



CENTENNIAL COAL
Newstan Colliery
ANNUAL REVIEW

March 2022

Annual Review Title Block

Name of Operation	Newstan Colliery
Name of Operator	Centennial Newstan Pty Ltd
Development Consent/ Project Approval #	DA 73_11_98 SSD-5145
Name of holder of Development Consent/ Project Approval	Centennial Newstan Pty Limited
Mining Lease #	Consolidated Coal Leases 727, 746, 763 and 764. Mining Leases 1380, 1452, 1480, 1586 and 1587. Mining Purposes Leases 304, 305, 327 and 328. Private Lands Lease 497
Name of Holder of Mining Lease	Centennial Newstan Pty Ltd
Water License #	WAL 18735
Name of Holder of Water License	Centennial Newstan Pty Ltd
MOP/RMP Start Date	30 June 2020
MOP/RMP End Date	23 May 2023
Annual Review Start Date	1 January 2021
Annual Review End Date	31 December 2021
I, MICHAEL CLARK certify that this audit report is a true and accurate record of the compliance status of Centennial Newstan for the period 1 January to 31 December 2021 and that I am authorised to make this statement on behalf of Centennial Newstan. <i>Note:</i> 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	MICHAEL CLARK
Title of Authorised Reporting Officer	Director
Signature of Authorised Reporting Officer	
Date	28-3-22.

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Plans

Plan Reference	Plan Name
NS2541A	Location of Surface Water Monitoring Points
NS3332	Location of Air, Noise, Weather Monitoring Points
NS3351	Newstan Colliery Annual Review Plan (workings as mined 2021 and planned 2022)
NS3394	NREA Rehabilitation Areas
NS3301	Plan of Premises – Underground workings Newstan EPL395

1 STATEMENT OF COMPLIANCE

The compliance of Newstan Colliery in 2021 is provide in Table 1 below. There were 9 non-compliances during the reporting period.

Table 1-1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Development Consent DA 73-11-98	No
Development Consent SSD-5145	No
Environmental Protection Licence 395	No
Mining Lease 1380	Yes
Mining Lease 1452	Yes
Mining Lease 1480	Yes
Mining Lease 1586	Yes
Mining Lease 1587	Yes

Table 1-2: 2021 Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Where Addressed in Annual Review
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP002 water quality limit criteria (23 March 2021).	Section 7.3.2 and Section 11
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality limit criteria (1 April 2021).	
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality limit criteria (8 April 2021).	
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality licence limits (15 April 2021).	
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality licence limits (22 April 2021).	
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality licence limits (29 April 2021).	
EPL395	L2.4	Water and / or land concentration limits	Non-Compliant	Exceedance of LDP017 water quality licence limits (6 May 2021).	

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Where Addressed in Annual Review
EPL395	L1.1	Pollution of waters	Non-Compliant	Dirty water catchment drain filled dirty water drain after slump on ROM coal stockpile bund. Potential for environmental harm.	Section 11
EPL395	E1.4	Macroinvertebrate and Ecotoxicological Monitoring Programs	Non-Compliant	Report not submitted within stipulated timeframe to the EPA.	Section 11
DA 73-11-98	6.4D	Noise Control – Newstan Ventilation Shaft Site at Awaba	Non-Compliant	Resident heard noise from Awaba compressor.	Section 9.3

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

Newstan Colliery is located approximately 25 kilometres (km) south-west of Newcastle and 140km north of Sydney within the Lake Macquarie Local Government Area (LGA). The Newstan Colliery surface site is in Fassifern approximately four kilometres north of the township of Toronto (Figure 2-1 and Figure 2-2).

In August 2014, the underground mining operations at Newstan Colliery were placed onto care and maintenance. These activities are undertaken in accordance with the approval Development Consent DA 73-11-98.

The Northern Coal Logistics Project (NCL) comprises of the existing approved surface coal handling and processing facilities at the Newstan Colliery Surface Site and Mandalong Mine – Cooranbong Entry Site, along with existing private haul road and rail loading infrastructure which was granted approval on 29 September 2015 under Development Consent SSD 5145.

Newstan Colliery is owned and operated by Centennial Newstan Pty Ltd (Centennial Newstan). The NCL is owned and operated by Centennial Northern Coal Services Pty Limited (Northern Coal Services) and Centennial Newstan.

2.1 SCOPE

This Annual Review (AR) details the compliance and environmental management performance of Newstan Colliery and NCL over the period 1 January 2021 to 31 December 2021. It has been prepared to demonstrate the sites performance and community engagement activities. The AR has been prepared in accordance with the Annual Review Guideline (DPIE 2015), and satisfies:

- Schedule 2, Condition 9.1 of Consent DA 73-11-98;
- Schedule 5, Condition 11 of Consent SSD 5145; and
- Reporting requirements of mining authorisations.

Following the approval of SSD 5145, the Cooranbong Entry Site and Cooranbong Haul Road were transferred from Mandalong Mine to Northern Coal Logistics; however, since operations at the Cooranbong Entry Site and Cooranbong Haul Road continue to be managed by Centennial Mandalong they have been incorporated in the Mandalong Colliery Annual Review.

2.2 MINE CONTACTS

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

Table 2-1: Centennial Site Environmental Contact Details

Name	Position	Phone
Terry O'Brien	Mine Manager	T: (02) 4956 0205
		E: Terry.O'Brien@centennialcoal.com.au
Alanna Ryan	Environment & Community Coordinator	T: (02) 4956 0206
		E: Alanna.Ryan@centennialcoal.com.au
Community Information and Complaints Line		1800 247 662



Figure 2-1: Regional Context

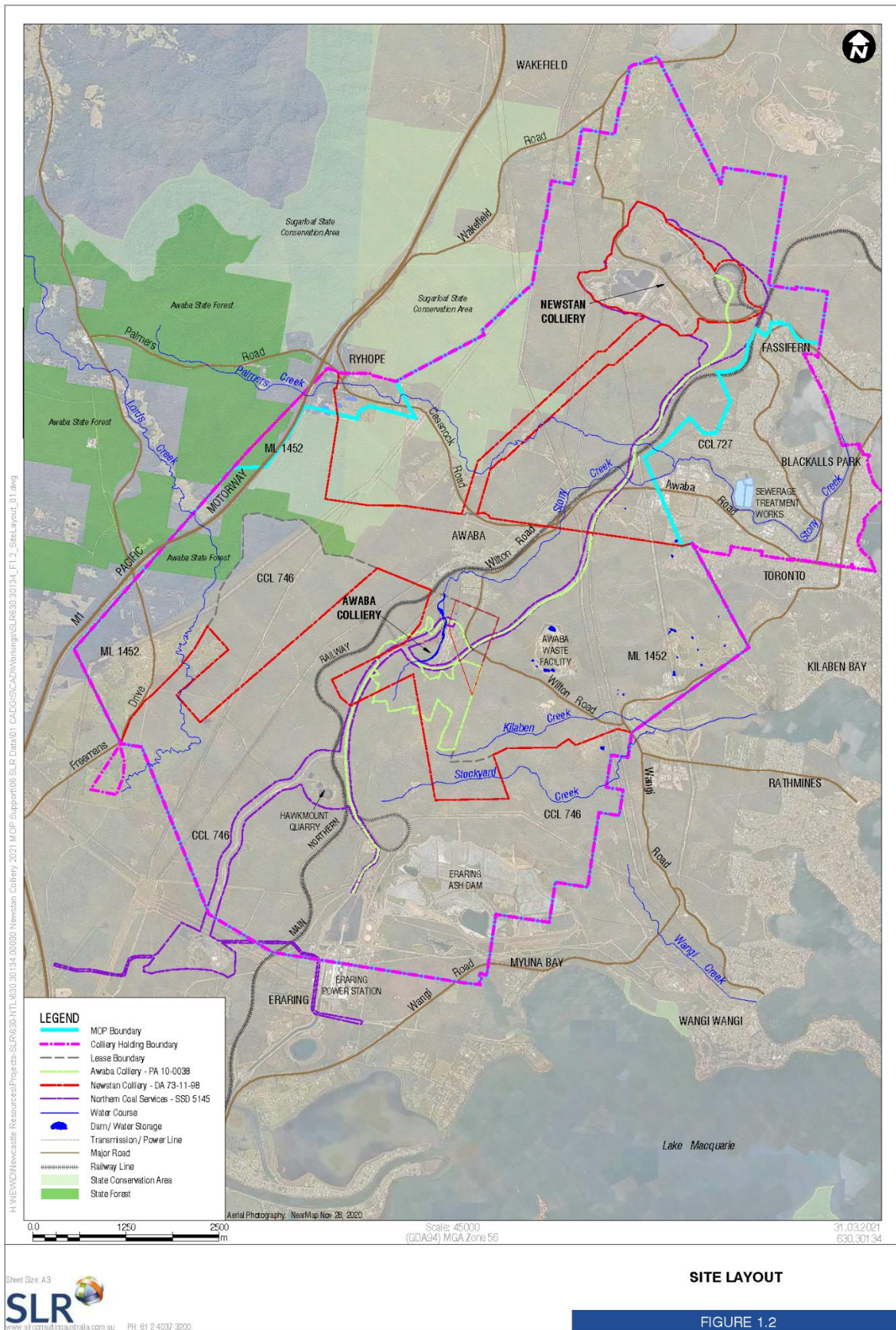


Figure 2-2: Site Layout

3 APPROVALS

3.1 PROJECT APPROVALS, MINING AUTHORISATIONS, AND OTHER LICENCES

A summary of Project Approvals, Mining Authorisations, and other Licences relevant to Centennial Newstan is provided in Table 3-1. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at the Newstan website.¹

Table 3-1: Environmental Approvals held by Centennial Newstan.

Approval	Description	Expiry Date
Project Approval		
DA 73-11-98	Permits development and works to occur as described in the EIS	6/7/2023 ²
SSD 5145	Receipt, handling, processing and transport of run-of mine coal from Centennial Coal's underground operations at Mandalong Mine, Newstan Colliery and Awaba Colliery.	31/12/2045
SSD-10333	<i>Application lodged with the Department of Planning, Industry and Environment for the Newstan Mine Extension Project</i>	<i>Under assessment</i>
Mining Leases		
ML 1380	Mining Lease	18/09/2037
ML 1452	Mining Lease	06/07/2020 (renewal sought)
ML 1480	Part NREA	20/07/2023
ML 1586	Mining Lease	13/10/2022
ML 1587	Surface area incl SREA.	23/10/2027
Mining Purpose Leases		
MPL 304	Part NREA	25/03/2035
MPL 305	Water Tanks	25/03/2035
MPL 327	Awaba Nitrogen Plant	05/08/2036
MPL 328	Part Awaba Stockpile	05/08/2036
Consolidated Coal Leases		
CCL 727	Pit top, SREA, NREA & surrounds	11/08/2027
CCL 746	Area above underground workings, within Crown Land.	31/12/2028
CCL 763	Parcel land south of the pit top, including Stony Creek Pipeline	09/06/2022
CCL 764	Area between the rail loops and the haul roads	18/05/2021 (renewal sought)
Private Lands Lease		
PLL 497	N/A	24/08/2038
Exploration Authorisations		
AUTH 399	Exploration Authorisation	17/11/2017 (renewal sought)
EL 5138	Exploration Licence	10/10/2021 (renewal sought)
EL 6641	Exploration Licence	17/11/2017 (renewal sought)

¹ www.centennialcoal.com.au/operations/newstan/

² The introduction of COVID-19 Legislation Amendment (Emergency Measures – Miscellaneous) Act 2020 has extended expiry of the development consent from 6 July 2021.

Approval	Description	Expiry Date
Mine Operations Plan		
Mine Operations Plan (MOP)	Summary of Mining and Processing Activities – Newstan and Awaba	06/07/2023
Environmental Protection Licence		
EPL 395	Permits scheduled activity “coal mining” and discharge of water from licensed discharge points.	Perpetual
Water Licences		
WAL 18735	Volume licence limit 750ML. North Lake Macquarie Water Source.	Continuing
Environment Protection and Biodiversity Conservation		
EPBC (2013/6906)	To upgrade coal preparation, handling infrastructure, transport and water management activities at the existing Northern Coal Services Site	31/12/2055
EPBC (2019/8528)	<i>Application lodged with the Department of Agriculture, Water and the Environment for the Newstan Mine Extension Project</i>	<i>Under assessment</i>

3.1.1 Changes During the Reporting Period

The following changes to Approvals, Mining Tenements, and other Licences occurred during the reporting period:

- SSD 10333 EIS for the Newstan Mine Extension Project submitted (24 August 2021) and request for a response to submission report received from DPIE (21 October 2021);
- CCL 764, ML 1452, AUTH 399, EL 5138 and EL 6641 renewal applications have been lodged, no renewal offers have been received at the time of writing of this Annual Review; and
- EL 5138 was varied on 8 June 2021 to omit Condition 11 (drilling notification)
- EPBC (2019/8528) application reviewed by the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development and advice provided to DAWE and the NSW DPIE (15 November 2021).

3.1.2 Extraction Plan / Subsidence Management Plan Status

The last underground coal was mined in 2014 and the relevant Subsidence Management Plan (Subsidence Management Plan LW101-LW103) expired following the completion of monitoring surveys in 2019.

Subsidence impact monitoring and mitigation works are now completed in accordance with the Newstan Complex Mining Operations Plan (13 July 2021 – 6 July 2023).¹

3.2 ANNUAL REPORTING REQUIREMENTS

Appendix 1 provides a checklist of reporting requirements and performance conditions addressed within the Annual Review.

In accordance with the requirements of SSD-5145 (Schedule 5, Condition 11), DA 73-11-98 Condition 9.1 (Annual Review) and the conditions outlined in **Appendix 1**, the 2020 Annual Review was provided to DPIE, NSW RR, LMCC, NRAR, EPA, NPWS and the Newstan Colliery CCC and is available at the Newstan website.²

¹ refer Section 6.5

² www.centennialcoal.com.au/operations/newstan/

4 OPERATIONS SUMMARY

4.1 PRODUCTION

Details of production and associated waste generated by the site for the report period and next reporting is provided in **Table 4-1**. A summary of the other operations and coal processing, handling and transport relevant to Centennial Newstan is provided in **Table 4-2**.

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

Table 4-1: Production Summary & Forecast

Material	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock / Overburden	N/A	nil	nil	nil
ROM Coal ¹	8 Mtpa	1.190	1.511	2.522
Coarse reject	N/A			
Fine reject (tailings)	N/A			
Saleable Product	8 Mtpa	1.155	1.373	2.32

1. receive, handle or process

Table 4-2: Other Operations

Approved Operation	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)
ROM Coal to NCSS from CES (for washing)	6 Mtpa	1.190	1.511
ROM Coal to NCSS from Newstan Colliery	4.5 Mtpa	nil	nil
ROM Coal to NCSS from Awaba Colliery	0.88 Mtpa	nil	nil
Product Coal to CES (middlings)	0.5 Mtpa	0.057	0.041
Transport (rail)	8 Mtpa ¹	1.033	1.326
Hours of operation	24/7	24/7	24/7

1. The Applicant must not despatch more than 8 trains from the site in any day; and Prior to transporting more than 5.5 million tonnes of coal by rail in any calendar year, the Applicant must construct the automated coal recovery and train loading system as proposed in the EIS, to the satisfaction of the Secretary. Following its construction, the Applicant must use the automated coal recovery and train loading system for all transport of coal by rail.

4.2 MINING OPERATIONS

Newstan Colliery underground operations were put on care and maintenance in August 2014. There was no production in 2021 and none currently planned for 2022. The underground operations were maintained during the January to December 2021 reporting period.

A separate project has been lodged with the NSW Department of Planning Industry and Environment (DPIE) to continue operation of Newstan Colliery as a mine.

4.3 EXPLORATION

No exploration or land preparation and construction works occurred during the reporting period. No exploration is proposed in the next reporting period.

4.4 LAND DISTURBANCE

Land disturbance at Newstan Colliery for the 2021 calendar reporting period consisted of works associated with the Southern Rejects Emplacement Area (SREA). The SREA has been designed and approved to be developed in a series of stages.

During the reporting period preparatory works were undertaken at the SREA, within the existing surface disturbance footprint, to allow for the placement of coarse coal rejects. Placement of coarse coal rejects commenced in 2021 and includes:

- Regular updating of site-specific dumping strategy;
- Rejects being spread and compacted in layers of approximately 400 mm;
- Material compacted to 80-90% compaction level;
- Capping of rejects with 500 mm of inert material;
- The maximum slope of final landform will be 4H:1V; and
- Revegetation of the final landform with native species.

4.5 CONSTRUCTION

There were no construction activities at Newstan Colliery for the 2021 calendar reporting period.

4.6 NEXT REPORTING PERIOD

There are no underground mining operations or exploration planned for the next reporting period.

Land disturbance (within the existing disturbance footprint) will continue around the SREA as these areas are progressively developed. Construction of the SREA tailings dam wall to increase its height will commence in 2022.

Progressive capping of the Northern Rejects Emplacement Area will continue.

The rehabilitation activities are discussed in further detail in Section 8.

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 Centennial Site.

Table 5-1: Actions from Previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Installation of air compressor ducting from original equipment manufacturer.	Centennial	Ducting has been installed	Section 6.2
Completion of Independent Environmental Audit (IEA).	DPIE	Complete	Section 10
Inclusion of Newstan subsidence rehabilitation in the Awaba Colliery Sinkhole Rehabilitation Management Plan.	Centennial	Complete	Section 8
Update Figure 1 to include all of the relevant information as required by Section 2 of the Department's Annual Review Guideline (October 2015)	DPIE	This Annual Review includes an additional site layout figure	Figure 2-2
Include Water Management as a separate section as per the Department's Annual Review Guideline (October 2015)	DPIE	This Annual Review includes a separate Water Management section	Section 7
Section 6.1 (Noise) does not include the data recorded throughout the reporting period. Include all data for discussion and comparison in all subsequent Annual Reviews.	DPIE	This Annual Review includes noise data for discussion and comparison	Section 6.2

6 ENVIRONMENTAL PERFORMANCE

Centennial Site 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, Centennial Site undertake a comprehensive monitoring program. The environmental monitoring program is shown in Figure 6-1 and Figure 6-2.

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 – Mine Subsidence
- Section 6.6 – Other Matters, including:
 - Heritage
 - Blasting
 - Waste, and
 - Greenhouse Gas

The environmental performance for water, rehabilitation and community aspects are reported in Sections 7, 8 and 9 respectively.

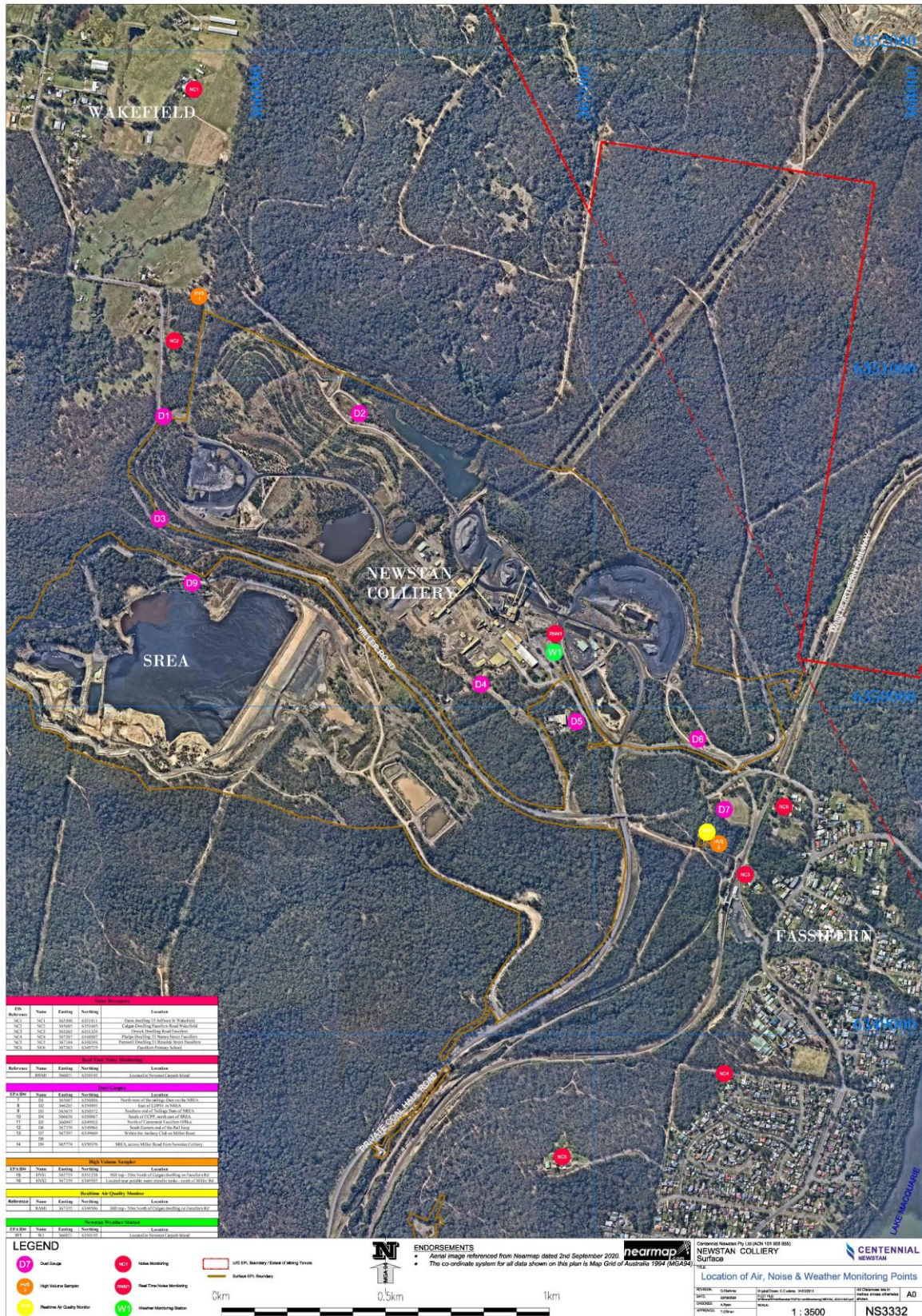


Figure 6-1: Location of Air, Noise and Weather Monitoring Points

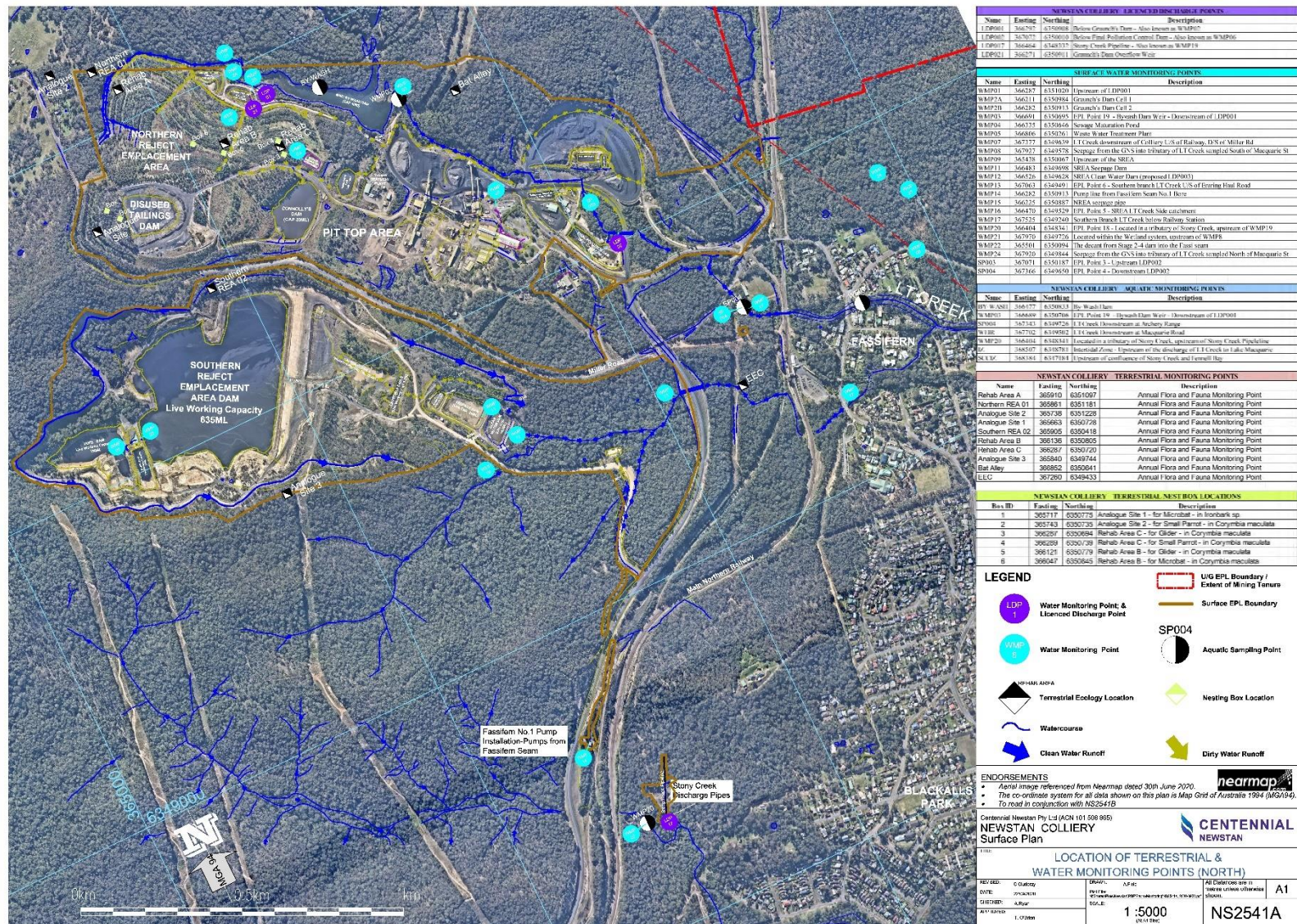


Figure 6-2: Location of Terrestrial and Water Monitoring Points

6.1 METEOROLOGICAL SUMMARY

Centennial Newstan undertake meteorological monitoring at Weather Station W1 (located in Newstan Carpark Island) in accordance with EPL 395 requirements. The location of the weather station is illustrated in Figure 6-1. Meteorological parameters recorded by W1 include:

- Wind speed;
- Wind direction;
- Temperature at 2m and 10m;
- Relative humidity;
- Solar radiation;
- Barometric pressure; and,
- Rainfall

W1 rainfall and temperature records for 2021 are summarised in Table 6-1.

A total of 1,421.4mm of rainfall was recorded in 2021, with March the wettest month (392.4mm) and April the driest (25mm). The total rainfall at Newstan for 2021 was 331.9mm above the annual average rainfall at the nearest BOM weather station of 1,089.5mm and above 2020 total of 1,276.8mm.

Table 6-1. Meteorological Summary at Newstan Colliery (W1)

2021 Month	Rainfall (mm)	Cumulative Rainfall (mm)	Long-term average Rainfall (mm) ¹
January	146.8	146.8	111.4
February	151.4	298.2	117.2
March	392.4	690.6	139.4
April	25	715.6	105.4
May	34	749.6	89.1
June	57.8	807.4	115.3
July	26.2	833.6	52.5
August	65.6	899.2	54.8
September	43.8	943	61.6
October	105.2	1,048.2	74.4
November	283.2	1,331.4	83.3
December	90	1,421.4	79.6
Total	1,421.4	1,421.4	1089.5

1. Long-term average rainfall data from BOM weather station Bolton Point (The Ridge Way) located approximately 2.8km from Fassifern

6.2 NOISE

6.2.1 Environmental Management

Centennial Newstan manage noise in accordance with the Northern Region Noise Management Plan (NMP). The Northern Region NMP has been developed to ensure that operational and construction noise impacts on the local community are minimised and appropriate management measures are identified and response protocols detailed should noise criteria be exceeded and to comply with statutory approval conditions.

During the reporting period, relevant noise producing activities included:

- Operation of mobile equipment – e.g. trucks, dozers, loaders
- Coal handling and preparation – e.g. conveyors; and
- Coal transporting activities – e.g. train loop, haul trucks.
- Newstan ventilation shaft site at Awaba.

Operational processes for Centennial Newstan to reduce noise emissions included:

- Attenuation of the CPP including the continuance of existing plant external walls down to the ground and fully enclosing exposed conveyors with Colorbond steel;
- Attenuation of the Reclaim Conveyor Transfer House including: the sealing of openings in all the walls around the conveyor transfer house, as required; the continuance of existing plant external walls down to the ground level, as required; fully enclosing exposed conveyors with Colorbond steel; and
- A 6-metre-high noise bund was constructed on the south eastern side of the coal train rail loop, to block line of sight between the coal train loading activities and receivers between R6 and R3.
- Compliance noise monitoring results, indicating any exceedance of noise criteria;
- On-site noise levels continuously monitored by a real-time noise monitor;
- Proactive noise planning in consultation with short-term meteorological forecasts to detect the onset of noise enhancing weather conditions e.g. temperature inversion;
- Site inspections and observation of unusually noisy equipment; and
- Investigating complaints relating to noise from mining operations.

6.2.2 Environmental Performance

Real- Time Noise Monitoring

The Northern Region NMP identifies response triggers for an on-site continuous real-time noise monitor at the Newstan Colliery Surface Site. Onsite noise levels that correspond to a receiver level at the nearest receiver equal to the Development Consent limit has been determined. When the determined on-site trigger level is exceeded, an alarm is sent to the control room to alert the site of the potential off site exceedance.

The real-time monitoring network operated throughout the reporting period.

Attended Noise Monitoring

GHD were engaged by Centennial Newstan to conduct quarterly noise compliance assessments for the Newstan Colliery (sites NC1-NC6) in accordance with the Development Consent criteria. Noise Criteria are specified for morning shoulder, day, evening, and night period for the amenity of neighbouring residences. Centennial Newstan complied with the project specific noise criteria at all monitoring sites during attended noise monitoring in the reporting period.

A summary of noise criteria and noise performance based on attended noise monitoring for 2021, together with management implications and proposed actions is shown in **Table 6-2**. Results from attended noise monitoring undertaken during the period in accordance with the Northern Region NMP is provided in **Table 6-3**.

Table 6-2: Newstan Noise Criteria and Monitoring Summary

Aspect	Approved Noise Limit (dB(A))						Performance During the Reporting Period	Key Management implications	Implemented/ Proposed Management Actions
Attended Noise Monitoring	Receiver / Monitoring Location	Morning Shoulder ¹	Day ²	Evening ³	Night ⁴		Quarterly attended monitoring was undertaken at the six required noise compliance locations (NC1, NC2, NC3, NC4, NC5 and NC6) There were no recorded noise exceedances across the six monitoring compliance locations.	Noise management controls at the Newstan Colliery and CHPP were effective. Noise management controls at the Awaba compressor were reviewed and additional mitigation measurements were implemented.	Attenuation of the Awaba compressor, including: - Compressor was enclosed within its own specific housing - Ducting was installed to improve compressor performance - Sound matting was installed within the compressor housing to improve noise attenuation - Monitoring undertaken December 2021 to measure and validate effectiveness of the additional attenuation
		<i>LAeq(15 min)</i>	<i>LAeq(15 min)</i>	<i>LAeq(15 min)</i>	<i>LAeq(15 min)</i>	<i>LA1(1 min)</i>			
	NC2	35	35	35	35	45			
	NC3, Residences around NC6	38	38	37	37	45			
	23	-	37	37	37	45			
	26	-	36	36	36	45			
	All privately owned residences - noise generated at the Newstan ventilation shaft site at Awaba	-	38	40	36	-			
	All other residences on privately-owned land	-	35	35	35	45			
			<i>LAeq(1 hour)</i>						
	NC6 (school), when in use	-	45 (external to school building)	-	-	-			

¹ Criteria for the Morning Shoulder period only applicable where these have been specifically developed for this period (SSD 5145)

² Day is defined as the period between 7am-6pm Monday to Saturday, and 8am-6pm on Sundays and Public Holidays

³ Evening is defined as the period 6pm-10pm

⁴ Night is defined as the period from 10pm-7am Monday to Saturday, and 10pm-8am on Sundays and Public Holidays.

Table 6-3: 2021 Attended Noise Monitoring Results

Site	Date	Monitoring Period										
		Day			Evening			Night				
		LAeq _(15 min)	Estimated Site Contribution LAeq _(15 min)	Criteria LAeq _(15 min)	LAeq _(15 min)	Estimated Site Contribution LAeq _(15 min)	Criteria LAeq _(15 min)	LAeq _(15 min)	Estimated Site Contribution LAeq _(15 min)	Criteria LAeq _(15 min)	Estimated LA1 _(1 min)	Criteria LA1 _(1 min)
NC1	Q4	48	N/A	35	68	N/A	35	80	N/A	35	N/A	45
	Q3	72	N/A		71	N/A		58	N/A		-	
	Q2	46	N/A		47	N/A		41	N/A		-	
	Q1	43	N/A		47	29		51	N/A		-	
NC2	Q4	61	32	36	57	31	35	46	24	35	<35	45
	Q3	59	34		57	N/A		49	N/A		-	
	Q2	63	N/A		58	N/A		43	31		40	
	Q1	59	N/A		54	31		49	N/A		-	
NC3	Q4	53	N/A	40	49	N/A	39	47	N/A	39	N/A	45
	Q3	61	N/A		47	N/A		40	33		45	
	Q2	57	N/A		55	31		43	32		44	
	Q1	57	N/A		55	N/A		50	N/A		-	
NC4	Q4	48	N/A	35	43	N/A	35	38	N/A	35	N/A	45
	Q3	49	N/A		37	N/A		35	30		33	
	Q2	53	N/A		44	N/A		51	N/A		-	
	Q1	43	N/A		48	N/A		37	N/A		-	
NC5	Q4	49	N/A	35	45	N/A	35	38	N/A	35	N/A	45
	Q3	46	N/A		36	N/A		37	N/A		-	
	Q2	40	N/A		38	N/A		38	N/A		-	
	Q1	43	N/A		52	N/A		38	N/A		-	
NC6	Q4	61	N/A	40	58	N/A	39	53	N/A	39	N/A	45
	Q3	59	N/A		39	30		48	33		40	
	Q2	63	N/A		58	37		43	N/A		-	
	Q1	61	N/A		59	N/A		45	N/A		-	

6.2.3 Comparison against Predictions

The *Northern Coal Logistics Project Environmental Impact Statement* (SLR Consulting Australia, 2014) found that the potential noise impacts are predicted to meet the project specific noise criteria at all resident locations, with the exception of NC3. The NC3 site is predicted to exceed the project specific noise criteria by up to 1dBA during night-time calm conditions and by up to 4dBA during night time temperature inversions for the current existing and approved operations.

