}^3$  (greater than 80% of the  $\text{PM}_{10}$  criteria) are recorded, to enable the mobilisation of water trucks or road sweepers as required.

Throughout this reporting period, IMC relocated AE-PF3 and installed a fourth optical photometer (VS6-PF1).

AE-PF3 (previously on the Appin East property boundary) was relocated to the southern end of the helipad in June 2021. This allowed the monitor to be closer to the operational areas, at a suitable distance from public roads and with fewer obstructions between it and dust-generating activities. The relocation of the monitor was completed after the approval of the AQMP (2020) and the allocation of funding to facilitate the relocation process.

Optical photometer VS6-PF1 (located at Ventilation Shaft 6) was erected in May 2021 and is used to monitor particulate matter in the vicinity of Ventilation Shaft 6. Similarly to AE-PF1 and W-PF1, VS6-PF1 is not used for assessment of compliance. Data from VS6-PF1 will be made available to the Appin Mine Community Consultative Committee (ACCC) and community members on request and may be used to investigate complaints or events.

The locations of the optical photometers are shown on Plan 3 and Plan 9.

**Table 14: Fixed optical photometer long-term criteria**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Criterion</b>
Total suspended particulate (TSP) matter	Annual	$90 \mu\text{g}/\text{m}^3$
Particulate matter $< 10 \mu\text{g}$ ( $\text{PM}_{10}$ )	Annual	$30 \mu\text{g}/\text{m}^3$

**Table 15: Fixed optical photometer short-term criteria**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Criterion</b>
Particulate matter $< 10 \mu\text{g}$ ( $\text{PM}_{10}$ )	24 hour	$50 \mu\text{g}/\text{m}^3$

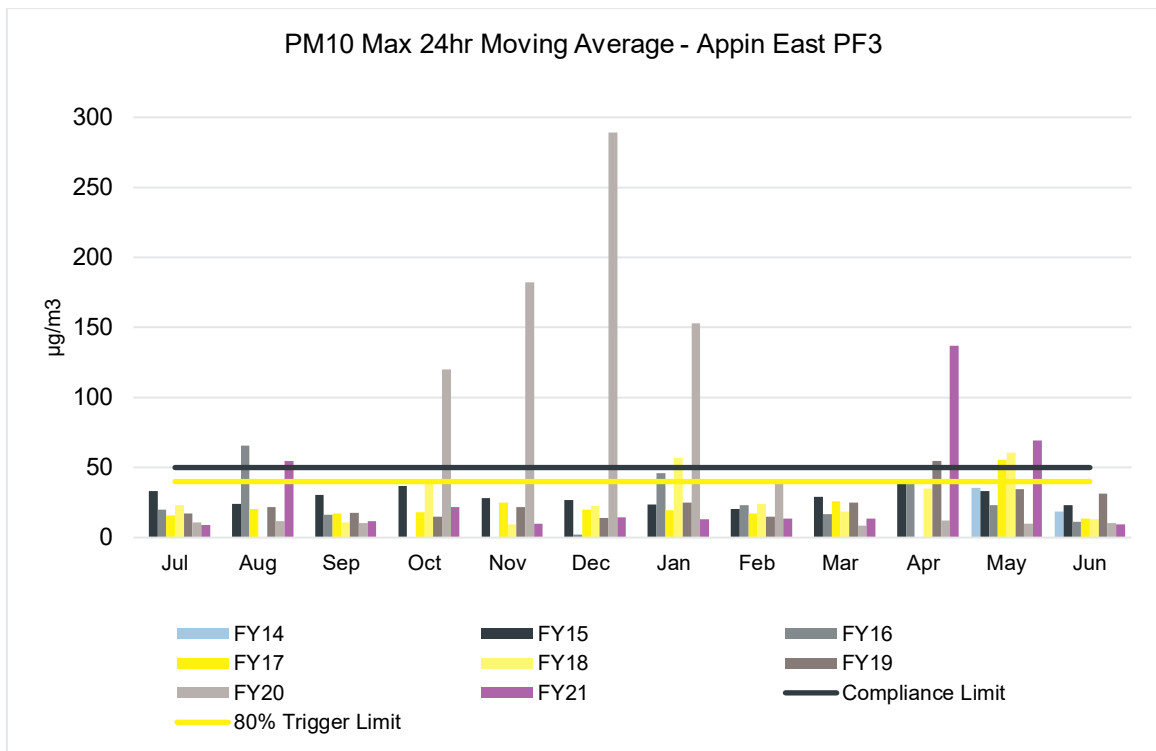
Three (3) exceedances against the short-term criteria were recorded at AE-PF3 during this reporting period, all of which are attributed to 'total impact', rather than 'incremental impact'. In all instances, IMC reviewed local (operational photometers) and regional air quality sources as a reference for high regional (not mine related) air quality comparisons.



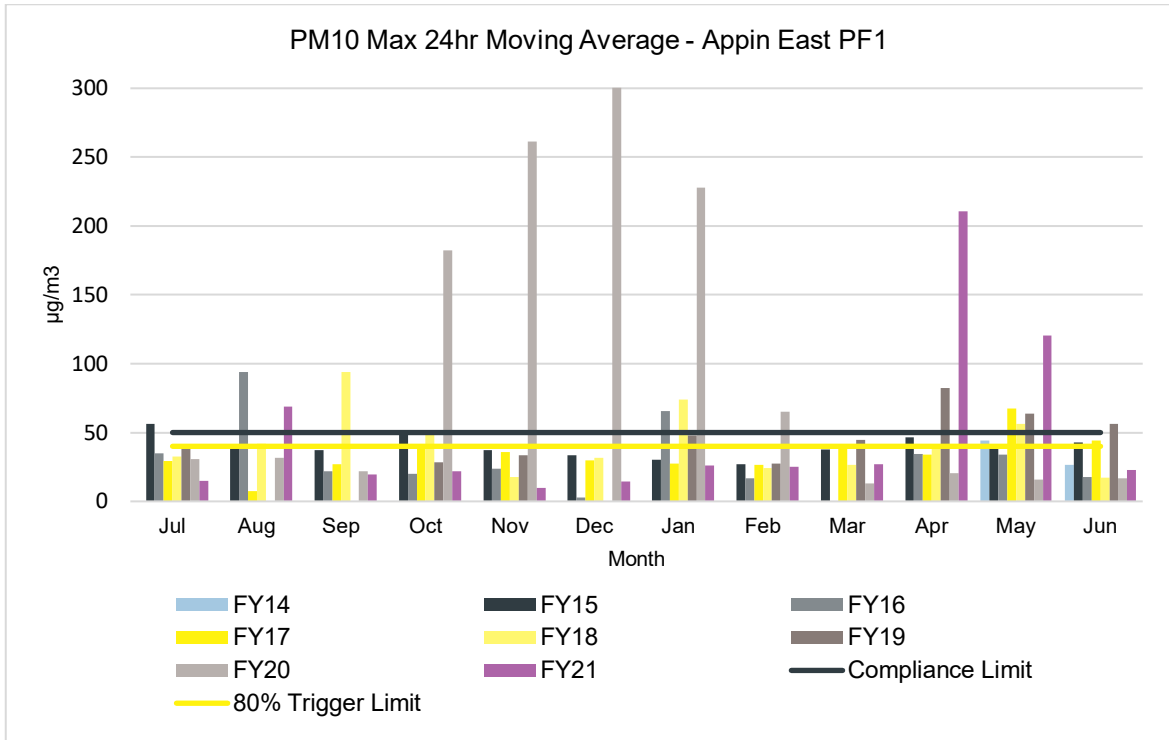
The data between the photometers and regional air quality for PM<sub>10</sub> correlated very well against the DPIE Regional Air Quality sites, supporting the assessment that the exceedances were not mine-related.

These events included severe weather (high winds in August), and hazard reduction burns (Avon Dam and Dharawal National Park across April and May). As a result of these extraordinary events, the HVAS was not run (when applicable).

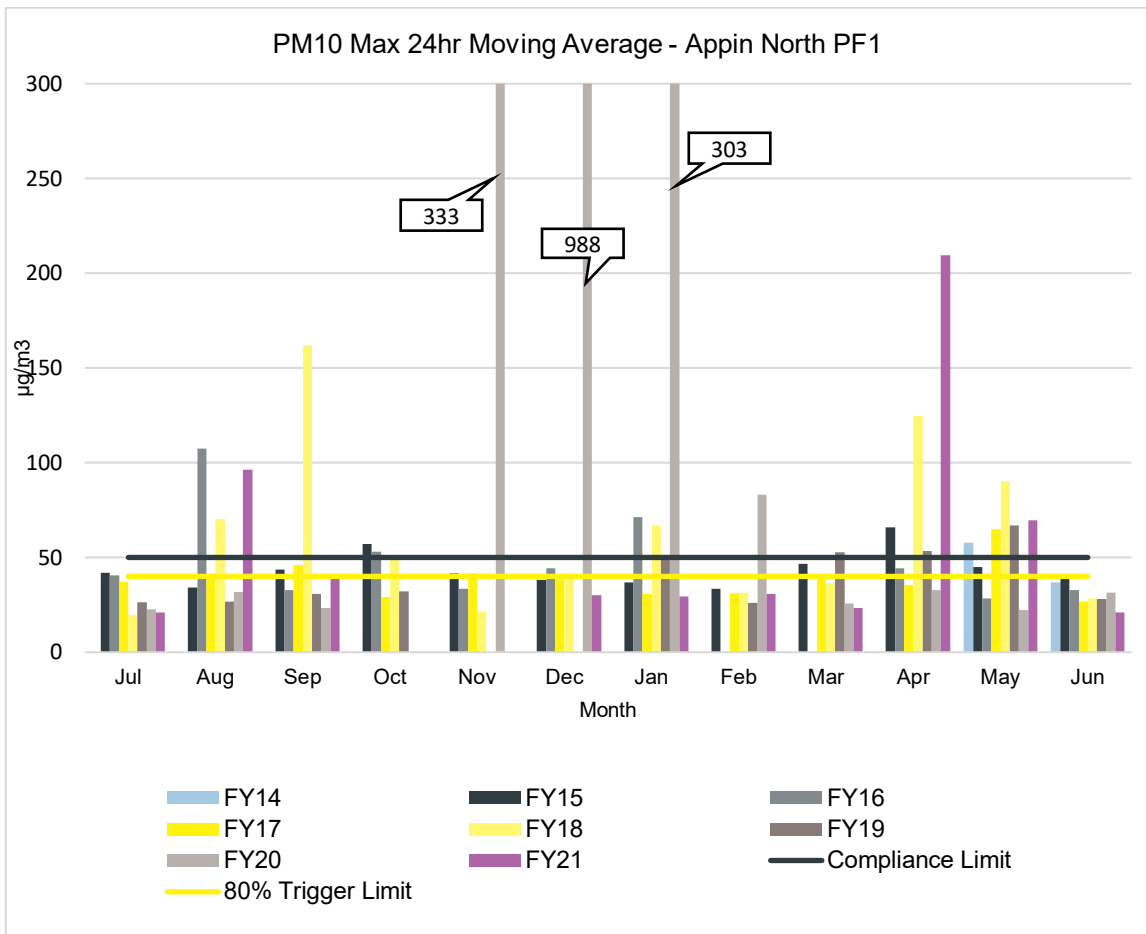
AE-PF1 at Appin East and W-PF1 at Appin North, also recorded exceedances over these months. Refer to Figure 5, Figure 6, Figure 7 and Figure 8 for maximum 24 hour moving averages for the photometers.



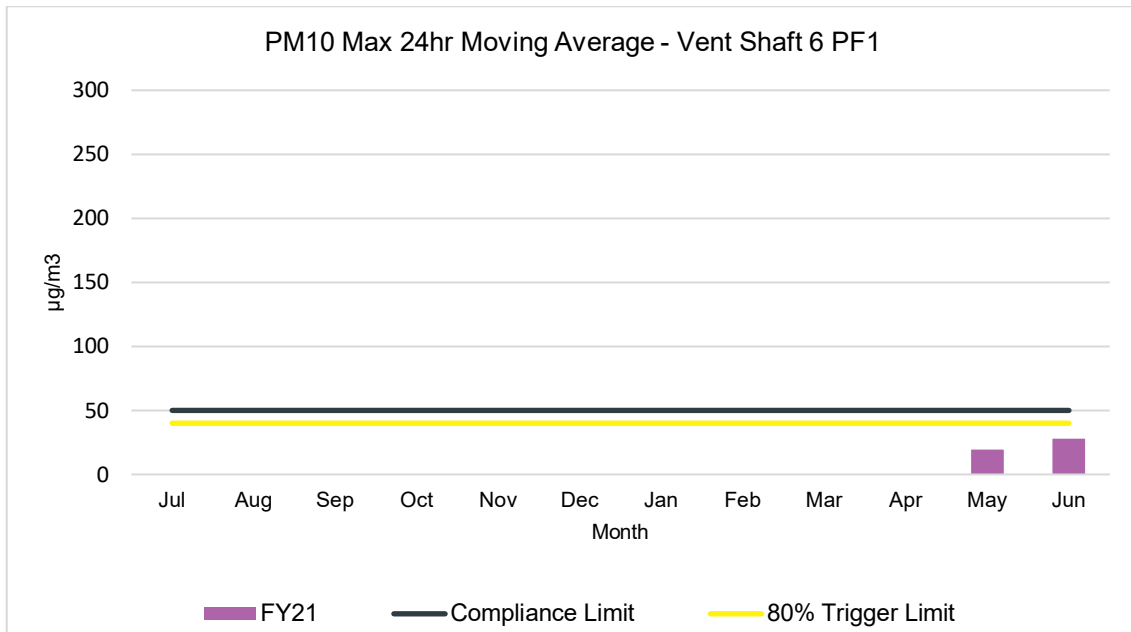
**Figure 5: PM<sub>10</sub> Maximum 24-hour Moving Average at Appin East PF3**



**Figure 6: PM<sub>10</sub> Maximum 24-hour Moving Average at Appin East PF1**



**Figure 7: PM<sub>10</sub> Maximum 24-hour Moving Average at Appin North PF1**



**Figure 8: PM<sub>10</sub> Maximum 24-hour Moving Average at Vent Shaft 6 PF1**

## 6.2 Erosion and Sediment

### 6.2.1 Environmental Management

Most activities at the Appin East, West, and North Pit Top sites are undertaken on relatively flat areas. Highly trafficked areas are generally sealed. There are minimal unsealed areas at all sites. Internal unsealed roads are maintained to prevent dust, primarily through dust suppression sprays and water cart application. Sediment fences are installed where required to filter sediment from drainage and/or seepage points.

Sediment is controlled by multiple techniques across the three sites, however the common practices include gravimetric separation using a series of dams and water treatment facilities. Water treatment techniques include flocculation to increase the rate that particles settle out of suspension. Discharged water is monitored for suspended solids in accordance with EPL 2504.

The water management system across Appin Mine is regularly inspected by the site environmental representatives to check that each system is operating as efficiently as possible.

#### 6.2.1.1 Appin West

IMC highlighted the trial of a dust suppressant during the FY20 reporting period. The suppressant, an emulsion of bitumen in water, is formulated to suppress dust on roads, hardstands and laydown areas in industrial environments such as mines, quarries and construction sites. The suppressant has continued to be utilised by the surface operations throughout the current reporting period. The product is used as a spray-on treatment and forms an impermeable seal so that roads and other dust-bearing surfaces are dust and mud free and functional in all weather conditions.

Areas that have the potential to be contaminated by surface operations at the Appin West Pit Top are contained within the catchment of the surface water dams, which are designed to capture and treat a 1:10 year, 72-hour rainfall event. The surface water dam contains a spillway designed for up to a 1:100-year rainfall event to maintain the engineering integrity of the structure and reduce the risk of erosion and sediment release (through LDP 25). Prior to the release of surface water from the surface water dam (via LDP 23 into Sandy Gully), water passes through a perlite filter (StormFilter®) unit which is designed to remove suspended solids, and insoluble oil and grease.



#### **6.2.1.2 Ventilation Shaft 6**

The majority of the Ventilation Shaft 6 site is either vegetated or sealed, therefore surface runoff no longer requires treatment under normal operating conditions.

Stormwater is directed to, and settled in the surface water basins, allowing for gravimetric separation, and discharged to Harris Creek via LDP 36. The surface water dam contains a spillway designed for up to a 1:100-year rainfall event to maintain the engineering integrity of the structure and reduce the risk of erosion and sediment release (through LDP 37).

#### **6.2.1.3 Appin East**

Appin East Pit Top utilises a series of surface water ponds capable of holding up to 22,000 kL of surface water. The surface water management is split into two dams. These earthen dams are used to capture, treat and recycle surface and stormwater runoff from the pit top.

Due to particle suspension of on-site dust and coal fines, surface and stormwater generated from pit-top runoff requires treatment prior to capture and storage in the surface dams. Surface water is dosed with a coagulant and flocculant prior to gravimetric separation, before passing through an overflow pipe into the main surface dam. Water from the main dam is used for dust suppression. Water can also be pumped into the sediment dam where it is drawn through the secondary-treatment system, the Dynasand filter, for discharge into the Georges River through LDP 19.

#### **6.2.1.4 Appin North**

The potential for erosion at the CWEA is managed in accordance with the CWEA Management Plan. The following activities are undertaken to minimise the likelihood of erosion within the CWEA:

- compaction of emplaced material;
- profiling of finished areas to designed gradients; and
- revegetation of the CWEA (once material is emplaced to meet design criteria).

Sediment is controlled by a series of sedimentation ponds, which have a combined capacity of ~200 ML. Water is treated at several locations across the site prior to transfer into BCD to comply with the water quality limits in EPL 2504.

### **6.2.2 Environmental Performance**

Routine water quality monitoring of Total Suspended Solids (TSS) across Appin Mine has not identified any issues associated with erosion and sedimentation. The Appin West, Appin East and Appin North sites are operating within the licence limits for TSS.

## **6.3 Surface Water**

### **6.3.1 Environmental Management**

Surface water management across Appin Mine is completed in accordance with EPL 2504 and the approved Appin Mine Water Management Plan (WMP). The WMP details the control measures, compliance procedures, monitoring programs, evaluation protocols, notification and communication processes for water management at Appin Mine. The plan has been prepared to satisfy Condition 16 of Schedule 4 of the Project Approval.

Specifics of the site water management systems are provided in WMP which is available on the South32 regulatory information website:

<https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.



## **6.3.2 Environmental Improvements**

### **6.3.2.1 Appin West**

The filter modules at LDP 23 are planned to undergo routine maintenance annually, taking place every July, including replacement of the filters and screens. Due to discharge volumes, and increased turbidity post-rainfall events, these filter modules were changed out twice in FY21.

In June 2021, IMC completed a service/clean of the silt trap in surface water Basin 1. This work is required biennially, especially after periods of highly turbid flows.

With the EPA issuing IMC with a Notice of Variation to EPL 2504 in March 2020, the Appin West WTP began investigating and initiating changes to the plants' operations in order to meet revised water quality concentration limits for LDP 24, which were expected to become live in July 2021. Over a period of four months, IMC completed a series of blending trials, plant changes, sampling technique changes, and chemistry analysis to achieve an optimal plant design capable of complying with the new limits. These changes are live and are evident in the water quality results from May 2021.

All oily water separators undergo quarterly routine servicing, including complete cleaning and change out of the coalescing and baffle plates (passive separators) if damaged, and annual servicing and sleeve replacement of the centrifugal (active) separator.

### **6.3.2.2 Appin East**

Appin East utilises a coagulant and flocculant dosing system to treat surface water runoff entering the pit top dams prior to controlled-discharge into the environment. As detailed last reporting period, upgrades were made to the system to allow for automated and variable dosing rates to accommodate for fluctuations in surface water flow rate and changes in water quality. Commissioning, which took place throughout the FY21 reporting period, identified air supply and silt buildup issues. The upgrades have been delayed and are still in commissioning phase. It is expected that the upgrades will be completed in early FY22.

The silt trap/dosing pit associated with the main surface water dam underwent routine maintenance during this reporting period, including silt removal.

The first flush system has undergone routine maintenance and cleaning to ensure the system is fully operational. The Dynasands filtration system was inspected and required no servicing.

All oily water separators undergo quarterly routine servicing, including complete cleaning and change out of the coalescing and baffle plates (passive separators) if damaged.

As noted in Section 4.4.1, IMC installed two condensate cleaners to replace the older style baffle plate separator for the compressor condensate.

### **6.3.2.3 Appin North**

Inspections of Brennans Creek Dam (BCD) are being conducted regularly by IMC. Surveillance reports are prepared every five years by the consultant geotechnical engineer. The latest report was submitted to the Dams Safety Committee in March 2017, with the next one scheduled for FY22.

The temporary WTP was commissioned in FY21 with a permanent WTP to be completed in FY22. The WTPs will improve the overall water quality entering Brennans Creek as detailed in Section 4.4.4.

Further improvements at Appin North under the Georges River Aquatic Health Monitoring Program are discussed in Section 6.3.3.3.

Surface run-off associated with the CWEA is managed as detailed in the approved CWEA Management Plan which is available on the South32 website.



### **6.3.3 Environmental Performance**

Results of surface water monitoring are reported on the South32 website every 14 days as per the requirements of Section 66(6) of the *POEO Act* and Condition 11 of Schedule 6 of the Project Approval; and on an annual basis to the EPA via the Annual Return (see Appendix B: 2020/21 EPA Annual Return for EPL 2504) and in the Annual Review. The online report is accessible at this link: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

A summary of results from the Appin Mine monitoring program is included in Table 16.

#### **6.3.3.1 Water Quality**

Compliance with water quality limits in Condition L2 of EPL 2504 was achieved across most monitoring sites at Appin Mine during the reporting period. There were no non-compliances recorded over the reporting period, however there was one biochemical oxygen demand (BOD) exceedance at both LDP 38 and LDP 4 during the reporting period. These exceedances are discussed in Table 16, and Section 11.

The trends for discharge water quality remain relatively consistent over the life of the operation.

#### **6.3.3.2 Water Discharge**

There was one (1) non-compliance with the EPL 2504 discharge volume limits over the reporting period (see Table 17).

An exceedance of the allowable discharge volume (80 kL/day) was recorded at LDP 38 on 31 July and 1 August 2020. The discharge volumes were 106.6 and 105.8 kL/day respectively. The cause of the volume limit exceedance was related to recent changes in the irrigation system logic. When uploading the new logic, the new lines of code changed "counter" reference numbers related to the volume control relay. Subsequently, the programmable logic control did not count the volume discharged per day, leading to continuous discharge of sewage effluent.

The overall trends for discharge volumes are relatively consistent over the life of the operation, taking into account the influence of rainfall. The volume of water discharged through LDP 24 increased during the reporting period, with an apparent trend change in November, when the plant shifted its emphasis on pit dewatering (see Table 17).

Graphs of long-term trends for water quality and discharge are provided in Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs.



**Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine**

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																										
<b>BOD</b>	No exceedances of the BOD 100 <sup>th</sup> percentile water quality criteria of 50 mg/L were recorded during the reporting period.	There was one exceedance of the 50-percentile limit (30 mg/L) during the reporting period that resulted from an excessive amount of soap being introduced into the plant from the bathhouse. The exceeding result was 38 mg/L.	<p style="text-align: center;">Point 4 - Biochemical Oxygen Demand</p> <table border="1"> <caption>Point 4 - Biochemical Oxygen Demand Data</caption> <thead> <tr> <th>Month</th> <th>Biochemical Oxygen Demand (mg/L)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>38</td></tr> <tr><td>Aug</td><td>8</td></tr> <tr><td>Sep</td><td>2</td></tr> <tr><td>Oct</td><td>6</td></tr> <tr><td>Nov</td><td>10</td></tr> <tr><td>Dec</td><td>18</td></tr> <tr><td>Jan</td><td>4</td></tr> <tr><td>Feb</td><td>14</td></tr> <tr><td>Mar</td><td>2</td></tr> <tr><td>Apr</td><td>3</td></tr> <tr><td>May</td><td>7</td></tr> <tr><td>Jun</td><td>3</td></tr> </tbody> </table>	Month	Biochemical Oxygen Demand (mg/L)	Jul	38	Aug	8	Sep	2	Oct	6	Nov	10	Dec	18	Jan	4	Feb	14	Mar	2	Apr	3	May	7	Jun	3
Month	Biochemical Oxygen Demand (mg/L)																												
Jul	38																												
Aug	8																												
Sep	2																												
Oct	6																												
Nov	10																												
Dec	18																												
Jan	4																												
Feb	14																												
Mar	2																												
Apr	3																												
May	7																												
Jun	3																												
Point 3/4	Yes	<p><b>pH</b></p> <p>All samples returned a pH result within the 50-percentile limit for FY21. The average pH was 8.05.</p>	<p style="text-align: center;">Point 4 - pH</p> <table border="1"> <caption>Point 4 - pH Data</caption> <thead> <tr> <th>Month</th> <th>pH</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>8.0</td></tr> <tr><td>Aug</td><td>7.8</td></tr> <tr><td>Sep</td><td>8.0</td></tr> <tr><td>Oct</td><td>7.9</td></tr> <tr><td>Nov</td><td>7.9</td></tr> <tr><td>Dec</td><td>7.9</td></tr> <tr><td>Jan</td><td>7.8</td></tr> <tr><td>Feb</td><td>7.9</td></tr> <tr><td>Mar</td><td>8.1</td></tr> <tr><td>Apr</td><td>8.3</td></tr> <tr><td>May</td><td>8.1</td></tr> <tr><td>Jun</td><td>7.9</td></tr> </tbody> </table>	Month	pH	Jul	8.0	Aug	7.8	Sep	8.0	Oct	7.9	Nov	7.9	Dec	7.9	Jan	7.8	Feb	7.9	Mar	8.1	Apr	8.3	May	8.1	Jun	7.9
Month	pH																												
Jul	8.0																												
Aug	7.8																												
Sep	8.0																												
Oct	7.9																												
Nov	7.9																												
Dec	7.9																												
Jan	7.8																												
Feb	7.9																												
Mar	8.1																												
Apr	8.3																												
May	8.1																												
Jun	7.9																												





Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data
Point 10	Yes	<p>Point 10 conductivity, pH and turbidity is monitored via an online continuous monitoring system. During the reporting period, the discharge did not rely upon Sydney Water dilution to achieve the conductivity limit of 2 mS/cm. This is because of the Drought condition detailed in EPL 2504 that allows for discharge of water above the 80-percentile concentration limit during Level 1 Sydney Water Restrictions.</p> <p>The daily average for conductivity, pH and turbidity for Point 10 are illustrated in these graphs. There were 49 instances where the daily average for conductivity exceeded 2 mS/cm; however, this was still within the allowable discharge conductivity concentration without dilution during level 1 water restrictions. Troughs in conductivity correlate with high rainfall events. There were no instances where average daily pH exceeded the licence limits. There is no licence limit for turbidity. Peaks in turbidity are generally attributed to high rainfall events, causing large catchment inflows to BCD. Monthly samples for TSS and Total Dissolved Solids (TDS) were within the compliance limits.</p> <p>There were no exceedances of alkalinity (as calcium carbonate), aluminium, arsenic, bicarbonate alkalinity cadmium, cobalt, copper, lead, manganese, nickel, nitrogen (total), oxidised nitrogen, zinc or chemical oxygen demand.</p> <p>The long-term trends indicate an improvement in discharge water quality over time, particularly in relation to copper, zinc, total nitrogen, nickel, lead, cobalt and aluminium. This is likely due to the implementation of the floating offtake in BCD.</p>	



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data
			<div> <p>Point 10 - Turbidity Daily Average</p> <p>NTU</p> <p>— Turbidity (NTU)</p> </div> <div> <p>Point 10 - Total Suspended Solids</p> <p>mg/L</p> <p>— Total Suspended Solids — 100 Percentile Limit</p> </div>



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																																																																														
Point 11	N/A	<p><b>TSS, pH and Conductivity</b></p> <p>There are no licence limits for Point 11. Point 11 is within the Georges River, upstream from the confluence of Brennans Creek and downstream from the Appin East Licenced Discharge Point (LDP) 19. Monthly TSS, pH and conductivity are illustrated in these graphs.</p> <p>The increase in conductivity in the January to March 2021 period can be attributed to drier conditions during this period leading to a concentration of salts in pools in the Georges River. Following ~300 mm of total rainfall in March 2021 (occurring after the March sampling), the pools in the Georges River would have been flushed with fresh water, resulting in a drop in conductivity from March onwards.</p>	<div> <p>Point 11 - Total Suspended Solids</p> <table border="1"> <caption>Point 11 - Total Suspended Solids (mg/L)</caption> <thead> <tr><th>Month</th><th>TSS (mg/L)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>5</td></tr> <tr><td>Aug</td><td>5</td></tr> <tr><td>Sep</td><td>7</td></tr> <tr><td>Oct</td><td>5</td></tr> <tr><td>Nov</td><td>7</td></tr> <tr><td>Dec</td><td>5</td></tr> <tr><td>Jan</td><td>5</td></tr> <tr><td>Feb</td><td>5</td></tr> <tr><td>Mar</td><td>5</td></tr> <tr><td>Apr</td><td>5</td></tr> <tr><td>May</td><td>5</td></tr> <tr><td>Jun</td><td>5</td></tr> </tbody> </table> </div> <div> <p>Point 11 - pH</p> <table border="1"> <caption>Point 11 - pH (pH units)</caption> <thead> <tr><th>Month</th><th>pH (units)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>6.5</td></tr> <tr><td>Aug</td><td>6.8</td></tr> <tr><td>Sep</td><td>6.5</td></tr> <tr><td>Oct</td><td>7.3</td></tr> <tr><td>Nov</td><td>7.2</td></tr> <tr><td>Dec</td><td>7.0</td></tr> <tr><td>Jan</td><td>6.4</td></tr> <tr><td>Feb</td><td>6.6</td></tr> <tr><td>Mar</td><td>7.3</td></tr> <tr><td>Apr</td><td>6.0</td></tr> <tr><td>May</td><td>5.8</td></tr> <tr><td>Jun</td><td>6.5</td></tr> </tbody> </table> </div> <div> <p>Point 11 - Conductivity</p> <table border="1"> <caption>Point 11 - Conductivity (µS/cm)</caption> <thead> <tr><th>Month</th><th>Conductivity (µS/cm)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>190</td></tr> <tr><td>Aug</td><td>125</td></tr> <tr><td>Sep</td><td>180</td></tr> <tr><td>Oct</td><td>200</td></tr> <tr><td>Nov</td><td>170</td></tr> <tr><td>Dec</td><td>190</td></tr> <tr><td>Jan</td><td>275</td></tr> <tr><td>Feb</td><td>370</td></tr> <tr><td>Mar</td><td>305</td></tr> <tr><td>Apr</td><td>230</td></tr> <tr><td>May</td><td>135</td></tr> <tr><td>Jun</td><td>155</td></tr> </tbody> </table> </div>	Month	TSS (mg/L)	Jul	5	Aug	5	Sep	7	Oct	5	Nov	7	Dec	5	Jan	5	Feb	5	Mar	5	Apr	5	May	5	Jun	5	Month	pH (units)	Jul	6.5	Aug	6.8	Sep	6.5	Oct	7.3	Nov	7.2	Dec	7.0	Jan	6.4	Feb	6.6	Mar	7.3	Apr	6.0	May	5.8	Jun	6.5	Month	Conductivity (µS/cm)	Jul	190	Aug	125	Sep	180	Oct	200	Nov	170	Dec	190	Jan	275	Feb	370	Mar	305	Apr	230	May	135	Jun	155
Month	TSS (mg/L)																																																																																
Jul	5																																																																																
Aug	5																																																																																
Sep	7																																																																																
Oct	5																																																																																
Nov	7																																																																																
Dec	5																																																																																
Jan	5																																																																																
Feb	5																																																																																
Mar	5																																																																																
Apr	5																																																																																
May	5																																																																																
Jun	5																																																																																
Month	pH (units)																																																																																
Jul	6.5																																																																																
Aug	6.8																																																																																
Sep	6.5																																																																																
Oct	7.3																																																																																
Nov	7.2																																																																																
Dec	7.0																																																																																
Jan	6.4																																																																																
Feb	6.6																																																																																
Mar	7.3																																																																																
Apr	6.0																																																																																
May	5.8																																																																																
Jun	6.5																																																																																
Month	Conductivity (µS/cm)																																																																																
Jul	190																																																																																
Aug	125																																																																																
Sep	180																																																																																
Oct	200																																																																																
Nov	170																																																																																
Dec	190																																																																																
Jan	275																																																																																
Feb	370																																																																																
Mar	305																																																																																
Apr	230																																																																																
May	135																																																																																
Jun	155																																																																																



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																																																																														
Point 12	TSS, pH and Conductivity	Point 12 is situated downstream of the confluence of Brennans Creek. Monthly TSS, pH and conductivity are illustrated in these graphs. Water quality at Point 12 is generally consistent with the chemistry at Point 10. EC is generally influenced by discharge from BCD.	<div> <p>Point 12 - Total Suspended Solids</p> <table border="1"> <caption>Point 12 - Total Suspended Solids (mg/L)</caption> <thead> <tr><th>Month</th><th>TSS (mg/L)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>9.0</td></tr> <tr><td>Aug</td><td>16.0</td></tr> <tr><td>Sep</td><td>6.0</td></tr> <tr><td>Oct</td><td>6.0</td></tr> <tr><td>Nov</td><td>8.0</td></tr> <tr><td>Dec</td><td>5.0</td></tr> <tr><td>Jan</td><td>5.0</td></tr> <tr><td>Feb</td><td>5.0</td></tr> <tr><td>Mar</td><td>5.0</td></tr> <tr><td>Apr</td><td>5.0</td></tr> <tr><td>May</td><td>5.0</td></tr> <tr><td>Jun</td><td>5.0</td></tr> </tbody> </table> </div> <div> <p>Point 12 - pH</p> <table border="1"> <caption>Point 12 - pH (pH units)</caption> <thead> <tr><th>Month</th><th>pH (units)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>7.7</td></tr> <tr><td>Aug</td><td>8.1</td></tr> <tr><td>Sep</td><td>8.5</td></tr> <tr><td>Oct</td><td>8.7</td></tr> <tr><td>Nov</td><td>8.4</td></tr> <tr><td>Dec</td><td>8.7</td></tr> <tr><td>Jan</td><td>8.6</td></tr> <tr><td>Feb</td><td>8.3</td></tr> <tr><td>Mar</td><td>8.9</td></tr> <tr><td>Apr</td><td>8.5</td></tr> <tr><td>May</td><td>8.4</td></tr> <tr><td>Jun</td><td>8.6</td></tr> </tbody> </table> </div> <div> <p>Point 12 - Conductivity</p> <table border="1"> <caption>Point 12 - Conductivity (µS/cm)</caption> <thead> <tr><th>Month</th><th>Conductivity (µS/cm)</th></tr> </thead> <tbody> <tr><td>Jul</td><td>400</td></tr> <tr><td>Aug</td><td>350</td></tr> <tr><td>Sep</td><td>900</td></tr> <tr><td>Oct</td><td>1600</td></tr> <tr><td>Nov</td><td>600</td></tr> <tr><td>Dec</td><td>1400</td></tr> <tr><td>Jan</td><td>1300</td></tr> <tr><td>Feb</td><td>700</td></tr> <tr><td>Mar</td><td>1750</td></tr> <tr><td>Apr</td><td>1400</td></tr> <tr><td>May</td><td>700</td></tr> <tr><td>Jun</td><td>1200</td></tr> </tbody> </table> </div>	Month	TSS (mg/L)	Jul	9.0	Aug	16.0	Sep	6.0	Oct	6.0	Nov	8.0	Dec	5.0	Jan	5.0	Feb	5.0	Mar	5.0	Apr	5.0	May	5.0	Jun	5.0	Month	pH (units)	Jul	7.7	Aug	8.1	Sep	8.5	Oct	8.7	Nov	8.4	Dec	8.7	Jan	8.6	Feb	8.3	Mar	8.9	Apr	8.5	May	8.4	Jun	8.6	Month	Conductivity (µS/cm)	Jul	400	Aug	350	Sep	900	Oct	1600	Nov	600	Dec	1400	Jan	1300	Feb	700	Mar	1750	Apr	1400	May	700	Jun	1200
Month	TSS (mg/L)																																																																																
Jul	9.0																																																																																
Aug	16.0																																																																																
Sep	6.0																																																																																
Oct	6.0																																																																																
Nov	8.0																																																																																
Dec	5.0																																																																																
Jan	5.0																																																																																
Feb	5.0																																																																																
Mar	5.0																																																																																
Apr	5.0																																																																																
May	5.0																																																																																
Jun	5.0																																																																																
Month	pH (units)																																																																																
Jul	7.7																																																																																
Aug	8.1																																																																																
Sep	8.5																																																																																
Oct	8.7																																																																																
Nov	8.4																																																																																
Dec	8.7																																																																																
Jan	8.6																																																																																
Feb	8.3																																																																																
Mar	8.9																																																																																
Apr	8.5																																																																																
May	8.4																																																																																
Jun	8.6																																																																																
Month	Conductivity (µS/cm)																																																																																
Jul	400																																																																																
Aug	350																																																																																
Sep	900																																																																																
Oct	1600																																																																																
Nov	600																																																																																
Dec	1400																																																																																
Jan	1300																																																																																
Feb	700																																																																																
Mar	1750																																																																																
Apr	1400																																																																																
May	700																																																																																
Jun	1200																																																																																
Point 18	Yes	IMC did not discharge from this point during the reporting period.																																																																															



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																										
Point 19	Yes	<p><b>pH</b></p> <p>FY21 displayed typical and expected compliance against pH.</p> <p>pH units remained steady in-line with long-term trends dictated by rainfall and temperature. Typically, higher rainfall months see increased pH, with lesser impact from flocculant and coagulant dosing chemicals. However, with the added control of in-line pH probes acting as interlocks for the discharge pumps, the likelihood of an exceedance is low.</p> <p>There were no exceedances of oil and grease (no longer required under the EPL).</p>	<table border="1"> <caption>Point 19 - pH Data</caption> <thead> <tr> <th>Month</th> <th>pH</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>6.8</td></tr> <tr><td>Aug</td><td>7.0</td></tr> <tr><td>Sep</td><td>7.6</td></tr> <tr><td>Oct</td><td>7.8</td></tr> <tr><td>Nov</td><td>7.6</td></tr> <tr><td>Dec</td><td>7.4</td></tr> <tr><td>Jan</td><td>7.4</td></tr> <tr><td>Feb</td><td>7.9</td></tr> <tr><td>Mar</td><td>7.8</td></tr> <tr><td>Apr</td><td>7.8</td></tr> <tr><td>May</td><td>7.1</td></tr> <tr><td>Jun</td><td>7.5</td></tr> </tbody> </table>	Month	pH	Jul	6.8	Aug	7.0	Sep	7.6	Oct	7.8	Nov	7.6	Dec	7.4	Jan	7.4	Feb	7.9	Mar	7.8	Apr	7.8	May	7.1	Jun	7.5
Month	pH																												
Jul	6.8																												
Aug	7.0																												
Sep	7.6																												
Oct	7.8																												
Nov	7.6																												
Dec	7.4																												
Jan	7.4																												
Feb	7.9																												
Mar	7.8																												
Apr	7.8																												
May	7.1																												
Jun	7.5																												
Point 20	Yes	<p><b>TSS</b></p> <p>FY21 TSS concentration followed the long-term trends of being well below the EPL 100 percentile concentration limit. The reporting period saw six samples (50%) below the limit of reporting. Similarly to the above, this performance is achieved through the discharge control.</p> <p>Historically, IMC has never exceeded this water quality criteria, with the highest recorded TSS concentration at &lt;50% of the 100<sup>th</sup> percentile limit.</p>	<table border="1"> <caption>Point 19 - Total Suspended Solids Data</caption> <thead> <tr> <th>Month</th> <th>TSS (mg/L)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>5</td></tr> <tr><td>Aug</td><td>5</td></tr> <tr><td>Sep</td><td>1</td></tr> <tr><td>Oct</td><td>1</td></tr> <tr><td>Nov</td><td>1</td></tr> <tr><td>Dec</td><td>5</td></tr> <tr><td>Jan</td><td>2</td></tr> <tr><td>Feb</td><td>6</td></tr> <tr><td>Mar</td><td>1</td></tr> <tr><td>Apr</td><td>1</td></tr> <tr><td>May</td><td>6</td></tr> <tr><td>Jun</td><td>5</td></tr> </tbody> </table>	Month	TSS (mg/L)	Jul	5	Aug	5	Sep	1	Oct	1	Nov	1	Dec	5	Jan	2	Feb	6	Mar	1	Apr	1	May	6	Jun	5
Month	TSS (mg/L)																												
Jul	5																												
Aug	5																												
Sep	1																												
Oct	1																												
Nov	1																												
Dec	5																												
Jan	2																												
Feb	6																												
Mar	1																												
Apr	1																												
May	6																												
Jun	5																												



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																										
Point 23	Yes	<p><b>pH</b></p> <p>FY21 displayed typical and expected compliance against pH.</p> <p>pH units remained steady in-line with long-term trends dictated by rainfall and temperature.</p> <p>Historically, IMC has only seen two exceedances since February 2014.</p>	<p>Point 23 - pH</p> <table border="1"> <caption>Point 23 - pH Data</caption> <thead> <tr> <th>Month</th> <th>pH units</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>7.8</td></tr> <tr><td>Aug</td><td>7.8</td></tr> <tr><td>Sep</td><td>7.7</td></tr> <tr><td>Oct</td><td>7.8</td></tr> <tr><td>Nov</td><td>7.7</td></tr> <tr><td>Dec</td><td>7.9</td></tr> <tr><td>Jan</td><td>7.6</td></tr> <tr><td>Feb</td><td>7.9</td></tr> <tr><td>Mar</td><td>7.8</td></tr> <tr><td>Apr</td><td>7.8</td></tr> <tr><td>May</td><td>7.8</td></tr> <tr><td>Jun</td><td>7.4</td></tr> </tbody> </table>	Month	pH units	Jul	7.8	Aug	7.8	Sep	7.7	Oct	7.8	Nov	7.7	Dec	7.9	Jan	7.6	Feb	7.9	Mar	7.8	Apr	7.8	May	7.8	Jun	7.4
Month	pH units																												
Jul	7.8																												
Aug	7.8																												
Sep	7.7																												
Oct	7.8																												
Nov	7.7																												
Dec	7.9																												
Jan	7.6																												
Feb	7.9																												
Mar	7.8																												
Apr	7.8																												
May	7.8																												
Jun	7.4																												
		<p><b>TSS</b></p> <p>FY21 TSS concentration followed the long-term trends of being well below the EPL 100 percentile concentration limit. The reporting period saw three samples (~ 25%) below the limit of reporting. Similarly to the above, this performance is achieved through discharge control with the higher concentrations linked to periods of intense rainfall.</p> <p>Long-term trends indicate that the perlite filters installed as part of the treatment for this LDP must be monitored and replaced annually or after large rainfall events, to ensure TSS is not exceeded.</p>	<p>Point 23 - Total Suspended Solids</p> <table border="1"> <caption>Point 23 - Total Suspended Solids Data</caption> <thead> <tr> <th>Month</th> <th>TSS (mg/L)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>5</td></tr> <tr><td>Aug</td><td>13</td></tr> <tr><td>Sep</td><td>1</td></tr> <tr><td>Oct</td><td>2</td></tr> <tr><td>Nov</td><td>3</td></tr> <tr><td>Dec</td><td>6</td></tr> <tr><td>Jan</td><td>4</td></tr> <tr><td>Feb</td><td>10</td></tr> <tr><td>Mar</td><td>26</td></tr> <tr><td>Apr</td><td>2</td></tr> <tr><td>May</td><td>5</td></tr> <tr><td>Jun</td><td>2</td></tr> </tbody> </table>	Month	TSS (mg/L)	Jul	5	Aug	13	Sep	1	Oct	2	Nov	3	Dec	6	Jan	4	Feb	10	Mar	26	Apr	2	May	5	Jun	2
Month	TSS (mg/L)																												
Jul	5																												
Aug	13																												
Sep	1																												
Oct	2																												
Nov	3																												
Dec	6																												
Jan	4																												
Feb	10																												
Mar	26																												
Apr	2																												
May	5																												
Jun	2																												



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data																										
Point 24	Yes	<p><b>pH</b></p> <p>FY21 displayed typical and expected compliance against pH. pH units fluctuated in-line with feed plant parameters and the changing chemistry of the source water. With the added control of the discharge coming from the WTP where pH correction takes place, the likelihood of an exceedance is reduced and would be related to a larger plant operational failure.</p> <p>Historically, IMC has only seen one exceedance since records began in 2012, most likely due to in-line probe drift.</p>	<table border="1"> <caption>Point 24 - pH Data</caption> <thead> <tr> <th>Month</th> <th>pH units</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>7.5</td></tr> <tr><td>Aug</td><td>7.5</td></tr> <tr><td>Sep</td><td>7.7</td></tr> <tr><td>Oct</td><td>7.1</td></tr> <tr><td>Nov</td><td>7.3</td></tr> <tr><td>Dec</td><td>8.1</td></tr> <tr><td>Jan</td><td>7.8</td></tr> <tr><td>Feb</td><td>8.4</td></tr> <tr><td>Mar</td><td>8.4</td></tr> <tr><td>Apr</td><td>8.4</td></tr> <tr><td>May</td><td>8.3</td></tr> <tr><td>Jun</td><td>8.0</td></tr> </tbody> </table>	Month	pH units	Jul	7.5	Aug	7.5	Sep	7.7	Oct	7.1	Nov	7.3	Dec	8.1	Jan	7.8	Feb	8.4	Mar	8.4	Apr	8.4	May	8.3	Jun	8.0
Month	pH units																												
Jul	7.5																												
Aug	7.5																												
Sep	7.7																												
Oct	7.1																												
Nov	7.3																												
Dec	8.1																												
Jan	7.8																												
Feb	8.4																												
Mar	8.4																												
Apr	8.4																												
May	8.3																												
Jun	8.0																												
		<p><b>TSS</b></p> <p>FY21 TSS concentration followed the long-term trends of being well below the EPL 100 percentile concentration limit. The reporting period saw 100% of samples below the limit of reporting. Similarly to the above, the likelihood of an exceedance is slim and would be related to a larger plant operational failure.</p>	<table border="1"> <caption>Point 24 - Total Suspended Solids Data</caption> <thead> <tr> <th>Month</th> <th>Total Suspended Solids (mg/L)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>1</td></tr> <tr><td>Aug</td><td>1</td></tr> <tr><td>Sep</td><td>1</td></tr> <tr><td>Oct</td><td>1</td></tr> <tr><td>Nov</td><td>1</td></tr> <tr><td>Dec</td><td>1</td></tr> <tr><td>Jan</td><td>1</td></tr> <tr><td>Feb</td><td>1</td></tr> <tr><td>Mar</td><td>5</td></tr> <tr><td>Apr</td><td>5</td></tr> <tr><td>May</td><td>5</td></tr> <tr><td>Jun</td><td>5</td></tr> </tbody> </table>	Month	Total Suspended Solids (mg/L)	Jul	1	Aug	1	Sep	1	Oct	1	Nov	1	Dec	1	Jan	1	Feb	1	Mar	5	Apr	5	May	5	Jun	5
Month	Total Suspended Solids (mg/L)																												
Jul	1																												
Aug	1																												
Sep	1																												
Oct	1																												
Nov	1																												
Dec	1																												
Jan	1																												
Feb	1																												
Mar	5																												
Apr	5																												
May	5																												
Jun	5																												



Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data
	Yes	<p><b>pH Continuous Monitoring</b></p> <p>Similarly to the grab sample results for the reporting period, typical and expected compliance against continuous pH was achieved. pH units fluctuated in-line with plant target and focus, with an apparent trend change in November, when the plant shifted its emphasis on pit dewatering.</p> <p>This trend slowly tapers off in early May, when the operations began targeting new discharge licence limits, which were scheduled to begin in FY22. These changes are discussed in Section 6.3.3.</p> <p><i>N.B. All instances of 'ZERO' readings are a function of 'no discharge' periods, and are not actual recorded pH values of water quality.</i></p>	
	N/A	<p><b>Conductivity Continuous Monitoring</b></p> <p>Whilst there is no water quality limit against Conductivity at this LDP for this reporting period, this data shows plant performance variation, supporting the comments provided above against pH compliance.</p> <p>Additionally, this data will be required in future versions of this report, with EC limits (100%ile) of 600 <math>\mu\text{S}/\text{cm}</math> required for FY22.</p> <p><i>N.B. All instances of 'ZERO' readings are a function of 'no discharge' periods, and are not actual recorded EC values of water quality.</i></p>	





Table 16: Summary of Compliance with EPL Water Quality Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data
Point 38	Yes	<p><b>BOD</b></p> <p>No exceedances of the BOD 100<sup>th</sup> percentile water quality criteria of 50 mg/L were recorded during the reporting period.</p> <p>There was one exceedance of the 50-percentile limit (30 mg/L) during the reporting period. The average BOD for all samples for FY21 was 16 mg/L. This is a marked improvement on last year's performance (35 mg/L), and most likely can be attributed to ongoing plant management and optimisation of the digestion process.</p> <p>Long-term data analysis for BOD concentration illustrates a more sensitive system, with EPL 50 Percentile exceedances during warmer periods, and following periods of fluctuating throughput. This correlates with a design change to the system to accommodate for peak pulse flows, which saw the installation of balance ponds. Consequently, changes in ambient temperature and plant throughput speeds, typically affect the efficacy of digestion within the dam and polishing tank, resulting in variations in BOD concentration.</p> <p>Point 38 was previously Point 22. The naming of this LDP was changed in a licence variation in March 2021.</p>	
Point 38	Yes	<p><b>pH</b></p> <p>FY21 displayed typical and expected compliance against pH. pH units remained steady, in-line with long-term trends dictated by temperature. Warmer months see higher solar insolation and higher pH, most likely due to biological activity. Lower throughput periods also see decreases in pH, associated with over-oxygenation of the system</p>	
Point 40	N/A	<p>Point 40 was added to EPL 2504 in March 2021 for the Appin North WTP discharge, which discharges in the vicinity of LDP 10 into Brennans Creek. The limits for LDP 40 do not apply until the commissioning of the permanent WTP.</p>	



Table 17: Summary of Compliance with EPL Discharge Volume Limits Across Appin Mine

Monitoring Site	EPL Compliant (Yes/No)	Comments	Data
Point 4	Yes	<p>Point 4 discharges fluctuate depending on the demand and use of the bathhouse facilities at Appin North as well as the amount of rainfall received during the month. Irrigation occurs on average twice per month for approximately three hours at a time. The Sewage Treatment Plant (STP) operates under a licence issued by Wollondilly Shire Council. Flow data is recorded through a flow meter via telemetry.</p> <p>During April 2021 there was a pump failure in the STP mutator tank. This led to the removal of ~111.385 kL of effluent off site by a licenced waste contractor to allow access to the pump for repair. Additionally, from June 2021 onwards, Greater Sydney was placed under a COVID 19 stay at home order, resulting in a significant drop in site attendance, with those coming to site for essential work possibly only staying for short periods of time and no personnel going underground from Appin North, meaning no shower usage. Because of this, coupled with the decrease in rainfall from April onwards, no effluent discharge was required during May and June 2021.</p>	
Point 10	Yes	<p>Flows from BCD consist of a gravity feed from the reclaim pond (Point 10, seepage from BCD), dilution waters as required (mixed with Point 10 and 13 waters), spillway overflows (Point 1) and dam discharge (Point 13) via a floating offtake. Flows do fluctuate with rainfall and dam storage volume. During the reporting period, IMC continued to provide supplementary flows to maintain pool levels downstream in the Georges River. Flows are automated based on dam water level and operate in accordance with the BCD Trigger Action Response Plan.</p> <p>There were multiple spill events (water spilling over the spillway) during FY21. These events occurred during August and November 2020 and March, April and May 2021. These were resulting from high rainfall periods varying between 100 mm to 320 mm for the months affected. The EPA was notified of these events accordingly.</p>	
Point 13	Yes	As per Point 10.	As per Point 10.
Point 18	Yes	IMC did not discharge from this point during the reporting period.	



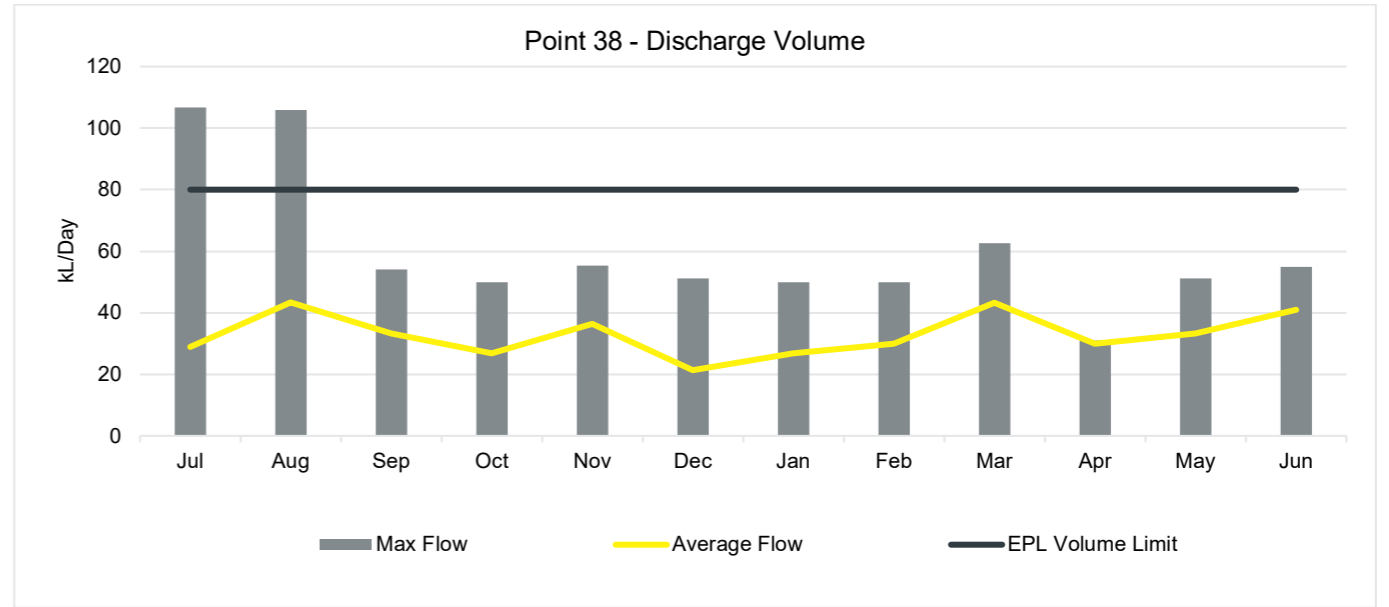
Table 17: Summary of Compliance with EPL Discharge Volume Limits Across Appin Mine

Point 19	Yes	<p>FY21 discharge volume for LDP 19 is as expected. Daily maximum flow was well below the EPL volume limit. This is due to flow rate constraints with the system set-up. Risk management and compliance against this limit is achieved through engineering. Pump capacities are the limiting factor to ensure compliance is achieved.</p> <p>Average flow for the 12-month period and relative to long-term trends, show typical peaks and troughs. The system expects larger average flows biannually. Consequently, higher average flows are experienced due to the period of increased discharge.</p>	<table border="1"> <caption>Point 19 - Daily Discharge Volume Data</caption> <thead> <tr> <th>Month</th> <th>Max Flow (kL/Day)</th> <th>Average Flow (kL/Day)</th> <th>EPL Volume Limit (kL/Day)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>1200</td><td>500</td><td>2000</td></tr> <tr><td>Aug</td><td>1250</td><td>1000</td><td>2000</td></tr> <tr><td>Sep</td><td>1200</td><td>200</td><td>2000</td></tr> <tr><td>Oct</td><td>1250</td><td>500</td><td>2000</td></tr> <tr><td>Nov</td><td>1250</td><td>550</td><td>2000</td></tr> <tr><td>Dec</td><td>1250</td><td>300</td><td>2000</td></tr> <tr><td>Jan</td><td>1250</td><td>250</td><td>2000</td></tr> <tr><td>Feb</td><td>1250</td><td>500</td><td>2000</td></tr> <tr><td>Mar</td><td>1250</td><td>600</td><td>2000</td></tr> <tr><td>Apr</td><td>1300</td><td>650</td><td>2000</td></tr> <tr><td>May</td><td>1300</td><td>700</td><td>2000</td></tr> <tr><td>Jun</td><td>1300</td><td>500</td><td>2000</td></tr> </tbody> </table>	Month	Max Flow (kL/Day)	Average Flow (kL/Day)	EPL Volume Limit (kL/Day)	Jul	1200	500	2000	Aug	1250	1000	2000	Sep	1200	200	2000	Oct	1250	500	2000	Nov	1250	550	2000	Dec	1250	300	2000	Jan	1250	250	2000	Feb	1250	500	2000	Mar	1250	600	2000	Apr	1300	650	2000	May	1300	700	2000	Jun	1300	500	2000																																							
Month	Max Flow (kL/Day)	Average Flow (kL/Day)	EPL Volume Limit (kL/Day)																																																																																											
Jul	1200	500	2000																																																																																											
Aug	1250	1000	2000																																																																																											
Sep	1200	200	2000																																																																																											
Oct	1250	500	2000																																																																																											
Nov	1250	550	2000																																																																																											
Dec	1250	300	2000																																																																																											
Jan	1250	250	2000																																																																																											
Feb	1250	500	2000																																																																																											
Mar	1250	600	2000																																																																																											
Apr	1300	650	2000																																																																																											
May	1300	700	2000																																																																																											
Jun	1300	500	2000																																																																																											
Point 20	Yes	IMC did not discharge from this point during the reporting period.																																																																																												
Point 24	Yes	<p>Daily maximum discharge volume limits, and monthly cumulative limits were compliant during the reporting period.</p> <p>Daily maximum flows fluctuated in-line with plant target and focus, with an apparent trend change in November, when the plant shifted its emphasis on pit dewatering. This trend is also apparent in the cumulative discharge volumes for the month.</p>	<table border="1"> <caption>Point 24 - Daily Discharge Volume Data</caption> <thead> <tr> <th>Month</th> <th>Max Flow (kL/Day)</th> <th>Average Flow (kL/Day)</th> <th>EPL Volume Limit (kL/Day)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>2200</td><td>600</td><td>4500</td></tr> <tr><td>Aug</td><td>1300</td><td>500</td><td>4500</td></tr> <tr><td>Sep</td><td>2100</td><td>700</td><td>4500</td></tr> <tr><td>Oct</td><td>2300</td><td>900</td><td>4500</td></tr> <tr><td>Nov</td><td>4000</td><td>1800</td><td>4500</td></tr> <tr><td>Dec</td><td>3800</td><td>2100</td><td>4500</td></tr> <tr><td>Jan</td><td>3600</td><td>2100</td><td>4500</td></tr> <tr><td>Feb</td><td>3700</td><td>2400</td><td>4500</td></tr> <tr><td>Mar</td><td>3500</td><td>2300</td><td>4500</td></tr> <tr><td>Apr</td><td>4000</td><td>2700</td><td>4500</td></tr> <tr><td>May</td><td>3800</td><td>2300</td><td>4500</td></tr> <tr><td>Jun</td><td>3500</td><td>2200</td><td>4500</td></tr> </tbody> </table> <table border="1"> <caption>Point 24 - Monthly Discharge Volume Data</caption> <thead> <tr> <th>Month</th> <th>Total flow (kL/Month)</th> <th>EPL Volume Limit (kL/Month)</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>18000</td><td>90000</td></tr> <tr><td>Aug</td><td>15000</td><td>90000</td></tr> <tr><td>Sep</td><td>20000</td><td>90000</td></tr> <tr><td>Oct</td><td>28000</td><td>90000</td></tr> <tr><td>Nov</td><td>55000</td><td>90000</td></tr> <tr><td>Dec</td><td>65000</td><td>90000</td></tr> <tr><td>Jan</td><td>68000</td><td>90000</td></tr> <tr><td>Feb</td><td>68000</td><td>90000</td></tr> <tr><td>Mar</td><td>72000</td><td>90000</td></tr> <tr><td>Apr</td><td>80000</td><td>90000</td></tr> <tr><td>May</td><td>72000</td><td>90000</td></tr> <tr><td>Jun</td><td>68000</td><td>90000</td></tr> </tbody> </table>	Month	Max Flow (kL/Day)	Average Flow (kL/Day)	EPL Volume Limit (kL/Day)	Jul	2200	600	4500	Aug	1300	500	4500	Sep	2100	700	4500	Oct	2300	900	4500	Nov	4000	1800	4500	Dec	3800	2100	4500	Jan	3600	2100	4500	Feb	3700	2400	4500	Mar	3500	2300	4500	Apr	4000	2700	4500	May	3800	2300	4500	Jun	3500	2200	4500	Month	Total flow (kL/Month)	EPL Volume Limit (kL/Month)	Jul	18000	90000	Aug	15000	90000	Sep	20000	90000	Oct	28000	90000	Nov	55000	90000	Dec	65000	90000	Jan	68000	90000	Feb	68000	90000	Mar	72000	90000	Apr	80000	90000	May	72000	90000	Jun	68000	90000
Month	Max Flow (kL/Day)	Average Flow (kL/Day)	EPL Volume Limit (kL/Day)																																																																																											
Jul	2200	600	4500																																																																																											
Aug	1300	500	4500																																																																																											
Sep	2100	700	4500																																																																																											
Oct	2300	900	4500																																																																																											
Nov	4000	1800	4500																																																																																											
Dec	3800	2100	4500																																																																																											
Jan	3600	2100	4500																																																																																											
Feb	3700	2400	4500																																																																																											
Mar	3500	2300	4500																																																																																											
Apr	4000	2700	4500																																																																																											
May	3800	2300	4500																																																																																											
Jun	3500	2200	4500																																																																																											
Month	Total flow (kL/Month)	EPL Volume Limit (kL/Month)																																																																																												
Jul	18000	90000																																																																																												
Aug	15000	90000																																																																																												
Sep	20000	90000																																																																																												
Oct	28000	90000																																																																																												
Nov	55000	90000																																																																																												
Dec	65000	90000																																																																																												
Jan	68000	90000																																																																																												
Feb	68000	90000																																																																																												
Mar	72000	90000																																																																																												
Apr	80000	90000																																																																																												
May	72000	90000																																																																																												
Jun	68000	90000																																																																																												



Table 17: Summary of Compliance with EPL Discharge Volume Limits Across Appin Mine

<p>Point 38</p> <p>No</p>	<p>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.</p> <p>Recent changes to the Programmable Logic Control (PLC) resulted in an error. The PLC did not count the volume discharged per day, leading to continuous discharge of sewage effluent. The error was identified on 2 August and rectified the following day.</p> <p>There was no identified environmental harm. Some pooling of irrigation water was identified; however no flow of water offsite was noted.</p> <p>The system is engineered to ensure compliance. Pump and discharge volumes can only be set to three settings; a daily maximum of 70 kL/day, 50 kL/day, or 30 kL/day to ensure compliance against the EPL.</p> <p>With discharge volumes dictated by sewage production, long-term trends are sporadic, which can be expected with fluctuations in personnel hours.</p> <p>Point 38 was previously Point 22. The naming of this LDP was changed in a licence variation in March 2021.</p>
---------------------------	--





### **6.3.3.3 Georges River Aquatic Health Monitoring Program**

The Georges River Aquatic Health Monitoring Program (GRAHMP), which is based on the previous Pollution Reduction Programs (PRPs) and Environment Improvement Programs (EIPs), was submitted to and approved by the EPA by 30 June 2020 in accordance with Condition E3 of EPL 2504 (as varied).

The monitoring program incorporates:

- quantitative sampling of macroinvertebrates;
- ecological assessment processes using DNA extracted from sediment;
- ecotoxicity testing;
- in-stream water quality;
- laboratory water quality testing; and
- pool level and flow monitoring.

Pool level monitoring was implemented through the installation of water level loggers called “Divers” in February 2021 (see Plate 7). This data can then be used in conjunction with a rating table/curve, and spot flow gaugings, to produce flow data.



**Plate 7: Water level logger installed in Georges River monitoring site Point 11**

The aim of the GRAHMP is to verify the changes associated with the construction of the Appin North WTP by:

- comparing water quality in the Georges River before and after commencement of the Appin North WTP;
- assessing any ecotoxicity of discharge waters from the Appin North WTP;



- comparing the in-stream and sediment biota of pools downstream of the discharge with reference sites (located upstream of the Brennans Creek confluence);
- calculating changes over time in the composition of in-stream and sediment biota, particularly downstream of the discharge; and
- assessing the downstream gradient changes in composition of the in-stream and sediment biota.

IMC has held regular meetings with community stakeholders to review progress of projects and monitoring results from previous PRPs and EIPs. Two meetings were held with the Georges River Stakeholder Group over this reporting period; on 16 October 2020 and 29 April 2021. The October 2020 meeting included updates on the AHMP, Water Balance Modelling and results of the Brine Study conducted at LDP 5. The April 2021 meeting detailed updates on the EPL variation, Platypus and Macquarie Perch Project and the most up to date results from Georges River monitoring. Both meetings went through updates on BCD and the Appin WTP Projects.

These meetings have been held since 2014. Details of meetings prior to this reporting period are provided in previous Annual Reviews. The meetings include representatives from the EPA, Biodiversity and Conservation Science Directorate (BCS), Georges Riverkeeper, Wollondilly and Campbelltown local councils, Georges River Environmental Alliance (GREA); National Parks Association of NSW (NPA NSW), ACCC and Western Sydney University (WSU).

Monitoring of the Georges River and Brennans Creek was undertaken over FY21 and will continue into FY24 in line with the current GRAHMP. The following items were completed in FY21:

- quarterly ecotoxicity sampling;
- biannual macroinvertebrate monitoring, which occurred in Spring 2020 and Autumn 2021;
- annual DNA Metabarcoding Ecological Assessment, which occurred in Spring 2020;
- pool level monitoring, which is continuous from the installation date and collected biannually; and
- flow monitoring, which is collected biannually at site GR\_UFS.

The next Aquatic Health Monitoring Report will be prepared in March 2022 in line with the GRAHMP monitoring schedule. This report will provide an analysis of the results of the aquatic health monitoring, particularly results from the macroinvertebrate and DNA metabarcoding.

The 2022 report will be available on the South32 website at: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>. Previous reports under the PRPs/EIPs are also available on the website.

## **6.4 Contaminated Land**

### **6.4.1 Environmental Management**

#### **6.4.1.1 Appin East**

##### **FY11 Underground Diesel Storage Tanks**

Introduced in the FY11 reporting period, IMC investigated a small area of the Appin East site that had formerly been used as a fuel dispensing station. The decommissioned fuelling area was excavated for road construction to upgrade coal loading facilities at the site. During the excavation and grading works, three previously unknown underground diesel storage tank pits were discovered. Leakage of diesel was evident in all three underground storage tank pits.



Preliminary investigations found the decommissioned fuelling area contained elevated concentrations of Total Petroleum Hydrocarbons (TPH) C10-C36. The contaminated soil surrounding the tanks was excavated and stored in a lined waste stockpile during the FY11 period. A monitoring program was established in 2011, with sampling conducted at four locations.

As discussed in the FY20 Annual Review, based on the long-term results, it was proposed that the groundwater monitoring program be discontinued at the end of FY20. The changes were approved by DPIE in September 2020, as part of a revision to the WMP.

During this reporting period, IMC confirmed that the historically stockpiled 'contaminated waste' associated with the excavation of the underground diesel storage tanks, no longer contained levels of TPHs which would classify it as 'Restricted Waste'<sup>12</sup>. This allowed IMC to dispose of the material at the CWEA as 'General Solid Waste'. No further sampling or information is presented in this Annual Review.

#### *FY21 Drainage Line Sediment Review*

Throughout the reporting period, dark/black sediment was observed in portions of a drainage line located within the Appin East site boundary that runs between the Main Dam spillway (LDP 21), discharge point LDP 19 and the Georges River. Following initial investigations, a consultant was engaged to carry out analysis of the sediment and determine its origin. Sediment and surface water sampling were carried out and submitted for laboratory and petrographic analysis. The main findings of the investigation were:

- Petrographic analysis identified that coal fines can account for the dark colouration of the sediments. The coal fines are likely derived from periodic overflows from the Main Dam over an extended period.
- Organic compounds were below detection level and trace metal concentrations are within ranges expected for natural runoff.
- Dissolved metals are below relevant ANZECC guidelines and/or within the expected range for natural streams. Therefore, metals in the sediments appear to be immobile at typical pH levels and unlikely to impact on downstream aquatic ecosystems.

The dark sediment is only present in the drainage line and no evidence of sediment was observed in the Georges River. Some pockets of the sediment in the drainage line are being established by vegetation.

It was recommended IMC develop a monitoring plan to further assess water quality and metal concentrations at LDP 19 and along the drainage line for a further 12-months. This monitoring will commence as of July 2021 and continue through FY22. The outcomes of the further monitoring will be discussed in the next Annual Review.

#### **6.4.1.2 *Appin North***

As presented in the FY10 reporting period, Appin North and the WCCPP completed a site inspection to identify indicators of contamination and a risk assessment was conducted with relevant staff.

The site inspection identified a small groundwater seep which was discharging into one of the site dirty water catchment ponds (Pond P3). The lab analysis of the seep confirmed that the seep contained traces of hydrocarbons and therefore triggered the reporting requirements under Section 60 of the *Contaminated Land Management Act 1997 (CLM Act)*.

---

<sup>12</sup> Assessed and classified using NSW EPA, Waste Classification Guidelines, Part 1: Classifying waste, 2014.



A comprehensive contamination site assessment was completed by an environmental consultant during the 2010/11 reporting period.

Similarly to Appin East, based on the long-term results, it was proposed that the groundwater monitoring program be discontinued as at the end of FY20. The changes were approved by DPIE in September 2020, as part of a revision to the WMP. No further sampling or information is presented in this Annual Review.

## 6.5 Threatened Fauna and Flora

### 6.5.1 *Environmental Management*

Threatened flora and fauna communities at Appin Mine are managed in accordance with the following approved plans:

- CWEA Management Plan;
- Broad-headed Snake and Southern Brown Bandicoot Management Plan;
- *Persoonia hirsuta* Offset Management Plan;
- Biodiversity Management Plan;
- Ventilation Shaft 6 Biodiversity Offset Strategy;
- Shale Sandstone Transition Forest Offset Management Plan; and
- Adaptive Management Plan for Water Sensitive EPBC Listed Species.

These plans include the management and mitigation measures for threatened species or habitats that occur on Appin Mine sites and are available on the South32 website at <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

*Persoonia hirsuta* is listed as “Endangered” under both the NSW *Biodiversity Conservation Act 2016* and the *EPBC Act*. A substantial population of *Persoonia hirsuta* is known to exist on the Appin North site. Several of the *Persoonia hirsuta* plants are located within operational areas such as high voltage transmission lines on site.

*Acacia bynoeana* is listed as “Endangered” under the NSW *Biodiversity Conservation Act 2016* and “Vulnerable” under the *EPBC Act*. The species has previously been recorded along existing roads, tracks and disturbed areas at Appin North.

*Pultenaea aristata* is listed as “Vulnerable” under the NSW *Biodiversity Conservation Act 2016* and the *EPBC Act*. The species has been recorded in areas of impeded drainage in woodland adjoining the main access road and in the vicinity of the southern extent of the Stage 3 CWEA. *P. aristata* plants have been identified within the rehabilitating CWEA (See Appendix A: Annual Emplacement Rehabilitation Report).

Flora and fauna aspects associated with mine subsidence are detailed in Section 6.14.

### 6.5.2 *Environmental Performance*

#### 6.5.2.1 *Broad-headed Snake and Southern Brown Bandicoot*

There have been no instances in the reporting period that required the implementation of mitigation measures for Broad-headed Snakes or Southern Brown Bandicoots (as outlined in the approved management plan).





### **6.5.2.2 Persoonia hirsuta - Ongoing Research and Conservation Management**

IMC conducted the eighth round of annual condition monitoring of the *Persoonia hirsuta* population at Appin North. The monitoring was undertaken in accordance with the approved *P. hirsuta* Offset Management Plan, which complies with EPBC Approval Condition 2. The monitoring was completed by one Niche Environment and Heritage (Niche) ecologist and one IMC representative over one day in December 2020, during the peak flowering period for the species. The report is included as Appendix D: Annual *Persoonia hirsuta* Condition Monitoring Report.

In accordance with Condition 3 of EPBC Approval 2010/5350, IMC has undertaken targeted research on *P. hirsuta* including:

- habitat and demography;
- population genetics;
- seed biology, germination and recruitment and propagation, and
- pollination.

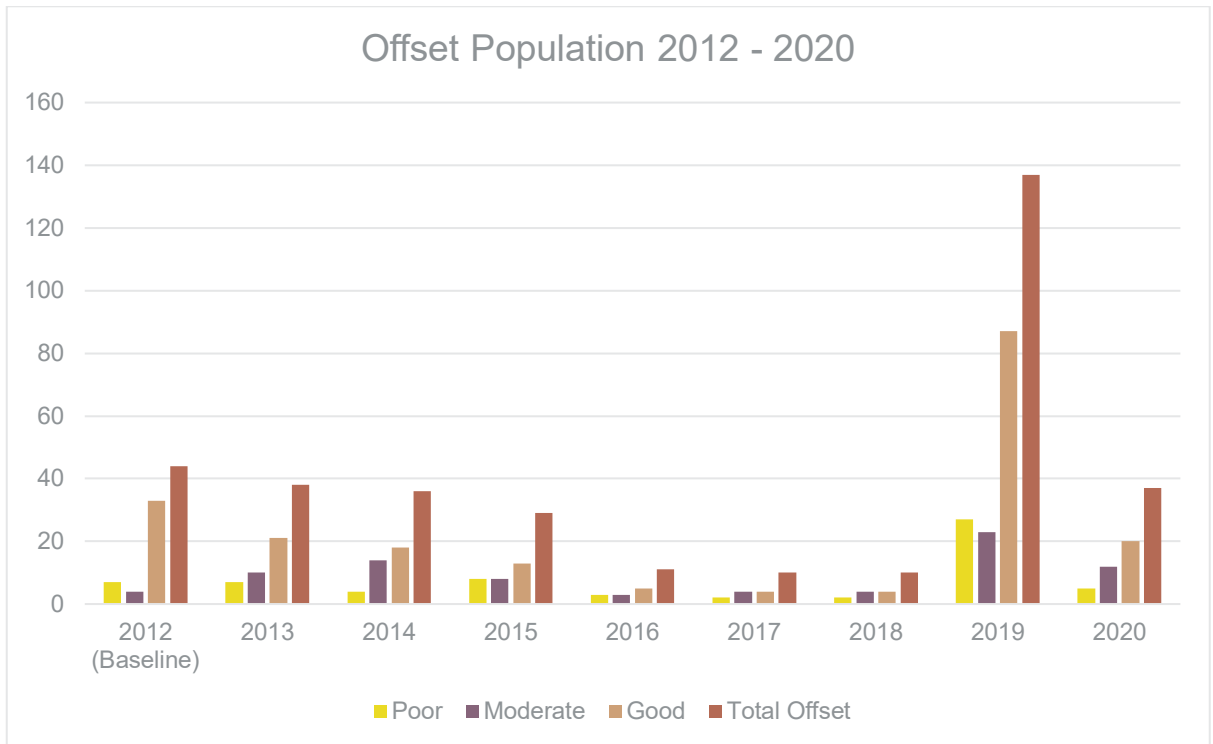
IMCs targeted research on *P. hirsuta* has been outlined in the *Persoonia hirsuta* Research Report, which was submitted to the Department of Agriculture, Water and the Environment (DAWE) in June 2021. The report aims to explore the history of the endangered species; detailing current and past research, particularly the research and conservation efforts conducted to date by IMC. It also aims to outline what future conservation efforts could be conducted to promote an increase in overall species population in and around the Appin North mining area.

The *Persoonia hirsuta* Research Report is available on the South32 website at <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

In May 2019, 128 *P. hirsuta* propagates (including seedlings and cuttings) were translocated to the *Persoonia* Offset at Appin North. The plants had been propagated by the Mount Annan Australian Botanic Garden, some grown from seed, others from cuttings, collected from different locations. The aim of the translocation was to boost the population within the offset area to at least 44 individuals (back to baseline population) and develop a translocation procedure that can be applied to this species. The plants continued to be monitored during FY20. Mortality was relatively high, predominantly due to the drought and initial high herbivory rates. The total Offset plant population and health over time is included in Figure 9. Of the 128 translocated plants, 28 remain alive. Most alive plants have put on new growth since planting.

In May 2021, a second translocation was carried out with 90 *P. hirsuta* in the Stage 2 CWEA rehabilitation area. The site consists of a 50 m x 50 m plot within which plants are roughly 1 m apart, each with mammal plant guards to protect against predation (Plate 8). The translocates are between two and four years old and were from propagative material collected from several wild populations to include a wide level of genetic diversity. The translocation will be watered and monitored by Mount Annan Australian Botanic Garden as well as IMC personnel with the aim of the translocation being to supplement the existing population at Appin North.

An additional translocation is planned at Appin North for 2022.



**Figure 9: *P. hirsuta* condition and population within the Offset**



**Plate 8: Healthy *P. hirsuta* plant in the Stage 2 Translocation Area**



### **6.5.2.3 Shale Sandstone Transition Forest Offset/BioBank Site**

The EPBC approval conditions for Appin Mine require a biodiversity offset of at least 44.9 ha of Shale Sandstone Transition Forest (SSTF), as well as an Offset Management Plan. In 2012, IMC identified a suitable site in Douglas Park NSW, within the Wollondilly Local Government Area. The land is approximately 86 ha in size which includes bushland, a transmission line easement, a small paddock, and several access tracks. The offset area is comprised of two parcels of land, separated from each other by Douglas Park Drive.

In October 2015, IMC made an application to the NSW Office of Environment & Heritage (OEH) to have the SSTF offset secured via a BioBanking Agreement under Part 7A Division 2 of the *Threatened Species Conservation Act 1995*. The BioBanking Agreement was finalised and executed on 1 February 2017. The offset is now managed in accordance with the BioBanking Agreement, ID Number 215 (BA 215). BA 215 details an annual works program (weed management, tree planting, monitoring etc). These works are carried out by Landcare and are summarised in the 2021 Annual Report provided as Appendix E: 2020/21 Appin West BioBank Site Annual Report.

### **6.5.2.4 Ventilation Shaft No.6 Offset**

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

The offset area (MZ5) is located to the north of the Appin No. 6 Ventilation Shaft site on the Mountbatten Stud property at Douglas Park NSW (Plan 7). The initial inspection of MZ5 resulted in the discovery of a population of the threatened plant, *Pimelea spicata* (spiked rice-flower), adding significant conservation value to the offset area.

In accepting the offset proposal, DPIE and DotE 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 site and the extent and health of the *P. spicata* population.

Landcare were engaged to undertake weed management at the site during the reporting period. The works focused on the treatment/removal of African Olive and Blackberry, which are prevalent at the site. This will continue throughout FY22.

The 2020 monitoring results indicate that, on average, the bushland on the site is outside of benchmark attribute values for the CPW but is showing trends towards benchmark values. Reduction in native species diversity within woodland areas is likely attributable to ongoing drought conditions and hot weather in early 2020, with subsequent large heavy rainfall events. It is likely over time with the continual management of the site that the vegetation is likely to reach benchmark condition or show an ongoing trend towards it.

An assessment of the change in size and distribution of the threatened plant population of *P. spicata* was undertaken as part of the 2016/17 monitoring program and was not repeated in this reporting period. The next scheduled census of the *P. spicata* population is scheduled to occur with the next monitoring report (Spring 2021 – FY22).

Recommendations in relation to the on-going management of the site include: ongoing monitoring of perimeter fence integrity to limit stock incursions; weed management focusing on large woody and vine weed removal in better condition areas; targeting Blackberry in MZ5 and MZ6 and removing Chilean Needle Grass and Blackthorn Thicket in the surrounding woodland. Refer to Appendix F: 2020/21 Ventilation Shaft No. 6 Offset Annual Monitoring Report.



### 6.5.2.5 Nepean River Biodiversity Stewardship Site

Niche was commissioned by IMC to conduct a BioBanking assessment of an offset site along Menangle Road at Douglas Park NSW, which is now referred to as the Nepean River BioBank Site. The assessment was conducted in May and November 2016. BioBanking Agreement 382 (BA 382) was made on 8 May 2018. The site provides in-perpetuity management and security for 67.41 hectares (ha) of woodland and forest communities, including two critically endangered ecological communities, as well as habitat that supports the threatened Cumberland Plain Land Snail.

BA 382 details an annual works program (weed management, tree planting, monitoring etc). These works are carried out by Landcare and are summarised in the 2021 Annual Report provided as Appendix G: 2020/21 Nepean River BioBank Site Annual Report.

### 6.5.2.6 Cataract River BioBank Site

A BioBanking agreement (BA 345) for the Cataract River BioBank Site was finalised on 6 February 2019. The site provides in-perpetuity management of approximately 8.53 ha (Lot 1, DP 572548). The property contains a critically endangered ecological community. IMC is required to undertake passive monitoring of the site until the BioBanking Trust Fund Deposit has reached 80 percent of the Total Fund Deposit. Once reached, IMC must commence all active management actions.

Three areas from which asbestos was removed were rehabilitated in 2020 with 500 seedlings of local grass, shrub species and 50 seedlings representing canopy species local to the area. The most recent 2021 monitoring observed a high success rate of seedlings on the previously disturbed site.

Additionally, exclusion fencing and security signage was installed at the Douglas Park Drive entrance of the site in the last reporting period and no stock or evidence of grazing was observed. Since the previous reporting period there was a noticeable increase in the native vegetation and (to a lesser extent) weed growth across the site, which is likely attributed to an increase in rainfall during the reporting period and the installation of the exclusion fencing. An example of this notable increase in vegetation can be seen in the comparison figures below in Plate 9, which shows an image of photo point 3 from last year compared to this year's monitoring.



**Plate 9: Comparison of vegetation growth from photo point 3. FY20 (LHS image) and FY21 (RHS Image) at the Cataract River Biobank Site**

The Annual Report for BA 345 is provided in Appendix H: 2021 Cataract River BioBank Site Passive Management Annual Report.



## **6.6 Weeds**

### **6.6.1 Environmental Management and Performance**

#### **6.6.1.1 Appin East and Appin West**

Environmental inspections (which include weed identification) are undertaken at the Appin East and Appin West sites. When noxious weeds are identified they are removed and treated. Maps outlining the weed growth areas are provided to the grounds maintenance personnel to assist with identifying the target locations. During the reporting period active weed management included:

- regular spraying of weed zones by licenced contractors; and
- regular inspections that review the effectiveness of weed management activities.

#### **6.6.1.2 Appin North**

Ongoing grounds maintenance is undertaken by a contractor who has a regular schedule of work. The annual CWEA rehabilitation monitoring program includes the identification of weeds present and proposed management strategies to control weed growth within the CWEA. Targeted weed control within the CWEA was undertaken by a contractor during the year which included slashing of perennial grasses and weed spraying.

## **6.7 Blasting**

No surface blasting activities were undertaken at Appin Mine during the reporting period. Minor blasting activities underground are undertaken in accordance with approved management plans.

## **6.8 Operational Noise**

### **6.8.1 Environmental Management**

Noise across Appin Mine is managed in accordance with the approved Noise Management Plan (NMP). The plan was prepared to satisfy Condition 5 of Schedule 4 of the Project Approval and details the relevant noise criteria, compliance procedures and controls relating to the mining operations.

A copy of the plan is available on the South32 website: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

#### **6.8.1.1 Monitoring Program**

A noise monitoring program has been developed to comply with Condition 5(f) of Schedule 4 of the Project Approval.

The objectives of the noise monitoring program are to:

- provide the framework for the responsible management of noise emissions associated with Appin Mine;
- describe the control measures for the management of noise emissions;
- prevent adverse noise impacts on the amenity of local communities and the environment;
- describe compliance criteria and exceedance assessment protocols;
- describe the noise monitoring program;



- comply with the relevant requirements of the Project Approval;
- describe measures for the reduction of noise emissions; and
- comply with South32 and other relevant standards and requirements.

Assessment criteria have been established for each monitoring location, as outlined in the NMP. The criteria enable an assessment of compliance to be made against the noise levels outlined in the Project Approval. The site-specific assessment criteria were developed using the following methodology:

- adoption of the relevant noise criteria as outlined in the Project Approval; and
- where relevant, adjusting the noise levels (to take into account monitoring location versus receivers) using the noise contours from the Noise Impact Assessment.

The program consists of attended monitoring using handheld portable monitors and real time noise monitoring. The attended monitoring is undertaken at the nominated monitoring locations to confirm compliance.

Adjustments to the Assessment Criteria in the NMP were made during the reporting period. These changes were accepted and approved by DPIE in December 2020 and have been reflected in Table 18.

#### **6.8.1.2 Sound Power Measurements**

In August 2020, a new noise consultant was engaged by IMC. Representative noise levels recorded at AE-NS5 over FY21 Q1 and Q2 were indicated to exceed the noise impact assessment criteria, however as the EDL power station is located between Ventilation Shaft 2 and the monitoring location, the cause of the exceedances was considered to be 'unconfirmed'.

The noise consultant was engaged to undertake further investigation of the ventilation shaft and power plant sites near AE-NS5 using sound power measurement methods. This work was undertaken in December 2020. The purpose of this work was to determine whether exceedances measured at AE-NS5 were caused by noise emissions from the site, or influenced by the EDL power station. Additionally, the measurements would also identify which pieces of equipment were contributing and rank them accordingly, ultimately allowing IMC to identify potential noise mitigation.

The sound power measurement report (completed in March 2021) concluded that the exceedances measured in FY21 Q1 were caused by IMC site operations. The main contributing factor was identified as the gas extraction recirculation valve operation. Noise is generated by the position of the valve through turbulence of the flowing gases, which is transmitted into the structure of the valve and connected pipework.

As an immediate temporary solution, the recirculation valve at the Appin East Gas Extraction Plant was closed, and suction pressure control is now being undertaken at the Appin West Gas Extraction Plant with different valving arrangements. More permanent solutions have been reviewed by IMC. These include:

- a) Sourcing a design and pricing for appropriate noise attenuation around the recirculation valves at Appin East - a design has been received however it has been determined that the installation of noise attenuation around the valve may result in gas build-up which may result in an explosion risk.
- b) Undertaking a review of the current recirculation valve installed to determine whether there is a more appropriate valve available on the market with better sound attenuation properties – the review indicated that there is no valve on the market that is more suitable for this application.

Options for mitigating noise at this location will continue to be investigated in FY22.



## 6.8.2 Environmental Performance

Quarterly attended monitoring was conducted in accordance with the approved monitoring program for the reporting period. Results of the monitoring are reported online and summarised in Table 18.

The assessed noise levels generated from Appin Mine were generally below the day, evening and night assessment criteria as listed in Table 18, with the exception of AE-NS5. All of the exceedances and non-compliances were detected at this location. On three occasions noise levels generated were greater than 2 dBA over the  $LA_{eq,15min}$  assessment criteria in the NMP at location AE-NS5 and therefore were reported as a non-compliance<sup>13</sup>.

Non-compliances recorded were, as discussed above, attributable to the gas extraction recirculation valve operation. Noise is generated by the position of the valve through turbulence of the flowing gases, which is transmitted into the structure of the valve and connected pipework. These non-compliances are discussed further in Section 11.

Appin Mine reported two exceedances against the  $LA_{eq,15min}$  criterion at location AE-NS5. It had become apparent that during the reporting period that IMC had increased vibration on the duct work at Ventilation Shaft 2. It was identified that a portion of the weld (holding the foil in place above the impeller) had failed, allowing the duct work to oscillate horizontally (approximately 10-20 mm). This correlates with the low frequency penalty applied to the quarterly noise monitoring. The shaft and ventilation fan were quickly taken out of service and repaired in June 2021. These exceedances are discussed further in Section 11.

Maintenance and corrective actions have been undertaken during the reporting period to reduce noise including:

- fan impeller cleaning for fans 1, 2 and 3;
- Fan 3 ductwork repairs;
- gas recirculation valve noise mitigation works, and
- targeted, off-cycle noise survey to determine sound power measurements from all equipment to assist with targeted noise mitigation into the future.

Graphs of long-term noise monitoring trends are provided in Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs.

