CENTENNIAL COAL
Lidsdale Siding
2021 ANNUAL REVIEW

February 2022

Annual Review Title Block

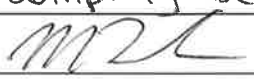
Name of Operation	Lidsdale Siding
Name of Operator	Ivanhoe Coal Pty Ltd
Project Approval #	Lidsdale Siding Upgrade PA 08_0223
Name of holder	Ivanhoe Coal Pty Ltd
Mining Lease #	N/A
Name of Holder of Mining Lease	N/A
Water License #	WAL25774 WAL24362
Name of Holder of Water License	Ivanhoe Coal Pty Ltd
MOP/RMP Start Date	N/A
MOP/RMP End Date	N/A
Annual Review Start Date	1 January 2021
Annual Review End Date	31 December 2021

I, Melinda Loh **certify that this audit report is a true and accurate record of the compliance status of Centennial Lidsdale Siding for the period 1 January to 31 December 2021 and that I am authorised to make this statement on behalf of Ivanhoe Coal Pty Ltd.**

Note:

a) *The Annual Review is an 'environmental audit' for the purposes of s122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion) in an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

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

Name of Authorised Reporting Officer	Melinda Loh
Title of Authorised Reporting Officer	Company Secretary
Signature of Authorised Reporting Officer	
Date	25.2.2022

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Plans

Plan Reference	Plan Name
1A	Project Locality
1C	Built Environment
2	Project Domains
3	Monitoring Locations
3A	Monitoring Locations
4A	Willow Management 2015
4B	Willow Management 2016
4C	Willow Management March 2019
4D	Willow Management Dec 2019
4E	Willow Management 2020
4F	Willow Management 2021

Appendices

Appendix No.	Appendix Name
1	Plans
2	Coal Transport Records
3	Noise
4	Air
5	Biodiversity
6	Waste
7	Surface Water
8	Groundwater

1 STATEMENT OF COMPLIANCE

Table 1-1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Project Approval PA 08_0223	Y
Environmental Protection Licence 5129	Y
Water Access Licences 24362 & 25774	Y

Non Compliances applicable to the reporting period are presented in the table below.

Table 1-2 2021 Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Where Addressed in Annual Review
PA 08_0223	Schedule 3 Condition 30	Rehabilitation Bond	Non-Compliant	Outstanding Bond Value	Section 11

Independent audit non-compliances have been outlined in Section 10.

Note: Compliance Status Key for Table 1-2

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

2 INTRODUCTION

Ivanhoe Coal Pty Ltd (Centennial Ivanhoe) operates the Lidsdale Siding Rail Loading Facility, located approximately 12 kilometres northwest from the city of Lithgow, NSW. Lidsdale Siding is situated approximately 150 kilometres west of Sydney adjacent to the township of Wallerawang.

The Lidsdale Siding Upgrade Project Environmental Assessment (EA) was submitted to the Department of Planning, Industry and Environment (DPIE) in August 2012. The Lidsdale Siding Upgrade Project was approved on 3 May 2013 by the Minister for Planning and Infrastructure, via the Planning Assessment Commission. The approval has been modified on three occasions.

The Upgrade Project at Lidsdale Siding ensures the improvement of operational efficiency and increases its overall throughput capacity to 6.3 million tonnes per annum. The upgraded train loading process is automated by establishing a coal stockpile with underground reclaimers feeding a conveyor, leading to a train loading bin with a total stockpile capacity of approximately 50,000 tonnes.

2.1 Scope

This Annual Review (AR) details the compliance and environmental management performance of Lidsdale Siding over the Period 1 January 2021 to 31 December 2021. It has been prepared, and community engagement activities for Lidsdale Siding. The AR has been prepared in accordance with the *Annual Review Guideline* (DPIE 2015), and satisfies the following condition of consent:

- Schedule 5, Condition 4
- Schedule 3 Condition 12

2.2 Mine Contacts

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

Table 2-1 Lidsdale Siding Environmental Contact Details

Name	Position	Phone
Geoff Rapson	Mine Manager	T: (02) 6355 9511
		E: Geoff.Rapson@centennialcoal.com.au
Natalie Gardiner	Environment & Community Coordinator	T: (02) 63501 1672
		E: Natalie.Gardiner@centennialcoal.com.au

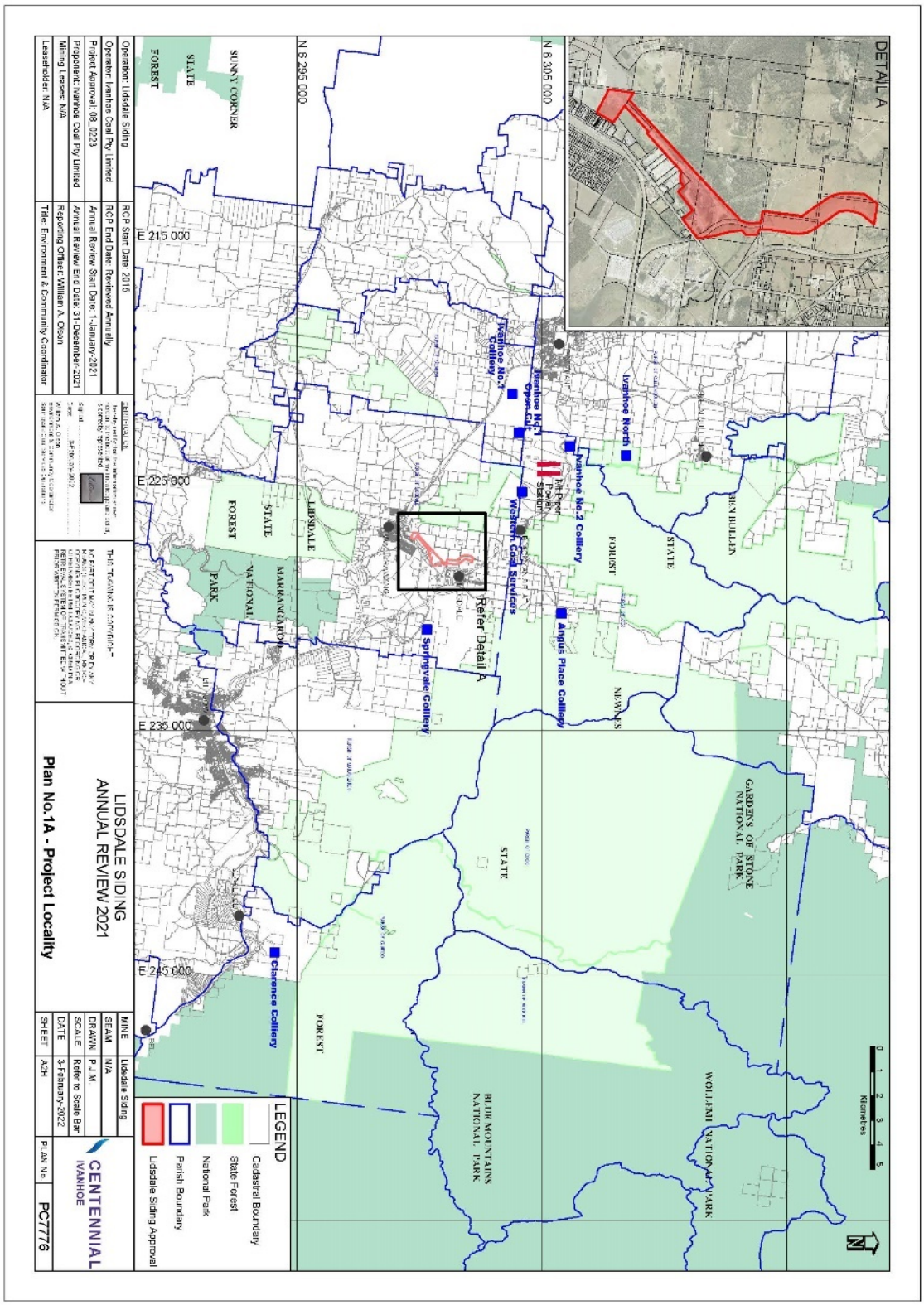


Figure 2-1 Lidsdale Siding Locality Plan

3 APPROVALS

A summary of Project Approvals, Mining Leases, and other Licences relevant to Lidsdale Siding is provided in Table 3-1. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at www.centennialcoal.com.au/site.

Table 3-1Environmental Approvals held by Lidsdale Siding.

Approval	Description	Expiry Date	Change to Approval during Reporting Period
Project Approval – NSW Department to Planning, Industry and Environment			
Project Approval 08_0223	Approval to carry out coal handling and train loading operations on the site until 31 December 2042.	31/12/2042	No
Environmental Protection Licence – NSW Environment Protection Agency			
Environment Protection Licence (EPL) 5129	The licence authorises the operation of the coal loading facility under the *Protection of the Environment Operations Act 1997* (POEO Act). Licence conditions relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice.	N/A	No
Site Lease (Public Transport Commission of NSW)			
Site Lease	Memorandum of Lease (4/11/1978). NSW Rail land, but there is a lease in place between the managers of the site (John Holland Group) and Centennial Ivanhoe. The original lease was signed by the owners of the site (former Department of Public Transport Commission of NSW) and Austen and Butta Limited.	30/04/2025	No
Water Licences – NSW Department of Planning, Industry and Environment – Water			
WAL 25774	WAL 25774 licenses the extraction of up to 1 ML/year of surface water from Pipers Flat Creek; however, this water source is not currently used.	N/A	No
WAL 24362	WAL 24362 licenses the extraction of up to 8.5 ML/year of groundwater from a production bore.	N/A	No

3.1 ANNUAL REPORTING

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

Table 3-2: Annual Review Requirements

Approval	Condition No	Requirement	Where addressed in Annual Review
PA 08_0223	Schedule 5 Condition 4	By the end of February 2014, and annually thereafter, the Proponent must review the environmental performance of the project to the satisfaction of the Planning Secretary. This review must:	This document
		(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year;	Section 4 and Section 8
		(b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the: i. relevant statutory requirements, limits or performance measures/criteria; ii. requirements of any plan or program required under this approval; iii. monitoring results of previous years; and relevant predictions in the EA;	Section 6 to 10
		(c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;	Section 1 and 11
		(d) identify any trends in the monitoring data over the life of the development;	Section 6 to 10
		(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6 to 10
		(f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	Section 12
PA 08_0223	Schedule 3 Condition 12	Monitoring of Coal Transport: (b) make these records publicly available in the annual review and on its website at the end of each calendar year	Appendix 2

4 OPERATIONS SUMMARY

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

Table 4-1: Production Summary & Forecast

Material	Approved Limit (PA 08_0223)	Coal received (t)		
		Previous reporting period (2020)	This reporting period (2021)	Forecasted next reporting period (2022)[1]
Saleable product	Receive 6.3 million tonnes per annum	Received from SCSO: 0 Received via rail: 998,441 tonnes Railed from site: 0 tonnes	Received from SCSO: 190,995 Received via rail: 557,723 tonnes Railed from site: 193,946 tonnes	Received from SCSO: 0 Received via rail: 0 Railed from site: 0 tonnes
Transport (rail)	All coal to be transported to or from the site by conveyor or by rail	Rail and conveyor transport only	Rail and conveyor transport only	Rail and conveyor transport only
	No more than 7 laden trains arrive at or leave the site per day	Maximum of 3 trains per day	Maximum of 2 trains per day	Maximum of 2 trains per day
	No more than 5 laden trains arrive at or leave the site each day when averaged per annum	Average 0.77 trains per day	Average 0.61 trains per day	Average 0 train per day

[1] As per SCSO budgeted forecast at 31/01/2021- Budgets subject to variation but will be conducted in accordance with approved operations.

4.1 OTHER OPERATIONS

Details of other operations relevant Lidsdale Siding is provided in Table 4-2 and Table 4-3.

Table 4-2: Operations Summary

Limits	Operation	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)
	Coal receival and unloading	Day period only[1]	Not compliant	Compliant

[1]=[1] *Day period for the purposes of coal receival and unloading from trains is defined as: The period from 07:00 to 18:00 on Monday to Saturday, and 08:00 to 18:00 on Sundays and Public Holidays*

Train loading activities (i.e. Export trains) can be undertaken 24 hours a day 7 days a week in accordance with Schedule 2 Condition 8.

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

Month	Received from SCSO	Received Via Rail	Railed From Site
January 2021	0	45516	0
February 2021	0	66653	0
March 2021	0	61328	0
April 2021	0	98514	0
May 2021	0	98508	0
June 2021	0	50742	0
July 2021	46608	3344	48111
August 2021	0	88489	0
September 2021	0	14725	0
October 2021	52040	29904	52276
November 2021	65747	0	55698
December 2021	26600	0	37861
Total 2021 CY	**190995**	**557723**	**193946**

There were no inconsistencies between the approved limit and actual production for the reporting period. Additional transport and operational detail is provided in Appendix 2.

4.2 CONSTRUCTION

There was no construction or demolition during the reporting period.

4.3 NEXT REPORTING PERIOD

Rail activities are forecast to occur in accordance with Table 4-1.

No construction or demolition works are scheduled to be completed in the next reporting period.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 5-1 summarises the outcomes of the 2020 Annual Review, including actions issued by Regulators and actions outlined by Lidsdale Siding.

Table 5-1: Actions from Previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Publication to the website within 1 month	DPIE	The 2020 Annual Review was published on the Centennial Website 26/2/2021.	Not Applicable

6 ENVIRONMENTAL PERFORMANCE

Lidsdale Siding implements an Environmental Management Strategy, including management plans, procedures and monitoring programs that provide a framework for managing environment and community risks and impacts. To measure compliance with site approvals and licences, Lidsdale Siding undertakes a comprehensive monitoring program.

This section provides a summary of environmental performance in the reporting period, including:

- Section 6.1 – Meteorological Summary
- Section 6.2 – Noise
- Section 6.3 – Air Quality
- Section 6.4 – Biodiversity
- Section 6.5 – Heritage
- Section 6.6 – Blasting
- Section 6.7- Other Matters

The environmental performance for water, rehabilitation and community aspects are reported in Sections 7.0, 8.0, 9.0 and 10.0 respectively.

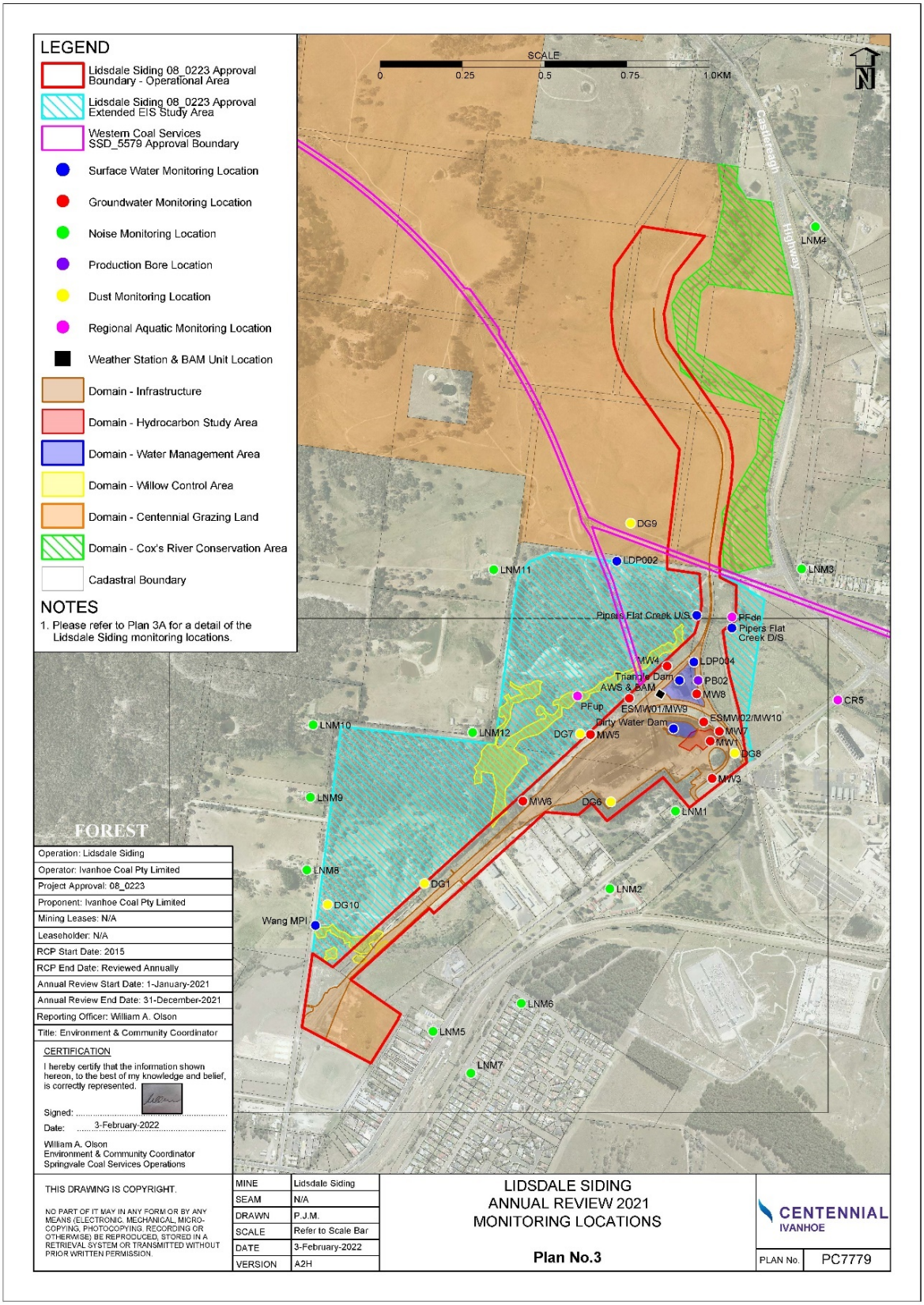


Figure 6-1 Lidsdale Siding Monitoring Locations

6.1 METEROLOGICAL SUMMARY

6.1.1 Environmental Management

Lidsdale Siding has operated a metrological monitoring station in accordance with PA 08_0223 Schedule 3 Condition 11 and EPL 5129.

In November 2021 the highest amount of rainfall was recorded at the site. March 2021 also recorded greater than long term average rainfall. Minimal rainfall was received in April 2021. All other months followed long term data trends. Results are presented in Table 6-1. Monthly rainfall trends have been presented against long term average in Figure 6-2.

Table 6-1 Metrological Conditions

Month	Rainfall (mm)	Cumulative rainfall (mm)	Min Temperature @2m	Max Temperature @2m
January 2021	98.6	98.6	6.44	35.14
February 2021	91.2	189.8	8.24	28.74
March 2021	134.4	324.2	3.68	28.76
April 2021	0.4	324.6	-3.17	27.99
May 2021	28.8	353.4	-5.02	21.1
June 2021	46.8	400.2	-4.41	17.58
July 2021	57.4	457.6	-7.48	18.1
August 2021	75.8	533.4	-4.7	21.4
September 2021	46.2	579.6	-3.57	22.1
October 2021	49.2	628.8	-0.92	28.54
November 2021	177.8	806.6	4.17	16.95
December 2021	73.80	880.4	8.24	18.27

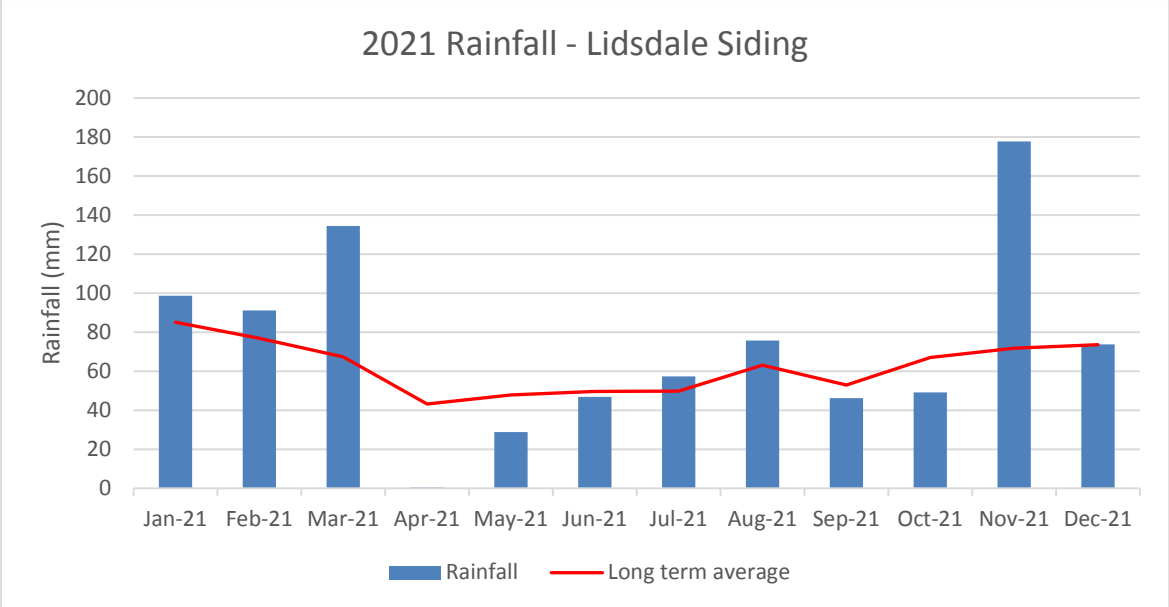


Figure 6-2 2021 Rainfall

Wind speed and direction have been plotted in a wind rose in Figure 6-3. The predominate wind direction in the reporting period was SW.

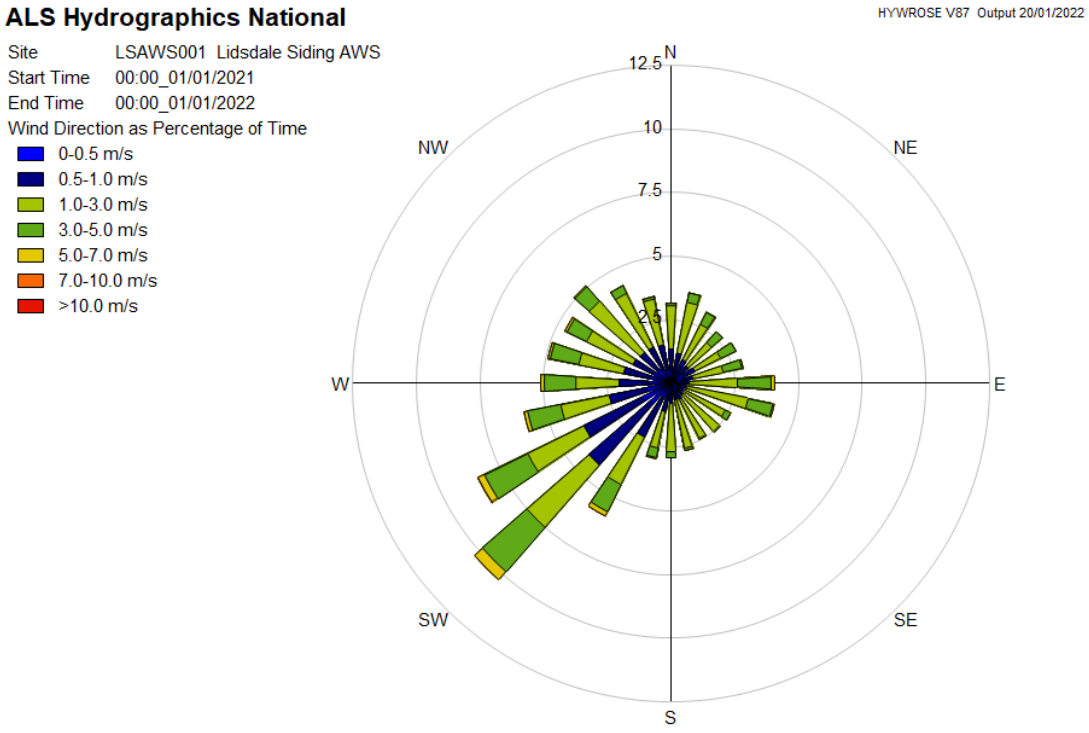


Figure 6-3 2021 Windrose

6.2 NOISE

6.2.1 Environmental Management

Lidsdale Siding manages noise in accordance with the Western Region Noise Management Plan (WRNMP) dated Feb 2021. This plan was approved by DPIE 15 Feb 2021.

The following sources of noise identified in the WRNMP are relevant for Lidsdale Siding operations:

- Operation of mobile equipment – e.g. trucks, loaders
- Rail loading and uploading operations
- Coal transporting activities – e.g. overland conveyors, rail

Noise mitigation measures for Lidsdale Siding are:

- Maintaining all plant and equipment to manufactures specifications (ongoing)
- Operate mobile plant in a quiet, efficient manner and regular training of operators (ongoing)
- Installation of frequency modulated reversing alarms or “quakers” on mobile plant to replace reversing alarms (complete)
- Switching off vehicles and plant when not in use (ongoing)
- Low-noise design for transfer chutes on conveyor systems (complete)
- Low-noise idlers fitted to conveyors (complete and ongoing as required to ensure compliance)
- Limiting sound power levels for key noise sources such as conveyor drives and the stockpile dozer (complete)
- Partial enclosures on conveyors (complete)
- Noise shielding on the loading bin (complete)

Additional noise management measures are outlined in the WRNMP.

6.2.2 Environmental Performance

Criteria

Schedule 3 Condition 2 of PA 08_0233 provides noise criteria for 12 identified locations. Condition L4.1 of EPL 5129 specifies noise limits at the same 12 locations.

Table 6-2 Lidsdale Siding Noise Criteria

Receiver ID	Monitoring location	Day LAeq (15 min)	Evening LAeq (15 min)	Night LAeq (15 min)	Night LA1 (1min)
1- Lot 2 Main St, Wallerawang	LNM 1	50	50	50	55
2 – Black Gold Cabins, Main St, Wallerawang	LNM 2	48	46	46	49
3 – "Killarney", Brays Lane, Wallerawang	LNM 12	48	47	47	56
4 – "Fairview", Brays Lane, Wallerawang	LNM 11	43	43	43	54
5 – Duncan Street, Lidsdale	LNM 3	46	46	46	57
6 – Old Castlereagh Highway, Lidsdale	LNM 4	43	43	43	56
7 – Royal Hotel, Main St, Wallerawang	LNM 5	44	41	41	49
8 – Cnr Heel St & Cripps Ave, Wallerawang	LNM 6	43	40	40	45
9 – Cnr Cripps Ave & Pindari Pl, Wallerawang	LNM 7	40	39	39	45
10 – Brays Lane South, Wallerawang	LNM 8	45	45	45	50
11 – "Tara" Brays Lane, Wallerawang	LNM 9	45	45	45	51
12 – Brays Lane Corner, Wallerawang	LNM 10	43	43	43	51

Attended Noise Monitoring

In accordance with the short-term monitoring program, monthly attended noise surveys have been undertaken at 12 locations which have been selected to be representative of identified receiver locations. These locations were shown in Figure 6-1. Results for Day, Evening and Night are presented in the following tables.

Table 6-3Lidsdale Siding LAeq (15minute) Day

Monitoring location	Day LAeq (15 min)	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	June 2021	July 2021	Aug 2021	Sept 2021	Oct 2021	Nov 2021	Dec 2021
LNM1	50	29	44	ND	45	ND	ND	ND	46	ND	43	ND	ND
LNM2	48	ND	36	ND	ND	ND	ND	ND	46	ND	42	ND	ND
LNM3	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM4	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM5	44	ND	35	ND	ND	ND	ND	ND	41	ND	43	ND	ND
LNM6	43	ND	21	ND	ND	ND	ND	ND	38	ND	ND	ND	ND
LNM7	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM8	45	32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM9	45	30	ND	ND	ND	ND	ND	ND	ND	ND	44	ND	ND
LNM10	43	27	41	ND	ND	ND	ND	ND	ND	ND	43	ND	ND
LNM11	43	41	36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM12	48	46	51	ND	ND	ND	ND	ND	43	ND	55	ND	ND

ND= Lidsdale Siding Not Discernible

Table 6-4 Lidsdale Siding LAeq (15minute) Evening

Monitoring location	Evening LAeq (15 min)	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	June 2021	July 2021	Aug 2021	Sept 2021	Oct 2021	Nov 2021	Dec 2021
LNM1	50	ND	ND	ND	ND	ND	ND	ND	ND	32	ND	ND	ND
LNM2	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM3	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM4	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM5	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM6	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM7	39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM8	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM9	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM10	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM11	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM12	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND= Lidsdale Siding Not Discernible

Table 6-5 Lidsdale Siding LAeq (15minute) Night

Monitoring location	Night LAeq (15 min)	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	June 2021	July 2021	Aug 2021	Sept 2021	Oct 2021	Nov 2021	Dec 2021
LNM1	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM2	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM3	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM4	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM5	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM6	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM7	39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM8	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM9	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM10	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM11	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM12	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND= Lidsdale Siding Not Discernible

Table 6-6 Lidsdale Siding LA1 (1minute) Night

Monitoring location	Night LA1 (1min)	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	June 2021	July 2021	Aug 2021	Sept 2021	Oct 2021	Nov 2021	Dec 2021
LNM1	55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM2	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM3	57	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM4	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM5	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM6	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM7	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM8	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM9	51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM10	51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM11	54	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LNM12	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND= Lidsdale Siding Not Discernible

Summary of Attended Noise Results

Table 6-3 highlights exceedances of the criteria in during the day criteria monitoring period in February and October 2021.

As outlined in the WRNMP and EPL 5129 Condition L4.3 "The noise criteria……are to apply under all meteorological conditions except the following:

(a) average wind speed at microphone height exceeds 5 m/s;

(b) wind speeds greater than 3 m/s measured at 10 m above ground level; or

(c) temperature inversion conditions greater than 3°C/100 m."

Table 6-7 Analysis of weather data during exceedances

Monitoring Event	Receptor location	Monitoring Start Time	Time Stamp and Average Wind Speed Data (m/sec)[1]
9 February 2021	LMN12	14:48	14:50 2.849 15:00 3.341 15:10 3.235
12 October 2021	LNM 12	16:33	16:30 4.140 16:40 3.311 16:50 3.007

[1] Data from Lidsdale Siding Metrological Station: Data from 10m above the ground. Data point shows 10 minutes preceding average (EPL 5129 Condition L4.4)

As demonstrated from the relevant metrological data the noise criteria did not apply at the time of monitoring. For this reason, exceedances noted in Table 6-7 have not been identified as non-compliances.

Sound Power Levels

To satisfy Condition 7 (d) of Schedule 3, the sound power levels of equipment on site will be monitored on an annual basis. Sound power testing was undertaken by Global Acoustics in 2021 and a summary of the results is presented in Appendix 3.

All plant items tested were within 2 dBA of noise the Noise Impact Assessment (Hatch 2012) except for the plant listed below:

- CV01 drive

Lidsdale Siding will continue to monitor potential impact at nearby noise sensitive receivers through the monthly operator-attended noise monitoring program.

6.2.3 Comparison against Predictions

Results of the noise modelling conducted for MOD 3 of PA 08_0223 demonstrate that exceedances of the consent and EPL limits and project noise trigger levels are predicted to occur at several assessment locations. These exceedances are historical and are not a result

of the unloading operations at the facility or the proposed modification. Noise emissions from the facility are predicted to be the same as for currently approved operations.

