MAULES CREEK COAL MINE

2020 ANNUAL REVIEW

Table 1

Annual Review Title Block

Name of Operation	Maules Creek Coal Mine
Name of Operator	Maules Creek Coal Pty Ltd
Development consent / Project Approval #	Project Approval 10_0138
Name of holder of development consent/project approval	Aston Coal 2 Pty Ltd.
Mining lease #	CL 375, ML1719 and ML1701.
Name of holder of mining lease	Maules Creek Coal JV which comprises: Aston Coal 2 Pty Ltd (75%), ICRA MC Pty Ltd (15%), J Power Australia Pty Ltd (10%)
Water Licence #	Refer to Water Licences in Table 2
Name of holder of water licence	Aston Coal 2 Pty Ltd, ICRA MC Pty Ltd, J Power Australia Pty Ltd
MOP/ RMP start date	November 2018
MOP/RMP end date	January 2023
Annual Review Commencement Date	1 January 2020
Annual Review Completion Date	31 December 2020
I, Jorge Moraga, certify that this audit report is a true and accurate record of the compliance status of Maules Creek Coal Mine for the period 1 January 2020 to 31 December 2020, and that I am authorised to make this statement on behalf of Maules Creek Coal Pty Ltd. Note. a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000. b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).	
Name of Authorised Reporting Officer	Jorge Moraga
Title of Authorised Reporting Officer Signature Date 29/03/2021	General Manager

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1 STATEMENT OF COMPLIANCE

This Annual Review has been prepared to provide a summary of the environmental performance of the Maules Creek Coal Mine (MCCM) over the reporting period. The compliance status of the MCCM against relevant approvals during the reporting period was assessed as at the end of the reporting period (i.e. 31 December 2020) and is summarised in Table 2. In addition, compliance with the Environment Protection Licence (EPL) has been assessed where required against the Project Approval, specifically Schedule 3, conditions 26, 30, 33 (c), 38 (b) and 40 (b).

Table 2 Statement of Compliance

Were all the conditions of the relevant approvals complied with?	Yes/No
Project Approval PA 10_0138	No
Coal Lease CL 375	No
Mining Operations Plan (MOP)	No
Mining Lease ML 1701	Yes
Mining Lease ML 1719	Yes
Exploration Licence A 346	Yes
Environment Protection Licence (No. 20221) (applicable conditions as above)	No
90WA801901 DWE Ref no: 90AL801900	Yes
Groundwater Monitoring Bores: 90BL255779, 90BL255780, 90BL255781, 90BL255782, 90BL255783, 90BL255784, 90BL255785, 90BL255786, 90BL255787, 90BL255788, 90WA822412, 90BL255789 and 90BL255790.	Yes
WAL12811	Yes
WAL12791	Yes
WAL29467	Yes
WAL29588	Yes
WAL27385	Yes
WAL12479	Yes
WAL27383	Yes
WAL13050	Yes
WAL41585	Yes
WAL36641	Yes
WAL12491	Yes
WAL12480	Yes

Were all the conditions of the relevant approvals complied with?	Yes/No
WAL12645	Yes
WAL 12718	Yes
WAL 12722	Yes

Any non-compliances during the reporting period are detailed in Table 4 and ranked according to the compliance status key presented in Table 3. Section 11 provides further details of any non-compliance and actions undertaken or proposed for the following reporting period to prevent re-occurrence and mitigate any potential adverse effects.

Table 3 Compliance Status Key

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-compliance	Non–compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 4 Non-Compliances

Relevant Documentation	Condition. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
PA10_0138	Schedule 3 Condition 12 a)	Ensure all equipment and noise control measures deliver sound power levels that are equal to or better than the MCC EA	Non-compliant	Technical non-compliance of a limited number of individual items. Overall site sound power level is compliant.	Section 6.4.2
PA10_0138	Schedule 3 Condition 7	Proponent shall ensure that operational noise generated by the project does not exceed the given criteria. 35 dB LAeq (15min) 45 dB LA1 (1min)	Non-Compliant	An exceedance was measured at NM1 at 22:30 on 1 April . During the monitoring a mine site contribution of LAEQ (15minute) of 39dBA was recorded.	Section 6.4.2
EPL20221	L3.3	Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.	Non-Compliant	An exceedance was measured at NM1 at 22:30 on 1 April . During the monitoring a mine site contribution of LAEQ (15minute) of 39dBA was recorded.	Section 6.4.2

Relevant Documentation	Condition. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
PA10_0138	Schedule 3 Condition 58	The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary	Non-Compliant	Demolition works of buildings identified in the Heritage Management Plan occurred prior to the receipt of the final report prepared by a suitably qualified heritage specialist.	Section 6.8.2
EPL20221	L1.1 O1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997	Non-Compliant	An uncontrolled discharges of waters on 16 January occurred from a drain on site following heavy rainfall events.	Section 7.2.2
EPL20221	L1.1 O1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997	Non-Compliant	An uncontrolled discharges of waters on 8 February occurred from a drain on site following heavy rainfall events. Expandable polystyrene balls from the explosives reload yard on site were mobilised with the water which was released.	Section 7.2.2
EPL20221	L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997	Non-Compliant	An uncontrolled discharges of waters on 3 December occurred from a drain on site following heavy rainfall events.	Section 7.2.2

Relevant Documentation	Condition. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
CL375	3	Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan	Non-Compliant	Topsoil and subsoil resources were mixed and stockpiled together in a temporary stockpile	Section 8.1.1.9
CL375	3	Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan	Non-Compliant	Heavy rainfall events resulted in erosion and rilling to areas of the mining lease.	Section 8.1.1.12

2 INTRODUCTION

This is the eighth Annual Review produced for the Maules Creek Coal Mine (MCCM) and has been prepared in accordance with the NSW Department of Planning and Environment's (DPIE) Integrated Mining Policy – Annual Review Guideline, October 2015. This document has been prepared to satisfy the following requirements:

- the Annual Review requirements of the DPIE under the Project Approval PA 10_0138 (Condition 4 Schedule 5);
- Environmental Management Report requirements of the Department Planning and Environment - Resources Regulator under the MCCM Mining Leases; and
- the routine reporting expectations of DoI-Water.

Though primarily covering the period from 1 January 2020 to 31 December 2020 (the reporting period), where relevant the Annual Review provides information on historical aspects of the Maules Creek Coal Mine, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing reporting period, or beyond.

2.1 PROJECT BACKGROUND AND DESCRIPTION

The Maules Creek Coal Mine (MCCM) is located on the north-west slopes and plains of New South Wales (NSW), approximately 18 kilometres (km) north-east of Boggabri within the Narrabri Local Government Area (LGA). The MCCM's regional locality is illustrated in Figure 1.

An Environmental Assessment for the Maules Creek Coal Project (referred to herein as the EA) was prepared by Hansen Bailey (2011) and was assessed under the NSW Environmental Planning and Assessment Act, 1979 (EP&A Act). The NSW Planning Assessment Commission (PAC), as a delegate for the NSW Minister for Planning and Infrastructure, issued the State environmental approval for the MCCM on 23 October 2012 (i.e. Project Approval PA 10_0138) for the construction and operation of an open cut coal mine with an approved maximum ROM coal production rate of 13 Mtpa until the end of December 2034. MCCM covers three mining leases CL 375, ML 1701 and ML1719. The Project Boundary (as defined by PA 10_0138) and mining authorities are shown on Figure 1 and Biodiversity Offset areas on Figure 2. The MCCM Commonwealth environmental approval (i.e. EPBC 2010/5566) was granted on 11 February 2013 by the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities.

Construction of the MCCM commenced in December 2013 and was substantially completed in 2015. The operations phase of the MCCM commenced in June 2014, and coal was first transported from the MCCM via the rail spur in December of 2014.

A modification to PA 10_0138 was lodged and approved in 2013 to allow minor adjustments to the alignment of the CHPP infrastructure and the construction and operation of electrical infrastructure.

A second modification to PA 10_0138 was lodged and approved in 2014 to adjust the location of the raw water pipeline and associated pump station.

A third modification to PA 10_0138 was lodged in May 2016 and approved in January 2017 to amend the percentage of employee bus use to better reflect the locally residing workforce and associated transport regime.

A fourth modification to PA10_0138 was lodged in 2017 and withdrawn in 2018 in relation to sound power level conditions.

A fifth modification to PA10_0138 was Lodged in December 2019 and approved in January 2020 to allow for the installation of a water pipeline from the nearby, Whitehaven owned Olivedene property to the mining operation.

A sixth modification to PA10_0138 was Lodged in December 2019 and approved in January 2020 to allow for the installation of a water pipeline from the nearby, Whitehaven owned Brighton and Roma properties to the mining operation.

2.2 MINE CONTACTS

The key operational personnel responsible for environmental management at MCCM during the reporting period included:

Name	Jorge Moraga
Title	General Manager
Address	Therribri Road, Boggabri, NSW 2382
Phone Number	02 6749 7800

Name	Matthew Sparkes
Title	Mine Manager
Address	Therribri Road, Boggabri, NSW 2382
Phone Number	02 6749 7800

Name	Ross Wilson
Title	Manager HSEC
Address	Therribri Road, Boggabri, NSW 2382
Phone Number	02 6749 7800

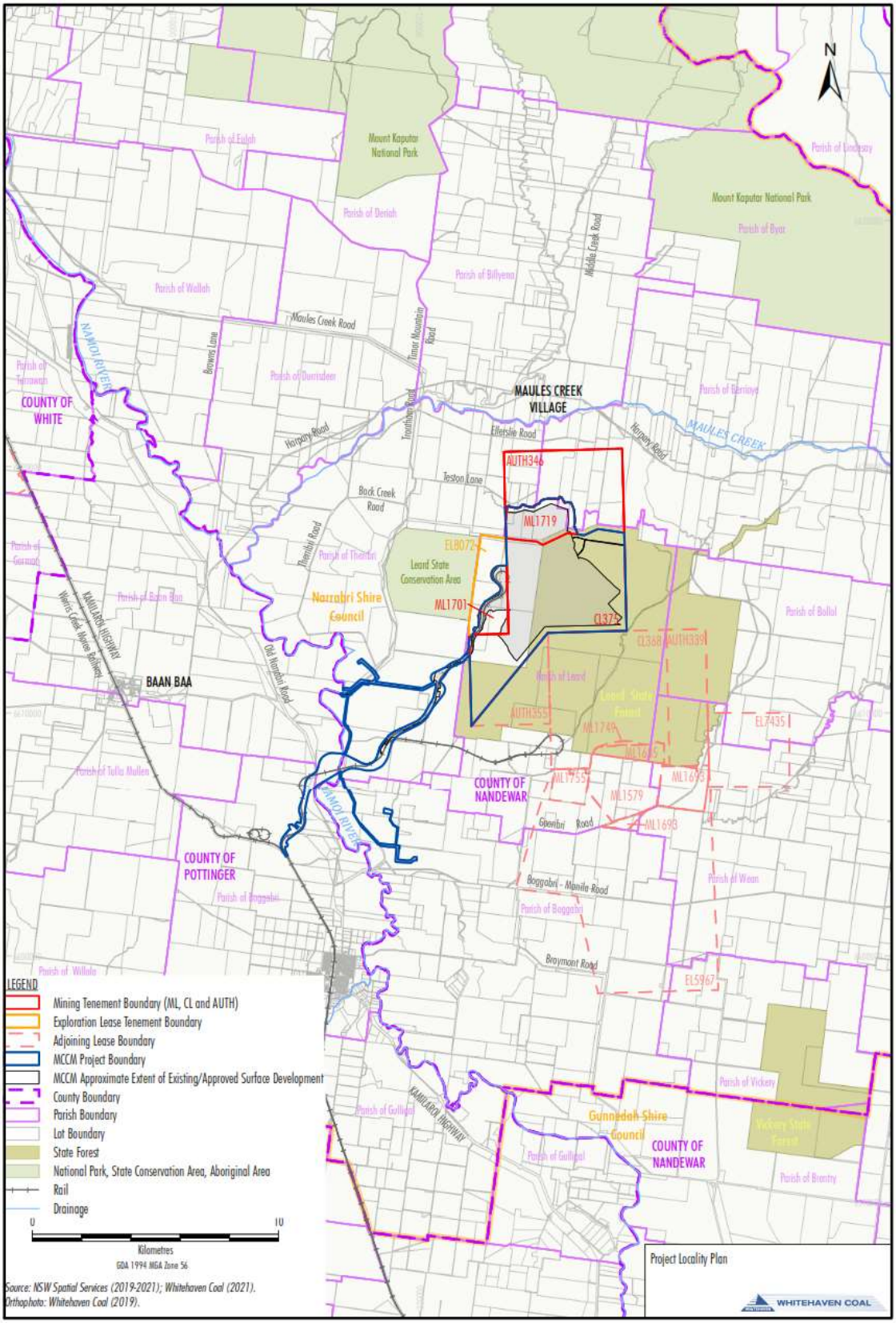


Figure 1 Project Locality Plan

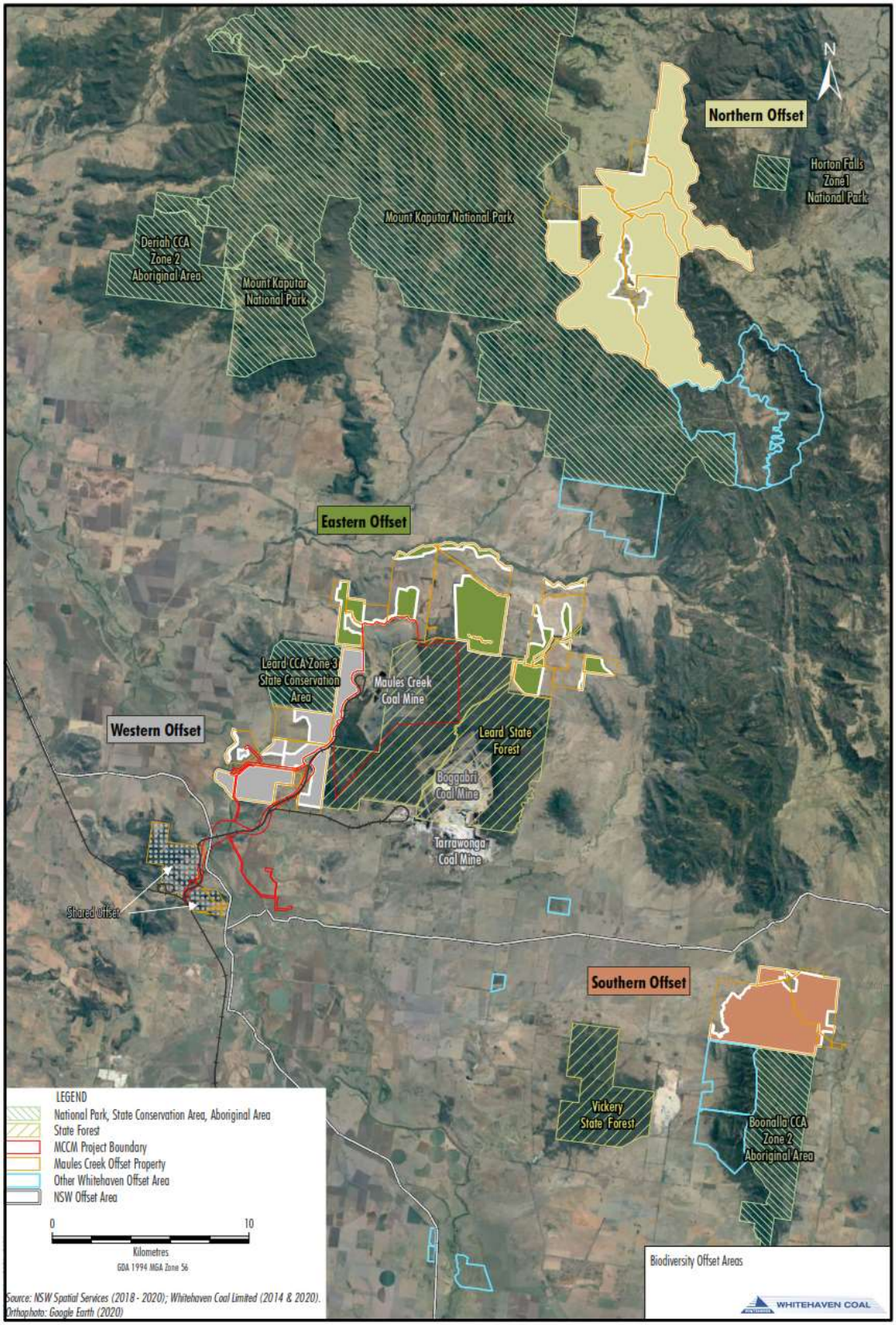


Figure 2 Biodiversity Offset Areas

3 APPROVALS

Table 5 provides a summary of the key licences, leases and approvals that have been obtained for the MCCM to enable the construction and operation of the mine.

Table 5 Licences, Leases and Approvals

Approval	Reference	Detail	Validity Dates
Project Approval	PA 10_0138	Pursuant to the Project EA, the PAC approval of the MCCM referred to in Schedule 1 subject to the conditions in Schedules 2 to 5.	23 October 2012 to December 2034
Project Approval Modification	PA 10_0138 (MOD1)	Pursuant to the Maules Creek Project Approval Modification Environmental Assessment, the Modification was granted to allow modifications to infrastructure requirements.	Granted on 25 July 2013
Project Approval Modification	PA 10_0138 (MOD2)	Pursuant to the Maules Creek Project Approval Modification Environmental Assessment, the Modification was granted to allow the design of key water related infrastructure to be optimised.	Granted on 10 March 2014
Project Approval Modification	PA 10_0138 (MOD3)	Pursuant to the Maules Creek Project Approval Modification Environmental Assessment, the Modification was granted to amend the employee bus use percentage to better reflect the locally residing workforce and associated transport regime.	Granted on 13 January 2017
Project Approval Modification	PA 10_0138 (MOD5)	Pursuant to the Maules Creek Project Approval Modification Environmental Assessment, the Modification was granted to allow the installation of a water pipeline from the nearby Whitehaven owned Olivedene property to the mining operation.	Granted on December 19
Project Approval Modification	PA 10_0138 (MOD6)	Pursuant to the Maules Creek Project Approval Modification Environmental Assessment, the Modification was granted to allow the installation of a water pipeline from the nearby, Whitehaven owned Brighton and Roma properties to the mining operation.	Granted on December 19

Approval	Reference	Detail	Validity Dates
Coal Lease	CL 375	Covers an area of approximately 4,200 hectares (ha). The southern part of the lease covers rights to mine from the surface to unlimited depth (~2,500 ha). The northern part of the lease covers rights to mine from 20 metre (m) depths to unlimited depth (~1,700 ha).	4 June 1991 to 4 June 2033
Authorisation	A 346	Covers the rights of the northern part of CL 375 from the surface to 20 m depth (~1,700 ha).	Expires 28 February 2021
Mining Lease	ML 1719	Covers the area to the north of the surface rights of CL 375, over a portion of A 346 that will accommodate part of the Northern Overburden Emplacement Area (OEA) for the MCCM.	Granted 11 November 2015 to 11 November 2036
Mining Lease	ML 1701	Covers the area to the west of CL 375 within the Project Boundary that will facilitate the extraction of some coal and accommodate some mine related infrastructure.	Granted 9 October 2014 to 9 October 2035
Exploration Lease	EL 8072	Covers the area to the west of ML1701 that will facilitate the extraction of some coal and accommodate some mine related infrastructure.	Renewal pending
Environment Protection Licence	EPL 20221	The NSW Environment Protection Authority (EPA) issues environment protection licences to the owners or operators of various industrial premises under the *Protection of the Environment Operations Act, 1997* (POEO Act).	Issued 2 May 2013
Mining Operations Plan Amendment B	MOP 2018-2022 Amendment B	Details mining and rehabilitation activities during the applicable period at MCCM.	Approved November 2020
Forest Corporation NSW Compensation	N/A	Agreement applies to part of Leard State Forest No. 420 that occurs within CL 375 and any mining lease pursuant to MLA 404 being ML1719.	Updated 1 July 2016
Emergency Tailings Emplacement	N/A	Notification of High Risk Activity – Emergency Tailings Emplacement	Notification provided April 2015.

Approval	Reference	Detail	Validity Dates
Surface Water Licence Water Supply Works and Water Use Approval	WAL41585	Previously 90SL101060. Water supply for mining and irrigation one overshot dam and a 150 millimetre (mm) Centrifugal Pump. 30 units. Under works approval 90CA834999	Converted to WAL41585 Renewed 1 July 2017. Expires 9 November 2025
Water Supply Works Approval	90WA801901 DWE Ref no: 90AL801900	Allows construction of a 610 mm Axial Flow Pump located on the Namoi River.	Issue date: 1/07/2004 Expiry date: 30/06/2027
Water Access Licence	WAL12811	135 ML with works approval 90CA807230. Upper Namoi Zone 5 Namoi Valley (Gins Leap to Narrabri) Groundwater Source.	Issue Date: 1/11/2006 Expiry Date: 6/11/2030
Water Access Licence	WAL12791	112 ML with works approval 90CA807180. Upper Namoi Zone 5, Namoi Valley (Gins Leap to Narrabri) Groundwater Source.	Issue Date: 1/11/2006 Expiry Date: 31/10/2026
Water Access Licence	WAL29467	306 ML water licence from porous rock water source for construction purposes. Refer 90WA822412	Issue Date: 16/01/2012 Expiry Date: 6/06/2025
Water Access Licence	WAL29588	0ML water licence from porous rock water source under works approval 90CA826925.	Issue Date: 16/01/2012 Expiry Date: 6/06/2022
Water Access Licence	WAL 27385	38 ML water licence from Namoi Groundwater Zone 4.	Granted 24 April 2012 for perpetuity.
Water Access Licence	WAL12479	78 ML water licence from Namoi Groundwater Zone 11 under works approval 90CA807652.	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Water Access Licence	WAL27383	0 ML water licence from Namoi Groundwater Zone 11.	Spare WAL. Granted 24 October 2011 for perpetuity.
Water Access Licence	WAL13050	3000 ML water licence from Lower Namoi Regulated River Water under works approval 90WA801901.	Issue Date: 1/07/2004 Expiry Date: 30/06/2027

Approval	Reference	Detail	Validity Dates
Water Access Licence	WAL36641	800 ML water licence from Gunnedah-Oxley Basin MDB groundwater source.	Perpetuity
Water Access Licence	WAL12491	77 ML water licence from Upper Namoi Zone 11 under works approval 90CA807676	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Water Access Licence	WAL12480	215 ML water licence from Upper Namoi Zone 11 under works approval 90CA807654.	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Water Access Licence	WAL12645	35 ML water licence from Upper Namoi Zone 4, Namoi Valley (Keepit Dam to Gin's Leap). Under works approvals 90CA806830, 90CA806981 & 90WA807004	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Water Access Licence	WAL12718	102 ML Water licence from the upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin'S Leap) Groundwater Source. Under works approval 90CA807012	Issue Date: 1/11/2006 Expiry Date: 19/05/2021
Water Access Licence	WAL12722	77 ML water licence from Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin'S Leap) Groundwater Source. Under works approval 90CA807023	Issue Date: 1/11/2006 Expiry Date: 19/05/2021
Bore Licence	90CA807230	Bore Constructed in the Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source. Works approval for WAL12811.	Issue Date: 1/11/2006 Expiry Date: 6/11/2030
Bore Licence	90CA807180	Bore Constructed in the Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source. Works approval for WAL12791.	Issue Date: 1/11/2006 Expiry Date: 31/10/2026
Bore Licence	90WA822412	Previously 90BL255704. Gunnedah – Oxley Basin Murray Darling Basin Groundwater Source. Works approval for WAL29467.	Granted 16 January 2012 to 06 June 2025
Bore Licence	90CA826925	Gunnedah-Oxley Basin Mdb Groundwater Source. Works approval for WAL29588.	Issue Date: 16/01/2012 Expiry Date: 15/01/2022

Approval	Reference	Detail	Validity Dates
Bore Licence	90CA807652	Upper Namoi Zone 11, Maules Creek Groundwater Source. Works approval for WAL12479.	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Bore Licence	90WA801901	Lower Namoi Regulated River Water Source. Works approval for WAL13050.	Issue Date: 1/07/2004 Expiry Date: 30/06/2027
Bore Licence	90CA807676	Upper Namoi Zone 11, Maules Creek Groundwater Source. Works approval for WAL12491.	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Bore Licence	90CA807654	Upper Namoi Zone 11, Maules Creek Groundwater Source. Works approval for WAL12480.	Issue Date: 1/11/2006 Expiry Date: 31/10/2029
Bore Licence	90CA807012	Bore Constructed in the Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin'S Leap) Groundwater Source. Works approval for WAL12718.	Issue Date: 1/11/2006 Expiry Date 19/05/2021
Bore Licence	90CA807023	Bore constructed in the Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin'S Leap) Groundwater Source. Works approval for WAL12722.	Issues Date: 1/11/2006 Expiry Date: 27/5/2021
Bore Licence	90WA809127	Bore constructed in the Upper Namoi Zone 4 Namoi Valley (Keepit Dam to Gins Leap) Groundwater Source.	Commencement 1 November 2006
Bore Licence	90WA820120	Previously 90BL001144. Gunnedah – Oxley Basin Murray Darling Basin Groundwater Source.	Granted 28 February 1939 for perpetuity. Converted 16 January 2012.
Bore License	90MW8333037	Gunnedah - Oxley Basin Murray Darling Basin Groundwater Source. Works approval for WAL36641	Perpetuity

Approval	Reference	Detail	Validity Dates
Bore Licences	90BL255779 90BL255780 90BL255781 90BL255782 90BL255783 90BL255784 90BL255785 90BL255786 90BL255787 90BL255788 90BL255789 90BL255790	For the purpose of Monitoring Bores.	Granted 25 August 2010 for perpetuity.
Bore Licence	90WA809078	Bore constructed in the Upper Namoi Zone 4 Namoi Valley (Keepit Dam to Gins Leap) Groundwater Source.	Commencement 1 November 2006
Bore Licence	90WA809079	Bore constructed in the Upper Namoi Zone 4 Namoi Valley (Keepit Dam to Gins Leap) Groundwater Source.	Commencement 1 November 2006
Bore Licence	90WA809300	Bore constructed in the Upper Namoi Zone 4 Namoi Valley (Gins Leap to Narrabri) Groundwater Source.	Commencement 1 November 2006

4 OPERATIONS SUMMARY

4.1 EXPLORATION ACTIVITIES

Exploration drilling was undertaken during the reporting period in accordance with the approved Mining Operations Plan (MOP) to further assist production planning and assess coal reserves within CL 375. Core and chip holes were undertaken to further define coal quality, geotechnical and structural information.

4.2 CONSTRUCTION

During the reporting period the following construction works occurred:

- Construction of new electric pump stations for bore water transfer.
- Construction of new 22kv electrical transmission line from sub-station to electric pump set
- Construction of a new western clean water diversion dam, pump set, pipe and discharge infrastructure
- Construction of new in pit water fill point
- Upgrade of light vehicle wash bay to include ramps

4.3 MINING OPERATIONS

MCCM is an open cut coal mine with an approved maximum ROM coal production rate of 13 Mtpa to December 2034. Pre-mining clearance activities including ecological, archaeological and soil analysis were undertaken in line with the relevant approvals and management plans. The 2020 vegetation clearing activities were completed during the approved annual clearing period (15th February to the 30th April each year).

Topsoil was reclaimed from the area to be mined and stockpiled for later use on rehabilitation areas. Overburden is blasted prior to being removed by loader and / or excavator and trucks before proceeding with coal extraction. Table 6 presents the production summary for the previous and current reporting periods and the anticipated production schedule for the next reporting period.

Table 6 Production Summary

Material	Approved limit	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Waste Rock / Overburden	81,000,000m^3 (MOP Year 1, 2017, Table 4)	61,853,755	66,329,608	78,476,230
ROM Coal	13 Million Tonnes (PA 10_0138 Sch. 2 Cond.6) > 5 Million Tonnes handled (EPL 20221)	9,690,770	11,746,975	13,000,000
Reject Material	NA	2,962,768	2,928,040	3,250,000
Saleable Product	12.4 Million Tonnes (PA 10_0138 Sch.2 Cond.9) > 5 Million Tonnes produced (EPL 20221)	8,850,258	8,870,352	9,750,000

4.4 COAL HANDLING AND PROCESSING

Product coal generated by the MCCM includes bypass coal (i.e. ROM coal that is crushed and screened but not washed in the CHPP) and washed coal that is processed in the CHPP. The product coal is stockpiled and then reclaimed and fed via conveyors to the Train Loading Facility. Once loaded, trains travel from the MCCM via the Maules Creek Rail Spur, Shared Rail Spur and the Werris Creek to Mungindi Railway Line to the Port of Newcastle for export.

4.5 OTHER OPERATIONS

4.5.1 Hours of Operation

Mining operations are conducted up to 24 hours per day, seven days per week.

4.5.2 Transport Rates

Coal is only transported from the MCCM via the Maules Creek rail spur and the shared portion of the Boggabri Coal rail spur.

The number of laden trains and amount of coal transported from MCCM, presented in

Table 7 has been recorded in accordance with:

- Schedule 2 Condition 8 and 9 of PA 10_0138, 'Coal Transport'; and
- Schedule 3 Condition 65 of PA 10_0138, 'Monitoring of Coal Transport'.

Table 7 Coal Transport

Parameter	Criteria	Total
Maximum number of laden trains from the site in any one day	10	8
Maximum number of laden trains from the site in a day when averaged over a calendar year	7	3.46
Maximum Tonnes of product coal transported from the site (Mt)	12.4	8.86

Appendix B details the coal transport records in accordance with the reporting requirements under Condition 65 (a) and (b) of PA 10_0138.

4.6 NEXT REPORTING PERIOD

4.6.1 Exploration

Exploration drilling will continue to be undertaken at the MCCM to further assess the coal reserves within the tenements. The focus of the ongoing exploration drilling is likely to involve the following:

- Further exploration within ML 1701.
- Further delineation of outlying coal prospective areas.

Further details of the proposed drilling program are provided in the approved MOP.

4.6.2 Construction Activities

Infrastructure upgrades are currently being investigated and may be implemented within the following reporting period including improvements to the CHPP, mine, administration and maintenance infrastructure areas.

4.6.3 Mine Operations

The mine production rates are planned to ramp up to approximately 13 Mtpa of ROM coal and approximately 78.5 million bank cubic metres (Mbcm) of overburden during 2021.

Vegetation clearing activities in mining areas over the next reporting period will be conducted in accordance with relevant Environmental Management Plans. The clearing program will be undertaken during the annual clearing

period from the 15 February to the 30 April as specified within the BMP, except under exceptional circumstances and with the approval by the Secretary of the DPIE.

4.6.4 Overburden Emplacements

The OEA will continue to develop generally in accordance with Project Approval PA 10_0138 and the Mining Operations Plan 2019-22 which are available on the Whitehaven Coal website.

4.6.5 Mining Fleet Upgrades

In March 2020 MCCM initiated an autonomous haulage operation of overburden using a single excavator and associated autonomous haulage trucks and continued under these arrangements through the balance of 2020.

Additional procurement of mining fleet will be subject to mine planning requirements in 2021.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The DPIE requested consideration of several sections in the Annual Review. Appendix F includes a table summarising the feedback and the relevant section where this is addressed.

6 ENVIRONMENTAL PERFORMANCE

The following sub-sections report on the environmental performance achieved during the reporting period and provide a summary of the environmental monitoring data compared to data predictions, trends and management measures.

6.1 METEOROLOGICAL MONITORING

Meteorological monitoring is conducted onsite in accordance with Schedule 3 Condition 35 of the PA 10_0138 at the MCC Automatic Weather Station (AWS). Additional weather data is available from other monitoring locations for reference purposes. The location of the MCCM AWS is illustrated in Figure 3. The total annual rainfall recorded for the year was approximately 802.2 millimetres (mm). The annual rainfall total is above the average rainfall recorded in the EA. The maximum rainfall was recorded during December (202mm), which is higher than the historical average of (62.2mm). In addition, seven months across the 2020 calendar year produced rainfall results above the mean rainfall recorded in the EA.

The temperature records and wind patterns are relatively consistent with the long term climatic data recorded at nearby BOM sites, and the predictions from the EA. The average temperature during the reporting period was 18.4°C, a minimum temperature of -4.5°C was recorded in August and a maximum temperature of 42.7°C was recorded in December. Each month of the reporting period recorded an average wind direction from the southern quadrants, with south easterly winds predominating for a total of seven months.

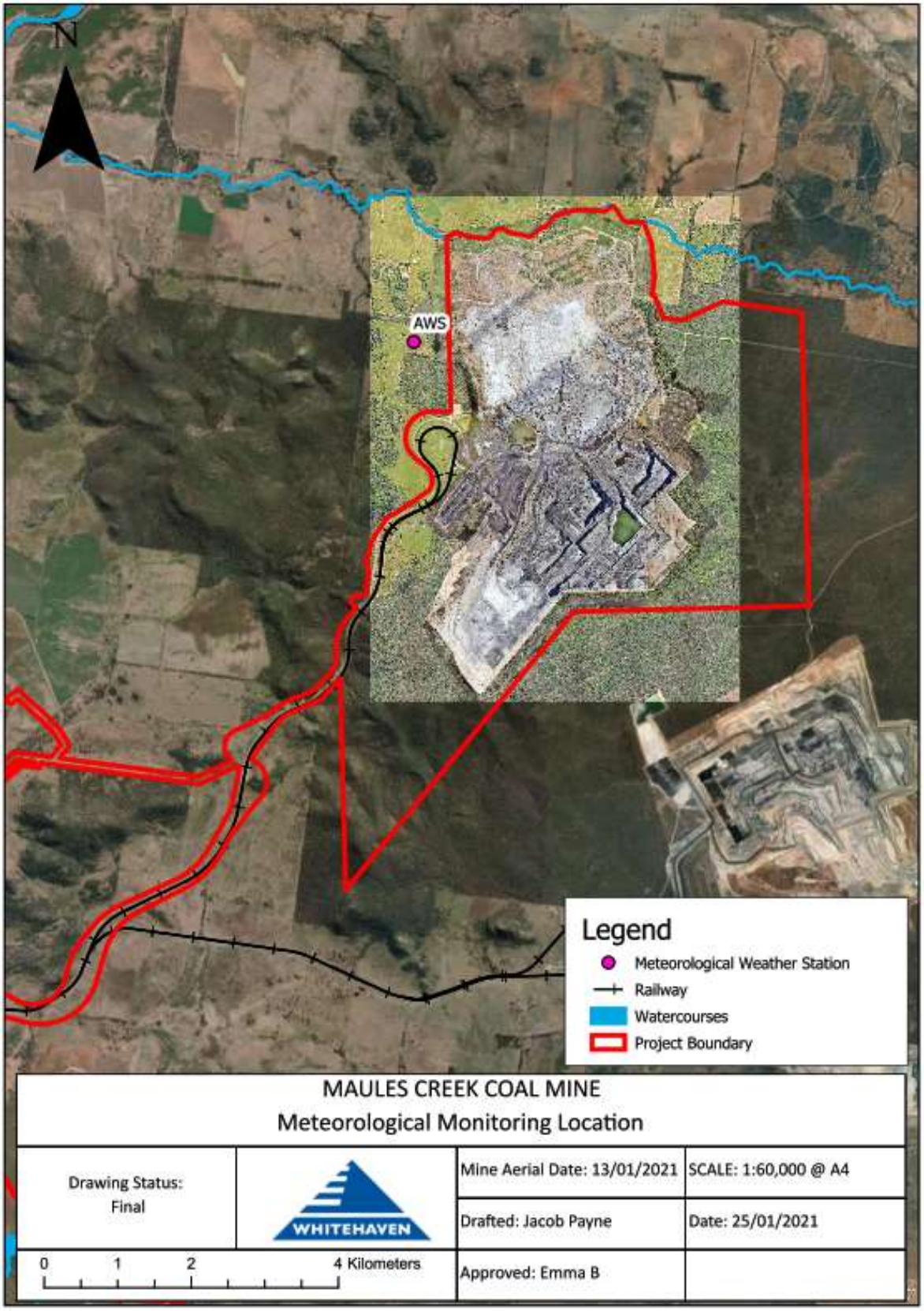


Figure 3 AWS Monitoring Location

6.2 AIR QUALITY

6.2.1 Environmental Management

Potential impacts to air quality are managed in accordance with the:

- Air quality criteria prescribed under schedule 3 condition 29 of the Project Approval;
- Relevant EPL conditions; and
- The MCC Air Quality and Greenhouse Gas Management Plan (AQGGMP).

Maules Creek Coal Mine implements a range of controls to manage dust, including but not limited to:

- Utilising water carts across the site with water fill points appropriately positioned. Additional contractor water carts are also employed around infrastructure areas and light vehicle roads, together with during clearing, mulching and topsoil stripping activities;
- Use of a dust suppressant additive on targeted haul roads;
- Visual dust assessments regularly undertaken on haul roads;
- Modification of work practices where required including changing dumping strategies;
- Temporary cessation of operational equipment as required;
- Predictive controls and Air Quality Trigger Action Response Plan (TARP) together with the daily risk response report presented to key operational personnel;
- Pre-strip areas are kept to a minimum and mulch cover used on cleared areas ahead of mining activities where possible;
- Operation of a real time SMS alarming system notifying of elevated dust levels;
- Site vehicles restricted to designated routes, with speed limits enforced;
- Blasting activities restricted to suitable weather conditions;
- 24 hour notification to key stakeholders and residents of planned blasts;
- Water suppression on conveyor transfers and stockpiles at the CHPP;
- Additional units within the air quality monitoring network; and
- Meteorological monitoring system used to identify conditions pertaining to elevated dust risk.

The MCC Air Quality Monitoring network is illustrated on Figure 4 and includes:

- Continuous monitoring of PM_{10} levels at the MCC TEOM (TEOM1). These results are available publically via the EPA website. It is noted that the location MCC TEOM2, shown on Figure 4 is located on mine owned land and the results are used by MCC for internal management purposes only.
- A third TEOM (TEOM 3) was installed in the Maules Creek area for management purposes during late 2017. This was commissioned as a recommendation from the Katestone Dust Benchmarking Study.
- TEOM3 was relocated to a new property in the Maules Creek area during the 2020 calendar year.
- PM_{10} levels are measured at a High Volume Air Sampler (HVAS) on a twenty-four hour basis every six days. Total Suspended Particulate Matter (TSP) is inferred from the measured PM_{10} data.
- A network of four dust deposition gauges (DDG's), measuring deposited dust and particulates on a monthly basis.
- Additional sampling units (E-sampling trailer units) to provide input data for the predictive air quality monitoring software.

In addition to the above, the Boggabri - Tarrawonga - Maules Creek (BTM) Air Quality Management Strategy (AQMS) was approved in 2017. Predictive air quality modelling simulation software is fully implemented to

inform operational risk. During the reporting period new predicative air quality software was trialled and implemented across the BTM

The NSW Office Environment & Heritage (OEH) and the NSW EPA installed a number of TEOM monitoring units in late 2017. The Namoi Region Air Quality Advisory Committee was established by the Minister for the Environment of which Whitehaven Coal is a stakeholder on the committee.