Centennial Newstan complied with the project specific noise criteria at all monitoring sites during attended noise monitoring in the reporting period and was generally consistent with the EIS.

6.2.4 Long Terms Analysis

Table 6-4 shows the number of noise criteria exceedances recorded by Centennial Newstan during the period from 2018 to 2021. There have been no recorded exceedances in the quarterly noise compliance assessments since 2019. A summary of results from attended noise monitoring undertaken during the period from 2018 to 2021 in accordance with the NMP is provided in **Appendix 3**.

Table 6-4: Summary of Exceedances by Noise Monitoring Location 2018 – 2021

Site ID	2018	2019	2020	2021
NC1	2	-	-	-
NC2	-	-	-	-
NC3	1	-	-	-
NC4	1	-	-	-
NC5	-	-	-	-
NC6	2	1	-	-

The noise monitoring for Centennial Newstan exceeded criteria at multiple receivers during the second quarterly noise monitoring in 2018, but was compliant for all other measurements for that year. Centennial Newstan was compliant for all of 2019 besides for the first quarterly monitoring session, where an exceedance was detected at R6 during the night time period. Centennial Newstan has been compliant at all receivers for all of 2020 and 2021. The noise monitoring results show that Centennial Newstan has been trending towards compliance since 2018, with the monitoring results being compliant for the past two. Recent results show that the noise from the operation is generally indiscernible at most monitoring locations.

6.2.5 Implemented / Proposed Improvements

In 2021, the Northern Region NMP TARP was updated following the Independent Environmental Audit.

Additional attenuation was also implemented for the compressor supporting the Newstan Colliery underground mine (at the Awaba compressor compound), including:

- Compressor was enclosed within its own specific housing;
- Ducting was installed to improve compressor performance; and
- Sound matting was installed within the compressor housing to improve noise attenuation.

Monitoring of the additional attenuation measures was undertaken in December 2021 and confirmed that the ducting had resulted in an improvement. Regardless, as a further conservative measure to improve noise attenuation at the Awaba compressor compound, sound matting will be installed on the opening of the shed in 2022. Centennial Newstan will continue to implement the Northern Region NMP and in accordance with Schedule 5, Condition 6 of SSD-5145 will review, and if necessary revise, the Northern Region NMP.

6.3 AIR QUALITY

6.3.1 Environmental Management

Centennial Newstan manage air quality in accordance with the Northern Region Air Quality and Greenhouse Gas Management Plan (AQGHGMP) which has been developed to ensure that operational and construction air quality impacts on the local community are minimised. Additionally, appropriate management measures are identified, and response protocols are outlined to comply with statutory approval conditions should air quality criteria be exceeded.

During the reporting period, relevant sources of dust emissions included:

- Wind erosion from disturbed areas and coal stockpiles;
- Wheel generated dust from vehicle movements;
- Fugitive emissions from coal handling and processing (crushing, wash plant);
- Coal transporting activities (haul road, train loading, conveyors);
- Operation of mobile equipment; and
- Ventilation fans.

Operational processes for Centennial Newstan to manage and mitigate dust emissions included:

- 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;
- Shaping and orientation of coal stockpiles to minimise wind erosion;
- Minimise drop heights when loading product as far as practicable; and
- Rehabilitation of disturbed areas as soon as practicable.

6.3.2 Environmental Performance

During the reporting period, Centennial Newstan undertook air quality monitoring in accordance with the approved Northern Region AQGHGMP, which included:

- Deposited particulate matter monitoring with Dust Depositional (DD) gauges at eight locations around the Newstan Colliery pit top facilities, NREA, SREA and Fassifern, collected monthly;
- One real-time TEOM sampling PM₁₀, operating continuously;
- Two High Volume Air Samplers (HVS), operating on a 1-in-6 day cycle – north of the NREA near Culgan's property (HVS1 – Hill Top) and south of Newstan Colliery near the Fassifern Railway Station (HVS2 – Water Tank) – monitoring for dust deposition rates and concentrations of Total Suspended Particulates (TSP) and Suspended Particles PM₁₀ and PM_{2.5};
- PM₁₀ and TSP results are measured against the project approval air quality criteria and PM_{2.5} results are collected for internal use only;

The Northern Region AQGHGMP monitoring locations are identified in **Figure 6-1**.

Dust Deposition

All particulate dust gauges recorded an annual average particulate monitoring result below the development consent limit of an 4g/m²/month for the annual averaging period show in **Table 6-5**.

Table 6-5: Summary of Dust Deposition Monitoring Results

Dust Deposition Gauge		Insoluble Solids (g/m2/month)		
Site ID	General Location	2021 Annual Average	Long Term Average ¹	Air Quality Criteria
DG1	west of disused tailings dam	0.71	1.08	4
DG2	east of LDP1 near Main Bywash dam	1.12	1.51	
DG3	north of SREA	0.82	1.21	
DG4	south of CPP	1.28	2.44	
DG5	north of Centennial Fassifern Office	0.93	1.43	
DG6	south east of rail loop	0.96	1.47	
DG7	Archery Club Miller Road	1.38	1.66	
DG9	SREA	0.55	1.56	

1. Long-term average calculated on results from January 2010 to December 2021

Continuous Monitoring

A summary of the recorded PM₁₀ levels at the TEOM unit (RAM1) is presented in **Table 6-6**. The number of days that exceeded the consent criterion is also shown. Note, the annual average includes results recorded on days declared as “event days”⁵ by DPIE. In 2021, there were no days declared as “event days” for PM₁₀, and, PM_{2.5} and ozone in the Lake Macquarie region.

Table 6-6: Summary of HVS 2021 Monitoring Results

Monitoring Location	2021 Annual Average (µg/m ³)	Number of days exceeding criterion	2021 Maximum 24-hour Average (µg/m ³)	Number of days exceeding criterion
Consent Criteria	25	-	50	-
RAM01	17.5	-	47.19	-

High Volume Air Samplers

A summary of the recorded results for high volume dust sampling is presented in **Table 6-6**. The number of days that exceeded the consent criterion is also shown.

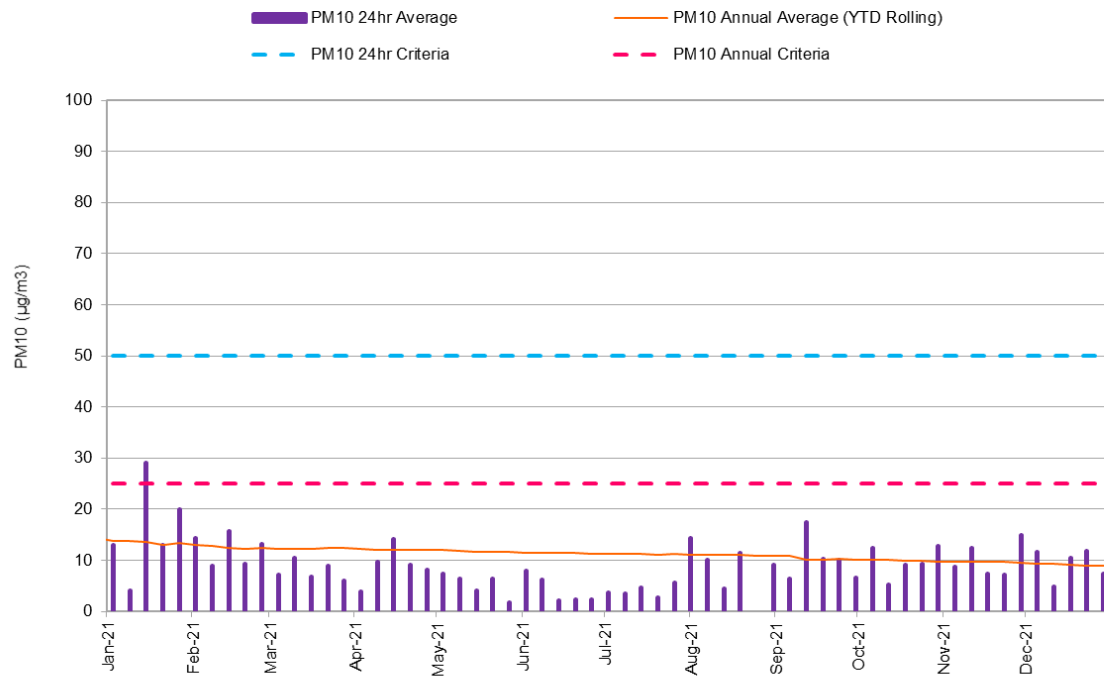
Rolling annual average and 24 hour results for high volume dust sampling at the Hill Top Location (HVS1) and Water Tank Location (HVS2) are provided for the following:

- PM₁₀ (refer **Figure 6-3**)
- TSP (refer **Figure 6-4**)
- PM_{2.5} (refer **Figure 6-5**)

The results obtained in the reporting period demonstrates compliance with the Development Consent and EPL limits (24hr and annual averages).

⁵ Air quality “event days” are days exceeding standards and are divided into exceptional and non-exceptional events. Exceptional events are those related to bushfires, hazard reduction burns and continental-scale dust storms

HVS1 (Hill Top) - PM10



HVS2 (Water Tank) - PM10

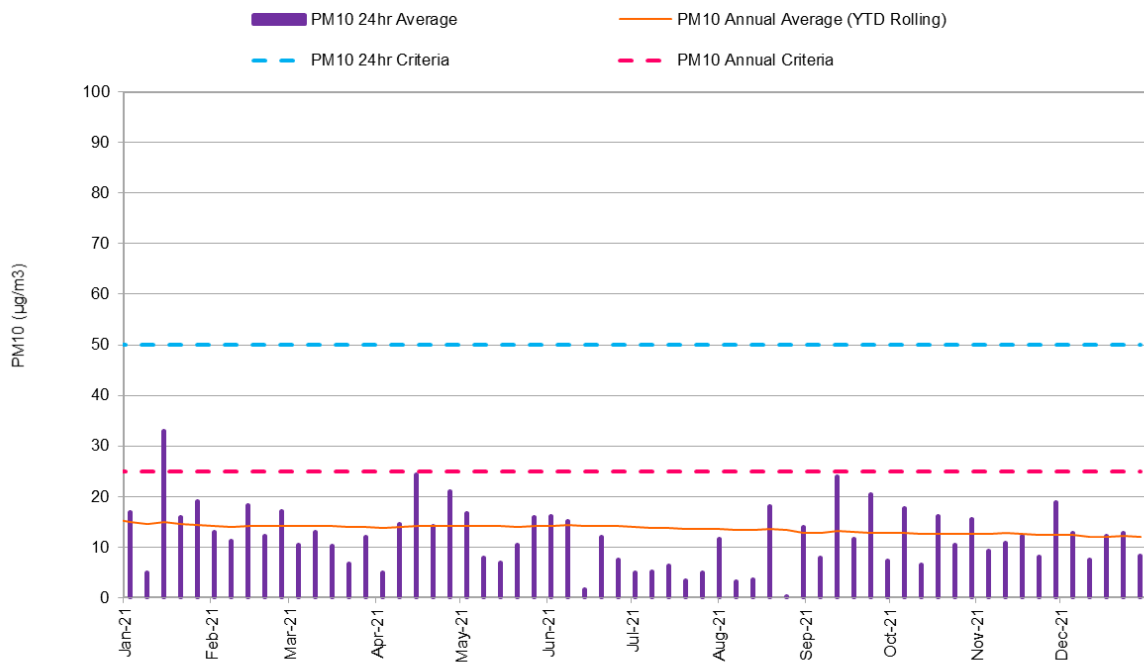
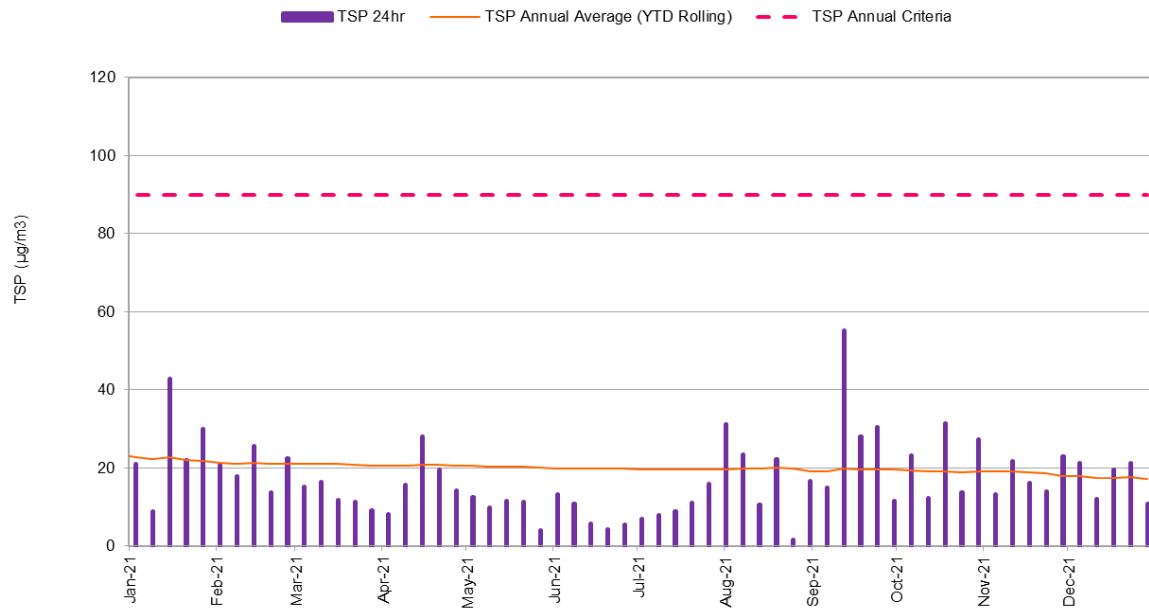


Figure 6-3: Annual PM₁₀ Summary Results at HVS1 and HSV2

HVS1 (Hill Top) - TSP



HVS2 (Water Tank) - TSP

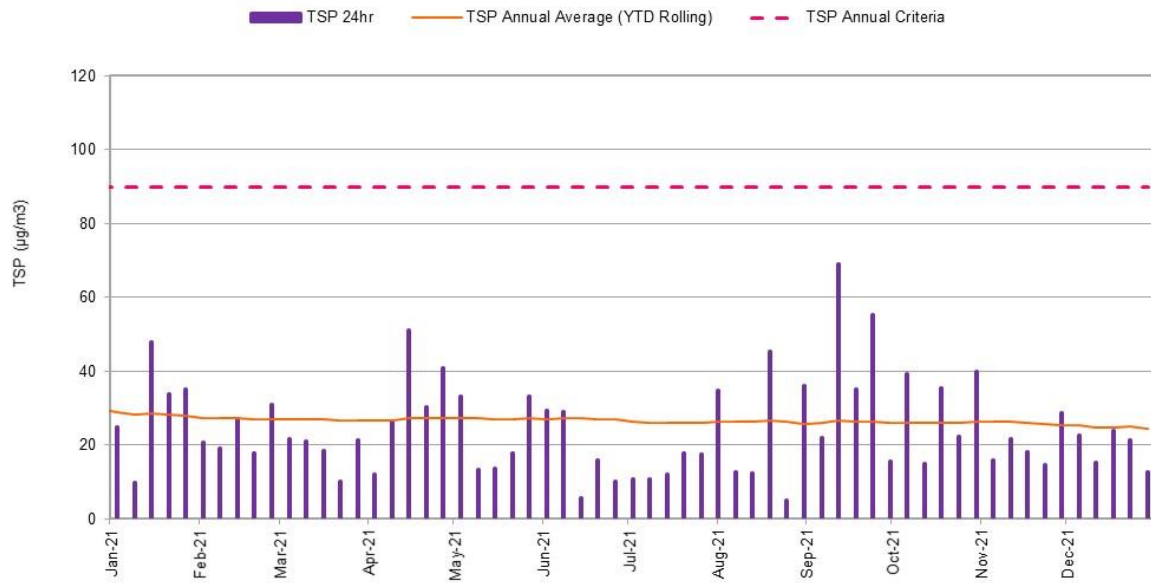
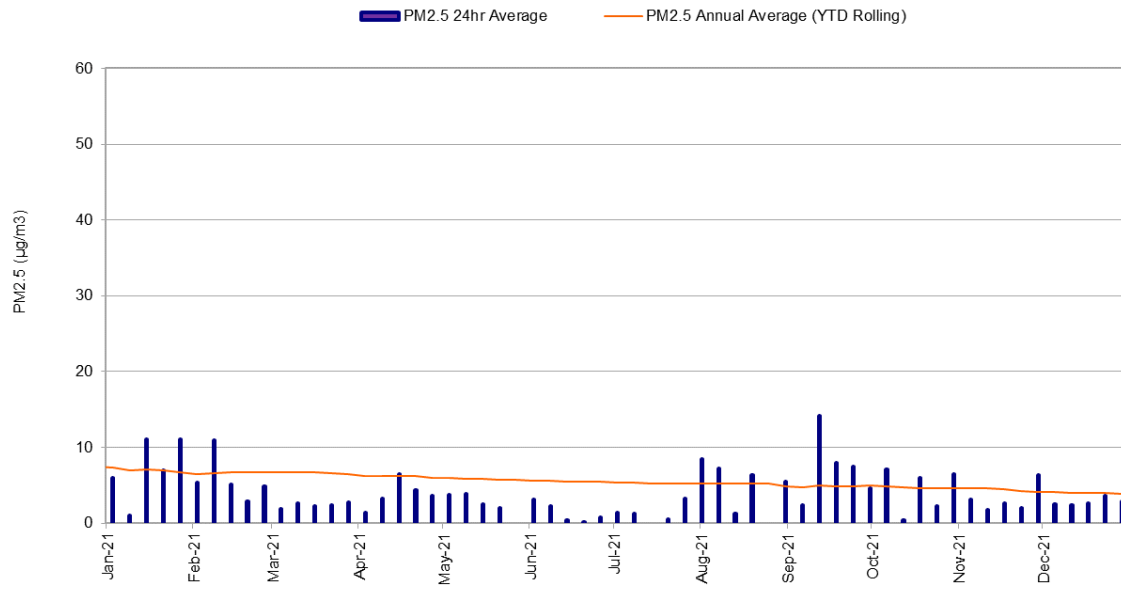


Figure 6-4: Annual TSP Summary Results at HVS1 and HSV2

HVS1 (Hill Top) - PM2.5



HVS2 (Water Tank) - PM2.5

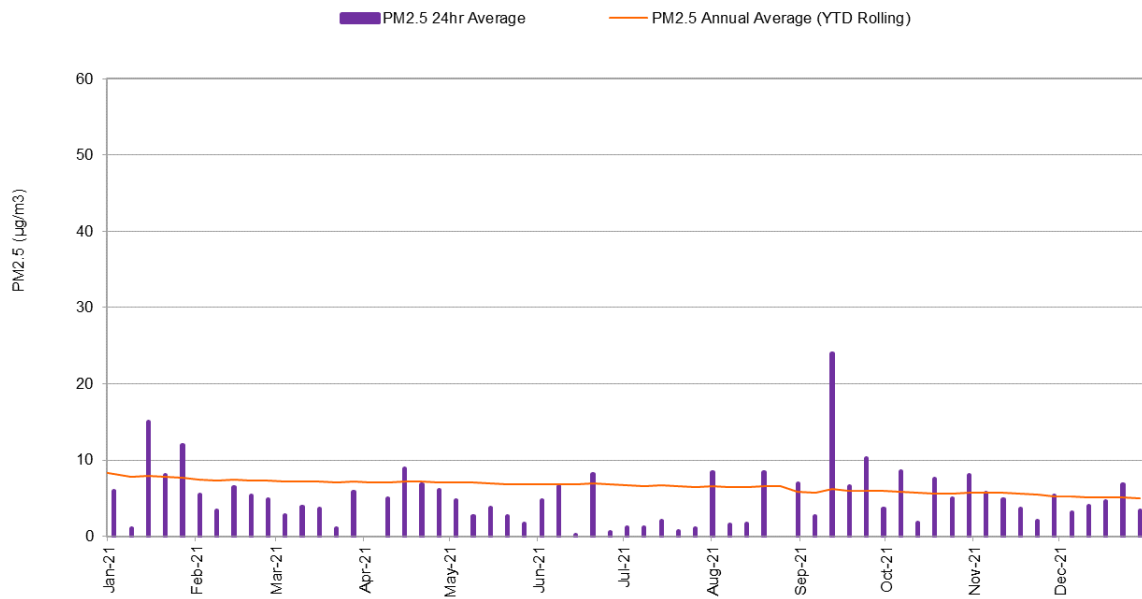


Figure 6-5: Annual PM_{2.5} Summary Results at HVS1 and HSV2

6.3.3 Comparison against Predictions

The site-specific ambient air quality levels adopted for the *Northern Coal Logistics Project Environmental Impact Statement* (SLR Consulting Australia, 2014) are provided in **Table 6-7**.

Table 6-7: Adopted Site-Specific Ambient Air Quality Environment

Parameter	Averaging Period	Assumed Background Ambient Level
Deposited Dust	Annual	2 g/m ² /month
TSP	Annual	30.9 µg/m ³ PLUS power station increment
PM ₁₀	24-hour	Varying
	Annual	14.7 µg/m ³ PLUS power station increment
PM _{2.5}	24-hour	Varying
	Annual	4.6 µg/m ³ PLUS power station increment

The air quality assessment for the Project (SLR Consulting Australia, 2014) indicated the project was unlikely to exceed the criteria at any of the identified sensitive receptors for the annual average deposited dust, TSP, PM₁₀, PM_{2.5} and the 24-hour average PM_{2.5} concentrations.

The dispersion modelling did predict a likelihood of exceedances at the nearest sensitive receptor of regulatory guidelines for PM₁₀ as a 24 hour average, however this was only under certain scenarios (where exporting greater than 6 Mtpa). For these scenarios, the air quality assessment found that “Automation of operations at the Newstan Colliery Surface Site, implemented as required to meet operational efficiencies, will result in the relevant PM₁₀ criterion at all of the identified sensitive receptors surrounding the Newstan Colliery Surface Site being achieved”.

Background concentrations of PM₁₀ also contribute significantly to predicted likelihood of exceedances of 24 hour PM₁₀.

6.3.4 Long Terms Analysis

Table 6-8 provides a summary of air quality monitoring results for the previous 5 years from 2017 to 2021. The table includes annual averages for:

- deposition dust (insoluble solids)
- PM₁₀ (ug/m³)
- TSP and
- PM_{2.5} (ug/m³)

During the trend period, the annual average for dust deposition is on a downward trend for all dust gauge monitoring locations except for DG2 which has been relatively stable (average 1.1 g/m²/month).

Annual averages for PM₁₀, PM_{2.5} and TSP at HVS1 and HVS2 all peaked in 2019 and were lower in 2021 than any other time in the previous 5 years.

All air quality monitoring results are within criteria and were generally consistent with predicted results.

Table 6-8: Long-term Air Quality Monitoring Summary (2017-2021)

Monitoring Location	Annual Averages					Development Consent Criteria (Annual Average)
	2017	2018	2019	2020	2021	
Insoluble Solids (g/m ² /month)						
DG1	1.91	0.72	1.04	0.83	0.71	4 g/m ² /month
DG2	1.08	0.88	1.45	1.11	1.12	
DG3	1.79	1.10	0.98	0.99	0.82	
DG4	4.34	3.94	3.41	3.07	1.28	
DG5	0.99	1.12	1.42	1.24	0.93	
DG6	1.32	1.87	1.98	0.92	0.96	
DG7	2.66	2.63	1.73	1.30	1.38	
DG9	0.77	0.86	0.80	0.78	0.55	
PM ₁₀ (µg/m ³)						
HVS1 (Hill Top)	11.5	13.9	17.6	13.8	9.2	25 µg/m ³
HVS2 (Water Tank)	14.6	15.5	18.8	15.5	10.8	
RAM1 ¹	18.6	18.1	23.6	17.4	17.5	
TSP (µg/m ³)						
HVS1 (Hill Top)	20.1	23.1	30.4	23.5	17	90 µg/m ³
HVS2 (Water Tank)	29.9	31.1	36.2	30	19.2	
PM _{2.5} (µg/m ³)						
HVS1 (Hill Top)	5.3	7.3	12.9	7.5	3.9	N/A
HVS2 (Water Tank)	6.8	8.0	12.6	8.5	5.0	

1. Annual average results include extraordinary event days and are therefore considered to be more conservative and represent an upper estimate of air quality monitoring results

6.3.5 Implemented / Proposed Improvements

In 2021, Centennial Newstan reviewed and revised the reporting process for responding to any potential air quality alarms, including improvements to documenting the investigation into the source of the exceedance (and the response taken) following receipt of any alarms.

The Northern Region AQGHGMP was revised and submitted to DPIE in November 2021 to amend the Trigger Action Response Plan.

6.4 BIODIVERSITY

6.4.1 Environmental Management

The Northern Region Biodiversity Management Plan (BMP) has been developed to guide the management of terrestrial and aquatic biodiversity at a regional scale and to comply with statutory approval conditions.

The Northern Region BMP describes management areas for the Newstan Complex (inclusive of Awaba Colliery). The management areas are based on operational activities, vegetation type and proposed management objectives and include:

- Operational Areas;
- Native Vegetation; and
- Areas of Biodiversity Significance.

Land management activities are detailed in the Northern Region BMP and are implemented by the Site Environment and Community Coordinator and undertaken in consultation with, but not limited to relevant specialists or contractors including bush regenerators, weed and pest consultants, qualified ecologists, Local Land Services (LLS) and the Rural Fire Service (RFS).

The Northern Region BMP is reviewed annually as part of the Annual Review. A detailed three yearly review is also conducted to identify the success of measures implemented for the previous three-year period and provide the basis for the upcoming three-year period.

6.4.2 Environmental Performance

The key management measures for 2021 included:

- Implementation of a monitoring program to determine the efficiency of rehabilitation at the site.
- Continuation of the current weed control program that targets weeds as per the order of priority of significance.

Condition 3.4 and 8.5 of Development Consent DA 73-11-98 requires an Annual Ecological Monitoring Program at Newstan Colliery. Surveys conducted over the site targeted floristics, vertebrate and invertebrate fauna species across multiple reference and rehabilitation sites throughout the project area.

Key findings recorded for the annual ecology monitoring program (RPS, 2022), include :

- Increased bird diversity at Rehabilitation B and SP004, however results were generally lower than in 2020.
- The White-Bellied Sea Eagle was the only threatened bird species detected during 2021 surveys.
- The Little Bentwing Bat (*Miniopterus australis*) (Vulnerable under the BC Act) was recorded at four of the five sites surveyed for microbats
- Invertebrate communities appear to be stabilizing after having fluctuated year to year across all sites.
- There is evidence of continued ecological succession in the rehabilitation areas; although some differences in the rate of improvement were detected.
- Anabat results for Rehabilitation Site B reported an SD card error. Therefore, no data was recorded for the site.

6.4.3 Comparison against Predictions

The RPS Annual Monitoring Report stated that habitat and flora assessments showed expected results. Reference sites have a higher inferred ecological condition than rehabilitation sites.

6.4.4 Long Terms Analysis

Flora Species Assemblages

- The rehabilitation sites surveyed showed a decrease in total species richness between 2020 and 2021
- Both reference sites showed an increase in species richness compared to 2020 monitoring results.

Bird Species Assemblages

Results from the RPS Annual Monitoring Report include:

- EEC and Dominant Community monitoring locations had an increase of four and one species respectively compared to the 2020 survey
- Rehabilitation Site A increased by three plant species compared to 2020
- Rehabilitation Site B and C decreased by six and eight species respectively in 2020, including a reduction of exotic species of five and four respectively
- Analogue 1 Site has fallen below previous native diversity for the first time since 2018, while Analogue 2 has reached its highest recorded species richness value.

Microbat Species Assemblages

As per the RPS Annual Monitoring report, results have shown that over time microbats are utilising the rehabilitation sites as much as the reference sites. It also evident that foraging habitat is adequate whilst roosting habitat is not available in these sites.

Invertebrate Species Assemblages

The RPS Monitoring Report has attributed high abundances of invertebrate species as being driven by individual morphospecies, or through a mixture of dipteran and hymenopteran morphospecies occurring in low to mid-level abundances.

6.4.5 Implemented / Proposed Improvements

As per RPS Monitoring Report, the following recommendations have been made to supplement natural regeneration of habitat at each monitoring site:

- Continuation of the current weed control program targeting declared weeds as per the order of priority of significant weed infestations; and
- Expansion of nest boxes.

6.5 MINE SUBSIDENCE

6.5.1 Environmental Management

Newstan Colliery did not mine for coal in 2021. The last underground coal was mined in 2014 and the relevant Subsidence Management Plan (Subsidence Management Plan LW101-LW103) expired following the completion of monitoring surveys in 2019 (in accordance with DA 73-11-98 Condition 8.7).

The Newstan Complex has experienced subsidence, in the form of subsidence cracks, or sinkholes in areas above historical workings with shallow depth of cover. Subsidence impact monitoring and mitigation works are now completed in accordance with the Newstan Complex Mining Operations Plan (13 July 2021 – 6 July 2023).⁶

There is risk requiring management for known sink holes/subsidence cracks, as well as unlocated subsidence impacts. Subsidence remediation and rehabilitation will be on-going throughout the life of the mine.

A program is in place for inspections of the surface above the former underground mining area. Should subsidence impacts occur to surface features, remediation and rehabilitation will be undertaken in accordance with the existing SMP, the existing Extraction Plan and future approved Extraction Plans that will be developed. The Awaba Colliery has developed a Sinkhole Rehabilitation Management Plan (SLR Consulting Australia, 2020) which Centennial Newstan may apply to rehabilitate any identified sinkholes.

If any surface cracks are found not to fill naturally, some remedial measures may be required at the completion of mining. Where necessary, rehabilitation methods for surface features may include such actions as repairing surface cracks in roads and general disturbed areas where the land surface has been cleared, or surface cracking in the natural environment. These works will be undertaken as per best practice for landform design in mine rehabilitation (Department of Industry, Tourism and Resources 2006).

Should cracking occur in roads or general disturbed areas, the surface will be graded and the cracks filled with sand, or other suitable material, prior to the surface being re-graded and compacted. If the area is no longer utilised, it will be deep ripped, topsoiled and appropriately revegetated.

Subsidence cracking may also occur in densely vegetated areas away from established tracks. In such instances where access by equipment is an issue, the most natural way to rehabilitate surface cracking is to place locally occurring vegetative matter above or within the cracks, hastening the natural processes that occur over a prolonged period. Appropriate materials placed in or above the cracks will be determined by the size of the cracks and the intended depth to which these materials would be used in the rehabilitation. Logs, sticks, leaf litter and local soil (ensuring a localised seed bank) could all be placed within and/or above the cracks. This form of rehabilitation would result in a natural looking rehabilitated crack that would continue to accumulate additional natural leaf litter and debris over time.

Using this method of rehabilitation would avoid additional access requirements and significant disturbance to existing natural vegetation. Prior to implementing this method of rehabilitation, a site inspection will be undertaken by the Environment and Community Coordinator to determine if the site and the associated substrate are suitable for infilling with natural materials (i.e. subsidence cracks within sandy soils are likely to repair naturally through sedimentation and infilling). If the substrate is not suitable for infilling with natural materials (i.e. subsidence cracks are within rocky areas) infilling of subsidence cracks will be undertaken using non-decomposing materials such as rocks and local soil (ensuring a localised seed bed).

⁶ Refer also Section 8

Any disturbance associated with access tracks to the groundwater (piezometer) and surface water monitoring sites will be reshaped as required and re-vegetated to be consistent with the surrounding vegetation.

6.5.2 Environmental Performance

In 2021, visual field inspections were undertaken to monitor for the presence of sinkholes and subsidence cracks by the Environment and Community Coordinator. There was one (1) new subsidence impact (sinkhole) identified on 1 December 2021 and reported to the Resources Regulator. This sinkhole has been added to the rehabilitation program and will be rehabilitated as soon as practicable with consideration to environmental and public safety risk.

During the reporting period FYFE were engaged to provide LiDAR survey of known sinkholes at Wakefield. The LiDAR survey was undertaken in November 2021 and the results are being used to assist with rehabilitation planning. LiDAR survey is being undertaken as a trial at one location and may be expanded to the Sinkhole Rehabilitation Management Plan if successful.

Planned sinkhole rehabilitation works for the coming year include:

- Rehabilitation of sinkhole identified on 1 December 2021. Following results of ground penetrating radar at Awaba Colliery in 2021/2022 this technology will be used at Newstan.

6.5.3 Implemented / Proposed Improvements

In 2021, continuous improvement of the visual field inspections and subsidence impact rehabilitation schedule for Newstan and Awaba was ongoing, including:

- Review of locations of existing/known subsidence impacts (i.e. sinkholes and surface cracks) in GIS for analysis against factors which are known to increase the likelihood of subsidence impacts occurring (i.e. depth of cover, steepness of terrain, proximity water courses, etc.)
- Development of monitoring and management precincts to ensure a risk based strategy for future inspections
- Development of a detailed database of subsidence impacts, including environmental and public safety risk factors, to inform remediation strategies

This improvement project will continue in 2022.

Newstan will continue to integrate visual field inspections and subsidence impact (sinkhole) rehabilitation into the Awaba Colliery Sinkhole Rehabilitation Management Plan.

6.6 OTHER MATTERS

6.6.1 Heritage

Centennial Newstan manages heritage aspects in accordance with the Northern Region Historic Heritage Management Plan and the Northern Region Aboriginal Cultural Heritage Management Plan.

Due to the Newstan Colliery being on care and maintenance during the reporting period, no pre and post mining monitoring was required to be conducted to assess any impacts on archaeological heritage as a result of mine subsidence.

6.6.2 Blasting

There was no blasting carried out at Centennial Newstan in 2021.

6.6.3 Waste

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

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

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

Office paper and cardboard is collected and recycled by a licenced waste management contractor. Metals are collected and stored in steel bins onsite prior to removal.

General refuse and non-recyclable materials are sorted and stored in 15m steel bins. The material was collected by a licenced waste management contractor for disposal.

Table 6-9 provides a summary of waste disposal quantities for 2021. There was a total of 87.58 tonnes of waste generated in 2021. Hazardous waste made up only 11.42 tonnes, and the majority of this waste class, almost 90%, was able to be recycled. General refuse was the main waste stream generated on site in 2021 and accounted for 56.27 tonnes.

Table 6-9: Summary of Waste Disposal Quantities for 2021

Waste Class	Waste Streams	Recycled	Disposed	Total
Hazardous	Waste Hydrocarbons (Oil, Oily Water, Oil Filters, Grease, Oily Rags / Absorbents), Empty Drums, Batteries, Chemicals (Acids, Solvents, Paints, Coolant)	10.25	1.17	11.42
Non-Hazardous	<i>Recycled:</i> Scrap Steel, Paper & Cardboard, Timber / Pallets, Tyres, <i>Disposed:</i> Mixed Solid Waste	19.89	56.27	76.16
				87.58

6.6.4 Greenhouse Gas Monitoring

Table 6-10 provides a summary of the Greenhouse Gas emissions for the 2021 Annual Review reporting period (Financial Year 2020-2021).