Noise emissions are declining over time because of improvements to unloading methodology and implementation of noise mitigation measures.

On-site attended noise measurements showed that the optimisation of train unloading activities by Centennial has effectively reduced noise emissions from wagons, wagon shunting and locomotives.

Noise emissions at the nearest residential assessment locations are predicted to be up to 5 dB lower than noise predictions provided in the Mod 1 EA.

6.2.4 Long Terms Analysis

Long term trends are summarised in the table below.

Table 6-8 Long Term Attended Noise Monitoring trends

	2017	2018	2019	2020	2021
No Exceedances of Day LAeq (15 min	0	0	0	0	0
No Exceedances of Evening LAeq (15 min)	0	0	0	0	0
No Exceedances of Night LAeq (15 min)	2	0	0	0	0
No Exceedances of Night LA1 (1min)	0	0	0	0	0

6.2.5 Implemented / Proposed Improvements

Noise management controls are considered effective based upon compliance with the noise criteria. Lidsdale Siding will continue to implement the WRNMP. Lidsdale Siding will review and revise the WRNMP in accordance with Schedule 5 Condition 5 accordingly.

6.2.6 Acquisition

There have been no requests received or actions undertaken during the reporting period.

6.3 AIR QUALITY

6.3.1 Environmental Management

Lidsdale Siding manages air quality in accordance with the Western Region Air Quality and Green House Gas Management Plan (WRAQMP) dated April 2021. This plan was approved by DPIE 10 May 2021.

The following identified sources of dust emissions in the WRAQMP are relevant for Lidsdale Siding operations:

- Wind erosion from coal stockpiles
- Wind erosion from disturbed areas and coal stockpiles
- Wheel generated dust from vehicle movements
- Fugitive emissions from coal handling and processing
- Fugitive emissions during train loading operations
- Coal transporting activities (i.e. conveyors and trains)
- Operation of mobile equipment

Dust mitigation measures for Lidsdale siding are:

- Signage to display speed limits on all unsealed roads in the surface facilities area
- Water sprays on unsealed areas during use or windy conditions
- Water sprays (sprinkler system) on the coal product stockpile during dry and windy conditions
- Maintaining enclosures on conveyor systems

6.3.2 Environmental Performance

Air Quality Criteria

Table 6-9 Long term criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Dust	Annual	2 g/m^2/month	4g/m^2/month

Table 6-10 Long term criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10 µm (PM10)	Annual	25 µg/m^3

Table 6-11Short term criteria for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM10)	24 hour	50µg/m^3

Lidsdale Siding undertakes air quality monitoring in accordance with the short-term program. The air quality monitoring locations are shown in Figure 6-1. This includes both depositional dust gauges and the Beta Attenuation Monitor (BAM).

Dust Deposition

Table 6-12 2021 results for deposited dust

Dust Gauge	Min	Mean	Max
DG1	0.22	0.42	0.93
DG6	<0.1	1.31	2.76
DG7	0.27	1.37	3.34
DG8	0.61	1.50	3.64
DG9	0.22	0.79	1.53
DG10	0.28	0.66	1.52

The annual averages for deposited dust are within or below the predicted ranges and remain complaint with the limits in the project approval and EPL.

PM10 and TSP

A ratio of PM10 and TSP is used to estimate TSP contributions. For Lidsdale Siding a conservative ration of 0.40 is used to calculate compliance with the TSP criteria from the PM_{10} data. The Springvale Colliery (SSD5594) Annual review presents 1 in 6 day operational measurements for TSP.

Table 6-13 2021 results particulate matter

	Criteria	Maximum (µg/m^3)	Mean (µg/m^3)
24hr PM10 (short term)	50	32.85	Not Applicable
PM10 (long term)	25	Not Applicable	15.37
Estimated TSP[1]	90	Not Applicable	38.425

[1]calculated TSP concentration estimate (PM10 annual average divided by 0.40)

Results are presented graphically in Appendix 4.

The annual averages for TSP and PM10 are within of below the predicted ranges and remain compliant with the limits in the project approval and EPL.

The 2021 data capture rate was 100% (which is greater than the 90% minimum data capture rate required).

6.3.3 Comparison against Predictions

As outlined in Mod 3 PA08_022 the Air Quality Impact Assessment quantified emissions of particulate matter for:

- total suspended particulate matter (TSP);
- particulate matter less than 10 microns in aerodynamic diameter (PM10); and
- particulate matter less than 2.5 microns in aerodynamic diameter (PM25).

The dispersion modelling conducted for the operation of the facility predicted compliance for all assessed particulate matter air pollutants at all surrounding sensitive receptor locations.

Mod 3 was not predicated to significantly change air quality impacts from those currently generated by the approved operation of the facility.

PM10, TSP and Depositional dust results for the year were within predictions.

6.3.4 Long Terms Analysis

The annual average long-term trends are summarised in the table below.

Table 6-14 Long term trends for deposited dust

	2017	2018	2019	2020	2021
DG1	0.4	0.8	1.45	1.11	0.42
DG6	1.1	1.40	1.73	2.30	1.31
DG7	1.0	1.30	1.57	1.47	1.37
DG8	2.1	2.9	1.92	1.75	1.50
DG9	1.3	1.65	2.60	1.80	0.79
DG10	0.5	1.22	1.29	1.48	0.66

Table 6-15 Exceedances for particulate matter

	2017	2018	2019	2020	2021
24hr PM10 (short term)	0	0	0[1]	0[1]	0
PM10 (long term)	0	0	0	0	0
TSP	0	0	0	0	0

[1]= excludes elevated PM10 results from regional dust storms from the west and bushfires as described in the 2019 and 2020 Annual Reviews per Schedule 3 Condition 8 Note d..

The 2021 annual dust results are below the annual average for 2021 and are consistent with long term data trends. Results are aligned to the predications for the project.

6.3.5 Implemented / Proposed Improvements

Dust emission controls are considered effective based upon compliance with the air quality criteria. Lidsdale Siding will continue to implement the WRAQMP. Lidsdale Siding will review and revise the WRAQMP in accordance with Schedule 5 Condition 5 accordingly. Recommendations from the 2021 Independent audit will be actioned in 2022.

6.4 BIODIVERSITY

6.4.1 Environmental Management

Lidsdale Siding manages biodiversity in accordance with the Biodiversity Management Plan dated October 2013. This plan was approved by DPIE 15 Feb 2013. Centennial has prepared a Western Region Biodiversity Management Plan. After receiving feedback from DPIE in October 2021 further consultation is proposed with relevant stakeholders in 2022 with re-submission by 30 April 2022.

A detailed program for the removal of willow trees from Pipers Flat Creek is considered a key component of the BMP and has been presented in the following section.

6.4.2 Crack Willow (Salix fragilis) Management

The following table provides a timeline of action undertaken to control willows.

Table 6-16 Willow Management Activities

Management Period	Actions Undertaken
July - August 2016	• Commencement of initial control program including site preparation and initial chemical herbicide to small Willows
November - December 2016	• Cut, remove, chip and transport dead Willows from initial control works
April - May 2017	• Poison remaining Willows
October - November 2017	• GPS all Willows within the study area • Slash and brush cutting of weeds for access to the creek and Willows • Stem injection of all Willows in the study area • Total of 1054 Willows treated, and GPS locations recorded
October - November 2018	• Remove Willows from creek banks and accessible Willows in creek using chainsaws and small excavator / bobcat • Remove mulched Willow material
November - December 2019	• Slashing of weeds • Remove full Willow trees and root structures from watercourse and windrow for mulching • Remove additional debris i.e., cars and dumped concrete from operations area • Mulching of tree stumps and windrowed Willows • Application of herbicide to weeds
February 2020	• Site inspections for effectiveness of Willows control program – no additional works identified

In November 2021 a review of the Willow Control Program was undertaken. This included a field inspection along Pipers Flat Creek and the previously maintained Willow Control Area. This area is shown in Plan 4A-4F in Appendix 1.

Weed Cover

The Piper Flat Creek Area is dominated by Rubus fruticosus (Blackberry), listed as a priority weed for the Central Tablelands under the NSW Biosecurity Act 2016.There are also several individual large trees of *Rosa rubiginosa* along the creek to the east of the site

Removal of Willows

A total of 44 Willow saplings were recorded across the previously managed site, with all saplings found along the banks of Pipers Flat Creek in various sizes.

Data on the relationship between height and stem diameter (DBH) is presented in a scatter plot graph in Figure 6-4. The results indicate that the majority of Willow trees recorded are low in height (<300 cm) and have small trunk diameters (<5 cm). The results demonstrate that the Willow control program has effectively removed the majority of the larger trees (with greater heights and DBH), but that a new generation of small trees is present.

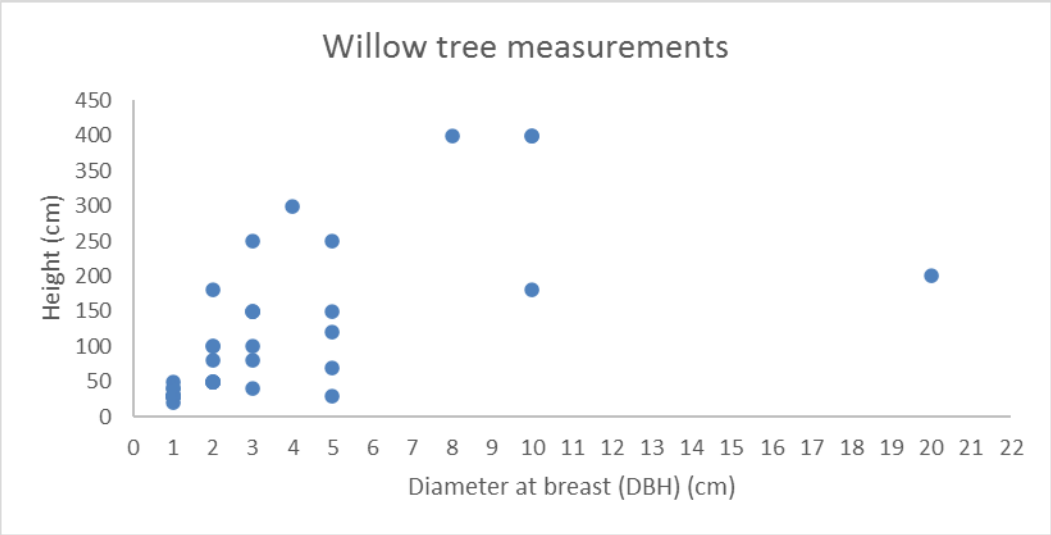


Figure 6-4Willow Tree Measurements

Establishment of Tube stock

A total of 1700 native plants (as 'tubestock') were planted across the site in accordance with the LSBMP in 2017 (including Eucalyptus aggregata plantings). Due to the density of exotic grass and shrub cover, the number of surviving tubestock specimens could not be determined.

Establishment of Tube stock

Several large logs are scattered across parts of the Site; however, they do not appear to provide fauna habitat due to the density of Blackberry surrounding the logs.

Photo Monitoring

Photo monitoring results are presented in Appendix 5.

6.4.3 Aquatic Ecology

Aquatic ecology monitoring is undertaken in accordance with the requirements of the Upper Coxs River Action and Monitoring dated March 2020. This was approved under Springvale Mine Extension Project (SSD 5594 Schedule 3 Condition 13) on 7 May 2021 by DPIE. A summary of results as relevant to Lidsdale Siding is presented in Appendix 5.

6.4.4 Comparison against Predictions

As described in the 2012 Environmental Assessment (EA), the Project is not expected to have a significant impact on the ecology of the broader study area, including threatened flora, threatened fauna or endangered ecological communities that are known or expected to occur therein. The low potential for impact is due to the habitats of the Project area being heavily disturbed, providing limited opportunities for those threatened species considered to have potential to occur within the broader study area.

The mitigation measures of weed control and the maintenance of erosion and sediment control to minimise sedimentation impacts to waterways are considered appropriate to manage to biodiversity impacts post construction.

During the reporting period there has been no additional clearing associated with the project.

6.4.5 Implemented / Proposed Improvements

As committed in the 2021 IEA Audit, Centennial will consult with State Rail regarding weed management activities in the Piper Creek Area which is adjacent to the Lidsdale Siding site. The management of blackberry will be a long-term process.

Centennial will establish a treatment program for willows to address the new generation of willows present in the Willow Control Area.

A follow up monitoring inspection will be undertaken after the next round of weed control treatments have taken effect.

6.5 HERITAGE

6.5.1 Environmental Management

Lidsdale Siding manages Aboriginal heritage in accordance with the Western Region Aboriginal Cultural Heritage Management Plan dated June 2018. This plan was approved by DPIE on 27 October 2017.

Lidsdale Siding manages European heritage in accordance with the Historic Heritage Management Plan dated June 2018. This was approved by DPIE on 27 October 2017.

6.5.2 Environmental Performance

There are no Indigenous heritage items located within the Lidsdale Siding Site.

There are no heritage items or archaeological sites located within 50 metres of the Lidsdale Siding lease boundary.

6.5.3 Comparison against Predictions

There are no Indigenous heritage items located within the Project Site. Construction works associated with the Project would be unlikely to affect identified heritage listed items in the vicinity of the Project Site that is those located within the broader study area.

There are no historical heritage items listed within the Project Site. The construction and operation of the Project will not impact on any of the listed heritage items within the local area that are outside the Project Site.

6.5.4 Implemented / Proposed Improvements

During the reporting period a survey was conducted to confirm the visual identification of heritage items. The Western Region Heritage Committee Meetings were held on in May and November 2021.

The land disturbance due diligence process implemented by the site is considered appropriate for the management of heritage items.

6.6 BLASTING

There was no blasting carried out at the Lidsdale Siding site in 2021.

6.7 OTHER MATTERS

6.7.1 Bushfire

There were no bushfires during the reporting period which impacted the operations. Firebreaks are maintained at Lidsdale Siding as part of normal grounds maintenance activities. Fire control equipment was inspected as part of normal operational maintenance activities.

6.7.2 Waste

Minimal waste is generated at the Lidsdale Site due to the store deliveries primarily occurring at other operations. In March 2021 the recycling bin was serviced with 0.040 tonnes being recycled.

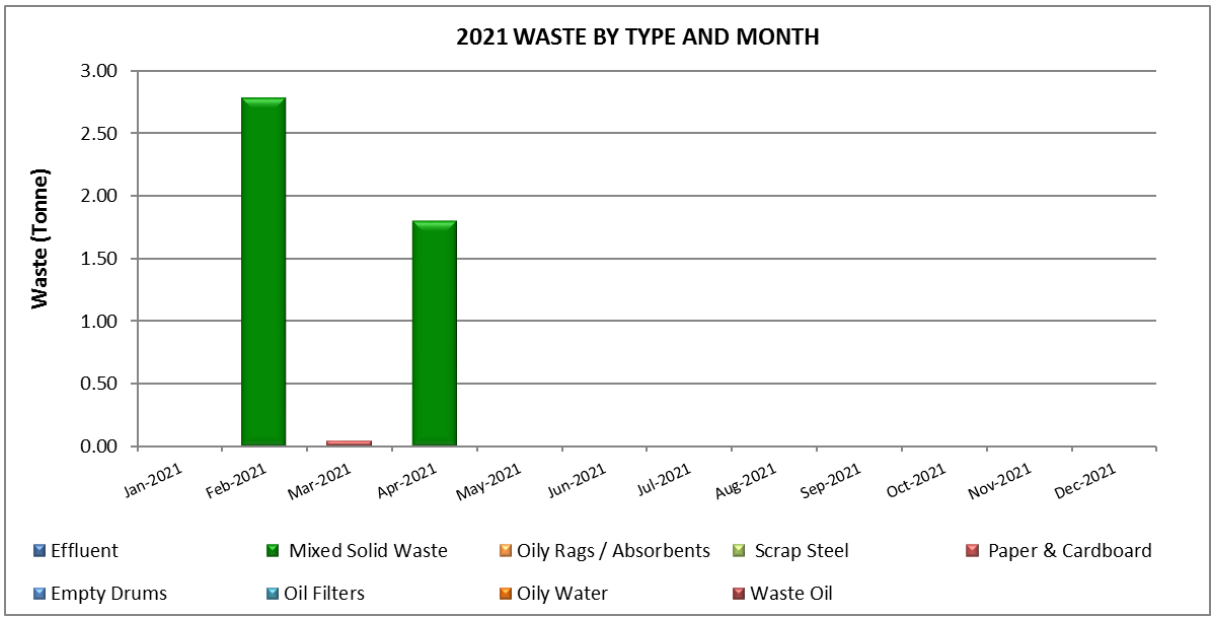


Figure 6-5 2021 Waste Generation

6.7.3 Phase 2 Environmental Site Assessment Works

A former diesel above-ground storage tank (AST) and associated fuel-dispensing infrastructure was historically operated on the Site. A diesel spill (approximately 20,000 L) occurred in the 1970's, and the Site is known to have been impacted with petroleum hydrocarbon contamination in the vicinity of the former AST.

An Environmental Management Plan was prepared for the site as being implemented as required. During the reporting period, additional monitoring locations were installed (MW11, MW12 and MW14a). These were sampled for the first time in Quarter 4 monitoring round.

The following conclusions can be made on the physiochemical parameters

- pH values indicate that the groundwater varies from slightly acidic to acidic.
- Redox potential indicates groundwater is generally oxidising.
- DO results indicate generally low levels across the Site. Fluctuating values have been observed across sites likely due to samples being bailed.
- EC results indicate low levels of conductive ions i.e. dissolved salts and inorganics within groundwater, representative of 'fresh to slightly brackish' water.

The analytical results from all groundwater samples collected from the Site as part of the 2021 Quarterly groundwater monitoring events were either below the LOR or the applicable Management Response Trigger Value (MMTV) apart from the exceedances observed at MW01 for Naphthalene

7 WATER

7.1 WATER MANAGEMENT

Lidsdale Siding manages both surface water and groundwater in accordance with the Water Management Plan dated January 2021. This plan was approved by DPIE on 12 March 2021.

Management measures used during the operational phase include:

- The use of higher grades of mechanical equipment across the facility to reduce downtime and increase the efficiency of the water management system.
- The management of water discharged from site
- Storage and use of chemicals/ fuel on site in accordance with Technical guidelines
- The use of sprinklers and water carts on coal stockpiles and compacted coal reject –
- The removal of coal spillage on ground
- The removal of invasive species (Willows)
- Visual, acoustic and water management bunds around maintenance
- Drainage lines maintenance.
- Ponds and Sediment Detention Basins maintenance.

7.1.1 Water Licenses

Water Licences

Lidsdale Siding currently holds two WALs for the extraction of surface water and groundwater to supplement water supply to the site. The WALs include specific extraction, monitoring, recording and reporting requirements.

- WAL 25774 licenses the extraction of up to 1 ML/year of surface water from Pipers Flat Creek, however this water source is not currently used.

- WAL 24362 licenses the extraction of up to 8.5 ML/year of groundwater from a production bore. The production bore was not used in the water year.

- Table 7-1 reports on the 'Water Year'. The Water Year is from 1 July to 30 June, not the calendar year.

Table 7-1Water Take (ML)

Licence Number	Water Sharing Plan, source & management zone (as applicable)	Entitlement (ML)	Passive take/inflows (ML)	Active pumping (ML)	TOTAL (ML)
WAL 24362 (Work Approval 10WA116403 Groundwater (Production Bore)	Sydney Basin Coxs River Groundwater Source	8.5	0	0	0
WAL 25774 (Work Approval 10WA102993) Surface water	Upper Nepean And Upstream Warragamba Water Source	1.0	0	0	0

Water Year Reporting Period 1/07/2020 - 30/06/2021

7.1.2 Water Balance

A site water balance model was developed for the water management system at Lidsdale Siding (GHD 2017) to quantify water transfers within the site under various rainfall conditions. No changes to water management or the site water balance are associated with MOD 1, MOD 2 or MOD 3.

Yearly rainfall and temperatures influence rainfall onto storages and catchment. This is reflected in LDP004 discharge frequency discussed in Section 7.2.2.

The following aspects are less than predicted in the water balance:

- External portable water supply was <0.1ML
- There has been no extraction of water from the production bore
- There has been no water make up supplied by Springvale

7.2 SURFACE WATER

7.2.1 Environmental Management

Discharge water quality is monitored monthly during discharge as per the requirements of EPL 5129 and the Lidsdale Siding Water Management Plan at Licenced Discharge Point (LDP) LDP004. The Location of LDP004 is shown in Figure 6-1.

7.2.2 Environmental Performance

Discharge Water

LDP004 discharges infrequently as a result of rainfall. LDP004 discharged on four occasions in January, March, November, and December during the reporting period. For compliance with EPL 5129 conditions, the water is tested for pH, Total Suspended Solids (TSS), Electrical Conductivity (EC) and Oil and Grease.

The water quality sampling results from the discharge events are presented in Table 7-2.

Table 7-2 LDP004 Water Quality Summary

Parameter	Unit of Measure	No. of samples required by the licence	No. of samples collected	Jan 2021	March 2021	Nov 2021	Dec 2021	EPL limit
pH	pH units	4	4	7.0	6.7	6.5	7.8	6.5-8.5
TSS	mg/L	4	4	88[1]	36[1]	<5	18	30
EC	µS/cm	4	4	300	424	335	306	No concentration limit
Oil & Grease	mg/L	4	4	<5	<5	<5	<5	10

[1]= EPL 5129 condition L2.5- rainfall between 31/12/2020 and 5/1/2021 was 62.8mm therefore the result is not considered an exceedance. Similarly between 18/3/2021 and 22/3/2021 was 89.6mm therefore the result is not considered an exceedance.

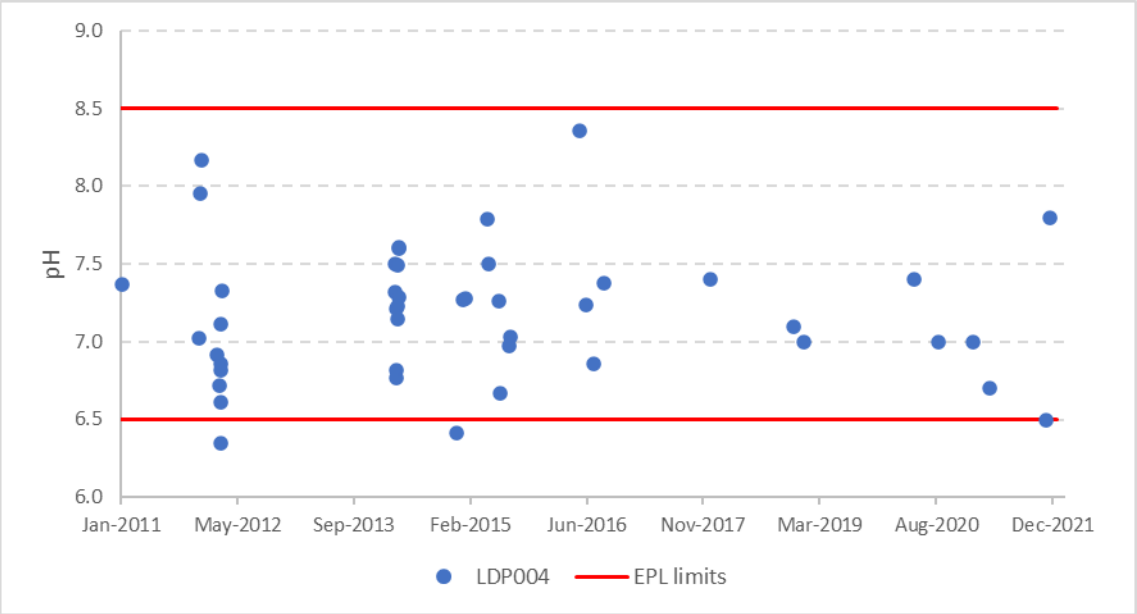


Figure 7-1 Lidsdale Siding LDP004 pH 2011-2021

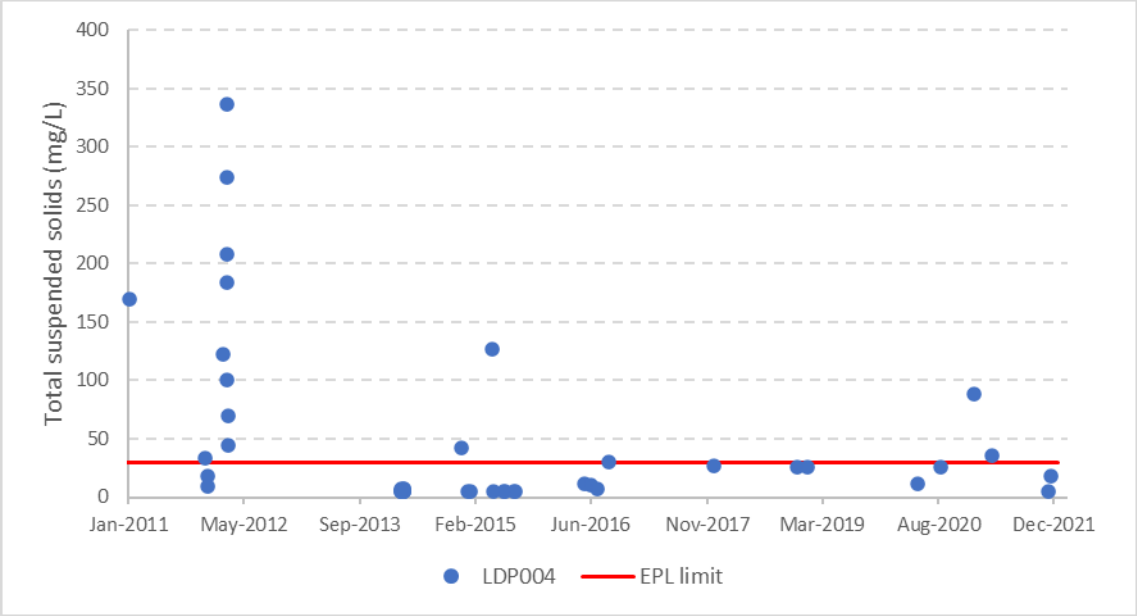


Figure 7-2 Lidsdale Siding LDP004 Total Suspended Solids 2011-2021

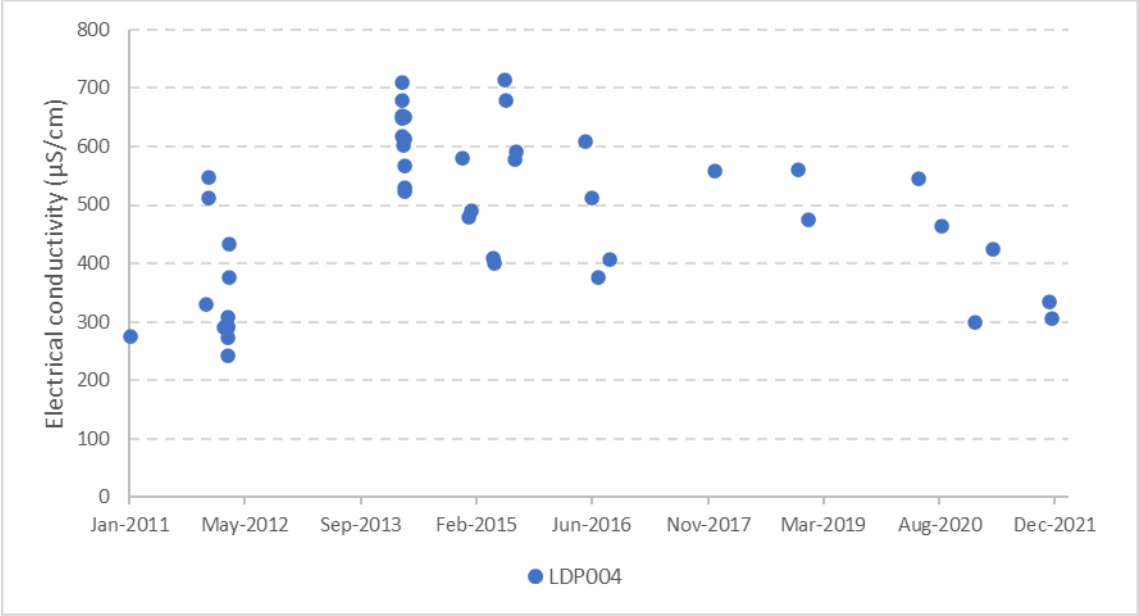


Figure 7-3 Lidsdale Siding LDP004 Oil and Grease 2011-2021

Surface Water

Water quality monitored downstream of Lidsdale Siding is assessed against site-specific guideline values (SSGVs) derived for the catchment. SSGVs are based on a review of ANZECC (2000) default guideline values (DGVs) and water quality observed at Pipers Flat Creek U/S (upstream reference site).

Table 7-3 2021 Upstream and Downstream Water Quality Results

Parameter	Units	Pipers Flat Creek U/S		Pipers Flat Creek D/S	
		#	Median	#	Median
Physicochemical					
EC	µS/cm	8	422	8	449
pH	pH units	8	7.0	8	6.8
TSS	mg/L	8	32	8	6
Turbidity	NTU	8	20	8	18
Nutrients					
Nitrate	mg/L	8	0.10	8	0.08
Nitrite	mg/L	8	0.01	8	0.01
Nitrate + nitrite	mg/L	8	0.10	8	0.08
Total phosphorus	mg/L	7	0.04	2	0.04
Major Ions					
Bicarbonate alkalinity	mg/L	8	97	8	1
Carbonate alkalinity	mg/L	8	1	8	1
Hydroxide alkalinity	mg/L	8	97	8	1
Total alkalinity	mg/L	8	97	8	89
Calcium	mg/L	8	27	8	33
Chloride	mg/L	8	26	8	25
Magnesium	mg/L	5	22	8	17
Potassium	mg/L	8	7	8	7
Sodium	mg/L	8	31	8	30
Sulphate	mg/L	8	102	8	101
Dissolved metals					
Aluminium	mg/L	8	0.04	3	0.19
Cadmium	mg/L	8	0.000	8	0.0001
Copper	mg/L	8	0.001	8	0.001
Iron	mg/L	8	0.34	8	0.46
Manganese	mg/L	8	0.184	8	0.196
Nickel	mg/L	8	0.004	8	0.003

Parameter	Units	Pipers Flat Creek U/S		Pipers Flat Creek D/S	
		#	Median	#	Median
Other					
BTEX	µg/L	8	1	8	1
Oil and grease	mg/L	8	5	8	5
TRHs	µg/L	8	50	8	50

Individual monitoring event triggers not sustained although investigated during the reporting period are discussed in Appendix 7.

Flood Study

Flood mitigations measures detailed in the Lidsdale Siding Flooding Assessment Report were implemented during 2021. This mainly involves the removal of crack Willows at Lidsdale Siding which was completed in 2021. Implementation of flood mitigation measures is provided in **Error! Reference source not found.**.