---

<sup>13</sup> Note that for the determination of compliance, the NSW Industrial Noise Policy states in Section 11:

*A development will be deemed to be in non-compliance with noise consent or licence condition of the monitored noise level is more than 2dB above the statutory noise limit specified in the consent or licence condition.*



**Table 18: Noise Survey Points and Results**

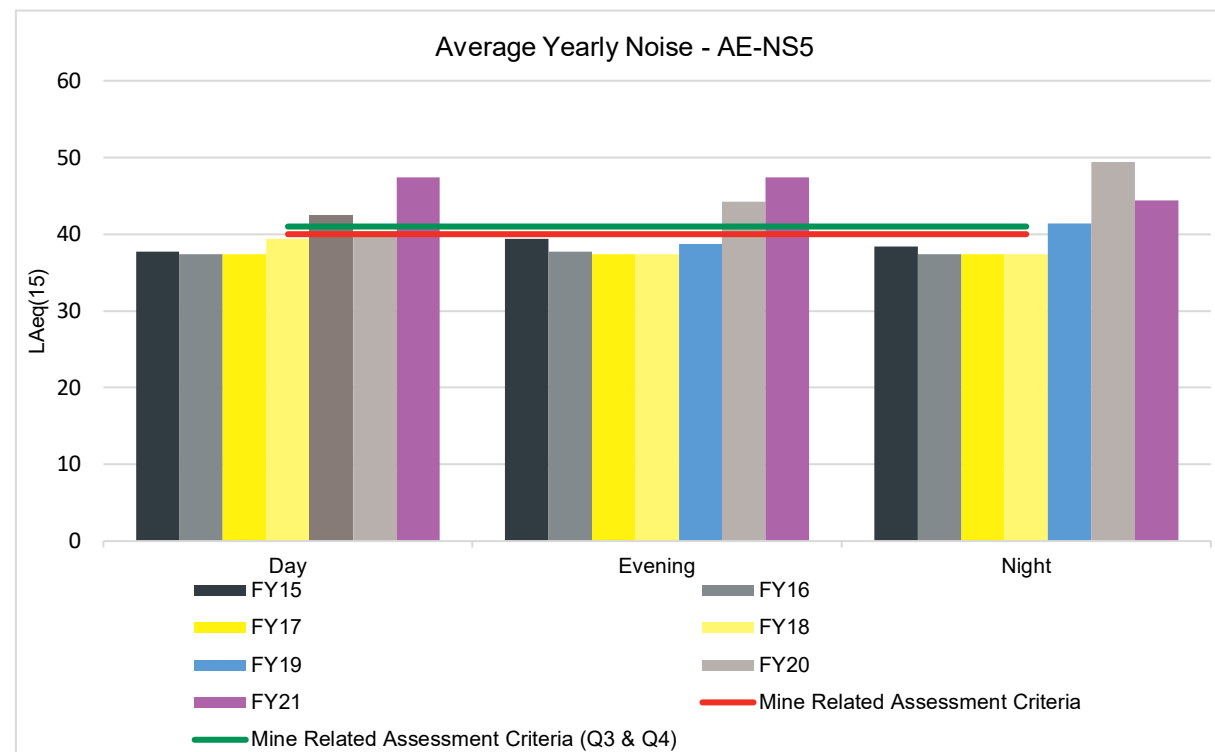
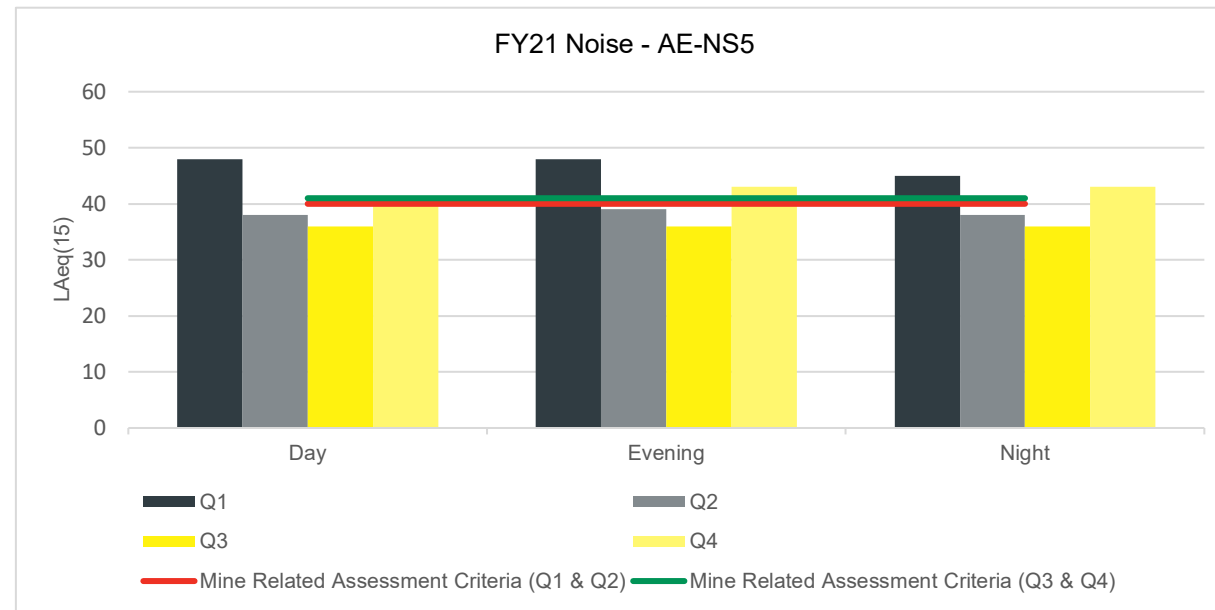
Survey Point ID	Type	Receivers	Assessment Criteria		Locality	Function	Data Summary	Comments
			LA <sub>eq</sub> (15 min)	LA <sub>1</sub> (1 min)				
AE-NS4	Attended	Appin township	43 (day, evening and night)	52 (night)	Located in paddock between Illawarra and Toggarai St North of Pit Top behind receiver 137.	Noise from AE Pit Top		<p><b>Compliant</b></p> <p>FY21 exhibited compliance with the assessment criteria. Noise generated from site was audible at the monitoring location. Appin Road still dominates as the overriding noise source.</p>





AE-NS5 Attended Appin No.1 and No.2 receivers 40<sup>14</sup> (day, evening and night) 50 (night)

Northamptondale Road between the No.2 Shaft Site and power plant project and the nearest residential receivers in the South to East quadrant from site. Noise levels between Shaft Site and the nearest residential receivers to the SE



**Non-compliant**

Site noise was clearly audible in FY21 and was observed to be the dominant noise source across all quarters. Three (3) non-compliances of noise criteria greater than 2 dBA over the assessment criteria in the NMP were recorded at AE-NS5:

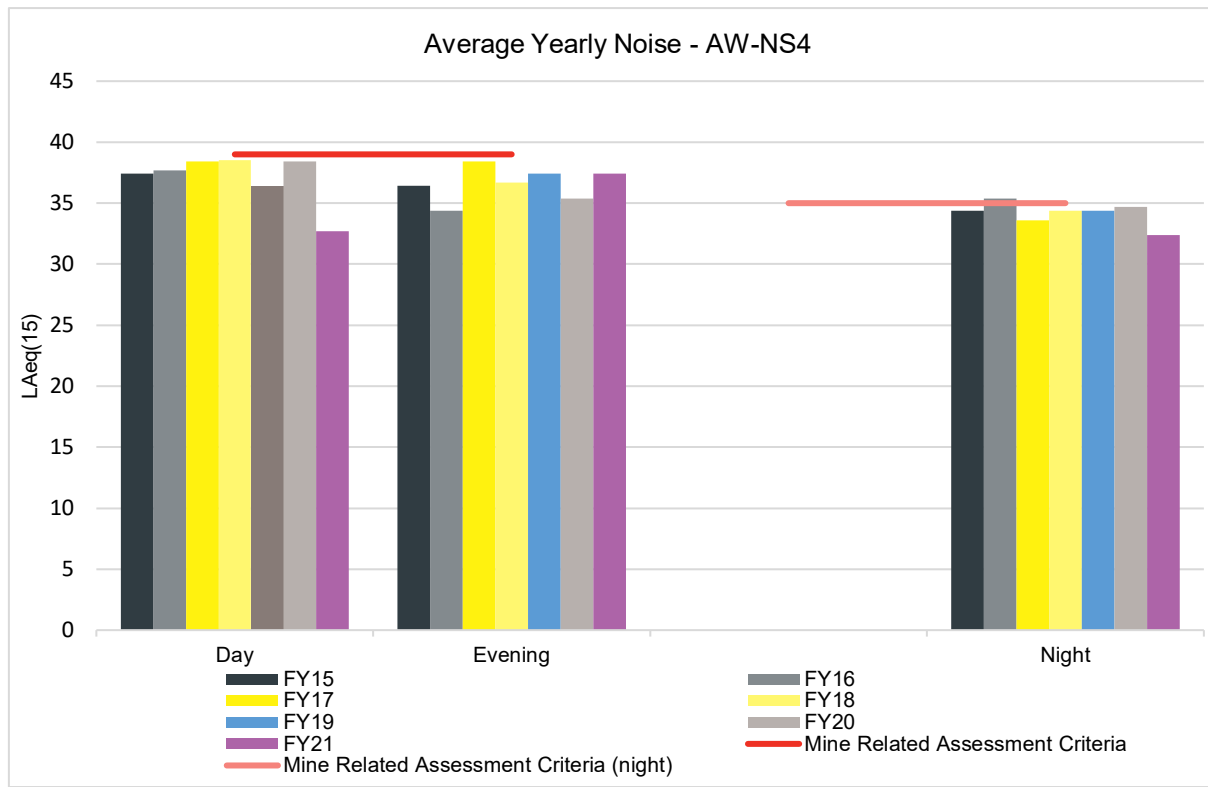
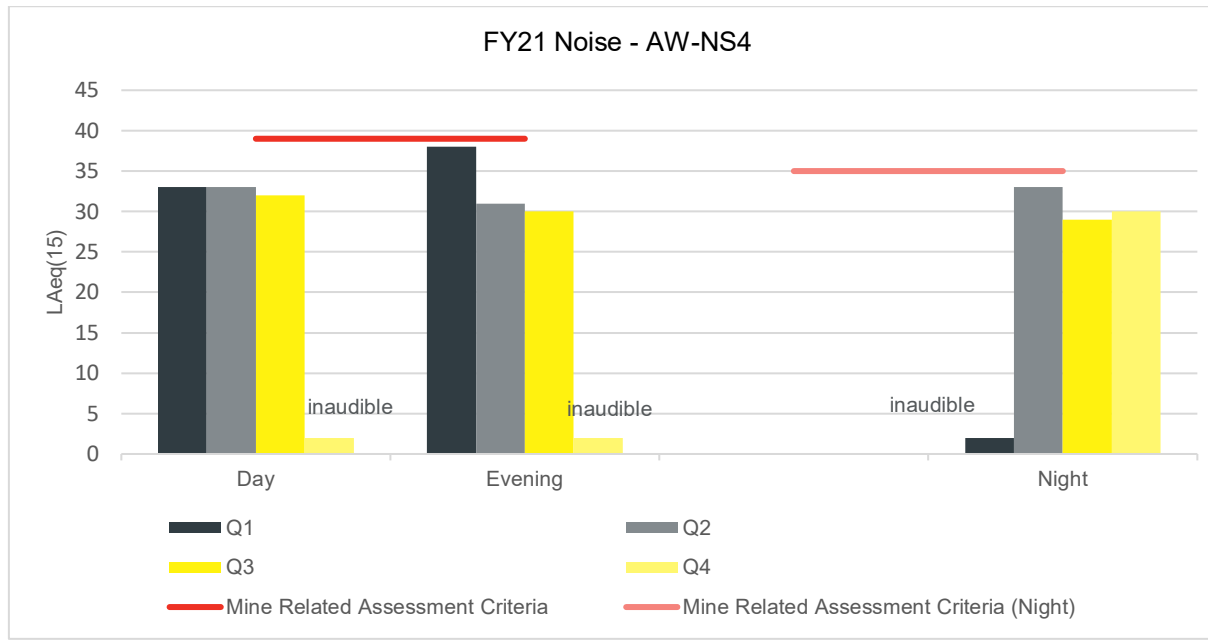
- a noise level of 48 dBA was recorded at 5 pm on 11 August 2020;
- a noise level of 48 dBA was recorded at 8:45 pm on 11 August 2020; and
- a noise level of 45 dBA was recorded at 11:45 pm on 11 August 2020.

Two exceedances were recorded at AE-NS5:

- a noise level of 43 dBA (with a 5 dBA low frequency noise penalty applied) was recorded at 8 pm on 18 May 2021; and
- a noise level of 43 dBA (with a 5 dBA low frequency noise penalty applied) was recorded at 11:15 pm on 18 May 2021.

Long term trend analysis shows the FY21 average higher than previously recorded for the day and evening periods. However this is due to poor Q1 results stemming from recirculation valve issues at the gas extraction plant. As discussed in Section 6.8.1, these issues have since been identified and resolved or a temporary fix implemented.

<sup>14</sup> 40 dBA was the assessment criteria adopted in the BSO Noise Management Plan dated 25/05/2017. The management plan has since been amended and approved (December 2020) and has been increased to 41 dBA to be consistent with the Project Approval.



AW-NS4	Attended	Appin West receivers South-west of Appin West Pit Top	39 (day and evening)	49 (night)	Ashwood South-west of West Pit Top	Road, Appin West Receivers South-west of Appin West pit top; and Appin West Receivers near Hume Highway
--------	----------	---	----------------------	------------	------------------------------------	---

**Compliant**

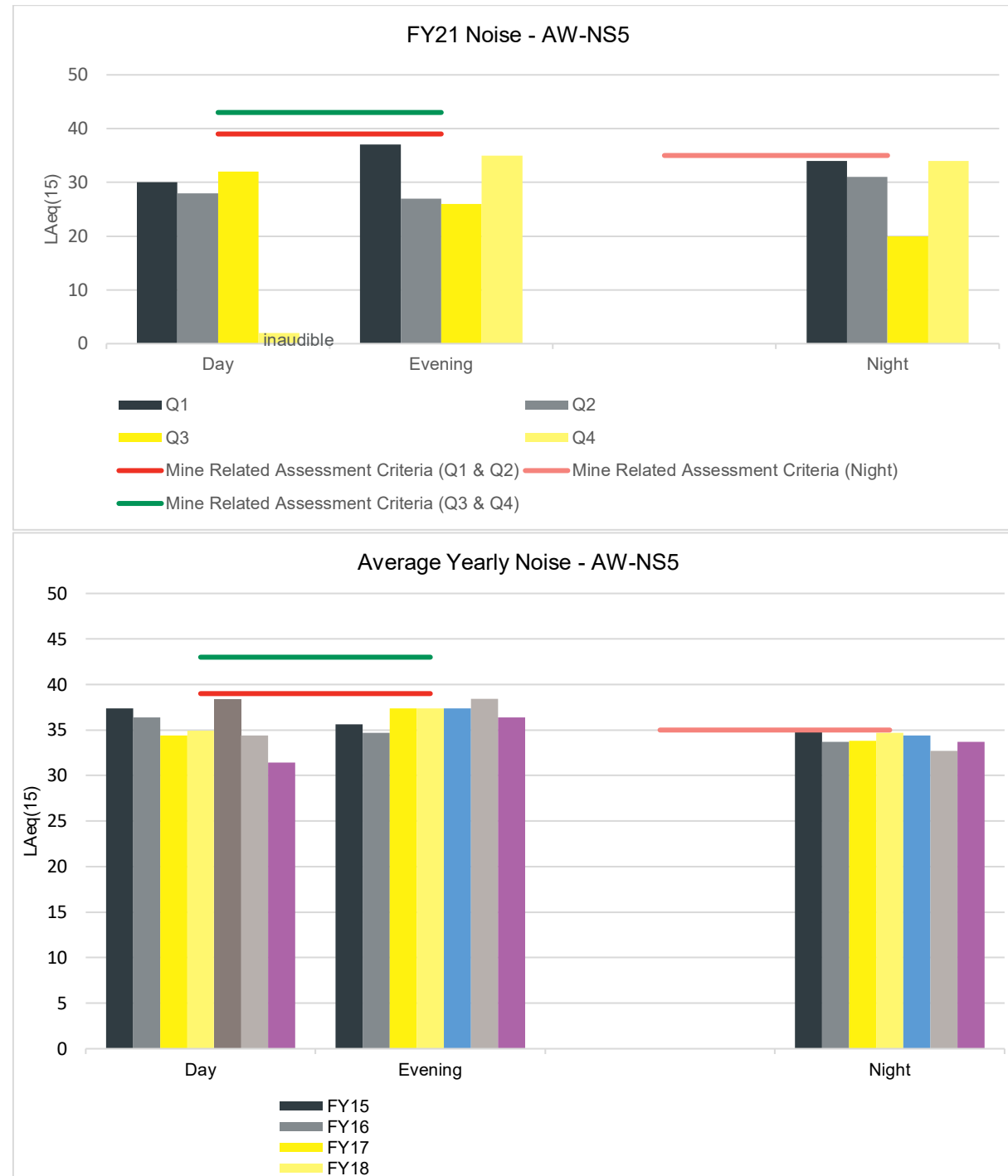
FY21 exhibited compliance with the assessment criteria.

Evening monitoring displayed a marginally higher-than-average trend when compared to historic data, however still showing regular peaks and troughs associated with long-term trends.



AW-NS5 Attended All other Appin West receivers 39<sup>15</sup> (day and evening) 53 (night)

Between nearest residential receivers on Douglas Park Drive and the Appin West Pit Top  
Noise level at AW property boundary; Noise levels between AW and nearest residential receivers on Douglas Park Drive



**Compliant**

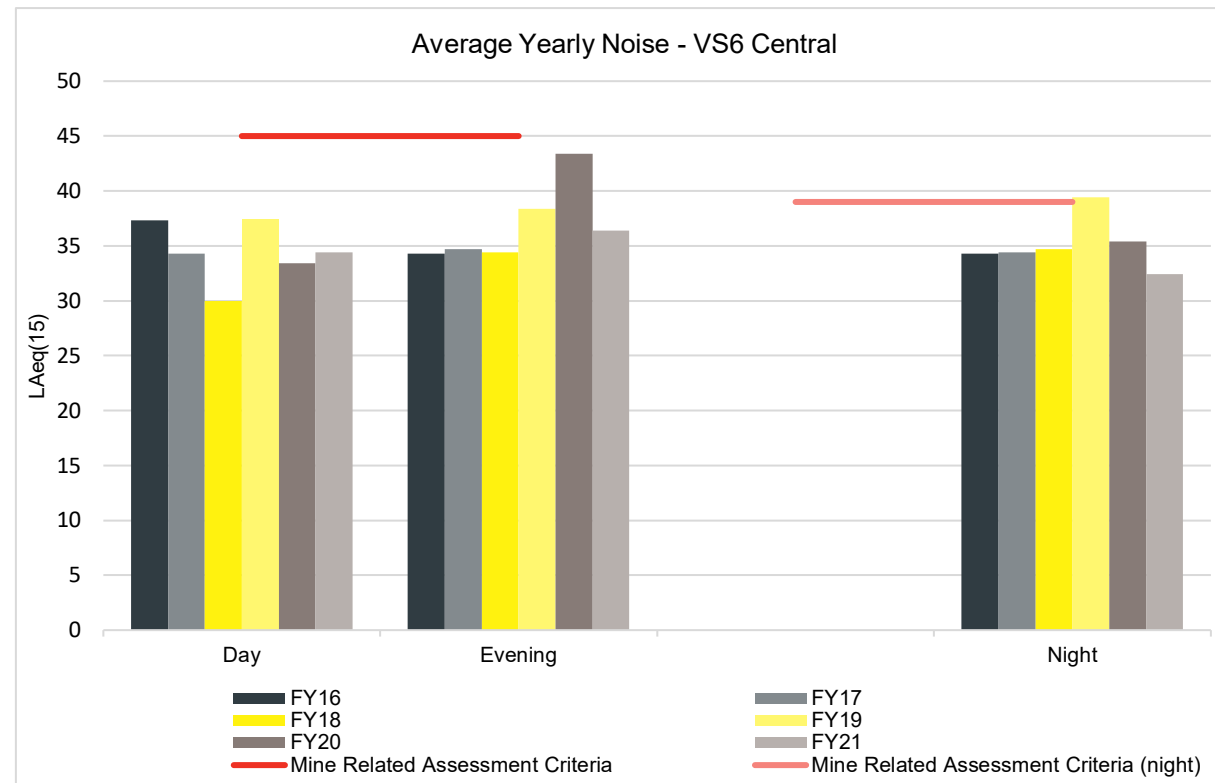
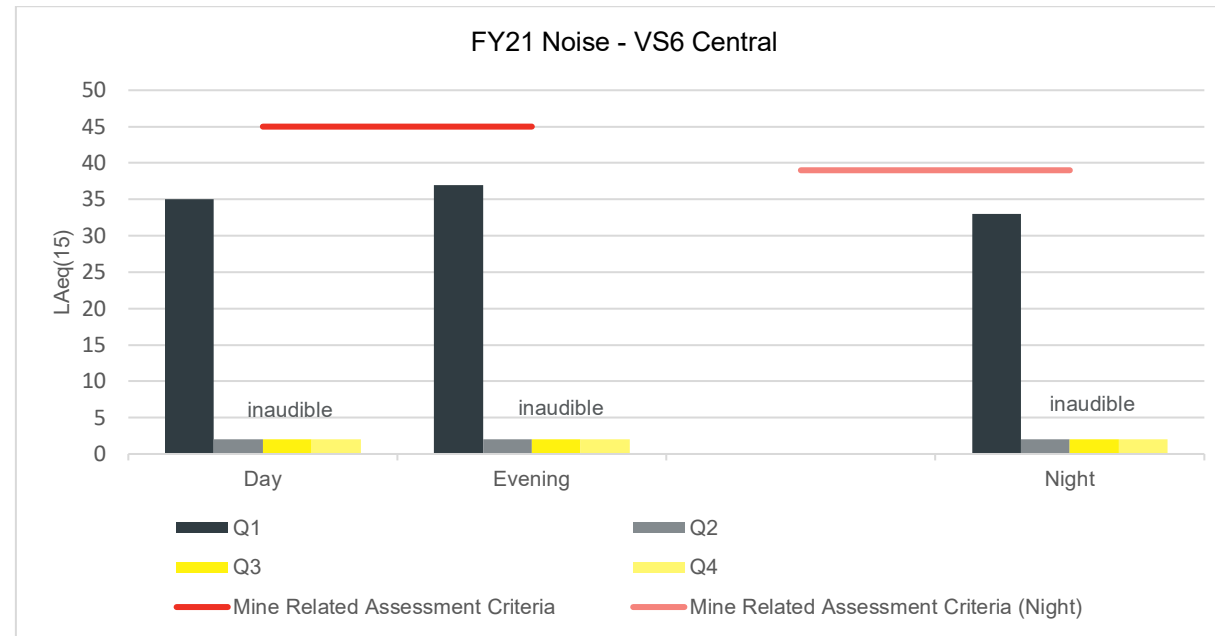
FY21 exhibited compliance with the assessment criteria.

Comparitively, FY21 had a higher-than-average 'Night' result, when compared to the short term data trends. However, still showing regular peaks and troughs associated with long-term trends.

<sup>15</sup> 39 dBA was the assessment criteria adopted in the BSO Noise Management Plan dated 25/05/2017. The management plan has since been amended and approved (December 2020) and has been increased to 43 dBA to be consistent with the Project Approval.



VS6 Central	Attended	Douglas Park Township and Receivers	45 day and evening) 49 (night)	Duggan Street behind Douglas Park Public School	Noise level between VS6 area and the nearest residential receivers to the West of site
			39 (night)		



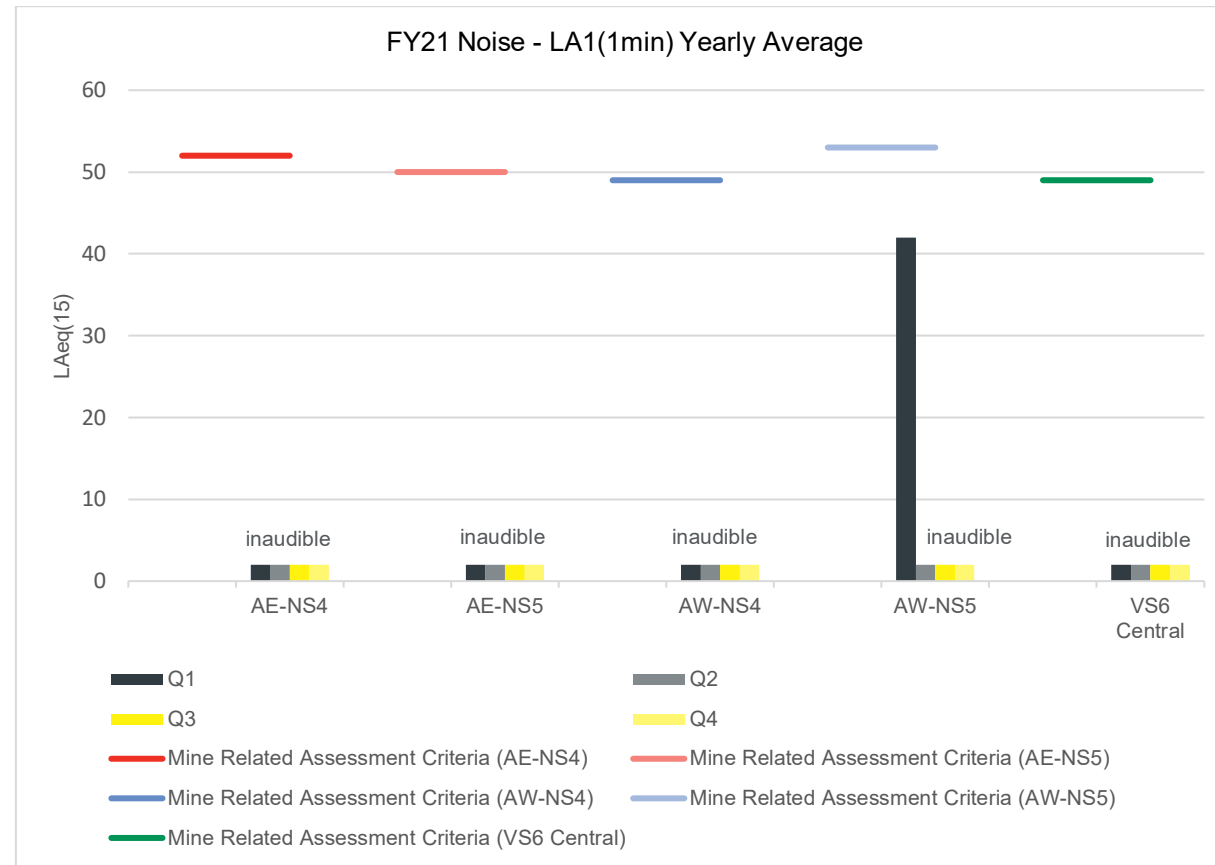
**Compliant:**

In Q1 site noise was clearly audible and was observed to be the dominant noise source across each sampling period. Noise measured was below the sleep disturbance criteria. Q2, 3, and 4 all returned 'inaudible' results across all sampling periods.

Long term trend analysis shows the FY21 average typically within historic trends.



LA <sub>1</sub> (1 min)						
AE-NS4,						
AE-NS5,						
AW-NS4,	Attended	Various (see above)	N/A	49 to 53 (see graph)	Various (see above)	Various (see above)
AW-NS5,						
VS6 Central						



**Compliant:**

Noise levels measured were below the assessment criteria for LA<sub>1,1min</sub> across all monitoring sites for FY21.

Q1 at AW-NS5 was the only site and period where a LA<sub>1,1min</sub> result was recorded attributable to mine related noise.

For long-term graphs see Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs.



## 6.9 Visual, Stray Light

The Appin West Pit Top is not directly visible by nearby residential receivers. Lighting located on the personnel and materials winder is partially visible from some residences at Wilton however it has not been raised by the community as an issue.

At Appin East, operations are not directly visible from nearby residential receiver locations. Lighting located at the top of the coal storage bins is partially visible from some residences however it has not been raised by the community as an issue.

Due to the relatively remote location of Appin North there are no significant issues regarding light pollution.

There were no lighting impacts from construction activities undertaken during the reporting period.

Three lighting community complaints were received in the reporting period in relation to exploration activities. Mitigation measures were put in place in these instances.

To minimise the visual disturbance from the Vent Shaft No. 6 site, exposed areas have been revegetated. The most significant feature for minimising visibility of the site is the earthen noise barrier. This bund has also been revegetated.

## 6.10 Aboriginal Heritage

Aboriginal and natural heritage at Appin North is managed in accordance with the approved CWEA Management Plan. The plan outlines the management/mitigation measures relating specifically to each heritage site located within or in close proximity to the CWEA. A copy of the plan is available at: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

The location of all heritage sites at the CWEA are shown on Plan 13: CWEA Cultural Heritage Sites.

Aboriginal aspects associated with subsidence from the underground mining activities are detailed in Section 6.14 of this report.

## 6.11 Natural Heritage

Natural heritage aspects associated with subsidence from the underground mining activities are detailed in Section 6.14 of this report.

## 6.12 Spontaneous Combustion

No incidence of spontaneous combustion occurred within this reporting period.

Bulli Seam coal has a very low propensity to spontaneous combustion. Sampling programs (at Appin Mine) are in place to detect any changes in coal quality that could potentially lead to spontaneous combustion occurring in coal stockpiles or the CWEA.

Routine and statutory inspections are used to identify any heating or spontaneous combustion events. In addition, a real-time carbon monoxide (CO) monitoring system exists underground, and all mine officials carry CO handheld monitors.

## 6.13 Bushfire

The risk of bushfire across Appin Mine is managed by a combination of preventative and ready response activities. Bushfire management on all sites is achieved through the formation of fire breaks, Asset Protection Zones (APZs), and the establishment of an extensive firefighting water pipeline around most sites (with booster pump facilities).



APZs are maintained as required.

There were no bushfires on IMC property in the reporting period, however some smaller-scale bushfires and hazard reduction burns did occur in the regional vicinity.

Appropriate site personnel are trained in emergency response and firefighting and have a supply of readily available firefighting equipment on the sites.

During FY21, IMC engaged a contractor to complete a risk assessment of the bushfire landscape at Appin Mine and provide a broad overview of the potential bushfire risks within and around the mine land holdings and indicate a range of bushfire protection measures that could be investigated and/or implemented to afford a greater level of bushfire resilience at these locations. The risk assessment will be used to develop a Bushfire Management Plan for the Appin Operations and is expected to be finalised in FY22.

The objectives of the Bushfire Management Plan will be to:

- comply with relevant legislative and other requirements related to bushfire management;
- provide the frame work for management of bushfire risks;
- detail the measures in place to protect company, public and private assets and the natural environment from the adverse impacts of uncontrolled wild fire;
- describe bushfire hazard reduction measures;
- outline the control measures to prevent spread of fire from IMC premises to adjacent lands;
- describe the communications, response and processes in place to manage bushfire emergencies;
- describe bushfire protection zone management practices;
- minimise the fire risks to personnel, the general community and fire-fighters; and
- cooperate with relevant bushfire services and other authorities in relation to bushfire management, bushfire hazard reduction and emergency response.

## **6.14 Mine Subsidence**

### **6.14.1 Approvals**

#### **6.14.1.1 AA7 Longwalls 705 – 710**

The Subsidence Management Plan (SMP) for AA7 Longwalls 705 to 710 was approved by the Department of Trade, Investment, Regional Infrastructure and Services (DTIRIS) on 28 February 2012 (for Longwalls 705 and 706) and 28 September 2012 (for Longwalls 707 to 710). On 17 April 2020, the SMP submitted to DPIE on 1 July 2008, and its subsequent amendments, was granted a new approval from the Resources Regulator until 31 December 2024. A variation to the finishing end of Longwall 708B (extending the panel by 94 m) was granted on 23 November 2020. The end date of the approval remains as 31 December 2024.

The Longwalls 705 to 710 SMP is supported by management plans addressing social, cultural, environmental and infrastructure aspects of the mining area.

Appin Longwall 708 is divided in to two sections - A and B, to step around a geological feature. Longwall 708A has been extracted. Longwall 708B began extraction on 24 April 2020 and as of 30 June 2021 had progressed approximately 1800 m.



#### **6.14.1.2 AA9 Longwalls 901 - 904**

The Extraction Plan (EP) for AA9 Longwalls 901 - 904 was approved by the Department of Planning and Environment (now DPIE) on 10 September 2014. The Longwalls 901 – 904 EP is supported by management plans addressing social, cultural, environmental and infrastructure aspects of the mining area.

IMC applied to DPIE to vary the EP Approval for Longwalls 901 - 904 on 24 March 2015 to shorten the commencing end of Longwall 901 by 418 m. DPIE approved the variation on 29 April 2015. A variation to Longwall 903 and 904 was approved on 21 March 2019. The latest variation, to extend the finishing end of Longwall 904 by 61 m, was approved on 18 December 2020.

Extraction of Longwall 903 commenced on 1 November 2019 and was completed on 7 April 2021. Longwall 904 began extraction on 20 May 2021 and as of 30 June 2021, had progressed approximately 195 m.

#### **6.14.1.3 Appin (West Cliff) Area 5 Longwalls 37 – 38**

The Area 5 EP for Longwalls 37 and 38 was approved by the Department of Planning and Infrastructure (now DPIE) on 24 March 2014. SMP approval was granted by DTIRIS on 28 March 2014. The EP is supported by management plans addressing cultural, environmental and infrastructure aspects of the mining area.

Longwall 38 was completed on 1 February 2016. The area has undergone post-mining monitoring in the reporting period as part of the approved monitoring program.

#### **6.14.2 AA7 and AA9 Monitoring and Management Programs**

Surface features in the vicinity of mining during the reporting period include:

- the Nepean River and associated tributaries;
- Harris Creek and associated tributaries;
- cliffs, rocky outcrops and steep slopes;
- Aboriginal and European heritage; and
- buildings and infrastructure.

Monitoring activities within the EP/SMP area includes:

- water flow, pool water levels and water quality monitoring;
- photographic and observational monitoring to identify mining-induced fractures, strata gas releases, iron staining and rock falls;
- aquatic ecology monitoring;
- Aboriginal and European heritage items; and
- built features.

The results of these monitoring programs are provided below.

#### **6.14.2.1 Landscape Features**

During the reporting period monitoring of environmental features was carried out in accordance with the Appin Longwalls 705 to 710 SMP and Longwalls 901 to 904 EP. Monitoring was conducted within the zone of influence during baseline, mining and post-mining periods (where applicable).





No new AA7 gas release zones were identified on the Nepean River during the extraction of Longwall 708B. Four previously reported gas zones were active at some point during the reporting period with just one gas zone observed to be active during the June 2021 inspection.

No new AA9 gas release zones were observed in the Nepean River during the reporting period. Twenty-six previously reported gas zones were observed to be active at some point during the reporting period. As of the June 2021 inspection, there were ten active gas release zones observed.

Each gas zone had an estimated emission rate of less than 3000 L/min and triggered a TARP Level 1 response under the Water Management Plan.

For all observed impacts, the appropriate TARPs were applied, actions implemented, and key stakeholders notified as required by the approved SMP and EP. Table 19 includes the Nepean River gas release zones observed during the reporting period.

The Longwall 903 End of Panel (EOP) Report was published in August 2021. The full report, including specialist assessments, can be accessed via the South32 Website:

<https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

#### **6.14.2.2 Surface Water**

Inspections of the Nepean River and tributaries around AA7 and AA9 are undertaken by the IMC Environmental Field Team (IMCEFT). Monitoring includes water quality and water level as well as visual inspections for any iron staining and gas releases. Gas release zones on the Nepean River are reported above. No areas of iron staining were identified during the reporting period. Water quality along the Nepean River fluctuated throughout the reporting period, corresponding to rainfall and changing flow conditions. Deviations in water quality results away from the baseline range were recorded downstream from the mining area however these were temporary, with similar changes recorded at the reference site, upstream from mining. No changes in water quality were attributed to mining activities.

Table 19 provides a summary of the predicted and observed impacts for surface waters during the reporting period. Further analysis of surface waters is included in the Longwall 903 EOP Report. Further analysis will also be included in the Longwall 708 EOP Report.



**Table 19: Predicted vs Observed Impacts for Landscape Features for Area 7 and Area 9**

<b>Aspect</b>	<b>Predicted Impacts</b>	<b>Observed Impacts</b>	<b>Completed Actions</b>
Surface waters	Unlikely for any significant change in water level along the Nepean River	No impacts observed	N/A
	Potential for surface water flow diversion is very low	No impacts observed	N/A
	Potential for surface water diversion directly above or adjacent the mining area	No impacts observed	N/A
	Low likelihood of ferruginous springs. Significant impacts on Nepean River pH, iron and dissolved oxygen not predicted	No impacts observed	N/A
Gas releases	Likely that strata gas emissions could occur in the Nepean River with some associated reduction in dissolved oxygen possible	Existing gas release zones observed for Area 7 and 9 during the reporting period. No new gas zones were identified.	<ul style="list-style-type: none"> <li>Continued monitoring program</li> <li>Reported in the Longwall 903 End of Panel Report</li> <li>Summary included in Annual Review</li> </ul>
Iron staining	Minor iron flocs are expected to occur in the Nepean River. No change in water quality is predicted	No impacts observed	N/A
Fracturing	Minor fracturing may occur in the bed of the Nepean River	No impacts observed	N/A
Creeks	Possible for localised increase in ponding, flooding or scouring	No impacts observed	N/A
Cliffs	Possible minor isolated rock falls. Unlikely that any large cliff instabilities would occur	No impacts observed	N/A
Steep Slopes	Unlikely that there would be any significant impacts to steep slopes	No impacts observed	N/A



### **6.14.2.3 Groundwater**

Piezometer and bore monitoring data have been used to determine pre-mining groundwater levels and quality. Groundwater data is collected during the mining period, then analysed and interpreted for reporting in the EOP Report as outlined in the relevant SMP and EP.

#### **6.14.2.3.1 AA7**

No longwall in Area 7 was completed in FY21 therefore no EOP Report was produced during the reporting period. Extraction of Longwall 708A was carried out between April and October 2019. Longwall 708B commenced in April 2020 and will continue in FY22. By the end of June 2021 Longwall 708B had progressed approximately 1800 m. The EOP Report for Longwall 708 will incorporate results from 708A and 708B.

Borehole EAW5 (S1913) is located approximately 1.2 km north to northwest of Longwall 708. Pressures in the Hawkesbury Sandstone (HBSS) have been monitored by three piezometers installed in the bore. At the end of the reporting period, the recorded water levels/pressures in the two upper piezometers were higher than the lowest observed in the baseline period. The pressure in the piezometer located at 194 m was 8.4 m below the baseline records.

Borehole EAW7 (S1936) is located over Longwall 706. Only one piezometer, installed at 65 m below ground level, has been operational during extraction of Longwall 708. The remaining piezometers failed by shear and were disconnected during Longwall 706 extraction for safety reasons. Data collected in February 2021 show water level in the piezometer at 4.8 m below the baseline level.

A comprehensive groundwater assessment will be included in the Longwall 708 EOP Report.

#### **6.14.2.3.2 AA9**

Extraction of Longwall 903 commenced in November 2019 and was completed in April 2021, with the EOP Report finalised in August 2021.

Three piezometers are monitoring the HBSS in borehole Appin West 9 (S1941), located 185 m from Longwall 903. During extraction of Longwall 903, a decline in groundwater pressure occurred in the HBSS at monitoring bore S1941, located 280 m from the longwall extraction. The observed groundwater pressure reductions are within the predicted range for the upper two sensors at 65 m and 125 m depth but represent a Level 1 TARP trigger for the sensor at 201.6 m depth. Groundwater pressures in the sensor at 201.6 m recovered above the Level 1 TARP trigger after 93 days. No significant change in groundwater chemistry is noted for the reporting period. Groundwater inflow to the mine is calculated from the daily mine water balance. The 20-day moving average mine inflow fluctuated between approximately 1.2 and 0 ML/day during the extraction of Longwall 903, below the TARP Level 1 trigger of 2.7 ML/day.

Further groundwater information can be found in the Longwall 903 End of Panel Report.

### **6.14.2.4 Aquatic Ecology**

Within the AA7 and AA9 mining domains, significant aquatic habitat is limited to the Nepean River and its tributaries. Four species of aquatic macrophytes and five species of native fish were identified in baseline assessments for AA7 and AA9. No threatened fish or invertebrate species were identified during field surveys. The area is potentially within the range of two threatened species (Macquarie Perch and Sydney Hawk Dragonfly) listed under the *Biodiversity Conservation Act*.

Mine subsidence can result in fracturing and a net vertical uplift of the river bed, resulting in reductions in water depth. It was predicted that these effects could impact flow, connectivity and



water quality, and could also reduce availability of aquatic habitat. The Nepean River within the mining areas is generally a deep, continuous slow-flowing pool created by the damming effect of Douglas Park and Menangle Weirs. This minimises the risk of impacts on aquatic ecology resulting from reduced water flow and/or depth caused by any fracturing or net uplift of the river bed. Any impacts on water flow would be expected to be minimal due to the flooded nature of the river system.

The latest round of aquatic ecology monitoring for AA7, undertaken in December 2020, included post-extraction monitoring for Longwalls 705, 706, 707A, 707B and 708A, and further pre-extraction monitoring for Longwalls 708B to 710. The latest round of monitoring for AA9 was undertaken in November 2019 and provided further post-extraction monitoring for Longwalls 901 and 902 and the first year of post-extraction monitoring for Longwall 903. Monitoring of Longwalls 701 to 704 ceased in 2014, following the collection of at least two years of post-extraction data for each longwall. The next round of ecological monitoring is scheduled for November 2021 and results will be included in the Appin Mine Annual Review for FY22. Results presented below included specialist monitoring as well as latest observations from the IMCEFT.

Monitoring undertaken by IMC and other specialist consultants during extraction of AA7 and AA9 longwalls identified gas releases in the Nepean River. No fracturing, changes in water levels or flow have been attributed to mining. Some minor and short-term changes in water quality in the Nepean River in AA9 have been observed however these have not been attributed to mining. During the reporting period, four gas release zones on the AA7 end of the Nepean River were observed to be active. No new gas zones were observed. As of the last inspection of the reporting period, one gas zone was observed to be active. On the AA9 end of the Nepean River, 26 previously reported gas zones were observed to be active during the reporting period. No new gas zones were identified. As of the last inspection of the reporting period, ten gas zones were observed to be active.

There continues to be no observed impacts to indicators of aquatic ecology (number of taxa and biotic indices derived from macroinvertebrate sampling) attributed to extraction of AA7 and AA9 longwalls. This is expected given no more than minor gas releases and no change in water quality in the Nepean River associated with mining. No changes in water quality were observed due to gas releases, neither were any changes in water levels or diversions of flow. Statistically significant differences in these indicators among Phases (i.e. surveys) and Reaches on the Nepean River, where present, were attributed to natural spatial and temporal variation, rather than mining.

Similarly, there was no evidence of any changes to fish and aquatic macrophytes attributable to mining. The fish assemblage sampled in the Nepean River following the commencement of extraction of these longwalls was comparable with that sampled prior to extraction and no fish kills or any other observations that may suggest an impact due to mining have been observed.

Over the course of the monitoring program large changes in the distribution of aquatic macrophytes have occurred. Most recently, high flows that have occurred in the river appear to have had a substantial effect on the extent of aquatic macrophytes at some sites in the current survey. Despite this, the species composition of macrophytes has been relatively consistent and the number and type of species identified in December 2020 were very similar to those identified in December 2013 and 2014 and November 2015, 2016, 2017, 2018 and 2019. Given the absence of any observed macrophyte desiccation and die-back, there is no evidence to suggest that changes in macrophyte diversity and distributions are outside what would be expected due to natural variation. In particular, changes to bank and river bed morphology due to flooding in 2019 appears to have resulted in substantial localised changes in the coverage of macrophytes, independent of mining.

A summary of predicted and observed impacts on aquatic ecology for the reporting period for AA7 and AA9 is provided in Table 20 and Table 21 respectively. Further detailed information on aquatic ecology monitoring can be found in latest EOP reports for Longwall 707 and 903, on the South32 website.



**Table 20: Predicted vs Observed Impacts for Aquatic Ecology for AA7**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Aquatic Ecology	Exposure of wetted substrata in some limited shallow areas of the river, potentially arising due to minor reductions in water depth caused by net uplift of the river bed	No reported change in water level apart from the normal fluctuations associated with rainfall and WaterNSW releases. No exposed wetted substrata observed	N/A
	Potential water loss or reduced flow due to fracturing of the river bed. However, this was not expected to result in significant water loss or reduced flow due to the flooded nature of this reach	No fracturing observed in the Nepean River and no water loss observed	N/A
	Components of aquatic ecology such as flow characteristics, connectivity and water quality should not be impacted by any predicted subsidence	No reported surface water flow diversions, impacts on water quality or connectivity of aquatic plant components	N/A
	Alterations to the composition of macrophyte beds due to small reductions in water depth. However, this is not expected to have a significant impact on the overall habitat in the survey area	No mining induced dieback has been observed though changes to bank and river bed morphology due to recent flood events appears to have resulted in substantial localised changes in the coverage of macrophytes, independent of mining.	N/A
	Possible that gas emissions may have impacts on water quality	No evidence of significant impacts on water quality due to gas releases	N/A
	Potential impacts on fish and macroinvertebrates due to mine subsidence are considered unlikely	No evidence of mining induced impact on either fish or macroinvertebrates	N/A

**Table 21: Predicted vs Observed Impacts for Aquatic Ecology for AA9**

Location	Attribute	Predicted Impacts	Observed Impacts	Completed Actions
Nepean River	Ponding, flooding and scouring of stream banks	There are unlikely to be any measurable impacts on the availability or connectivity of aquatic habitats in the downstream reach of the Nepean River due to its flooded nature and very low gradient.	None identified during observations of aquatic macroinvertebrates, fish and aquatic macrophytes at aquatic ecology monitoring sites in 2019. No impacts observed by IMCEFT as part of routine monitoring through the reporting period.	N/A
	Fracturing of bedrock and diversion of surface flows	It is considered unlikely that there would be any net loss of water from the catchment. No significant changes in the quantity or quality of permanent aquatic habitat.	None identified during observations of aquatic macroinvertebrates, fish and aquatic macrophytes at aquatic ecology monitoring sites in 2019 or during IMCEFT inspections throughout the reporting period.	N/A
	Gas releases	Minor gas releases, associated iron precipitate and reductions in concentrations of dissolved oxygen are likely to occur due to extraction.	None identified during observations of aquatic macroinvertebrates, fish and aquatic macrophytes at aquatic ecology monitoring sites in 2019. Gas releases observed however not associated with any reduction in dissolved oxygen.	N/A
Drainage Lines	Fracturing of bedrock and diversion of surface flows	Effects to aquatic habitat and biota due to any diversion of flows and draining of pools in drainage lines would be minimal, due to the limited aquatic habitat provided by these areas.	No fracturing observed in drainage lines.	N/A



#### 6.14.2.5 Terrestrial Ecology

Assessments of significance have been completed for an endangered community and threatened flora and fauna species in the mining area. The assessments focused on flora and fauna that could potentially be impacted by subsidence. The following aspects were assessed:

- native vegetation communities;
- threatened flora; and
- threatened fauna and fauna habitat.

Plant communities, fauna habitats, threatened species, populations and ecological communities have not been significantly impacted by subsidence during the reporting period as outlined in Table 22.

**Table 22: Predicted vs Observed Impacts for Terrestrial Ecology for AA7 and AA9**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Vegetation communities and fauna habitat	Minor impacts to riparian habitats on the Nepean River through changes in water levels, desiccation, gas release and minor fracturing	No impacts observed	N/A
	Minor impacts to vegetation due to rock falls, an increase in ponding, flooding or cracking to drainage lines and creeks	No impacts observed	N/A
Threatened flora	Unlikely that any threatened flora would be significantly impacted	No impacts observed	N/A
Threatened fauna	Unlikely that threatened fauna or habitats will be significantly impacted	No impacts observed	N/A

#### 6.14.2.6 Cultural Heritage

No impacts to historical sites or Aboriginal heritage sites were recorded during the reporting period.

#### 6.14.2.7 Surface Infrastructure

Surface infrastructure located within or near the mining areas includes the following:

- Optical fibre cables (Telstra, Optus, NextGen and Powertel).
- Main Southern Railway and associated infrastructure.
- HW2 Hume Highway and associated infrastructure.
- Local roads and drainage culverts.
- Power infrastructure.
- Copper telecommunications cables.
- Potable water and sewerage networks.
- Building structures, pools, water tanks and farm dams.
- Groundwater bores.
- Heritage structures.
- Nepean Twin Bridges at Douglas Park.
- Pumps in the Nepean River.



- Upper Canal, Cataract Tunnel and associated infrastructure.
- Survey Control Marks.

A summary of the observed surface infrastructure impacts during the reporting period for AA7 is provided in Table 23. Surface infrastructure impacts attributed to AA9 are summarised in Table 24.

### **6.14.3 Area 5 Monitoring and Management Programs**

Longwall 38 ceased extraction on 1 February 2016. Monitoring of the Georges River continues, providing pre-remediation data for the Georges River Rehabilitation Plan (GRRP). Monitoring activities currently include:

- photographic and observational monitoring including the Georges River and its tributaries, cliff lines and landscape features;
- water flow, pool water levels and water quality monitoring; and
- shallow groundwater level monitoring.

Monthly monitoring is undertaken by the IMCEFT with fortnightly targeted inspections of Georges River pools that are observed to be below baseline level. Below baseline water levels were recorded during the FY21 reporting period. All pools that exhibited below baseline water levels have previously been reported. The occurrence of below baseline observations during FY21 was fewer than previous years following subsidence impacts. Below baseline pool levels are assessed in detail in the GRRP.

Remediation options for impacted sections of the Georges River as a result of Longwalls 32 to 38 have been proposed in the GRRP. The GRRP incorporates findings from a pre-remediation study. This involved the cessation of discharge from BCD and the monitoring of water recession in pools, as well as incorporating the results from the Georges River Catchment Modelling. Pre-remediation data continued to be collected through the reporting period. This included pool water levels and quality, and surface flows.

The GRRP was approved by the Resources Regulator on 24 April 2020. It updates the proposed rehabilitation of the Georges River, following the completion of extraction of Area 5. It is included in the Appin Mine Mining Operations Plan (MOP), approved by the Resources Regulator on 19 August 2020 for a limited period and reapproved on 16 October 2020. IMC are currently arranging for land access agreements to undertake the approved GRRP. Results from the WC21 rehabilitation trial at Dendrobium Mine will confirm the methodology to be used in Georges River.

#### **6.14.3.1 Landscape Features**

Post-mining monitoring includes regular inspections of the Georges River as well as riparian features and cliffs. There were no new impacts identified as subsidence in Area 5 has ceased (see Table 25).

#### **6.14.3.2 Surface Water**

The monitoring program provides a basis for the comparison of flow, pool level and water quality in the area before, during and after mining as outlined in the Area 5 Longwalls 37 to 38 EP.

During the reporting period field water quality in the Georges River and tributary sites generally remained within the baseline range, with no significant change in trend or adverse changes being observed. No TARP trigger levels were recorded for pH. The levels of manganese, nickel and zinc in the Georges River maintained similar pre-Longwall 38 variability, with no significant change to the observed ranges as a result of extraction of Longwall 38.

A summary of the observed surface water impacts for Longwall 38 is provided in Table 26.



**Table 23: Predicted vs Observed Impacts for Surface Infrastructure for Area 7 in FY21**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Local Road	Minor cracking and localised heaving of the road surface in some locations above the longwall	Bump in subsidence profile and the pavement developed in two locations on Menangle Road during the extraction of LW708A	Menangle Road was proactively repaired on two occasions prior to the development of safety or serviceability issues
Hume Highway	No impacts on the safety or serviceability of the highway after the implementation of the management strategies	Minor crazing noted in pavement. Bumping started to develop in carriage way and Partridge VC truck stop. No impact to safety or serviceability at this stage.	No repairs undertaken at this stage. Repairs to road surface likely early in FY22.
Main Southern Railway	No impacts on the safety or serviceability of the railway after the implementation of the management strategies	Minor changes in track geometry but all were managed through the implementation of the Management Plan.	Minor tamping required to fix a pre-existing issue with the track.
Douglas Park Twin Bridges	Impacts unlikely after the implementation of the TARP	No reported impacts	N/A
Moreton Park Road Bridge (south)	Impacts unlikely after the detailed investigation, analysis and implementation of the TARP	No reported impacts	N/A
Power Infrastructure	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	N/A
Copper telecommunications cables	Impacts unlikely	No reported impacts	N/A
Optical fibre cables	Impacts unlikely with the implementation of the management strategies including OTDR monitoring and mitigation	No reported impacts	N/A
Building structures	A low frequency of minor impacts and very low frequency of more significant impacts were predicted	All building structures remained in safe and serviceable conditions during the extraction of LW708A.	Claims that have been lodged are being managed by Subsidence Advisory NSW (SA NSW) through the relevant legislation
Pools	In ground pools could be more susceptible to ground strains	No reported Impact	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Water tanks	Impacts unlikely	No reported impacts	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Farm dams	Potential for minor cracking or leakage	No impacts attributed to mine subsidence.	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Heritage structures	Impacts unlikely	No reported impacts	N/A
Groundwater bores	Potential for blockage or reduction in the capacity of the groundwater bores	No reported impact.	N/A
Pumps in the Nepean River	Impacts unlikely	No reported impacts	N/A
The Upper Canal, Cataract Tunnel and associated infrastructure	Impacts unlikely	No reported impacts	N/A
Survey control marks	Marks are likely to be exposed to the full range of mining induced subsidence movements. Marks within the area of influence have been noted as 'disturbed' in the SCIMS database.	Marks have been exposed to the full range of mining induced subsidence movements.	Following the completion of subsidence in the area a network of survey marks will be re-established to the satisfaction of NSW Spatial Services.





Table 24: Predicted vs Observed Impacts for Surface Infrastructure for Area 9 in FY21

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Local Road	Minor cracking and localised heaving of the road surface in some locations above the longwall	No reported impacts due to mining.	N/A
Main Southern Railway	No impacts on the safety or serviceability of the railway after the implementation of the management strategies	No reported impacts.	N/A
Douglas Park Twin Bridges	Impacts unlikely after the implementation of the TARP	No reported impacts.	N/A
Moreton Park Road Bridge (south)	Impacts unlikely after the detailed investigation, analysis and implementation of the TARP	No reported impacts	N/A
Power Infrastructure	Impacts unlikely, but minor mitigation measures may be required	No reported impacts.	N/A
Copper telecommunications cables	Impacts unlikely	No reported impacts	N/A
Optical fibre cables	Impacts unlikely with the implementation of the management strategies including OTDR monitoring and mitigation	No reported impacts	N/A
Potable Water network	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	N/A
Sewerage Network	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	N/A
Building structures	A low frequency of minor impacts and very low frequency of more significant impacts were predicted	No new impacts.	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Pools	In ground pools could be more susceptible to ground strains	No reported impacts.	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Water tanks	Impacts unlikely	One impact to a water tank reported during Longwall 903	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Farm dams	Potential for minor cracking or leakage	No impacts attributed to mine subsidence.	Claims that have been lodged are being managed by SA NSW through the relevant legislation
Heritage structures	Impacts unlikely	No reported impacts	N/A
Groundwater bores	Potential for blockage or reduction in the capacity of the groundwater bores	No reported impacts	N/A
Pumps in the Nepean River	Impacts unlikely	No reported impacts	N/A
The Upper Canal, Cataract Tunnel and associated infrastructure	Impacts unlikely	No reported impacts	N/A
Survey control marks	Marks are likely to be exposed to the full range of mining induced subsidence movements. Marks within the area of influence have been noted as 'disturbed' in the SCIMS database.	Marks have been exposed to the full range of mining induced subsidence movements.	Following the completion of subsidence in the area a network of survey marks will be re-established to the satisfaction of NSW Spatial Services.



**Table 25: Predicted vs Observed Impacts for Landscape Features for Area 5 during the reporting period**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Georges River and tributaries	Negligible environmental consequences including: negligible diversion of flows or changes in the natural drainage behaviour of pools; negligible gas releases and iron staining; and negligible increase in water cloudiness. over at least 80% of the stream length subject to vertical subsidence >20mm. No subsidence impact or environmental consequence greater than minor.	No new impacts observed	N/A
Cliffs	Cliffs of "special significance": Negligible impact (that is occasional rock falls 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 impacts (that is occasional rock falls, 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)	No impacts observed	N/A
Access Track	Minor impacts	No impacts observed	N/A

**Table 26: Predicted vs Observed Impacts for Surface Water for Area 5**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Georges River	Negligible environmental consequences including: negligible diversion of flows or changes in the natural drainage behaviour of pools; negligible gas releases and iron staining; and Negligible increase in water cloudiness. Over at least 80% of the stream length subject to vertical subsidence >20mm. No subsidence impact or environmental consequence greater than minor.	Based on analysis of the long-term water quality records for designated upstream and downstream sites of Longwall 38, no significant water quality impacts were observed or measured within the Georges River. Fracturing and diversion of flow with lower pool levels. Pool water levels respond to releases from BCD.	<ul style="list-style-type: none"> <li>Monitoring program continued</li> <li>Reported to key stakeholders</li> <li>Reported in EoP Report and Annual Review</li> <li>Monitoring program reviewed</li> <li>Impacts reviewed against Performance Measures</li> <li>Technical specialist notified and advice on Corrective Management Actions (CMAs) sought</li> <li>Impacts to Georges River included in GRRP, which was approved at the end of FY20.</li> </ul>



### **6.14.3.3 Groundwater**

Post mining monitoring of groundwater in the HBSS in Area 5 has continued as outlined in the Longwall 37-38 EP.

No adverse interconnection of aquifers and aquitards has been observed within 20 m of the plateau surface and no increased rate of groundwater recharge into the plateau has been observed in the post-mining period.

No TARP trigger levels related to aquifer or aquitard interconnection or changes in recharge have been observed in the post-mining period.

Water levels in piezometers GR27, GR28, GR70 and WC54 were not affected by subsidence during or after extraction of Longwall 38. The water level in WC95 fell by approximately 9 m and was reported as a Level 1 TARP during Longwall 38 extraction. At the end of the reporting period the water level in the borehole was 0.12 m above the pre-mining baseline level and about 9.4 m higher than the lowest level recorded following mining. These changes remain within predictions.

### **6.14.3.4 Aquatic Ecology**

No specialist aquatic ecology monitoring was undertaken during the reporting period as the post-mining period of this program is complete. Results from specialist aquatic ecology monitoring have been included in previous Annual Reviews.

Observations of aquatic ecology habitat is captured as part of monthly inspections undertaken by the IMCEFT. Apart from low water levels observed in some pools during the reporting period, no specific impacts to aquatic ecology were evident.

Specialist aquatic ecology monitoring will continue following the implementation of the GRRP.

A summary of predicted and observed impacts on aquatic ecology is provided in Table 27.

### **6.14.3.5 Terrestrial Ecology**

A baseline Terrestrial Flora and Fauna Assessment (Biosphere, 2009) was undertaken in support of the BSO Project Environmental Assessment. The Study Area for the assessment included Longwalls 37 and 38. Supplementary field surveys for terrestrial biodiversity were undertaken by Niche (2013), for the purposes of the Longwalls 37 and 38 EP.

Subsidence effects are unlikely to have a significant impact on any threatened flora or fauna species (Niche, 2013). However, impacts may lead to the alteration of habitat and the alteration of the natural flow regimes of rivers, stream, floodplains and wetlands following longwall mining (Niche, 2013).

Visual inspections of vegetation communities within the Longwalls 37 and 38 Study Area are undertaken as a part of routine landscape and water monitoring programs. Post-mining monitoring focuses on detecting changes to vegetation communities and fauna habitat present within the Longwalls 37 and 38 Study Area.

No impacts to vegetation have been observed in the post-mining period as shown in Table 28.



**Table 27: Predicted vs Observed Impacts for Aquatic Ecology for Area 5**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Aquatic Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	No specialist monitoring undertaken in the reporting period. Observational monitoring continues with no impacts evident in the reporting period.	N/A

**Table 28: Predicted vs Observed Impacts for Terrestrial Ecology for Area 5**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Terrestrial Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	No impacts observed.	N/A



### 6.14.3.6 Cultural Heritage

No historical sites were located above Longwall 38.

There were no post mining impacts identified as a result of longwall extraction in the reporting period. Impacts have previously been noted to Aboriginal shelter sites Georges River No. 2 (AHIMS # 52-2-2243) and Georges River No. 3 (AHIMS # 52-2-2243). These impacts were a result of subsidence movements from Longwall 35 and Longwall 36. See relevant EOP Reports for further information.

### 6.14.3.7 Surface Infrastructure

Subsidence monitoring programmes are developed in consultation with key stakeholders and ensure that all key infrastructure and other surface features located above the extraction areas are closely monitored to assess subsidence movements and impacts.

Active mining concluded in Area 5 with the completion of Longwall 38 on 1 February 2016. The area has undergone post mining monitoring as part of the approved monitoring program and no survey monitoring has been undertaken in FY21. There were no reported impacts to any built features or subsidence claims in FY21 in Area 5.

## 6.15 Hydrocarbon Contamination

Refer to Section 6.4.

## 6.16 Hazardous Material Management

### 6.16.1 Storage

Oils are stored in purpose-built facilities with appropriate bunding and firefighting provisions available. A licenced contractor is engaged to remove and recycle and/or dispose of used/waste oil and grease products through appropriately licenced facilities.

Diesel fuel is brought to the Appin Pit Tops by road tanker and stored in above ground bunded tanks, from where it is transferred to diesel pods for underground use or direct to machinery.

Appin has two chlorine dioxide dosing plants in use; one at the Appin West Pit Top, and the other at BCD.

Details of the bulk chemical storage locations and manifest quantities associated with the Appin West and Appin North operations are provided in Table 29 and Table 30. No dangerous goods stored at Appin East are at manifest quantities.

**Table 29: Summary of Dangerous Goods Storage at manifest quantities - Appin West**

Storage Area ID	Proper Shipping Name	UN No.	Class / Division	PG	Type	Design Capacity	Typical Quantity
ABT 01	Hydrochloric Acid 33%	1789	8	II	AGT	12,500 L	12,500 L
ABT 02	Sodium Hydroxide 35%	1824	8	III	AGT	1,800 L	1,800 L



ABT 03	Sodium Hypochlorite 12.5%	1791	8	III	AGT	1,800 L	1,800 L
ABT 04	Hydrochloric Acid 9%	1789	8	III	AGT	3,000 L	3,000 L
ABT 05	Sodium Chlorite 7.5%	1908	8	III	AGT	3,000 L	3,000 L
ABT 06	Hydrochloric Acid 33%	1789	8	II	AGT	15,000 L	15,000 L
ABT 07	Sodium Chlorite 7.5%	1908	8	III	AGT	2,000 L	2,000 L
ABT 08	Sodium Hydroxide 35%	1824	8	III	AGT	2,000 L	2,000 L
ABT 09	Citric Acid		N/A		AGT	2,000 L	2,000 L

**Table 30: Summary of Dangerous Goods Storage at manifest quantities - Appin North**

Storage Area ID	Proper Shipping Name	UN No.	Class / Division	PG	Type	Design Capacity	Typical Quantity
ABT 01	Sodium Chlorite 7.5%	1908	8	III	AGT	4,000 L	3,000 L
ABT 02	Hydrochloric Acid 9%	1789	8	III	AGT	4,000 L	3,000 L

### 6.16.2 Explosives

All explosives/detonators for the Appin operations are currently stored at the explosives storage facility located at the Appin East mine site. IMC is currently in the process of relicensing the AW magazine. Storage facility capacity information for Appin East and Appin West is provided in Table 31 and Table 32 respectively.

**Table 31: Explosives and Detonator Storage – Appin East**

Site	Type	Capacity
Appin East	1.1D Explosive	550 kg
	1.1B Detonators	5,000 detonators

**Table 32: Explosives and Detonator Storage – Appin West**

Site	Type	Capacity
Appin West	1.1D Explosive	2,000 kg
	1.1B Detonators	5,000 detonators



### 6.16.3 Radiation Gauges

There is one monitoring gauge (moisture scanner) at the Appin East Surface Elevator Belt that contains low emission radioactive isotopes. This gauge is licenced and maintained as per the legal requirements. The gauge is housed in an appropriate container and is inspected and tested in accordance with legislative requirements.

There are several monitoring gauges (moisture scanners) in the WCCPP that contain low emission radioactive isotopes. These gauges are licenced and maintained as per legal requirements. All gauges are housed in appropriate containers and are inspected and tested in accordance with legislative requirements.

## 6.17 Methane Management

The in-seam gas content of Appin mining areas is in the order of 12 to 14 cubic metres of methane per tonne of in-situ coal. A comprehensive underground methane drainage program is maintained, which includes a network of drill holes and pipes to recover a large proportion of this gas by in-seam and cross-measure drainage. Methane drainage is necessary to provide a safe, compliant and productive underground mining environment.

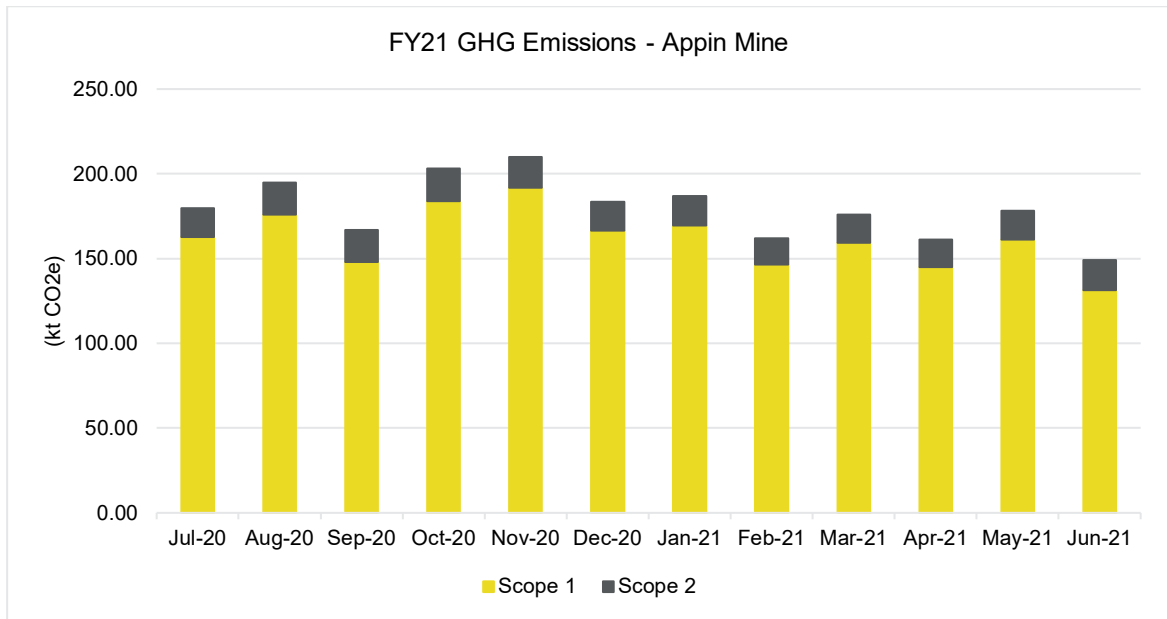
Methane gas extraction, utilisation and venting rates are summarised and reported monthly for greenhouse gas (GHG) accounting. During this period the Appin monitoring systems, procedures and figures reported were audited (reasonable assurance) as required by statutory and internal requirements.

Results of the GHG accounting for FY21 are summarised in Table 33 and Figure 10.<sup>16</sup> Long-term results for FY15 to FY21 are shown in Figure 11.

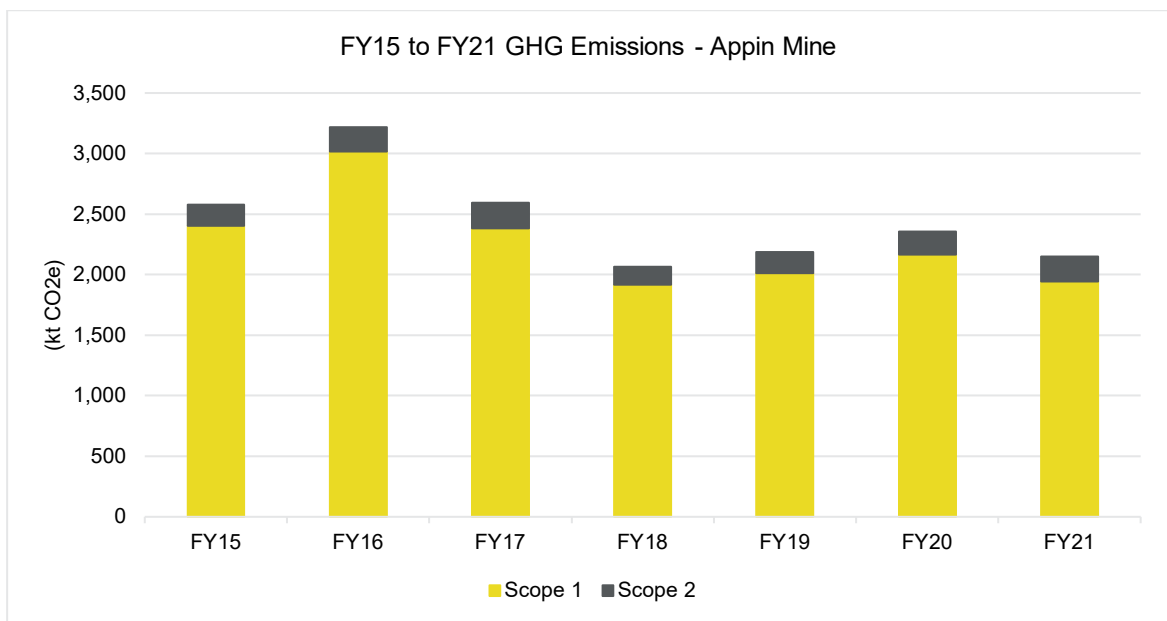
**Table 33: Summary of Greenhouse Emissions - Appin Mine**

<b>Emission Type</b>	<b>Unit</b>	<b>FY21 Total</b>
Scope 1	kt CO <sub>2-e</sub>	1941
Scope 2	kt CO <sub>2-e</sub>	210

<sup>16</sup> Figures are for NGER (National Greenhouse and Energy Reporting) Facility WCF01 (for FY15 and FY16) and APN01.



**Figure 10: FY21 GHG Emissions - Appin Mine**



**Figure 11: FY15 to FY21 GHG Emissions - Appin Mine**

### 6.17.1 Mine Safety Gas Drainage

In AA7 and AA9, gas drainage is now entirely undertaken by the underground gas drainage network before being piped to the surface and utilised by the Energy Developments Limited (EDL) Plants (West and East). When there is more gas available from the mine than can be utilised by EDL, the flaring systems are initiated to abate the methane content of the gas.

The flares at the Appin West Gas Drainage Plant were not in operation during FY21. The flares at the Appin East Gas Drainage Plant were used during the reporting period, however only on an as required basis when the neighbouring power station was non-operational, and gas could not be





redirected to Appin West. All drained gas has been utilised at EDL for power generation, with some minor venting during plant changes and transitions.

Mine safety gas drainage well sites in AA7 and AA9 have been rehabilitated. During the reporting period a successful level of grass cover over the rehabilitated gas well areas has been maintained.

### **6.17.2 Mine Methane Extraction**

The methane gas extracted from the coal seam by the underground gas extraction network is directed to the surface, via the gas drainage plants, from where it is piped to the electricity generation plants and used to generate electricity. A total of 1957 kt CO<sub>2</sub>-e was recovered and transferred (i.e. abated) to the EDL Power Plant.

### **6.17.3 Mine Ventilation Fans**

During the reporting period, approximately 1818 kt CO<sub>2</sub>-e was emitted to atmosphere from the Appin Mine Ventilation System, down 15% when compared to FY20 (2083 kt CO<sub>2</sub>-e). The average CH<sub>4</sub> concentration was 0.30% (up from 0.28% in FY20) and the average CO<sub>2</sub> concentration was 0.20% (up from 0.16% in FY20).

### **6.17.4 Decarbonisation Program**

South32 has set greenhouse gas emission targets, with a short-term target of maintaining Scope 1 emissions at FY15 levels through to the end of FY21, and a medium-term emissions reduction target of 50% by 2035 on a FY21 baseline (operational emissions only). The plan is then to progressively reduce emissions, such that the business is carbon neutral by 2050. The goal of carbon neutrality by 2050 aligns South32 with the Paris Agreement, as well as the NSW aspirational target for 2050.

During FY19, IMC completed a concept level study that proposed a phased roadmap of projects with the aim of delivering the goal of carbon neutrality by 2050 through a combination of increased gas capture, treatment of ventilation air methane (VAM), and offsetting. During FY20, work towards delivering key projects associated with the roadmap to carbon neutrality began. In FY21, this work has focussed primarily on increasing the proportion of fugitive emissions generated by longwall production that are captured by the gas drainage system and reticulated to abatement facilities (either power generation or flaring). This is measured by the post drainage capture efficiency (PDCE) metric.

Increases in longwall gas capture have been achieved with additional underground drilling programmes that began in FY20 and were continued into FY21. This includes directionally drilled holes targeting gas bearing strata below the longwall and into zones where it is thought gas can be extracted from the longwall goaf (the void formed by longwall extraction). Although the long term target of an average PDCE of 67% has not yet been achieved, consistent increases in PDCE have been delivered with peak rates reaching or exceeding 67%. Average PDCE increased to approximately 56% in FY20 and then to approximately 60% in FY21. During South32's base year (FY15), PDCE was 51.4%. On several occasions during the previous two years, PDCE has reached 65-67%, indicating the 67% target is achievable. These periods include December 2019-January 2020, September-October 2020, and February 2021.

Study work relating to the introduction of VAM abatement technology also commenced during FY20. Delays to the study occurred through FY21 due to COVID19 impacts, in particular the pilot plant testing.

Consequently the study wasn't able to progress as desired, however attention still remains on four key areas related to IMC's decarbonisation roadmap. These involve:

1. Recommissioning the MEGTEC Vocsidizer at Appin North (the former 'WestVAMP' facility) – this will involve reconfiguration of the existing equipment, or moving the existing equipment to a different shaft within IMC.



2. Scaling up the CSIRO VAMMIT technology (successfully operated at a pilot plant scale) into a full scale VAMMIT demonstration plant at IMC.
3. Consideration of the feasibility to implement commercial scale Regenerative Thermal Oxidisers (including the aforementioned VAMMIT units) on new and existing IMC shafts.
4. Engagement with prominent tertiary institutes and the broader industry regarding development of future VAM technology or other decarbonisation opportunities.

Items 1 and 2 above are proposed to be the subject of a pending expression of interest through Coal innovation NSW, which would see funding provided by the NSW government and potentially South32, through the Innovate32 program.

Pending success of these applications, work could commence in January 2022 on these initiatives. Items 3 and 4 are longer term objectives, and will follow on from the outcomes of items 1 and 2.

A concept study into alternative decarbonisation opportunities has also commenced.

## 6.18 Public Safety

No incidents involving the general public occurred during the reporting period. Public safety risks associated with the site activities are addressed and controlled as listed in Table 34.

Site safety is managed under a Health and Safety Management System.

**Table 34: Safety Risks and Control Mechanisms**

Potential Safety Risk	Control Mechanism
Safety on Site	<p>Workers are required to undertake a site induction which outlines the accountabilities and responsibilities in regard to safety whilst working on site, which enables them to gain access to site via the swipe card system using boom gates and turnstiles.</p> <p>Prior to visitors entering the Pit Top area they are required to contact the Illawarra Access Controller (IAC) at the turnstile or their site contact to gain access to the site. From this point the visitor is accompanied by their site contact. Once on-site additional safety information is shared via:</p> <ul style="list-style-type: none"> <li>• safety training and awareness sessions are held for all personnel working on site which allow for two-way communication between management and the workforce;</li> <li>• pre-shift safety discussions and Toolbox Talks;</li> <li>• posters, and TV screens presenting safety information located around the site;</li> <li>• periodic business updates including email and newsletter material distributed to workers; and</li> <li>• various meeting forums include safety as an agenda item in addition to a dedicated site HSE Committee meeting.</li> </ul> <p>There is no access to operational sites for members of the public unless approved.</p> <p>Access to North Cliff is restricted with locked gates.</p>
Road Safety	<p>A Drivers' Code of Conduct is in place at Appin West to ensure appropriate driver behaviour by all those who drive through Douglas Park to the mine including employees, contractors and truck transports, The Code of Conduct is communicated to employees and contractors.</p> <p>Routine daily inspections of public roads are conducted for evidence of coal spilled from trucks with the use of road sweepers as required.</p>



**Table 34: Safety Risks and Control Mechanisms**

All trucks leaving Appin North and Appin East sites must pass through the truck wash and cover loads prior to exiting the site.

Periodic speed monitoring is conducted along Wedderburn Road.

## 6.19 Waste Management

### 6.19.1 General Waste

General waste is segregated on all sites to maximise reuse and recycling opportunities in accordance with the Appin Mine Waste Management Plan. The waste streams applicable to Appin Mine are listed in Table 35.

**Table 35: Main waste streams for Appin Mine**

Waste Stream	Treatment
Timber	Recycled off site
Cardboard and paper	Recycled off site
Commingle	Recycled off site
Printer cartridges	Recycled off site
Oils (mineral and synthetic)	Recycled off site
Oily waters	Treated on site or recycled or disposed off-site
Steel and scrap metal	Recycled off site
Sewage effluent	Appin North – Treated and irrigated on-site Appin West – Treated and irrigated on-site Appin East – Disposed via town sewerage system
Industrial filters (oil filters)	Off-site recycling, treatment and disposal
Bathroom water	Appin North - Spray irrigated to land on site Appin West - Spray irrigated to land on site Appin East – Connected to town sewerage system
Particulate filters (exhaust fumes)	Off-site treatment and disposal
Hazardous waste	Off-site treatment or disposal
General waste	Landfill and reused at ResourceCo
Weak acid cation (WAC) regenerate	Removed off site for treatment/disposal
Brine	Removed off site for disposal
Biosolids	Transfer to drill mud ponds at CWEA
Drilling muds and waters	Transfer to drill mud ponds at CWEA
Electronic waste	Recycled off site
Concrete waste	Recycled off site

Solid waste volumes generated at Appin Mine (including Appin West, Appin East, Appin North and WCCPP) for the reporting period are specified in Table 36. Waste generated from exploration activities (drilling muds) and by the AW WTP for FY21 are also included in Table 36.



**Table 36: Main waste quantities for Appin Mine**

<b>Waste Stream</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>
General Waste (tonnes)	1146	1323	1080	782	1023	335	347
General Waste (ResourceCo) (tonnes)	-	-	-	-	424	1255	808
Industrial filters (tonnes)	381	380	268	243	352	754	836
Timber (tonnes)	234	225	147	62	75	5	5
Metal (tonnes)	1349	1344	935	936	967	1062	900
Cardboard (tonnes)	30	20	21	15	22	29	23
Commingle (tonnes)	17	17	14	7	17	388	14
WAC (ML)						4.5	5.9
Brine (ML)						123	139
Biosolids (ML)						0.5	0.7
Drilling Muds (ML)						5	8.4
Electronic Waste (tonnes)						0.026 <sup>17</sup>	0.2 <sup>18</sup>

### 6.19.2 Waste Reduction and Recycling

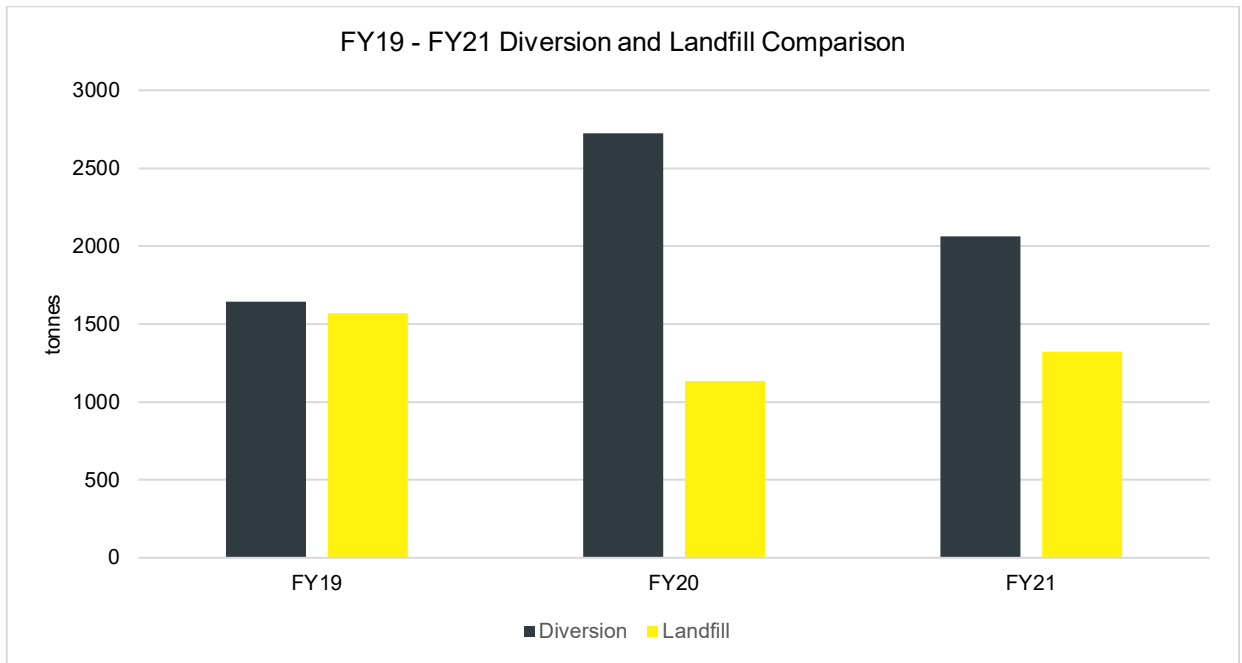
In FY19, IMC and its main waste contractor began redirecting wastes from landfill in an attempt to reduce the waste footprint of IMC. A Cleanaway and ResourceCo joint venture Resource Recovery Facility, located in Wetherill Park, processes dry non-recyclable waste. Combustible materials are turned into Processed Engineered Fuel (PEF), diverting approximately 94% of waste material from landfill. The processed engineered fuels, Low Calorific Value (CV) and High CV, comply with the requirement of the Clean Energy Regulator under the Emissions Reduction Fund.

Based on FY21 waste figures from Appin Mine, five tonne of timber and 23 tonnes of cardboard waste were generated on site. Redirecting this waste to the recycling facility is an alternative end-of-life treatment and final disposal of products opportunity.

A comparison of volumes from FY19 – FY21 diverted from and disposed of in landfill is provided in Figure 12.

<sup>17</sup> Recorded e-waste disposed at the Regional Operations Centre (ROC) via the University of Wollongong (UoW) e-waste bin. E-waste is recycled by an external recycling vendor.

<sup>18</sup> 68kg was disposed at the Regional Operations Centre (ROC) via the University of Wollongong (UoW) e-waste bin. 136kg was disposed via Certified Environmental Disposal services provided by DXC.



**Figure 12: FY19 – FY21 Diversion and Landfill Comparison**

### 6.19.3 Coal Wash

Coal wash is a by-product of processing ROM coal. During FY21, a total of 0.995 Mt of coal wash was emplaced at the CWEA. This was comprised of 0.74 Mt of coal wash from the WCCPP and 0.26 Mt from the DCPP.

The Stage 3 CWEA provides 33.5 Mt of coal wash emplacement with an expected emplacement life of approximately five years as of June 2021 (based on projected coal wash volumes). The Stage 4 CWEA will provide an additional 26.0 Mt of coal wash emplacement with an expected life to 2048.

Table 37 outlines the capacity and status of each of the coal wash emplacement areas.

Emplacement Stage	Estimated Capacity (Mt)	Emplacement Status
1	4.6	Complete
2	20.8	Complete
3	33.5	Current
4	26.0	Not Yet Commenced

During the reporting period, IMC diverted approximately 0.858 Mt of coal wash from the DCPP for beneficial uses (i.e. as an engineered fill in housing developments and Roads and Maritime Services (RMS) road infrastructure projects, for the development of arterial and agricultural roads, and under an Operational Purpose Deduction (OPD) to improve a stockpile design at WCCPP), with nearly 6 Mt diverted since 2009. IMC has a long-term agreement with Lend Lease at Calderwood, Western Earth Moving at Tullimbar, and with the RMS on the Albion Park Bypass project, that should continue to see a large volume of coal wash diverted for beneficial uses in FY21 and beyond. IMC has also developed a pipeline of major projects that will require engineered fill for the next five years.

The IMC Coal Wash Road Base Project was finalised in FY21, which utilises coal wash with other recycled materials such as fly ash to produce a material suitable for a variety of applications. IMC aligned with three universities (University of Wollongong, University of Sydney and University of Newcastle) and two other industry partners (RMS and Douglas Partners) and was successful in



securing an Australian Research Council (ARC) Linkage Project grant of \$590k to conduct research into the long-term performance of this material in roads and railways. Although the three-year project was finalised by the end of 2020, IMC are still looking to utilise coal wash and fly ash as an engineering fill for haul road construction.

Considerable previous work has been carried out on the alternative uses of coal wash, including ongoing monitoring of potential contaminants when coal wash is used for landfill or emplacement. This previous work has been reported in previous Annual Reviews.

IMC will continue to be involved in research, the development of, and implementation of alternative uses for coal wash in order to minimise the volume of coal wash emplaced at the CWEA in future.

IMC have also developed a new coal (Berrima) product destined for Vietnam that is a blend of high ash coal product constituted of coal wash that has been subjected to additional processing and Illawarra High Ash Coking Coal which is commonly referred to as Illawarra Energy Coal. 493 kT of the Berrima product were sold in FY21.

There is potential for the development of a continuing new market for the new blended product of coal wash and Illawarra Energy Coal.

#### **6.19.4 Sewage**

During the reporting period, ongoing monitoring and inspections were conducted on the two Appin Mine Sewage Treatment Plants (STPs).

Both STPs are 'Smith and Loveless' units, located at the Appin West and Appin North sites that discharge into maturation ponds. The treated effluent is irrigated on site via LDP 38 (Appin West) and LDP 4 (Appin North). A waste water maintenance contractor is periodically engaged to review operational performance and assist with the operational aspects of the Appin West and Appin North STPs to minimise the likelihood of any issues occurring.

In order to meet the land capability and irrigation management requirements of the utilisation area at Appin West, there is a predicted overflow of the storage dams up to 2.5 times per year. This is under the proviso that a minimum of 3.8 ha of irrigation area is available; and wet-weather storage is triggered following >5mm of rain.

As a result, overflow of treated effluent from the storage dam is permitted via LDP39. This LDP was approved and installed during FY21.

Monitoring of the STP effluent at both sites is completed monthly in accordance with EPL 2504. Monitoring results are reported annually via the EPA Annual Return and are made available to the public via the 14-day Report, available on the South32 website.

#### **6.19.5 WAC Disposal**

WAC, a waste stream from the AW WTP, is transported off-site to a licenced waste management facility. The total volume of WAC transported off-site during the reporting period was 5.9 ML, an increase of 1.4 ML compared to the previous reporting period. This was due to increased throughput of the AW WTP.

#### **6.19.6 Water Treatment Plant Biological Sludge**

The Appin West backwash treatment plant was commissioned in April 2009. One of the by-products of the Backwash Treatment process is an organic sludge. The total volume of sludge transferred to the CWEA in the reporting period was approximately 684 kL.



As part of the AN Temporary WTP, a sludge waste is generated and transported offsite via a licenced contractor for disposal. The total volume of sludge generated and disposed for this plant during FY21 was approximately 120kL.

### **6.19.7 Brine Disposal**

Brine is a by-product of the WTP process. Approximately 138 ML was generated in FY21 from the AW WTP, and 1.16 ML from the AN Temporary WTP. The brine is transported by truck to LDP 5 under EPL 3241 located at Marley Place, Unanderra. The brine is discharged into the same location as the dewatering discharge from Dendrobium Mine, which provides dilution for the brine as it is released into Allans Creek.

## **6.20 North Cliff**

The North Cliff Mine Site and access road is located between O'Hares Creek and Stokes Creek and is located in the Dharawal National Park. The majority of the site is gently sloping in a northerly direction towards O'Hares Creek. The mine site covers an area of approximately 10.3 ha of which approximately 6.5 ha is undisturbed by mining activities. The North Cliff site is shown in Plan 11: North Cliff Site Plan.

Access to the site is along Fire Trails 10B and 10C from an intersection on the Bulli/Appin Road, 6 km northwest of Bulli Pass.

### **6.20.1 Land Ownership and Approvals**

The North Cliff Mine Site and access road is covered by CCL 724, which includes the surface and land below to an unlimited depth over the mine site and to a depth of 15 m over the access road. Consent to establish the mine was granted in 1981 by the Minister for Planning and Environment under Section 101 of the *Environment Planning and Assessment Act 1979* and subsequently amended under Section 102 of the Act.

### **6.20.2 History**

Mining operations commenced at the site in 1983, with mining operations restricted to a single unit continuous miner. The ROM product was brought to the surface through the No. 4 shaft and into a 400-tonne surge bin, from which the product was loaded into trucks and transported to the WCCPP for processing.

Mining operations ceased at North Cliff in 1990 at which time all underground equipment was removed from the site. The two shafts were temporarily sealed with concrete caps with additional security fencing and associated signage installed to prevent unauthorised access. A number of the buildings and associated structures, and various other pieces of equipment were also removed from site. Periodic inspections are undertaken by the Specialist Environment.

### **6.20.3 Remaining Infrastructure**

As specified above, most of the infrastructure that was located on the North Cliff site was removed following closure of the mine in 1990. The major structures remaining on the site include:

- No. 3 shaft head frame;
- No. 4 shaft head frame; and
- sub-station base slabs.



There are also various items of redundant equipment on the site, including several large above ground water tanks. However, these are not posing an environmental or safety hazard. There has been no equipment removed from site during the reporting period.

#### **6.20.4 Site Security**

The North Cliff Site is enclosed with a 1.8-metre-high fence with two locked entry gates. The site security fencing is inspected on a regular basis.

#### **6.20.5 Site Rehabilitation**

An area on the site between the two shafts was used for the disposal of spoil excavated from the sinking of the shafts. The spoil heap, which covers an area of approximately 3.5 ha and contains 55,000 m<sup>3</sup> of loosely tipped shale and sandstone, has been graded, shaped and has partially regenerated with local species.

The Appin Mine Conceptual Closure Plan details the remaining site-specific closure works to be undertaken at this site. A summary is provided below:

- Conduct gas drainage and ventilation studies to determine the linkage (if any) between the underground workings at Appin North and North Cliff, then from this study determine a suitable methodology for accessing and sealing the shafts.
- Review and liaise with external stakeholders regarding final land use at the site.
- Prepare a site-specific Rehabilitation Management Plan (RMP) for North Cliff and gain external approvals from Resources Regulator and other relevant external stakeholders.
- Fill and seal No. 3 and No. 4 shafts in accordance with RMP and external approval requirements.
- Demolish and remove any redundant infrastructure from the site.
- Remediate any contaminated soil by removal, encapsulation or land farming on site.
- Re-profile site as per the final landform design to reduce the slope lengths by constructing contour banks and armouring channels to prevent erosion.
- Revegetate disturbed areas as per the final revegetation/landscape plan utilising local species.
- Other works as required to achieve the final land end use per the RMP.
- Develop ongoing maintenance management plans.

Post Closure works will include:

- monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for at least five years after works have been completed (or surface mining lease relinquished); and
- carry out weed control and replanting/reseeding as necessary.

Minor works to lower the spillway of the sediment pond were undertaken in FY21 by excavation into sandstone bedrock. An assessment was undertaken in FY21 to investigate any atmospheric connectivity between North Cliff and the current operational underground workings of Appin Colliery.

A Business Case for progressing the rehabilitation of the site was approved in August 2021. Further investigations and preliminary approvals will be progressed in FY22.





#### **6.20.6 Water Management**

Surface drainage mainly flows in open channels to the site pond located at the northwest corner of the site. The pond is a permeable structure that filters the water that passes through the wall. Water that overflows via the dam spillway in wet weather events or passes through the wall flows through open sedge-land before entering an unnamed creek and into O'Hares Creek. There is no environmental impact associated with these discharge events on the receiving environment. No significant issues were identified with the site drainage system during the reporting period, although as noted, minor works to lower the spillway of the sediment pond were undertaken. No hydrocarbons or chemicals are stored at the site.

#### **6.20.7 Air Quality**

The generation of windblown dust from the North Cliff site is unlikely to cause any adverse impacts on air quality in the community due to the isolated location of the site or on the surrounding vegetation. A large proportion of the disturbed areas are largely compacted hence further reducing the likelihood of generating significant emissions of wind-blown dust.

#### **6.20.8 Noxious Weeds**

The management measures to monitor and control the growth of noxious weeds on the site include the use of a weed control specialist to inspect the site if required. No issues requiring action from a weed control specialist were identified, however a small amount of Pampas Grass and Crofton Weed were removed on site by the Specialist Environment over FY21.

#### **6.20.9 Archaeological Sites**

Archaeological surveys were carried out in 1977 and 1983. The studies identified one aboriginal site, a single axe groove on an exposed rock shelf; located within the fenced mine site area. No damage occurred to this site during the development or operation of the mine. No damage was identified at this site during the reporting period.

#### **6.20.10 Environmental Inspections**

Regular environmental inspections of the North Cliff site were completed during the reporting period. The inspections cover multiple aspects including, but not limited to site security and safety, surface drainage, erosion, weed management, archaeological sites, dust and hydrocarbon management.