Table 6-10: Summary of Greenhouse Gas Emissions (FY2017 – FY2021)

	FY2017	FY2018	FY2019	FY2020	FY2021
Electricity	11,363	10,695	9,886.3	9,788	9,332
Diesel	1,740	1,681	2,023	2,145	1,679
Fugitives – CH ₄	70,739	44,900	37,288	42,252	60,282
Fugitives – CO ₂	929	761	8,725	1,390	593
Total of above GHG Emissions (tonnes)	84,711	58,127	50,839	55,575	71,886

7 WATER MANAGEMENT

Centennial Newstan manages and monitors water in accordance with the:

- Newstan Colliery Water Management Plan;
- Northern Coal Services Water Management Plan;
- Northern Region Mine Water Discharges Management Plan; and

The relevant water management plans address the requirements of the development consents and have been developed to ensure:

- Ensure effective and structured monitoring of surface water/groundwater resources;
- Ensure that water quality leaving the site meets the appropriate quality standards outlined in EPL 395;
- Demonstrate sufficient water supply for all stages of operations;
- Outline programs for stream health, ecotoxicology and aquatic ecology monitoring; and
- Capture the water management measures being implemented.

In 2021, the Newstan Colliery Water Management Plan was revised and submitted to DPIE in November 2021 to incorporate amendments associated with IEA.

During the reporting period, Centennial Newstan operated the water management system in accordance with the relevant Water Management Plans. Monitoring and data review was undertaken in accordance with the relevant Water Management Plans, Development Consent and Environmental Protection Licence 395 requirements.

Surface water and groundwater monitoring sites are provided in **Figure 6-2**.

Details of water licensing and associated take are provided in **Section 7.1**. A summary of the site water balance is provided in **Section 7.2**. A summary of surface water monitoring and groundwater monitoring results for the reporting period are provided in **Section 7.3** and **Section 7.4** respectively. Detailed surface water and groundwater monitoring results for the reporting period are provided at **Appendix 2**.

7.1 WATER LICENSES

A summary of water take and available water under water access licences for the water year ending during the reporting period (i.e. 1 July 2020 to 30 June 2021) is provided in **Table 7-1**.

Table 7-1: Water Licenses and Take

Licence	Water sharing plan, source and management zone	Entitlement (ML)	Passive take/inflows	Active pumping	TOTAL
WAL 18735	North Lake Macquarie Water Source.	750	0	48.793	48.793

7.2 WATER BALANCE

Centennial Newstan uses a water balance model to assist in the forecasting and management of water onsite. The model is used to review performance and undertake short term projections (12 months) of water requirements, as well as predict water needs for the life of the mine.

The site water balance is reviewed and revised annually as a minimum or as necessary when there are changes to operations.

The water balance for Centennial Newstan has been presented in **Table 7-2** and

Table 7-3. In 2021, the modelling results indicate that the volume of Fassifern Underground Storage decreased by approximately 421 ML, the decrease may be attributable to the above average rainfall in 2021. Discrepancy between inflows, outflows and change in storage is due to the limitations in accuracy of the storage measurements and water balance model predictions.

Table 7-2: Site Water Balance (Newstan Colliery)

Centennial Newstan 2021 Water Balance	Volume (ML)
Water Sources (Inflows)	
Groundwater inflows	395
Surface infiltration into underground workings	2,092
Transfers from Newstan Colliery Surface Site	1,368
Total Inputs	3,855
Water Loss (Outflows)	
Transfers to Newstan Colliery Surface Site	3,940
Discharge to Stoney Creek outlet	337
Total Outputs	4,277
Change in Storage	
Underground water storages	-421
Total Change in Storages	-427
Water Balance	
Change in water inventory (inputs – outputs – change in storage)	0

Table 7-3: Site Water Balance (Newstan Colliery Surface Site)

Centennial Newstan 2021 Water Balance	Volume (ML)
Water Sources (Inflows)	
Direct rainfall onto storages	312
Catchment runoff	830
Transfers from Newstan Colliery	3940
Transfers from Main By-Wash Dam	135
Potable Supply	3
Total Inputs	5,220
Water Loss (Outflows)	
Evaporation	304
Dust suppression	152
Discharge via Licensed Discharge Points	3157
Transfers to NCSS (from underground)	1,368
Water stored in tailings	28
Losses	123
Total Outputs	5,132
Change in Storage	
Surface water storages	88
Total Change in Storages	88
Water Balance	
Change in water inventory (inputs – outputs – change in storage)	0

7.3 SURFACE WATER

7.3.1 Environmental Management

Surface water monitoring is undertaken in accordance with the Northern Coal Services Water Management Plan, the Mine Water Discharges Management Plan, Development Consent and Environment Protection Licence 395 requirements.

The site also operates a Surface Water TARP to identify and manage potentially adverse impacts, as well as assist with managing the site's surface water during storm events.

Surface water monitoring includes:

- Surface water quality and flow (monthly/event based), including licensed discharge points;
- Stream health (six-monthly); and
- Channel stability (annually).

The location of surface water monitoring sites is shown on Figure 6-2 and Plan– NS2541A.

7.3.2 Environmental Performance

Water Discharge Volumes

For each of the licensed discharge points, Centennial Newstan must monitor the volume of water being discharged (daily during any discharge). A summary of the water volume data of EPL monitoring points can be found in **Table 7-4**.

Table 7-4: Licenced Discharge Points Volume

Location	Days discharging	Lowest result (ML/day)	Mean result (ML/day)	Highest result (ML/day)	Total 2021 (ML)	EPL Limit (ML/day)
LDP001	347	1	9.66	10.95	3,350.8	11
LDP002	3	0.4	2.76	5.56	8.28	n/a
LDP017	42	2.2	16.11	31.96	676.7	n/a

Surface Water Quality - LDP001

Centennial Newstan operate the Clean Water Plant to treat water from the surface and the Fassifern Seam, prior to discharging to the North arm of LT Creek via LDP001.

The majority of the water discharged through LDP001 comes from an underground water storage called the Fassifern Seam and is treated through the Clean Water Plant prior to discharge. However if the rainfall exceeded the capacity of Graunch's Dam, this may also flow through LDP001.

All water discharged via LDP001 must meet the criteria for 100 percentile concentration limits specified within EPL 395. A summary of surface water monitoring results is shown in **Table 7-5**. The results obtained in the reporting period demonstrates compliance with the EPL limits.

Additional surface water quality monitoring results are presented in **Appendix 2**.

Table 7-5: LDP001 Water Quality Summary

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Aluminium [#] (mg/l)	12	22	LOR	0.0005	0.006	0.15
Barium [#] (mg/l)	12	22	0.05	0.09	0.19	0.25
Bicarbonate alkalinity (mg/l)	12	60	290	489	618	711
Boron [#] (mg/l)	12	22	0.120	0.164	0.204	1.3
Cadmium [#] (mg/l)	12	22	LOR	LOR	LOR	0.0008
Conductivity (µS/cm)	SF4	347	1434	2289	2878	3250
Copper [#] (mg/l)	12	22	LOR	0.0005	0.0013	0.005
Lead [#] (mg/l)	12	22	LOR	0.001	0.002	0.038
Lithium [#] (mg/l)	12	22	0.099	0.135	0.196	0.4
Mercury [#] (mg/l)	12	22	LOR	LOR	LOR	0.0006
Molybdenum [#] (mg/l)	12	22	0.012	0.021	0.030	0.04
Nickel [#] (mg/l)	12	22	0.003	0.006	0.008	0.0425
Nitrogen [^] (mg/l)	12	22	LOR	0.16	0.34	2.7
Oil and Grease (mg/l)	12	11	LOR	LOR	LOR	6
pH	SF4	347	6.6	7.2	7.7	6.5-8.5
Phosphorus [^] (mg/l)	12	22	LOR	0.00	0.01	0.41
Selenium [^] (mg/l)	12	22	LOR	0.0004	0.0016	0.011
TKN-N (mg/l)	12	22	LOR	0.03	0.2	2.6
Total suspended solids (mg/l)	52	59	LOR	0.3	10	50
Zinc [#] (mg/l)	12	22	LOR	0.001	0.003	0.04

[#] dissolved concentrations (where specified by EPL)

[^] total concentrations (where specified by EPL)

SF4 (Special Frequency 4) means continuous sampling as reported as a daily average

LOR means below the limit of reporting

Surface Water Quality - LDP002

LDP002 is located at the emergency outlet of the Final Pollution Control Dam discharging into the North arm of LT Creek (downstream of LDP001). The Final Pollution Control Dam has a design capacity of 10 year average recurrence interval (ARI), 24 Hour Event. Rainfall events which exceed the design capacity result in emergency discharge via LDP002.

In 2021, water was released from LDP002 from 23 March to 25 March (3 days). This event occurred during the exceptional rainfall event in March where Centennial Newstan recorded 298.4mm of rainfall between 18 and 23 March 2021.

All water discharged via LDP002 must meet the criteria for 100 percentile concentration limits specified within EPL 395. A summary of surface water monitoring results is shown in **Table 7-6**.

There was one incident recorded during the discharge event. Total Suspended Solids (TSS) has a limit of 50 mg/L. The TSS result was 112 mg/L. The PIRMP was activated including notification of EPA and other agencies and provision of incident investigation report. Water quality sampling was undertaken at the time of the event, with downstream water quality results comparable to the upstream water quality results. All other results obtained were compliant with the EPL limits.⁷

Table 7-6: LDP002 Water Quality Summary

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Oil and Grease (mg/l)	1	1	LOR	LOR	LOR	10
pH	1	1	8.09	8.09	8.09	6.5-8.5
Total suspended solids (mg/l)	1	1	112	112	112	50

Surface Water Quality - LDP017

Water levels in the Fassifern Underground Storage are managed by transferring water to the Clean Water Plant for treatment and discharge (via LDP001). During wet periods when water within the Fassifern Underground Storage rises above 16.6 m below ground level, the storage discharges water through two 600 mm diameter pipes into Stony Creek via the LDP017 emergency discharge point and its associated discharge infrastructure.

In 2021, water was discharged from LDP017 from 1 April to 12 May (42 days). All water discharged via LDP017 must meet the criteria for 100 percentile concentration limits specified within EPL 395. A summary of surface water monitoring results is shown in **Table 7-7**.

There were six incidents recorded during the discharge event due to exceedance of water quality limits.⁸

^{8, 8} The non-compliances are reported in the **Table 1-1: Statement of Compliance** and **Section 11**

Table 7-7: LDP017 Water Quality Summary

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Aluminium [#] (mg/l)	SF1	6	LOR	0.015	0.08	0.22
Antimony (mg/l)	SF1	6	LOR	LOR	LOR	0.009
Arsenic [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.042
Barium [#] (mg/l)	SF1	6	0.023	0.0285	0.032	0.25
Beryllium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.004
Bicarbonate alkalinity (mg of CaCO ₃ /l)	SF1	6	121	289	349	711
Boron [#] (mg/l)	SF1	6	0.05	0.108	0.13	0.37
Cadmium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.0004
Calcium (mg/l)	SF1	6	30	48	55	38
Chloride (mg/l)	SF1	6	62	147	185	516
Chromium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.006
Cobalt [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.003
Conductivity (µS/cm)	SF2	6	944	1544	1730	3250
Copper [#] (mg/l)	SF1	6	LOR	0.0005	0.002	0.007
Iron [#] (mg/l)	SF1	6	LOR	0.028	0.12	230
Lead [#] (mg/l)	SF1	6	LOR	0.00067	0.004	0.023
Lithium [#] (mg/l)	SF1	6	0.037	0.064	0.079	0.164
Magnesium (mg/l)	SF1	6	20	34.5	39	16
Manganese [#] (mg/l)	SF1	6	0.003	0.009	0.021	1.2
Mercury [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.0006
Molybdenum [#] (mg/l)	SF1	6	0.003	0.0035	0.004	0.045
Nickel [#] (mg/l)	SF1	6	0.003	0.004	0.005	0.024
Nitrogen [^] (mg/l)	SF1	6	0	0.083	0.4	2.7
Oil and Grease (mg/l)	SF1	6	LOR	LOR	LOR	6
pH	SF1	6	7.28	7.38	7.76	6.5-8.5
Phosphorus [^] (mg/l)	SF1	6	0	0.008	0.04	0.41
Potassium (mg/l)	SF1	6	6	7.83	9	6
Selenium [^] (mg/l)	SF1	6	LOR	LOR	LOR	0.011
Silica [#] (mg/l)	SF1	6	9	11.28	13.3	24.8
Silver [#] (mg/l)	SF1	6	LOR	LOR	LOR	<0.001
Sodium (mg/l)	SF1	6	141	245	288	635
Sulfate (mg/l)	SF1	6	228	304	359	232

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Tin (mg/l)	SF1	6	LOR	LOR	LOR	0.003
Titanium (mg/l)	SF1	6	LOR	0.003	0.02	10
TKN-N (mg/l)	SF1	6	LOR	0.03	0.2	2.6
Total suspended solids (mg/l)	SF1	5	8	28	87	50
Vanadium [#] (mg/l)	SF1	6	LOR	LOR	LOR	<0.010
Zinc [#] (mg/l)	SF1	6	LOR	0.011	0.034	0.04

[#] dissolved concentrations (where specified by EPL)

[^] total concentrations (where specified by EPL)

SF1 (Special Frequency 1) means in the event of a discharge, a grab sample of the water discharged must be collected: a) within the first 6 hours of any discharge occurring; and b) every seven (7) days thereafter for the duration of the discharge.

SF2 (Special Frequency 2) means continuous sampling during any discharge

LOR means below the limit of reporting

Stream Health Monitoring

Centennial Newstan undertake stream health monitoring in accordance with the Macroinvertebrate and Ecotoxicological Monitoring Program which was developed to meet Special Condition E1 of EPL 395. A sediment monitoring program is also undertaken (in accordance with Condition M8 of EPL 395). The sediment monitoring program includes the sediments within the Bywash Dam located downstream of LDP001 and at three locations (including one within the intertidal zone) within LT Creek.

This monitoring program details sample collection and analysis, quality, documentation and reporting to meet the requirements of EPL 395. Aquatic ecology monitoring has been undertaken biannually since 2013 along with water and sediment monitoring.

In 2021, GHD were engaged to undertake aquatic ecology monitoring to satisfy condition M8 in relation to sediment quality monitoring at reporting of LT Creek sites, and E1 in relation to macroinvertebrate sampling at LT Creek sites, Stony Creek sites and control sites.

The results of the aquatic ecology monitoring are detailed in two reports *Newstan Aquatic Ecology Monitoring Spring 2021 Report* (GHD Pty Ltd, 2022a) and *Newstan aquatic ecology Autumn 2021 data report* (GHD Pty Ltd, 2022b) which are provided to the EPA with the Annual Return.

EPL 395 condition L5.1 requires that the Water Treatment Plant at the NCSS must be operated and maintained such that the specified toxic effect of the effluent released from Newstan LDP001 on the specified test organism must not exceed the corresponding percentile limit listed for that organism.

In 2021, an ecotoxicological study was conducted and detailed in the report *Newstan Ecotoxicity Assessment 2021 Report* (GHD Pty Ltd, 2021b). This report assessed the licensed mine water discharge from Newstan Colliery and a downstream monitoring point (LDP001 and WMP03 respectively), as required by EPL 395 conditions E1.3, E1.4 and E1.5.

GHD (2021b), concluded that the water quality at both sites is characterised by a relatively elevated conductivity, though below the EPL limit. For both sites most dissolved metal concentrations are below their respective LoRs or at concentrations below ANZG (2018) DGVs for metals in freshwater.

LDP001 water showed no acute toxicity for the cladoceran species, while chronic toxicity was observed for the undiluted (100%) concentration only. For the same species, no acute or chronic toxicity is observed at WMP03, a result that has been consistent throughout the entire monitoring program. None of the monitoring points demonstrated toxicity in the microalgae test.

LDP001 water quality and ecotoxicity results for the 2021 monitoring event are compliant with EPL 395 limits.

Channel Stability Monitoring

Geomorphic condition and watercourse stability is assessed at the following locations:

- LT Creek downstream of discharges from Newstan LDP001 and LDP002.
- Stony Creek downstream of discharges from Newstan LDP017.

Watercourse stability monitoring was undertaken in 2021 by the Environment and Community Coordinator. It was recommended further review be undertaken by a suitably qualified and experienced geomorphologist. Soil Conservation Service have been engaged to undertake watercourse stability monitoring in 2022.

7.3.3 Comparisons against Predictions

The discharge of water from LDP001 has the potential to impact on LT Creek. This potential impact was addressed in consultation with the EPA, under a Pollution Reduction Programme (PRP) included on EPL 395. The PRP required Centennial Newstan to design, construct, commission, operate and maintain a Water Treatment Plant capable of treating water to be discharge at LDP001. This PRP also involved the development of site-specific concentration limits to minimise the potential impacts from LDP001. The results obtained in the reporting period demonstrates compliance with the EPL limits and are therefore within predictions.

Previous investigations identified that underground water extraction of 11 ML/day is required under operational conditions to maintain the underground water level at least 2 metres below the invert of the Stony Creek pipeline (EPL Point 17). The current EPL limit for the volume of water discharged through LDP001 is 11 ML/day. During heavy rainfall in the reporting period, the infiltration rate of water to the Fassifern Underground Storage was greater than the rate of water that could be extracted by Newstan Colliery and treated in the Clean Water Plant (and discharged through LDP001), resulting in emergency discharge from LDP017. A review of underground water extraction requirements was undertaken (refer **Section 7.3.5**).

7.3.4 Long Term Analysis

An historical overview of monitoring results (including metals) is provided in the report in **Appendix 2**.

The discharge analytes for LDP001 have been included from 2016. All units in the graphs are in mg/L, with the exception of pH (pH units) and Conductivity (µS/cm).

The Environmental Protection Licence (EPL) 395 limits (where specified) have been included on the graphs. While the limits only apply to either dissolved or total metals, both dissolved and total (where available and applicable) have been provided in the attached graphs to give an overall view of the water quality results from LDP001. There are no discharge limits within the Project Approvals (DA 73-11-98 and SSD 5145) .

The graphs demonstrate that all analytes are generally below the licence criteria, and have remained relatively stable since 2016.

Bicarbonate alkalinity is the only analyte with any recorded exceedances of the licence limit in the past 5 years, most recently in August 2019. The vast majority of results for Bicarbonate alkalinity are below the licence limits, and the results have a generally decreasing trend.

Temporal analysis of the toxicity data from 2015 to 2021 showed a consistent absence of acute toxicity at LDP001. Chronic toxicity is observed intermittently, although in recent years

a decreasing trend in chronic toxicity is evident. WMP03 has consistently been non-toxic for the cladoceran species and the microalga test has showed no toxicity in four of the last five years, with the exception of 2019 (GHD, 2021b).

7.3.5 Implemented / Proposed Improvements

In 2021, a review was undertaken by Centennial Newstan to determine whether there are any improvements which could be undertaken to reduce the likelihood of discharging from LDP017 (Stony Creek) for specific rainfall events. This review included consideration of water discharge license requirements and whether it would be beneficial to increase the amount of water treated at the Clean Water Plant (and discharged through LDP001) in certain circumstances.

7.4 GROUNDWATER

7.4.1 Environmental Management

Groundwater monitoring is undertaken in accordance with the Newstan Colliery Water Management Plan and Development Consent (DA-73-11-98) requirements.

Groundwater related monitoring is generally undertaken twice per year and includes groundwater level and groundwater quality (mainly pH and EC), with monitoring bores located in the following strata:

- Alluvial Aquifer;
- Coal Seam Bedrock Aquifer;

Centennial Newstan has a total of fifteen groundwater monitoring bores. The location of groundwater monitoring sites is shown on Figure 6-2 and Plan– NS2541A.

The Newstan Colliery Water Management Plan also establishes groundwater level and quality trigger values to identify and manage potentially adverse impacts. Where the monitoring indicates any adverse impacts due to mining, Centennial Newstan would implement a remediation strategy to the satisfaction of Department of Planning, Industry and Environment – Water.

7.4.2 Environmental Performance

Monitoring results for alluvial aquifers are provided in **Table 7-8** and monitoring results for the coal seam bores are provided in **Table 7-9**.

The 2021 annual averages are generally in line with the long-term averages at each location for groundwater level, pH and electrical conductivity.

Table 7-8: Alluvial Aquifer Results for 2021

Monitoring Bore	Groundwater Level (mbgs)			pH (pH Unit)			Electrical Conductivity (µS/cm)		
	Baseline	Long Term Average	2021 Annual Average	Baseline	Long Term Average	2021 Annual Average	Baseline	Long Term Average	2021 Annual Average
MB9	0.96	1.49	1.09	7.16	5.74	5.74	300	259	205
MB10	3	2.66	2.55	5.98	6.27	6.88	1000	1343	1047
MB11	2.52	2.62	2.65	5.85	6.33	7.54	2400	3570	3870
MB12	5.33	4.82	4.05	6.2	6.67	7.67	1000	1358	1010
MB13	4.88	4.83	4.72	6.55	6.63	6.79	600	865	678
MB14	3.73	3.57	2.86	6.33	6.47	6.79	580	470	389
MB15	5.88	3.81	2.38	5.71	6.12	6.43	100	293	279
MB17	2.63	2.82	2.24	6.53	6.24	6.55	225	193	196

Table 7-9: Coal Seam Bedrock Aquifer Results for 2021

Monitoring Bore	Groundwater Level (mbgs)			pH (pH Unit)			Electrical Conductivity (µS/cm)		
	Baseline	Long Term Average	2021 Annual Average	Baseline	Long Term Average	2021 Annual Average	Baseline	Long Term Average	2021 Annual Average
MB1	29.78	30.02	n/a	6.79	6.88	n/a	3020	2820	n/a
MB2	11.25	11.45	n/a	6.53	6.01	n/a	1620	1340	n/a
MB3	9.9	10.76	9.98	6.73	7.26	7.64	652	1265	1355
MB4	22.01	19.93	18.57	5.64	5.32	5.18	291	223	459
MB5	24.35	24.12	23.32	6.39	6.27	6.45	1820	1731	1845
MB6	45.17	44.94	45.7	6.51	6.65	6.87	1440	1295	1300
MB16	33.28	33.55	33.78	6.1	6.02	5.94	780	606	86
MB18	n/a	19.24	15.91	n/a	7.13	7.5	n/a	2006	1200
MB19	n/a	22.48	21.31	n/a	6.84	7.66	n/a	1654	1695

7.4.3 Comparison against Predictions

A hydrogeological model was developed as part of the *Newstan Mod 8 Water Resources Impact Assessment* (GHD Pty Ltd, 2018). The hydrogeological model predicted the lateral zone of impact through depressurisation of aquifers from existing West Borehole Seam workings (which remain dewatered) and future mining activities (within the Mod 8 extension of mining area) and future groundwater inflow.

(GHD Pty Ltd, 2018) predicts that there will be no change to groundwater quality as a result of mining at Newstan. Minor temporal variability in groundwater quality is expected within the coal seams and overburden due to the nature of the fractured and porous rock groundwater sources. This variability is expected to be within the bounds of the observed groundwater quality.

Mining at Newstan is not predicted to result in any drawdown of alluvial groundwater. The groundwater model predicts drawdown to occur within the lower Permian strata.

The results obtained in the reporting period are generally consistent with predicted hydrogeological model.

7.4.4 Long Term Analysis

An historical overview of groundwater monitoring results is provided in the report in **Appendix 2**.

A review of the groundwater levels and quality was undertaken for the Newstan Colliery Water Management Plan (GHD Pty Ltd, 2021a) and found the following:

Visual review of alluvial groundwater levels indicates that there is response to below and above average rainfall at a majority of the alluvial monitoring bores. Alluvial groundwater levels typically vary by 1 to 2 m.

Alluvial groundwater quality is generally slightly acidic. Within Lords Creek, alluvial groundwater quality varies from fresh at MB09, MB14, MB15 and MB17, to brackish at MB11. Monitoring data indicates that alluvial groundwater in Kilaben Creek, Stockyard Creek and Stony Creek is slightly brackish.

Identified trends in pH and electrical conductivity (EC) at alluvial monitoring bores include:

- a slight increase in EC at MB13 and MB09 and a slight decrease in EC at MB11,
- slightly decreasing acidity at MB15 (from approximately 6 pH units to 7 pH units) and an increase in pH at MB11 (increasingly basic).

These trends do not indicate any impact from existing mining activities from Newstan operations on shallow groundwater systems such as alluvial areas.

Visual review of groundwater hydrographs for monitoring bores installed in the Permian Coal Measures indicates that groundwater levels at MB04, MB05 and MB06 fluctuate with below and above average rainfall. Due to their proximity to the coal seam outcrop, groundwater levels at MB04, MB05 and MB06 may have a stronger influence from rainfall recharge.

Groundwater levels at remaining locations installed in the Permian Coal Measures (MB02, MB03, MB16) are relatively constant with levels generally varying by less than 2 m. Levels within bores installed within the Fassifern Underground Storage (MB18 and MB19) are influenced by inputs and outputs of water from the Fassifern Underground Storage.

Generally, there is no evidence of groundwater drawdown attributable to mining at Newstan at monitoring bores installed in the Permian Coal Measures.

Groundwater quality within the Permian Coal Measures is generally slightly brackish and varies from very slightly acidic to very slightly basic. The exception to this is at MB04 where groundwater is fresh and acidic and at MB16 where groundwater is slightly acidic and generally very slightly brackish.

There are no obvious trends in EC or pH at groundwater bores installed in the Permian Coal Measures with the exception of a slight increase in EC over the last two years at MB04. This trend is not considered attributable to mining activities at Newstan given mining was completed in the area by 2009. The variation in conductivity has been from approximately 200 $\mu\text{S}/\text{cm}$ to 500 $\mu\text{S}/\text{cm}$, which is considered to be minor, and this corresponds with a reduction in water level. The bore recovered in both average EC and water level by September 2019.

7.4.5 Implemented / Proposed Improvements

Centennial Newstan will continue to undertake groundwater monitoring in accordance with the Newstan Colliery Water Management Plan and Development Consent (DA-73-11-98) requirements.

8 REHABILITATION

Newstan manages rehabilitation in accordance with most recently approved Mining Operations Plan (MOP).

The MOP describes the management of rehabilitation at the Newstan Colliery and was developed to meet the requirements of Mining Lease conditions.

A description of the proposed rehabilitation activities during the MOP term is provided in Section 7.2 of the MOP. The MOP is available on the Newstan website.⁹

This section addresses the annual rehabilitation reporting requirements for Project Approvals DA 73-11-98 and SSD 5145, the MOP and relevant Newstan Mining Leases.

8.1 SUMMARY OF REHABILITATION

Table 8-1: Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2020 (ha)	2021 (ha)	2022 (ha)
A. Total mine footprint ¹⁰	3989.9 ¹	3989.9 ¹	3989.9 ¹
B. Total active disturbance ¹¹	25.4	25.4	25.4
C. Land being prepared for rehabilitation ¹²	Nil	Nil	Nil
D. Land under active rehabilitation ¹³	Nil	Nil	Nil
E. Completed rehabilitation ¹⁴	34.6	34.6	34.6

1. The total mine footprint accounts for the total Colliery Mining Lease Holding, the surface disturbance area is much smaller at ~162.6 hectares.

⁹ www.centennialcoal.com.au/operations/newstan/

¹⁰ **Total Mine Footprint:** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in the DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.

¹¹ **Total Active Disturbance:** includes all areas requiring rehabilitation

¹² **Land being prepared for rehabilitation:** includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines)

¹³ **Land under active rehabilitation:** includes areas under rehabilitation and being managed to achieve relinquishment – includes 'ecosystem and land use establishment' and 'ecosystem and land use sustainability' (as defined under the DRE MOP/RMP Guidelines)

¹⁴ **Completed rehabilitation:** requires formal sign off from DRE that the area has successfully met the rehabilitation land use objectives or completion criteria

Progressive rehabilitation within this MOP term is focused on the following areas:

Tailings Storage Facility (Domain 2):

- NREA – The NREA is being progressively rehabilitated as areas become available following capping and shaping. Capping of the tailings storage facility continued during 2021 and will be ongoing in the coming year.
 - The Tailings Dam within the NREA is used as an active coarse rejects emplacement area, as well as serving for the purpose of capping the tailings dam.
 - Rehabilitation of the NREA is ongoing. The tailings dam will continue to be capped using coarse reject (although capping will be minimal). The compaction of the material and the final landform RL will be as outlined in the Newstan EIS (Umwelt, 1998).
 - Once capping is completed, the dam will be rehabilitated. *Note, this will not occur during this MOP term.*
 - The NREA coarse reject emplacement (or batters) has been capped (minimum of 500 mm) with suitable ENM of VENM prior to being seeded. Some small areas may be capped or repaired during the reporting period.
 - Ongoing maintenance and monitoring of the rehabilitation will continue within the NREA.
- SREA – The SREA has been designed to be progressively developed in stages. Progressive rehabilitation works have been undertaken in this area and will continue where areas become available.
 - Minimal decommissioning activities are proposed at the SREA during the MOP term.

Underground Mining Areas (Domain 8):

This includes areas that have been subject to subsidence, and where required subsidence remediation and rehabilitation works will be undertaken including rehabilitation of surface cracks or sinkholes by (ripping/excavating and backfilling and reseeding), minor erosion/sediment control works and minor remedial drainage earthworks. It also includes monitoring infrastructure (piezometers, weirs and transducers, seismometers, survey markers).

Section 6.5 provides further details of mine subsidence monitoring and mitigation, including rehabilitation activities.

9 COMMUNITY CONSULTATION

Centennial Newstan consults with the community through forums such as the Newstan Colliery Community Consultative Committee (CCC) and community organised events.

Meetings of the Centennial Newstan CCC were held in March, August and November 2021. A detailed presentation was provided to attendees at each CCC meeting on the Mine's environmental monitoring and upcoming projects. A detailed presentation was provided to attendees at each CCC meeting which are available at the Newstan website.¹⁵

Key agenda items discussed in 2021 included the Awaba Sinkhole, Awaba Seep and Newstan Mine Extension Project.

9.1 EXTRACTION PLAN CONSULTATION

Extraction plan consultation did not occur as Newstan Colliery does not have an extraction plan due to being in a state of care and maintenance.

9.2 COMMUNITY SPONSORSHIP

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

- Woodrising Neighbourhood Centre;
- West Wallsend Public School; and
- Macquarie Shoal Swim Club.

9.3 COMMUNITY COMPLAINTS

During the 2021 calendar year reporting period as applicable for this report, there has been one community complaint received.

One noise complaint was received from a resident that heard noise from Awaba compressor (located at the Newstan ventilation shaft site) resulting in further attenuation controls being installed.¹⁶

Table 9-1: Record of annual community complaints for 2016 to 2020

Community Complaints						
Year	Air	Water	Noise	Waste	Other	Total
2016	0	2	2	0	0	4
2017	0	0	1	0	0	1
2018	0	0	1	0	0	1
2019	0	0	0	0	0	0
2020	0	0	1	0	0	1
2021	0	0	1	0	0	1

Community complaints are an uncommon event at Newstan Colliery as is demonstrated by the table above. Community contact information is maintained and checked to ensure that if a community member wishes to get in contact with Newstan Colliery that they can.

¹⁵ www.centennialcoal.com.au/operations/newstan/

¹⁶ Refer **Section 6.2.2** for details of the additional attenuation of noise from Awaba compressor installed in 2021

10 INDEPENDENT ENVIRONMENTAL AUDIT

Centennial Newstan underwent an Independent Environmental Audit (IEA) in the 2021 calendar year reporting period. The 2021 IEA was undertaken by members of the environmental consultancy company; IEMA – Integrated Environmental Management Australia. This was facilitated by Centennial site team members and the Centennial Compliance/Assurance team.

The *Newstan Colliery Independent Environmental Audit 2021* (IEMA, 2021), found that Centennial Newstan displayed a high level of compliance with all approval conditions. This included development consents SSD 5145 and DA 73-11-98, EPL 395 as well as all applicable Mining Leases. Out of a total of 669 compliance conditions there were eight administrative non-compliances and seven low non-compliances identified with zero medium or high non-compliance identified.

A summary of non-compliances and the status of the proposed actions is presented in Table 10-1. Recommendations that required no action, relate to the Cooranbong Entry Site¹⁷ or were completed prior to this Annual Review have been excluded.

A copy of the *Newstan Colliery Independent Environmental Audit 2021* (IEMA, 2021) is available at the Newstan website.¹⁸

Table 10-1: Non-Compliance Findings and Action Status from 2021 IEA Report

Condition Reference	IEA Recommendation	Newstan Proposed Actions NCS	By when	Action Status
SSD-5145 Schedule 3, Condition 10 & DA 73-11-98 Schedule 2 Condition 6.1E	NC REC 1: Develop a reporting process where, following receipt of an air quality alarm, the investigation into the source of the exceedance (and the response taken) is documented as per the TARP.	N1 NEW-NCS IEA 2021: Centennial will develop a reporting process to document the response to air quality alarms at Newstan.	30 September 2021	COMPLETE Reporting process developed and documented
SSD-5145 Schedule 3, Condition 12	NC REC 2: Continue liaison with NRAR to obtain a solution for the water licencing issue.	N2 NEW-NCS IEA 2021: Centennial will contact NRAR regarding the water licencing issue.	30 September 2021	Request for update submitted in September (ongoing)
SSD-5145 Schedule 3, Condition 12 & WAL 18735	NC REC 3: Additional detail is required in the Annual Review regarding water licence extraction volumes, including a comparison against licence amounts compared to water extracted by Centennial.	N3 NEW-NCS IEA 2021: Centennial will include additional detail regarding water licence extraction volumes, including a comparison against licence amounts compared to water extracted in the 2022 Annual Review.	31 March 2022	COMPLETE Annual Review – Section 7.1
SSD-5145 Schedule 3, Condition 16 and Statement of Commitments No. 9	NC REC 4: Undertake annual channel stability monitoring along LT Creek.	N4 NEW-NCS IEA 2021: Centennial will undertake annual channel stability monitoring along LT Creek.	31 December 2021	COMPLETE Channel stability monitoring undertaken in December 2021. Soil Conservation Service engaged to undertake detailed monitoring in 2022.