Table 7-4 Flood mitigation measures at Lidsdale Siding

Mitigation measure	Detail	2021 Activities	2022 Proposed
Option 1: Removal of Willows – Pipers Flat Creek	There is a portion of significantly congested Willows growth in Pipers Flat Creek that could be thinned out to reduce peak water levels under a 100-year ARI event.	-GPS logging and recording of treated Willow,tree locations -Poisoning (in accordance with the recommendations of the local weed authority regarding the herbicide use close to the waterway), removal (conducted where safe to do so without causing damage to riparian habitat), and in-situ mulching of Willows along Pipers Flat Creek catchment. -Maintenance of Eucalyptus aggregata and associated community plantings -Weed Control - Weeding & Spraying as required (Tree Guard Maintenance, Establishment and survival watering, Photographs & Reporting)	As per 2021 activities if required
Option 2: Local Bunding	Propose to remove a bund on the western side of the siding that elevates water levels during flood events.	Nil	Nil
	Construct a new bund to the north of the rail siding to protect the siding during flood events.	Bund maintenance and vegetation hydro-seeding	As per 2021 activities

7.2.3 Comparison against Predictions

Surface water related predictions during the operation of the Project are outlined below:

- the recycling of water around the site (through pipes and via natural shallow underground / surface flow mechanisms) may progressively increase salinity levels and promote the mobilisation of contaminants over time.
- contaminated water passing through the Project Site and broader study area has the potential to accumulate on the surface (increasing in salinity) and also mix with shallow groundwater prior to draining back to the main pollution control pond for reuse
- the impact of widespread flooding or a sustained rainfall event has the potential to transfer significant quantities of surface water through the pond system resulting in a reduction in the total residence time for settlement and an increase in the total amount of suspended material being discharged
- accidental spills and leaks entering the site surface water reuse system.
- raw water use from Creek at various stages of the process. New conditions may potentially be applied to the existing licence following its conversion to a Water Access Licence under the Water Management Act 2000.
- windborne coal/road dust has the potential to mobilise around the facility. This material is collected by surface water runoff and is transported to the containment ponds, then potentially (post settling) to nearby watercourses
- encroachment of Pipers Flat Creek floodwaters on to the site via the western corner. Encroachment is potentially due to an historical diversion of the Creek to the north of the site and from willow trees partially blocking efficient Creek flow. Sedimentation of the Creek's confluence with the Coxs River has developed over time from offsite erosion resultant from some overgrazing and land clearing.
- the Railway Culvert which runs under the railway line and flows into Pipers Flat Creek, is subject to flow back up from the Creek during flood events.
- water supply and demand varies depending on climatic conditions and needs to suppress dust on roads and coal stockpiles.
- the natural drainage from the site and surrounding sub-catchment area for Pipers Flat Creek is compromised due to the location of the site (historical), Creek diversion and capturing of surface runoff (from on and parts of surrounding area)
- use of raw 'clean' water resources.
- off-site water from the property located to the south (adjacent to the main entrance, between rail site and Main Road) pools behind the tree-lined visual/acoustic bund that extends in a "dog-leg" shape across the southern perimeter. This temporarily ponded water poses a nuisance to neighbouring properties
- a gap in the bund tends to discharge uncontrolled stormwater across the site and occasionally through the workshop area before it drains towards the main pollution control pond.
- sedimentation of ponds and basins reduces their capacity.

The results obtained form the LDP004 during the period are generally in accordance with the predications for the project and the management measures to control this are considered adequate.

7.2.4 Implemented / Proposed Improvements

The surface water monitoring program in the approved water management plan will continue to be implemented at the sites.

IEA Improvement recommendations pertaining to the construction of the triangle dam and the refinement of dam flocculation procedures will be a focus in 2022.

7.3 GROUNDWATER

7.3.1 Environmental Management

Groundwater sampling is undertaken in accordance with the Lidsdale Siding Water Management Plan.

7.3.2 Environmental Performance

Median Groundwater Results for 2021 are presented in Table 7.5.

2021 groundwater monitoring data indicates that:

- Groundwater at the site was generally acidic.
- Groundwater salinity ranged from fresh to slightly brackish.
- Groundwater levels generally increased throughout 2021 due to above average rainfall.
- Monitoring bores MW01 and MW03 were dry in quarter 1 and 2 monitoring.

Water level and Water quality results are presented graphically in Appendix 8 with a comparison to SSGV.

Table 7-5 2021 Groundwater Quality Median results

Parameter	Unit	MW1	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10
Physiochemical										
DO	mg/L	4.3	8.2	4.4	6.7	5.4	2.5	5.6	4.6	3.9
EC	µS/cm	571	190	507	490	364	611	535	284	633
pH	pH units	6	7	4	5	6.1	6	6	5.7	6.1
TSS	mg/L	605	1211	257	984	341	2850	2535	1500	880
Turbidity	NTU	757	1984	315	1150	295	4000	1600	1860	565
Nutrients										
Nitrate	mg/L	0.05	0.99	1.27	0.02	1.95	0.02	0.02	0.19	0.09
Nitrite	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate + nitrite	mg/L	0.05	0.99	1.27	0.02	1.95	0.02	0.02	0.19	0.09
Major Ions										
Bicarbonate alkalinity	mg/L	206	32	2	11	66	292	105	31	26
Carbonate alkalinity	mg/L	1	1	1	1	1	1	1	1	1
Hydroxide alkalinity	mg/L	1	1	1	1	1	1	1	1	1
Total alkalinity	mg/L	206	32	2	11	66	292	105	31	26
Calcium	mg/L	34	7	36	33	23	36	49	16	6
Chloride	mg/L	15	12	11	4	18	21	12	5	30

Parameter	Unit	MW1	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10
Magnesium	mg/L	27	4	23	32	14	29	21	11	18
Potassium	mg/L	5	3	6	3	4	10	6	6	7
Sodium	mg/L	25	25	35	15	31	32	39	19	53
Sulfate	mg/L	1	38	254	232	92	1	179	93	174
Dissolved Metals										
Cadmium	mg/L	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Copper	mg/L	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001
Iron	mg/L	0.29	0.05	0.05	0.05	0.05	0.53	0.05	0.05	57.3
Manganese	mg/L	0.317	0.011	0.396	0.013	0.001	0.691	2.885	0.213	0.988
Nickel	mg/L	0.002	0.002	0.018	0.027	0.001	0.002	0.009	0.01	0.006
Other										
BTEX	µg/L	4	1	1	1	1	1	1	1	1
Oil and grease	mg/L	5	5	5	5	5	5	5	5	5
TRH	µg/L	24,000	100	100	100	100	5035	100	100	100

7.3.3 Comparison against Predictions

It was predicated that during operation, groundwater volumes collected in the reclaim tunnel would be minimal as the tunnel will be fully concrete lined. There would be no impact of dewatering on the other aquifers on water quantity and quality of the Coxs River downstream. During operations, any surface water from the catchment would be diverted away from disturbed areas thereby preventing any potential mixing with groundwater. Moreover, the clean runoff would be of a better water quality than the groundwater contained within the shallow aquifer.

7.3.4 Implemented / Proposed Improvements

The groundwater monitoring program in the approved Water Management Plan will continue to be implemented.

8 REHABILITATION

The Environmental Assessment stated that should no further use of the Lidsdale Siding site be found when operations cease, the site would be closed, decommissioned, and rehabilitated.

Rehabilitation measures include:

- Removal of the rail spur line and shunt
- Removal of all infrastructure
- Removal of carbonaceous and contaminated materials
- Filling the reclaim tunnel and other physical features of the siding
- Rehabilitation of the remaining disturbed areas.

None of the above measures were undertaken during the reporting period. The Rehabilitation measures will be implemented at closure.

The rehabilitation and closure objective for the site is to create stable, non-polluting post closure landforms that allow the achievement of the post closure land use.

Lidsdale Siding has approval to carry out coal handling and train loading operations on the site until 31 December 2042.

9 COMMUNITY CONSULTATION

Lidsdale Siding consults with the community through forums such as, the Centennial Western Region Community Consultative Committee and community organised events.

Meetings of the Centennial Western Region Community Consultative Committee (CCC) were held

- 17 February 2021
- May 2021 (Presentation distributed only)
- 18 August 2021
- 17 November 2021

Some meetings were conducted using online forums (Microsoft teams to adhere to covid-19 requirements).

Representatives of the appointed community representatives, relevant government organisations and company representatives attended the meetings. A detailed presentation was provided to attendees at each CCC meeting on the operational activities at the site.

Key agenda items discussed in 2021 in relation to Lidsdale Siding were:

- Rail unloader project operations and coal receipt
- Lidsdale Siding Rail unloader automation project
- Historical contaminated diesel spill management approval for expenditure and action implementation
- Ongoing inspection, monitoring, reporting, and compliance activities
- Site Environmental and Community program implementation

9.1 COMMUNITY SPONSORSHIP

The Lidsdale Siding continues to support the local community through various sponsorship avenues to the following community activities, groups and associations in 2021, including:

- 1 The Westpac Rescue Helicopter Service
- 2 Lithgow City Council for LithGlow and Halloween
- 3 Mingaan Wiradjuri Aboriginal Corporation for NADOIC Week

9.2 COMMUNITY COMPLAINTS

In accordance with Schedule 5, Condition 11A, Ivanhoe Coal Pty Ltd is updates a complaint register monthly on the Centennial website. Long terms trends in complaints are presented in Table 9-1.

Table 9-1 Record of annual community complaints for 2017 to 2021

Community Complaints						
Year	**Air**	**Water**	**Noise**	**Waste**	**Other**	**Total**
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	0	0	0	0	0	0
2020	0	0	0	0	0	0
2021	0	0	0	0	0	0

There have been no community complaints at Lidsdale Siding during the reporting period.

10 INDEPENDENT ENVIRONMENTAL AUDIT

Schedule 5, Condition 9 of PA 08_0223 requires Lidsdale Siding to commission an IEA within 12 months of completion of the upgrade to the coal loader, and every three years thereafter.

Centennial has completed the 2021 Independent Environmental Audit (IEA) for Lidsdale Siding. The IEA was completed by the approved auditors Chris Jones and Jessica Coffey of IEMMA. Specialist auditors Clayton Richards, Rod Linnett and Ali Naghizadeh were also part of the audit team.

In accordance with Schedule 5, Condition 10 of PA08_0223 and the Departments auditor endorsement letter, dated 23 August 2021, a copy of the IEA Report and Centennial's response to the audit recommendations (RAR) was submitted to the Department on 6 December 2021.

As discussed with the Department, there was an error in the action due date (reference made to Quarter 1 2021 which preceded the audit). The amended dates have been published on the website and have been presented below.

Table 10.1 shows the Lidsdale Siding response to the auditor's recommendations as listed within Table 9 of the 2021 Independent Environmental Audit (IEA) Report relating to Non-Compliance Recommendations.

Table 10-1 Non-Compliance Recommendations

Condition Number	Recommendation	Response	Timing	2021 AR Update
Lidsdale Siding Project Approval PA08_0223				
Schedule 2, Condition 8A Hours of Operation	No further recommendations	No further recommendations.	Finding and recommendation noted. No further action is proposed.	N/A
Schedule 3, Condition 10 Air Quality and Green House Gas Management Plan	NC REC 1: The BAM unit, and any temporary replacements should be calibrated in accordance with AS3580.9.11 as specified in Table 4-2 of the AQGHGMP. Investigate an alarm system for when the BAM unit fails.	R1 LS IEA 2021: Centennial will revise the scope of works associated with the calibration of the BAM unit.	15 February 2022	COMPLETE The implementation of a revised scope of works for the BAM calibration will occur in 2022.
	NC REC 2: Site to review the Western Region Air Quality & GHG Management Plan to include: a. reporting data capture rates and any deviations from test methods. It is recommended that data which is not of good quality (e.g. due to calibration failure, flow faults, number of valid data points, etc.) be excluded from the reported data capture rate. b. recording of triggers, actions and general mitigation measures for air quality.	R2 LS IEA 2021: Centennial will investigate the feasibility of installing a 'fail' alarm on the BAM unit.	28 February 2022	COMPLETE Discussion regarding the alarming functions on the BAM are underway.
		R3 LS IEA 2021: Centennial will review and revise the Western Region Air Quality & Green House Gas Management Plan.	8 March 2021	ONGOING Centennial has provided a scope of works to a consultant for the revision of management Plans. Update to the documents will be occurring in Quarter 1 as required under S5 chedule5 condition 5.
Schedule 3, Condition 17 Surface Water Discharges	IMP REC 2: Site to prepare a flocculation procedure which outlines type of flocculation, dosage, timing and	R4 LS IEA 2021: Centennial will develop a flocculation procedure for LDP004.	27 January 2021	COMPLETE A draft flocculation procedure has been developed in consultation with the service procedure.

Condition Number	Recommendation	Response	Timing	2021 AR Update
	testing requirements. IEMA anticipates this to be an internal document only.			
Schedule 3, Condition 21 Water Management Plan	IMP REC 4: it is recommended that the overflow between cell 1 and cell 2 of the triangle dam as per an engineering design. Once final works are completed it is recommended an engineer completes a 'as constructed' inspection.	R5 LS IEA 2021: Centennial will review engineering design to finalise the construction of the triangle dam between cell 1 and 2, and complete 'as constructed' inspection at completion of the project.	30 December 2022	COMMENCED Quotes are currently being sought by Centennial for civil engineering works.
	IMP REC 5: there is a small section of the flood mitigation bund where there is exposed coal and the area is bare (noted that is a small section and it is stable). Update the RMP to note that prior to closure that the status of coal within the flood mitigation bund is reviewed, coal will be removed, and any exposed areas will be rehabilitated.	R6 LS IEA 2021: Centennial will review and revise the Rehabilitation Management Plan.	8 March 2022	ONGOING Centennial has provided a scope of works to a consultant for the revision of management Plans. Update to the documents will be occurring in Quarter 1 as required under S5 chedule5 condition 5.
Schedule 3, Condition 22 Water Management Plan	IMP REC 6: Liaise with State Rail to ensure that weed spraying is completed within the study area (area adjacent to the Project Approval area). In particular within the part of the 'willow removal area'.	R7 LS IEA 2021: Centennial will contact State Rail regarding ongoing weed management of the lots adjacent to the Lidsdale Siding site.	15 February 2021	COMLETE A meeting has been scheduled for Quarter 1 2022.
	IMP REC 7: Follow-up the approval of the draft 2019 BMP with DPIE.	In reference to the Department's letter dated, 18 October 2021. Centennial is implementing the Department's request to revise the Western Region Biodiversity Management Plan (BMP), inclusive of undertaking contemporary consultation with agencies. The	Not Applicable	ONGOING A revised WRBMP will be submitted by 30 April as discussed with DPIE.

Condition Number	Recommendation	Response	Timing	2021 AR Update
		Department has requested that the revised BMP be submitted 30 April 2022. No further action is proposed.		
Schedule 3, Condition 1 Environmental Management Strategy	No further recommendations.	Finding and Recommendation Noted. No further action is proposed.	Not Applicable	Not Applicable
Schedule 3 Condition 7 Incident Reporting	No further recommendations.	Finding and Recommendation Noted. No further action is proposed.	Not Applicable	Not Applicable
EPL 5129				
Condition L2.4 Limit Conditions	No further recommendations.	Finding and Recommendation Noted. No further action is proposed.	Not Applicable	Not Applicable
Condition O4.2 Operating Conditions	No further recommendations.	Finding and Recommendation Noted. No further action is proposed.	Not Applicable	Not Applicable
Condition M2 Monitoring and	NC REC 1: The BAM unit, and any temporary replacements should be calibrated in accordance with AS3580.9.11 as specified in Table 4-2 of the AQGHGMP. Investigate an alarm system for when the BAM unit fails.	Centennial will revise the scope of works associated with the calibration of the BAM unit. (R1 LS IEA 2021)	15 February 2022	As reported above,

Condition Number	Recommendation	Response	Timing	2021 AR Update
Recording Conditions		Centennial will investigate the feasibility of installing a 'fail' alarm on the BAM unit. (R2 LS IEA 2021)	28 February 2022	
	NC REC 2: Site to review the Western Region Air Quality & GHG Management Plan to include: a. reporting data capture rates and any deviations from test methods. It is recommended that data which is not of good quality (e.g. due to calibration failure, flow faults, number of valid data points, etc.) be excluded from the reported data capture rate. b. recording of triggers, actions and general mitigation measures for air quality.	Centennial will review and revise the Western Region Air Quality & Green House Gas Management Plan. (R3 LS IEA 2021)	8 March 2022	As reported above,
Condition M2.3	No further recommendations.	Finding and Recommendation Noted. No further action is proposed.	Not Applicable	Not Applicable
Condition M3.1	NC REC 1: The BAM unit, and any temporary replacements should be calibrated in accordance with AS3580.9.11 as specified in Table 4-2 of the AQGHGMP. Investigate an alarm system for when the BAM unit fails.	Centennial will revise the scope of works associated with the calibration of the BAM unit. (R1 LS IEA 2021)	15 February 2022	As reported above,
		Centennial will investigate the feasibility of installing a 'fail' alarm on the BAM unit (R2 LS IEA 2021)	28 February 2022	As reported above,
	NC REC 2: Site to review the Western Region Air Quality & GHG Management Plan to include: a. reporting data capture rates and any deviations from test methods. It is recommended that data which is not of good quality (e.g. due to calibration	Centennial will review and revise the Western Region Air Quality & Green House Gas Management Plan (R3 LS IEA 2021)	8 March 2022	As reported above,

Condition Number	Recommendation	Response	Timing	2021 AR Update
	failure, flow faults, number of valid data points, etc.) be excluded from the reported data capture rate. b. recording of triggers, actions and general mitigation measures for air quality.			

Table 10.2 shows the Lidsdale Siding Response to the IEA Recommendations listed within Table 10 of the 2021 IEA Report relating to Additional Recommended Actions.

Table 10-2 Additional Recommendations

Schedule and Condition Number	Improvement REC Number	IEA- Recommendation	Lidsdale Siding Response/ Action Plan	Timeframe for completion of action	2021 AR Update
PA08_0223 Schedule 3 Condition 2 Noise	IMP REC 1	It is noted that the noise monitoring reports from 2019 onwards reports do not have individual report reference/identification, which make it difficult to refer to a specific report. It would be beneficial for the future report to be labelled so as they can be easily identified.	Centennial has requested the inclusion of individual report referencing/ identification for future noise monitoring events.	No further action required	No further action required
PA08_0223 Schedule 3 Condition 18 Water	IMP REC 3	EMP to be updated to include the new GW bores.	R8 LS IEA 2021: Centennial will review and revise the Water Management Plan	8 March 2022	ONGOING Centennial has provided a scope of works to a consultant for the revision of management Plans. Update to the documents will be occurring in Quarter 1 as required under S5 chedule5 condition 5.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

This section refers to non-compliances and incidents reported during the reporting period. IEA period non-compliances have been discussed in Section 10. Table 11-1 presents the non-compliance for the reporting period.

Table 11-1 Non-Compliance

Overview of incident/non-compliance	Schedule 3 Condition 30 required a revised rehabilitation bond for the Lidsdale Siding Project to be submitted to the Department by 15 March 2021.
Description of Incident/non-compliance	Centennial has paid a portion of the bond amount however there is an outstanding bond amount to be paid for the project.
Action taken	Centennial has paid a portion of the bond amount and submitted an extension request until the 30 November 2021 which was approved by the Planning Secretary on 8 June 2021. A further extension of time was requested on 26 November 2021 until 28 February 2022. Centennial was advised on 25 February 2022 that the extension to supply this bond was not approved.
Current Status of Actions	Centennial is currently undertaking further discussions with DPIE in relation to the payment of bonds.

A summary of incident and regulatory action is presented in the following table.

Table 11-2 Summary of Reportable Incidents and Regulatory Actions

Compliance Type	Agency(ies)	Number
Incidents		0
Caution Notices	0	0
Warning Letters	DPIE	1
Penalty Notices		0
Prosecutions		0

Note: This table includes actions taken by DPE, DRG, Resources Regulator and the EPA during the reporting period.

One warning letter was received from DPIE on 23 April 2021 for failing to comply with the requirements of Schedule 5 Condition 7 which relates to train loading and unloading times. Non-compliances were not recorded against this condition of consent in 2021 as outlined in Section 4 and demonstrated by data presented in Appendix 2.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

This section refers to non-compliances and incidents reported during the reporting period. IEA period non-compliances have been discussed in Section 10. In 2021 there were no non-compliance or incidents reported. A summary of incident and regulatory action is presented in the following table.

Table 11-1 Summary of Reportable Incidents and Regulatory Actions

Compliance Type	Agency(ies)	Number
Incidents		0
Caution Notices	0	0
Warning Letters	DPIE	1
Penalty Notices		0
Prosecutions		0

Note: This table includes actions taken by DPE, DRG, Resources Regulator and the EPA during the reporting period.

One warning letter was received from DPIE on 23 April 2021 for failing to comply with the requirements of Schedule 5 Condition 7 which relates to train loading and unloading times. Non-compliances were not recorded against this condition of consent in 2021 as outlined in Section 4 and demonstrated by data presented in Appendix 2.

12 ACTIVITES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Table 12.1 presents activities that are currently planned for the next reporting period, including

Table 12-1: Forecast Operations for 2022

Improvement Actions
• Liase with State Rail re weed management of area adjacent to the Lidsdale Siding Site • Develop program for further removal of willows • Investigate feasibility of alternate dust control methods • Continue to progress IEA actions
Management Plan Revisions
• Water Management Plan • Rehabilitation Management Plan • Air Quality Management Plan
Condition Triggers
• Undertake revisions to Management plans within 3 months of IEA and Annual review Submission

It is noted that changes to production activities may trigger changes to planned activities.

13 REFERENCES

ACIRL (2021) January to December 2021Monitoring Reports

GHD (2021) January to December 2021 Monitoring Reports

GHD (2022) 2021 Annual Review of Surface and Groundwater Results

Global Acoustics (2022) Lidsdale Siding Sound Power Survey 2021

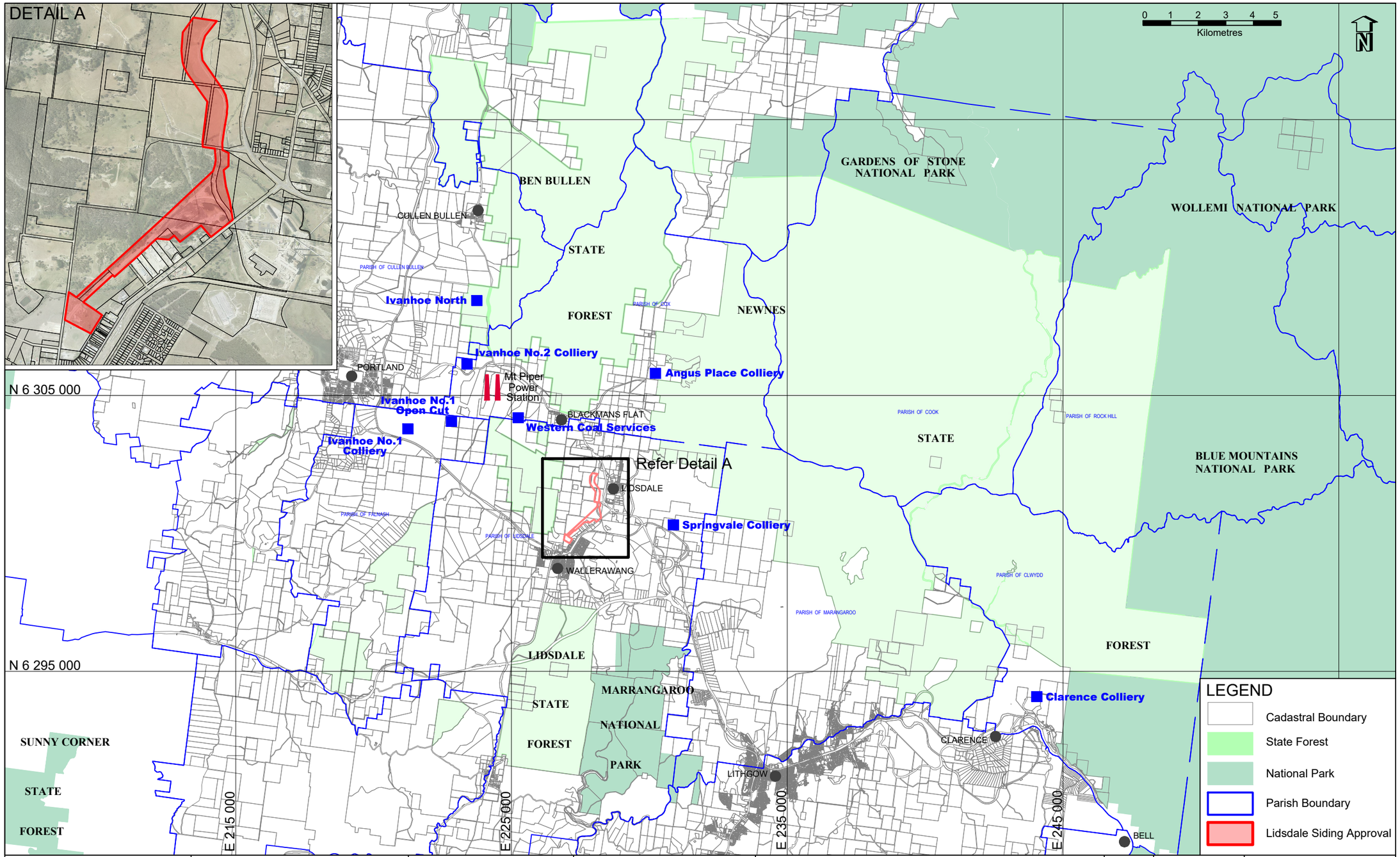
JR Richard (2021) Total Waste Management Report Lidsdale Siding

IEMMA (2021) Lidsdale Siding Independent Environmental Audit 2021

SLR (2021) Lidsdale Siding Willow Control Audit

Appendices

Appendix 1: Plans



Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

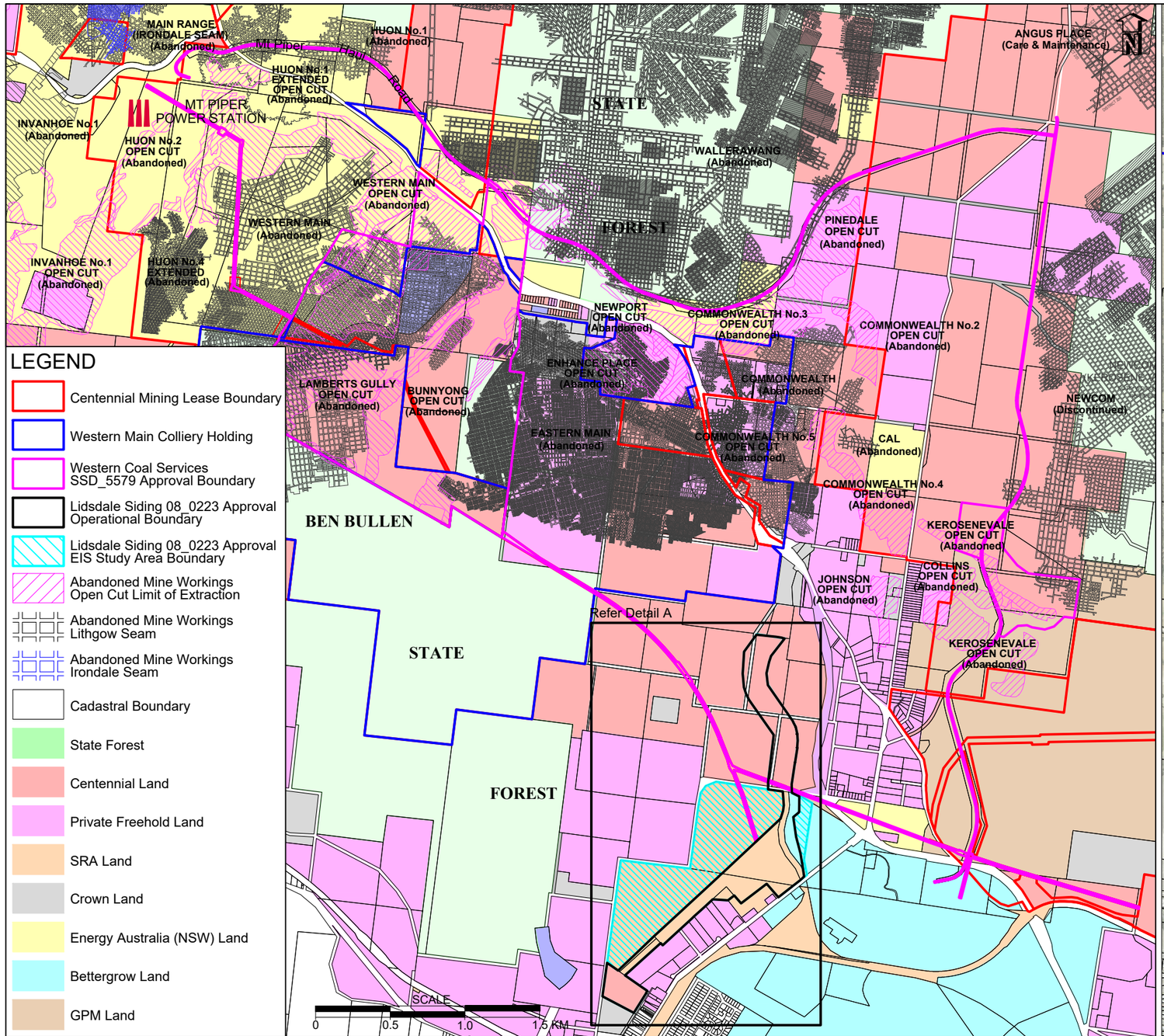
LIDSDALE SIDING ANNUAL REVIEW 2021

Plan No.1A - Project Locality

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7776



Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

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Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021