Daily ambient air quality data for PM10 and PM2.5 particulate sizes from the Maules Creek TEOM1 monitoring unit is provided and published on the OEH managed air quality website. This has occurred since 2016 prior to the establishment of the Namoi Region Air Quality Monitoring Project.

Figure 4 Air Quality Monitoring Locations

6.2.2 Environmental Performance

A summary of the depositional dust air quality monitoring results at MCCM for the 2020 reporting period is provided in Table 8 .

Table 8 Deposited Dust Monitoring Results

Month	MC1 (g/m^2)	MC2 (g/m^2)	MC3 (g/m^2)	MC4 (g/m^2)
January	1.7	4.2[C]	2.2	3.3
February	4.1	4.5	3.5	9.8
March	1.2	0.8	0.8	1.2
April	1.1	1.0	1.8	1.6
May	1.0	3.0	4.0	8.4[C]
June	1.0	1.1	1.4	2.4
July	0.6	1.7	2.0	2.4
August	1.1	2.8	1.4	0.8
September	2.5	2.9	1.4	0.7
October	3.7	0.4	0.8	1.1
November	3.6[C]	1.0	1.2	1.0
December	4.0	3.4	5.1	0.9
Annual Average	2.13	2.23	2.13	2.8

C = Results contaminated by deposits deemed unrelated to mining activities (bird droppings, insects and vegetation).

Deposited dust monitoring data demonstrated compliance with the Project Approval (<4g/m2) throughout the 2020 calendar year. February recorded the highest values at all locations for the year with the highest concentration of 9.8 g/m² produced at MC4. Dust gauge results can be significantly impacted by localised sources (e.g. due to dust from livestock, agriculture, lawn mowers, cars travelling on local dirt roads, etc.) and are susceptible to contamination from organic material (such as plant detritus and droppings from birds which often perch on the gauges). As dust fallout generally occurs within relatively close proximity to sources, elevated dust gauge results are often caused by sources nearby to the monitor. However during certain meteorological conditions results can also be influenced by sources further afield and larger scale events such as regional dust storms. In the case of the DDG4 February 2020 sample of 9.8g/m2 /month, It can be determined that due to the minimal time spent downwind of the mine (approximately 11% based on the available weather data), the distance from the mining operations, the low level recorded at the nearest monitor DDG3 and the expected pattern of impacts as shown in Figure 5 and Figure 6, it is unlikely for MCCM to have been a significant contributor the deposited dust level recorded at DDG4 in February 2020. The elevated February result at MC4 was determined as not to be attributable to MCCM based on reviewing meteorological conditions and historical monitoring results for both MC4 and other monitoring locations closer to the operation. Low concentrations for the remainder of the year has maintained the compliant annual average.

The annual average deposited dust levels measured during 2020 have been compared with the modelling predictions for Year 5 and Year 10. For the purpose of assessing compliance with approved modelling the level excluding contaminated data has been considered. The measured annual average deposited dust levels in 2020 were elevated compared with the modelling predictions. It is however noted that the modelling predictions from the AQA used an annual average deposited dust background (contribution from non-mining sources) of 0.5 g/m2

/month whilst the historical pre mining era deposited dust monitoring data (collected from 1982 to 1986) presented in the AQA show an annual average of 1.9g/m2 /month deposited dust in the area. It is therefore considered that the background deposited dust concentration was potentially underestimated in the modelling. If an approximate background of 1.9g/m2 /month were adopted in the predicted levels, the measured annual average deposited dust levels (excluding contaminated data) in 2020 would generally be fairly well aligned with the predicted levels.

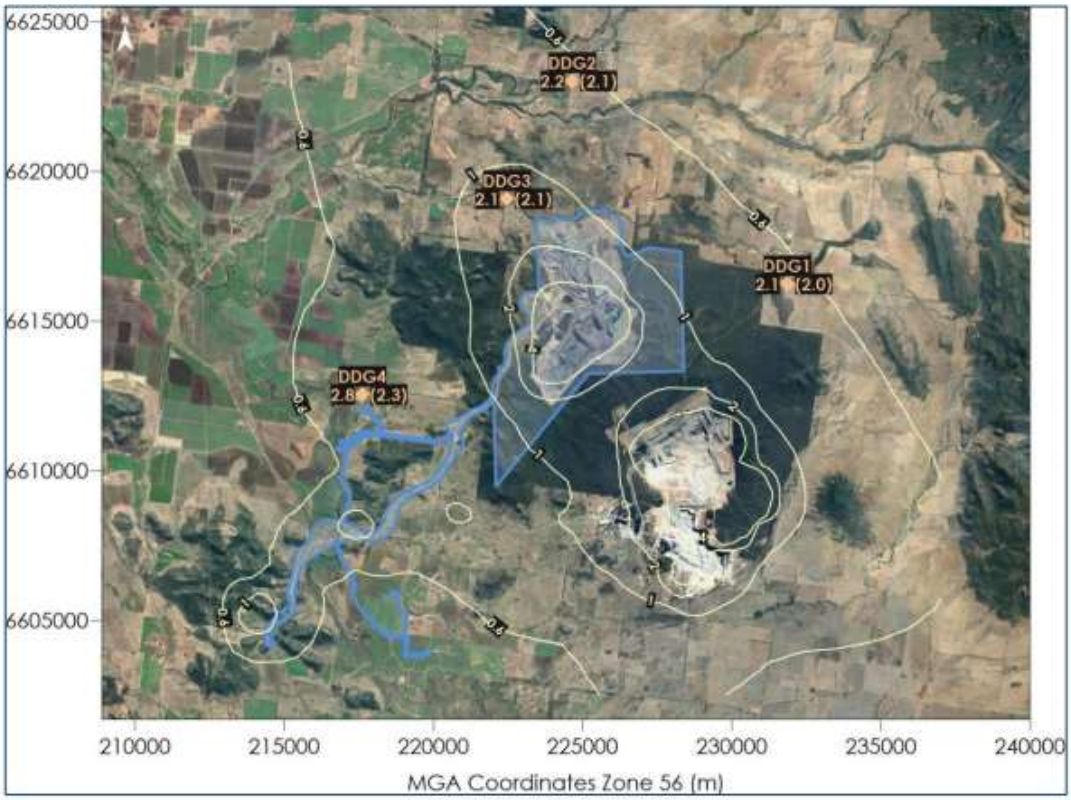


Figure 5 Comparison of measured and predicted annual average deposited dust levels (g/m²/month) Year 5

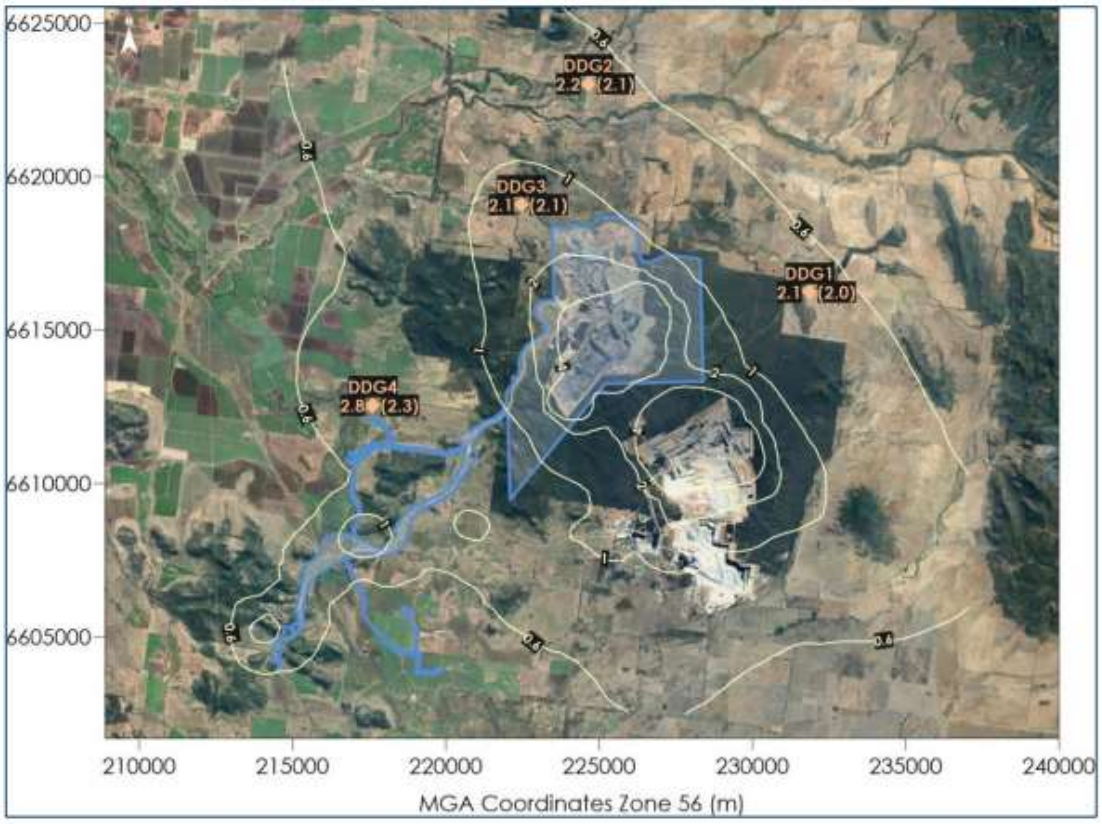
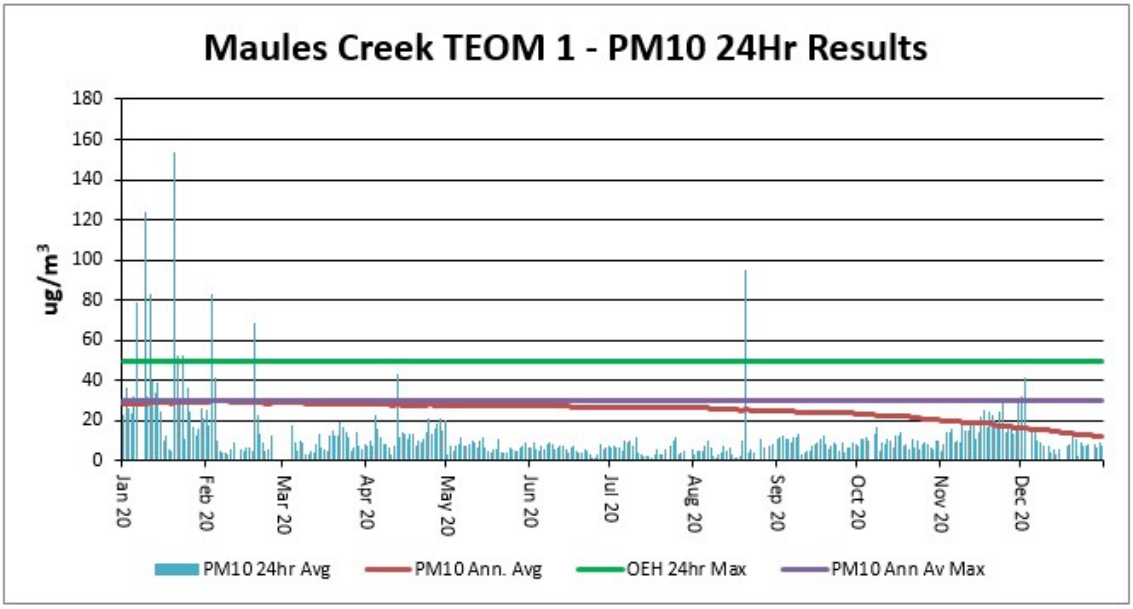


Figure 6 Comparison of measured and predicted annual average deposited dust levels (g/m^2/month) Year 10

PM_{10} 24Hr and Annual Average (TEOM1)

Elevated results above the 24 hour average occurred 9 times during the reporting period. The results corresponded with regional air quality events. Graph 1 shows that the majority of exceedances take place towards the beginning of the year during a period of drought and unusually intense bushfire activity. Overall the

annual average trend indicated in Graph 1 is on a downward trend, this is attributable to an increase in regular rainfall throughout the year improving soil moisture and promoting vegetation regrowth.



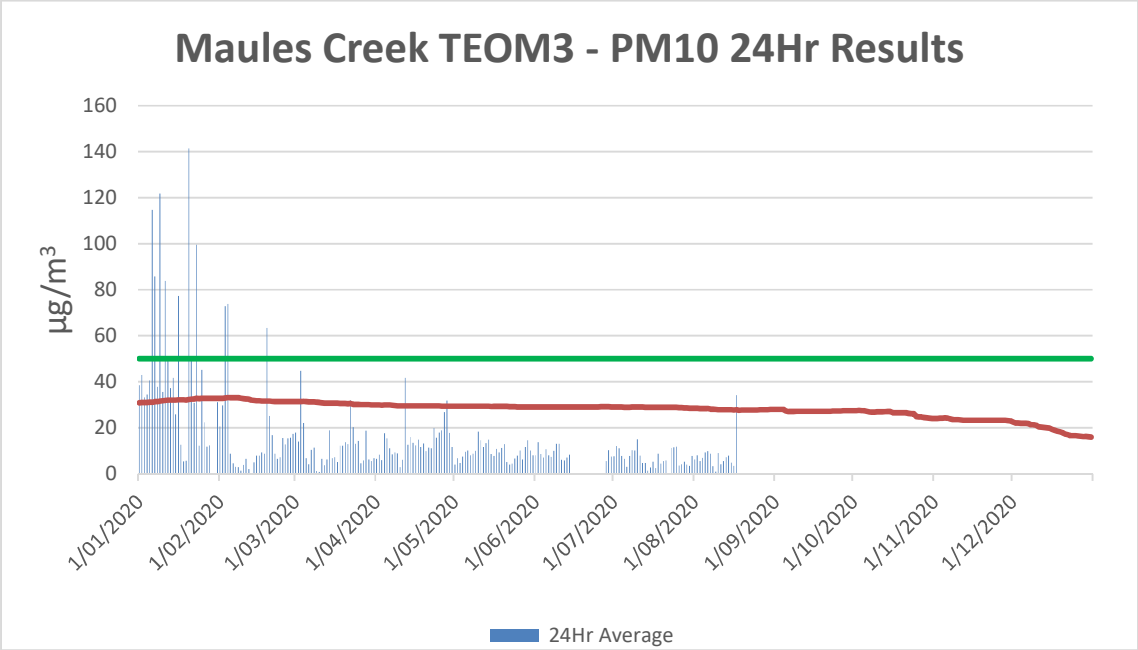
Graph 1: PM_{10} 24Hr and Annual Average Results (TEOM1)

The annual average PM10 levels measured during 2020 have been compared with the modelling predictions for Year 5 and Year 10 in Figure 2 and Figure 3 respectively. The measured annual average PM10 data in 2020 were in general found to align well with the modelling predictions, with the exception of TEOM2 which measured an annual average PM10 level approximately 10µg/m3 lower than that predicted, indicating that the monitor was less impacted by mining operations or the modelling over predicted the potential impacts.

PM_{10} 24Hr and Annual Average (TEOM3)

Elevated results above the 24 hour average occurred 11 times during the reporting period. The results corresponded with regional air quality events. Graph 2 shows that the majority of exceedances take place towards the beginning of the year during a period of drought and unusually intense bushfire activity.

Data from TEOM3 ceases on the 18th of August 2020 when the station was relocated to a new location and is awaiting a permanent power supply and associated infrastructure to be installed. Figure 4 shows the new location in relation to Maules Creek Coal's other air quality monitoring equipment.



Graph 2: PM_{10} 24Hr and Annual Average Results (TEOM3)

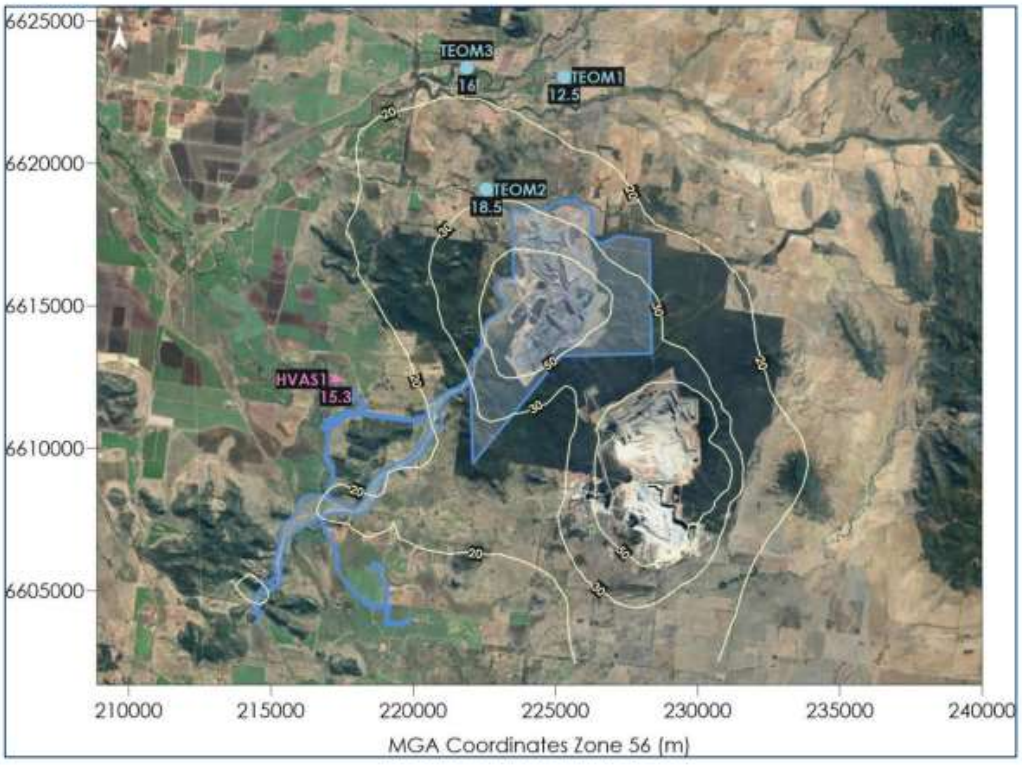


Figure 7 Comparison of measured and predicted annual average PM_{10} levels (µg/m³) Year 5

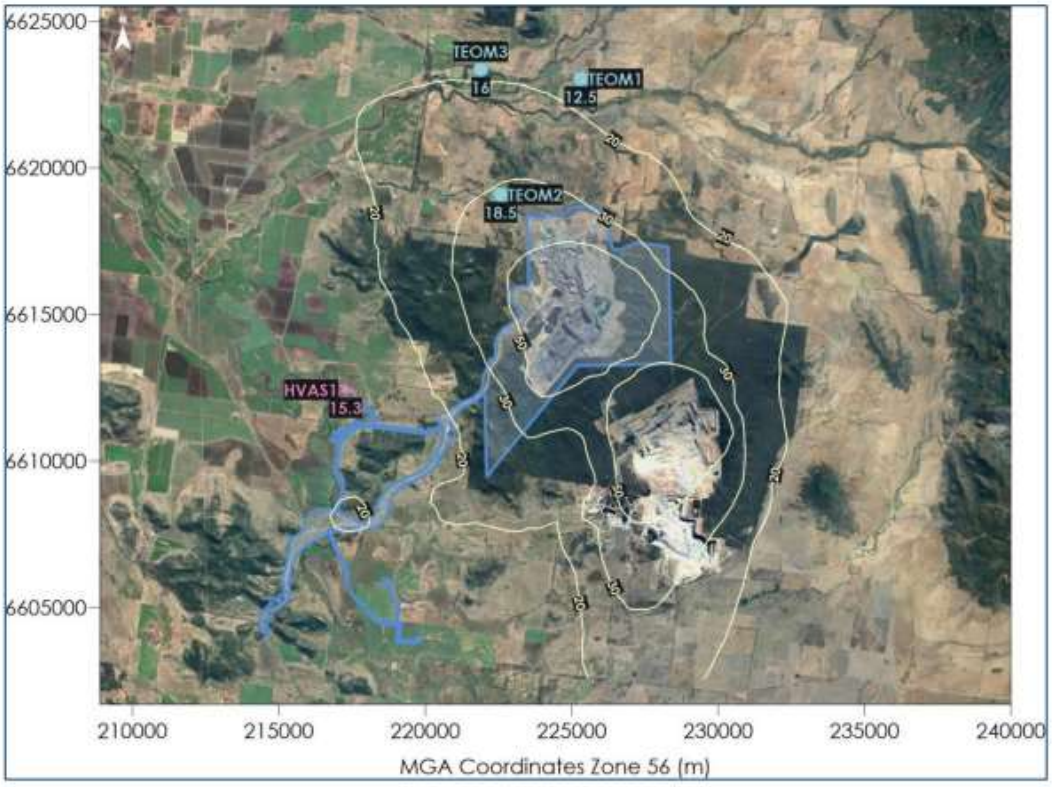
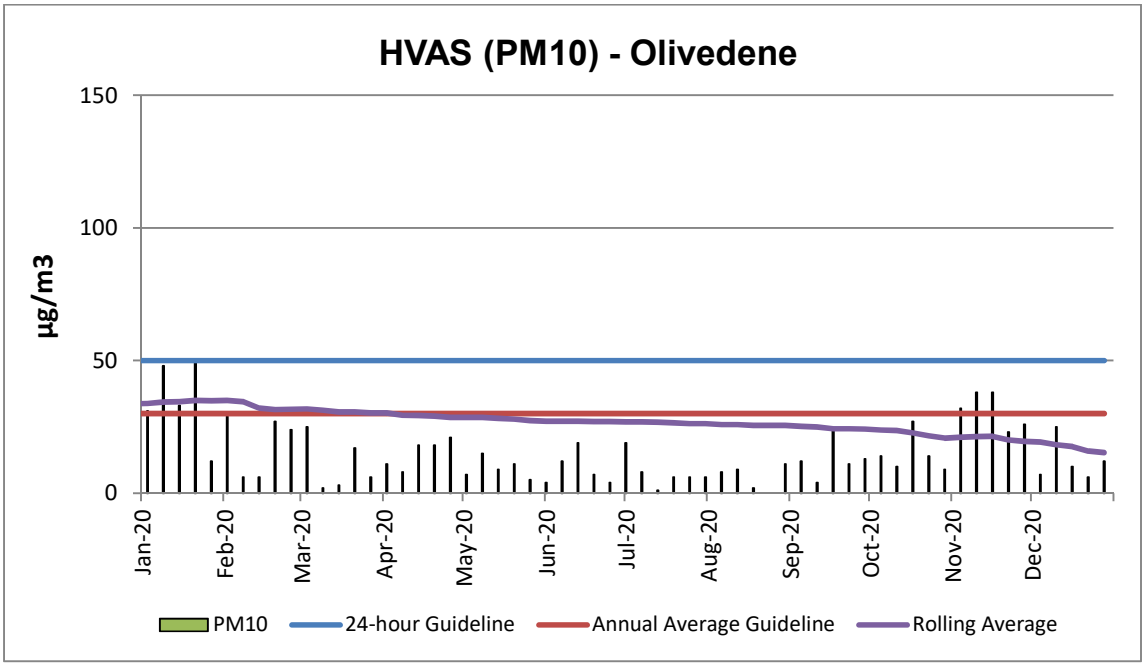


Figure 8 Comparison of measured and predicted annual average PM_{10} levels (µg/m³) Year 10

PM_{10} 24Hr and Annual Average (HVAS1)

The HVAS PM_{10} monitoring results are illustrated in Graph 3 below. Monitoring conducted at the MCC HVAS shows that the 24Hr criteria of 50 µg/m³ was not exceeded during the reporting period.

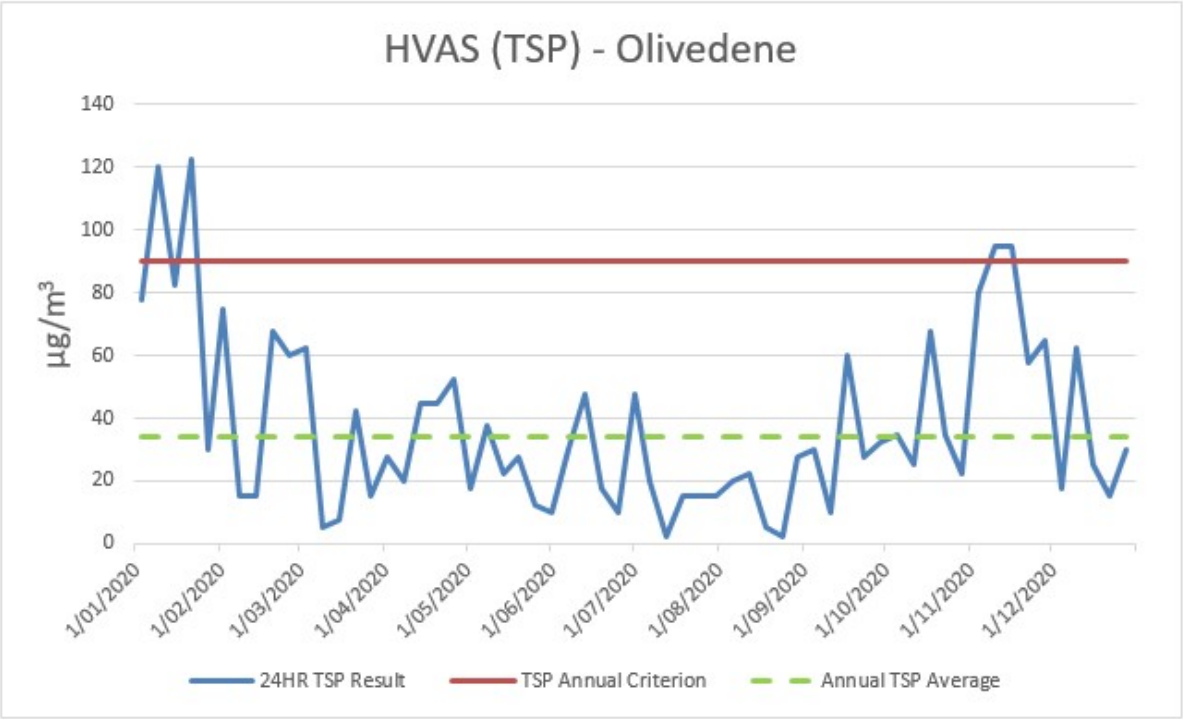
The PM_{10} rolling average remained above the applicable criteria of 30 µg/m³ at the beginning of the reporting period, the results can be attributed to the drought conditions, lack of ground cover in the region and the severe widespread bushfires that took place throughout the 4th quarter of the previous year. Consecutive compliant readings beginning in April are responsible for lowering the annual average to 15.3µg/m³ recorded at the HVAS monitor in 2020.



Graph 3: PM_{10} 24Hr and Annual Average Results (HVAS1)

Total Suspended Solids (TSP) Annual Average (HVAS)

Total Suspended Particulates (TSP) is inferred from the measured PM_{10} data. Monitoring conducted at the MCC HVAS indicated the TSP rolling annual average remained below the applicable criteria provided in Schedule 3 Condition 29 of PA10_0138 of 90 µg/m^3. The TSP monitoring results are illustrated in Graph 4 below. The annual average TSP levels measured during 2020 have been compared with the modelling predictions for Year 5 and Year 10. The 2020 measured annual average TSP data appears to be well aligned with the modelling predictions.



Graph 4: TSP Results (HVAS1)

6.2.3 Proposed Improvement Measures

Proposed measures to continuously improve include:

- Continued application of the BTM predictive modelling software and refinement where necessary;
- A move to in-pit dumping;
- Continue overburden shaping to assist with enabling the placement of topsoil and rehabilitation establishment in the northern emplacement of the MCCM footprint; and
- Continued engagement with the EPA regarding the Namoi Regional Air Quality Monitoring network.

6.3 GREENHOUSE GAS

6.3.1 Environmental Management

Greenhouse Gas (GHG) emissions at MCCM are managed in accordance with Schedule 3 Condition 27 of PA 10_0138 and the AQGHGMP. The main sources of GHG emissions considered in the AQGHGMP are:

- Fuel consumption (diesel) during mining operations – Scope 1.
- Release of fugitive methane (CH_4) from the fracturing of coal seams – Scope 1 and indirect emissions resulting from the MCCM's consumption and use of purchased electricity – Scope 2.

Electricity

A number of controls were applied to reduce electricity consumption at the MCCM during the reporting period, including:

- The energy efficiency of new electrical equipment is considered during procurement.
- Use of variable speed drives on pumps and conveyors in the CHPP.
- Avoiding idle running of conveyors in the CHPP.
- Management of lighting around the mine site.
- Use of bypass coal.

Diesel Consumption

A number of controls were applied to reduce diesel consumption at the MCCM during the reporting period including:

- Ensuring dump trucks are fully loaded where possible prior to hauling to maximise efficiency, i.e. fuel used per unit of material moved.
- Maximising the efficiency of the mining fleet through regular maintenance;
- Mine planning efficiencies to minimise the gradient, length and height of loaded haul runs for dump trucks, where possible.
- In-pit and mobile refueling facilities.
- Monitoring system for heavy vehicle use and fuel burn. This system also determines individual equipment utilisation which assists in minimising fleet size and associated wastage.
- Continued operation of the employee shuttle bus system to and from site.

6.3.2 Environmental Performance

Greenhouse Gas emissions associated with the MCCM are reported through participation in the National Pollutant Inventory (NPI) and as part of the Whitehaven Group in the National Greenhouse and Energy Report Scheme (NGERS). NPI data is publically available on the Commonwealth Department of Agriculture, Water and the Environment website. The total GHG Emissions attributed to the MCCM reported for the NGERS 2020 Financial Year (FY) reporting period was 865,669t CO_2-e.[1] The following sections detail the three key GHG contributors calculated for the 2020 NGER reporting period. During the past two years of operations MCC has reported lower than predicted fugitive emissions. Prior years reported higher than the EA estimated fugitive emissions. This was a result of the emissions calculation method used for fugitive gas that utilised the Method 1 approach, which is an over-estimation versus a significantly lower and closely aligned site specific emission factor applied during the EA.

Diesel Usage

95,208kL of diesel (stationary and transport use) was consumed equating to 256,680 tCO_2-e GHG Emissions. Diesel usage was higher than that estimated in the EA. This can be attributed to longer hauls which were

[1] Amendment made to rectify incorrect units of measure (kt to t) 11th November 2021.

experienced in relation to overburden placement in out of pit dumps, more coal was also mine in 2020 than estimated in the EA.

Fugitive Emissions

There was an estimated total of 579,217t CO_2-e fugitive emissions from MCCM in the 2020 FY. This is lower than the EA estimation.[2]

Electricity Consumption

30,660.94 KWh[3] power equating to approximately 24.835 kT CO_2-e was consumed by MCCM. This is less than the predicted consumption from the EA of scope 2 emissions of 49,280 tCO_2-e. This reduction in electricity consumption can be attributed to an increase in by-pass coal. This results in coal not being washed through the onsite CHPP, resulting in lower electricity usage.

6.3.3 Proposed Improvement Measures

Management measures described above will continue to be implemented during the next reporting period, including transitioning from the currently applied default Method 1 to the Method 2 assessment calculation methodology for fugitive emissions.

6.4 NOISE

6.4.1 Environmental Management

Potential noise impacts associated with the MCCM are managed in accordance with the:

- Noise criteria and operating conditions prescribed under Schedule 3 Conditions 7 and 15 of PA 10_0138.
- EPL 20221 Conditions L3 and M7.
- The MCC Noise Management Plan (NMP) approved by DPIE, and prepared to satisfy the requirements of the EPL and PA 10_0138.

Additionally, various controls were implemented to manage noise during the reporting period, including but not limited to:

- Real-time unattended noise monitoring systems at representative locations within the local area.
- Monthly compliance attended monitoring by independent acoustic consultants.
- Meteorological forecasting and daily risk reporting to advise of weather conditions in advance.
- Annual noise model validation (refer 6.4.2).
- Continued monitoring of TARP levels and dissemination of trigger alerts to MCCM personnel via SMS.
- Training of dispatch and supervisors regarding noise management and TARP's.

[2] Amendment made to rectify incorrect units of measure (kg to t) 11th November 2021.

[3] Amendment made to rectify incorrect units of measure (MWh to KWh) 11th November 2021.

- Dispatch operator that monitors real time noise data and can advise of any required modifications to work practices. Modifications may include changing dumping strategies, reducing the number of machines operating or ceasing operations.
- Roaming inspections by personnel at offsite locations to identify any audible mine related noise.
- Utilising overburden emplacement areas with acoustic shielding and higher windrows.
- Equipment sound power testing and analysis of fixed and mobile fleet.
- Operator training and awareness to reduce equipment noise.
- Use of 'silent horns' on the excavator and supporting truck fleet.
- Ongoing maintenance of the MCC mining fleet including any noise suppression equipment.
- Design and trials of new muffler systems on Hitachi 5000 class trucks.
- Low frequency noise assessments.

The MCCM noise monitoring network is illustrated on Figure **9** and includes:

- Continuous monitoring at real-time monitoring units that are utilised for daily management purposes.
- Monthly attended monitoring at six locations as described in the EPL (NM1 to NM6).

6.4.2 Environmental Performance

Attended Monitoring

The Noise Policy for Industry (NPfI) was introduced in late 2017. The application of the low frequency assessment consistent with the NPfI was applied during the reporting period.

Attended monitoring is completed on a monthly basis by an independent consultant and is used to assess compliance with licence and approval limits for mining generated noise. Monthly noise survey results are available in the EPL monitoring data reports available on the MCCM website. During this reporting period one noise exceedance occurred on the 1st of April 2020. The exceedance was measured at NM1 at 22:30. A mine site contribution of LAeq (15 min) of 39dBA was recorded, however a +5 dB modifying factor was applicable due to low-frequency noise. A follow-up measurement was taken at 23:13 and site only noise levels complied with the relevant criteria.

When the Acoustic Impact Assessment (NIA) was initially prepared in 2011, modifying factors were not assessed in accordance with the NPfI however the NPfI has been applied where required to all attended monitoring results, so the measured LAeq (15 min), has been compared with the predicted LAeq (15 min) without the modifying factors applied. When compared, noise levels measured at NM1 in 2020 were lower than noise levels predicted for Year 5 in the Environmental Assessment (EA).

Data trends over the life of the mine indicate that site-only LAeq noise levels have been low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. At NM1 and NM2, site-only LAeq noise levels have increased slightly over the life of the project. At NM3, NM5, and NM6, site-only LAeq noise levels have remained very low throughout the life of the project and at NM4, site-only LAeq noise levels increased slightly from 2014 to 2016 and decreased from 2016 to 2020.

Discrepancies between the predicted and actual noise impacts of the project are identified and the potential cause of significant discrepancies are discussed below and shown in Tables 9 -14. When comparable, noise levels measured in 2020 were lower than noise levels predicted for Year 5 in the EA at all monitoring locations during all measurements with a single exception, discussed below. Predictions in the EA represent worst-case noise

impact under prevailing conditions, so it is expected that actual noise levels would typically be lower than these predictions. In April 2020, the measured site-only LAeq,15minute at NM1 was 34 dB, however a +5 dB modifying factor was applicable due to low-frequency noise, which resulted in an exceedance. When the EA was initially prepared in 2011, modifying factors were not assessed in accordance with the NPfI which was not issued until 2017. This is the primary cause of discrepancy, as without application of the modifying factor, measured noise levels were lower than predicted in the EA.

Table 9 NM1 Measured $L_{Aeq,\ 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq,\ 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	Inversion, ESE Wind	IA	35	NC
February	NA	IA	-	NA
March	NA	IA	-	NA
April	Inversion, No Wind	34	35	-1
May	NA	IA	-	NA
June	NA	<25	-	NA
July	Inversion, SSE Wind	IA	35	NC
August	NA	IA	-	NA
September	Inversion, SSE Wind	<25	35	NC
October	NA	35	-	NA
November	NA	23	-	NA
December	NA	23	-	NA

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

Table 10 NM2 Measured $L_{Aeq,\ 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq,\ 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	NA	<20	-	NA
February	NA	30	-	NA
March	NA	25	-	NA
April	Inversion, No Wind	<20	39	NC
May	NA	<30	-	NA
June	Inversion, No Wind	28	39	NC
July	Inversion, SSE Wind	IA	39	NC
August	NA	IA	-	NA
September	Inversion, No Wind	<20	39	NC
October	Inversion, ESE Wind	35	39	-4
November	NA	29	-	NA
December	Inversion, SSE Wind	IA	39	NC

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

Table 11 NM3 Measured $L_{Aeq, 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq, 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	Inversion, ESE Wind	IA	33	NC
February	NA	<25	-	NA
March	NA	NM	-	NA
April	Inversion, No Wind	IA	33	NC
May	NA	<25	-	NA
June	Inversion, No Wind	<25	33	NC
July	NA	<20	-	NA
August	Inversion, ESE Wind	IA	33	NC
September	Inversion, No Wind	IA	33	NC
October	Inversion, ESE Wind	IA	33	NC
November	NA	23	-	NA
December	Inversion, SSE Wind	IA	33	NC

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

Table 12 NM4 Measured $L_{Aeq, 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq, 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	Inversion, ESE Wind	IA	31	NC
February	NA	IA	-	NA
March	NA	<25	-	NA
April	Inversion, No Wind	IA	31	NC
May	NA	<20	-	NA
June	Inversion, No Wind	<20	31	NC
July	Inversion, ESE Wind	<25	31	NC
August	Inversion, ESE Wind	IA	31	NC
September	Inversion, No Wind	IA	31	NC
October	Inversion, ESE Wind	<30	31	NC
November	NA	25	-	NA
December	NA	24	-	NA

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

Table 13 NM5 Measured $L_{Aeq, 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq, 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	NA	IA	-	NA
February	NA	IA	-	NA
March	NA	IA	-	NA
April	Inversion, No Wind	IA	30	NC
May	NA	IA	-	NA
June	Inversion, No Wind	IA	30	NC
July	Inversion, SSE Wind	IA	30	NC
August	Inversion, ESE Wind	<25	30	NC
September	NA	<20	-	NA
October	NA	<30	-	NA
November	NA	IA	-	NA
December	NA	IA	-	NA

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

Table 14 NM6 Measured $L_{Aeq, 15\ Minute}$ Compared to 5 Year Predicted $L_{Aeq, 15\ Minute}$

Month	Applicable Meteorological Condition	Measured MCCP $L_{Aeq,15minute}$	Predicted MCCP $L_{Aeq,15minute}$	Difference
January	NA	IA	-	NA
February	NA	<20	-	NA
March	NA	<20	-	NA
April	Inversion, No Wind	IA	30	NC
May	NA	IA	-	NA
June	Inversion, No Wind	NM	30	NC
July	NA	<25	-	NA
August	Inversion, SSE Wind	IA	30	NC
September	Inversion, No Wind	IA	30	NC
October	NA	<25	-	NA
November	Inversion, ESE Wind	24	30	-6
December	Inversion, ESE Wind	<20	30	NC

NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and

NC indicates measured MCCP site L_{Aeq} noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" quantity (e.g. less than 30 dB), therefore measured and predicted noise levels were not comparable.