¹⁷ The Cooranbong Entry Site is managed by Centennial Mandalong, the status of the proposed actions for non-compliances at the Cooranbong Entry Site have been incorporated in the Mandalong Colliery Annual Review

¹⁸ www.centennialcoal.com.au/operations/newstan/

Condition Reference	IEA Recommendation	Newstan NCS Proposed Actions	By when	Action Status
SSD-5145 Schedule 3, Condition 5	IMP REC 1: Update TARP in the Regional Noise Management Plan to reflect current operations and alarm triggers for Newstan Coal Services (remove reference to "yellow" alarm within 2dB). The TARP should also have more defined actions to be completed by Centennial.	N8 NEW-NCS IEA 2021: Centennial will update the Regional Noise Management Plan to reflect current operations and alarm triggers for NCS and submit to DPIE for approval.	6 November 2021	COMPLETE Revised Noise Management Plan submitted to DPIE on 5/11/21
SSD-5145 Schedule 3, Condition 7 and 10 & DA73-11-98 Schedule 2 Condition 6.1C and 6.1E	IMP REC 2: Reporting of short term exceedances of PM10 in the Annual Review (dates and results), regardless of whether they are a compliance issue. If results have been affected by extraordinary events this should be noted.	N9 NEW-NCS IEA 2021 Centennial will include all PM10 exceedances within the Annual Review, including if results have been affected by extraordinary events. Extraordinary events will also be noted.	31 March 2022	COMPLETE Annual Review – Section 6.3.2
	IMP REC 3: It is recommended the Annual Review should include separate details for overall PM10 annual average (all values) compared to PM10 annual average (extraordinary events removed).	N10 NEW-NCS IEA 2021 Centennial will include a comparison of PM10 annual average (all values) compared to PM10 annual average (extraordinary events removed)	31 March 2022	COMPLETE Annual Review – Section 6.3.2
	IMP REC 4: It is noted that PM2.5 results are included within the Newstan Colliery Annual Review. As there are no criteria within the approval conditions for Newstan, details should be included in the Annual Review that these PM2.5 results are for internal use only.	N11 NEW-NCS IEA 2021: Centennial will include a note within the Annual Review that PM2.5 results are obtained for internal use only.	31 March 2022	COMPLETE Annual Review – Section 6.3.2
SSD-5145 Schedule 3, Condition 17 & DA 73-11-98 Schedule 2 Condition 4.1	IMP REC 7: A defined rainfall figure (in mm/24hr) should be included in the Water Management Plan for inspections following heavy rainfall events.	N5 NEW-NCS IEA 2021: Centennial will revise the Water Management plan to include Wetlands requirements (condition xii) along with the addition of a defined rainfall figure (in mm/24hr) following heavy rainfall events. The revised Water Management Plan will be submitted to DPIE for approval.	6 November 2021	COMPLETE Revised Water Management Plan submitted to DPIE on 5/11/21
	NC REC 5: The next update to the Newstan Water Management Plan should include Wetlands requirements (condition xii)			

Condition Reference	IEA Recommendation	Newstan NCS Proposed Actions	By when	Action Status
SSD-5145 Schedule 3, Condition 19	IMP REC 8: Ensure that there is clear delineation in the Biodiversity Management Plan between current key requirements under existing operations vs proposed requirements under commencement of clearing associated with MOD 1 under SSD5145. A lot of actions do not need to be implemented until works are completed under MOD 1.	N13 NEW-NCS IEA 2021: Centennial will revise the Biodiversity Management Plan to clearly delineate actions associated with existing operations vs proposed requirements under commencement of clearing associated with MOD 1 under SSD5145. The revised Biodiversity Management Plan will be submitted to DPIE for approval.	6 November 2021	COMPLETE Revised Biodiversity Management Plan submitted to DPIE on 5/11/21
SSD-5145 Schedule 3, Condition 20	IMP REC 9: Centennial to follow up with DPIE regarding their consideration of Centennials extension request for the Conservation Bond in letter dated 14 Jan 2019.	N14 NEW-NCS IEA 2021: Centennial will contact DPIE regarding a previously submitted extension request for the Conservation Bond (letter dated 14 Jan 2019).	30 September 2021	In progress – Request for update submitted 29 September 2021 (ongoing)
SSD-5145 Schedule 3, Condition 29	IMP REC 11: Future rehabilitation monitoring reports should provide a comparison against key MOP completion criteria (Section 6 of the MOP). IMP REC 12: Future rehabilitation monitoring should also include a discussion against how the rehabilitation is tracking against the rehabilitation objectives in Schedule 3, Condition 27. IMP REC 13: Seek advice regarding managing Rhodes grass in new rehabilitation areas. IMP REC 14: Additional information is required in the Detailed Mine Closure Plan about the required topsoil volumes, quality and the volume of topsoil deficit. IMP REC 15: Additional information is to be included in the future MOP regarding capping material for rehabilitation and closure activities. Additional details could also be added to the Rehabilitation Cost Estimate.	N15 NEW-NCS IEA 2021: Centennial will address this recommendation as part of implementing the new regulations for mining rehabilitation under the <i>Mining Act 1992</i> , released by the Resources Regulator in July 2021.	2 July 2022	In progress – Centennial is in the process of revising the necessary processes and documents as part of implementing the new regulations for mining rehabilitation under the <i>Mining Act 1992</i> , released by the Resources Regulator in July 2021.

Condition Reference	IEA Recommendation	Newstan NCS Proposed Actions	By when	Action Status
SSD-5145 Schedule 5, Condition 1	IMP REC 16: EMS should include references to the non-compliance and incident definitions in the consent.	N16 NEW-NCS IEA 2021: Centennial will revise the EMS to include references to the non-compliance and incident definitions in the consent and submit to DPIE for approval	6 November 2021	COMPLETE Revised EMS submitted to DPIE on 5/11/21
SSD-5145 Schedule 5, Condition 11	IMP REC 17: Additional details required in the Annual Review for noise results, including long term trends. General discussion for compliance of noise over the long term.	N17 NEW-NCS IEA 2021: Centennial will include additional details for noise results including long term trends along with general discussion for compliance of noise over the long term in the Annual Review	31 March 2022	COMPLETE Annual Review – Section 6.2
	IMP REC 18: Include additional information in the Annual Reviews around subsidence management and sinkhole identification and repair.	N18 NEW-NCS IEA 2021: Centennial will include additional information regarding subsidence management, identification, and repair within the Annual Review.	31 March 2022	COMPLETE Annual Review – Section 6.5
DA73-11-98 Schedule 2 Condition 3.2	IMP REC 20: The following MPs have been updated and are currently pending approval. Need to follow up with DPIE: - Newstan Colliery EMS; - Erosion and Sediment Control Plan (noted now part of the Newstan WMP); - Newstan Colliery Land Management Plan; - Centennial Newstan Landscape Management Plan; - Newstan Wetland Management Plan.	N19 NEW-NCS IEA 2021: Centennial will contact DPIE regarding plans currently submitted with the Department.	30 September 2021	DPIE contacted on 13 September 2021 (approval pending)
EPL 395 Condition E1.4	IMP REC 21: Details of those who prepared the Annual Ecotoxicology Reports should be included to outline they are suitably qualified and experienced.	N7 NEW-NCS IEA 2021: Centennial will include details of persons who complete the ecotoxicological monitoring within the Annual Ecotoxicology Report.	31 December 2021	Next report due May 2022 – reporting scope revised to include qualifications of persons completing the report

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

During the 2021 calendar year reporting period there were a total of 9 reportable incidents and non-compliances (excluding community complaints). The following provides a summary of the incidents and non-compliances, including the actions taken by Centennial Newstan in response to the incident/non-compliance:

Table 11-1 Incidents and Non-Compliances during the Reporting Period

Compliance ¹⁹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Non-Compliance 1	EPL water concentration limits for Total Suspended Solids (TSS) at LDP 2.	On 23 March, water was released from LDP 2 that exceeded the EPL water concentration limits for Total Suspended Solids (TSS). This event occurred during an exceptional rainfall event in March where site recorded 298.4mm of rainfall between 18 and 23 March 2021.	PIRMP was activated including notification of EPA and other agencies and provision of incident investigation report.	Complete
Non-Compliance 2 to 7	EPL water concentration limits were exceeded at LDP 17.	Water concentration limits were exceeded on six (6) occasions during discharge from LDP17. A separate incident was recorded for each monitoring event where an exceedance was recorded. Table 11-2 details the recorded exceedances at LDP 17.	The PIRMP was activated including notification of EPA and other agencies and provision of incident investigation report. Throughout the discharge event all necessary measures were being undertaken to manage the water level, including continued pumping to the surface from the Fassifern Underground Storage for process of water in the Clean Water Plant and discharge from LDP 1 in accordance with the Northern Coal Services Water Management Plan at rates allowable by applicable licenses. Water quality sampling was undertaken at the time of the event and a report providing a comparison of water quality results to previous discharge events at LDP 17 was completed and provided to the EPA.	Complete

¹⁹ See Compliance Status Key beneath Table 1-2 for risk level, colour code and description.

Compliance ¹⁹	Overview of incident/non-compliance	Description of incident/non-compliance	Actions	Status of Actions
Non-Compliance 8	Report not submitted to the EPA within the stipulated timeframe.	Condition E1.4 of EPL395 requires that the ecotoxicological monitoring report be submitted to the EPA within 3 months of the monitoring being completed	Monitoring was undertaken on 20/5/2021. The report should have been submitted to the EPA by 21/8/2021. Report submitted on the 14/09/2021	Complete
Non-Compliance 9	Incident that had potential for environmental harm occurred	On 13 October 2021, during routine inspections the dirty water catchment drain between ROM stockpile and LT Creek was observed filling with materials.	Immediate action was undertaken to prevent the flow of materials. The PIRMP was activated including notification of EPA and other agencies and provision of incident investigation report. Water quality sampling was undertaken and a detailed investigation was completed.	Complete

Table 11-2: LDP017 Recorded Exceedances

Analyte	EPL 395 limit (mg/L)	Result (mg/L) – recorded exceedances only					
		1-Apr	8-Apr	15-Apr	22-Apr	29-Apr	6-May
Calcium	38		52	52	55	52	49
Magnesium	16	20	26	36	39	40	37
Potassium	6		9	7	8	8	8
Sulfate	232		328	321	315	359	285
Total Suspended Solid	50			87 [^]			

[^] The result is not consistent with the turbidity results, and visual observations at the water sampling site. An investigation was undertaken at the laboratory, but conservatively included as a potential exceedance.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Table 12-1 presents activities that are currently planned for the next reporting period.

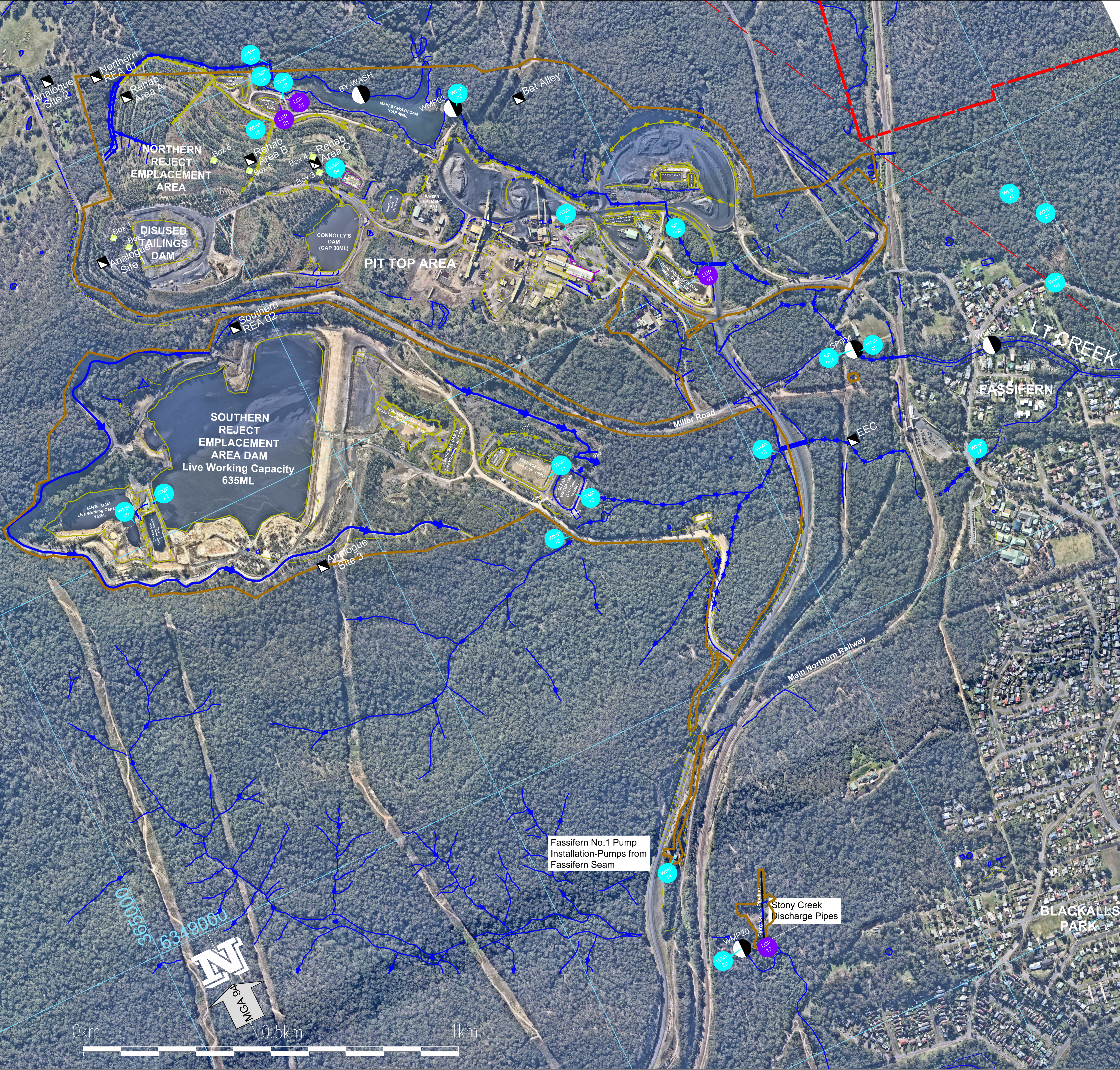
Table 12-1: Forecast Operations for 2022

Improvement Actions
• Plan for rehabilitation of the NREA • Monitoring and development of an improvement works program for LT Creek by the Soil Conservation Service • Rehabilitation of sinkhole identified 1 December 2021
Management Plan Revisions
• Relevant Management Plans that include rehabilitation will be revised to be consistent with new regulations for mining rehabilitation under the <i>Mining Act 1992</i>, released by the Resources Regulator in July 2021 • Northern Coal Services and Northern Region Mine Water Discharge Management Plan
Condition Triggers
• Undertake revisions to Management plans within 3 months of the Annual Review Submission

13 REFERENCES

- Centennial Newstan. (2019). *Annual Review 2018*.
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- GHD Pty Ltd. (2018). *Newstan Mod 8 Water Resources Impact Assessment*.
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- IEMA. (2021). *Newstan Colliery, Independent Environmental Audit 2021*.
- RPS. (2022). *Newstan Colliery Annual Monitoring Report: 2021 Annual Flora and Fauna Monitoring*.
- SLR Consulting Australia. (2014). *Northern Coal Logistics Project Environmental Impact Statement*.
- SLR Consulting Australia. (2020). *Awaba Colliery Sinkhole Rehabilitation Management Plan*.
- Umwelt. (1998). *Environmental Impact Statement. Powercoal – Newstan Colliery Life Extension Project*.

PLANS



NEWSTAN COLLIERY LICENCED DISCHARGE POINTS				
Name	Easting	Northing	Description	
LDP001	366292	6350908	Below Graunch's Dam - Also known as WMP02	
LDP002	367072	6350010	Below Final Pollution Control Dam - Also known as WMP06	
LDP017	366464	6348332	Stony Creek Pipeline - Also known as WMP19	
LDP021	366271	6350911	Graunch's Dam Overflow Weir	
SURFACE WATER MONITORING POINTS				
Name	Easting	Northing	Description	
WMP01	366287	6351020	Upstream of LDP001	
WMP2A	366211	6350984	Graunch's Dam Cell 1	
WMP2B	366282	6350913	Graunch's Dam Cell 2	
WMP03	366691	6350695	EPL Point 19 - Bywash Dam Weir - Downstream of LDP001	
WMP04	366335	6350646	Sewage Maturation Pond	
WMP05	366806	6350261	Waste Water Treatment Plant	
WMP07	367377	6349639	LT Creek downstream of Colliery U/S of Railway, D/S of Miller Rd	
WMP08	367927	6349578	Seepage from the GNS into tributary of LT Creek sampled South of Macquarie St	
WMP09	365438	6350067	Upstream of the SREA	
WMP11	366483	6349698	SREA Seepage Dam	
WMP12	366526	6349628	SREA Clean Water Dam (proposed LDP003)	
WMP13	367063	6349491	EPL Point 6 - Southern branch LT Creek U/S of Eraring Haul Road	
WMP14	366282	6350913	Pump line from Fassifern Seam No.1 Bore	
WMP15	366225	6350887	NREA seepage pipe	
WMP16	366470	6349529	EPL Point 5 - SREA LT Creek Side catchment	
WMP17	367525	6349240	Southern Branch LT Creek below Railway Station	
WMP20	366404	6348341	EPL Point 18 - Located in a tributary of Stony Creek, upstream of WMP19	
WMP21	367970	6349726	Located within the Wetland system, upstream of WMP8	
WMP22	365501	6350094	The decant from Stage 2-4 dam into the Fassi seam	
WMP24	367920	6349844	Seepage from the GNS into tributary of LT Creek sampled North of Macquarie St	
SP003	367071	6350187	EPL Point 3 - Upstream LDP002	
SP004	367366	6349650	EPL Point 4 - Downstream LDP002	
NEWSTAN COLLIERY AQUATIC MONITORING POINTS				
Name	Easting	Northing	Description	
BY-WASH	366477	6350833	By-Wash Dam	
WMP03	366689	6350706	EPL Point 19 - Bywash Dam Weir - Downstream of LDP001	
SP004	367343	6349726	LT Creek Downstream at Archery Range	
WEIR	367702	6349502	LT Creek Downstream at Macquarie Road	
WMP20	366404	6348341	Located in a tributary of Stony Creek, upstream of Stony Creek Pipeline	
IZ	368507	6348781	Intertidal Zone - Upstream of the discharge of LT Creek to Lake Macquarie	
SCCIZ	368384	6347184	Upstream of confluence of Stony Creek and Fennell Bay	
NEWSTAN COLLIERY TERRESTRIAL MONITORING POINTS				
Name	Easting	Northing	Description	
Rehab Area A	365910	6351097	Annual Flora and Fauna Monitoring Point	
Northern REA 01	365861	6351181	Annual Flora and Fauna Monitoring Point	
Analogue Site 2	365738	6351228	Annual Flora and Fauna Monitoring Point	
Analogue Site 1	365663	6350728	Annual Flora and Fauna Monitoring Point	
Southern REA 02	365905	6350418	Annual Flora and Fauna Monitoring Point	
Rehab Area B	366136	6350805	Annual Flora and Fauna Monitoring Point	
Rehab Area C	366287	6350720	Annual Flora and Fauna Monitoring Point	
Analogue Site 3	365840	6349744	Annual Flora and Fauna Monitoring Point	
Bat Alley	366852	6350641	Annual Flora and Fauna Monitoring Point	
EEC	367260	6349433	Annual Flora and Fauna Monitoring Point	
NEWSTAN COLLIERY TERRESTRIAL NEST BOX LOCATIONS				
Box ID	Easting	Northing	Description	
1	365717	6350775	Analogue Site 1 - for Microbat - in Ironbark sp.	
2	365743	6350735	Analogue Site 2 - for Small Parrot - in Corymbia maculata	
3	366287	6350694	Rehab Area C - for Glider - in Corymbia maculata	
4	366289	6350739	Rehab Area C - for Small Parrot - in Corymbia maculata	
5	366121	6350779	Rehab Area B - for Glider - in Corymbia maculata	
6	366047	6350845	Rehab Area B - for Microbat - in Corymbia maculata	
LEGEND				
			U/G EPL Boundary / Extent of Mining Tenure	
			Water Monitoring Point; & Licenced Discharge Point	
			Surface EPL Boundary	
			Water Monitoring Point	
			Aquatic Sampling Point	
			REHAB AREA	
			Terrestrial Ecology Location	
			Nesting Box Location	
			Watercourse	
			Clean Water Runoff	
			Dirty Water Runoff	
ENDORSEMENTS				
- Aerial image referenced from Nearmap dated 30th June 2020. - The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94). - To read in conjunction with NS2541B				
Centennial Newstan Pty Ltd (ACN 101 508 865)				
NEWSTAN COLLIERY Surface Plan				
TITLE: LOCATION OF TERRESTRIAL & WATER MONITORING POINTS (NORTH)				
REVISED: C.Cluderay	DRAWN: A.Field		All Distances are in metres unless otherwise shown.	
DATE: 22/09/2020	Plot File: N:\Shared\Plans\Newstan\PDF\Enviro\Monitoring\NS2541A_2020-0922.pdf		A1	
CHECKED: A.Ryan	SCALE: 1 :5000 (At A1 Size)		NS2541A	
APPROVED: T. O'Brien				



Noise Receptors				
EIS Reference	Name	Easting	Northing	Location
NC1	NC1	365500	6351811	Davis dwelling 35 Jeffson St Wakefield
NC2	NC2	365685	6351045	Culgan Dwelling Fassifern Road Wakefield
NC3	NC3	365263	6351334	Orrcock Dwelling Road Fassifern
NC4	NC4	367387	6348387	Phelps Dwelling 33 Naran Street Fassifern
NC5	NC5	367164	6348394	Parnwell Dwelling 51 Renolds Street Fassifern
NC6	NC6	367363	6349719	Fassifern Primary School

Real Time Noise Monitoring				
Reference	Name	Easting	Northing	Location
RNM1	RNM1	366851	6350195	Located in Newstan Carpark Island

Dust Gauges				
EPA ID#	Name	Easting	Northing	Location
7	D1	365687	6350884	North west of the tailings Dam on the NREA
8	D2	366285	6350893	East of LDP01 in NREA
9	D3	365673	6350572	Southern end of Tailings Dam of NREA
10	D4	366656	6350967	South of CCPP, north east of SREA
11	D5	366947	6349953	North of Centennial Fassifern Office
12	D6	367339	6349864	South Eastern end of the Rail loop
13	D7	367397	6349669	Within the Archery Club on Miller Road
14	D9	365774	6350376	SREA, across Miller Road from Newstan Colliery.

High Volume Sampler				
EPA ID#	Name	Easting	Northing	Location
15	HVS1	365759	6351238	Hill top - 50m North of Culgan dwelling on Fassifern Rd
16	HVS2	367339	6349585	Located near potable water transfer tanks - south of Miller Rd

Realtime Air Quality Monitor				
Reference	Name	Easting	Northing	Location
RAM1	RAM1	367335	6349586	Hill top - 50m North of Culgan dwelling on Fassifern Rd

Newstan Weather Station				
EPA ID#	Name	Easting	Northing	Location
W1	W1	366851	6350195	Located in Newstan Carpark Island

LEGEND

- D7

Dust Gauge
- HVS 2

High Volume Sampler
- RAM 1

Realtime Air Quality Monitor
- NC1

Noise Monitoring
- RNM1

Real Time Noise Monitoring
- W1

Weather Monitoring Station
- U/G EPL Boundary / Extent of Mining Tenure
- Surface EPL Boundary

0km

0.5km

1km

- ENDORSEMENTS
- Aerial image referenced from Nearmap dated 2nd September 2020.
 - The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).



Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COLLIERY

Surface

CENTENNIAL
NEWSTAN

TITLE

Location of Air, Noise & Weather Monitoring Points

REVISION: C.Chudersky

DATE: 22/09/2020

CHECKED: A.Ryan

APPROVED: T.O'Brien

Original Drawn: C.Chudersky

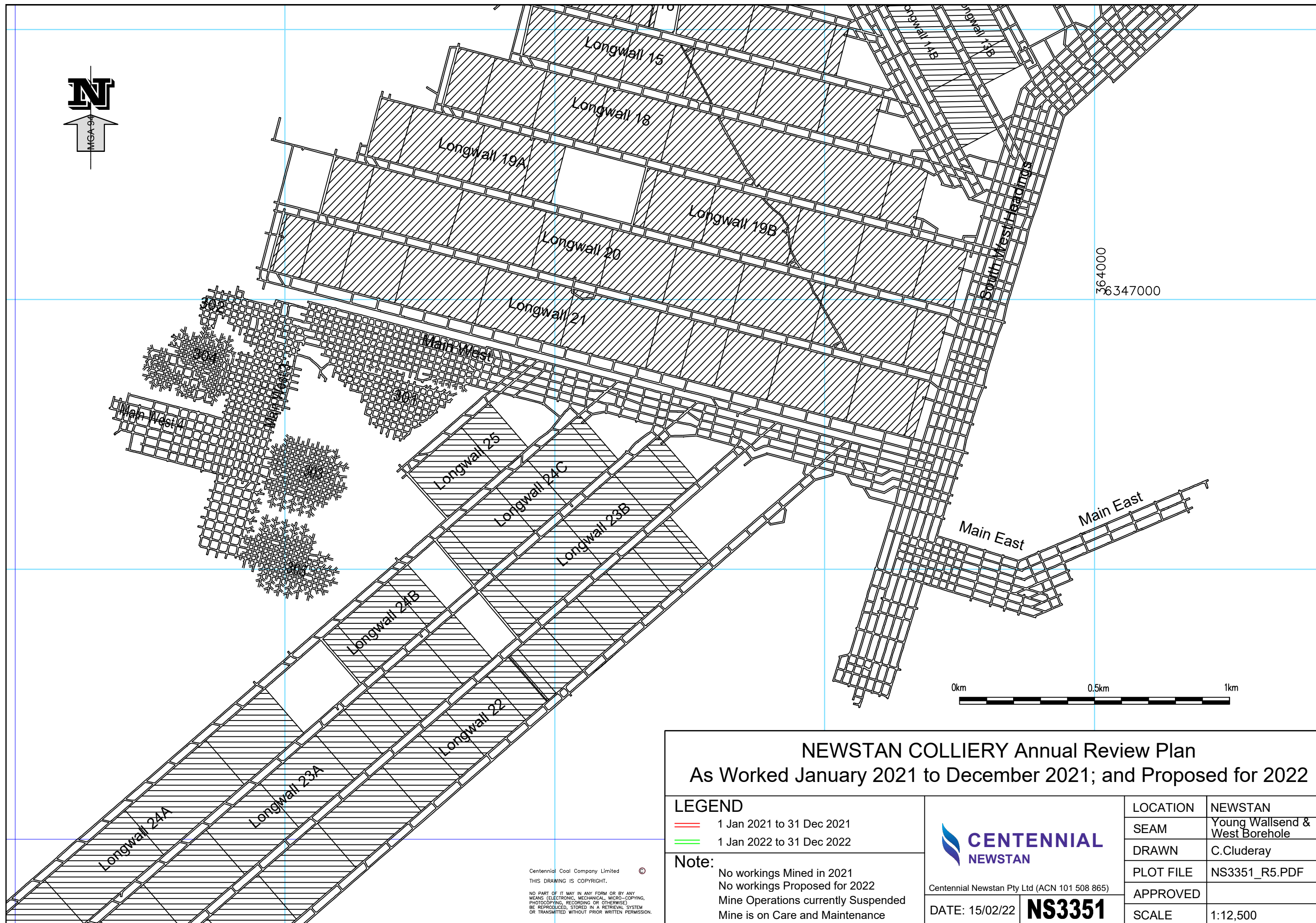
RLOT FILE: N:\Shared\Files\Newstan\PDF\EnviroMonitoring\NS3332_2020-0922.pdf

SCALE: 1 : 3500

All Distances are in metres unless otherwise shown.

A0

NS3332



NEWSTAN COLLIERY Annual Review Plan

As Worked January 2021 to December 2021; and Proposed for 2022

LEGEND

- 1 Jan 2021 to 31 Dec 2021
- 1 Jan 2022 to 31 Dec 2022

Note:

No workings Mined in 2021
No workings Proposed for 2022
Mine Operations currently Suspended
Mine is on Care and Maintenance



Centennial Newstan Pty Ltd (ACN 101 508 865)

DATE: 15/02/22

NS3351

LOCATION	NEWSTAN
SEAM	Young Wallsend & West Borehole
DRAWN	C.Cluderay
PLOT FILE	NS3351_R5.PDF
APPROVED	
SCALE	1:12,500

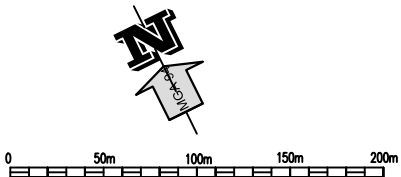
Centennial Coal Company Limited
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Legend

-  Domain E - Rehabilitation Area - Woodland
-  Ecosystem and Landuse Establishment

ENDORSEMENTS
• Aerial image referenced from NearMap dated 5th October 2021.

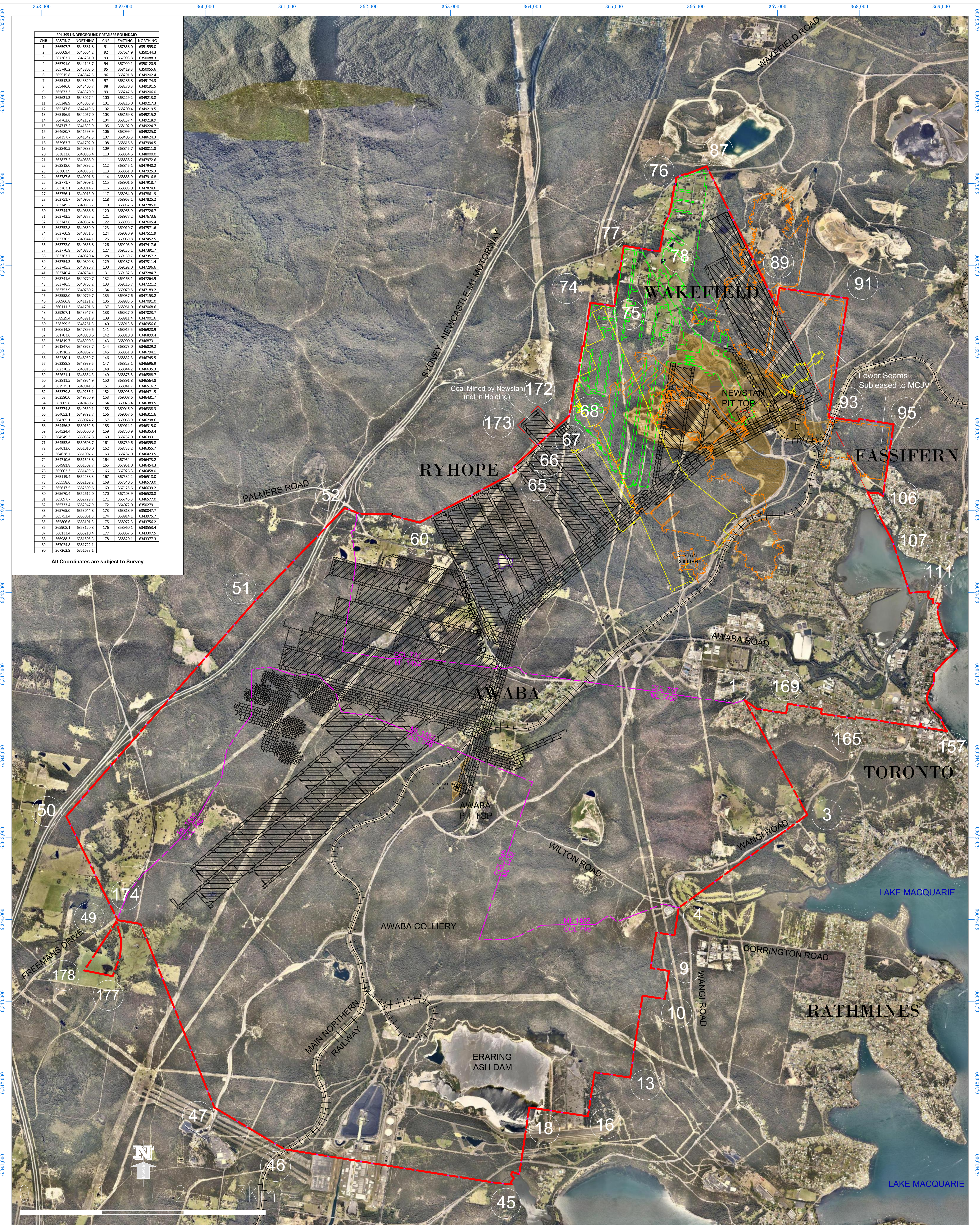


Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COLLIERY
Surface



TITLE:				NREA Rehabilitation Areas	
REVISION:	C.CLUDERAY	DRAWN:	C.CLUDERAY	All Distances are in metres unless otherwise shown.	A3
DATE:	15-02-2022	DATE:	05-10-2018		
CHECKED:	A.Ryan	PDF:	N:\MGA2020\FILES\3.0 Environment\3.02 Annual Report\2021 Year\Newstan\NS3394_R2.pdf		
APPROVED:	SCALE: 1:4000			NS3394	