## 7. WATER MANAGEMENT

### 7.1 Water Licences

The water take for Appin Mine over the reporting period is provided in Table 38.

Note: 1 unit = 1 ML.

**Table 38: Water Take – Appin Mine**

<b>Water Licence No.</b>	<b>Water Sharing Plan, Source and Management Zone</b>	<b>Entitlement (units)</b>	<b>Total (ML)</b>
10AL117284	Greater Metropolitan Region Unregulated River Water Sources Hawkesbury and Lower Nepean Rivers Water Source Menangle Weir Management Zone	53	0.03
10AL117998	Greater Metropolitan Region Unregulated River Water Sources Southern Sydney Rivers Water Source Georges River Catchment Management Zone	2750	643
10AL118765	Greater Metropolitan Region Groundwater Sources Sydney Basin Central Groundwater Source	274	
10AL118777	Greater Metropolitan Region Groundwater Sources Sydney Basin Nepean Groundwater Source Nepean Management Zone 2	303	778
10AL119248	Greater Metropolitan Region Groundwater Sources Sydney Basin Nepean Groundwater Source Nepean Management Zone 2	300	

### 7.2 Compensatory Water

Under relevant provisions of the Project Approval (Condition 14 of Schedule 4), IMC 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 WMP. IMC is currently supplying compensatory water as per the Table 39 and Table 40.



**Table 39: Compensatory Water – Groundwater Bores**

<b>Bore</b>	<b>Mining Location</b>	<b>Impact</b>	<b>Current Status</b>	<b>Actions / Agreements</b>	<b>Water Supply Rate</b>
Unregistered	AA5  LW38 tailgate	Reduced yield due to initial reduction in SWL in shallow 30 m groundwater bore.	Matter Resolved	IMC has successfully completed optimisation works on the bore (pump replacement and modification to the pump control regime) which obtained 90% of the agreed pre-mining yield.  A final Deed of Release signed with a small compensation payment to resolve the matter.	Up to 1 x 13 kL per week.  Typically supplied at 1 x 13 kL per month.
GW108312	AA7 LW707B	Pre-emptively grouted to avoid gas release in high traffic area.	Currently investigating long-term supply options in consultation with TfNSW (formerly RMS).	Currently TfNSW organising water deliveries as required, with reimbursement sought from IMC.  Discussions regarding long-term replacement on-going with TfNSW continuing. Works intended to commence upon completion of subsidence following the extraction of Longwall 708B.	As required, due to significant seasonal fluctuations in water demand.
Initially Unregistered Licence: 10WA121956	AA9 LW901/902 chain pillar	Reduced yield due to initial reduction in SWL in shallow 20 m groundwater bore.	Awaiting landholder response.	Offers made to landholder to drill a replacement bore (WaterNSW Approval under #10WA123661).	2 x 13 kL loads per fortnight.
GW072249	AA9 LW901/902 chain pillar	Reduced yield (overcome).	Awaiting landholder response.	Optimisation (pump replacement) works completed to maximise available yield. Pump testing indicates sufficient yield can be obtained relative to agreed pre-mining yield.  Further offers have been made in-good faith for additional ancillary infrastructure to increase discharge pressure in existing irrigation system.	2 x 13 kL loads per fortnight.
GW104602	Douglas Mains	Reduced yield.	Pump warranty issue	Optimisation (pump replacement and tank installation) works completed to maximise available yield. IMC currently managing warranty issue (pump failure) with contractor.	5 x 13 kL loads per week.
GW105388	AA7 LW709	Reduced yield.	On-hold pending further negotiations following DPIE Secretary Review.	Subject to DPIE Secretary Review.	6 x 13 kL loads per week.



**Table 40: Compensatory Water – Farm Dams**

<b>Mining Location</b>	<b>Impact</b>	<b>Current Status</b>	<b>Actions / Agreements</b>	<b>Water Supply Rate</b>
LW 904 and 905	Pre-mining safety mitigatory works.	On-going management during the extraction of Longwall 904 and 905.	<p>Progression of slumping failure of dam wall embankment identified during pre-LW904 geotechnical inspection following rainfall event.</p> <p>Dam subsequently drained and alternative temporary water supply measures implemented for stock watering (2 x horses).</p> <p>Dam to be refilled once subsidence is completed following the extraction of Longwall 905.</p>	As required (nominally 1 x 13 kL load per month).



## 7.3 Groundwater

### 7.3.1 Appin West

During the reporting period, groundwater from the Appin underground operations was pumped to the surface at Appin West for treatment via the Appin West WTP. The treated water is either blended and piped underground for reuse, and/or discharged to the environment via LDP 24. Discharge volumes at LDP 24 are made available to the public via the 14-day Report, published on the South32 website. Refer to Table 17 for discharge volumes.

### 7.3.2 Appin East

During the reporting period, groundwater from the Appin White Panel storage area was pumped to the surface and stored in a 1,400 L tank at Appin East. The water is dosed with sodium hypochlorite to inhibit microbiological growth, before being re-used underground for fire suppression, and mine-services uses (hose-down, belt maintenance, etc.).

### 7.3.3 Appin North

Water for underground use is delivered from BCD to the underground operations via a gravity fed pipeline. Water make resulting from strata water inflow is collected in pits and low points in the underground workings where it is mixed with water delivered underground from surface storage. This strata water is brought to the surface either as moisture contained within the coal or as surplus underground water. Groundwater and surplus mine water can be pumped to the surface for use in the WCCPP from Area 5 if required. During the reporting period approximately<sup>19</sup> 176 ML (calculation<sup>20</sup>) of water was delivered underground from BCD with 7.26 ML of surplus underground water pumped to the surface for use in the WCCPP and the Appin North Temporary WTP. The remaining ~467 ML<sup>21</sup> of BCD water was used in the WCCPP, for dust suppression (watercarts), washdown and the truck wash. Excess water in Pond 3 and Pond 4a continued to be used for dust suppression on the active coal wash emplacement area with the water being filtered through the CWEA before entering the emplacement underdrainage system.

The Appin North Temporary WTP was commissioned in May 2021 and allows for the treatment of groundwater pumped to the surface from Area 5. The treated groundwater that meets required limits is then directly discharged to Brennans Creek as permeate via LDP 40. Non-conforming water is discharged into a drainage line that feeds BCD. Discharge volumes and water quality at LDP 40 is made available to the public via the 14-day Report, available on the South32 website. Refer to Table 17 for discharge volumes.

The planned Appin North Permanent WTP will treat water currently stored in Area 5, as well as underdrainage from the CWEA water management system.

There were no incidents of groundwater pollution within the report period.

Groundwater monitoring associated with previous land contamination due to hydrocarbons is discussed in Section 6.4.

---

<sup>19</sup> BCD underground usage is calculated using the BCD to Surface flow meter (method described in Footnote 18). The BCD to Surface flow meter stopped turning in April 2020 and was not repaired until September 2020, therefore weekly averages from the previous financial year was used to supplement missing data.

<sup>20</sup> There are two flow meters that record flow leaving BCD, one is the total flow from BCD to the Surface and Underground (UG), and the other is BCD to the Surface only. Therefore, the flow of BCD water to UG needs to be calculated by subtracting the BCD to Surface flow from the BCD to Surface and UG flow.

<sup>21</sup> Figure is an approximation as it contains estimates (see Footnote 17).



## 7.4 Water Supply and Use

### 7.4.1 Appin West

Mine water is processed at the WTPs [IMS 1 and 2] to produce treated water (permeate). This treated water is supplied to the Appin Mine underground mining operations. Any shortfall in underground supply is supplemented by potable water provided by Sydney Water. Excess permeate is discharged to the environment via LDP 24. Potable water is used for site administration buildings, workshops, the bathhouse, fire emergency services, Appin West Gas Extraction Plant, and as a back-up for underground operations.

Throughout the reporting period, IMC identified that the Sydney Water meter used to calculate potable water usage was malfunctioning and underreporting. Appropriate changes to the meter type and arrangement of RPZs, strainers, meter, etc. would also allow for more laminar flow and more accurate reporting. This work was completed in February 2021, and has since resulted in far more consistent water use on site.

Table 41 provides an overview of the potable water usage associated with the Appin West site for the reporting period.

**Table 41: Potable Water Usage for Appin West**

Area	Usage FY20 (ML)	Usage FY21 (ML)	Variance (ML)	Comments
Appin West	72	62	-10	Identified issues with meter arrangement causing underreporting and inaccurate flow. Amended in February 2021. Will result in more accurate reporting.

### 7.4.2 Appin East

Potable water is supplied by Sydney Water to the Appin East site via a 600 kL surface tank. This tank provides potable water for the bathhouse, workshops, administration buildings, fire emergency services, Appin No.2 shaft area, EDL Appin East Power Plant, and nearby mine-owned cottages.

Surface water runoff from rainfall is captured in the main surface dam and is reused as supply for the dust suppression on haulage roads and stockpiles, along with the dirty equipment hose down.

Table 42 provides an overview of the potable water usage associated with the Appin East site for the reporting period.

**Table 42: Potable Water Usage for Appin East**

Area	Usage FY20 (ML)	Usage FY21 (ML)	Variance (ML)	Comments
Appin East	296	185	- 111	Zero dilution at BCD and fixed leaks that were discussed in Section 4.4.5.

### 7.4.3 Appin North

The Appin North site is primarily reliant on water from BCD. Some potable water is trucked to site and stored in a surface tank for use in the bathhouse and office facilities. Most water is sourced from BCD from where it is pumped, following chlorine dioxide treatment, for use in the following areas:



- underground areas for dust suppression;
- WCCPP and associated infrastructure; and
- Appin North Pit Top.

A pipeline is in place to dilute discharge from BCD to reduce salinity levels in-line with the EPL if required. This pipeline will potentially be used as future water supply to the WCCPP during drought. Dilution of BCD discharges ceased in March 2020 following the addition of the drought condition for Point 10 (EPL 2504 Condition L2.6).

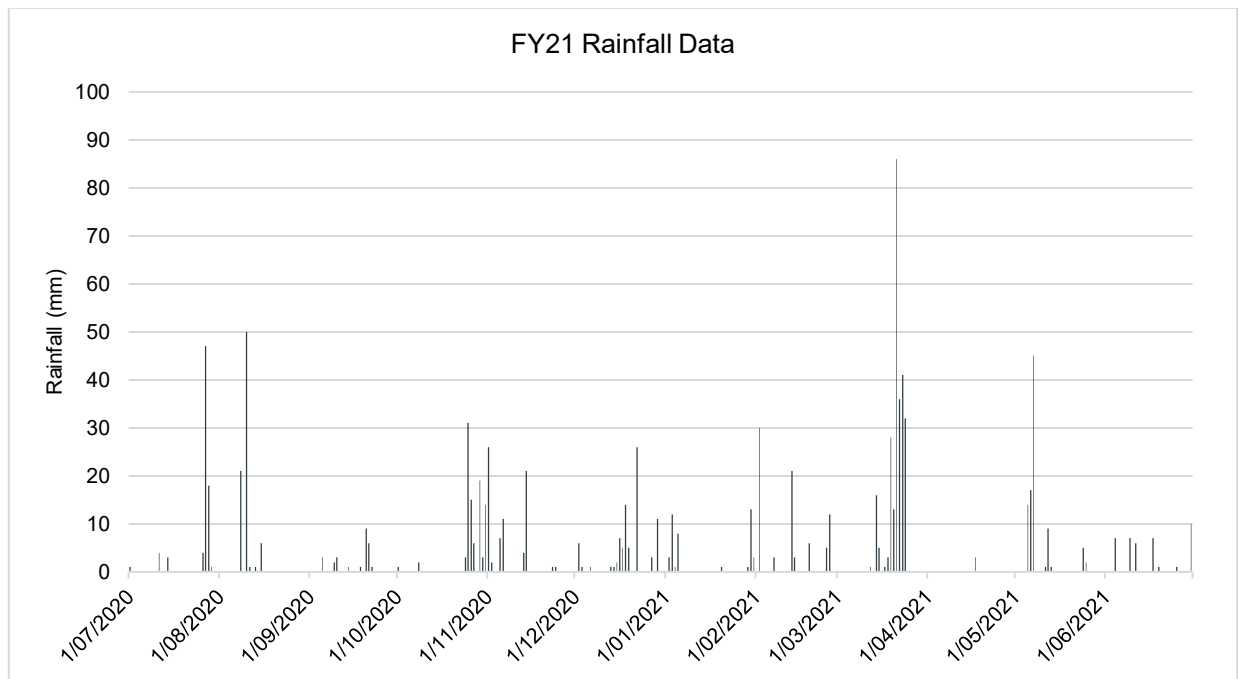
A summary of the water usage for the reporting period, compared to the previous reporting period, is provided in Table 43.

**Table 43: Water Usage Comparison – Appin North**

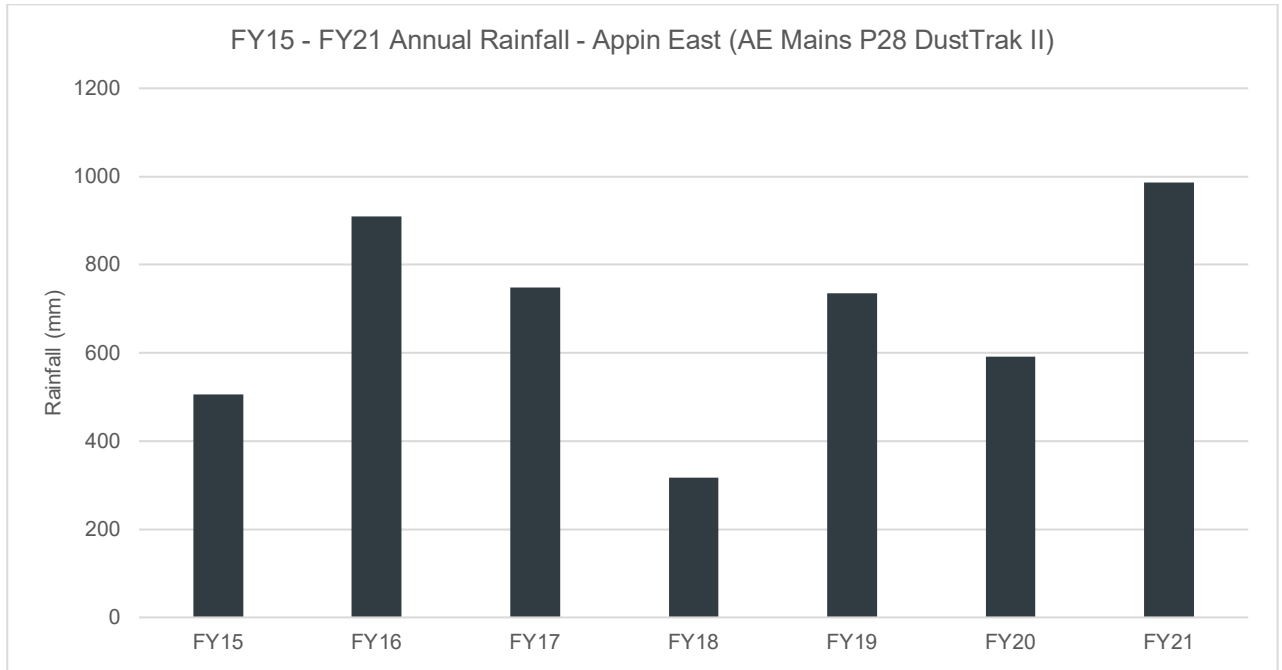
Type	Usage FY20 (ML)	Usage FY21 (ML)	Comment
Potable Water	1.49	1.63	Nil
Recycled (BCD) Water	518	643	Nil

## 7.5 Rainfall

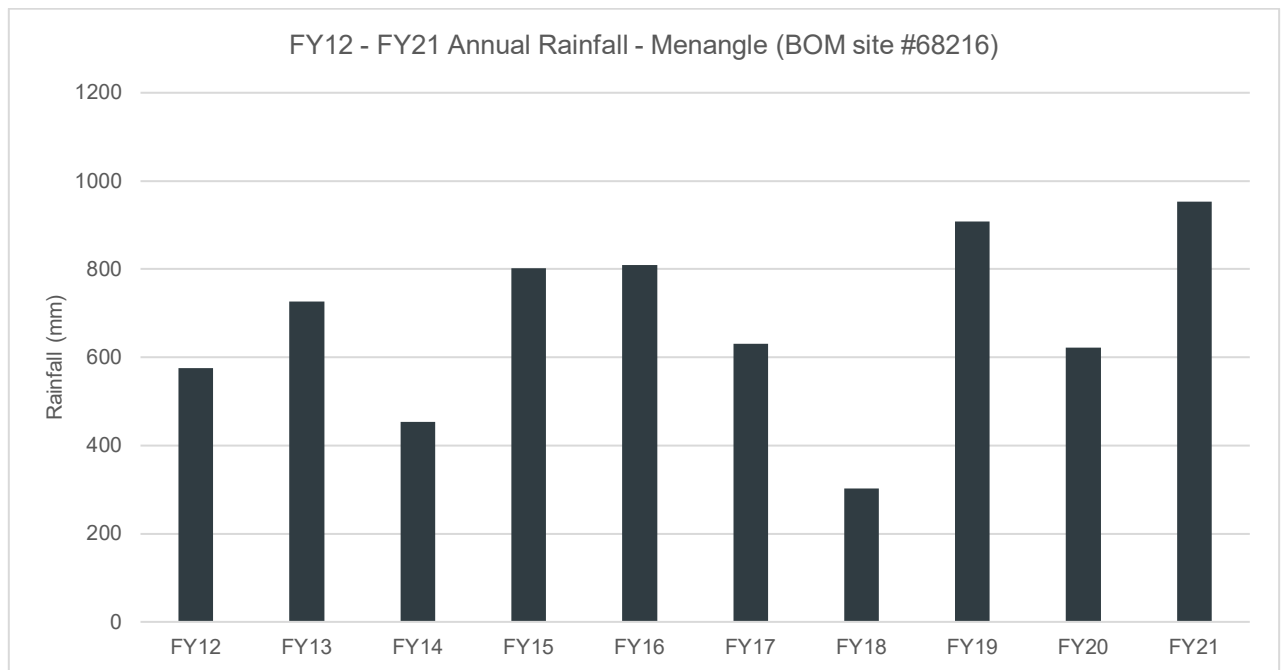
Figure 13 displays rainfall data for FY21 at Menangle (Menangle Bridge), NSW. Figure 14 shows the annual rainfall for the region since FY15 from the Appin East DustTrak unit. Figure 15 displays the annual rainfall for the region since FY12 from the Bureau of Meteorology (BOM) station located at Menangle Bridge.



**Figure 13: FY21 rainfall data - Menangle (BOM site #68216)**



**Figure 14: FY15 - FY21 Annual Rainfall - Appin East (AE Mains P28 DustTrak II)**



**Figure 15: FY12 - FY21 Annual Rainfall - Menangle (BOM site #68216)**





## 8. REHABILITATION

### 8.1 Rehabilitation for the Reporting Period

#### 8.1.1 Buildings

No demolition of buildings was undertaken during the reporting period.

#### 8.1.2 Rehabilitation of Disturbed Land

Progressive rehabilitation of the CWEA has been undertaken during the reporting period in accordance with the approved CWEA Management Plan.

The following works were undertaken during the reporting period:

- establishing the growth medium for ~3 ha and seeding of ~2.5 ha in Stage 3.

Plate 10 shows the performance of rehabilitation on Stage 2 of the emplacement.



**Plate 10: Stage 2 emplacement rehabilitation FY21 (Seeded in 2007)**

Refer to Appendix A: Annual Emplacement Rehabilitation Report for further detail of the success of the rehabilitation of the CWEA.

In addition, tree planting and monitoring of revegetation at the BioBank sites was undertaken during the reporting period. For more detail, refer to Section 6.5 and the following annual reports included as appendices to this report:

- Appendix D: Annual *Persoonia hirsuta* Condition Monitoring Report
- Appendix E: 2020/21 Appin West BioBank Site Annual Report
- Appendix F: 2020/21 Ventilation Shaft No.6 Offset Annual Monitoring Report
- Appendix G: 2020/21 Nepean River BioBank Site Annual Report
- Appendix H: 2021 Cataract River BioBank Site Passive Management Annual Report



The rehabilitation status is provided in Table 44.

**Table 44: Rehabilitation Status (Cumulative)**

Location	Area Affected/Rehabilitation (ha)		
	Previous Report (FY20)	This Report (FY21)	Forecast (FY22)
A Total Mine Footprint	28377	28377 <sup>22</sup>	28377
B Total Active Disturbance	148	157	158
C Land Being Prepared for Rehabilitation	9	8 <sup>23</sup>	10
D Land Under Active Rehabilitation	21	17 <sup>24</sup>	20
E Completed Rehabilitation <sup>25</sup>	42	44 <sup>26</sup>	44

### 8.1.3 Legacy Sites and Rehabilitation Program

The Legacy Sites and Rehabilitation Program consisted predominantly of initial site investigations and approvals planning in the reporting period.

A Risk Assessment for North Cliff rehabilitation planning identified the need to investigate any atmospheric connectivity between North Cliff and the current operational underground workings of Appin Mine. The study progressed in FY21, with a connectivity assessment being undertaken. Further investigations and consultation are required to develop the shaft sealing methodology for the North Cliff site that is critical to developing rehabilitation options for the site.

A Business Case for progressing the rehabilitation of the site was approved in August 2021. Further investigations, consultation and preliminary approvals will be progressed in FY22.

The focus of the Legacy Sites and Rehabilitation Program in FY21 was sites associated with Dendrobium Mine. See the Dendrobium Mine and Cordeaux Colliery Annual Review on the South32 website at <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

## 8.2 Rehabilitation and Research

Refer to Section 6.5.2.2 for details on the *Persoonia hirsuta* translocation trial that is ongoing. The research report required under Condition 3 of EPBC Approval 2010/5350 was submitted to DAWE on 29 June 2021. A copy of the research report is available on the South32 website at: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

As part of the GRRP, approved by the Resources Regulator on 24 April 2020 (See Section 6.14), IMC commenced a water balance study in 2018. Stage 1 was finalised in October 2019, and Stage 2 was finalised in September 2020.

<sup>22</sup> Consists of the size of the Project Approval boundary for the BSO Project (mining lease footprint) only.

<sup>23</sup> Landform Establishment and Growth Medium Development phases.

<sup>24</sup> Ecosystem and Land Use Establishment Phase.

<sup>25</sup> Note that no areas of rehabilitation have been signed off as complete by the Resources Regulator to date.

<sup>26</sup> Ecosystem and Land Use Sustainability and Relinquishment Phases.



A Georges River Catchment Model has been developed by consultants WSP to support the GRRP. The initial stage (Stage 1) of the Georges River Catchment Model included developing a water balance model of the Upper Georges River pool and rockbar system and assessing the performance of proposed measures to remediate mine subsidence impacts to the system. Stage 2 of the model extended the pool water balance model to include Appin North and WCCPP surface operations, including BCD and upstream water management infrastructure.

A Bushfire Research and Trial literature review was completed in the reporting period. The literature review was undertaken to support the development of a trial burn in established rehabilitation areas of the CWEA. Coal wash sampling is planned to be undertaken in FY22.

### 8.3 Further Development of the Final Rehabilitation Plan

The Appin Mine MOP addresses the rehabilitation requirements and objectives for all domains associated with the combined Appin Mine sites. The MOP outlines a range of post land use options that are potentially available for Appin Mine sites upon completion of operations. The future final land use objectives are yet to be decided upon and agreed due to timing of the eventual closure of Appin Mine related sites.

The MOP was updated in FY20 to both reflect changes in operations as well as meet the draft requirements of a Rehabilitation Management Plan (RMP). The MOP was approved by the Resources Regulator and DPIE in FY21.

The Rehabilitation Cost Estimate (RCE) for Appin Mine was reviewed in FY20 according to the latest RCE tool as part of the MOP review. There have been no significant changes to the RCE in FY21, however infrastructure associated with the Appin North WTP construction has now been included. The latest RCE is attached<sup>27</sup> as Appendix I: Rehabilitation Cost Estimate.

Legislative Rehabilitative Reforms under the *Mining Act 1992* were passed by the government on 2 July 2021<sup>28</sup>. These reforms, through the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*, prescribe new mining lease conditions relating to rehabilitation and set clear, achievable and enforceable requirements for rehabilitation. A review of the MOP and its conversion to a RMP to meet the requirements of the Form and Way documents will be required. The revised RMP and associated documents are required to be submitted to the Resources Regulator by 2 July 2022.

A review of the Appin Mine Conceptual Closure Plan was undertaken by a consultant during FY21 and will be finalised in FY22. The outcomes of this review will be incorporated into the RMP.

---

<sup>27</sup> The RCE is Commercial in Confidence and is only provided to the Resources Regulator.

<sup>28</sup> <https://www.resourcesregulator.nsw.gov.au/environment/rehabilitation/rehabilitation-and-compliance-reforms>.



## 9. COMMUNITY

The closest township to Appin West surface operations is the village of Douglas Park, which is located approximately 4 km to the north west of the surface operations. The current underground mining operations (i.e. Area 7 and Area 9) are located on the outskirts of the Douglas Park village.

The closest township to Appin North surface operations is the village of Appin, which is located approximately 4 km to the north west of the operations.

Appin East Pit Top is located on the outskirts of Appin.

At the completion of this reporting period, Appin Mine employed approximately 1200 employees and contractors<sup>29</sup>.

### 9.1 Complaints

IMC operates a 24 hour Community Call Line (free call 1800 102 210) and a general email address [illawarracommunity@south32.net](mailto:illawarracommunity@south32.net). The call line and email address enable the community to request and provide feedback about operational activities and lodge complaints on any aspect of the Appin Mine operations. The call line number and email address have been advertised throughout the reporting period in all correspondence distributed to the community.

A complaint received by IMC in whatever format is investigated and resolved by the Corporate Affairs Team. The appropriate team member will investigate the complaint and seek assistance from the relevant site or operational personnel. Where required, additional details will be sought from the complainant where there is insufficient information for investigation (where contact details are provided).

Community complaints must be responded to within 24 hours of the complaint being received<sup>30</sup>. Some complaints require ongoing investigation and remedial action to address the nature of the complaint.

Complaint information is provided publicly on the South32 website and to the ACCC, Douglas Park Advisory Panel, IMC management, and government agencies on a regular basis.

During this reporting period, 17 complaints were received in relation to Appin Mine operations (including Pit Tops and exploration work), in comparison to seven in the previous reporting period. The increase in complaints is primarily related to exploration activities in the area. Details of the complaints received, and the actions taken, are provided in Appendix J: Appin Mine Community Complaints Report FY21. A summary of all complaints received across Appin Mine in FY21 is included in Figure 16. An analysis of complaints since FY13 is included in Figure 17.

---

<sup>29</sup> As at August 2021. It should be noted that contractors are only reportable if they are in SAP, otherwise the Finance Team receives the total amount of contractor hours claimed and divides by 40 to get an FTE equivalent.

<sup>30</sup> This timeframe relates to contact with the complainant, not resolution/investigation of the matter.

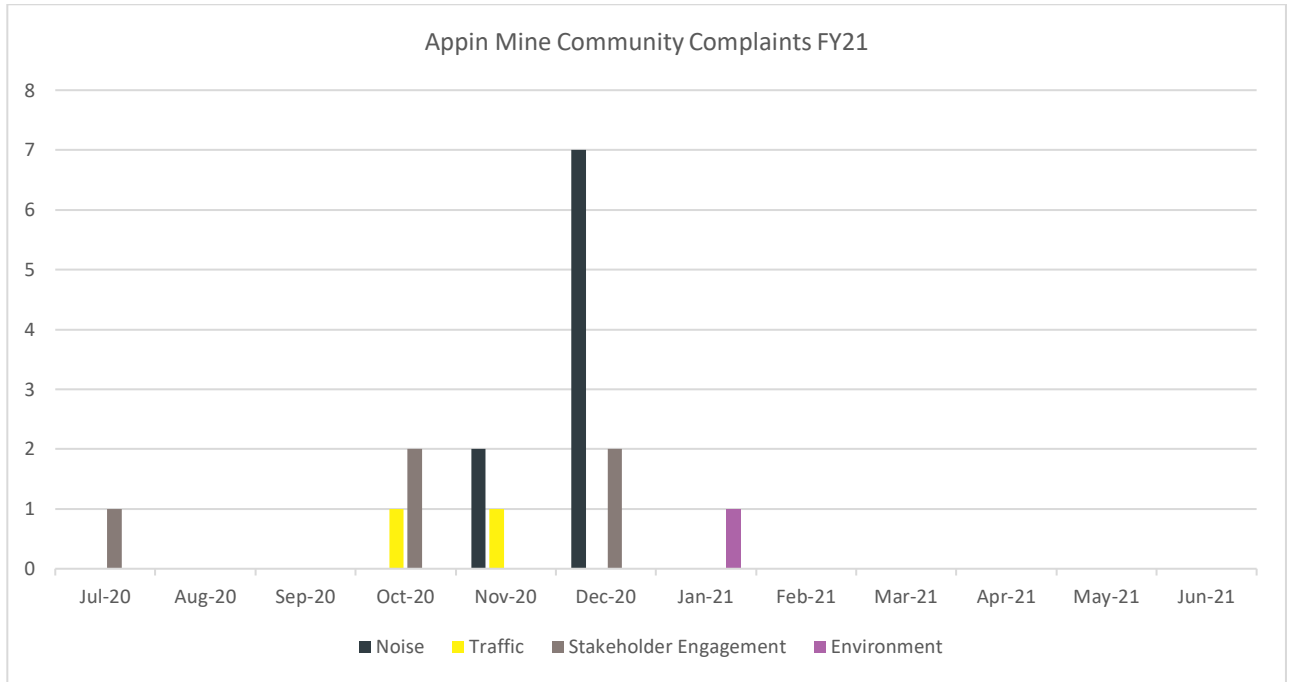


Figure 16: FY21 Community Complaints for Appin Mine

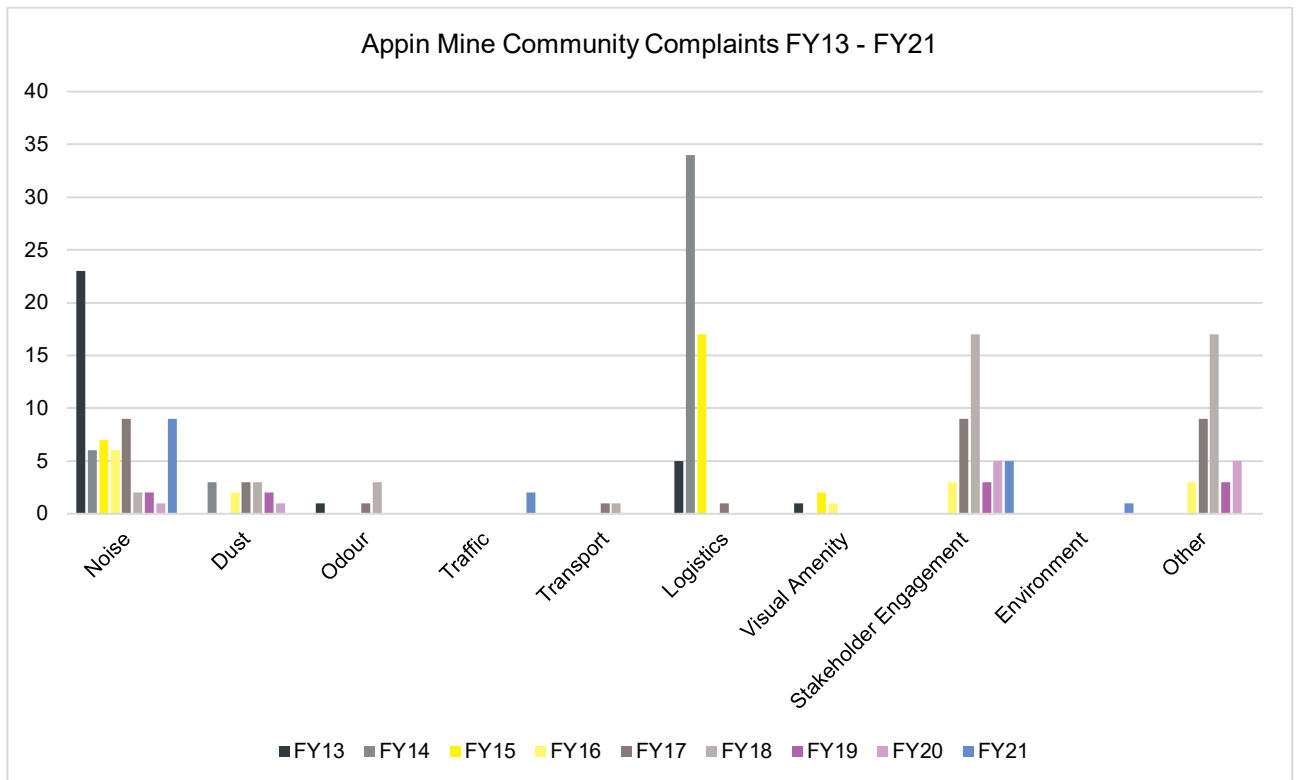


Figure 17: Community complaints from FY13 – FY21 for Appin Mine



## 9.2 Community Engagement

IMC's Corporate Affairs team manages regular community engagement activities as per the IMC Stakeholder Engagement Management Plan, with the support of operational and functional team members as appropriate. The plan identifies key stakeholders and appropriate communication and engagement methods.

Key regional stakeholders include:

- communities surrounding the Appin Mine operations;
- local government;
- State government agencies and authorities including DPIE, WaterNSW, EPA, Resources Regulator, Subsidence Advisory NSW and others;
- employees and contractors;
- community and special interest groups;
- the indigenous community – Tharawal Aboriginal Land Council and others;
- local schools and volunteer groups; and
- the broader regional community.

Community information is provided in accordance with the IMC Stakeholder Engagement Management Plan. Communication methods include:

- community newsletters via letter box drops;
- door knocks;
- community notice boards;
- community perception surveys;
- media releases and other media activities;
- IMC regulatory page on the South32 website, and project specific webpages; and
- stakeholder group presentations and information sessions.

IMC directly manages the following Appin Mine stakeholder committees and working groups:

- ACCC;
- Douglas Park Advisory Panel (DPAP);
- Menangle Advisory Panel (MAP); and
- Illawarra Metallurgical Coal Community Partnerships Program Board.



### 9.2.1 ACCC

In accordance with Condition 6 of Schedule 6 of the Project Approval, IMC has established and operates the ACCC. The ACCC is operated in accordance with the Community Consultative Committee Guideline for State Significant Projects and has been operating since September 2012<sup>31</sup>.

The ACCC provides a forum that enables regular two-way communication between IMC and the community/stakeholders and promotes open discussion on IMC's Appin Mine operations. The basis of discussion includes information on mining operations, environmental performance of the mine, and community relations activities, and issues/outcomes as they arise during mining activity. Topics discussed in the meeting generally reflect community concerns and interests at the time.

The ACCC nominally comprises 11 members including representatives of IMC, local councils, local community and other key stakeholders who have an interest in IMC's operations and the potential impacts of mining in the area. The committee is chaired by an independent chairperson, who is appointed by the Secretary of the DPIE. Formal meetings are generally held every two months.

A summary of information presented to the ACCC during the reporting period includes but is not limited to:

- Mountbatten House and Stable works;
- COVID-19 response and management;
- the Georges River Remediation Plan approval;
- personnel changes at IMC;
- gas release and infrastructure impacts updates;
- proposed AVMA Project;
- S32 Reconciliation Action Plan;
- Nepean River Biobanking Site;
- Biodiversity Conservation Trust site review;
- Dendrobium Mine Extension Project;
- Appin North water treatment plant;
- management plan approvals;
- future Appin extraction;
- general environmental issues; and
- general community issues.

The minutes of community meetings are made available to the public on the South32 webpage: <https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>. Meetings are held locally, with some being held online during FY21 due to COVID-19 restrictions.

### 9.2.2 DPAP

A purpose-formed community representative group, DPAP was established by IMC in April 2010 to provide input to the preparation of the Ventilation Shaft No. 6 Environmental Assessment. Since

---

<sup>31</sup> Previously named the Illawarra Coal Community Consultative Committee.



approval and commencement of construction, meetings have continued with other local issues discussed including mine subsidence. DPAP operates under an agreed Terms of Reference and is facilitated by IMC. The DPAP comprises seven representatives of the Douglas Park Township. Meetings are generally held every two months in person at Douglas Park, with some being held online during FY21 due to COVID-19 restrictions.

A summary of information presented to DPAP during the reporting period includes but is not limited to:

- Mountbatten House and Stable works;
- exploration progress;
- infrastructure updates;
- local community investment fund distribution;
- AVMA Project update;
- IMC's offset carbon emissions;
- Dendrobium Mine Extension Project;
- 345 Menangle Road updates; and
- community relationship improvements.

During the reporting period, members of DPAP were also kept informed of operational matters relating to Appin Mine operations in Douglas Park through email updates.

### **9.2.3 MAP**

A purpose-formed community representative group, the MAP was established by IMC in March 2021 to support community engagement on the AVMA Project. It enables regular two-way communication between representatives of the local community and IMC on the Project.

The MAP operates under an agreed Terms of Reference and is facilitated by an Independent Chairperson. It is comprised of seven Menangle community representatives, one Douglas Park community representative and two IMC representatives. The community representatives include landholders nearby to the project location.

A summary of information discussed with the MAP during the reporting period includes:

- introduction and agreement on how the MAP will work;
- project overview;
- planning and approvals;
- project construction methods;
- air quality data;
- Menangle Road intersection upgrade;
- community engagement plans; and
- environmental assessments.

## **9.3 IMC Community Partnerships Program (CPP)**

IMC has an overriding commitment to supporting the communities in which we operate. As part of this commitment, the CPP was established to provide support for community projects and initiatives in the regions surrounding our Appin Mine.





Since being established in 2004, the program has provided support to a range of community groups and not-for-profit organisations. The CPP is funded by three cents per saleable tonne of coal from Appin Mine. The program is administered by a board of community and IMC representatives, which enables community-based decision making on the allocation of funds.

During the past 12 months the Board has committed over \$132,475 for community projects in the local Wollondilly area. Groups that benefitted from program funding in 2020/21 included:

- Scouts NSW;
- Cath's Kindy;
- Life Education;
- Wollondilly Shire Council (Douglas Park 355 Committee);
- NSW Regional Fire Service; and
- Lifeline Macarthur.

The CPP continued its support for Life Education with funding to Appin, Douglas Park and Wilton Public Schools to enable children to visit the Life Education mobile learning centre. Funding was extended to include Cawdor Public School and early childhood learning centres within the communities surrounding IMC operations. Life Education aims to empower the young to make the best choices for a safe life, through leading drug and health education programs. IMC has supported Life Education in the Wollondilly area since 2008.

The CPP also continued its support of Lifeline Macarthur, providing support for volunteer training to manage the crisis call line. This service saw an exponential increase in calls in FY2020/21 as the COVID-19 pandemic resulted in increased mental health issues.

Organisations in the local community are encouraged to apply for funding. Applications for funding under the CPP are assessed against a range of selection criteria, which can be viewed at:

[https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/2020---illawarra-coal-cpp---grant-guidlines-application-form-and-compliance-certificate.pdf?sfvrsn=54afada7\\_8](https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/2020---illawarra-coal-cpp---grant-guidlines-application-form-and-compliance-certificate.pdf?sfvrsn=54afada7_8).



## 10. INDEPENDENT AUDIT

### 10.1 Environmental Audits

The audits/management reviews undertaken during the reporting period are provided in Table 45.

**Table 45: Environmental Audits undertaken during reporting period**

Date	Type	Internal	External	Comments
October 2019	IEA		X	Undertaken by ERM
June 2021	Annual ISO 14001		X	Re-certification
June 2021	Self-Assessment	X		Self-assessment of compliance with the South32 Environment Standard
June/July 2021	Reasonable Assurance Audit	X	X	Review of externally reported greenhouse gas and water data
Ongoing	Management plan governance checks	X		Governance checks are conducted internally as a part of ISO 14001 certification. A schedule has been developed and checks are undertaken as per the schedule.

#### 10.1.1 Independent Environmental Audit

An Independent Environmental Audit (IEA) of Appin Mine is undertaken every three years. The most recent IEA was conducted in October 2019, with the report submitted in December 2019. The IEA identified 12 non-compliances, 14 administrative non-compliances and six observations.

An action plan to address the non-compliances and observations was developed and submitted to DPIE and DoTEE. The action plan is provided in Appendix K: EPBC Approval 2010/5350 Compliance Report.

The next triennial IEA is scheduled to be undertaken in October 2022.

#### 10.1.2 ISO 14001

The IMC Environmental Management System has been certified to the International Standard ISO 14001 since May 2003. ISO 14001 Certification for Appin Mine operations was maintained following an external audit over May and June 2021. No non-conformances were identified.

Appin East, Appin West, Appin North and the WCCPP are included in IMC's schedule of certified ISO 14001:2015 sites. Each of these operational sites, as well as the CWEA has been regularly audited for compliance against this standard.

The auditing process requires demonstration of adequacy of systems to manage environmental aspects and impacts related to site activities. The systems audited include legal compliance, document control, records, corrective action, monitoring and control, training and management of risks.

All ISO 14001 Actions from 2020 were completed, as confirmed by the 2021 audit.

#### 10.1.3 Environment Standard Self Assessment

An updated version of the South32 Environment Standard was released in October 2020. The Environment Self Assessment for this reporting period was conducted by IMC personnel. It was found that the requirements of the Environment Standard are largely in place with some opportunities



to update existing processes. All corrective actions were raised in the action tracking system utilised by IMC and will be closed out as required.

#### **10.1.4 KPMG**

KPMG undertook a reasonable assurance audit for NGER and water data for the reporting period. This audit commenced in June and was completed in July 2021. There were no material findings.

#### **10.1.5 Governance Reviews**

The below Governance Reviews were conducted for Appin Mine during the reporting period:

- Pollution Incident Response Management Plan;
- Adaptive Management Plan for Water Sensitive EPBC Act Listed Species;
- Broad-headed Snake Management Plan;
- *Persoonia hirsuta* Offset Management Plan;
- Southern Brown Bandicoot Management Plan;
- Shale Sandstone Transition Forest Offset Management Plan;
- Noise Management Plan; and
- Water Management Plan.

From these, the majority of corrective actions raised were administrative. All corrective actions were raised in the action tracking system utilised by IMC and closed out as required. Changes required to the respective management plan as a result of the Governance Review are recorded in the Management Plan Review Log.

### **10.2 Environmental Risk Register**

Environmental risks associated with the site operations are recorded in the Environmental Aspects and Impacts Register. The Environmental Aspects and Impacts Register is reviewed regularly and is the basis of the Environmental Improvement Plan.



## 11. INCIDENTS, NON-COMPLIANCES AND EXCEEDANCES DURING THE REPORTING PERIOD

Non-compliances recorded during the reporting period are detailed in Table 46, details of exceedances with criteria are provided in Table 47 and regulatory actions in the reporting period are provided in Table 48. Non-compliances identified in the IEA are listed in Appendix M: Independent Environmental Audit 2019 - Action Response Table.

**Table 46: Non-compliances during the reporting period**

<b>NC1</b>	
Non-compliance	Non-compliance with volume limit in Condition L3.1 in EPL 2504 at LDP 22. This is also a non-compliance with Condition 15 of Schedule 4 of PA 08_0150.
Date	31 July/1 August 2020
Details of non-compliance	The allowable discharge volume of 80 kilolitres per day was exceeded on 31 July and 1 August 2020. The discharge volumes were 106.6 and 105.8 kL/day respectively.
Location	LDP 22, located at Appin West effluent irrigation area.
Cause of non-compliance	The cause of the volume limit exceedance was related to recent changes in the irrigation system logic. When uploading the new logic, the new lines of code changed "counter" reference numbers related to the Volume Control Relay. Subsequently, the programmable logic control (PLC) did not count the volume discharged per day, leading to continuous discharge of sewage effluent.  The error was identified on 3 August 2020 and the logic in the PLC corrected.
Actions taken to mitigate adverse effects of non-compliance	There was no identified environmental harm. Some pooling of irrigation water was identified, however no flow of water offsite was noted.
Actions taken to prevent reoccurrence	The logic in the PLC was corrected. No further non-compliances were recorded. This volume limit was removed from EPL 2504 in March 2021.
<b>NC2</b>	
Non-compliance	Exceedance of noise criteria in Condition 2 of Schedule 4 of PA 08_0150 at AE-NS5.
Date	11 August 2020
Details of non-compliance	Exceedances of noise criteria greater than 2 dBA over the limit in Condition 2 of Schedule 4 were recorded at AE-NS5: <ul style="list-style-type: none"> <li>at 4:45 pm, a noise level of 46 dBA was recorded (an exceedance of 6 dBA);</li> </ul>



	<ul style="list-style-type: none"> <li>at 8:30 pm, a noise level of 46 dBA was recorded (an exceedance of 6 dBA); and</li> <li>at 11:30 pm, a noise level of 45 dBA was recorded (an exceedance of 5 dBA).</li> </ul> <p>A 2 dBA penalty was applied to these measurements.</p> <p>The noise criteria at this location at the time of the exceedance was 40 dBA.</p>
Location	Monitoring location AE-NS5 (80 Northamptondale Road), located in the vicinity of Ventilation Shaft 2.
Cause of non-compliance	<p>Representative noise levels recorded at AE-NS5 in August 2020 were indicated to exceed the noise impact assessment criteria, however as the EDL power station is located between Ventilation Shaft 2 and the monitoring location, the cause of the exceedances was considered to be 'unconfirmed'.</p> <p>A noise consultant was engaged to undertake further investigation of the ventilation shaft and EDL power station sites near AE-NS5 using sound power measurement methods. This work was undertaken in December 2020.</p> <p>The sound power measurement report (dated March 2021) concluded that the exceedances measured in August 2020 were caused by ICHPL site operations. The main contributing factor was identified as the gas extraction recirculation valve operation. Noise generated by the valve is caused by turbulence which is transmitted into the structure of the valve and connected pipes.</p>
Actions taken to mitigate adverse effects of non-compliance	As an immediate temporary fix, the recirculation valve at the Appin East Gas Extraction Plant was closed, and suction pressure control was undertaken at the Appin West Gas Extraction Plant with different valving arrangements.
Actions taken to prevent reoccurrence	More permanent solutions continue to be reviewed. These options include the installation of noise attenuation around the recirculation valve and a review of the recirculation valve to identify if more appropriate valves are available with better sound attenuation properties.
<b>NC3</b>	
Non-compliance	Non-compliance with Condition 11 of Schedule 4 of PA 08_0150 and Condition O3.1 of EPL 2504 due to visible air pollution.
Date	22 August 2020
Details of non-compliance	A release of stone dust occurred at Ventilation Shaft 6, which resulted in visible air pollution. Condition 11 of Schedule 4 requires visible air pollution generated from the project to be minimised. Dust emissions occurred at approximately 9.45 am for approximately one hour.
Location	Ventilation Shaft 6, located at Douglas Park.



Cause of non-compliance	The cause of the emission was a change in ventilation underground. The primary material that was ventilated was stone dust, which is an inert, non-hazardous material.
Actions taken to mitigate adverse effects of non-compliance	There was no actual or potential environmental harm associated with the event.
Actions taken to prevent reoccurrence	Underground mine planning processes were reviewed.
<b>NC4</b>	
Non-compliance	Non-compliance with requirement to run continuous monitoring equipment at 90% availability in accordance with Condition M2.2 of EPL 2504.
Date	25 September 2020
Details of non-compliance	It was identified during a routine instrument check that the data for Point 28 (the Appin East compliance DustTrak unit) appeared irregular. The unit was physically inspected and it was identified that the inlet tube to the DustTrak was pinched (~1050 hrs 24/09/20). The availability of the instrument over the reporting period for EPL 2504 was 87%.
Location	Point 28 (AE-PF3), located at Appin East Pit Top.
Cause of non-compliance	The inlet tube to the DustTrak was most likely pinched during an inspection to investigate a communications error on 7 September 2020. Normally, when there is a flow blockage to the instrument, an error message would be sent, however on this occasion there was no error message, most likely because the flow rate was not reduced enough.
Actions taken to mitigate adverse effects of non-compliance	There was no actual or potential environmental harm associated with this event. A review of the data from the second DustTrak located at Appin East did not identify any dust events.
Actions taken to prevent reoccurrence	Additional checks are undertaken when accessing the equipment.
<b>NC5</b>	
Non-compliance	Non-compliance with Schedule A of CCL 724 requiring the EPBC Approval Compliance report to be submitted to the Resources Regulator at the same time as submission to DAWE.
Date	11 August 2020



Details of non-compliance	It was identified during the review of compliance for the EPBC Approval 2010/5350 Compliance Report that the Compliance Report is required to be submitted to the Resources Regulator at the same time as it is submitted to DAWE (under Schedule A of CCL 724). The Compliance Report was attached to the Annual Review, submitted at the end of September 2020.
Location	N/A
Cause of non-compliance	It was considered that the submission of the Compliance Report with the Annual Review was acceptable.
Actions taken to mitigate adverse effects of non-compliance	This was an administrative non-compliance.
Actions taken to prevent reoccurrence	The Environmental Compliance/Conformance Assessment and Reporting Procedure has been updated to reflect this requirement.

**Table 47: Exceedances of criteria during reporting period**

<b>EX1</b>	
Exceedance	Exceedance of noise criteria in Condition 2 of Schedule 4 of PA 08_0150 at AE-NS5.
Date	18 May 2021
Details of exceedance	<p>Exceedances of noise criteria in Condition 2 of Schedule 4 were recorded at AE-NS5:</p> <ul style="list-style-type: none"> <li>a noise level of 43 dBA (with a 5 dBA low frequency noise penalty applied) was recorded at 8:30 pm; and</li> <li>a noise level of 43 dBA (with a 5 dBA low frequency noise penalty applied) was recorded at 11:15 pm.</li> </ul> <p>The limit at this location is 41 dBA.<sup>32</sup></p>
Location	Monitoring location AE-NS5 (80 Northamptondale Road), located in the vicinity of Ventilation Shaft 2.
Cause of exceedance	The cause of the exceedance was investigated and it was identified that a portion of the weld holding part of the internal structure in Fan 3 at Ventilation Shaft 2 had come loose.

<sup>32</sup> The noise criteria at AE-NS5 were reviewed against the Project Approval in 2020 against relevant receiver locations. A revised Noise Management Plan was approved on 7 December 2020.



	<p>Note that for the determination of compliance, the NSW Industrial Noise Policy states in Section 11.1.3:</p> <p><i>A development will be deemed to be in non-compliance with noise consent or licence condition of the monitored noise level is more than 2dB above the statutory noise limit specified in the consent or licence condition.</i></p>
Actions taken to mitigate adverse effects of exceedance	The weld was repaired.
Actions taken to prevent reoccurrence	Continued monitoring is undertaken as per Condition 5(f) of Schedule 4 of PA 08_0150.
<b>EX2</b>	
Exceedance	Exceedance of BOD 50 <sup>th</sup> percentile criteria in EPL 2504 at LDP 22 (Condition L2.4).
Date	1 July 2020.
Details of exceedance	An exceedance of the BOD 50 <sup>th</sup> percentile criteria (30 mg/L) occurred at LDP 22. The result recorded was 32 mg/L. This was not recorded as a non-compliance as no other BOD exceedances at this location were recorded during the reporting period.
Location	LDP 22, located at Appin West effluent irrigation area.
Cause of exceedance	The cause of the exceedance was not confirmed. It is possible that as the dam levels have been kept low, pond activity may have been stimulated due to increased oxygen saturation, and potential biomass build up on the dam walls.
Actions taken to mitigate adverse effects of exceedance	There was no environmental harm associated with this exceedance.
Actions taken to prevent reoccurrence	There were no identified actions to prevent reoccurrence. It is noted that there were no further exceedances of criteria at this location over the reporting period.
<b>EX3</b>	
Exceedance	Exceedance of BOD 50 <sup>th</sup> percentile criteria in EPL 2504 at LDP 3/4 (Condition L2.4).
Date	22 July 2021.
Details of exceedance	An exceedance of the BOD 50 <sup>th</sup> percentile criteria (30 mg/L) occurred at LDP 3/4. The result recorded was 38 mg/L. This was not recorded as a non-compliance as no other BOD exceedances at this location were recorded during the reporting period.





Location	LDP 3/4, located at the Appin North effluent irrigation area.
Cause of exceedance	The cause of the exceedance was likely the failure of a soap gun in the bathhouse, which resulted in an increase in soap discharged to the system. Discussions were also held with the laboratory undertaking sample analysis to review laboratory processes.
Actions taken to mitigate adverse effects of exceedance	The soap gun was repaired.
Actions taken to prevent reoccurrence	The soap guns are checked on a daily basis and repairs implemented as required.

**Table 48: Regulatory action during reporting period**

<b>Regulatory Action</b>	<b>Detail</b>
Official Caution	None issued
Warning Letters	None issued.
Penalty Notices	None issued.
Prosecution Proceedings	None commenced.

Refer to the following reports for specific compliance information:

Appendix B: 2020/21 EPA Annual Return for EPL 2504;

Appendix K: EPBC Approval 2010/5350 Compliance Report;

Appendix L: Project Approval 08\_0150 Compliance Report; and

Appendix M: Independent Environmental Audit 2019 - Action Response Table.



## **12. ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD**

### **12.1 Mine Operations**

During the next reporting period underground operations will continue in Area 7 and Area 9. Development and extraction will continue into the currently approved panels of LW904 and LW709 and beyond to LW905 and LWs 710-711 subject to all necessary approvals being in place.

Construction activities in the next reporting period are detailed in Section 12.3.

### **12.2 Exploration**

The planned activities for FY22 are heavily focussed on exploration in tenements adjoining the current mining lease area, to increase geological and gas reservoir understanding of the Bulli Seam resource. Exploration is concentrated in the new EL 8972 tenement, with twenty of the twenty-nine exploration holes planned in FY22 located in this area. There are a further five exploration holes planned outside of the CCL 767 boundary, across tenements A248 and EL 4470 for AA7, AA9 and AA10 exploration. Just four exploration boreholes occur within the boundaries of CCL 767, although these will be drilled under the coinciding exploration licence. All twenty-nine planned exploration boreholes are standard coal exploration boreholes with the exception of one; a surface to in-seam hole (STIS) drilled to investigate a dyke in the Area 7 Longwall 11 block.

Landholder negotiations for the boreholes in established mining lease and exploration tenements are well under way. However, all planned borehole locations are subject to some adjustment based on landholder preferences as well as budgetary considerations.

Approvals boreholes related to mining operations in CCL 767 will also feature in FY22 planned drilling. Current plans involve two groundwater monitoring holes proximal to underground workings, three geotechnical holes associated with the proposed AVMA Project and a series of shallow geotechnical seismic shot holes associated with the AVMA Project.

The planned locations of FY22 proposed exploration and approvals drilling across South32 IMC operations are illustrated in Figure 18.

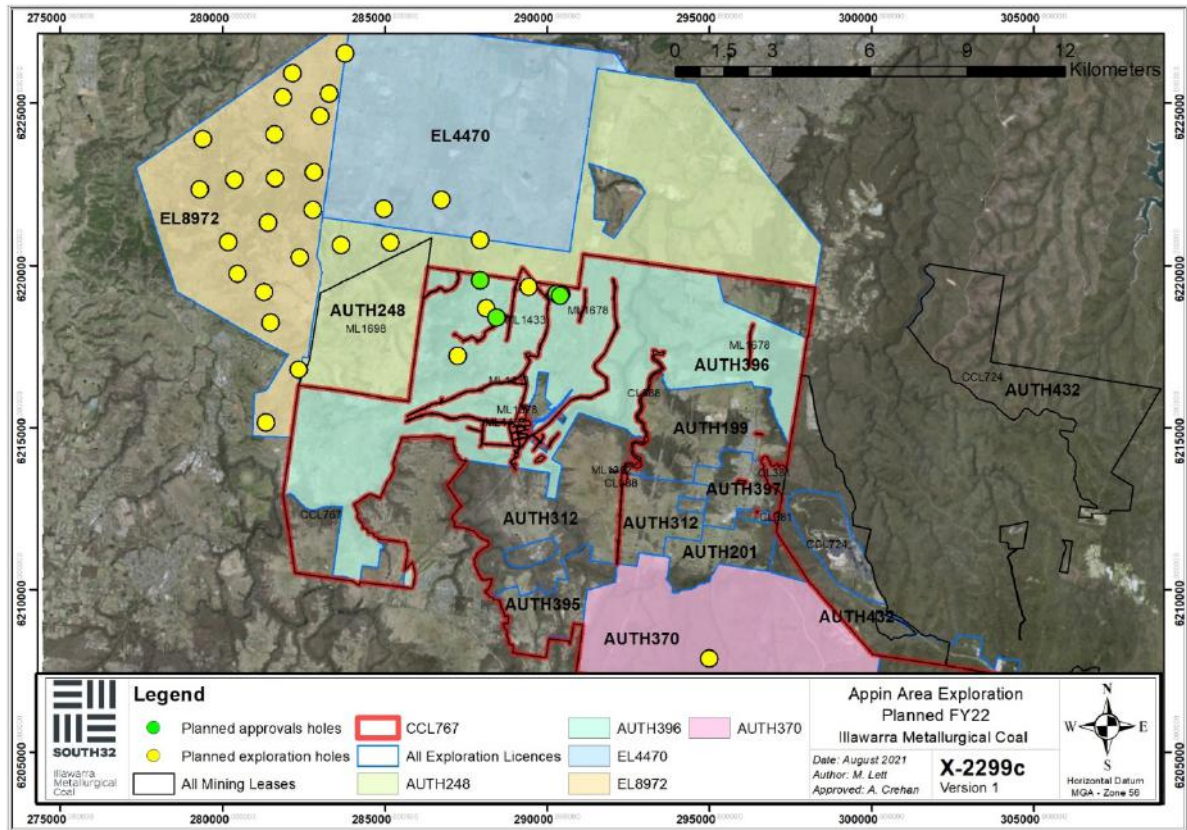


Figure 18: FY22 planned exploration across the Appin mining domain

## 12.3 Projects

The following projects will be progressed in the next reporting period:

- Construction of the Appin North Permanent WTP to be completed in FY22.
- Upgrades to underground piping infrastructure at the AW WTP and related surface water tanks to resupply treated water to the operations.
- Ventilation Shaft 6 Chiller upgrade project – to provide better cooling and performance to the ventilation fans at the site.
- Decommissioning of 8000 t product bins at the WCCPP. Preliminary plans indicate the project will include constructing a new primary stockpile and truck load out bins to the south of the current WCCPP, including a high-level conveyor, primary stockpile, reclaim conveyor and automated truck load-out. Work is planned to commence in FY22 and continue into FY24.
- Subject to approval, construction of the proposed AVMA project is proposed to commence in Q3 2022. The construction phases include the installation of infrastructure and equipment required for the operation of ventilation shafts and mine access facilities. Preliminary works, including updates to management plans, will occur in FY22.
- Upgrades to the Appin North bulk coal winder. This is a long-term project that will be ongoing with expected completion in FY23.
- Upgrades to the Appin North Waste Sorting Pad.
- Commissioning of the Appin East surface water automated dosing system.



- Switchyard upgrades at multiple sites and locations across Appin Mine to replace old infrastructure. The project scope includes No. 2 Vent Shaft, Appin North, Appin East and Appin West. The project is partially complete and considered ongoing with upgrades to additional infrastructure being assessed for further completion in FY22.
- Replacing the BCD discharge valves (LDP 10 and LDP 13).
- Installation of a new flow meter at the Appin North Point 16 underdrainage overflow pipe in FY22.
- Installation of pump on reclaim sump at BCD.
- Relocation of drill mud slurry ponds at Appin North.
- Haul road upgrades/development at Appin North approved under an OPD.

## 12.4 Environmental Management

The following activities will be progressed in the next reporting period:

- Continue monitoring under the Georges River Aquatic Health Program.
- Undertake phase 3 of the *Persoonia hirsuta* translocation trials.
- Progress approvals, planning and environmental assessments required to undertake the work described in the GRRP.
- Continue to progress the current phase of the decarbonisation program.
- Review the MOP and submit the RMP.
- Conduct further investigations and consultation and progress preliminary approvals for rehabilitation of the North Cliff site.
- Installation of habitat in the CWEA for the Broad-headed Snake.
- Publishing of the 14-day Report from EQuIS.
- Design of a bushfire trial in established rehabilitation in the CWEA to progress relinquishment.



## 13. REFERENCES AND ASSOCIATED DOCUMENTS

- Biosphere, Bulli Seam Operations, Appendix F- Terrestrial Flora Assessment (2009).
- IMC, Appin Mine Air Quality and Greenhouse Gas Management Plan.
- IMC, Appin Mine Environmental Management Strategy.
- IMC, Appin Mine Mining Operations Plan – 1 October 2020 – 30 September 2024.
- IMC, Appin Mine Water Management Plan.
- IMC, Appin Mine Coal Wash Emplacement Area Management Plan.
- IMC, Appin Mine Waste Management Plan.
- IMC, Georges River Rehabilitation Plan.
- IMC, Longwall 903 End of Panel Report (2021).
- Niche, West Cliff Longwalls 37-38 Extraction Plan Terrestrial Flora and Fauna Assessment (2013).
- NSW Department of Planning and Environment (2015). Annual Review Guideline, Post approval requirements for State Significant Developments, October 2015.
- NSW EPA (2021), Environment Protection Licence No. 2504.

### 13.1 Acronyms used in Annual Review

Table 49: Acronyms used in Annual Review

ACRONYM	DEFINITION	ACRONYM	DEFINITION
ACCC	Appin Mine Community Consultative Committee	IMS	Integrated membrane system
AQMP	Air Quality and Greenhouse Gas Management Plan	LDP	Licence Discharge Point
AN WTP	Appin North Water Treatment Plant	LW	Longwall
AW WTP	Appin West Water Treatment Plant	MOP	Mining Operations Plan
ARC	Australian Research Council	NATA	National Association of Testing Authorities
BCD	Brennans Creek Dam	NEPM	National Environment Protection Measure
BSO	Bulli Seam Operations	OEH	Office of Environment and Heritage (now Biodiversity Conservation Division)
CCL	Consolidated Coal Lease	PEF	Processed engineered fuel
CMA	Corrective Management Action	PM <sub>2.5</sub>	Particulate matter 2.5 microns



CO	Carbon monoxide	PM <sub>10</sub>	Particulate matter 10 microns
CPP	Community Partnerships Program	PRP	Pollution Reduction Program
CPW	Cumberland Plain Woodland	RCE	Rehabilitation Cost Estimate
CV	Calorific Value	RMP	Rehabilitation Management Plan
CWEA	Coal Wash Emplacement Area	RMS	Roads and Maritime Services
DDG	Dust Deposition Gauge	RoM	Run of Mine
DotE	Department of the Environment	IMC	South32 Illawarra Metallurgical Coal
DPIE	Department of Planning, Industry and Environment <sup>33</sup>	SA NSW	Subsidence Advisory NSW
DTIRIS	Department of Trade, Investment, Regional Infrastructure and Services	SBO	Strategic Biodiversity Offsets
EC	Electrical conductivity	SMP	Subsidence Management Plan
EDL	Energy Developments Limited	SSTF	Shale Sandstone Transition Forest
EIP	Environment Improvement Program	STP	Sewage Treatment Plant
EFT	South32 Environmental Field Team	SWMP	Surface Water Management Plan
EP	Extraction Plan	TARP	Trigger Action Response Plan
EPA	Environment Protection Authority	TSS	Total Suspended Solid
EPBC	Environment Protection and Biodiversity Conservation	TPH	Total petroleum hydrocarbons
EPL	Environment Protection Licence	VAM	Ventilation Air Methane
FY	Financial Year	WTP	Water Treatment Plant
GHG	Greenhouse Gas	WMP	Water Management Plan
HVAS	High volume air sampler	WCCPP	West Cliff Coal Preparation Plant

<sup>33</sup> Previously Department of Planning and Environment, Department of Planning, Department of Urban Affairs and Planning



## 13.2 Management Plans

The Management Plans in Table 50 are required by the Bulli Seam Operations Project Approval, EPBC Approvals or the EPL.

Table 50: Management Plans		
Management Plan	Approved Date	Next Review
Adaptive Management Plan for Water Sensitive EPBC Act Listed Species	28/01/2021	31/01/2024
Air Quality & Greenhouse Gas Management Plan	9/12/2020	7/12/2023
Biodiversity Management Plan	16/02/2021	1/01/2024
Broad Headed Snake and Southern Brown Bandicoot Management Plan	28/01/2021	23/12/2023
Coal Wash Emplacement Area Management Plan	28/01/2021	16/12/2023
Environmental Management Strategy	1/10/2020	1/09/2023
Gas Drainage Management Plan	7/12/2020	3/12/2023
Heritage Management Plan	14/08/2020	8/07/2023
Noise Management Plan	7/12/2020	3/12/2023
<i>Persoonia Hirsuta</i> Offset Management Plan	12/04/2019	12/04/2022
Pollution Incident Response Management Plan EPL 2504	N/A	15/02/2023
Rehabilitation Management Plan / Mining Operations Management Plan (MOP)	9/10/2020	17/08/2024
Shale Sandstone Transition Forest Offset Management Plan	1/07/2021	1/07/2025
Surface Activities Management Plan	1/10/2020	1/09/2023
Traffic Management Plan	23/07/2020	30/06/2023
Ventilation Shaft 6 Biodiversity Offset Strategy	20/11/2020	1/10/2041
Waste Management Plan	5/11/2020	1/11/2023
Water Management Plan	11/09/2020	1/07/2023



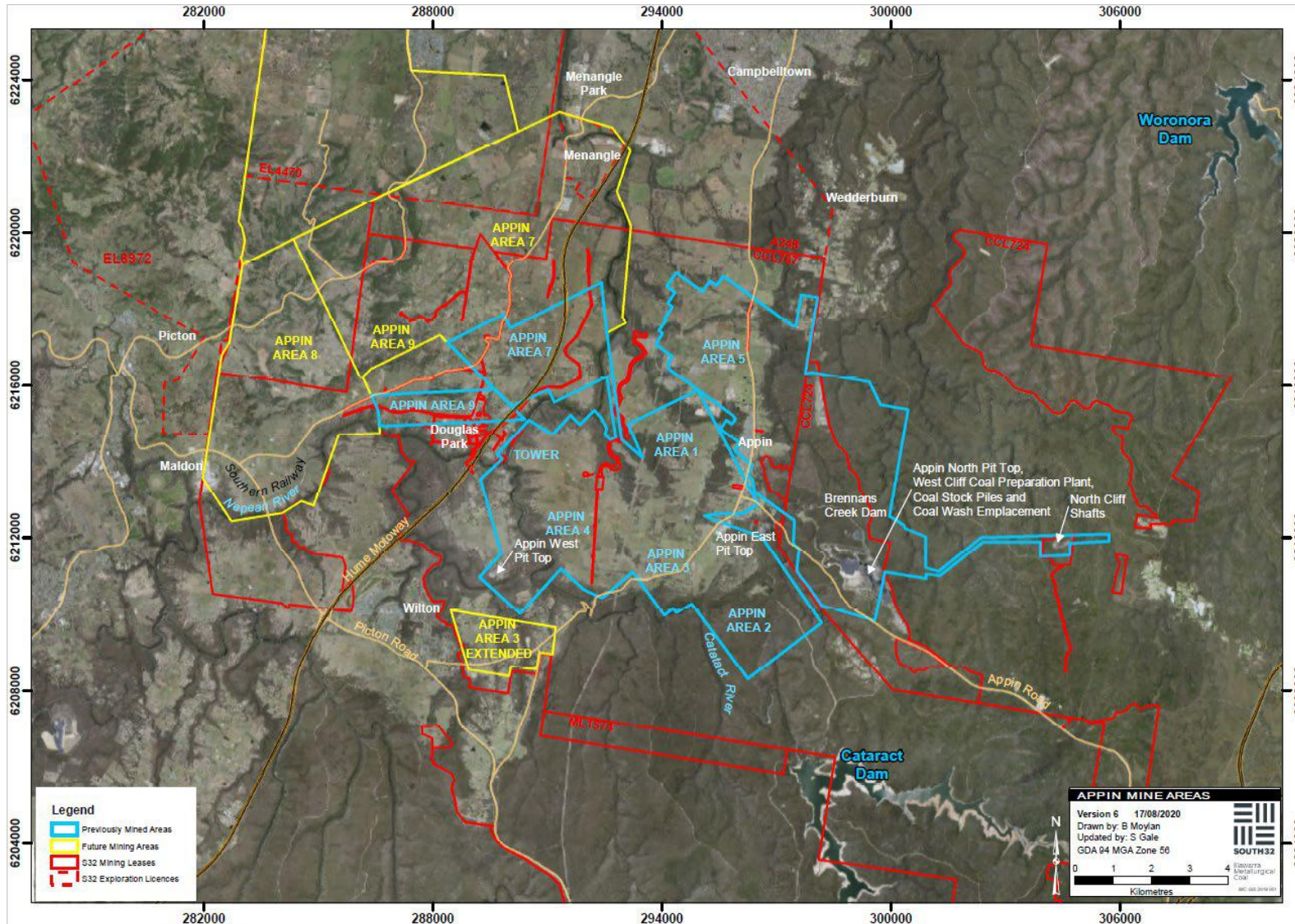
---

**14. PLANS**



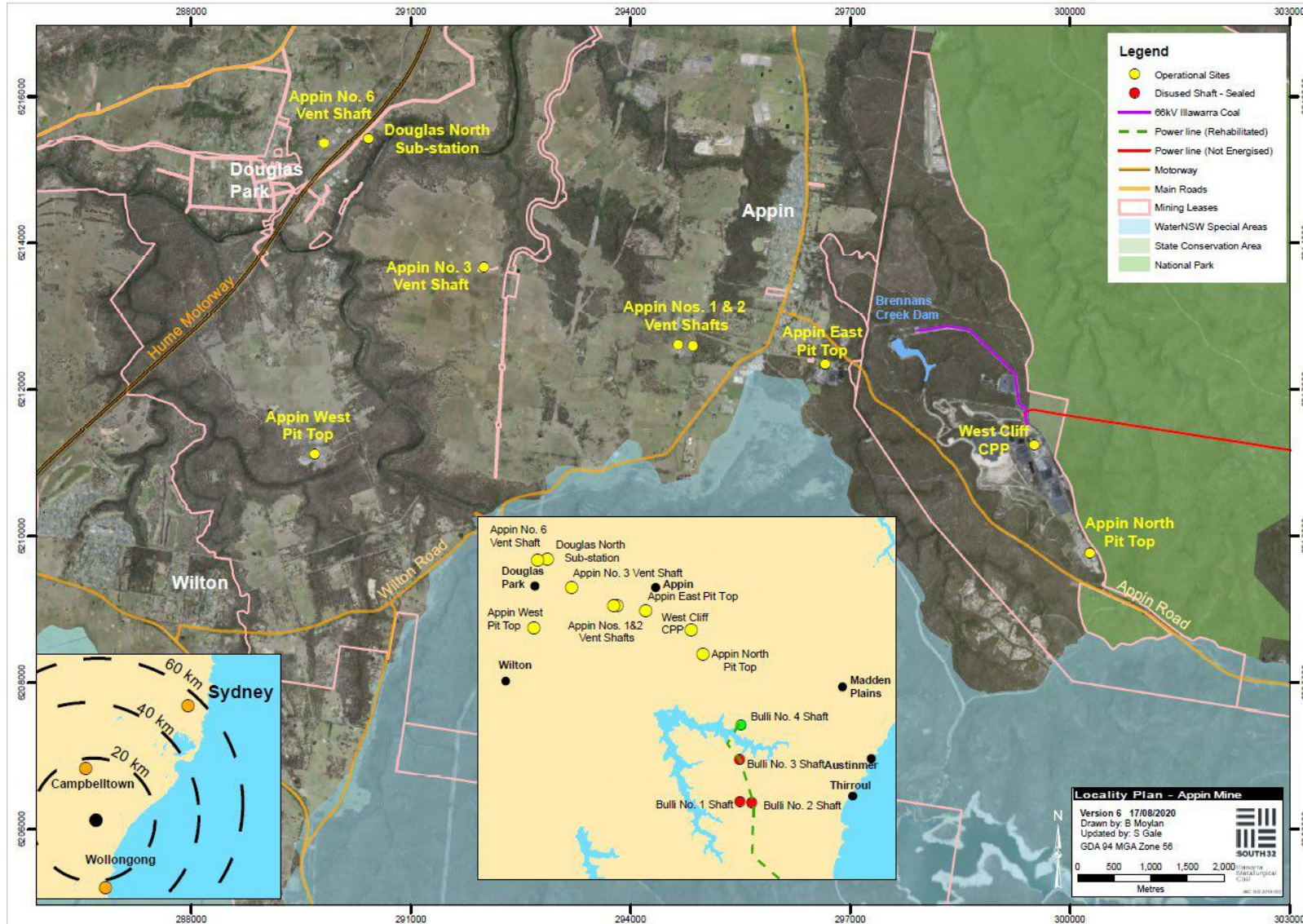


### Plan 1: Regional Location Plan



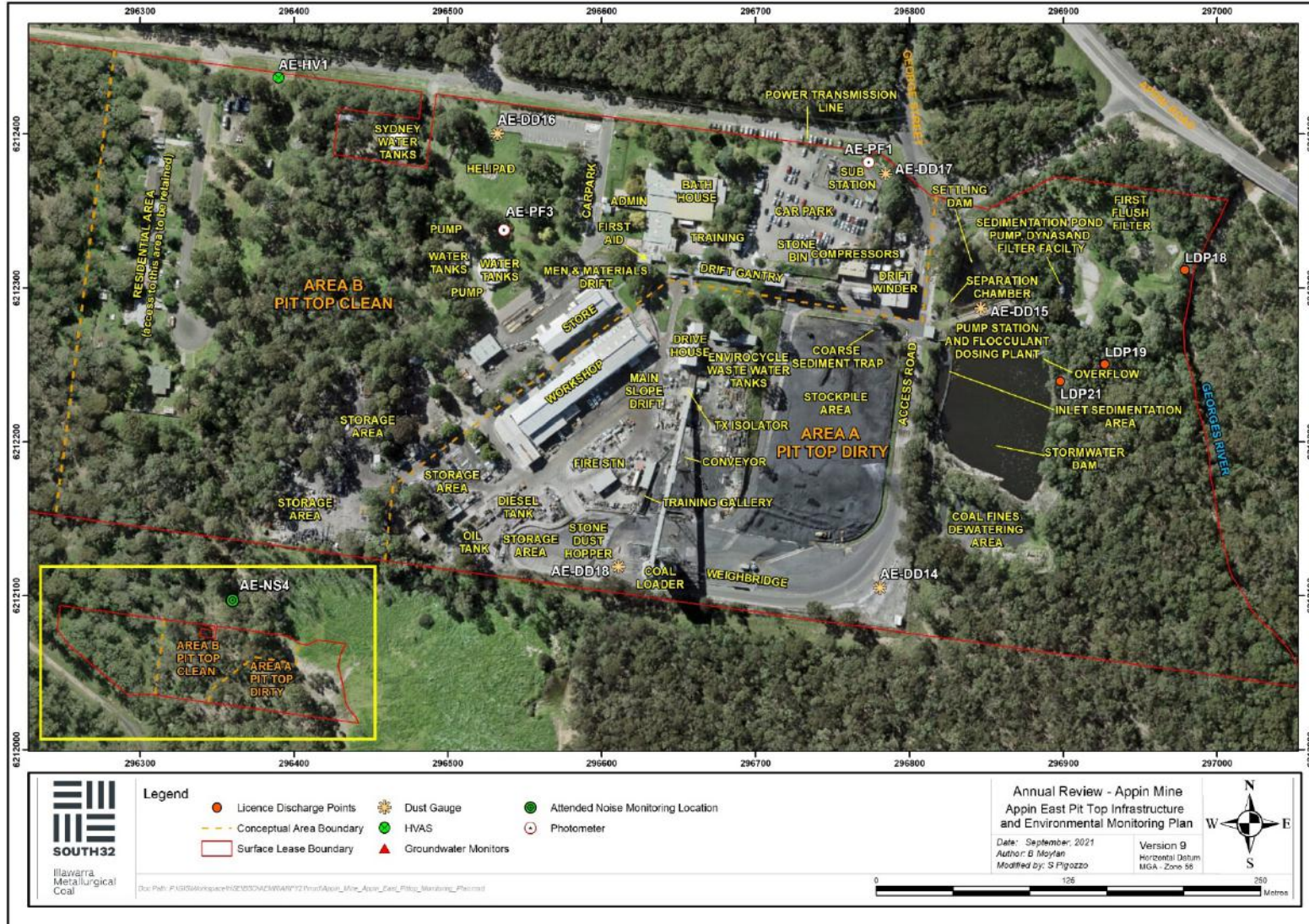


## Plan 2: Appin Shaft Locality Plan



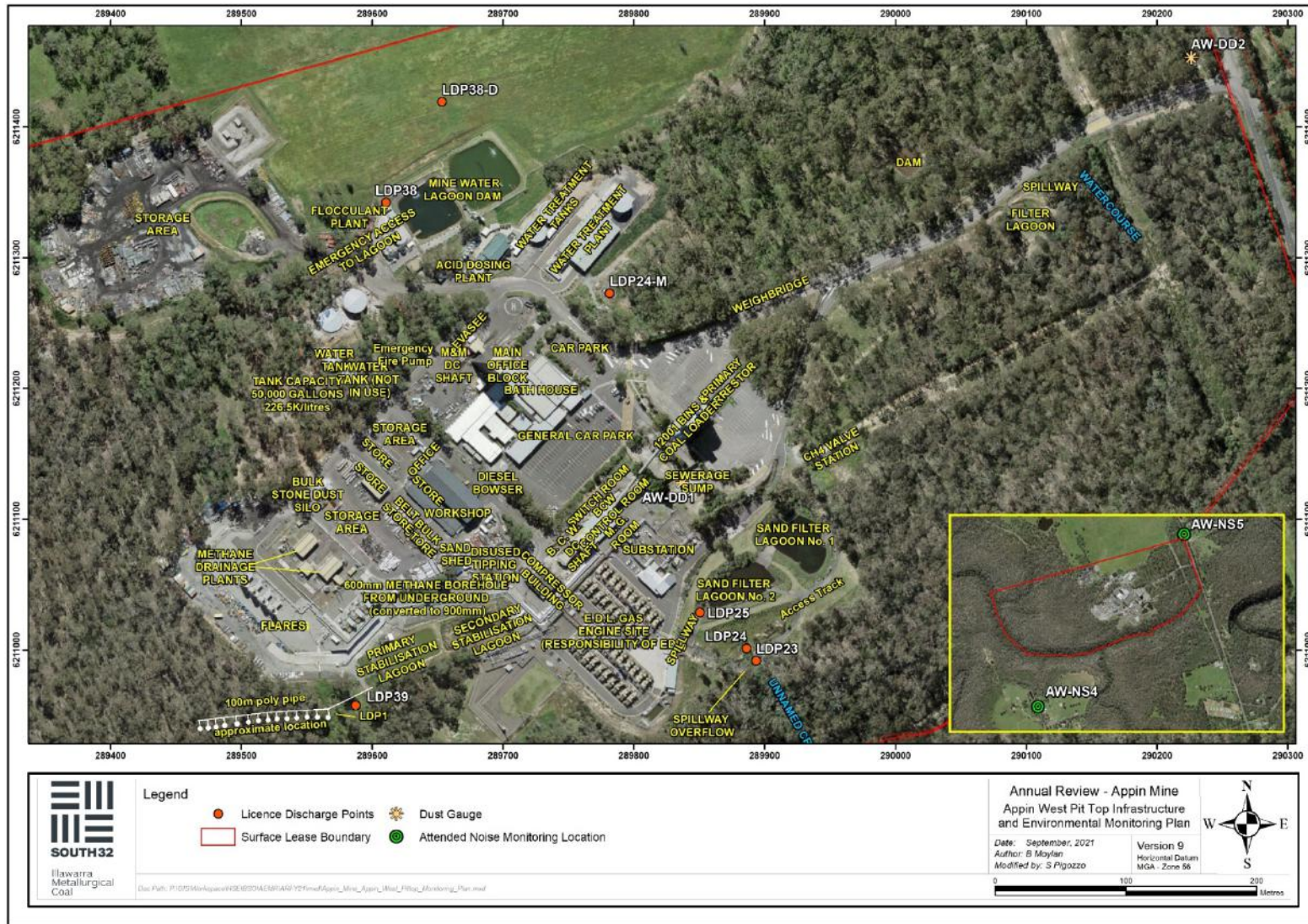


### Plan 3: Appin East Mine Site



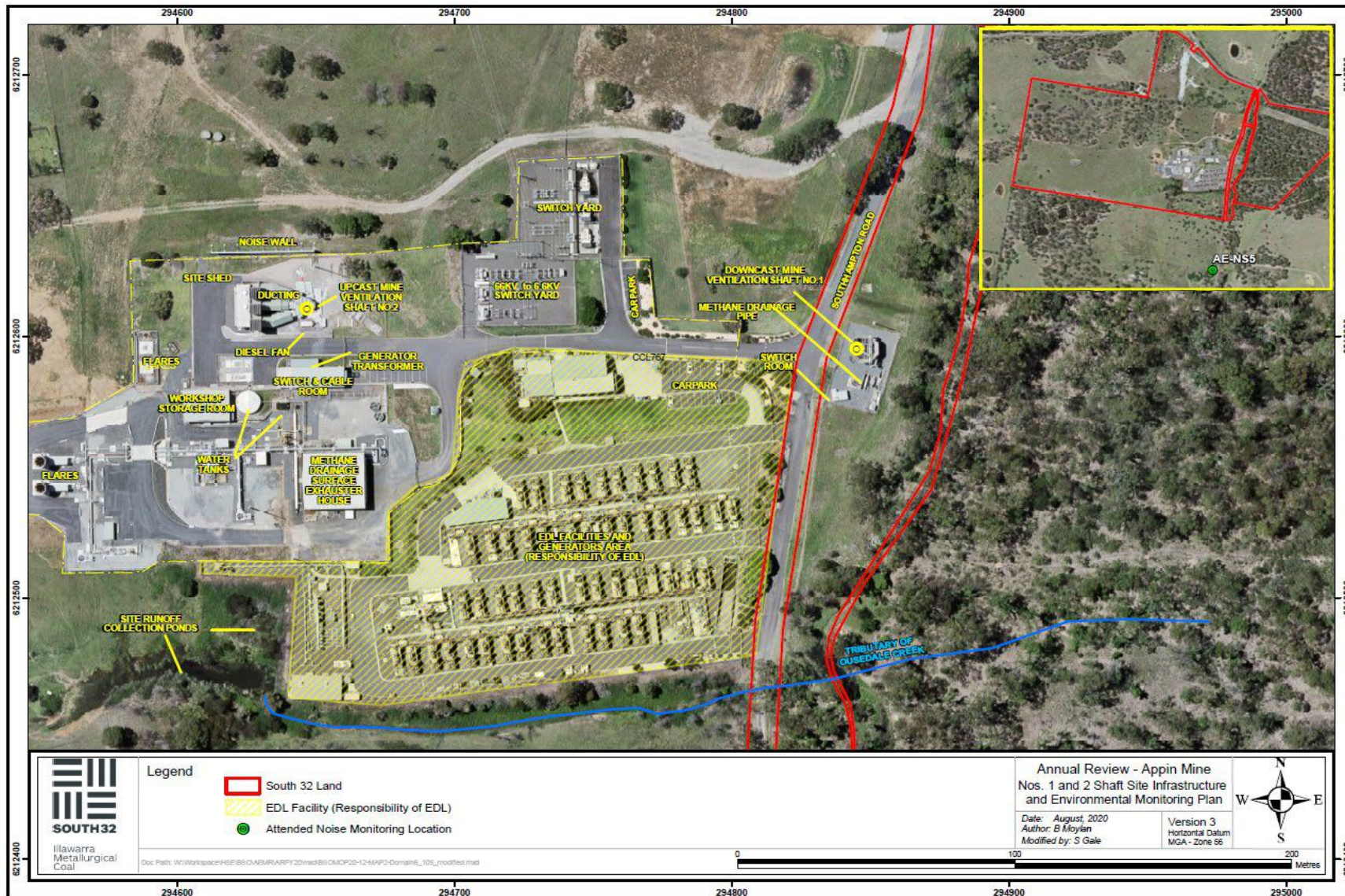


### Plan 4: Appin West Mine Site



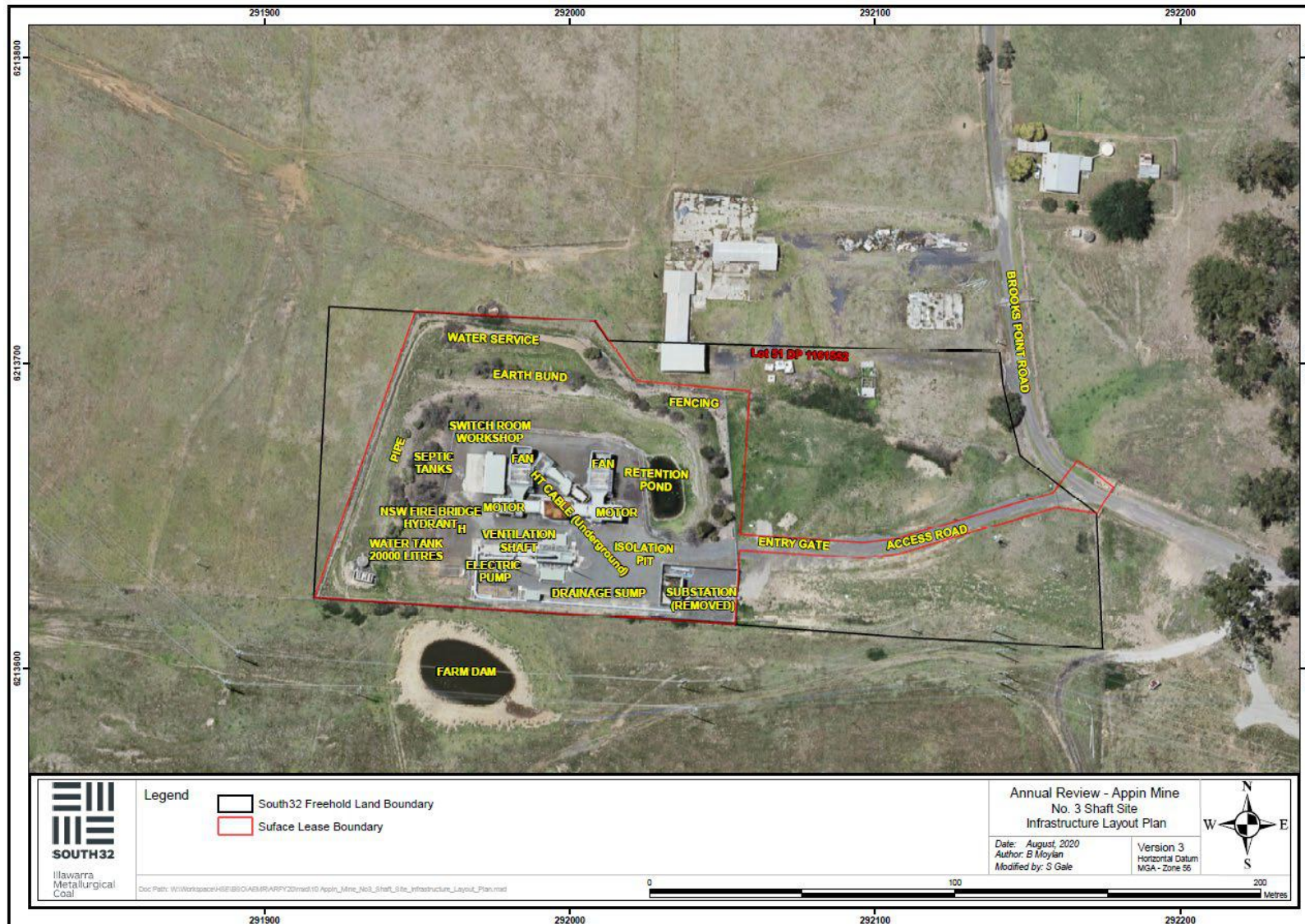


### Plan 5: No. 1 and No. 2 Ventilation Shaft Site



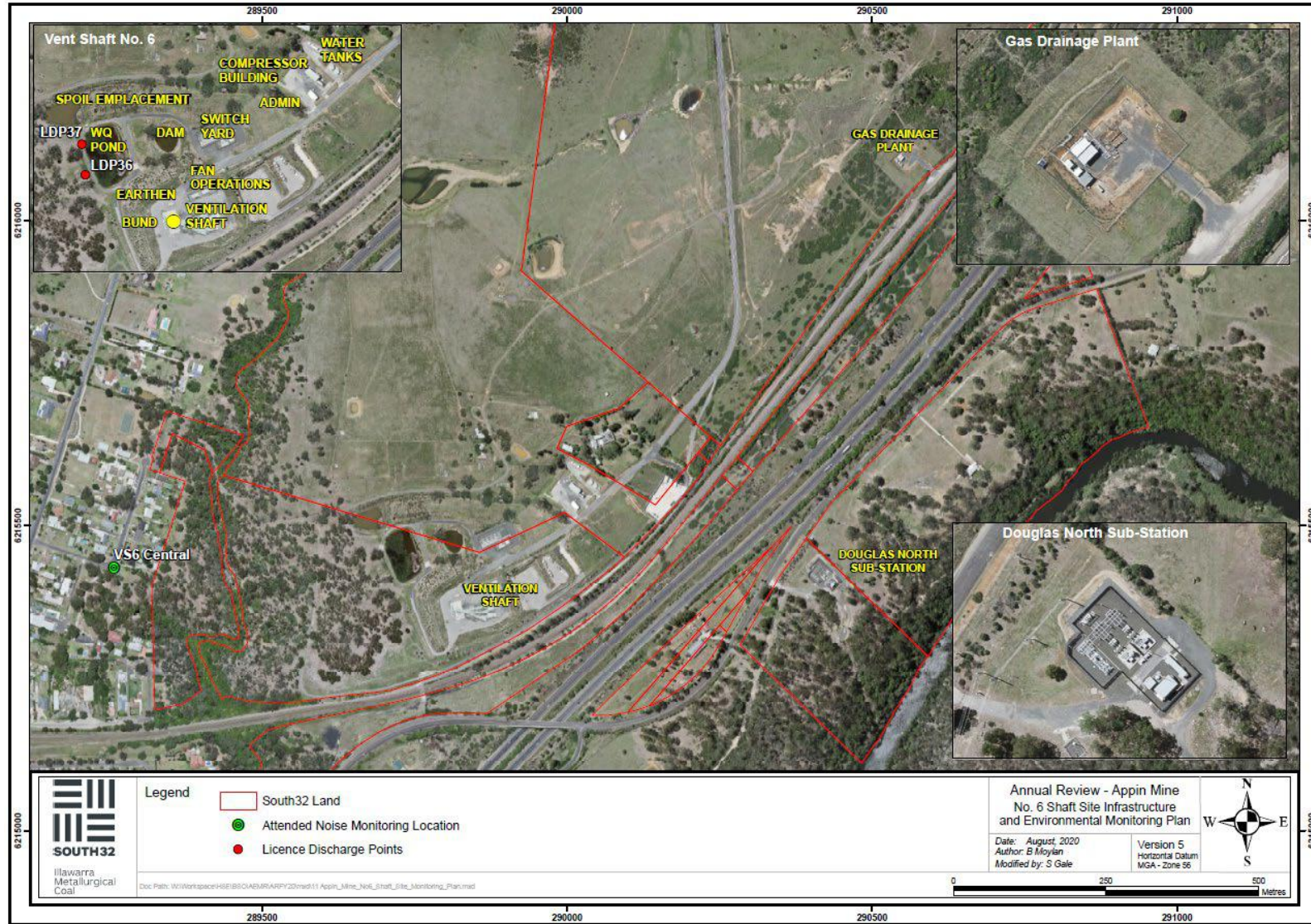


### Plan 6: No. 3 Ventilation Shaft Site



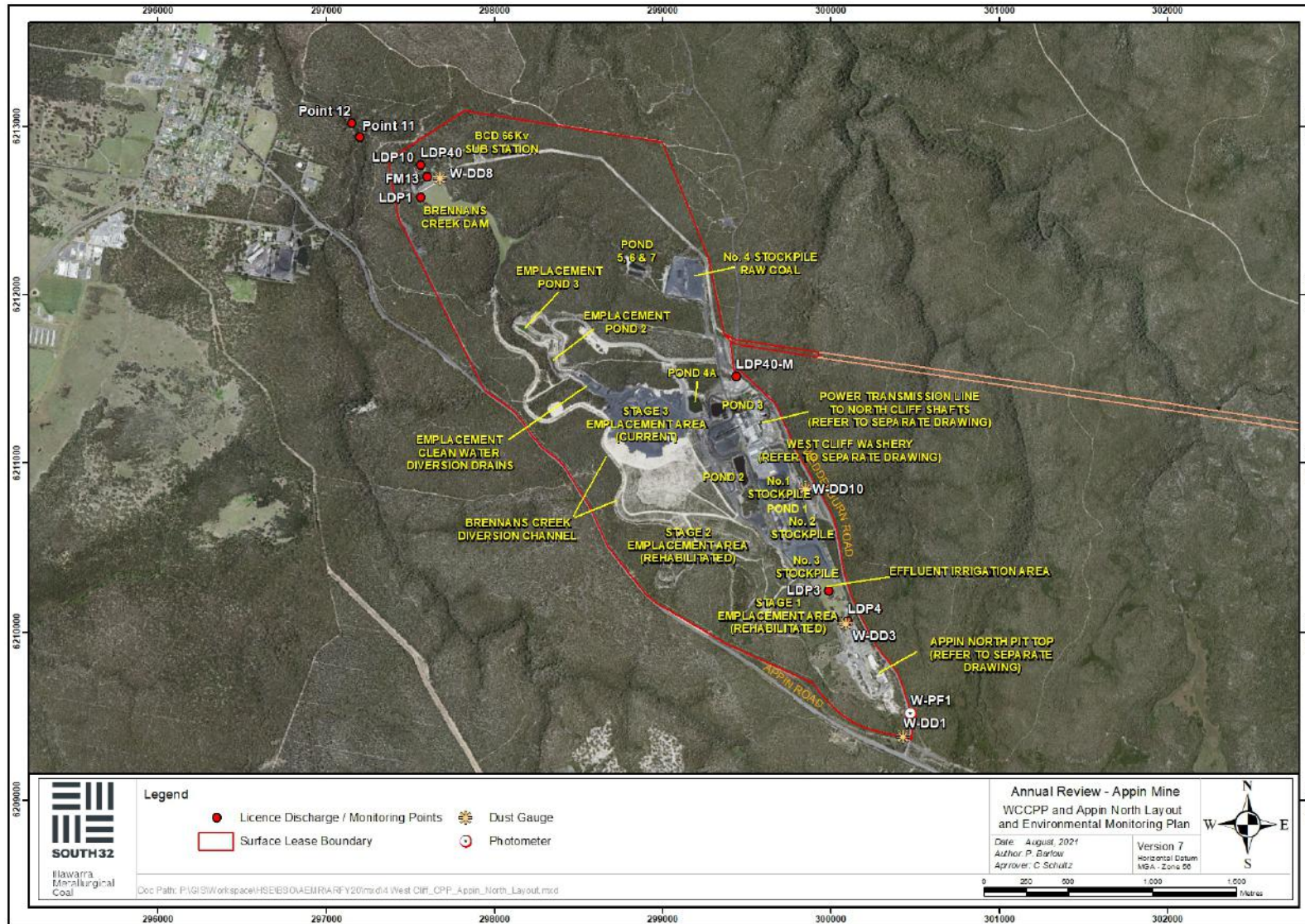


### Plan 7: No. 6 Ventilation Shaft Site





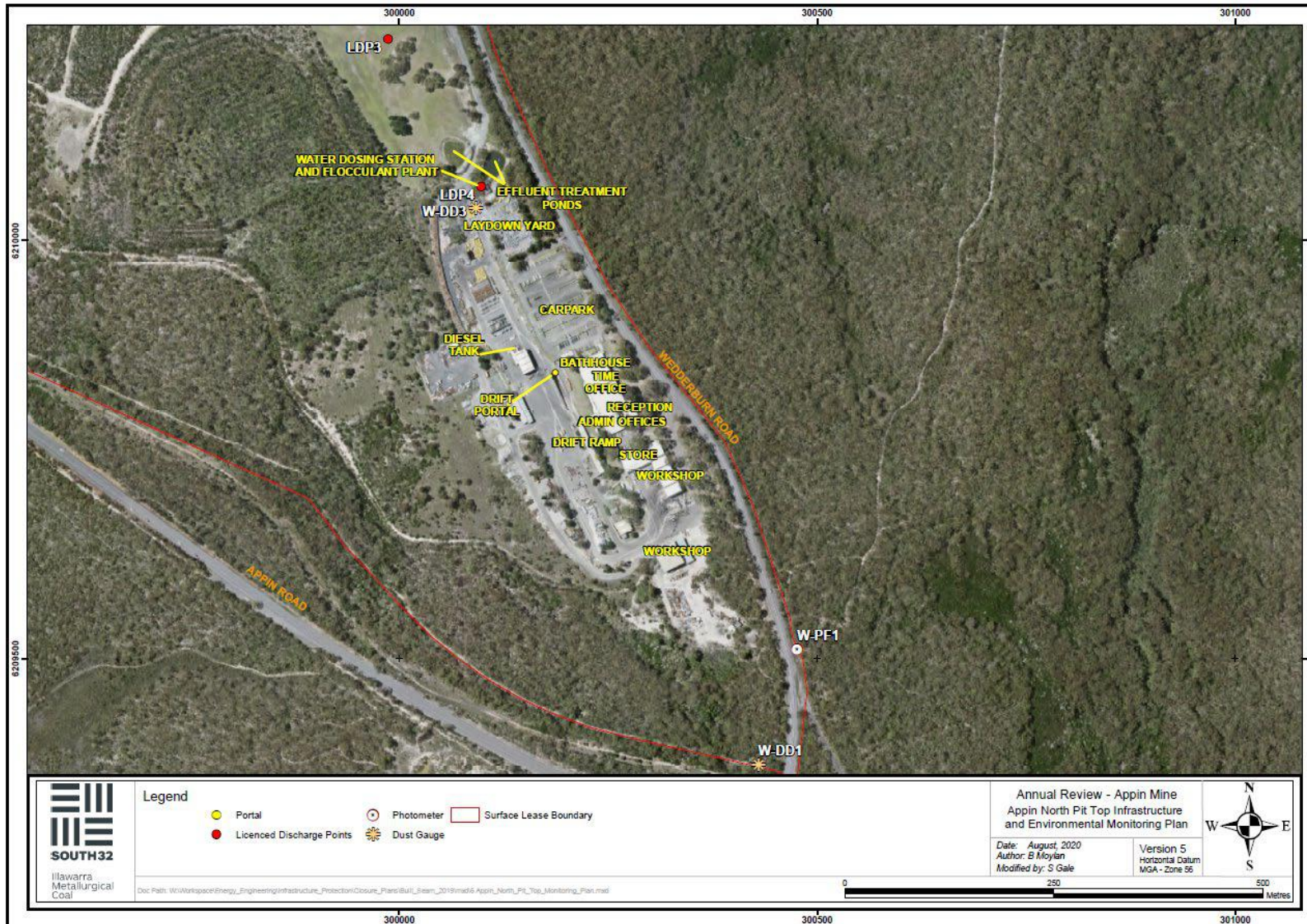
### Plan 8: WCCPP and Appin North Layout