Plan No.1C - Built Environment

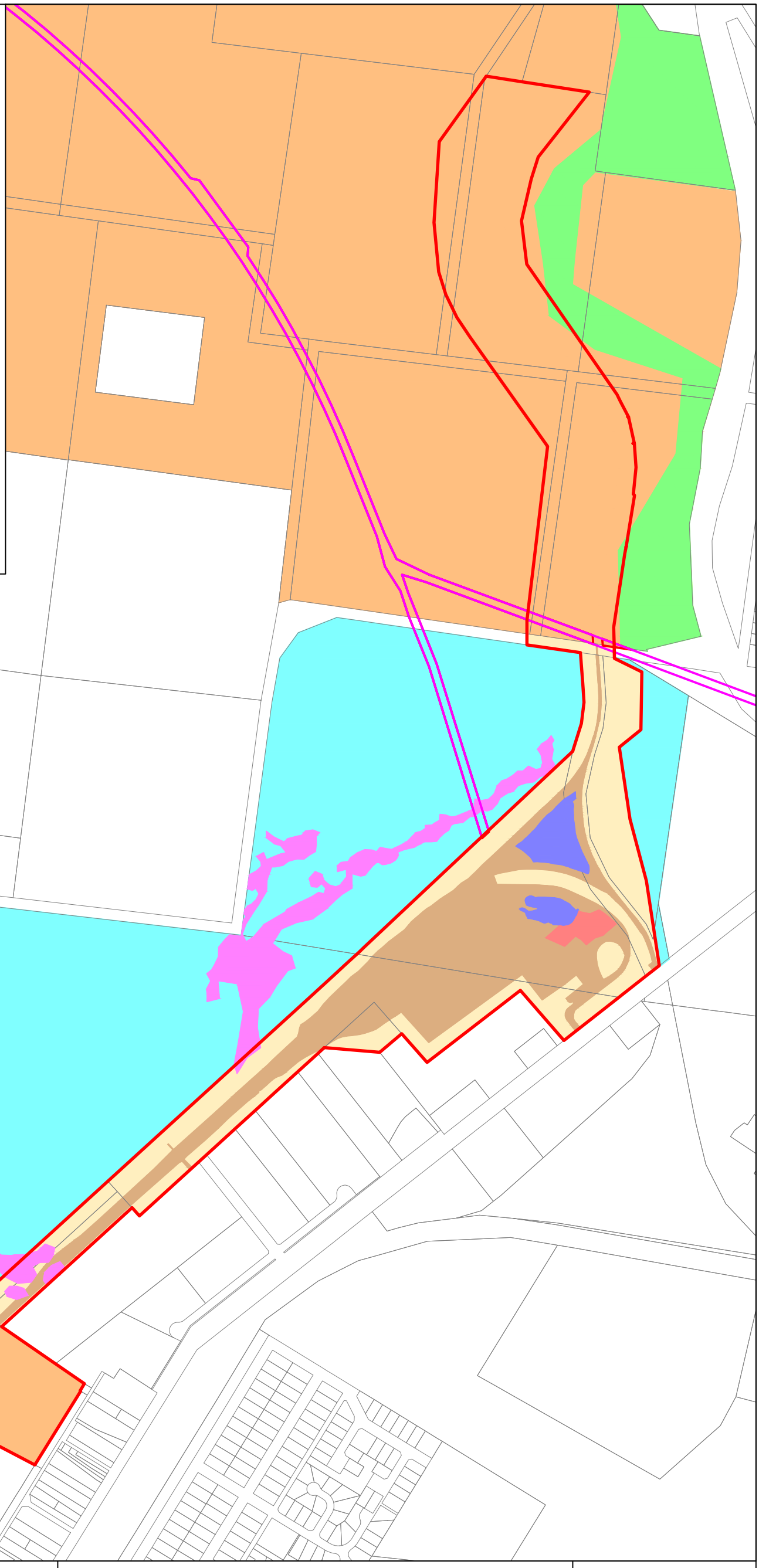
MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7777

LEGEND

- Lidsdale Siding 08_0223 Boundary
- Lidsdale Siding Extended EIS Study Area
- Western Coal Services SSD_5579 Boundary
- Domain - Infrastructure
- Domain - Water Management
- Domain - Hydrocarbon Study Area
- Domain - Willow Control Area
- Domain - Centennial Grazing Land
- Domain - Cox's River Conservation Area
- Domain - Other Lands
- Cadastral Boundary



Operation: Lidsdale Siding	
Operator: Ivanhoe Coal Pty Limited	
Project Approval: 08_0223	
Proponent: Ivanhoe Coal Pty Limited	
Mining Leases: N/A	
Leaseholder: N/A	
RCP Start Date: 2015	
RCP End Date: Reviewed Annually	
Annual Review Start Date: 1-January-2021	
Annual Review End Date: 31-December-2021	
Reporting Officer: William A. Olson	
Title: Environment & Community Coordinator	

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
VERSION	A2H

LIDSDALE SIDING
ANNUAL REVIEW 2021
PROJECT DOMAINS

Plan No.2

CENTENNIAL IVANHOE

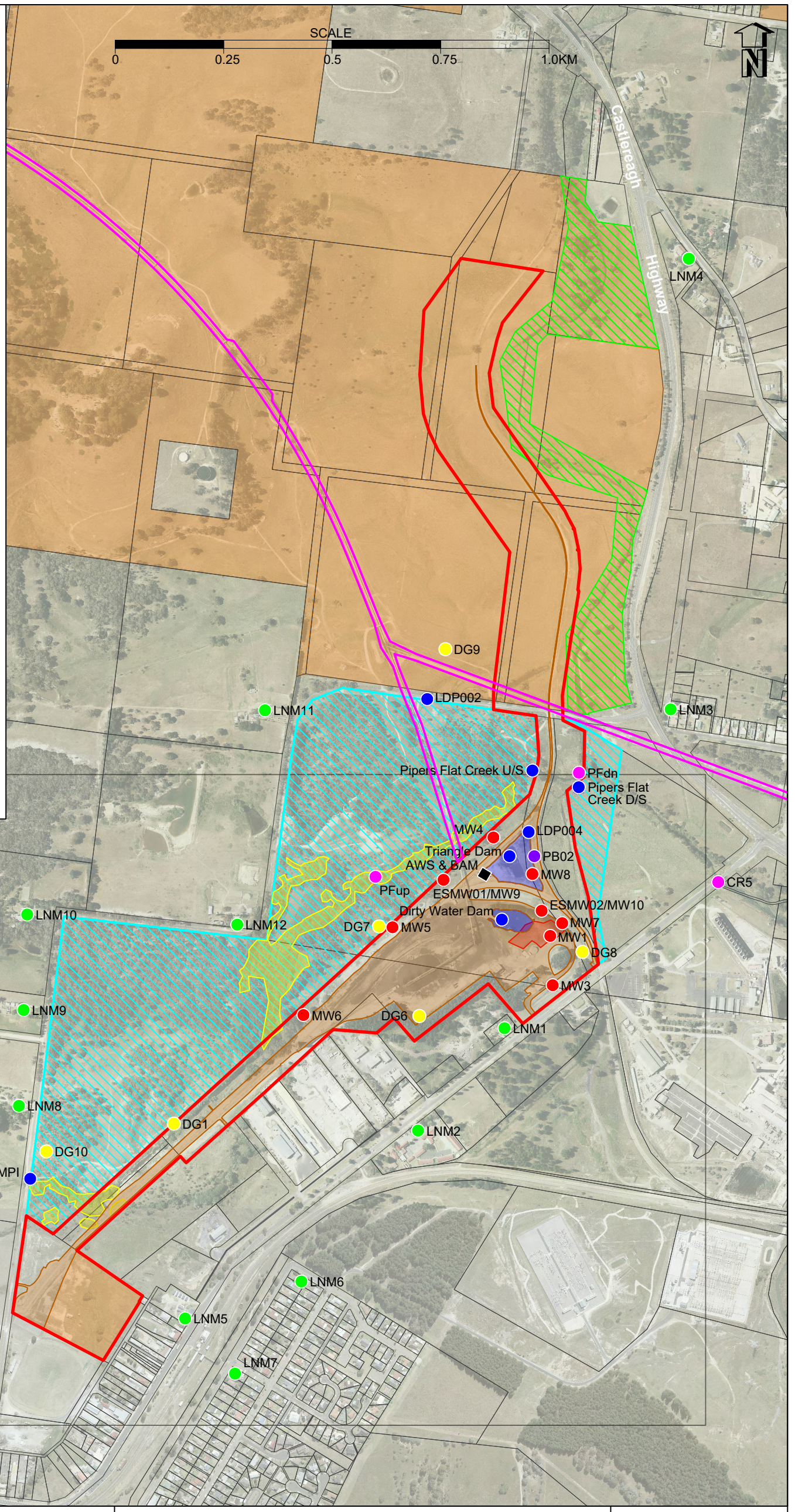
PLAN No. PC7778

LEGEND

- Lidsdale Siding 08_0223 Approval Boundary - Operational Area
- Lidsdale Siding 08_0223 Approval Extended EIS Study Area
- Western Coal Services SSD_5579 Approval Boundary
- Surface Water Monitoring Location
- Groundwater Monitoring Location
- Noise Monitoring Location
- Production Bore Location
- Dust Monitoring Location
- Regional Aquatic Monitoring Location
- Weather Station & BAM Unit Location
- Domain - Infrastructure
- Domain - Hydrocarbon Study Area
- Domain - Water Management Area
- Domain - Willow Control Area
- Domain - Centennial Grazing Land
- Domain - Cox's River Conservation Area
- Cadastral Boundary

NOTES

1. Please refer to Plan 3A for a detail of the Lidsdale Siding monitoring locations.



Operation:	Lidsdale Siding
Operator:	Ivanhoe Coal Pty Limited
Project Approval:	08_0223
Proponent:	Ivanhoe Coal Pty Limited
Mining Leases:	N/A
Leaseholder:	N/A
RCP Start Date:	2015
RCP End Date:	Reviewed Annually
Annual Review Start Date:	1-January-2021
Annual Review End Date:	31-December-2021
Reporting Officer:	William A. Olson
Title:	Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
VERSION	A2H

LIDSDALE SIDING
ANNUAL REVIEW 2021
MONITORING LOCATIONS

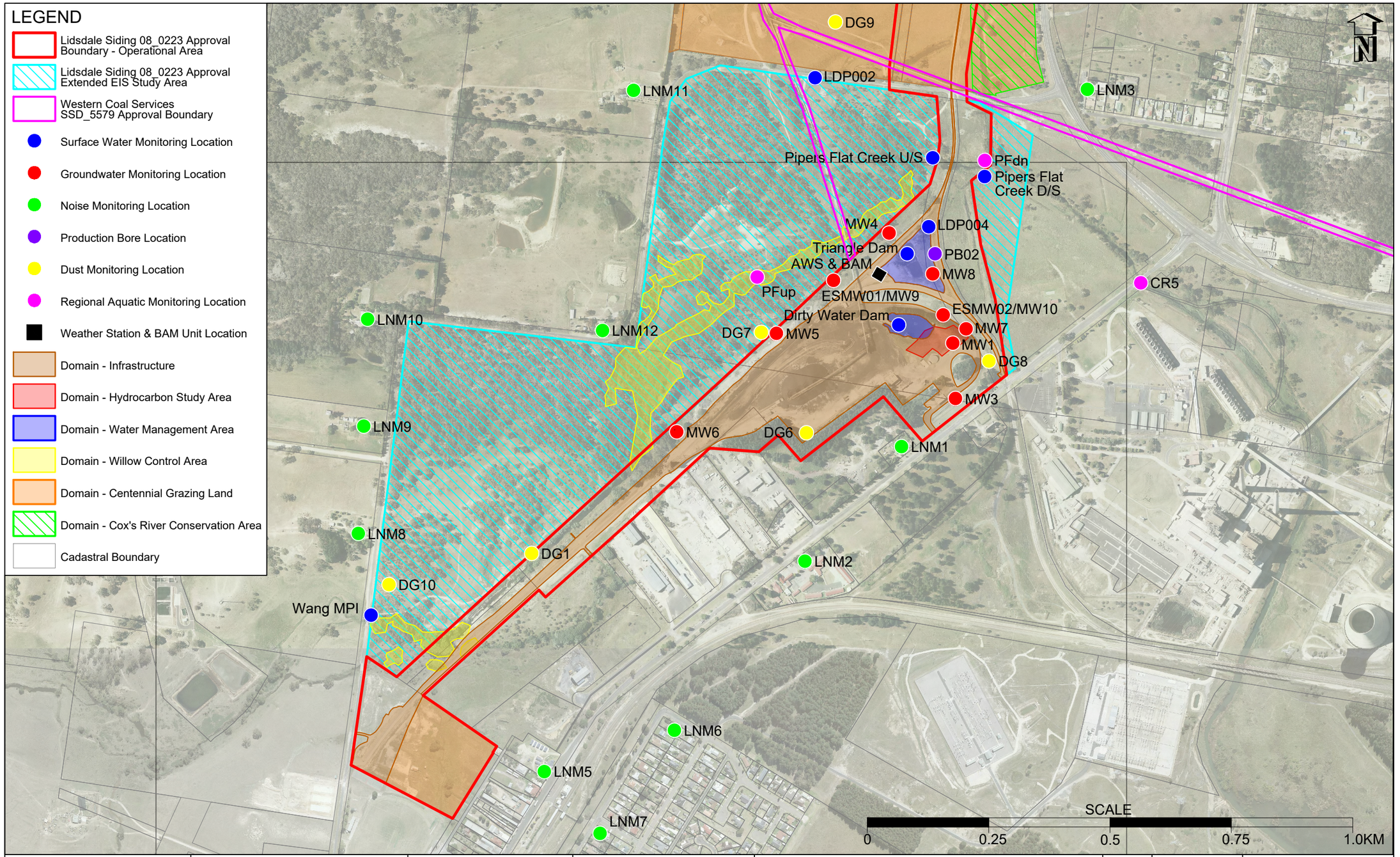
Plan No.3

CENTENNIAL IVANHOE

PLAN No. PC7779

LEGEND

- Lidsdale Siding 08_0223 Approval Boundary - Operational Area
- Lidsdale Siding 08_0223 Approval Extended EIS Study Area
- Western Coal Services SSD_5579 Approval Boundary
- Surface Water Monitoring Location
- Groundwater Monitoring Location
- Noise Monitoring Location
- Production Bore Location
- Dust Monitoring Location
- Regional Aquatic Monitoring Location
- Weather Station & BAM Unit Location
- Domain - Infrastructure
- Domain - Hydrocarbon Study Area
- Domain - Water Management Area
- Domain - Willow Control Area
- Domain - Centennial Grazing Land
- Domain - Cox's River Conservation Area
- Cadastral Boundary



Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2020

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
MONITORING LOCATIONS

Plan No.3A

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7822

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

SCALE 0 125m

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4A - Willow Management
Aerial Photo March 2015

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7780

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

N

SCALE 0 125m

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4B - Willow Management
Aerial Photo December 2016

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7781

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

SCALE 0 125m

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4C - Willow Management
Aerial Photo March 2019

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7782

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

N

SCALE 0 125m

NOTE: Flight path for Lidsdale Siding survey capture did not cover entire area of Willow Management in December 2020.

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4D - Willow Management
Aerial Photo December 2019

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7783

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

SCALE 0 125m

NOTE: Flight path for Lidsdale Siding survey capture did not cover entire area of Willow Management in December 2020.

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4E - Willow Management
Aerial Photo December 2020

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7784

LEGEND

- Lidsdale Siding 08_0223 Approval Operational Boundary
- Willow Management Area
- Cadastral Boundary

SCALE 0 250m

SCALE 0 125m

Operation: Lidsdale Siding	RCP Start Date: 2015
Operator: Ivanhoe Coal Pty Limited	RCP End Date: Reviewed Annually
Project Approval: 08_0223	Annual Review Start Date: 1-January-2021
Proponent: Ivanhoe Coal Pty Limited	Annual Review End Date: 31-December-2021
Mining Leases: N/A	Reporting Officer: William A. Olson
Leaseholder: N/A	Title: Environment & Community Coordinator

CERTIFICATION

I hereby certify that the information shown hereon, to the best of my knowledge and belief, is correctly represented.

Signed: .....

Date: 3-February-2022

William A. Olson
Environment & Community Coordinator
Springvale Coal Services Operations

LIDSDALE SIDING
ANNUAL REVIEW 2021
ENVIRONMENTAL MANAGEMENT
Plan No.4F - Willow Management
Aerial Photo December 2021

MINE	Lidsdale Siding
SEAM	N/A
DRAWN	P.J.M.
SCALE	Refer to Scale Bar
DATE	3-February-2022
SHEET	A2H

CENTENNIAL IVANHOE

PLAN No. PC7785

Appendix 2:

Coal Transport Records

Table A1-1: Long term trends in coal transportation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2021													
Coal transported from site (Tonnes)	0	0	0	0	0	0	48111	0	0	52276	55698	37861	**193946**
Coal imported to site (Tonnes)	45516	66653	61328	98514	98508	50742	3344	88489	14725	29904	0	0	**557723**
No. of trains departing site	12	20	17	27	32	16	14	29	5	24	16	10	**222**
2020													
Coal transported from site (Tonnes)	56,897	72,275	68,360	87,320	75,605	125,758	68,483	78,513	99,005	73,272	99,799	93,154	**998,441**
Coal imported to site (Tonnes)	56,897	72,275	68,360	87,320	75,605	125,758	68,483	78,513	99,005	73,272	99,799	93,154	**998,441**
No. of trains departing site	14	19	18	23	20	33	20	24	28	21	31	27	**278**
2019													
Coal transported from site (Tonnes)	0	0	0	0	0	3458	0	3390	0	3726	71490	130348	**212412**
Coal imported to site (Tonnes)	0	0	0	0	0	0	0	0	0	3726	71490	130348	**205564**
No. of trains departing site	0	0	0	0	0	1	0	1	0	1	19	35	**57**
2018													
Coal transported from site (Tonnes)	9912	0	0	0	0	0	0	0	0	0	0	0	**9912**
No. of trains departing site	3	0	0	0	0	0	0	0	0	0	0	0	**3**
2017													
Coal transported from site (Tonnes)	118759	30484	0	0	0	0	90657	60697	78131	116708	71470	6697	**573603**
No. of trains departing site	34	9	0	0	0	0	27	18	23	33	21	2	**167**
2016													
Coal transported from site (Tonnes)	191250	160325	157283	98686	115423	13624	0	23989	0	95563	81887	94556	**1032586**
No. of trains departing site	56	47	46	29	34	4	0	7	0	28	24	28	**303**
2015													
Coal transported from site (Tonnes)	137183	184017	219070	142049	140961	200833	112960	79540	72021	40184	94962	115225	**1539005**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
No. of trains departing site	40	54	64	42	41	59	33	23	21	12	28	34	**453**
2014													
Coal transported from site (Tonnes)	143029	128635	135864	142808	136383	109259	160330	169381	145485	213734	129928	213362	**1828198**
No. of trains departing site	42	38	40	42	40	32	47	50	43	63	38	63	**538**
2013													
Coal transported from site (Tonnes)	176028	88414	115606	106636	88216	58928	93988	33512	124434	116341	58874	150016	**1210993**
No. of trains departing site	52	26	34	31	26	17	28	10	37	34	17	44	**356**

Table A1-2 Train Times 2021

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
11-Jan-21	LS06	14:45	15:00 - 17:30	07:00	Mt Piper	Domestic
12-Jan-21	LS06	13:45	13:55 - 16:10	07:24	Mt Piper	Domestic
13-Jan-21	LS06	12:30	12:55 - 15:20	07:08	Mt Piper	Domestic
14-Jan-21	LS06	13:06	13:10 - 16:35	07:20	Mt Piper	Domestic
15-Jan-21	LS06	12:55	13:10 - 16:00	07:16	Mt Piper	Domestic
16-Jan-21	LS06	12:35	12:50 - 15:25	08:45	Mt Piper	Domestic
17-Jan-21	LS06	14:25	14:40 - 17:00	07:15	Mt Piper	Domestic
18-Jan-21	LS06	13:15	13:30 - 16:00	07:42	Mt Piper	Domestic
20-Jan-21	LS06	13:48	14:00 - 16:30	07:47	Mt Piper	Domestic
21-Jan-21	LS06	13:30	14:00 - 16:30	07:45	Mt Piper	Domestic
27-Jan-21	LS06	13:01	13:30 - 16:00	07:42	Mt Piper	Domestic
28-Jan-21	LS06	12:22	13:30 - 16:00	07:45	Mt Piper	Domestic
01-Feb-21	LS06	14:00	14:10 - 14:41	07:00	Mt Piper	Domestic
02-Feb-21	LS06	12:35	12:43 - 15:25	07:12	Mt Piper	Domestic
03-Feb-21	LS06	12:40	12:46 - 1533	07:20	Mt Piper	Domestic
04-Feb-21	LS06	14:35	14:58 - 17:38	07:35	Mt Piper	Domestic
05-Feb-21	LS06	12:40	13:08 - 15:55	07:45	Mt Piper	Domestic
06-Feb-21	LS06	13:00	13:16 - 15:59	08:25	Mt Piper	Domestic
07-Feb-21	LS06	13:55	14:15 - 17:05	07:10	Mt Piper	Domestic
08-Feb-21	LS06	13:10	13:30 - 16:30	08:50	Mt Piper	Domestic
09-Feb-21	LS06	14:20	14:35 - 17:30	09:30	Mt Piper	Domestic
10-Feb-21	LS06	16:30				
11-Feb-21			07:13 - 09:57	10:13	Mt Piper	Domestic
11-Feb-21	LS06	14:55				
12-Feb-21			09:00 - 11:42	12:15	Mt Piper	Domestic
12-Feb-21	LS06	17:58				
13-Feb-21			07:40 - 11:40	11:45	Mt Piper	Domestic
13-Feb-21	LS06	16:50				
14-Feb-21			08:15 - 10:55	12:55	Mt Piper	Domestic
21-Feb-21	LS08	08:15	08:38 - 11:23	11:38	Mt Piper	Domestic
21-Feb-21	LS06	13:25	13:40 - 15:45			
23-Feb-21				07:22	Mt Piper	Domestic
23-Feb-21	LS06	12:05	13:35 - 16:35	17:00	Mt Piper	Domestic
24-Feb-21	LS04	07:05	07:17 - 10:43	10:45	Mt Piper	Domestic
24-Feb-21	LS06	16:20	16:30 - 17:50			
25-Feb-21			07:15 -08:18	08:30	Mt Piper	Domestic
25-Feb-21	LS06	14:00	14:24 - 17:00	07:45	Mt Piper	Domestic
26-Feb-21	LS06	13:05	13:25 - 17:05	17:20	Mt Piper	Domestic
01-Mar-21	LS04	12:25	12:30 - 15:30	17:45	Mt Piper	Domestic
02-Mar-21	LS04	07:15	07:38 - 15:25	17:25	Mt Piper	Domestic
03-Mar-21	LS04	07:10	08:24 - 11:35	12:00	Mt Piper	Domestic

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
03-Mar-21	LS06	17:25				
04-Mar-21			08:56 - 11:50	11:55	Mt Piper	Domestic
04-Mar-21	LS06	16:33	16:54 - 17:55			
05-Mar-21			07:13 - 08:36	09:00	Mt Piper	Domestic
05-Mar-21	LS06	14:20	15:20 - 17:40			
06-Mar-21			08:45 - 09:10			
07-Mar-21				15:25	Mt Piper	Domestic
12-Mar-21	LS02	11:00	11:11 - 13:50	14:02	Mt Piper	Domestic
12-Mar-21	LS10	17:15				
13-Mar-21			07:15 - 10:00	11:03	Mt Piper	Domestic
13-Mar-21	LS08	16:10				
14-Mar-21			08:10 - 10:18	10:18	Mt Piper	Domestic
14-Mar-21	LS04	17:45				Domestic
15-Mar-21			07:28 - 11:30	11:55	Mt Piper	Domestic
19-Mar-21	LS04	17:10				
20-Mar-21			07:22 - 10:45	11:10	Mt Piper	Domestic
20-Mar-21	LS04	16:45				
21-Mar-21			08:18 - 10:40	11:00	Mt Piper	Domestic
21-Mar-21	LS04	16:10	16:20 - 17:20			
22-Mar-21			08:27 - 10:28			
25-Mar-21				10:30	Mt Piper	Domestic
25-Mar-21	LS04	15:30				
26-Mar-21			09:50 - 12:48			
27-Mar-21				07:45	Mt Piper	Domestic
27-Mar-21	LS04	14:10	14:25 - 17:20			
28-Mar-21				9:25	Mt Piper	Domestic
28-Mar-21	LS04	15:15	15:33 - 16:47			
29-Mar-21			07:25 - 08:55	11:30	Mt Piper	Domestic
29-Mar-21	LS04	17:00				
30-Mar-21			07:45 - 10:34			
31-Mar-21				10:30	Mt Piper	Domestic
01-Apr-21	LS04	15:30	07:30 - 09:05	09:40	Mt Piper	Domestic
01-Apr-21	LS04	15:35				
02-Apr-21			08:15 - 11:42		Mt Piper	Domestic
02-Apr-21	LS04	17:45				
03-Apr-21			08:20 - 11:40	12:15	Mt Piper	Domestic
03-Apr-21	LS04	17:20				
04-Apr-21			13:16 - 15:25	17:20	Mt Piper	Domestic
07-Apr-21	LS04	09:10	09:15 - 12:20			
08-Apr-21				07:55	Mt Piper	Domestic
08-Apr-21	LS04	12:55				
09-Apr-21			07:23 - 09:55	10:24	Mt Piper	Domestic
09-Apr-21	LS04	15:35	15:46 - 16:37			

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
10-Apr-21			07:10 - 08:53	09:28	Mt Piper	Domestic
10-Apr-21	LS06	09:55	10:10 - 12:57	14:17		
10-Apr-21	LS04	14:35	14:50 - 16:30			
11-Apr-21			08:10 - 08:54	09:25	Mt Piper	Domestic
11-Apr-21	LS06	09:42	10:11 - 12:50	13:23	Mt Piper	Domestic
11-Apr-21	LS04	14:25	14:34 - 17:05			
13-Apr-21				10:34	Mt Piper	Domestic
13-Apr-21	LS04	17:40				
14-Apr-21			07:35 - 10:00	10:19	Mt Piper	Domestic
14-Apr-21	LS04	15:00	16:25 - 17:25			
15-Apr-21			08:10 - 10:36			
16-Apr-21				09:55	Mt Piper	Domestic
16-Apr-21	LS04	15:35	16:00 - 18:00			
17-Apr-21			07:20 - 08:05	09:00	Mt Piper	Domestic
17-Apr-21	LS04	15:25	15:40 - 18:00			
18-Apr-21			08:20 - 08:43	09:20	Mt Piper	Domestic
18-Apr-21	LS04	14:55	15:14 - 17:35	18:01	Mt Piper	Domestic
19-Apr-21	LG06	07:30	08:15 - 14:15			
20-Apr-21				09:37	Mt Piper	Domestic
20-Apr-21	LS04	14:52	15:12 - 17:46	17:58	Mt Piper	Domestic
21-Apr-21	LG06	07:18	11:18 - 14:55	16:30	Mt Piper	Domestic
22-Apr-21	LS04	08:15				
23-Apr-21			08:25 - 15:02			
24-Apr-21				08:15	Mt Piper	Domestic
24-Apr-21	LS04	14:45	14:52 - 17:45	18:15	Mt Piper	Domestic
25-Apr-21	LS04	08:45	08:58 - 12:03	12:59	Mt Piper	Domestic
25-Apr-21	LS04	17:30	17:40 - 18:00			
26-Apr-21			07:38 - 11:15	11:30	Mt Piper	Domestic
26-Apr-21	LS04	17:15	17:20 - 18:00			
27-Apr-21			07:30 - 10:35	10:44	Mt Piper	Domestic
27-Apr-21	LS04	17:10	17:15 - 18:00			
28-Apr-21			07:20 - 10:20	10:25	Mt Piper	Domestic
28-Apr-21	LS04	16:45	16:58 - 18:00			
29-Apr-21			09:27 - 10:45			
30-Apr-21			7:40 - 8:55	09:20	Mt Piper	Domestic
30-Apr-21	LS04	14:10	14:17 - 15:59			
01-May-21				07:15	Mt Piper	Domestic
01-May-21	LS04	12:25	12:38 - 14:20			
02-May-21				07:10	Mt Piper	Domestic
02-May-21	LS04	12:15	12:37 - 14:10			
03-May-21				07:10	Mt Piper	Domestic
03-May-21	LS04	11:35	11:45 - 13:16			
04-May-21				09:30	Mt Piper	Domestic

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
04-May-21	LS04	14:35	14:50 - 16:50			
05-May-21			08:16 - 8:52	09:30	Mt Piper	Domestic
05-May-21	LS04	17:00				
06-May-21			08:30 - 11:00	11:30	Mt Piper	Domestic
06-May-21	LS04	16:20				
07-May-21			07:50 - 12:10			
08-May-21				07:40	Mt Piper	Domestic
08-May-21	LS04	12:44	12:53 - 15:00			
09-May-21				07:30	Mt Piper	Domestic
10-May-21	LS04	17:05				
11-May-21			10:11 - 12:15	12:43	Mt Piper	Domestic
12-May-21	LS04	09:00	09:48 - 12:10	13:30	Mt Piper	Domestic
13-May-21	LS04	07:25	08:10 - 10:06	10:20	Mt Piper	Domestic
13-May-21	LS04	16:02	16:13 - 18:00			
14-May-21			07:25 - 8:30	09:15	Mt Piper	Domestic
14-May-21	LS04	14:55	15:05 - 17:00			
15-May-21			07:20 - 7:40	08:08	Mt Piper	Domestic
15-May-21	LS04	12:40	13:00 - 15:55			
16-May-21				08:00		
16-May-21	LS04	13:00	13:09 - 15:59		Mt Piper	Domestic
17-May-21				07:30		
17-May-21	LS04	12:38	12:52 - 15:30		Mt Piper	Domestic
18-May-21					Mt Piper	Domestic
19-May-21				07:35		
19-May-21	LS04	13:20	13:42 - 16:35		Mt Piper	Domestic
20-May-21				08:30		
20-May-21	LS06	09:15	09:23 - 12:30	13:30	Mt Piper	Domestic
20-May-21	LS04	14:25	14:50 - 17:05			
21-May-21				07:45	Mt Piper	Domestic
21-May-21	LS06	08:05	08:33 - 11:47	12:12	Mt Piper	Domestic
21-May-21	LS04	12:23	12:28 - 15:26			
24-May-21				06:00	Mt Piper	Domestic
24-May-21	LS06	7:50	08:00 - 11:00	12:06	Mt Piper	Domestic
24-May-21	LS04	12:50	13:00 - 15:45			
25-May-21				07:30	Mt Piper	Domestic
25-May-21	LS06	08:15	08:26 - 10:45	11:30	Mt Piper	Domestic
25-May-21	LS04	13:15	13:22 - 16:14			
26-May-21				06:15	Mt Piper	Domestic
26-May-21	LS06	07:25	07:40 - 10:42	11:45	Mt Piper	Domestic
26-May-21	LS04	12:25	12:50 - 15:35			
27-May-21				07:45	Mt Piper	Domestic
27-May-21	LS06	08:20	08:30 - 11:16	15:15	Mt Piper	Domestic
27-May-21	LS04	15:40	15:58 - 18:00			

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
28-May-21			07:20 - 08:08	08:38	Mt Piper	Domestic
28-May-21	LS06	09:05	09:14 - 12:22	13:40	Mt Piper	Domestic
28-May-21	LS04	14:02	14:14 - 16:52			
29-May-21				07:35	Mt Piper	Domestic
29-May-21	LS04	13:20	13:33 - 16:10			
31-May-21				07:30	Mt Piper	Domestic
31-May-21	LS04	13:15	13:30 - 16:15		Mt Piper	Domestic
08-Jun-21				09:15	Mt Piper	Domestic
08-Jun-21	LS04	15:25	15:35 - 17:50			
09-Jun-21			07:45 - 08:26	08:50	Mt Piper	Domestic
09-Jun-21	LS04	13:15	13:24 - 16:07			
10-Jun-21				07:20	Mt Piper	Domestic
11-Jun-21	LS04	12:05	12:22 - 15:00			
12-Jun-21				07:38	Mt Piper	Domestic
12-Jun-21	LS04	11:55	12:09 - 14:48			
13-Jun-21				07:25	Mt Piper	Domestic
13-Jun-21	LS04	12:20	12:30 - 15:15			
15-Jun-21				09:00	Mt Piper	Domestic
18-Jun-21	LS04	12:56	13:11 - 16:01			
19-Jun-21				07:30	Mt Piper	Domestic
19-Jun-21	LS04	13:30	13:41 - 15:44			
20-Jun-21				08:00	Mt Piper	Domestic
20-Jun-21	LS06	13:28	13:40 - 15:43			
21-Jun-21				08:00	Mt Piper	Domestic
21-Jun-21	LS04	13:30	14:12 - 16:35			
22-Jun-21			7:20 - 8:05	08:20	Mt Piper	Domestic
22-Jun-21	LS04	12:51	13:09 - 16:15			
23-Jun-21				07:30	Mt Piper	Domestic
23-Jun-21	LS04	13:20	13:29 - 16:38			
24-Jun-21				07:00	Mt Piper	Domestic
24-Jun-21	LS04	12:15	12:44 - 16:10			
25-Jun-21				07:00	Mt Piper	Domestic
25-Jun-21	LS04	12:40	13:12 - 15:45			
28-Jun-21				11:15		
28-Jun-21	LS04	17:00			Mt Piper	Domestic
29-Jun-21			07:40 - 10:20	10:50		
29-Jun-21	LS04	15:54	16:13 - 18:00		Mt Piper	Domestic
30-Jun-21			07:55 - 09:17	09:40		
30-Jun-21	LS04	15:10	15:24 - 16:45			
01-Jul-21			16:00 - 17:25			
08-Jul-21				08:30	Mt Piper	Domestic
12-Jul-21	LS06	08:15	09:38 - 12:10		NCIG	Export
27-Jul-21	LS06		07:35 - 09:42		NCIG	Export