EPL 395 UNDERGROUND PREMISES BOUNDARY					
CNR	EASTING	NORTHING	CNR	EASTING	NORTHING
1	36697.7	6346681.8	91	367858.0	635195.0
2	366609.4	6346664.2	92	367624.9	6350144.3
3	367363.7	6345281.0	93	367993.8	6350088.3
4	367791.0	6344145.7	94	367999.1	6350120.9
5	365740.2	6343808.6	95	368419.3	6350055.6
6	365515.8	6343842.5	96	368291.8	6349202.4
7	365512.5	6343800.6	97	368286.8	6349176.3
8	365446.0	6343406.7	98	368270.3	6349191.5
9	365673.3	6343370.9	99	368247.5	6349206.0
10	365621.3	6343027.4	100	368229.2	6349213.8
11	365348.9	6343068.9	101	368216.0	6349217.3
12	365247.6	6342419.6	102	368200.4	6349219.5
13	365196.9	6342067.0	103	368169.8	6349215.2
14	364762.6	6341132.4	104	368137.4	6349218.9
15	364717.2	6341033.9	105	368102.9	6349224.7
16	364680.7	6341593.9	106	368099.4	6349225.0
17	364357.7	6341642.5	107	368066.3	6348624.3
18	363963.7	6341702.0	108	368056.5	6347994.3
19	363840.5	6340883.5	109	368845.7	6348011.8
20	363833.6	6340886.4	110	368854.6	6348000.0
21	363827.2	6340888.9	111	368838.2	6347972.6
22	363818.0	6340892.2	112	368895.1	6347940.2
23	363803.9	6340896.1	113	368861.9	6347925.3
24	363787.6	6340901.6	114	368885.9	6347916.8
25	363771.7	6340906.1	115	368892.6	6347918.7
26	363763.1	6340914.7	116	368895.0	6347874.6
27	363756.1	6340913.0	117	368884.0	6347861.9
28	363751.7	6340908.3	118	368893.1	6347825.2
29	363748.2	6340898.7	119	368852.6	6347785.0
30	363744.7	6340888.6	120	368865.9	6347776.7
31	363743.5	6340877.2	121	368877.2	6347673.6
32	363740.6	6340867.4	122	368899.1	6347605.4
33	363732.8	6340869.0	123	369010.1	6347571.6
34	363760.9	6340851.5	124	369030.9	6347511.9
35	363770.5	6340844.1	125	369069.8	6347452.5
36	363772.0	6340844.1	126	369103.9	6347417.6
37	363770.8	6340830.3	127	369135.1	6347391.7
38	363763.7	6340820.4	128	369159.7	6347357.2
39	363754.3	6340808.9	129	369187.5	6347311.4
40	363755.3	6340796.7	130	369192.0	6347296.6
41	363740.4	6340784.1	131	369182.5	6347284.7
42	363741.6	6340770.7	132	369168.1	6347264.9
43	363746.5	6340765.2	133	369116.7	6347221.1
44	363753.9	6340760.2	134	369079.5	6347189.2
45	363558.0	6340779.7	135	369037.6	6347153.2
46	363666.8	6341191.2	136	368985.6	6347091.0
47	363611.3	6341701.6	137	368961.0	6347068.6
48	359207.1	6343947.3	138	368927.0	6347023.7
49	358929.4	6343991.9	139	368911.4	6347001.6
50	359289.5	6343261.3	140	368913.8	6346996.6
51	360614.8	6347899.6	141	368915.5	6346928.9
52	361703.6	6349030.6	142	368910.8	6346899.4
53	361819.7	6348993.3	143	368900.0	6346873.1
54	361847.6	6348973.7	144	368873.0	6346828.2
55	361916.2	6348962.7	145	368851.8	6346794.1
56	362280.1	6348959.7	146	368832.3	6346745.5
57	362288.8	6348939.5	147	368823.1	6346696.9
58	362370.2	6348918.7	148	368844.2	6346625.1
59	362621.1	6348854.3	149	368875.5	6346588.7
60	362811.5	6348954.9	150	368891.8	6346564.8
61	362975.1	6349041.3	151	368941.7	6346516.1
62	363379.8	6349255.1	152	368995.3	6346471.5
63	363580.0	6349360.9	153	369008.6	6346431.7
64	363802.8	6349480.2	154	369025.4	6346389.5
65	363774.8	6349739.1	155	369046.9	6346338.1
66	364052.1	6349792.7	156	369067.6	6346311.6
67	364305.1	6350024.2	157	369068.9	6346298.6
68	364456.3	6350162.9	158	369014.1	6346315.0
69	364524.4	6350300.0	159	368750.9	6346353.4
70	364549.3	6350587.8	160	368757.0	6346393.1
71	364552.6	6350608.7	161	368739.6	6346395.8
72	364613.6	6351010.0	162	368733.2	6346355.7
73	364628.7	6351007.7	163	368287.0	6346423.5
74	364710.6	6351543.8	164	367954.4	6346473.2
75	364981.8	6351502.7	165	367951.0	6346454.3
76	365002.3	6351499.6	166	367926.3	6346458.0
77	365119.4	6352238.3	167	367532.2	6346518.0
78	365558.6	6352169.2	168	367540.5	6346573.0
79	365617.5	6352509.6	169	367125.6	6346469.3
80	365670.4	6352612.0	170	367103.9	6346520.8
81	365697.7	6352729.7	171	367466.3	6346577.0
82	365733.4	6352947.9	172	364072.0	6350279.1
83	365765.0	6353344.1	173	365818.9	6350247.7
84	365753.4	6353061.3	174	358914.1	6348975.7
85	365806.6	6353101.3	175	358972.3	6347956.2
86	365908.1	6353120.8	176	358960.1	6347553.4
87	366133.4	6353210.4	177	358867.6	6343807.5
88	366888.3	6351505.3	178	358520.1	6343377.3
89	367024.8	6351722.1			
90	367263.9	6351688.1			

All Coordinates are subject to Survey

LEGEND

- Great Northern Seam Workings
- Fassifern Seam Workings
- Borehole Seam Workings
- Young Wallsend / West Borehole Workings (Workings at 22/08/2014)

- Colliery Holding Boundary (Underground Premises Boundary)
- Lease Boundaries

EPL 395 Surface Premises

ENDORSEMENTS
• Aerial image referenced from NearMap on the 19th October 2014.
• For details regarding Consolidated Coal Leases held by Centennial Newstan refer to plans PC1, PC6, PC7 & PC8.
• Colliery Holding Co-ordinates supplied by P. Duncan - Registered Mining Surveyor Centennial Property, Titles and Survey.
• The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).
• Plan prepared by C. Cludery - Registered Mining Surveyor

NOTE: This Plan to be Viewed in Conjunction with NS3302 (Plan of Premises - Surface Areas)

Centennial Newstan Pty Ltd (ACN 101 508 865) NEWSTAN COLLIERY West Borehole & Young Wallsend Seams				 Centennial Energy	
Plan of Premises - Underground Workings Newstan EPL 395					
DRAWN: C. Cludery	REV: 1	FILE: NS3301.PLOT\NS3301NEWSTAN001.pdf	All Distances are in metres unless otherwise shown.		A0
DATE: 18/11/2014	CHECKED: V. Howatt	SCALE: 1 : 15000	NS 3301		
APPROVED: P. Williams					

APPENDICES

Appendix 1: Checklist of Annual Review Reporting Requirements

This appendix provides a checklist of reporting requirements and performance conditions addressed within the Annual Review, including:

- Table A1-1 provides the key Annual Review requirements outlined in the Project Approvals, Schedule 5 Condition 11 of SSD-5145 and Schedule 2 Condition 9.1 of DA 73-11-98;
- Table A1-2 provides the key Annual Review requirements outlined in the Mining Authorisations;
- Table A1-3 provides other Annual Review requirements outlined in the Project Approvals; and
- Table A1-4 provides the Annual Review submission requirements outlined in the Project Approvals.

Table A1-1: Project Approval Annual Review Requirements

Approval	Requirement	Annual Review Section
SSD-5145 Schedule 5 Condition 11	<i>By the end of March each year, or as otherwise agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:</i>	
	<i>a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;</i>	Section 4
	<i>b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the:</i>	Section 6
	<i>i. relevant statutory requirements, limits or performance measures/criteria;</i>	
	<i>ii. requirements of any plan or program required under this consent;</i>	
	<i>iii. monitoring results of previous years; and relevant predictions in the documents identified in condition 2(a) of Schedule 2</i>	
	<i>c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;</i>	Section 11
	<i>d) identify any trends in the monitoring data over the life of the development;</i>	Section 6
	<i>e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and</i>	Section 6
	<i>f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.</i>	Section 6 and Section 12
DA 73-11-98 Condition 9.1 (Annual Review)	<i>Each year the Applicant shall submit an Annual Review to the Secretary and to all relevant agencies. This report must:</i>	
	<i>a) identify the standards and performance measures that apply to the development;</i>	Section 3 and Section 6
	<i>b) describe the works carried out in the last 12 months;</i>	Section 4
	<i>c) describe the works that will be carried out in the next 12 months;</i>	Section 4
	<i>d) include a summary of the complaints received during the past year, and compare this to the complaints received in the previous 5 years; include a summary of the monitoring results on the development</i>	Section 9
	<i>e) include a summary of the monitoring results on the development during the past year;</i>	Section 6
	<i>f) include an analysis of these monitoring results against the relevant:</i>	
	<i>• impact assessment criteria/limits;</i>	Section 6
	<i>• monitoring results from previous years; and</i>	
	<i>• predictions in the EIS and SEE noted in condition 1.1;</i>	
	<i>g) identify any trends in the monitoring results over the life of the development;</i>	Section 6
	<i>h) identify any non-compliance during the previous year; and</i>	Section 11
	<i>i) describe what actions were, or are being, taken to ensure compliance.</i>	Section 11

Table A1-2: Mining Authorisation Annual Review Requirements

Approval	Requirement	Annual Review Section
ML 1380, MPL 304, MPL 305, PPL 497 Schedule 2 Condition 3 (Mining Operations Plan and Annual Rehabilitation Report)	3. Mining Operations Plan and Annual Rehabilitation Report <i>(f) The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:</i> <i>(i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;</i> <i>(ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and</i> <i>(iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resources.nsw.gov.au/environment.</i> <i>Note: The Rehabilitation Report replaces the Annual Environmental Management Report.</i>	This Annual Review Section 8 This Annual Review This Annual Review
ML 1452, ML 1480, ML 1587 Condition 3 (Annual Environmental Management Report)	<i>(1) Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General.</i> <i>(2) The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:-</i> <i>(a) the accepted Mining Operations Plan;</i> <i>(b) development consent requirements and conditions;</i> <i>(c) Environment Protection Authority and Department of Land and Water Conservation licences and approvals;</i> <i>(d) any other statutory environmental requirements;</i> <i>(e) details of any variations to environmental approvals applicable to the lease area; and</i> <i>(f) where relevant, progress towards final rehabilitation objectives.</i> <i>(3) After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.</i> <i>(4) The lease holder shall, as and when directed by the Minister, co-operate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies.</i>	This Annual Review Section 4 and Section 8 Section 5 This Annual Review
ML 1586, CCL 727, CCL 764, CCL 763, CCL 746 Condition 4 and 5 (Environment Management Report)	4. Environment Management Reporting <i>The lease holder must lodge Environmental Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General.</i> 5. The EMR must: <i>a) report against compliance with the MOP;</i> <i>b) report on progress in respect of rehabilitation completion criteria;</i> <i>c) report on the extent of compliance with regulatory requirements; and</i> <i>d) have regard to any relevant guidelines adopted by the Director-General;</i>	This Annual Review Section 4 Section 8 Section 11 This Annual Review

Approval	Requirement	Annual Review Section
MPL 327, MPL 328 Condition 10 (Annual Environmental Management Report)	<i>(a) The lease holder shall each year once operations have commenced, submit for the Minister's approval an Annual Environmental Management Report" relating to the operations of the lease holder on the subject area.</i>	This Annual Review
	<i>(b) The date by which the Report must be submitted will be determined by the Minister after consulting with the lease holder.</i>	This Annual Review
	<i>(c) The Report shall comprise:</i>	
	<i>(i) a plan showing short, medium and long term mining plans;</i>	Section 4
	<i>(ii) a rehabilitation report (in respect of open cut operations) and/or a surface environmental management report (in respect of underground operations) ;</i>	Section 8
	<i>(iii) a review of performance in terms of Environment Protection Authority and Department of Water Resources licence and approval conditions (related to the Clean Air Act 1961, the Clean Waters Act 1970, the Noise Control Act 1975, the Environmentally Hazardous Chemical Act 1985, the Pollution Control Act 1970 and the Water Act 1912) applicable to the subject area;</i>	Section 6 and Section 11
	<i>(iv) a review of performance in terms of Development Consent conditions for the subject area;</i>	Section 11
	<i>(v) a listing of any variations obtained to approvals applicable to the subject area during the previous year.</i>	Section 3
EL 5138 Condition 8 (Annual Activity Reporting)	8. Unless otherwise approved by the Secretary, the licence holder must submit annual activity reports prepared in accordance with the Exploration Guideline: Annual Activity Reporting for Prospecting Titles (NSW Department of Industry) at the following times: <i>(a) Annually, within one calendar month following the grant anniversary date of this licence;</i> <i>(b) On any other date or dates directed by the Secretary in writing; and</i> <i>(c) Within one calendar month following the cancellation or expiry of this licence.</i>	This Annual Review

Table A1-3: Other Annual Reporting Requirements

Approval	Requirement	Annual Review Section
DA 73-11-98 Condition 8.2(a) (Surface and Ground Water)	<i>(iii) The results and interpretation of surface and ground water monitoring are to be provided by the Applicant in an approved form to the DoI Water, LMCC and EPA on a six monthly basis, unless otherwise directed by the Secretary. The results are also to be contained and analysed in the Annual Review (Condition 9.1).</i>	Section 7
DA 73-11-98 Condition 8.5 (Fauna and Flora Monitoring)	<i>The Applicant shall prepare a detailed monitoring program of habitat areas, including any wetlands and aquatic habitats, during the development and for a period after the completion of the development to be determined by the Secretary in consultation with LMCC, OEH and DRG. The program shall monitor impacts attributable to the development and include monitoring of the success of any restoration or reconstruction works. The Applicant shall include the monitoring program in the Flora and Fauna Management Plan (condition 3.4). The Applicant shall carry out any further works required by the Secretary as a result of the monitoring. A summary of monitoring results shall be included in the Annual Review.</i>	Section 6.4
DA 73-11-98 Condition 8.6 (Cultural Heritage Monitoring)	<i>The Applicant shall monitor the effectiveness of measures outlined in the archaeology and heritage management plan (condition 3.3). A summary of monitoring results shall be included in the Annual Review.</i>	Section 6.6.1
SSD-5145 Schedule 3 Condition 25 (Waste)	<i>The Applicant must: (d) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.</i>	Section 6.6.3
DA 73-11-98 Condition 8.7 (Subsidence Monitoring)	<i>The Applicant shall undertake a detailed and ongoing monitoring program of subsidence resulting from mining to the satisfaction of the Secretary and in consultation with DoI Water, DRG and SA NSW throughout the life of the mine and for a period of at least five years after the completion of mining, or other such period as determined by the Secretary in consultation with DoI Water and DRG.... The Applicant shall include information on monitoring conducted and the interpreted results in the Annual Review (condition 9.2).</i>	Section 6.5
DA 73-11-98 Condition 3.4(a)(vi) (Flora and Fauna Assessment and Management)	<i>4. development of a program to specifically monitor the success or otherwise of proposed ameliorative measures in relation to the threatened flora and fauna species over five years from the commencement of construction in the relevant area. The monitoring is to be undertaken by experienced Botanist(s)/ Zoologist(s). Annual progress reports and a final report outlining the implementation and success or otherwise of the ameliorative measures shall be included in the Annual Review during the monitoring period.</i>	N/A no current specific monitoring program is in place
DA 73-11-98 Condition 8.4(b) (Blasting - Newstan Ventilation Shaft Site at Awaba)	<i>The Applicant shall: (ii) include the results of the monitoring information as required by the EPA and in the Annual Review (Condition 9.1).</i>	N/A no blasting undertaken (Section 6.6)

Table A1-4: Annual Reporting Submission Requirements

Approval	Requirement	Annual Review Section
DA 73-11-98 Condition 9.2. (Access to Information)	<i>a) Within 3 months of the approval of any plan/strategy/program required under this consent (or any subsequent revision of these plans/strategies/programs), or the completion of the audits or Annual Reviews required under this consent, the Applicant shall:</i> • <i>provide a copy of the relevant document/s to the relevant agencies;</i> • <i>ensure that a copy of the relevant document/s is made publicly available at the mine; and</i> • <i>put a copy of the relevant document/s on its website.</i>	This Annual Review
DA 73-11-98 Condition 10.2(a) (Community Consultation / Complaints)	<i>The Environmental Officer (refer condition 3.1) shall be responsible:</i> <i>(ii) providing a report of complaints in the Annual Review throughout the life of the project to the Secretary, LMCC, EPA, DRG, and CCC.</i>	
SSD-5145 Schedule 5 Condition 6 (Revision of Strategies, Plans and Programs)	<i>Within 3 months of:....</i> <i>(b) the submission of an annual review under condition 11 below;.... the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review, the revised document must be submitted to the Secretary for approval.</i>	
SSD-5145 Schedule 5 Condition 14 (Access to Information)	<i>Within 3 months of the date of this consent, the Applicant must:</i> <i>(a) make copies of the following publicly available on its website:</i> <i>(vii) the annual reviews of the development;</i> <i>(b) keep this information up-to-date, to the satisfaction of the Secretary.</i>	
SSD-5145 Statement of Commitments (Environmental Management and Reporting)	<i>Each year, Northern Coal Services will prepare an Annual Review, which will report environmental monitoring results and evaluate performance for the previous 12 month period, to be distributed to the relevant government agencies, Newstan Colliery CCC and Mandalong Mine CCC.</i>	

Appendix 2: Water Monitoring Results and Trends

This appendix provides a summary of the water monitoring results and trends, including:

- Section A2.1 provides a summary of the 2021 surface water quality results for all analytes listed in the EPL. Note, Section 7.3.2 lists only the analytes with assigned concentration limits. This section includes surface water quality results for:
 - LDP001 refer Table A2-1
 - LDP002 refer Table A2-2
 - LDP017 refer Table A2-3
- Section A2.2 provides the long-term trends for LDP001 for the period 2016 – 2021;
- Section A2.3 provides the groundwater monitoring long-term trends for the Alluvial Aquifer for the period 2016 – 2021; and
- Section A2.4 provides the groundwater monitoring long-term trends for the for Coal Seam Bedrock Aquifer for the period 2016 – 2021.

A2.1 SURFACE WATER QUALITY – 2021 SUMMARY (ALL ANALYTES)

LDP001 Summary

- The discharge analytes for LDP001 have been included from 2016.
- All units in the graphs are in mg/L, except for pH (pH units) and Conductivity (µS/cm).
- The Environmental Protection Licence 395 was modified in November 2015. The modified limits have been included on the graphs.
- The majority of water discharged through LDP001 was from an underground water called the Fassifern Seam.
- EPL Limits may only apply to dissolved or total metals. However, both dissolved and total metals and nutrients are displayed on attached graphs.

Table A2-1: LDP001 Water Quality Monitoring Summary 2021 (all analytes)

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Aluminium [#] (mg/l)	12	22	LOR	0.0005	0.006	0.15
Arsenic [#] (mg/l)	12	22	LOR	0.00004	0.0003	
Barium [#] (mg/l)	12	22	0.05	0.09	0.19	0.25
Bicarbonate alkalinity (mg/l)	12	60	290	489	618	711
Boron [#] (mg/l)	12	22	0.120	0.164	0.204	1.3
Cadmium [#] (mg/l)	12	22	LOR	LOR	LOR	0.0008
Calcium [#] (mg/l)	12	22	19.7	32.8	45.0	
Chloride [#] (mg/l)	12	22	270	387	550	
Chromium [^] (mg/l)	12	22	LOR	0.00009	0.001	
Cobalt [#] (mg/l)	12	22	LOR	0.0002	0.0004	
Conductivity (µS/cm)	SF4	347	1434	2289	2878	3250
Copper [#] (mg/l)	12	22	LOR	0.0005	0.0013	0.005
Iron [#] (mg/l)	12	22	LOR	0.001	0.012	
Lead [#] (mg/l)	12	22	LOR	0.001	0.002	0.038
Lithium [#] (mg/l)	12	22	0.099	0.135	0.196	0.4
Magnesium (mg/l)	12	22	7.83	13.25	16.20	
Manganese [#] (mg/l)	12	22	LOR	LOR	LOR	
Mercury [#] (mg/l)	12	22	LOR	LOR	LOR	0.0006

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Molybdenum [#] (mg/l)	12	22	0.012	0.021	0.030	0.04
Nickel [#] (mg/l)	12	22	0.003	0.006	0.008	0.0425
Nitrogen [^] (mg/l)	12	22	LOR	0.16	0.34	2.7
Oil and Grease (mg/l)	12	11	LOR	LOR	LOR	6
pH	SF4	347	6.6	7.2	7.7	6.5-8.5
Phosphorus [^] (mg/l)	12	22	LOR	0.00	0.01	0.41
Potassium [#] (mg/l)	12	22	3.4	4.4	5.2	
Selenium [^] (mg/l)	12	22	LOR	0.0004	0.0016	0.011
Sodium (mg/l)	12	22	366	454	576	
Sulfate [#] (mg/l)	12	11	67	127	202	
TKN-N (mg/l)	12	22	LOR	0.03	0.2	2.6
Total sulfate (mg/l)	12	22	65	126	221	
Total suspended solids (mg/l)	52	59	LOR	0.3	10	50
Turbidity (NTU)	SF4	347	0.1	42.7	698	
Zinc [#] (mg/l)	12	22	LOR	0.001	0.003	0.04

[#] dissolved concentrations

[^] total concentrations

SF4 (Special Frequency 4) means continuous sampling as reported as a daily average

LOR means below the limit of reporting

Table A2-2: LDP002 Water Quality Monitoring Summary 2021 (all analytes)

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Aluminium [#] (mg/l)	Weekly during any discharge	1	0.03	0.03	0.03	
Aluminium [^] (mg/l)	Weekly during any discharge	1	4.83	4.83	4.83	
Antimony (mg/l)	Weekly during any discharge	1	0.002	0.002	0.002	
Arsenic [#] (mg/l)	Weekly during any discharge	1	0.001	0.001	0.001	
Arsenic [^] (mg/l)	Weekly during any discharge	1	0.003	0.003	0.003	
Barium (mg/l)	Weekly during any discharge	1	0.066	0.066	0.066	
Beryllium [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Beryllium [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Boron (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Cadmium [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Cadmium [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Calcium (mg/l)	Weekly during any discharge	1	7	7	7	
Chromium [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Chromium [^] (mg/l)	Weekly during any discharge	1	0.004	0.004	0.004	
Cobalt [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Cobalt [^] (mg/l)	Weekly during any discharge	1	0.001	0.001	0.001	
Conductivity (µS/cm)	SF1	1	367	367	367	
Copper [#] (mg/l)	Weekly during any discharge	1	0.002	0.002	0.002	
Copper [^] (mg/l)	Weekly during any discharge	1	0.008	0.008	0.008	
Iron (mg/l)	Weekly during any discharge	1	3.63	3.63	3.63	
Lead [#] (mg/l)	Weekly during any discharge	1	0.001	0.001	0.001	
Lead [^] (mg/l)	Weekly during any discharge	1	0.010	0.010	0.010	
Lithium (mg/l)	Weekly during any discharge	1	0.018	0.018	0.018	
Magnesium (mg/l)	Weekly during any discharge	1	2	2	2	
Magnesium [#] (mg/l)	Weekly during any discharge	1	2	2	2	
Mercury [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Mercury [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Molybdenum [#] (mg/l)	Weekly during any discharge	1	0.010	0.010	0.010	
Molybdenum [^] (mg/l)	Weekly during any discharge	1	0.028	0.028	0.028	
Nickel [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Nickel [^] (mg/l)	Weekly during any discharge	1	0.004	0.004	0.004	
Nitrogen [^] (mg/l)	Weekly during any discharge	1	1.4	1.4	1.4	
Oil and Grease (mg/l)	SF1	1	LOR	LOR	LOR	10
pH	SF1	1	8.09	8.09	8.09	6.5-8.5
Phosphorus (mg/l)	Weekly during any discharge	1	0.10	0.10	0.10	
Potassium (mg/l)	Weekly during any discharge	1	2	2	2	
Selenium [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Selenium [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Silica (mg/l)	Weekly during any discharge	1	26.4	26.4	26.4	
Silver [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Silver [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Sodium (mg/l)	Weekly during any discharge	1	70	70	70	
Sulfate (mg/l)	Weekly during any discharge	1	24	24	24	
Tin (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Titanium (mg/l)	Weekly during any discharge	1	0.03	0.03	0.03	
Total Heavy Metals (mg/l) ¹	Weekly during any discharge	-	n/a	n/a	n/a	
Total suspended solids (mg/l)	SF1	1	112	112	112	50
Turbidity (NTU)	SF1	1	378	378	378	
Vanadium [#] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Vanadium [^] (mg/l)	Weekly during any discharge	1	LOR	LOR	LOR	
Zinc [#] (mg/l)	Weekly during any discharge	1	0.005	0.005	0.005	
Zinc [^] (mg/l)	Weekly during any discharge	1	0.057	0.057	0.057	

[#] dissolved concentrations

[^] total concentrations

¹ Laboratory unable to provide sample analysis for Total Heavy Metals.

SF1 (Special Frequency 1) means in the event of a discharge, a grab sample of the water discharged must be collected: a) within the first 6 hours of any discharge occurring; and b) every seven (7) days thereafter for the duration of the discharge.

LOR means below the limit of reporting

Table A2-3: LDP017 Water Quality Monitoring Summary 2021 (all analytes)

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Aluminium [#] (mg/l)	SF1	6	LOR	0.015	0.08	0.22
Aluminium [^] (mg/l)	SF1	6	0.12	0.587	2.67	
Antimony (mg/l)	SF1	6	LOR	LOR	LOR	0.009
Arsenic [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.042
Arsenic [^] (mg/l)	SF1	6	LOR	0.0005	0.002	
Barium [#] (mg/l)	SF1	6	0.023	0.0285	0.032	0.25
Beryllium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.004
Beryllium [^] (mg/l)	SF1	6	LOR	LOR	LOR	
Bicarbonate alkalinity (mg of CaCO ₃ /l)	SF1	6	121	289	349	711
Boron [#] (mg/l)	SF1	6	0.05	0.108	0.13	0.37
Cadmium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.0004
Calcium (mg/l)	SF1	6	30	48	55	38
Chloride (mg/l)	SF1	6	62	147	185	516
Chromium [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.006
Chromium [^] (mg/l)	SF1	6	LOR	0.000333	0.002	
Cobalt [#] (mg/l)	SF1	6	LOR	LOR	LOR	0.003
Cobalt [^] (mg/l)	SF1	6	LOR	0.0003	0.002	
Conductivity (µS/cm)	SF2	6	944	1544	1730	3250
Copper [#] (mg/l)	SF1	6	LOR	0.0005	0.002	0.007
Copper [^] (mg/l)	SF1	6	0.001	0.002	0.004	
Iron (mg/l)	SF1	6	0.05	0.403	1.76	
Iron [#] (mg/l)	SF1	6	LOR	0.028	0.12	230
Lead [#] (mg/l)	SF1	6	LOR	0.00067	0.004	0.023

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Lead^ (mg/l)	SF1	6	LOR	0.0003	0.002	
Lithium# (mg/l)	SF1	6	0.037	0.064	0.079	0.164
Magnesium (mg/l)	SF1	6	20	34.5	39	16
Manganese# (mg/l)	SF1	6	0.003	0.009	0.021	1.2
Mercury# (mg/l)	SF1	6	LOR	LOR	LOR	0.0006
Mercury^ (mg/l)	SF1	6	LOR	LOR	LOR	
Molybdenum# (mg/l)	SF1	6	0.003	0.0035	0.004	0.045
Molybdenum^ (mg/l)	SF1	6	0.004	0.0045	0.005	
Nickel# (mg/l)	SF1	6	0.003	0.004	0.005	0.024
Nickel^ (mg/l)	SF1	6	0.003	0.004	0.006	
Nitrogen^ (mg/l)	SF1	6	0	0.083	0.4	2.7
Oil and Grease (mg/l)	SF1	6	LOR	LOR	LOR	6
pH	SF1	6	7.28	7.38	7.76	6.5-8.5
Phosphorus^ (mg/l)	SF1	6	0	0.008	0.04	0.41
Potassium (mg/l)	SF1	6	6	7.83	9	6
Selenium# (mg/l)	SF1	6	LOR	LOR	LOR	
Selenium^ (mg/l)	SF1	6	LOR	LOR	LOR	0.011
Silica# (mg/l)	SF1	6	9	11.28	13.3	24.8
Silver# (mg/l)	SF1	6	LOR	LOR	LOR	<0.001
Sodium (mg/l)	SF1	6	141	245	288	635
Sulfate (mg/l)	SF1	6	228	304	359	232
Temperature (°C)	SF2	6	14	17.182	20.3	
Tin (mg/l)	SF1	6	LOR	LOR	LOR	0.003
Titanium (mg/l)	SF1	6	LOR	0.003	0.02	10
TKN-N (mg/l)	SF1	6	LOR	0.03	0.2	2.6

Pollutant	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value	EPL395 100 percentile concentration limit
Total suspended solids (mg/l)	SF1	5	8	28	87	50
Turbidity (NTU)	SF2	6	LOR	LOR	LOR	
Vanadium [#] (mg/l)	SF1	6	LOR	LOR	LOR	<0.010
Vanadium [^] (mg/l)	SF1	6	LOR	0.0027	0.011	
Zinc [#] (mg/l)	SF1	6	LOR	0.011	0.034	0.04
Zinc [^] (mg/l)	SF1	6	LOR	0.0005	0.002	

[#] dissolved concentrations (where specified by EPL)

[^] total concentrations (where specified by EPL)

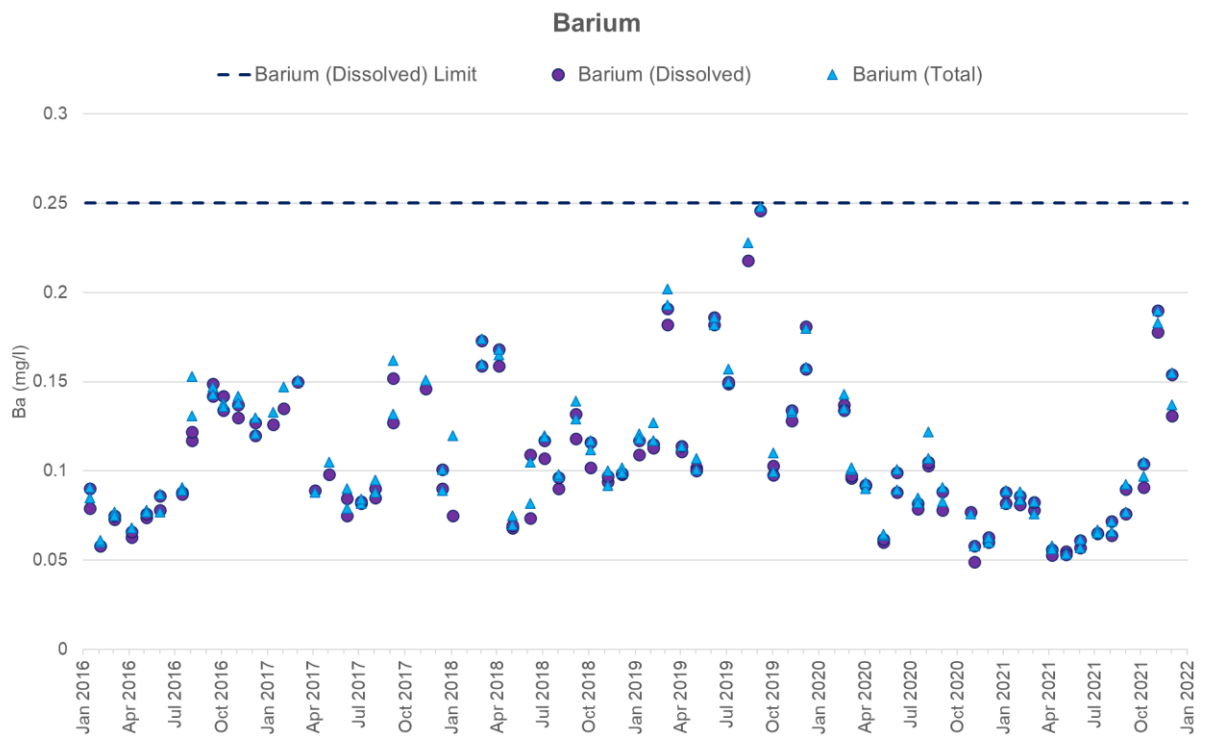
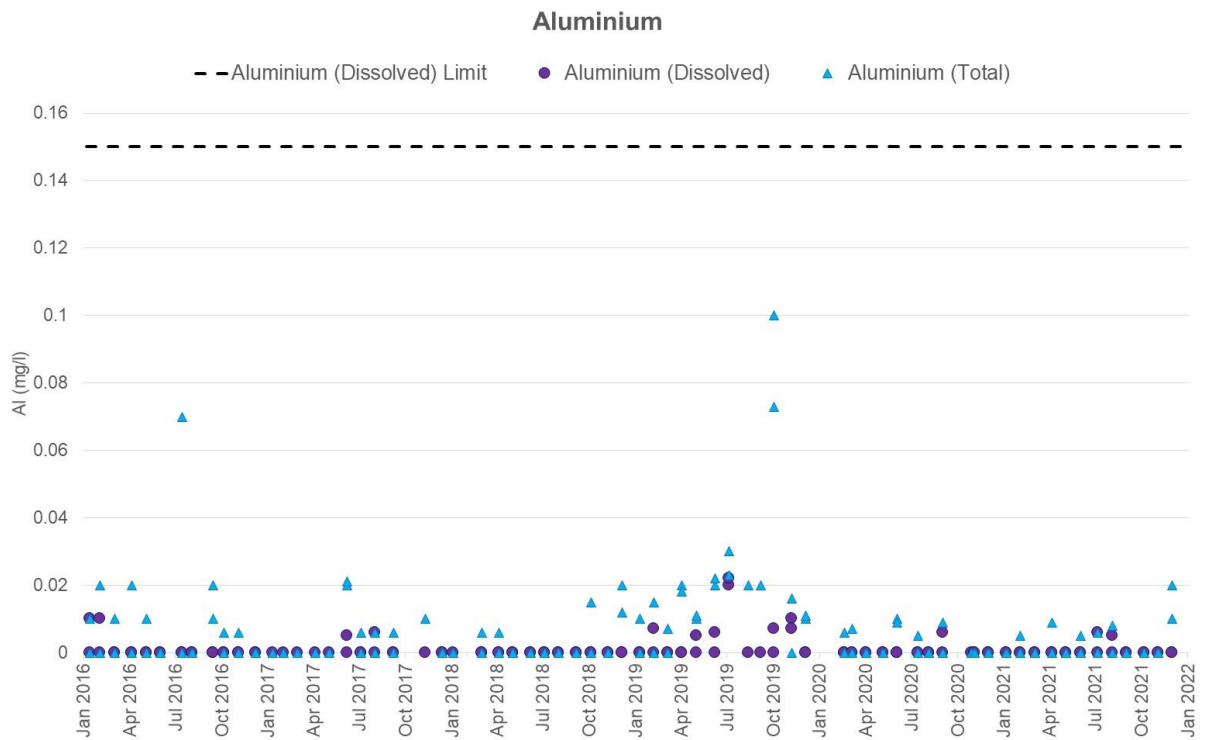
SF1 (Special Frequency 1) means in the event of a discharge, a grab sample of the water discharged must be collected: a) within the first 6 hours of any discharge occurring; and b) every seven (7) days thereafter for the duration of the discharge.