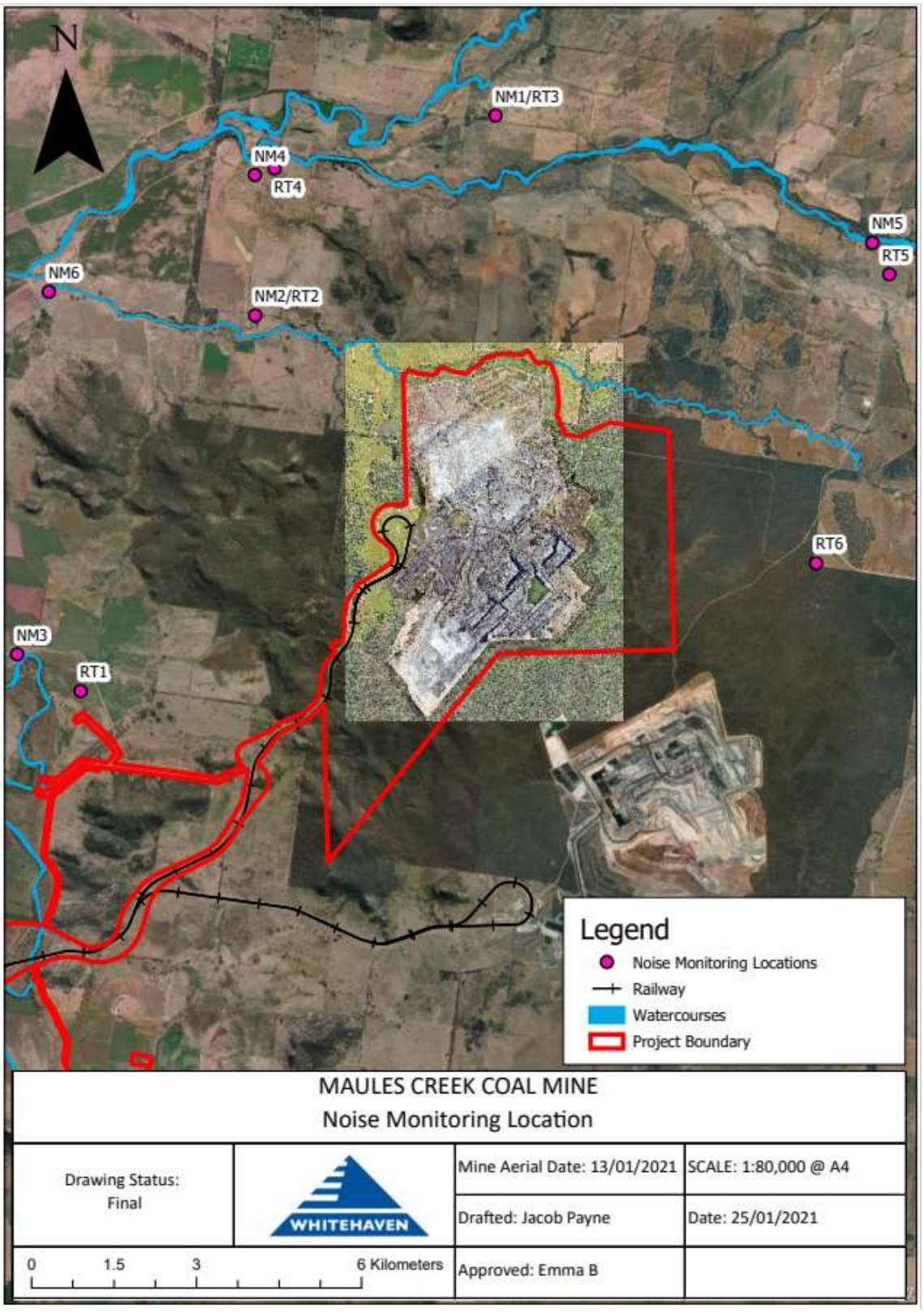


Figure 9 Noise Monitoring Network Locations

Annual Sound Power Testing

Sound power level testing of fixed and mobile plant has been undertaken and results are provided in Appendix C. 133 individual pieces of mobile plant were tested during the reporting period. Sound power levels from all mobile plant were less than or equal to the predicted sound power targets described in the Project EA for modelling purposes. The total sound power level for stationary plant this reporting period is lower than last reporting period. Results recorded for some pieces of stationary plant within the CHPP were once again greater than the power targets described in the Project EA due to the layout and operation of the CHPP and other surface plant. During testing it was not always possible to measure each fixed plant item in isolation. Due to the low-frequency content of the CHPP, it interfered with measurements of other nearby sources. Feed/product conveyors and other transfer stations could not always be isolated which likely increased background noise levels and/or reduced the possible measurement positions used during the assessment.

Performance measurements by monthly attended monitoring results support the position that MCCM is operating generally in accordance with the respective Project Approval and EPL 20221 criteria for mining noise.

MCCM is continuing to further develop solutions to manage sound power levels on mobile equipment. Ongoing work continued during the reporting period to improve exhaust systems on the Hitachi class truck fleet.

Annual Validation

Maules Creek Coal engaged an acoustic consultancy to undertake a validation assessment of the site noise model to fulfil the requirements of the MCC Noise Management Plan (NMP) and Schedule 3 Condition 16(f). The assessment aimed to review real-time and attended monitoring data for 2020, and validate the results against the model predictions from the Environmental Assessment NIA.

The validation exercise occurred comparing a period in July and concluded that the EA Project acoustic impact assessment model was generally more conservative in predicting noise impact relative to predictions for actual operations. Measured 90th percentile low pass LAeq were compared with 90th percentile model predictions to evaluate correlation between model predictions and measured mining noise.

Results indicate the model provided a good level of accuracy in predicting noise when considering a wide range of weather conditions. Predictions were lower than the Project Acoustic Impact Assessment at all locations other than NM2/RT2 and NM6, for which a difference of plus 1dB was predicted. This indicates a lower level of noise impact is generally predicted relative to the Acoustic Impact Assessment.

Proposed Improvement Measures

A number of improvement measures are proposed for the next reporting period including:

- Further review of exhaust systems on haul trucks.
- Operational planning to continue to include screening options for overburden dumps.
- Pending approval and implementation of the updated NMP.
- Additional improvements to the real time environmental noise monitoring system.
- Installation of a multi-directional noise monitor
- Transition to a higher volume of in-pit dumping
- Work collaboratively with Boggabri Coal and Tarrawonga Coal to minimise noise impacts

6.5 BLAST

6.5.1 Environmental Management

Blast management measures are implemented at MCCM to support the management and control of post blast fume generation, dust impacts, rock fragmentation, blast overpressure and ground vibration. Blasting impacts associated with the MCCM are managed in accordance with the:

- Blasting criteria prescribed under Schedule 3 Conditions 18 to 20 of PA 10_0138.
- Blast Management Plan (BLMP), relevant MCC procedures and the BTM Blast Management Strategy (BTMBS) that have been approved to satisfy the requirements of the EPL and PA 10_0138.

During the reporting period a number of controls were applied to reduce the potential for impacts associated with blasting at the MCCM. The key controls implemented include, but were not limited to:

- Best practice blast design and drill practices in accordance with the relevant Australian Standards.
- Blast scheduling considering meteorological conditions, including wind speed and direction.
- Pre-blast assessment for each blast to determine blast exclusion zones, potential fume generation risks and appropriate controls measures to minimise potential risks.
- Review of blasts and investigations as required.
- Revision to the BTM BLMS and improving commitments and control measures.
- Coordination of blasts to avoid cumulative impacts in accordance with the BLMS.
- The likelihood of fume generation is reduced through consideration of explosive product, geological conditions, best practice loading procedures, blast scheduling, 'sleep-time' and meteorological conditions.

Air blast overpressure and ground vibration monitoring are undertaken at four monitoring locations shown on Figure 10.

6.5.2 Environmental Performance

There were 115 blasts carried out during the reporting period. All blast monitors were fully operational during the reporting period. All events remained within the applicable criteria at these locations. Details of blasts are included in Appendix A. Complete capture rate for each unit occurred where blasts were above the trigger threshold. Table 15 Summary of Blasting Results summarises the blasting monitoring results during the period.

As stated above there were no monitored exceedances of the applicable ground vibration and air blast overpressure limits during the 2020 reporting period at the Maules Creek monitors. Both overpressure and ground vibration monitoring results are consistent with the predicted blasting impacts described within the EA. During the reporting period three results were above the 95th percentile limit. This is a minor increase on last year's results where the 95th percentile was not exceeded.

Table 15 Summary of Blasting Results

Location	Parameter	Average	Maximum	100% Limit	Exceedance
BM1	Air blast overpressure (dB(Lin Peak))	93.23	112.20	120	-
	Vibration (mm/s)	0.10	1.40	10	-
BM2[#]	Air blast overpressure (dB(Lin Peak))	96.59	115.10	120	-
	Vibration (mm/s)	0.16	2.03	10	-
BM3	Air blast overpressure (dB(Lin Peak))	99.32	116.50	120	-
	Vibration (mm/s)	0.22	4.07	10	-
BM4[#]	Air blast overpressure (dB(Lin Peak))	98.03	115.30	120	-
	Vibration (mm/s)	0.34	3.27	10	-

* BM1 is on mine owned property.

[#] BM2 and BM4 are on property either owned or acquired during the course of the reporting period.

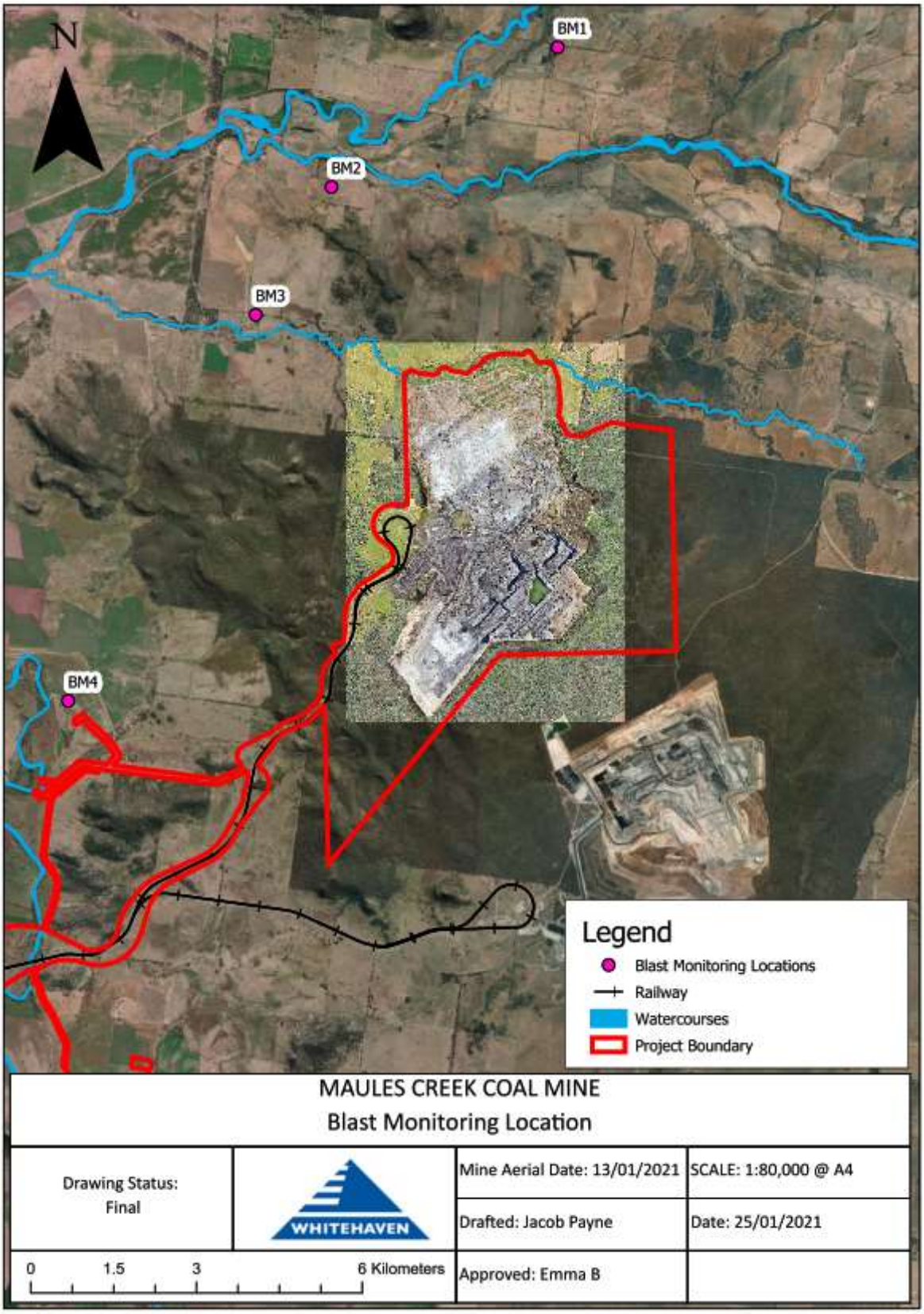


Figure 10 Blast Monitoring Network Locations

6.5.3 Blast Fume

Blast fume generation, including visible NOx fume, varies from yellow to orange to dark red depending on the concentration of NO_2 in the post-blast gases. There were no significant fume events (i.e. greater than Level 3C classified against the *Australia Explosives Industry & Safety Group* guideline) during the reporting period. There was a total of 21 recorded blasts with fume observed within the 2020 calendar year. 11 of those were classed as 1A, 3 classed as 1B, 2 classed as 2A, 2 classed as 2B, 1 classed as 2C and 2 classed as 3B. All blasts were video recorded and categorised in line with the BLMP and relevant industry guidelines.

6.5.4 Proposed Improvement Measures

Continual refinement to blasting design, geological definition, and engagement with blasting product suppliers, shall occur during the next reporting period.

6.6 BIODIVERSITY

6.6.1 Environmental Management

Biodiversity was managed in accordance with:

- Schedule 3 Conditions 52 of the PA 10_0138; and
- the MCC Biodiversity Management Plan (BMP) and Biodiversity Offset Strategy (BOS) prepared to satisfy the requirements of PA 10_0138.

Various treatments were implemented during the reporting period to mitigate impacts of the MCCM including (but not limited to):

- weed monitoring and inspections;
- feral animal monitoring and inspections;
- seed management and collection;
- flora and fauna monitoring; and
- fuel load assessment.

6.6.2 Maules Creek Coal Mine (MCCM) – Biodiversity Offset Area (BOA) Management

MCCM Revised Biodiversity Management Plan (BMP) was approved by the former NSW DPE on 26th April 2017 and the Revised NSW Biodiversity Offset Strategy was approved by former NSW DPE on 27th October 2015 for the MCCM Biodiversity Offset Area (BOA) to maintain and improve 12,169ha of native woodland and forest covering four offset precincts called the Eastern and Western region (adjacent to MCCM, Leard Forest and Leard State Conservation Area); the Southern region (adjacent to the Boonalla Aboriginal Area) and the Northern region (adjacent to the eastern boundary of Mount Kaputar National Park).

Offset Security Management

Six Conservation Agreements for 11 MCCM Offset properties were registered on title by the NSW Land Registry Service on 20th March, 13th and 16th July 2020. WHC continued to consult with NSW DPIE and Commonwealth DAWE during the reporting period to keep abreast of securement progress; including receiving on 18th March 2020 a 12 month extension to the EPBC Approval 2010/5566 Condition 13 securement date until the 31st March 2021 (except for the joint owned with Boggabri Coal, Rocklea Offset property which is 15th December 2022). By the end of the reporting period, the BCT and WHC had finalised a further six Conservation Agreements for another 7 MCCM Offset properties aiming to lodge and register with NSW Land Registry Service by the 31st March 2021. Following registration of Conservation Agreements; WHC will prioritise negotiations of those MCCM Offset properties that NPWS has previously shown interest in being transferred to National Park Estate.

Infrastructure & Waste Management

During the reporting period, a total of 13.8km of new fencing (fauna friendly) was constructed along the perimeter of MCCM BOA (Offset properties of Bimbooria, Velyama West, Teston South and Mt Lindesay) as well as maintenance of signage and gates undertaken as required to continue to restrict unauthorised access and minimise livestock incursion. Also during the reporting period, 92.4km of redundant internal fences were deconstructed on Wirradale and Mt Lindesay Offset properties and 69 redundant or derelict assets/infrastructure were removed, previously associated with the former agricultural use of MCCM BOA. Waste removed is either recycled (in the case for scrap metal) or disposed offsite (general municipal waste and tyres) at the Narrabri Waste Management Facility. Any remaining derelict assets/infrastructure items will continue to be assessed, removed and remediated as required prior to transfer to MCCM Offset properties to National Park Estate.

Seed Management

Routine seed assessments completed for the MCCM BOA identified a turnaround in climatic conditions across the region due to the above average rainfall in 2020. The routine seed assessments aim to identify on a seasonal basis the life cycle stage and development of native plants to identify what, where, when and how to target appropriate resources to collect seed for future revegetation programs. A total of 42 species were collected resulting in 13,212 grams of local provident seed from across the MCCM BOA. As part of the WHC group wide revegetation planning; the onsite collected seed was supplemented with commercially sourced local and regional provident seed by reputable seed collectors. A local revegetation provider was engaged to propagate the seed to produce Box Gum and non-EEC/CEEC Woodland overstorey species seedlings required for the 2020 revegetation program completed as well as planning for the 2021 revegetation program for the MCCM BOA.

Revegetation Management

The MCCM BMP revegetation strategy focuses on restoration and revegetation of cleared non-native grassland (former cultivation) and derived native grasslands and assisting natural regeneration in better quality woodland areas. During the reporting period, revegetation ground preparation utilised tractors and excavators augering holes (to a depth >0.3m) to relieve compaction, improve permeability and infiltration to increase sub-surface soil moisture for planting as part of the 2020 revegetation program on the Kelso, Velyama West, Velyama East, Louenville, Teston South, Teston North, Tralee, Ferndale, Ellerslie, Thornfield, Onavale, Wirradale, Wongala South and Mt Lindesay Offset properties. There was no understorey revegetation carried out during the reporting period. The overstorey revegetation program was undertaken between May and November 2020 with more than 60,000 hiko seedlings of Box-Gum and other Woodland species planted over 1100ha of the MCCM BOA. Combined with good seasonal conditions, routine tree watering and maintenance activities post planting

have been successful to ensure that over 90% survival has been achieved for the MCCM BOA which is commensurate with the target Woodland vegetation structure.

Heritage Management

During the reporting period, heritage site and fencing inspections were completed on the 202 known Aboriginal cultural heritage sites within the MCCM BOA. Each site is maintained with protective fencing around the heritage site perimeter and signage to mitigate access and disturbance. One new Aboriginal cultural heritage site was identified on the Mt Lindesay property (Mt Lindsay AS4 – AHIMS 20-1-0161). The Aboriginal Cultural Values Report (a requirement under the approved Aboriginal Heritage Conservation Strategy - AHCS) was submitted as part of RAP consultation requirements and to DPIE updating the status of AHCS commitments. In December 2020, MCCM self-reported to DPIE an inconsistency in the sequence of infrastructure removal works whereby a final heritage report on the infrastructure was not received prior to the works being undertaken. This represented no change in either the outcome, or recommended measures, from the heritage report.

Habitat Management

During the reporting period, habitat augmentation was undertaken with 63 previously stockpiled timber logs being transported to the Velyama West Offset property to create a coarse woody debris habitat area linking remnant vegetation within the “east-west” corridor identified in the BMP.

Weed Management

WHC coordinated routine formal weed monitoring/inspections undertaken across MCCM BOA in February, May, September and November 2020. The priority weeds identified included legacy noxious weeds inherited from previous owners management regimes such as African Box Thorn, St Johns Wort, Briar Rose, Green Cestrum and Cactus species (Common, Tiger and Rope Pear) as well as a range of broadleaf weeds within revegetation areas. The weed monitoring/inspections ensure that timely and prioritised weed control is undertaken on a seasonal basis with the spatial information directly given to spraying contractors to identify what, where, when and how to target appropriate resources across the MCCM BOA for weed control.

During the reporting period, WHC implemented a comprehensive weed control program across the MCCM BOA including 7,916.1ha treated across the Eastern and Western regions, 285.6ha treated on Southern region and 6,661.5ha treated on Northern region. Only appropriately qualified and experienced weed contractors (AQF3 accreditation or higher for use of herbicide) were engaged to undertake weed control works for WHC.

Pest Animal Management

WHC undertook routine pest animal monitoring across the MCCM BOA in February, May, September and November 2020. The adoption of a “monitor, measure and manage” approach to pest animal management will allow WHC to implement adaptive management in response to changes being measured through monitoring in pest animal abundance specific to the different geographical regions of the MCCM BOA. Pest animal monitoring utilises the relevant methodologies for specific pest animals generally in accordance with the NSW DPI *Monitoring Techniques for Vertebrate Pests* so that a range of methods can be used such as transects/spotlighting and cameras traps where practicable and relevant to specific Offset regions and properties. Monitoring demonstrated that certain animals like Eastern Grey Kangaroos can be high abundance all year; while Goats, Foxes and Feral Pigs are seasonally variable between scarce to medium abundance and all other pest animal species recorded as scarce to low abundance levels across 2020. The pest animal monitoring

ensures that timely and prioritised pest animal control is undertaken on a seasonal basis identifying what, where, when and how to target appropriate resources across the MCCM BOA for pest animal management.

During the reporting period, WHC implemented a comprehensive feral animal control program across the MCCM BOA with routine 1080 baiting and pig trapping programs undertaken in March (resulting in 61 Foxes, 3 Wild Dogs and 3 Feral Pigs removed from 388 baits presented and 25 Feral Pigs trapped), June (130 Foxes, 2 Wild Dogs and 8 Feral Pigs removed from 970 baits presented and 48 Feral Pigs trapped), September (110 Foxes, 29 Wild Dogs and 11 Feral Pig removed from 1050 baits presented and 71 Feral Pigs trapped) and December 2020 (171 Foxes, 2 Wild Dogs and 20 Feral Pigs removed from 1010 baits presented and 45 Feral Pigs trapped). Over 3400 baits were presented on the MCCM BOA in 2020 resulting in 16% to be taken by pest animals. Night time open range shooting programs were implemented in conjunction with the other programs resulting in an additional 56 Rabbits, 5 Feral Cats, 70 Hares, 28 Feral Pigs and 23 Foxes being controlled in 2020. The Feral Goat harvesting during the reporting period resulted in 49 being captured and on sold to an abattoir. Only appropriately qualified and experienced feral animal contractors (appropriate feral animal management qualifications, NSW fire arm licence and pesticide accreditation where relevant) were engaged to undertake feral animal control works for WHC.

Soil & Erosion Management

Annual inspections were undertaken including unsealed tracks and associated drainage structures across the MCCM BOA to review appropriate erosion and sediment control measures required in accordance with the Blue Book (Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004)). Due to the above average rainfall during the reporting period; additional targeted maintenance was identified for nine sites within MCCM BOA to mitigate further erosion and sediment issues. The remaining sites and tracks/drainage structures can be continue to be maintained during routine WHC Biodiversity fire break track maintenance program.

Grazing Management

MCCM BOAs continued to be destocked and no strategic grazing occurring during the reporting period. There were four instances of stock incursion during the reporting period; with the stock on each occasion quickly retrieved and fences repaired (if required) to maintain to a stock proof condition.

Bushfire Management

In accordance with the BMP, annual fuel load monitoring was undertaken in December 2020 as part of planning and assessment of bushfire hazard and ecological burn strategy in 2021 for the MCCM BOA. During the reporting period, the average overall fuel load measured and fire risk for the Northern region ranged between 14t/ha to 17t/ha (moderate to high) with a moderate fire risk; Southern region was 10t/ha to 16t/ha (moderate) with a moderate fire risk; Eastern region ranged between 8t/ha and 11t/ha (moderate) with a low to moderate fire risk; while for the Western region ranged between 9t/ha and 13t/ha (moderate) ranging from low to moderate fire risk. Other fire management implemented by WHC during the reporting period included spatial data collection for 733.4km of fire break tracks with maintenance carried out as required to a zero fuel barrier standard across the MCCM BOA. Due to the above average rainfall, WHC were unable to undertake any ecological burning in 2020 for the MCCM BOA. WHC maintains regular communications throughout the reporting period with both the Liverpool Range and Namoi-Gwydir Zone RFS teams around planning of other WHC BOA site ecological burn programs as well as providing WHC emergency contacts. WHC maintains a

specialist firefighting contractor for an on call engagement during the fire season to respond in the event of a bushfire on WHC BOAs and non-mining lands.

Threatened Flora Fencing

During the reporting period, a total of 27.4km of new demarcation fencing was constructed around threatened flora sites for species such as *Dichanthium setosum* and *Thesium australe* on the MCCM Offset properties of Wirradale, Wongala and Mt Lindesay. This brings the total of threatened flora sites now fenced to 46 that have been identified and protected across the MCCM BOA.

Tylophora linearis Management

In accordance with the BMP, Stages 1 (Root Architecture) to 4 (Seed Propagation) of the *Tylophora linearis* translocation program had previously been completed in 2014 and 2015; with the Growth Study ongoing during the reporting period. Monitoring has continued of the 77 *Tylophora linearis* seedlings transplanted within Wollandilly Offset property during December 2015 that were propagated from seed collected onsite at MCCM during 2014. Of these translocated plants as many as eight stems were recorded in the second quarter of 2020, including additional stems not previously observed representing either clonal reproduction or seed germination. These additional stems and the continued seed release from one of the transplanted *Tylophora linearis* in 2020 are evidence of the transplantation project contributing towards an established and viable population of *Tylophora linearis* within the Wollandilly Offset property. Quarterly inspections of known *Tylophora linearis* populations were undertaken to identify reproductive material which could be collected for additional germination trials. A total of 25 seeds were collected from the transplanted *Tylophora linearis* in April and July 2020, however only one seed successfully germinated with this plant but died shortly after germination. Ongoing monitoring in 2020 of the Teston South BOA *Tylophora linearis* topsoil enclosures did not identify any above ground growth or germination from potential translocated below ground rhizomes. No other seed collection opportunities were identified from the MCCM clearing area or natural *Tylophora linearis* populations during the reporting period.

Pomaderris queenslandica Management

In accordance with the BMP, Stages 1 (Root Architecture) to 4 (Seed Germination) of the *Pomaderris queenslandica* translocation program had previously been completed in 2015 and 2016. Monitoring continued during the reporting period of the translocated *Pomaderris queenslandica* plant that was propagated from a cutting in 2015 and planted within the Wollandilly BOA during November 2017. Unfortunately, this plant died during the first quarter of 2020. An additional germination and propagation trial was commenced in 2019 from *Pomaderris queenslandica* seed collected during 2014/2015 resulting in a total of 34 seedlings being planted across the MCCM Offset Properties in July 2020. Ongoing monitoring of these seedlings has recorded 100% survival including flowering of these plants in the second half of 2020. In the last quarter of 2020, additional seed was opportunistically collected from *Pomaderris queenslandica* populations within other WHC Offset Properties (Rosevale) and State Forests (Pilliga East and Jacks Creek) to enable future germination and translocation trials.

Monitoring Program

The ecological monitoring program of the MCCM BOA included winter bird surveys undertaken in August 2020, spring fauna monitoring of 16 general fauna sites, 85 bird sites and 35 arboreal mammal sites undertaken between October and November 2020 plus spring flora/vegetation monitoring of 52 treatment sites, 8 control sites and 8 reference sites undertaken in November 2020. Overall flora and fauna monitoring results reflect the above average rainfall favourable conditions in 2020 compared to the drought conditions across 2018 and 2019.

During the winter bird surveys, four threatened species were recorded (Brown Treecreeper, Diamond Firetail, Dusky Woodswallow and Grey-crowned Babbler). During spring fauna monitoring, a total of 131 bird species were recorded during standardised bird surveys across 85 sites. Split by habitat, 110 bird species were recorded in 32 woodland sites (average = 28.3; range 14 to 45), 93 species in 30 revegetation/rehabilitation sites (average = 16.2; range 7 to 37), and 116 species in 23 naturally regenerating sites (average = 27.1, range 11 to 37). Comparing to 2019 results, more bird species were detected in 2020 (2019 richness = 104), average species richness was higher for 2020 in woodland (2019; average = 18.5; range 13 to 27) and revegetated and regenerated sites (combined in 2019; average = 11.25; range 4 to 18). A total of 12 species of microbat were detected by harp trapping at 16 sites in 2020. Average species richness at the 16 woodland sites was 3.25, with a range from 1 to 8. Species richness was higher in 2020 when compared with 2019 surveys, which recorded 10 species and a mean richness of 2.6 (range 0 to 6). Diurnal herpetofauna surveys detected 28 species of reptile (average = 4.1; range 1 to 6) and 1 species of frog across 16 sites. General spotlighting surveys at 8 sites detected 33 species across all vertebrate taxa (average = 9.1; range 6 to 16) including 1 species of gliding mammal. Targeted nocturnal gliding mammal surveys along 35 transects detected 3 species of glider (average = 0.46; range 0 to 2) for a total of 26 individual gliders (Greater Glider = 16, Squirrel Glider = 7, Sugar Glider = 3). The gliding mammal detection rate for the targeted surveys was 0.46 species per transect resulting in a more efficient survey effort than the detection rate of 0.1 per survey from the general spotlight surveys.

During the spring flora monitoring, native plant species richness (NPS) increased from 43 sites last year to 47 out of the 52 treatment sites meeting or exceeding the completion criteria (80% native species richness benchmark for relevant biometric vegetation communities). Native overstorey cover (NOS) increased from 9 sites last year to 12 out of the 52 treatment sites meeting or exceeding the completion criteria (minimum overstorey cover benchmark for relevant biometric vegetation communities). Native midstorey cover (NMS) increased from 50 sites last year to 51 out of the 52 sites meeting or exceeding the completion criteria (minimum midstorey cover benchmark for relevant biometric vegetation communities). Native ground cover grass (NGCG) increased from 28 sites last year to 45 out of the 52 treatment sites meeting or exceeding the completion criteria (based on the minimum groundcover benchmark or averaged reference site values for relevant biometric vegetation communities, whichever is lowest).

Audits and Reviews

There was no Independent Biodiversity Audit or Leard Forest Regional Biodiversity Strategy Review required during the reporting period.

Research

In accordance with Condition 15 & 16 of the MCCM EPBC Approval 2010/5566, MCC must fund $1 million into research of Box Gum Woodland mining rehabilitation as well as $1.5 million into research for threatened species recovery actions for the Regent Honeyeater, Swift Parrot and South-eastern (Corbens) Long-eared Bat. In accordance with approved Research Project Plans; Maules Creek Coal funded the following activities during 2019 including:

- Annual spring surveys at potential Swift Parrot foraging habitat sites across their breeding range in Tasmania.
- Research for Regent Honeyeater involved designing, installation and undertaking survey of nest predation mitigation structures plus Noisy Miner management and facilitation/coordination of twice annual volunteer survey programs.
- Radio tracking of habitat and roost usage research of South-eastern Long-eared Bat as well continuing development of acoustic techniques for Nyctophilus species call identification.
- Draft reporting of the seed bank within natural and stockpiled soil samples at the MCCM.

The findings of these research projects will be used to inform MCC on potential improvements to rehabilitation and restoration practices in particular during Box-Gum Woodland revegetation activities but also the management of threatened species both onsite and in the Biodiversity Offset Areas.

Pre-Clearing and Clearing Surveys

The 2020 clearing program occurred during February - March 2020 and consisted of the clearance of a total of 6ha to facilitate the expansion of the mining pit area and the outer pit and overburden area (OOP).

The ecological works for the clearing program consisted of the following activities;

- Weed Mapping
- Threatened Flora Surveys
- Fauna Pre-clearing Surveys
- Clearance Supervision
- Post-felling re-inspections

Prior to the commencement of any clearing activities the limits of clearing were surveyed and marked with flagging tape.

The pre-clearance and clearance flora and fauna surveys were conducted in several stages, some of which were ongoing throughout the entire clearing period and others conducted in discrete phases.

Targeted threatened flora surveys were conducted prior to the clearing activities in conjunction with the weed mapping surveys. All threatened flora identified was recorded and their locations mapped with hand held GPS units.

Fauna pre-clearance surveys were also conducted in the week prior to the clearing works, to minimise the risk of birds nesting between the time of the survey and the commencement of clearing. This process ensures the maximum possible wellbeing of the native fauna within the clearing areas as outlined in the BMP. Fauna pre-clearance surveys consisted of identifying, marking and documenting suitable fauna habitat features. These features include significant rock outcrops and crevices, large boulders, nests and, in particular, trees bearing hollows which have the potential to support species such as bats, gliders, possums, reptiles and birds. All fauna

pre-clearing teams were equipped with endoscopic cameras to enable the examination of hollows considered likely to contain fauna. Features identified as likely to support resident fauna were marked with a large "H" using fluorescent spray paint and flagging tape. Habitat features were recorded using hand held GPS units.

In addition to the identification and marking of likely habitat features, nocturnal spotlight surveys were conducted throughout the clearing area to identify hollows in use by resident fauna such as the Squirrel Glider (*Petaurus norfolcensis*) and microbats. These surveys were conducted from dusk until approximately two hours after sunset.

Vegetation clearance was conducted following a two stage process, as follows:

- Stage 1 - After an area has been suitably surveyed for fauna habitat features, grubbing dozers then removed all understory vegetation leaving the marked habitat features isolated. Following grubbing works, habitat items were allowed to stand overnight. This was to allow resident fauna the opportunity to self-relocate to adjacent undisturbed vegetation.
- Stage 2 - In the following days, felling machinery conducted the removal of the isolated habitat items under the supervision of an ecology team. Habitat trees were shaken by the clearing machinery prior to felling to encourage fauna which had not already vacated the tree to now do so. After the shaking of the tree and following approval from the ecological team, the habitat tree was felled as softly as possible. Following felling the supervising ecology team inspected hollows and loose bark for resident fauna which had not self-relocated and rescued any present fauna.

Fauna was encountered throughout the 2020 clearance works, including species of mammals and reptiles. Threatened species under the Biodiversity Conservation Act 2016 (Formerly called the *Threatened Species Conservation* (TSC) Act 1995) and/or the *Environment Protection and Biodiversity Conservation* (EPBC) Act 1999 were also encountered.

The following threatened fauna species were encountered during 2020 clearing works:

- Yellow-bellied Sheathtail Bat *(Saccolaimus flaviventris)*

6.6.3 Proposed Improvement Measures

A number of improvement measures are proposed for the next reporting period including:

- Follow up monitoring of revegetation and weed management works across the offset areas and associated adaptive management;
- Continued implementation and progression of research projects required under the EPBC approval (refer section 8.1.1.9) ;
- Continuation of propagation and translocation programs for *Tylophora linearis* and *Pomaderris queenslandica*; and
- Implement improvements from audit findings.

6.7 ABORIGINAL CULTURAL HERITAGE

6.7.1 Environmental Management

Aboriginal cultural heritage is managed in accordance with the Aboriginal Archaeology and Cultural Heritage Management Plan (AACHMP) which was prepared to satisfy Schedule 3 Condition 58 and the SOC detailed in the PA 10_0138. The AACHMP was revised in 2016 by Whincop Archaeology and approved in March 2017 by DPIE; the AACHMP is currently being revised with consultation occurring during the reporting period to improve the methodology for monitoring of annual clearance works, and to update the data within the document. The BTM Aboriginal Cultural Heritage Strategy was approved in November 2017.

6.7.2 Environmental Performance

Annual Monitoring Program

The Annual Site Audit was undertaken on 11-12 November 2020 with two Registered Aboriginal Party (RAP) representatives accompanied by a specialist archaeologist approved by DPIE. The Annual Site Audit included an inspection of all extant previously identified Aboriginal cultural heritage sites within the MCCM boundary (and immediate surrounds). The inspection assessed the condition of 49 extant sites including fencing, potential nearby disturbance and photographic records. Any required fence maintenance identified during the audit was not carried out, but noted in the resulting 2020 fencing audit report. One site, Teston GG3 in the Leard SF, was not accessible during the fencing audit, and a suitable route to this site is being developed so that it will be visited before in future annual fencing audits.

All Aboriginal cultural heritage objects recovered from MCCM are stored securely at the Red Chief Local Aboriginal Land Council as part of an approved Care Agreement, which was approved in early 2018. In accordance with the Care Agreement, Red Chief LALC is responsible for a regular audit of the artefact archive.

Additional Monitoring / Inspection of Sensitive Heritage Areas

The annual monitoring program was undertaken at MCCM in accordance with the requirements of section 6.4.1 of the AACHMP. Archaeological monitoring of Aboriginal cultural heritage sensitive areas is undertaken prior to topsoil clearance with RAP representatives accompanied by specialist archaeologists. Archaeological monitoring was undertaken on 13 February and 2-3 April 2020 during the clearing program, and included the visual inspection of 33 grader scrapes totalling approximately 3.7 km of ground surface inspection, and inspection of six drill pads. Archaeological monitoring identified two previously unrecorded isolated artefacts in the drill pads, constituting two new Aboriginal cultural heritage sites registered on AHIMS (Leard SF IA14 and Leard SF IA15). Once approved on AHIMS, these two sites were updated to 'destroyed' sites. No new artefacts were identified in grader scrape monitoring.

There remains low potential for finding significant archaeological sites during the archaeological monitoring process. This is consistent with the findings of the Aboriginal Archaeology Heritage Assessment undertaken as part of the EA.

Archaeological Salvage Report

All artefact sites identified within the MCCM disturbance area have been salvaged in previous reporting periods through a combination of surface collection, test excavation and open-area excavation. The MCCM Archaeological Salvage report is being prepared and will be completed in 2021.

Aboriginal Heritage Conservation Strategy (AHCS)

As previously mentioned, the Aboriginal Heritage Conservation Strategy was approved by the DPIE in November 2017. In February 2020, the Cultural Values report was completed and endorsed by RAPs involved in the survey. The final draft report will be presented to the wider Aboriginal community at an 'On-Country' workshop event to be held on one of the Maules Creek offsets. This event, which was scheduled to occur in April 2020, has been delayed until 2021 (due to COVID pandemic), after which a final report on the results of the AHCS works will be prepared and finalised.

Ongoing Consultation

In accordance with the AACHMP, meetings with RAPs are convened approximately every six months. Two meetings were held during 2020, and were open to all RAPs. The first RAP meeting (held in June) was held via zoom, and included one RAP attendee. The December meeting was held in person in Boggabri.

Management of Quinine Bush

Quinine Bush (*Alstonia constricta*) continues to be mapped across the project as part of the land pre-clearance surveys, with the aim of identifying opportunities for seed collection and propagation. Ecologists have also been trained on the identification of potential Aboriginal scarred trees during the pre-clearance surveys.