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
28-Jul-21	LS06	07:02	08:38 - 10:45	11:00	NCIG	Export
29-Jul-21	LS06	07:05	08:00 - 10:14	10:15	NCIG	Export
31-Jul-21	LS04	15:30	15:45 - 17:59			
01-Aug-21	LS04	13:50	14:07 - 16:53			
03-Aug-21				07:15	Mt Piper	Domestic
03-Aug-21	LS04	13:15	13:38 - 16:30			
04-Aug-21				07:50	Mt Piper	Domestic
04-Aug-21	LS04	14:15	14:20 - 17:40			
05-Aug-21				07:30	Mt Piper	Domestic
05-Aug-21	LS04	13:00	13:23 - 16:12			
06-Aug-21				07:25	Mt Piper	Domestic
06-Aug-21	LS04	12:30	12:39 - 15:20			
07-Aug-21				08:45	Mt Piper	Domestic
07-Aug-21	LS04	13:26	13:53 - 16:18			
08-Aug-21				07:30	Mt Piper	Domestic
08-Aug-21	LS04	12:25	12:36 - 14:59			
09-Aug-21				07:30	Mt Piper	Domestic
09-Aug-21	LS04	12:00	12:16 - 15:06			
10-Aug-21				07:45	Mt Piper	Domestic
10-Aug-21	LS04	13:30	13:40 - 16:35			
11-Aug-21				07:15	Mt Piper	Domestic
11-Aug-21	LS04	12:22	12:23 - 15:12			
12-Aug-21				07:20	Mt Piper	Domestic
12-Aug-21	LS04	12:16	12:31 - 15:20			
13-Aug-21				08:30	Mt Piper	Domestic
13-Aug-21	LS04	12:25	13:14 - 16:08			
14-Aug-21				07:30	Mt Piper	Domestic
14-Aug-21	LS04	12:45	12:57 - 15:45			
15-Aug-21				07:10	Mt Piper	Domestic
15-Aug-21	LS04	11:50	12:23 - 15:18			
16-Aug-21				07:25	Mt Piper	Domestic
16-Aug-21	LS04	11:56	12:35 - 15:34			
17-Aug-21				07:30	Mt Piper	Domestic
17-Aug-21	LS04	12:10	12:35 - 14:25			
18-Aug-21				07:50	Mt Piper	Domestic
18-Aug-21	LS04	12:24	12:36 - 15:00			
19-Aug-21				07:10	Mt Piper	Domestic
19-Aug-21	LS04	11:50	12:47 - 14:40			
20-Aug-21				07:30	Mt Piper	Domestic
20-Aug-21	LS04	11:15	11:40 - 13:35			
21-Aug-21				07:25	Mt Piper	Domestic
21-Aug-21	LS04	11:50	12:02 - 13:58			
22-Aug-21				08:05	Mt Piper	Domestic

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
22-Aug-21	LS04	13:44	13:58 - 15:52			
23-Aug-21				08:30	Mt Piper	Domestic
23-Aug-21	LS04	12:30	12:40 - 14:40			
24-Aug-21				07:00	Mt Piper	Domestic
24-Aug-21	LS04	11:20	11:30 - 13:30			
25-Aug-21				07:10	Mt Piper	Domestic
25-Aug-21	LS04	13:00	13:06 - 15:58			
26-Aug-21				07:07	Mt Piper	Domestic
26-Aug-21	LS04	12:00	12:38 - 14:10			
27-Aug-21			12:50 - 13:52		Mt Piper	Domestic
28-Aug-21				07:36	Mt Piper	Domestic
28-Aug-21	LS04	12:30	12:40 - 15:32			
29-Aug-21				07:20	Mt Piper	Domestic
29-Aug-21	LS04	12:27	12:27 - 15:31			
30-Aug-21				07:03	Mt Piper	Domestic
30-Aug-21	LS04	11:40	11:56 - 14:55			
31-Aug-21				09:00	Mt Piper	Domestic
31-Aug-21	LS04	12:45	13:55 - 16:50			
01-Sep-21				07:30	Mt Piper	Domestic
01-Sep-21	LS04	12:25	12:40 - 14:58			
02-Sep-21				07:00	Mt Piper	Domestic
02-Sep-21	LS04	11:35	12:57 - 15:09			
03-Sep-21				06:45	Mt Piper	Domestic
06-Sep-21	LS06	16:30				
07-Sep-21			07:28 - 09:37	10:00	Mt Piper	Domestic
07-Jun-21	LS06	14:35	15:06 - 16:40			
08-Sep-21			7:10 - 8:25	08:40	Mt Piper	Domestic
08-Sep-21	LS06	13:40	14:00 - 16:43			
13-Sep-21				15:00	Mt Piper	Domestic
12-Oct-21	LS08	14:22	14:50 - 18:00			
13-Oct-21			07:05 - 07:14	07:20	Mt Piper	Domestic
13-Oct-21	LS04	13:00	13:35 - 16:51			
14-Oct-21				07:00	Mt Piper	Domestic
14-Oct-21	LS04	13:45	14:00 - 17:00			
15-Oct-21				07:00	Mt Piper	Domestic
15-Oct-21	LS04	12:05	12:22 - 15:55			
16-Oct-21				07:24	Mt Piper	Domestic
16-Oct-21	LS04	12:08	12:29 - 15:32			
17-Oct-21				07:00	Mt Piper	Domestic
17-Oct-21	LS04	11:50	12:15 - 15:30			
18-Oct-21				07:15	Mt Piper	Domestic
18-Oct-21	LS04	12:16	12:45 - 16:48			
19-Oct-21				07:15	Mt Piper	Domestic

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
19-Oct-21	LS04	12:30	12:41 - 15:39			
20-Oct-21				07:15	Mt Piper	Domestic
20-Oct-21	LS04	12:15	12:40 15:45			
21-Oct-21				11:30	Mt Piper	Domestic
22-Oct-21	LS06	09:12	09:50 - 11:49	12:56	NCIG	Export
22-Oct-21	LS02	14:25	14:50 - 17:00	17:30	NCIG	Export
23-Oct-21	LS06	07:45	08:50 - 11:02	11:25	NCIG	Export
23-Oct-21	LS02	14:38	15:20 - 17:24	17:54	NCIG	Export
24-Oct-21	LS06	12:00	12:40 - 14:20	15:07	NCIG	Export
24-Oct-21	LS02	16:20	16:35 - 18:48	19:15	NCIG	Export
25-Oct-21	LS06	07:20	07:37 - 09:45	11:30	NCIG	Export
25-Oct-21	LS02	14:45	15:03 - 17:03	17:30	NCIG	Export
26-Oct-21	LS06	07:00	07:27 - 09:25	10:50	NCIG	Export
26-Oct-21	LS02	15:01	15:15 - 17:27	19:15	NCIG	Export
27-Oct-21	LS06	08:30	09:45 - 12:15	13:05	NCIG	Export
27-Oct-21	LS02	14:40	15:48 - 17:55	18:00	NCIG	Export
28-Oct-21	LS06	06:55	07:55 - 10:52	12:20	NCIG	Export
28-Oct-21	LS02	14:00	14:15 - 17:02	19:30	NCIG	Export
29-Oct-21	LS02	16:50				Export
03-Nov-21	LS02		15:56 - 17:57	18:55	NCIG	Export
04-Nov-21	LS02	14:55	16:35 - 18:36	19:15	NCIG	Export
05-Nov-21	LS02	14:20	16:08 - 18:08	18:22	NCIG	Export
06-Nov-21	LS02	14:36	14:58 - 16:45	18:26	NCIG	Export
07-Nov-21	LS02	13:55	14:40 - 16:40	18:27	NCIG	Export
08-Nov-21	LS02	14:05	14:49 - 17:15	18:20	NCIG	Export
17-Nov-21	LS08	18:30				Export
18-Nov-21			06:27 - 08:10	08:57	NCIG	Export
19-Nov-21	LS14	05:50	06:14 - 08:24	08:55	NCIG	Export
20-Nov-21	LS14	06:00	06:10 - 08:16	08:30	NCIG	Export
21-Nov-21	LS06	06:30	10:00 - 11:59	12:35	NCIG	Export.
25-Nov-21	LS06		07:55 - 10:05	10:30	NCIG	Export
26-Nov-21	LS06	07:00	08:05 - 10:03	11:05	NCIG	Export
27-Nov-21	LS06	06:05	06:30 - 08:45	09:00	NCIG	Export
28-Nov-21	LS06	06:00	06:27 - 08:27	12:00	NCIG	Export
29-Nov-21	LS06	06:45	07:00 - 08:00	09:05	NCIG	Export
30-Nov-21	LS06		06:35 - 07:52	08:50	NCIG	Export
01-Dec-21	LS06	08:00	08:15 - 10:08		NCIG	Export
02-Dec-21	LS06	06:00	07:27 - 09:06	09:50	NCIG	Export
03-Dec-21	LS06	06:00	09:10 - 11:14	11:20	NCIG	Export
05-Dec-21	LS06	06:00	06:27 - 08:28	08:50	NCIG	Export
21-Dec-21	LS14		07:03 - 09:03	09:35	NCIG	Export
22-Dec-21	LS14	06:41	08:15 - 10:16	11:13	NCIG	Export
23-Dec-21	LS14	04:48	06:41 - 08:42	09:30	PWCS	Export

Unloading Date	Train ID	Arrive Time	Tipping Times	Departure Time	Destination	Comments
24-Dec-21	LS14	06:00	07:12 - 08:48	09:12	PWCS	Export
29-Dec-21	LS14	05:30	06:30 - 10:15	10:37	PWCS	Export
30-Dec-21	LS14	05:45	06:35 - 08:30	08:50	PWCS	Export

Appendix 3:

Noise

Table 3A- 1 2021Sound Power Results (dB)

Item	2021		Hatch NIA	L_{WA} Measured above Hatch NIA
	L_{WA}	L_W	L_{WA}	
CV01 conveyor, open side (1m)	74	83	77	-3
CV01 conveyor, open side @ top (1m)	74	82	77	-3
CV01 conveyor, closed side (1m)	Not measured	-	77	Not Applicable
CV02 conveyor, open side @ ground (1m)	85	91	84	+1
CV02 conveyor, open side elevated (1m)	86	95	84	+2
CV02 conveyor, closed side @ ground (1m)	79	87	84	-5
CV01 drive	92	97	71	+21
CV02 drives A + B	Not measured		83	
CV01 chute, lower section	Not measured		68	
CV01 conveyor, start point	Not measured		68	
Reclaim conveyor (1m)	Not measured		-	-
Unload conveyor (1m)	Not measured		-	-
Reclaim conveyor drive	Not measured		-	-
Reclaim conveyor chute	Not measured		-	-
Coal drop from wagon (1st drop)	Not measured		-	-
Coal drop from wagon (2nd drop)	Not measured		-	-
Locomotives	Not measured		-	-

Notes: 1. A-weighted total sound power levels taken from Table 3.4 of Hatch 2012 NIA

Appendix 4:

Air

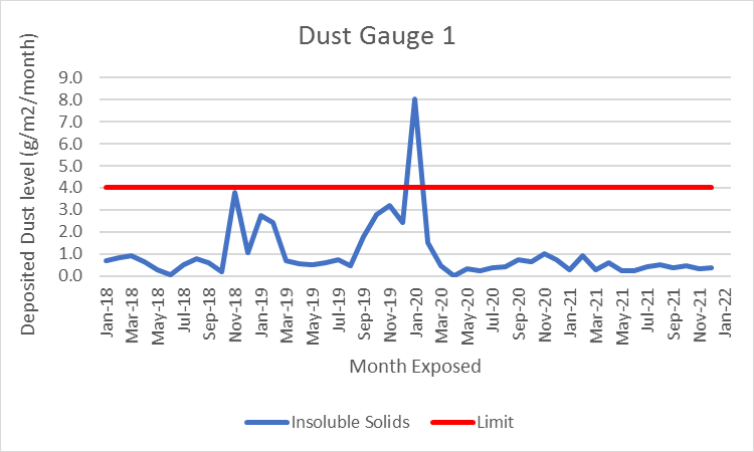


Figure 4A-1 Dust Gauge 1 2018-2021

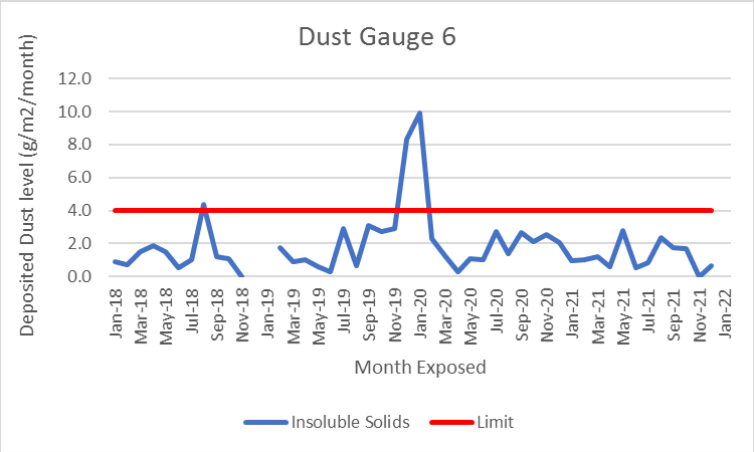


Figure 4A-2 Dust Gauge 6 2018-2021

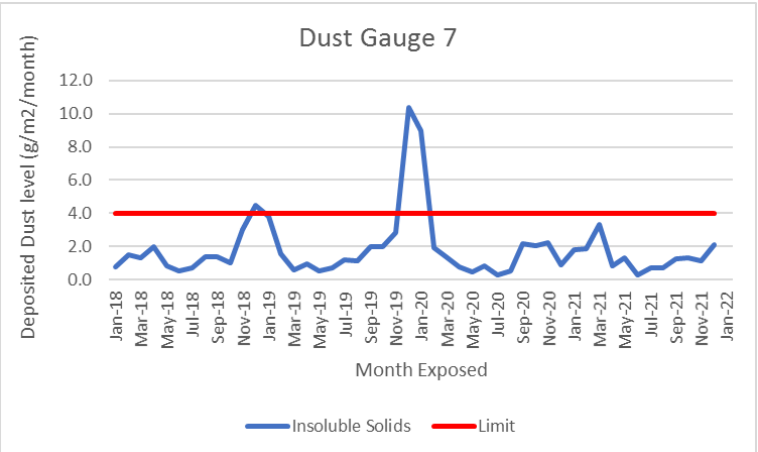


Figure 4A-3 Dust Gauge 7 2018-2021

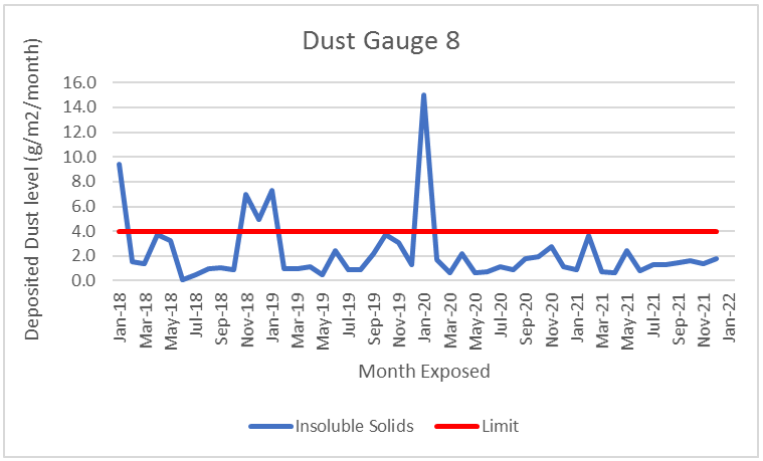


Figure 4A-4 Dust Gauge 8 2018-2021

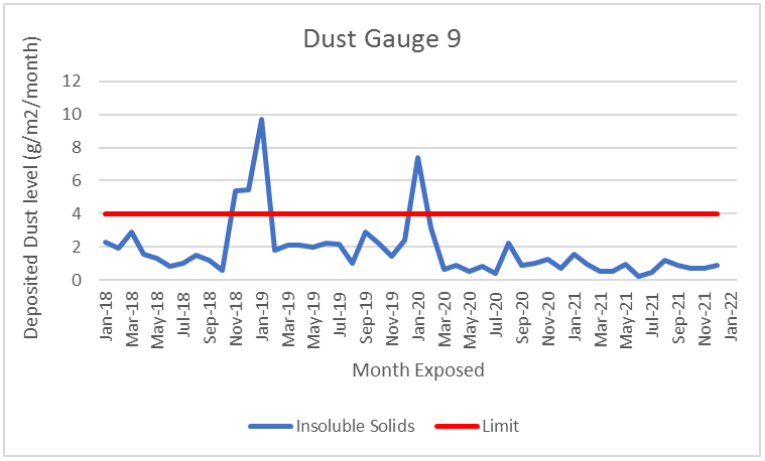


Figure 4A-5 Dust Gauge 9 2018-2021

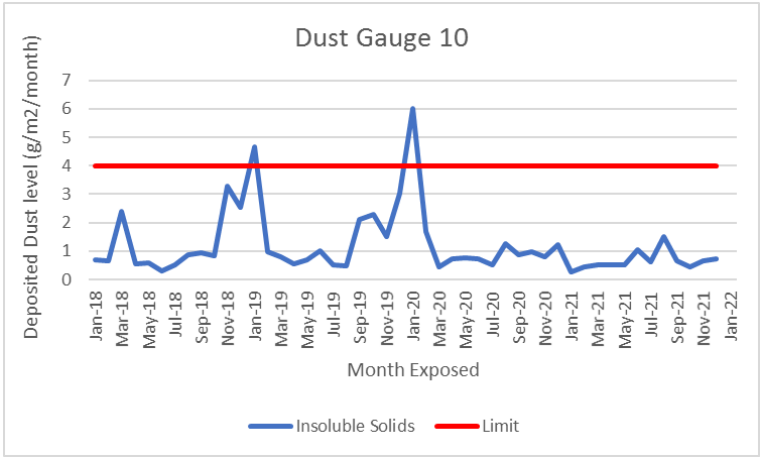


Figure 4A-6 Dust Gauge 10 2018-2021

Greenhouse Gas

Table 4A-1: Total GHG emissions from site

Emissions Summary (CO_2-Et) 2021	Total
Total Energy Consumption (GJ)	1684
Scope 1 Emissions CO2eT Total	59
Scope 2 Emissions CO2eT Total	379
Scope 1 & Scope 2 Emissions CO2eT Total	0

Appendix 5:

Biodiversity

Willow Control photo monitoring

Photo point monitoring within the Willow Control Program was situated in three locations (one in each major area of willow control. The photos were also taken in four orientations (North, East, South, and West).

Photo point one is in the area to the north-east of the Site. This site has a few larger Willow trees to be removed and is dominated by Blackberry (**Photo 1** to **Photo 4).**

Photo 1 Photo point one: North

Photo 2 Photo point one: East

Photo 3 Photo point one: South

Photo 4 Photo point one: West

Photo Point 2 is within the large patch in the middle of the Site, with a large open paddock on the north side of Piper Flats Creek. The patch also contains several large logs, although these are mainly covered in Blackberry (see **Photos 5** to **8)**.

Photo 5 Photo point two: North

Photo 6 Photo point two: East

Photo 7 Photo point two: South

Photo 8 Photo point two: West

Photo Point 3 is in the western-most parts of the Site close to Brays Lane. There are several Willow saplings in this area although less Blackberry. The four photos for Photo Point 3 are shown below in **Photos 9** to **12.**

Photo 9 **Photo point three: North**

Photo 10 **Photo point three: East**

Photo 11 **Photo point three: South**

Photo 12 **Photo point three: West**

Upper Coxs River Catchment Aquatic Ecology 2021

Taxa richness at Pipers Flat Creek sites was more variable between seasons than between sites in 2021 (Figure). Taxa richness was higher at both PFup and PFdn in spring than autumn, with results similar between sites during both sampling events. All taxa richness results in 2021 were below the long-term median.

EPT richness results were similar between the Pipers Flat Creek sites in 2021, with EPT richness slightly higher in spring than autumn (Figure). Ephemeroptera and Trichoptera taxa were collected in all Pipers Creek samples in 2021, while the only samples to contain a Plecoptera taxon were both replicates from PFdn in spring 2021. EPT richness results were higher than the long-term PFup median in all samples in 2021.

SIGNAL-2 scores in autumn 2021 were higher at background site PFup than at impact site PFdn, while results in spring 2021 indicated greater difference in SIGNAL-2 scores between replicates than between sites (Figure). SIGNAL-2 scores were above the long-term PFup median in all replicates collected from PFup in 2021, while only one replicate collected from PFdn during each season was above the long-term median result.

Water and sediment quality were similar at PFup and PFdn during sampling in autumn and spring 2021. Two discharge events were recorded from LDP4 into Pipers Flat Creek prior to sampling in 2021, in January and March 2021. The last discharge occurred in March, approximately eight weeks prior to sampling in autumn 2021. There were no discharges from LDP4 recorded prior to sampling in spring 2021. As such, it is not expected that LDP4 discharges accounted for any differences observed in the macroinvertebrate community between sites upstream and downstream of the discharge point on Pipers Flat Creek. The few notable differences between sites are likely to be attributable to differences in instream habitats.

Taxa richness results in 2021 were variable between seasons (Figure). In autumn, taxa richness at impact site CR5 was higher than at the background sites (CR0/CR1) and upstream site CR4, and higher than the long-term CR4 median in one replicate. In spring, taxa richness results were lower at impact site CR5 than at background sites, upstream site CR4 or the long-term CR4 median. EPT richness (Figure) and SIGNAL-2 results (Figure) in the Coxs River were similar at sites upstream (CR4) and downstream (CR5) of the Pipers Flat Creek confluence in both autumn and spring. Results of all macroinvertebrate metrics at CR5 were higher than those at Coxs River recovery site CR6 during both sampling events of 2021. Overall, the 2021 aquatic ecology monitoring does not indicate impacts of discharges from Lidsdale Siding on the aquatic ecology of Pipers Flat Creek or the Coxs River.

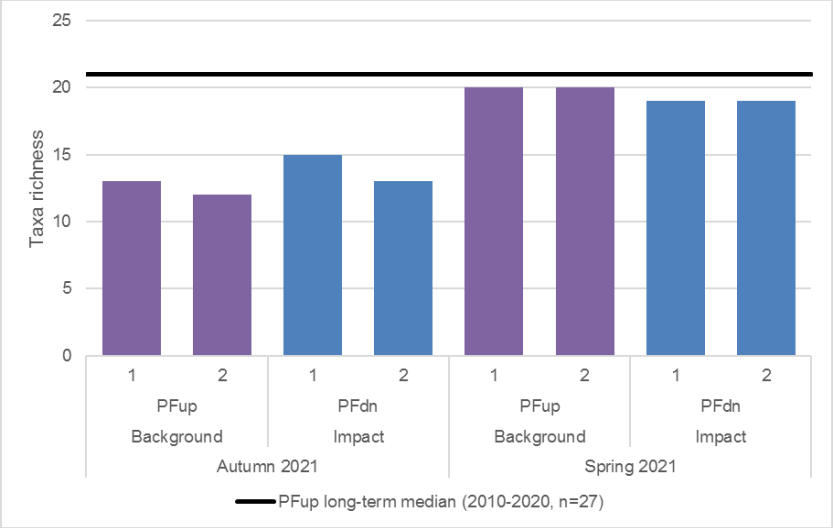


Figure 5A-1Taxa richness in Pipers Flat Creek samples in 2021

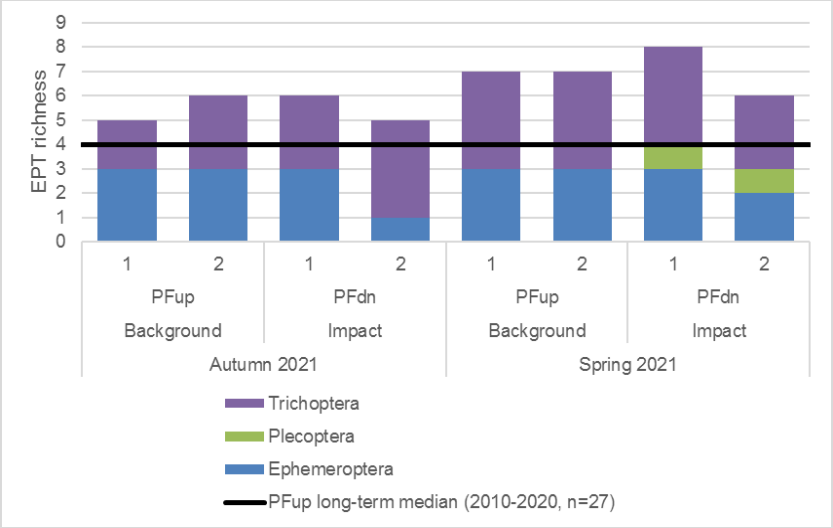


Figure 5A-2 EPT richness in Pipers Flat Creek samples in 2021

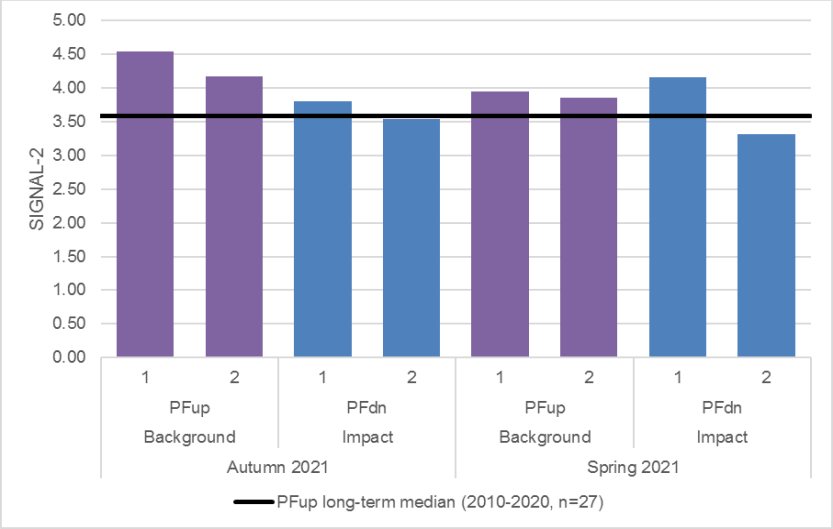


Figure 5A-3SIGNAL-2 in Pipers Flat Creek samples in 2021

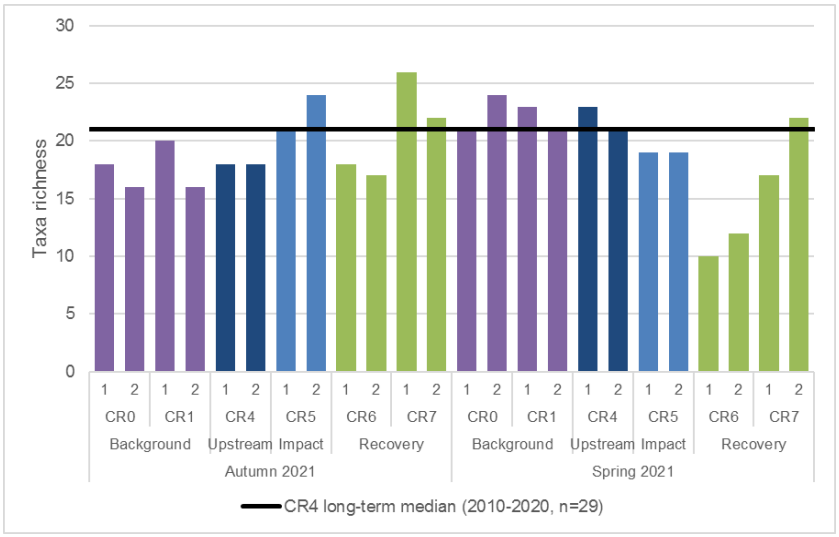


Figure 5A-4Taxa richness in Coxs River samples associated with Lidsdale Siding in 2021

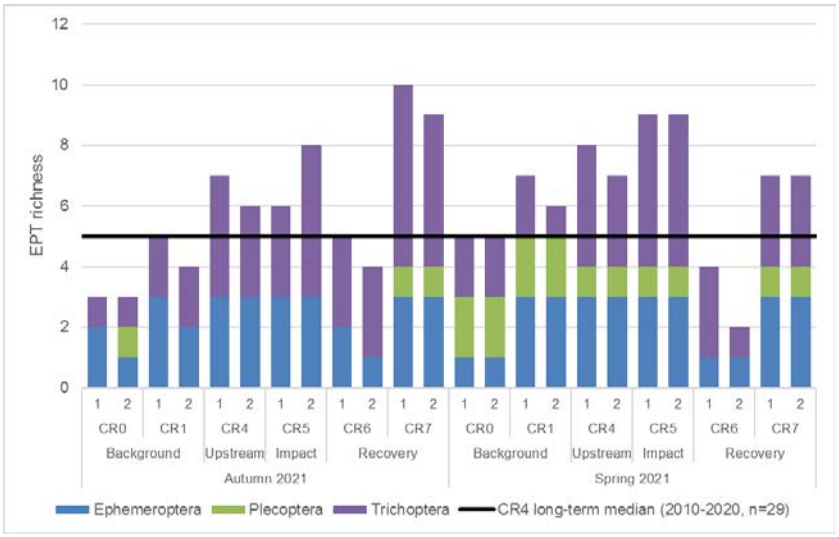


Figure 5A-5 EPT richness in Coxs River samples associated with Lidsdale Siding in 2021