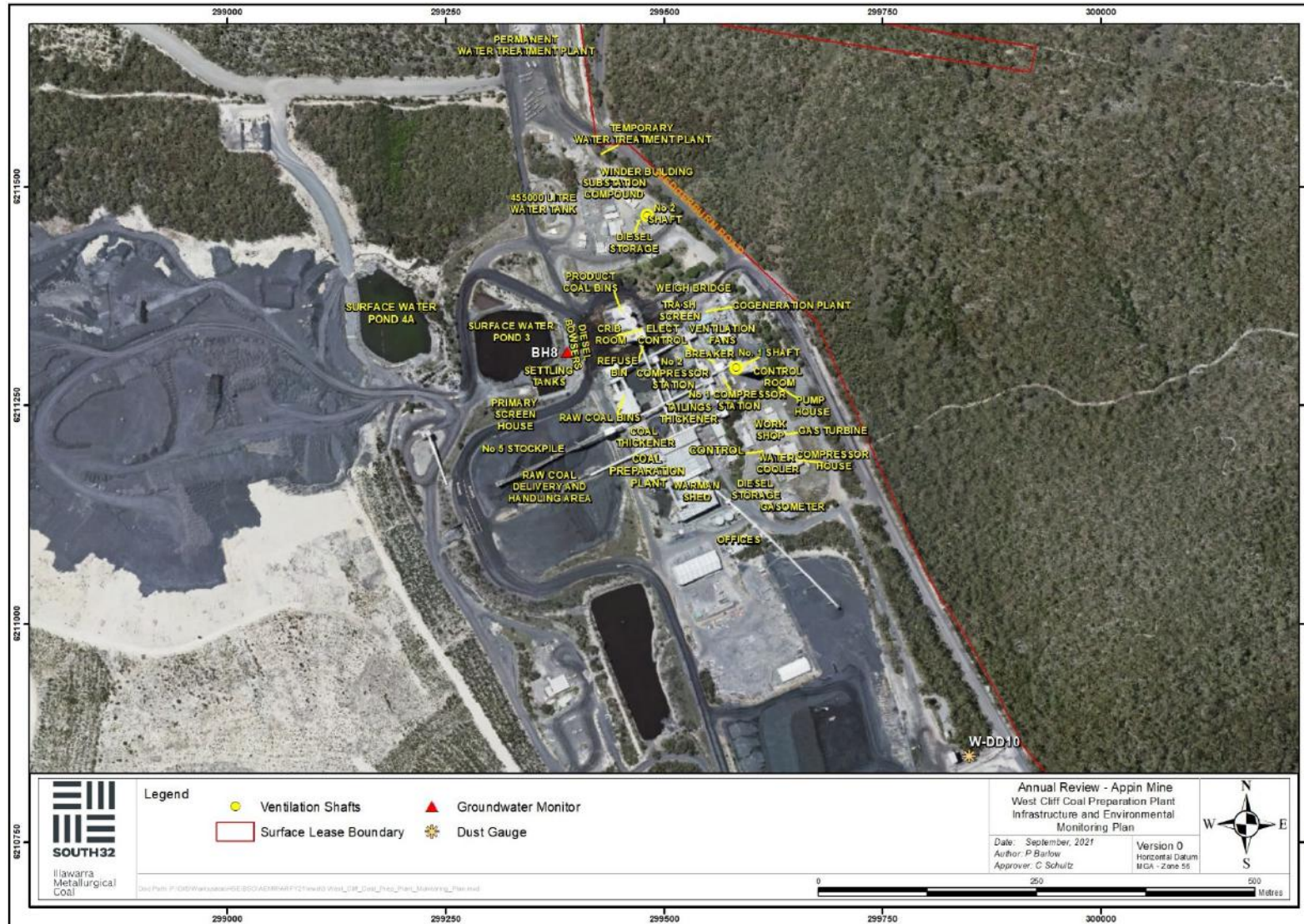


### Plan 9: Appin North Pit Top



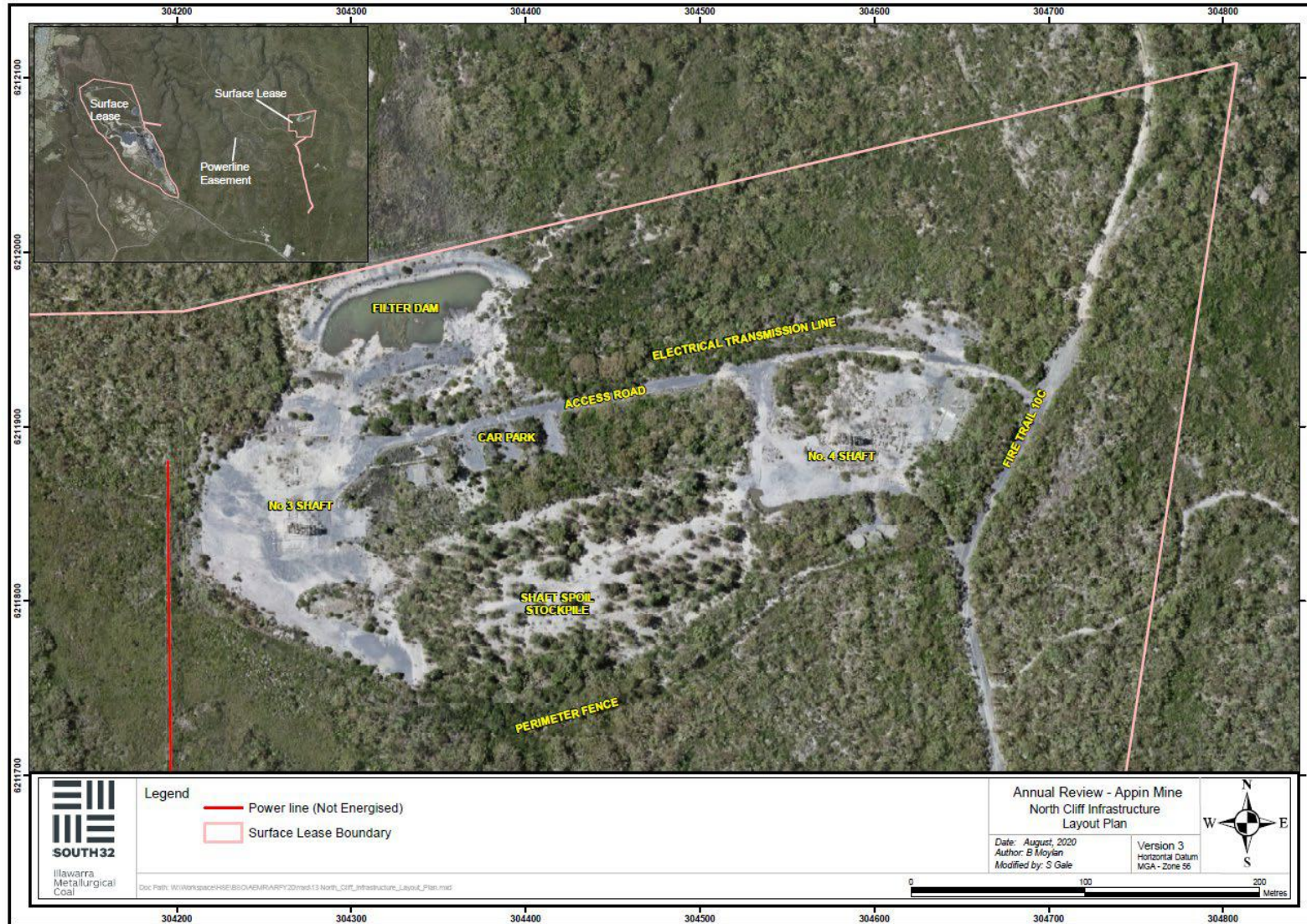


### Plan 10: West Cliff Coal Preparation Plant





### Plan 11: North Cliff Site Plan



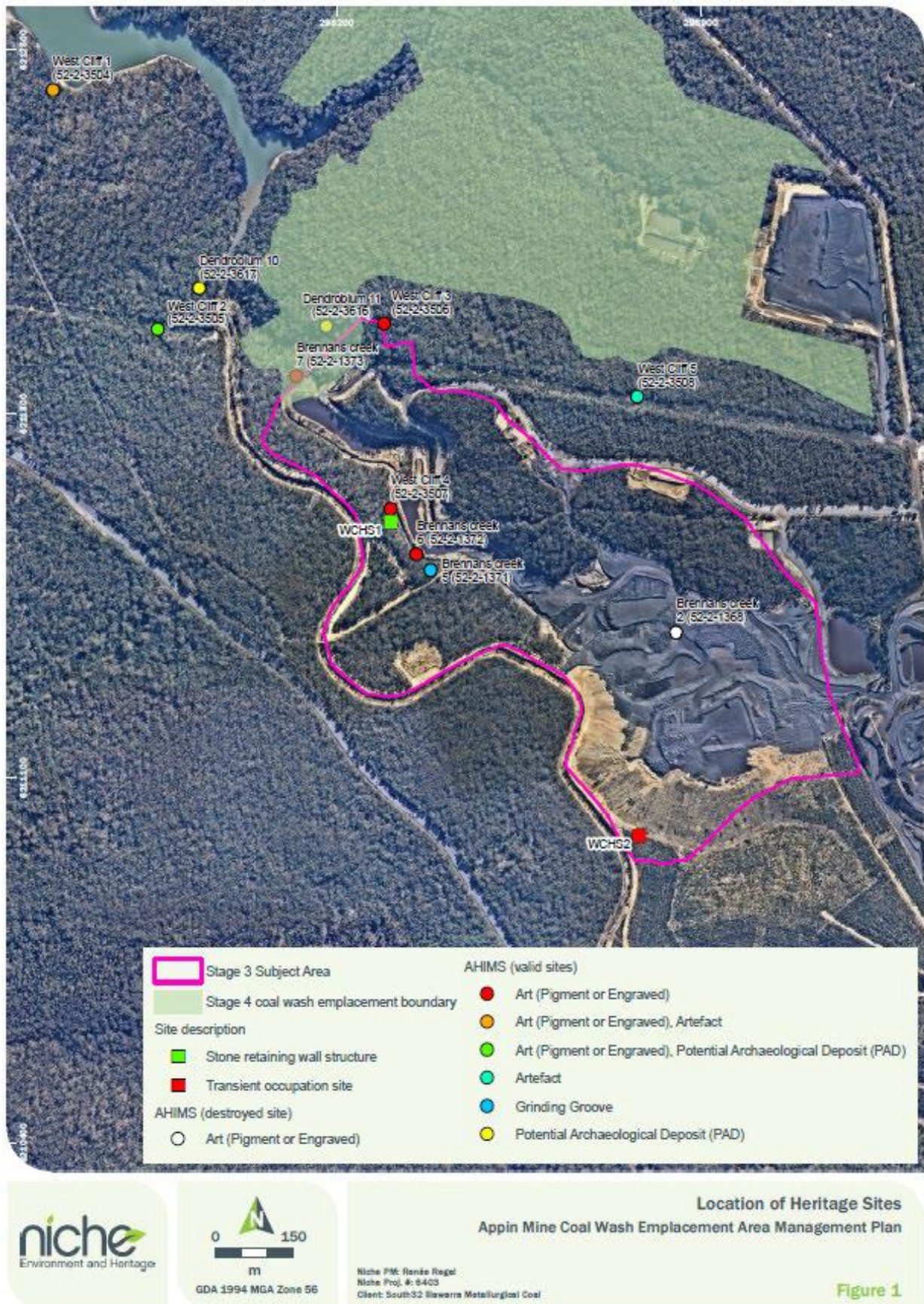


**Plan 12: Land Preparation Plan – CWEA**



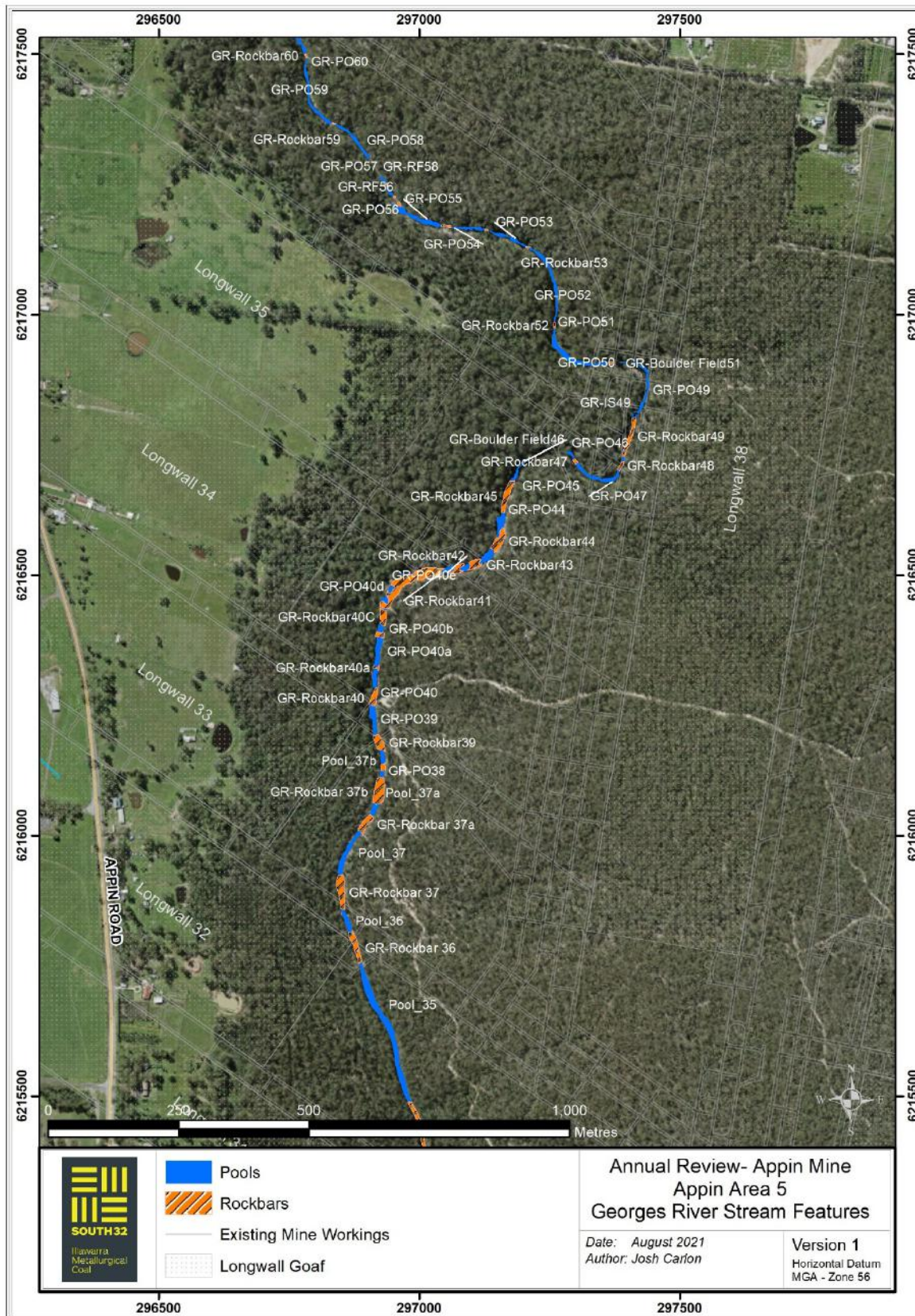


### Plan 13: CWEA Cultural Heritage Sites



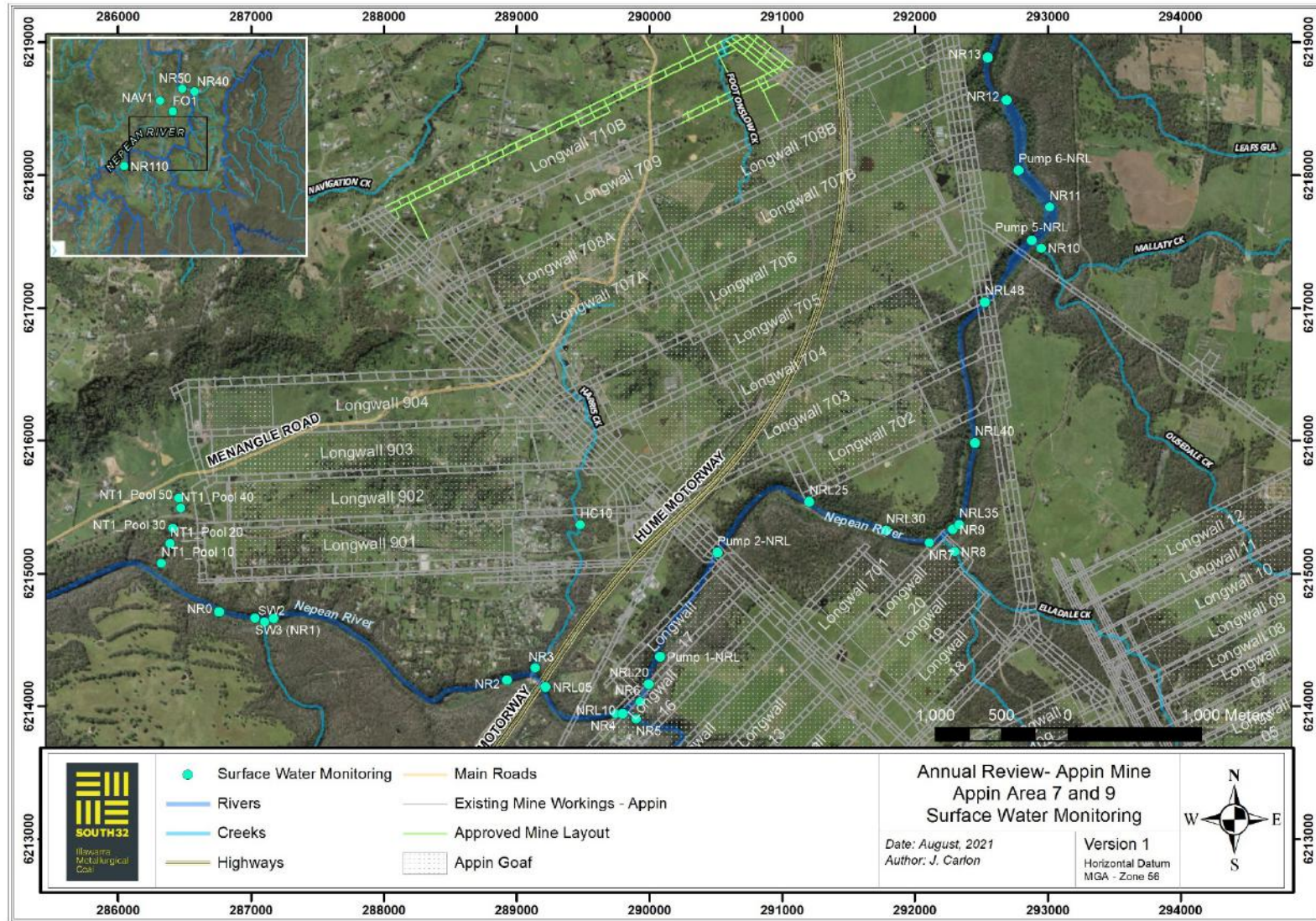


### Plan 14: Georges River Subsidence Areas



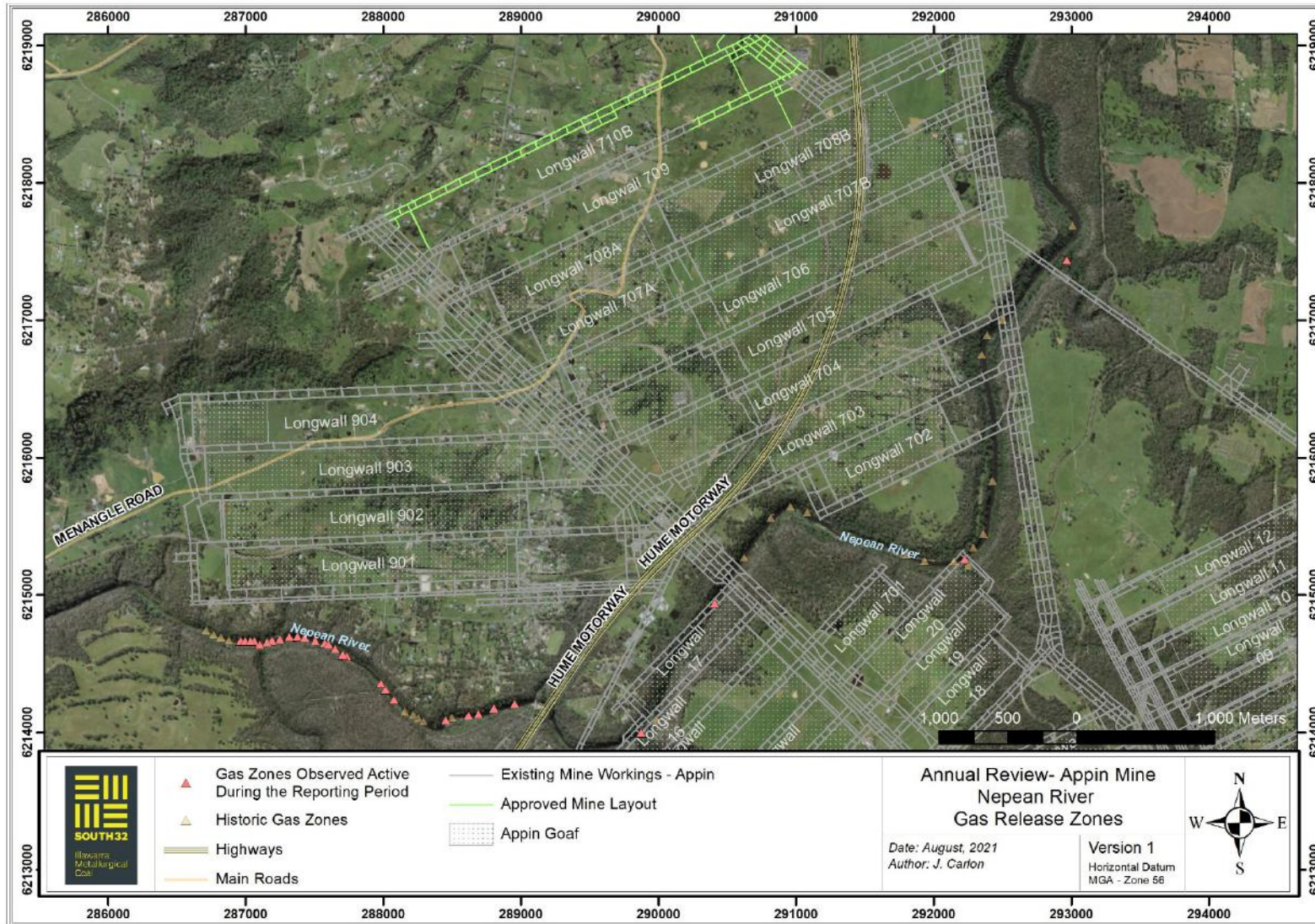


### Plan 15: Appin Area 7 and 9 FY21 Surface Water Monitoring





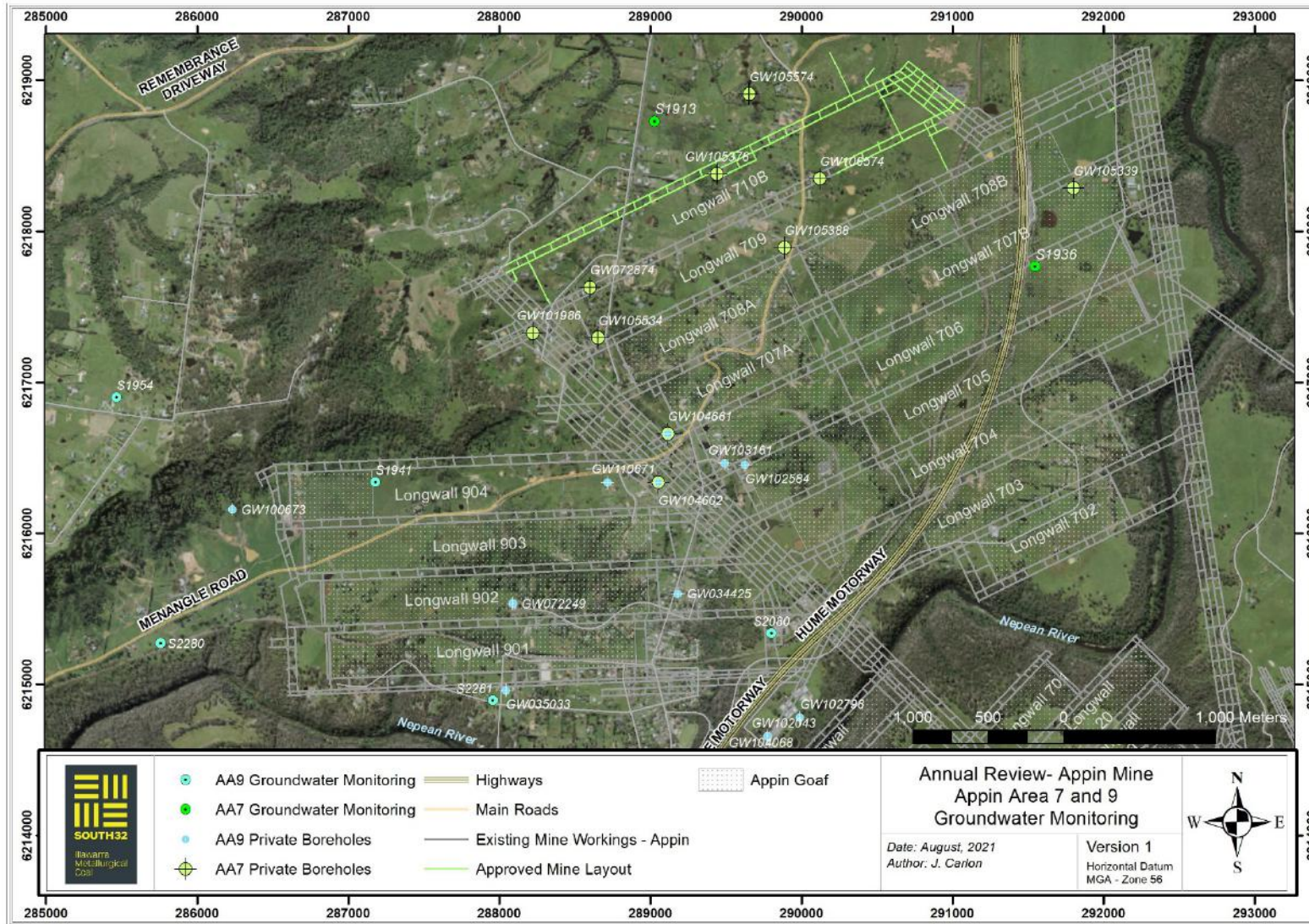
### Plan 16: Appin Area 7 and 9 – FY21 Gas Zones





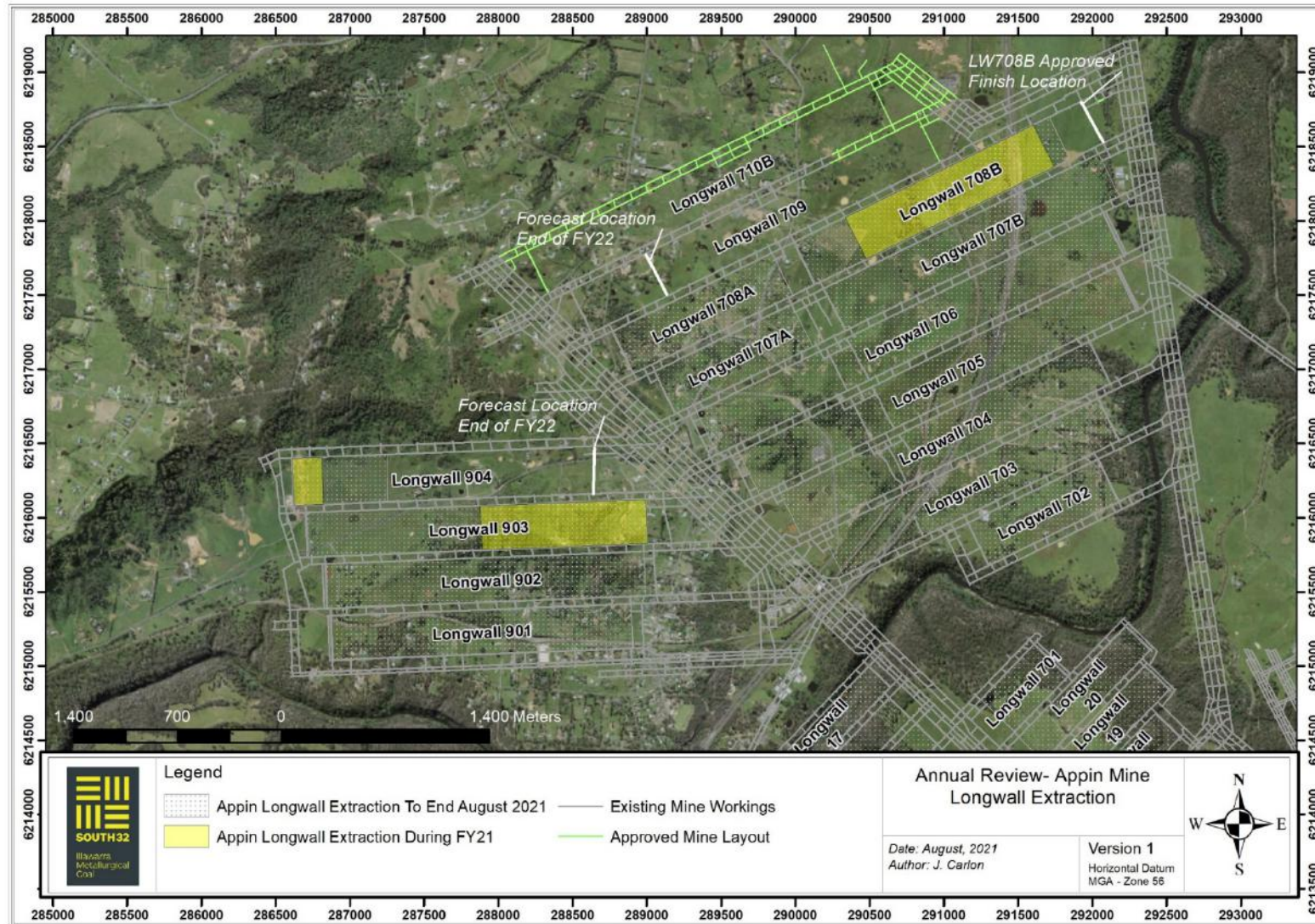


### Plan 17: Groundwater Monitoring Sites in Area 7 and 9



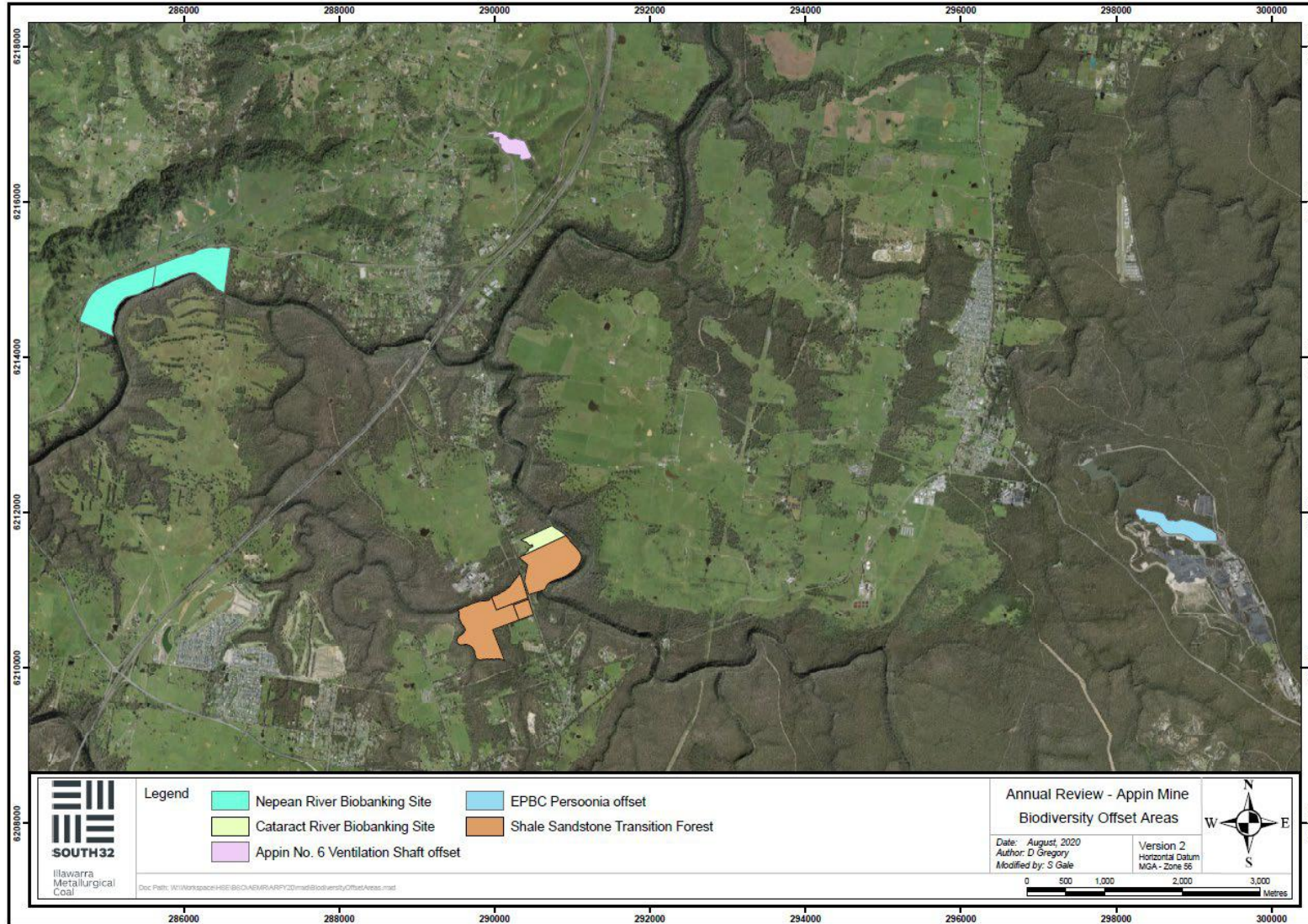


### Plan 18: Mine Extraction Plan – FY21 and FY22





### Plan 19: Biodiversity Offset Locations





---

## **15. APPENDICES**

### **Appendix A: Annual Rehabilitation Report**

# **MONITORING REPORT - EMPLACEMENT REHABILITATION YEAR 10**

Illawarra Metallurgical Coal 2020



# CONTENTS

Contents .....	2
Introduction .....	3
Requirement for Monitoring .....	3
Purpose Of This Report.....	4
Survey Design.....	5
Aim.....	5
Key Performance Criteria .....	5
Methods .....	5
2020 RESULTS AND DISCUSSION .....	9
Biometric Vegetation Assessment .....	9
Photo-Point Monitoring .....	23
Threatened Plant Random Meander.....	23
Fauna .....	23
Completion Criteria.....	27
Conclusion and recommendations.....	32
Plans.....	33
Plan A: CWEA Plot Locations And Rehabilitation Progress .....	34
Plan B: Camera Trap Locations 2019.....	35
Plan C: Threatened plant random meander across the CWEA 2020 .....	36
Appendix 1: Photo Point Monitoring.....	37

# 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 2020 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 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 Overstorey Cover
- Native Midstorey 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). 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, and 17 plots in 2017 across five treatments (Plan A & Plan B) and 19 plots in 2019. Monitoring sites are listed in (Table 4).

**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, as detailed above. The BioBanking Local Benchmark Calculator is then 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 this year was used as the Local Benchmark. The data was entered into the Local Benchmark Calculator. Variation from previous benchmarks may be due to the limitations with survey methods due to a change in personnel conducting the monitoring.

**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

### 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. This method is the most appropriate for the purposes of the monitoring survey. Two people, approximately 10 metres apart, traverse the CWEA. Targeted species included those known to exist locally (some within the Appin North Colliery surface lease-area) and include; *Acacia bynoeana*, *Epacris purpurascens* var. *purpurascens*, *Grevillea parviflora* ssp. *parviflora*, *Melaleuca deanei*, *Persoonia hirsuta*, *Persoonia nutans* and *Pultenaea aristata*.

### **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 labor 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.

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 and the benchmarks presented in this report are used 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.

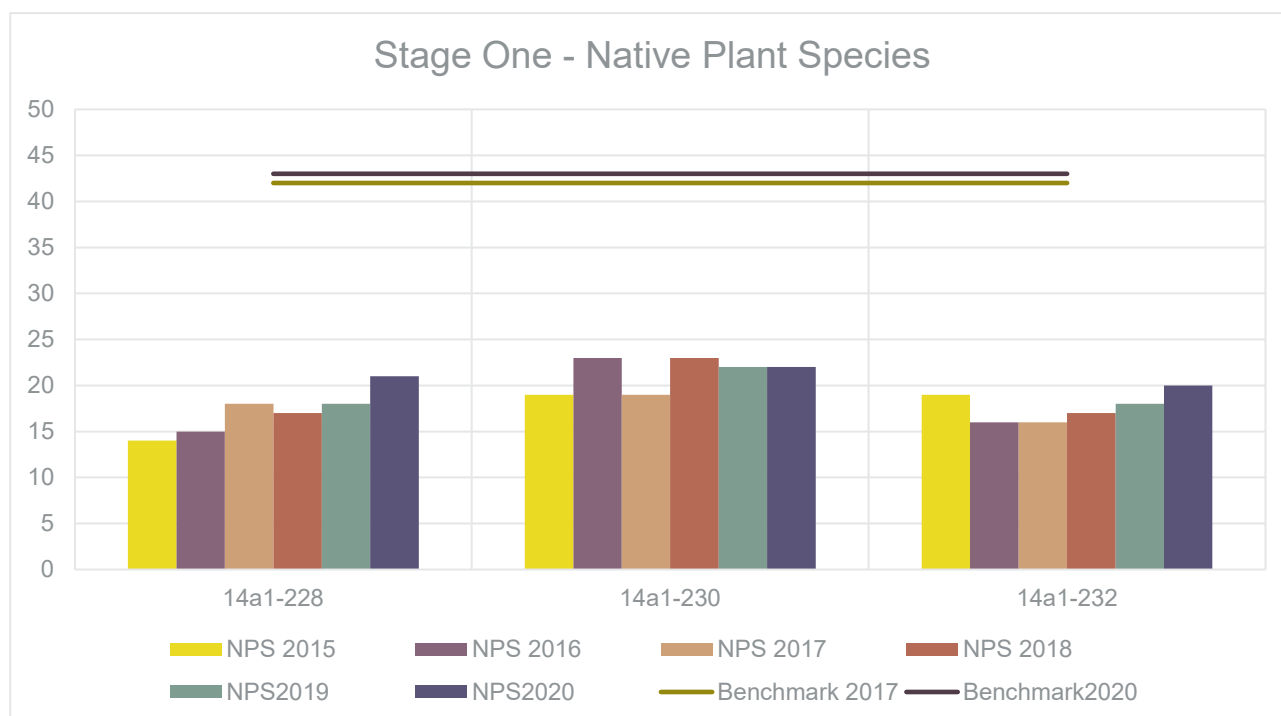
Fauna monitoring using camera traps is required annually, starting five years after translocation or as deemed appropriate, depending on the maturity of the revegetation. Criteria can be measured most easily in spring by noting flowering, seed production, seedling growth and establishment.

# 2020 RESULTS AND DISCUSSION

## BIOMETRIC VEGETATION ASSESSMENT

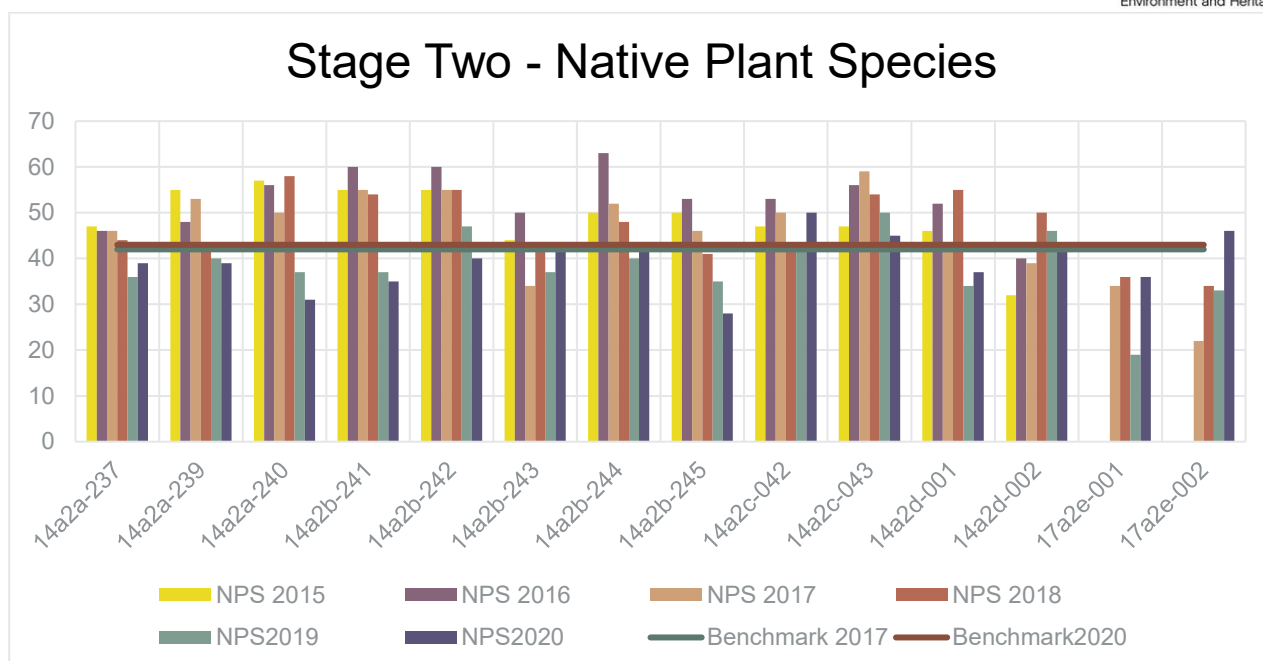
### Native Plant Species Richness

The 2020 local benchmark for Native Plant Species Richness is  $\geq 43$  species per plot (previously  $\geq 42$ ).



**Figure 1: Number of native plant species - Stage One**

The plots in Stage One had low species richness in comparison to benchmark; however, this is consistent with the results of previous years (2015 to 2019) (Figure 1). This may be due to the differing nature of the methodology used in comparison to Stage Two; i.e. Stage One has shallower topsoil and was planted with tube stock (predominantly Acacia and Eucalypts).



**Figure 2: Number of native plant species - Stage Two (Area 2a, 2b, 2c, 2d, 2e)**

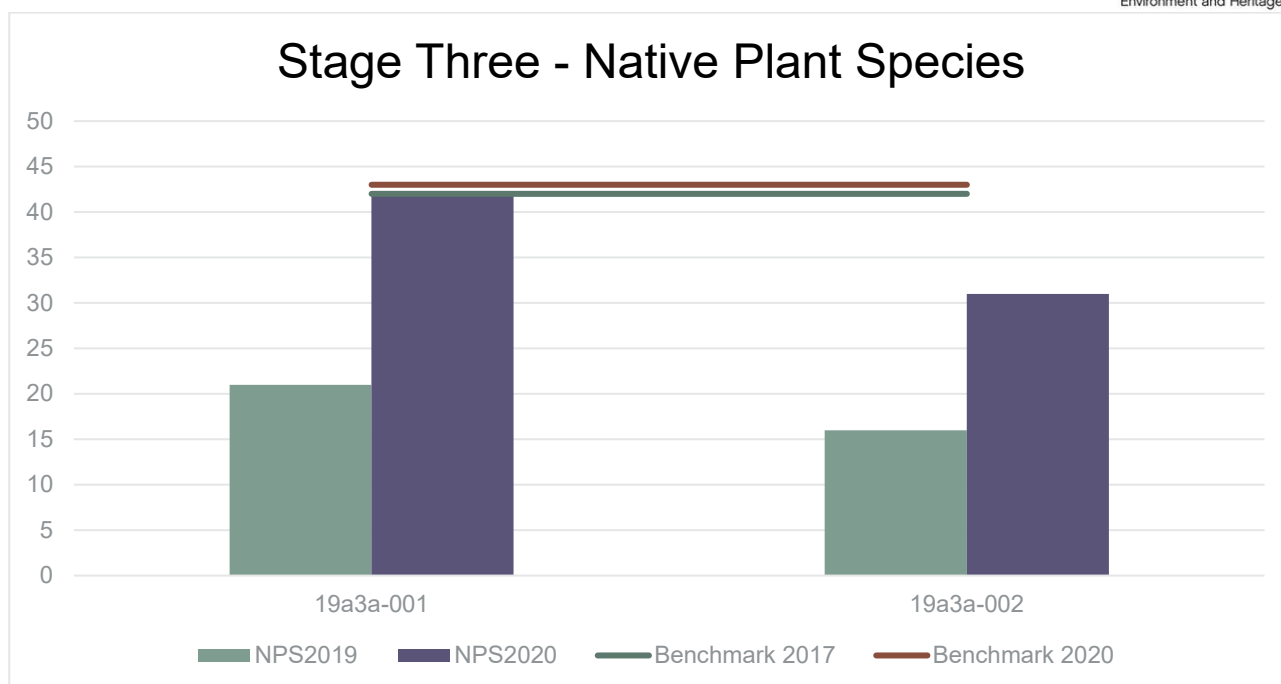
The plots in Area 2a had an average of 36 species per plots in 2020, slightly lower than the average of 37 (2019) and 48 (2018) species per plot of previous years monitoring. Rehabilitation in this area commenced in 2007 and it is expected that species richness will approach benchmark (43) over time.

The plots in Area 2b had an average of 37 species per plot which is slightly lower than the average with the 2019 data (average of 39) year and lower than data for 2018 (average of 48). The average has just fallen under above benchmark but is expected to approach benchmark (43) after species composition changes due to shade and outcompeting resources.

The native plant species richness of Areas 2c and 2d (last seven years) are all above benchmark levels (of 43), with the average for Area 2c (47.5) lower than 2019 data (46) and lower again than 2018 data (49). The average for Area 2d (40), same as 2019 data (40) and lower than 2018 data (53).

Area 2e (treated in 2017) received results just below benchmark (average of 41), this is a large increase from 2019 data (average of 26) and 2018 data (average of 35). It is expected to continue to increase with time and as the treatments establish further.

The high native species richness present in Stage Two may reflect the immaturity of the translocation areas, in that it shows that no particular species has had time to establish dominance and out-compete other species. It is expected that these sites in Stage Two will see fluctuation in species diversity over time and approach benchmark levels as certain species thrive and out compete others for resources and space.



**Figure 3: Number of native plant species - Stage Three (Area 3a)**

The newly treated Area 3a (previous report labelled 2f) was below benchmark for Native species richness (average of 36.5), an increase from 2019 data (average of 18.5). It is expected that species richness will increase further at these locations as the treatments establish.

### Native Overstorey Cover

The 2020 local benchmark for Native Overstorey Cover is 6.6 – 12.0 percent foliage cover (previously 1.9 – 17.7 percent foliage cover).

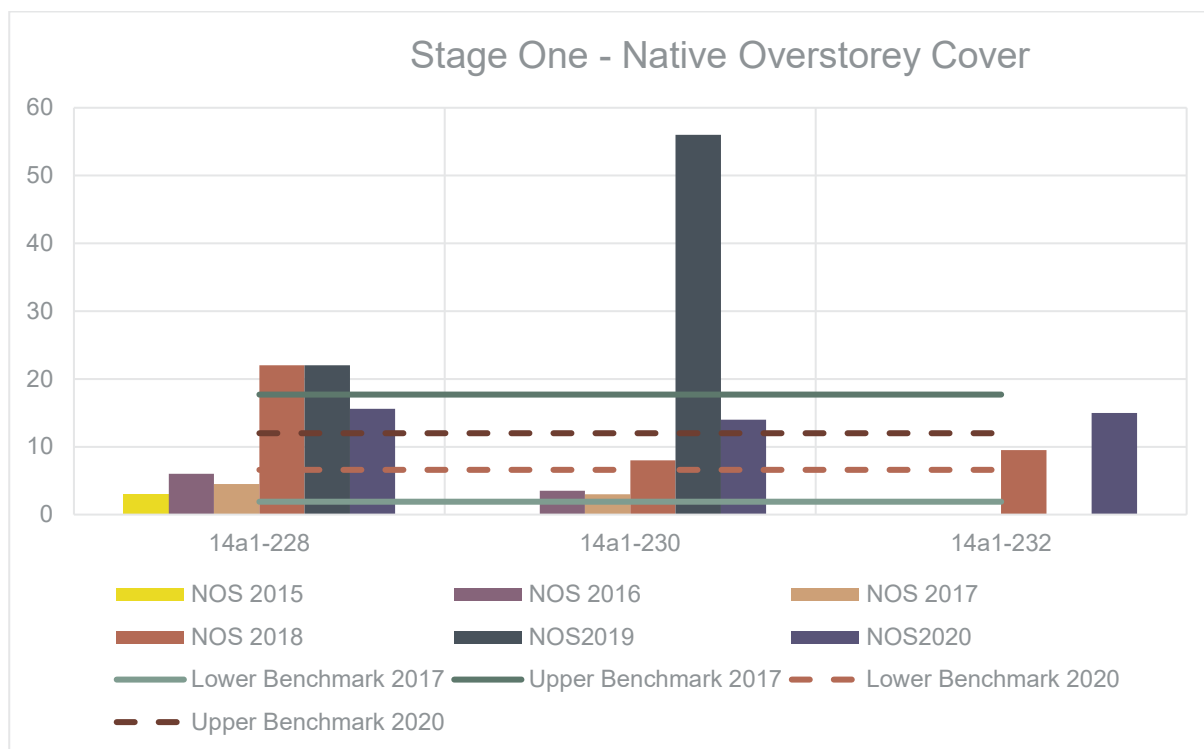


Figure 4: Native overstorey cover - Stage One

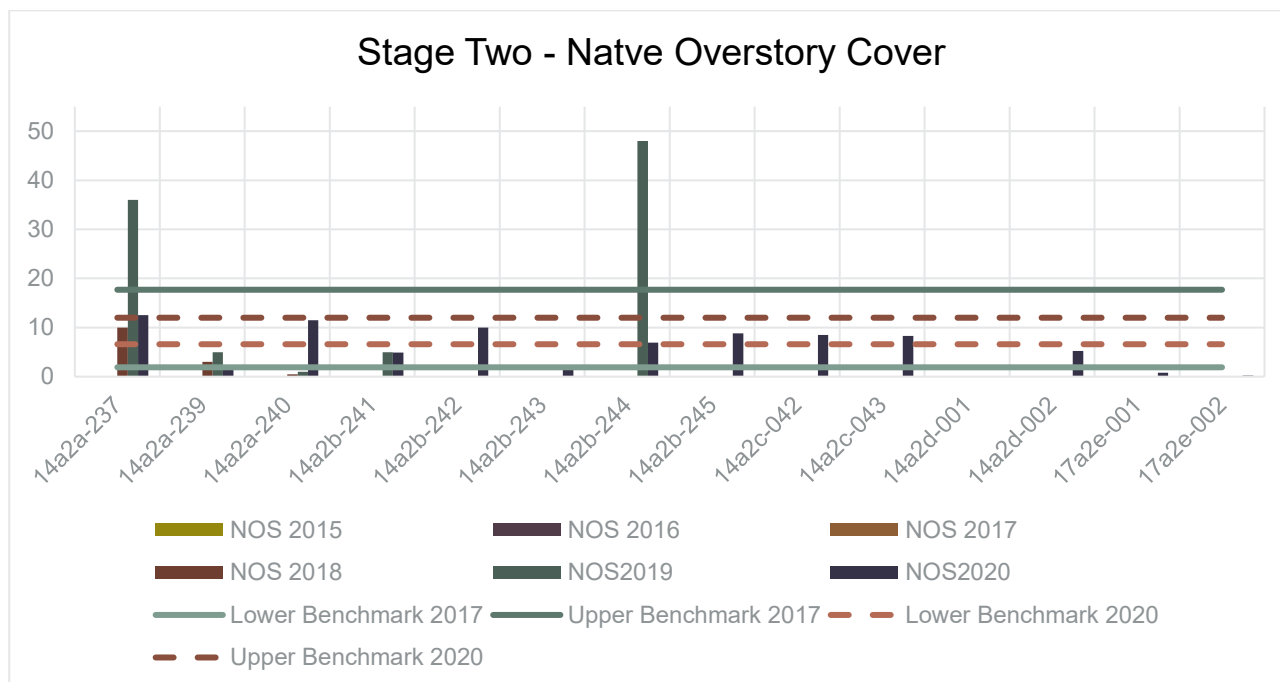


Figure 5: Native overstorey cover - Stage Two (Area 2a, 2b, 2c, 2d and 2e)

All plots in Stage One and all plots (except 14a2d-001) in Stage Two have recorded native overstorey cover in 2020 (Figure 4 and Figure 5). The dramatic increase in overstorey cover in 2018, compared with previous years, may in part be due to placement of the transect. Despite all efforts to maintain a consistent bearing for the monitoring transect, even a slight change in angle can result in differing results. It is clear, however, that the canopy in Stage One and Two are



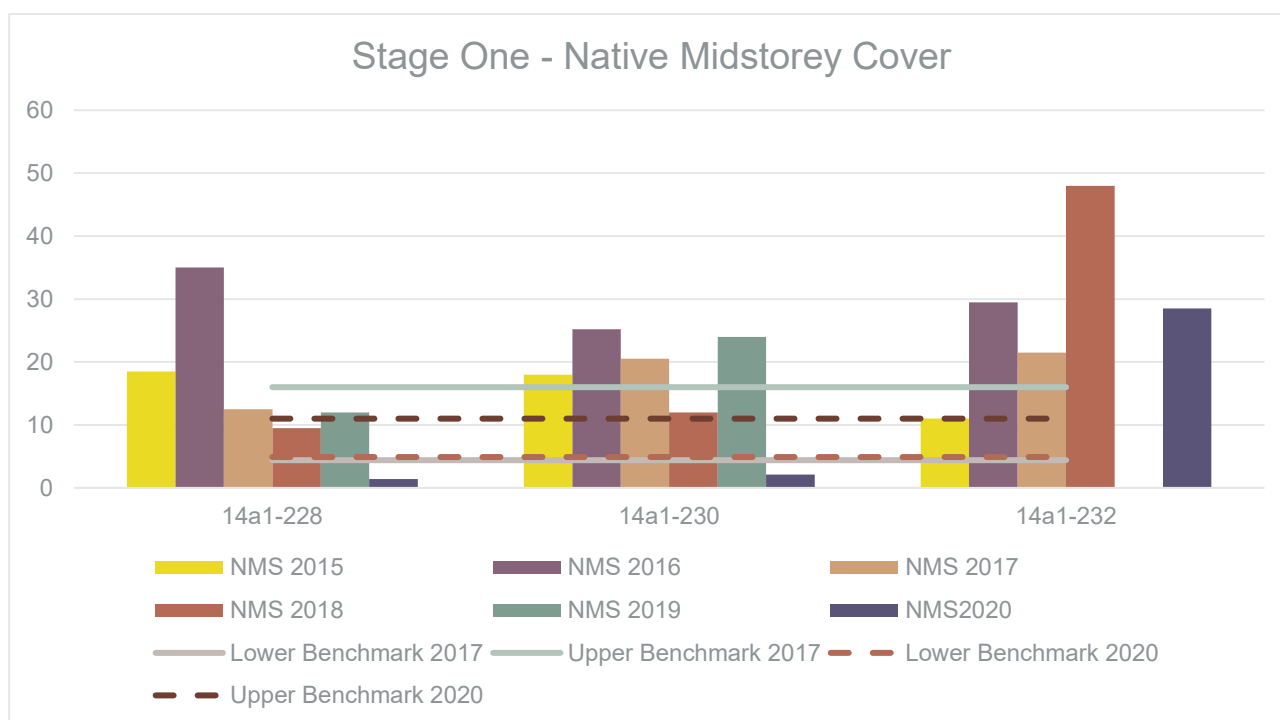
developing within benchmark values. Native overstorey cover is increasing in the newer areas and will continue to increase as the plants become established.

The areas subject to rehabilitation in Areas 2c, 2d and 2e are still somewhat immature and have only recorded a smaller amount of native overstorey cover. With all dominant overstorey species being recorded within the monitoring plots, native overstorey cover is likely to increase over time. Canopy species within the plots were present as shrubs or sub-shrubs in 2020 and were considered a component of the midstorey or groundcover (shrubs < 1 metre). Therefore, sites in Area 2c are within the benchmark range, although sites in Areas 2d and 2e are not yet in the benchmark range for native overstorey cover. As the translocation areas establish and mature it is expected that native overstorey cover will increase and approach benchmark levels.

Stage Three is still too immature to record any native overstorey cover and sites are not yet in the benchmark range for native overstorey cover. As the translocation areas establish and mature it is expected that native overstorey cover will increase and approach benchmark levels.

### Native Midstorey Cover

The 2020 local benchmark for Native Midstorey Cover is 4.9 – 11.0 percent foliage cover (previously 4.4 – 16.0 percent foliage cover).



**Figure 6: Native Midstorey Cover - Stage One**

Every plot in 2020 within Stage One demonstrated below benchmark values for native midstorey cover (Figure 6). This dramatic decline in overstorey cover from 2019, and compared with previous years, may in part be due to placement of the transect. Despite all efforts to maintain a consistent bearing for the monitoring transect, even a slight change in angle can result in differing results, it may also be associated with the observer bias (a limitation of the methodology) or the slow shift in maturity and growth from shrubs to larger overstorey trees. Some species within the plots were previously present only as shrubs or sub-shrubs and were considered a component of the midstorey or groundcover (shrubs < 1 metre) and have since grown to be included in the native overstorey cover (i.e. shrubs that were less than one metre in previous years are now large shrubs or small trees over one metre).

The plots previously showing values above benchmark may be a factor of the immature canopy contributing to the midstorey cover. It is likely that midstorey cover in Stage One may increase and stabilise in coming years as the rehabilitation areas mature.

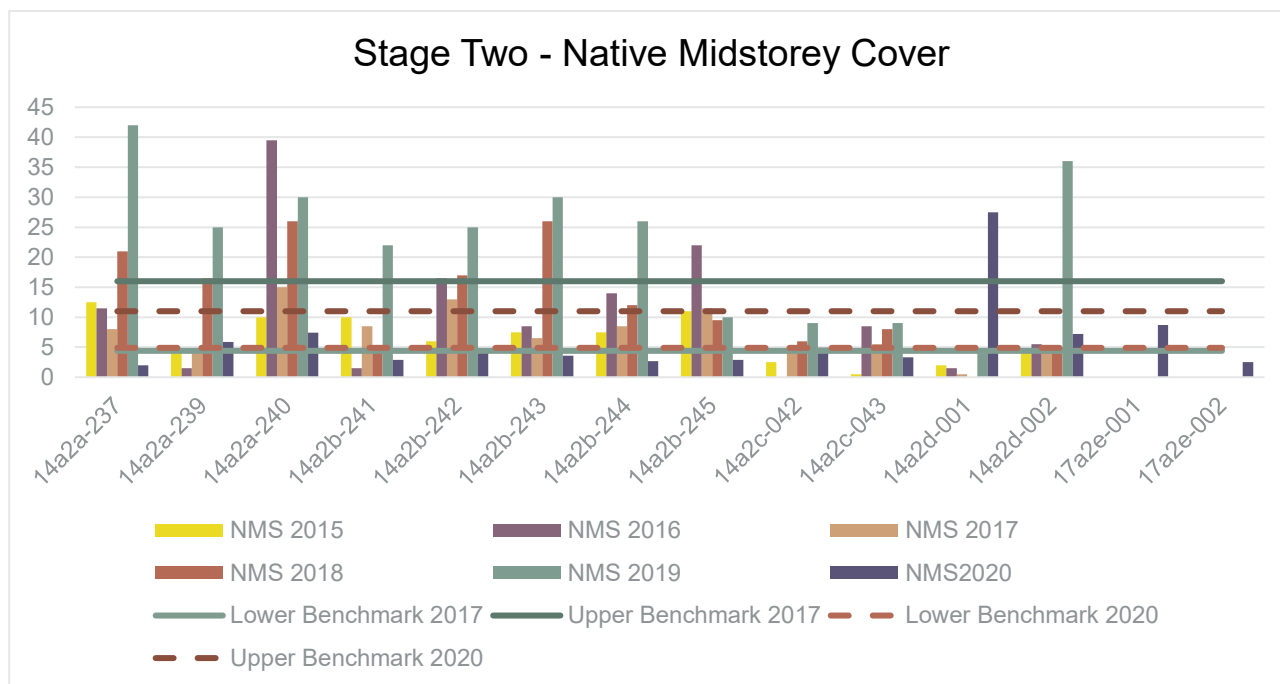


Figure 7: Native Midstorey Cover - Stage Two ( Area 2a, 2b, 2c, 2d and 2e)

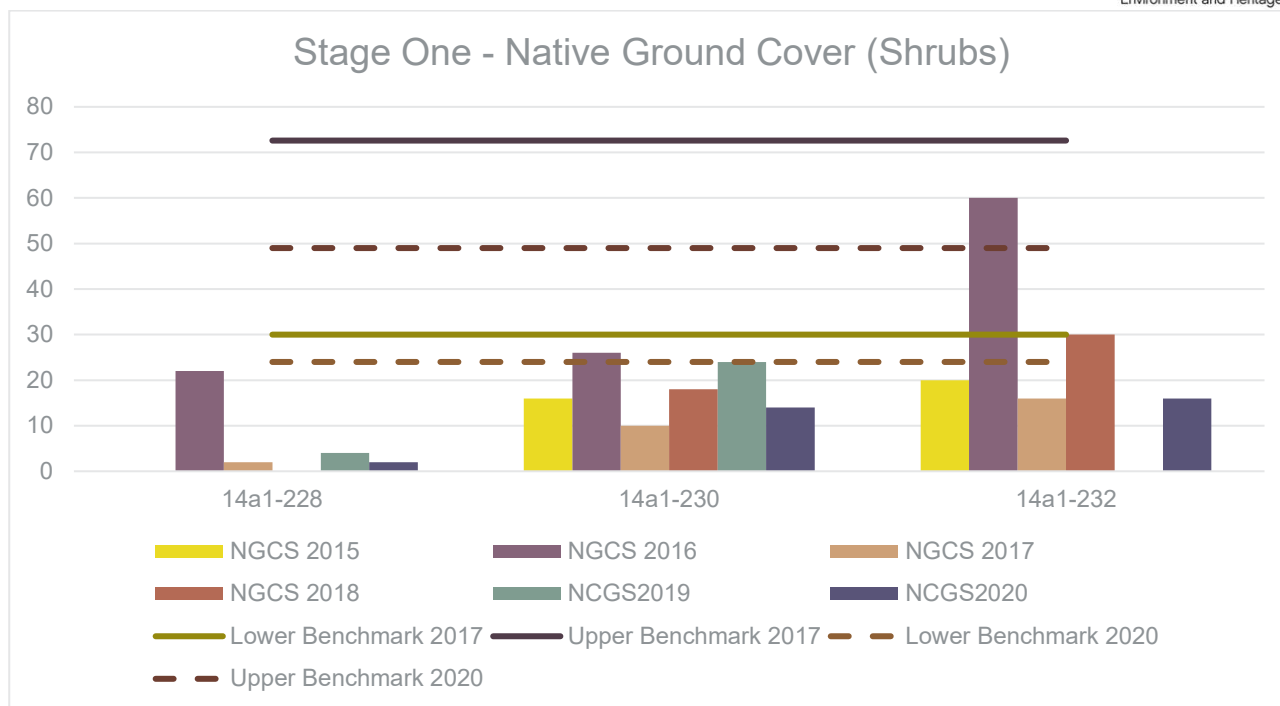
Stage Two results demonstrated eight plots below benchmark values for native midstorey cover in 2020 (Figure 7). This dramatic decline in midstorey cover from 2019, and compared with previous years, may in part be due to placement of the transect. Despite all efforts to maintain a consistent bearing for the monitoring transect, even a slight change in angle can result in differing results, it may also be associated with the increase in native overstorey cover, the shift in maturity and growth from regrowth shrubs to larger overstorey trees. Some species within the plots were previously present only as shrubs or sub-shrubs and were considered a component of the midstorey or groundcover (shrubs < 1 metre) and have since grown to be included in the native overstorey cover (i.e. shrubs that were less than one metre in previous years are now large shrubs or small trees over one metre).

The plots previously showing values above benchmark may be a factor of the immature canopy contributing to the midstorey cover. It is likely that midstorey cover in Area 2d and 2e will increase further in coming years as the rehabilitation areas mature.

Stage Three is still too immature to record any native midstorey cover and sites are not yet in the benchmark range for native midstorey cover. As the translocation areas establish and mature it is expected that native midstorey cover will increase and approach benchmark levels.

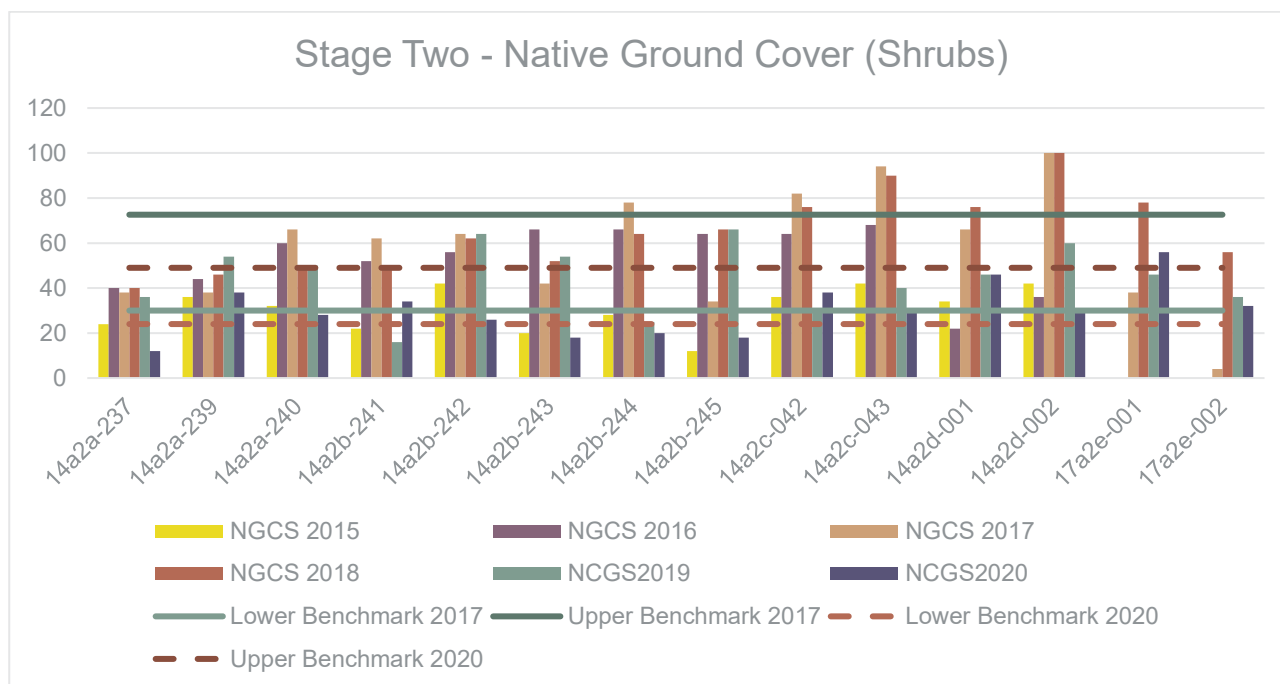
#### Native Ground Cover (Shrubs)

The 2020 local benchmark for Native Groundcover (Shrubs), i.e., woody plants < 1 metre: 24.0 – 49.0 percent (previously 30.0 – 72.6 percent).



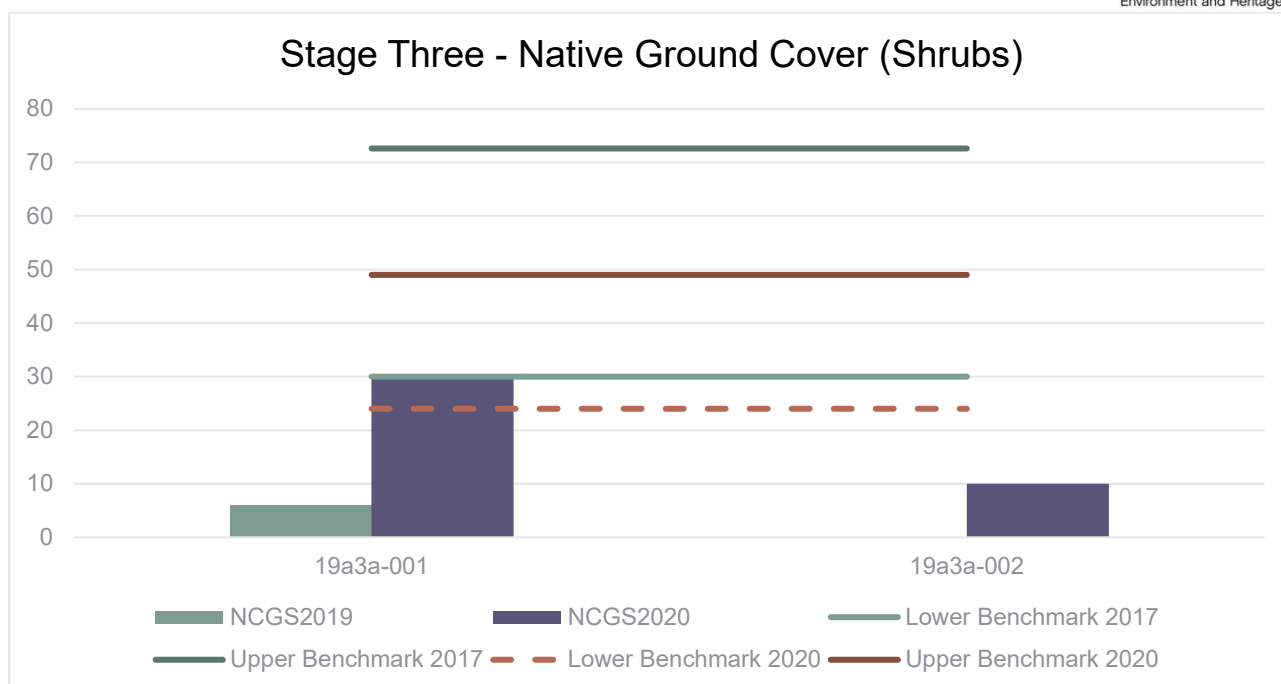
**Figure 8: Native ground cover - Shrubs - Stage One**

Stage One plots are all below and outside the benchmark range for the attribute (Figure 8). The low ground cover in may be because the bulk of the species planted within Stage One treatment were either canopy or small tree species.



**Figure 9: Native ground cover - Shrubs - Stage Two (Area 2a, 2b, 2c, 2d and 2e)**

For Stage Two, most plots are within (or just below) the benchmark range for the attribute (Figure 9). Moderate ground cover in the newly treated Area 2d and 2e will change with time as the species compete and mature, currently within benchmark.



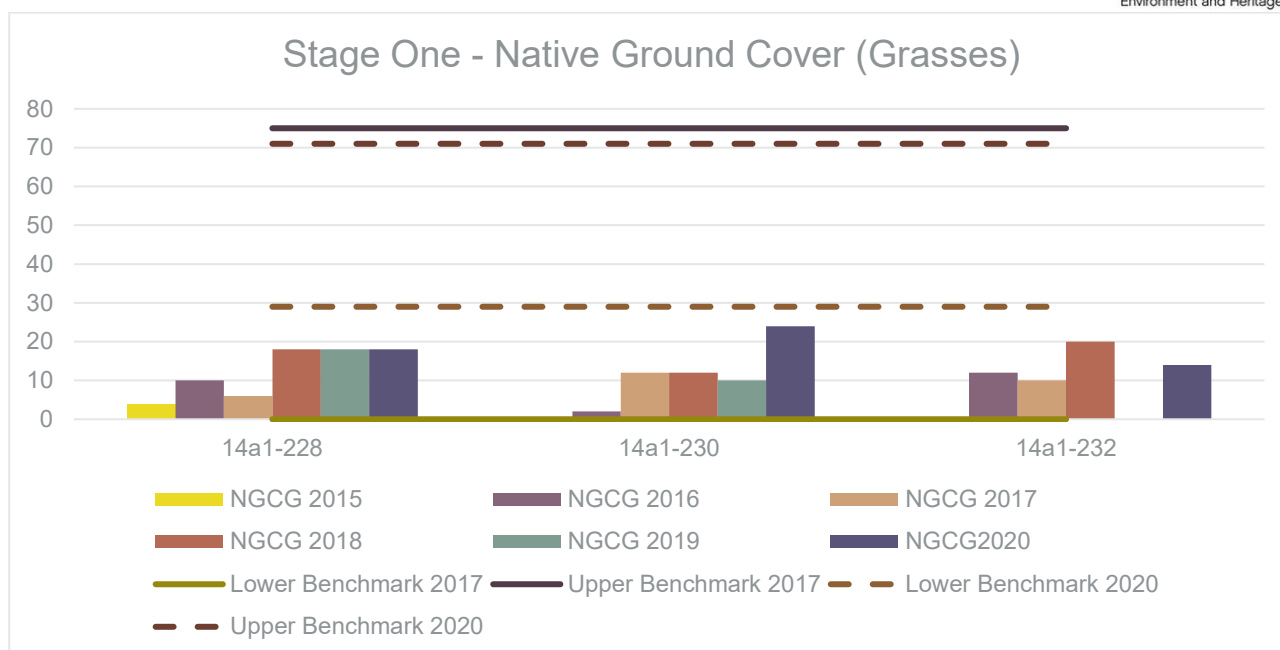
**Figure 10: Native ground cover - Shrubs - Stage Three (Area 3a)**

Stage Three plots are within the lower or below benchmark range for the attribute (Figure 10). The low ground cover may be because the species have not established within this Stage, due to recent rehabilitation. Low ground cover in the newly treated areas is expected to increase with time.

#### **Native Ground Cover (Grasses)**

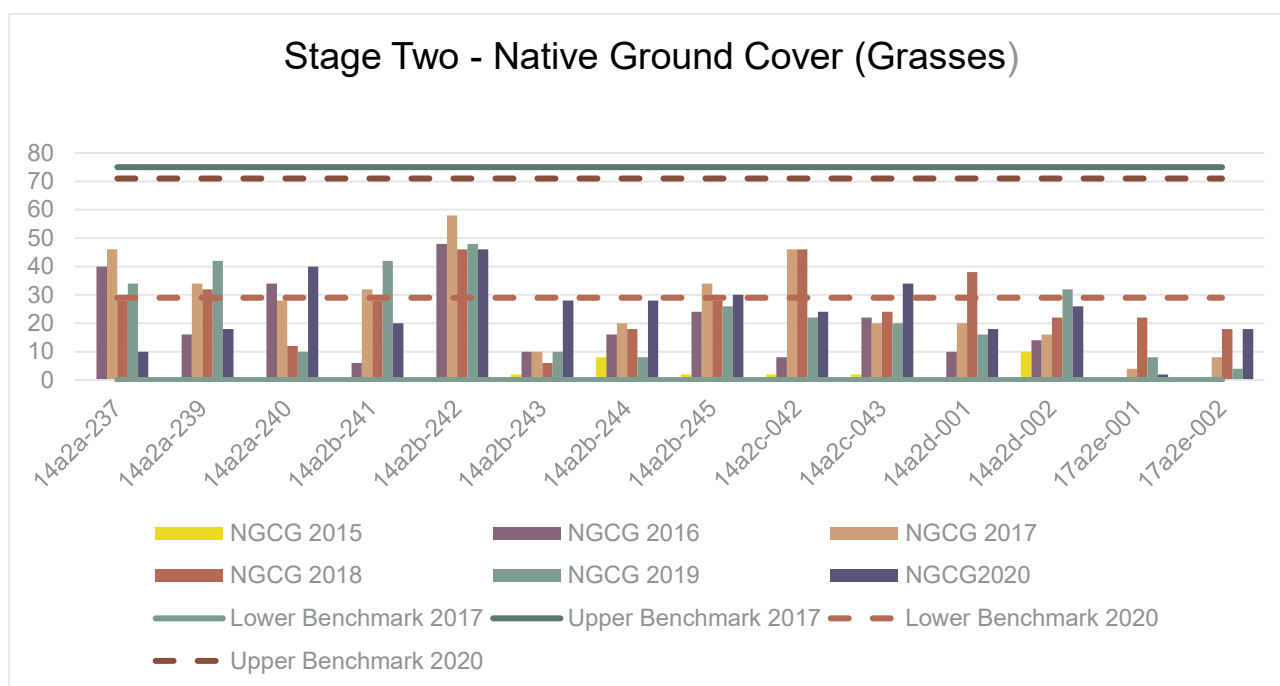
The 2020 local benchmark for Native Groundcover (Grasses) is 29.0 - 71.0 (previously 0.0 – 75.0 percent).

Grass cover is naturally low in the control sites, as is typical of Sydney Coastal Dry Sclerophyll Forests, hence the broad benchmark range for the attribute. This is entirely reasonable given that the translocated soils are from Sydney Coastal Dry Sclerophyll Forests, which are naturally higher in cover for herbs and forbs than grasses. Grass cover also requires an open environment and since most of the treatments have resulted in a relatively dense midstorey and shrub layer, native grass is difficult to establish. Percent cover of native grasses is not necessarily indicative of ecosystem health in Sydney Coastal Dry Sclerophyll Forests and the attribute is within benchmark in all treatment areas. In saying this, increases in native grass cover are shown in some of the areas.



**Figure 11: Native ground cover - Grasses - Stage One**

All treatments in Stage One were previously within 2017 benchmark for this attribute (keep in mind how broad this range is), now are below 2020 benchmarks (Figure 11). Over time the percentage stabilises as in plot 14a1-228.



**Figure 12: Native ground cover - Grasses - Stage Two (Areas 2a, 2b, 2c, 2d and 2e)**

All treatments in Stage Two were previously within 2017 benchmark for this attribute but now some are below 2020 benchmarks (Figure 12). As the over and midstorey canopy cover increases, the understorey species tend to reduce and stabilise as the vegetation matures.

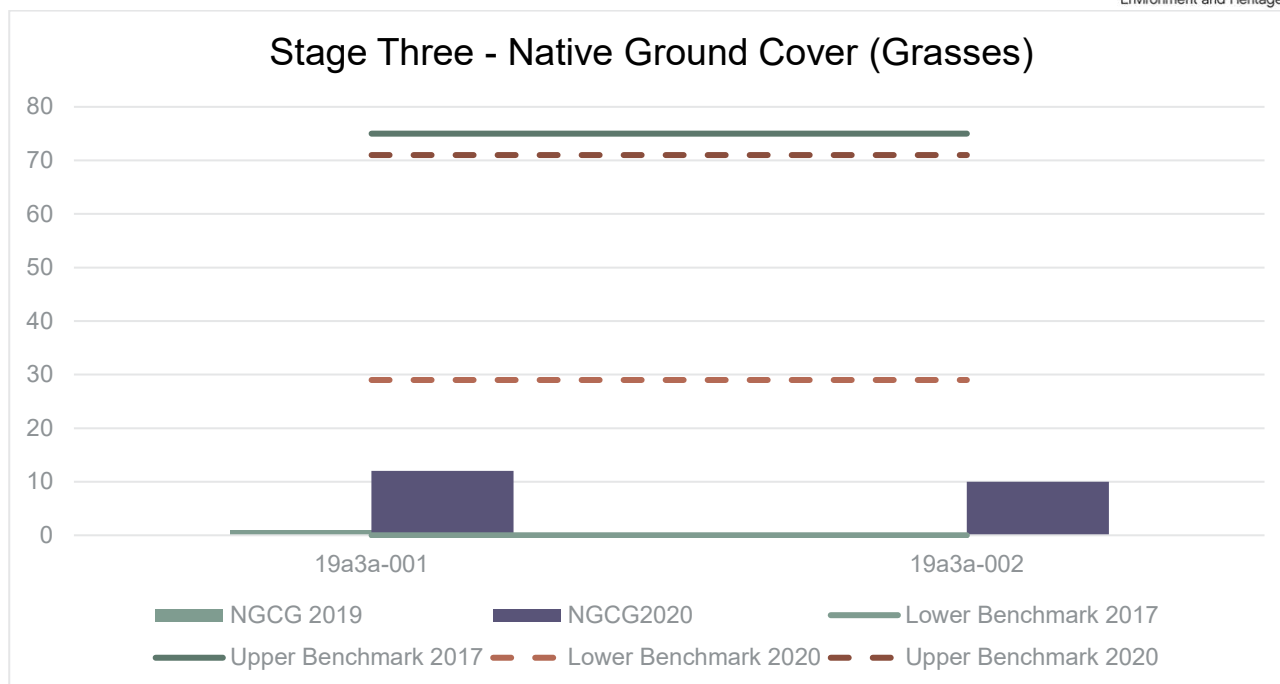


Figure 13: Native ground cover – Grasses - Stage Three (Area 3a)

All treatments in Stage Three were previously within 2017 benchmark, at zero percent in the first year of monitoring, but now both are below 2020 benchmarks (Figure 13). As the rehabilitation progresses there will be fluctuations of understorey and midstorey species competing for light and resources as the vegetation matures.

**Native Ground Cover (Other)**

The 2020 local benchmark for Native Ground Cover (Other), i.e., herbs and forbs other than grasses is 1-14 (previously, 28.8 – 66.6 percent).