6.7.3 Proposed Improvement Measures

In 2021, several aspects of cultural heritage work will continue, including the review and revision of the MCCM Aboriginal Archaeology Cultural Heritage Management Plan (AACHMP). In particular, the AACHMP has been updated to reflect the current status of Aboriginal sites, but also to develop an improved methodology for the inspection of annual clearance areas. The AACHMP, which has been updated by Whincop Archaeology and reviewed by Whitehaven Coal, has been updated to replace the use of grader scrapes during clearance with a targeted inspection of the ground surface prior to disturbance. This main change to the clearance methodology within the AACHMP was proposed by RAPs during 2019 RAP consultation meetings. The intention is to remove the use of grader scrapes from the process, as it is considered both ineffective and unnecessarily arduous work. The proposed change is for the ground surface of all Aboriginal cultural heritage sensitive areas to be inspected prior to land clearance works. Some other minor changes to the AACHMP have also been presented to the RAPs for review.

Other Aboriginal cultural heritage work in 2021 will include the annual audit of Aboriginal cultural heritage site fencing. Consultation via meetings will continue in 2021, and RAPs will be consulted regarding the results of the cultural values survey of the MCCM biodiversity offset areas. The MCCM salvage report, which provides a history of Aboriginal occupation and land use in the project area based on the results of the archaeological salvage

program, will also be completed during 2021. Annual clearance works in 2021 will be monitored under the existing system, through the use of grader scrapes (the AACHMP is unlikely to be approved before the clearance works begin, however the new process of ground surface inspection will occur if the AACHMP is approved prior).

6.8 HISTORIC HERITAGE

6.8.1 Environmental Management

Historic heritage is managed in accordance with Schedule 3 Condition 58 of PA 10_0138 and the Statement of Commitments included in Appendix 5 of PA 10_0138, as well as specific management measures contained within the Maules Creek Historic Heritage Management Plan (HHMP).

The original Historic Heritage Assessment undertaken as part of the EA identified five (5) historic heritage sites within MCC owned land. In 2016, an assessment was undertaken to address the proposed realignment of a river water pipeline in proximity to two additional historic heritage sites (Harparary Site Complex), which were deemed to be of local significance and were subsequently added to the MCCM HHMP.

6.8.2 Environmental Performance

A site inspection of all known historic heritage sites within the Maules Creek vicinity was undertaken as per Section 4.3.1 of the HHMP to ensure protective fencing was installed and adequate and to monitor the ingress of weeds at the seven (7) historic heritage sites. The site inspection included an assessment of the structural integrity of heritage buildings at four sites (Velyama Shearing Shed; Warriahdool Hut; Harparary Cottage; and Harparary Wool Shed), the archaeologist concluded that both structures at the Harparary Complex were in very poor condition and, therefore, a safety hazard. NSW DPIE were notified on 22nd December 2020 of the demolition of the Harparary Complex Historical Heritage Sites in accordance with the MCCM Historical Heritage Management Plan. All other historic heritage sites were considered to be in a stable condition.

As predicted in the EA, the mining activity has not directly impacted the historic heritage items, although the extreme deterioration and unsafe condition of the two Harparary Complex structures has resulted in the deliberate demolition of these buildings. While this has resulted in a partial loss of historic heritage value, each site maintains an intact archaeological record that retains historic heritage values of local significance (their significance is primarily associated with the historical and archaeological values associated with the archaeological deposits at the site).

6.8.3 Proposed Improvement Measures

Biennial monitoring of historic heritage sites was undertaken in 2020, with maintenance and weed control to be undertaken as required. The demolition of the derelict, collapsing structures at Harparary Complex has improved the safety of the site and will ensure the archaeological deposits can be effectively maintained.

6.9 TRAFFIC

6.9.1 Environmental Management

Traffic impacts associated with the MCCM are managed in accordance with Schedule 3 Condition 59 to 66 of the PA 10_0138 and the Traffic Management Plan (TMP). Various management measures were implemented during the reporting period to mitigate the traffic impacts of the MCCM including:

- A code of conduct for drivers of heavy and light vehicles;
- Notification to contractors and staff regarding the driver code of conduct and to advise of any updated access arrangements;
- Nominated access routes for all vehicles travelling to and from the MCCM, reinforced by approved signage and quarterly audits;
- Provision of a shuttle bus service for employees to access site;
- Consideration of school bus pick up and drop off times when scheduling shift changeovers;
- Monitoring of traffic volumes, road safety inspections, quarterly auditing of approved access routes;
- Results for coal transport monitoring are made publically available on the MCC website annually;
- Community feedback via MCCM community contact line, website request and email, as well as consultation with the Community Consultative Committee (CCC); and
- Consultation with the relevant authorities to obtain necessary permits prior to the movement of oversized loads on public roads.

6.9.2 Environmental Performance

MCC has conducted an annual audit regarding local road access restrictions as described in the TMP. Analysis of employee transport records demonstrated that over 80% of wages employees utilised the bussing services provided over the 2020 reporting period. This has been consistent with previous years and is in line with the that which was approved in Mod 3.

There were no complaints regarding traffic generated by the MCCM received during the reporting period.

The utilisation of the Boggabri access road off the Kamilaroi Highway was the primary access for mine related traffic during the reporting period which assisted in reducing vehicle interactions of mine and public traffic on Therribri Road.

6.9.3 Proposed Improvement Measures

Annual audits of restricted roads, quarterly monitoring of traffic volumes to the site and responses to any community complaints will continue to be implemented during the next reporting period. Section 6 of the MCC Traffic Management Plan requires quarterly traffic surveys to be undertaken, these surveys assess operations, maintenance and CHPP wages employees utilise the bussing service. Results for these surveys are presented in Table 16 Traffic Survey Results below.

Table 16 Traffic Survey Results

Period	Wages Employees Accessing Site During Survey Period	Wages Employees Utilising Bus	Bus Utilisation (%)
Q1	29,482	25,393	86.13
Q2	33,026	27,582	83.52
Q3	34,249	27,694	80.86
Q4	33535	27082	80.76

6.10 WASTE MANAGEMENT

MCC aims to implement all reasonable and feasible measures to minimise waste and ensure it is appropriately stored, handled and disposed of. Waste materials at MCCM are managed in accordance with:

- Schedule 3 Condition 70 of PA 10_0138.
- Condition A1 & A3 of the EPL.
- The Materials Safety Management Plan (MSMP) & Pollution Incident Response Management Plan (PIRMP).
- The legal and strategic framework for managing wastes in NSW.

MCCM waste streams include general waste, hazardous waste and sewage, and are collected and disposed of at authorised waste disposal sites by a licenced contractor. Sewage waste from the CHPP office building is now treated on site.

Any mineral waste material within the operation that is determined to be potentially acid forming (PAF) are placed (buried) in the OEA or within mined-out sections of the open cut and covered with non-acid generating material at a location to minimise further oxidation. Additional management measures are detailed in the approved MOP.

6.10.1 Environmental Performance

Waste Streams

Inspections of waste management practices are carried out to ensure general, hydrocarbon and recyclable waste is segregated. Data on waste streams are collated using information provided by the licenced contractors. During the reporting period waste output decreased by approximately 4.3% for general waste when compared with the previous reporting period.

A total of 504 t of general waste and 2822 kl of septic waste was removed in the 2020 reporting period. Approximately 258 t of solid recyclable material and 1339 kl of used oils were collected for recycling by a licenced contractor. 112 t of regulated waste and 4Kl of Coolant was also removed from site by a licensed contractor.

Waste management was consistent with the relevant management details in the EA and there were no significant incidents relating to waste management practices during the reporting period.

6.10.2 Proposed Improvement Measures

MCC will continue to monitor and report waste streams on a regular basis to effectively manage waste generated by the operation of the MCCM.

MCC will continue to manage and check for potential PAF material and dispose of this material as per the requirements of the MOP.

6.11 HAZARDOUS MATERIALS

6.11.1 Environmental Management

Hazardous materials at the MCCM are managed and disposed of in accordance with the relevant Australian standards. Any spillages of potentially hazardous materials are required to be reported immediately to determine the appropriate response.

6.11.2 Environmental Performance

No reportable or significant incidents involving hazardous materials occurred during the reporting period. Minor leaks and spills associated with plant maintenance and operation were managed on site. The PIRMP was not required to be activated for any significant reportable incidents relating to hazardous materials. This will continue to be managed during the next reporting period.

Explosives

No environmental incidents involving explosives handling or storage occurred during the reporting period.

6.11.3 Proposed Improvement Measures

Continued operation of a bioremediation area will occur during the next reporting period.

7 WATER MANAGEMENT

7.1 WATER SUPPLY

Table 17 Water Take For the 2019-2020 Water Year

Water Licence #	Water Sharing Plan	Water Source and Management Zone	Entitlement units	Passive Take/ Inflows	Active Pumping by MCCM**	Total
WAL 27385	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 4 Namoi Valley (Keepit Dam to Gin's Leap) Groundwater Source	63~	63	0	63
WAL12718	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin's Leap) Groundwater Source	471^	7	196	203
WAL12722	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin's Leap) Groundwater Source	586*	0	466	466
WAL 12811	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source	135	0	71	71
WAL 12491	Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 11 Maules Creek Groundwater Source	77	1	0	1
WAL 12479	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 11 Maules Creek Groundwater Source	78	0	0	0
WAL 27383	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 11 Maules Creek Groundwater Source	0	0	0	0
WAL 12480	Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 11 Maules Creek Groundwater Source	215	0	0	0

WAL 29467	NSW Murray Darling Basin Porous Rock Groundwater Sources	Gunnedah - Oxley Basin Mdb Groundwater Source	306	159	23.7	182.7
WAL 29588	NSW Murray Darling Basin Porous Rock Groundwater Sources	Gunnedah - Oxley Basin Mdb Groundwater Source	0	0	0	0
WAL 36641	NSW Murray Darling Basin Porous Rock Groundwater Sources	Gunnedah - Oxley Basin Mdb Groundwater Source	800	260	0	260
WAL 41585	NA	Catchment: Unnamed Water Source	30	0	0	0
WAL 13050	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	3,000	0	269	269

~Inclusive of 38ML of entitlement, 25ML carry over from Water Year 2018/2019.
^Inclusive of 102ML of entitlement, 102ML carry over from Water Year 2018/2019, and 267ML of temporary transfers.
**Inclusive of 77ML of entitlement, 77ML carry over from Water Year 2018/2019, and 432ML of temporary transfers.*

7.2 SURFACE WATER MANAGEMENT

7.2.1 Environmental Management

The MCCM water management system aims to ensure there are no adverse impacts on receiving water quality, to allow for early detection of any potential impacts and develop appropriate corrective actions. Potential impacts to surface water quality are managed in accordance with:

- The surface water criteria prescribed under schedule 3 condition 36 to 40 of the PA 10_0138.
- EPL 20221 Conditions P1, L1, L2, L3 and M2.
- The MCC Water Management Plan (WMP) prepared to satisfy the requirements of the EPL and PA 10_0138.

During the reporting period various controls strategies were implemented to manage surface water quality including:

- Prior to disturbance of land, appropriate erosion and sediment controls were established.
- Maintenance of a number of sediment dams previously constructed to collect runoff from disturbed areas, which is then used for dust suppression or pumped to the mine water dam for re-use on site.
- A combination of temporary and permanent clean and dirty water drains have been established to divert runoff from undisturbed areas and collect runoff from disturbed areas.
- Additional erosion and sediment control measures have been used for other small disturbance areas including silt fences, rock checks and other measures as required.
- Any water collected within the open cut pits is contained and reused on-site.

- Maintaining an up-to-date water balance to ensure on-site water demands are satisfied whilst minimising offsite water impacts.
- Validation of the site water balance model.
- Regular sampling and inspections of the onsite and surrounding surface water system.

Surface water monitoring locations are illustrated on **Figure 11** and **Figure 12**. A summary of the surface water quality findings from the reporting period is provided below.

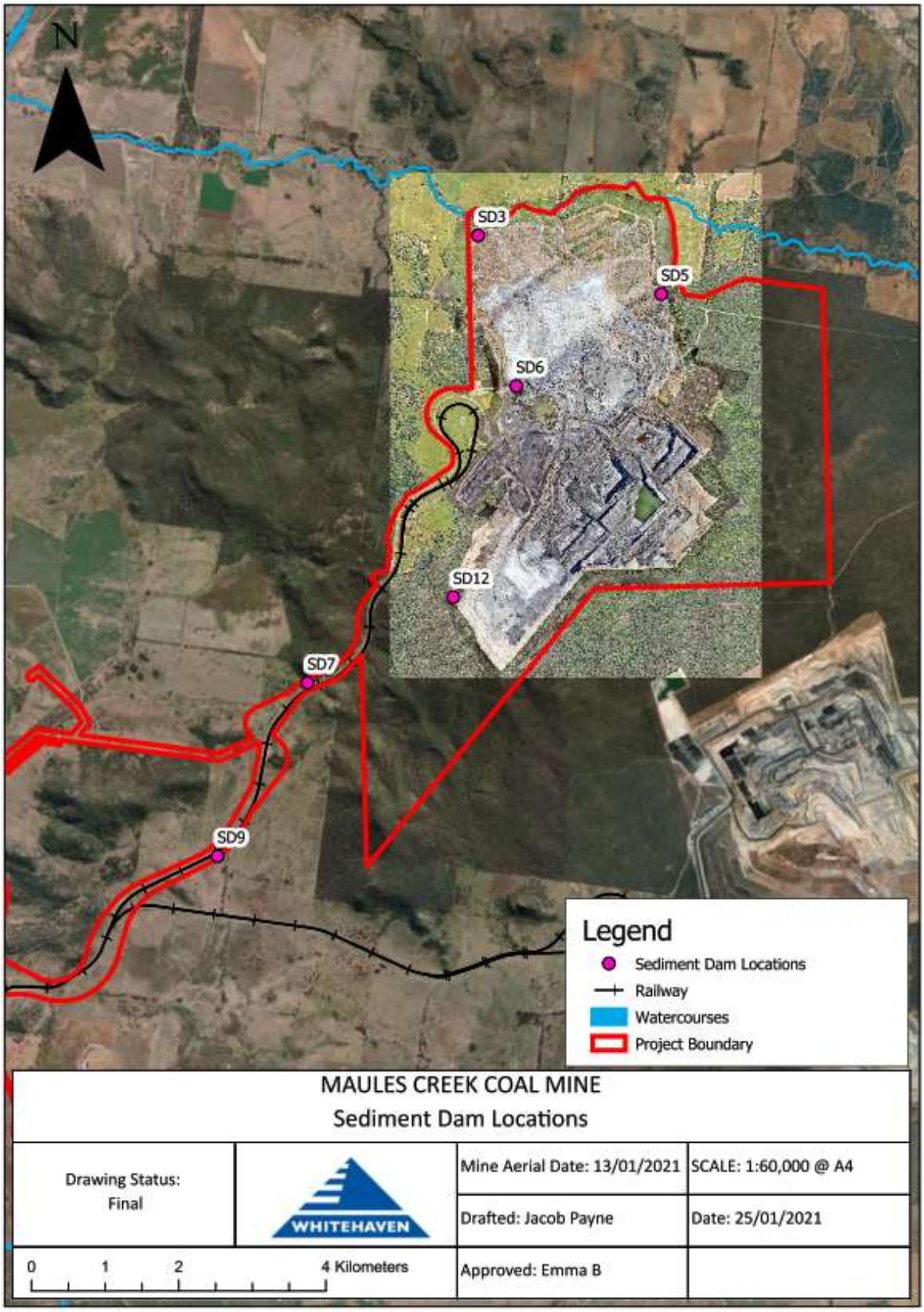


Figure 11 Sediment Dam Monitoring Locations

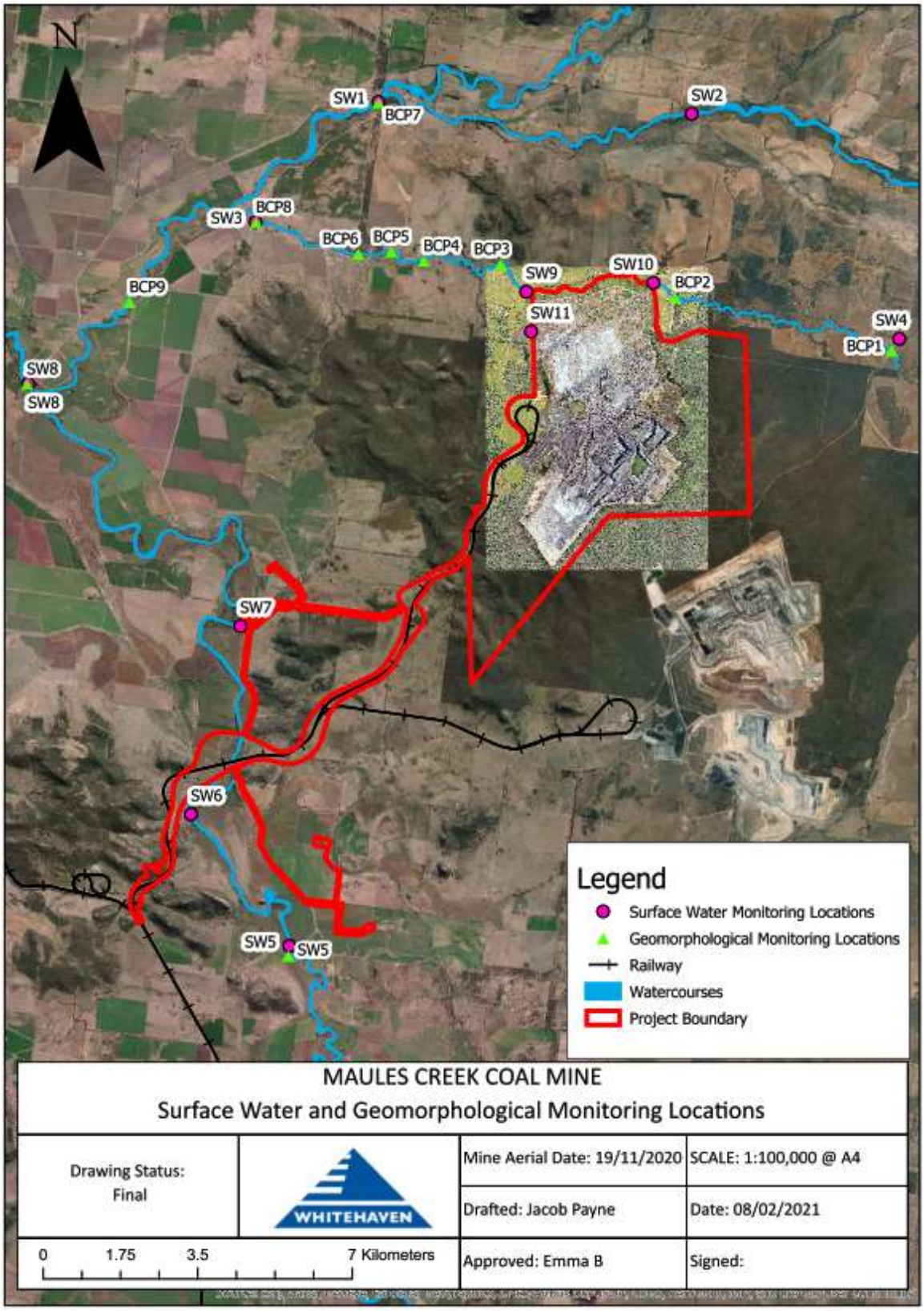


Figure 12 Surface Water and Geomorphological Monitoring Locations

7.2.2 Environmental Performance

Surface Water Quality

Routine surface water monitoring is conducted in surrounding watercourses on a monthly basis and the pH, EC and TSS monitoring results are detailed in Appendix D. Samples are collected consistent with Water Sampling Methods, AS/NZS5667.1 and AS/NZS 5667.6. All laboratory analysis is conducted by a NATA accredited laboratory. Laboratory pH in creeks and rivers surrounding the project are all trending generally within the ANZECC acceptable range for Irrigation, Ecosystem Health and Recreation. No community complaints were received during the reporting period in relation to surface water quality. Surface water EC and TSS trends are shown in Appendix D.

During the year, though some higher EC and metal levels were recorded at surface water sites, the upstream locations had the same or higher results than the downstream sites. This indicates that MCCM did not impact on the metal levels recorded at these locations. Overall, the surface water quality results recorded during the reporting period were generally consistent with historical trends recorded during baseline monitoring and previous years of operations at the MCCM. Additionally, the monitoring results are consistent with the EA prediction that the Project will not adversely affect surface water quality in downstream receiving waters. Water quality trends from 2016 are included in Appendix D and show that EC, TDS and TSS values fluctuate between wet and dry periods throughout the monitoring period since the commencement of monitoring.

Preliminary Trigger Values (PTVs) for twenty six key water quality parameters for Maules Creek, Back Creek and the Namoi River have been included in the WMP. Where insufficient data is available, ANZECC eco-system trigger values have been adopted (eleven parameters) in Appendix D. Trigger values have been developed using background data for fifteen parameters. The adopted trigger values will be refined as the operational stages of the MCCM proceeds. Monitored values above the PTV's are related to variable flow and upstream effects not attributable to the operation.

Onsite Water Quality

MCC monitors 'mine water' defined in the WMP as water that has come into contact with coal (e.g. groundwater inflows and surface runoff to the open cut pit or stormwater runoff from the ROM and product coal stockpiles). The water quality sampling of any 'mine water' conducted during the 2020 reporting period has been characterised as coal contact water and results shown are in Appendix D.

Flow

Throughout the reporting period, flow in the Namoi River has been largely dictated by natural flows following wet weather activities. Inflow pumping from the Namoi River to site was significantly lower than predicted in the EA for Year 5 (1,620 ML). This is attributed to the higher than average annual 2020 rainfall recorded at the mine site providing an adequate supply of water for operational use. Flows in Back Creek are noted in monitoring data following intense rainfall events.

Wet Weather Discharge Monitoring

During the year two discharges occurred from sediment dam SD3 (16th of January and 8th of February) and one discharge from sediment dam SD9 (3rd of December). Each occasion was due to rainfall exceeding 38.4mm over a consecutive 5 day period immediately prior to the discharge occurring. Water samples from SD3 and SD9 were collected and analysed in accordance with the licence requirements. Water quality results for all discharge events are summarised in Appendix D. Site water balance modelling was also undertaken and is discussed in Section 7.4.

During the discharge on the 16th of January water overtopped a drain reporting to SD3 following intense storm activity. A total of 55.6mm of rain fell with 33mm falling in a half hour period. This resulted in the potential of 3ML of water reporting to Back Creek.

Following 96mm of rain on the 8th of February, water reporting to a drain at the base of the Northern overburden emplacement area overtopped for a period of approximately 45 minutes. During this time approximately 2.16ML of water discharged from site.

Water discharged from the Maules Creek Mine on the 8th of February was carrying expandable polystyrene balls which had been mobilised from the explosive reload yard upstream of the discharge area.

During the wet weather event where 47.2mm of rain fell on the 3rd of December, water reporting to a drain at the base of the Northern overburden emplacement area overtopped following a full blockage of the drain. Over a period of approximately 12 hours it is predicted that 10.3ML of water could have entered Back Creek.

During all three uncontrolled releases water quality samples were obtained and reported on.

On 12 January 2021 the NSW EPA commenced prosecution proceedings against Maules Creek Coal Pty Limited alleging 3 non-compliances with condition L1.1 of the EPL (Pollution of waters) and 1 non-compliance with condition O1.1 of the EPL (Activities must be carried out in a competent manner) relating to unlicensed discharges of water during significant rainfall events on the 16th of January 2020 and the 8th of February 2020 and the release of expandable polystyrene balls from the Maules Creek Mine on the 8th of February 2020.

Geomorphological Assessment

Stream and riparian vegetation health assessments were conducted by a qualified consultant in May 2020 at upstream and downstream locations along Maules Creek, Back Creek and the Namoi River as illustrated on figure 8. All sites were selected for photographic survey of the existing geomorphological condition of the downstream drainage system, from the mine site to the Namoi River. The assessment included macroinvertebrate monitoring as well as physical and chemical monitoring in accordance with Australian River Assessment System (AusRivAS) guidelines as required in the Water Management Plan (WMP).

Visual habitat assessments were conducted at twelve of the aquatic monitoring sites during the survey period in accordance with the NSW AusRivAS Manual. All twelve surveyed sites showed indications of disturbance from current land uses to varying degrees. All observations were recorded utilising the standard NSW AusRivAS field datasheets. A photograph was also taken at each sampling location, both upstream and downstream to provide a visual indication of the habitat at each location, and to form a baseline record of current conditions. The primary disturbances noted at all sites included presence of exotic vegetation, erosion of banks, disturbance from stock, feral animals and disruption of natural hydrology from existing tracks, roads, causeways and other infrastructure. Bank stabilisation and erosion control measures are also in place at SW5.

Water quality measurements were conducted at one Namoi River site (SW5), one site along Maules Creek (BCP7) and four sites along Back Creek (BCP1, BCP2, BCP6, BCPX). No water quality measurements were taken at SW8 (Namoi River), BCP3, BCP4, BCP5, BCP8 (Back Creek) or BCP9 (Maules Creek) as these sections were dry and lacked any remnant pools.

The recorded in situ pH and DO levels are within the ranges considered suitable for most aquatic life. The in situ water quality recordings for EC for the majority of the sites were largely within the acceptable trigger value ranges listed in the ANZECC guidelines. However, the EC for site BCP7 was above trigger values at the time of survey. Natural impacts on conductivity in water are rain, geology and evaporation while anthropogenic impacts include road salt, septic/landfill leachate, impervious surface runoff and agricultural runoff. As conductivity can increase as a result of the presence of various ions including nitrate, phosphate, and sodium and site BCP7 is intersected by a causeway that is frequently utilised by vehicles, the increased EC at site BCP7 may be an indication of adjacent anthropogenic disturbances. However, as freshwater streams with conductivity ranging from 150 to 500 µS/cm are known to support diverse aquatic life (Behar, 1997), the increase above trigger value range is not considered to be significant.

Turbidity levels could not be compared to ANZECC guidelines as conversion factors from mg/L to NTU vary depending on instrument calibration levels. However, based on visual assessments as well as the relative lack of macrophytes, it is assumed that turbidity levels were above the trigger value range at all sites. The water discolouration at the majority of the sites suggests varying levels of suspended sediments within the water which in turn implies high turbidity levels.

Although the ANZECC guidelines do not provide a trigger value for alkalinity, an alkalinity range of 75 – 200 ppm is considered suitable for most aquatic life. Although the ANZECC guidelines provide an ideal pH range of 6.5 – 8, several aquatic organisms can be tolerant of pH levels up to 9. The recorded alkalinity levels were within suitable ranges to support aquatic life.

A total of 32 taxa were recorded across the 12 sampled habitats (6 edge and 6 bed) with an average of approximately 10 taxa per habitat. Overall, the highest level of taxa richness was recorded in the edge habitat at BCP6 (16 taxa) while the lowest diversity was recorded in the bed habitat at BCP7 (5 taxa). Overall, the total number of taxa recorded across sites containing water in 2020 was similar to that between 2015 – 2018, indicating that the significant drop in taxa numbers in 2019 was highly likely due to degradation in conditions from prevailing drought conditions during the 2019 surveys.

The taxon Corixidae (Water boatman) was recorded across all habitats at all sites. Other common taxa present across most sites included Dytisidae (diving beetles), Hydraenidae (minute beetles), Baetidae (a mayfly), Coenagrionidae (a damselfly) and Physidae (a snail). New taxa recorded during 2020 was limited to a single individual of the family Conoesucidae (a caddis fly). Common taxa recorded in previous years that were absent in 2020 were Glossiphoniidae (a leech) and Orthocladinae (a non-biting midge).

Numbers of taxa recorded at each site were similar or higher than those recorded in previous years at most sites. However, site BCP7 showed a significant reduction in taxa compared to most previous years. This reduction at BCP7 compared to 2016 – 2018 findings is consistent with the reduction in water levels and edge vegetation, particularly *Phagmites australis*, in 2020 compared to previous survey periods.

Taxa numbers at SW5, which comprises the only site where samples have been collected in each year of monitoring, was in a similar range to that of the 2015 – 2018 monitoring periods. The similarity of taxa numbers at most sites for the 2020 period compared to most previous years indicates a recovery of macroinvertebrate

composition from drought conditions following significant rainfall events in 2020. However, the absence in 2020 of the disturbance/pollution sensitive taxa, Leptophlebidae (a mayfly) which was generally always recorded from sites BCP7, SW5 and SW8 between 2016 – 2018, indicates that recovery of invertebrate community composition following the 2019 drought conditions is still limited to more disturbance/pollution tolerant taxa.

Overall, the waterbodies surveyed during the May 2020 monitoring surveys remained in a highly disturbed condition, although half of the monitoring sites contained water. Riparian vegetation was generally in a highly disturbed state mainly due to high levels of exotic vegetation, sediment disturbance from stock and bank erosion. However, vegetation in 2020 showed signs showed a significant increase in groundcover and improvement in health of trees, likely due to amount of rainfall received over the last five months, a reprieve from the extensive drought conditions previously experienced in the area over the last few years.

Water quality was also relatively low mainly due to high levels of turbidity, which would result in lower light penetration and consequently reduced macrophyte growth. While overall macroinvertebrate taxa richness in 2020 was similar to most prior survey periods (i.e. between 2015 – 2019), the types of taxa recorded differed across years. This is likely due to the difference in available habitats at the monitoring sites, given to the difference in water levels between years.

While taxa richness was relatively consistent between years, there was a relative decrease in the proportion of sensitive taxa recorded in 2020. This is likely a reflection of the slow recovery from decreased habitat conditions following the extreme drought conditions experienced in 2019. The AusRivAS models also indicate some decrease in integrity in some habitats in drier periods.

7.3 GROUNDWATER

7.3.1 Environmental Management

Groundwater at MCCM is managed in accordance with:

- The groundwater criteria prescribed under schedule 3 condition 36 to 40 of the PA 10_0138.
- EPL 20221 Conditions P1 and M2.
- The MCCM WMP prepared to satisfy the requirements of the EPL and PA 10_0138.

Currently groundwater monitoring is conducted at a network of regional bores and privately owned bores as illustrated in Figure 9.

The groundwater sampling sites on privately owned land are sampled biannually for depth to water and water quality. The regional bores are currently sampled monthly for depth to water and quarterly for water quality. Once the baseline groundwater quality of the regional bore network has been established, water quality monitoring will be conducted on a biannual basis as per the WMP. Bores are sampled in accordance with the Approved Water Sampling Methods and AS/NZS5667.11. All laboratory analysis is conducted by a NATA accredited laboratory.

In 2010, eight groundwater monitoring bores and four vibrating wire piezometers were constructed within former exploration holes ('MAC' bores) to collect pre-mining information as part of the Environmental Assessment (EA). All of these bores were progressively removed by mining or external activities, with the exception of one bore (MAC1280).

A replacement monitoring network was developed by MCCM in consultation with DPI-Water in 2013. The majority of the replacement bores were installed between 2013 and 2014. The replacement bores have the prefix 'RB' or 'BCM'. The two 'BCM' bores were installed along Back Creek to investigate the potential for a shallow water table to be present that could support vegetation occurring within the riparian zone along the drainage line. The progression of mining resulted in the removal of RB01, RB01A, RB02 and RB02A in 2017, and an alternative sampling location was identified, and continued to be sampled, pending amendment of the EPL.

A network of 17 additional monitoring bores and VWPs were proposed as part of the EA to monitor the cumulative impact of the BTM complex on the groundwater regime. The bores were also installed between 2013 and 2014 and positioned in lines radiating out from the Maules Creek Mine. The purpose of these sites was to monitor for depressurisation in the Permian strata and any potential water level drawdown within the surrounding alluvial aquifer. Details for each of the monitoring sites are provided in Appendix E.

This table indicates where a bore has been installed in proximity to the preliminary sites recommended within the Maules Creek EA, and the original bore numbering proposed within the EA. The monitoring sites are either PVC monitoring bores (standpipes) for shallow strata, or arrays of multi-level vibrating wire piezometers (VWPs) installed within multiple coal seams at different depths. Paired VWP arrays with a shallow standpipe were installed in some sites to allow for monitoring of the connectivity between shallow aquifers and deeper coal seams. The sites chosen also aimed, where possible, to be adjacent to existing shallow alluvial monitoring bores monitored by the NSW government to further assist in monitoring and understanding connectivity between the different geological units. These bores have the prefix 'REG' indicating they are for monitoring behaviour of 'regional' groundwater systems.

7.3.2 Environmental Performance

Parameters recorded as part of the scheduled groundwater monitoring for this reporting period are summarised below and results are provided in Appendix E. The appendix also includes graphs that compare the measured groundwater levels with predicted water levels from the 2020 groundwater model for each bore, in addition to presenting water level and water quality observations against triggers that were generally developed in accordance with the methodology proposed in the Water Management Plan.

Groundwater level trigger values were based on the 5th and 95th percentile values of all manual data observations that were collected from regional monitoring bores until the end of 2016. Although observations between mid-2015 and the end of 2016 coincide with the preliminary period of operation, this data was included as baseline to establish a greater data set for analysis.

Groundwater quality trigger values were developed for Total Dissolved Solids (TDS) and sulfate using the control chart methodology. A control chart is an x-y chart with three additional horizontal 'control lines' running parallel to the horizontal axis. The 'control lines' are equivalent to one, two and three standard deviations based on the baseline data (until the end of 2016). Equivalent percentiles are used to assist interpretation. Trigger events occur when:

- One data point is greater than the 99.87th percentile (3 standard deviations);
- Two consecutive data points greater than the 97.73rd percentile (2 standard deviations); and
- Five successive data points greater than the 84.13th percentile (1 standard deviation).

When evaluating the results from control charts it is important to note that water chemistry results for each bore have some natural variability and are influenced by factors such as bore construction, sample depth, the sample collection method, climatic conditions, and aquifer conditions. Therefore, changes to previously observed trends do not necessarily indicate an impact from mining, but simply trigger further investigations to determine the cause of the variability.

Control charts were developed for total dissolved solids (TDS) but not for electrical conductivity (EC) as there are no ANZECC guideline values for EC. TDS is directly correlated with EC, allowing control charts developed for TDS to be used to evaluate changes in the salinity of groundwater.

The concentrations of dissolved metals and nutrients in groundwater samples were compared against the ANZECC (2000) and NHMRC (2011) guideline values. The concentrations of dissolved metals are commonly low and often fall below the level of laboratory detection. It is important to note that the adopted thresholds simply provide information on the beneficial uses of the water, and are not necessarily indicators of impacts from mining.

Regional Groundwater Bores

Figure E1, which is included within Appendix E, is a spatial representation of recent groundwater levels from standpipe bores within the monitoring network. Groundwater levels generally decrease in elevation down the alignment of Maules Creek and Back Creek, indicating that groundwater flow is a reflection of the topography in these areas. Slightly depressed groundwater levels are evident in the Permian monitoring bores in close proximity to the mining area, as has been previously predicted by numerical modelling. The Permian monitoring locations east of the Maules Creek mining area recorded the greatest reductions in water level across the monitoring network during 2020. The monitoring network targets a range of different stratigraphic units and groundwater systems at different vertical elevations, and therefore it is not appropriate to present water level contour lines on Figure E1. Despite this, the available water level hydrographs can be interpreted to assess hydraulic gradients vertically and spatially.

TDS concentrations are variable within the monitoring network and range from fresh to brackish. The majority of the TDS concentrations that were recorded over the 2020 monitoring period are consistent with historical trends. Four bores triggered with respect to TDS concentrations (REG5, REG13, REG13, RB05A), while five bores triggered with respect to sulfate concentrations (REG5, REG6, REG7A REG13, REG14). The trigger events are discussed further in Section 7.3.2.

Private Groundwater Bores

Groundwater monitoring was conducted at private bores twice during the reporting period. Not all bores could be sampled for level or quality on both occasions due to bore access restrictions or the pump not being active. Graphs showing trends in groundwater level and water quality for the private bores are included within Appendix E. During 2020 all of the bores recorded relatively stable groundwater levels, with some increases greater than 1 m observed in WOL1 and WHAN, which are likely associated with significant rainfall in January/February. Slight increases were also observed in BRE2 and Tralee.

The pH, EC, TDS and sulfate concentrations all remained relatively stable during the reporting period and values are generally consistent with historical data. The sulfate concentration in BAS2 is significantly higher than other private bores. Increased values of EC and TDS in BRE2, which have been present since 2017, remain elevated over the 2020 reporting period. The sulfate concentration in WHAN was uncharacteristically high in the February sampling event, although returned to levels that are consistent with historical records by August. The historical dataset for these private bores suggests that exceedances of NHRMC (2011) drinking water guidelines are common, with these relatively elevated concentrations likely representative of natural groundwater. Over the 2020 reporting period, ANZECC (2000) guideline values for dissolved metals (largely iron) were exceeded in the BAS1, BAS2, BRE2, MORSE, MOR2, and TRALEE bores.

Vibrating Wire Piezometers

The locations of Vibrating Wire Piezometers (VWPs) is illustrated in Figure 13. Appendix E includes graphs of water levels for each VWP group plus any adjacent shallow standpipe monitoring bores for the duration of monitoring.

The data collected by the VWP data loggers is downloaded on a monthly basis. The VWPs measure water pressure (equivalent to water level) within select coal seams and observations from sensors at different depths show groundwater level differences that occur vertically within the geological sequence. VWP water level variations demonstrate different trends that are often related to climatic conditions and/or mining. The VWPs that are in close proximity to the active mining areas indicate that depressurisation is occurring as mining progresses, which is consistent with numerical modelling. Climatic influences are also evident within some of the VWPs, with significant rainfall events (CRD spikes) leading to rising groundwater levels in some sensors and gradual declines that are likely associate with drought observed at some locations. Graphs of compiled VWP recordings are also included in Appendix E. During 2020, decreasing trends in certain coals seams that are monitored by REG01, REG08, REG10, RB03, RB04, and RB05 were observed, which are consistent with long-term depressurisation that has been ongoing during mining activities. While these monitoring points show an overall fall over 2020, the influence of heavy rainfall in January/February typically resulted in a slight increase in groundwater levels (REG01, REG08, RB03, RB04, RB05). This rainfall also led to a significant increase in the groundwater levels in the REG02 fault zone VWP, where a strong direct correlation to rainfall and recharge has previously been seen. Groundwater levels in REG07 and REG09 have continued to remain stable over the 2020 monitoring period, suggesting that mining induced depressurisation has not extended this far to the east/southeast.

Figure 13 Groundwater Monitoring Locations

7.3.2 Trigger events

Analysis of trigger events against the WMP were undertaken and shown within figures and tables in Appendix E. The trigger events are also summarised below in Table 18 Groundwater Trigger Events. The concentrations of dissolved metals and nutrients within the monitoring bores were compared with the thresholds from the ANZECC guidelines (refer Appendix E, Table E-3). The water level and quality records within these bores will continue to be monitored and further investigated.