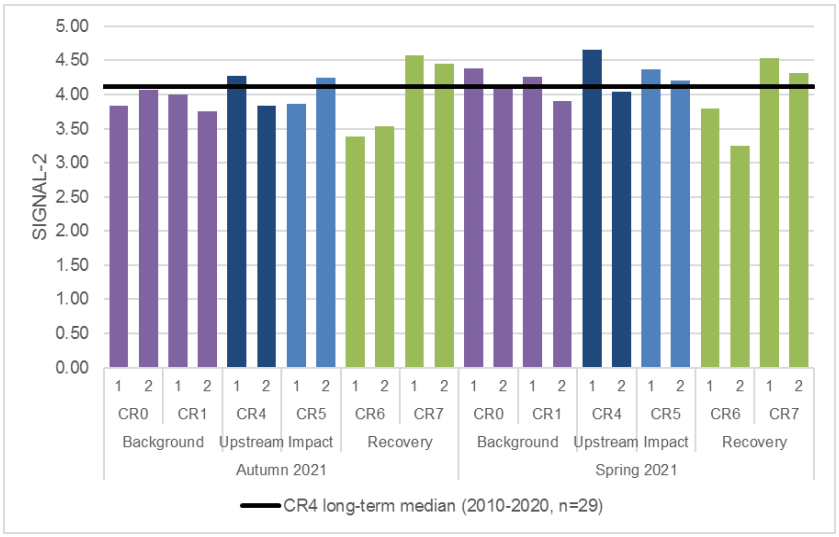


Figure 5A-6 SIGNAL-2 in Coxs River samples associated with Lidsdale Siding in 2021

Appendix 7:

Surface Water

Table 7A1-Water SSGV assessment and investigation – 2021

Parameter	Occurrence (SSGV)	Investigation
TSS	January, 46 mg/L (25 mg/L)	67 mm of rain fell over Lidsdale Siding in the 5 days leading up to the sampling event causing sedimentation in Pipers Flat Creek resulting in a 46 mg/L result. TSS upstream at Pipers Flat Creek US recorded a concentration of 60 mg/L.
Turbidity	January, 45 NTU (25 NTU)	67 mm of rain fell over Lidsdale Siding in the 5 days leading up to the sampling event causing sedimentation in Pipers Flat Creek resulting in a 45 NTU result. Turbidity upstream at Pipers Flat Creek US recorded a concentration of 50 NTU.
	March, 29 NTU (25 NTU)	65 mm of rain fell over Lidsdale Siding in the 5 days leading up to the sampling event causing sedimentation in Pipers Flat Creek resulting in a 29 NTU result. Turbidity upstream at Pipers Flat Creek US recorded a concentration of 38 NTU.
Total Phosphorus	November, 0.04 mg/L (0.02 mg/L)	Total phosphorus measured upstream at Pipers Flat Creek US returned a result of 0.03 mg/L, also greater than the SSGV. Therefore, the trigger event was likely caused by factors upstream of LS operations. Wallerawang STP discharge upstream on Pipers Flat Creek in November 2021 recorded a result of 0.167 mg/L as per their website publication.
Dissolved Aluminium	November, 0.22 mg/L (0.055 mg/L)	Dissolved aluminium measured upstream at Pipers Flat Creek US returned a result of 0.27 mg/L, greater than the Pipers Flat Creek DS result. Therefore, the trigger event was likely caused by factors upstream of LS operations. Wallerawang STP discharge upstream on Pipers Flat Creek in November 2021 recorded a result of 0.45 mg/L as per their website publication.
	December, 0.19 mg/L (0.055 mg/L)	Dissolved aluminium measured upstream at Pipers Flat Creek US returned a result of 0.20 mg/L, greater than the Pipers Flat Creek DS result. Therefore, the trigger event was likely caused by factors upstream of LS

Parameter	Occurrence (SSGV)	Investigation
		operations. Wallerawang STP discharge upstream on Pipers Flat Creek in December 2021 recorded a result of 0.61 mg/L as per their website publication.
Dissolved Copper	January, 0.002 mg/L (0.0014 mg/L)	Dissolved copper measured upstream at Pipers Flat Creek US returned a result of 0.002 mg/L being equivalent to the trigger event. Therefore, the trigger event was likely caused by factors upstream of LS operations.
Dissolved Iron	January, 0.56 mg/L (0.3 mg/L)	Dissolved iron measured upstream at Pipers Flat Creek US returned a result of 0.45 mg/L, also above the trigger level of 0.3 mg/L. Therefore, the trigger event was likely caused by factors upstream of LS operations.
	March, 0.38 mg/L (0.3 mg/L)	Dissolved iron measured upstream at Pipers Flat Creek US returned a result of 0.22 mg/L, below the trigger level of 0.3 mg/L. Approximately 50 mm of rainfall was recorded in the five days prior to sampling which may have disturbed iron rich sediments in Pipers Flat Creek. LDP004 was discharging during the time of sampling. Elevated dissolved iron concentrations at Pipers Flat Creek DS were potentially influenced by discharges through LDP004.
	November, 0.76 mg/L (0.3 mg/L)	Dissolved iron measured upstream at Pipers Flat Creek US returned a result of 0.74 mg/L, also above the trigger level of 0.3 mg/L. Therefore, the trigger event was likely caused by factors upstream of LS operations.
	December, 0.53 mg/L (0.3 mg/L)	Dissolved iron measured upstream at Pipers Flat Creek US returned a result of 0.53 mg/L, also above the trigger level of 0.3 mg/L. Therefore, the trigger event was likely caused by factors upstream of LS operations.