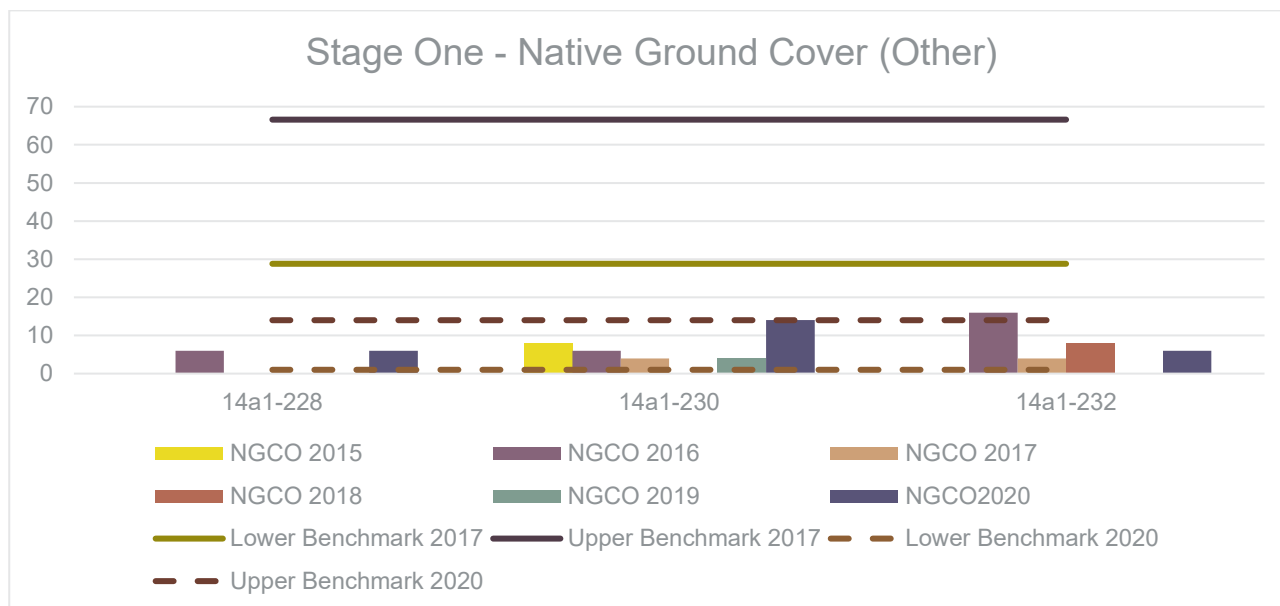
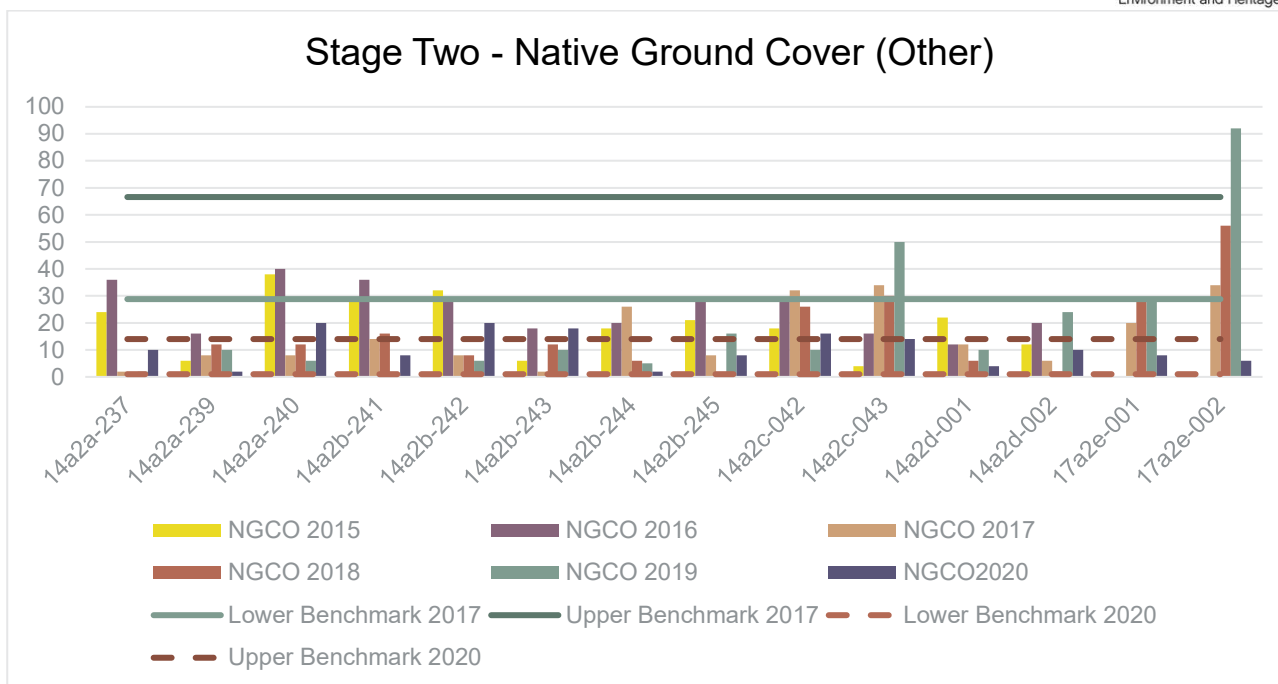


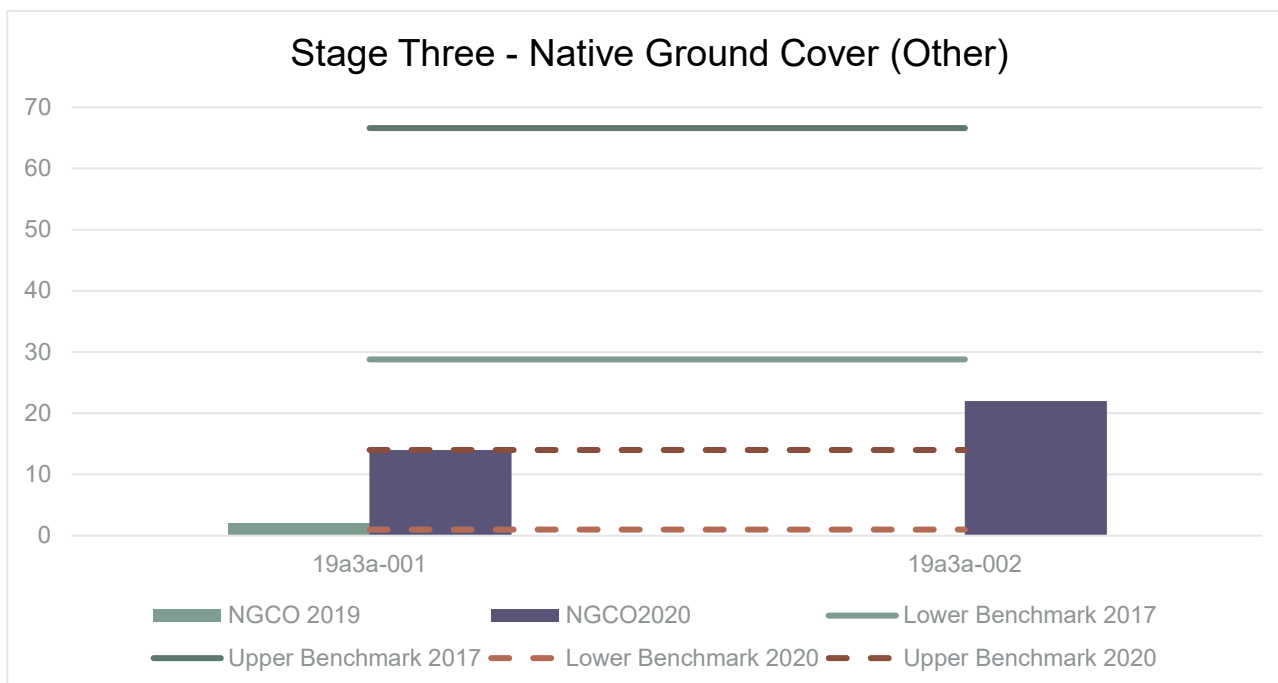
Figure 14: Native ground cover - Other - Stage One

Stage One continues to experience low levels, but within benchmark for Native Ground Cover (Other), which along with low native grass cover appears symptomatic of the treatment history and the subsequent density of the shrub and midstorey layers (Figure 6), consistent with the updates in benchmark of the control plots (representing mature vegetation stage).



**Figure 15: Native ground cover - Other - Stage Two (Areas 2a, 2b, 2c, 2d and 2e)**

Stage 2 plots are at or below benchmark for Native Groundcover (Other), this is potentially due to the limitations with survey methods due a change in personnel conducting the monitoring. Areas 2b and 2c show the high percentages within benchmark and the other areas are trending towards the benchmark values. Most plots are within 2020 benchmark, although reducing in cover from previous years.



**Figure 16: Native ground cover --Other - Stage Three**

Stage Three has shown an increase in cover within or exceeding the 2020 benchmark as expected, this will fluctuate over time as the plants establish across the Stage.

### Exotic Plant Cover

There is no local benchmark for exotic plant cover. Whilst it is assumed that there would be 0 – 5% exotic plant cover within the control plots, a target of <20% has been established in the KPIs for all rehabilitation areas.

The dominant weeds recorded include *Eragrostis curvula* (African lovegrass), *Andropogon virginicus* (Whisky Grass), *Conyza bonariensis* (Fleabane), and *Hypochaeris radicata*. *Pennisetum clandestinum* (Kikuyu), *Cortaderia selloana* (Pampas grass) and *Cynodon dactylon* (Common Couch) are all exotic perennial grasses that have dominated localised patches within the CWEA and also require management.

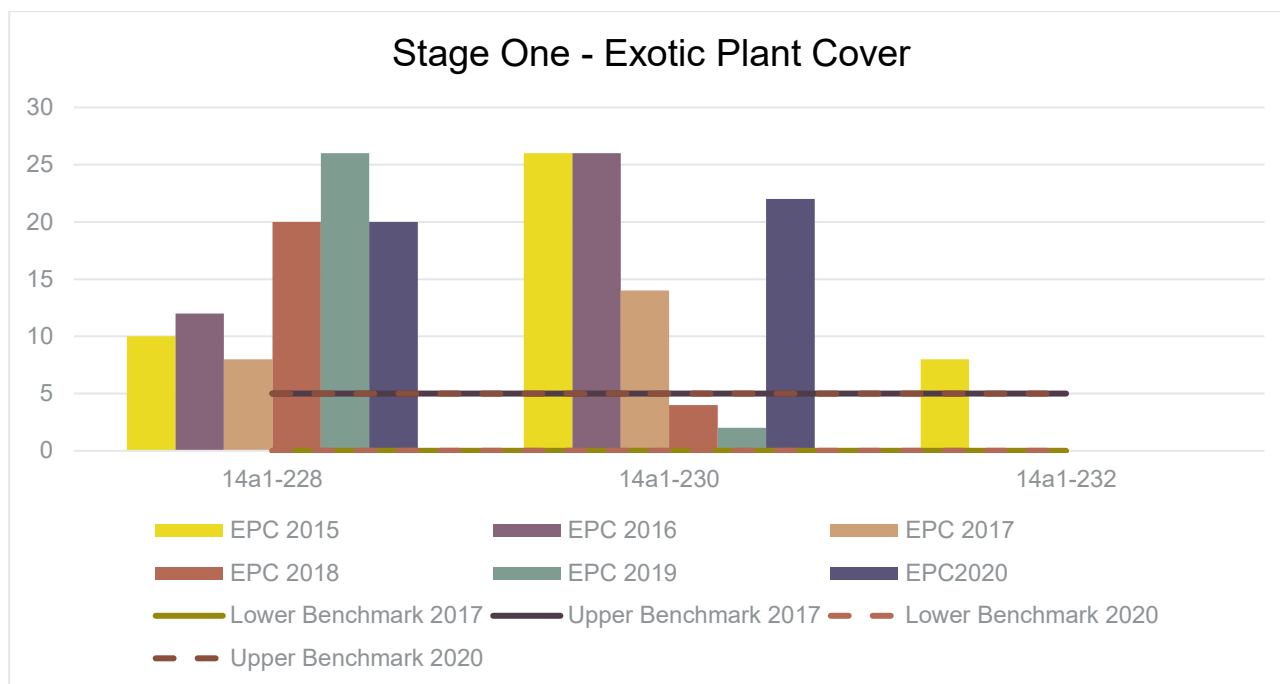
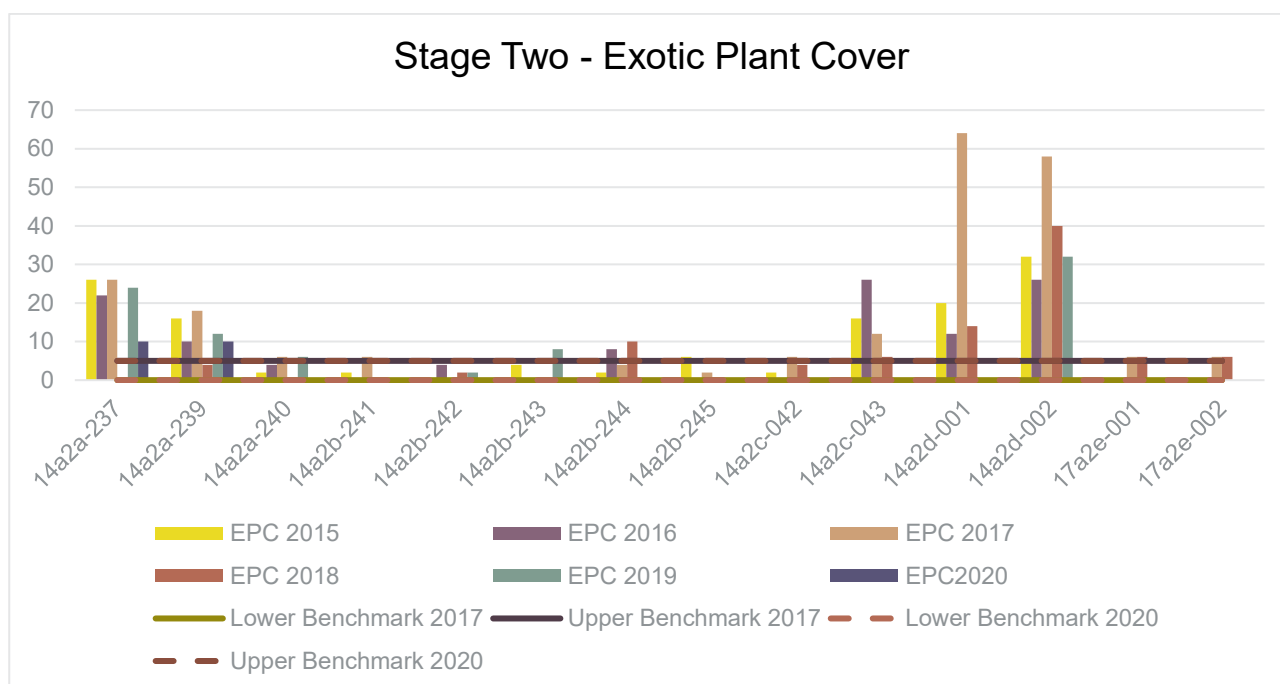


Figure 17: Exotic Plant Cover - Stage One

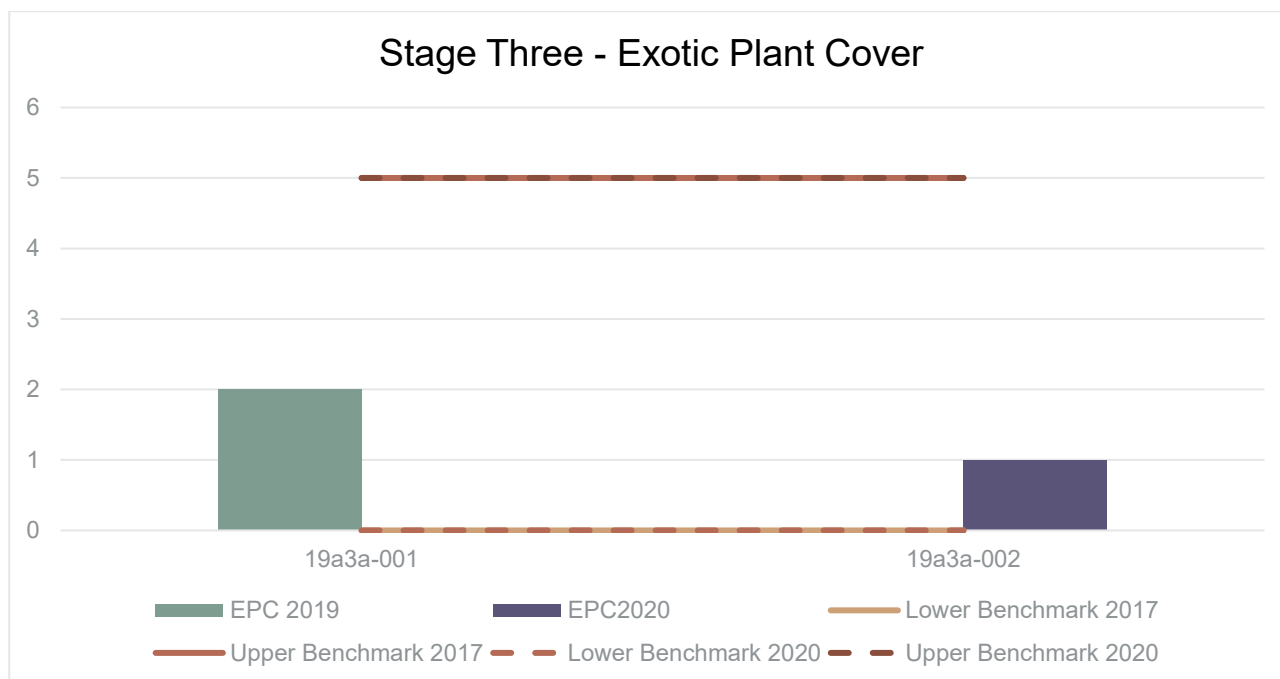
Out of the three sites in Stage One, two are at or above 20% exotic plant cover (Figure 17), it is suggested that weed management occur in this area mainly for exotic grasses.





**Figure 18: Exotic Plant Cover - Stage Two (Areas 2a, 2b, 2c, 2d and 2e)**

Within Stage Two, there are two plots in Area 2a that have 10% exotic plant cover. The rest of the plots in Stage two have 0% exotic plant cover. All the plots in Stage 2 fall below 20% exotic plant cover (Figure 18).



**Figure 19: Exotic Plant Cover - Stage 3 (Area 3a)**

Both sites in Stage Three fall below the target of 5% exotic plant cover (Figure 19).

### Length of Fallen logs

The 2020 local benchmark for Length of Fallen Logs is  $\geq 49$  (previously,  $\geq 34$  metres within the 20 x 50 metre plot).

All Stages have substantial log length. This was due to the targeted movement of this material along with the soil translocation. These figures are not expected to change dramatically over time, however the Figures 20-22 serve to demonstrate that an adequate amount of logs have been introduced with the translocation. Given the limitations on the amount of logs available to the CWEA as a resource, the current on-site strategy for log placement has been substantially reduced and will still meet benchmark levels.

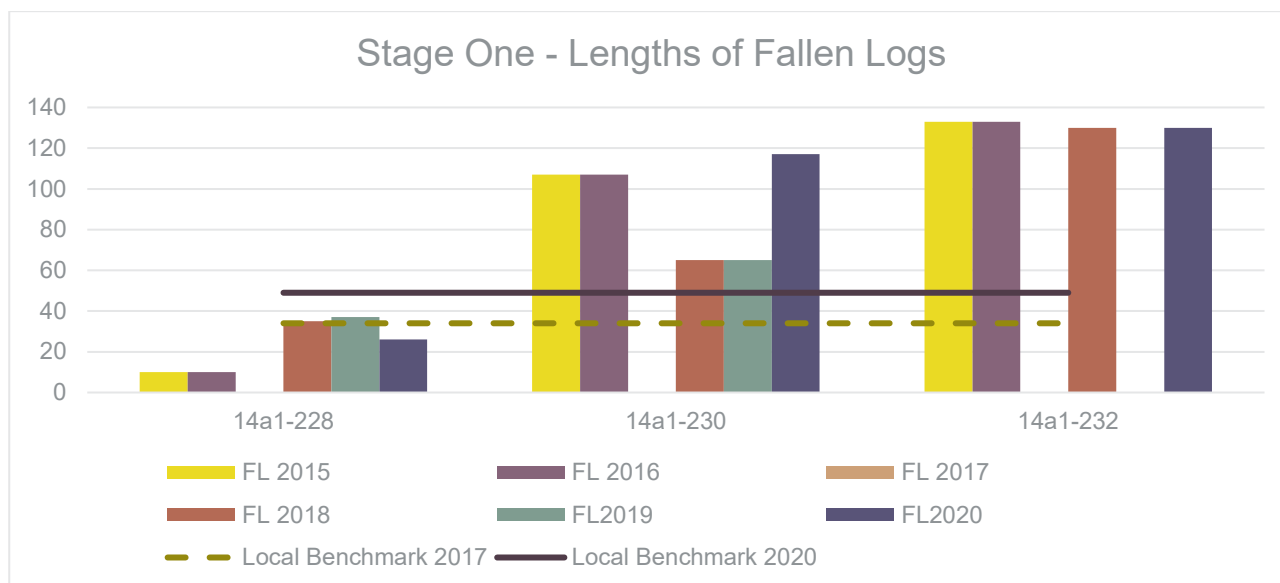


Figure 20: Length of fallen logs - Stage One

Stage One has one plot with lower length of logs not within benchmarks, where the other two plots fall within the benchmark (Figure 20). Although it fluctuates over time, this is potentially due to the slight change in transect bearing.

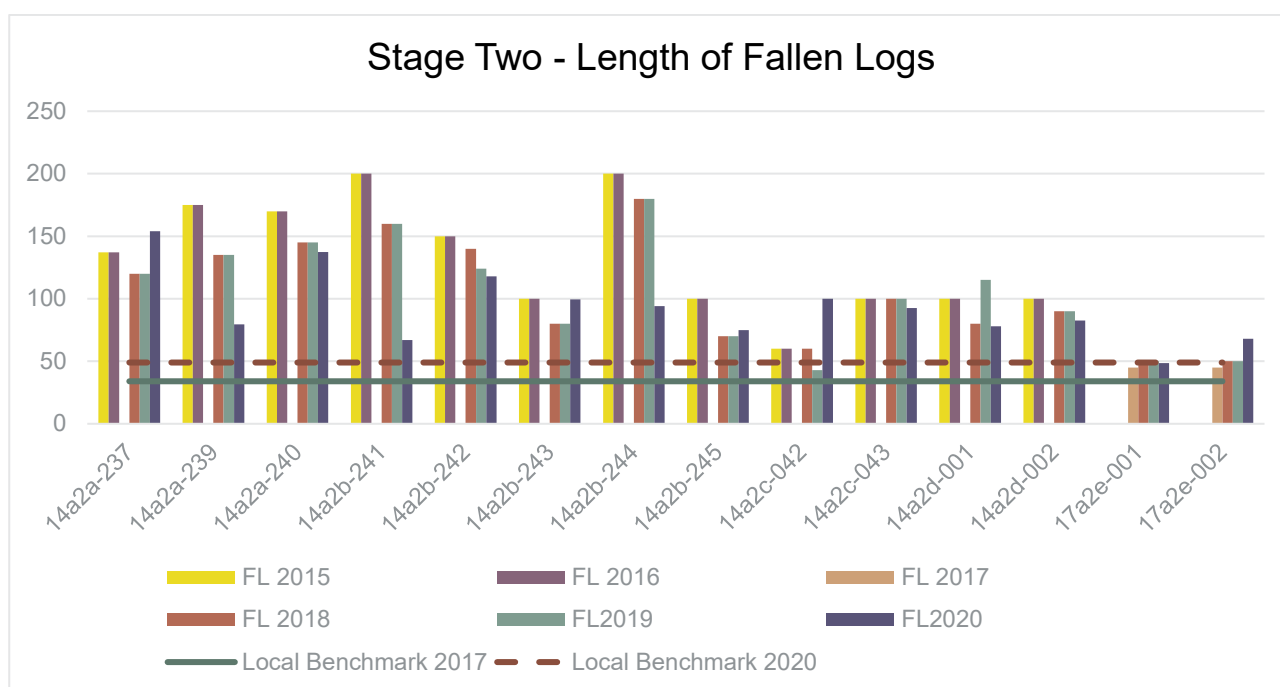


Figure 21: Length of fallen logs - Stage Two

Stage Two plots have logs within or exceeding the benchmark (Figure 21), although it fluctuates over time, this is potentially due to the slight change in transect bearing.

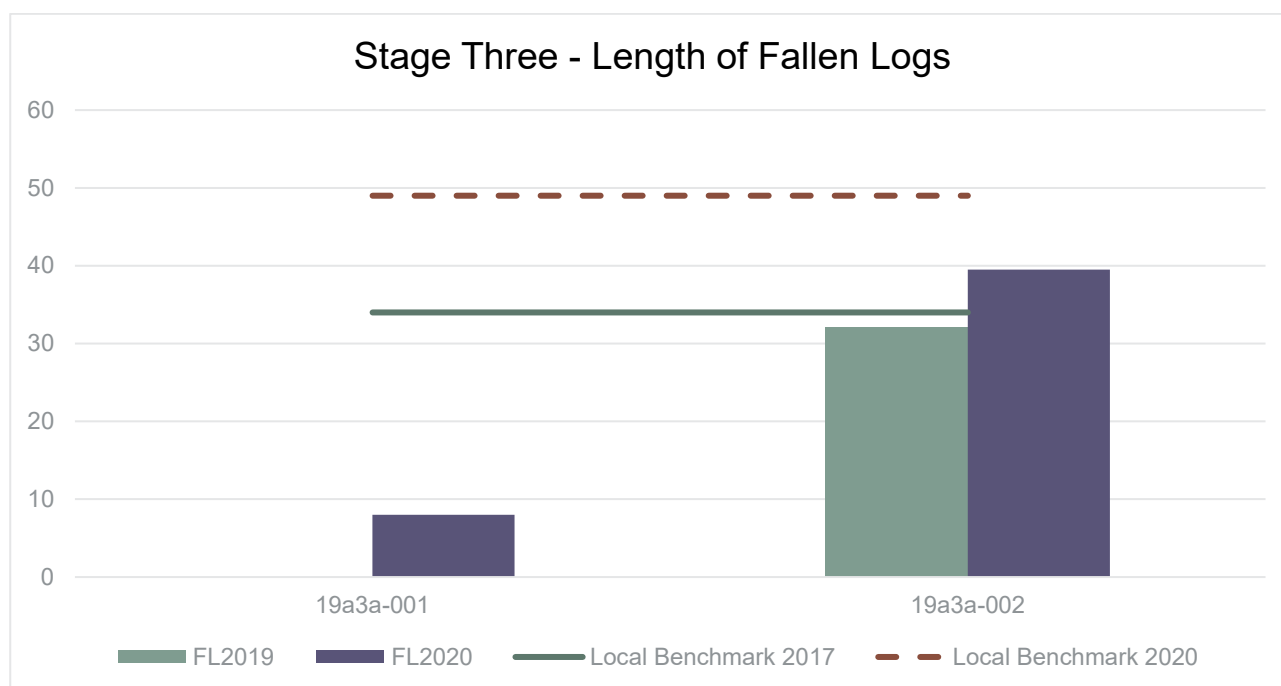


Figure 22: Length of fallen logs - Stage 3

Stage Three plots have logs below benchmark (Figure 22), this may fluctuate over time, this is potentially due to the slight change in transect bearing. The newly rehabilitated areas have an opportunity to add additional logs if required to help stabilise soil and allow fauna habitat to form.

## 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). In general, all treatment areas have a good cover of native vegetation as a response to soil translocation.

## 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 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 will be in 2023.

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

## FAUNA

Camera traps were deployed across ten sites in 2020 across all of the rehabilitation areas (69 days camera hours) from 1 October 2020 – 9 December 2020. Cameras were placed in general habitat

of the rehabilitation areas, all of which were attached low to the ground against a tree (Figure 9 and Table 8).

**Table 7: Camera Trap Locations**

Site Name	Latitude	Longitude
Site 1	-34.22460089	150.8156992
Site 2	-34.2281074	150.8192009
Site 3	-34.22468549	150.8209196
Site 4	-34.22398261	150.8185984
Site 5	-34.22208408	150.815546
Site 6	-34.22760974	150.8228298
Site 7	-34.22760593	150.8229082
Site 8	-34.22799157	150.8227389
Site 10	-34.22460089	150.8156992

The survey detected nine different native species; three of which were mammals, four birds and two reptiles. The results are summarised in Table 9. The deer present in the area use trees to scratch between their antlers and in this year monitoring it was captured on the camera trap.

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

Species	Common Name	Native vs Introduced	Threatened Species	Site									Total
				1	2	3	4	5	7	8	10		
<i>Wallabia bicolor</i>	Swamp Wallaby	Native	No		1	4	2	2	2	5	4	20	
<i>Vulpes vulpes</i>	Fox	Introduced	No						1			1	
<i>Tachyglossus aculeatus</i>	Echidna	Native	No		1				1		3	5	
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced	No		2							2	
<i>Lichenostomus leucotis</i>	White-eared Honeyeater	Native	No			2						2	
<i>Rhipidura rufifrons</i>	Rufus Fantail	Native	No		1							1	
<i>Mus musculus</i>	House mouse	Introduced	No		2			1	1	1	3	8	
<i>Psophodes olivaceus</i>	Eastern Whipbird	Native	No			2						2	
<i>Platycercus elegans</i>	Crimson Rosella	Native	No							1		1	
<i>Rattus fuscipes</i>	Bush rat	Native	No		3	4	1			1		9	
<i>Varanus sp.</i>	Goanna	Native	No		1							1	
<i>Diporiphora australis</i>	Tommy Roundhead Dragon	Native	No								1	1	
<i>Dama dama</i>	Deer	Introduced	No							2	3	5	
<b>Total</b>				<b>0</b>	<b>11</b>	<b>12</b>	<b>3</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>14</b>	<b>58</b>	

N.B. All cameras were falsely triggered due to weather and wind, the positioning near young vegetation which moves within the strong wind, because of this the cameras ran out of batteries earlier than anticipated. The number of records can not distinguish if the same individual returned to the camera at a later date.





Swamp Wallaby foraging at night



Crimson Rosella



Deer antler scratching on tree



Deer

## COMPLETEION CRITERIA

Table 9 details the completion criteria for the Coal Wash Emplacement Area (CWEA) for all three stages of the West Cliff Washery site, provided by IMC personnel (South32 2020). The completion criteria relates 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 Stage 1 and Stage 2. Stage 3 is still in early stages of rehabilitation and requires logs to be spread across sections of the hill to slow water down and reduce erosion.
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 3 is establishing, although slowly due to recent weather events (2020 bushfires and heat, large rainfall events washing topsoil downhill). This will be monitored and growth should
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	For CWEA, CWEAMP – Section 6 - Vegetation and Fauna Management.		

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
				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).		Stage Three is being rehabilitated progressively.	increase over time as the plants establish in the soil. Stage One and Two had established plant growth with many shrubs and tree species starting to shade the areas, logs and rocks are creating habitat and leaf litter cover will return nutrients into the soil.
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 and Two has had habitat features installed, such as logs and rocks. Stage 3 may require more logs placed across the sites to assist with erosion control.
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.
			Plant establishment and growth.	50% combined vegetative cover achieved and sustained for a period of two years.	Target was determined based on past experience and taking into consideration:		Stage One had a healthy vegetation cover; species diversity is low although



Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
					<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>consistent species with surrounding vegetation. Stage Two had an overall low vegetation cover score, combining all structural layers, this adds to more than 50% and will continue to increase as the plant growth stabilises. Stage Three monitoring was established in 2019, more detail will be provided in 2021.</p>
			Weed cover.	Regular weed control undertaken.	<p>Project Approval Condition 17 (f). NSW Biosecurity Act 2015.</p>		<p>Stage One and Two had a variety of challenges with exotic species, more time required for tree and shrub species to establish. It is recommended that more weed management is conducted in these Stages to keep on top of the exotic species.</p>
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.	<p>CWEAMP Section 8.1.1.1 – Key Performance Criteria. Also applies to other domains due to similar vegetation community.</p>	Rehabilitation works in some sections of Emplacement Stage One and Two are complete.	In 2020 many of the shrub and canopy species appear to be flowering and setting seed in Stage One and

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
						Stage One was rehabilitated to the standard of the day.	Two, although Stage Three individuals are too young to establish reproductive aspects.
			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 is less than 20%, 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 (Stages One and Two)			Floristic structure, species composition.	Trajectory analysis indicates selected biometric indicators (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.	CWEAMP – Section 6.3 -Emplacement Rehabilitation which outlines the monitoring program and benchmarks.  Also applies to other domains due to similar vegetation community.		At this stage visual comparisons to benchmarks have been applied. This 2020 report combines the previous 2017 benchmark results with the 2020 newly calculated benchmarks to show changes over time with regards to the control sites. In 2021 statistical tests will be performed to

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
							determine the success of treatments of each Stage.
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 the outcomes achieved from the tenth season of monitoring the rehabilitation success in Stages 1, 2 and 3 of the CWEA. For the most part, 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. It is likely to spread and out-crowd native plants if not treated. Weed management is recommended mainly within Stage 1 and Stage 3 and will continue to be a major focus for rehabilitation.

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 2020 monitoring data. This may be due to the drought conditions of 2018, with flora slow to respond to weather conditions.

Despite all efforts to maintain a consistent bearing for the monitoring transect, even a slight change in angle can result in differing results in floristics and potentially a constraint on the detection of threatened species efforts within plots. 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.

One threatened plant species, *Pultenaea aristata* was detected during the threatened plant random meander across the CWEA. Plot data does not indicate threatened species presence in the wider CWEA. The random meander method is an important part of monitoring, the data from which can assist in determining the success of the rehabilitation areas in relation to threatened species and their habitats.

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

# PLANS





Drawn by: Philip Rofe. Last updated: 12/14/2020 3:37:51 PM File: T:\Spatial\Working\ae021 - PM File - T:\Spatial\Working\ae021 - WestCliff\_Monitoring\Maps\Other Maps\6342\_Figure1\_Plots.mxd





Drawn by: Philip Rofe. Last updated: 12/14/2020 3:00:39 PM File: T:\Spatial\Working\6021 - WestCliff\_Monitoring\Maps\Other Maps\6342\_Figure\_3\_RandomMeander.mxd



APPENDIX 1: PHOTO POINT MONITORING



Plate 1: Site A1\_228 (left 2010, middle 2019, right 2020)



Plate 2: Site A1\_230 (left 2010, middle 2019, right 2020)



Plate 3: Site A1-232 (left 2010, middle 2019, right 2020)



Plate 4: A2a\_237 (left 2010, middle 2019, right 2020)



Plate 5: Site A2a\_239 (left 2010, middle 2019, right 2020)



Plate 6: Site A2a\_240 (left 2010, middle 2019, right 2020)



Plate 7: Site A2b 244 (left 2010, middle 2019, right 2020)



Plate 8: Site A2b 241 (left 2010, middle 2019, right 2020)



Plate 9: Site A2b\_242 (left 2010, middle 2019, right 2020)



Plate 10: Site A2b\_243 (left 2010, middle 2019, right 2020)



Plate 11: Site A2b\_245 (left 2010, middle 2019, right 2020)



Plate 12: Site A2c-042 (left 2012, middle 2019, right 2020)



Plate 13: A2c-043 (left 2012, middle 2019, right 2020)



Plate 14: A2d-001 (left 2015, middle 2019, right 2020)



Plate 15: A2d-002 (left 2015, middle 2019, right 2020)



Plate 16: 17a2e-001 (left 2017, middle 2019, right 2020)





Plate 17: 17a2e-002 (left 2017, middle 2019, right 2020)



Plate 18: 19a2f-001 (left 2019, right 2020)



Plate 19:19a2f-002 (left 2019, right 2020)

## References

Cropper, S.C. (1993) Management of Endangered Plants. CSIRO Publications Victoria.

Eyre TJ, Ferguson DJ, Hourigan CL, Smith GC, Mathieson MT, Kelly, AL, Venz MF, Hogan, LD & Rowland, J. 2018. Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland. Department of Environment and Science, Queensland Government, Brisbane.

Niche Environment & Heritage (2015). Rehabilitation Monitoring Report Year 5 – West Cliff Colliery Coal Wash Emplacement Area. Report prepared for Illawarra Coal.

Meek, P., Ballard, G. and Fleming, P. (2012). An introduction to camera trapping for wildlife surveys in Australia.

OEH (2014). BioBanking Assessment Methodology 2014.

<https://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf>

South32 (2020) South32 Illawarra Metallurgical Coal Mining Operations Plan,

<https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>, Accessed December 2020.



---

**Appendix B: 2020/21 EPA Annual Return for EPL 2504**



## 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: 1-2-2020 To: 31-1-2021

### 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
Waste disposal by application to land	> 0.00	capacity
Coal works	> 5,000,000.00	T annual handing capacity
Mining for coal	> 5,000,000.00	T annual production 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	5
Waste	0
Other	14
<b>Total complaints recorded by the licensee during the reporting period</b>	<b>19</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	12	12	2	12	51
pH	pH	12	12	7.8	8.0	8.3



## 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
Alkalinity (as calcium carbonate)	milligrams per litre	11	11	370	784	971
Aluminium (dissolved)	milligrams per litre	11	11	0.04	0.30	0.62
Arsenic (dissolved)	micrograms per litre	11	11	<1	1	2
Bicarbonate alkalinity	milligrams per litre	11	11	361	712	906
Cadmium (dissolved)	micrograms per litre	11	11	<0.1	0.1	0.1
Cobalt (dissolved)	micrograms per litre	11	11	<1	1	1
Conductivity	microsiemens per centimetre	11	11	753	1593	1980
Copper (dissolved)	micrograms per litre	11	11	2	3	5
Lead (dissolved)	micrograms per litre	11	11	<1	<1	<1
Manganese (dissolved)	micrograms per litre	11	11	4	8	25
Nickel (dissolved)	micrograms per litre	11	11	9	22	38
Nitrogen (ammonia)	micrograms per litre	11	11	20	64	170
Nitrogen (total)	micrograms per litre	11	11	100	527	1400
Oxidised nitrogen	micrograms per litre	11	11	20	255	860
pH	pH	11	11	8.3	8.6	8.8
Total dissolved solids	milligrams per litre	11	11	375	954	1150
Total suspended solids	milligrams per litre	11	11	<5	9	21
Turbidity	nephelometric turbidity units	Continuous	Continuous	3	26	102.70
Zinc (dissolved)	micrograms per litre	11	11	<5	7	20

## 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	11	11	127	219	305
pH	pH	11	11	6.46	6.9	7.83
Total suspended solids	milligrams per litre	11	11	<5	6	7

## 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	11	11	351	1100	1800
pH	pH	11	11	7.7	8.4	8.8
Total suspended solids	milligrams per litre	11	11	<5	8	16

## 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	0	0	0
Total suspended solids	milligrams per litre	0	0	0	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	6.9	7.4	7.9
Total suspended solids	milligrams per litre	12	12	<5	5	17

## Discharge & Monitoring Point 22

Discharge to utilisation area.

Water quality monitoring.

Volume Monitoring., The 100mm poly pipe from the secondary stabilisation lagoon of the sewage treatment plant which discharges to the utilisation area.

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
Biochemical oxygen demand	milligrams per litre	12	12	<2	19	38
pH	pH	12	12	6.9	7.3	7.8

## 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	7.5	7.8	8.0
Total suspended solids	milligrams per litre	12	12	1	9	37

## Discharge & Monitoring Point 24



**Discharge to waters**

Water quality monitoring. Discharge volume monitoring, Piped discharge outlet for mine water.

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
Alkalinity (as calcium carbonate)	milligrams per litre	12	12	52	231	502
Aluminium (dissolved)	milligrams per litre	12	12	<0.01	0.01	0.04
Arsenic (dissolved)	micrograms per litre	12	12	<1	2	4
Bicarbonate alkalinity	milligrams per litre	12	12	52	227	475
Cadmium (dissolved)	micrograms per litre	12	12	<0.01	<0.01	<0.01
Cobalt (dissolved)	micrograms per litre	12	12	<1	1	1
Conductivity	microsiemens per centimetre	12	12	110	478	995
Copper (dissolved)	micrograms per litre	12	12	<1	<1	<1
Lead (dissolved)	micrograms per litre	12	12	<1	<1	<1
Manganese (dissolved)	micrograms per litre	12	12	<1	1	1
Nickel (dissolved)	micrograms per litre	12	12	<1	13	36
Nitrogen (ammonia)	micrograms per litre	12	12	100	189	320
Nitrogen (total)	micrograms per litre	12	12	100	289.2	500
Oxidised nitrogen	micrograms per litre	12	12	20	72.50	230
pH	pH	12	12	7.1	7.5	8.2
Total dissolved solids	milligrams per litre	12	12	70	271	558
Total suspended solids	milligrams per litre	12	12	<1	<1	<1
Total suspended solids	milligrams per litre	12	12	<1	<1	<1
Zinc (dissolved)	micrograms per litre	12	12	<5	5	5

**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	3.99	6.96	68.92

### 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

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	Continous	Continuous	2.24	4.76	54.74

### 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	8.45	11.86	96.16

### Discharge & Monitoring Point 36

Discharge to waters. Discharge quality monitoring - Douglas Park Vent Shaft No.6, Piped discharge outlet from stormwater dam.  
 lat. long. -34.180977 150.718149



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	346	435	628
pH	pH	5	5	7.6	7.8	7.98
Total suspended solids	milligrams per litre	5	5	8	12.8	22

### 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	73.1	1329

#### 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	Continous	0	430	794

#### 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	2529	4086

### 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	Continuous	0	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

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	464	1255

### Discharge & Monitoring Point 22

Discharge to utilisation area.

Water quality monitoring.

Volume Monitoring., The 100mm poly pipe from the secondary stabilisation lagoon of the sewage treatment plant which discharges to the utilisation area.

lat. Long. -34.217742 150.716151

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	28	107

### Discharge & Monitoring Point 24

Discharge to waters

Water quality monitoring. Discharge volume monitoring, Piped discharge outlet for mine water.

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	1005	4072
KL/month	Continuous during discharge	Continuous	10919	30681	67374

## 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>
L2.4
<b>Summary of particulars of the non-compliance ▼</b>
Biochemical Oxygen Demand (BOD) exceedance in effluent at WCCPP Licence Discharge Point (LDP) 3
<b>Further details on particulars of non-compliance, if required ▼</b>
Exceedance of the 100% BOD limit of 50 mg/L was recorded at LDP 3 on 7/02/2020. The result was 51 mg/L. LDP 3 is the discharge point from the Appin North sewage treatment plant to the irrigation area (LDP 4).
<b>Number of times occurred ▼</b>
1
<b>Date(s) when the non-compliance occurred, if applicable ▼</b>
7/2/2020
<b>Cause of non-compliance ▼</b>
On 28/01/20, an excessive amount of soap entered the sewage treatment plant. It is considered that this may have contributed to the higher BOD results as it may have had an impact on the nutrient digesting microbes. It is thought that the system was still recovering from that event at the time the sample was taken.
<b>Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼</b>
Temporary aeration was initiated of the irrigation pond and close monitoring of the system for the following week was initiated. No environmental harm was identified.
An additional sample was taken of the effluent waters for further testing (which was compliant).
<b>Action taken or that will be taken to prevent a recurrence of the non-compliance ▼</b>
Personnel were requested to provide early advice if issues occurred that may impact the plant.
<b>Uploaded Document Name ▼</b>



<b>Uploaded Document Description ▼</b>

**Licence condition number not complied with ▼**

L3.1

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

Exceedance of the allowable discharge volume of 80 kilolitres per day as per Condition L3.1 was recorded at LDP 22 on 31 July and 1 August 2020. The discharge volumes were 106.6 and 105.8 kL/day respectively.

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

An error was identified on 3 August 2020 with the logic in the Programmable Logic Control (PLC). There was no identified environmental harm. Some pooling of irrigation water was identified, however no flow of water offsite was noted.

**Number of times occurred ▼**

1

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

31/7/2020

**Cause of non-compliance ▼**

The cause of the volume limit exceedance was related to recent changes in the irrigation system logic. When uploading the new logic, the new lines of code changed "counter" reference numbers related to the 'Volume Control Relay'. Subsequently, the PLC did not count the volume discharged per day, leading to continuous discharge of sewage effluent.

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

After the exceedance was identified, the contractor responsible for recent logic changes was contacted. It was confirmed that the event was caused by the logic.

The required changes to the logic were made.

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

Issues with the irrigation logic were corrected.

**Uploaded Document Name ▼**

**Uploaded Document Description ▼**

**Licence condition number not complied with ▼**

M2.2

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

Failure of Air Quality Monitoring Equipment at Point 28 AE-PF3

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



# Annual Return

ENDEAVOUR COAL PTY LIMITED

Licence 2504

During routine monthly-data collation, it was identified that the DustTrak unit (P28 - AE-PF3) ceased transmitting data to the hosting site. Transmission ceased on 9/02/20 at 16:10.

**Number of times occurred ▼**

1

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

3/3/2020

**Cause of non-compliance ▼**

The cause of unit failure was a failure of the power board, potentially due to water.

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

Data from the neighbouring air quality unit did not detect any exceedances in PM10/24 hr average since the 9/02/20. There was no risk of a noncompliance going undetected. The power board was replaced and seals on the unit were checked.

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

The power board was replaced and seals on the unit were checked.

**Uploaded Document Name ▼**

**Uploaded Document Description ▼**

**Licence condition number not complied with ▼**

M2.2

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

Failure to run AE-PF3 continuously, resulting in the 90% availability requirement not been met over the Annual Return reporting period

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

N/A

**Number of times occurred ▼**

1

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

24/9/2020

**Cause of non-compliance ▼**

During a routine instrument check it was identified that the data for Point 28 (the Appin East compliance DustTrak unit) appeared irregular. The unit was physically inspected and it was identified that the inlet tube to the DustTrak was pinched (~1050 hrs 24/09/20).

Normally, when there is a flow blockage to the instrument, an error message would be received, however no error message was sent by the unit, most likely because the flow rate was not reduced enough.

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





Interrogation of the data showed that previous communications errors led to the unit being reset on 7/09/20 (15:10 hrs), which resolved the comms error. It is most likely that the inlet tube was pinched during this process.

Data post-the comms error event was determined to be inconsistent and likely contains errors. Following the reinstatement of the inlet tube, the unit was functioning correctly (as of 11:00 hrs 24/09/20). This event decreased the availability of the instrument to 87% leading to a non-compliance.

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

Personnel undertaking the monitoring were made aware of the issue to prevent recurrence.

There were no identified impacts due to the nature of the sampling point and the position of a secondary monitor which would comply with licence requirements for supplementary sampling when continuous monitoring is unavailable for periods beyond 48hrs.

**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

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?	Yes
Is the PIRMP available at the premises?	Yes
Is the PIRMP available in a prominent position on a publicly accessible website?	Yes
Address of the web page where the PIRMP 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>	
Has the PIRMP been tested?	Yes
The PIRMP was last tested on	10-7-2020



# Annual Return

ENDEAVOUR COAL PTY LIMITED

Licence 2504

Has the PIRMP been updated?	<b>Yes</b>
The PIRMP was last updated on	<b>15-2-2021</b>
Number of times the PIRMP was activated in this reporting period?	<b>0</b>
The PIRMP was activated on	<b>N/A</b>

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

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>No</b>
---	-----------

## 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?	<b>Yes</b>
When was the last check (As per ISO 14001) of the EMS completed?	<b>3-7-2020</b>
Were there any non-conformances related to environmental issues identified in the last check of the EMS?	<b>Yes</b>
If there were non-conformances identified, were these non-conformances rectified?	<b>Yes</b>

## 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

<b>Name</b>	Chris Schultz
<b>Position</b>	Superintendent Environment



# Annual Return

ENDEAVOUR COAL PTY LIMITED

Licence 2504

<b>Email Address</b>	Chris.Schultz1@south32.net
<b>Phone Number</b>	0242863384
<b>Signature</b>	
<b>Name</b>	
<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>	



---

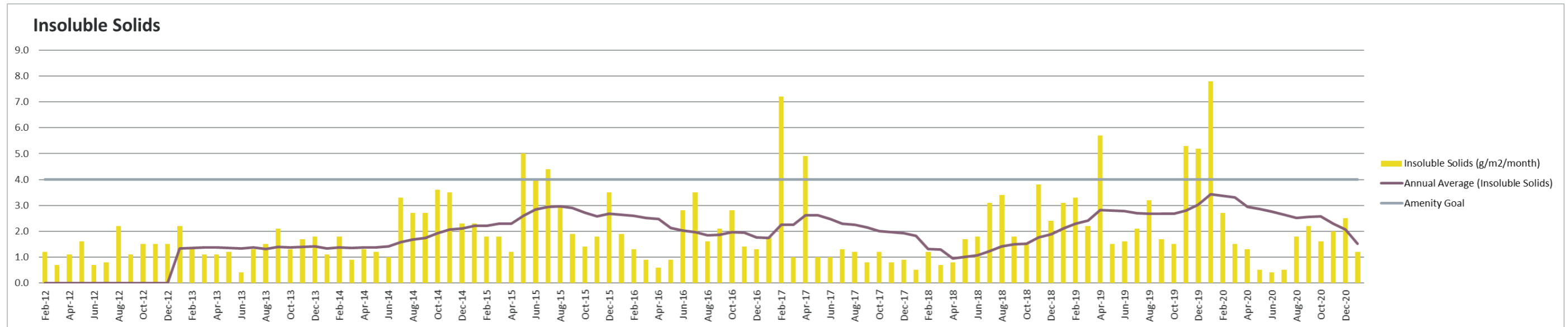
**Appendix C: Appin Mine Long-Term Environmental Monitoring Graphs**

Appendix C – Long-term Monitoring Data

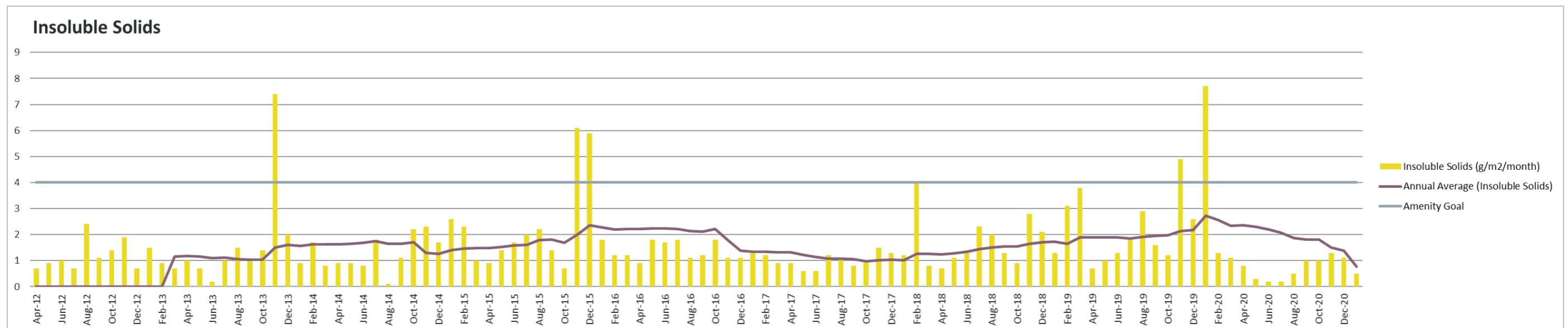
**Dust Monitoring**

**Appin East**

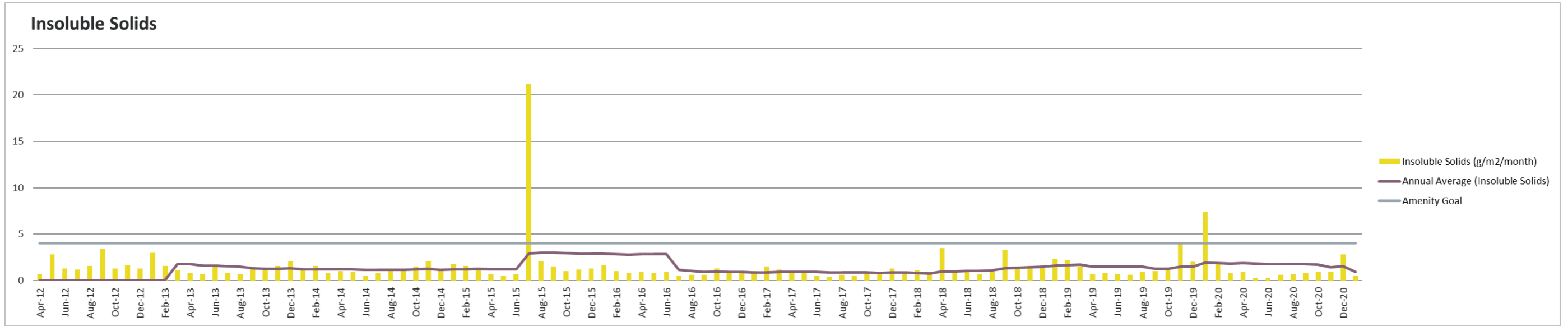
**Dust Deposition Results – AE-DDG14 - 12MMA**



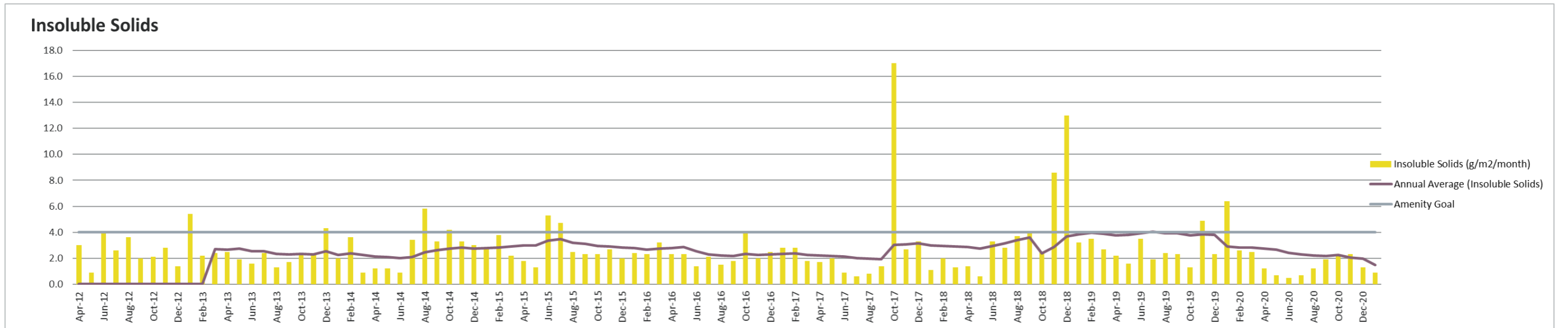
**Dust Deposition Results – AE-DDG15 - 12MMA**



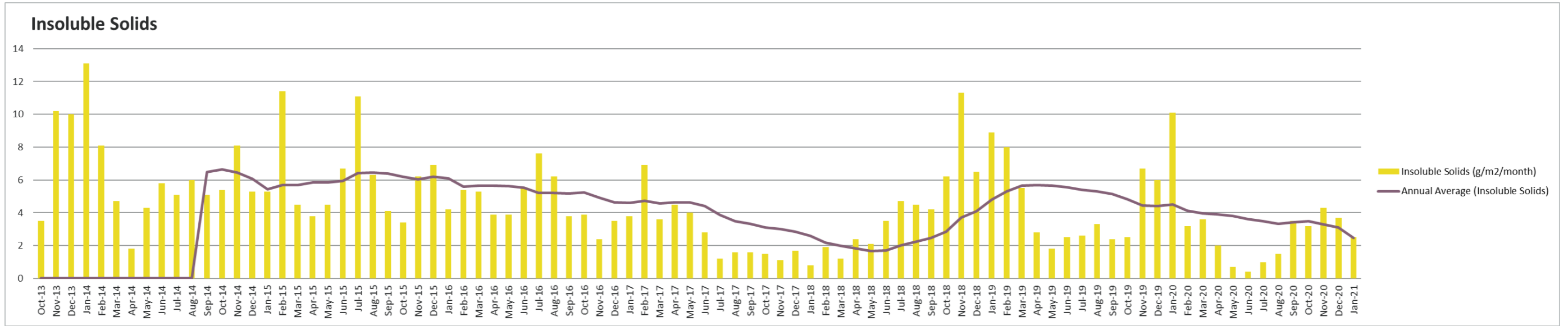
Dust Deposition Results – AE-DDG16 - 12MMA



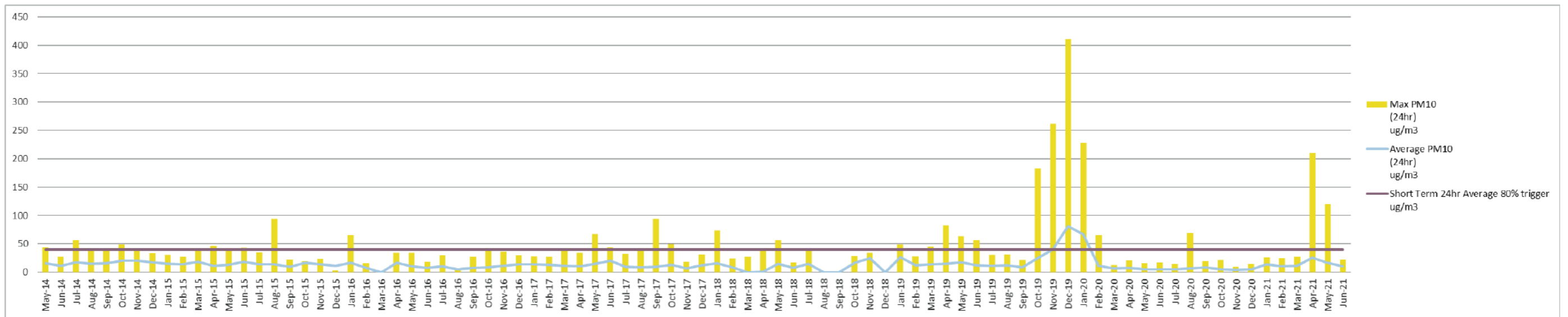
Dust Deposition Results – AE-DDG17 - 12MMA



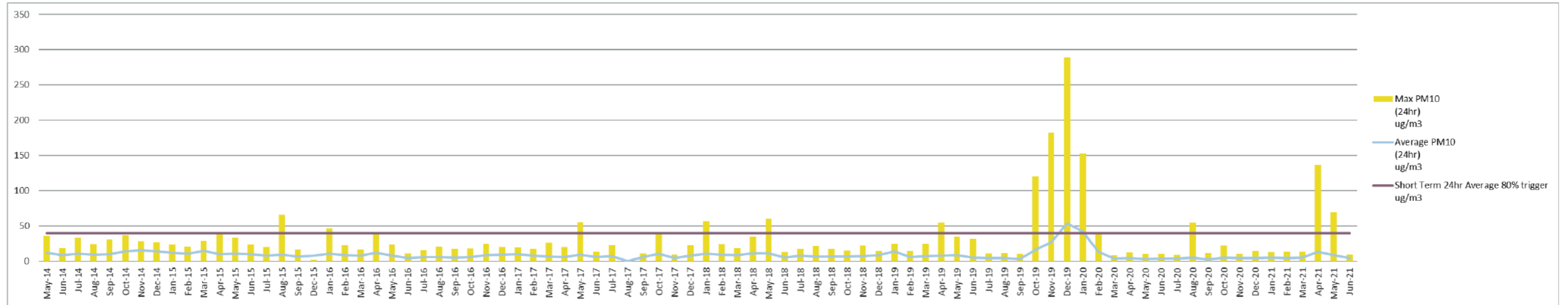
Dust Deposition Results – AE-DDG18 - 12MMA



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

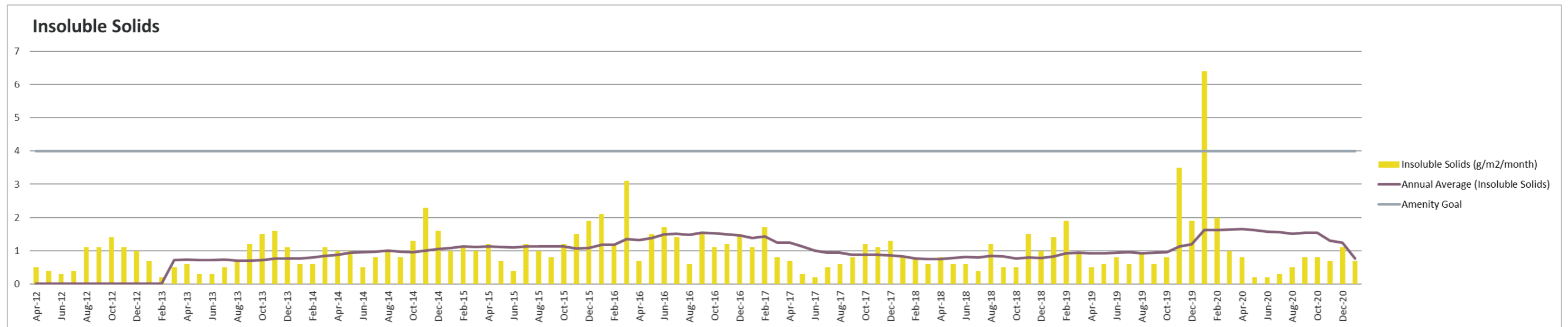


**Optical Photometer (DustTrak) – AE-PF3 – 24-hour average (PM<sub>10</sub>)**



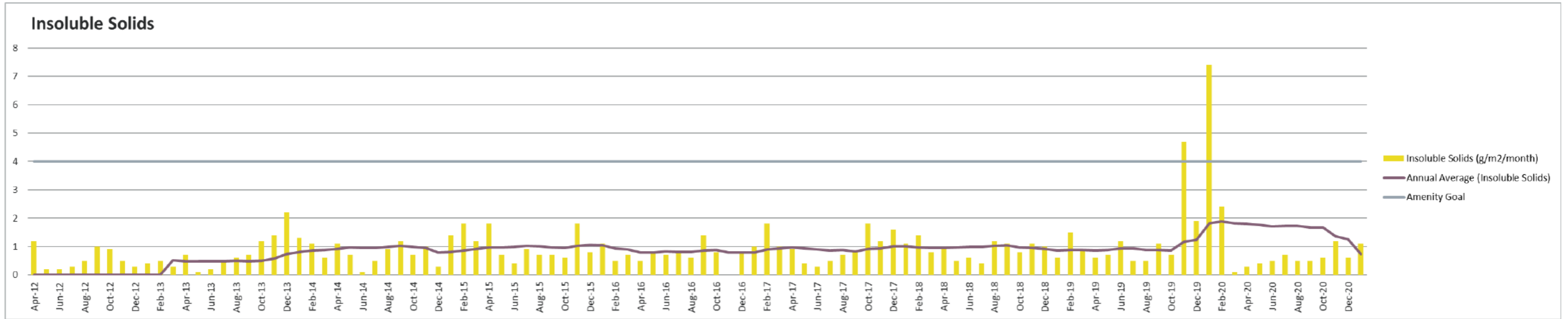
**Appin West**

**Dust Deposition Results – AW-DD1 - 12MMA**



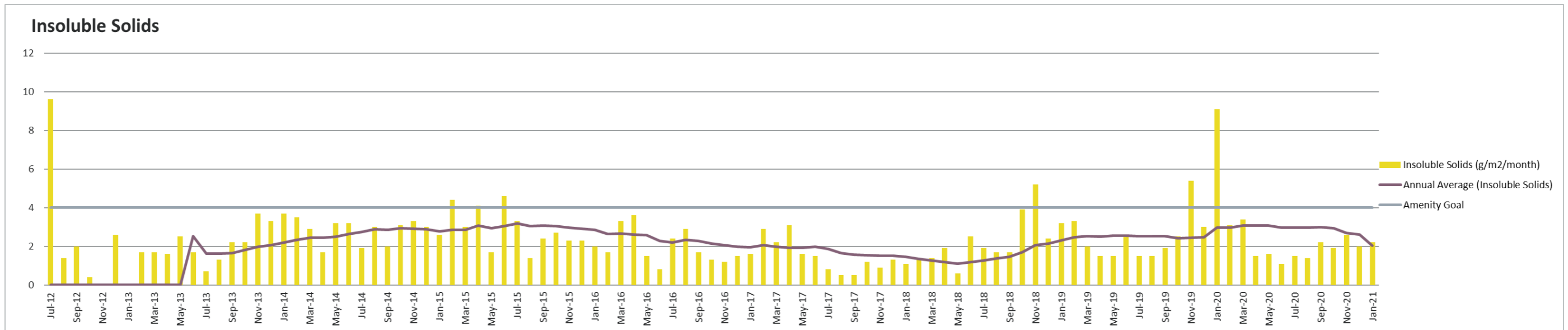


Dust Deposition Results – AW-DD2 - 12MMA

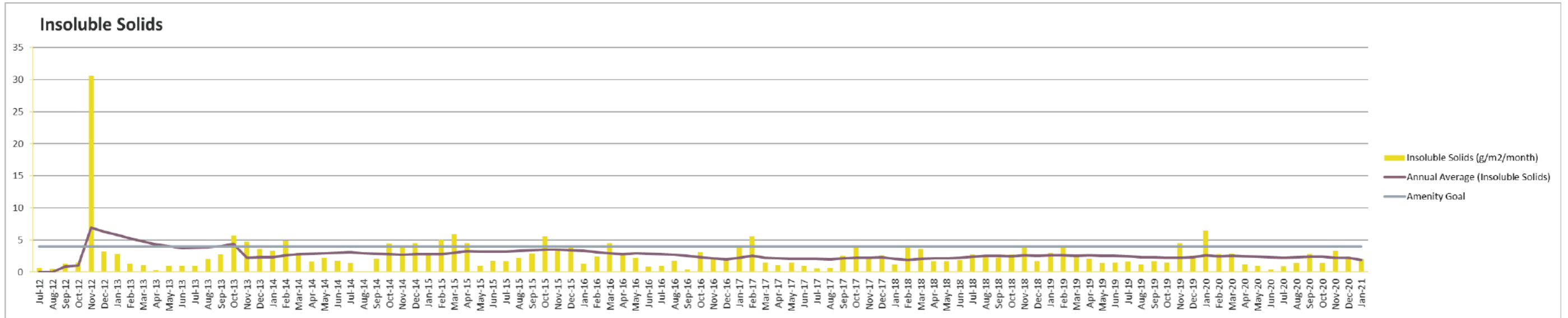


Appin North

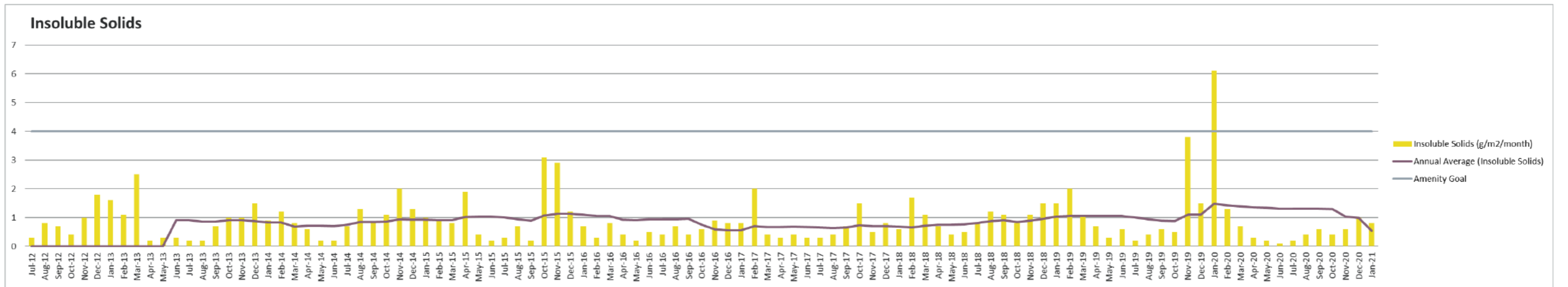
Dust Deposition Results – W-DD1 - 12MMA



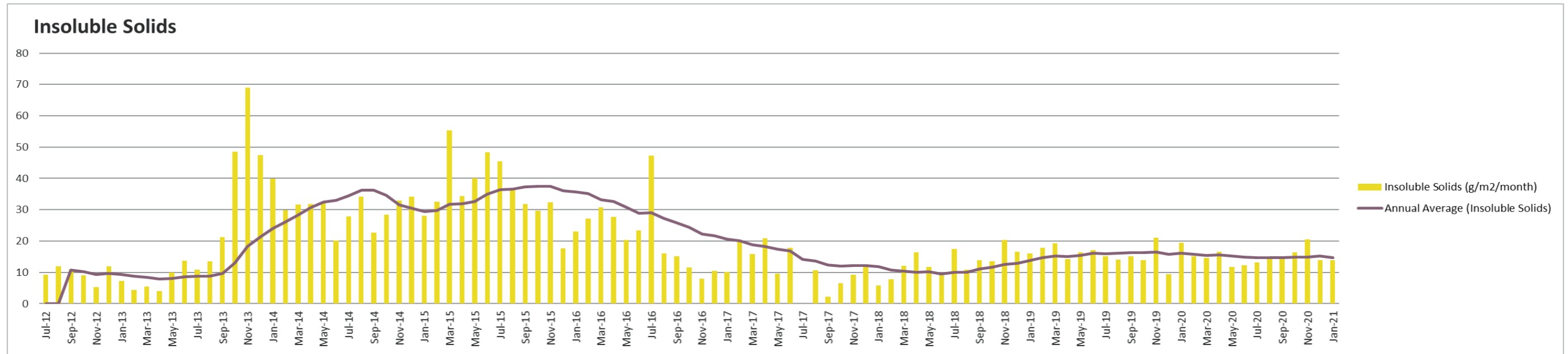
Dust Deposition Results – W-DD3 - 12MMA



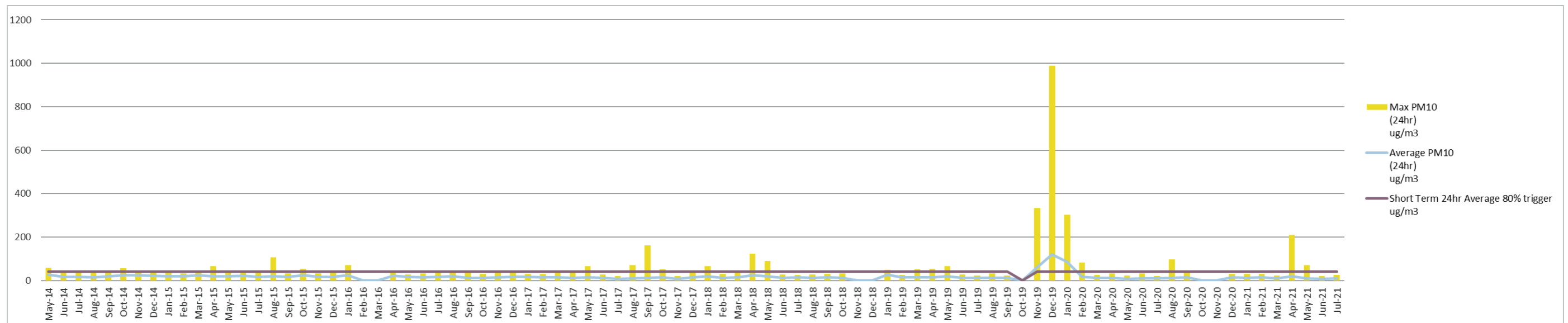
Dust Deposition Results – W-DD8 - 12MMA



Dust Deposition Results – W-DD10 - 12MMA



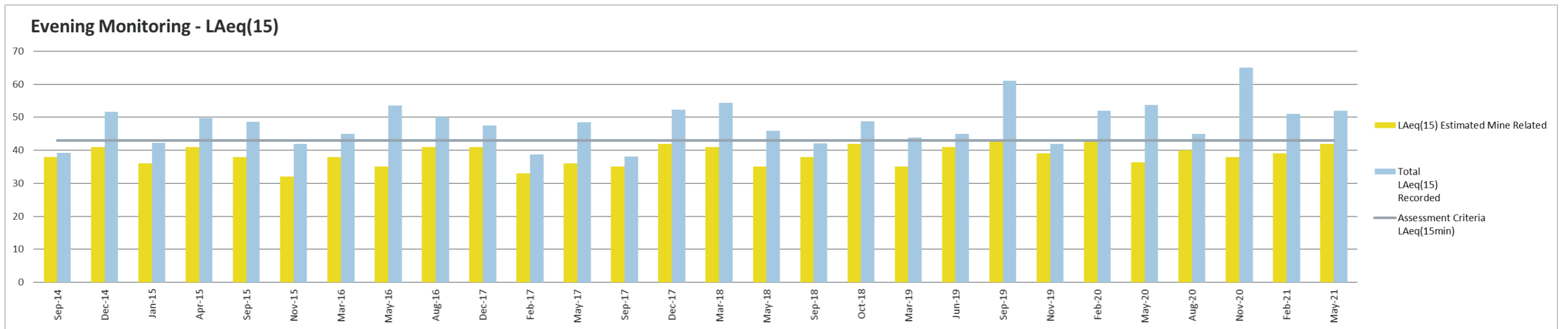
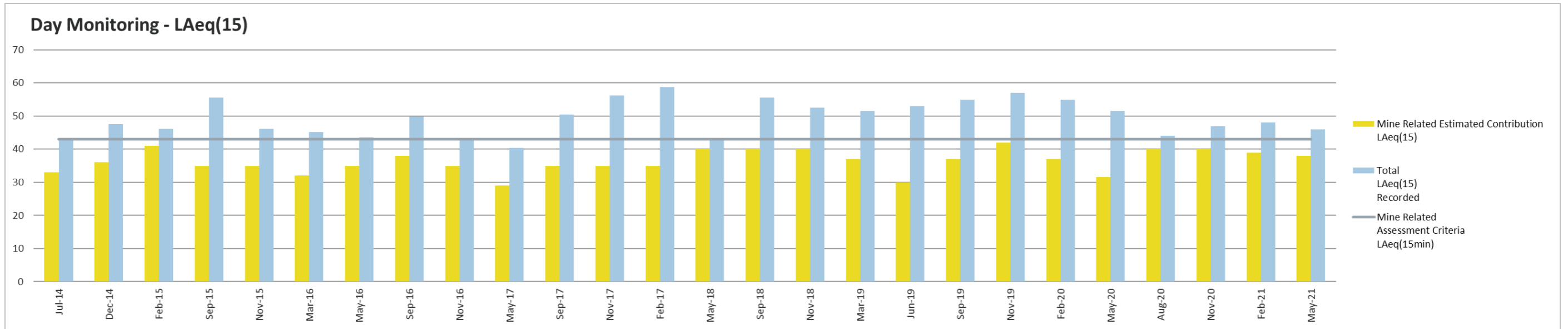
Optical Photometer (DustTrak) – W-PF1 – 24-hour average (PM<sub>10</sub>)

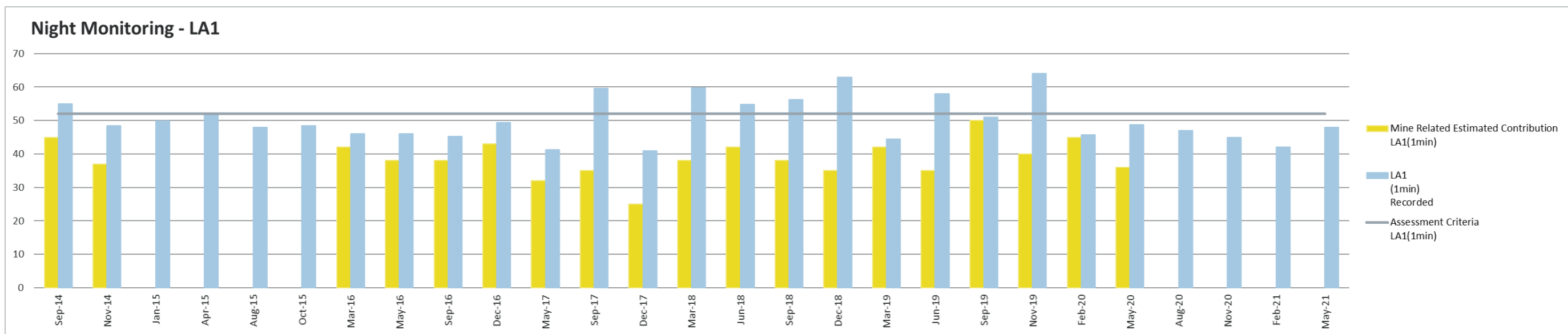
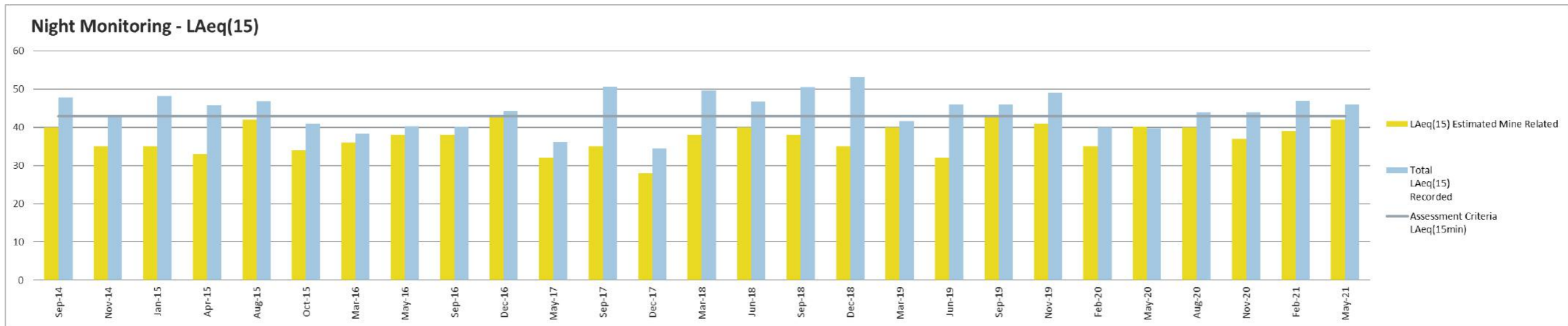


**Noise**

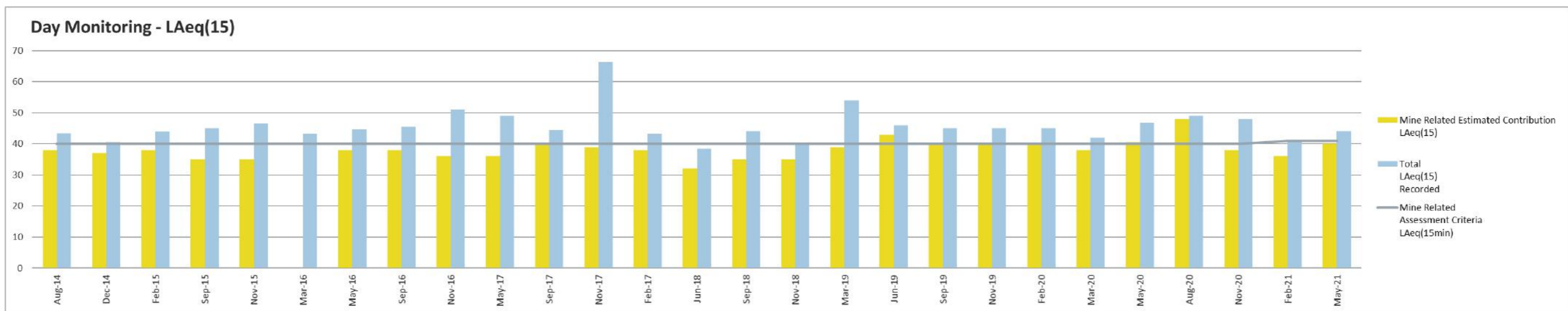
**Appin East**

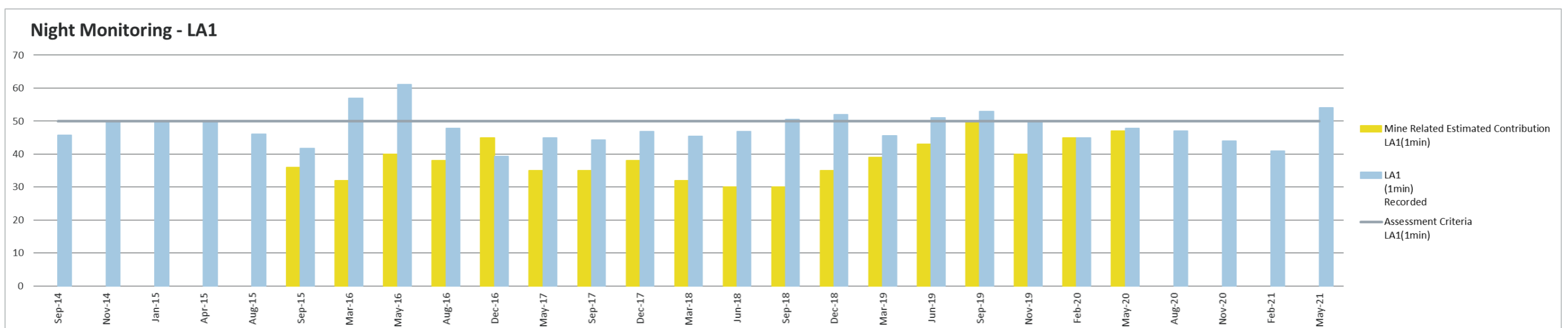
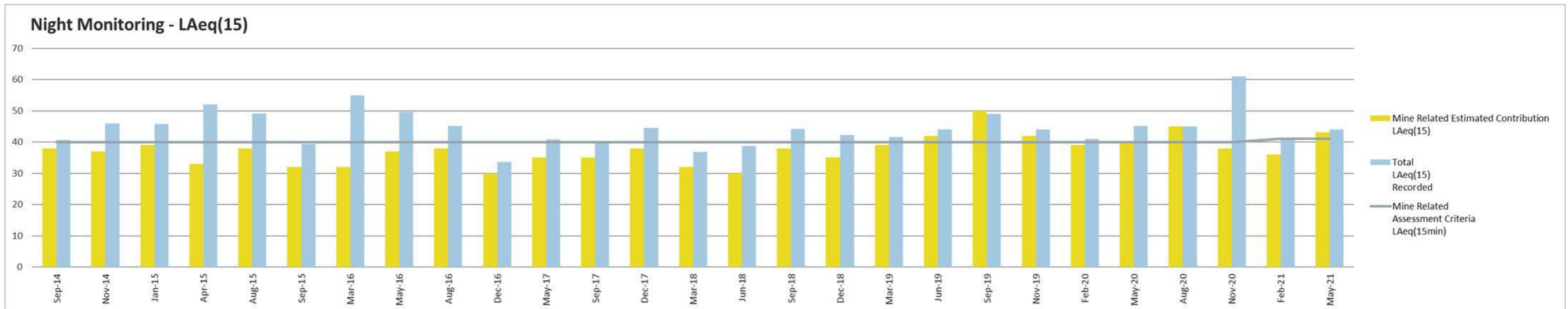
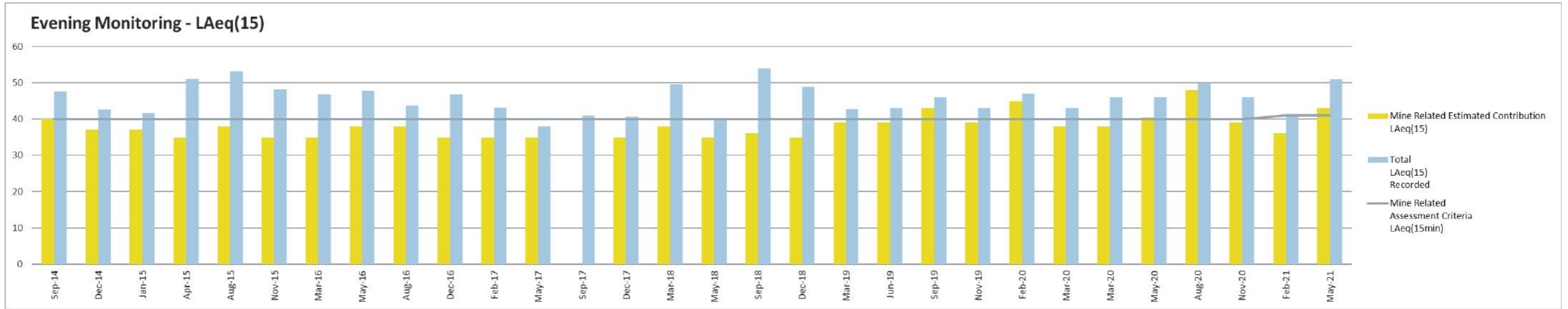
**Noise Monitoring Results – AE-NS4**





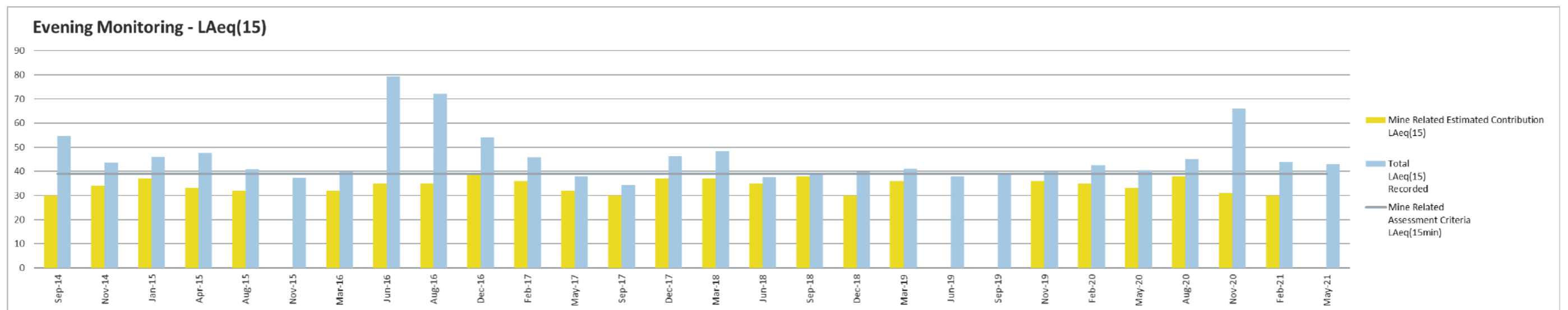
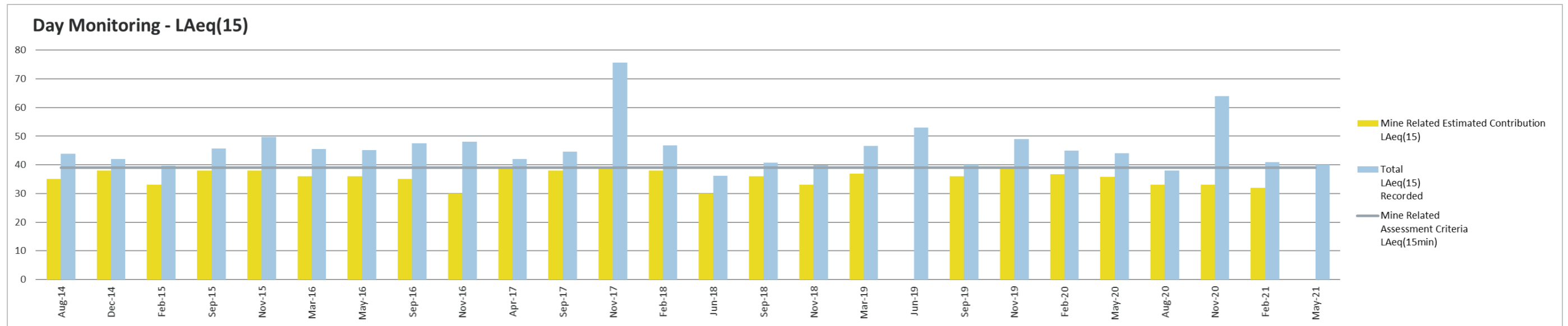
## Noise Monitoring Results – AE-NS5

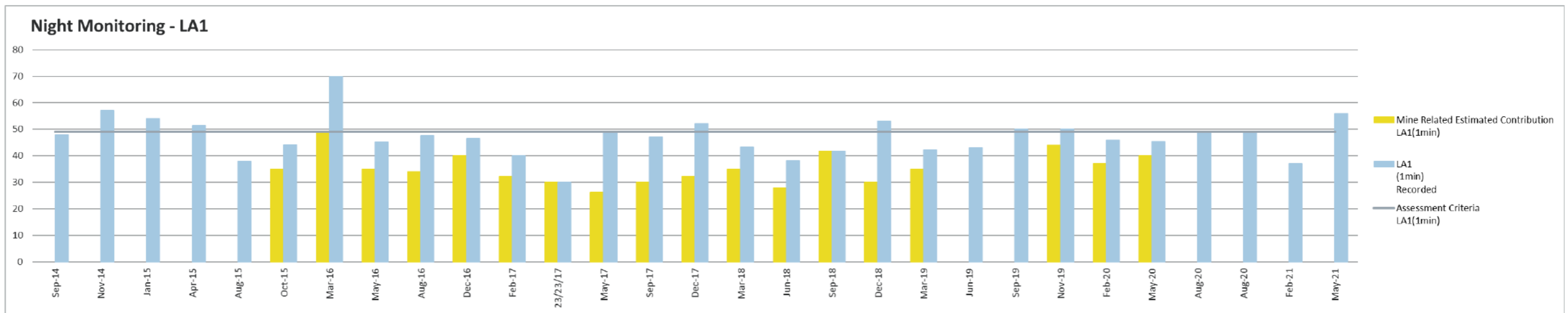
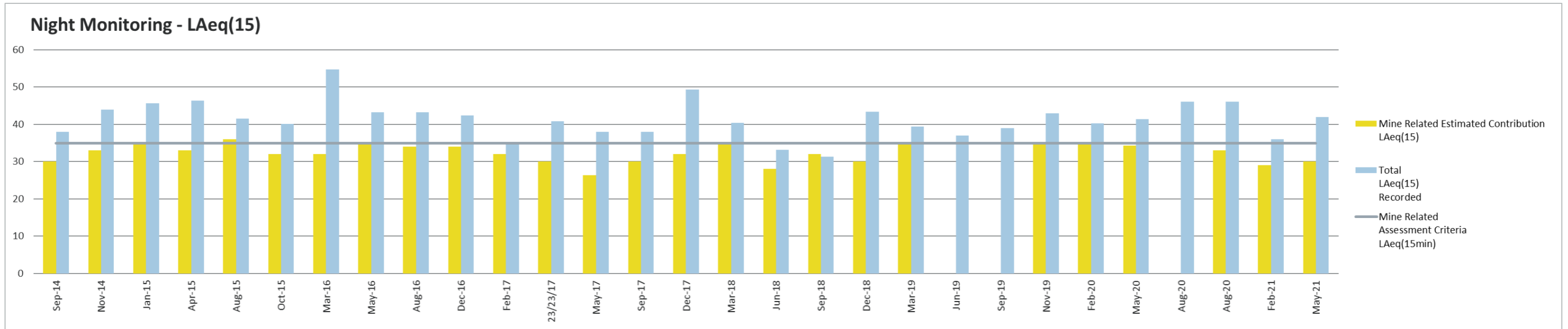