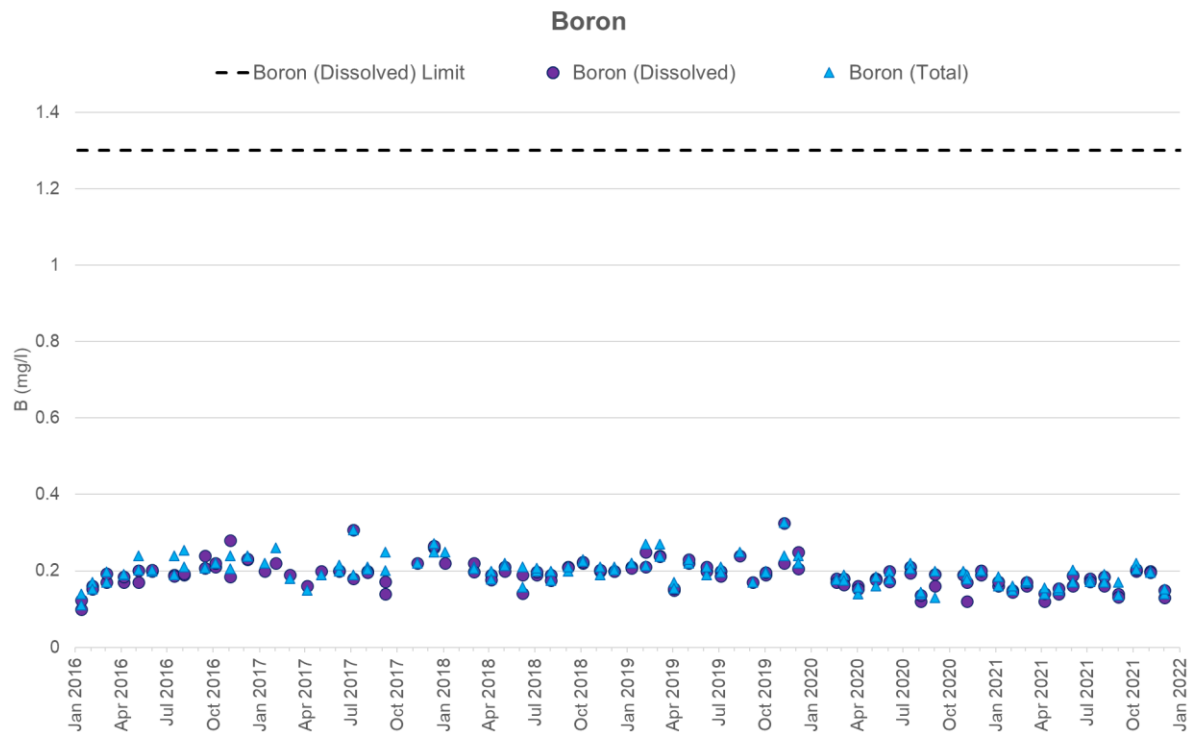
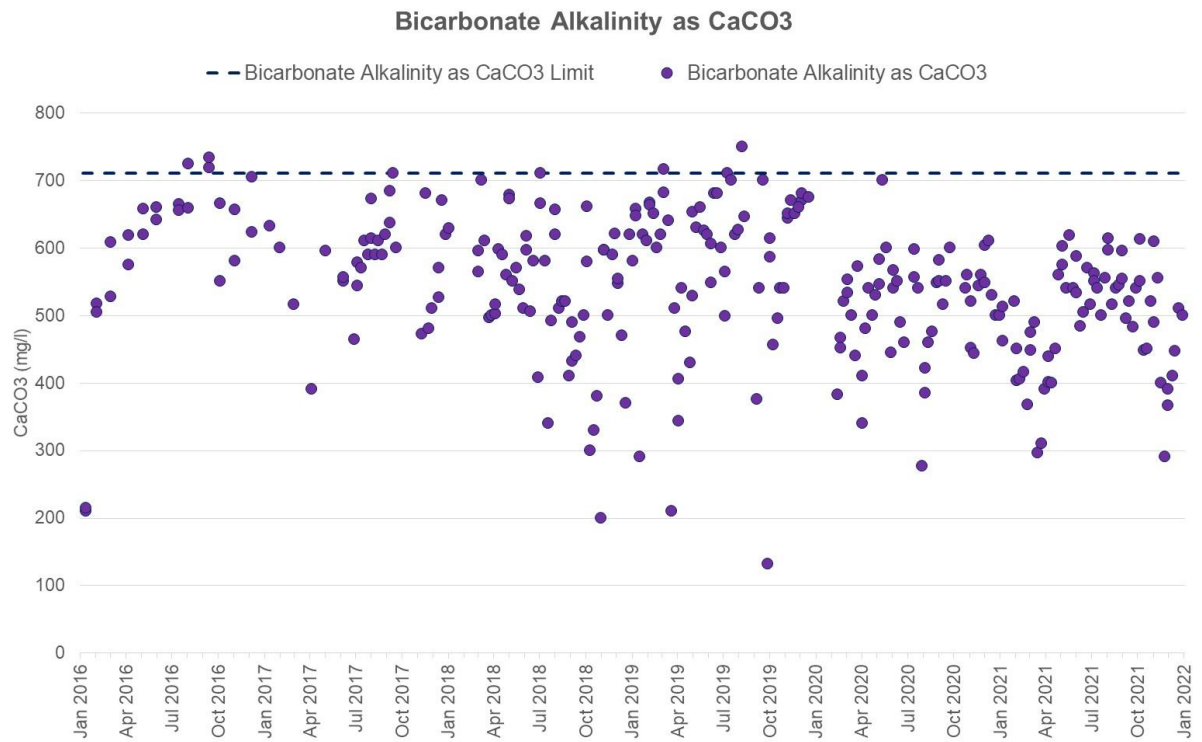
SF2 (Special Frequency 2) means continuous sampling during any discharge

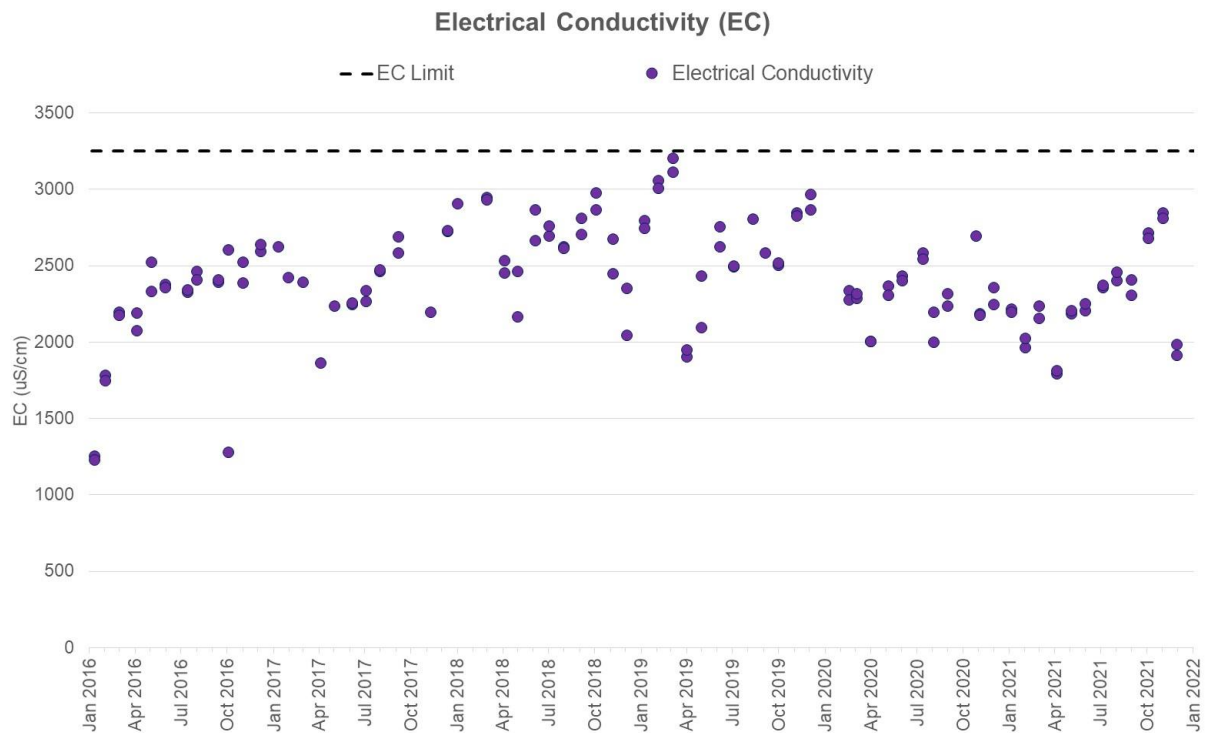
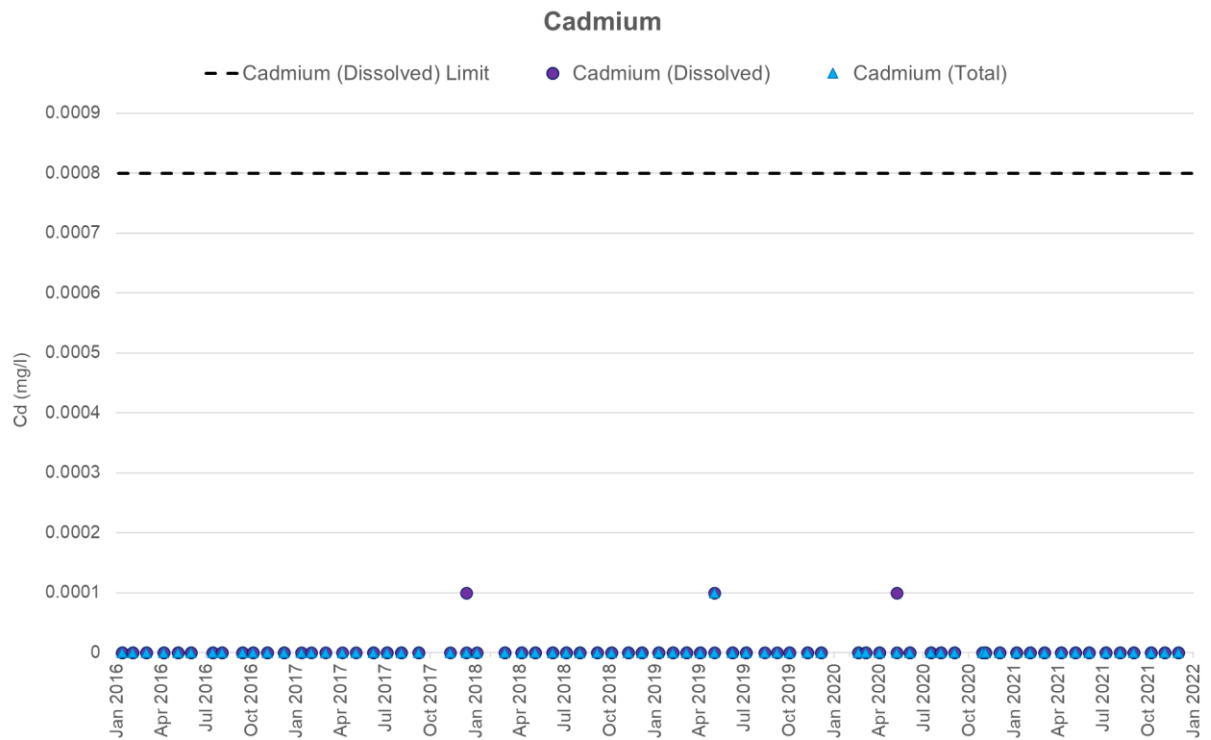
LOR means below the limit of reporting

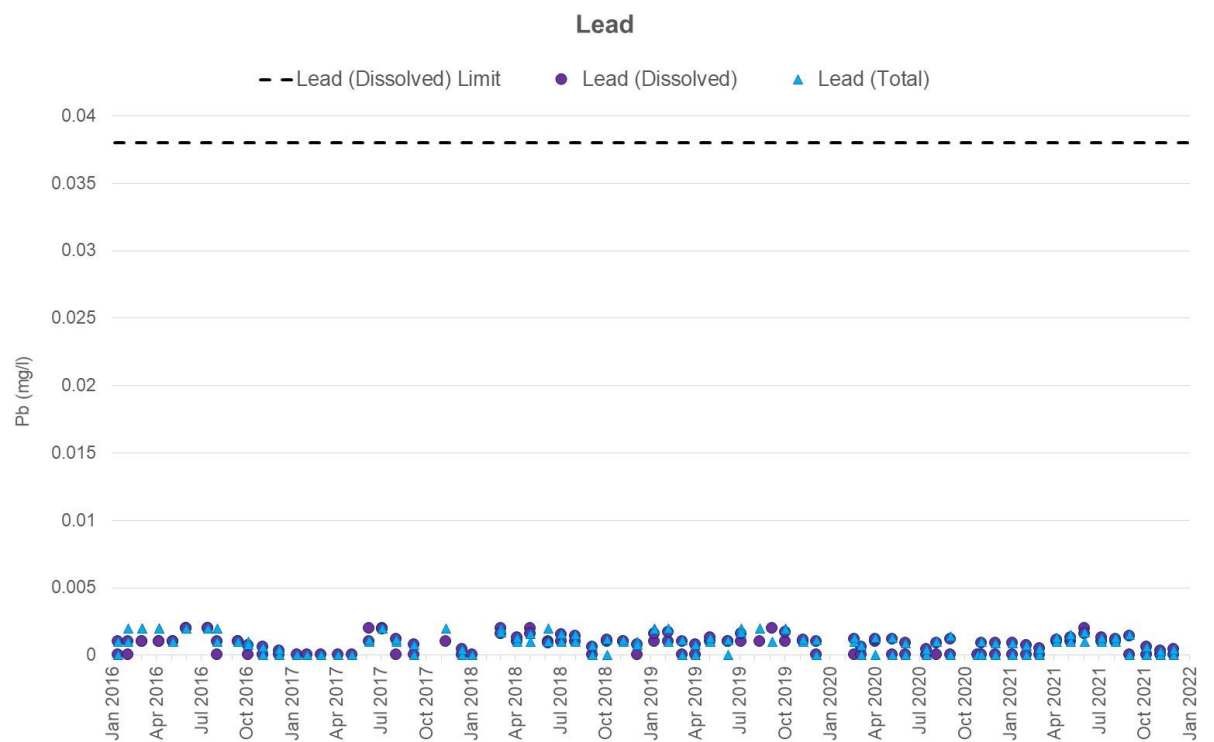
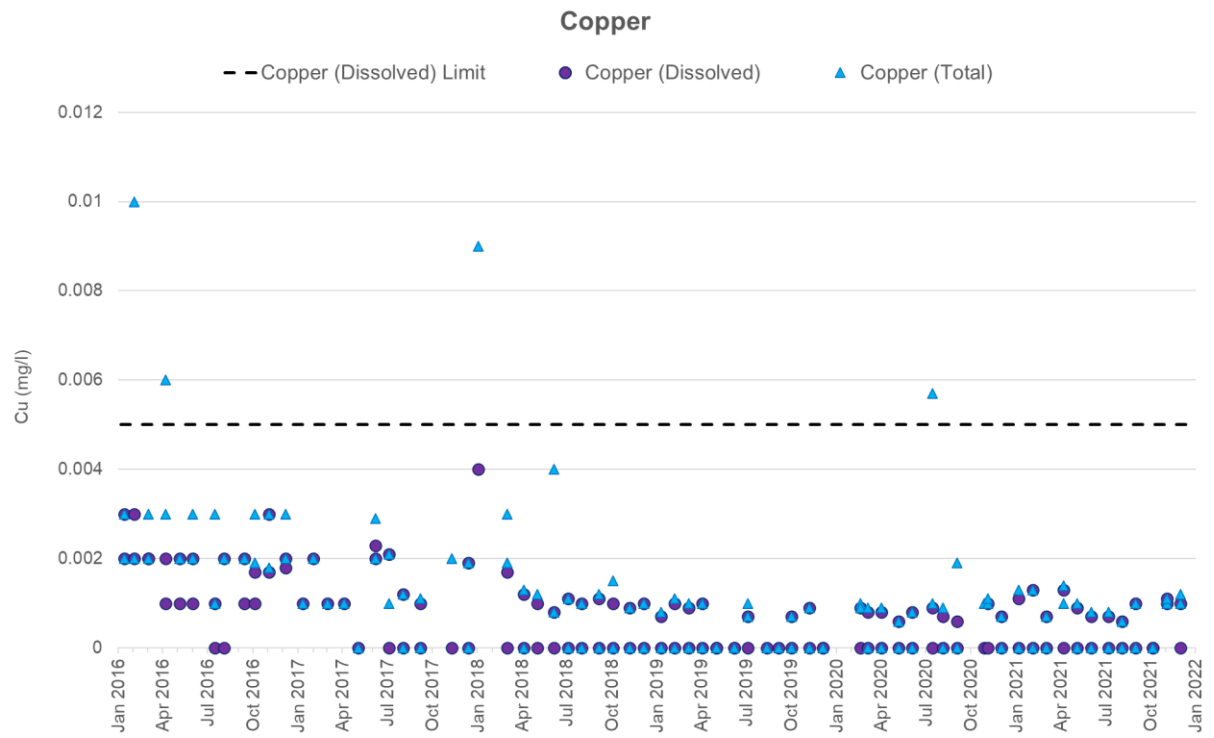
A2.2 Surface Water Quality – LDP001 Long Term Trends against Limits

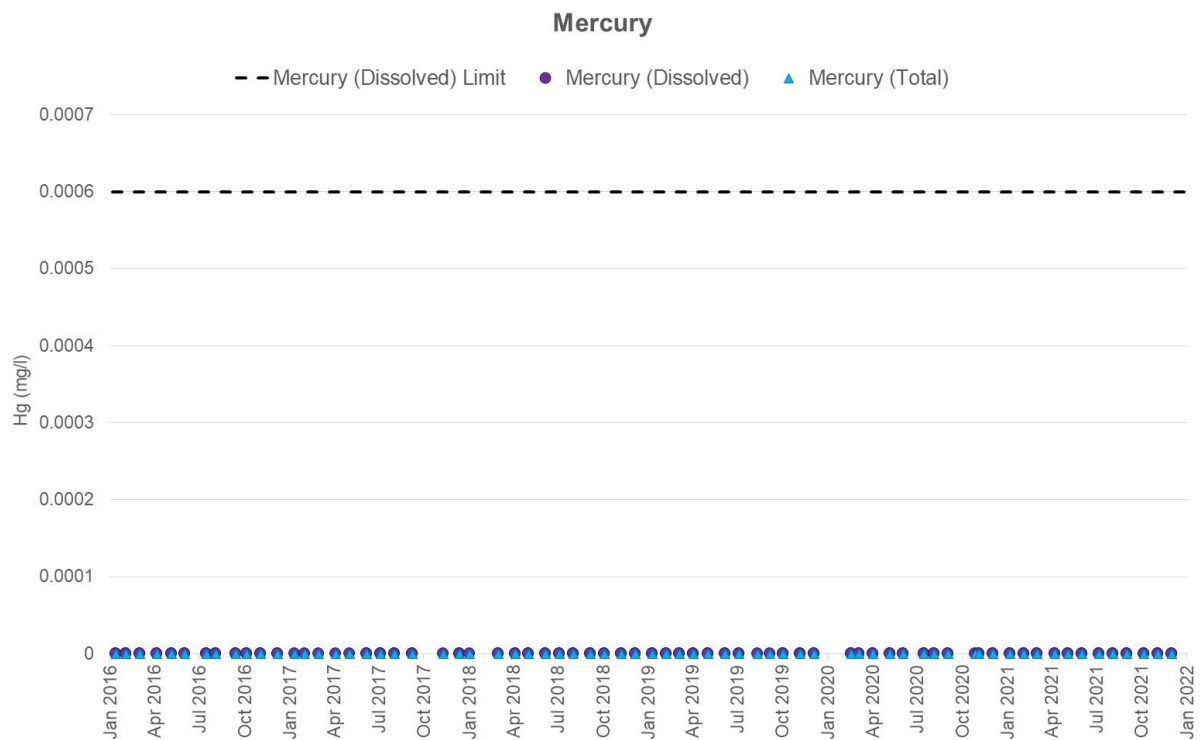
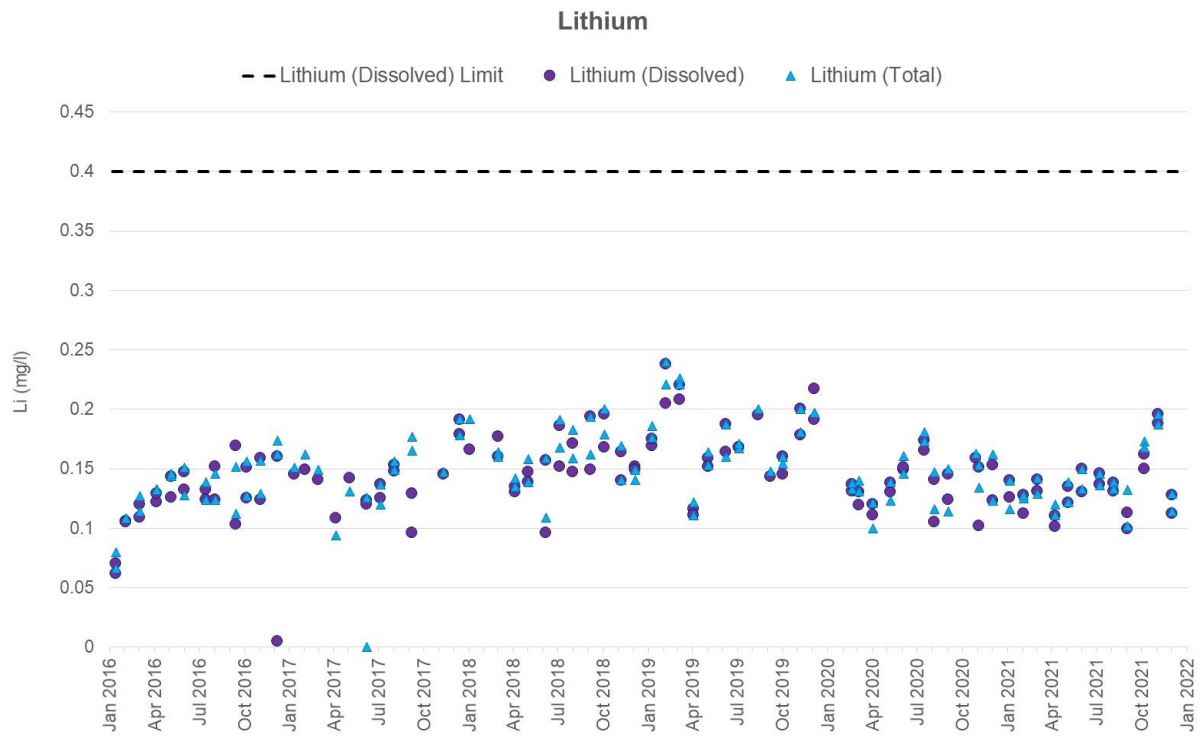
A2.2.1 ALUMINIUM	78
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A2.2.3 BICARBONATE ALKALINITY	79
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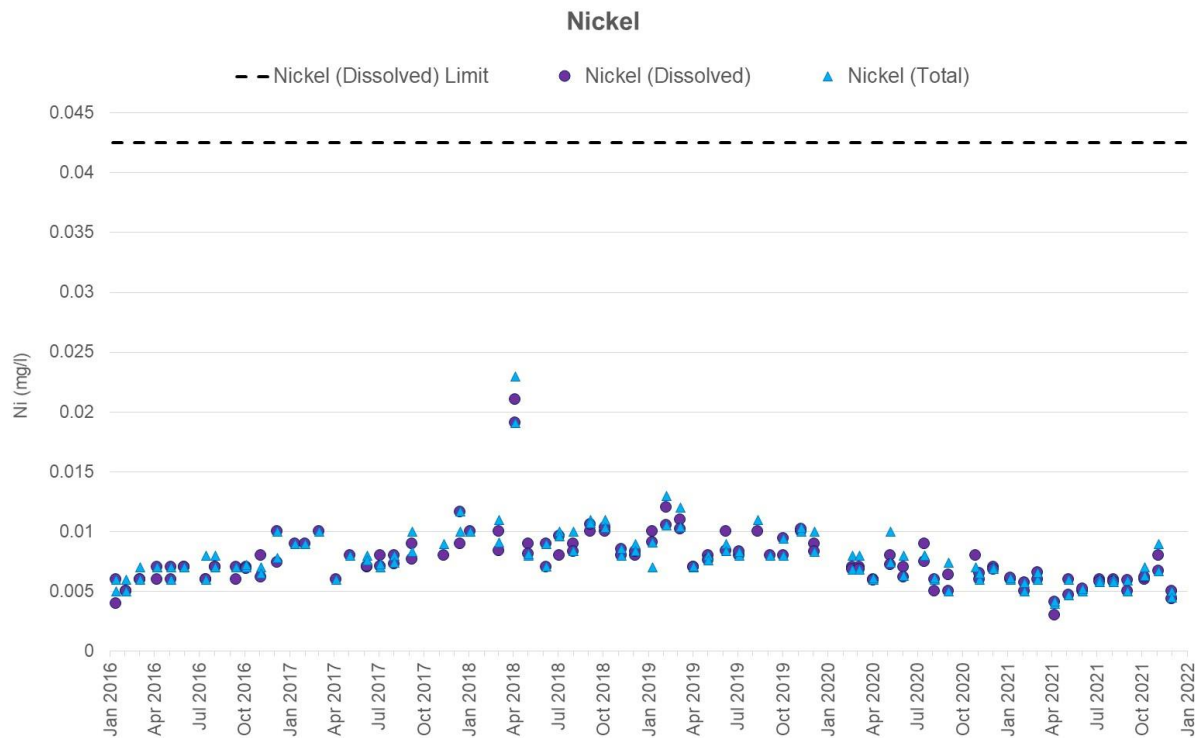
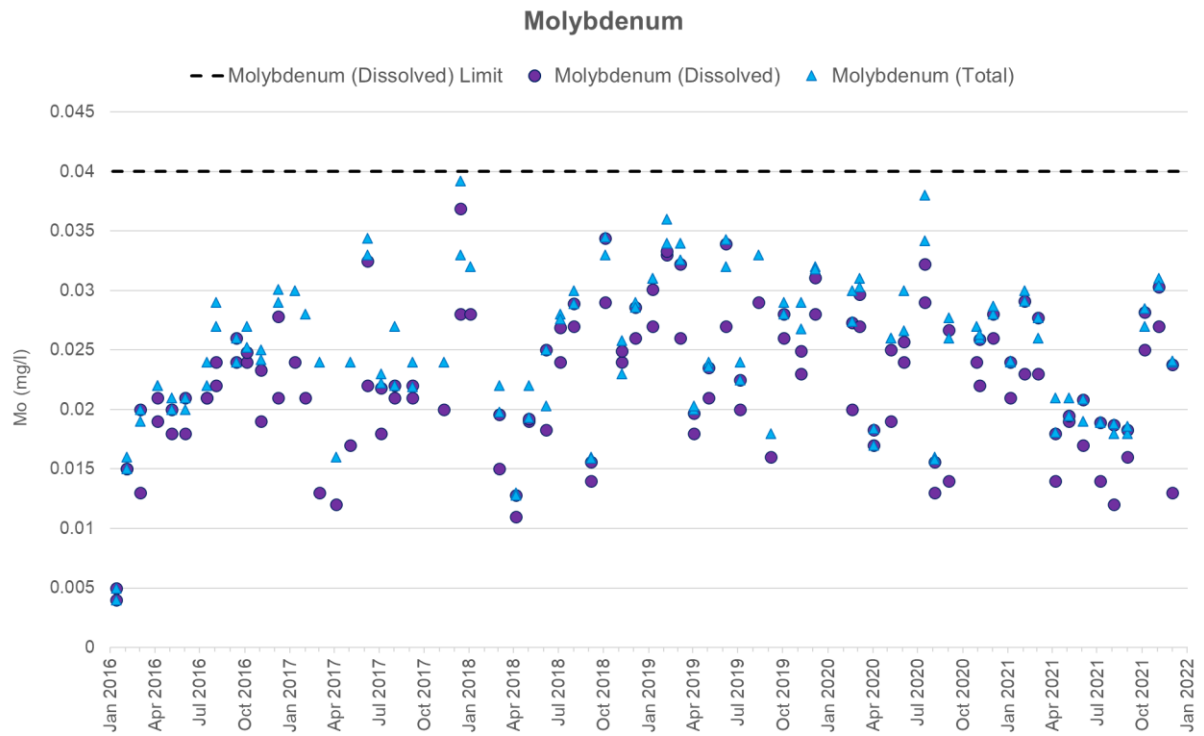


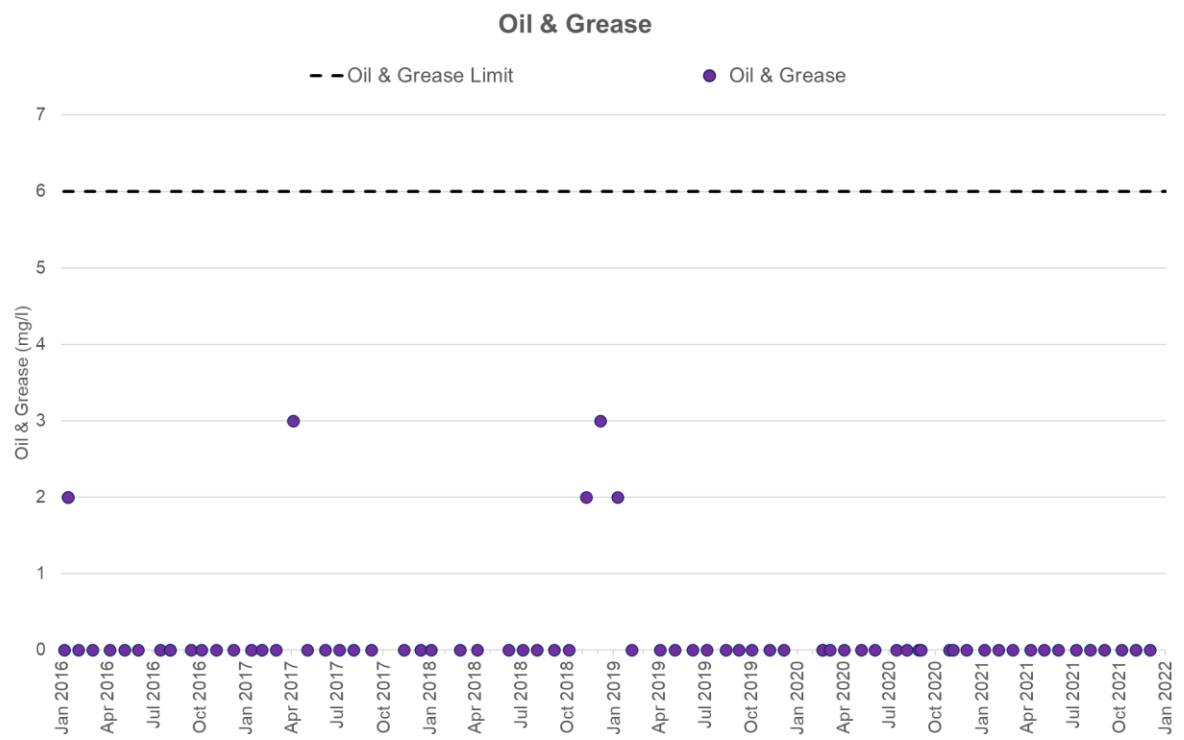
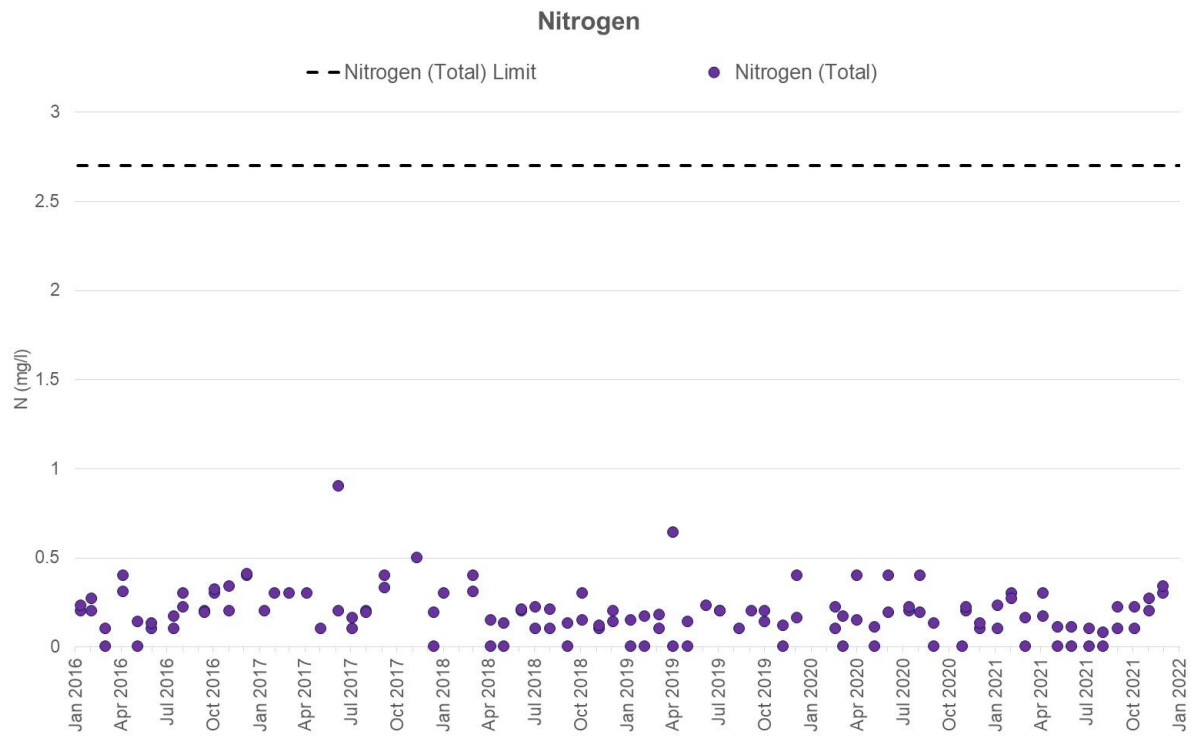