The historical dataset for these monitoring bores suggests that exceedances of NHRMC (2011) drinking water guidelines are common, with these relatively elevated concentrations likely representative of natural groundwater. Over the 2020 reporting period, ANZECC (2000) livestock and/or irrigation guideline values were exceeded for pH (MAC1280, REG4, REG13), sulfate (REG13), and some dissolved metals (MAC1280, REG3, REG5, REG13) (refer Appendix E, Table E-3). These exceedance are generally consistent with historical data, noting that MAC1280 is likely impacted by the grout that was used during installation of the bore.

Table 18 Groundwater Trigger Events

Bore	Geology	Triggered?			Comment
		Level	TDS	SO_4	
MAC1280	Permian	No	No	No	pH consistently higher than trigger value since the start of sampling, which is attributed to cement grout installation impacts.
RB05A	Merriown Seam	Yes – falling	Yes	No	Water level falling as predicted due to proximity to active mining. Sulfate concentrations reached a historical high in September, although again decline in December.
REG12	Boggabri Volcanics	Yes	Yes	No	Groundwater levels are generally consistent with 2019 levels, falling slightly below the lower trigger level. From October to December levels have returned to be within the baseline range. TDS levels rising since June 2020, with a historical high recorded in December. Increases over this period are consistent with most other monitoring bores and may be attributed to an increased level of recharge throughout the year, or possibly with issues/variations in the sampling methodology.
REG13	Boggabri Volcanics	Yes – stable	Yes	Yes	Over the 2020 reporting, groundwater levels were relatively stable and were marginally higher than the upper trigger value. Sulfate and TDS concentrations were higher than the upper trigger value in September/December 2020. Increases over this period are consistent with most other monitoring bores and may be attributed to an increased level of recharge throughout the year, or possibly with issues/variations in the sampling methodology.
REG14	Basement	Yes	No	Yes	Groundwater levels in January/February 2020 fell below the lower trigger levels. Although higher than average rainfall saw these levels rise to baseline ranges over the remainder of the year. Sulfate concentrations for each sampling event exceed the upper trigger value, although are still generally within

					historical ranges. Relative increases in September/December 2020 are consistent with most other monitoring bores and may be attributed to an increased level of recharge throughout the year, or possibly with issues/variations in the sampling methodology.
REG3	Boggabri Volcanics	Yes	No	No	Historical water level observations suggest that this bore is likely impacted from nearby alluvial extraction. Levels are consistent with the 2019 reporting period and generally fall below the lower trigger value.
REG4	Boggabri Volcanics	Yes – falling	No	No	Groundwater level variations are consistent with the gradual decline that has been ongoing since 2017. No increase in the wetter than average 2020 may suggest that previous declines are not attributable to drought, although it should be noted that the cumulative decline over four years is less than 1 m.
REG5	Boggabri Volcanics	Yes	Yes	Yes	Groundwater levels over the 2020 reporting period are generally stable and largely fall within baseline ranges, although a single measurement in September falls below the lower trigger value. TDS levels are consistent with the historical dataset and fall below the lower set of triggers. These triggers are likely inappropriate due to the uncharacteristically high concentrations at the start of the monitoring record skewing data. Sulfate concentrations have remained stable since 2018 (at concentrations above the upper trigger value) after reaching these elevated concentrations between 2018 and 2019. Previously it has been conceptualised that a relative absence of recharge has been the cause of these elevated levels. However, a decrease has not been observed over the wetter than average 2020.
REG6	Boggabri Volcanics	Yes – rising	No	Yes	Significant rainfall in January/February 2020 has led to more than a 1 m rise in groundwater levels, although these still fall below the lower trigger value after the 2017 to 2020 drought. Sulfate concentrations at a historical high in December 2020. The reason for this is unknown, but may be linked to possible issues/ variations in the sampling methodology.
REG7A	Alluvium	Yes – rising	No	Yes	Significant rainfall in January/February 2020 has led to more than a 2.5 m rise in groundwater levels over the reporting period. Although rising, January/February levels still fell below the lower trigger value. Increases in sulfate concentrations over this period are consistent with most other monitoring bores and may be attributed to an increased level of recharge throughout the year, or possibly with issues/variations in the sampling methodology.

7.3.3 Groundwater Inflows

Surface water balance estimates of groundwater inflow that reports to the mining area was negligible in the 2017 calendar year (less than 10 ML/year), after which volumes are estimated to have increased in 2018 (578 ML/year), 2019 (231 ML/year), and in the current 2020 reporting period (218 ML/year) (WRM, 2021). This increase after 2017 reflects the deepening of the pit below the regional water table. As mining progresses, groundwater inflows are predicted to vary with the changing mine layout, depending on the interception of porous rock water sources and the area of the mine being developed.

The Groundwater Impact Assessment (AGE, 2011) estimated the rate of groundwater seepage to the open cut pits in the mining complex using a cumulative numerical model. AGE (2014) updated the groundwater model and seepage estimates as summarised in the WMP. The groundwater model was further updated in 2018 (AGE, 2018) and again in 2020 (AGE, 2020). The Maules Creek mine plan was amended as part of 2020 updates to the model to better reflect the actual progression of mining up to March 2019.

Predictions of groundwater inflow over 2020 is as follows for the various model iterations: AGE (2014) – 1,015 ML/year; AGE (2018) 478 ML/year; and AGE (2020) 647 ML/year. Estimates of inflow from current modelling (AGE, 2020) are approximately triple the estimated inflows from the site water balance model (WRM, 2021). It is important to note that estimates for the numerical groundwater models represent groundwater removed by pumping, water that evaporates from the highwall, and water bound with coal and spoil. In contrast the water balance method only estimates the volume of water that flows into the mine water circuit. Both methods are therefore not directly comparable due to differing underlying assumptions.

Monitoring to the east of Maules Creek Mine (REG01, REG08, REG10, RB03, RB04, RB05) has shown declining groundwater levels since the onset of monitoring in 2014, with drawdown observed over 2020 consistent with this trend. This depressurisation of the coal seams is expected to be a response to mining at Maules Creek since the pit floor moved below the water table. Additionally, Boggabri Mine is progressing northwards towards Maules Creek Mine, and a cumulative impact is likely to be contributing to the observed depressurisation. Groundwater levels in REG07 and REG09 have remained stable since the onset of monitoring, suggesting that mining induced depressurisation has not extended this far to the east/southeast.

Inflows for the 2019-2020 water year have been accounted for via the different groundwater licenses held by Maules Creek (listed in Section 7.1) and were determined using proportional takes for each of the alluvial water sources based on the numerical modelling outputs (AGE, 2020) for the same period.

The passive take from the alluvial Upper and Lower Namoi Groundwater Sources cannot be directly measured or validated, and therefore the takes must be estimated via numerical groundwater modelling, and validated through groundwater level monitoring between the mines and the alluvial zones. There is therefore an inherent uncertainty in the estimates of the passive takes from the alluvial aquifers that cannot be reduced as direct measurement of this flow change is not possible

7.3.4 Validation of Groundwater Model

As required by Schedule 3, condition 40 (c) of PA10_0138, a review of the measured groundwater monitoring results against predictions made within the 2014 groundwater model was undertaken by AGE. This review commenced in 2016 as part of a wider review of groundwater processes occurring in the Maules Creek area. The validation/verification process involved comparing:

- Measured groundwater levels and trends in the monitoring bore and vibrating wire piezometer (VWP) network with the model predictions; and
- Estimates of pit inflow from site water balances with model predictions.

The groundwater model was updated and recalibrated in 2018 (AGE, 2018) and again in 2020 (AGE, 2020). Modelled water levels for the 2020 model are provided in Appendix E for comparison with observed monitoring data. The 2020 groundwater model contains observed rainfall data to June 2019, and uses a synthetic average

rainfall dataset after that time. Therefore, the AGE (2020) model more accurately accounts for the period of drought that occurred between 2017 and 2020 compared to the AGE (2018) model, where only 2017 conditions were captured (calibration dataset to December 2017).

Overall, the trends observed in the standpipe monitoring bores are comparable, even if the matches to absolute water level elevations are variable. Modelled groundwater level predictions at VWPs are generally similar to observed trends, although absolute water level elevations are again variable. Numerical modelling for the BTM Complex has always struggled to accurately match the trends and absolute levels observed in VWPs, including vertical hydraulic gradients. VWP simulations of the AGE (2020) model are a significant improvement relative to previous modelling in this regard, although matching observations in VWPs that are not yet depressurised by mining (REG02, REG07, REG09) is still problematic.

Estimated pit inflows have decreased in 2020 compared to the previous year. The estimated inflow of 218 ML/year (0.60 ML/day) (WRM, 2021) matches well with the groundwater model when taking into account the different assumptions that underly each method (as discussed in Section 7.3.3).

7.3.5 Proposed Improvement Measures

The groundwater monitoring program and management measures described above will continue to be implemented during the next reporting period.

7.4 SITE WATER BALANCE

The site water balance for the reporting period is presented below in Table 19 Site Water Balance (Calendar Year 2020).

A review of the water balance found that inflows to the site during the reporting period were higher than the predictions made in the EA for Year 5 and Year 10 of MCCM operations. Rainfall and runoff (3,083 ML) was significantly higher than predicted in the EA for Year 5 and Year 10 (1,233 ML and 1,103 ML, respectively). This is attributed to the higher than average rainfall received at MCCM in 2020. Actual Namoi River pumping inflow (269 ML) was much lower than predicted in the EA for Year 5 and Year 10 (1,620 ML and 1,860 ML, res pectively).

Net CHPP water usage (3,707 ML supply minus 2,699 ML recovery = 1,008 ML net) is significantly less that the consumption predicted in the EA for Year 5 and Year 10 (2,384 ML and 2,598 ML, respectively). This is due to the differences between the predicted and actual proportion of ROM coal that is bypassed (and therefore not washed).

Dust suppression usage (1,025 ML) was significantly higher than predicted in the EA for Year 5 and Year 10 (328 ML and 453 ML, respectively) - this is due to active management measures in place to minimise potential dust emissions from haul roads and other exposed areas during the reporting period.

Estimated in-pit groundwater inflows (219 ML) are within the range of those predicted in the EA for Year 5 and Year 10 (36 ML and 350 ML, respectively). Over the last 3 reporting years notable groundwater inflow was observed in the operation. This is likely to be attributed to the mining sequence progressing deeper within the stratigraphy, resulting in increased groundwater inflow from the coal seams.

Table 19 Site Water Balance (Calendar Year 2020)

Aspect	Volume (ML)
Change in Storage	
Start of 2020	444
End of 2020[2]	1,474
Net Change in Storage	1,030
Water Inflows	
Namoi River Pumping	269
MAC1498 Bore	24
Olivdene Bore	24
Brighton Bore	40
Roma Bore	213
BCM Bore	0
Rainfall & runoff^	3,083
CHPP Water Recycling	2,699
In-pit Groundwater Seepage[4]	219
Total Inflows	6,571
Water Outflows	
CHPP water use	3,707
Dust suppression	1,025
Evaporation from storages[3]	440
Clearing / construction process water	54
Offsite discharge	26
Licence Discharge	120
Total Outflows	5,372
Water Balance (2020)	1,199

* Volume for calendar year

[2] Includes recorded volumes in RWD2 and MWD1&2, as well as estimated volumes in sediment dams and pits.

Based on flow meter readings

^ Based on the calibrated MCCM water balance model, using site rainfall data

[3] Based on the calibrated MCCM water balance model, using SILO datadrill evaporation data

[4] Based on model calibration, operational observation & pumping meter records

8 REHABILITATION

The Rehabilitation Strategy for the MCCM is described in Section 7.16 of the EA. The State and Commonwealth approvals both specify that the rehabilitation of the MCCM must be consistent with the Rehabilitation Strategy (i.e. Condition 71 of Schedule 3 of PA 10_0138 and Condition 26 of EPBC 2010/5566). The MOP summarises the key elements of the Rehabilitation Strategy as well as providing a description of activities and mine landforms.

8.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

8.1.1.1 Status of Mining and Rehabilitation

At the completion of the reporting period, all domains were classed as 'active' and 78.44 ha of rehabilitation was completed in association with stabilisation following the completion of particular construction activities. **Figure 14** below from the approved MOP represents the mining domains at the completion of the reporting period. Progressive shaping occurred on the northern emplacement, with approximately 193 hectares seeded to achieve a Box Gum Woodland.

8.1.1.2 Post Rehabilitation Land Uses

The proposed post mining land use for MCCM will be consistent with the description contained in the EA and as per the requirements of the State and Commonwealth approvals. The area will be returned to a mixture of native vegetation communities including grassy woodland, shrubby woodland/open forest and riparian forest natural forest and woodland. Condition 71 of Schedule 3 of PA 10_0138 lists the overall rehabilitation objectives for the MCCM. These are outlined below in Table 20 and also included in the MOP.

Table 20 Rehabilitation Objectives

Feature	Objective
Mine site	• Safe, stable and non-polluting • Constructed landforms drain to the natural environment
Final void	• Minimise the size and depth of the final void as far as is reasonable and feasible • Minimise the drainage catchment of the final void as far as is reasonable and feasible
Surface Infrastructure	• To be decommissioned and removed, unless the Executive Director Mineral Resources agrees otherwise
All land, other than the final void	• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: ○ Local native plant species; and ○ A landform consistent with the surrounding environment, in accordance with the Revised Biodiversity Offset Strategy and the BMP (I.e. Conditions 45 and 53 of Schedule 3 of PA 10_0138 respectively).
Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure

8.1.1.3 Rehabilitation Performance Indicators

Table 21 summarises the rehabilitation status for the MCCM. Rehabilitation activities continued on the Northern Overburden Emplacement Area. During the reporting period 78.41ha of spoil were reshaped with topsoil spread. and all land currently under active rehabilitation has been seeded with a White Box Gum woodland mix. In addition to the seeding, tubestock seedlings were planted over a 10 ha section on the lower northeastern slopes of the rehabilitation area.

Table 21 Rehabilitation Status

Mine Area Type	Previous Reporting Period 2019	This Reporting Period 2020 (Actual)	Next Reporting Period 2021 (Forecast)
A. Total mine footprint	1,362	1,433	1,479
B. Total active disturbance	1,659	1,661	1,707
C. Land being prepared for rehabilitation	60.46	54.0	54.0
D. Land under active rehabilitation	115.03	193.44	233
E. Completed rehabilitation	-	-	-

8.1.1.4 Decommissioning and Demolition Activities

As anticipated in the MOP, no decommissioning activities of permanent infrastructure was undertaken during the reporting period.

8.1.1.5 Other Rehabilitation Activities

Rehabilitation activities associated with the exploration activities were undertaken and topsoil stockpiles were seeded during the reporting period. Where possible, exploration holes were located on previously disturbed land in order to minimise disturbance.

8.1.1.6 Departmental Sign-off of Rehabilitated Areas

Departmental sign-off has not been requested.

8.1.1.7 Variations in Activities against MOP/RMP

A new MOP was approved during the 2020 reporting period that included modifications and refinement to the mine design, topsoil stockpiles, completion criteria description, rehabilitation trials and disturbance areas within the MOP term. The MOP was approved for the period November 2020 – January 2023 and is available on the Whitehaven Coal website.

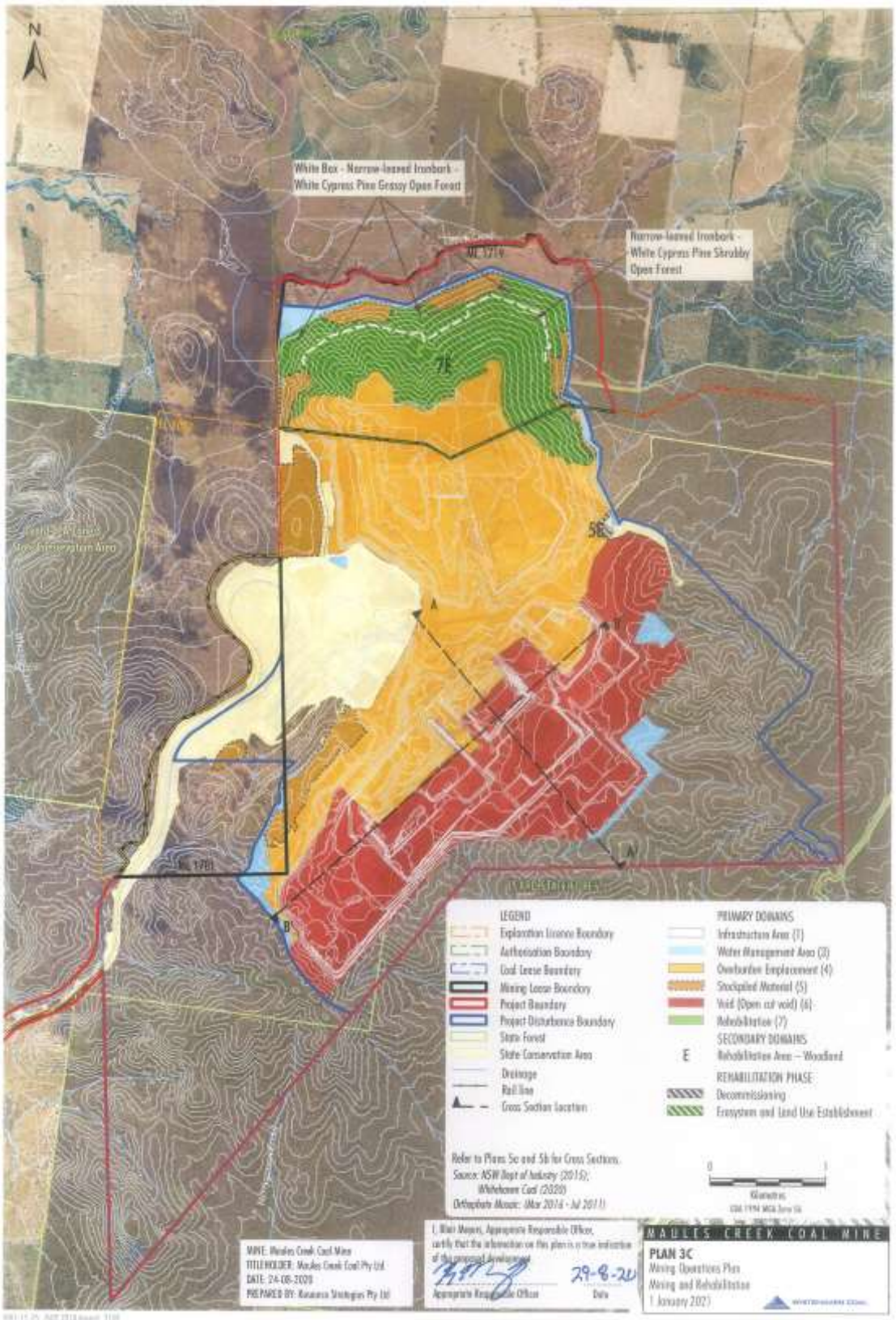


Figure 14 Mining Domains at Completion of the Reporting Period (2020)

8.1.1.8 Monitoring

An area of 10ha which was seeded in 2019 was monitored in spring 2020. The groundlayer was dominated by Carthamus lanatus and Sclerolaena muricata. Native grasses that were recorded include Austrostipa scabra, Dichanthium sp., Sporobolos creber and Bothriochloa macra, Eragrostis parviflora, Rytidosperma caespitosum and Eriochloa pseudoacrotricha. Native forbs that were most common at the site include Erodium crinitum and Evolvulus aslinoides.The midstory was dominated by Acacia implexa. Canopy species, which consisted of Eucalyptus spp., were not yet established at that strata.

Visual inspections of short term (or temporary) rehabilitation are undertaken to assess surface stabilisation around infrastructure areas and topsoil stockpiles.

8.1.1.9 Topsoil Stripping and Stockpiling

During the reporting period topsoil and subsoils were stripped and stockpiled to address the objectives in the SHMP within the MOP. Long-term stockpiles were seeded with White Box Gum Woodland seed mix as part of the 2020 seeding program.

In February the Resource Regulator identified a temporary topsoil stockpile where both topsoil and subsoils had been co-mixed. Topsoil was salvaged from the identified stockpile with all other material being stored in a subsoil stockpile.

8.1.1.10 Topsoil Balance

In line with Condition 39 of Schedule 3 of PA 10_0138, and Conditions 26(b), 27(c) and 27(d) of EPBC 2010/5566, the management of topsoil at the MCCM is undertaken in accordance with the Soil Management Protocol.

Detailed soil surveys have been undertaken within the disturbance footprint, prior to the stripping of topsoil. An independent consultant completed surveys assessing suitability of topsoil and subsoils for use on mine rehabilitation and the preparation of stripping plans for each of the topsoil areas. Topsoil volumes stored to date are summarised in Table 22. MCCM will continue to monitor topsoil volumes to ensure appropriate volumes are recovered for later use on rehabilitation areas. A number of topsoil stockpiles may also require relocation during the following reporting period to enable to progression of mining operations.

Table 22 Topsoil Balance

Topsoil Balance (M^3)								
Area	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
MIA / Construction	539,166	145,990	-	-	-	-	-	685,156
Mining Operations	252,490	349,928	852,524	762,718	251,075	225,173	127,086	2,820,994
Still to clear / strip	-	-	-	-	-	-	-	446,748
Totals	791,656	495,918	852,524	762,718	251,075	225,173	127,086	3,952,898

EA Total for rehab	-	-	-	-	-	-	-	2,368,000
Net difference	-	-	-	-	-	-	-	1,584,898

8.1.1.11 Trials, Research Projects and Initiatives

In accordance with Condition 15 & 16 of the MCCM EPBC Approval 2010/5566, MCC must fund $1 million into research of Box Gum Woodland mining rehabilitation as well as $1.5 million into research for threatened species recovery actions for the Regent Honeyeater, Swift Parrot and South-eastern (Corbens) Long-eared Bat. In accordance with approved Research Project Plans; Maules Creek Coal funded the following activities during 2019 including:

- Annual spring surveys at potential Swift Parrot foraging habitat sites across their breeding range in Tasmania.
- Research for Regent Honeyeater involved designing, installation and undertaking survey of nest predation mitigation structures plus Noisy Miner management and facilitation/coordination of twice annual volunteer survey programs.
- Radio tracking of habitat and roost usage research of South-eastern Long-eared Bat as well continuing development of acoustic techniques for Nyctophilus species call identification.
- Draft reporting of the seed bank within natural and stockpiled soil samples at the MCCM.

The findings of these research projects will be used to inform MCC on potential improvements to rehabilitation and restoration practices in particular during Box-Gum Woodland revegetation activities but also the management of threatened species both onsite and in the Biodiversity Offset Areas.

8.1.1.12 Key Issues to Achieving Successful Rehabilitation

The key issues to achieving successful rehabilitation at MCCM include:

- Excessive erosion and sedimentation (e.g. gullying and sedimentation resulting in land stability and vegetation growth issues).
- Weed and feral animal infestation.
- Poor vegetation establishment and growth (including the Box-Gum Woodland EEC/CEEC).
- Landform instability.

In cases where rehabilitation performance is sub-optimal, additional management measures will be implemented (e.g. replanting, repairing landform and water management features, application of mulch/fertilisers, feral animal and weed control etc.). During the reporting period a Corrective Actions Protocol was developed which will allow for tracking and reporting on all corrective actions undertaken in relation to the rehabilitation.

An updated TARP for rehabilitation at MCCM has been included in the MOP, which outlines appropriate actions and varied responses that will be implemented as required.

8.1.1.13 Actions for the next reporting period

The rehabilitation actions and detailed justification for the next reporting period will be detailed in the MOP. Rehabilitation is continuing on the northern overburden emplacement area. During the next reporting period

significant tube stock will be planted across the 2020 rehabilitation areas, with rehabilitation works being undertaken in accordance with the MCC rehabilitation standards which were developed in 2020.

8.1.1.14 Proposed Research and Rehabilitation for 2021

MCCM will continue to progressively shape available areas that are at final landform and elevation for rehabilitation. Continuing shaping and rehabilitation of available areas will be targeted in the north-eastern extent of the overburden emplacement during the 2021 reporting period. Minor exploration site rehabilitation and short term (or temporary) rehabilitation will also occur as required. As outlined in Section 8.1.1.11, implementation of research into both the Box-Gum Woodland rehabilitation and Threatened Species recovery actions is underway and, on the research schedule, is on track for completion in 2022/2023.

9 COMMUNITY

Social impacts and opportunities associated with the MCCM are managed in accordance with the Social Impact Management Plan (SIMP), Schedule 3 Condition 78 and the Statement of Commitments (SoC) Appendix 5 of PA 10_0138.

9.1 COMMUNITY ENGAGEMENT ACTIVITIES

MCC uses a wide variety of community engagement and consultation methods including the MCCM Community Consultative Committee (CCC), Boggabri-Tarrawonga-Maules Creek (BTM) combined CCC, Whitehaven website, MCCM phone hotline and dedicated email address, local media updates, MCCM Mine Tours, local school visits and presentations to students and teachers in and out of School, sponsorship of local community events and groups, meetings as required with neighbours and a range of stakeholders including government and non-government agencies.

MCCM operates a Community Consultative Committee, with meetings held quarterly during the reporting period. In addition a joint meeting between Maules Creek Coal, Boggabri Coal and Tarrawonga Coal Mines CCC's was held in May 2020. A second joint meeting was scheduled for October however due to COVID restrictions did not go ahead. Minutes of these meetings are posted on the Whitehaven website once ratified at the following meeting.

MCCM are also involved and attend various community events and information forums as part of engaging with the local community including; Business Chamber forums, Council meetings, industry forums, local school and business functions, community gatherings and charity club functions.

9.2 COMMUNITY CONTRIBUTIONS & INITIATIVES

As well as attending functions, WHC and MCCM also contribute to the community by providing financial support and sponsorship to various community events and initiatives throughout the community, these included:

- Australian Red Cross
- Baan Baa Tennis Club
- Black Magic
- Black N Blue Gym
- Boggabri Sacred Heart School P&F
- Carols in the Park - St Barnabas

- Clontarf Foundation
- Country Universities Centre North West
- Dorothea Mackellar Poetry Society
- Future EDU Inc
- Gomeroi Elders Group
- Gunnedah Chamber of Commerce
- Gunnedah Eisteddfod Society Inc.
- Gunnedah High School
- Gunnedah Public School
- Gunnedah Show Society
- Gunnedah South Public School
- Gunnedah St Marys College
- Gunnedah Two Rivers Arts Council
- Gunny Munny
- Janice Knox Artwork
- Legacy
- Maules Creek Campdraft Club
- Narrabri & District Chamber of Commerce
- Narrabri High School
- Narrabri Local Aboriginal Land Council
- NSW Rural Fire Service
- Rebecca Artis
- Rotary Mental Health
- Westpac Rescue Helicopter Service

The MCCM Social Impact Management Plan (SIMP) outlines a number of objectives to monitor the effect of the MCCM within the local community relating to housing, employment, training, economic development, community infrastructure and traffic. The following reports on the activities, monitoring and results with regards to the objectives outlined in the SIMP.

Housing

To reduce the pressure on the local short term housing market during this phase of operations, third party accommodation was supplied to contractors at the Civeo Accommodation Villages in predominantly Boggabri with some to Narrabri.

In addition, with the ramp up of mining employment this third party accommodation is also available to mine operations employees at a subsidised rate, to assist in reducing peak rental/leasing concerns in the local area. The fee for use, increases every three months in order to encourage employees to move into the local community permanently. Whitehaven has a strong focus on employing local people at its operations and this subsidised approach has been positively received as a short term housing solution by new employees to the mine as they investigate and look to relocate to the local area. WHC will continue to monitor in conjunction with local councils the ongoing housing and accommodation market to ensure impacts are managed.

Employment and Training

As at the end of the reporting period, MCCM Whitehaven portion of the workforce was approximately 523 with over 74% residing in the local area. The remaining 26% workforce (including management and professional staff) have permanent residence listed as being outside the Narrabri and Gunnedah LGAs. From March 2020 to

November 2020, MCCM recruited 96 permanent roles, of which 46 were local residents (48% of the new recruits; and 9% of the overall workforce); and 19 relocated to live in the Narrabri or Gunnedah LGA as a result of their employment at MCCM (4% of the workforce).
During this period, MCCM employed 25 new recruits from the Gunnedah LGA (5% of the workforce); and 22 new recruits from the Narrabri LGA (4% of the workforce). In this same time period, MCCM employed 5 new recruits from the Tamworth LGA within a safe daily commute to site.
The associated transport solution of both residential and non–residential workforce is satisfied by the ongoing shuttle bus service that is provided by MCCM for both operational employees as well as staff/management where this is practicable.

Whitehaven's *Workforce Diversity Policy* has supported strong representation of women, Indigenous and young people. Of the MCCM workforce at the end of the period:

- 150 (approximately 12%) are Indigenous, with the percentage remaining the same as the previous reporting period;
- 70 (approximately 13%) are women, with the percentage remaining the same as the previous reporting period; and
- 86 commenced roles as a Trainee Operator (new to mining).

Whitehaven and MCCM provide training opportunities for apprenticeships and traineeships in order to support local employment and increase local skill levels. During the reporting period six (6) locals accepted positions as one (1) auto electrician, one (1) HV electrician, one (1) Communications technician and three (3) Plant mechanics as part of the WHC MCCM apprenticeship program. This takes the total number of apprenticeships accepted under the program to 56, since 2011.

Provision of employment figures and amount of local spend by WHC is also available and provided to councils as requested to assist the councils in their forward planning, these figures are also included in financial reports released by WHC.

Economic Development

Whitehaven, which includes MCCM contributes financially to the economy at both state and federal level and to the communities in which we operate. Employees and contractors also add a significant economic contribution to the Gunnedah, Narrabri, Boggabri and Werris Creek townships through their purchases from local businesses.

In 2020 Whitehaven spent:

- $199.0m in salaries, wages, taxes and superannuation to employees (on an equity joint venture basis)
- $113.3m in royalties to the New South Wales Government (on an equity joint venture basis)
- Over $856.0m on mining, washing and delivering coal onto trains at our mine sites
- Over $414.0m in port and rail charges for track access haulage costs and port costs

Community Infrastructure

During the reporting period MCCM paid Narrabri Shire Council (NSC) over $500,000 under its VPA as a result of coal sales directly from the MCCM, to be spent on further infrastructure projects.

During the 2020 period WHC spent approximately $413 million with local businesses and suppliers in the Narrabri, Gunnedah, Tamworth and Liverpool Plains Shires. Local jobs and local spend with local businesses will remain a focus in future years.

9.3 COMMUNITY COMPLAINTS

Whitehaven maintains a dedicated Community Hotline 1800 WHAVEN (1800 942836) which was updated in 2020 for all the sites including MCCM and is answered by an operator. The contact line continues to be advertised on the Whitehaven Coal website, MCCM CCC meeting and minutes, in Community Newsletters and newspaper advertising.

A summary of the complaints (by category) received by MCCM over the last two reporting years are detailed in Table 23. The Community Complaints Register is also available on the Whitehaven Coal website and a summary provided at CCC meetings.

Table 23 Summary of Community Complaints and Enquiries

Category	2019	2020
Air quality	5	1
Traffic	5	0
Lighting	0	1
Noise	1	1
Blasting	9	5
Social impacts	1	0
Other	0	3
TOTAL	21	11

Note: a single complaint may involve multiple categories.

9.3.1.1 Complaint Trends

The total number of complaints received in 2020 was significantly lower than those recorded in the 2019 reporting period.

Air quality complaints were significantly down in 2020 to one (1) from five (5) in the previous reporting period. The EPA forwarded one complaint relating to air quality in April. MCCM undertook a review of real time monitoring data and operational responses, responding to the EPA with the data. The information provided indicated compliance with the Air quality TARP.

One lighting complaint was received in 2020 up from nil in 2019. MCC liaised with the property owner and adjusted the lighting plants accordingly.

Noise complaints were consistent with the previous year. The EPA reviewed noise data supplied by MCC and no further action was taken.

Blast complaint were down to five (5) from nine (9) in 2019. These related to two separate blasts. All monitoring data was compliant with licencing conditions. All monitoring data was supplied to the regulatory agency and complainants.

During the reporting period there were three (3) miscellaneous complaints receive. Two (2) of these related to waters flowing within Back Creek. Both of these were made during extreme wet weather events when the creek was in flood. During these events MCC experienced overflow events which were self-reported to the appropriate agencies and investigations undertaken. The third complaint related to the MCC CCC, MCC provided all information requested from the DPI&E and no further action was taken.

9.3.1.2 Actions & Proposed Improvements

Community complaints primarily related to water and blasting concerns. Actions taken in response to complaints included a range of measures, including however not limited to, the following:

- Investigations into specific mining activities and trialing and implementing equipment upgrades;
- Reviewing video footage or visual media where available;
- Reviewing real time data monitoring and operational activities;
- Reviewing daily risk reports to determine appropriate TARP levels dependent on specific mining activities and weather patterns to support operational management;
- Analysis of meteorological data and physical inspections of offsite locations;
- Communicating learnings and issues to operational personnel;
- Community consultation; and
- Ongoing engagement with regulatory agencies and local community members.

10 INDEPENDENT AUDITS

10.1 INDEPENDENT REHABILITATION AUDIT

In response to a notice under section 240(1)C issued by DPIE in April 2019, an audit was undertaken on Maules Creek Coal's rehabilitation progress. As a result of the audit the actions presented in Table 24 were proposed. A summary of the status at the end of the 2020 Annual Review reporting period is provided below.

Table 24 Summary of Rehabilitation Audit

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
1	Progressive rehabilitation	Annual rehabilitation planning process	*Develop and implement an annual rehabilitation planning process that details how annual rehabilitation targets will be met. Include suitable drought adaptation and resilience components and integrate into the rehabilitation plan.* *These components should detail protocols to facilitate successful ecosystem establishment and sustainability in the context of current and future climatic conditions of northwestern NSW. To facilitate this, the Annual Rehabilitation Plan should detail protocols for:* • *Achieving MOP commitment*	MCC will develop and implement an Annual Rehabilitation Plan that details how annual rehabilitation targets outlined in the current MOP will be met. The Annual Rehabilitation Plan will detail the following protocols for each phase of rehabilitation to achieve MOP commitments and facilitate successful ecosystem establishment and sustainability: • Landform Design. • Landform Construction. • Water Management. • Soil Management. • Seed Selection/Fertiliser. • Climate Adaption/Schedule. • Revegetation.	Complete

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
			• *management and/or risk assessment tools for post-mining ecosystem rehabilitation (e.g. Halwatura et al. 2015);* • *predicting seasonal conditions;* • *monitoring environmental conditions (e.g. soil moisture);* • *risk and triage analyses of current and future rehabilitation investments*	• Rehabilitation Performance Review. • Corrective Actions. • Land Disturbance. The above protocols will require sign off from relevant MCCM personnel prior to commencement of the next phase. The content of the protocols will reflect MCC's rehabilitation objectives and commitments in the Project Approval, relevant assessment documents and management plans. The Annual Rehabilitation Plan will also incorporate a number of procedures (described in this table) to document how rehabilitation phases will be completed in accordance with relevant regulatory requirements and Whitehaven standards.	
2	Progressive rehabilitation	Mine planning–Rehabilitation Program Integration	*Enact a program to integrate rehabilitation into mine planning activities, including soil management.*	MCC will prepare a Short Term Plan for the MCCM, a component of which will be an Annual Rehabilitation Schedule, to integrate mine planning, rehabilitation and soil management activities for the next 12 to 18 months. The Short Term Plan and Annual Rehabilitation Schedule will be reviewed quarterly against the MOP to monitor progress	Complete

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				against rehabilitation targets. The Annual Rehabilitation Schedule will include a progressive breakdown of key activities and associated timing in order to achieve these targets, consistent with the Protocols provided in the Annual Rehabilitation Plan.	
3	Record keeping & Monitoring	Record keeping practices review	*Implement a procedure for rehabilitation-, soil-, vegetation- and biodiversity-monitoring and record keeping practices with the objective of ensuring that the requirements specified in applicable plans, programs and strategies are recorded and controlled include tracking the implementation of corrective actions.* *The specified procedure should include (without limitation) detail on how required corrective measures are recorded and controlled.*	MCC will develop and implement a Rehabilitation Management System for the MCCM to allow information relevant to rehabilitation, soil management, vegetation and biodiversity to be accessible to relevant staff and contractors and facilitate good record keeping practices. The following key elements of the Rehabilitation Management System administrative functions will provide a secure central data storage location and ensure all relevant documents are up to date and support rehabilitation performance: • Data management and record keeping – hierarchy for data filing and storage in accordance with existing WHC administration systems to facilitate access to information and record keeping.	Complete
4	Record keeping	Rehabilitation spatial data maintenance	*Implement a protocol of keeping rehabilitation data up to date with Rehabilitation Phase changes. This should include integrating data attributes relating to rehabilitation (e.g. ameliorant application*		

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
			rate, seed mix, soil source) into the rehabilitation polygon feature class. *This data can then be utilised to understand contributing factor into rehabilitation success or failure.*	• Mapping and scheduling – rehabilitation polygon mapping including rehabilitation attributes (e.g. ameliorant application rate, seed mix, soil source) and progressive rehabilitation schedule which incorporates short- and long-term climate modelling. • Document and plan register – document control register incorporating relevant plans, protocols and procedures. • Legislation and commitment register – register of rehabilitation commitments and legislative and regulatory requirements • Risks to rehabilitation – details of risks to rehabilitation identified in the MOP. • Review and corrective actions register – register for required corrective actions and mitigation measures as an outcome of annual rehabilitation monitoring. • Training and development program – suite of training information and tools aimed at delivering rehabilitation information to relevant staff and contractors.	