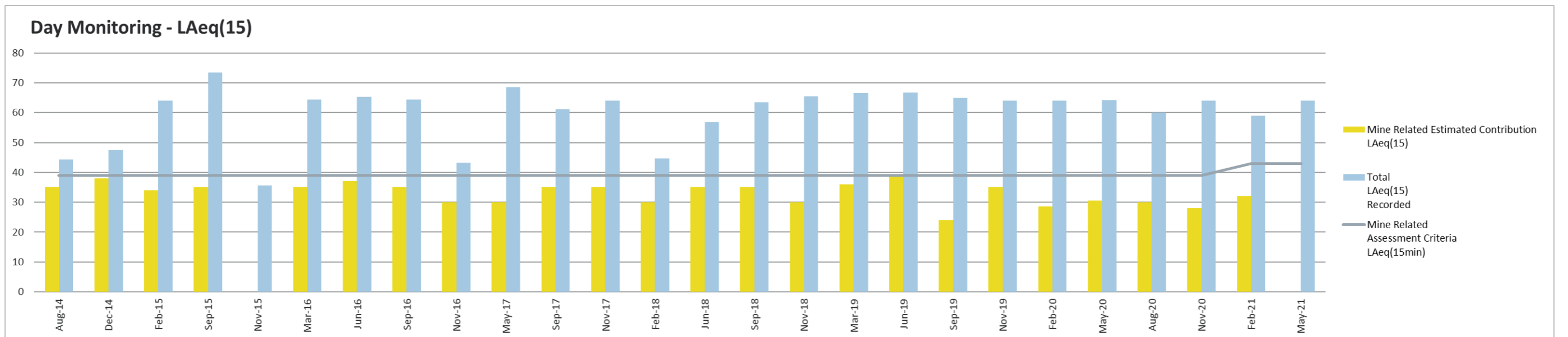
Appin West

Noise Monitoring Results – AW-NS4

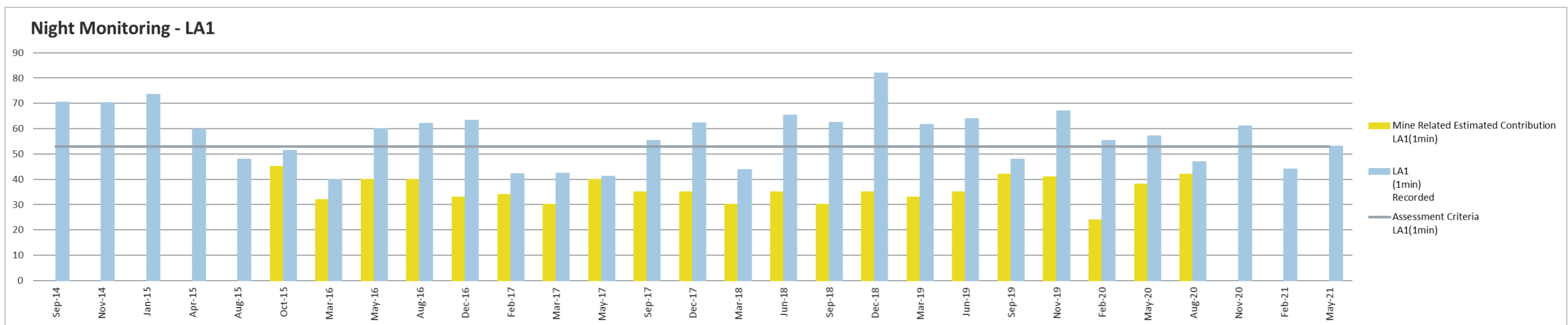
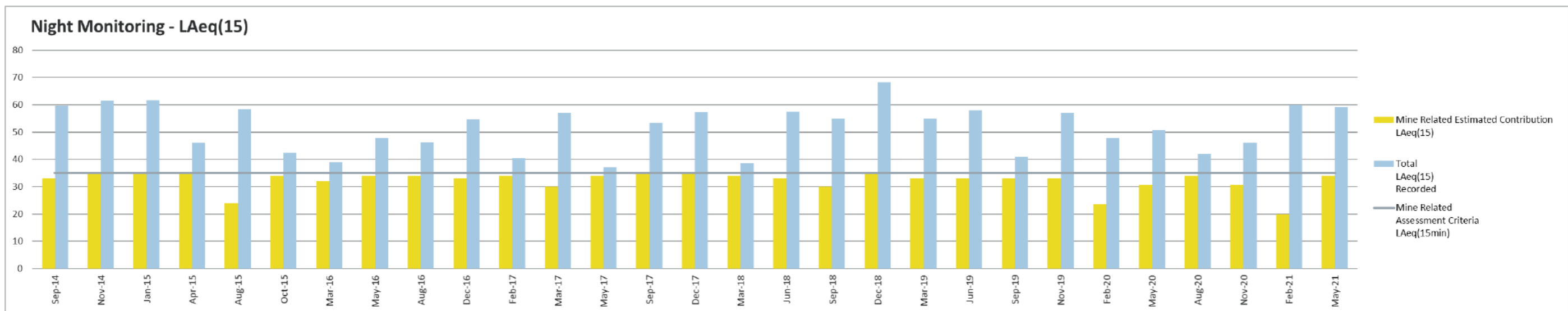
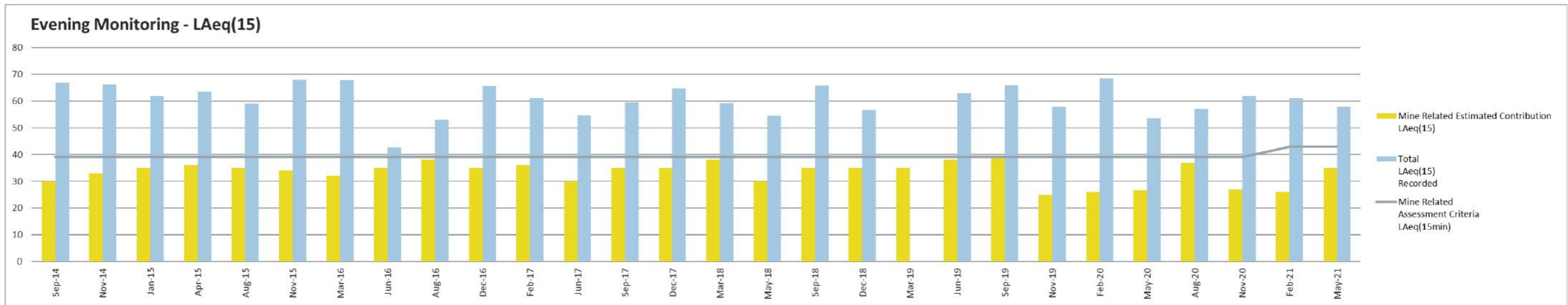




## Noise Monitoring Results – AW-NS5

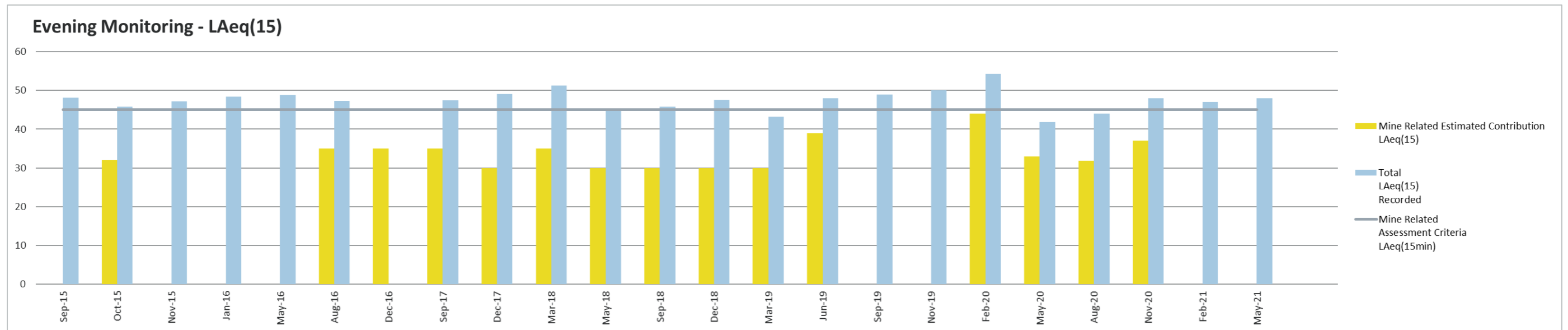
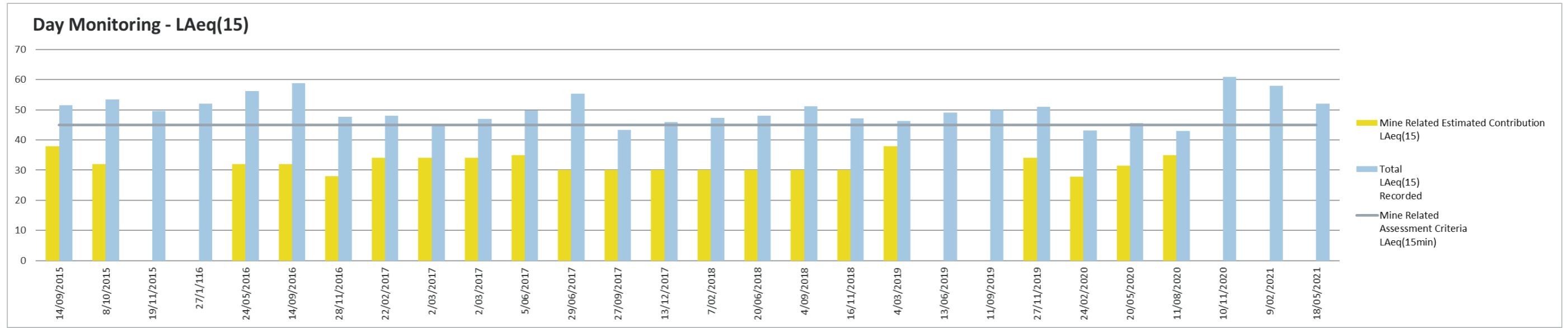


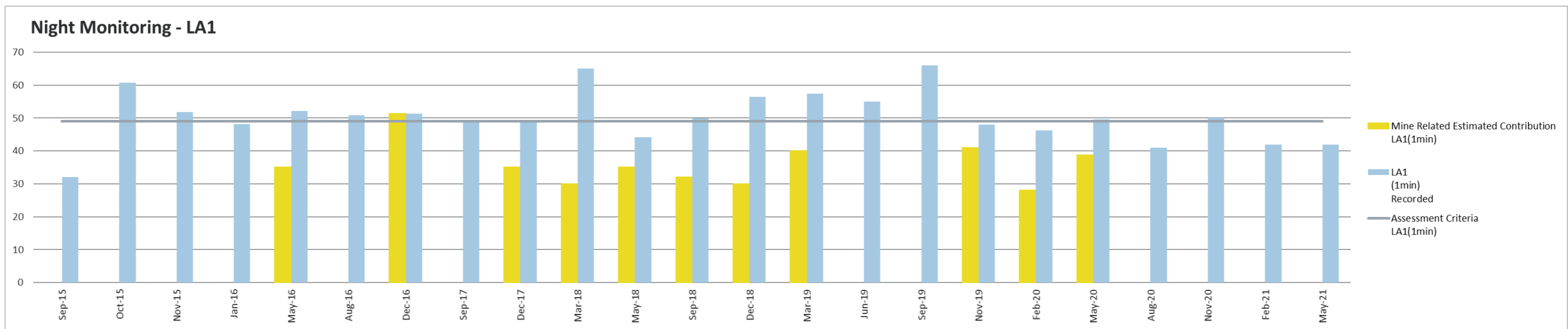
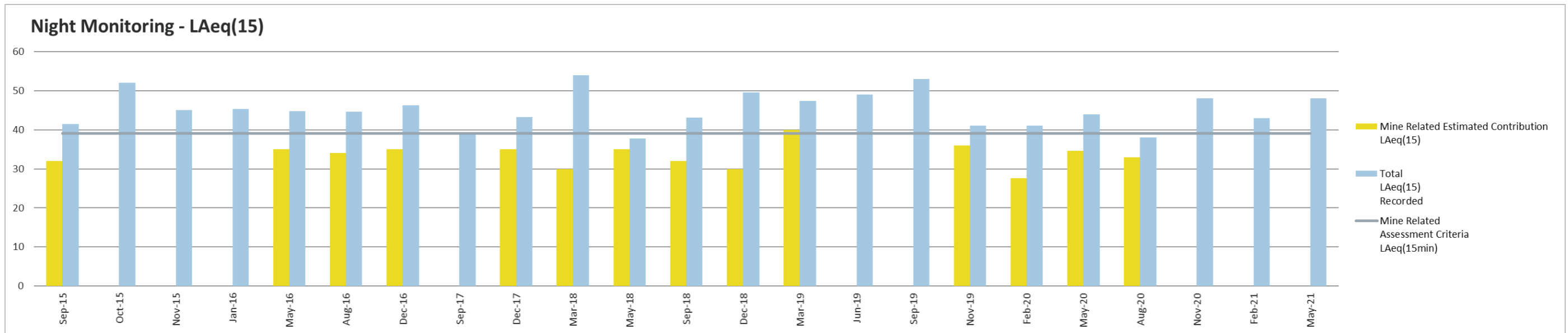




Ventilation Shaft 6

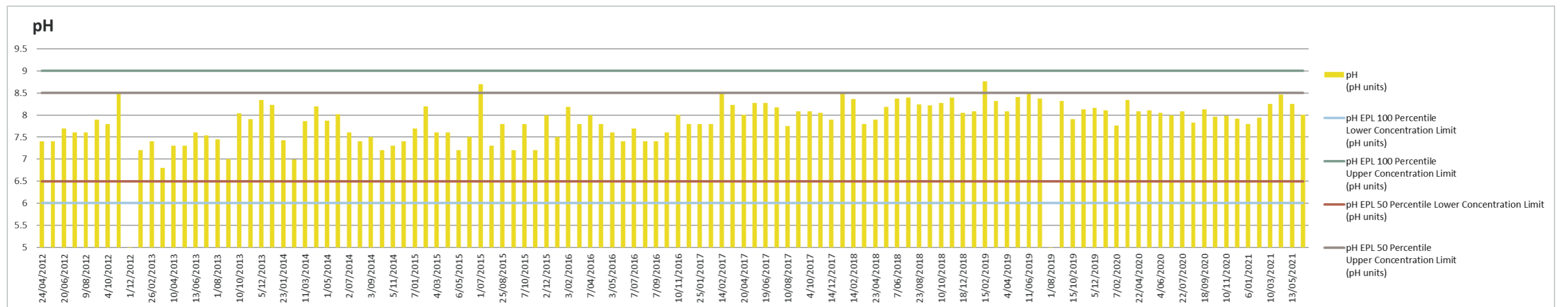
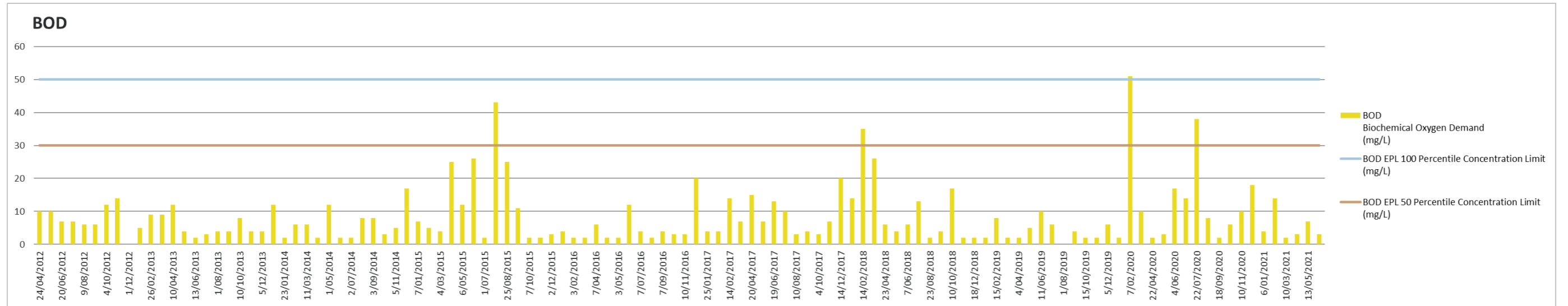
Noise Monitoring Results – VS6 Central



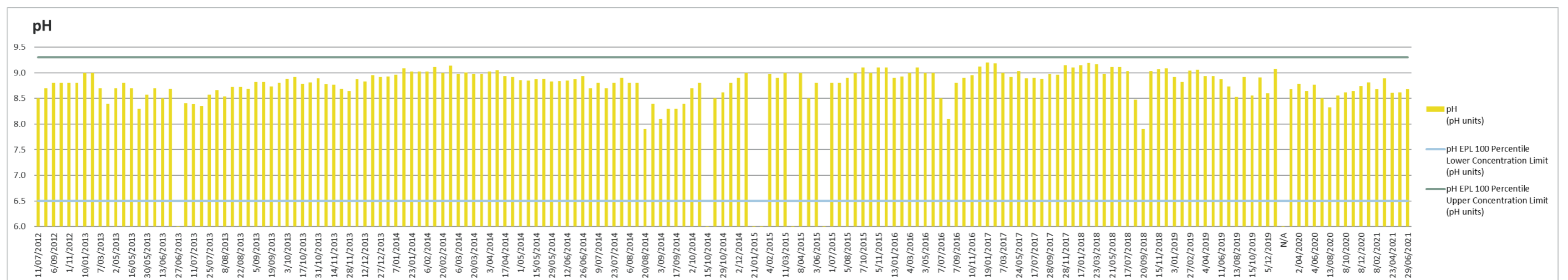


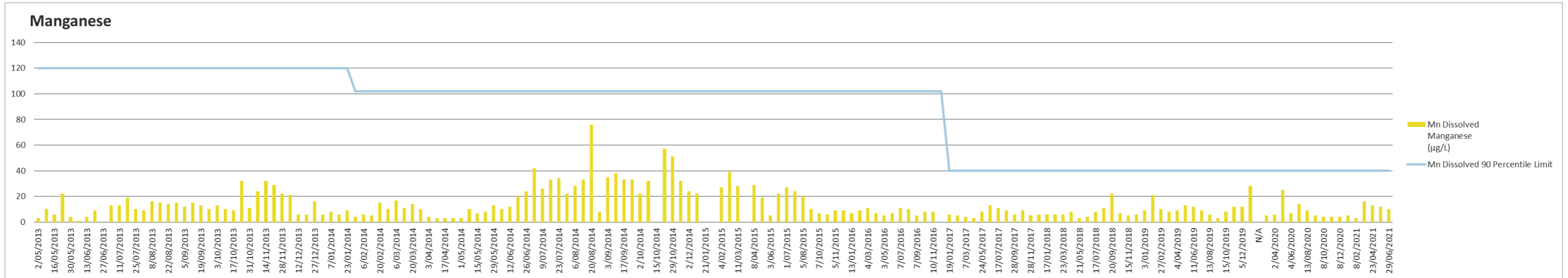
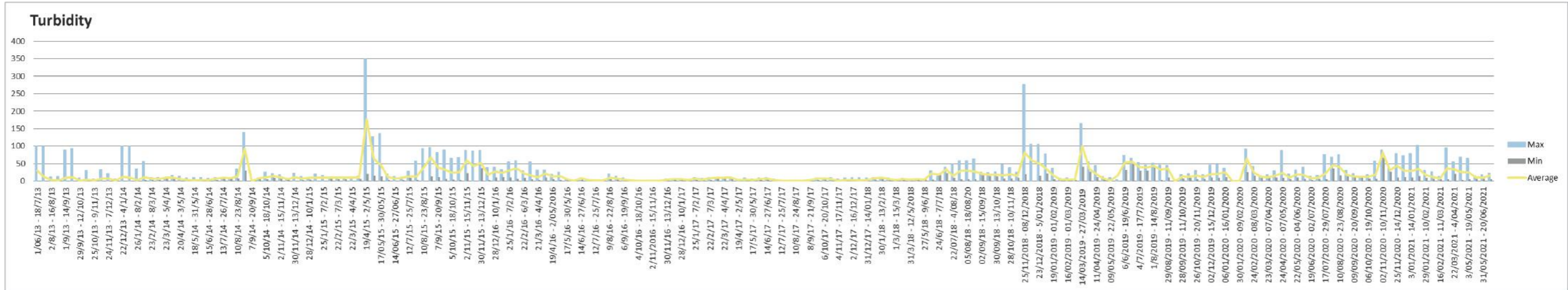
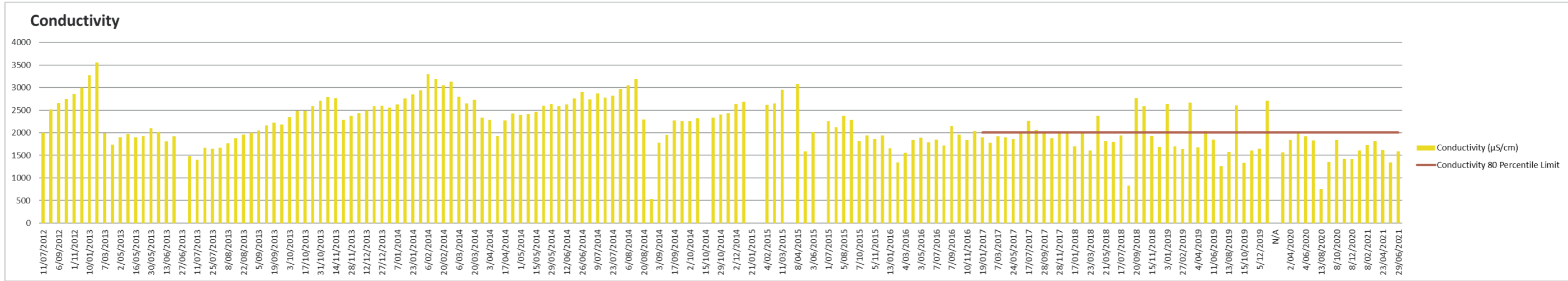
# Water Quality

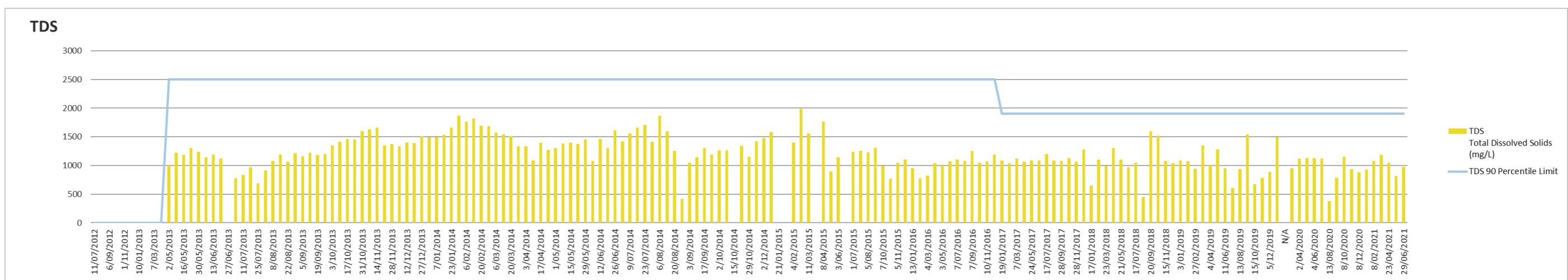
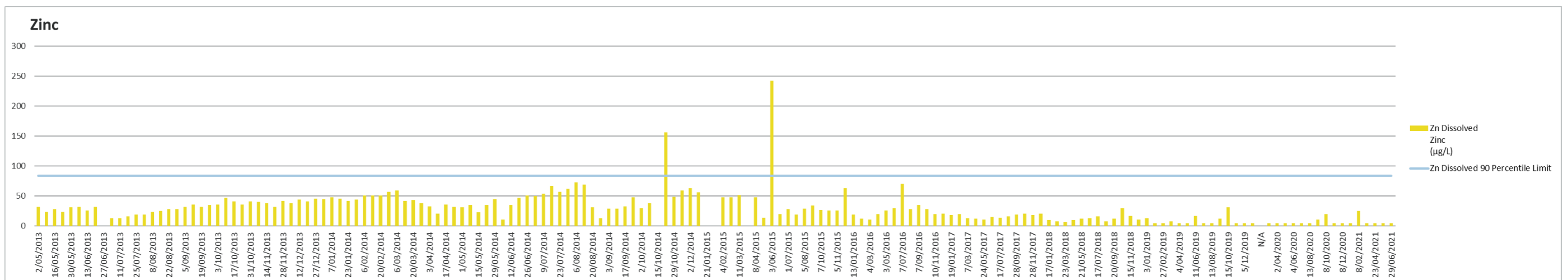
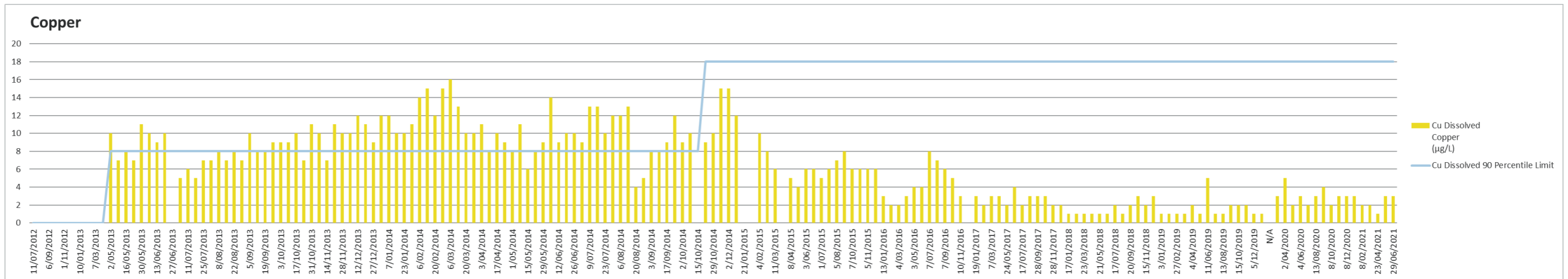
## Water Quality Monitoring Results – Point 3/4

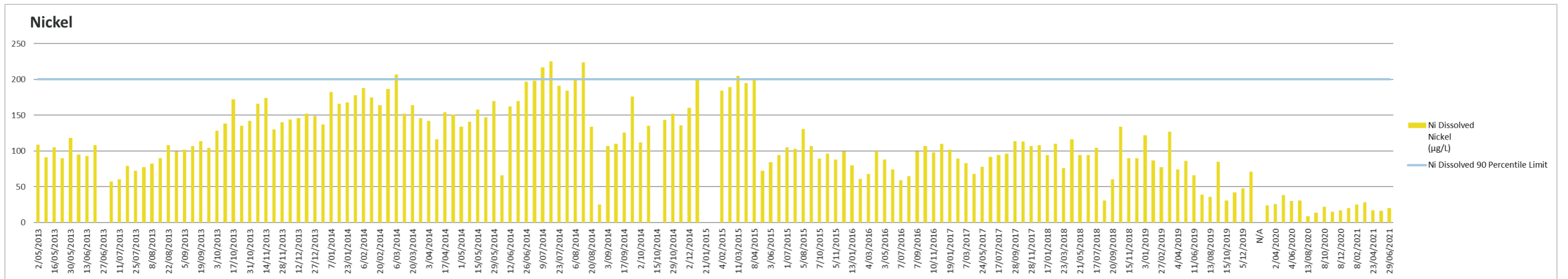
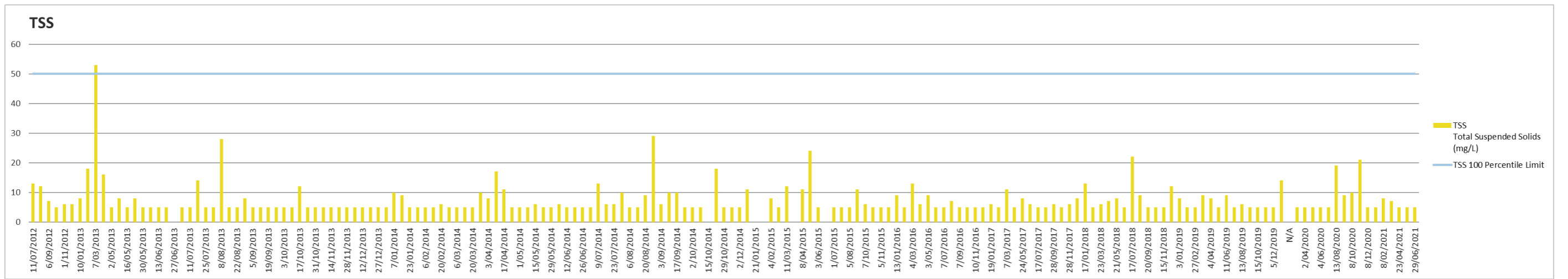
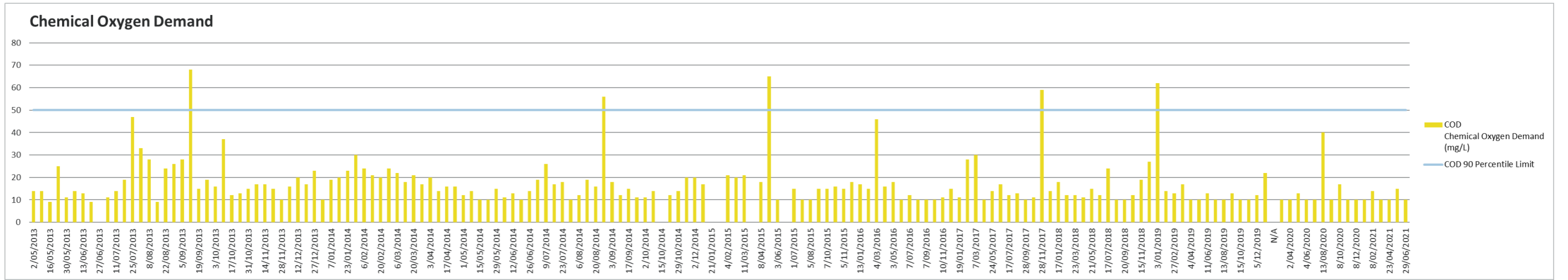


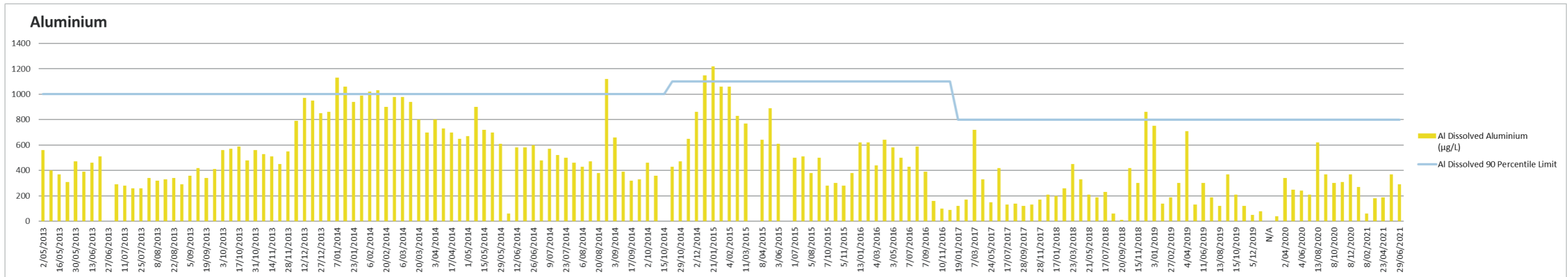
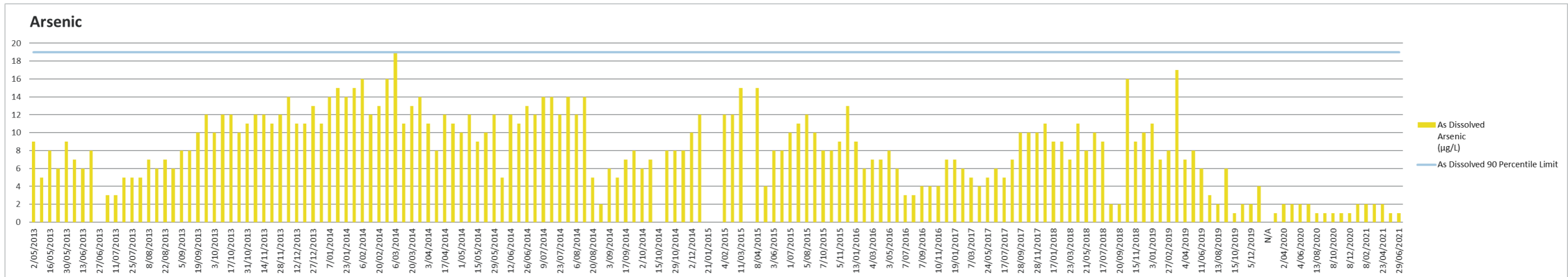
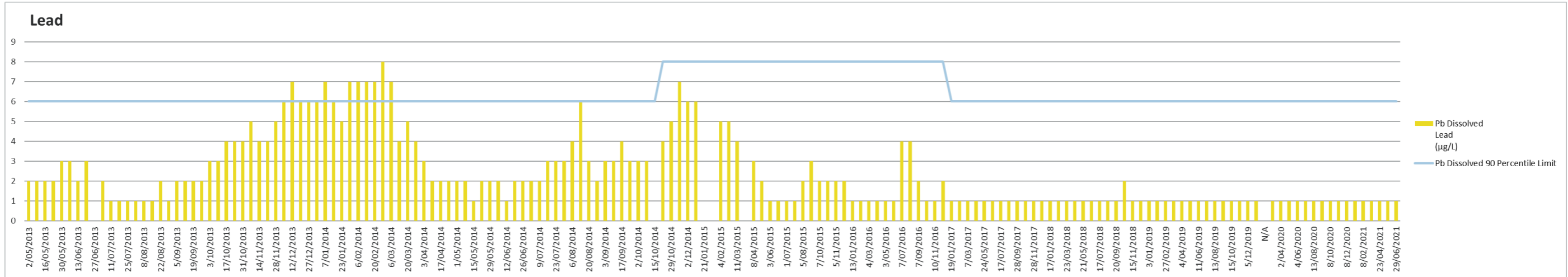
## Water Quality Monitoring Results – Point 10 – Grab Sample





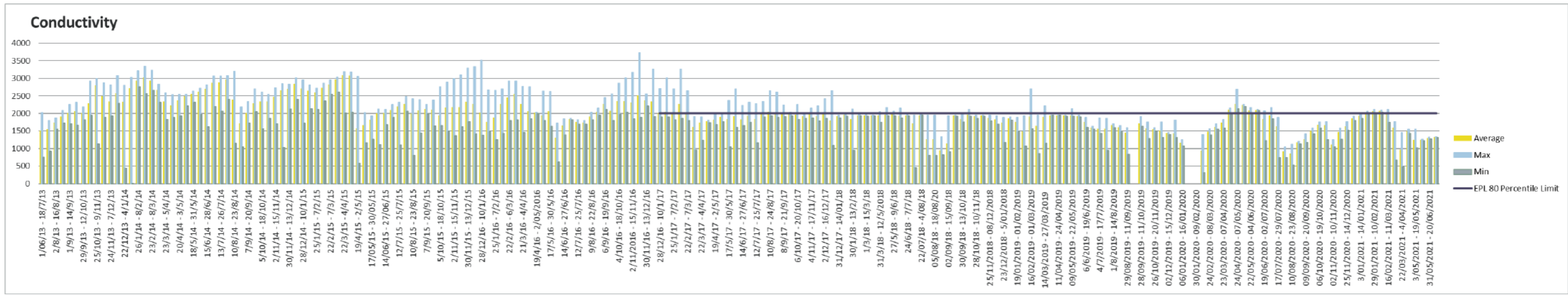
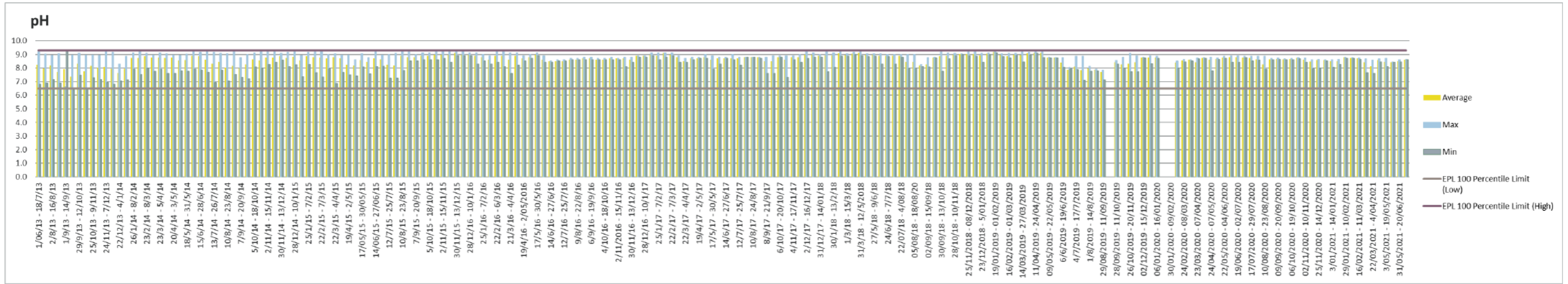




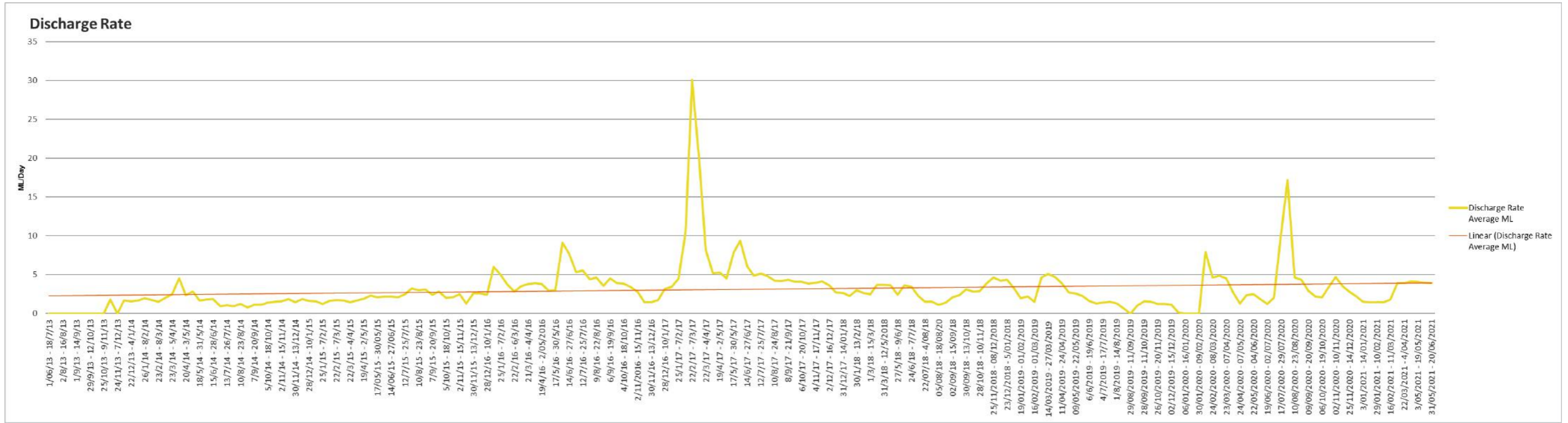




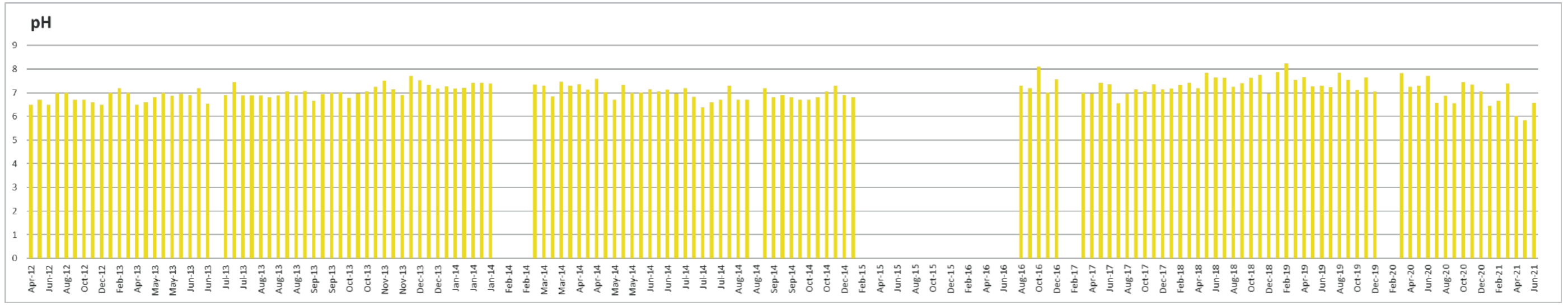
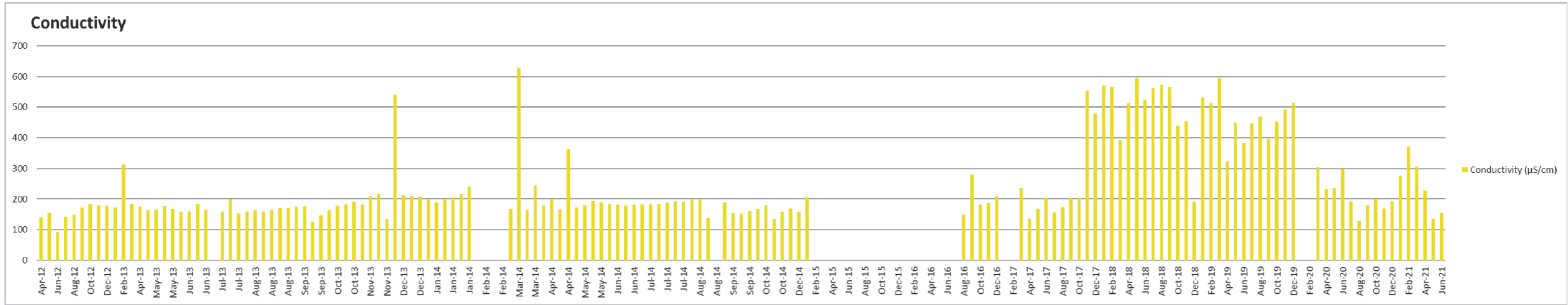
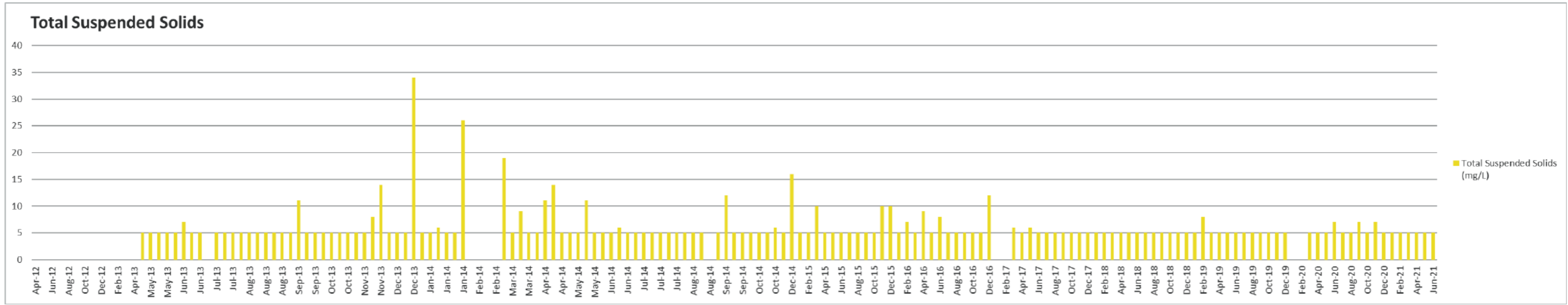
Water Quality Monitoring Results – Point 10 – Continuous Monitoring



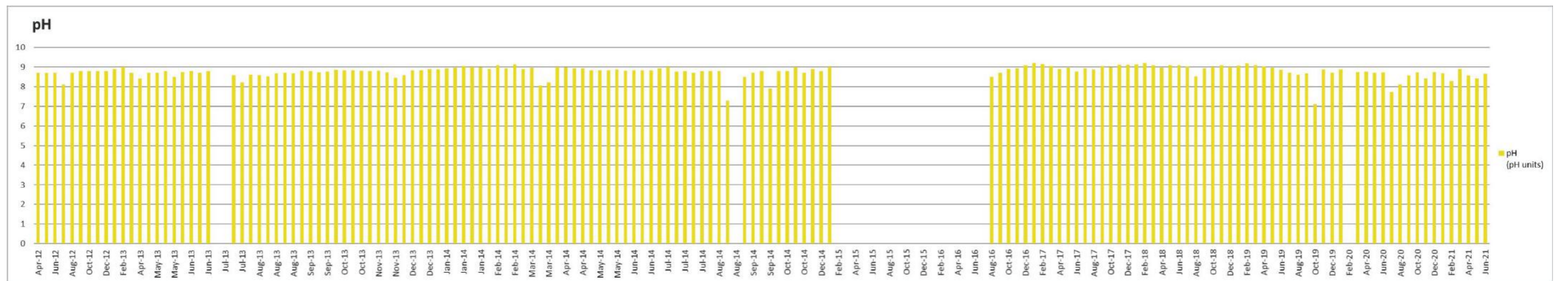
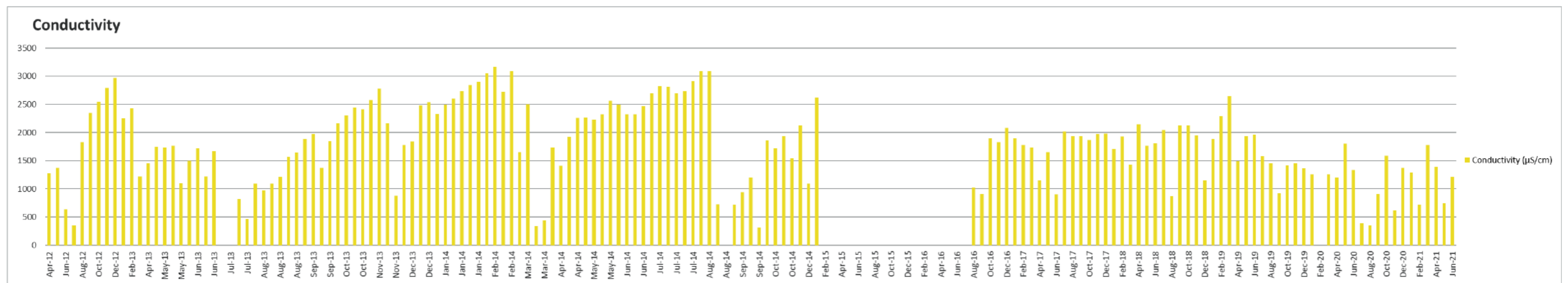
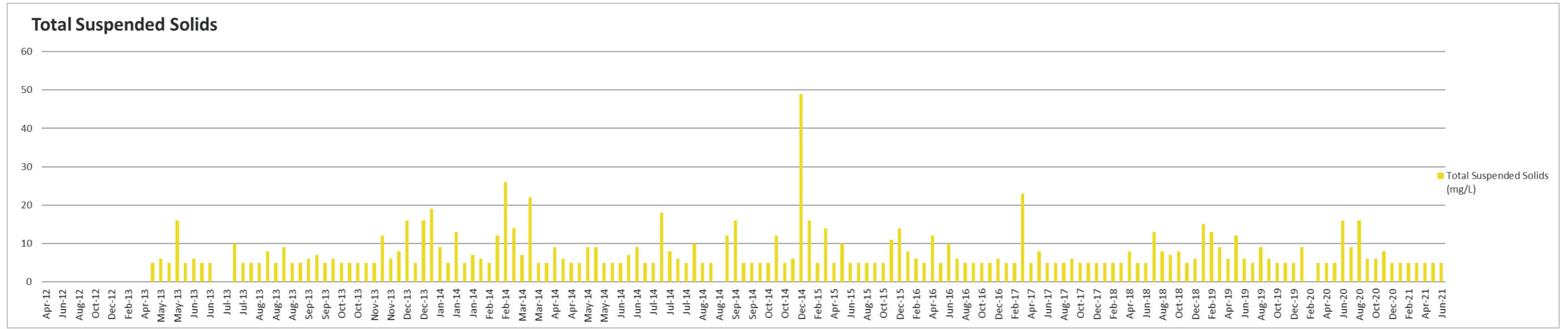
# Discharge Rate – Point 10



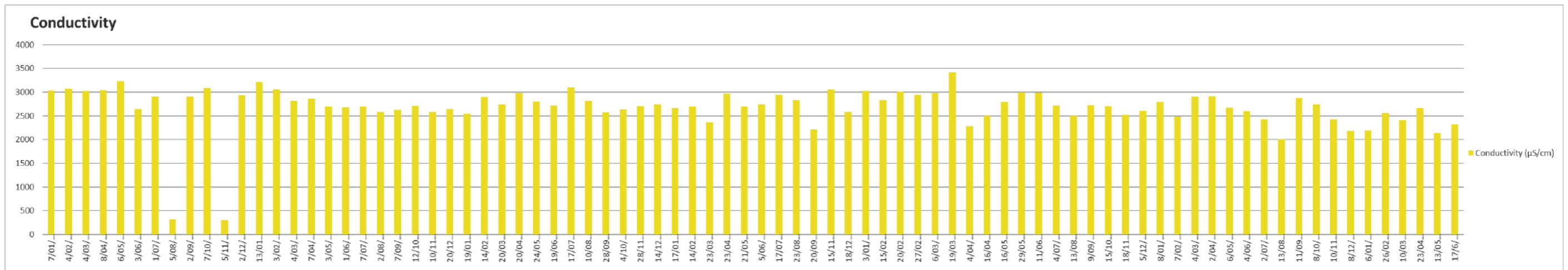
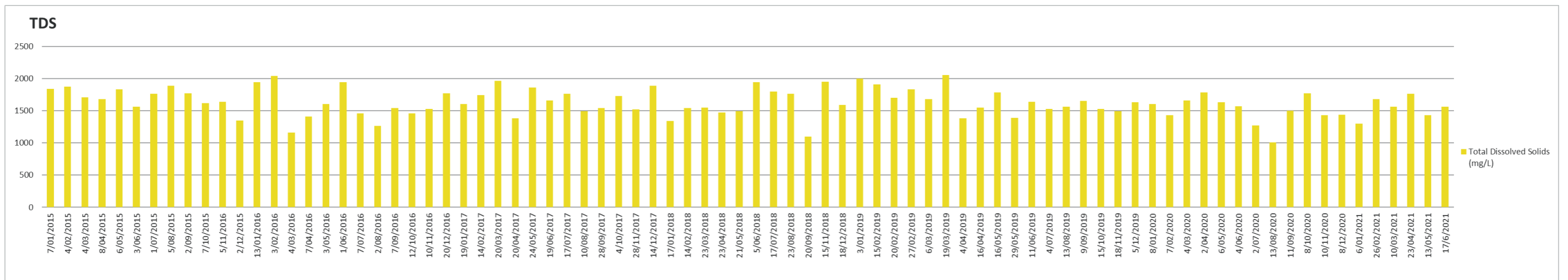
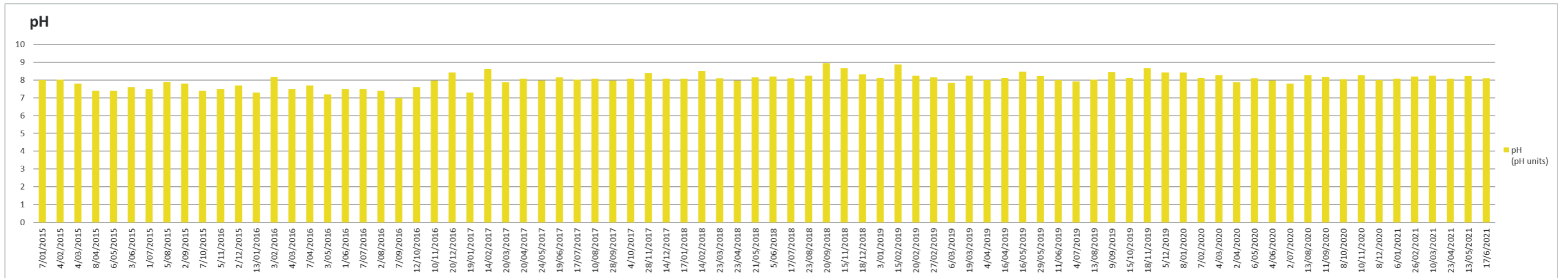
# Water Quality Monitoring Results – Point 11 (Grab)



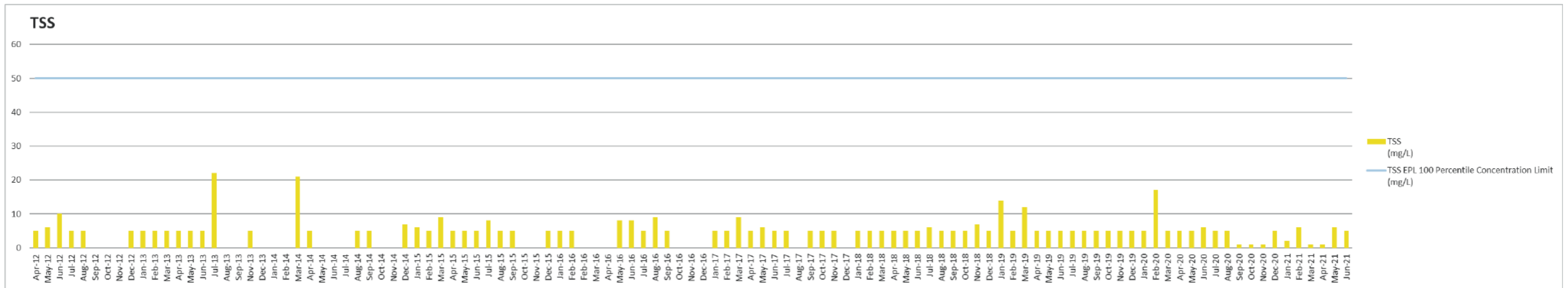
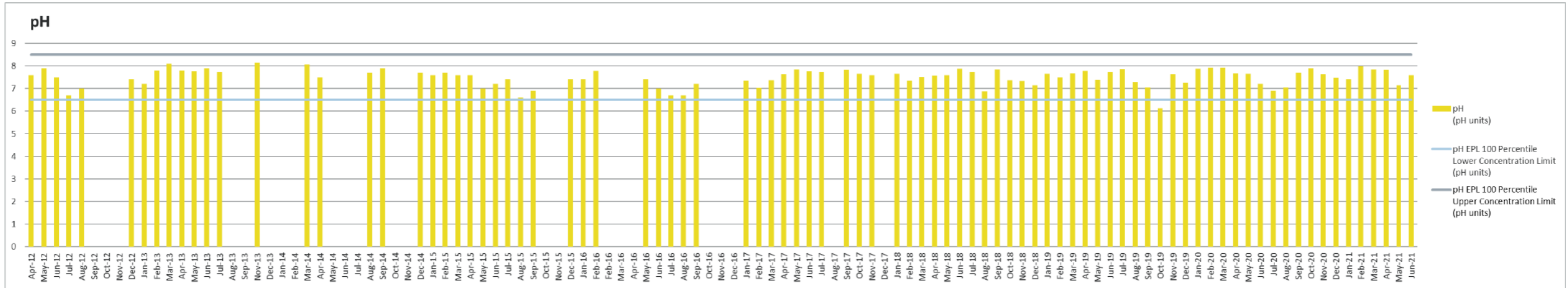
**Water Quality Monitoring Results – Point 12 (Grab)**



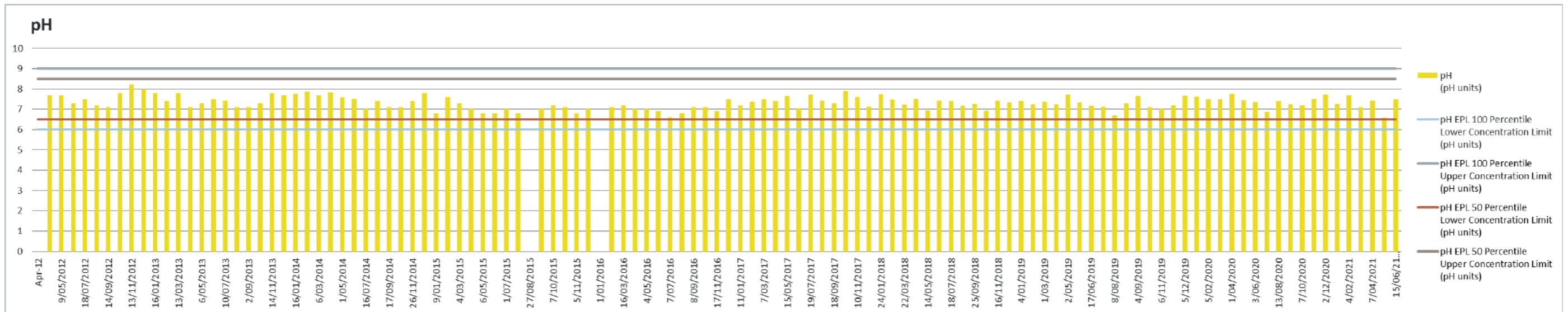
## Water Quality Monitoring Results – Point 16

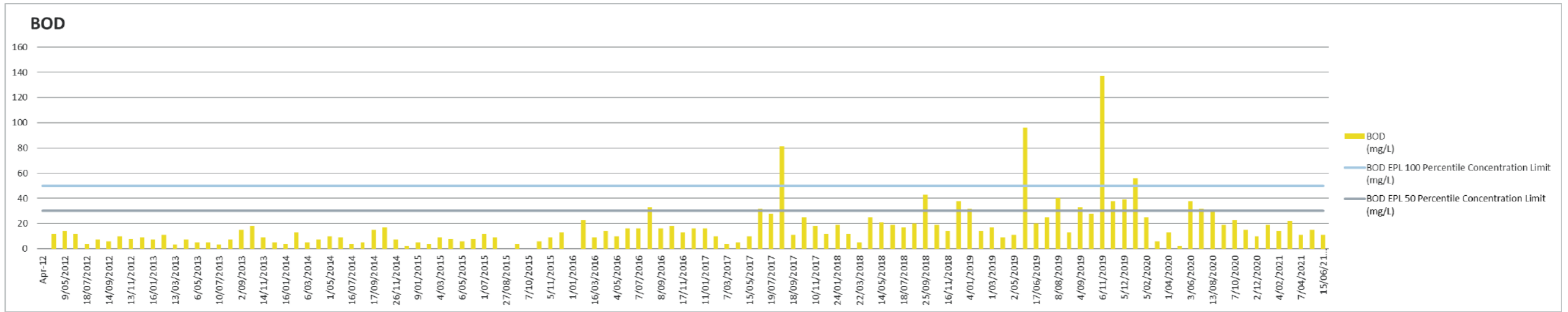


**Water Quality Monitoring Results – Point 19**

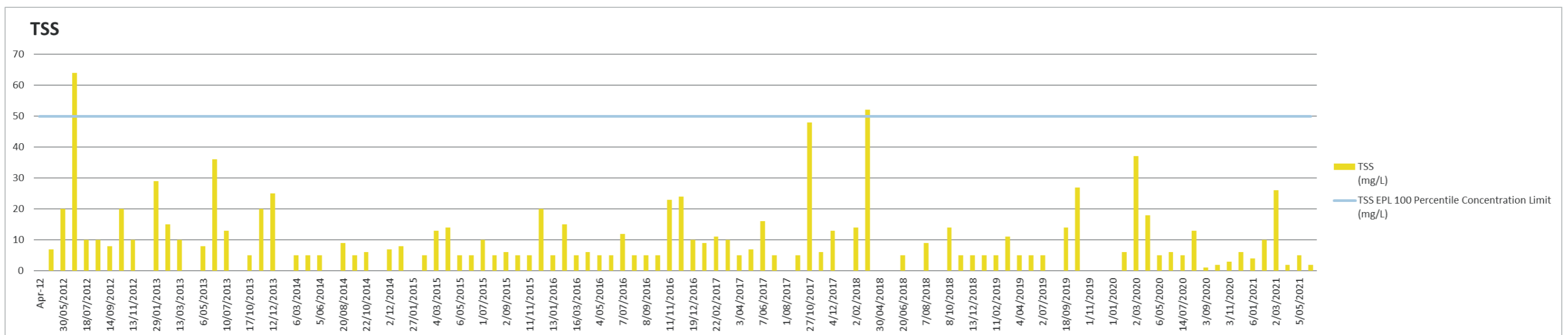
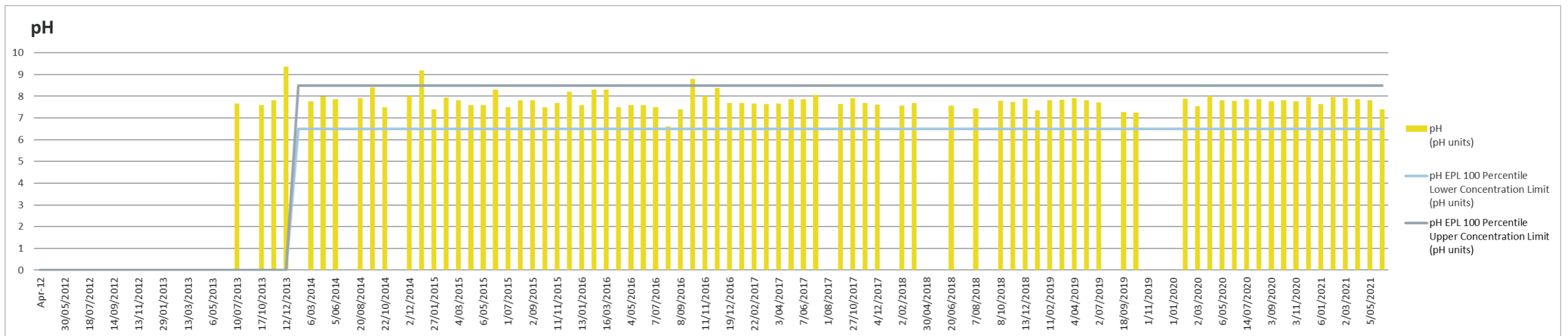


**Water Quality Monitoring Results – Point 38 (Grab)**

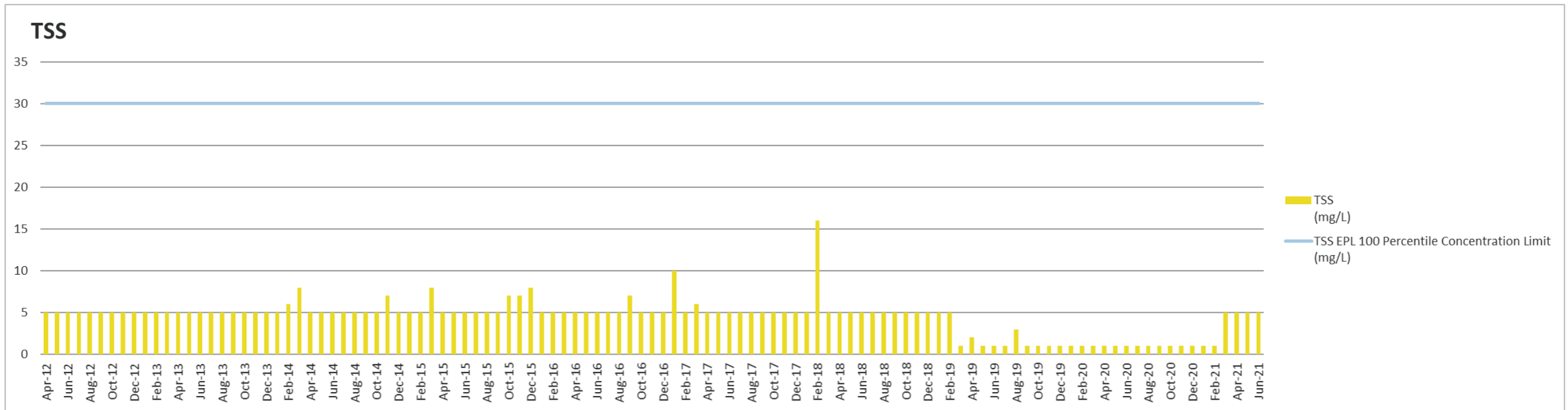
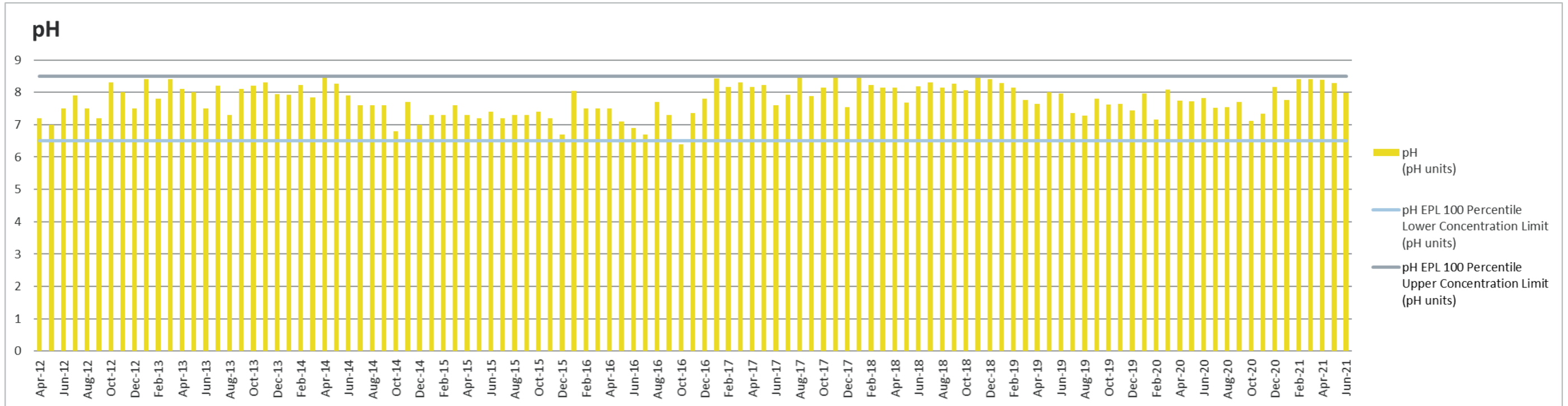




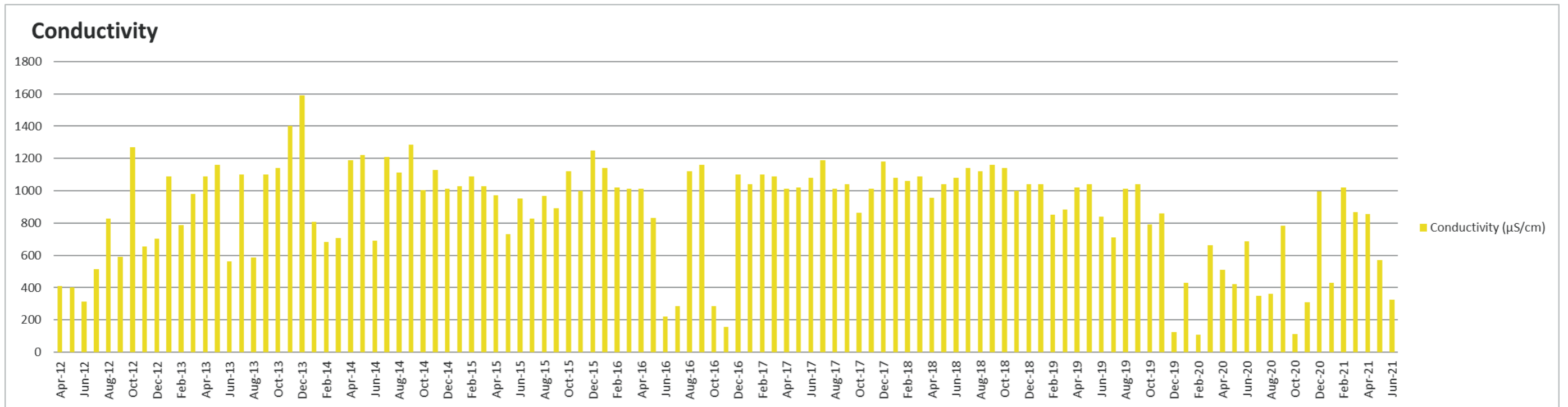
### Water Quality Monitoring Results – Point 23 (Grab)



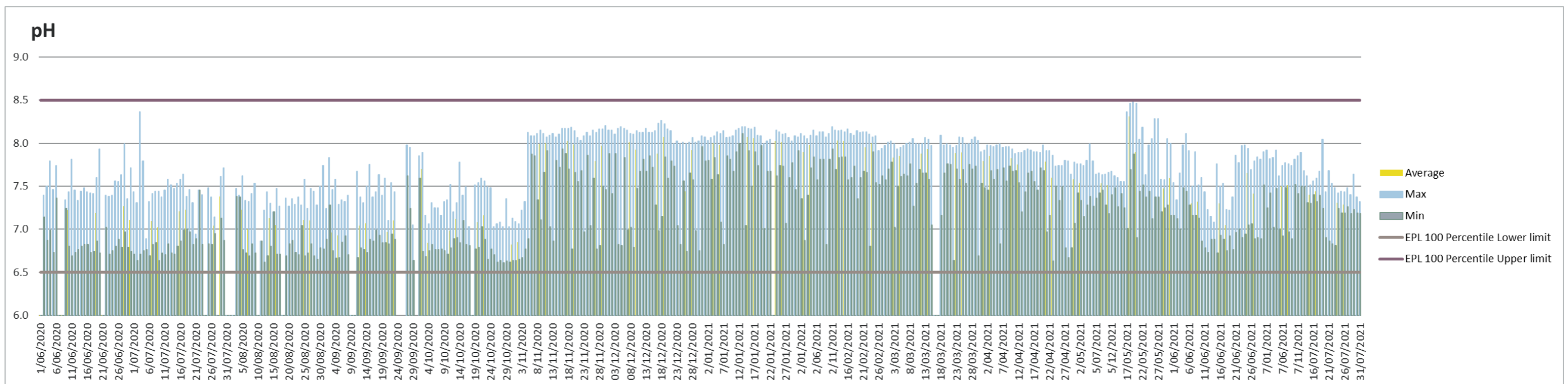
Water Quality Monitoring Results – Point 24 (Grab)

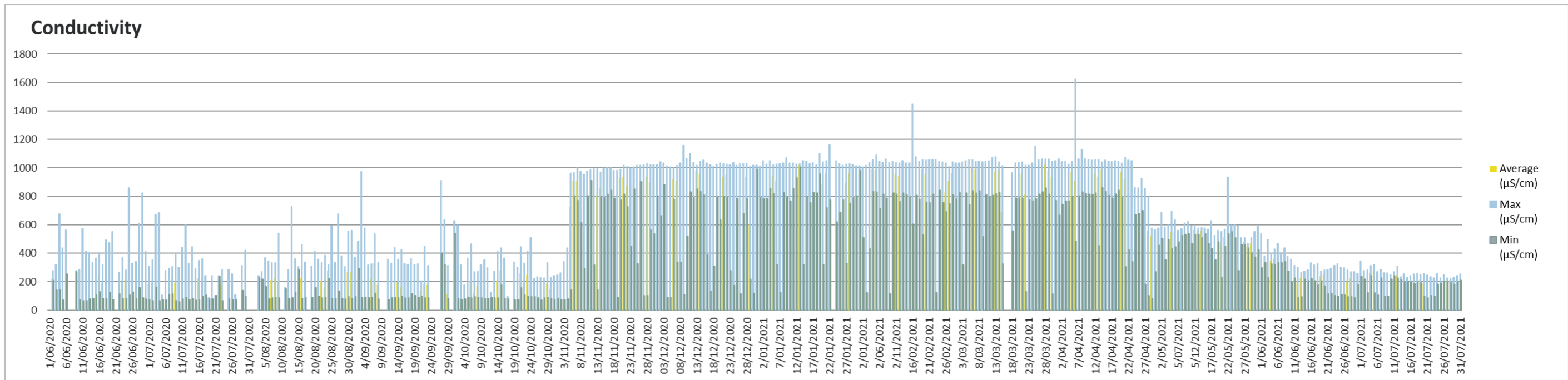




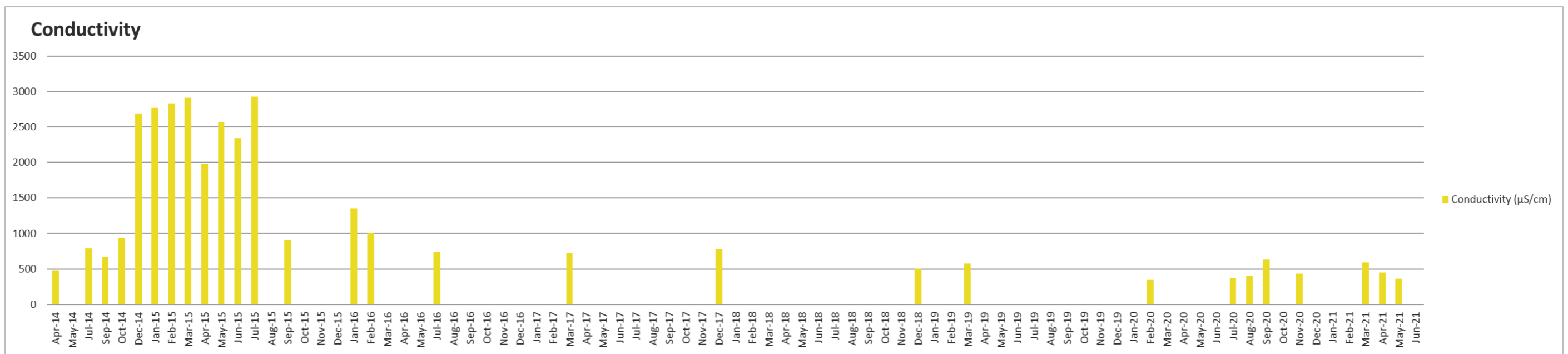


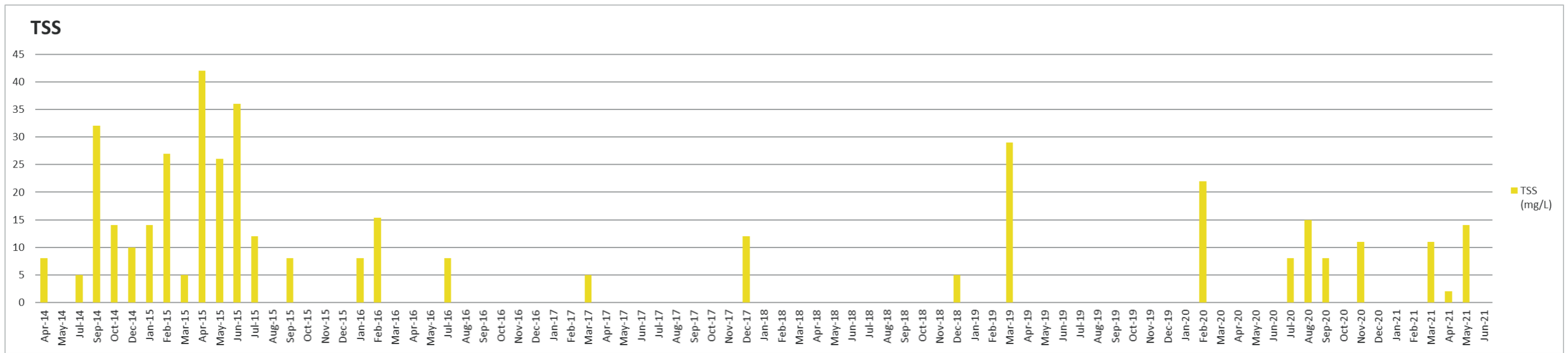
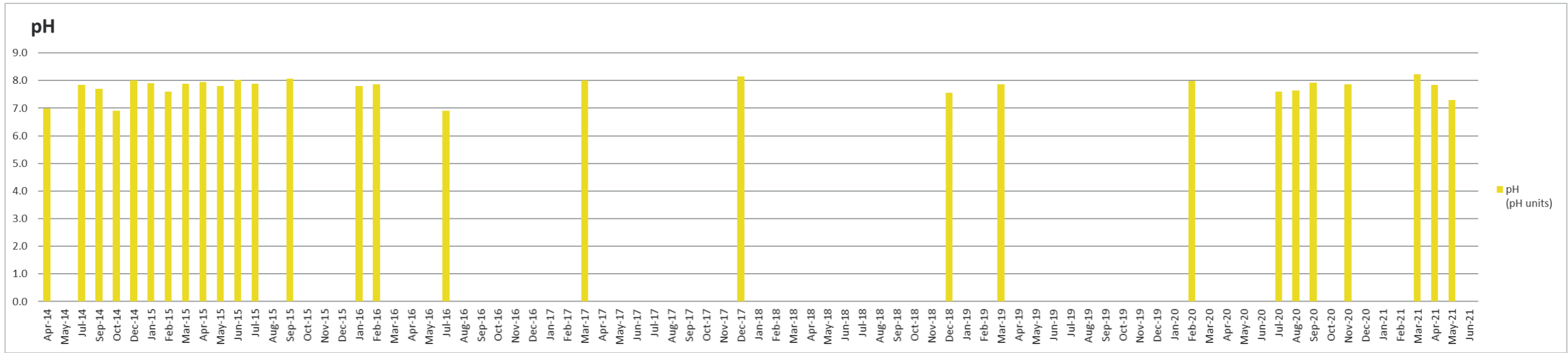
### Water Quality Monitoring Results – Point 24 (Continuous)



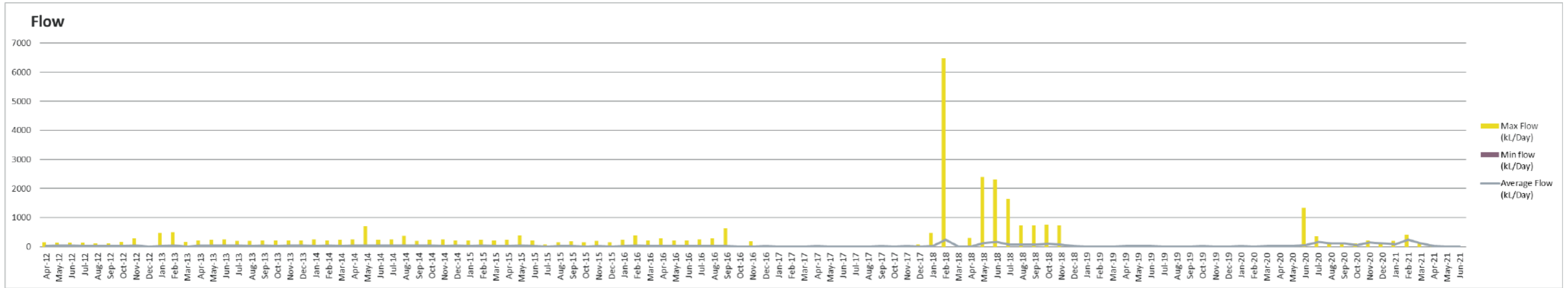


### Water Quality Monitoring Results – Point 36 (when discharging)

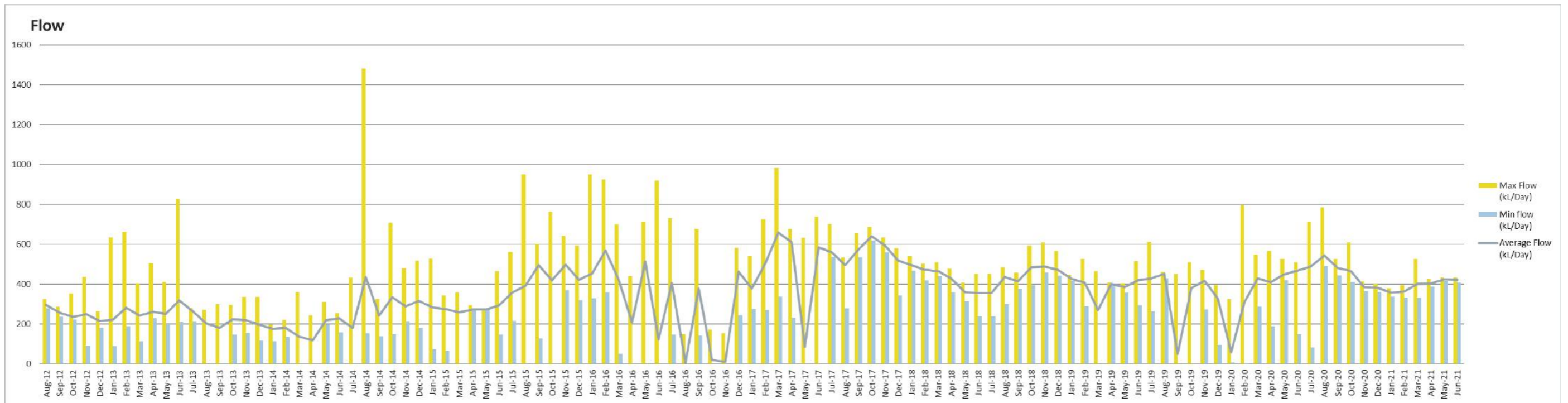




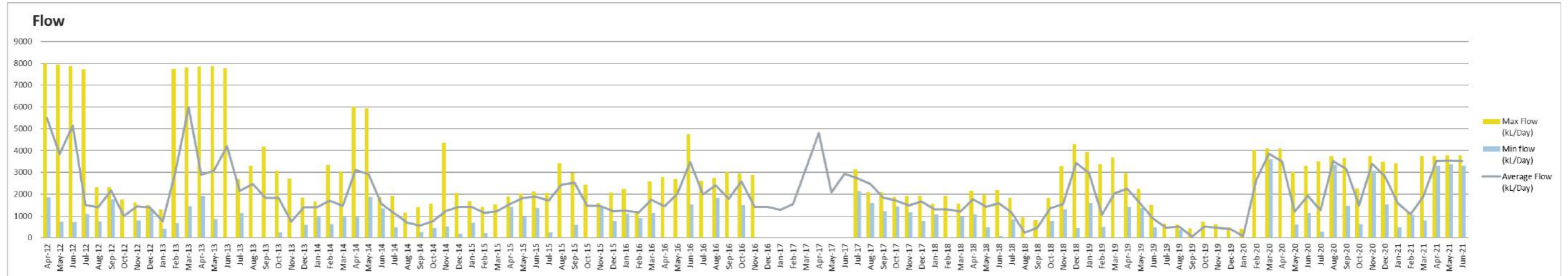
**Volume Monitoring Results – Point 4**



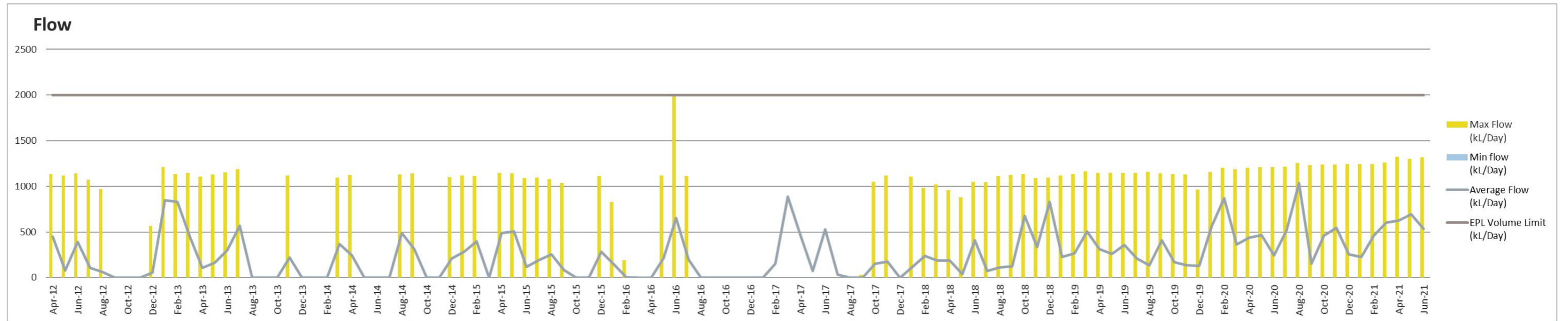
**Volume Monitoring Results – Point 10**



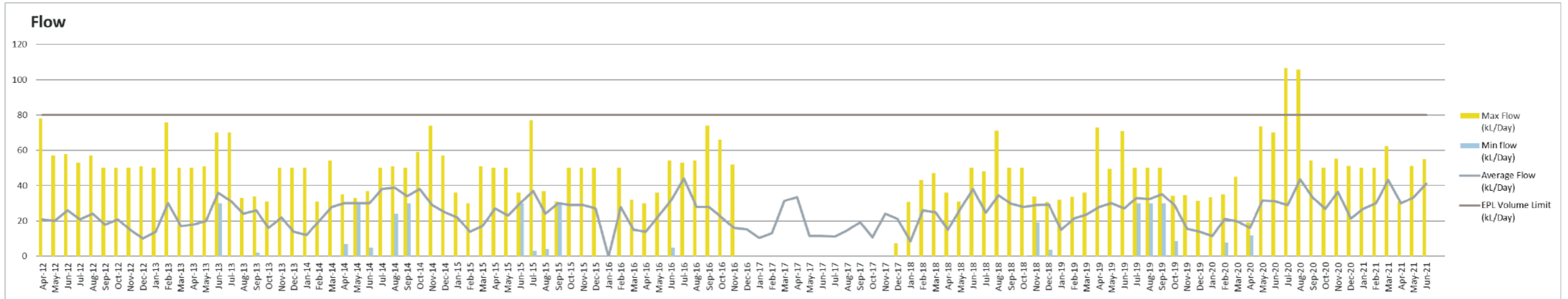
**Volume Monitoring Results – Point 13**



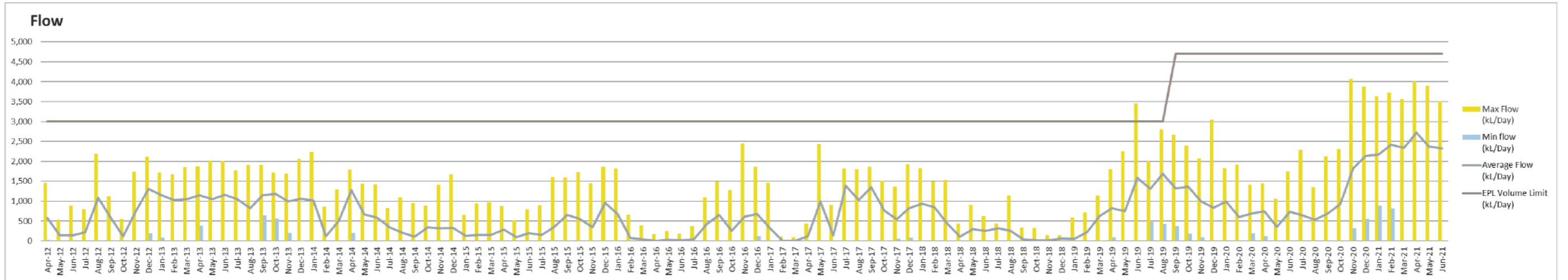
**Volume Monitoring Results – Point 19**



**Volume Monitoring Results – Point 38**



**Volume Monitoring Results – Point 24**



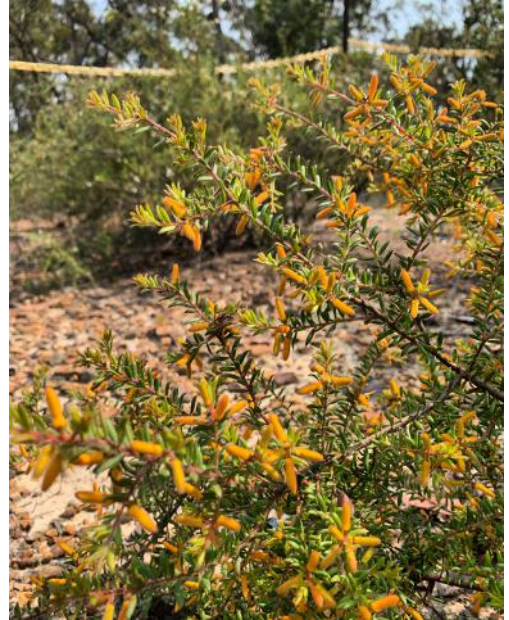


---

**Appendix D: Annual *Persoonia Hirsuta* Condition Monitoring Report**

# **ANNUAL *PERSOONIA HIRSUTA* CONDITION MONITORING REPORT**

Illawarra Metallurgical Coal, 2020 Survey





## CONTENTS

Overview .....	3
Review of previous Surveys .....	3
References .....	9
Appendix A: Rating system used to determine the condition of <i>P. hirsuta</i> individuals .....	10
Appendix B: Records from 2019 .....	11
Appendix C: Persoonia Hirsuta Research Strategy and Status .....	16

## OVERVIEW

Illawarra Metallurgical Coal (IMC) conducted its eight 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 2020, 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 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;

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.

## **CURRENT SURVEY (SPRING 2020)**

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

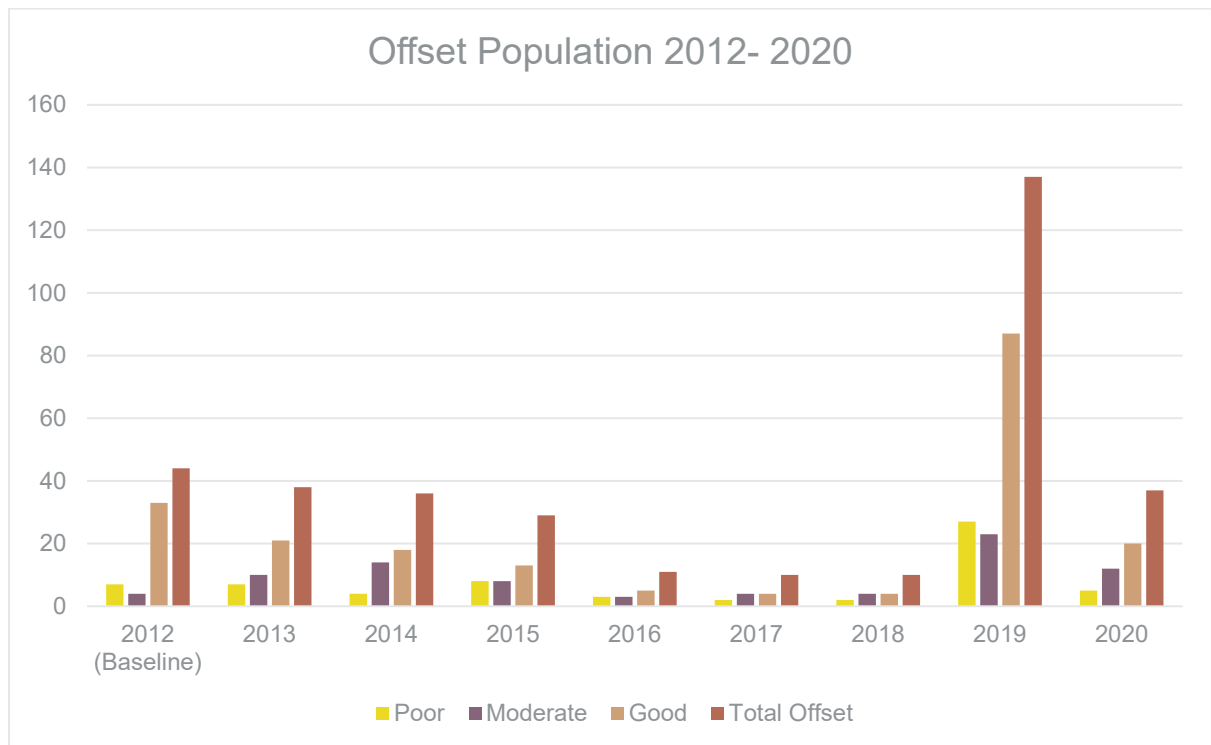
Height was measured using a tape measure, measuring from the ground surface to the highest point on the plant, without physically moving any part of the plant. Condition was defined using a combination of factors, including the percent cover of leaves, colour of leaves and the presence or absence of 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 2020 was nine (cm002, CF001, cm011, DG011, ns006, ns021, ns022, ns025, SH004). Two plants in 2020 had died (DG025 and ns014). One new plant (SH006) was identified in the Offset during the burn survey 2020 and will be added to the monitoring in 2021.
- The additional 126 translocated plants (See Spring 2019 result summary above) have been monitored within the surrounding Appin North lease offset population since 2019 (Figure 1). Please note the new 2020 tags on the individual plants have been updated to match the nursery tags although named according to the naming convention (initials of the person who found them and a number). 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.
- There were 28 individuals of translocated *Persoonia hirsuta* alive in the translocated area in December 2020 (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, PB124).
- The total individuals combined with the offset and translocated population is 38.