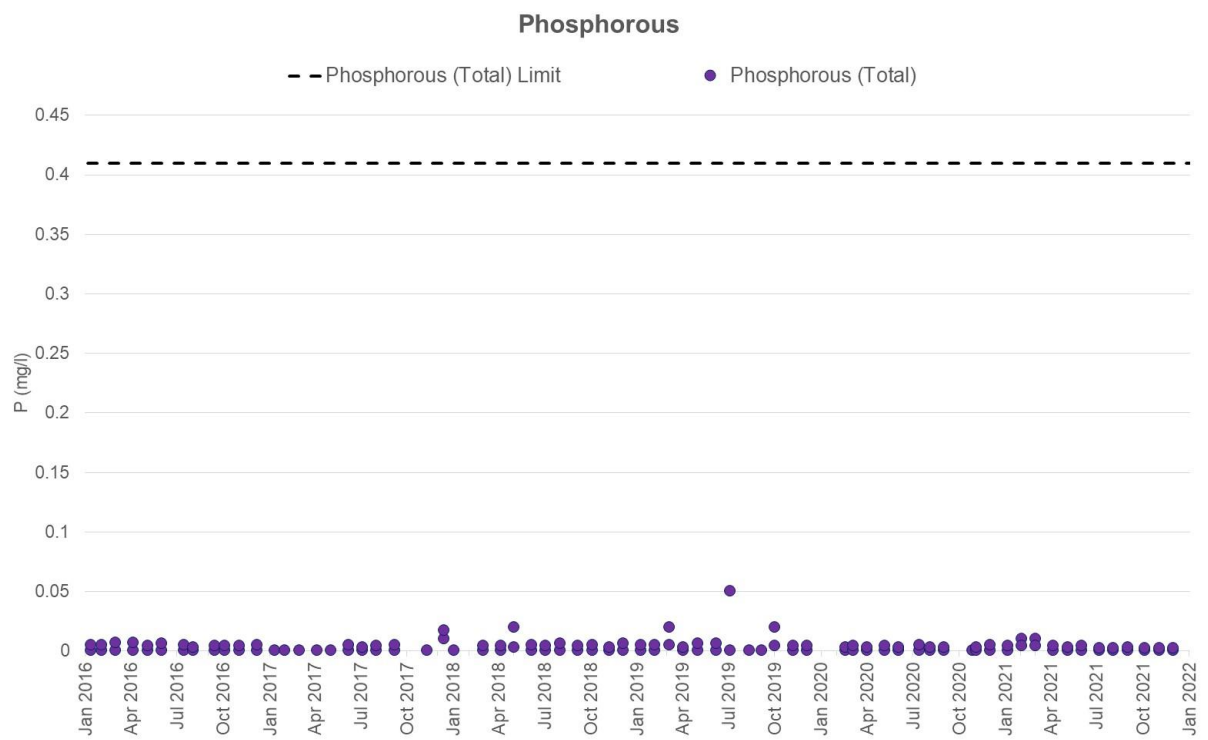
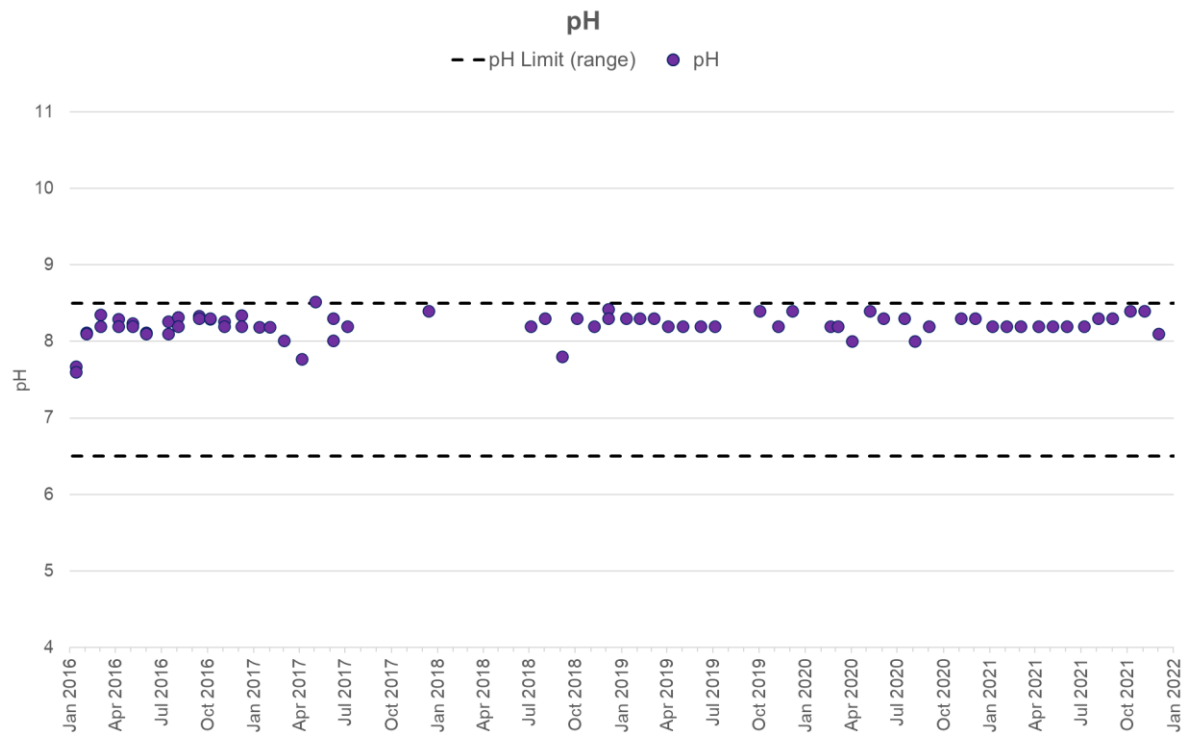


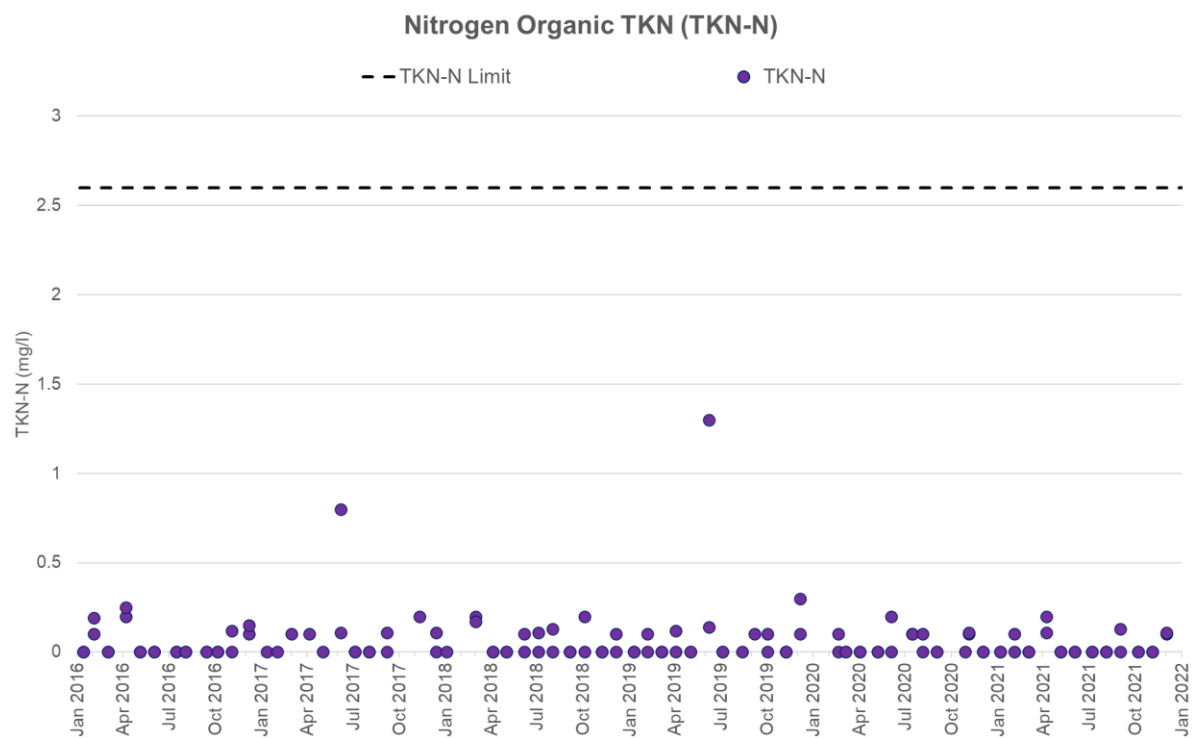
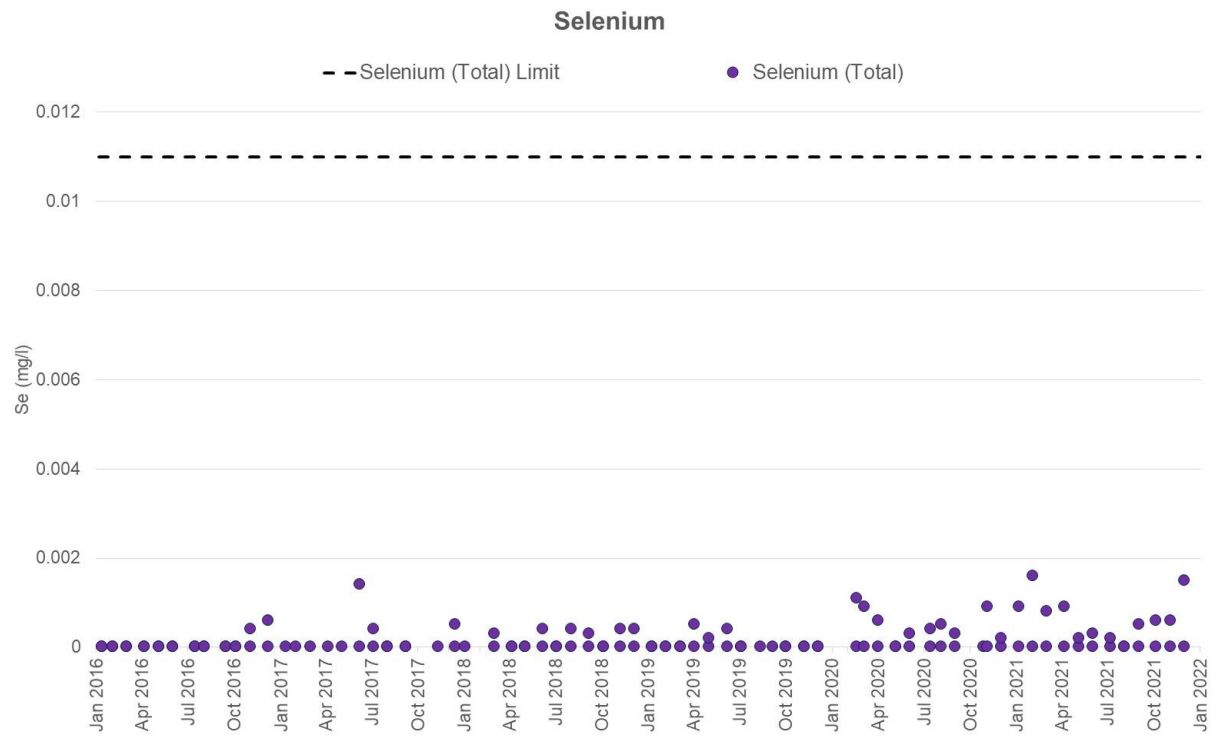


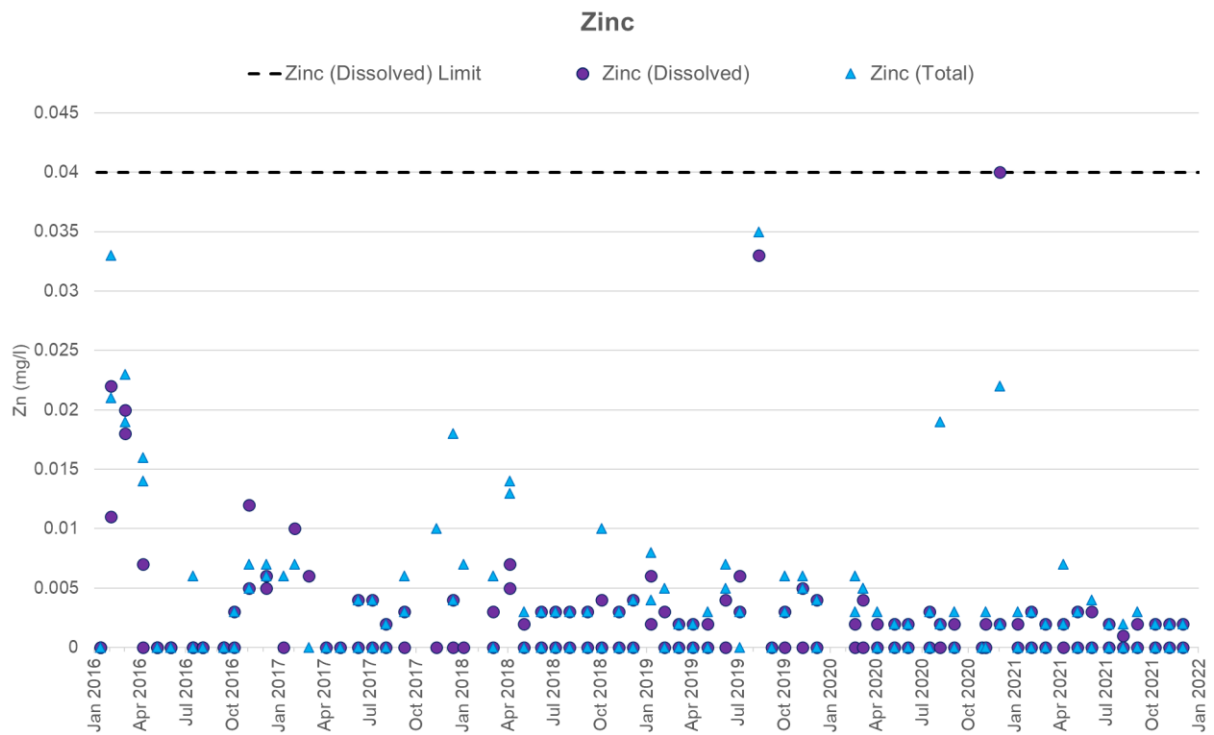
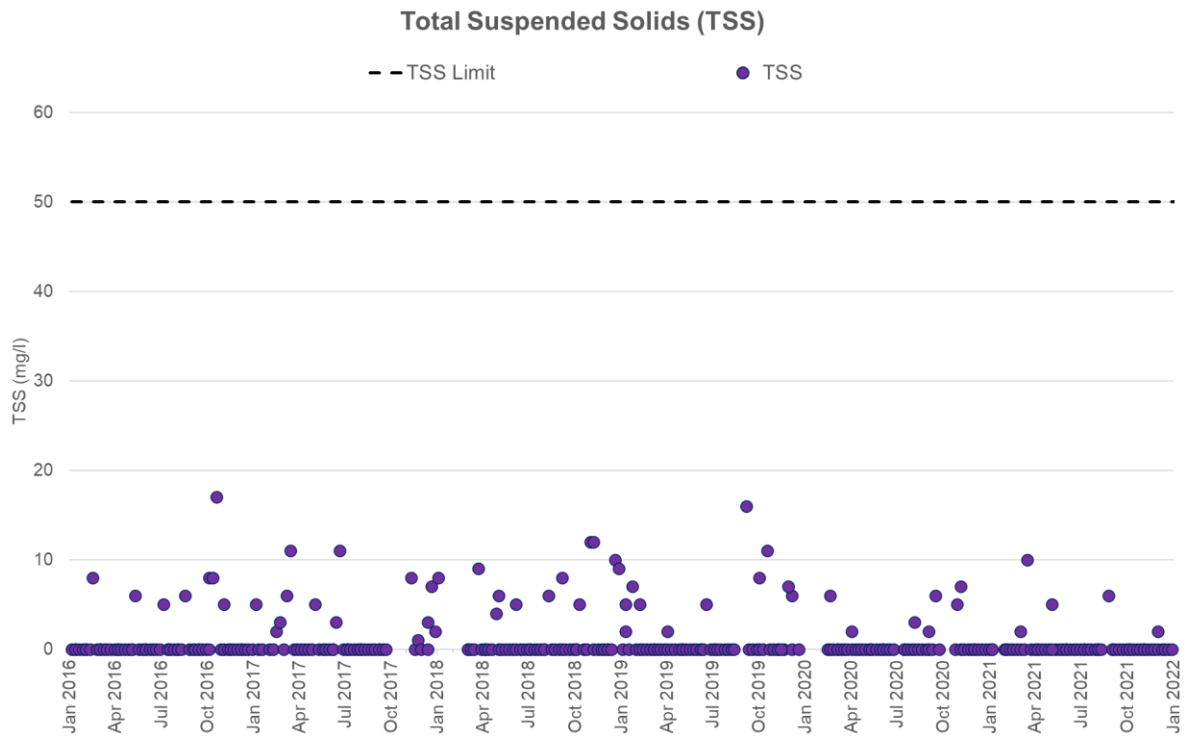






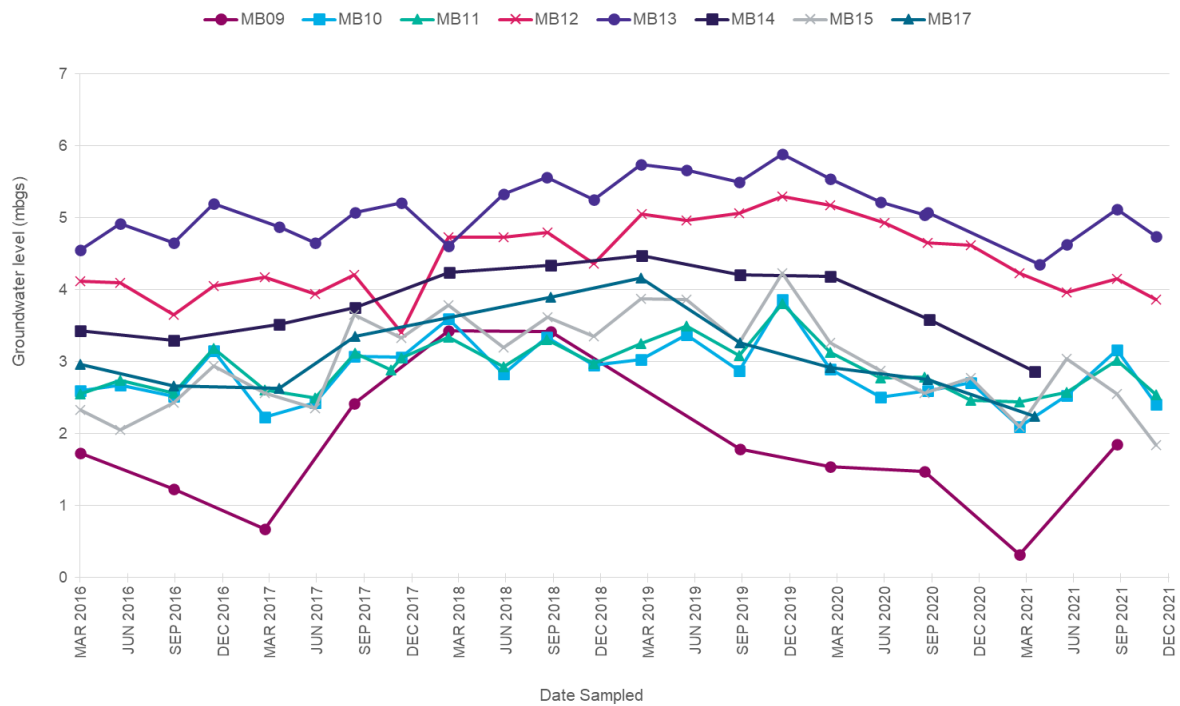




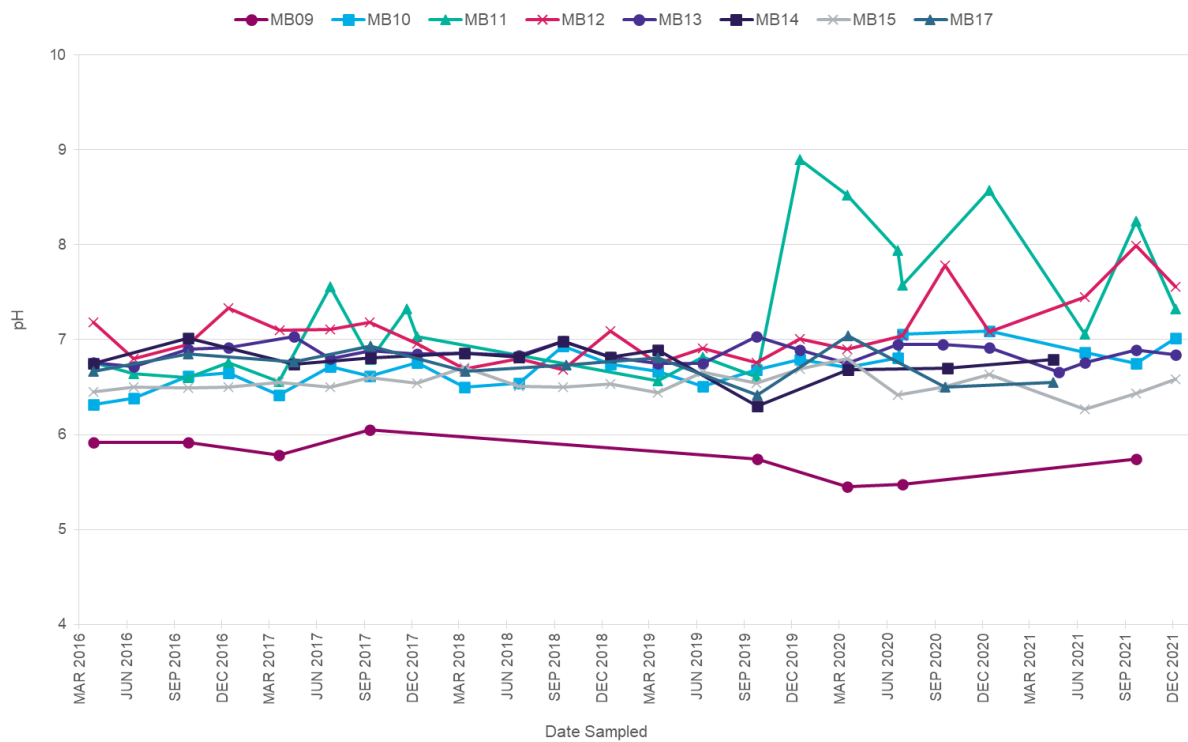


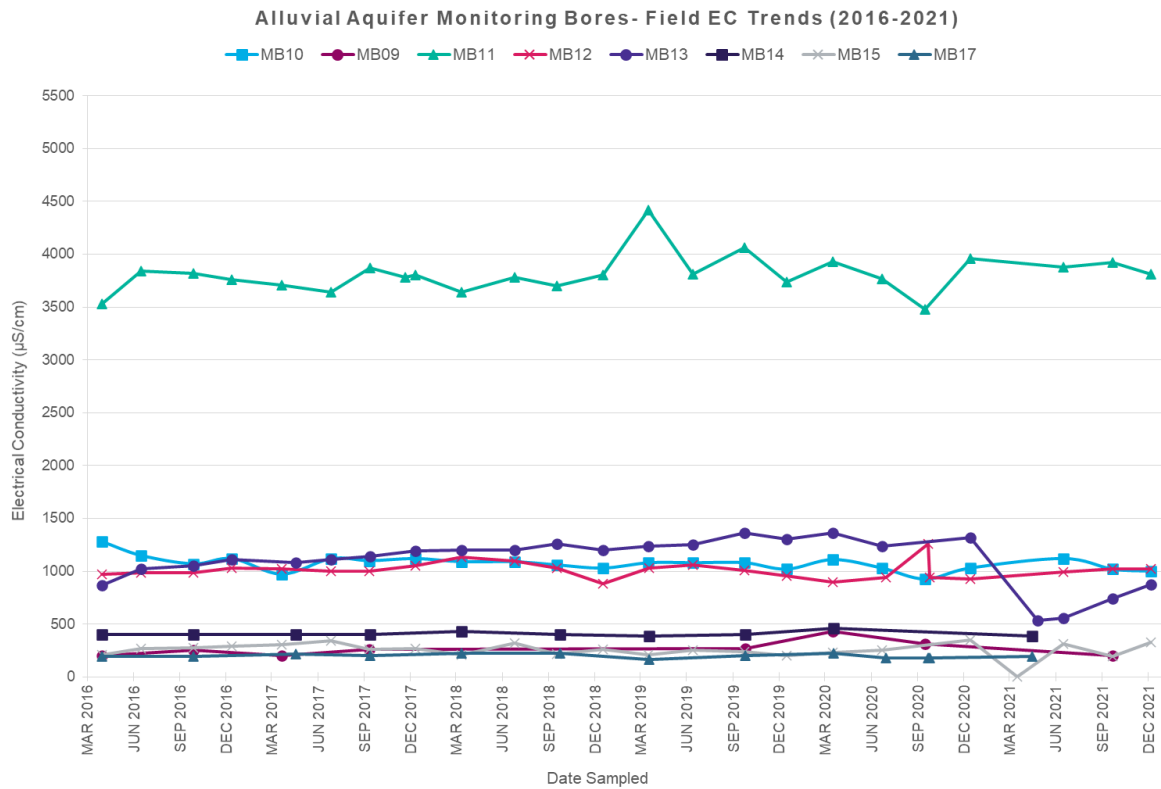
A2.3 Groundwater Quality Monitoring - Long-term Trends for Alluvial Aquifer

Alluvial aquifer Monitoring Bores- Groundwater Level (Depth To Water) (2016-2021)

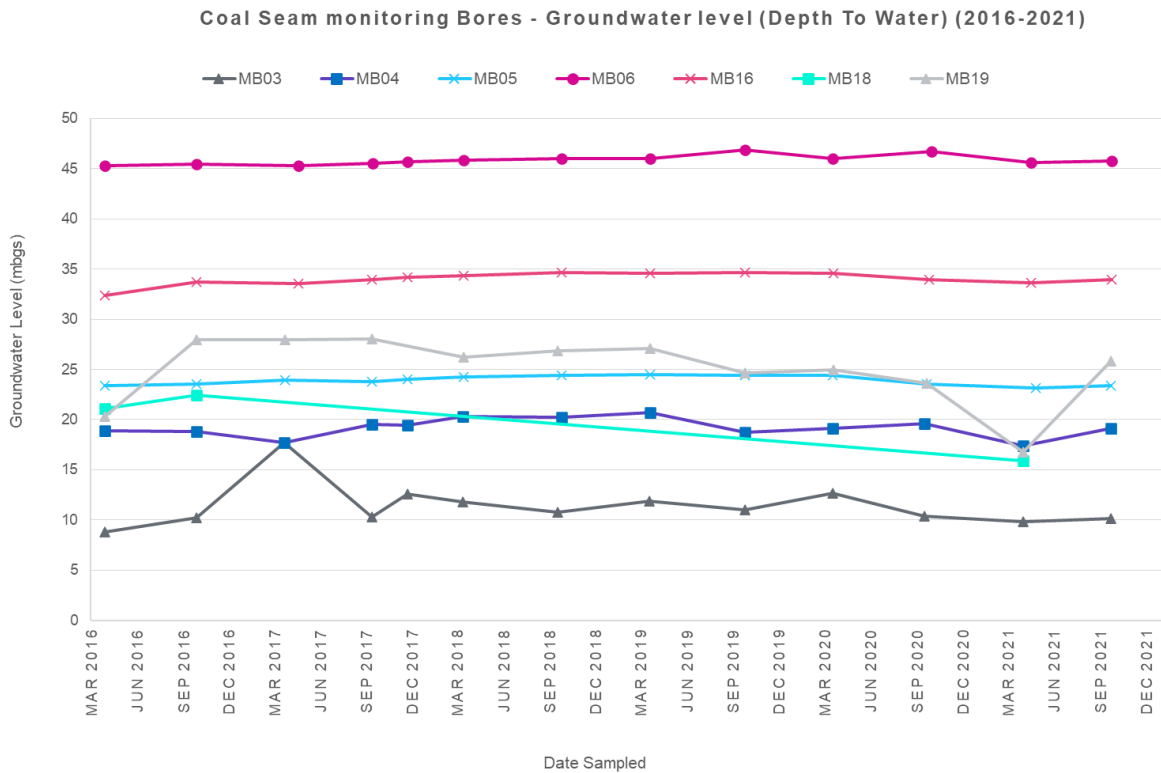


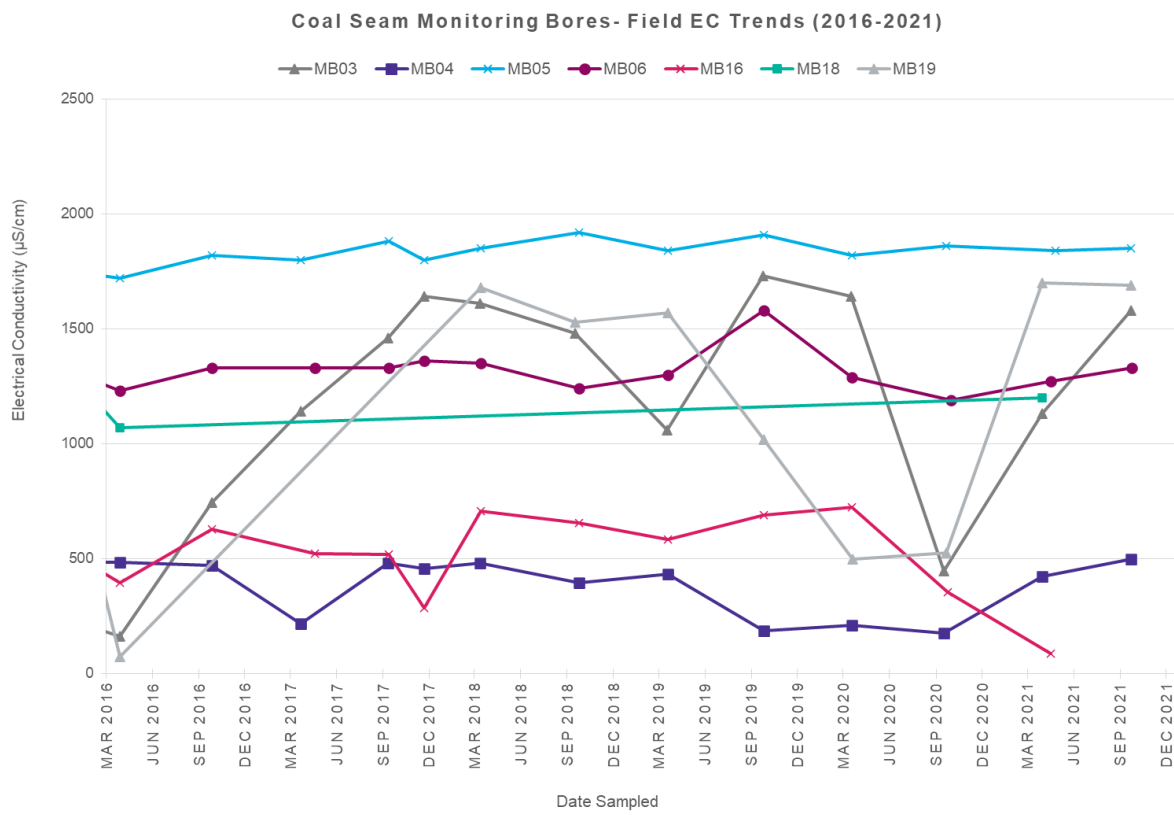
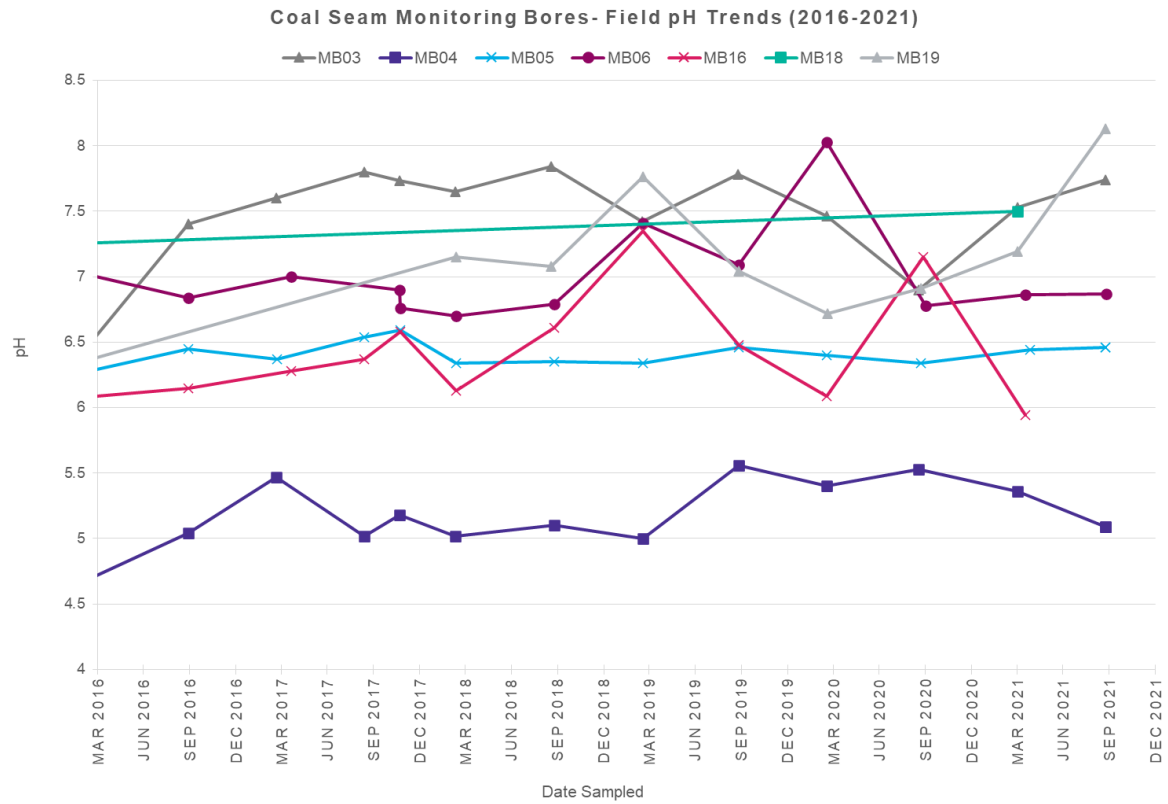
Alluvial Aquifer Monitoring Bores- Field pH Trends (2016-2021)





A2.4 Groundwater Quality Monitoring - Long-term Trends for Coal Seam Aquifer





Appendix 3: Attended Noise Monitoring Results

This appendix provides a summary of the attended noise monitoring results

Table A3-1: Attended Noise Monitoring Results (2018 – 2021)