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				MCC will develop and implement a Rehabilitation Monitoring Procedure (as a component of the Annual Rehabilitation Plan) that will outline the rehabilitation monitoring program methodology at the MCCM. Consistent with the protocols outlined in the Annual Rehabilitation Plan and MOP, the rehabilitation monitoring program will monitor (among other things): • evidence of erosion or sedimentation; • success of initial grass cover and/or tree and shrub planting establishment; • vegetation health and structure (e.g. density, cover, species diversity); • adequacy of drainage controls; • presence of weeds; and • general stability and landscape function (e.g. nutrient cycling and water infiltration). Outcomes of monitoring will identify possible trends, allow results to be compared against rehabilitation completion criteria and identify any required corrective actions. Rehabilitation monitoring results will be collated in the	

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				Rehabilitation Management System and reported in the Annual Review, including discussion of any trends and effectiveness of management and/or corrective actions.	
5	Biodiversity Management	Weed monitoring and management	*Implement a weed monitoring procedure within the lease boundaries. The developed methodology should be implemented with the objective of delivering data such that weed treatment can:* *• ensure that obligations under the Biosecurity Act 2015 can be met;* *• ensure that weed densities do not interfere with any of the rehabilitation performance indicators; and* *• track weed treatment effectiveness and weed population dynamics.*	MCC will develop and implement a Weed Management Procedure (as a component of the Annual Rehabilitation Plan) to be implemented for the MCCM within the Project Approval Boundary to control the occurrence and spread of weed species required under the NSW Biosecurity Act, 2015. The Weed Management Procedure will be consistent with the weed control program outlined in the MCCM Biodiversity Management Plan, and will target the priority and regional weed species in the North West Regional Strategic Weed Management Plan 2017-2022 (NWLLS, 2017). In accordance with the recommendations of the Rehabilitation Report (Aspect Ecology, 2019), the Weed Management Procedure will outline the weed control measures and monitoring methodology to ensure: • MCCM's obligations under the NSW Biosecurity Act, 2015 can be met, in	Complete

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				accordance with the Biodiversity Management Plan; and • weed densities do not interfere with any rehabilitation performance indicators. The Weed Management Procedure will allow MCCM to accurately track effectiveness of weed management measures and weed population dynamics. Inspections of weed presence and abundance within rehabilitation areas will be undertaken on a regular basis (at least monthly). A summary of weed control undertaken at the MCCM will be reported in the Annual Review.	
6	Training & development: organisational learning	Rehabilitation knowledge sharing program	*Implement a process for rehabilitation-, soil-, vegetation- and biodiversity- related knowledge sharing between business units to appropriately utilise the knowledge, skills and resources already existing in the organisation.*	As described above, in accordance with the recommendations of the Rehabilitation Report (Aspect Ecology, 2019), a Rehabilitation Management System will be implemented for the MCCM to allow information relevant to rehabilitation, soil management, vegetation and biodiversity to be accessible to relevant staff and contractors. A quarterly environmental meeting is conducted between Whitehaven's Gunnedah open cut operations. A 'Rehabilitation' item will be included on the	Ongoing A review of all plans and procedures has been completed with a focus on better integration of the mine planning and production processes with the Environmental Management Strategy. Following the Resource Regulator notices there is improved communication between WHC business units regarding rehabilitation fostering knowledge sharing and building skills between key personnel.

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				agenda of this meeting to facilitate discussion and knowledge sharing of each site's rehabilitation management activities. Discussion on this topic will not be limited to rehabilitation and may also include discussion of related topics including soil management and biodiversity management. Any reports/information agreed to be shared at the quarterly environmental meeting will be provided via email correspondence or uploaded to a document share-point.	Quarterly environmental meetings have been conducted during 2020, with rehabilitation works and findings discussed.
7	Soil Management and Growing Media Development	Soil management review and Action Plan	*Implement a monthly review process of any activities that have been undertaken in association with the following three soil management stages:* • *Topsoil Stockpile Destination* • *Topsoil Rehandle (ie. stockpile relocation)* • *Rehabilitation* *Management are then to ensure that all specific soil handling management task events have been undertaken in accordance*	MCC has developed and implements a Soil Management Protocol and it will be included in the Annual Rehabilitation Plan. The Soil Management Protocol includes: • a description of the existing soil profile; • topsoil and subsoil testing procedures; • a soil balance; • clearing and grubbing procedures; • soil and spoil amelioration methods; • soil stripping procedures; • soil stockpiling procedures; • soil characterisation methods; and	Complete

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
			with the Soil Management Protocol (MOP app D s 1.2), and ensure corrective actions are taken in instances where they have not.	• soil respreading procedures. The existing MCCM Soil Handling and Management Plan will be reviewed on a monthly basis and will include a review of soil stockpile mapping and the soil balance. Soil parameters in rehabilitated areas will be monitored during the annual rehabilitation monitoring program.	
8	Soil Management	Stockpile Management	*Implement the following soil management-related actions:* *Conduct a strategic analysis of potential alternative or additional soil storage locations; and* *Seed current topsoil that will be in storage for over one year with native grasses and understorey mix.*	In accordance with the recommendations of the Rehabilitation Report (Aspect Ecology, 2019), the following soil management actions have been implemented at the MCCM: • Modification of existing, and identification of new, topsoil storage locations/extents to address constraints in storage volume, minimise material rehandling and improve topsoil health. The location and extent of topsoil stockpiles are shown on Plans 3C to 3E and described in Section 5.2.4. • Contour scarifying and seeding (with a mix of native grasses and understorey species) of existing and new topsoil stockpiles that will be stored for over one year, as soon as	Complete

Item #	Theme	Proposed measures or actions	Proposed Recommendation and Action from Aspect Ecology Audit Report (2019)	Previous Response from MCCM	Action Status and Response by MCCM - December 2020
				practicable following completion of the stockpile. • Direct placement of topsoil on final shaped landforms, wherever possible. The above measures will be included in the Soil Management Procedure.	

10.2 INDEPENDENT ENVIRONMENTAL AUDIT 2018

An IEA was undertaken in 2018 by an independent consultancy approved by the DPI&E as required under Schedule 5, Condition 10 of the PA10_0138.

The following actions were identified during the 2018 IEA in Table 25 below. A copy of the audit report and the action plan in response to the audit recommendations is available on the Whitehaven Coal website. These include recommendations that may have been relevant during the audit period however outside the applicable Annual Review reporting period. All actions were completed prior to this Annual Review period, or alternatively continued to be reviewed and applied as required (i.e. real time noise monitoring).

Table 25 IEA Recommendations and Actions

Item	Assessment requirement	Auditor recommendation	Proposed Action	Estimated completion date
Sch 2 Cond 10	*By the end of 2013, or as otherwise agreed by the Secretary, the Proponent shall surrender the existing development consent (i.e. DA85/1819) for mining on the site in accordance with Section 104A of the EP&A Act.*	This is a legacy Administrative Non Compliance. MCCM satisfied the requirements of this condition during the current audit period, however the required date was not met. No further action required.	No further action required	Not applicable.
Cond 17	*By the end of March 2013, unless the Secretary agrees otherwise, the Proponent shall enter into a planning agreement with Council in accordance with:* *(a) Division 6 of Part 4 of the EP&A Act; and* *(b) the terms of the Proponent's offer in Appendix 3.*	No further action required as this is a legacy ANC relating to timeframe.	No further action required	Not applicable
Sch 3 Cond 7	*Noise Criteria* *Except for the noise affected land in Table 1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 5.* *Table 5: Noise criteria dB(A)* Land: All privately-owned residences — Day/Evening/Night $L_{Aeq(15\ min)}$: 35 — Night $L_{A1\ (1\ min)}$: 45 *Note:* • *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.* • *Operational noise includes noise from the mining operations and the use of private roads and rail spurs.* *However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*	MCCM is to ensure that all noise mitigation measures are implemented and TARPs are monitored and responded to accordingly to minimise the potential for noise exceedances.	MCC will continue to monitor real time noise levels and respond to TARP levels and responsibilities specified within the NMP. Attended monitoring results and compliance will be reported within the required external reports (EPL monthly report and Annual Review).	Ongoing
12	*Attenuation of Plant* *The Proponent shall:* *(a) ensure that:* • *all mining trucks and water carts used on the site are commissioned as noise suppressed (or attenuated) units;* • *ensure that all equipment and noise control measures deliver sound power levels that are equal to or better than the sound power levels identified in the EA, and correspond to best practice or the application of the best available technology economically achievable;*	MCCM needs to continue to implement improvement of controls to reduce the sound power levels of the equipment that exceeds the EA criteria.	MCCM will continue to undertake SPL testing and report on mitigation measures within the Annual Review.	Ongoing

	• *where reasonable and feasible, improvements are made to existing noise suppression equipment as better technologies become available; and* *(b) monitor and report on the implementation of these requirements annually on its website.*			
24	*BLASTING* *Operating Conditions* *The Proponent shall not undertake blasting on-site within 500 metres of:* *(a) any public road without the approval of Council; or.* *(b) any land outside the site that is not owned by the Proponent, unless:* • *the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement, or* • *the Proponent has:* ○ *demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and* ○ *updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land.*	No further action required, as all necessary agreements are now in place.	Complete	Complete
33	*AIR QUALITY & GREENHOUSE GAS* *Operating Conditions* *The Proponent shall:* *(a) implement best management practice to minimise the off-site odour, fume and dust emissions of the project, including best practice coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail;* *(b) operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures*	No further action required as the predictive model is now operational and the official caution related to a specific event with no ongoing air quality impacts.	Operation of the predictive tool is implemented and safeguards in place to ensure continued operation.	Complete

	(such as relocate, modify and/or suspend operations) to ensure compliance with the relevant conditions of this approval; *(c) manage PM2.5 levels in accordance with any requirements of an EPL;* *(d) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d in condition 29);* *(e) minimise any visible off-site air pollution;* *(f) minimise the surface disturbance of the site generated by the project; and* *(g) co-ordinate the air quality management on site with the air quality management at other mines within the Leard Forest Mining Precinct to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Secretary.*			
66	*Rail Transport* *Within 12 months of the completion of the Gunnedah Traffic Study, the Proponent shall:* *……..* *b) provide a report of the outcomes of this liaison and identify reasonable and feasible proposals recommended by the Proponent and/or the Gunnedah Shire Council towards implementing the Study's recommendations, to the satisfaction of the Secretary.*	No further action required as this is a legacy ANC.	No further action required.	Complete.
70	*WASTE* *The Proponent shall:* *(a) implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project;* *(b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; and* *monitor and report on the effectiveness of the waste minimisation and management measures in the Annual Review.*	Review waste management practices around segregation of waste.	Reviewed. New waste management contract provider implemented.	Complete.
Schedule 4 Condition 2	*NOTIFICATION OF LANDOWNERS/TENANTS* *Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 1 that is subsequently purchased by the Proponent, the Proponent shall:* *(a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet*	No further action required given that Tenancy Agreement is in accordance with this condition.	No further action required.	Complete.

	entitled "Mine Dust and You" (as may be updated from time to time); *(b) advise the prospective tenants of the rights they would have under this approval; and* *(c) request the prospective tenants consult their medical practitioner to discuss the air quality monitoring data and predictions and health impacts arising from this information, to the satisfaction of the Secretary.*			
Schedule 4 Condition 13	*Online Communication of Onsite Activities and Monitoring of Noise and Air Quality* *The Proponent shall, within 3 months of the date of this approval:* *(a) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form:* • *daily weather forecasts for the coming week;* • *proposed operational responses to these weather forecasts;* • *real-time noise and air quality monitoring data (subject to any necessary caveats); and* • *any operational responses that were taken in response to the noise and air quality monitoring data, and* *(b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, to the satisfaction of the Secretary*	MCCM should include on its website details about its daily "*operational responses*" to the weather forecast.	Complete. Daily website details now address the recommendation. Additionally, operational responses are already included within the respective management plans. Furthermore, a daily risk output from 'Envirosuite' informs weather conditions and risk levels, with controls already identified within the management plans applied accordingly. An administrative change was made to the new website format to include reference to proposed operational responses.	Complete
Appendix 5 Statement of Commitments	*Mining Operations* *Maules Creek Coal shall surrender its existing development consent DA 85/1819 following the grant of the Project Approval.*	Refer to CoA Schedule 2 condition 10. This is a legacy ANC. No further action required.	No further action required.	Complete.
Coal Lease 375				
Condition 10.	*Blasting* *Blast Overpressure* *The lease holder must ensure that the blast overpressure noise level generated by any blasting within the lease area does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises, as the case may*	Refer to CoA Condition 18.	Noted. No further exceedances have occurred since this event. This unit was on mine owned land.	Not applicable.

	be, unless determined otherwise by the Department of Environment, Climate Change and Water.			
Condition 14	*Roads and Tracks* *During wet weather the use of any road or track must be restricted so as to prevent damage to the road or track.*	MCCM should endeavour and commit to restricting unnecessary traffic movement on roads and tracks in wet weather.	The Resources Regulator completed an audit in May 2018 and identified this condition was compliant. Many tracks and roads are inaccessible in wet conditions. Pre-work notification to biodiversity contractors is provided to specify the level of access permitted, including excluding access where required. Section 6.12 of the Biodiversity Management Plan addresses control of access and designated tracks. No further controls are proposed.	Not applicable
CoA PA10_0138 Management Plans				
25	*Blast Management Plan* *The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary.*	Ensure approval records for all plans requiring Secretary approval are maintained. Ensure that all blast notifications are issued in accordance with the BMP.	Noted.	As required
45	*Revised Biodiversity Offset Strategy* *The Proponent shall prepare and implement a revised biodiversity offset strategy for the identified offset areas in Table 16 to the satisfaction of the Secretary. The revised Strategy must:* *(a) not reduce the size or quality of the proposed offset areas;* *(b) be consistent (as far as is possible) with the recommendations and objectives of the Leard Forest Mining Precinct Regional Biodiversity Strategy;*	There is an opportunity to update the BOS to ensure the consistency as required by condition (b).	Noted. The BOS has been revised to align, as far as possible, with the objectives of the RBS and is still pending approval from DP&E.	Complete.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 NON-COMPLIANCES

The compliance status of the MCCM against relevant approvals during the reporting period was assessed in Section 1 as of the end of the reporting period (31 December 2020). Further details of any actions undertaken or proposed for non-compliances, including within the following reporting period, are summarised in Table 26.

Table 26 Non-Compliance Details and Proposed Action Plan

Non - Compliance	Date / Location	Cause	Action Plan	Estimated Completion Date
Schedule 3 Condition 12 a)	1/8/2020 MCC CHPP	Individual fixed plant items located at the CHPP do not have the ability to be measured in isolation of the running plant. This has resulted in a Technical non-compliance of a limited number of fixed plant individual items whilst undertaking sound power testing. Overall site sound power level is compliant.	Continue maintenance program, testing and reporting	Complete
PA10_0138 Schedule 3 Condition 7 EPL20221 L3.3	1/4/2020 NM1	Attended noise monitoring measurement was recorded above the performance criteria.	MCC completed a number of mitigating actions in accordance with the controls specified in the approved MCC Noise Management Plan. Real time monitoring units were in operation and being monitored by the dispatch team. The production team and supervisor undertook various control measures, including modifying operation of equipment. Further investigation was also undertaken in relation to the event by operational and environmental personnel with stakeholders notified. Actions were taken to undertaken	Complete

Non - Compliance	Date / Location	Cause	Action Plan	Estimated Completion Date
			remedial works on a pump which was being utilised.	
PA10_0138 Schedule 3 Condition 58	23/9/2020 "Kelso"	Demolition works of two buildings identified in the Historic Heritage Management Plan occurred prior to the receipt of the final report prepared by a suitably qualified heritage specialist.	The regulator was notified and a review was completed into the processes and procedures which led to the removal of the infrastructure ahead of the final historical heritage consultant report on the legacy infrastructure within the MCC biodiversity offset properties being received.	Complete
EPL20221 L1.1	16/1/2020 and 8/02/2020	On 12 January 2021 the NSW EPA commenced prosecution proceedings against Maules Creek Coal Pty Limited alleging 3 non-compliances with condition L1.1 of the EPL (Pollution of waters) relating to unlicensed discharges of water during significant rainfall events on 16 January 2020 and 8 February 2020 and the release of expandable polystyrene balls from the Maules Creek Mine on 8 February 2020.	MCC undertook a review of the drainage structures on the rehabilitation area to better understand their water carrying capabilities. Amendments and upgrades are being implemented based on the findings of the review. MCC constructed a new dam next to the Hanwha yard and directed Hanwha to install an enclosed EPS delivery system. Works were undertaken to desilt drainage lines and dams to ensure capacity was available for wet weather events.	Ongoing
EPL20221 L1.1	3/12/2020	An unlicensed water discharge occurred on 3 December 2020 during a significant rainfall event.	MCC undertook a review of the drainage structures on the rehabilitation area to better understand their water carrying capabilities. Amendments and upgrades are being implemented based on the findings of the review.	Ongoing

Non - Compliance	Date / Location	Cause	Action Plan	Estimated Completion Date
			Works are continuing to desilt drainage systems and sedimentation dams to ensure wet weather capacity.	
CL375	25/2/2020 Clearing Area	Topsoil and subsoil were comingled in a temporary stockpile location. Persons undertaking the topsoil stripping activities where not proficient in the Soil Handling Management Plan.	MCC undertook a review of the Soil Handling Management Plan (SHMP) and retrained persons undertaking soil stripping activities. All possible topsoil was salvaged from the stockpile with the additional material stockpiled in a subsoil stockpile	Completed
CL375	25/2/2020	Erosion and sediment control practices and measures had not been undertaken in accordance with the MOP leading to rilling and erosion.	MCC undertook works to install appropriate erosion and sediment control measures within the NOEA to mitigate heavy rainfall events. Additionally a corrective actions protocol was put in place to identify areas requiring actions and remediation following events.	Completed

11.2 REPORTABLE INCIDENTS OR EXCEEDANCES

Each type of incident or exceedance has been described in Table 4 of this report. Other exceedances related to air quality were not attributed to mining activities (i.e. regional air quality events). All reportable non-compliances have been reported to the relevant agencies in line with the reporting process.

11.3 REGULATORY ACTIONS

The following official cautions, warning letters and penalty notices were issued to MCC during the reporting period.

- Clean up notice under section 91 POEOA Act issued by the EPA in February. Issued to identify the location and clean-up methods to be used in the removal of expandable polystyrene balls (EPS).
- Clean up notice under section 91 POEOA Act issued by the EPA in April. This was issued to undertake the clean-up of EPS as identified in the clean-up notice issued in February.
- A penalty notice was issued by DPIE was received in February in relation to the construction of a water pipeline without development consent.

- Notice under section 240(1)(C) of the *Mining Act 1992* was issued by DPIE-RR in May, requiring an amendment to the MOP to include the findings of the Aspect Ecology Rehabilitation Audit discussed in Section 10.1.
- An Official Caution from DPIE was received in May in relation to Schedule 3 Condition7 of the approval regarding the exceedance of the operational noise impact assessment criteria of 35dB(A).
- A penalty notice from the DPIE-RR in May in relation to CL375, relating to the stripping and stockpiling of soil resources not undertaken in accordance with the MOP.
- A penalty notice from the DPIE-RR in August in relation to CL375, relating to the erosion and sediment control practices and measures not being undertaken in accordance with the MOP leading to serious rilling and erosion.
- An Official Caution from DPIE-RR was received in August in relation to CL375, relating to the erosion and sediment control practices and measures not being undertaken in accordance with the MOP leading to rilling and erosion.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Activities to be completed in the next reporting period to improve the environmental or community performance of the MCCM, in addition to those separately identified in Section 11 include implementing revised management plans, progressing overburden shaping and rehabilitation opportunities, undertaking research related projects regarding Box-Gum Grassy Woodlands, and continuing identification of community support opportunities.

APPENDIX A

BLAST MONITORING RECORDS

Blast Monitoring Records

The records presented in Table A-1 have been included to satisfy the blast reporting requirements of Schedule 3 Condition 19 and 20 of PA 10_0138.

Table A-1
Blast Monitoring Records

Date	Time	ID/Location	BM1 mm/s	BM1 dBL	BM2 mm/s	BM2 dBL	BM3 mm/s	BM3 dBL	BM4 mm/s	BM4 dBL
Exceedance Criteria (0% (5%))			10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)
02/01/2020	12:05	TST 07-20-OB-A BRY07-20-PS-ONV	0.01	83.80	0.09	101.80	0.26	93.80	0.53	93.20
03/01/2020	12:09	MER 05-31-OB	0.04	87.10	0.06	92.40	0.07	90.40	0.09	95.70
07/01/2020	12:16	TST07-20-OB-B BRY07-44-PS	0.13	92.10	0.27	90.90	0.30	92.30	0.51	96.30
10/01/2020	12:05	TNN07/44/OB ONV08-35-OB BRY07-20-PS-ONV-B & Rocks	0.06	92.30	0.09	112.50	0.15	105.50	0.38	106.5
14/01/2020	12:05	TEA 04-36-PS-MER	0.16	83.30	0.24	85.70	0.29	92.60	0.33	105.8
16/01/2020	12:43	TST 07-21-OB TST 07-24-PS_ONV BRY 07-42-PS-TST	0.11	97.80	0.21	98.20	0.37	99.60	0.47	108.0
22/01/2020	13:44	VEL04-32-OB	0.06	97.20	0.12	97.70	0.10	94.50	0.11	103.8
24/01/2020	15:02	TST07-22-OB	0.09	94.50	0.11	111.90	0.12	104.70	0.20	98.10
30/01/2020	12:07	TNN 07-42-OB TSL 07-40-PS-B	0.07	93.40	0.12	88.80	0.26	92.60	0.43	91.00
31/01/2020	12:08	BRT_05_52_OB	0.08	92.70	0.11	107.30	0.17	100.50	0.07	115.3
03/02/2020	12:45	NAG 04-42-OB	0.01	91.9	0.02	105.6	0.02	103	0.03	91.7
05/02/2020	14:30	TST-24-OB	0.05	87.9	0.08	93.2	0.11	101.3	0.2	103.2
11/02/2020	14:01	TSU 07-38-OB	0.06	101.9	0.21	100.5	0.21	104.3	0.21	102.3
14/02/2020	15:17	MER 05-28-OB MER 05-28-TOE	0.05	90.4	0.12	91.5	0.11	93.9	0.2	92
19/02/2020	15:31	TSU_07_37_OB	0.07	102.9	0.13	99.9	0.16	98.3	0.3	98.1
24/02/2020	15:14	NAG-04-40	0.09	92.5	0.25	96.4	0.29	98	0.45	96
28/02/2020	12:30	NAG04-32-OB	0.12	98.4	0.22	100.4	0.25	100.6	0.47	93.5
04/03/2020	15:27	TNN 06-21_OB	0.06	98.8	0.07	93	0.12	97.8	0.3	95.8
17/03/2020	16:43	MER05-27-OB FLX05-26-PS	0.06	102.4	0.12	99	0.13	103.1	0.26	100.7
19/03/2020	12:02	BRA 07-44-OB-B	0.05	86.7	0.09	88.7	0.09	99	0.17	89.2
20/03/2020	12:17	MER_05_26_OB	0.03	88.9	0.07	99.4	0.05	96.1	0.12	93.4
24/03/2020	15:37	TNN 06-20-OB BRY 07-20-PS-TST	0.09	86.6	0.15	96.6	0.31	104.5	0.53	90
02/04/2020	15:56	NAG 04-33-OB	0.1	92.7	0.2	90.7	0.27	93.5	0.31	99.5
04/04/2020	14:09	TNN07-22-OB BRY07-22-PS	0.06	90.4	0.1	107.8	0.18	107.6	0.51	98.4
09/04/2020	12:18	BRA 07-42-OB JEB 04-34-OB	0.09	88.8	0.17	92.9	0.19	101.4	0.19	94.7
14/04/2020	12:42	BRY07-22-PS NAG_04_40_OB_B	0.06	90.3	0.13	92.4	0.14	96.4	0.23	95.9
18/04/2020	12:30	VEL05_30_OB	0.1	90.7	0.18	92.7	0.17	97.6	0.39	97.8
18/04/2020	15:35	TSM-07-40-OB	0.03	95	0.05	101.2	0.06	104.7	0.05	102
20/04/2020	12:21	TNN 07-21-OB	0.05	89.9	0.05	92.5	0.09	96.8	0.18	94.6
22/04/2020	15:33	MER04-26-OB TEA04-26-PS	0.17	88.7	0.19	88.2	0.23	92.1	0.54	84.6
27/04/2020	12:07	NAG04-34-OB	0.1	90.1	0.15	96.2	0.24	98.3	0.41	99.4
29/04/2020	10:37	VEL05-29-OB	0.07	79.7	0.12	86	0.13	88.5	0.29	92.2

Date	Time	ID/Location	BM1 mm/s	BM1 dBL	BM2 mm/s	BM2 dBL	BM3 mm/s	BM3 dBL	BM4 mm/s	BM4 dBL
Exceedance Criteria (0% (5%))			10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)
02/05/2020	15:23	JEB06-29-OB	0.09	87.5	0.14	101.7	0.18	102.1	0.45	94.2
04/05/2020	12:26	BRA_06_21_OB_B BRA_07_22_OB	0.08	91.7	0.08	91.2	0.09	94.5	0.24	97
05/05/2020	15:21	MER_04_34_OB	0.06	101.6	0.09	93	0.13	103.1	0.11	93.3
07/05/2020	12:14	TNN07-40-OB	0.04	90	0.08	93.6	0.07	97.4	0.1	99.2
11/05/2020	12:53	MER06-35-OB	0.11	103.9	0.15	102.9	0.15	109.6	0.21	99.7
12/05/2020	12:30	LRN_04_42_OB	0.14	89.4	0.31	91.6	0.36	98.7	0.35	93.7
16/05/2020	14:35	VEL 05-26-OB FLX 05-25-PS	0.14	101.7	0.16	103.6	0.24	101.7	0.75	103.8
20/05/2020	12:22	BRA07-21-OB-A 395-07-17-OB	0.03 0.04	96.2 90.2	0.04 0.05	109.7 111.5	0.05 0.11	105.7 99.2	0.07 0.18	94.2 94.9
22/05/2020	13:09	356-08-47-OB	0.02	91.8	0.03	98.9	0.04	97.9	0.04	92.3
25/05/2020	12:27 12:28	295-01-02-OB-JEA VEL05-27-OB BRA07-21-OB-B	0.05 0.15	91.7 93.6	0.08 0.26	94.9 93.6	0.09 0.31	97.4 104.3	0.32 0.54	101.9 96.1
30/05/2020	12:14 12:15	BRA07-40-OB HRN08-43-OB	0.09 0.09	95.7 95.73	0.18 0.10	97 92.6	0.16 0.11	104.4 104.0	0.21 0.11	94.6 92.7
05/06/2020	12:21	295_01_04_OB_JEA 395_07_16_OB VEL05_32_OB	0.14	89.20	0.13	93.40	0.21	95.20	0.53	96.20
10/06/2020	12:14	LRN04_41_OB 356_06_52_OB ONV_06_50_PS	0.16 0.16	94.2 94.2	0.24 0.14	91.1 93.1	0.45 0.17	93.3 93.3	0.38 0.36	93.8 93.8
13/06/2020	12:18	395_07_15_OB MER06_30_OB	0.05	86.9	0.09	94.4	0.1	96.3	0.19	105.33
18/06/2020	13:24	VEL05_36_OB LRN05_42_PS	0.08	94.1	0.19	99.3	0.2	101.8	0.29	97.7
22/06/2020	12:12	HRN08_44_OB HRN08_42_OB NAG05_26_OB	0.05	93.9	0.09	100.4	0.1	99.1	0.19	97
26/06/2020	15:34	LRN05_40_OB 200_05_35_PS	0.11	92.9	0.22	93.1	0.17	102	0.24	114.1
30/06/2020	12:12	327_06_47_OB HRN08_41_OB	0.06	88.9	0.14	90.9	0.13	92	0.13	104.9
01/07/2020	15:26	MER06_28_OB NAG05_26_OB_B	0.04	85.7	0.07	88.7	0.07	95.4	0.15	91.8
04/07/2020	12:16	LRN05_42_OB TSL07_35_PS	0.18	93.6	0.15	92.8	0.37	94.8	0.58	90
07/07/2020	12:21	VEL05_35_OB	0.06	88.2	0.15	90	0.14	96.7	0.18	93.7
08/07/2020	15:13	MER06_32_OB LRN04_32_COAL	0.05	90.3	0.11	93.8	0.1	96.9	0.21	91.4
11/07/2020	16:34	TSU07_36_OB	0.07	92.8	0.16	89	0.21	90.5	0.24	99.1
14/07/2020	12:21	295_01_06_OB_JEA NAG05_26_OB_C	0.08	112.2	0.11	102.7	0.15	97.7	0.46	101.1
17/07/2020	12:34	JEB03_37_OB	0.37	100.3	0.72	99.3	1.1	106.2	0.86	106.7
20/07/2020	12:31	327_06_48_OB VEL05_33_OB NAG05_35_PS 295_01_02_TOE	0.05 0.03	97.1 97.1	0.13 0.03	94.4 94.4	0.20 0.05	99.2 99.2	0.22 0.08	100.6 100.6
23/07/2020	11:59	ONV06_51_PS	0.05	89.6	0.08	88.7	0.1	90.1	0.06	85.8
24/07/2020	12:40	NAG05_26_COAL JEB05_37_OB	0.12	93.8	0.19	102.4	0.26	101.3	0.41	105
30/07/2020	15:40	ONV06_51_OB	0.04	91.9	0.07	100.7	0.08	101.7	0.07	96.7
03/08/2020	12:15	TSU07_33_OB	0.1	96.3	0.15	101.5	0.18	99.9	0.24	96.7
05/08/2020	13:04	295-01-07-OB-JEA NAG05-26-OB-D NAG05-29-TS	0.06	95.2	0.15	96.4	0.22	97.5	0.9	97.4
07/08/2020	12:06	HRN08-40-OB ONV_06_49_PS JEB06_37_PS	0.1	86	0.14	81.7	0.19	98.6	0.15	98.1
12/08/2020	12:41	JEB06_37_OB	0.12	102.2	0.25	98.3	0.3	101.4	0.29	101.4
14/08/2020	15:33	VEL05-31-OB ONV06-50-OB	0.06	89.4	0.08	90	0.05	96.1	0.13	103.5
20/08/2020	10:22	HERN08-39-OB	1.4	110.8	2.03	115.1	4.07	116.5	3.27	107.6
22/08/2020	12:59	NAG05_36_CA	0.13	94.2	0.4	109	0.35	107.5	0.73	105.7

Date	Time	ID/Location	BM1 mm/s	BM1 dBL	BM2 mm/s	BM2 dBL	BM3 mm/s	BM3 dBL	BM4 mm/s	BM4 dBL
Exceedance Criteria (0% (5%))			10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)	10 (5)	120 (115)
26/08/2020	12:16	MER06-34-OB	0.05	86.7	0.11	92.3	0.11	91.8	0.09	102.9
27/08/2020	12:21	375-07-17-OB 375-05-16-OB	0.05	95	0.11	100.5	0.24	104.1	0.51	104.2
29/08/2020	12:15	HRN09_39_OB JEB04_37_OB ONV09_38_PS	0.17	94.2	0.34	100.1	0.27	103.2	0.39	99.6
31/08/2020	12:19	VEL05-33-OB-B 210-05-33-PS	0.04	91.9	0.08	108.3	0.14	109.9	0.21	101.9
01/09/2020	12:15	ONV06--52-OB	0.07	96.8	0.07	97.8	0.09	97.5	0.09	92.5
04/09/2020	16:00	375-07-16-OB	0.03	82.3	0.04	95.8	0.1	90.8	0.16	96.2
08/09/2020	12:27	275-01-05-OB-JEA	0.15	96.1	0.26	98.3	0.42	105	1.55	103.3
12/09/2020	12:53	TSU06-47-OB	0.03	88.2	0.06	91.7	0.07	96.8	0.08	93.7
14/09/2020	12:31	MER05-37-OB HRN09-40-OB ONV09-39-PS	0.06	97.4	0.08	100.79	0.1	106.04	0.24	97.4
16/09/2020	15:24	TNN07-37-OB	0.04	89.6	0.09	101.2	0.11	94.4	0.14	99.6
18/09/2020	12:25	295-01-08-OB-JEA 268-01-08-PS LRN04-40-OB	0.07	102.1	0.09	91	0.15	102.5	0.33	100.8
21/09/2020	12:44	TSU06-49-OB	0.05	86.2	0.06	111.5	0.07	111.5	0.07	107.5
24/09/2020	12:14	TNN07-33-OB BRY07-36-PS NAG05-29-RAMP	0.11	94.4	0.27	103.9	0.27	94.1	0.43	99.6
26/09/2020	9:18	TST07-19-OB	0.04	93.3	0.05	97.9	0.11	102	0.18	99.5
29/09/2020	15:40	NAG05-33-CA	0.18	100.4	0.44	112.2	0.31	109.4	0.38	90.6
30/09/2020	15:17	275-01-05-OB-B	0.03	96.2	0.03	88.2	0.06	97.7	0.13	98.7
02/10/2020	15:48	TSU06-51-OB TNN06-52-PS	0.07	101.1	0.12	97.9	0.17	102.9	0.11	103.9
03/10/2020	15:38	TNN07-36-OB BRY07-36-PS-B	0.15	84.6	0.32	91.5	0.23	91.3	0.62	93.1
06/10/2020	15:34	295-01-05-OB-JEA 275-01-05-PS HRN08-39-OB-B	0.09	92.9	0.24	96.6	0.36	95.2	1.05	95
12/10/2020	12:12	BRY07-17-OB	0.05	89.9	0.1	96.2	0.17	98.3	0.24	96.6
15/10/2020	12:25	TSU06-52-OB TNN06-52-PS-B	0.07	92.2	0.13	97.6	0.23	97.5	0.45	97.8
19/10/2020	12:09	JEB03-37-OB	0.02	94.6	0.04	92.7	0.06	99.8	0.05	99
23/10/2020	12:09	BRA07-16-OB BRY07-16-PS	0.06	92.8	0.1	92.2	0.25	89.9	0.46	92
28/10/2020	9:24	NAG05-37-OB	0.11	87.3	0.13	91.8	0.19	99.4	0.24	112.4
31/10/2020	12:24	BRA07-38-OB	0.06	96.7	0.13	103.5	0.12	108.9	0.19	107.2
03/11/2020	15:31	ONV08-45-OB TSL08-45-PS NAG05-26-OB-E	0.06	90.6	0.12	92.7	0.1	97.9	0.2	94.4
07/11/2020	15:22	BRY07-33-OB	0.09	100.7	0.16	91.5	0.13	97.9	0.24	94
10/11/2020	15:29	NAG05-37-OB-B	0.09	89	0.16	91.9	0.19	101.8	0.33	97.6
11/11/2020	15:20	HRN08-39-TO Strip 8 Rocks	0.01	87.6	0.02	89.6	0.02	92.6	0.02	84.4
17/11/2020	16:05	210-05-35-OB	0.07	100.5	0.14	105.5	0.14	101.9	0.28	104.6
19/11/2020	15:09	BRY07-19-OB	0.06	97.4	0.09	93.6	0.14	105.7	0.29	100

Date	Time	ID/Location	BM1 mm/s	BM1 dBL	BM2 mm/s	BM2 dBL	BM3 mm/s	BM3 dBL	BM4 mm/s	BM4 dBL
Exceedance Criteria (0% (5%))			**10 (5)**	**120 (115)**	**10 (5)**	**120 (115)**	**10 (5)**	**120 (115)**	**10 (5)**	**120 (115)**
21/11/2020	15:32	JEA01-08-OB 279-01-05-TO MER04-37-OB	0.11	98.9	0.21	92.5	0.37	102.4	0.97	97.6
25/11/2020	12:30	ONV08-44-OB TSM06-52-OB	0.05	97.5	0.08	88.8	0.09	91.9	0.11	91.8
27/11/2020	15:20	HRN09-44-OB	0.05	97.8	0.12	94.4	0.11	100.2	0.12	94.7
30/11/2020	16:52	JEA01-05-OB	0.1	91.1	0.15	91.7	0.29	98.4	0.66	95.9
04/12/2020	15:38	TNN07-40-OB	0.52	93.1	0.17	86.1	0.18	101	0.36	98.1
07/12/2020	12:22	TSM06-51-OB	0.87	86.3	0.03	85.9	0.03	88.8	0.03	88.6
10/12/2020	15:28	275-01-04-OB-JEA HRN08-41-TO	0.12	95.4	0.18	92.8	0.4	95	0.49	95.2
12/12/2020	12:09	BRY07-15-OB	0.05	110.1	0.11	99.9	0.24	103.4	0.36	110.9
16/12/2020	12:26	JEA06-25-OB HRN09-41-PA	0.17	95.3	0.23	99.7	0.31	104.4	0.93	112.7
18/12/2020	12:24	HRN09-43-OB	0.06	87.8	0.07	87.7	0.08	93.3	0.08	94.5
22/12/2020	12:23	NAG06-36-PS	0.11	91.9	0.21	105	0.19	92.5	0.29	90.9
23/12/2020	12:24	NAG05-34-OB NAG05-31-PS NAG05-36-CO	0.1	95.8	0.19	94.8	0.27	107.2	0.93	98.4
29/12/2020	12:17	HRN09-42-OB	0.05	88.8	0.06	99.9	0.07	108.3	0.07	95

APPENDIX B

COAL TRANSPORT RECORDS

Appendix B
Coal Transport Records

The records presented in Appendix B have been included to satisfy the coal transport reporting requirements of Condition 65 (a) and (b) of PA 10_0138. The amount of coal transported from the site on a monthly basis and the date and time of each rail movement generated by the MCCM has been listed in the Table B-1 and Table B-2 below.