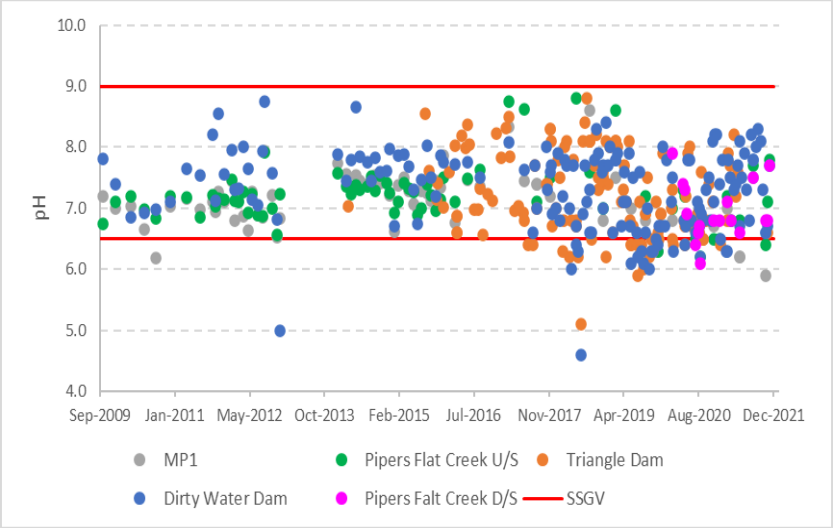


Figure 7A-1 Historical pH at surface water monitoring locations

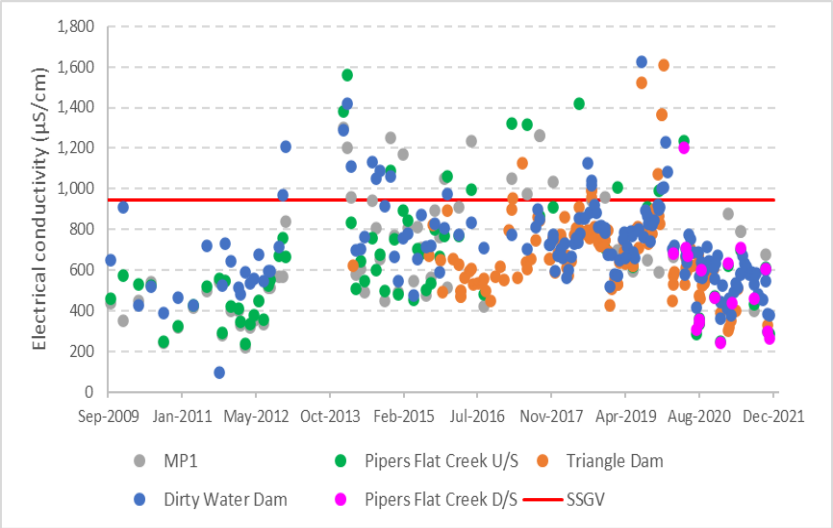


Figure 7A-1 Historical EC at surface water monitoring locations

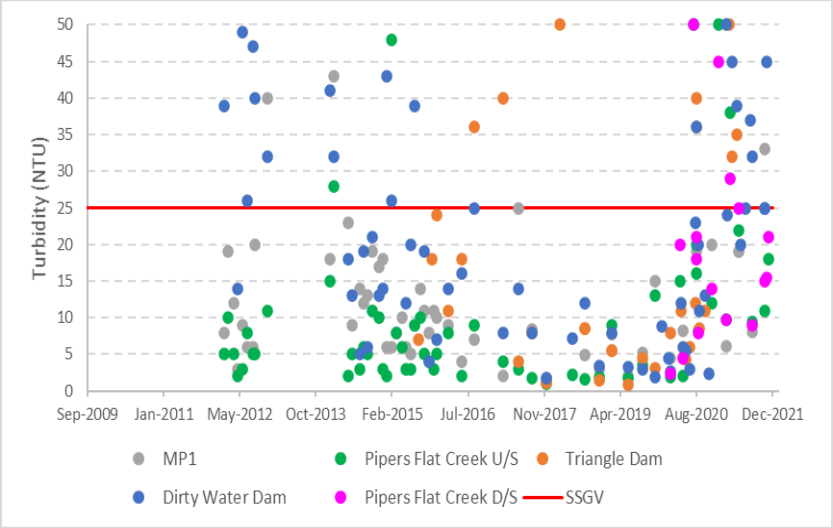


Figure 7A-2 Historical Turbidity at surface water monitoring locations

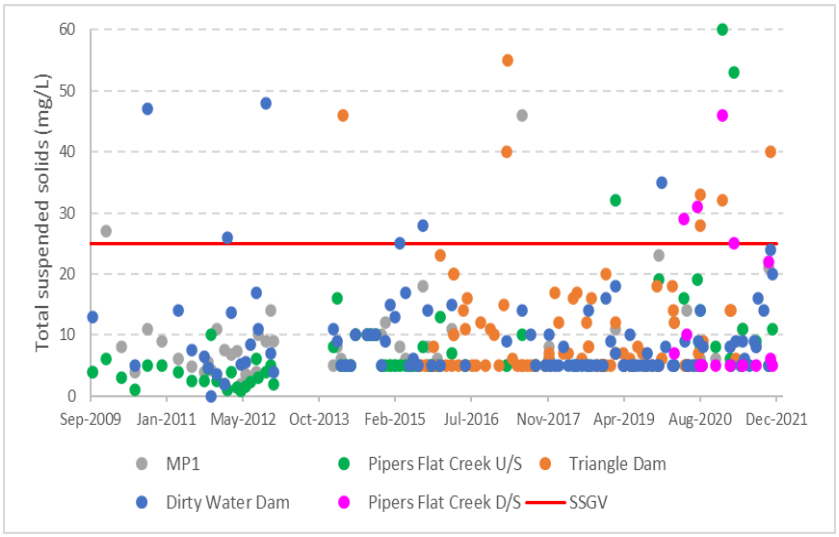


Figure 7A-3 Historical TSS at surface water monitoring locations

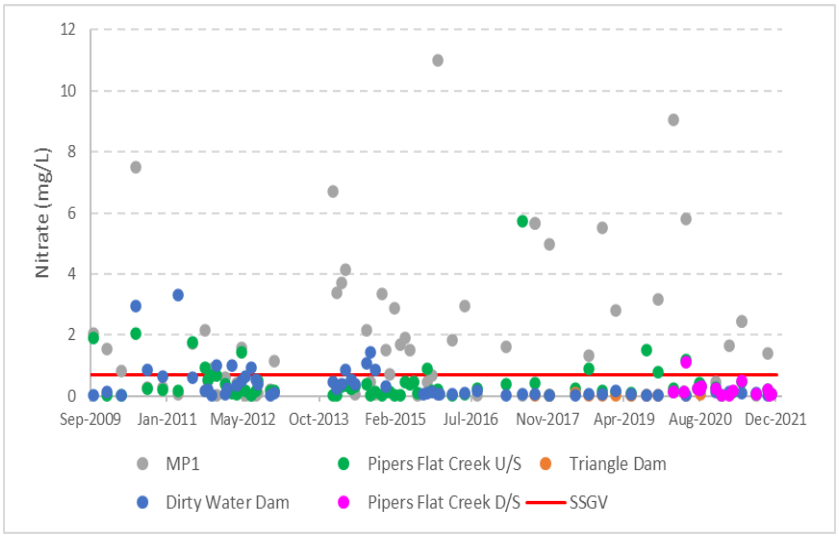


Figure 7A-4 Historical Nitrate at surface water monitoring locations

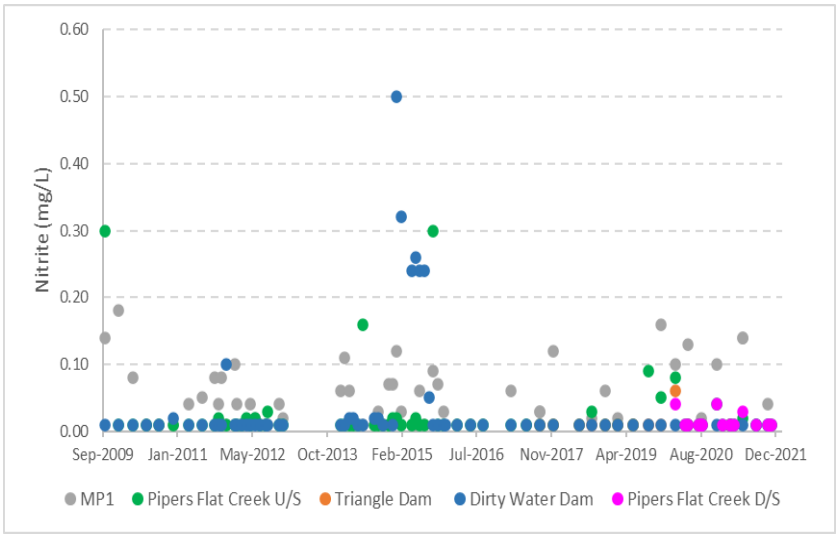


Figure 7A-5 Historical Nitrite at surface water monitoring locations

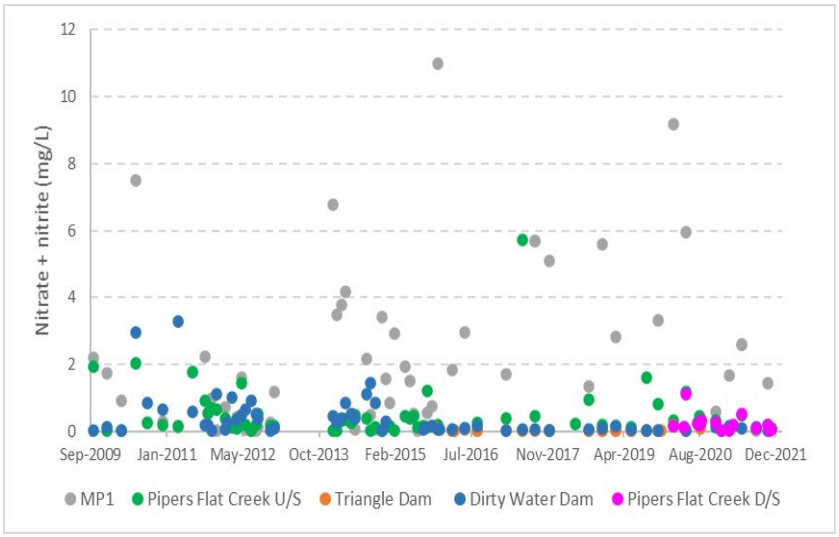


Figure 7A-6 Nitrate + Nitrite at surface water monitoring locations

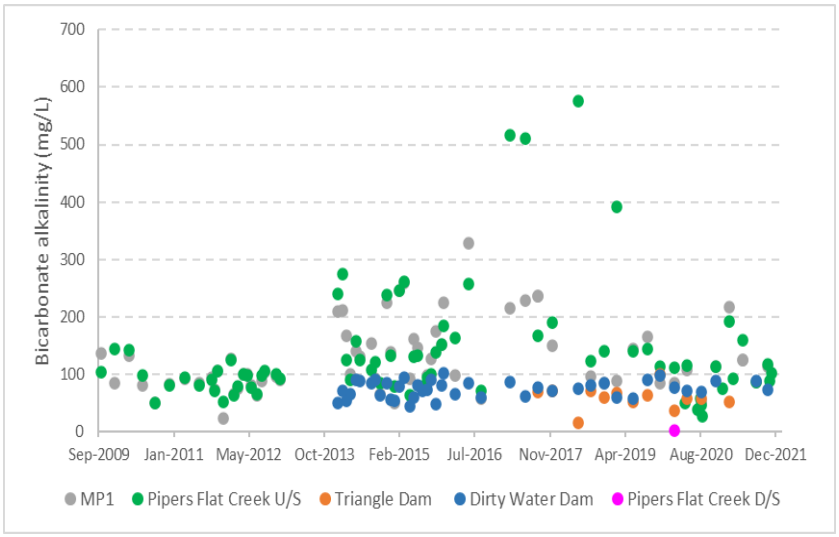


Figure 7A-7 Historical HCO Alkalinity at surface water monitoring locations

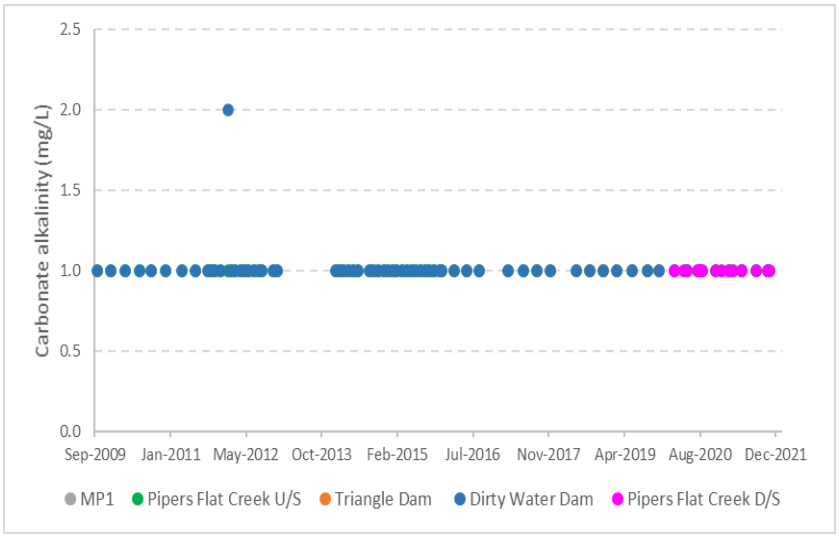


Figure 7A-8 Historical CO Alkalinity at surface water monitoring locations

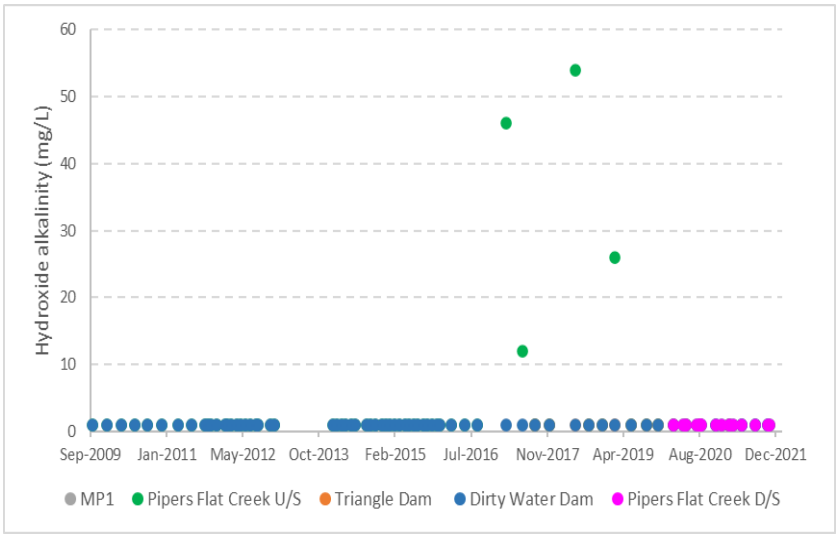


Figure 7A-8 Historical OH Alkalinity at surface water monitoring locations

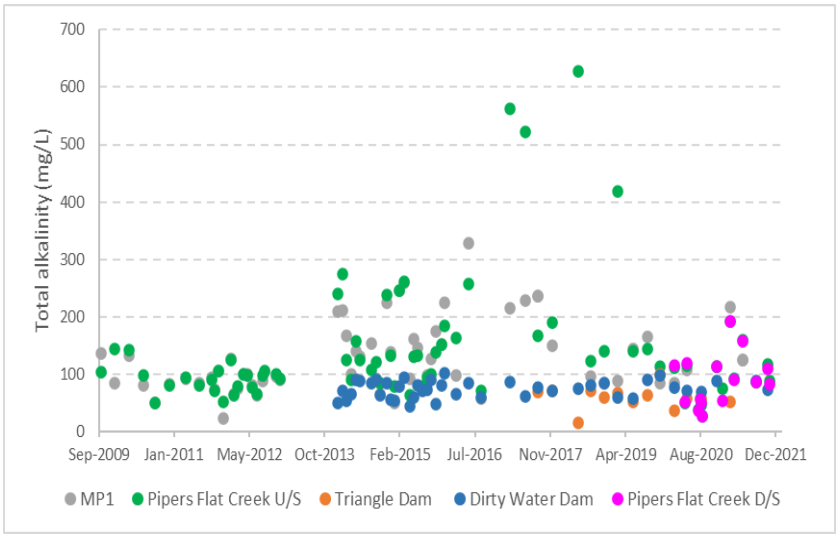


Figure 7A-9 Historical Total Alkalinity at surface water monitoring locations

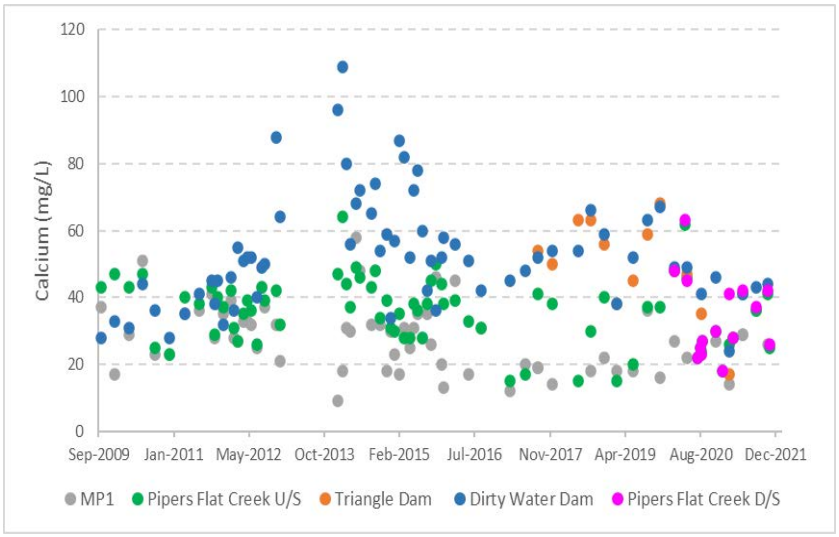


Figure 7A-10 Historical Calcium at surface water monitoring locations

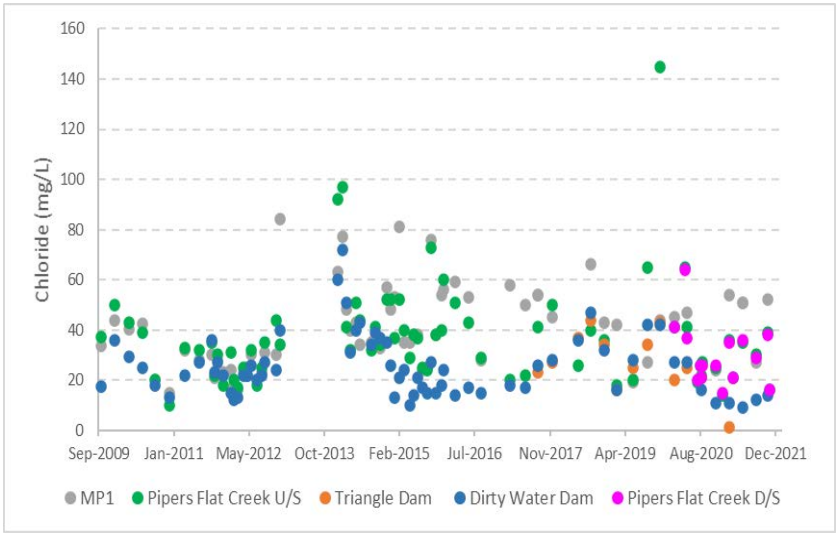


Figure 7A-11 Historical Chloride at surface water monitoring locations

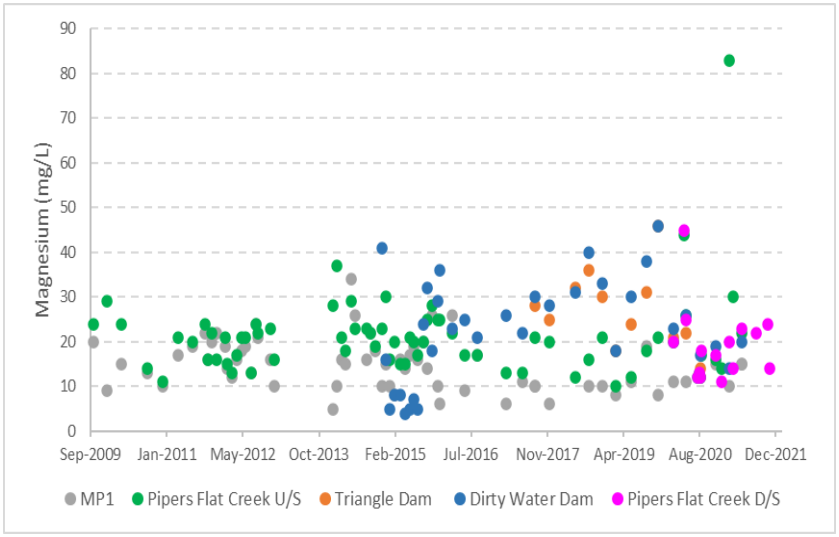


Figure 7A-12 Historical Magnesium at surface water monitoring locations

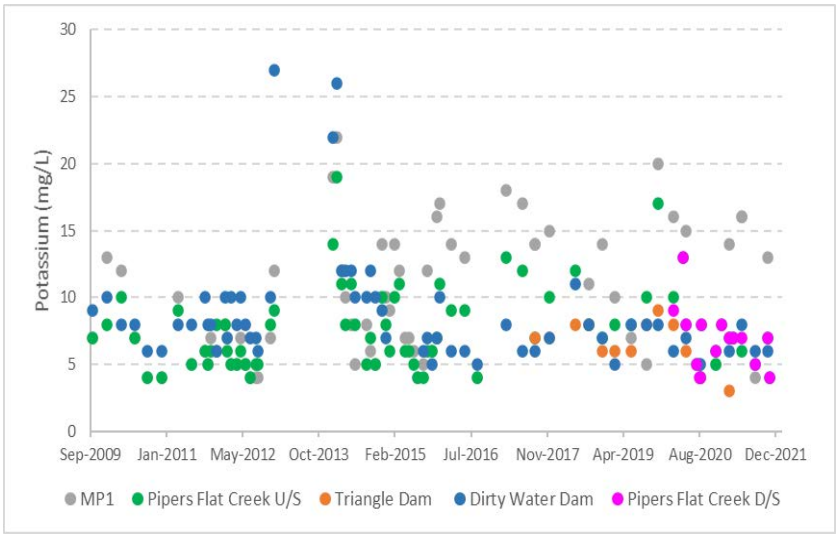


Figure 7A-13 Historical Potassium at surface water monitoring locations

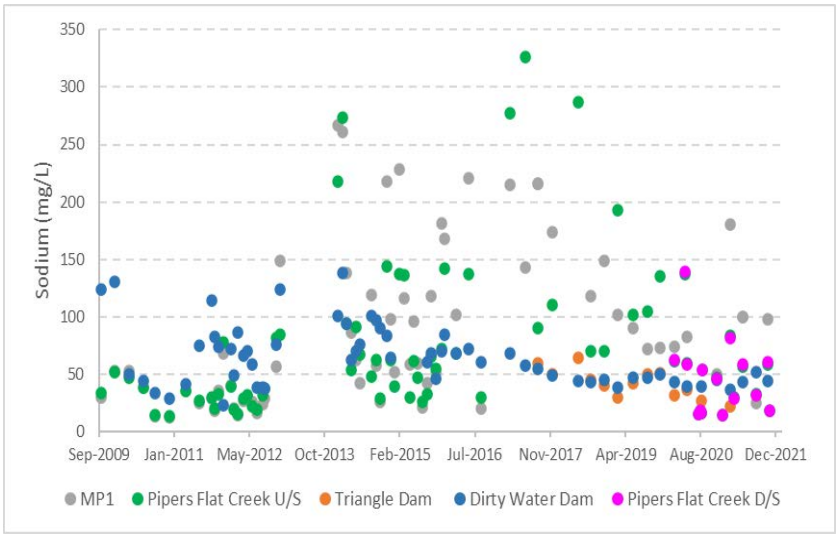


Figure 7A-14 Historical Sodium at surface water monitoring locations

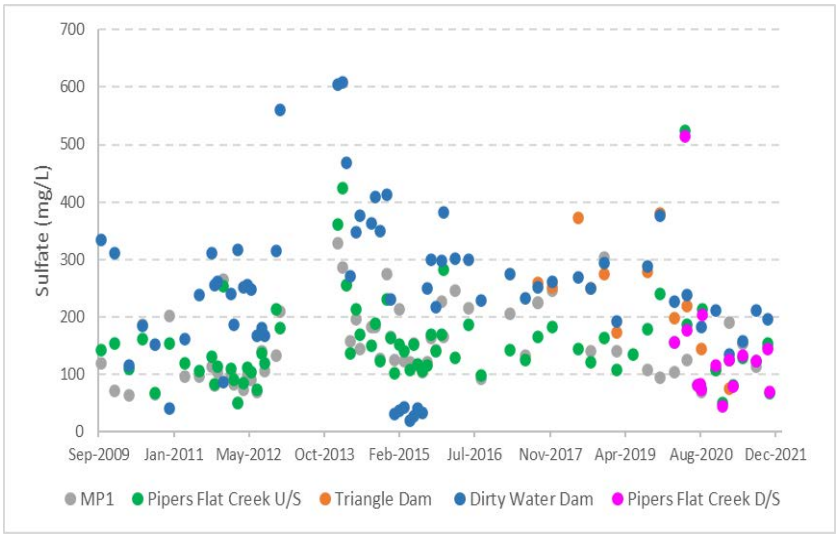


Figure 7A-15 Historical Sulfate at surface water monitoring locations

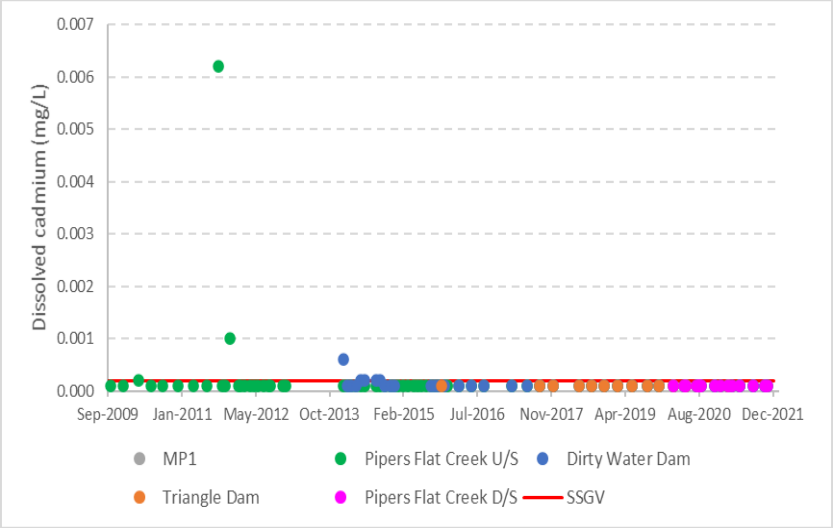


Figure 7A-16 Historical Dissolved Cadmium at surface water monitoring locations

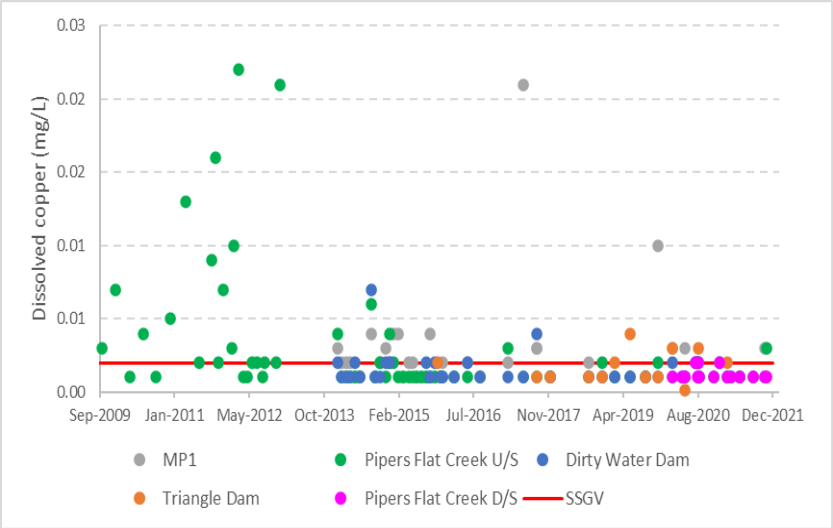


Figure 7A-17 Historical Dissolved Copper at surface water monitoring locations

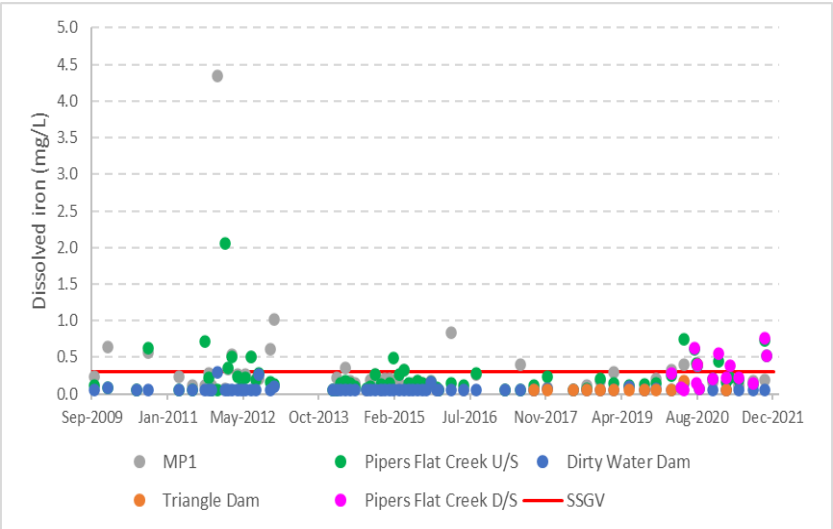


Figure 7A-18 Historical Dissolved Iron at surface water monitoring locations

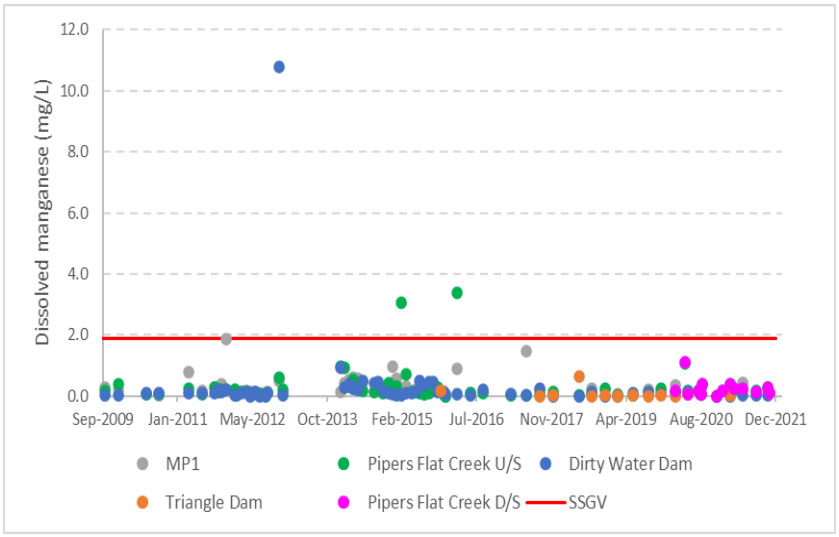


Figure 7A-19 Historical Dissolved Manganese at surface water monitoring locations