Date and time	Site ID	Period	Done by	LAm _{ax} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
16/12/2021 16:02	NC1	Day	GHD	72	58	50	41	48	N/A	35	N/A	N/A	Yes
16/12/2021 16:25	NC2	Day	GHD	76	72	65	37	61	32	36	N/A	N/A	Yes
16/12/2021 16:48	NC3	Day	GHD	72	66	49	42	53	N/A	40	N/A	N/A	Yes
16/12/2021 17:07	NC4	Day	GHD	70	60	48	40	48	N/A	35	N/A	N/A	Yes
16/12/2021 17:25	NC5	Day	GHD	70	62	49	41	49	N/A	35	N/A	N/A	Yes
16/12/2021 17:44	NC6	Day	GHD	80	74	62	44	61	N/A	40	N/A	N/A	Yes
16/12/2021 18:37	NC1	Evening	GHD	92	82	55	40	68	N/A	35	N/A	N/A	Yes
16/12/2021 18:58	NC2	Evening	GHD	75	71	56	36	57	31	35	N/A	N/A	Yes
16/12/2021 19:19	NC3	Evening	GHD	70	64	45	39	49	N/A	39	N/A	N/A	Yes
16/12/2021 19:39	NC4	Evening	GHD	58	53	45	36	43	N/A	35	N/A	N/A	Yes
16/12/2021 19:57	NC5	Evening	GHD	60	52	47	39	45	N/A	35	N/A	N/A	Yes
16/12/2021 20:17	NC6	Evening	GHD	80	71	55	48	58	N/A	39	N/A	N/A	Yes
16/12/2021 22:14	NC1	Night	GHD	101	93	84	39	80	N/A	35	N/A	45	Yes
16/12/2021 22:36	NC2	Night	GHD	73	48	36	34	46	24	35	<35	45	Yes
16/12/2021 22:58	NC3	Night	GHD	68	61	44	39	47	N/A	39	N/A	45	Yes
16/12/2021 23:17	NC4	Night	GHD	49	44	41	34	38	N/A	35	N/A	45	Yes
16/12/2021 23:36	NC5	Night	GHD	53	42	39	36	38	N/A	35	N/A	45	Yes
16/12/2021 23:56	NC6	Night	GHD	79	62	47	39	53	N/A	39	N/A	45	Yes
2/09/2021 15:44	NC1	Day	GHD	98	87	55	41	72	N/A	35	N/A	N/A	Yes
2/09/2021 16:07	NC2	Day	GHD	76	71	62	37	59	34	36	N/A	N/A	Yes
2/09/2021 16:30	NC3	Day	GHD	79	75	54	40	61	N/A	40	N/A	N/A	Yes
2/09/2021 16:51	NC4	Day	GHD	70	61	51	38	49	N/A	35	N/A	N/A	Yes
2/09/2021 17:11	NC5	Day	GHD	67	56	46	38	46	N/A	35	N/A	N/A	Yes
2/09/2021 17:32	NC6	Day	GHD	81	72	58	39	59	N/A	40	N/A	N/A	Yes
2/09/2021 18:00	NC1	Evening	GHD	94	85	67	39	71	N/A	35	N/A	N/A	Yes
2/09/2021 18:23	NC2	Evening	GHD	76	70	53	49	57	N/A	35	N/A	N/A	Yes
2/09/2021 18:46	NC3	Evening	GHD	69	61	42	36	47	N/A	39	N/A	N/A	Yes
2/09/2021 19:07	NC4	Evening	GHD	47	44	38	34	37	N/A	35	N/A	N/A	Yes
2/09/2021 19:28	NC5	Evening	GHD	56	42	39	32	36	N/A	35	N/A	N/A	Yes
2/09/2021 19:49	NC6	Evening	GHD	53	52	40	35	39	30	39	N/A	N/A	Yes
2/09/2021 22:00	NC1	Night	GHD	79	73	44	38	58	N/A	35	-	45	Yes
2/09/2021 22:23	NC2	Night	GHD	75	58	37	31	49	N/A	35	-	45	Yes
2/09/2021 22:45	NC3	Night	GHD	65	42	40	37	40	33	39	45	45	Yes

Date and time	Site ID	Period	Done by	LAm _{max} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
2/09/2021 23:05	NC4	Night	GHD	50	41	38	33	35	30	35	33	45	Yes
2/09/2021 23:26	NC5	Night	GHD	61	49	35	31	37	N/A	35	-	45	Yes
2/09/2021 23:47	NC6	Night	GHD	76	54	40	38	48	33	39	40	45	Yes
15/06/2021 15:46	NC1	Day	GHD	69	58	46	39	46	N/A	35	N/A	N/A	Yes
15/06/2021 16:10	NC2	Day	GHD	76	72	68	38	63	N/A	36	N/A	N/A	Yes
15/06/2021 16:34	NC3	Day	GHD	74	70	55	44	57	N/A	40	N/A	N/A	Yes
15/06/2021 16:54	NC4	Day	GHD	80	58	53	38	53	N/A	35	N/A	N/A	Yes
15/06/2021 17:15	NC5	Day	GHD	55	49	42	35	40	N/A	35	N/A	N/A	Yes
15/06/2021 17:36	NC6	Day	GHD	85	75	66	43	63	N/A	40	N/A	N/A	Yes
15/06/2021 18:09	NC1	Evening	GHD	71	53	46	39	47	N/A	35	N/A	N/A	Yes
15/06/2021 18:33	NC2	Evening	GHD	77	72	56	33	58	N/A	35	N/A	N/A	Yes
15/06/2021 18:57	NC3	Evening	GHD	74	68	48	38	55	31	39	N/A	N/A	Yes
15/06/2021 19:19	NC4	Evening	GHD	60	56	46	37	44	N/A	35	N/A	N/A	Yes
15/06/2021 19:40	NC5	Evening	GHD	55	47	41	34	38	N/A	35	N/A	N/A	Yes
15/06/2021 20:02	NC6	Evening	GHD	80	70	54	40	58	37	39	N/A	N/A	Yes
15/06/2021 22:03	NC1	Night	GHD	51	46	43	37	41	N/A	35	-	45	Yes
15/06/2021 22:27	NC2	Night	GHD	70	51	38	32	43	31	35	40	45	Yes
15/06/2021 22:49	NC3	Night	GHD	52	46	44	41	43	32	39	44	45	Yes
15/06/2021 23:11	NC4	Night	GHD	68	62	57	35	51	N/A	35	-	45	Yes
15/06/2021 23:32	NC5	Night	GHD	51	47	41	32	38	N/A	35	-	45	Yes
15/06/2021 23:54	NC6	Night	GHD	67	50	41	31	43	N/A	39	-	45	Yes
4/03/2021 15:48	NC1	Day	GHD	63	49	44	40	43	N/A	35	N/A	N/A	Yes
4/03/2021 16:10	NC2	Day	GHD	76	71	65	37	59	N/A	36	N/A	N/A	Yes
4/03/2021 16:33	NC3	Day	GHD	74	71	54	41	57	N/A	40	N/A	N/A	Yes
4/03/2021 16:54	NC4	Day	GHD	60	55	46	37	43	N/A	35	N/A	N/A	Yes
4/03/2021 17:14	NC5	Day	GHD	64	49	44	39	43	N/A	35	N/A	N/A	Yes
4/03/2021 17:35	NC6	Day	GHD	79	74	65	42	61	N/A	40	N/A	N/A	Yes
4/03/2021 18:02	NC1	Evening	GHD	70	57	46	43	47	29	35	N/A	N/A	Yes
4/03/2021 18:24	NC2	Evening	GHD	75	68	50	36	54	31	35	N/A	N/A	Yes
4/03/2021 18:47	NC3	Evening	GHD	77	68	46	38	55	N/A	39	N/A	N/A	Yes
4/03/2021 19:08	NC4	Evening	GHD	70	59	49	36	48	N/A	35	N/A	N/A	Yes
4/03/2021 19:29	NC5	Evening	GHD	60	58	57	40	52	N/A	35	N/A	N/A	Yes
4/03/2021 19:50	NC6	Evening	GHD	85	71	55	46	59	N/A	39	N/A	N/A	Yes
4/03/2021 22:00	NC1	Night	GHD	54	52	52	49	51	N/A	35	-	45	Yes
4/03/2021 22:23	NC2	Night	GHD	73	64	41	35	49	N/A	35	-	45	Yes

Date and time	Site ID	Period	Done by	LAmx 15min	LA1 15min	LA10 15min	LA90 15min	LAeq 15min	Estimated Site Contribution (LAeq,15min)	Criteria (LAeq,15 min)	Estimated LA1,1min	Criteria (LA1,1 min)	Compliant with site consent / licence criteria (Yes/No)
4/03/2021 22:47	NC3	Night	GHD	67	63	54	38	50	N/A	39	-	45	Yes
4/03/2021 23:08	NC4	Night	GHD	52	47	38	34	37	N/A	35	-	45	Yes
4/03/2021 23:28	NC5	Night	GHD	53	46	39	34	38	N/A	35	-	45	Yes
4/03/2021 23:50	NC6	Night	GHD	71	51	42	37	45	N/A	39	-	45	Yes
1/12/2020 15:36	NC1	Day	GHD	68	52	47	44	47	N/A	35	N/A	N/A	Yes
1/12/2020 16:01	NC2	Day	GHD	88	74	68	59	65	33	36	N/A	N/A	Yes
1/12/2020 16:23	NC3	Day	GHD	74	73	71	67	69	33	40	N/A	N/A	Yes
1/12/2020 16:44	NC4	Day	GHD	69	62	54	48	53	N/A	35	N/A	N/A	Yes
1/12/2020 17:05	NC5	Day	GHD	74	64	62	57	60	N/A	35	N/A	N/A	Yes
1/12/2020 17:26	NC6	Day	GHD	84	75	64	57	64	N/A	40	N/A	N/A	Yes
1/12/2020 18:00	NC1	Evening	GHD	73	61	46	43	49	N/A	35	N/A	N/A	Yes
1/12/2020 18:23	NC2	Evening	GHD	78	72	66	58	64	N/A	35	N/A	N/A	Yes
1/12/2020 18:46	NC3	Evening	GHD	81	76	65	53	63	N/A	39	N/A	N/A	Yes
1/12/2020 19:06	NC4	Evening	GHD	75	63	59	45	54	N/A	35	N/A	N/A	Yes
1/12/2020 19:26	NC5	Evening	GHD	72	66	60	49	57	N/A	35	N/A	N/A	Yes
1/12/2020 19:47	NC6	Evening	GHD	82	72	66	59	64	N/A	39	N/A	N/A	Yes
2/12/2020 22:00	NC1	Night	GHD	48	46	44	40	42	21	35	21	45	Yes
2/12/2020 22:22	NC2	Night	GHD	74	66	44	40	51	24	35	24	45	Yes
2/12/2020 22:45	NC3	Night	GHD	78	74	53	43	61	N/A	39	-	45	Yes
2/12/2020 23:05	NC4	Night	GHD	61	53	49	40	46	N/A	35	-	45	Yes
2/12/2020 23:25	NC5	Night	GHD	48	46	45	38	42	N/A	35	-	45	Yes
2/12/2020 23:47	NC6	Night	GHD	72	62	46	40	49	N/A	39	-	45	Yes
2/09/2020 15:15	NC1	Day	GHD	71	57	52	44	49	N/A	35	N/A	N/A	Yes
2/09/2020 15:38	NC2	Day	GHD	81	74	69	41	63	N/A	36	N/A	N/A	Yes
2/09/2020 16:02	NC3	Day	GHD	75	66	56	44	54	N/A	40	N/A	N/A	Yes
2/09/2020 16:23	NC4	Day	GHD	81	71	56	36	57	N/A	35	N/A	N/A	Yes
2/09/2020 16:43	NC5	Day	GHD	59	49	42	35	40	N/A	35	N/A	N/A	Yes
2/09/2020 17:05	NC6	Day	GHD	82	76	68	42	64	N/A	40	N/A	N/A	Yes
2/09/2020 18:00	NC1	Evening	GHD	61	53	45	39	43	N/A	35	N/A	N/A	Yes
2/09/2020 18:23	NC2	Evening	GHD	76	72	55	40	58	N/A	35	N/A	N/A	Yes
2/09/2020 18:45	NC3	Evening	GHD	75	68	61	42	58	N/A	39	N/A	N/A	Yes
2/09/2020 19:07	NC4	Evening	GHD	65	58	54	36	49	N/A	35	N/A	N/A	Yes
2/09/2020 19:29	NC5	Evening	GHD	60	52	38	32	39	N/A	35	N/A	N/A	Yes
2/09/2020 19:51	NC6	Evening	GHD	76	69	58	38	56	N/A	39	N/A	N/A	Yes
2/09/2020 22:00	NC1	Night	GHD	50	47	44	37	41	N/A	35	-	45	Yes

Date and time	Site ID	Period	Done by	LAm _{max} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
2/09/2020 22:23	NC2	Night	GHD	78	65	43	36	52	N/A	35	-	45	Yes
2/09/2020 22:46	NC3	Night	GHD	79	74	42	33	59	33	39	<33	45	Yes
2/09/2020 23:08	NC4	Night	GHD	43	40	35	28	32	N/A	35	-	45	Yes
2/09/2020 23:29	NC5	Night	GHD	56	50	41	29	38	N/A	35	-	45	Yes
2/09/2020 23:52	NC6	Night	GHD	82	63	42	33	54	33	39	<33	45	Yes
11/06/2020 15:34	NC1	Day	GHD	70	63	55	41	51	N/A	35	N/A	N/A	Yes
11/06/2020 16:03	NC2	Day	GHD	82	76	69	37	65	N/A	36	N/A	N/A	Yes
11/06/2020 16:27	NC3	Day	GHD	81	74	57	43	61	N/A	40	N/A	N/A	Yes
11/06/2020 16:47	NC4	Day	GHD	75	55	50	39	47	N/A	35	N/A	N/A	Yes
11/06/2020 17:07	NC5	Day	GHD	70	58	49	42	48	N/A	35	N/A	N/A	Yes
11/06/2020 17:29	NC6	Day	GHD	79	71	62	47	59	37	40	N/A	N/A	Yes
11/06/2020 18:00	NC1	Evening	GHD	61	51	46	43	45	N/A	35	N/A	N/A	Yes
11/06/2020 18:00	NC2	Evening	GHD	79	73	58	35	59	30	35	N/A	N/A	Yes
11/06/2020 18:00	NC3	Evening	GHD	75	69	46	40	54	34	39	N/A	N/A	Yes
11/06/2020 18:00	NC4	Evening	GHD	66	63	50	35	48	N/A	35	N/A	N/A	Yes
11/06/2020 18:00	NC5	Evening	GHD	50	42	39	37	39	N/A	35	N/A	N/A	Yes
11/06/2020 18:00	NC6	Evening	GHD	74	66	49	40	52	35	39	N/A	N/A	Yes
11/06/2020 22:00	NC1	Night	GHD	53	47	45	40	43	N/A	35	-	45	Yes
11/06/2020 22:00	NC2	Night	GHD	79	70	43	36	55	30	35	36	45	Yes
11/06/2020 22:00	NC3	Night	GHD	51	45	41	38	40	34	39	40	45	Yes
11/06/2020 22:00	NC4	Night	GHD	65	59	38	30	44	N/A	35	-	45	Yes
11/06/2020 22:00	NC5	Night	GHD	46	40	35	31	33	N/A	35	-	45	Yes
11/06/2020 22:00	NC6	Night	GHD	69	59	44	35	46	35	39	40	45	Yes
10/03/2020 14:44	NC1	Day	GHD	66	57	54	42	50	N/A	35	N/A	N/A	Yes
10/03/2020 15:05	NC2	Day	GHD	79	73	66	40	61	35	36	N/A	N/A	Yes
10/03/2020 15:29	NC3	Day	GHD	78	75	60	41	62	N/A	40	N/A	N/A	Yes
10/03/2020 15:50	NC4	Day	GHD	79	64	50	39	56	N/A	35	N/A	N/A	Yes
10/03/2020 16:12	NC5	Day	GHD	68	59	54	50	53	N/A	35	N/A	N/A	Yes
10/03/2020 16:33	NC6	Day	GHD	88	75	65	44	63	N/A	40	N/A	N/A	Yes
10/03/2020 18:00	NC1	Evening	GHD		57	48	42	47	33	35	N/A	N/A	Yes
10/03/2020 18:23	NC2	Evening	GHD	78	72	56	34	58	31	35	N/A	N/A	Yes
10/03/2020 18:46	NC3	Evening	GHD	72	63	47	37	49	N/A	39	N/A	N/A	Yes
10/03/2020 19:07	NC4	Evening	GHD	62	55	50	34	45	N/A	35	N/A	N/A	Yes
10/03/2020 19:27	NC5	Evening	GHD	60	57	55	48	53	N/A	35	N/A	N/A	Yes
10/03/2020 19:51	NC6	Evening	GHD	81	72	53	45	59	N/A	39	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAm _{ax} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
10/03/2020 22:00	NC1	Night	GHD	54	54	50	37	45	N/A	35	-	45	Yes
10/03/2020 22:23	NC2	Night	GHD	75	62	35	29	50	25	35	36	45	Yes
10/03/2020 22:45	NC3	Night	GHD	55	47	39	36	38	N/A	39	-	45	Yes
10/03/2020 23:05	NC4	Night	GHD	56	51	41	31	39	N/A	35	-	45	Yes
10/03/2020 23:25	NC5	Night	GHD	47	44	40	33	37	N/A	35	-	45	Yes
10/03/2020 23:47	NC6	Night	GHD	68	60	49	32	48	N/A	39	-	45	Yes
4/12/2019 15:35	NC1	Day	GHD	67	55	49	40	46	N/A	35	N/A	N/A	Yes
4/12/2019 15:57	NC2	Day	GHD	80	73	65	39	61	N/A	36	N/A	N/A	Yes
4/12/2019 16:20	NC3	Day	GHD	81	74	56	39	61	40	40	N/A	N/A	Yes
4/12/2019 16:41	NC4	Day	GHD	61	52	47	35	43	N/A	35	N/A	N/A	Yes
4/12/2019 17:02	NC5	Day	GHD	63	50	46	36	42	N/A	35	N/A	N/A	Yes
4/12/2019 17:23	NC6	Day	GHD	84	75	61	43	62	N/A	40	N/A	N/A	Yes
4/12/2019 18:00	NC1	Evening	GHD	60	49	45	37	42	N/A	35	N/A	N/A	Yes
4/12/2019 18:22	NC2	Evening	GHD	83	72	53	32	59	33	35	N/A	N/A	Yes
4/12/2019 18:44	NC3	Evening	GHD	73	66	57	37	54	N/A	39	N/A	N/A	Yes
4/12/2019 19:05	NC4	Evening	GHD	75	67	51	32	53	N/A	35	N/A	N/A	Yes
4/12/2019 19:25	NC5	Evening	GHD	65	55	46	38	45	N/A	35	N/A	N/A	Yes
4/12/2019 19:46	NC6	Evening	GHD	92	70	54	38	63	N/A	39	N/A	N/A	Yes
4/12/2019 22:00	NC1	Night	GHD	55	46	40	34	38	N/A	35	-	45	Yes
4/12/2019 22:00	NC2	Night	GHD	48	43	41	37	39	N/A	35	-	45	Yes
4/12/2019 22:00	NC3	Night	GHD	55	43	40	34	38	N/A	39	-	45	Yes
4/12/2019 22:00	NC4	Night	GHD	46	41	35	29	33	N/A	35	-	45	Yes
4/12/2019 22:00	NC5	Night	GHD	55	48	44	37	42	N/A	35	-	45	Yes
4/12/2019 22:00	NC6	Night	GHD	79	51	45	41	50	N/A	39	-	45	Yes
20/09/2019 11:56	NC1	Day	GHD	70	62	55	40	51	34	35	N/A	N/A	Yes
20/09/2019 12:21	NC2	Day	GHD	80	73	61	37	60	33	36	N/A	N/A	Yes
20/09/2019 12:44	NC3	Day	GHD	93	80	75	42	71	37	40	N/A	N/A	Yes
20/09/2019 13:04	NC4	Day	GHD	72	62	51	40	49	33	35	N/A	N/A	Yes
20/09/2019 13:24	NC5	Day	GHD	66	53	48	41	46	33	35	N/A	N/A	Yes
20/09/2019 13:45	NC6	Day	GHD	80	74	63	43	61	36	40	N/A	N/A	Yes
19/09/2019 18:03	NC1	Evening	GHD	60	55	46	41	45	30	35	N/A	N/A	Yes
19/09/2019 18:26	NC2	Evening	GHD	78	73	57	45	59	33	35	N/A	N/A	Yes
19/09/2019 18:48	NC3	Evening	GHD	73	67	56	42	53	33	39	N/A	N/A	Yes
19/09/2019 19:10	NC4	Evening	GHD	71	64	55	37	52	32	35	N/A	N/A	Yes
19/09/2019 19:31	NC5	Evening	GHD	50	47	45	42	44	30	35	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAmx 15min	LA1 15min	LA10 15min	LA90 15min	LAeq 15min	Estimated Site Contribution (LAeq,15min)	Criteria (LAeq,15 min)	Estimated LA1,1min	Criteria (LA1,1 min)	Compliant with site consent / licence criteria (Yes/No)
19/09/2019 19:53	NC6	Evening	GHD	74	67	49	45	53	32	39	N/A	N/A	Yes
19/09/2019 22:00	NC1	Night	GHD	57	50	48	44	46	28	35	<45	45	Yes
19/09/2019 22:24	NC2	Night	GHD	77	69	40	36	54	30	35	38	45	Yes
19/09/2019 22:47	NC3	Night	GHD	75	68	44	39	52	32	39	<34	45	Yes
19/09/2019 23:07	NC4	Night	GHD	43	39	37	33	35	30	35	<45	45	Yes
19/09/2019 23:28	NC5	Night	GHD	52	47	41	37	40	27	35	<45	45	Yes
19/09/2019 23:49	NC6	Night	GHD	72	52	46	44	48	31	39	<45	45	Yes
5/06/2019 14:48	NC1	Day	GHD	80	60	48	43	51	35	35	N/A	N/A	Yes
5/06/2019 15:14	NC2	Day	GHD	80	76	68	39	64	34	36	N/A	N/A	Yes
5/06/2019 15:36	NC3	Day	GHD	84	78	68	40	66	35	40	N/A	N/A	Yes
5/06/2019 15:56	NC4	Day	GHD	64	56	45	36	44	31	35	N/A	N/A	Yes
5/06/2019 16:17	NC5	Day	GHD	69	56	46	40	45	32	35	N/A	N/A	Yes
5/06/2019 16:39	NC6	Day	GHD	80	74	65	45	62	36	40	N/A	N/A	Yes
5/06/2019 18:05	NC1	Evening	GHD	53	48	45	42	44	34	35	N/A	N/A	Yes
5/06/2019 18:29	NC2	Evening	GHD	79	74	58	36	60	31	35	N/A	N/A	Yes
5/06/2019 18:51	NC3	Evening	GHD	68	59	45	38	47	31	39	N/A	N/A	Yes
5/06/2019 19:13	NC4	Evening	GHD	71	61	51	35	50	29	35	N/A	N/A	Yes
5/06/2019 19:34	NC5	Evening	GHD	52	47	41	37	39	31	35	N/A	N/A	Yes
5/06/2019 19:56	NC6	Evening	GHD	79	69	51	38	55	33	39	N/A	N/A	Yes
5/06/2019 22:00	NC1	Night	GHD	50	44	42	37	40	30	35	<45	45	Yes
5/06/2019 22:22	NC2	Night	GHD	78	70	40	33	55	28	35	<45	45	Yes
5/06/2019 22:45	NC3	Night	GHD	49	43	40	33	37	26	39	<45	45	Yes
5/06/2019 23:06	NC4	Night	GHD	59	49	34	28	35	25	35	<45	45	Yes
5/06/2019 23:28	NC5	Night	GHD	46	43	40	34	37	26	35	<45	45	Yes
5/06/2019 23:49	NC6	Night	GHD	50	46	41	34	38	28	39	<45	45	Yes
20/03/2019 15:53	NC1	Day	GHD	73	61	52	41	50	35	35	N/A	N/A	Yes
20/03/2019 16:19	NC2	Day	GHD	77	74	65	34	61	32	36	N/A	N/A	Yes
20/03/2019 16:43	NC3	Day	GHD	73	70	47	39	55	35	40	N/A	N/A	Yes
20/03/2019 17:04	NC4	Day	GHD	72	61	50	36	48	31	35	N/A	N/A	Yes
20/03/2019 17:24	NC5	Day	GHD	74	58	47	37	47	32	35	N/A	N/A	Yes
20/03/2019 17:45	NC6	Day	GHD	80	74	63	44	61	38	40	N/A	N/A	Yes
20/03/2019 18:10	NC1	Evening	GHD	76	57	47	39	48	33	35	N/A	N/A	Yes
20/03/2019 18:34	NC2	Evening	GHD	76	71	51	34	56	33	35	N/A	N/A	Yes
20/03/2019 19:00	NC3	Evening	GHD	85	73	61	38	62	34	39	N/A	N/A	Yes
20/03/2019 19:20	NC4	Evening	GHD	77	75	74	39	70	29	35	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAm _{ax} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
20/03/2019 19:45	NC5	Evening	GHD	62	54	49	40	46	30	35	N/A	N/A	Yes
20/03/2019 20:08	NC6	Evening	GHD	81	73	50	42	58	37	39	N/A	N/A	Yes
20/03/2019 22:05	NC1	Night	GHD	66	50	45	39	44	32	35	<39	45	Yes
20/03/2019 22:35	NC2	Night	GHD	84	71	48	31	57	29	35	<38	45	Yes
20/03/2019 22:58	NC3	Night	GHD	79	75	46	40	60	36	39	<40	45	Yes
20/03/2019 23:20	NC4	Night	GHD	55	50	39	30	38	28	35	<32	45	Yes
20/03/2019 23:42	NC5	Night	GHD	58	52	49	35	45	29	35	<39	45	Yes
21/03/2019 0:06	NC6	Night	GHD	62	59	52	41	49	38	39	57	45	No
19/12/2018 12:20	NC1	Day	GHD	64	54	48	40	45	35	35	N/A	N/A	Yes
12/12/2018 12:54	NC2	Day	GHD	84	74	64	48	62	33	36	N/A	N/A	Yes
18/12/2018 17:30	NC3	Day	GHD	70	64	53	42	51	N/A	40	N/A	N/A	Yes
18/12/2018 17:08	NC4	Day	GHD	68	62	51	40	49	N/A	35	N/A	N/A	Yes
18/12/2018 16:45	NC5	Day	GHD	78	73	52	42	57	N/A	35	N/A	N/A	Yes
18/12/2018 16:20	NC6	Day	GHD	78	72	63	49	60	N/A	40	N/A	N/A	Yes
18/12/2018 18:05	NC1	Evening	GHD	67	56	50	40	47	35	35	N/A	N/A	Yes
18/12/2018 18:29	NC2	Evening	GHD	77	73	56	40	59	35	35	N/A	N/A	Yes
18/12/2018 18:53	NC3	Evening	GHD	72	67	49	40	54	N/A	39	N/A	N/A	Yes
18/12/2018 19:15	NC4	Evening	GHD	77	65	56	43	54	N/A	35	N/A	N/A	Yes
18/12/2018 19:40	NC5	Evening	GHD	76	73	63	43	61	N/A	35	N/A	N/A	Yes
18/12/2018 20:03	NC6	Evening	GHD	74	68	57	49	57	36	39	N/A	N/A	Yes
18/12/2018 22:00	NC1	Night	GHD	58	56	55	47	51	32	35	37	45	Yes
18/12/2018 22:25	NC2	Night	GHD	76	69	49	38	54	32	35	36	45	Yes
18/12/2018 23:48	NC3	Night	GHD	59	52	49	42	46	29	39	34	45	Yes
18/12/2018 22:56	NC4	Night	GHD	63	62	61	47	57	N/A	35	37	45	Yes
18/12/2018 23:23	NC5	Night	GHD	46	45	44	42	43	27	35	32	45	Yes
19/12/2018 0:14	NC6	Night	GHD	82	71	53	47	57	34	39	42	45	Yes
22/08/2018 16:00	NC1	Day	Global Acoustics	73	65	52	40	52	N/A	35	N/A	N/A	Yes
22/08/2018 16:22	NC2	Day	Global Acoustics	81	75	50	36	59	35	36	N/A	N/A	Yes
22/08/2018 14:36	NC3	Day	Global Acoustics	67	61	52	42	50	N/A	40	N/A	N/A	Yes
22/08/2018 15:00	NC4	Day	Global Acoustics	70	62	45	37	48	N/A	35	N/A	N/A	Yes
22/08/2018 15:21	NC5	Day	Global Acoustics	60	51	45	39	43	N/A	35	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAm _{ax} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
22/08/2018 13:10	NC6	Day	Global Acoustics	73	68	57	42	55	N/A	40	N/A	N/A	Yes
22/08/2018 19:08	NC1	Evening	Global Acoustics	48	44	41	35	38	35	35	N/A	N/A	Yes
22/08/2018 19:36	NC2	Evening	Global Acoustics	47	42	38	31	35	32	35	N/A	N/A	Yes
22/08/2018 20:23	NC3	Evening	Global Acoustics	54	49	42	35	40	N/A	39	N/A	N/A	Yes
22/08/2018 20:45	NC4	Evening	Global Acoustics	51	41	36	30	34	N/A	35	N/A	N/A	Yes
22/08/2018 21:05	NC5	Evening	Global Acoustics	48	42	38	33	36	N/A	35	N/A	N/A	Yes
22/08/2018 20:02	NC6	Evening	Global Acoustics	60	54	49	40	46	N/A	39	N/A	N/A	Yes
22/08/2018 23:47	NC1	Night	Global Acoustics	52	46	39	32	37	N/A	35	N/A	45	Yes
22/08/2018 23:26	NC2	Night	Global Acoustics	46	36	33	28	31	N/A	35	N/A	45	Yes
22/08/2018 22:41	NC3	Night	Global Acoustics	55	50	47	36	44	"NM"	39	"NM"	45	Yes
22/08/2018 22:20	NC4	Night	Global Acoustics	67	59	51	28	47	N/A	35	N/A	45	Yes
22/08/2018 22:00	NC5	Night	Global Acoustics	49	42	38	31	35	N/A	35	N/A	45	Yes
22/08/2018 23:02	NC6	Night	Global Acoustics	69	54	43	33	44	N/A	39	N/A	45	Yes
25/06/2018 12:23	NC1	Day	Global Acoustics	64	48	41	31	38	N/A	35	N/A	N/A	Yes
25/06/2018 12:46	NC2	Day	Global Acoustics	80	74	60	28	59	"NM"	36	N/A	N/A	Yes
25/06/2018 14:13	NC3	Day	Global Acoustics	75	70	46	38	54	N/A	40	N/A	N/A	Yes
25/06/2018 14:33	NC4	Day	Global Acoustics	76	62	50	35	52	N/A	35	N/A	N/A	Yes
25/06/2018 14:54	NC5	Day	Global Acoustics	63	55	46	39	45	N/A	35	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAmx 15min	LA1 15min	LA10 15min	LA90 15min	LAeq 15min	Estimated Site Contribution (LAeq,15min)	Criteria (LAeq,15 min)	Estimated LA1,1min	Criteria (LA1,1 min)	Compliant with site consent / licence criteria (Yes/No)
25/06/2018 13:07	NC6	Day	Global Acoustics	73	68	58	42	56	N/A	40	N/A	N/A	Yes
25/06/2018 20:45	NC1	Evening	Global Acoustics	52	46	42	37	40	38	35	N/A	N/A	No
25/06/2018 19:45	NC2	Evening	Global Acoustics	56	42	36	30	34	<30	35	N/A	N/A	Yes
25/06/2018 18:46	NC3	Evening	Global Acoustics	75	71	49	42	55	N/A	39	N/A	N/A	Yes
25/06/2018 18:25	NC4	Evening	Global Acoustics	62	55	46	39	44	N/A	35	N/A	N/A	Yes
25/06/2018 18:00	NC5	Evening	Global Acoustics	54	46	43	40	41	N/A	35	N/A	N/A	Yes
25/06/2018 19:10	NC6	Evening	Global Acoustics	58	54	51	47	49	48	39	N/A	N/A	No
25/06/2018 22:00	NC1	Night	Global Acoustics	65	61	48	38	47	37	35		45	No
25/06/2018 22:22	NC2	Night	Global Acoustics	48	41	37	29	34	30	35		45	Yes
25/06/2018 23:07	NC3	Night	Global Acoustics	80	76	48	42	60	43	39		45	No
25/06/2018 23:33	NC4	Night	Global Acoustics	53	48	40	34	38	36	35		45	No
25/06/2018 23:54	NC5	Night	Global Acoustics	67	46	39	31	37	N/A	35		45	Yes
25/06/2018 22:46	NC6	Night	Global Acoustics	67	63	50	46	51	46	39		45	No
26/03/2018 13:40	NC1	Day	Global Acoustics	61	49	42	36	40	N/A	35	N/A	N/A	Yes
26/03/2018 13:58	NC2	Day	Global Acoustics	82	77	59	37	62	N/A	36	N/A	N/A	Yes
26/03/2018 15:20	NC3	Day	Global Acoustics	69	64	45	38	48	N/A	40	N/A	N/A	Yes
26/03/2018 15:39	NC4	Day	Global Acoustics	73	63	53	41	52	N/A	35	N/A	N/A	Yes
26/03/2018 15:58	NC5	Day	Global Acoustics	81	56	50	37	50	N/A	35	N/A	N/A	Yes

Date and time	Site ID	Period	Done by	LAm _{ax} 15min	LA ₁ 15min	LA ₁₀ 15min	LA ₉₀ 15min	LA _{eq} 15min	Estimated Site Contribution (LA _{eq} ,15min)	Criteria (LA _{eq} ,15 min)	Estimated LA ₁ ,1min	Criteria (LA ₁ ,1 min)	Compliant with site consent / licence criteria (Yes/No)
26/03/2018 14:45	NC6	Day	Global Acoustics	80	72	64	43	61	N/A	40	N/A	N/A	Yes
26/03/2018 21:45	NC1	Evening	Global Acoustics	54	53	52	43	49	N/A	35	N/A	N/A	Yes
26/03/2018 21:26	NC2	Evening	Global Acoustics	49	42	40	36	38	N/A	35	N/A	N/A	Yes
26/03/2018 20:29	NC3	Evening	Global Acoustics	76	69	55	38	57	N/A	39	N/A	N/A	Yes
26/03/2018 20:06	NC4	Evening	Global Acoustics	55	51	47	37	43	N/A	35	N/A	N/A	Yes
26/03/2018 19:45	NC5	Evening	Global Acoustics	56	45	42	38	40	N/A	35	N/A	N/A	Yes
-	NC6	Evening	Global Acoustics	Measurement not conducted at this location for this period						39		N/A	Yes
26/03/2018 22:01	NC1	Night	Global Acoustics	85	61	56	44	56	N/A	35	N/A	45	Yes
26/03/2018 22:24	NC2	Night	Global Acoustics	43	39	37	32	34	<25	35	27	45	No
26/03/2018 23:10	NC3	Night	Global Acoustics	54	40	37	32	35	N/A	39	N/A	45	Yes
26/03/2018 23:32	NC4	Night	Global Acoustics	50	41	37	28	34	N/A	35	N/A	45	Yes
26/03/2018 23:53	NC5	Night	Global Acoustics	47	38	36	33	35	N/A	35	N/A	45	Yes
-	NC6	Night	Global Acoustics	Measurement not conducted at this location for this period						39		45	Yes



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