Table B-1
Coal Transported Monthly

Month	Coal Transported (MT)
January	0.55
February	0.68
March	0.65
April	0.77
May	0.80
June	0.94
July	1.0
August	0.64
September	0.60
October	0.79
November	0.61
December	0.83
TOTAL	8.86

Table B-2

Daily Train Movements

Date and Time of Loading			
1/01/2020 13:02	14/04/2020 23:21	2/07/2020 1:04	1/10/2020 10:39
1/01/2020 19:29	15/04/2020 2:11	2/07/2020 4:04	1/10/2020 22:48
1/01/2020 23:12	15/04/2020 18:42	2/07/2020 8:48	2/10/2020 7:46
2/01/2020 2:54	15/04/2020 23:54	2/07/2020 12:36	2/10/2020 11:03
2/01/2020 13:56	16/04/2020 4:19	2/07/2020 18:47	2/10/2020 15:06
2/01/2020 18:22	16/04/2020 8:18	2/07/2020 22:24	2/10/2020 18:13
3/01/2020 3:23	16/04/2020 17:32	3/07/2020 4:48	2/10/2020 21:56
3/01/2020 15:19	16/04/2020 21:19	3/07/2020 8:01	3/10/2020 4:29
4/01/2020 0:42	17/04/2020 1:11	3/07/2020 10:24	3/10/2020 9:56
4/01/2020 5:49	17/04/2020 14:47	3/07/2020 13:41	3/10/2020 14:00
4/01/2020 14:49	18/04/2020 0:53	3/07/2020 21:29	3/10/2020 17:32
4/01/2020 21:45	18/04/2020 5:14	4/07/2020 2:15	3/10/2020 20:23
5/01/2020 3:26	18/04/2020 15:36	4/07/2020 7:07	3/10/2020 23:17
5/01/2020 10:35	19/04/2020 4:12	4/07/2020 9:45	4/10/2020 8:27
5/01/2020 17:31	19/04/2020 7:05	4/07/2020 13:17	4/10/2020 14:16
5/01/2020 22:07	19/04/2020 13:26	4/07/2020 16:39	4/10/2020 20:44
6/01/2020 2:12	19/04/2020 21:30	4/07/2020 19:38	5/10/2020 1:05
6/01/2020 12:24	21/04/2020 5:04	4/07/2020 22:25	5/10/2020 3:48
6/01/2020 16:53	21/04/2020 7:43	5/07/2020 0:49	5/10/2020 14:22
7/01/2020 2:14	21/04/2020 18:28	5/07/2020 4:36	5/10/2020 17:03
7/01/2020 12:04	22/04/2020 12:15	5/07/2020 7:25	5/10/2020 20:25
8/01/2020 7:47	22/04/2020 16:15	5/07/2020 13:40	6/10/2020 0:56
8/01/2020 15:29	22/04/2020 19:26	5/07/2020 18:22	6/10/2020 4:30
8/01/2020 22:27	22/04/2020 22:00	5/07/2020 22:13	6/10/2020 12:34
10/01/2020 4:33	23/04/2020 6:03	6/07/2020 1:27	6/10/2020 18:41
11/01/2020 22:17	23/04/2020 11:48	6/07/2020 4:45	6/10/2020 22:14
12/01/2020 5:32	23/04/2020 15:37	6/07/2020 7:50	7/10/2020 1:09
12/01/2020 14:50	23/04/2020 20:58	6/07/2020 10:54	7/10/2020 4:41
13/01/2020 2:34	24/04/2020 2:34	6/07/2020 17:26	7/10/2020 9:33
13/01/2020 6:16	24/04/2020 5:09	6/07/2020 20:41	7/10/2020 15:20
13/01/2020 20:29	24/04/2020 8:13	7/07/2020 2:18	8/10/2020 22:20
14/01/2020 1:27	24/04/2020 13:00	7/07/2020 5:31	9/10/2020 4:32
14/01/2020 4:44	24/04/2020 17:45	7/07/2020 8:23	9/10/2020 11:23
14/01/2020 8:28	24/04/2020 21:24	7/07/2020 19:36	9/10/2020 20:39
14/01/2020 22:33	24/04/2020 23:55	7/07/2020 22:45	10/10/2020 2:46
15/01/2020 11:40	25/04/2020 2:29	8/07/2020 1:47	10/10/2020 8:41
16/01/2020 0:27	25/04/2020 12:52	8/07/2020 4:58	10/10/2020 13:17
16/01/2020 17:55	25/04/2020 20:39	9/07/2020 2:46	10/10/2020 18:14
17/01/2020 4:29	25/04/2020 23:10	9/07/2020 5:44	10/10/2020 20:55

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7/04/2020 11:37	25/06/2020 17:21	18/09/2020 11:17	21/12/2020 11:39
7/04/2020 19:25	25/06/2020 20:40	18/09/2020 23:03	21/12/2020 18:28
7/04/2020 22:47	25/06/2020 23:18	19/09/2020 7:44	22/12/2020 2:08
8/04/2020 2:19	26/06/2020 4:14	19/09/2020 10:49	22/12/2020 20:15
8/04/2020 5:26	26/06/2020 6:54	19/09/2020 13:19	23/12/2020 17:15
8/04/2020 11:17	26/06/2020 15:34	20/09/2020 5:36	23/12/2020 21:27
8/04/2020 15:35	26/06/2020 18:28	20/09/2020 10:05	24/12/2020 13:16
8/04/2020 23:44	26/06/2020 21:41	20/09/2020 14:53	24/12/2020 22:59
9/04/2020 4:43	27/06/2020 1:20	21/09/2020 16:21	25/12/2020 21:10
9/04/2020 8:27	27/06/2020 6:02	22/09/2020 0:44	26/12/2020 0:00
9/04/2020 13:58	27/06/2020 8:32	25/09/2020 10:11	26/12/2020 6:37
9/04/2020 16:59	27/06/2020 15:51	25/09/2020 15:17	26/12/2020 12:27
9/04/2020 23:13	27/06/2020 20:23	26/09/2020 6:41	26/12/2020 17:24
10/04/2020 3:50	28/06/2020 0:17	26/09/2020 9:28	26/12/2020 20:59
10/04/2020 6:39	28/06/2020 2:58	26/09/2020 13:20	27/12/2020 0:01
10/04/2020 11:43	28/06/2020 7:06	26/09/2020 21:49	27/12/2020 5:05
10/04/2020 21:59	28/06/2020 10:05	27/09/2020 1:39	27/12/2020 12:33
11/04/2020 2:52	28/06/2020 13:26	27/09/2020 6:26	27/12/2020 15:03
11/04/2020 22:49	28/06/2020 19:18	27/09/2020 9:54	28/12/2020 2:49
12/04/2020 7:21	28/06/2020 22:36	27/09/2020 15:07	28/12/2020 8:37
12/04/2020 14:50	29/06/2020 3:50	28/09/2020 1:22	28/12/2020 11:19
12/04/2020 19:56	29/06/2020 6:24	28/09/2020 1:22	28/12/2020 14:31
12/04/2020 23:46	29/06/2020 10:20	28/09/2020 9:11	28/12/2020 17:55
13/04/2020 2:52	29/06/2020 14:42	28/09/2020 12:55	28/12/2020 22:56
13/04/2020 6:03	29/06/2020 17:26	28/09/2020 20:04	29/12/2020 5:13
13/04/2020 10:03	30/06/2020 13:54	29/09/2020 0:10	29/12/2020 13:07
13/04/2020 15:29	30/06/2020 20:03	29/09/2020 18:56	29/12/2020 19:43
13/04/2020 22:30	30/06/2020 23:34	29/09/2020 23:06	29/12/2020 22:44
14/04/2020 1:51	1/07/2020 2:37	30/09/2020 9:29	30/12/2020 3:15
14/04/2020 8:41	1/07/2020 10:31	30/09/2020 16:24	30/12/2020 14:46
14/04/2020 13:22	1/07/2020 18:07	30/09/2020 20:07	31/12/2020 7:32
14/04/2020 18:29	1/07/2020 22:04	30/09/2020 22:36	31/12/2020 12:37

APPENDIX C

Annual Sound Power Testing

Appendix C

Annual Sound Power Testing

Table C-1

Sound Power Level Testing Results

Equipment Model	Plant ID	EA model Lw	EA model LwA	2020 Lw	2020 LwA
TRACKED BULLDOZERS					
CAT D10T	301	129	127	124	121
CAT D10T	302	129	127	123	121
CAT D10T2	303	129	127	125	123
CAT D11T	320	129	127	123	121
CAT D11T	321	129	127	122	119
CAT D11T	322	129	127	125	123
CAT D11T	323	129	127	125	122
CAT D11T	324	129	127	124	123
Komatsu 475	350	129	127	121	119
Komatsu 475	351	129	127	121	117
Komatsu 475	352	129	127	122	118
CAT D11T	858	129	127	127	125
CAT D11T	859	129	127	124	122
CAT D11T	860	129	127	124	123
CAT D11T	866	129	127	125	122
CAT D10T	870	129	127	126	124
CAT D10T	872	129	127	125	123
CAT D10T	876	129	127	124	122
CAT D9T	WTC18	129	127	121	118
CAT D6R	WTC20	129	127	118	114
CAT D9T	WTC26	129	127	122	119
CAT D10T	WTC29	129	127	124	120
WHEELED BULLDOZERS					
CAT 834G	873	122	115	114	112
CAT 854G	877	122	115	115	112
DRILLS					
CAT MD6290	451	122	118	119	117
CAT MD6290	452	122	118	120	117
CAT MD6290	453	122	118	119	116
CAT MD6290	454	122	118	118	116

Equipment Model	Plant ID	EA model Lw	EA model LwA	2020 Lw	2020 LwA
CAT MD6290	455	122	118	120	117
CAT MD6290	456	122	118	120	116
Reedrill SKF	151	122	118	121	117
Reedrill SKF	153	122	118	122	116
EXCAVATORS					
Hitachi EX3600	221	131	119	120	112
Hitachi EX3600	222	131	119	122	113
Hitachi EX3600	223	131	119	119	113
Hitachi EX3600	224	131	119	119	111
Hitachi EX8000	261	131	119	122	113
Hitachi EX8000	262	131	119	123	114
Hitachi EX8000	263	131	119	124	115
Hitachi EX8000	264	131	119	123	114
Hitachi EX8000	265	131	119	123	115
TEREX RH170	530	131	119	119	115
Hitachi EX3600	810	131	119	119	112
ZX360	WTC22	131	119	114	107
ZX290	WTC31	131	119	112	108
374F	WTC34	131	119	113	106
GRADERS					
CAT 16M	401	118	112	115	111
CAT 16M	402	118	112	116	110
CAT 24M	415	118	112	114	110
CAT 24M	416	118	112	115	109
CAT 16M	862	118	112	111	108
CAT 16M	864	118	112	110	107
CAT 14H	WTC15	118	112	109	107
CAT 14H	WTC21	118	112	108	107
REAR DUMP TRUCKS					
Hitachi EH5000	001	124	117	122	116
Hitachi EH5000	002	124	117	121	115
Hitachi EH5000	003	124	117	121	117
Hitachi EH5000	004	124	117	123	115
Hitachi EH5000	005	124	117	123	116

Equipment Model	Plant ID	EA model Lw	EA model LwA	2020 Lw	2020 LwA
Hitachi EH5000	006	124	117	122	116
Hitachi EH5000	007	124	117	123	115
Hitachi EH5000	008	124	117	121	115
Hitachi EH5000	009	124	117	124	116
Hitachi EH5000	010	124	117	122	115
Hitachi EH5000	011	124	117	121	116
Hitachi EH5000	012	124	117	123	116
Hitachi EH5000	013	124	117	122	117
Hitachi EH5000	014	124	117	121	116
Hitachi EH5000	015	124	117	122	116
Hitachi EH5000	016	124	117	121	115
Hitachi EH5000	017	124	117	123	114
Hitachi EH5000	018	124	117	122	116
Hitachi EH5000	019	124	117	121	115
Hitachi EH5000	020	124	117	122	116
Hitachi EH5000	021	124	117	121	115
Hitachi EH5000	022	124	117	123	116
Hitachi EH5000	023	124	117	121	116
Hitachi EH5000	024	124	117	121	115
Hitachi EH5000	025	124	117	122	116
Hitachi EH5000	026	124	117	121	117
Hitachi EH5000	027	124	117	123	117
Hitachi EH5000	028	124	117	122	116
Hitachi EH5000	029	124	117	123	115
Hitachi EH5000	030	124	117	124	116
Hitachi EH5000	031	124	117	122	115
Hitachi EH5000	032	124	117	124	116
Hitachi EH5000	033	124	117	122	115
Hitachi EH5000	034	124	117	124	116
Hitachi EH5000	035	124	117	122	115
Hitachi EH5000	036	124	117	121	114
Hitachi EH5000	037	124	117	121	115
Hitachi EH5000	038	124	117	123	117
Hitachi EH5000	039	124	117	122	115
Hitachi EH5000	040	124	117	122	116

Equipment Model	Plant ID	EA model Lw	EA model LwA	2020 Lw	2020 LwA
Hitachi EH5000	041	124	117	124	117
Hitachi EH5000	042	124	117	122	116
Hitachi EH5000	043	124	117	121	115
Hitachi EH5000	044	124	117	122	115
Hitachi EH5000	045	124	117	123	116
Hitachi EH3500	051	124	117	123	116
Hitachi EH3500	052	124	117	122	116
Hitachi EH3500	053	124	117	121	115
Hitachi EH3500	054	124	117	120	115
Hitachi EH3500	055	124	117	122	116
CAT 789 DXQ	101	124	117	122	116
CAT 789 DXQ	102	124	117	123	116
CAT 789 DXQ	103	124	117	122	117
CAT 789 DXQ	104	124	117	122	115
CAT 789 CXQ	840	124	117	123	116
CAT 789 CXQ	841	124	117	124	117
CAT 789 CXQ	842	124	117	122	116
CAT 789 CXQ	843	124	117	124	117
CAT 789 CXQ	874	124	117	123	116
CAT 789 CXQ	875	124	117	124	116
CAT 789 CXQ	882	124	117	122	115
CAT 789 CXQ	883	124	117	123	116
CAT 789 CXQ	884	124	117	122	115
CAT 789 CXQ	885	124	117	123	115
CAT 789 CXQ	887	124	117	122	114
CAT 789 CXQ	888	124	117	120	114
CAT 789 CXQ	889	124	117	120	115
CAT 789 CXQ	890	124	117	121	116
CAT 789 CXQ	891	124	117	121	115
WATER CARTS					
CAT 777G	501	122	115	120	115
CAT 777G	502	122	115	118	113
CAT 777G	503	122	115	118	114
CAT 777G	803	122	115	118	113
CAT 777G	806	122	115	117	112

Equipment Model	Plant ID	EA model Lw	EA model LwA	2020 Lw	2020 LwA
CAT 777G	807	122	115	118	113
CAT 777G	821	122	115	119	114
WHEEL LOADERS					
Komatsu WA1200	430	122	115	118	113
CAT 992K	800	122	115	116	111
CAT 992K	812	122	115	116	112
STATIONARY PLANT					
Coal Preparation Plant		133	117	131	117
Conveyors (200m section)		113	108	109	104
Conveyors (500m section)		117	112	110	106
Primary ROM sizer		117	109	114	106
Secondary ROM sizer		121	112	118	112
Product Stacker		111	104	108	99
Product Reclaimer		122	115	112	103
Raw Coal Transfer Station		117	103	116	105
CPP product Transfer Station		117	103	116	104
Train Loadout		114	103	121	116

APPENDIX D

Surface Water

Appendix D

Surface Water

The surface water monitoring results for the reporting period are detailed in the table below.

Table D-1

Location	Date	pH Value	Electrical Conductivity @ 25°C	Total Dissolved Solids (TDS)	Suspended Solids (SS)	Turbidity	Total Alkalinity as CaCO3	Calcium (filt.)	Magnesium (filt.)	Sodium (filt.)	Potassium (filt.)	Aluminium (total)	Cadmium (total)	Chromium (total)	Copper (total)	Lead (total)	Manganese (total)	Nickel (total)	Selenium (total)	Silver (total)	Zinc (total)	Boron (total)	Iron (Total)	Arsenious Acis, As (III)	Arsenic Acid As (V)	Mercury	Nitrite + Nitrate as N	Total Nitrogen	Total Phosphorus as P	Total Anions	Total Cations
		pH Unit	µS/cm	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L
SW1	13/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	17/02/2020	7.33	359	272	<5	3.2	102	29	10	22	4	<0.01	<0.0001	<0.001	<0.001	<0.001	0.076	0.001	<0.01	<0.001	<0.005	<0.05	0.08	<0.5	<0.5	<0.0001	3.85	4.6	0.23	3.44	3.33
	18/03/2020	7.22	572	381	6	5	165	50	18	43	3	0.21	<0.0001	<0.001	<0.001	<0.001	0.392	0.001	<0.01	<0.001	<0.005	<0.05	0.82	1.0	0.8	<0.0001	0.49	0.9	0.16	5.83	5.92
	16/04/2020	7.23	501	349	9	9.1	166	46	17	40	2	0.38	<0.0001	<0.001	<0.001	<0.001	0.31	<0.001	<0.01	<0.001	<0.005	<0.05	0.9	1.0	1.2	<0.0001	0.42	0.7	0.16	5.64	5.48
	15/05/2020	7.16	540	324	12	9.1	165	44	18	39	2	0.16	<0.0001	<0.001	<0.001	<0.001	0.298	<0.001	<0.01	<0.001	<0.005	<0.05	0.81	1.1	<0.5	<0.0001	0.43	0.6	0.09	5.42	0.19
	15/06/2020	7.28	512	296	20	13.2	150	38	15	36	2	0.47	<0.0001	<0.001	<0.001	<0.001	0.308	<0.001	<0.01	<0.001	<0.005	<0.05	0.78	<0.5	<0.5	<0.0001	0.42	0.6	0.13	5.13	4.75
	14/07/2020	7.32	474	316	12	11.6	157	36	14	37	2	0.12	<0.0001	0.005	<0.001	<0.001	0.192	0.002	<0.01	<0.001	0.017	<0.05	0.66	0.9	<0.5	<0.0001	0.41	0.7	0.11	4.61	2.37

	14/08/2020	7.22	475	284	16	9.2	157	39	14	38	2	0.49	<0.0001	<0.001	<0.001	<0.001	0.216	<0.001	<0.01	<0.001	<0.005	<0.05	1	1.1	0.6	<0.0001	0.34	0.6	0.14	4.99	4.8
	14/09/2020	7.45	450	274	24	8.3	156	41	15	37	2	0.43	<0.0001	<0.001	0.006	<0.001	0.219	<0.001	<0.01	<0.001	<0.005	<0.05	0.89	2	<0.5	<0.0001	0.13	0.3	0.11	4.77	4.94
	13/10/2020	7.3	420	246	34	18.6	143	38	15	36	2	0.68	<0.0001	<0.001	<0.001	<0.001	0.117	<0.001	<0.01	<0.001	<0.005	<0.05	1.08	<0.5	0.8	<0.0001	<0.01	0.2	0.08	4.44	4.75
	11/11/2020	7.25	510	312	32	17.5	163	39	15	33	2	0.78	<0.0001	<0.001	0.001	<0.001	0.178	<0.001	<0.01	<0.001	<0.005	<0.05	1.28	1.3	<0.5	<0.0001	0.04	0.2	0.12	4.95	4.67
	11/12/2020	7.26	463	292	29	20.9	176	50	14	34	2	1	<0.0001	<0.001	<0.001	<0.001	0.229	<0.001	<0.01	<0.001	<0.005	<0.05	0.9	1.1	<0.5	<0.0001	0.03	0.2	0.13	5.12	5.18
SW2	13/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	17/02/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	18/03/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	16/04/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	15/05/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	15/06/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/07/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/08/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/09/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	13/10/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/11/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/12/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW4	1803/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	15/06/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/09/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/12/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW5	1703/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	15/06/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/09/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

	11/12/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW6	13/01/2020	Dry	Dry	Dry	Dry	Dry	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	17/02/2020	7.65	208	309	930	1800																								
	17/03/2020	7.93	315	286	103	218																								
	16/04/2020	7.85	399	264	106	174																								
	15/05/2020	8.34	666	386	29	22.6																								
	15/06/2020	Dry	Dry	Dry	Dry	Dry																								
	14/07/2020	Dry	Dry	Dry	Dry	Dry																								
	14/08/2020	7.97	386	258	101	108																								
	14/09/2020	8.48	475	270	50	20.2																								
	13/10/2020	7.97	597	296	62	67.4																								
	11/11/2020	8.47	536	330	86	71.2																								
	11/12/2020	Dry	Dry	Dry	Dry	Dry																								
SW7	13/01/2020	Dry	Dry	Dry	Dry	Dry	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
	17/02/2020	7.58	208	282	660	1810																								
	18/03/2020	7.85	314	265	99	203																								
	16/04/2020	7.78	347	262	252	294																								
	15/05/2020	8.01	540	290	38	54.5																								
	15/06/2020	8.09	575	326	44	45.9																								
	14/07/2020	8.18	537	351	48	59.9																								
	14/08/2020	7.96	374	246	106	115																								
	14/09/2020	8.28	472	278	48	20.1																								
	13/10/2020	8.15	521	263	20	26.2																								
	11/11/2020	8.38	533	324	73	71.2																								

	11/12/2020	8.33	534	344	48	57.2																							
SW8	17/03/2020	7.82	280	262	59	148	102	22	9	16	5	4.12	<0.0001	0.010	0.009	0.002	0.124	0.01	<0.01	<0.001	0.017	0.07	3.74	<0.5	0.9	<0.0001	0.67	1.9	0.30	2.81	2.66
	15/06/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/092020	8.41	458	268	19	5.9	146	33	17	32	3	1.08	<0.0001	0.001	0.002	<0.001	0.042	<0.001	<0.01	<0.001	<0.005	<0.05	0.92	0.5	0.6	<0.0001	0.02	0.5	0.04	4.6	4.51
	11/12/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW9	18/03/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	15/06/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	14/092020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/12/2020	7.95	560	507	113	235	129	56	14	48	12	5.45	<0.0001	0.003	0.009	0.003	0.084	0.009	<0.01	<0.001	0.014	0.06	3.91	0.9	1	<0.0001	<0.01	1.5	0.23	5.89	6.34

MCC Surrounding Surface Water Monitoring Results

Sampling was unable to be taken at all monitoring locations as Back Creek and upper Maules Creek are ephemeral.

Table D-2
Sediment Dam Triggers

Parameter	100th percentile
Oil and grease (mg/L)	10
pH	6.5-8.5
Total suspended solids (mg/L)	50

Table D-3
Off-site Discharge Monitoring Laboratory Results

Location	Date	pH	Electrical Conductivity @ 25°C	Total Dissolved Solids @180°C	Suspended Solids	Turbidity	Total Alkalinity as CaCO3	Calcium	Magnesium	Sodium	Potassium	Aluminium (total)	Cadmium (total)	Chromium (total)	Copper (total)	Lead (total)	Manganese (total)	Nickel (total)	Selenium (total)	Silver (total)	Zinc (total)	Boron (total)	Iron (total)	Arsenious Acid, As (III)	Arsenic Acid, As (V)	Mercury	Nitrite + Nitrate as N	Total Nitrogen as N	Total Phosphorus as P	Total Anions	Total Cations	Oil and Grease
		pH Unit	µS/cm	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L
SW1	17/01/2020	7.26	260	347	202	537	106	15	4	36	6	14.9	0.0001	0.012	0.010	0.009	0.467	0.012	<0.01	<0.001	0.041	0.09	12.4	<0.5	5.7	<0.0001	0.37	2.5	0.99	2.75	2.8	0
	10/02/2020	7.80	375	346	648	983	102	26	8	38	4	27.7	<0.0001	0.019	0.011	0.014	0.652	0.014	<0.01	<0.001	0.062	<0.05	19.4	<0.5	3.5	<0.0001	1.56	3.4	0.54	3.42	3.71	0
SW2	17/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	10/02/2020	7.51	137	258	462	961	55	9	3	10	9	26.0	<0.0001	0.016	0.013	0.014	0.574	0.015	<0.01	<0.001	0.062	<0.05	20.0	<0.5	1.7	<0.0001	0.30	2.6	0.73	1.16	1.36	0
SW3	17/01/2020	7.08	169	549	2380	5590	64					54.7	<0.0001	0.036	0.030	0.035	1.150	0.049	<0.01	<0.001	0.097	0.07	37.00	1.1	<0.5	0.0001	0.93	5.1	1.50	1.49	1.88	0
	10/02/2020	8.13	205	386	898	1630	89	15	3	20	4	47.7	<0.0001	0.028	0.018	0.016	0.732	0.026	<0.01	<0.001	0.081	0.06	31.7	<0.5	1.5	<0.0001	0.46	3.3	0.76	2.00	1.97	0
SW4	17/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	10/02/2020	7.87	163	344	1070	2120	72	16	3	9	5	62.2	<0.0001	0.030	0.014	0.024	1.07	0.025	<0.01	<0.001	0.119	<0.05	36.0	<0.5	1.2	<0.0001	1.18	3.8	0.61	1.44	1.56	5
SW5	17/01/2020	7.99	454	286	77	67.7	157	22	20	36	5	2.56	<0.0001	0.004	0.003	<0.001	0.110	0.005	<0.01	<0.001	<0.005	<0.05	2.60	<0.5	3.2	<0.0001	0.19	1.7	0.31	4.17	4.44	<5
	10/02/2020	7.38	168	454	2000	4450	60	9	5	12	4	105	0.0001	0.168	0.079	0.023	1.68	0.176	<0.01	<0.001	0.179	<0.05	104	<0.5	0.5	<0.0001	1.28	7.7	3.35	1.48	1.48	<5
SW8	17/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	10/02/2020	7.20	105	264	910	1960	35	5	3	8	4	47.0	<0.0001	0.053	0.033	0.016	0.824	0.048	<0.01	<0.001	0.080	<0.05	40.8	<0.5	0.6	<0.0001	0.67	3.2	1.22	0.92	0.95	7
SW9	17/01/2020	5.91	155	284	682	1300	74	15	4	6	9	20.6	<0.0001	0.014	0.009	0.012	0.390	0.017	<0.01	<0.001	0.032	<0.05	12.00	<0.5	0.7	<0.0001	0.80	3.2	0.63	1.59	1.57	<5
	10/02/2020	7.70	259	297	74	221	74	22	5	12	9	12.3	<0.0001	0.008	0.004	0.006	0.192	0.007	<0.01	<0.001	0.027	<0.05	7.37	<0.5	0.6	<0.0001	5.14	6.0	0.23	2.19	2.26	6
SW10	17/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	10/02/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW11	17/01/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	10/02/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

Table D-4

On-site Surface Water Monitoring

Site	Parameter	Units	Frequency	Samples	Date	Min	Mean	Max/Only Value
Mine Void	TSS	mg/L	Every 2 Months	1	18/02/2020	-	-	<5
	Conductivity	µs/cm				-	-	1320
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	7.90
Mine Void	TSS	mg/L	Every 2 Months	1	15/04/2020	-	-	8
	Conductivity	µs/cm				-	-	1110
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	8.15
Mine Void	TSS	mg/L	Every 2 Months	1	12/06/2020	-	-	<5
	Conductivity	µs/cm				-	-	1110
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	8.34
Mine Void	TSS	mg/L	Every 2 Months	1	13/08/2020	-	-	<5
	Conductivity	µs/cm				-	-	1050
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	8.46
Mine Void	TSS	mg/L	Every 2 Months	1	12/10/2020	-	-	44
	Conductivity	µs/cm				-	-	1220
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	8.44
Mine Void	TSS	mg/L	Every 2 Months	1	16/12/2020	-	-	21
	Conductivity	µs/cm				-	-	1000
	Oil & Grease	mg/L				-	-	<5
	pH	pH				-	-	7.32

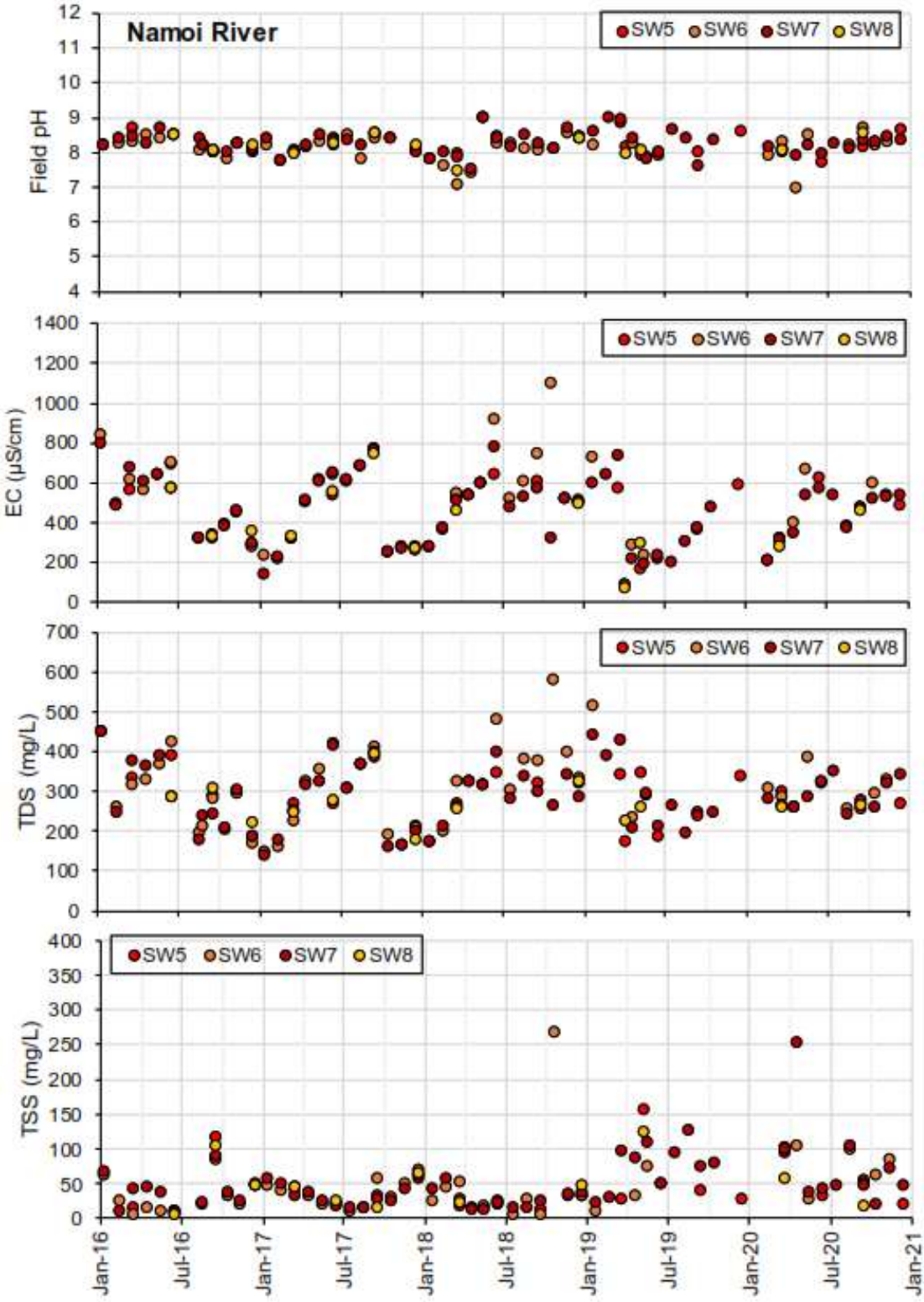


Figure D-1 – Namoi River surface water quality trends (5 year summary – 2016 to 2020)

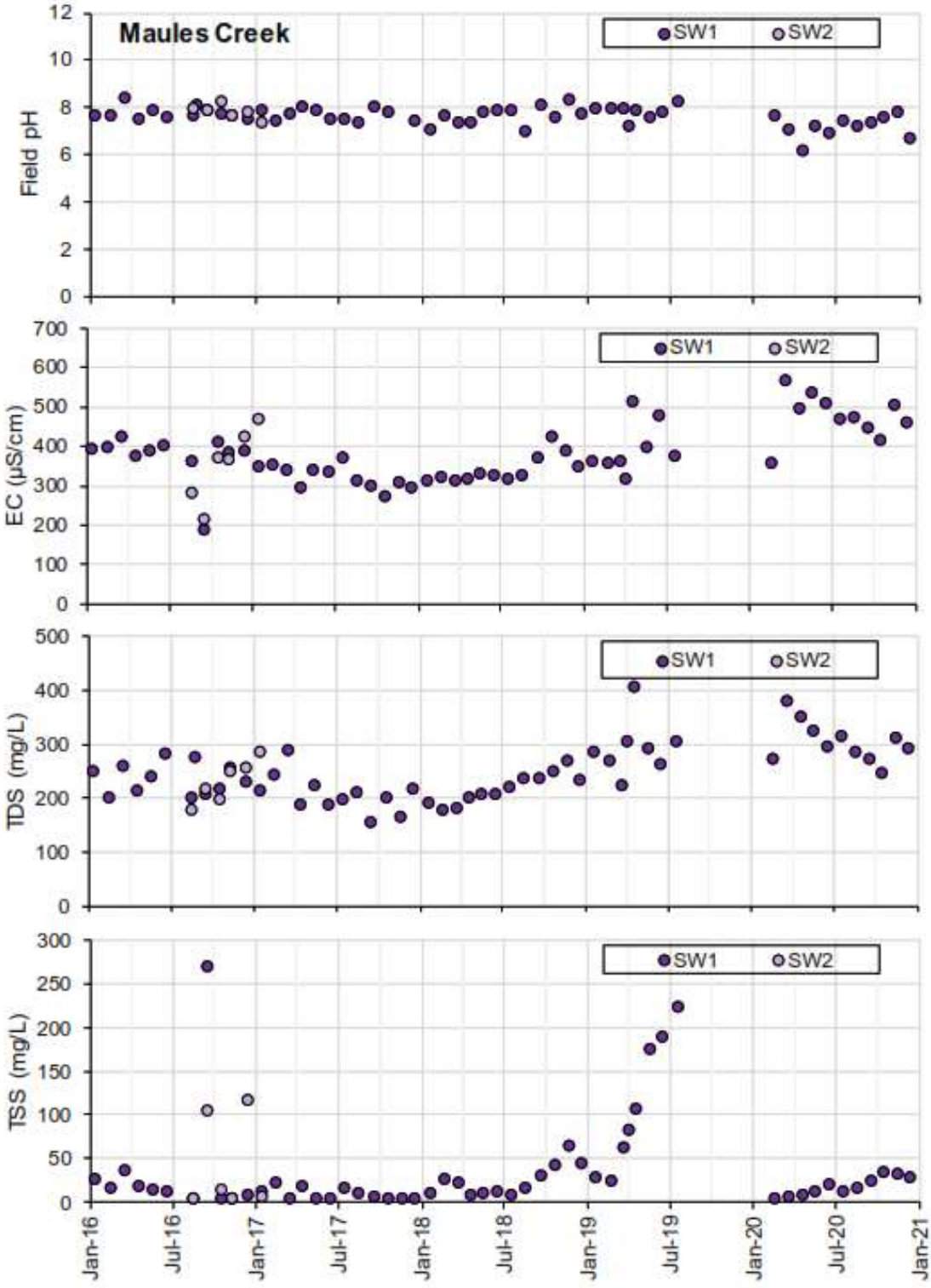


Figure D-2 – Maules Creek surface water quality trends (5 year summary – 2016 to 2020)

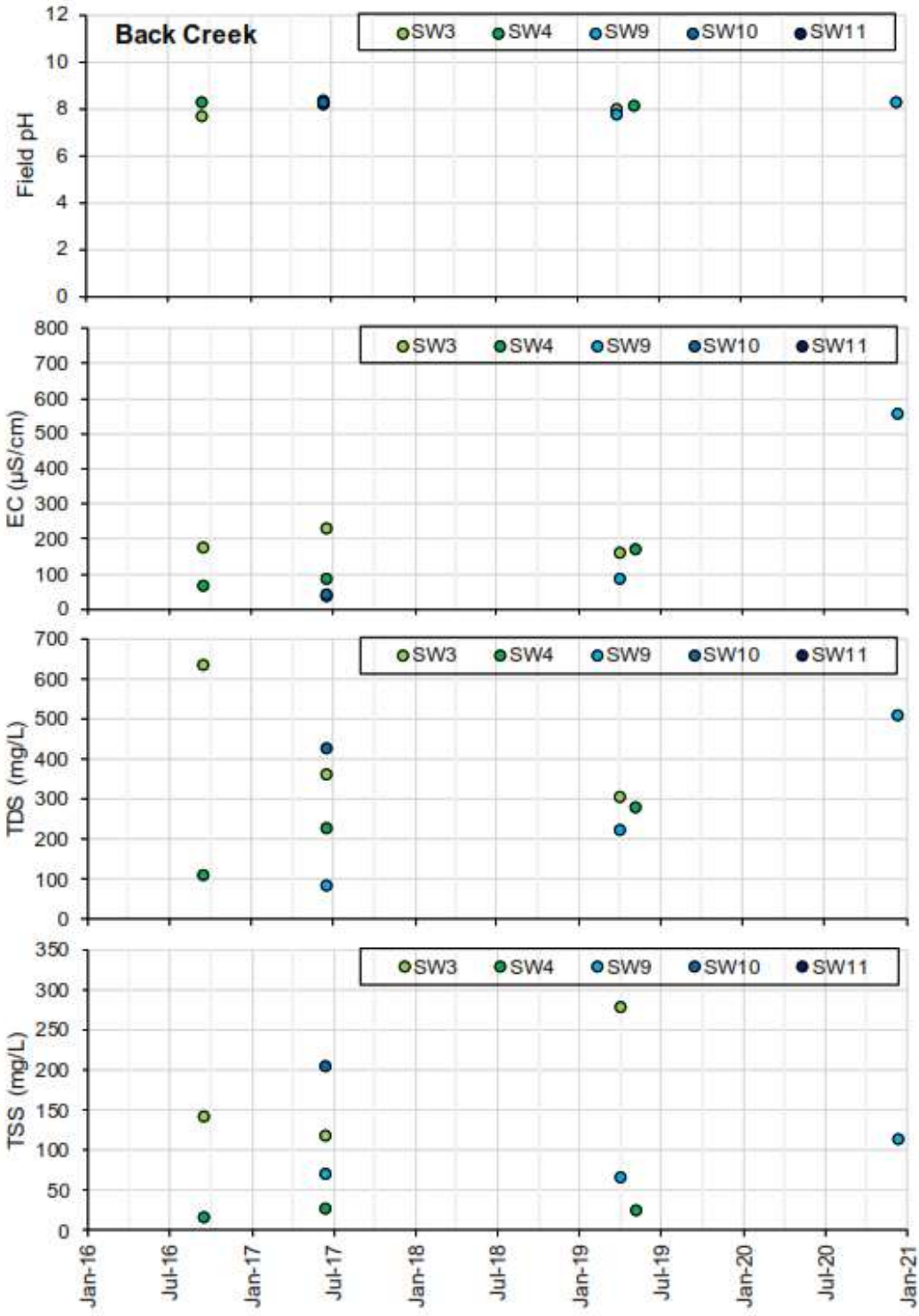


Figure D-3 – Back Creek surface water quality trends (5 year summary – 2016 to 2020)

APPENDIX E

Groundwater

Appendix E
Groundwater

Table E-1
Active monitoring bore details

Bore ID	Approx. EIS proposed site	Type	Network	Easting (GDA94Z56)	Northing (GDA94Z56)	GL (mAHD)	Bore depth (m)	Screen/sensor depth (mbgl)	Target geology
BCM01	BCMB01	SP (dry)	Maules Creek	223841	6618371	273.39	10	6.75 - 9.75	Alluvium
BCM03	BCMB03	SP (dry)	Maules Creek	230085	6617546	305.02	10	6.75 - 9.75	Alluvium
MAC1280	-	SP	Maules Creek	226525	6616503	322.5	146	56 – 59	Interburden between Braymont seams
RB03_VW1	-	VWP	Maules Creek	227947	6613635	407.89	-	164	Braymont seam
RB03_VW2	-	VWP	Maules Creek	227947	6613635	407.89	-	242	Merriown seam
RB03_VW3	-	VWP	Maules Creek	227947	6613635	407.89	-	289	Nagero seam
RB03_VW4	-	VWP	Maules Creek	227947	6613635	407.89	-	317	Templemore seam
RB04_VW1	-	VWP	Maules Creek	228213	6614910	437.53	-	209	Braymont seam
RB04_VW2	-	VWP	Maules Creek	228213	6614910	437.53	-	272.5	Merriown seam
RB04_VW3	-	VWP	Maules Creek	228213	6614910	437.53	-	309	Nagero seam
RB04_VW4	-	VWP	Maules Creek	228213	6614910	437.53	-	339	Lower Northam seam
RB05A	-	SP + logger	Maules Creek	228065	6616810	328.1	246.5	239 - 245	Merriown seam
RB05_VW1	-	VWP	Maules Creek	228071	6616813	328.4	-	107	Braymont seam
RB05_VW2	-	VWP	Maules Creek	228071	6616813	328.4	-	213	Jeralong seam
RB05_VW3	-	VWP	Maules Creek	228071	6616813	328.4	-	280	Nagero seam
RB05_VW4	-	VWP	Maules Creek	228071	6616813	328.4	-	390	Templemore seam
REG1_VW1	L1VWP2	VWP	Regional	226946	6622396	286.17	-	118.7	Jeralong seam

Bore ID	Approx. EIS proposed site	Type	Network	Easting (GDA94Z56)	Northing (GDA94Z56)	GL (mAHD)	Bore depth (m)	Screen/sensor depth (mbgl)	Target geology
REG1_VW2	L1VWP2	VWP	Regional	226946	6622396	286.17	-	134.5	Merriown seam
REG1_VW3	L1VWP2	VWP	Regional	226946	6622396	286.17	-	193.5	Nagero seam
REG1_VW4	L1VWP2	VWP	Regional	226946	6622396	286.17	-	281.5	Therribri seam
REG2_VW1	-	VWP	Regional	232722	6620459	317.01	-	60	Fault zone
REG2_VW2	-	VWP	Regional	232722	6620459	317.01	-	120	Fault zone
REG2_VW3	-	VWP	Regional	232722	6620459	317.01	-	200	Fault zone
REG2_VW4	-	VWP	Regional	232722	6620459	317.01	-	260	Fault zone
REG3	L2VWP2	SP + logger	Regional	217164	6619558	241.6	57	50.50 - 56.50	Boggabri Volcanics
REG4	L3MB1	SP + logger	Regional	219323	6612763	259.95	72.5	65.5 - 71.5	Boggabri Volcanics
REG5	-	SP + logger	Regional	220649	6609521	252.17	78.7	72.2 - 78.2	Boggabri Volcanics
REG5A	-	SP (dry)	Regional	220646	6609514	252.03	22	18 – 21	Alluvium
REG6	L4VWP1	SP + logger	Regional	223100	6606534	250.65	96	88.0 – 94.0	Boggabri Volcanics
REG7_VW1	-	VWP	Regional	233543	6605348	291.62	-	67.5	Braymont seam
REG7_VW2	-	VWP	Regional	233543	6605348	291.62	-	148.2	Merriown seam
REG7_VW3	-	VWP	Regional	233543	6605348	291.62	-	242.5	Nagero seam
REG7A	-	SP + logger	Regional	233545	6605359	291.71	36	24 - 30	Alluvium
REG8_VW1	L5VWP1	VWP	Regional	230030	6615113	341.6	-	91.5	Braymont seam
REG8_VW2	L5VWP1	VWP	Regional	230030	6615113	341.6	-	221	Merriown seam
REG8_VW3	L5VWP1	VWP	Regional	230030	6615113	341.6	-	274	Nagero seam
REG9_VW1	-	VWP	Regional	234233	6610591	346.81	-	115.8	Braymont seam
REG9_VW2	-	VWP	Regional	234233	6610591	346.81	-	175.2	Merriown seam
REG9_VW3	-	VWP	Regional	234233	6610591	346.81	-	268	Nagero seam
REG10_VW1	L1VWP1	VWP	Regional	226723	6618261	287.12	-	55	Braymont seam

Bore ID	Approx. EIS proposed site	Type	Network	Easting (GDA94Z56)	Northing (GDA94Z56)	GL (mAHD)	Bore depth (m)	Screen/sensor depth (mbgl)	Target geology
REG10_VW2	L1VWP1	VWP	Regional	226723	6618261	287.12	-	144.2	Merriown seam
REG10_VW3	L1VWP1	VWP	Regional	226723	6618261	287.12	-	178	Nagero seam
REG10_VW4	L1VWP1	VWP	Regional	226723	6618261	287.12	-	185.5	Upper Northam seam
REG10A	BCMB02	SP (dry)	Regional	226717	6618260	287.12	10	6.75 - 9.75	Alluvium
REG12	L2MB1	SP + logger	Regional	222632	6617358	285.61	48.3	38.4 - 44.4	Boggabri Volcanics
REG13	-	SP + logger	Regional	219713	6611129	277.08	133	128 - 132	Boggabri Volcanics
REG14	-	SP + logger	Regional	225547	6602649	250.18	102	90 - 96	Basement
WHAN (GW060214)	-	Bore + logger	Private	221134	6622897	264*	10	TBC	TBC
School (GW027653)	-	Bore	Private	224673	6623048	282*	8.4	TBC	Gravel
WOL1 (GW062778)	-	Bore + logger	Private	226799	6622149	290*	7.2	TBC	TBC
WOL2	-	Bore	Private	226119	6618673	285*	TBC	TBC	TBC
MOR1	-	Bore + logger	Private	220649	6619125	260*	TBC	TBC	TBC
MOR2	-	Bore + logger	Private	219871	6618803	2560*	TBC	TBC	TBC
TESTON (GW003489)	-	Bore	Private	222568	6619102	270*	45.4	TBC	Hard rock
TRALEE (GW003478)	-	Bore	Private	224102	6618538	278*	33.8	TBC	Basalt
MORSE (GW001869)	-	Bore	Private	228203	6617691	302*	63.1	TBC	Sandstone
BRE2 (GW000583)	-	Bore	Private	234377	6616639	354*	96.3	TBC	Hard rock
BAS1	-	Bore	Private	217107	6612427	239*	TBC	TBC	TBC
BAS2	-	Bore	Private	217548	6612037	238*	TBC	TBC	TBC

SP = standpipe bore, VWP = vibrating wire piezometer, logger = datalogger installed, dry = bore currently dry so no datalogger installed.
Details for private bores have been estimated based on the registered bore closest to the monitored location. Not all construction details are available for each site, and several bores are some distance from the closest registered bore so all construction details remain uncertain. * = elevation of private bore interpolated from groundwater model DEM, TBC = To be confirmed.