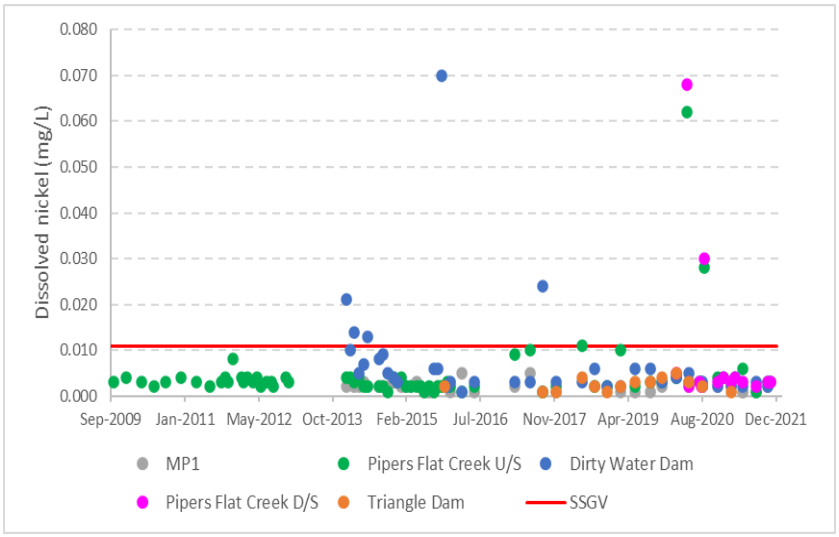


Figure 7A-20 Historical Dissolved Nickel at surface water monitoring locations

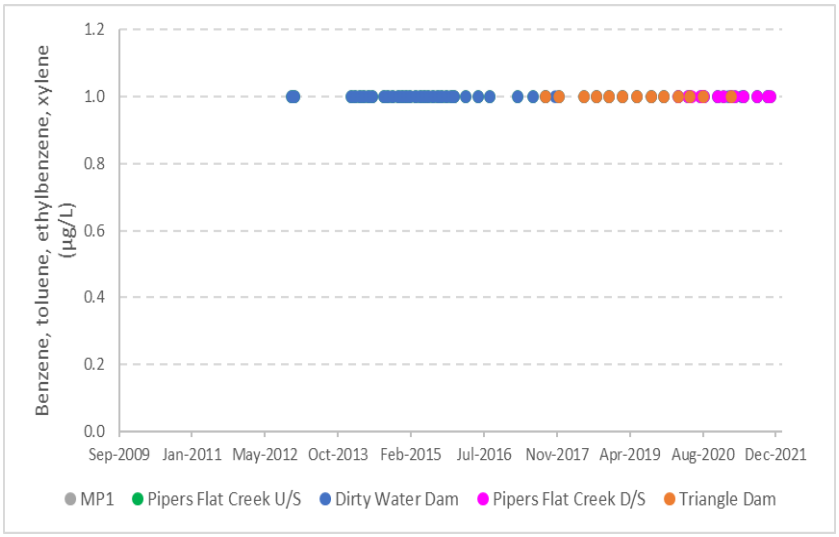


Figure 7A-21 Historical Sum of BTEX at surface water monitoring locations

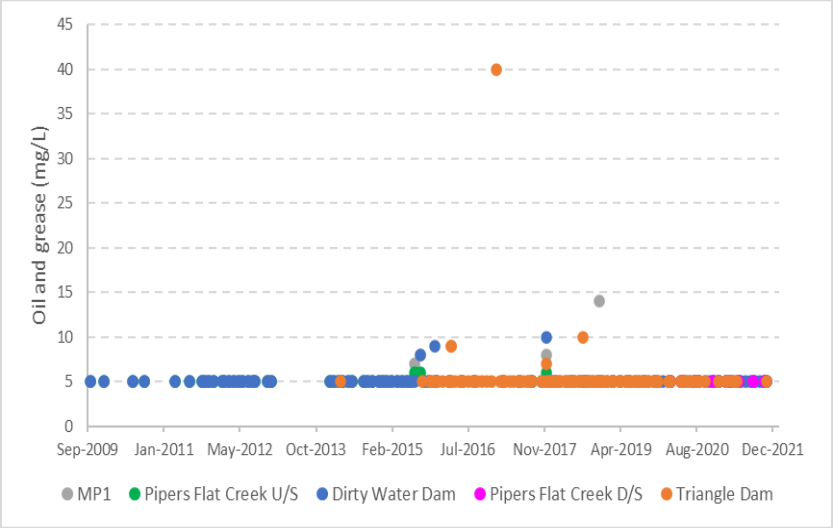


Figure 7A-22 Historical Oil and Grease at surface water monitoring locations

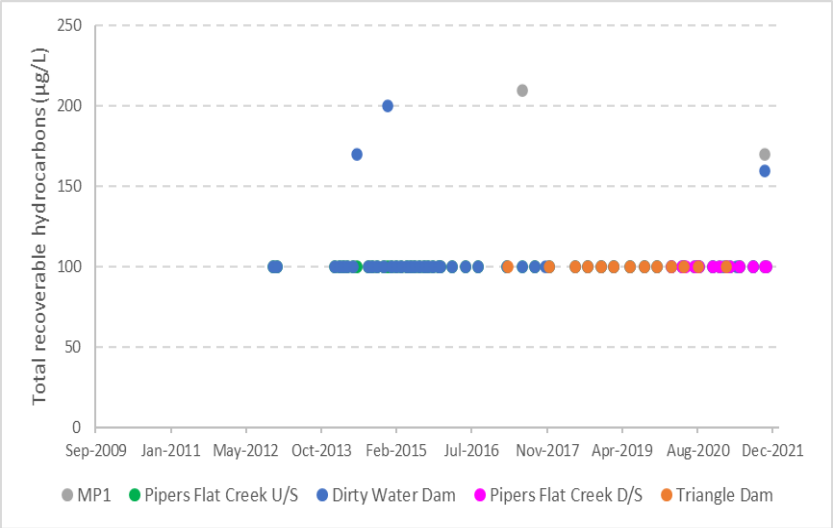


Figure 7A-23 Historical TRHs at surface water monitoring locations

Appendix 8: Groundwater

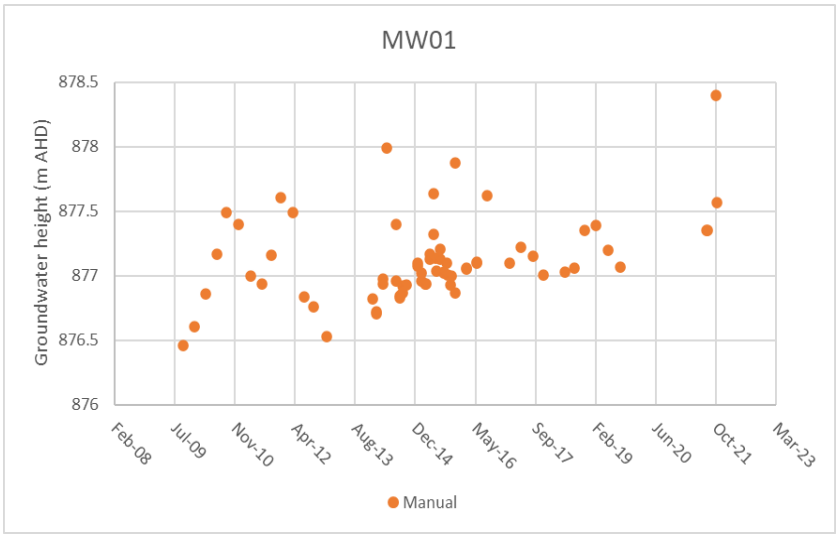


Figure 8A-1 MW01 groundwater height

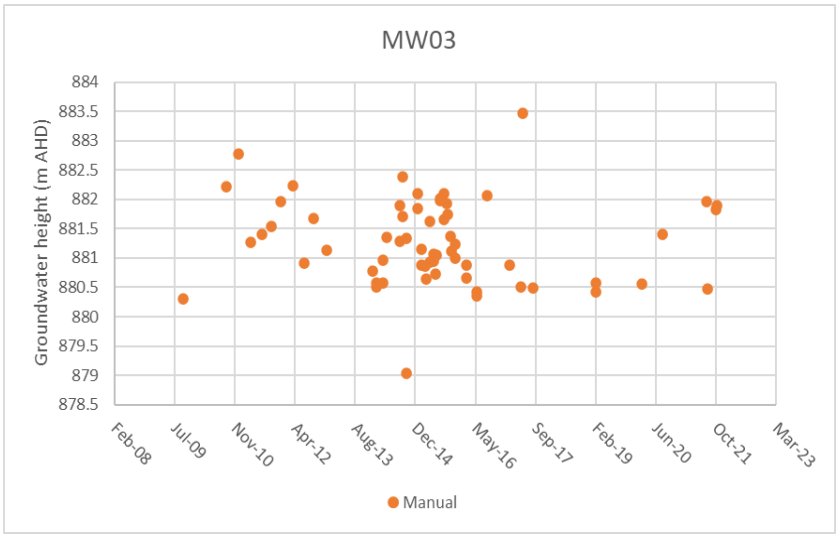


Figure 8A-2 MW03 groundwater height

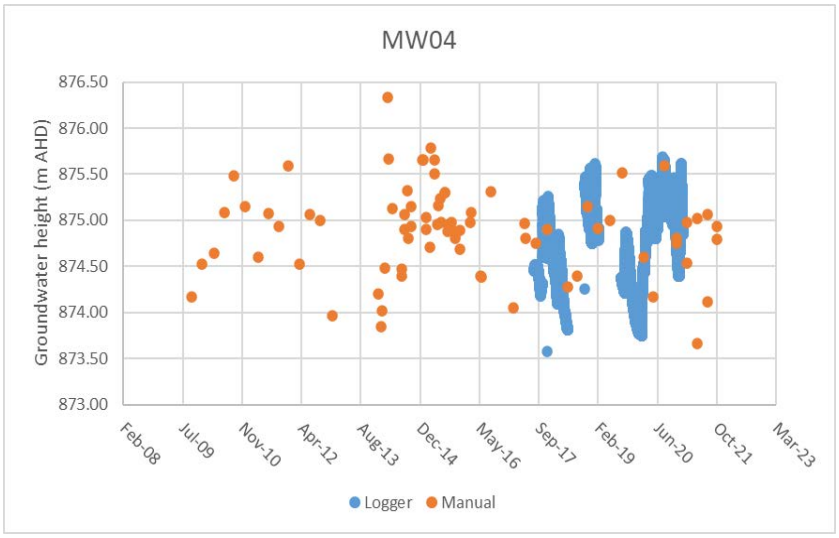


Figure 8A-3 MW04 groundwater height

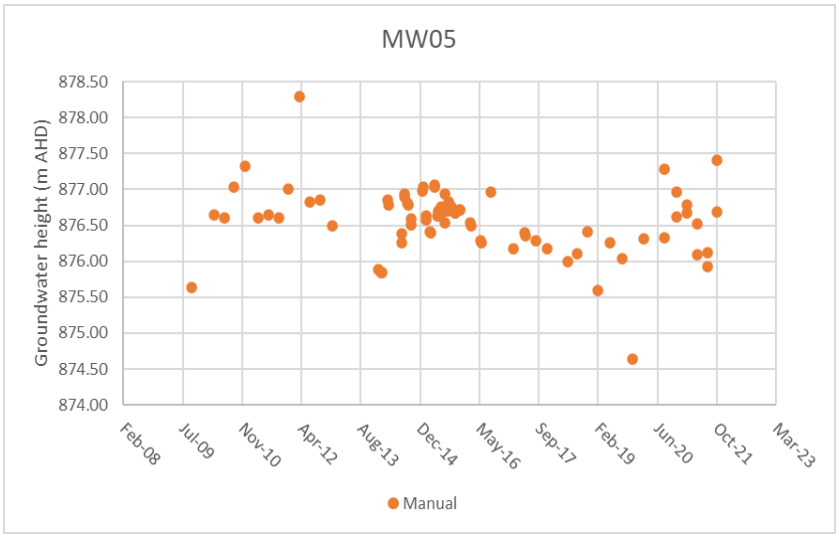


Figure 8A-4 MW05 groundwater height

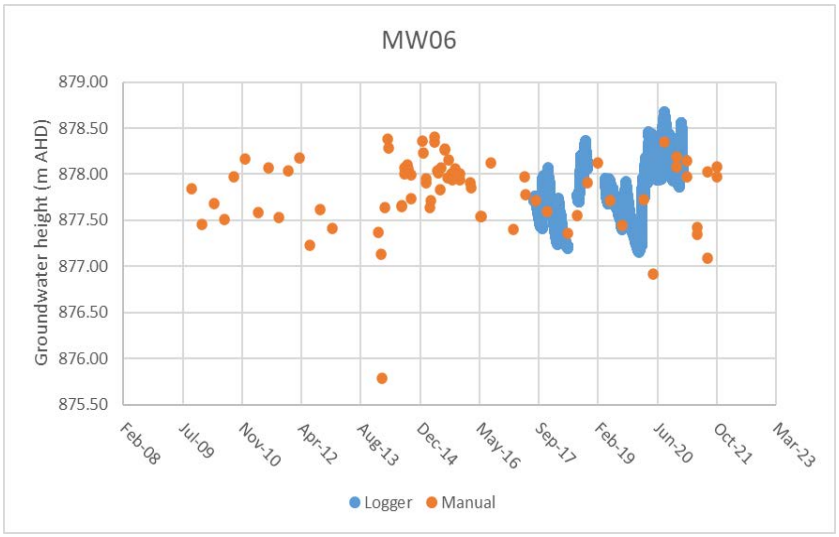


Figure 8A-5 MW06 groundwater height

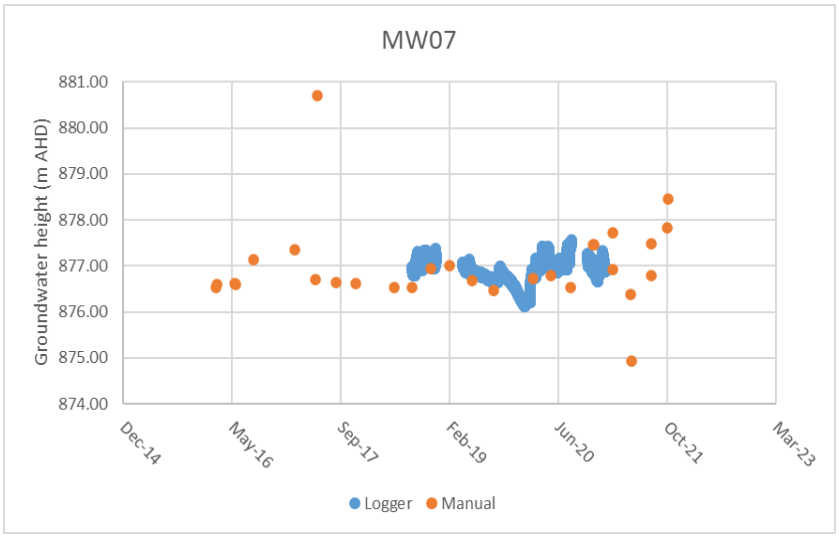


Figure 8A-6 MW07 groundwater height

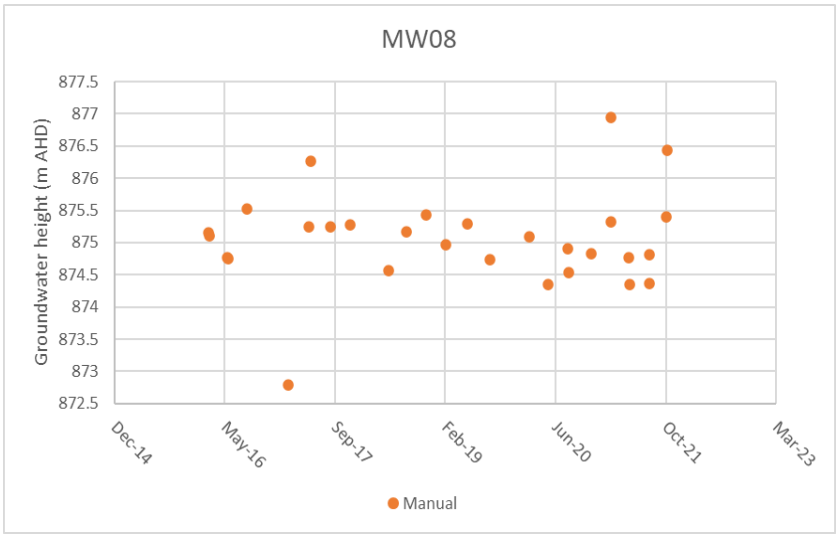


Figure 8A-7 MW08 groundwater height

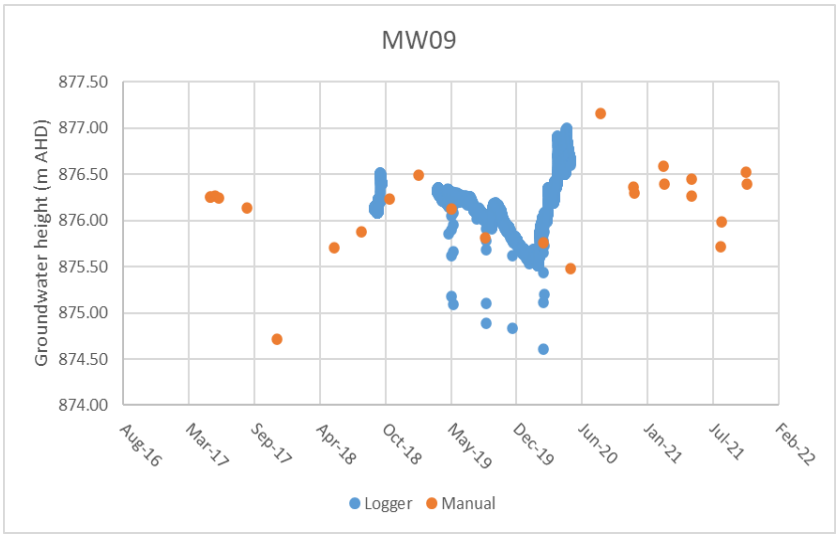


Figure 8A-8 MW09 groundwater height

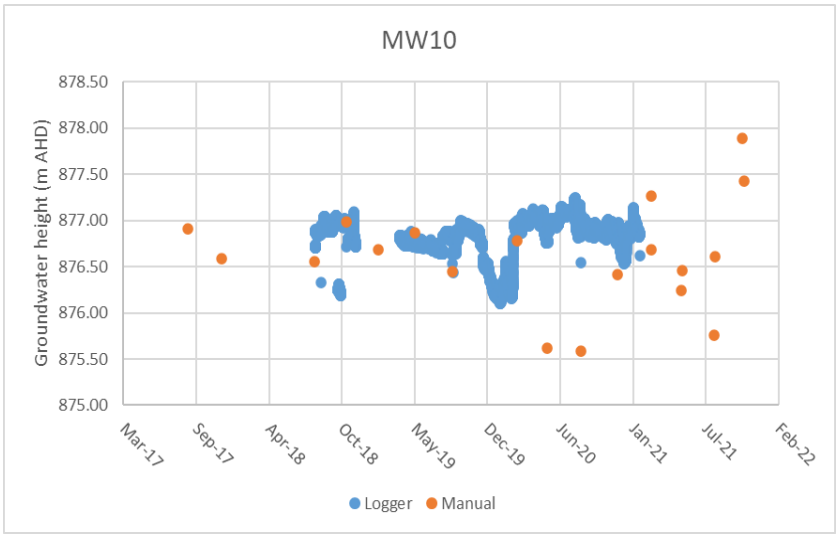


Figure 8A-9 MW10 groundwater height

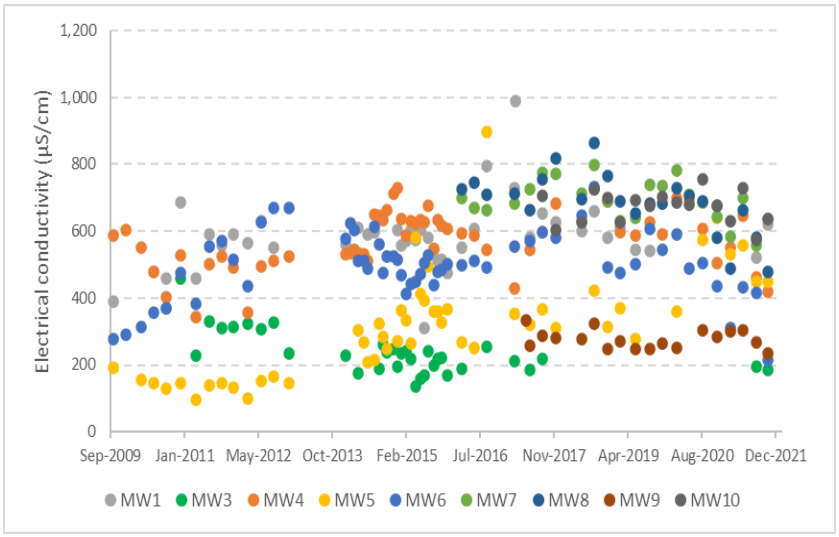


Figure 8A-10 Electrical conductivity monitored in groundwater

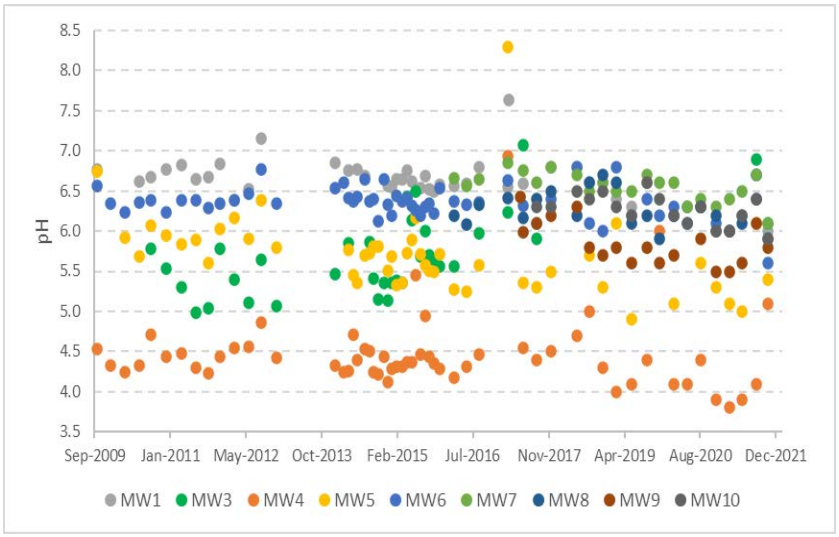


Figure 8A-11 pH monitored in groundwater

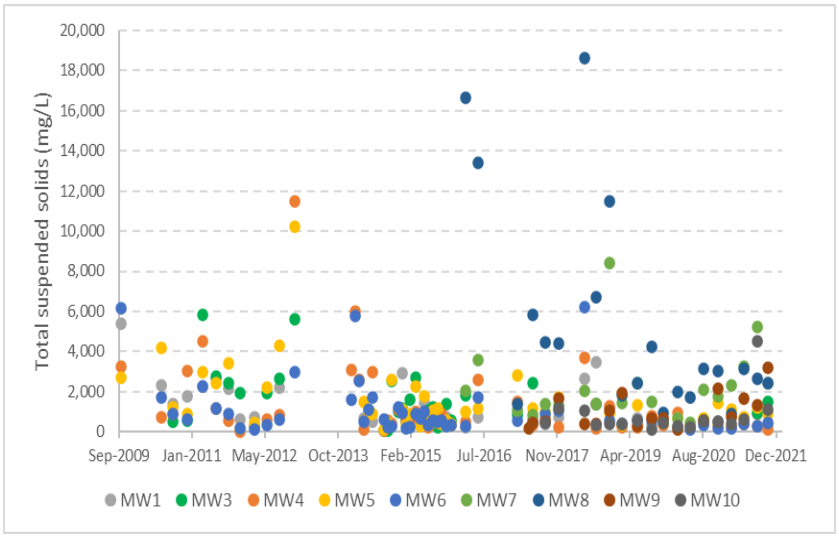


Figure 8A-12 TSS monitored in groundwater

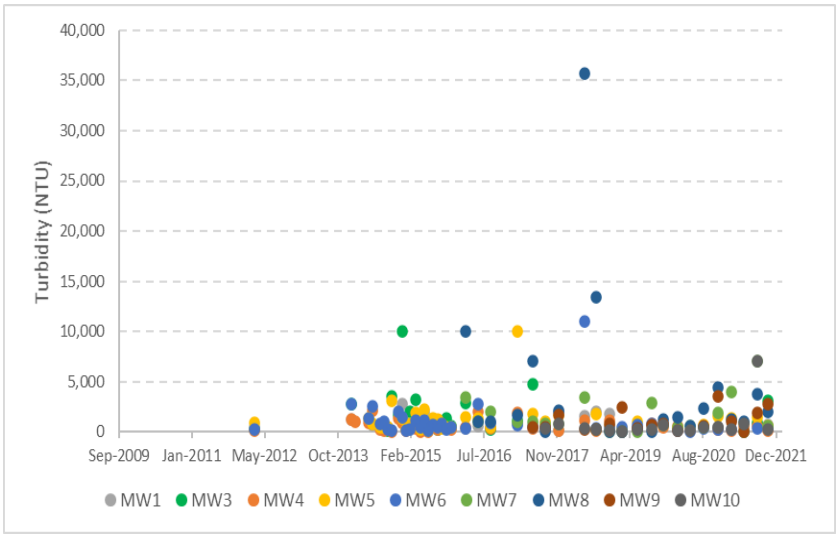


Figure 8A-13 Turbidity monitored in groundwater

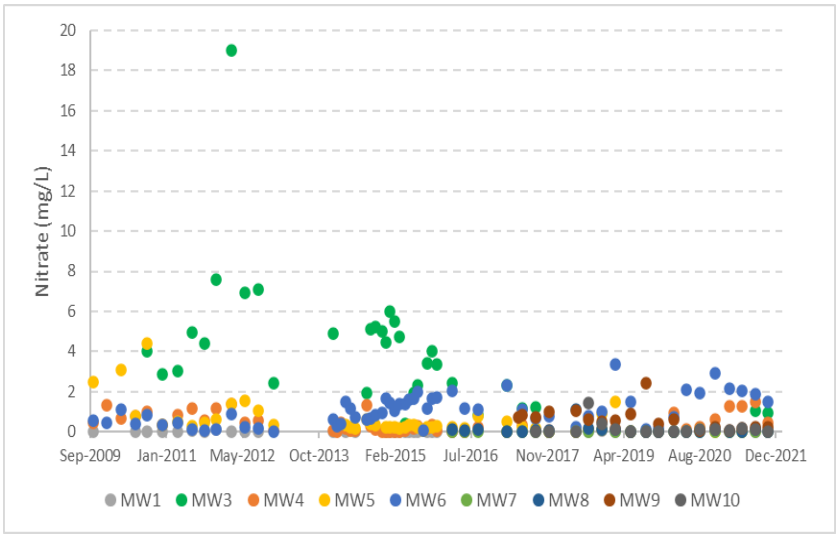


Figure 8A-14 Nitrate monitored in groundwater

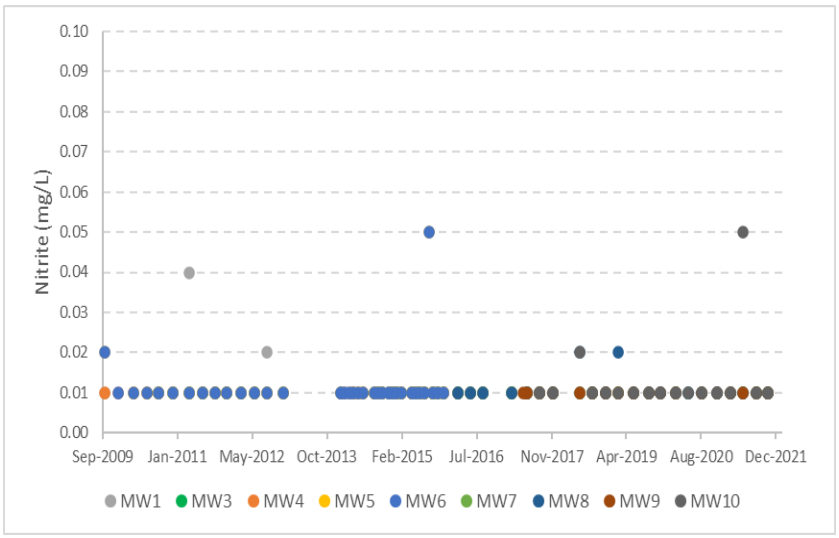


Figure 8A-15 Nitrite monitored in groundwater

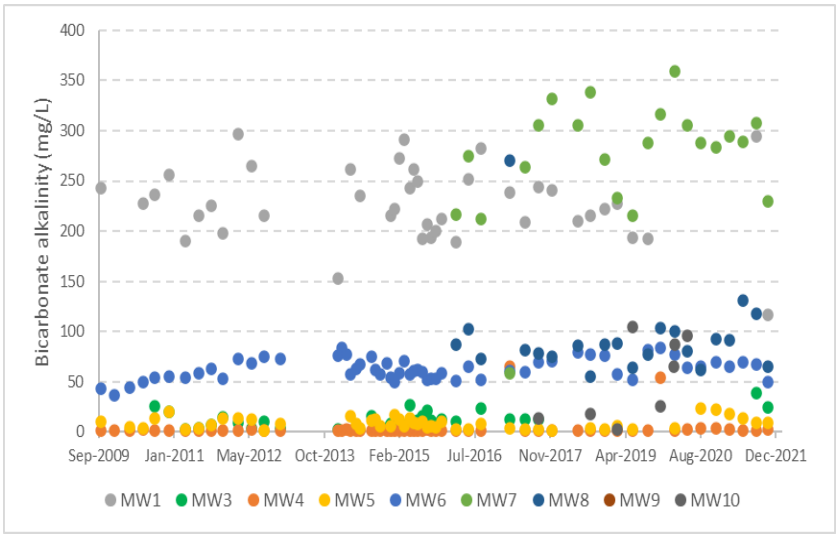


Figure 8A-16 HCO alkalinity monitored in groundwater

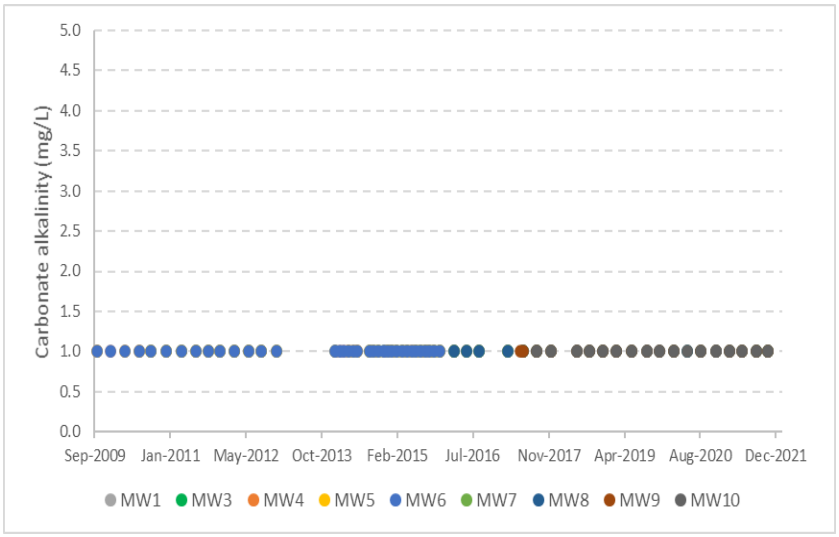


Figure 8A-17 CO alkalinity monitored in groundwater

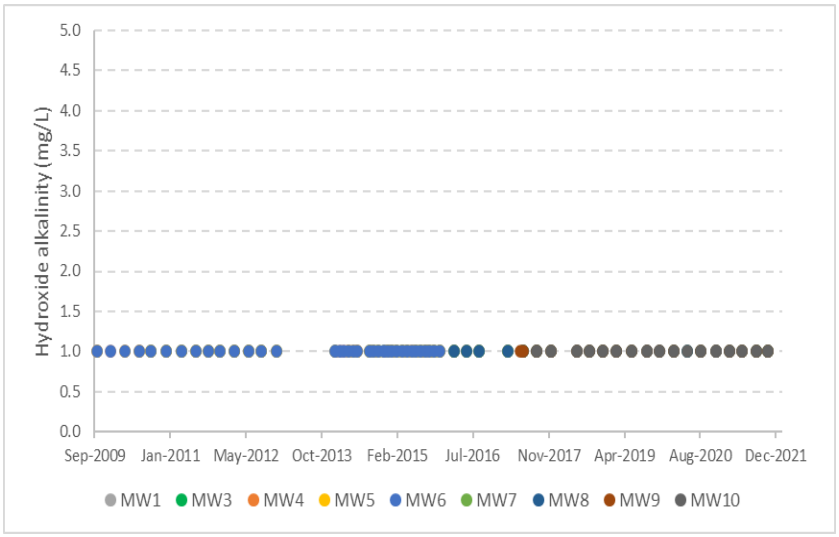


Figure 8A-18 OH alkalinity monitored in groundwater

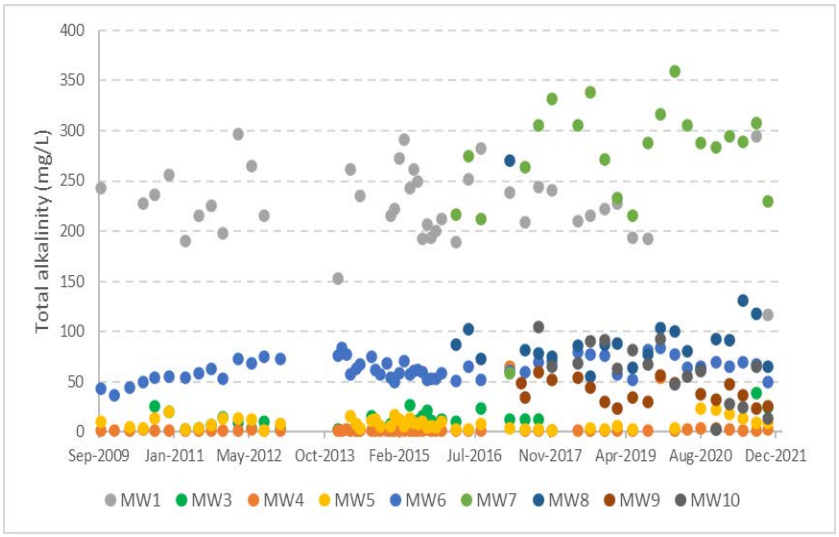


Figure 8A-19Total alkalinity monitored in groundwater

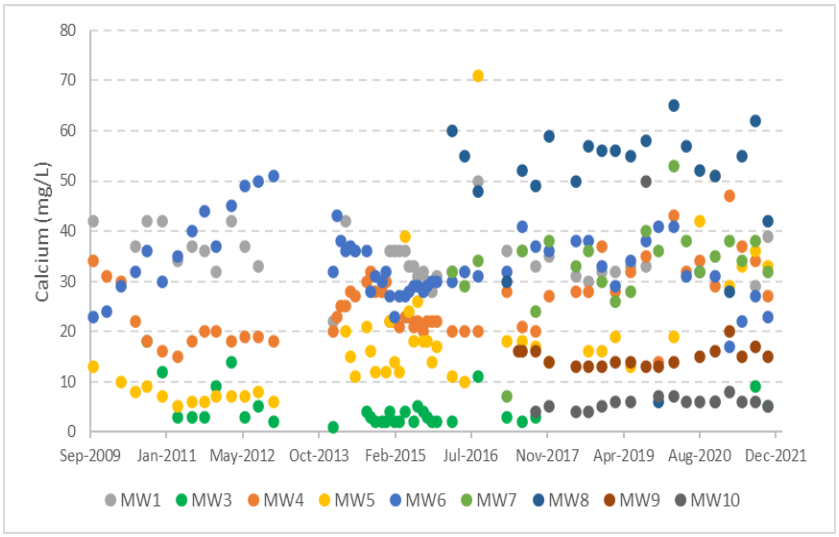


Figure 8A-20 Calcium monitored in groundwater

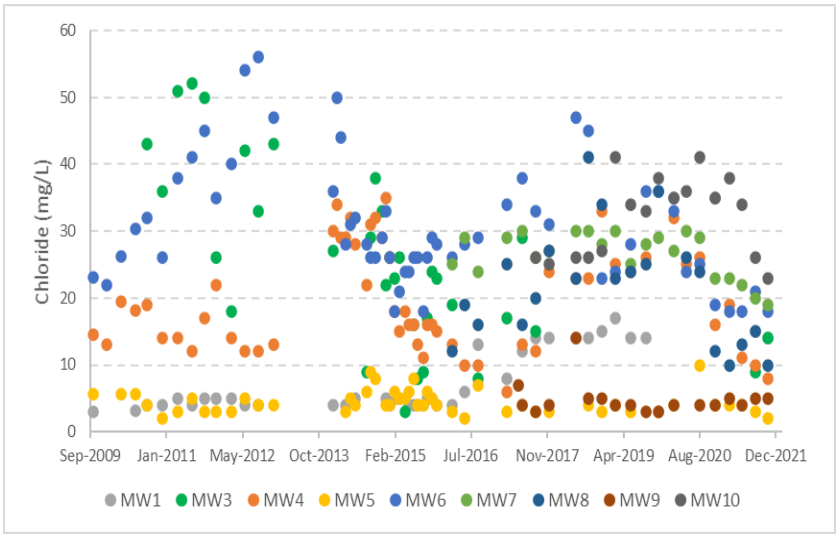


Figure 8A-21 Chloride monitored in groundwater

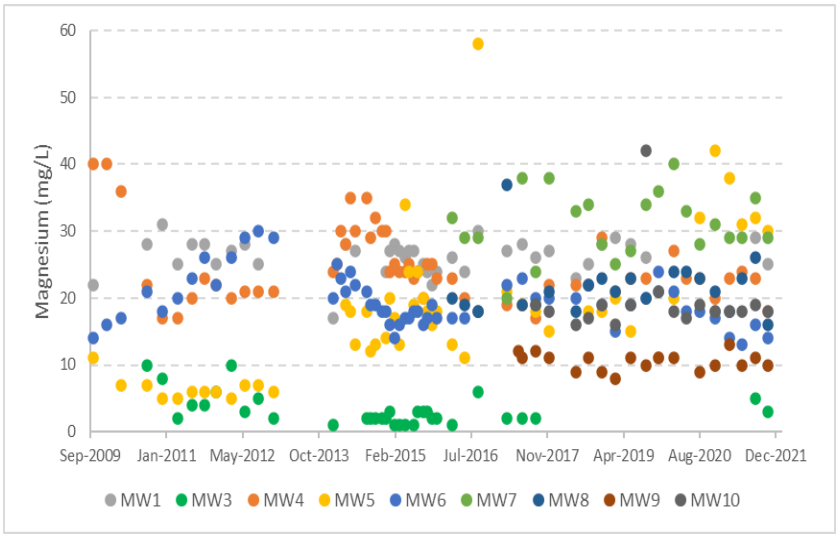


Figure 8A-22 Magnesium monitored in groundwater

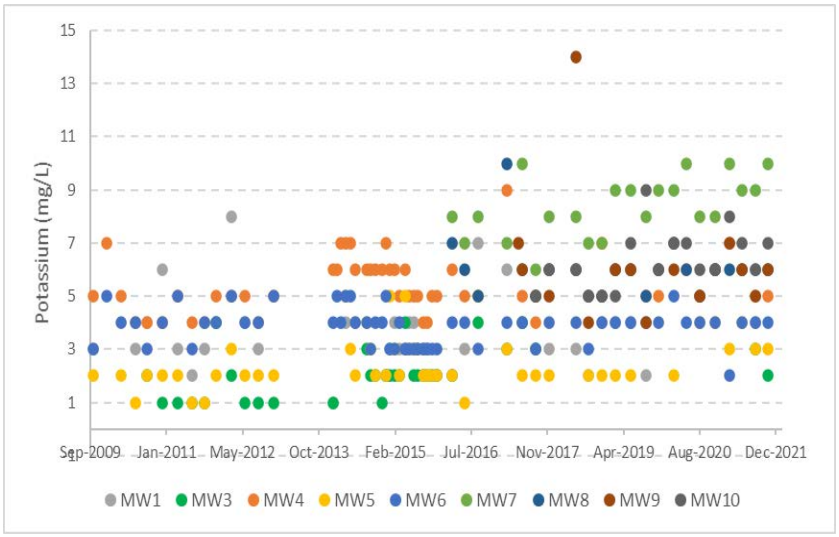


Figure 8A-23 Potassium monitored in groundwater

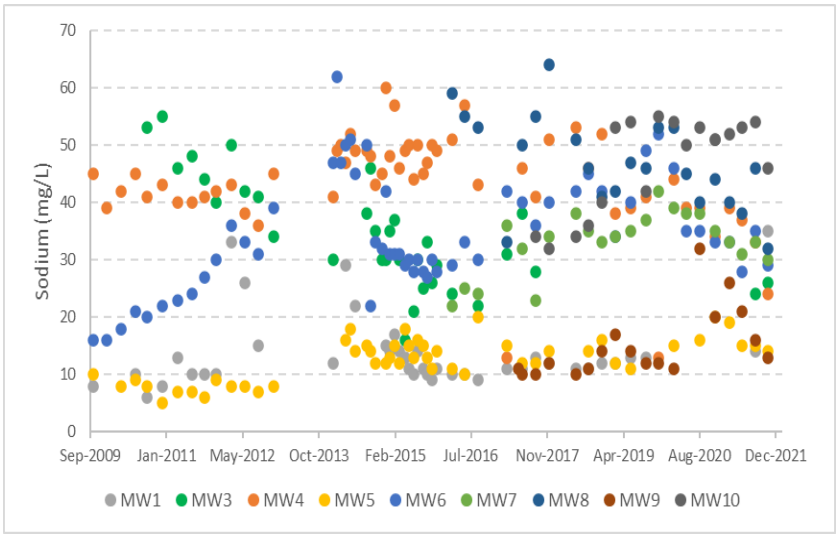


Figure 8A-24 Sodium monitored in groundwater

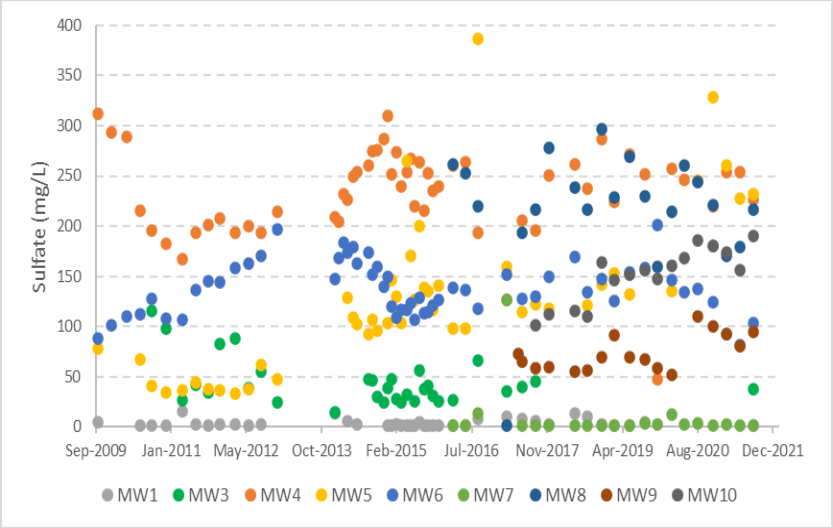


Figure 8A-25 Sulfate monitored in groundwater

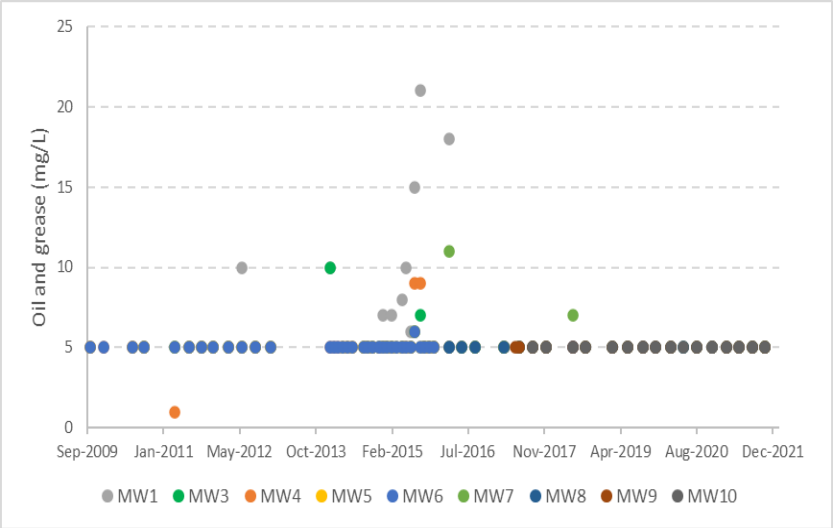


Figure 8A-26 Oil and grease monitored in groundwater

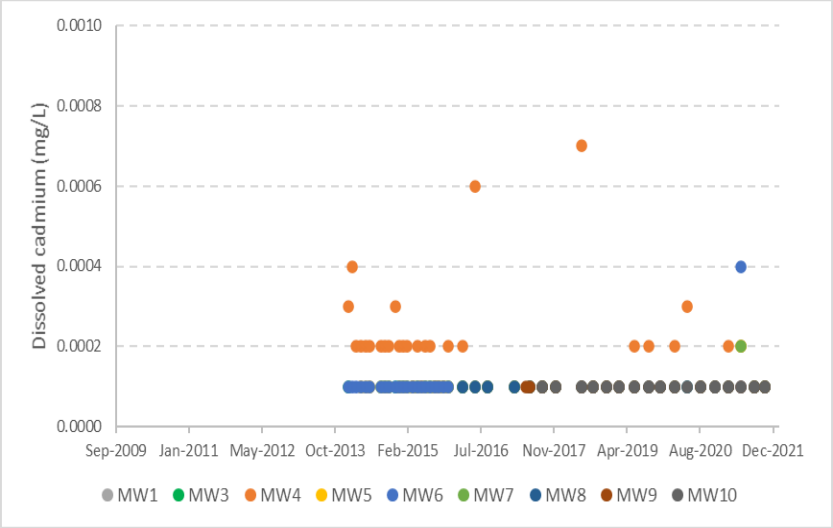


Figure 8A-27 Dissolved cadmium monitored in groundwater

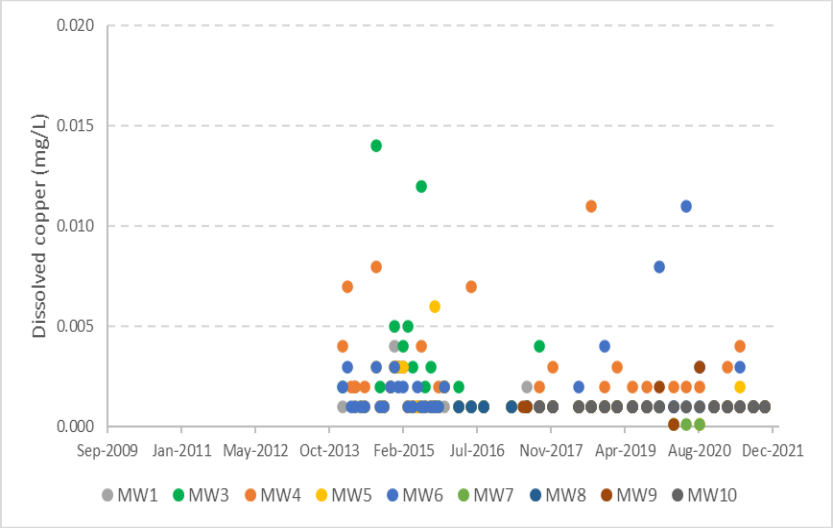


Figure 8A-28 Dissolved copper monitored in groundwater

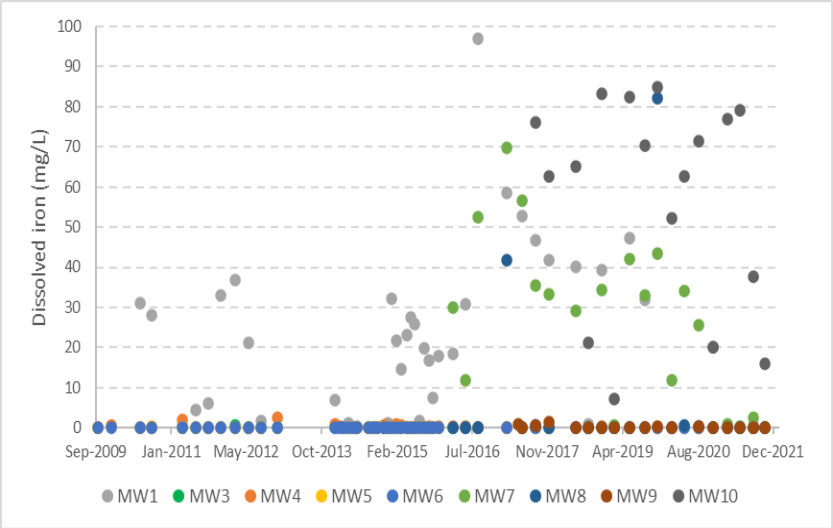


Figure 8A-29 Dissolved iron monitored in groundwater

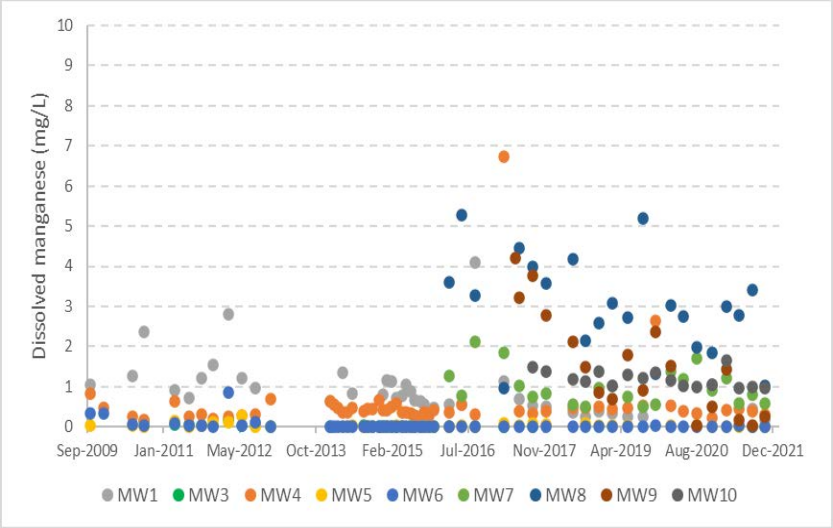


Figure 8A-30 Dissolved manganese monitored in groundwater

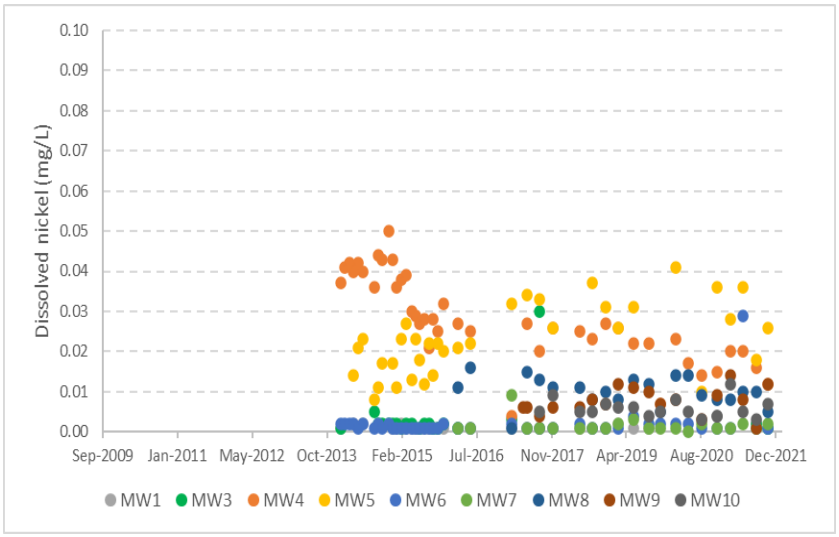


Figure 8A-31 Dissolved nickel monitored in groundwater

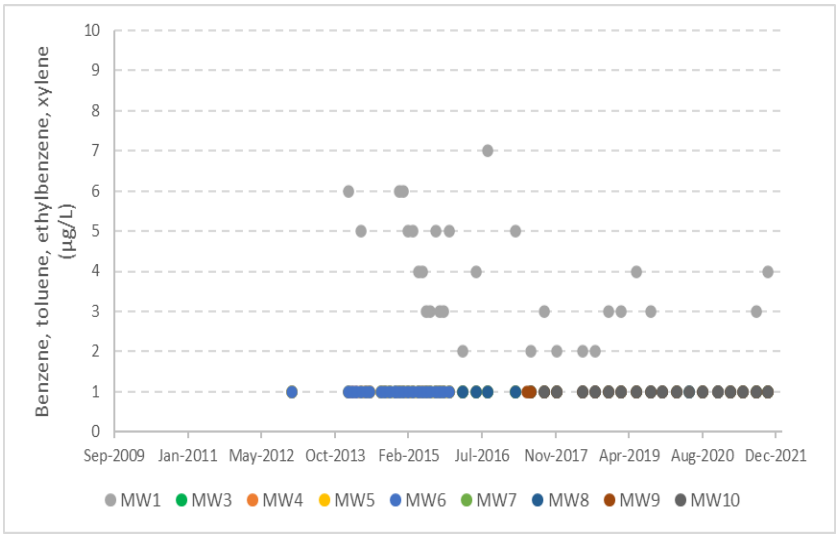


Figure 8A-32 BTEX monitored in groundwater

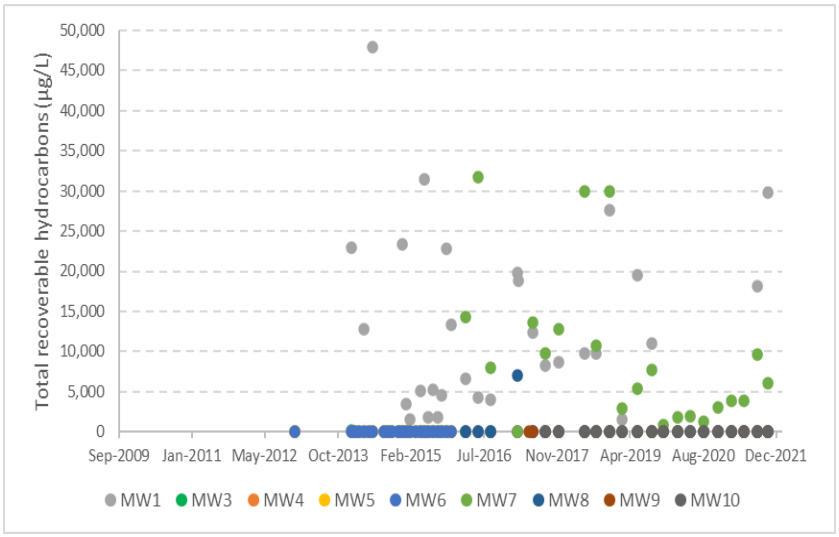


Figure 8A-33 TRH monitored in groundwater

Table 8A-1 2021 Groundwater Trigger Investigations

Parameter	Bore	Occurrence (SSGV)	Investigation
pH	MW3	• August, 6.9 • November, 6.1 (5.6 – 6.0)	The pH results recorded were greater than the SSGV pH range and are less acidic (closer to neutral) than the SSGV.
	MW4	• February, 3.8 • May, 3.9 • August, 4.1 • November, 5.1 (4.3 – 4.5)	Generally, lower pH results were recorded during 2021 across groundwater monitoring locations at Lidsdale Siding, including those upgradient of operational areas. Therefore, the reduced pH values may be caused by regional aquifer conditions.
	MW5	• February, 5.1 • May, 5.0 • August, 6.1 • November, 5.4 (5.5 – 5.9)	
	MW6	• February, 6.0 • May, 6.2 • August, 6.7 • November, 5.6 (6.3 – 6.5)	
EC	MW5	• February, 530 µS/cm • May, 556 µS/cm • August, 448 µS/cm • November, 449 µS/cm (362 µS/cm)	EC at MW5 generally increased in 2021 showing an opposing trend to all other monitoring bores which showed decreasing results. EC showed reduced levels in August and November 2021, however, are still elevated above the SSGV. Further investigative action is to be taken if EC shows an increasing trend in 2022.
Dissolved Nickel	MW5	• February, 0.028 mg/L • May, 0.036 mg/L (0.024 mg/L)	Dissolved nickel concentrations at MW5 are historically elevated greater than the SSGV. There is no evidence of elevated nickel concentrations in Lidsdale Siding operational water storages (Dirty Water Dam and Triangle Pond) to suggest groundwater seepage is causing the elevated results.

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