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

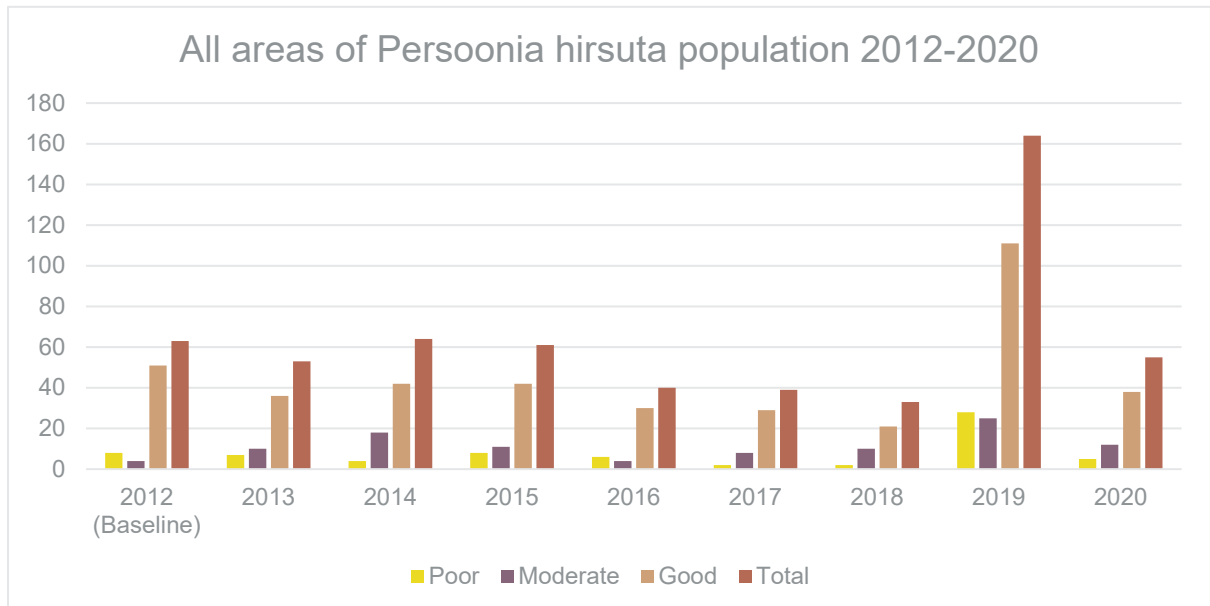
### Appin North Other Areas

- An additional 18 live individuals are being monitored within the surrounding Appin North lease (see Figure 3),
- Nine individuals were taken out of the monitoring in 2020 (DG005, DG022, DG028, DG032, JC002, ns031, SH003, YN001, YN002). This includes the three new individuals that were identified in 2019 within the non-core non-impacted area along the Dam Road are no longer alive or were misidentified as juveniles (SH003, YN001, YN002).

## Total Site Count

- The total count for live *P. hirsuta* plants at Appin North in summer 2020 was 49, including plants that have been identified post-baseline (2012) and the additional 28 plants translocated that are still alive (Figure 2). Excluding these, there has been a decrease of 105 plants in 2020, 98 of the translocated individuals and seven in the non-impacted area along the Dam Road.

The results are tabulated in Appendix B.



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

## Discussion

- The overall health of the core population of *P. hirsuta* is moderate 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. One recruitment of *P. hirsuta* within the burn trial area has been observed to date (SH006).
- 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 allow them growth and have a greater chance of survival.

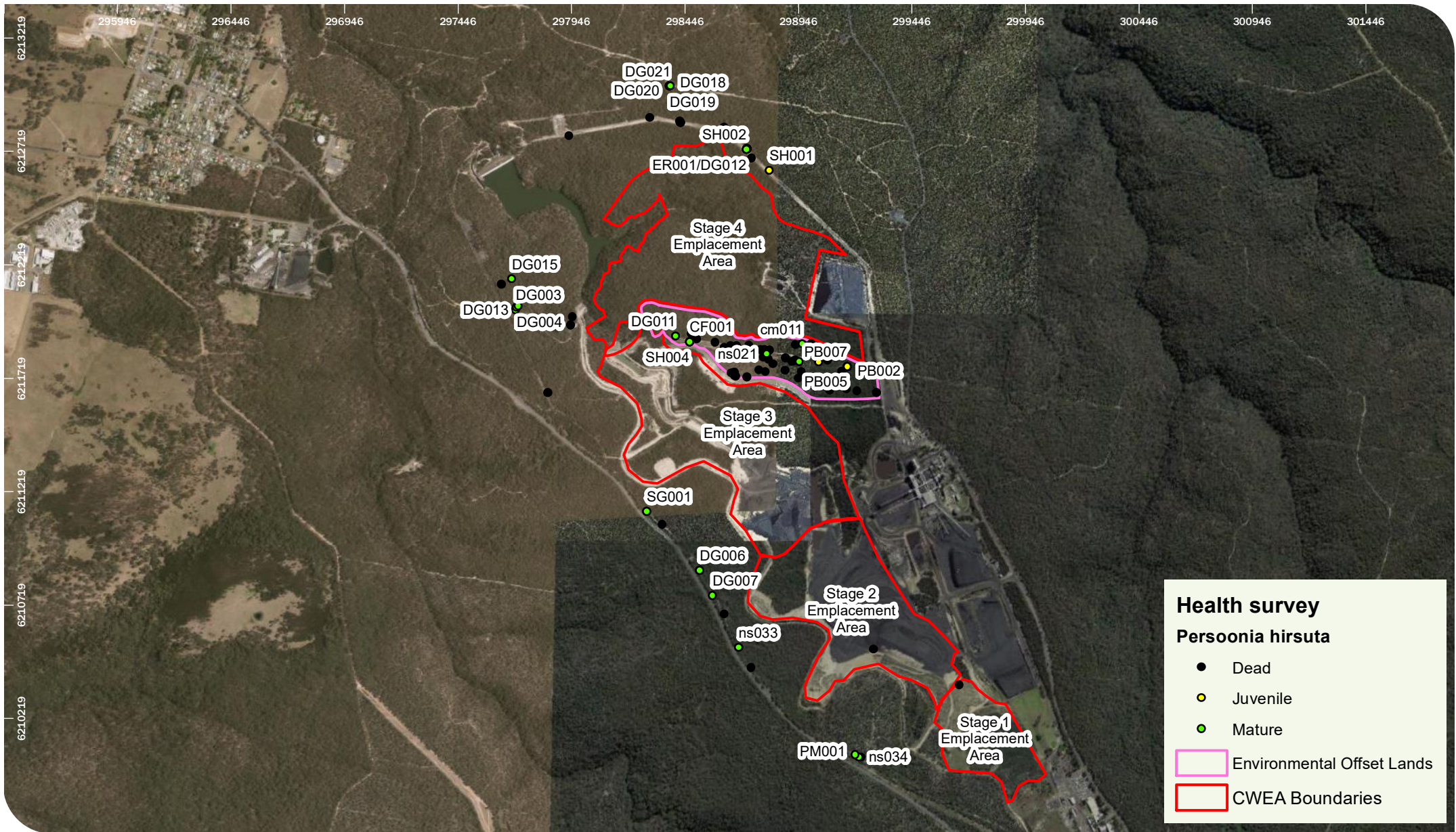
## Ongoing Research and Conservation Management

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.



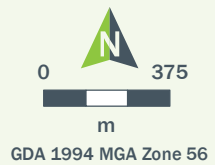
**Health survey**

**Persoonia hirsuta**

- Dead
- Juvenile
- Mature

Environmental Offset Lands

CWEA Boundaries



Niche PM: Sian Griffiths  
 Niche Proj. #: 6021  
 Client: South32 IMC

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

**Figure 1**

Drawn by: Philip Rofe. Last updated: 12/14/2020 3:58:49 PM File: T:\Spatial\Working\6021 - WestCliff\_Monitoring\Maps\Other Maps\6021\_Figure1\_Offset.mxd



## 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 2020

Area	Nursery #	Label	Height (mm)	Width (mm)	Age Class	Condition	E	N
Emplacement Rehab	-	DG023	Dead	Dead	Dead	Dead	299655	6210366
Emplacement Rehab	-	DG033	Dead	Dead	Dead	Dead	299277	6210523
Non core non impacted	-	DG005	Dead	Dead	Dead	Dead	298819	6212634
Non core non impacted	-	DG014	Dead	Dead	Dead	Dead	298718	6212726
Non core non impacted	-	DG017	Dead	Dead	Dead	Dead	298619	6212825
Non core non impacted	-	DG022	Dead	Dead	Dead	Dead	298290	6212866
Non core non impacted	-	DG024	Dead	Dead	Dead	Dead	297935	6212786
Non core non impacted	-	DG027	Dead	Dead	Dead	Dead	298682	6210531
Non core non impacted	-	DG028	Dead	Dead	Dead	Dead	299213	6210048
Non core non impacted	-	DG029	Dead	Dead	Dead	Dead	298619	6210678
Non core non impacted	-	DG031	Dead	Dead	Dead	Dead	298740	6212688
Non core non impacted	-	DG032	Dead	Dead	Dead	Dead	297701	6212019
Non core non impacted	-	JC001	Dead	Dead	Dead	Dead	297704	6212032
Non core non impacted	-	JC002	Dead	Dead	Dead	Dead	298346	6211073
Non core non impacted	-	ns031	Dead	Dead	Dead	Dead	298511	6210872
Non core non impacted	-	ns027	Dead	Dead	Dead	Dead	298568	6210760
Non core non impacted	-	ns028	Dead	Dead	Dead	Dead	299196	6210059
Non core non impacted	-	ns029	Dead	Dead	Dead	Dead	297712	6212037
Non core non impacted	-	ns030	Dead	Dead	Dead	Dead	297943	6211952
Non core non impacted	-	SH003	Dead	Dead	Dead	Dead	297684	6212156
Non core non impacted	-	ns035	Dead	Dead	Dead	Dead	297944	6211953
Non core non impacted	-	YN001	Dead	Dead	Dead	Dead	298644	6212804
Non core non impacted	-	YN002	Dead	Dead	Dead	Dead	298381	6213005
Non core non impacted	-	cm021	Dead	Dead	Dead	Dead	298379	6213004
Non core non impacted	-	SH001	360	150	Juvenile	Excellent	298377	6213006
Non core non impacted	-	SH002	150	180	Juvenile	Excellent	298382	6213005
Non core non impacted	-	DG003	775	1230	Mature	Excellent	297842	6211654
Non core non impacted	-	DG004	425	1060	Mature	Excellent	298422	6212851
Non core non impacted	-	DG006	428	705	Mature	Very good	297951	6211989
Non core non impacted	-	DG007	510	1750	Mature	Excellent	297637	6212132
Non core non impacted	-	DG008	645	1020	Mature	Very good	299223	6210048
Non core non impacted	-	DG013	392	882	Mature	Excellent	298278	6211131
Non core non impacted	-	DG015	523	1142	Mature	Excellent	298718	6212731
Non core non impacted	-	DG018	700	1550	Mature	Very good	298721	6212729
Non core non impacted	-	DG019	350	1150	Mature	Very good	298717	6212727
Non core non impacted	-	DG020	500	1150	Mature	Very good	298719	6212730
Non core non impacted	-	DG021	600	1400	Mature	Very good	298738	6210444
Non core non impacted	-	ER001/DG012	580	1130	Mature	Excellent	298475	6211914
Non core non impacted	-	ns033	330	680	Mature	Excellent	299291	6211655
Non core non impacted	-	ns034	545	1100	Mature	Good	299134	6211714
Non core non impacted	-	PM001	280	700	Mature	Excellent	299073	6211686
Non core non impacted	-	SG001	235	210	Mature	Excellent	299095	6211692
Offset	-	AH001	Dead	Dead	Dead	Dead	299083	6211666
Offset	-	AW001	Dead	Dead	Dead	Dead	298950	6211791
Offset	-	AW002	Dead	Dead	Dead	Dead	298960	6211747

Area	Nursery #	Label	Height (mm)	Width (mm)	Age Class	Condition	E	N
Offset	-	CB004	Dead	Dead	Dead	Dead	298946	6211718
Offset	-	cm001	Dead	Dead	Dead	Dead	298888	6211752
Offset	-	cm003	Dead	Dead	Dead	Dead	298772	6211754
Offset	-	cm004	Dead	Dead	Dead	Dead	298663	6211731
Offset	-	cm005	Dead	Dead	Dead	Dead	298651	6211741
Offset	-	cm006	Dead	Dead	Dead	Dead	298664	6211744
Offset	-	cm007	Dead	Dead	Dead	Dead	298619	6211853
Offset	-	cm009	Dead	Dead	Dead	Dead	298579	6211877
Offset	-	cm010	Dead	Dead	Dead	Dead	299074	6211798
Offset	-	cm012	Dead	Dead	Dead	Dead	298820	6211843
Offset	-	cm013	Dead	Dead	Dead	Dead	298798	6211844
Offset	-	cm014	Dead	Dead	Dead	Dead	298673	6211861
Offset	-	cm015	Dead	Dead	Dead	Dead	298806	6211827
Offset	-	cm016	Dead	Dead	Dead	Dead	298807	6211825
Offset	-	cm017	Dead	Dead	Dead	Dead	298815	6211801
Offset	-	cm018	Dead	Dead	Dead	Dead	298695	6211834
Offset	-	cm019	Dead	Dead	Dead	Dead	298931	6211797
Offset	-	cm020	Dead	Dead	Dead	Dead	299119	6211704
Offset	-	DG001	Dead	Dead	Dead	Dead	299037	6211788
Offset	-	DG002	Dead	Dead	Dead	Dead	298933	6211799
Offset	-	DG009	Dead	Dead	Dead	Dead	298889	6211807
Offset	-	DG025	Dead	Dead	Dead	Dead	298833	6211781
Offset	-	ns001	Dead	Dead	Dead	Dead	298669	6211727
Offset	-	ns002	Dead	Dead	Dead	Dead	298638	6211825
Offset	-	ns003	Dead	Dead	Dead	Dead	298405	6211903
Offset	-	ns004	Dead	Dead	Dead	Dead	298485	6211930
Offset	-	ns005	Dead	Dead	Dead	Dead	298933	6211865
Offset	-	ns007	Dead	Dead	Dead	Dead	298963	6211868
Offset	-	ns008	Dead	Dead	Dead	Dead	299003	6211871
Offset	-	ns009	Dead	Dead	Dead	Dead	299025	6211820
Offset	-	ns010	Dead	Dead	Dead	Dead	299098	6211818
Offset	-	ns011	Dead	Dead	Dead	Dead	298781	6211844
Offset	-	ns012	Dead	Dead	Dead	Dead	298728	6211863
Offset	-	ns013	Dead	Dead	Dead	Dead	299138	6211748
Offset	-	ns015	Dead	Dead	Dead	Dead	298719	6211724
Offset	-	ns017	Dead	Dead	Dead	Dead	298792	6211812
Offset	-	ns018	Dead	Dead	Dead	Dead	298918	6211790
Offset	-	ns020	Dead	Dead	Dead	Dead	299089	6211685
Offset	-	ns024	Dead	Dead	Dead	Dead	298802	6211746
Offset	-	ns026	Dead	Dead	Dead	Dead	299074	6211709
Offset	-	ns014	Dead	Dead	Dead	Dead	299204	6211662
Offset	-	cm008	Dead	Dead	Dead	Dead	299159	6211671
Offset	-	DG010	Dead	Dead	Dead	Dead	298646	6211861
Offset	-	ns019	Dead	Dead	Dead	Dead	298498	6211889
Offset	-	cm002	270	150	Juvenile	Poor	298406	6211903
Offset	-	CF001	620	1380	Mature	Excellent	299074	6211676
Offset	-	cm011	400	710	Mature	Poor	298466	6211878
Offset	-	DG011	670	800	Mature	Excellent	298873	6211924
Offset	-	ns006	650	750	Mature	Poor	298819	6212634
Offset	-	ns021	650	800	Mature	Good	298717	6212727

Area	Nursery #	Label	Height (mm)	Width (mm)	Age Class	Condition	E	N
Offset	-	ns022	750	1050	Mature	Moderate	298427	6212845
Offset	-	ns025	660	1400	Mature	Fairly Poor	298427	6212845
Offset	-	SH004	610	200	Mature	Very Good	298427	6212845
Stage 4	-	ns016	Dead	Dead	Dead	Dead	298466	6211878
Translocated	-	NOTAGE-78	Dead	Dead	Dead	Dead	299162	6211770
Translocated	-	P2017-1049/1-23	Dead	Dead	Dead	Dead	299162	6211770
Translocated	3	PB001	Dead	Dead	Dead	Dead	299162	6211770
Translocated	31	PB003	Dead	Dead	Dead	Dead	299162	6211770
Translocated	106	PB004	Dead	Dead	Dead	Dead	299162	6211770
Translocated	48	PB006	Dead	Dead	Dead	Dead	299162	6211770
Translocated	63	PB009	Dead	Dead	Dead	Dead	299162	6211770
Translocated	35	PB010	Dead	Dead	Dead	Dead	299162	6211770
Translocated	28	PB011	Dead	Dead	Dead	Dead	299162	6211770
Translocated	36	PB012	Dead	Dead	Dead	Dead	299162	6211770
Translocated	33	PB013	Dead	Dead	Dead	Dead	299162	6211770
Translocated	27	PB014	Dead	Dead	Dead	Dead	299162	6211770
Translocated	75	PB015	Dead	Dead	Dead	Dead	299162	6211770
Translocated	2	PB016	Dead	Dead	Dead	Dead	299162	6211770
Translocated	10	PB017	Dead	Dead	Dead	Dead	299162	6211770
Translocated	1	PB018	Dead	Dead	Dead	Dead	299162	6211770
Translocated	102	PB019	Dead	Dead	Dead	Dead	299162	6211770
Translocated	23	PB020	Dead	Dead	Dead	Dead	299162	6211770
Translocated	50	PB021	Dead	Dead	Dead	Dead	299162	6211770
Translocated	64	PB023	Dead	Dead	Dead	Dead	299162	6211770
Translocated	62	PB024	Dead	Dead	Dead	Dead	299162	6211770
Translocated	61	PB026	Dead	Dead	Dead	Dead	299162	6211770
Translocated	14	PB027	Dead	Dead	Dead	Dead	299162	6211770
Translocated	45	PB028	Dead	Dead	Dead	Dead	299162	6211770
Translocated	32	PB029	Dead	Dead	Dead	Dead	299162	6211770
Translocated	63	PB031	Dead	Dead	Dead	Dead	299162	6211770
Translocated	74	PB032	Dead	Dead	Dead	Dead	299162	6211770
Translocated	4	PB033	Dead	Dead	Dead	Dead	299162	6211770
Translocated	76	PB034	Dead	Dead	Dead	Dead	299162	6211770
Translocated	30	PB035	Dead	Dead	Dead	Dead	299162	6211770
Translocated	29	PB036	Dead	Dead	Dead	Dead	299162	6211770
Translocated	35	PB037	Dead	Dead	Dead	Dead	299162	6211770
Translocated	26	PB040	Dead	Dead	Dead	Dead	299162	6211770
Translocated	58	PB041	Dead	Dead	Dead	Dead	299162	6211770
Translocated	30	PB042	Dead	Dead	Dead	Dead	299162	6211770
Translocated	40	PB043	Dead	Dead	Dead	Dead	299162	6211770
Translocated	44	PB044	Dead	Dead	Dead	Dead	299162	6211770
Translocated	5	PB048	Dead	Dead	Dead	Dead	299162	6211770
Translocated	65	PB049	Dead	Dead	Dead	Dead	299162	6211770
Translocated	7	PB050	Dead	Dead	Dead	Dead	299162	6211770
Translocated	24	PB051	Dead	Dead	Dead	Dead	299162	6211770
Translocated	56	PB055	Dead	Dead	Dead	Dead	299162	6211770
Translocated	57	PB056	Dead	Dead	Dead	Dead	299162	6211770
Translocated	3	PB057	Dead	Dead	Dead	Dead	299162	6211770
Translocated	60	PB058	Dead	Dead	Dead	Dead	299162	6211770
Translocated	39	PB059	Dead	Dead	Dead	Dead	299162	6211770

Area	Nursery #	Label	Height (mm)	Width (mm)	Age Class	Condition	E	N
Translocated	22	PB061	Dead	Dead	Dead	Dead	299162	6211770
Translocated	6	PB063	Dead	Dead	Dead	Dead	299162	6211770
Translocated	9	PB065	Dead	Dead	Dead	Dead	299162	6211770
Translocated	11	PB066	Dead	Dead	Dead	Dead	299162	6211770
Translocated	115	PB067	Dead	Dead	Dead	Dead	299162	6211770
Translocated	121	PB068	Dead	Dead	Dead	Dead	299162	6211770
Translocated	48	PB069	Dead	Dead	Dead	Dead	299162	6211770
Translocated	51	PB071	Dead	Dead	Dead	Dead	299162	6211770
Translocated	59	PB072	Dead	Dead	Dead	Dead	299162	6211770
Translocated	24	PB073	Dead	Dead	Dead	Dead	299162	6211770
Translocated	38	PB074	Dead	Dead	Dead	Dead	299162	6211770
Translocated	71	PB079	Dead	Dead	Dead	Dead	299162	6211770
Translocated	20	PB080	Dead	Dead	Dead	Dead	299162	6211770
Translocated	14	PB081	Dead	Dead	Dead	Dead	299162	6211770
Translocated	85	PB082	Dead	Dead	Dead	Dead	299162	6211770
Translocated	25	PB083	Dead	Dead	Dead	Dead	299162	6211770
Translocated	118	PB084	Dead	Dead	Dead	Dead	299162	6211770
Translocated	38	PB085	Dead	Dead	Dead	Dead	299162	6211770
Translocated	43	PB086	Dead	Dead	Dead	Dead	299162	6211770
Translocated	102	PB087	Dead	Dead	Dead	Dead	299162	6211770
Translocated	52	PB089	Dead	Dead	Dead	Dead	299162	6211770
Translocated	29	PB091	Dead	Dead	Dead	Dead	299162	6211770
Translocated	49	PB092	Dead	Dead	Dead	Dead	299162	6211770
Translocated	26	PB094	Dead	Dead	Dead	Dead	299162	6211770
Translocated	111	PB095	Dead	Dead	Dead	Dead	299162	6211770
Translocated	103	PB096	Dead	Dead	Dead	Dead	299162	6211770
Translocated	15	PB097	Dead	Dead	Dead	Dead	299162	6211770
Translocated	114	PB098	Dead	Dead	Dead	Dead	299162	6211770
Translocated	112	PB099	Dead	Dead	Dead	Dead	299162	6211770
Translocated	18	PB100	Dead	Dead	Dead	Dead	299162	6211770
Translocated	41	PB101	Dead	Dead	Dead	Dead	299162	6211770
Translocated	31	PB102	Dead	Dead	Dead	Dead	299162	6211770
Translocated	33	PB104	Dead	Dead	Dead	Dead	299162	6211770
Translocated	7	PB105	Dead	Dead	Dead	Dead	299162	6211770
Translocated	54	PB106	Dead	Dead	Dead	Dead	299162	6211770
Translocated	36	PB107	Dead	Dead	Dead	Dead	299162	6211770
Translocated	27	PB108	Dead	Dead	Dead	Dead	299162	6211770
Translocated	119	PB109	Dead	Dead	Dead	Dead	299162	6211770
Translocated	117	PB110	Dead	Dead	Dead	Dead	299162	6211770
Translocated	64	PB111	Dead	Dead	Dead	Dead	299162	6211770
Translocated	16	PB112	Dead	Dead	Dead	Dead	299162	6211770
Translocated	13	PB114	Dead	Dead	Dead	Dead	299162	6211770
Translocated	21	PB115	Dead	Dead	Dead	Dead	299162	6211770
Translocated	8	PB116	Dead	Dead	Dead	Dead	299162	6211770
Translocated	37	PB117	Dead	Dead	Dead	Dead	299162	6211770
Translocated	46	PB118	Dead	Dead	Dead	Dead	299162	6211770
Translocated	53	PB119	Dead	Dead	Dead	Dead	299162	6211770
Translocated	42	PB120	Dead	Dead	Dead	Dead	299162	6211770
Translocated	47	PB121	Dead	Dead	Dead	Dead	299162	6211770
Translocated	9	PB122	Dead	Dead	Dead	Dead	299162	6211770

Area	Nursery #	Label	Height (mm)	Width (mm)	Age Class	Condition	E	N
Translocated	6	PB123	Dead	Dead	Dead	Dead	299162	6211770
Translocated	19	PB125	Dead	Dead	Dead	Dead	299162	6211770
Translocated	107	PB126	Dead	Dead	Dead	Dead	299162	6211770
Translocated	12	PB127	Dead	Dead	Dead	Dead	299162	6211770
Translocated	55	PB002	315	110	Juvenile	Very Good	299162	6211770
Translocated	34	PB005	370	110	Juvenile	Very Good	299162	6211770
Translocated	11	PB007	240	180	Juvenile	Moderate	299162	6211770
Translocated	12	PB008	615	200	Juvenile	Very Good	299162	6211770
Translocated	20	PB022	270	130	Juvenile	Good	299162	6211770
Translocated	1	PB025	560	240	Juvenile	Very Good	299162	6211770
Translocated	87	PB030	340	210	Juvenile	Very Good	299162	6211770
Translocated	44	PB038	150	140	Juvenile	Moderate	299162	6211770
Translocated	2	PB039	360	170	Juvenile	Good	299162	6211770
Translocated	105	PB045	240	90	Juvenile	Good	299162	6211770
Translocated	18	PB046	360	160	Juvenile	Very Good	299162	6211770
Translocated	52	PB047	160	50	Juvenile	Good	299162	6211770
Translocated	41	PB052	210	150	Juvenile	Moderate	299162	6211770
Translocated	16	PB053	510	160	Juvenile	Very Good	299162	6211770
Translocated	50	PB054	310	160	Juvenile	Very Good	299162	6211770
Translocated	40	PB060	250	100	Juvenile	Moderate	299162	6211770
Translocated	42	PB062	310	120	Juvenile	Moderate	299162	6211770
Translocated	61	PB064	390	240	Juvenile	Very Good	299162	6211770
Translocated	32	PB070	240	90	Juvenile	Moderate	299162	6211770
Translocated	4	PB075	110	90	Juvenile	Moderate	299162	6211770
Translocated	21	PB076	270	120	Juvenile	Moderate	299162	6211770
Translocated	108	PB077	230	120	Juvenile	Moderate	299162	6211770
Translocated	34	PB088	410	200	Juvenile	Very Good	299162	6211770
Translocated	55	PB090	260	100	Juvenile	Good	299162	6211770
Translocated	17	PB093	110	100	Juvenile	Good	299162	6211770
Translocated	13	PB103	270	100	Juvenile	Fairly Poor	299162	6211770
Translocated	82	PB113	130	50	Juvenile	Moderate	299162	6211770
Translocated	5	PB124	430	140	Juvenile	Moderate	299162	6211770

## 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
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>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. The next stage will involve translocations of plants grown from seed in the nursery 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> seedlings recorded in 2020.
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



---

**Appendix E: 2020/21 Appin West BioBank Site Annual Report**



**Landcare Australia**

**Annual Report for the  
NSW Biodiversity Conservation Trust  
August 2020 to August 2021**

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

## Contents

<b>1. BioBanking Annual Reporting Table.....</b>	<b>3</b>
<b>2. Photo Points.....</b>	<b>8</b>
<b>3. Results of the inspections required by the BioBanking Agreement.....</b>	<b>21</b>
<b>4. Site visit April, August, October and Novmber 2019, May and August 2020 .....</b>	<b>22</b>
4.1. Weeds.....	22
4.2. Fire .....	23
4.3. Pest Animals .....	24

## 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: 19 August 2021		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	Site visits for this reporting period, include:  3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021  Additional site visit planned for June 2021, which had to be postponed due to COVID19 Sydney lockdown restrictions.	No stock observed in all management zones on each site visit.  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.	No other observed evidence of grazing, trampling or other traces of stock animals.
2. Weed control	Ongoing – (minimum	Yes	Site visits for this reporting period, include	Weed control at MZ1, MZ2, MZ3 and Transmission Line (TL) easement and edges of MZ6 and MZ7 adjoining easement on each	Ongoing herbicide treatment required in MZ1, MZ2, MZ3 and the transmission line easement for Blue Periwinkle, Paterson’s Curse, Bridal Creeper,

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

	4 times per year)		<p>3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021</p> <p>Additional site visit planned for June 2021, which had to be postponed due to COVID19 Sydney lockdown restrictions.</p>	<p>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>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 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 herbicide used at each visit is available (if required).</p> <p>Slashing in the TL was planned for July 2021, however this was postponed due to COVID19 lockdown restrictions in Sydney and has been rescheduled for August/September 2021.</p>	<p>African Lovegrass, Stinking Roger, 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>
<b>3. Management of fire for conservation</b>	Ongoing	Yes	<p>Quarterly site visits.</p>	<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 <i>Acacia</i> spp. (predominantly <i>A. decurrens</i>) in MZ1, MZ2 and MZ7.</p> <p>Fuel loads vary in all Management Zones but are at least 20 tonnes per hectare or greater across the site.</p>
<b>4. Management of human disturbance</b>	Ongoing	Yes	<p>Quarterly site visits.</p>	<p>Signage and fencing as per the BBA are in good working order.</p> <p>No additional waste has been observed on the site during the site visits this year.</p>	<p>Access for management purposes includes South32 and Landcare Australia (land management contractor) staff.</p>



BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting


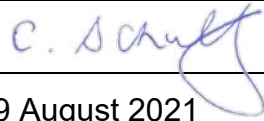
					<p>There is no ability for stock or unauthorized motor vehicles to access the site with the current exclusion fencing in place.</p> <p>Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts would be reported to South32 and the BCT as per BBA.</p>
<b>5. Retention of native vegetation</b>	Ongoing	Yes	Quarterly site visits.	There was no other evidence of vegetation being killed, destroyed or poisoned onsite during this reporting period.	No evidence or observation of recent ringbarking or tree felling onsite, except for the reported incident in August 2019 during the previous reporting period.
<b>6. Planting or seeding - maintenance</b>	Ongoing	Yes	Quarterly site visits	<p>As per the Section 6.6 of the BBA, a planting program was 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>Success rate in survivability of the canopy species planted since the drought has declined in the past 12 months to approx. 50%. The seedlings are being significantly grazed by native and non-native herbivores on the site (see Section 10, below).</p>	Soil moisture levels were monitored at each site visit at MZ3 to ensure ongoing viability of the seedlings.
<b>7. Retention of dead timber</b>	Ongoing	Yes	Quarterly site visits	There is no evidence that dead timber has been removed from the site in this reporting period.	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.

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

<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.	<p>Fox scats were observed within in the TL and MZ1 and MZ2 in the previous reporting period.</p> <p>No goat scats have been observed during any site visits.</p> <p>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 LA at Douglas Park</p>	<p>Following liaison with Greater Sydney Region LLS the site is currently included in the regional Spring and Autumn fox baiting program due the presence of fox scats and observations at the site.</p> <p>The pest management plan is due for review between 2021 and 2023 as per Annexure C of the BBA. Initial discussions between EC and LA have been held in regards to the review of the pest management plan.</p>
<b>12. Nutrient control</b>	Ongoing	Yes	Quarterly site visits.	Nil	No fertilizers 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	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.
<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>		
Nil			N/A		
Nil			N/A		
<b>Records submitted with this report</b>					
<input checked="" type="checkbox"/> Photographs taken at the photo points set in the BioBanking agreement – see attached - <i>Please note: The 2021 photopoints will be submitted at a later date when current restrictions are eased and LA staff can access the site as discussed and approved by Martin Bremner from the BCT in August 2021</i>					
<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













BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

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: 19 August 2021	Date: 19 August 2021

## 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).

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP#	Dire ctio n	23-25 October 2017	February 2018	February 2019	July 2020
PP1	N				
PP1	E				
PP1	S				


BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP1	W				
PP2	N				
PP2	E				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

<b>PP2</b>	<b>S</b>					
<b>PP2</b>	<b>W</b>					
<b>PP3</b>	<b>N</b>					

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP3	E				
PP3	S				
PP3	W				



BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP4	N				
PP4	E				
PP4	S				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP4	W				
PP5	N				
PP5	E				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP5	S				
PP5	W				
PP6	N				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP6	E				
PP6	S				
PP6	W				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP7	N				
PP7	E				
PP7	S				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP7	W				
PP8	N				
PP8	E				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

PP8	S				
PP8	W				
PP9	N				

BioBanking Agreement 215 - Annual Report (2020 – 2021), Photo Points, Inspections, Monitoring and Reporting

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 4 years due to the installation of the exclusion fencing (refer to photopoints for further detail) heavy rainfall in the region in 2020 has increased growth of existing groundcover (and weed species).*
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.*
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 at 12 Dec 2020 and 27 April 2021 the site fencing was maintained.*
  - b. *Currently maintained to a standard to control human disturbance and inspected annually:*
    - *As at 12 Dec 2020 and 27 April 2021 the site fencing was maintained.*
  - c. *Currently maintained at a standard to control feral or overabundant herbivores and/or vertebrate pests and inspected annually (inspected 12 Dec 2020 and 27 April 2021). Whilst the existing fencing is adequate to ensure stock exclusion, the fencing will not prevent native and non-native herbivores from accessing the site.*
4. *Records of any human disturbance on the biobank site – (reporting 6 monthly) – No human disturbance observed at the site on 8 Oct 2020 and 27 April 2021.*
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 on 8 Oct 2020 and 27 April 2021).*
6. *Evidence of Waste – (reporting 6 monthly) – No evidence of additional or new waste was observed during the site visits on 8 Oct 2020 and 27 April 2021.*

#### 4. Site visits - September 2020 (Annual Site Audit), October 2020, November 2020, December 2020, February 2021, March 2021 and April 2021

##### 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>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	Treatment of exotic weeds and grasses with herbicide spot spraying and hand pulling of weeds.
<b>MZ2</b>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	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>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	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>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	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 and hand-pulling of weeds inside tree guards. Specific supplementary watering of tubestock on 8 Oct 2020.
<b>MZ4</b>		Management zone not visited: no access due to high-risk cliffs. No weeds observed in adjacent management zones.
<b>MZ5</b>		Management zone not visited: no access due to high-risk cliffs. No weeds observed in adjacent management zones.
<b>MZ6</b>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	Undertaken in conjunction with weed control works in MZ7. Maintenance sweep targeting key weed threats, concentrating along existing tracks.
<b>MZ7</b>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 March 2021 27 April 2021	Undertaken in conjunction with weed control works at MZ6. Maintenance sweep targeting key weed threats, concentrating along existing tracks.

Diary template for weed control management			
Date	Management Zone	Description and type of activity undertaken or observation made	Minor variations (details and reasons)
8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	<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>);</li> <li>- Small-leaved Privet (<i>Ligustrum sinense</i>); and</li> <li>- Stinking Roger (<i>Tagetes minuta</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 was planned to be slashed in July 2021 to improve efficiency of weed treatment in this zone, however this has been postponed due to recent COVID19 lockdown restrictions in Sydney and is planned for late August or September 2021
8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	<b>MZ 6 and 7</b>	Quarterly maintenance weeds sweeps ongoing. Occasional spot spraying of African Lovegrass in these zones	Ongoing observation in these Zones
3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	<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 regional fox baiting program in Spring and Autumn. The site was baited using Canid Pest Ejectors in Autumn 2020 with no baits triggered.

## 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>	8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	No evidence of recent fire activity during site visit (Management report suggests last burn was in 2004).  <i>Acacia</i> spp. in MZ 2 and MZ 7 continue to exhibit senescence. Fuel loads approx. 20 tonnes per hectare on average.

<b>Diary template for fire management activities</b>			
<b>Date</b>	<b>Management Zone</b>	<b>Description and type of activity undertaken or observation made</b>	<b>Minor variations (details and reasons)</b>
3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	MZ 1, 2, 3, TL, 6, 7	No fire management activities undertaken except for opportunistic observation during weeding activities and during the annual site audit inspection on 3 Sept 2020.	N/A

### 4.3. Pest Animals

<b>1. Template for reporting of monitoring activities</b>		
<b>Management Zone</b>	<b>Date</b>	<b>Current level of impact on vegetation</b> This column must record impacts as Negligible, Minimal, Moderate or High
<b>MZ 1, 2, 3, TL, 6, 7</b>	3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	Minimal grazing by native herbivores in all zones except MZ3.  Heavy grazing of seedlings planted in this zone. All seedling with growth above the corflute guards have been impacted by native or non-native herbivores (macropods and possibly feral goats – although no scats have been observed in the MZs).

<b>Diary template for feral and overabundant herbivore management</b>			
<b>Date</b>	<b>Management Zone</b>	<b>Description and type of activity undertaken</b> This column must include details of the feral and overabundant herbivores targeted, control techniques, and numbers controlled.	<b>Minor variations (details and reasons)</b>
14 Oct 2020 20 Oct 2020 28 Oct 2020 6 Nov 2020	<b>MZ2 and TL</b>	GS LLS regional fox baiting program conducted by LA on site in Spring 2020.	Due to an administrative error Fox Baiting was not conducted in Autumn 2021 at the site as it was not listed in the schedule of baiting locations. The program will continue again in Spring 2021.
3 Sept 2020 8 Oct 2020 12 Dec 2020 25 Feb 2021 4 Mar 2021 27 Apr 2021	<b>All</b>	Opportunistic observation was undertaken during weeding activities and also during the annual site audit inspection on 3 Sept 2020.	N/A



---

**Appendix F: 2020/21 Ventilation Shaft No.6 Offset Annual Monitoring Report**



**Landcare Australia**

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

**August 2020**

## Document Control

### Project Name

APPIN VENT SHAFT 6 BUSH REGENERATION REPORT FOR SOUTH32

		Date
<b>Prepared by</b>	Dimi Ratnayaka	26/8/2020
<b>Approved by</b>	Rob Porter	27/08/2020

### 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.

Landcare Australia Pty Ltd has prepared this report for South32 and accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this document and its supporting material by any third party. Information provided is not intended to be a substitute for site-specific assessment or legal advice in relation to any matter.

# 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.

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 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 and left onsite.
	Maintenance	Woody and Herbaceous	Follow-up spot spraying 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.

Table 1: Description of work

Notes:

- All spraying utilised a 1% solution of Roundup Biactive, Grazon (for selected woody weeds) or 10% solution of Associate Nufarm for brush and broad-leaf weeds.



- All cut/scrape and painting or drill stem injection was done using neat Roundup Biactive and a marker dye.
- Refer to the attached map for location of areas treated for both primary and maintenance weed control.

### 3. Comments

#### 3.1. Management Issues:

Previous erosion observed to the unnamed creek in MZ5 running east to west (refer to blue highlighted area on the map for location details).

Both management zones are impacted significantly 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 three quarterly site visits on the following dates in 2020, including:

- 17 March
- 18 May
- 2 July

A further seven (7) site visit are planned between Sept 2020 and June 2021. 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.

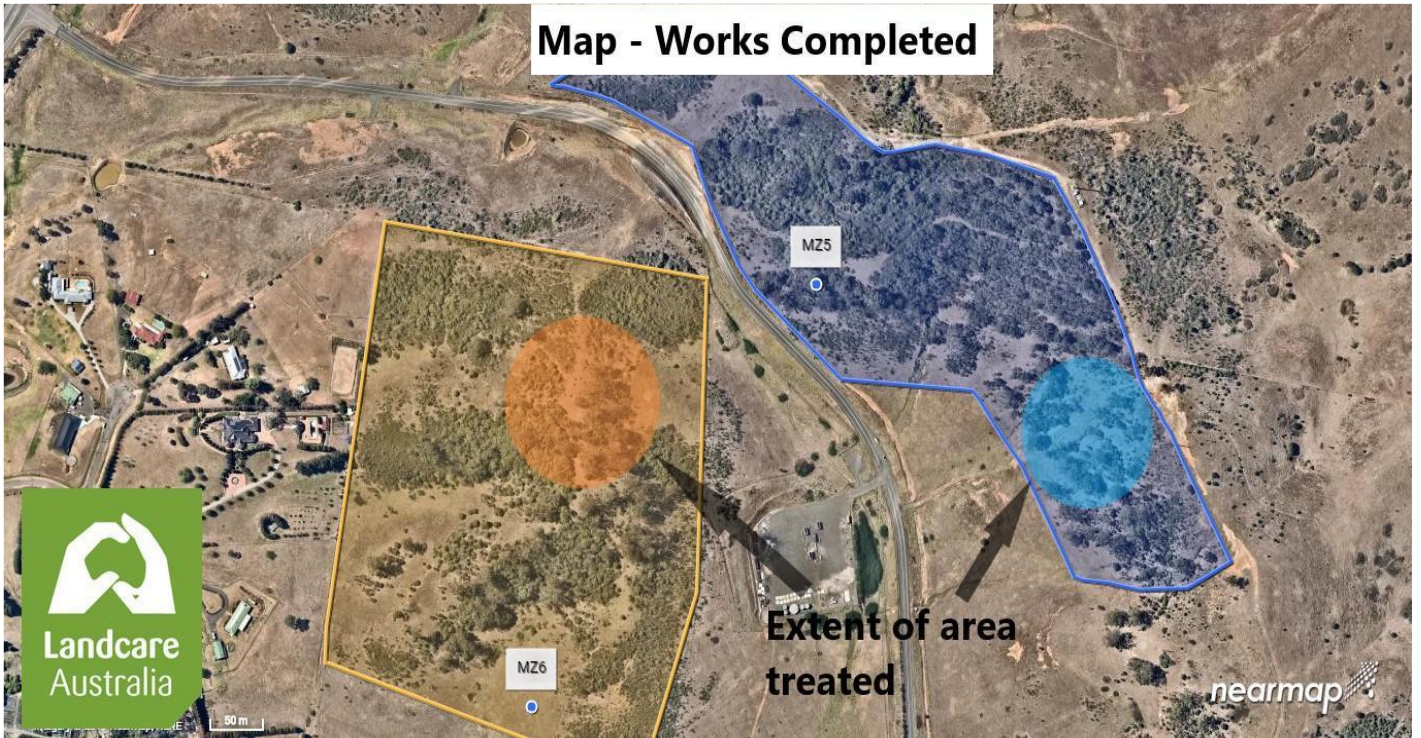
### 4. Weed Species Identified and Treated within MZ 5 and MZ 6

Scientific Name	Common Name
<b>Herbaceous</b>	
<i>Brassica spp.</i>	Know by various common names
<i>Cirsium vulgare</i>	Spear thistle
<i>Conyza spp.</i>	Fleabane
<i>Echium plantagineum</i>	Paterson's curse
<i>Verbena bonariensis</i>	Purpletop
<i>Eragrostis curvula</i>	African lovegrass
<i>Lysimachia arvensis</i>	Scarlet Pimpernel
<i>Gomphocarpus fruticosus</i>	Narrow-leaf cotton bush
<i>Pennisetum clandestinum</i>	Kikuyu
<i>Solanum spp</i>	Nightshade
<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



---

**Appendix G: 2020/21 Nepean River BioBank Site Annual Report**



**Landcare Australia**

**Annual Report for the  
Biodiversity Conservation Trust  
September 2020 to September 2021**

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

## Contents

1. BioBanking Annual Reporting Table .....	3
2. Photo Points.....	11
3. Results of the inspections required by the BioBanking Agreement .....	18
4. Landcare Australia Site Visits.....	19
4.1. Weeds.....	19
4.2. Fire .....	20
4.3. Native herbivores.....	20
4.4. Vertebrate (feral) pests .....	21
4.5. Nest boxes .....	22

## 1. BioBanking Annual Reporting Table

BioBank Site Annual Report					
Location Details					
<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: 2 September 2021</b>		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
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)
<b>1. Management of grazing for conservation</b>	Ongoing	Yes	Recorded at the following site visits including:  3 Sept 2020 1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	No stock observed in all management zones on each site visit or during the annual audit inspection.  Grazing by stock animals continues to occur on the properties to the east, north and south of the site.	No evidence of grazing, trampling or other traces of stock animals in the reporting period.
<b>2. Weed control</b>	Ongoing – (4 times per year)	Yes	Quarterly site visits, including:  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021 8 July 2021*	Weed control at Management Zone (MZ) 1 and MZ2 spot spraying using herbicide and hand-pulling of species listed in BioBanking Agreement (BBA) 382.  Infestation of Prickly Pear in MZ1 and MZ2 not listed in the BBA. However, approx. 80% of existing Prickly Pear population has been removed to date. Broadacre	Additional herbicide treatment required in MZ1 and MZ2. African Lovegrass, Stinking Roger, various Thistle, Fleabane, Blackberry, Prickly Pear and woody species such as African Boxthorn still persist on the site. The above average rainfall in the summer of 2020 and 2021 resulted in higher densities of these weed species in MZ1 and MZ2.

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: 2 September 2021		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
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)
				<p>treatment with a quick spray unit was undertaken in MZ1 and MZ2 using selective herbicides to control other woody weed species such as African Boxthorn.</p> <p>Maintenance sweeps for key weed threats through MZ3 and the accessible parts of MZ4. No access permitted to MZ5 due to the high cliffs and gorges. No significant weed issues observed in these zones during maintenance sweeps.</p> <p>Herbicides have been used on the BioBanking site at the quarterly site visits and during seedling planting prep 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 of the eastern planting area of MZ1 in May 2021 has reduced the capacity for taller weed species such as</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> <p>It was observed that native species such as Kangaroo Grass is increasing in density in</p>

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: 2 September 2021		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
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)
				Stinking Roger to suppress light availability to the seedlings.	MZ1 east as result of the annual slashing in this area.  <i>*Please note the 8 July 2021 weed sweep was postponed due to current Covid -19 restrictions in Greater Sydney Region.</i>
<b>3. Management of fire for conservation</b>	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	No evidence of recent fire activity during site visits (BBA suggests no burn as far back as 1962).  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.	Fuel loads vary in all management zones but are at least 20-25 tonnes per hectare or greater across the site.
<b>4. Management of human disturbance</b>	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	Signage and fencing as per the BBA are in good working order.  No additional waste has been observed on the site during the site visits this year.  There has been no observations or evidence of incursions onto the site from the neighbouring properties.	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.



<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: 2 September 2021</b>		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
<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 (including reference to management zones), any variations and the reasons for variation.</b>	<b>Visual observations and other comments (including reasons for non-completion)</b>
					Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions.
<b>5. Retention of native vegetation</b>	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	There was no evidence of native vegetation being removed or poisoned onsite.	No evidence or observation of recent ringbarking or tree felling on the site.
<b>6. Planting or seeding</b>	May/June 2020	Yes	June 2020.	Success rate in survivability of the canopy and shrub layer species planted in June 2020 in MZ1 is approx. 70-80%. However due to the heavy grazing by goats the seedlings are unable to grow beyond the height of the tree guards (450mm) (refer to Section 10 below).  Currently there is approx. 65% success rate in survivability in the western section of MZ1 (planted in Autumn 2019) following from the drought conditions in the summer of 2019. More recent above	Soil moisture levels were monitored at each site visit to ensure ongoing viability of the seedlings.

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: 2 September 2021		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
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)
				average rainfall has allowed those plants remaining to grow significantly in this reporting period.	
7. Retention of dead timber	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	There is no evidence that dead timber has been 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.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021	No areas identified across the site which currently require any supplementary erosion control or stabilisation.	Observations made during maintenance sweeps for all accessible zones during quarterly sites visits.
9. Retention of rocks	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021	No rock removal has occurred on the site since the commencement of the BBA.	Site monitored for rock removal at quarterly site visits to the accessible management zones.


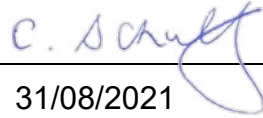
BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

<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: 2 September 2021</b>		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
<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)
			11 May 2021		
<b>10. Control of feral and overabundant native herbivores</b>	Ongoing	Yes	Quarterly site visits.  1 Dec 2020 18 Feb 2021 14 Mar 2021 11 May 2021  During six monthly fox baiting program including:  Sept 2020 May 2021	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 activated trail cameras on numerous occasions during the six monthly fox and wild dog control program.  A plan has been developed with Greater Sydney Local Land Service (GS LLS) and Landcare Australia to capture and remove feral goats from the site commencing in Sept/Oct 2021 subject to land owner approval and funding.	Feral goats have had a significant impact on the seedlings planted in MZ1 eastern sections. Approx. 95% of all seedlings above the height of the corflute guards have been grazed by feral goats (as observed onsite by Landcare Australia staff).
<b>11. Vertebrate pest management</b>	Ongoing Autumn and Spring	Yes	Candid Pest Ejector (CPE) program completed in Spring	CPEs with lures and 1080 capsules were installed at two sites in MZ3, each with trail cameras within the vicinity to record any activity around each of the CPEs.	CPE sites were visited at least weekly to check the integrity of the lure and capsule and retrieve camera footage (Sept 2020 and May 2021).

<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: 2 September 2021</b>		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
<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 (including reference to management zones), any variations and the reasons for variation.</b>	<b>Visual observations and other comments (including reasons for non-completion)</b>
			2020 and Autumn 2021.		Foxes had activated two (2) ejectors each in Spring 2020 and also in Autumn 2021.  At the completion of both programs all CPEs and trail cameras were removed from site as per the GS LLS spring and autumn fox and wild dog baiting program.
<b>12. Nutrient control</b>	Ongoing	Yes	Ongoing	N/A	No fertilizers (except for diluted seasol 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>		
N/A			N/A		
<b>Records submitted with this report</b>					
<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					

BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

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: 2 September 2021		Property address: 1025 and 1235 Menangle Rd, Douglas Park			
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)
<input checked="" type="checkbox"/> Results of any monitoring, inspections, surveys required in Annexures C and D to the BioBanking agreement – see attached					
<input checked="" type="checkbox"/> Photographs taken at the photo points set in the BioBanking agreement – see attached - <i>Please note: The year three (2021) photopoints will be submitted at a later date when current restrictions are eased and Landcare Australia staff can access the site (discussed and approved by Martin Bremner from the BCT in August 2021).</i>					

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: 31 August 2021	Date: 31/08/2021

## 2. Photo Points



*Please note: The year three (2021) photopoints will be submitted at a later date when current Covid-19 restrictions are eased and Landcare Australia staff can access the site (discussed and approved by Martin Bremner from the BCT in August 2021).*

<b>Location of Photopoints</b>					
<b>Projected Coordinate System: GDA 94, MGA – Zone 56</b>					
<b>Photopoint Ref.</b>	<b>Easting</b>	<b>Northing</b>	<b>Feature</b>	<b>Direction of Photo</b>	<b>Comment (Date)</b>
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 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 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

BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

PP#	Direction	25 March 2019		August 2020	
PP1	NE				
PP1	NW				

BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting







<b>PP2</b>	<b>SE</b>				
<b>PP2</b>	<b>NW</b>				
<b>PP3</b>	<b>N</b>				









BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

PP3	S				
PP5	E				
PP5	W				







BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

PP6	N				
PP6	S				
PP7	SE				

BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

<b>PP9</b>	<b>NE</b>				
<b>PP9</b>	<b>NW</b>				
<b>PP10</b>	<b>SE</b>				

BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

<b>PP10</b>	<b>NW</b>				
<b>PP11</b>	<b>E</b>				
<b>PP11</b>	<b>W</b>				

### 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). No stock incursion has allowed groundcover to be maintained and/or increase in density across the site over the previous 3 years due to the installation of the exclusion fencing (refer to photopoints for further detail). Above average rainfall in the region in the summer of 2020 and 2021 has increased growth of existing groundcover (and weed species).
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 (last inspected 11 May 2021).
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, southern and northern boundaries (last inspected 11 May 2021).
  - b. *Currently maintained to a standard to control human disturbance* on the eastern, southern and northern boundaries (last inspected 11 May 2021).
  - c. *Currently maintained to a standard to control feral or overabundant herbivores and/or vertebrate pests* (last inspected 11 May 2021) – Whilst the existing fencing is adequate to ensure stock exclusion for horses and cattle, the fencing will not prevent native and non-native (such as goats) herbivores from accessing the site.
4. *Records of any human disturbance on the biobank site* – (reporting 6 monthly) – Nil human disturbance observed at the site (last inspected 11 May 2021).
5. *Evidence of erosion* – (reporting 6 monthly) – There are no areas identified across management zones as currently requiring any supplementary erosion control or stabilisation (last inspected 11 May 2021).
6. *Evidence of Waste* – (reporting 6 monthly) – No evidence of additional or new waste was observed during site visit on 11 May 2021.

#### 4. Site Visits - Sept 2020 (Annual Site Audit), December 2020, February 2021, March 2021, May 2021 and July 2021\*

##### 4.1. Weeds

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
<b>MZ 1</b>	1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021 8 July 2021*	Treatment of exotic weeds and grasses spot spraying with herbicide or using a quick spray™ unit and hand-pulling of weeds undertaken in conjunction with MZ2. Maintenance sweep targeting key weed threats.
<b>MZ 2</b>	1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021 8 July 2021*	Treatment of exotic weeds and grasses spot spraying with herbicide, or using a quick spray unit and hand-pulling of weeds undertaken in conjunction with MZ1. Maintenance sweep targeting key weed threats.
<b>MZ 3</b>	1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021 8 July 2021*	Maintenance sweep targeting key weed threats.
<b>MZ 4</b>	1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021 8 July 2021*	Maintenance sweep targeting key weed threats in accessible sections of this zone.
<b>MZ 5</b>		No weed sweeps conducted – no access to the gorge.

Diary template for weed control management			
Date	Management Zone	Description and type of activity undertaken or observation made	Minor variations (details and reasons)
1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021 8 July 2021*	1, 2, 3, 4	Weed control, herbicide (spot spraying and or using a quick spray unit) 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 fruiticosus</i>, Blackberry</li> <li>• <i>Verbena rigida</i>, Purpletop</li> <li>• <i>Conyza bonariensis</i>, Fleabane</li> <li>• <i>Tagetes minuta</i>, Stinking Roger</li> <li>• <i>Asparagus asparagoides</i>, Bridal creeper</li> <li>• <i>Cirsium vulgare</i>, Spear Thistle</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 onsite. Along with African Boxthorn it is one of the more prevalent invasive

		<ul style="list-style-type: none"> <li><i>Eragrostis curvula</i>, African Lovegrass</li> </ul> <p><i>*Please note the 8 July 2021 weed sweep has been postponed due to current Covid-19 restrictions in Greater Sydney.</i></p>	weed species identifiable on the site and will require significant follow-up for emergents.
--	--	---	---

## 4.2. Fire

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
1, 2, 3, 4, 5	3 Sept 2020 1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021	No evidence of recent fire activity during site visits (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)
3 Sept 2020 1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021	All	No specific fire management activities undertaken except for opportunistic observation during weeding, watering and the annual audit site inspection	N/A

## 4.3. Native herbivores

Template for reporting of monitoring activities			
Management Zone	Date	Current level of impact on vegetation	Observations and assessment of monitoring
All	3 Sept 2020 1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021	This column must record impacts as Negligible, Minimal, Moderate or High  Observation during weeding, watering, fox baiting and the annual site audit inspection suggest that grazing by native herbivores is negligible at the site.	Trail cameras set up for fox baiting revealed several common native mammal and bird species regularly graze and traverse the site.

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

		overabundant herbivores targeted, control techniques, and numbers controlled.	
3 Sept 2020 1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021	All	No specific native herbivore management work undertaken except for opportunistic observation.	Native species observed include: Common Wombat Eastern Grey Kangaroo Swamp Wallaby Superb Lyrebird

#### 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
All	Sept 2020 and May 2021	Trail cameras installed in Sept 2020 and May 2021 during the GS LLS fox and wild dog baiting program revealed feral goats and foxes traversing the site.  No threatened native fauna has been observed within the site to date by Landcare Australia. Common native fauna species observed may be moderately impacted by the presence of foxes on the site.  There has been a high level of grazing by feral goats on seedlings planted across the site.	Feral species observed onsite include feral goats and foxes.

Diary template for vertebrate pest management			
Date	Management Zone	Description and type of activity undertaken This column must include details of the vertebrate pests targeted, control techniques applied and numbers controlled.	Minor variations (details and reasons)
Sept 2020 May 2021	MZ2 and MZ3	The site participates in the GS LLS seasonal fox and wild dog baiting program including, installation of signage, setup of trail cameras and CPEs.	GS LLS has provided a proposal to trap and remove feral goats off site. Due to current Covid-19 restrictions and the reduced capacity of GS LLS to



BioBanking Agreement 382 - Annual Report (Sept 2020 to Sept 2021), Photo Points, Inspections, Monitoring and Reporting

		<p>The bait stations include a lure and 1080 capsule, installed at two locations on the site. Each bait station has a trail camera within its vicinity.</p> <p>Foxes activated two (2) baits in Spring 2020 and also in Autumn 2021.</p> <p>Feral goats triggered the trail cameras on numerous occasions during the fox and wild dog baiting program in both September 2020 and May 2021.</p>	<p>assist with the spring fox baiting program, Landcare Australia recommends that fox baiting be deferred in September 2021 and these funds be re-directed to manage feral goats on the site as this is considered a higher priority for the long term management of the site.</p>
<p>3 Sept 2020 1 Dec 2020 18 Feb 2021 4 March 2021 11 May 2021</p>	All	<p>Opportunistic observations were undertaken during weeding activities and also during the annual site audit inspection.</p>	N/A

#### 4.5. Nest boxes

Template for reporting of nestbox monitoring				
Nest box type and location (Easting and Northing)	Date	Evidence of occupation (e.g. scratches, chew marks, whitewash)	Species recorded	Observations and assessment of monitoring (e.g. breeding events occurring? Feral species present?)
<p>271 nest boxes installed across the site in July 2019.</p> <p>The details of each box was reported in the 2019-2020 annual report as per the BBA.</p>	<p>Inspected in August 2020.</p> <p>No further assessment required until year eight of the BBA.</p>	<p>Provided in previous reporting period.</p>	<p>Provided in previous reporting period.</p>	<p>Provided in previous reporting period.</p>



---

**Appendix H: 2021 Cataract River BioBank Site Passive Management Annual Report**



**Landcare Australia**

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

**Annual Report – 2021 for Passive Management**

**Cataract River Biobanking Stewardship Site**

---

## Annual report summary of passive management actions

BSA Site Reporting and Monitoring				
Audit details				
Reporting year of BSA site: 2021 Site visit (if required): 4/02/2021 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 Landcare Australia on behalf of South32 Illawarra Metallurgical Coal			Biodiversity Stewardship agreement ID: BA 345  Name of landowner/site contact: Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of South32 Illawarra Metallurgical Coal.  South32 Illawarra Metallurgical Coal Address: Level 3, Enterprise 1 Building, Innovation Campus Squires Way, North Wollongong NSW 2500	
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	No further stock have been observed since the installation of the sites boundary exclusion fencing. During the passive monitoring site visit on the 4 Feb 2021 there was no evidence of recent stock incursion via grazing or horse manure.  Grazing by stock animals appears to have significantly reduced on the adjoining site to the west.
	1.2 If stock is observed, the landowner must take measures to remove the stock immediately.	Ongoing from commencement date	No	N/A

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 requirement for active management is initiated.
<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	No	Fire management of the site will be in accordance with the BSA and only commence once the requirement for active management is initiated.
<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	Signage has been installed to the Douglas Park Drive entrance to the site.  The area previously disturbed due to the removal of asbestos containing material (ACM) has been revegetated in accordance with the requirements of the BCT.
	4.3 The landowner must not store or dispose of any waste on the BSA site.	Ongoing from commencement date	No	No waste has been stored on, or disposed of, at the BSA 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	No	No native vegetation has been removed or poisoned onsite to date.
	5.2 Native vegetation must not be burnt except in accordance with fire management plan.	Ongoing from commencement date	No	No wildfire or hazard reduction burning has occurred on the site since the commencement date.
<b>6. Replanting or supplementary planting where</b>	6.1 N/A until active management	NA	Yes	Replanting on the disturbed site containing ACM has been completed and seedlings were observed to have a high success rate at previous site visits.

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>	Seedlings were of local provenance from the Western and South Western Sydney Region via our native nursery supplier
<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>No</b>	No dead timber (standing or fallen) has been removed and no additional timber has been introduced to the site since commencement of the BSA.
<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>No</b>	No rock removal has occurred on the site since the commencement of the BSA.
<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 has been observed and minimal native herbivory could be identified during site visits.
<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>No</b>	Natural flow regimes are maintained on the site in accordance with the BSA.

<b>Details of incidents or events that have had an adverse effect on biodiversity values on biobank site</b>	
Description of incident or event (e.g. natural events)	Action taken and/or proposed recommended actions
Nil	Nil
<b>Any other comments or observations regarding the biobank site</b>	
<i>Please include photos of the site visit along with comments/observations.</i> Landcare Australia identified and installed 6 photo point locations during a site visit on the 13 <sup>th</sup> of Aug 2019. Each photo point from the previous report is shown with the UTM's. (Note: photo points 1 and 3 were moved in 2019 slightly so as not to be within the zone containing ACM). The six photo points were revisited on the 4 <sup>th</sup> of February 2021 as shown below.	Since the previous reporting period there is a noticeable visual difference in the vegetation across the site which is likely attributed to both the drought conditions at the time and the lack of effective exclusion fencing to the site. The images taken in Feb 2021 show a significant increase in the native vegetation (and to a lesser extent) weed growth across the site most likely attributed to the increase in rainfall across the site and the installation of the exclusion fencing.

2019



2021



Photo point 1





Photo point 2



Photo point 3




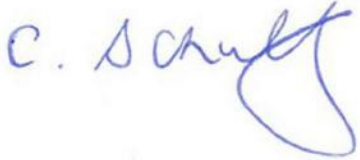
**Photo point 4**



**Photo point 5**



Photo point 6

<b>Signature and declaration</b>		
<p>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.</p> <p>Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report.</p>		
<p>Signed</p> 	<p>Signed</p> 	
<p>Date 01/03/2021</p>	<p>Date</p>	<p>3/03/2021</p>



---

## **Appendix I: Rehabilitation Cost Estimate**

Rehabilitation cost estimate provided only for Department of Regional NSW (Resources Regulator). The Rehabilitation Cost estimate is commercial in nature.

Please contact the Department or IMC representative for further information.



---

**Appendix J: Appin Mine Community Complaints Report FY21**

### Appin Mine - Community Complaints Report FY2021

Date	Nature of Complaint	Actions / Follow Up
14/01/2021	Community member contacted the Community Team directly via phone at 6:32 am regarding night work and lights associated with the exploration drilling site at Razorback	The Community Team Member advised the resident the night works were being conducted for one night only and will revert back to day light hours the next day. Should additional night works be required the resident will be informed and mitigation would happen on the lights at night. No further response as provided by the resident.
11/12/2020	Community member contacted the Community Call Line at 10:24 am regarding the response provided by a Community Team Member	The Community Team Member previously spoke to the resident regarding concerns around the exploration activities happening within the Razorback area. The resident was not satisfied with actions taken by Illawarra Metallurgical Coal and was not able to have a productive conversation with the Community Team Member. The Community Team Member attempted to end the conversation with the resident which did not provide a satisfactory outcome. The caller requested their dissatisfaction with the Community Team Member's response be recorded and did not request a further call back. The complaint was closed.
11/12/2020	Community member contacted the Community Call Line at 10:12 am regarding night operations and noise associated with from the exploration drill site coming into the house.	The Community Team responded the same day to advise the resident there had been some operational delays and the drilling would continue for another week. Field crews were working on additional noise mitigation measures and will work towards day time operations only. The resident was not satisfied with this response and requested compensation for the noise over the last two weeks. The Community Team member provided details of their current mitigation and actions progressing to cease drilling, however the resident was not responsive to current actions and the call had to be ended due to lack of productive communications.
11/12/2020	Community member contacted the Community Call Line at 8:57 am regarding night operations and noise associated with the exploration drill site being heard inside their house.	The Community Team responded the same day to advise there had been some operational delays and the drilling would continue for another week. Field crews were working on additional noise mitigation measures and would be moving to daytime operations only. No further feedback was received from the resident.

Date	Nature of Complaint	Actions / Follow Up
10/12/2020	Community member contacted the Community Call Line at 4:50 am regarding the light spill from the exploration drill site coming into their house.	The Community Team responded the same day to advise the field crew will adjust the lights before the start of night shift that day. The resident was satisfied with the response and advised they will inform Illawarra Metallurgical Coal if there are any continuing issues with the lights. No further response was received from the resident.
8/12/2020	Community member contacted Illawarra Metallurgical Coal reception at 9:05 am with concerns about the noise associated with the exploration drilling occurring in Razorback	The Community Team responded the same day advising noise mitigation had been installed around the drill site, however there are some gaps which fall in the same direction of the resident's property. After discussions with the Exploration team, it was confirmed that night time drilling may cease on Wednesday 9 December. The resident was satisfied with the outcome.
8/12/2020	Community member contacted the Community Call Line at 1:05 pm with concerns about the noise associated with the exploration drilling occurring in Razorback.	The Community Team responded the same day advising noise mitigation had been installed around the drill site, however there are some gaps which fall in the same direction of the resident's property. After discussions with the Exploration team, it was confirmed that night time drilling may cease on Wednesday 9 December. The resident was satisfied with the outcome. The resident then provided additional feedback on 9 December advising their dissatisfaction with the operations continuing throughout the night. The Community Team advised the resident the works were due to an operational delay and further actions will be taken to complete work within the next week.
4/12/2020	Community member contacted the Community Call Line at 6:42 am with concerns about the noise associated with the exploration drilling occurring in Razorback.	The Community Team responded the same day advising that additional noise mitigation measures would be considered, and that drilling would conclude on the property sooner than anticipated. The resident was concerned about the activity throughout the night as they were a shift worker. The field crew within the exploration team confirmed activities would stop that night and commence the following week. Resident was satisfied with the feedback
3/12/2020	Community member contacted the Community Call Line at 4:30 pm with concerns about the exploration drilling occurring in Razorback and communication to residents	The Community Team was unable to respond to the resident as they did not request a call back or leave their contact details.

Date	Nature of Complaint	Actions / Follow Up
1/12/2020	Community member contacted the Community Call Line at 7:25 am with concerns about the noise associated with the exploration drilling occurring in Razorback.	The Community Team responded the same day advising that additional noise mitigation measures would be considered, and that drilling would conclude on the property sooner than anticipated. The resident was satisfied with the feedback.
25/11/2020	Community member contacted the Community Call Line at 9:53 am with concerns about the exploration drilling occurring on private property in Razorback. The noise from the activities at night time was keeping the resident awake.	The Community Team responded the same day to provide the resident with an update of the activities on site. The resident requested the site be shut down after 8 pm each night in line with Council requirements. It was explained that the activities are approved by Mining Act 1992 and will be operating 24 hours until the end of December. In recognition of the noise issue, improved noise mitigation measures would be installed to reduce the impact on the resident. An update was provided via letter box drop to the resident later the same day with further mitigation actions listed. No further feedback was received from the resident.
20/11/2020	Community member contacted the Community Team by direct call regarding lights and dust concerns on an exploration drill site located on private property at Razorback. The drill site was being setup at the time of the call and the caller's details were provided to the appropriate Community Team member for follow-up the next business day.	The Community Team contacted the resident the following business day, however the call was unanswered. The following the day resident contacted the Community Call Line requesting a call back to discuss the concerns. The call was returned the same day and the resident was advised that noise mitigation would be increased to reduce noise from the drill rig and generators. Field crew had also adjusted the lights to not interfere with the resident's property and would continue to monitor the situation. Dust mitigation measures were put in place immediately and further options to address the dust remain under investigation. The resident was appreciative of the actions taken to date. The complaint is to be closed.



Date	Nature of Complaint	Actions / Follow Up
9/11/2020	Community member contacted the Community Team by email at 12.42 pm advising of a traffic hazard at 345 Menangle Road. Heavy vehicles associated with the geotechnical assessment activities are causing traffic on Menangle Road to slow quickly as visibility is poor. The distraction of drivers looking at the activities was also noted.	The Community Team responded the same day advising that public safety had been considered in plans, however appreciated the period of frequent heavy vehicle movements could have been managed better with traffic management. Frequent heavy vehicle movements associated with geotechnical drilling activities were complete 10 November, and any future heavy vehicle movements (such as when demobilising) will have traffic control measures in place. All trucks accessing the property throughout the activities will approach the property from Menangle allowing for a left hand turn to improve traffic flow in the area. 'Caution trucks entering ahead' signage has been ordered from Wollondilly Shire Council and will be placed on Menangle Road either side the intersection. The resident was appreciative of the action taken.
17/10/2020	Community member contacted the Community Call Line at 12.30 pm regarding the Community Newsletter. The resident requested a call back Monday.	The Community Team followed up with the resident on Monday 19/10/2020 for further information. The resident did not appreciate the distributor traversing well-manicured grass to reach the letterbox and requested they use the driveway in the future. The resident did not wish to provide address details. The distributor company was contacted the same day and confirmed they would advise staff to access properties by driveway only in the area. The resident was provided this feedback on the same day and was satisfied with the outcome.
14/10/2020	Community member contacted the Community Call Line at 4.30 pm. They were furious they receive 'junk mail' from South32 despite having a 'no junk mail' sign on the letterbox. The call was anonymous, and no contact detail or address was provided to enable follow-up.	The Community Team followed up with the Community Newsletter distributor the same day. The distributor confirmed it is legally able to deliver pamphlets with community information, such as South 32's, to 'no junk mail' homes under Australian Law. The distributor will continue to do so as agreed with South32. The distributor was willing to avoid the letterbox of the resident with the concern however the address was not provided for this to occur.
1/10/2020	Community member contacted the Community Call Line at 11.47 am regarding a speeding truck on Mount Ousley travelling toward Appin. The community member did not request a call back.	The Community Team shared the concern with logistics for investigation the same day. The truck GPS data confirmed the truck was speeding and the driver was provided a written warning by the contracting company.

Date	Nature of Complaint	Actions / Follow Up
8/07/2020	Community member contacted the Community Team by email at 8.42 pm dissatisfied with Illawarra Metallurgical Coal's engagement on exploration activities and environmental matters relating to Georges River.	The Community Team responded by return email on 10 July at 8.13 am. It was noted proactive notification of the exploration activities was provided to nearby residents but not the Company's Community Consultative Community (CCC). Based on the feedback received, the Company will proactively notify the CCC of exploration drill locations in the future. The Georges River matters were shared with the CCC at the time of occurrence and provided in the meeting minutes. The website link to the CCC minutes were shared with the resident along with the most recent community newsletters were also shared which included an overview of recent CCC meetings. No further feedback was received from the resident.



---

**Appendix K: EPBC Approval 2010/5350 Compliance Report**



## Bulli Seam Operations Annual Compliance Report – August 2021 (EPBC 2010/5350)

**Date of submission:** 10 August 2021

**South32 Website Upload Date:** 10 August 2021

Abbreviations:

DOtEE – Federal Department of the Environment and Energy (now DAWE)

DAWE – Department of Agriculture, Water and the Environment (formerly DOtEE)

OEH – NSW Office of Environment and Heritage (now Biodiversity and Conservation Science Directorate)

CCL – Consolidated Coal Lease

EPBC – Environment Protection and Biodiversity Conservation

IMC – Illawarra Metallurgical Coal

In accordance with condition 14 of the EPBC Approval (2010/5350), 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.

Condition	Condition Summary	Status	Compliant 2021
1	<u>Persoonia Hirsuta (Hairy Geebung)</u> Approval holder must legally secure the approved offset area for conservation for the duration of the EPBC approval.	Proposed offset area submitted to DOtEE in the <i>Persoonia hirsuta</i> Offset Management Plan. Application submitted on 26 Nov 2013 to amend CCL724 via a s238 Condition under the Mining Act 1992 to legally secure a <i>Persoonia hirsuta</i> Offset Area at Appin North (formerly West Cliff Mine) as required by the Bulli Seam Operations EPBC Approval (2010/5350). The Minister for Resources and Energy amended CCL 724 on 23 March 2014.	Yes



Condition	Condition Summary	Status	Compliant 2021
2	<p><u>Persoonia Hirsuta</u></p> <p>Develop a management plan for the <i>Persoonia hirsuta</i> offset area.</p> <p>Annual monitoring requirements and provide results of the monitoring to the Dept within a timeframe.</p> <p>No clearing of Stage 4 emplacement area permitted until the Offset MP has been approved by the Minister.</p>	<p><i>Persoonia hirsuta</i> Offset Management Plan was submitted to DOtEE prior to 31 December 2012 and approved on 22 November 2013 (ref 2013/10882). The latest revision (version 8) was approved April 2019. Plan is available on South32 website using this link: <a href="#">Persoonia hirsuta Offset Management Plan</a>.</p> <p><i>Persoonia hirsuta</i> Condition Reports were submitted as required in 2013, 2014, 2015 (submitted late), 2016, 2017, 2018, 2019 and 2020.</p> <p>Clearing for Stage 4 coal-wash emplacement has not yet been undertaken.</p>	Yes
3	<p><u>Persoonia Hirsuta</u></p> <p>Engage a suitably qualified expert to undertake targeted research to inform conservation activities. Make research publicly available.</p>	<p>IMC received an extension to the deadline for finalising and reporting the research to 30 June 2021. The research report was submitted to DAWE on 29 June 2021. The research report is available on the South32 website using this link: <a href="#">Persoonia hirsuta Research Report</a>.</p> <p>The research strategy is included within the approved Offset MP (see link above).</p>	Yes
4	<p><u>Shale/Sandstone Transition Forest</u></p> <p>Implement the approved SSTF Offset MP.</p> <p>Legally secure the offset for long term conservation.</p>	<p>In 2012, IMC provided an offset management plan as well as ecological survey information to comply with these conditions. The plan was approved by DOtEE in June 2013. In 2014, IMC requested an extension to the deadline to have the offset secured in perpetuity. DOtEE granted an additional 18 months, making the deadline March 2016.</p> <p>In October 2015, IMC made an application to (then) NSW Office of Environment &amp; Heritage (OEH) to have the SSTF offset secured via a BioBanking Agreement</p>	Yes



Condition	Condition Summary	Status	Compliant 2021
		under Part 7A Division 2 of the <i>Threatened Species Conservation Act 1995</i> . The BioBanking Agreement was finalised and executed on 1 February 2017.	
5	<p><u>Shale/Sandstone Transition Forest</u></p> <p>Provide a management plan for shale/sandstone transition forest.</p>	<p>Management plan submitted and approved on 7 June 2013. The revised Plan was updated and approved on 2 September 2014.</p> <p>The Management Plan was updated in 2018 and re-submitted to the DOtEE to reflect the new offset mechanism (BioBanking). Condition 5A was added to the EPBC approval in May 2018:</p> <div style="border: 1px solid black; padding: 5px;"><p style="text-align: center;"><b>Conditions attached to the approval</b></p><p>5A If the <b>Shale Sandstone Transition Forest</b> is legally secured as a registered NSW BioBanking site, the management plan developed under the NSW BioBanking Agreement for that site is an Offset Management Plan for the purposes of Condition 4. The annual reporting required under that scheme may be provided to the <b>department</b> in place of the reports containing monitoring results required at Condition 5c, on the proviso that all measures specified in Condition 5 are covered.</p></div> <p>The 2017/18, 2018/19 and 2019/20 SSTF monitoring was conducted under the requirements of the Biobanking Agreement.</p> <p>The 2020 annual report was also completed in accordance with the BioBanking Agreement and will be provided to DAWE in August 2021.</p> <p>In the Independent Environmental Audit (Dec 2019) that was conducted for the Bulli Seam Operations (BSO) under Condition 9 of Schedule 6 of the BSO Project Approval and Condition 18 of EPBC Approval 2010/5350, an administrative non-compliance was noted, and a recommendation was made as follows:</p>	Yes



Condition	Condition Summary	Status	Compliant 2021
		<p><i>It is recommended that confirmation be sought from the Department that the required timing for submission of the monitoring report in Condition 5c be changed to that required under the Biobanking Scheme.</i></p> <p>South32 received the below response from DAWE in July 2020:</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>From:</b> Peter Blackwell &lt;<a href="mailto:Peter.Blackwell@awe.gov.au">Peter.Blackwell@awe.gov.au</a>&gt;  <b>Sent:</b> Friday, 10 July 2020 2:34 PM  <b>To:</b> Schultz, Chris &lt;<a href="mailto:Chris.Schultz1@south32.net">Chris.Schultz1@south32.net</a>&gt;  <b>Cc:</b> Vaughn Cox &lt;<a href="mailto:Vaughn.Cox@awe.gov.au">Vaughn.Cox@awe.gov.au</a>&gt;  <b>Subject:</b> RE: Submission date for Biobanking Report - Shale/Sandstone Transition Forest Offset [SEC=OFFICIAL]</p> <p>Hi Chris</p> <p>I confirm that, consistent with the intent of condition 5A, added to the conditions attached to the approval on 4 May 2018, if the SSTF is legally secured as a registered NSW BioBanking site, the annual reporting required under NSW BioBanking for that site may be provided to the Department in place of the reports containing monitoring results required at condition 5c, and thus such reports should be provided to the Department in accordance with the timing required under NSW BioBanking for that site.</p> <p>Cheers</p> <p><b>Peter Blackwell</b>  Post Approvals Section  Assessments (WA, SA, NT), Post Approvals and Policy Branch  Environment Approvals Division</p> <p>Department of Agriculture, Water and the Environment   <a href="http://awe.gov.au">awe.gov.au</a>  T: 03 6208 2927   E: <a href="mailto:peter.blackwell@awe.gov.au">peter.blackwell@awe.gov.au</a></p> </div> <p>In June 2021, the wording in Condition 5 of the approval was amended to remove ambiguity.</p>	
6	<p><u>Coal Wash Emplacement Staging and Rehabilitation Plan</u></p> <p>Develop a Coal Wash Emplacement Staging and Rehabilitation Plan for stage 4 coal wash emplacement area.</p> <p>Submission of rehabilitation monitoring results.</p>	<p>The Coal Wash Emplacement Area Management Plan (available on the South32 website using <a href="#">this link</a>) incorporates the requirements of both the EPBC Act approval and NSW EP&amp;A Act. The latest version of the Plan was approved by DAWE on 28 January 2021.</p> <p>Results of the monitoring are provided in the Annual Review which is published on the South32 website. The 2020 report was submitted on time by email on 21 July 2021 and will be included in the FY21 Annual Review.</p>	Yes



Condition	Condition Summary	Status	Compliant 2021
7	<p><u>Southern Brown Bandicoot and Broad Headed Snake Management Plan or Plans</u></p> <p>Develop a Southern Brown Bandicoot and Broad Headed Snake conservation management plan or plans.</p>	<p>Draft Plans completed and submitted to DOfEE on 15 May 2013.</p> <p>Plans were revised following comments from DOfEE and OEH. Final Plans re-submitted to DOfEE and OEH on 29 April 2014. Plans approved on 28 May 2014.</p> <p>The Plans were revised and combined in 2020 in APNMP0111. The plan was approved by DAWE on 28 January 2021. The current Plan is available on the South32 website at <a href="#">Broad-headed Snake and Southern Brown Bandicoot Management Plan</a>.</p>	Yes
8	<p><u>Surface and Ground Water Quality Monitoring and Adaptive Management Plan</u></p> <p>Develop a Surface and Ground Water Quality Monitoring and Adaptive Management Plan for species listed in the EPBC Act.</p>	<p>Original Plan submitted on the 30 September 2012 to DOfEE. Plan was approved on 3 July 2014.</p> <p>The Plan was revised in 2020 and approved by DAWE on 28 January 2021. The current plan is available on the South32 website at: <a href="#">Adaptive Management Plan for Water Sensitive EPBC Species</a>.</p>	Yes
9	<p><u>Mine Closure Environmental Management Plan</u></p> <p>Develop a mine closure plan 3 years prior to closure for EPBC Act listed species.</p>	Plan not yet submitted. To be submitted in the mine closure plan.	N/A
10	<p><u>Mine Closure Environmental Management Plan</u></p> <p>Management for EPBC listed bats through the decommissioning of mining equipment.</p>	Plan not yet submitted. To be submitted in the mine closure plan.	N/A
11	<p><u>Shapefiles</u></p> <p>Provide offset area shapefiles to the DOfEE.</p>	Shapefiles provided on 26 November 2013.	Yes





Condition	Condition Summary	Status	Compliant 2021
12	<u>Notification of Actual Date of Commencement</u> Notification date of commencement to be supplied to DSEWPaC.	Letter sent to DOtEE (previously DSEWPaC) on 31 May 2012.	Yes
13	<u>Publication Requirements</u> Publish all management plans, reports, strategies or agreements with the Department	Undertaken as required. See South32 website: <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> .	Yes
14	<u>Compliance Report</u> Publish a report on website addressing compliance with each of the conditions of this approval.	This compliance report meets this condition. The 2013, 2014, 2015, 2016, 2017, 2018, 2019 and 2020 reports were submitted and are available on the South32 website.	Yes
15	<u>Accurate Records Must be Maintained</u> Maintain accurate records substantiating all activities associated with or relevant to the conditions of approval.	Documents are maintained in the IMC controlled document system.	Yes
16 (16A, 16B, 16C, 16D, 16E)	<u>Minister's Approval of the Modification to a Management Plan, Report, Strategy or Agreement</u> Apply to the minister for approval to modify management plans, reports, strategies or agreements.	The following management plans were submitted in FY21: <ul style="list-style-type: none"> <li>- Broad-headed Snake and Southern Brown Bandicoot Management Plan</li> <li>- Adaptive Management Plan – Water Sensitive EPBC Act Listed Species</li> <li>- Coal Wash Emplacement Area Management Plan</li> </ul> Minor amendments to these documents were included in the revisions. The management plans were approved by the Minister.  The Shale Sandstone Transition Forest Offset Management Plan was reviewed however does not require approval by the Minister.	Yes



Condition	Condition Summary	Status	Compliant 2021
17	<u>Minister's Modification to a Management Plan, Report, Strategy or Agreement</u> Comply with the minister's request to modify management plans, reports, strategies or agreements.	No requests received from the Minister for modifications in this reporting period.	Yes
18	<u>Independent Auditor</u> Commission and pay the full cost for independent environmental auditor of the project.	Independent audits were carried out in accordance with the conditions in 2013/14, 2017 and 2019. This most recent report is available on the South32 website at: <a href="#">IEA 2019</a> . There was no audit undertaken in this reporting period. The next audit will take place in 2022.	Yes
19	<u>Unsatisfactory Commencement of Action</u> If work has not commenced within 5 years of approval, written approval needs to be obtained from the minister.	Work commenced on 15 May 2012 as per date of commencement letter sent to the Department.	Yes

BULLI SEAM OPERATIONS  
Broad-headed Snake and Southern Brown Bandicoot Management Plan  
APNMP0111  
Management Plan Version 1.1

AUDIT REVIEW			Outcome	Comment	Proposed Action
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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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 preclearing 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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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		Install artificial pavers on a westerly facing section of the emplacement area. This project was not completed in FY21 and is planned for FY22.
--	-------	---	------------	--	---

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

		<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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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.	



BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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	In late 2020 the Emplacement operational personnel were refreshed on the requirements for threatened species during emplacement construction.	
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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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.	
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 January 2021.	
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. There is some further work required to install artificial pavers in the emplacement area. No translocation of Velvet Geckos has been undertaken or required.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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 After Action Close-out	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. There is some further work required to install artificial pavers in the emplacement area. No translocation of Velvet Geckos has been undertaken or required.	As per action above regarding the installation of artificial pavers
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 this, watercart 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.	
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.	

**BULLI SEAM OPERATIONS**

**Broad-headed Snake and Southern Brown Bandicoot Management Plan**

APNMP0111

Management Plan Version 1.1

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.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Reporting of project to DAWE and other stakeholders.	In Control	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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

Provision of Regional Funding	7.1	<p>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).</p> <p>The project took place over three years commencing July 2014 and finishing June 2017 with payments issued as follows:</p> <ul style="list-style-type: none"> <li>• Year 1 \$85,000 July 2014.</li> <li>• Year 2 \$85,000 July 2015.</li> <li>• Year 3 \$80,000 July 2016.</li> </ul>	In Control	Program completed as required	
Actions to be funded	7.2	<p>OEH developed a Project Proposal to be funded by IC, which addressed points (c) to (f) of the EPBC Approval Condition 7.</p> <p>The Project Proposal, OEH Letter of endorsement and BHPBilliton letter of endorsement are provided in Appendix 5, Appendix 6 and Appendix 7 respectively.</p>	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.	
Impacts to other EPBC Act Listed Species	7.3	<p>Condition 7(d) of the EPBC Approval for works conducted by OEH as follows:</p> <p>(d) a demonstration that management actions to be undertaken will not adversely impact EPBC Act listed species;</p> <p>The OEH Proposal addressed the above requirement (see section titled Consideration of Impacts of the Project).</p>	In Control	The OEH Proposal addressed the above requirement.	
Funding Arrangements	7.4	<p>OEH provided a Project Proposal for the Broad headed snake and Southern Brown bandicoot Recovery Actions (see Appendix 5).</p> <p>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.</p>	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.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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 Annual Review.	
Reporting	8.1.2	IMC will report on the performance of the SBMP in the Annual Review. 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.	In Control	The Annual Reviews have been completed as required and published to the South32 website.	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

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>	
Publication	12.3	<p>Condition 13 of the EPBC Approval requires the proponent to:</p> <p><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 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>	

BULLI SEAM OPERATIONS

Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

Independent Environmental Audit	12.4.1	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.	In Control	The last IEA was conducted in 2019.	
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 SBMP are nominally undertaken on a three yearly basis.	In Control	The last Governance Review was undertaken in July 2020.	



BULLI SEAM OPERATIONS  
 Persoonia Hirsuta Offset Management Plan  
 ICHMP0249  
 Management Plan Version 8

AUDIT REVIEW			Outcome	Comment & Evidence	Proposed Action
Section	MP Ref.	Requirement / Obligation			
Protection Mechanism	1.4.1	The Persoonia hirsuta Offset Area is protected by incorporating a condition into Consolidated Coal Lease No. 724 (CCL724)	In Control	Refer to lease conditions	
Protection Mechanism	1.4.1	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 2019.	
Protection Mechanism	1.4.1	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.	Improvement opportunity	The Compliance Report for FY20 was provided as an Appendix to the Annual Review, that was submitted to the Resources Regulator at the end of September each year. The FY21 Compliance Report will be submitted at the same time as it is submitted to DAWE.	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Protection Mechanism	1.4.1	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 2019.	
----------------------	-------	--	------------	---	--

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Protection Mechanism	1.4.1	<p>In the event that the Persoonia offset cannot achieve the objectives of Conditions 1 and 2, Illawarra Coal 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, Illawarra Coal will provide an alternative compensatory measure commensurate with the requirements of approval condition 1 to the satisfaction of the Department, or</li> <li>- CCL724 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 CCL724. In the event it can be demonstrated that a suitable alternative offset could not be</li> </ul>	In Control	Not triggered.	
----------------------	-------	--	------------	----------------	--

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

		suitable alternative offset could not be found, Illawarra Coal will provide an alternative compensatory measure commensurate with the requirements of approval condition 1 to the satisfaction of the Department.			
Review of the MP	1.5	This Plan will be reviewed in accordance with Condition 2(l) i.e. the findings from the research programs required by Conditions 3 will be incorporated into the approved Persoonia hirsuta Offset Management Plan 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 15 May 2021.	In Control	The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.  The Offset Management Plan will be reviewed within 6 months of 15 May 2021.	
Persoonia Monitoring	4.1.2	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 this plan.	In Control	See Annual Persoonia health monitoring report that is submitted each year to DAWE.	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Persoonia Monitoring	4.1.2	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 (Appendix A). All plants have been recorded with a Garmin GPS and flagged with fluorescent, biodegradable flagging tape and given a unique ID.	In Control	Monitoring methods as per the above.	
Survey Timing	4.1.3	The survey will be conducted from late spring into early summer which is the peak flowering period for the species.	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	4.1.4	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 this Plan.	In Control	2020 report was submitted on 22 December 2020 as required.	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Research	5	South32 Illawarra Metallurgical Coal has engaged the University of Wollongong and Royal Botanic Gardens Trust to conduct research on Persoonia hirsuta. 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>	
Research	5	As new information becomes available regarding the local population of P. hirsuta, this will be incorporated into the Management Plan 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	5	In accordance with the conditions, South32 Illawarra Metallurgical Coal will prepare a research report and this will be made available on the Company's 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 South32 website.</p>	
Performance Objectives and Management Actions	6	1a. Secure Offset by the required timeframe i.e. 15 May 2014.	In Control	Offset secured as per timing requirements.	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Performance Objectives and Management Actions	6	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	6	1c.Maintain or increase the number of individual plants in the Offset area relative to the 2012 baseline population (~44 plants).	In Control	Two translocations have been undertaken to Appin North (Autumn 2019 and Autumn 2021).	Continue to monitor translocated <i>Persoonia</i> plants.
Performance Objectives and Management Actions	6	2a. Develop a <i>P. hirsuta</i> research strategy	In Control	Research strategy is included in the MP.	
Performance Objectives and Management Actions	6	2b. Targeted research commenced by July 2013	In Control	Targeted research has been underway since 2013.	
Performance Objectives and Management Actions	6	2c. Research findings published by 30 June 2021 as per the EPBC Act consent.	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	6	3a. No loss of <i>Persoonia hirsuta</i> in the offset area 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.  Permit to Disturb process is in place (IMCF0209).	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Performance Objectives and Management Actions	6	3b. No loss of <i>Persoonia 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.	
Performance Objectives and Management Actions	6	3c. Avoidance of surface runoff from emplacement areas entering the <i>Persoonia hirsuta</i> Offset Area	In Control	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.  Drainage will be incorporated into the design of Stage 4 emplacement. Not yet required.	
Performance Objectives and Management Actions	6	3d. Restrict access to offset area	In Control	Signage in place. Access to Appin North is restricted. Permit to Disturb process in place.  The area is not fenced to allow unimpeded access for wildlife and pollination vectors across the site.	
Performance Objectives and Management Actions	6	3e. Minimise weed infestation within the Offset Area	In Control	Minor weed control is undertaken by experienced personnel for perennial grasses on the powerline easement.	Weed control is ongoing.



BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Performance Objectives and Management Actions	6	3f. Minimise dust impacts to <i>Persoonia hirsuta</i> from operations	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. Watercarts 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	6	4. Adequate regeneration of emplacement as per the Approved Emplacement Management Plan.	In Control	As per Annual Emplacement Rehabilitation Report.	
Performance Objectives and Management Actions	6	Soil translocation protocols and re-vegetation protocols to be implemented as per the West Cliff Coal Wash Emplacement Area 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 CWEA Emplacement MP	
Performance Objectives and Management Actions	6	Persoonia hirsuta individuals within the approved emplacement and development footprints may be translocated to the rehabilitating emplacement.	In Control	Not required at this stage.	

BULLI SEAM OPERATIONS

Persoonia Hirsuta Offset Management Plan

ICHMP0249

Management Plan Version 8

Performance Objectives and Management Actions	6	Introduce successfully propagated plants (or seed from propagated plants) from the nursery at Royal Botanic Gardens to the rehabilitating emplacement (or other suitable areas outside the emplacement and disturbance footprints).	In Control	Translocation of Persoonia plants from the nursery to the emplacement (Stage 2) was undertaken in Autumn 2021.	
Performance Objectives and Management Actions	6	Annual rehabilitation survey will be conducted and a report attached to the BSO Annual Review.	In Control	Annual report is attached as an appendix each year to the Annual Review. The 2020 rehabilitation report was submitted to DAWE via email on 21 July 2021.	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 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.	
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.	Execute the Georges River Rehabilitation Plan, once all necessary approvals in place.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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	No Macquarie Perch have been identified within mining areas. Longwall mining does not occur below named streams where Macquarie Perch are found.	Continue monitoring fish habitat in the mining areas.
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.	Continue monitoring fish habitat in the mining areas.
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.	
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	A temporary water treatment plant (WTP) is currently operational, producing high quality water for discharge to Brennans Creek. A permanent WTP is under construction. Discharge from BCD will be modified once consistent flow from the WTP is achieved.	Complete construction of permanent WTP.
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.	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.	Continue monitoring fish habitat in the mining areas.
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	No Macquarie Perch have been identified within mining areas. Longwall mining does not occur below named streams where Macquarie Perch are found.	Continue monitoring fish habitat in the mining areas.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.	Continue monitoring impacts in the mining areas.
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.	Continue monitoring impacts in the mining areas.
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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.	Continue monitoring impacts in the mining areas.
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.	TARPS have been reported and actioned as required.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 TARP's 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.



BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

<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 Environmental Improvement 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 Attachment B.</li> <li>* Aquatic monitoring (including fish sampling) via the West Cliff Area 5 Longwall 37 - 38 Extraction Plan (Biodiversity Management Plan). Refer Attachment C.</li> <li>* Aquatic monitoring (including fish sampling) via the Appin Area 9 Longwall 901 - 904 Extraction Plans (Biodiversity Management Plan). Refer Attachment D.</li> <li>* Georges River Environmental Improvement Program (EIP). The EIP for the Georges River incorporates (Refer to Attachment E):             <ul style="list-style-type: none"> <li>- A program of works to improve the aquatic health of the River;</li> <li>- Quantitative sampling of macroinvertebrates;</li> <li>- Ecological assessment processes using DNA extracted from sediment; and</li> <li>- Water quality 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>
------------------------------------	--------------	--	-------------------	---	---

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 EIP report on South32 website: <a href="https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/licenses/eip2-2020-report_final.pdf?sfvrsn=a813859a_6">https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/licenses/eip2-2020-report_final.pdf?sfvrsn=a813859a_6</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 S32 web page.
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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 S32 web page. 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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

Terrestrial Biodiversity Monitoring Methods	8.3.2	<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>	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.
---	-------	---	------------	--	--

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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: <ul style="list-style-type: none"> <li>* two baseline monitoring campaigns 1 year prior to mining;</li> <li>* monthly visual inspections (as part of Landscape Features Monitoring), increased to weekly inspections during critical periods during mining;</li> <li>* six monthly monitoring for two years (as part of Landscape Features Monitoring) post mining;</li> <li>* general observation of active mining areas during all other monitoring.</li> </ul>	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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	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.	Execute the Georges River Rehabilitation Plan, once all necessary approvals in place.
Monitoring methods for <i>Leucopogon exolasius</i>	8.4.2	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): * Fixed photo points. * 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). * Random meander transects in targeted monitoring areas in order to identify recruitment.	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 MP and Georges River Aquatic Health Monitoring Program on the South32 website.	
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/our-business/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents</a>	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 MP and Georges River Aquatic Health Monitoring Program on the South32 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	



BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.	
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.	Continue monitoring impacts in the mining areas.
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.	Execute the Georges River Rehabilitation Plan, once all necessary approvals in place.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 WTP at Appin North. The EPA and Georges River Stakeholder Group is regularly advised and where required, consulted on the discharge from BCD.	Complete construction of permanent WTP.
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.	Execute the Georges River Rehabilitation Plan, once all necessary approvals in place.
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	
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.	Execute the Georges River Rehabilitation Plan, once all necessary approvals in place.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

Injection Grouting	9.2.5.2	<p>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.</p>	In Control	<p>Georges River Rehabilitation Plan approved by DPIE and the Resources Regulator incorporates these requirements.</p>	
Surface Treatment	9.2.5.6	<p>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.</p>	In Control	<p>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</p>	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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	No Macquarie Perch identified to date.	Continue monitoring impacts in the mining areas.
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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 installation of a WTP at Appin North and review of blending options at Appin West.	
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	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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	Annual Reviews are published on the South32 website as required.	
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	Results are reporting online via the 14 day monitoring report <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> .	
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	The 2020/21 Annual Return was submitted as required.	
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	The most recent EoP reports completed are for	



BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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.	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 South32 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	The last IEA was conducted in 2019.	

BULLI SEAM OPERATIONS

Adaptive Management Plan for Water Sensitive EPBC Act Listed Species

IMCMP0253

Version 6

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 July 2020.	
-----------	--------	--	------------	---	--

BULLI SEAM OPERATIONS  
 Coal Wash Emplacement Area Management Plan  
 WCPMP0019  
 Management Plan Version 5

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 still at least 10 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	Area cleared to date for Stage 3 is ~40Ha. 2021 clearing will add an additional 2.5 ha onto this total once complete.	
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 still at least 10 years away.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 still at least 10 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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 Arc GIS 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	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 15m along curved and straight sections. Risk assessments conducted as required on haul roads graded above 11%. In field verification is 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 verification is undertaken as required.</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 verification is undertaken as required. No haul roads have been constructed at a grade above 20%.</p>	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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	In field verification is undertaken as required.	
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.	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.	Refresh operational personnel on the requirements of the rehabilitation plan
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		



BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

<p>Construction of Emplacement Catch Ponds</p>	<p>4.2.7.1</p>	<p>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.</p>	<p>In Control</p>	<p>Clean water drains are in place. Planning for new emplacement ponds is in progress.</p>	
<p>Erosion and Sediment Control Measures for Emplacement Catch Ponds</p>	<p>4.2.7.3</p>	<p>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.</p>	<p>In Control</p>	<p>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.</p>	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 FY21.	
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	As per last desktop review, active emplacement area is within limits. Emplacement Area at 18.59 ha at time of desktop review (1/08/2021). Western face of emplacement currently being covered by topsoil with an additional 2.5 ha to be added once 2021 clearing is completed.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	
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. Refer to Section 6 for more detail on vegetation removal. 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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 2020 which looked at "topsoil deficit" and identified actions to reduce the risk of a topsoil shortfall.	Incorporate topsoil stockpiling into the design planning for Stage 4 (include a topsoil inventory for Stage 4).  Investigate other options for sourcing alternative material and progress required approvals.
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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		

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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>• DCPP 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	The Material Acceptance Form must be completed and approved prior to the transport of any material not generated by the WCCPP or DCPP to the emplacement for use or disposal.	In Control	Material Acceptance Forms are completed as required.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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	<p>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.</p>	
Coal Wash Tipping	4.2.9.4	<p>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).</p>	In Control	<p>Required inspections are undertaken.</p> <p>In field verification is undertaken as required.</p>	
Coal Wash Drying	4.2.9.5	<p>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.</p>	In Control	<p>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.</p> <p>In field verification is undertaken as required.</p>	



BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 course and fine coal wash materials. Confirmed by positive results from compaction testing.	
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.  <u>In field verification undergone as</u>	
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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	Records of compaction tests are maintained by the emplacement contractor.	
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.	
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.  In field verification undertaken as required.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.  In field verification undertaken as required.	
Bench Heights	4.2.9.7	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: <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	Emplacement benches established as outlined in the Management Plan.  In field verification undertaken as required.	
Bench Heights	4.2.9.7	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.	In Control	Bench heights of 30 m are not exceeded in the CWEA.  This is verified annually by external geotechnical inspections.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 MP.	
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. Due to COVID, the volume of coal wash from the DCPD able to be directed to beneficial use was reduced.	
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 10 years away from this location. The site is also buffered by the Brennans Creek Diversion Channel.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	
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.	
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	Cultural heritage is managed as per the approved CWEAMP.	
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 FY21.	
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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>	In Control	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 January 2021. However, due to other site projects taking priority use of site excavators, the 1st stage clearing work had not commenced until July 2021.	
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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>	In Control	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.	



BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	
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 ad vegetation are spread as detailed.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	
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	Rock outcrops are being constructed as required. Soil capping and habitats are currently being built over the western side of the stage 3 CWEA.	
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.	

BULLI SEAM OPERATIONS  
 Coal Wash Emplacement Area Management Plan  
 WCPMP0019  
 Management Plan Version 5

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.	
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.  No pest management has been required in FY21.	
Bushfire Management	6.3.5.2	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.	In Control	A literature review of bushfire and rehabilitation was undertaken in FY21. The implementation of a trial burn in rehabilitated areas will be investigated and implemented in FY22 if conditions are suitable.  The <i>Persoonia</i> Research report was submitted to DAWE in June 2021.	
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.	
<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.	In Control	Not yet triggered	Design plans to comply with this Condition

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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 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>	
--------------	-----	---	------------	--	--

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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	
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.	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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.	
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 2020. 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.	
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 2020. See last CWEA Monitoring Annual Report.  Next round of Fauna monitoring to be undertaken Spring 2021.	
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 Illawarra Metallurgical Coal 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.	



BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

<p>Emplacement Monitoring</p>	<p>8.3</p>	<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>	<p>In Control</p>	<p>Compaction tests undertaken as required. Records are kept by the emplacement contractor on the South32 file storage system.</p>	
<p>Emplacement Monitoring</p>	<p>8.4</p>	<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>	<p>In Control</p>	<p>Monthly samples collected as required - refer to 14-day Report (Point 16) on South32 website.</p>	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

<p>Emplacement Monitoring</p>	<p>8.5</p>	<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>	<p>In Control</p>	<p>Monitored as part of quarterly inspection regime by Specialist Environment. Last inspection completed in June 2021.</p>	
<p>Complaints and Non-compliance Management</p>	<p>9.1</p>	<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>	<p>In Control</p>	<p>No complaints regarding CWEA activities received in FY21.</p>	

BULLI SEAM OPERATIONS

Coal Wash Emplacement Area Management Plan

WCPMP0019

Management Plan Version 5

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	No events or non-compliances relating to CWEA activities were identified in FY21.	
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 FY21.	
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 on the South32 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 DAWE on 21 July 2021.	

BULLI SEAM OPERATIONS  
 Coal Wash Emplacement Area Management Plan  
 WCPMP0019  
 Management Plan Version 5

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 South32 website.	
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 exceedances or non-compliances associated with the CWEA were identified in FY21.	
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 being revised.	
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 2019. The next IEA is due in 2022.	

BULLI SEAM OPERATIONS  
Coal Wash Emplacement Area Management Plan  
WCPMP0019  
Management Plan Version 5

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.	
-----------	--------	---	------------	--	--

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

			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		
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.	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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.	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<p>Use of the biobank site Cultural heritage</p>	<p>3.2</p>	<p>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.</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	
<p>Use of the biobank site Obtaining of consents, permits and authorisations</p>	<p>3.3</p>	<p>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</p>	<p>In Control</p>		



BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<p>Use of the biobank site Development</p>	<p>3.4.1</p>	<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>	<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 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>	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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>	
<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>The 2020 annual audit by BCT occurred on 3 August 2020.</p>	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

Use of biobank site Permissible human activities	3.6	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:  * All Management Zones - Any human activity reasonably considered necessary to remove or reduce an imminent risk of serious personal injury or damage to property.	In Control	As per Management Actions comments below.	
--	-----	--	------------	---	--

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

Use of biobank site Permissible human activities	3.6	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:  * 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.	In Control	As per Management Actions comments below.	
---	-----	--	------------	---	--

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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 - 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>	<p>In Control</p>	<p>As per Management Actions comments below.</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 activity required to undertake permissible development</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	
<p>Management actions and management plans</p>	<p>4.1</p>	<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>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 of 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.	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

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</p>	In Control	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.	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

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>	In Control	Not triggered	



BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

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.	In Control	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.	In Control	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.	In Control	Not triggered	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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>	
--	-------------	---	-------------------	--	--

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

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.	In Control	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.	In Control	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.	In Control	Not triggered	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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.	In Control	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.	In Control	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.	In Control	Not triggered	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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).	In Control	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>			

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 past annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.</p> <p>Quarterly site visits for this reporting period, include 29 April 2019, 16 Oct 2019, 5 Nov 2019, 12 May 2020 and 6 August 2020.</p> <p>No stock observed in all management zones on each site visit. Grazing by stock animals continues to occur on the private property (to the north and south) without any known incursion into the site. No other observed evidence of grazing, trampling or other traces of stock animals.</p>	
--	----------------------	--	-------------------	---	--

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 past annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.</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. 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 have been used on the BioBanking site during quarterly site visits to undertake management actions (i.e. weed control) in each respective management zone as listed in the BBA. A list of herbicide used at each visit is available (if required).Ongoing herbicide treatment required in MZ1, MZ2, MZ3 and the transmission line easement for Blue Periwinkle, Paterson’s Curse, Bridal Creeper, African Lovegrass, Stinking Roger, Spear Thistle, Fleabane, Paddy’s Lucerne and other woody species such as Small Leaved Privet. 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>	
---	----------------------	---	-------------------	--	--

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

Standard Management Actions Weed Control	Section 1	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	N/A	BioBanking Agreement 215 only made on 1/2/17. The review on the Management plan will occur before the end of the 6th year since commencement - February 2023.	
Standard Management Actions Fire	Section 1	Comply with Fire MP - Ongoing from first payment date	In Control	Comments as per last annual audit by BCT (site visit 3/9/20).  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. Heavy senescence of <i>Acacia</i> spp. (predominantly <i>A. decurrens</i> ) in MZ1, MZ2 and MZ7. Fuel loads vary in all management zones but are at least 20 tonnes per hectare or greater across the site.	



BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

Standard Management Actions Fire	Section 1	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	N/A	BioBanking Agreement 215 only made on 1/2/17. The review on the Management plan will occur before the end of the 6th year since commencement - February 2023.	
Standard Management Actions Fire	Section 1	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	In Control	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. Heavy senescence of <i>Acacia</i> spp. (predominantly <i>A. decurrens</i> ) in MZ1, MZ2 and MZ7. Fuel loads vary in all management zones but are at least 15 -20 tonnes per hectare or greater across the site.  No evidence of recent fire activity during all six site visits (BBA suggests last burn/wildfire was in 2004).  Comment from last annual audit by BCT (18/9/19) - Action Completed Satisfactorily - No planned burns required until 2026. No evidence of recent fire activity observed during inspection.	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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 recent annual audit by BCT (site visit 3/9/20). The 2020 annual audit is not due until after August 2020.</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> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts are reported to South32 and the BCT as per BBA.</li> <li>• Action Completed Satisfactorily - New signs indicating that the site is under video surveillance installed as per last year's recommendation.</li> </ul>	
<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>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 3/9/2020). The 2021 annual audit is not due until after August 2021.</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	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 recent annual audit by BCT (site visit 3/9/20).</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 recent annual audit by BCT (site visit 3/9/20).</p> <p>Signage and fencing as per the BBA have been installed and are in good working order.</p> <p>Action Completed Satisfactorily - New BSA signs have been installed.</p>	
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	<p>Comments as per recent annual audit by BCT (site visit 3/9/20).</p> <p>Signage and fencing as per the BBA have been installed and are in good working order.</p> <p>Action Completed Satisfactorily</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 recent annual audit by BCT (site visit 3/9/20).  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 recent annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.  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.	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<p>Standard Management Actions Replanting or supp planting</p>	<p>Section 1</p>	<p>Planting required in the 0.5 Ha Management Zone 3 - 250 plants. Record date of planting - commencing from first payment date</p>	<p>In Control</p>	<p>Comments as per recent annual audit by BCT (site visit 3/9/20)  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.  Action Completed Satisfactorily</p>	
<p>Standard Management Actions Replanting or supp planting</p>	<p>Section 1</p>	<p>Protect plants from grazing for two years or until 50cm high. Record the date when the plant height requirements are met. - commencing from first payment date</p>	<p>In Control</p>	<p>Comments as per recent annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.  Plant guards have been maintained around plantings.  Action Completed Satisfactorily</p>	
<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 recent annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due till after August 2021.  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.  Action Completed Satisfactorily.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 annual audit by BCT (site visit 3/9/2020). The 2021 annual audit is not due until after August 2021.           Illawarra Landcare confirmed by email on 26/9/19 that all plantings were sourced from Western and South Western Sydney.           Action Completed Satisfactorily.</p>	
<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 3/9/20). The 2021 annual audit is not due till after August 2021. .           Quarterly site visits. Specific site visit for illegal timber felling in MZ1 On 9 Aug 2019. As indicated above, CPW canopy species were illegally removed. Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.           No evidence of dead timber removal observed during inspection.           Action Completed Satisfactorily</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 3/9/20). The 2021 annual audit is not due until after August 2021.</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>	
<p>Standard Management Actions Erosion Control</p>	<p>Section 1</p>	<p>Take reasonable steps to prevent, control erosion - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.</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>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<p>Standard Management Actions Erosion Control</p>	<p>Section 1</p>	<p>Don't remove rocks from the site - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.</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>	
<p>Standard Management Actions Erosion Control</p>	<p>Section 1</p>	<p>Can bring rocks from outside the site but once onsite cant be removed. - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due until after August 2021.</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>	



BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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 3/9/20). The 2021 annual audit is not due until after August 2021.</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>N/A</p>	<p>BioBanking Agreement 215 only made on 1/2/17. The review on the Management plan will occur before the end of the 6th year since commencement - February 2023.</p> <p>Comments as per last annual audit by BCT (site visit 3/9/20): Funding for this action will be included in the next management payment. BCT considers that the existing management plan remains fit for purpose and no update is required at this time. It is recommended that this funding will be reallocated by the landowner to other management actions e.g. weed control.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

Additional Management Actions Vert Pest Management	Section 2	Comply with Vertebrate Pest MP - Ongoing from first payment date	In Control	<p>Comments as per last annual audit by BCT (site visit 3/9/20). The 2021 annual audit is not due till after August 2021.</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 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><u>Action Completed Satisfactorily</u></p>	
Additional Management Actions Vert Pest Management	Section 2	<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>	N/A	<p>BioBanking Agreement 215 only made on 1/2/17.          The review of the Management Plan will occur before the end of the 6th year since commencement - February 2023.</p> <p>Comments as per last annual audit by BCT (site visit 3/9/20):          Funding for this action will be included in the next management payment. BCT considers that the existing management plan remains fit for purpose and no update is required at this time. It is recommended that this funding will be reallocated by the landowner to other management actions e.g. weed control.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 3/9/20). The 2021 annual audit is not due until after August 2021.</p> <p>No fertilizers have been used on the site since the commencement of the BBA. 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 3/9/20). The 2021 annual audit is not due until after August 2021.</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 No evidence of artificial structures being constructed to impede natural flow regimes observed during site inspection.</p> <p>Action Completed Satisfactorily</p>	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

<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 3/9/20). The 2021 annual audit is not due till after August 2021.</p> <p>Level and type of weed control reported by landowner is consistent with agreement.</p> <p>MZ1:  <ul style="list-style-type: none"> <li>• Treatment of exotic perennial grasses (African Love Grass, Kikuyu, Carpet Grass) four times a year (team of 2)</li> <li>• Treatment of herbaceous perennials four times a year (team of 2)</li> </ul>                     MZ2:  <ul style="list-style-type: none"> <li>• Treatment of African Love Grass along edges of MZ2</li> </ul>                     MZ3:  <ul style="list-style-type: none"> <li>• Treatment of Paterson’s Curse and Carpet Grass to assist native grasses and establishment of plantings</li> </ul>                     Transmission line • Treatment of exotic perennial grasses and herbaceous perennials that will potentially invade the biobank site MZ4; MZ5; MZ6  <ul style="list-style-type: none"> <li>• Maintenance sweeps especially along track edges; negligible weed incursions</li> </ul>                     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. 2021 report due 18 August.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 3/9/20). The 2021 annual audit is not due until after August 2021.  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 3/9/20). The 2021 annual audit is not due until after August 2021.  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 3/9/20). The 2021 annual audit is not due till after August 2021.  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	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 3/9/20). The 2021 annual audit is not due until after August 2021.</p> <p>No evidence of recent fire activity during all visits (BBA suggest last burn/wildfire was in 2004).          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	N/A	<p>BioBanking Agreement 215 only made on 1/2/17.          The review on the Management plan will occur before the end of the 6th year since commencement - February 2023.</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 3/9/21). The 2021 annual audit is not due until after August 2021.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence.          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>	
--	------------------	--	-------------------	---	--

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 3/9/21). The 2021 annual audit is not due until after August 2021.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence.          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>	
--	-------------------------------	--	-------------------	---	--



BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 3/9/21). The 2021 annual audit is not due until after August 2021.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence. 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 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 3/9/21). The 2021 annual audit is not due until after August 2021.</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>BCT Recommendation: Liaise with Local Land Services regarding the likely effectiveness of undertaking a fox baiting program on the site. Fox baiting.</p> <p>Action completed in Spring 2020.</p>

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

<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 3/9/2020). The 2021 annual audit is not due until after August 2021.</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. No evidence of vertebrate pest activity observed during site inspection. Monitoring identified some fox activity.</p> <p>Action Completed Satisfactorily</p>	
<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 3/9/2020). The 2021 annual audit is not due until after August 2021.</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. No evidence of vertebrate pest activity observed during site inspection. Monitoring identified some fox activity.</p> <p>Action Completed Satisfactorily</p>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

Annexure D: Monitoring, reporting and record keeping requirements	Ref.	Requirement / Obligation			
Monitoring	1.3	Photo Points - Within 12 months or commencement date and every 12 months thereafter	In Control	<p>Comments as per last annual audit by BCT (site visit 3/9/2020). The 2021 annual audit is not due until after August 2021.</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>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

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 3/9/2020). The 2021 annual audit is not due until after August 2021.</p> <p>Quarterly site visits for this reporting period, include 29 April 2019, 16 Oct 2019, 5 Nov 2019, 12 May 2020 and 6 August 2020. No stock observed in all management zones on each site visit. Grazing by stock animals continues to occur on the private property (to the north and south) without any known incursion into the site. No other observed evidence of grazing, trampling or other traces of stock animals.</p> <p><u>Action Completed Satisfactorily</u></p>	
Monitoring	1.3	Number of stock and dates when stock have entered - Quarterly	In Control	<p>No stock observed in all management zones on each site visit. Grazing by stock animals continues to occur on the private property (to the north and south) without any known incursion into the site. As per South32 Appin BioBanking Agreement 2020 Annual Report.</p>	

BULLI SEAM OPERATIONS

Shale Sandstone Transition Forest Offset Management Plan

APNMP0118

Version 1

Monitoring	1.3	<p>Physical condition of fencing</p> <ul style="list-style-type: none"> <li>- control of stock</li> <li>- control of humans</li> <li>- control of ferals and overabundant herbivores</li> <li>- control of vertebrates pests</li> <li>- Quarterly</li> </ul>	In Control	<p>As per South32 Appin BioBanking Agreement Annual Report 2020.</p> <p>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. Quarterly inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts are reported to South32 and the BCT as per BBA.</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>	
Monitoring	1.3	<p>Records of human disturbance</p> <ul style="list-style-type: none"> <li>- Bi-annually</li> </ul>	In Control	<p>As per South32 Appin BioBanking Agreement Annual Report 2020. 2021 report due in August 2021.</p> <p>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. Quarterly inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts are reported to South32 and the BCT as per BBA.</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>	

BULLI SEAM OPERATIONS  
 Shale Sandstone Transition Forest Offset Management Plan  
 APNMP0118  
 Version 1

Monitoring	1.3	Evidence of erosion - Bi-annually	In Control	No areas identified across the management zones which currently require any supplementary erosion control or stabilisation.  As per South32 Appin BioBanking Agreement Annual Report 2020. 2021 report due in August 2021.	
Monitoring	1.3	Evidence of waste - Bi-annually	In Control	No evidence of waste was observed during the quarterly site visits.  As per South32 Appin BioBanking Agreement Annual Report 2020. 2021 report due in August 2021.	
Reporting	2	Landowner must complete and submit and annual report to the Chief Executive for approval using the annual reporting template.	In Control	Report submitted on 19 August 2020.  2021 Report due for submission on 19 August 2021	



## Appendix L: Project Approval 08\_0150 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.	Compliant	Management Plans developed and implemented to minimise harm to the environment.
<b>TERMS OF APPROVAL</b>		
2. The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) Statement of Commitments; (c) PPR; and (d) conditions of this approval. Note: The general layout of the project is shown in Appendices 2 to 4	Non-compliant	Non-compliances have been recorded of Condition 2 of Schedule 4, Condition 11 of Schedule 4, and Condition 15 of Schedule 4. These are 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. The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this approval; and (b) the implementation of any actions or measures contained in these documents.	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.  Note: Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings to the satisfaction of either the Secretary or the Executive Director Mineral Resources. 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.	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: (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.	Compliant	Coal extraction and transportation was below the limits as specified in the approval during the reporting period.
<b>Appin Ventilation Shaft No. 6</b>		
6A. The Proponent may operate Appin Ventilation Shaft No. 6 until 31 December 2041, unless otherwise agreed by the Secretary. Note: Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings, to the satisfaction of the Secretary and DRE. Consequently, this approval will continue to apply in all	Compliant	Ventilation occurred during the reporting period. The cessation date has not been triggered.



<p>other respects other than the right to bore and operate the ventilation shaft until the site has been properly rehabilitated.</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><b>SURRENDER OF CONSENTS AND APPROVALS</b></p>																
<p>8. By 31 December 2012, or as otherwise agreed by the Secretary, the Proponent shall surrender all existing development consents and project approvals for 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>Letters sent on 29 July 2014 to DoPE and 1 Aug 2014 to WSC advising that Illawarra Coal 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 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</p>	<p>Compliant</p>	<p>New buildings and structures were project managed by the</p>														





<p>existing buildings and structure, that are part of the project are constructed in accordance with: (a) the relevant requirements of the BCA; and (b) any additional requirements of the MSB 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 4A of the EP&amp;A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.</li> <li>Part 8 of the EP&amp;A Regulation sets out the requirements for the certification of the project.</li> </ul>		<p>engineering team to the relevant building codes.</p>
<b>DEMOLITION</b>		
<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 carried out in the reporting period was undertaken to the required standard.</p>
<b>OPERATION OF PLANT AND EQUIPMENT</b>		
<p>12. The Proponent shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.</p>	<p>Compliant</p>	<p>Operations are conducted in accordance with approved management plans. Daily, weekly and monthly inspections of plant, 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>
<b>STAGED SUBMISSION OF STRATEGIES, PLANS OR PROGRAMS</b>		
<p>13. With the approval of the 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>
<b>STRATEGIC BIODIVERSITY OFFSETS</b>		
<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 Secretary may, in consultation with OEH, accept in satisfaction of the requirement for the</p>	<p>Compliant</p>	<p>Approved biodiversity offset strategy is in place.</p>



<p>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 Secretary accepts such an offset under this condition, the Secretary shall issue a written statement to the proponent advising:</p> <ul style="list-style-type: none"> <li>(a) the details of the proposed offset land;</li> <li>(b) the offset requirements that are being met;</li> <li>(c) the conservation values that have been relied upon to meet the offsetting requirements;</li> <li>(d) that in the opinion of the Secretary: <ul style="list-style-type: none"> <li>(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</li> <li>(ii) if the land has been subject to a previous statement from the 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.</li> </ul> </li> </ul> <p>If the 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 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 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 Secretary's statement in respect of that land, unless otherwise agreed with the 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 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>



<b>Table 1: Subsidence Impact Performance Measures</b>		
<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 over at least 80% of the stream length subject to vertical subsidence &gt;20 mm.</li> </ul> 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. Negligible impact on structural integrity or external fabric.	
	unless the owner of the feature agrees otherwise in writing.	
Other buildings or structures of identified heritage significance	No loss of heritage value greater than predicted under a Heritage Management Plan prepared under condition 6 below.	
<b>Mine workings</b>		
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible impact, negligible consequence or negligible loss (including main headings under the Georges River)	To remain longterm stable and non-subsiding.	
Second workings	To be carried out only within longwall mining domains, in accordance with an approved Extraction Plan.	
<p>Notes:</p> <ol style="list-style-type: none"> <li>1) The Proponent will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this approval (see condition 5 below).</li> <li>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 Secretary will be the final arbiter.</li> <li>3) The only cliffs of special significance known to occur within the site are termed A7_0088, A7_0102, A8_0001 and A8_0030 in the EA.</li> <li>4) The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.</li> <li>5) In the case of the Dharawal State Conservation Area, the Secretary's satisfaction can only be expressed following consultation with OEH.</li> <li>6) Broughtons Pass Weir is also subject to performance measures set out in Table 2.</li> <li>7) Listings of State or National heritage significance may be made before or after the date of this approval.</li> <li>8) An Aboriginal heritage site of special significance has cultural and/or archaeological values which are considered to hold exceptionally high value, based on assessment of characteristics including size, complexity and quality of the site; its setting within the landscape; and associated cultural and historical contexts for Aboriginal people (see the Bulli Seam Operations PAC Report, July 2010). The only Aboriginal heritage feature within the site accepted as holding special significance as at the date of this approval is S2-2-S305. However, other sites may be identified as a result of studies required for Extraction Plans.</li> </ol>		
<b>Offsets</b>		
2. If the Proponent exceeds the performance measures in Table 1 and the Secretary determines that: <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> then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.	N/A	Condition not triggered during reporting period



<p>Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence</p>														
<p><b>Performance Measures – Built Features</b></p>														
<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 Secretary.</p> <p><i>Table 2: Subsidence Impact Performance Measures</i></p> <table border="1"> <thead> <tr> <th colspan="2"><b>Built features</b></th> </tr> </thead> <tbody> <tr> <td> <p>Key public infrastructure:</p> <ul style="list-style-type: none"> <li>• Main Southern Railway;</li> <li>• Hume Highway; and</li> <li>• Key <b>WaterNSW</b> infrastructure (Nepean Tunnel, Cataract Tunnel, Upper Canal, Broughtons Pass Weir and other weirs)</li> </ul> </td> <td> <p>Always safe and serviceable.</p> <p>Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.</p> </td> </tr> <tr> <td> <p>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).</p> </td> <td> <p>Always safe.</p> <p>Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.</p> <p>Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged</p> </td> </tr> <tr> <td> <p>Houses, industrial premises, swimming pools, farm dams and other built features or improvements</p> </td> <td> <p>infrastructure component must be replaced.</p> </td> </tr> <tr> <th colspan="2"><b>Public safety</b></th> </tr> <tr> <td> <p>Public Safety</p> </td> <td> <p>Negligible additional risk.</p> </td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>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).</li> <li>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 Secretary will be the final arbiter.</li> <li>3) The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.</li> <li>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.</li> </ol>	<b>Built features</b>		<p>Key public infrastructure:</p> <ul style="list-style-type: none"> <li>• Main Southern Railway;</li> <li>• Hume Highway; and</li> <li>• Key <b>WaterNSW</b> infrastructure (Nepean Tunnel, Cataract Tunnel, Upper Canal, Broughtons Pass Weir and other weirs)</li> </ul>	<p>Always safe and serviceable.</p> <p>Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.</p>	<p>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).</p>	<p>Always safe.</p> <p>Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.</p> <p>Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged</p>	<p>Houses, industrial premises, swimming pools, farm dams and other built features or improvements</p>	<p>infrastructure component must be replaced.</p>	<b>Public safety</b>		<p>Public Safety</p>	<p>Negligible additional risk.</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>
<b>Built features</b>														
<p>Key public infrastructure:</p> <ul style="list-style-type: none"> <li>• Main Southern Railway;</li> <li>• Hume Highway; and</li> <li>• Key <b>WaterNSW</b> infrastructure (Nepean Tunnel, Cataract Tunnel, Upper Canal, Broughtons Pass Weir and other weirs)</li> </ul>	<p>Always safe and serviceable.</p> <p>Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.</p>													
<p>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).</p>	<p>Always safe.</p> <p>Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.</p> <p>Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged</p>													
<p>Houses, industrial premises, swimming pools, farm dams and other built features or improvements</p>	<p>infrastructure component must be replaced.</p>													
<b>Public safety</b>														
<p>Public Safety</p>	<p>Negligible additional risk.</p>													
<p>4. Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 2 is to be settled by the Secretary, following consultation with the MSB and the Executive Director Mineral Resources. Any decision by the Secretary shall be final and not subject to further dispute resolution under this approval.</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 summary of the predicted vs observed impacts.</p>												
<p><b>Extraction Plans</b></p>														
<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 Secretary. Each extraction plan must:</p> <p>(a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;</p> <p>(b) be approved by the 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</p>	<p>Compliant</p>	<p>SMPs and Extraction Plans have been prepared as required to include the required information.</p> <p>Approved plans are available on the regulatory website: <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>												



<p>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> <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 OEH, WaterNSW and DPI 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 OEH 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</p>		
--	--	--



<p>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 OEH 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) 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</li> <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, OEH 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: (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and (b) a detailed description of the measures that would be implemented to remediate predicted impacts.</p>	<p>Compliant</p>	<p>The Subsidence Management Plans and Extraction Plans include the required information and are available on the website: <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>
<p><b>First Workings</b></p>		
<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-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>Compliant</p>	<p>First workings have been carried out as required.</p> <p>Link to Subsidence Management Plans and Extraction Plans <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>
<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 Secretary. This program must be prepared in consultation with DRE and be submitted to the Secretary for approval by 30 September 2012 and must include proposals for:</p> <p>(a) 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:</p> <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> <p>(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;</p> <p>(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;</p> <p>(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</p>	<p>Compliant</p>	<p>The environmental research program was approved by DPIE on 13 May 2021.</p>



<p>(e) regular recalibration of methodologies and models used for subsidence effect and impact prediction, as they are applied within the project area.</p> <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><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 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 must be prepared in consultation with OEH, WaterNSW and DRE, be submitted to the Secretary for approval by 30 September 2012, and be:</p> <p>(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</p> <p>(b) targeted at genuine research, as opposed to implementing the matters required by this approval.</p>	<p>Compliant</p>	<p>The environmental research program was approved by DPIE on 13 May 2021.</p>																										
<p><b>SCHEDULE 4 SPECIFIC ENVIRONMENTAL CONDITIONS – GENERAL</b></p>																												
<p><b>NOISE</b></p>																												
<p><b>Noise impact Assessment Criteria</b></p>																												
<p>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.</p> <p><i>Table 1: Interim Noise Criteria dB(A)</i></p> <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>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>A1</sub> (1 min)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Appin Township</td> <td>136, 137, 139, 142, 143</td> <td>44</td> <td>44</td> <td>44</td> <td rowspan="3">52</td> </tr> <tr> <td>135</td> <td>43</td> <td>43</td> <td>43</td> </tr> <tr> <td>100-134, 141, 146-160, 194-197, 200-209, 211, 236-278, 283-284</td> <td>42</td> <td>42</td> <td>42</td> </tr> </tbody> </table> <p><i>Notes to Tables 1, 2 and 3:</i></p> <ul style="list-style-type: none"> <li>To identify the locations referred to in Table 1, 2 and 3, refer to Appendix 5; and</li> <li>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.</li> </ul> <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>	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	<p>N/A</p>	<p>This condition has been superseded by Condition 2 of Schedule 4.</p>
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																								
<p>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.</p>	<p>Non-compliant</p>	<p>One exceedance and one non-compliance with criteria were recorded at monitoring location AE-NS5 during the reporting period. See Section 11 for more detail.</p>																										





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,	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	
	Any other privately owned property	42	42	42	
Douglas Park	All privately-owned	45	45	39	49

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

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.

**Construction Noise**

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.

N/A

No activities relating to this project were conducted during this reporting period.

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.

N/A

No construction activities relating to this project were conducted during this reporting period.

Table 2A: Construction noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A1</sub> (1 min)
All privately owned residences – 7.00am to 6.00pm, Monday to Saturday and 8.00 am to 1.00 pm Saturday	50	45	39	49
All privately owned residences – outside the above hours	45	45	39	49

**Noise Mitigation**

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 Secretary for resolution.

N/A

No requests for noise mitigation measures were received during the reporting period.



<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, to the satisfaction of the 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: <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>
<b>Noise Management Plan</b>		
<p>5. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with EPA and WSC, and submitted to the 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; and</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this approval;</li> </ul>	Compliant	<p>The Noise Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p>
<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 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 Secretary for resolution.</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>



<b>AIR QUALITY &amp; GREENHOUSE GAS</b>																									
<b>Odour</b>																									
7. The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	Compliant	Odour has not been raised as a wider community concern during the reporting period.																							
<b>Greenhouse Gas Emissions</b>																									
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 Secretary.	Compliant	<p>The Air Quality and Greenhouse Gas Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>See Section 6.17.4 for information on the decarbonisation program.</p>																							
<b>Air Quality Criteria</b>																									
<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.</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>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 5: Short term criterion 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> 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>c</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>Notes for Tables 4-6:</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 3580.10.1:2000 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 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> 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>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month	Compliant	<p>Air quality criteria were achieved during the reporting period. It is noted that exceedances of criteria were recorded during the reporting period as a result of the hazard reduction activity in the area (excluded as classified as an extraordinary event).</p> <p>Air quality data is reported on the South32 website 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>
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> 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>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month																						
<b>Air Quality Acquisition Criteria</b>																									
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 acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 5.	N/A	<p>There have been no requests for land acquisition during the reporting period.</p> <p>It is noted that this condition should refer to Conditions 4 and 5 of Schedule 5.</p>																							



Table 7: Long term acquisition criteria for particulate matter			
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>	

Table 8: Short term acquisition criteria for particulate matter		
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>

Table 9: Long term acquisition criteria for deposited dust			
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month

Notes for Tables 7 - 9:

- <sup>a</sup> Total impact (ie incremental increase in concentrations due to the project plus background concentrations due other sources);
- <sup>b</sup> Incremental impact (ie incremental increase in concentrations due to the project on its own);
- <sup>c</sup> Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:200 Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter Gravimetric Method; and
- <sup>d</sup> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illeg activities or any other activity agreed to by the Secretary in consultation with EPA.

Operating Conditions		
<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 Secretary.</p>	Non-compliant	<p>A visible dust emission occurred during the reporting period from Ventilation Shaft 6. See Section 11 for more details.</p> <p>Best practice measures are detailed in the Air Quality and Greenhouse Gas Management Plan. The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p>
Air Quality & Greenhouse Gas Management Plan		
<p>12. The Proponent shall prepare and implement a detailed Air Quality &amp; Greenhouse Gas Management Plan for the project to the satisfaction of the 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 program that uses a combination of high volume samplers and dust deposition gauges to evaluate the performance of the project, and includes a protocol for determining exceedances with the relevant conditions of this approval.</p>	Compliant	<p>The Air Quality and Greenhouse Gas Management Plan has been submitted and approved. The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p> <p>It is noted that the dust deposition gauges were decommissioned in FY21 and will only be used for complaints investigations. The high volume air sampler was also decommissioned. The DustTraks in use provide real time air quality monitoring data.</p>
METEOROLOGICAL MONITORING		
<p>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:</p>	Compliant	<p>Weather stations operate in the vicinity of the operation that generally meet these requirements.</p>



<p>(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.</p>		
<b>SOIL &amp; WATER</b>		
<p>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.</p>	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>		
<p>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.</p> <p>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.</p> <p>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 Secretary for resolution.</p> <p>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 Secretary.</p>	Compliant	Compensatory water supplies have been provided as required.
<b>Surface Water Discharges</b>		
<p>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.</p>	Non-compliant	Discharge volume limits were exceeded at LDP 22 during the reporting period. Exceedances of 50 <sup>th</sup> percentile criteria for BOD at LDP 22 and LDP 3/4 were also recorded during the reporting period. Refer to Section 11 for details.
<b>Surface Water Management Plan</b>		
<p>16. The Proponent update and implement the Surface Water Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI Water and EPA by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary, and submitted to the 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>	Compliant	<p>The Water Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p>



<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; and</li> <li>- any water storages;</li> </ul> </li> <li>• measures to minimise potable water use and to reuse and recycle water;</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> <li>- surface water and stream health impact assessment criteria.</li> </ul> </li> </ul> <p>Note: This plan must be suitably integrated with the Water Management Plans that form part of Extraction Plans.</p>		
<b>WEST CLIFF COAL WASH EMPLACEMENT AREA</b>		
<p>17. The Proponent shall prepare and implement a West Cliff Coal Wash Emplacement Area Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with OEHL and be submitted to the 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>	Compliant	<p>The Coal Wash Emplacement Area Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</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><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 Secretary. This offset strategy must:</p> <p>(a) be prepared in consultation with OEH;</p> <p>(b) be submitted to the Secretary for approval by the end of December 2012, or as otherwise agreed by the 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 Secretary, to the satisfaction of the 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>
<p><b>Underground Coal Wash Emplacement Trial</b></p>		
<p>20. The Proponent shall prepare and undertake an Underground Coal Wash Emplacement Trial for the project to the satisfaction of the Secretary. The design of the trial must:</p> <p>(a) be undertaken in consultation with OEH;</p> <p>(b) be submitted to the 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 OEH.</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>
<p><b>PROJECT SURFACE INFRASTRUCTURE MANAGEMENT</b></p>		
<p><b>Gas Drainage Management Plan</b></p>		
<p>21. The Proponent shall prepare and implement 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 Secretary. This plan must be submitted to the 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>Compliant</p>	<p>The Gas Drainage Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>There was no gas drainage infrastructure installed during the reporting period.</p>



<p>(d) avoidance of significant impacts and minimisation of impacts generally; (e) flaring or use of drained hydrocarbon gases, wherever practicable; (f) achievement of applicable standards and goals; (g) mitigation and/or compensation for significant noise, air quality and visual impacts; and (h) rehabilitation of disturbed sites.</p>		
<p><b>Surface Activities Management Plan</b></p>		
<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: (a) be submitted to the Secretary for approval by 30 April 2017, unless the Secretary agrees otherwise; and (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> <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>Compliant</p>	<p>The Surface Activities Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <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: (a) undertake a dilapidation survey of the Upper Canal, in consultation with WaterNSW and the Heritage Division; (b) prepare final detailed design plans in consultation with WaterNSW; and (c) undertake vibration monitoring for all earthworks undertaken within 25 metres of the Upper Canal, to the satisfaction of the 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: (a) undertake a dilapidation survey of the Upper Canal in consultation with WaterNSW and the Heritage Division; and (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 the Heritage Division, to the satisfaction of the 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 shall update the approved Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with OEH, the Aboriginal community, Council, any local historical organisations and relevant landowners;</p> <p>(b) be submitted to the 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>(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>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>	<p>Compliant</p>	<p>The Heritage Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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>. The requirements of the plan are being implemented.</p>
<p><b>TRANSPORT</b></p>		
<p><b>Monitoring of Coal Transport</b></p>		
<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>	<p>Compliant</p>	<p>Records of coal transport are maintained.</p> <p>These records are on the South32 website: <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>



<b>Traffic Management Plan</b>		
26. The Proponent shall update the approved Traffic Management Plan for the project to the satisfaction of the Secretary. This plan must be: (a) prepared in consultation with the RMS, WCC, WSC and the CaCC; (b) submitted to the Secretary for approval by 31 January 2017; (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 (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.	Compliant	The Traffic Management Plan has been submitted and approved.  The plan is available on the website: <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> . The requirements of the plan are being implemented.
26A. The Proponent shall ensure that safe access to Ventilation Shaft No.6 is provided from public roads.	Compliant	The intersection was constructed to ensure safe access to the site.
<b>VISUAL</b>		
<b>Visual Amenity and Lighting</b>		
27. The Proponent shall: a) minimise the visual impacts, and particularly the off-site lighting impacts, of the main infrastructure area and associated ancillary surface works; b) take all practicable measures to further mitigate off-site lighting impacts from the project; and 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 Secretary.	Compliant	Lighting has been installed to minimise off-site impacts.
<b>WASTE</b>		
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, to the satisfaction of the Secretary.	Compliant	Waste management has been undertaken in accordance with the Waste Management Plan. See Section 6.19.
29. The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Secretary. This plan must be submitted to the Secretary by 30 September 2012.	Compliant	The Waste Management Plan has been submitted and approved.  The plan is available on the website: <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> .  The requirements of the plan are being implemented.
<b>BUSHFIRE MANAGEMENT</b>		
30. The Proponent shall: (a) ensure that the project is suitably equipped to respond to any fires on site; and	Compliant	Sites are equipped to manage bushfires.  Asset protection zones are maintained as required.



<p>(b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.</p>																						
<p><b>REHABILITATION</b></p>																						
<p><b>Rehabilitation Objectives</b></p>																						
<p>31. The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. 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> <p><i>Table 10 Rehabilitation Objectives</i></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 Executive Director Mineral Resources 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 Executive Director Mineral Resources 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 <i>Mine Subsidence Compensation Act 1961</i>.</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><i>Notes:</i></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 a 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 landform.</li> </ol>	Feature	Objective	Mine site (as a whole)	Safe, stable & non-polluting	Project Surface infrastructure	To be decommissioned and removed, unless the Executive Director Mineral Resources 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 Executive Director Mineral Resources 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 <i>Mine Subsidence Compensation Act 1961</i>.</li> </ul>	Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure	<p>Compliant</p>	<p>Rehabilitation is conducted in accordance with the MOP/Rehabilitation Management Plan.</p>
Feature	Objective																					
Mine site (as a whole)	Safe, stable & non-polluting																					
Project Surface infrastructure	To be decommissioned and removed, unless the Executive Director Mineral Resources 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 Executive Director Mineral Resources 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 <i>Mine Subsidence Compensation Act 1961</i>.</li> </ul>																					
Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure																					
<p><b>Progressive Rehabilitation</b></p>																						
<p>32. The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.</p>	<p>Compliant</p>	<p>Rehabilitation is conducted in accordance with the MOP/Rehabilitation Management Plan.</p> <p>Rehabilitation activities are detailed in Section 8</p>																				
<p><b>Rehabilitation Management Plan</b></p>																						
<p>33. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project, with specific reference to all surface facilities sites, to the satisfaction of the Executive Director Mineral Resources. This plan must:</p> <p>(a) be prepared in consultation with the Department, OEH, DPI Water, Council and the CCC;</p> <p>(b) be prepared in accordance with any relevant DRE guideline and be consistent with the rehabilitation objectives in the EA and in Table 11;</p> <p>(c) provide for detailed mine closure planning, including measures to minimise socio-economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance;</p> <p>(d) build, to the maximum extent practicable, on the other management plans required under this approval; and</p>	<p>Compliant</p>	<p>The MOP/Rehabilitation Management Plan has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p>																				



<p>(e) be submitted to the Executive Director Mineral Resources for approval by 30 September 2012.</p> <p>Note: The Rehabilitation Management Plan should address all land impacted by the project, whether prior to or following the date of this approval.</p>		
<p><b>BIODIVERSITY</b></p>		
<p>Appin East Mine Gas Safety Management Project</p>		
<p>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 Secretary.</p>	<p>Compliant</p>	<p>The Appin East Mine Safety Gas Project biodiversity requirements have been incorporated into the Biodiversity Management Plan.</p> <p>The Biodiversity Management Plan has been submitted and approved.</p>
<p><b>Ventilation Shaft No. 6</b></p>		
<p>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:</p> <p>(a) be prepared in consultation with OEH and to the satisfaction of the Secretary;</p> <p>(b) incorporate at least 8.7 hectares of existing Cumberland Plain Woodland vegetation; and</p> <p>(c) make suitable arrangements to protect and manage this offset area in perpetuity.</p> <p>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.</p>	<p>Compliant</p>	<p>The Ventilation Shaft 6 Biodiversity Offset Strategy has been submitted and approved.</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, to the satisfaction of the Secretary. The plan must:</p> <p>(a) be prepared in consultation with OEH, and submitted to the 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>Compliant</p>	<p>A Biodiversity Management Plans is in place.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</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><b>SCHEDULE 5: ADDITIONAL PROCEDURES</b></p>		
<p><b>NOTIFICATION OF LANDOWNERS</b></p>		
<p>1. As soon as practicable 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</p> <p>(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>Compliant</p>	<p>As noted in Section 6.8, non-compliances of noise impact assessment criteria were recorded in the reporting period at AE-NS5.</p> <p>Notifications have been made to the relevant residents as required.</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 Secretary in writing for an independent review of the impacts of the project on his/her land.</p> <p>If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Proponent shall:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:</p>	<p>N/A</p>	<p>Condition not triggered during reporting period.</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 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 Secretary.</p> <p>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 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>	N/A	Condition not triggered during reporting period.
<b>LAND ACQUISITION</b>		
<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 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;</li> </ul> <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 Secretary; and</li> </ul>	N/A	Condition not triggered during reporting period.



<ul style="list-style-type: none"> <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 Secretary for resolution.</p> <p>Upon receiving such a request, the 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 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 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 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 obligations to acquire the land shall cease, unless the 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>



<b>SCHEDULE 6: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING</b>		
<b>ENVIRONMENTAL MANAGEMENT</b>		
<b>Environmental Management Strategy</b>		
<p>1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:</p> <p>(a) be submitted to the Secretary for approval by 30 September 2012;</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;</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>• copies of any 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 has been submitted and approved.</p> <p>The plan is available on the website: <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> <p>The requirements of the plan are being implemented.</p>
<b>Management Plan Requirements</b>		
<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>(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>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>(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 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 Secretary, to the satisfaction of the Secretary.</p>	<p>Compliant</p>	<p>Actions have been implemented to address exceedances of criteria. Further detail is provided in Section 11.</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 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> <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>Compliant</p>	<p>This condition has been addressed in this Annual Review.</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 (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: (a) the submission of an annual review under Condition 4 above; (b) the submission of an incident report under Condition 7 below; (c) the submission of an audit report under Condition 9 below; and (d) any modification to the conditions of this approval, (unless the conditions require otherwise), the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the 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><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 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 IMC 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></p>		
<p><b>Incident Reporting</b></p>		
<p>7. The Proponent shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	<p>Compliant</p>	<p>No incidents causing or threatening to cause material environmental harm occurred during the reporting period.</p> <p>Exceedances of limits were notified to the Department as required.</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,</p>	<p>Compliant</p>	<p>Monitoring data is reported in the 14-day EPL Report. This</p>



<p>in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.</p>		<p>data is available on the South32 website 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>
<p><b>INDEPENDENT ENVIRONMENTAL AUDIT</b></p>		
<p>9. By the end of December 2013, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:</p> <p>(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;</p> <p>(b) include consultation with the relevant agencies;</p> <p>(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);</p> <p>(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and</p> <p>(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.</p> <p>Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.</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 FY20</p> <p>A copy of the Audit findings and Response to Recommendations can be found on South32 Regulatory webpage. <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>
<p>10. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.</p>	<p>Compliant</p>	<p>The audit report, dated December 2019, was provided to the Department within the required timeframe.</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 Secretary; and</li> </ul> <p>(b) keep this information up-to-date, to the satisfaction of the Secretary.</p>	<p>Compliant</p>	<p>All approved plans, strategies and monitoring results are on the South32 webpage. <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>



---

**Appendix M: Independent Environmental Audit 2019 - Action Response Table**

## Appendix M: Progress against actions identified in the 2019 Independent Environmental Audit at Bulli Seam Operations (BSO)

### Minister's Conditions of Approval PA 08\_0150

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status as at 30 June 2021
2.1	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.	<p>The audit team observed inadequate storage of chemicals, oils and waste oil including bunds filled with water and other debris, bunds with insufficient capacity and drains to sumps blocked at the maintenance workshops, laydown areas and waste storage areas at Appin East and West.</p> <p>A bund, sump and oily water management procedure has been developed and it is understood a review of facilities has been conducted in accordance with the procedure. Actions are to be prioritised and implemented on a risk basis and capital availability.</p>	Observation – Non Compliance	Implement the actions from the review.	<p>IMC will continue to review and implement hydrocarbon and chemical facility improvement projects on the basis of risk and funding availability.</p> <p>Bunds will continue to be maintained on an ongoing basis.</p>	<p>IMC will continue to review and implement hydrocarbon and chemical facility improvement projects on the basis of risk and funding availability.</p> <p>Bunds will continue to be maintained on an ongoing basis.</p> <p><b>Ongoing</b></p>
2.12	<p>The Proponent shall ensure that all the plant and equipment used on 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>A SAP maintenance system is in place for preventative maintenance scheduling, execution and close out. A review of scheduled versus completed maintenance is done every Monday and rescheduling undertaken as necessary.</p> <p>Evidence of maintenance of subcontractor vehicles was also sighted by the auditor.</p> <p>New maintenance plans are being developed for bund checks, but have not yet been finalised and added to SAP.</p> <p>New metering at LDP24 is currently undergoing commissioning and will also need maintenance plans to be</p>	Observation - Compliant	Ensure maintenance plans and preventative maintenance schedules are set up in SAP for bund checks and new metering at LDP24.	<p>SAP notifications have been set up for checking of bunds at Appin East, Appin West and the West Cliff Coal Preparation Plant.</p> <p>Notifications will be set up for checking of bunds at Appin North by 31 March 2020.</p> <p>SAP notifications will be set up for the maintenance of equipment at</p>	<p>The N2 Notification has been created in SAP for cleaning of the bunds, Sumps and Separators at AN and the Site environmental Specialist has outlined the work instructions for the IMC projects department.</p> <p><b>Complete (as at 30 June 2020)</b></p>

		<p>developed and added to SAP maintenance system.</p> <p>All personnel have access to system to add maintenance requests.</p> <p>The environment team conduct weekly and monthly inspections at Appin North, East and West. Inspections are recorded in G360. The Environment Specialists can raise maintenance work orders directly from G360 during the inspection.</p>			LDP24 by 31 March 2020.	
3.9	<p>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 Secretary. This program must be prepared in consultation with DRE and be submitted to the Secretary for approval by 30 September 2012 and must include proposals for:</p> <p>(a) Testing (including core testing and in situ) to further define the mechanical, hydrogeological and geochemical properties of rock strata within each longwall domain, including:</p> <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> <p>(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;</p> <p>(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;</p> <p>(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</p> <p>(e) Regular recalibration of methodologies and models used for subsidence effect and impacts prediction, as they are applied within the project area.</p>	<p>South32 advised that the Environmental Research Program (ERP) was submitted to the Department on 19 September 2012 but have not received approval to-date. The ERP has been implemented and Extraction Plans updated to include the results.</p>	Administrative Non Compliance	<p>Recommend to confirm with DPIE that the ERP is approved or confirm the actions necessary to obtain approval.</p>	<p>Correspondence will be submitted to DPIE requesting clarification on any actions necessary for approval of the Environmental Research Program by 31 March 2020.</p>	<p>Letter and revised ERP (Rev 2) was submitted, seeking confirmation the document was approved when submitted in 2012. The ERP was revised/ updated in accordance with Condition 5, Schedule 6 of the BSO Project Approval.</p> <p>Plan approved 13 May 2021.</p> <p><b>Complete</b></p>

Note: Results of this program are to be incorporated within subsequent Extraction Plans, including the subplans required under condition 5(g)-(l) above.

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.

Table2: Noise Criteria dB(A)

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	
Area	Receiver Number	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
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	40	40	40	

Attended noise monitoring is conducted on a quarterly basis. Since 2019 noise monitoring has been conducted by ERM, prior to which it was conducted internally. Noise levels were above the assessment criteria on three occasions during 2019. Exceedances of assessment criteria were recorded at Appin No. 1 & 2 in June and September and at Vent Shaft 6 in March 2019. Investigations into the exceedances did not identify and significant issues with the vent fans however there is a plan to replace attenuators and inlet vanes to determine if that will resolve the issue. No regulatory action has been taken.

Non Compliance

Continue to investigate sources of noise exceedances and implement corrective actions.

IMC will continue to investigate sources of noise exceedances and implement corrective actions where appropriate.

IMC will continue to investigate sources of noise exceedances and implement corrective actions where appropriate.

Ongoing

		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>										
4.14	<p>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.</p> <p>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.</p> <p>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 Secretary for resolution.</p> <p>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 Secretary.</p>		<p>It is understood that BSO receive approximately half a dozen compensatory water requests per year. These have been historically handled through the subsidence advisory board. However, the new process is that the claims are now received directly by BSO.</p> <p>Short term solutions include a water truck taking water to affected landholders. Long term solutions can include new bore/s and drilling deeper at current bore.</p> <p>Claims are reviewed and tracked through the monthly Subsidence Review Meeting. Currently there is one case that has been referred to the Secretary for resolution and is</p>				Observation - Compliant	Ensure BSO continues to work with DPIE to resolve compensatory water dispute.	IMC will continue to work with DPIE to resolve compensatory water requests as applicable.	IMC will continue to work with DPIE to resolve compensatory water requests as applicable.	
	<p style="text-align: right;"><b>Ongoing</b></p>										



		currently with the department for consideration.				
4.15	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.	Refer to EPL P1.3, L2.4, L3.1	Non Compliance	Refer EPL Compliance.	IMC will continue to investigate any exceedances of water quality criteria as they occur and implement corrective actions where identified.	IMC will continue to investigate any exceedances of water quality criteria as they occur and implement corrective actions where identified. <b>Ongoing</b>
4.23A	Prior to construction of the Appin East Mine Gas Safety Management Project, the Proponent shall: (a) Undertake a dilapidation survey of the Upper Canal, in consultation with WaterNSW and the Heritage Division; (b) Prepare final detailed design plans in consultation with WaterNSW; and (c) Undertake vibration monitoring for all earthworks undertaken within 25 metres of the upper Canal, to the satisfaction of the Secretary.	Consultation of the modification for the pipeline was undertaken with OEH, but nothing specific was conducted with the Heritage Division. OEH made no comments on the Upper Canal in their submission on the MOD. No evidence of further OEH or Heritage Division consultation was provided. Historical Heritage assessment attached to the MOD states that there is only one heritage site at this location and that impacts to this would be minor and that no further heritage assessment is required prior to commencement of the works. Extensive consultation and communication was conducted with WaterNSW during 2017, including discussions in relation to the following: <ul style="list-style-type: none"> <li>• Dilapidation survey</li> <li>• Detail design plans</li> <li>• Vibration</li> </ul>	Administrative Non Compliance	No further action required – historic ANC	No further action	No further action <b>Complete</b>
4.23B	Following the completion of construction of the Appin East Mine Gas Safety Management Project, the Proponent shall:	Extensive consultation and communication was conducted with WaterNSW during 2017, including discussions in relation to the following: <ul style="list-style-type: none"> <li>• Dilapidation survey</li> <li>• Detail design plans</li> <li>• Vibration monitoring</li> </ul>	Administrative Non Compliance	No further action required – historic ANC	No further action	No further action <b>Complete</b>

		<ul style="list-style-type: none"> <li>Monitoring results and photos</li> </ul> <p>No consultation with Heritage Division on completion of the pipeline was provided.</p>				
4.28	<p>The Proponent shall:</p> <p>(a) Minimise the waste (including coal reject) generated by the project; and</p> <p>(b) Ensure that the waste generated by the project is appropriately stored, handled and disposed of, to the satisfaction of the Secretary.</p>	<p>Two incidents were reported to the EPA related to issues of waste being inappropriately disposed at the site:</p> <ol style="list-style-type: none"> <li>Contents of reagent bund removed and placed at the slurry ponds</li> <li>Oil separation pit cleaned out and disposed at Appin North pit top.</li> </ol> <p>Following the incidents, the WMP has been reviewed but not yet updated.</p> <p>A procedure for bund, sump and oily water maintenance has been developed and includes requirements for inspection and maintenance and assessment of historic bunds for capacity.</p> <p>Waste is managed by Cleanaway and a new contract for Cleanaway to manage the area at Appin East and Appin West has recently been negotiated.</p> <p>Cleanaway will issue a notice if there is contamination of the waste streams. A Cleanaway representative is on site at Appin West full time and another representative will be shared between Appin East and north.</p>	Non Compliance	Ensure Waste Management Plan is updated and approved.	<p>A review of the Waste Management Plan has been undertaken and opportunities for improvement have been identified. Additional review of the Plan is anticipated pending discussions with the EPA. The Plan will be submitted to DPIE for review by 31 December 2020.</p>	<p>Waste Management Plan reviewed November 2020.</p> <p>Plan approved 5 November 2020.</p> <p><b>Complete</b></p>
4.29	<p>The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Secretary. This plan must be submitted to the Secretary by 30 September 2012.</p>	<p>BSO has reviewed the current Waste Management plan following recent incidents but has not yet updated the document.</p>	Observation - Compliant	Ensure Waste Management Plan is updated and approved.	As above	<p>As above</p> <p><b>Complete</b></p>

6.1	<p>The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:</p> <ol style="list-style-type: none"> <li>(a) Be submitted to the Secretary for approval by 30 September 2012;</li> <li>(b) Provide the strategic framework for environmental management of the project;</li> <li>(c) Identify the statutory approvals that apply to the project;</li> <li>(d) Describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;</li> <li>(e) Describe the procedures that would be implemented to: <ul style="list-style-type: none"> <li>• Keep the local community and relevant agencies informed about the operation and environmental performance of the project;</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> </li> <li>(f) Include: <ul style="list-style-type: none"> <li>• Copies of any 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> </li> </ol>	<p>The EMS doesn't include "copies of any strategies, plans and programs approved under the conditions of this approval" but does list all relevant plans and these are generally available online with the EMS</p>	Administrative Non Compliance	Suggest request removal or reword of condition 6.1 (f) dot point 1	Administrative Review of Project Approval, including this item, to be submitted to DPIE by 30 June 2020.	<p>Application for administrative modification of Project Approval, including this item, was submitted to DPIE on 3/6/2020.</p> <p>It was decided not to proceed with administrative amendments at this time.</p> <p>The EMS was reviewed in September 2020 and approved on 1 October 2020.</p> <p>It was noted in the EMS that the documents are listed as references to comply with this condition. All relevant documents are available on the South32 website.</p> <p><b>Complete</b></p>
6.5	<p>Within 3 months of:</p> <ol style="list-style-type: none"> <li>(a) The submission of an annual review under Condition 4 above;</li> <li>(b) The submission of an incident report under Condition 7 below;</li> <li>(c) The submission of an audit report under Condition 9 below; and</li> <li>(d) Any modification to the conditions of this approval, (unless the conditions require otherwise), the Proponent shall review, and if necessary revise, the strategies, plans and programs required under this approval to the satisfaction of the Secretary.</li> </ol> <p><i>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.</i></p>	<p>Management plan reviews have generally been conducted on an annual basis however some reviews are overdue. Reviews have not been conducted following submission of incident reports. It is noted that BSO has developed a management plan review log and reviews are now being documented.</p>	Administrative Non Compliance	Ensure management plans are reviewed and revised as required by this condition.	Management Plan Review Log in place and reviews will be undertaken as required.	<p>Management Plan Review Log in place and reviews will be undertaken as required.</p> <p><b>Ongoing</b></p>

6.7	The Proponent shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Ferric chloride discharge. Initial notification was to EPA hotline – refer to EPL for details. Letter to EPA (7 day report) was provided on 5/11. Incident occurred on the 18 <sup>th</sup> October. DPIE was notified on Friday 19 <sup>th</sup> October along with other agencies but was not provided with a report until 5 November.	Administrative Non Compliance	Ensure DPIE is provided with a written report within 7 days of the date of the incident.	DPIE will be provided a report within 7 days of any incident that has caused or threatened to cause material harm to the environment.	DPIE will be provided a report within 7 days of any incident that has caused or threatened to cause material harm to the environment.  <b>As required</b>
6.10	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	The last IEA Audit report was submitted on 27 March 2017, slightly later than the 6 week due-date of 7 March 2017. No evidence was provided that a response plan was submitted as required by the condition. An incorrect response plan is currently published online.	Administrative Non Compliance	No further action, historical ANC. Ensure response plan is developed and submitted with this IEA.	Correct response to recommendations for 2017 IEA is now online.  Response to recommendations for 2019 IEA is this document.	Correct response to recommendations for 2017 IEA is now online.  Response to recommendations for 2019 IEA is this document.  <b>Complete (as at 30 June 2020)</b>

## Environmental Protection Licence 2504

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status																								
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Non-compliances with water quality limits were reported to the EPA during the reporting period. Two Penalty notices were issued by the EPA in February 2019 for failing to maintain or operate equipment in a proper and efficient manner and for causing pollution of waters due to discharged of ferric chloride to the Georges River.	Non Compliance	No further action required.	No further action	No further action																								
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.	Non-compliances with water quality limits were reported to the EPA during the reporting period. Two Penalty notices were issued by the EPA in February 2019 for failing to maintain or operate equipment in a proper and efficient manner and for causing pollution of waters due to discharged of ferric chloride to the Georges River.	Non Compliance	No further action required.	No further action	No further action																								
L2.4	Water and/or Land Concentration Limits:																													
	Point 3 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>3DGM 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>	Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM 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	Non-compliance with the concentration limits were reported to the EPA on three occasions during the reporting period. All events were investigated, and no further action taken.	Non Compliance	No further action required.	No further action	No further action
Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM 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																									

	<p>Point 22</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>3DGM 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>	Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM 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	<p>Two exceedances of BOD above the 100 percentile concentration limit were reported during the audit period. The exceedances were investigated, and action taken where appropriate.</p>	<p>Non Compliance</p>	<p>No further action required</p>	<p>No further action</p>	<p>No further action</p>
Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM 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																									
	<p>Point 23</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>3DGM concentration limit</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <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></td> <td></td> <td></td> <td>6.5 – 8.5</td> </tr> <tr> <td>Total Suspended Solids</td> <td>Milligrams per litre</td> <td></td> <td></td> <td></td> <td>50</td> </tr> </tbody> </table>	Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit	Oil and Grease	Milligrams per litre				10	pH	pH				6.5 – 8.5	Total Suspended Solids	Milligrams per litre				50	<p>One exceedance of TSS concentration limit was reported during the audit period. Action was taken to replace filter media and subsequent samples returned to normal levels.</p>	<p>Non Compliance</p>	<p>No further action required</p>	<p>No further action</p>	<p>No further action</p>
Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit																									
Oil and Grease	Milligrams per litre				10																									
pH	pH				6.5 – 8.5																									
Total Suspended Solids	Milligrams per litre				50																									
<p>L3.1</p>	<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;</p> <p>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> </tbody> </table>	Point	Units of Measure	Volume/Mass Limit	18	Kilolitres per day	1000	19	Kilolitres per day	2000	22	Kilolitres per day	80	<p>One exceedance on Point 24 was reported during the audit period. The exceedance was investigated, and action taken where appropriate</p>	<p>Non Compliance</p>	<p>No further action required</p>	<p>No further action</p>	<p>No further action</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> <ul style="list-style-type: none"> <li>a) The processing, handling, movement and storage of materials and substances used to carry out the activity; and</li> <li>b) The treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.</li> </ul>			<p>A formal warning letter was issued by the EPA in March 2019 for failure to bund a flocculant tank at Appin North. A temporary bund was placed at the tank. The tank has since been decommissioned.</p> <p>The audit team observed potentially inadequate storage of chemicals, oils and waste oil including bunds filled with water and other debris, bunds with insufficient capacity and drains to sumps blocked by mud at the maintenance workshops, laydown areas and waste storage areas at Appin East and West. A bund, sump and oily water management procedure has been developed and it is understood a review of facilities has been conducted in accordance with the procedure. Actions are to be prioritised and implemented on a risk basis and capital availability.</p> <p>Two incidents were reported to the EPA related to issues of waste being inappropriately disposed at the site:</p> <ol style="list-style-type: none"> <li>1. Contents of reagent bund removed and placed at the slurry ponds</li> <li>2. Oil separation pit cleaned out and disposed at Appin North pit top</li> </ol> <p>No further action was taken by the EPA.</p>	Non Compliance	Implement the actions of the review	<p>IMC will continue to review and implement hydrocarbon and chemical facility improvement projects on the basis of risk and funding availability. Bunds will continue to be maintained on an ongoing basis.</p>	<p>IMC will continue to review and implement hydrocarbon and chemical facility improvement projects on the basis of risk and funding availability. Bunds will continue to be maintained on an ongoing basis.</p> <p><b>Ongoing</b></p>
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity:			BSO reported a non-compliance with condition O2.1 relating to the discharge	Non Compliance	Ensure maintenance plans and	SAP notifications have been set up for checking of	Maintenance plan numbers as follows:

	<p>a) Must be maintained in a proper and efficient condition; and b) Must be operated in a proper and efficient manner</p>	<p>of ferric chloride into the Georges River in October 2018. The incident resulted from replacement of a pump taken out of service for maintenance with a pump that discharged at a higher rate and caused overdosing of the sediment dam at point 19. A SAP maintenance system is in place for preventative maintenance scheduling, execution and close out. A review of scheduled versus completed maintenance is done every Monday and rescheduling undertaken as necessary. Evidence of maintenance of subcontractor vehicles was also sighted by the auditor. New maintenance plans are being developed for bund checks, but have not yet been finalised and added to SAP. New metering at LDP24 is currently undergoing commissioning and will also need maintenance plans to be developed and added to SAP maintenance system</p>		<p>preventative maintenance schedules are set up in SAP for bund checks and new metering at LDP24.</p>	<p>bunds at Appin East, Appin West and the West Cliff Coal Preparation Plant.  Notifications will be set up for checking of bunds at Appin North by 31 March 2020.  SAP notifications will be set up for the maintenance of equipment at LDP24 by 31 March 2020.</p>	<p>1. 1W production inspection is active – 30825803 2. 1W electrical work order is active – 30825763 3. 4W instrument calibrations work order is active – 30825766*** 4. 52W instrument work order, active - 30825773***  *** denotes maintenance plans that relate to LDP24 instrumentation calibration and replacement. the remainder are part of ongoing maintenance for electrical faults etc.  <b>Complete</b></p>						
M6.1	<p>For each discharge point or utilisation area specified below, the licensee must monitor: a) The volume of liquids discharged to water or applied to the area; b) The mass of solids applied to the area; c) The mass of pollutants emitted to the air; At the frequency and using the method and units of measure, specified below.</p>											
	<p>Point 4</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Unit of measure</th> <th>Sampling method</th> </tr> </thead> <tbody> <tr> <td>Continuous</td> <td>Kilolitres per day</td> <td>In line instrumentation</td> </tr> </tbody> </table>	Frequency	Unit of measure	Sampling method	Continuous	Kilolitres per day	In line instrumentation	<p>Monitoring report indicates manual readings taken from January to December 2017 as flow meters were being replaced. EPA was not notified of the change of sampling method.</p>	<p>Administrative Non Compliance</p>	<p>Ensure issues with sampling equipment are notified to the EPA.</p>	<p>EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.</p>	<p>EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.  <b>As required</b></p>
Frequency	Unit of measure	Sampling method										
Continuous	Kilolitres per day	In line instrumentation										



		Illawarra Coal now maintains a Correspondence Register to record all correspondence with regulators and it was sighted that issues with monitoring equipment was now being notified to the EPA.												
	Point 19 <table border="1"> <thead> <tr> <th>Frequency</th> <th>Unit of Measure</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Continuous during discharge</td> <td>Kilolitres per day</td> <td>In line instrumentation</td> </tr> </tbody> </table>	Frequency	Unit of Measure	Sampling Method	Continuous during discharge	Kilolitres per day	In line instrumentation	Monitoring report indicates manual readings taken from February to December 2017 as flow meters being replaced. Refer above	Administrative Non Compliance	Ensure issues with sampling equipment are notified to the EPA.	EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.	EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.  <b>As required</b>		
Frequency	Unit of Measure	Sampling Method												
Continuous during discharge	Kilolitres per day	In line instrumentation												
	Point 24 <table border="1"> <thead> <tr> <th>Frequency</th> <th>Unit of Measure</th> <th>Unit of Measure</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Continuous during discharge</td> <td>Kilolitres per day</td> <td>KL/month per day</td> <td>Flow meter and continuous logger</td> </tr> </tbody> </table>	Frequency	Unit of Measure	Unit of Measure	Sampling Method	Continuous during discharge	Kilolitres per day	KL/month per day	Flow meter and continuous logger	Monitoring report indicates manual readings taken from January to December 2017 as flow meters being replaced. Refer above	Administrative Non Compliance	Ensure issues with sampling equipment are notified to the EPA.	EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.	EPA will be notified as required where there are any changes to the sampling method as specified in the EPL.  <b>As required</b>
Frequency	Unit of Measure	Unit of Measure	Sampling Method											
Continuous during discharge	Kilolitres per day	KL/month per day	Flow meter and continuous logger											
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.  Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	Refer to condition L1.1 re ferric chloride incident.  The incident occurred on 18/10 and the 7 day written notification was provided on 5/11.	Administrative Non Compliance	Ensure notification is undertaken as required.	The EPA will be provided a report within 7 days of any incident that has caused or threatened to cause material harm to the environment.	The EPA will be provided a report within 7 days of any incident that has caused or threatened to cause material harm to the environment.  <b>As required</b>								
U1.1	AIM: The aim of this Environment Improvement Program (EIP) is to improve water quality and aquatic health in the Georges River downstream of licenced discharge point 10 (Brennans creek discharge). WORKS: The licensee must undertake its commitments to works and activities described in the latest controlled version of the document titled "Illawarra Coal, Bulli Seam Operations, Georges River Environmental Improvement Program".	The EIP document is available on the company website. No report has been submitted for 2019. Reports for 2017 and 2018 reviewed. Monitoring of macroinvertebrates and ecotoxicity is continuing. BSO is in discussion with the EPA as to next steps to enable proposed discharge limits at Point 10 to be achieved. It is	Non Compliance	No further action – dependent on outcome of negotiation with EPA.	IMC is continuing to engage with the EPA on the project to improve water quality in the Georges River.	IMC is continuing to engage with the EPA on the project to improve water quality in the Georges River.  The EIP has been replaced with the Georges River Aquatic Health Monitoring Program.								

	<p>The latest version of the document must be displayed on the licensee's website.</p> <p>In addition to the reporting and consultation commitments in document, the licensee must submit a report to the EPA by the due date recommending licence limits for discharge point 10.</p> <p>DUE DATE: 31 December 2018 DUE DATE: 30 June 2019</p> <p>Note: This EIP follows from Pollution Reduction Programs 19 and 20.</p>	<p>expected that another water filtration plant will be constructed at Appin North.</p>				<p>A temporary WTP has been commissioned at Appin North and a permanent WTP is under construction.</p> <p><b>Ongoing</b></p>
--	---	---	--	--	--	--

### Consolidated Coal Leases 724 and 767

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
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>Refer to CoA and EPL for air and water quality non-compliances. Erosion and sediment control was noted around construction works. Pit top areas run into stormwater management system.</p>	<p>Non Compliance</p>	<p>Refer to CoA and EPL for air and water quality non-compliances.</p>	<p>No further action.</p>	<p>No further action.</p>

EPBC Approval 2010/5350

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
5	<p><b>Shale Sandstone Transition Forest</b>                      The person taking the action must provide to the Minister for approval within 1 year of the date of this approval, a plan for the management of the Shale / Sandstone Transition Forest offset. The approved Shale / Sandstone Transition Forest offset Management Plan (the Forest plan) must include but not be limited to:</p> <ul style="list-style-type: none"> <li>a. Specific management measures to control weed species, pest animals, public access and otherwise manage the Shale / Sandstone Transition Forest offset so that the ecological condition of the Shale / Sandstone Transition Forest is maintained or enhanced to a higher condition than that being lost as a result of this action;</li> <li>i. This may be demonstrated through comparisons of floristic diversity and structure, vegetation health and/or percentage cover of introduced or weed plants;</li> <li>b. An outline of key milestones and performance objectives;</li> <li>c. Measures for annual monitoring of the ongoing quality (as measured against the ecological survey information referred to at Conditions 4 a) of the Shale / Sandstone Transition Forest Offset and the effectiveness of management actions. Reports containing the monitoring results must be submitted to the department within 30 days of every 12 month anniversary of the date the Shale / Sandstone Transition Forest offset is protected in perpetuity; and</li> <li>d. Corrective actions and contingency measures to be implemented should monitoring indicate a decrease in the quality of the Shale / Sandstone Transition Forest conservation offset.</li> </ul> <p>The approved Forest plan must be implemented within 2 years of the date of this approval.</p>	<p>Approval of the original plan outside audit period.</p> <p>Monitoring Report 2017 (covering once a year monitoring in November 2016), submitted 23 March 2017</p> <p>Monitoring Report 2018 (covering monitoring October 2017 to June 2018 under BioBanking), submitted 31 May 2018.</p> <p>Monitoring Report 2019 (covering April 2018-May 2019 under BioBanking) submitted 9 August 2019</p> <p>The submission email for the 2018 monitoring Report was accompanied by a note explaining why this report was submitted later than “30 days every 12 month anniversary of the date the Offset is protected in perpetuity” as a requirement of Condition 5c (which therefore required submission by 2-3 March 2018). South32 had been holding off sending the report until they received the Departments decision to revise Condition 5 in May 2018. Submission of the 2017 and 2019 reports were also outside of the requirements of 5c and no explanations for the late submission were provided in the submission emails.</p> <p>It is noted that condition 5A states that “annual reporting required under that (BioBanking) scheme may be provided to the department in place of the reports containing monitoring results required under Condition 5C”, thereby implying that the time of submission would also be according to the BioBanking scheme requirements, notwithstanding the final clause of</p>	Administrative Non Compliance	It is recommended that confirmation be sought from the Department that the required timing for submission of monitoring report in Condition 5c be changed to that required under the BioBanking scheme.	Correspondence will be provided to DotEE requesting a revision to report submission dates by 30 June 2020.	<p>Request submitted by due date.</p> <p>Correspondence received that reporting in accordance with the timing under the NSW BioBanking Agreement is acceptable.</p> <p>Variation to EPBC Approval 2010/5350 approved on 11 June 2021 addressing the inconsistency.</p> <p><b>Complete</b></p>

		<p>this Condition 5c (“on the proviso that all measures specified in Condition 5 are covered”).</p> <p>Monitoring reports provide evidence of corrective actions. Photographs of photo points are compared to 2017 photo points, indicating changes in quality.</p>				
18	The audit must be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Minister.	The endorsement of the audit team was not received from the Minister prior to conducting the audit on 24 October 2019, but until 9 December 2019.	Administrative Non Compliance	No further action required.	No further action.	No further action.

### EPBC Approval 2010/5722

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
3	<p>The person taking the action must submit a Vegetation Management plan to the Minister for approval. The plan must address the following requirements:</p> <ul style="list-style-type: none"> <li>(a) Make reference to the Biodiversity Offset strategy as outlined in condition 2;</li> <li>(b) Measures to protect the population of <i>Pimelea spicata</i> found in the area proposed for protection through condition 2. These must: <ul style="list-style-type: none"> <li>i. Monitor the <i>Pimelea spicata</i> population to determine the success of management or the need for intervention;</li> <li>ii. Include the establishment of thresholds that if reached would require intervention measures; and</li> <li>iii. Identify what further management measures must be implemented of a threshold is reached</li> </ul> </li> <li>(c) Rehabilitate MZ2, MZ3 and MZ4 (Annexure B) using appropriate native species with input from a suitably qualified CPW expert; and</li> <li>(d) The plan must include key milestones, performance indicators, corrective actions and timeframes for the completion of all</li> </ul>	<p>Monitoring reports cover the offset area, but there is no evidence of monitoring or maintenance within rehabilitated vegetation within MZ2-4. During field inspection, it appeared that only the noise mitigation bund/wall had been planted with trees. Several areas were observed to be un-related (e.g. MZ 2 and parts of MZ 4) or exhibited rehabilitation failure, as evidenced by the numerous old plastic protective sleeves without plants growing within. Areas of weeds were also observed.</p>	Non Compliance	<p>Survey to be undertaken by a suitably qualified expert of plant density/composition/survival in rehabilitated zones, and corrective measures to be taken where required.</p>	<p>Recommendation noted however IMC has a requirement to maintain an asset protection zone around the Ventilation Shaft 6 fan site.</p> <p>Weed control works will be undertaken as required.</p>	<p>Recommendation noted however IMC has a requirement to maintain an asset protection zone around the Ventilation Shaft 6 fan site.</p> <p>Weed control works will be undertaken as required.</p> <p><b>Ongoing</b></p>

	<p>actions outlined in the plan for the life of the project.</p> <p>The approved plan must be implemented.</p> <p>The person taking the action must not clear any CPW until the Minister approves the plan.</p>					
--	---	--	--	--	--	--

## Noise Management Plan

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
4.5	<p>The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary.</p> <p>This plan must:</p> <ol style="list-style-type: none"> <li>a) be prepared in consultation with EPA and WSC, and submitted to the Secretary for approval by 30 September 2012;</li> <li>b) include provisions to ensure that the road haulage fleet attains and maintains best practices in both equipment and operations;</li> <li>c) seek to minimise road traffic noise generated by employee commuter vehicles on public roads, particularly Douglas Park Drive and Macarthur Road;</li> <li>d) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval;</li> <li>e) outline procedures to manage responses to any complaints or issues raised by the owners of affected residences; and</li> <li>f) include a noise monitoring program that: <ul style="list-style-type: none"> <li>• uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the project; and</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this approval.</li> </ul> </li> </ol>	<p>It is understood the date of the NMP was updated by the document controller prior to publishing to the system – the actual date of the document pre-dates the Department approval.</p>	Administrative Non Compliance	<p>Ensure those responsible for publishing documents are aware that they are approved documents.</p>	<p>Document Controllers have been advised of this requirement.</p>	<p>Document Controllers have been advised of this requirement.</p> <p><b>Complete</b></p>

## Air Quality & Greenhouse Management Plan

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
4.12	<p>The Proponent shall prepare and implement a detailed Air Quality &amp; Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> <li>a) be prepared in consultation with EPA, and submitted to the Secretary for approval by 30 September 2012;</li> <li>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;</li> <li>c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; and</li> <li>d) include an air quality monitoring program that uses a combination of high volume samplers and dust deposition gauges to evaluate the performance of the project, and includes a protocol for determining exceedances with the relevant conditions of this approval.</li> </ul>	<p>Consultation was not undertaken in accordance with the condition when the plan was revised. It was advised that consultation for the plan was completed at the time the plan was originally developed.</p> <p>The Air Quality, Greenhouse Gas &amp; Energy Management Plan contains a commitment to undertake routine sensory odour assessments however it was confirmed that these are no longer conducted.</p>	Administrative Non Compliance	<p>Ensure that revised management plans are provided to relevant stakeholders for consultation prior to submission for approval.</p> <p>The process for assessing odour should be reviewed and the plan updated accordingly.</p>	<p>Management Plans will be provided to relevant stakeholders and other regulatory agencies for review as required. It is noted that stakeholder consultation is a requirement when the management plan is first developed, and not a requirement of the condition for each review of management plans.</p> <p>Any odours identified during inspections by environmental personnel will be investigated. This will be reflected in the next review of the Air Quality and Greenhouse Gas Management Plan, to be completed by 31 December 2020.</p>	<p>Review of Air Quality and Greenhouse Gas Management Plan completed 7 December 2020.</p> <p>The plan was approved on 9 December 2020.</p> <p><b>Complete</b></p>

## Surface Water Management Plan

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
4.16	<p>The Proponent [must] update and implement the Surface Water Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI Water and EPA by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary, and submitted to the</p>	<p>The SWMP was approved by the secretary on 27 June 2018.</p> <p>The SWMP generally addresses the requirements of the condition, excluding the issues identified below.</p>	Administrative Non Compliance	<p>The SWMP needs to be updated to include potable water minimisation controls in SWMP.</p>	<p>There are significant changes planned to surface water management</p>	<p>Water Management Plan reviewed July 2020.</p>

	<p>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; and</li> <li>– any water storages;</li> </ul> </li> <li>• measures to minimise potable water use and to reuse and recycle water;</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:</li> </ul>	<p>The SWMP does not include a Water Response Plan however the plan refers to the relevant extraction and subsidence management plans which include Trigger Action Response Plans (TARP) for water impacts. Spill response procedures and emergency response plan were sighted by the auditor that address the requirements of a Water Response Plan, these are not captured in the SWMP and these documents are not referred to in the SWMP. Through discussions it is understood that in the event of a risk to impacting the surface water management system, BSO have the ability to interlock dams, and move water around site as needed, but this is not a documented process. Recently completed Appin North water movement/management figure has been completed. An opportunity to include this in the SWMP to demonstrate how surface water can be controlled around the site. Appin West also have a figure. Appin East doesn't have this plan. The SWMP does not adequately address "potable water minimisation controls". Controls are in place, such as the water filtration plant at Appin West, replaces Sydney Water use. Plans for Appin North to also have filtration plant that will also reduce need for Sydney Water use. The PRP relating to the semi-closed loop system for washery water is ongoing. Refer to EPL condition U1.1.</p>		<p>Update the SWMP to include details of interlocking of dams to control water.</p>	<p>at Appin North in 2020.</p> <p>These requirements will be incorporated in the next review of the Surface Water Management Plan by 31 December 2020.</p>	<p>The plan was approved on 11 September 2020.</p> <p><b>Complete</b></p>
--	--	---	--	---	--	---

	<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> <li>- surface water and stream health impact assessment criteria.</li> </ul> <p><i>Note: This plan must be suitably integrated with the Water Management Plans that form part of Extraction Plans.</i></p>					
--	--	--	--	--	--	--

### West Cliff Coal Wash Emplacement Management Plan

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
4.17	<p>The Proponent shall prepare and implement a West Cliff Coal Wash Emplacement Area Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with OEH and be submitted to the Secretary for approval by the end of June 2013. This plan must include:</p> <ul style="list-style-type: none"> <li>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);</li> <li>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;</li> <li>c) management strategies for the protection and conservation of <i>Persoonia hirsuta</i>;</li> <li>d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot;</li> <li>e) a comprehensive water monitoring program for the emplacement;</li> <li>f) provide for progressive rehabilitation of the emplacement area, including through: <ul style="list-style-type: none"> <li>• maximising opportunities for natural regeneration;</li> </ul> </li> </ul>	<p>As required by 4.17(a) and as stated in the WCCWEAMP, detailed design plans for Stage 4 are not included in the plan. It is understood that these plans are still being developed, as Stage 4 has yet to commence.</p> <p>As per figure Plan 5 – Cultural Heritage Plan site 52-2-3505 is currently proposed to be avoided, along with 52-2-2228/3617 and 52-2-3506.</p> <p>It is understood that the plan was submitted and approved by the Secretary in 2016. The plan was then submitted to the Federal Government for approval under EPBC and due to the length of time taken to review asked for the date to be updated to 2017.</p> <p>The revision number remained the same and no updates to the plan were made.</p> <p>The plan otherwise addresses the requirements of this condition.</p>	Observation - Compliant	Ensure that detailed design plans for Stage 4, when developed, are included in the WCCWEAMP.	Detailed design plans for Stage 4 will be included in the WCCWEAMP prior to commencing Stage 4.	<p>Detailed design plans for Stage 4 will be included in the WCCWEAMP prior to commencing Stage 4.</p> <p>Stage 4 has not yet commenced as at 30 June 2021.</p> <p><b>Not triggered</b></p>



	<ul style="list-style-type: none"> <li>maximising retention of suitable habitat species; appropriate weed and pest control strategies; and</li> <li>planting only endemic species in habitat mixes appropriate for soil, slope and aspect</li> </ul>					
--	--	--	--	--	--	--

## Traffic Management Plan

Item No.	Assessment Requirement	Comment	Audit Classification	Response/Action	IMC Response December 2019	Status
4.26	<p>The Proponent shall update the approved Traffic Management Plan for the project to the satisfaction of the Secretary. This plan must be:</p> <ol style="list-style-type: none"> <li>prepared in consultation with the RMS, WCC, WSC and the CaCC;</li> <li>submitted to the Secretary for approval by 31 January 2017;</li> <li>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 include strategies to manage construction traffic, including road closure protocols, community consultation and measures to avoid potential road safety conflicts with other road users.</li> </ol>	<p>The TMP was approved by the Secretary on 26 July 2018. It was advised that consultation for the plan was completed at the time the plan was originally developed. No material changes were made to the 2017 update and the plan was approved without request for further consultation.</p> <p>The TMP does not include a/any schedule of works for intersection upgrades. States "<i>The program and schedule of upgrade works for the intersection will be prepared by RMS</i>", and it is understood that no intersection works were undertaken for the period, none proposed currently.</p> <p>The plan does not include details of the upgrade of the intersection of West Cliff Mine Access Road and Appin Road. This work was completed prior to the audit period, and therefore no longer relevant. It is suggested this condition is updated to remove this requirement. The TMP does not adequately address construction traffic requirements. It was advised this is generally captured by a construction management plan developed for any relevant construction activities.</p>	Observation - Compliant	<p>Suggested that condition 4.26 is updated to remove the requirement around details for upgrade "<i>of the intersection of West Cliff Mine Access Road and Appin Road</i>", as this has been completed and is no longer relevant. Suggest TMP is updated to include a commitment to develop and detail construction traffic requirements for each construction project.</p>	<p>These requirements will be incorporated in the next review of the Traffic Management Plan by 31 December 2020.</p>	<p>Traffic Management Plan reviewed 30 June 2020.</p> <p>The plan was approved on 23 July 2020.</p> <p><b>Complete</b></p>



---

**Appendix N: 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 2020 to 30 June 2021

### 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

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:

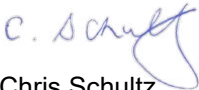
- Dendrobium Mine and Cordeaux Colliery Annual Review FY21 (Appendix 10)
- Appin Mine Annual Review FY21 (Appendix N).

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:  
(printed) Chris Schultz

Position Superintendent Environment (as delegated under Power of Attorney issued June 2020)

Date: 22/09/2021

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.