Regional Groundwater Bores

Table E-2

Groundwater Levels (metres below bore datum)

Year-Month	RB05A	Reg3	Reg4	Reg5	Reg5A	Reg6	Reg7A	Reg10Aa	Reg12	Reg13	Reg14	BCM01	BCM03
2020-01	70.30	16.54	20.60	17.88	*Dry*	24.98	9.53	*Dry*	26.02	22.70	21.72	*Dry*	*Dry*
2020-02	70.66	16.43	20.53	*no access*	*Dry*	22.90	8.77	*Dry*	25.97	22.68	21.25	*Dry*	*Dry*
2020-03	71.39	15.71	20.63	*no access*	*Dry*	22.69	8.37	*Dry*	26.06	22.74	20.85	*Dry*	*Dry*
2020-04	71.12	15.17	20.67	*no access*	*Dry*	22.43	7.83	*Dry*	26.03	22.76	20.64	*Dry*	*Dry*
2020-05	71.41	14.73	20.68	17.92	*Dry*	22.15	7.05	*Dry*	26.04	22.78	20.54	*Dry*	*Dry*
2020-06	71.86	14.63	20.66	17.96	*Dry*	22.04	7.03	*Dry*	26.00	22.80	20.50	*Dry*	*Dry*
2020-07	72.41	14.52	20.71	17.99	*Dry*	21.93	7.05	*Dry*	26.02	22.81	20.45	*Dry*	*Dry*
2020-08	72.28	14.44	20.67	17.90	*Dry*	21.79	7.04	*Dry*	25.92	22.73	20.44	*Dry*	*Dry*
2020-09	73.13	14.46	20.73	18.18	*Dry*	21.75	7.11	*Dry*	26.00	22.78	20.41	*Dry*	*Dry*
2020-10	73.46	15.01	20.71	17.93	*Dry*	21.71	7.06	*Dry*	25.93	22.76	20.65	*Dry*	*Dry*
2020-11	73.63	15.09	20.59	17.86	*Dry*	21.65	7.08	*Dry*	25.93	22.66	20.57	*Dry*	*Dry*
2020-12	74.02	15.05	21.10	17.94	*Dry*	21.64	7.06	*Dry*	25.92	22.75	21.10	*Dry*	*Dry*

Shaded cells indicate dry bore.

Table E-3

Groundwater Monitoring Results and comparison with ANZECC guideline trigger values

Location	Date	Lab pH value	Lab electrical conductivity @ 25°C	TDS @ 180°C	Sulfate as SO4 - turbimetric	Aluminum (filt.)	Arsenic (filt.)	Barium (filt.)	Cadmium (filt.)	Copper (filt.)	Lead (filt.)	Lithium (filt.)	Manganese (filt.)	Molybdenum (filt.)	Nickel (filt.)	Zinc (filt.)	Boron (filt.)	Iron (filt.)	Ammonia as N	Nitrite as N	Nitrate as N	Total anions	Total cations	Ionic balance
		pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%
ANZECC Guideline value	Drinking water	6.5-8.5	-	600	500/250	0.2	0.01	0.2	0.002	2/1	0.01	-	0.5/0.1	0.05	0.02	3	4	0.3	0.5	3	50	-	-	-
	Livestock drinking water	-	-	3000-13000	1000-2000	5	0.5	-	0.01	0.5-5	0.1	-	-	0.15	1	20	5	-	-	30	-	-	-	-
	Long-term irrigation water	6.0-8.5	-	-	-	5	0.1	-	0.01	0.2	2	2.5	0.2	0.01	0.2	2	0.5	0.2	-	-	-	-	-	-
	Limit of reporting	0.1	1	1	1	0.01	0.001	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01
RB05A	12/03/2020	7.57	1910	1060	80	<0.01	<0.001	0.302	<0.0001	<0.001	<0.001	0.025	0.105	0.007	0.008	0.013	0.06	0.07	0.81	0.27	0.31	21.1	19.2	4.59
	26/06/2020	7.61	1790	1020	83	<0.01	<0.001	0.299	<0.0001	<0.001	<0.001	0.029	0.085	0.007	0.008	0.01	0.06	0.16	0.93	<0.01	0.03	21	18.7	5.72
	18/09/2020	7.62	1870	1240	93	<0.01	<0.001	0.292	<0.0001	<0.001	<0.001	0.024	0.091	0.006	0.007	0.01	0.06	0.1	0.86	<0.01	0.05	21.3	20.6	1.82
	8/12/2020	7.63	1840	1120	86	<0.01	<0.001	0.293	<0.0001	<0.001	<0.001	0.026	0.088	0.006	0.008	0.006	0.06	0.11	0.82	<0.01	0.06	20.5	19	3.8
Reg3	12/03/2020	7.92	1180	718	78	<0.01	0.002	0.016	<0.0001	<0.001	<0.001	<0.001	0.144	0.017	0.002	0.007	0.06	0.07	0.08	<0.01	<0.01	13.5	11.7	7.09
	4/06/2020	7.86	1310	704	81	<0.01	0.002	0.02	<0.0001	<0.001	<0.001	<0.001	0.195	0.012	0.002	<0.005	0.06	0.08	0.03	<0.01	0.02	13.3	12.9	1.55
	10/09/2020	7.79	1300	769	91	<0.01	0.002	0.02	<0.0001	<0.001	<0.001	<0.001	0.197	0.014	0.001	0.009	<0.05	0.18	0.03	<0.01	0.09	13	13.1	0.19
	7/12/2020	8.12	1170	728	89	<0.01	0.004	0.021	<0.0001	<0.001	<0.001	<0.001	0.172	0.017	<0.001	<0.005	0.06	0.08	0.08	<0.01	0.07	13.1	12.1	3.93
Reg4	11/03/2020	8.57	1090	632	31	<0.01	<0.001	0.018	<0.0001	<0.001	<0.001	0.088	0.016	0.009	0.001	<0.005	0.06	<0.05	0.17	0.41	0.03	12	11	4.24
	11/06/2020	8.62	1100	516	20	<0.01	0.001	0.02	<0.0001	0.002	<0.001	0.084	0.048	0.008	0.001	0.009	0.06	<0.05	0.1	0.38	<0.10	11.8	11.4	1.53
	10/09/2020	8.23	1140	584	14	<0.01	<0.001	0.016	<0.0001	<0.001	<0.001	0.045	0.056	0.004	<0.001	<0.005	0.06	<0.05	0.11	0.16	0.03	12.1	11.4	3.19
	26/11/2020	8.3	1110	696	14	<0.01	<0.001	0.024	<0.0001	<0.001	<0.001	0.06	0.013	0.006	0.001	<0.005	<0.05	<0.05	0.02	0.19	0.05	12.5	11.1	5.85
Reg5	12/03/2020	*No access*																						
	11/06/2020	7.95	1900	920	274	<0.01	<0.001	0.034	<0.0001	<0.001	<0.001	0.006	0.3	0.004	0.001	0.009	<0.05	<0.05	0.21	<0.01	0.02	20.5	19.3	2.92
	9/09/2020	8.04	1930	1070	253	<0.01	<0.001	0.014	<0.0001	<0.001	<0.001	0.004	0.294	0.003	<0.001	0.009	0.05	<0.05	0.16	<0.01	0.03	19.3	19	0.56
	27/11/2020	7.96	1920	1220	281	<0.01	<0.001	0.02	<0.0001	<0.001	<0.001	0.005	0.21	0.004	0.001	0.007	<0.05	<0.05	0.12	<0.01	0.02	20.5	18	6.32
Reg5A	12/03/2020	*Dry*																						
	11/06/2020	*Dry*																						
	9/09/2020	*Dry*																						
	27/11/2020	*Dry*																						
Reg6	12/03/2020	8.21	2080	1140	146	<0.01	<0.001	0.063	<0.0001	<0.001	<0.001	0.013	0.07	-	0.006	<0.005	0.06	<0.05	0.08	0.09	0.02	21	18.3	6.93
	10/06/2020	7.98	2000	1060	134	<0.01	0.001	0.06	<0.0001	0.001	<0.001	0.01	0.091	-	0.004	0.008	0.07	<0.05	0.06	<0.01	0.02	20.2	19	3.21
	10/09/2020	7.79	2020	1110	134	<0.01	0.001	0.048	<0.0001	0.004	<0.001	0.006	0.117	-	0.002	0.008	<0.05	<0.05	0.06	<0.01	0.03	19.5	18.7	2.07
	26/11/2020	7.97	2120	1220	204	<0.01	<0.001	0.042	<0.0001	0.002	<0.001	0.01	0.105	-	0.004	0.013	0.06	<0.05	0.05	<0.01	<0.01	20.6	18.8	4.57
Reg7A	12/03/2020	7.29	885	533	43	<0.01	0.003	0.11	<0.0001	<0.001	<0.001	0.002	0.416	0.001	0.002	0.064	<0.05	0.17	0.02	<0.01	<0.01	10.1	9.95	0.62
	10/06/2020	7.19	968	558	60	<0.01	0.002	0.123	<0.0001	<0.001	<0.001	0.002	0.353	<0.001	<0.001	0.044	<0.05	0.1	<0.01	0.02	0.4	9.96	10.2	1.38
	11/09/2020	7.18	957	551	60	<0.01	<0.001	0.113	<0.0001	0.001	<0.001	0.001	0.343	<0.001	0.001	0.052	<0.05	0.13	<0.01	<0.01	0.42	10.3	10.3	0.09
	7/12/2020	7.4	896	540	59	<0.01	<0.001	0.109	<0.0001	0.006	<0.001	0.003	0.317	<0.001	0.002	0.064	<0.05	0.07	<0.01	0.01	0.24	9.77	9.56	1.08
Reg10A	12/03/2020	*Dry*																						
	26/06/2020	*Dry*																						
	18/09/2020	*Dry*																						

Location	Date	Lab pH value	Lab electrical conductivity @ 25°C	TDS @ 180°C	Sulfate as SO4 - turbimetric	Aluminum (filt.)	Arsenic (filt.)	Barium (filt.)	Cadmium (filt.)	Copper (filt.)	Lead (filt.)	Lithium (filt.)	Manganese (filt.)	Molybdenum (filt.)	Nickel (filt.)	Zinc (filt.)	Boron (filt.)	Iron (filt.)	Ammonia as N	Nitrite as N	Nitrate as N	Total anions	Total cations	Ionic balance
		pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%
	8/12/2020	*Dry*																						
Reg12	12/03/2020	7.54	2270	1370	57	<0.01	<0.001	0.068	<0.0001	0.002	<0.001	0.032	0.115	0.003	0.001	0.018	0.11	<0.05	0.05	<0.01	<0.01	26.9	23.1	7.52
	25/06/2020	7.51	2210	1310	64	<0.01	0.001	0.07	<0.0001	<0.001	<0.001	0.043	0.111	0.004	0.002	0.035	0.13	0.16	0.06	<0.01	0.02	25.7	24	3.56
	18/09/2020	7.6	2210	1410	47	<0.01	0.001	0.066	<0.0001	0.002	<0.001	0.03	0.114	0.002	<0.001	0.02	0.1	0.07	0.02	<0.01	0.11	26.3	25.6	1.46
	8/12/2020	7.58	2250	1550	68	<0.01	<0.001	0.071	<0.0001	0.001	<0.001	0.038	0.101	0.002	<0.001	0.018	0.1	0.07	0.04	<0.01	0.01	24.4	23.7	1.37
Reg13	11/03/2020	8.57	3280	2220	1130	<0.01	<0.001	0.05	<0.0001	<0.001	0.002	0.177	0.053	0.031	0.003	<0.005	0.08	<0.05	0.69	<0.01	<0.01	35.7	32	5.37
	11/06/2020	7.76	3040	1890	1040	<0.01	<0.001	0.053	<0.0001	<0.001	<0.001	0.184	0.076	0.034	0.005	0.029	0.09	<0.05	0.69	<0.01	0.03	33.4	32.6	1.16
	9/09/2020	7.56	3540	2530	1240	<0.01	<0.001	0.048	<0.0001	<0.001	<0.001	0.011	0.369	0.01	0.004	0.017	0.14	<0.05	0.07	<0.01	0.1	39.6	39.6	0.1
	26/11/2020	7.67	3670	2580	1360	<0.01	<0.001	0.053	<0.0001	<0.001	<0.001	0.021	0.343	0.013	0.009	0.019	0.13	<0.05	0.11	<0.01	0.02	42	39	3.8
Reg14	11/03/2020	7.72	1010	654	54	<0.01	0.003	0.026	<0.0001	<0.001	<0.001	0.004	0.131	0.009	0.009	0.008	<0.05	<0.05	0.15	<0.01	<0.01	11.1	9.85	5.84
	10/06/2020	7.58	1040	488	49	<0.01	0.003	0.034	<0.0001	0.001	<0.001	0.002	0.187	0.009	0.011	0.02	<0.05	<0.05	0.05	<0.01	0.01	11	10.6	1.49
	10/09/2020	7.47	1060	646	81	<0.01	0.003	0.031	<0.0001	<0.001	<0.001	<0.001	0.208	0.005	0.004	0.016	<0.05	<0.05	0.06	<0.01	0.04	11.5	10.6	4.07
	27/11/2020	7.54	1040	694	78	<0.01	0.003	0.027	<0.0001	<0.001	<0.001	0.001	0.209	0.006	0.004	0.013	<0.05	<0.05	0.04	<0.01	0.02	11.6	10	7.58
BCM01	12/03/2020	*Dry*																						
	25/06/2020	*Dry*																						
	14/09/2020	*Dry*																						
	8/12/2020	*Dry*																						
BCM03	12/03/2020	*Dry*																						
	25/06/2020	*Dry*																						
	1/09/2020	*Dry*																						
	8/12/2020	*Dry*																						
MAC1280	12/03/2020	11.8	3950	2310	14	2.36	<0.001	215	<0.0001	0.009	<0.001	0.14	<0.001	0.026	0.023	0.006	<0.05	<0.05	6.6	0.32	0.11	30.8	31.1	0.53
	26/06/2020	11.9	3630	1850	15	2.67	<0.001	0.185	<0.0001	0.008	<0.001	0.15	<0.001	0.027	0.019	0.01	<0.05	<0.05	6.1	0.63	0.13	30.4	30.2	0.35
	18/09/2020	11.6	3620	2180	17	2.54	0.001	0.18	<0.0001	0.01	<0.001	0.128	<0.001	0.029	0.02	0.008	<0.05	<0.05	6.03	0.69	0.33	31.4	31.9	0.83
	8/12/2020	11.7	3650	2330	16	2.85	<0.001	0.178	<0.0001	0.009	<0.001	0.132	<0.001	0.03	0.018	<0.005	<0.05	<0.05	5.94	0.52	0.15	27.3	31.3	6.76

Private Groundwater Bores

Table E-4

Groundwater Levels

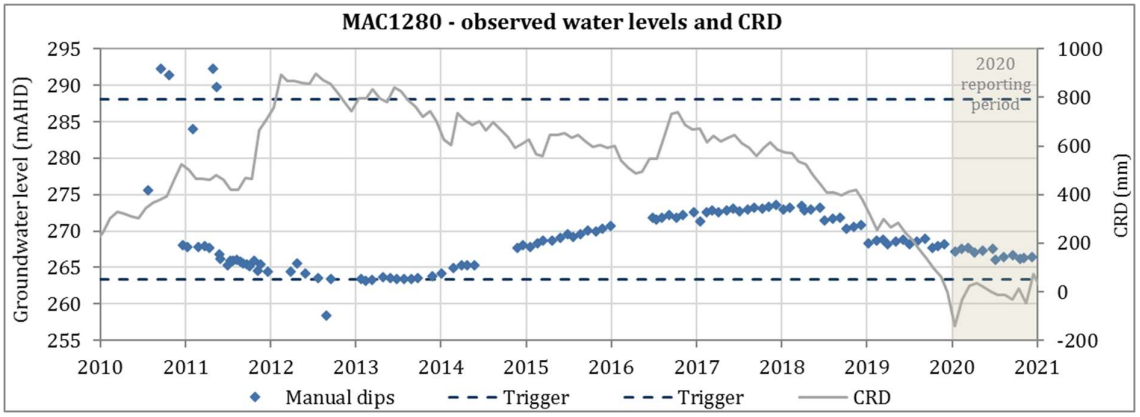
Year-Month	MOR1	MOR2	BRE2	WOL1	WOL2	SCHOOL	WHAN	TRALEE	MORSE	BAS1	BAS2	Teston
2020-01	12.47	13.28	19.08	3.42	*Blocked*	*tap*	3.61	20.10	*No access*	*tap*	11.06	19.79
2020-08	12.37	13.31	18.87	5.05	*Blocked*	*tap*	3.86	19.61	21.93	*tap*	10.64	19.70

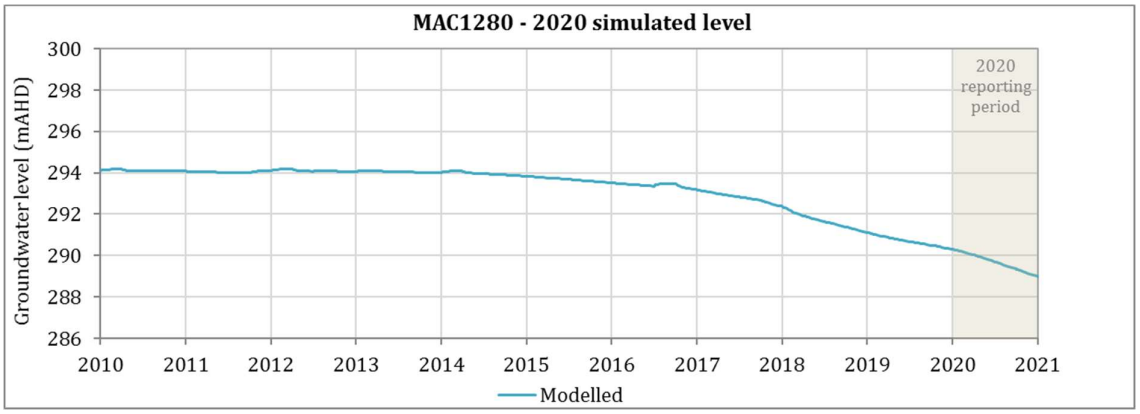
Table E-5

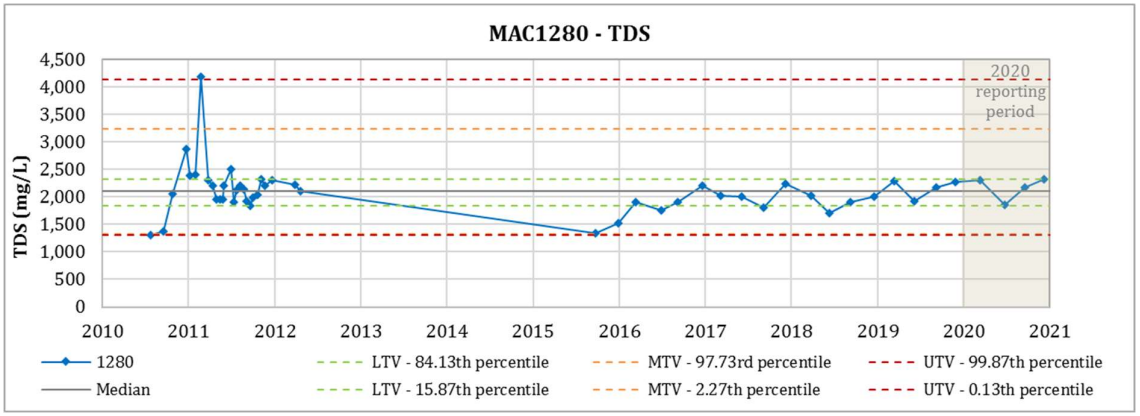
Groundwater Monitoring Results and comparison with ANZECC guideline trigger values

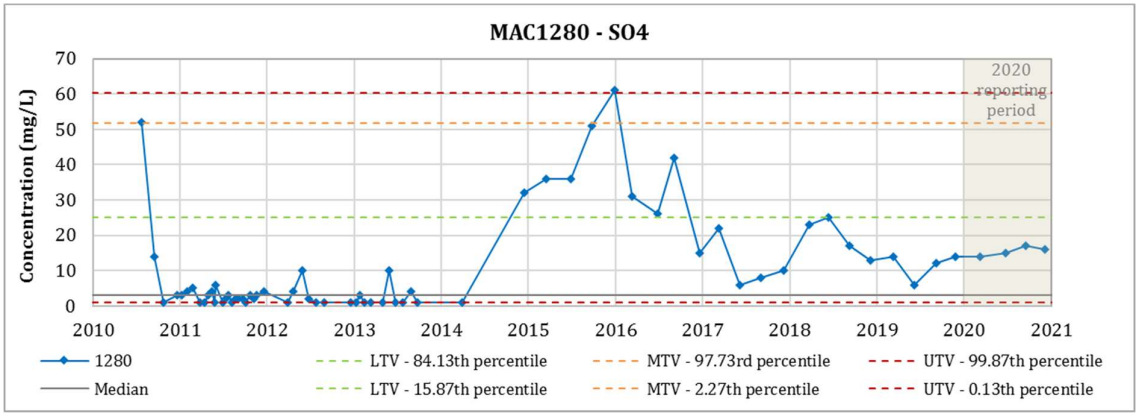
Site	Date	Lab pH value	Lab electrical conductivity @ 25°C	TDS @ 180°C	Sulfate as SO4 - turbimetric	Arsenic (filt.)	Cadmium (filt.)	Copper (filt.)	Lead (filt.)	Nickel (filt.)	Zinc (filt.)	Iron (filt.)	Ammonia as N	Nitrite as N	Nitrate as N	Total anions	Total cations	Ionic balance
		pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%
ANZECC Guideline value	Drinking water	6.5-8.5	-	600	500/250	0.01	0.002	2/1	0.01	0.02	3	0.3	0.5	3	50	-	-	-
	Livestock drinking water	-	-	3000-13000	1000-2000	0.5	0.01	0.5-5	0.1	1	20	-	-	30	-	-	-	-
	Long-term irrigation water	6.0-8.5	-	-	-	0.1	0.01	0.2	2	0.2	2	0.2	-	-	-	-	-	-
	Limit of reporting	0.1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.005	0.05	0.01	0.01	0.01	0.01	0.01	0.01
MOR1	24/02/2020	7.78	1390	906	38	<0.001	<0.0001	0.012	<0.001	0.001	0.027	<0.05	0.03	0.3	15.2	14	12.5	5.64
	11/08/2020	7.3	1060	672	32	<0.001	<0.0001	0.01	<0.001	<0.001	0.026	<0.05	<0.01	0.52	35.6	10.8	10.8	0.11
MOR2	24/02/2020	7.84	84	43	<1	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.005	0.06	0.03	<0.01	<0.01	0.9	0.64	-
	27/08/2020	7.54	89	62	<1	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.005	0.36	0.08	<0.01	0.03	0.86	0.8	-
BRE2	25/02/2020	8.01	3890	2420	<1	0.008	<0.0001	<0.001	<0.001	<0.001	<0.005	0.24	0.85	<0.01	<0.01	42.6	37.8	5.94
	27/08/2020	7.88	3740	2050	<1	0.01	<0.0001	<0.001	<0.001	<0.001	<0.005	0.3	0.82	<0.01	<0.01	38.6	37.5	1.41
WOL1	25/02/2020	7.19	541	348	40	<0.001	<0.0001	0.005	<0.001	<0.001	0.013	<0.05	0.01	<0.01	2.72	5.4	4.88	5
	10/08/2020	7.26	533	320	30	<0.001	<0.0001	0.001	<0.001	<0.001	0.01	<0.05	<0.01	<0.01	1.06	5.48	5.17	2.85
WOL2	24/02/2020	*bore blocked*																
	11/08/2020	*bore blocked*																
School raw	25/02/2020	6.86	566	348	10	<0.001	<0.0001	0.005	0.003	<0.001	0.023	<0.05	0.02	<0.01	1.25	5.56	5.21	3.31
	11/08/2020	7.32	291	194	4	<0.001	<0.0001	0.006	<0.001	0.001	0.042	<0.05	<0.01	<0.01	1.77	3.07	2.87	3.41
Whan	25/02/2020	7.36	556	358	67	<0.001	<0.0001	0.002	<0.001	<0.001	0.006	<0.05	<0.01	<0.01	2.09	5.38	4.99	3.72
	11/08/2020	7.09	455	280	29	<0.001	<0.0001	0.003	<0.001	<0.001	0.023	<0.05	<0.01	<0.01	1.5	4.69	4.38	3.35
Tralee	24/02/2020	7.11	1390	788	26	<0.001	<0.0001	<0.001	<0.001	0.009	0.056	13.7	0.56	<0.01	0.06	16.5	14.1	7.98
	13/08/2020	7.17	1320	726	29	<0.001	<0.0001	<0.001	<0.001	0.007	0.034	5.18	1.57	<0.01	0.1	16.2	14.8	4.66
Morse	24/02/2020	*no access*																
	13/08/2020	7.06	913	530	23	<0.001	0.013	0.002	<0.001	0.002	0.045	0.17	0.02	<0.01	0.04	10.1	9.94	0.82
Bas1	28/02/2020	6.87	536	314	11	<0.001	<0.0001	<0.001	<0.001	0.002	<0.005	1.34	0.05	<0.01	<0.01	6.07	4.88	10.8
	10/08/2020	6.91	542	304	7	<0.001	<0.0001	<0.001	<0.001	0.002	0.008	2.49	0.05	<0.01	0.02	6.22	5.75	3.98
Bas2	24/02/2020	7.08	1280	823	178	<0.001	<0.0001	0.001	<0.001	0.002	0.022	1.96	0.05	<0.01	1.71	13.6	12.2	5.31
	10/08/2020	7.02	1020	594	114	<0.001	<0.0001	<0.001	<0.001	0.003	0.082	15.6	0.17	<0.01	0.05	11	10.3	3.21
Teston	24/02/2020	7.25	1180	768	23	<0.001	0.0038	0.028	<0.001	0.003	0.006	0.07	0.1	<0.01	<0.01	14.1	12.1	7.86
	10/08/2020	7.26	1320	816	25	<0.001	0.0014	0.005	<0.001	0.003	0.01	0.16	0.05	<0.01	0.05	16	15	3.05

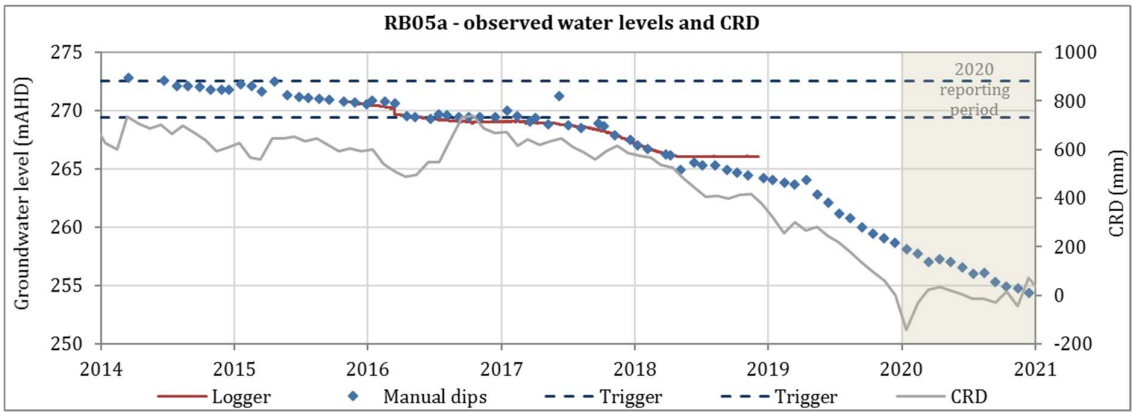
Regional standpipe monitoring bores – observed and modelled water levels, and water quality trigger parameters

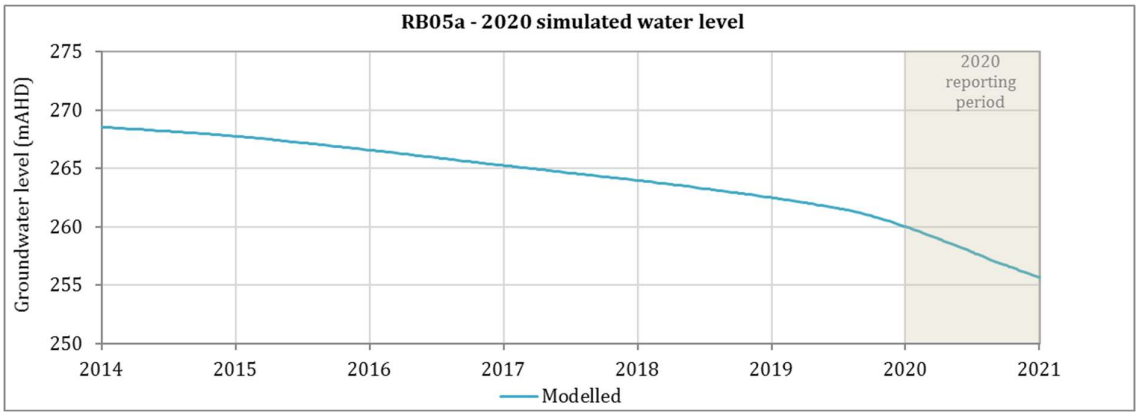


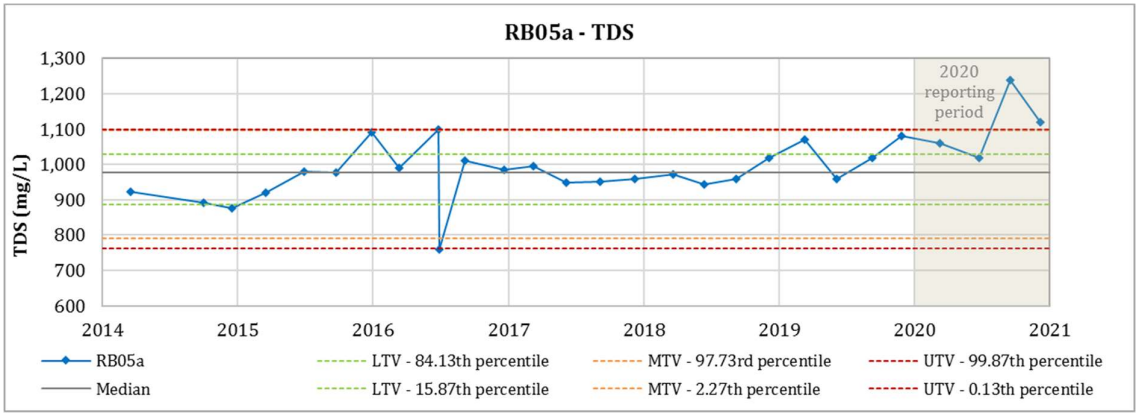


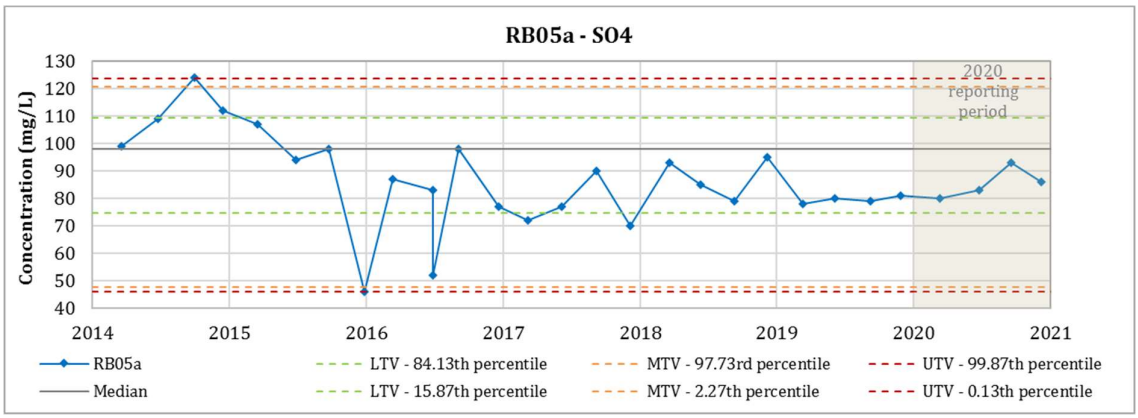


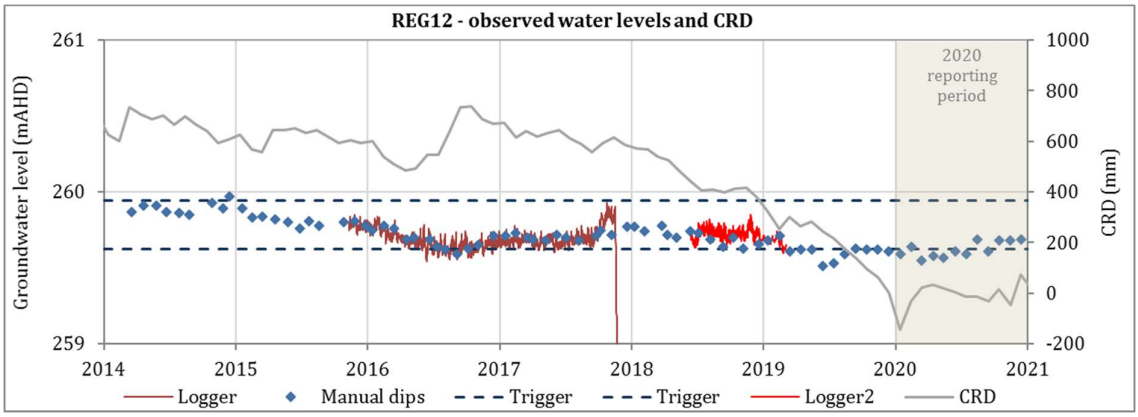

MAC1280 - SO4
Concentration (mg/L)
70
60
50
40
30
20
10
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
1280
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

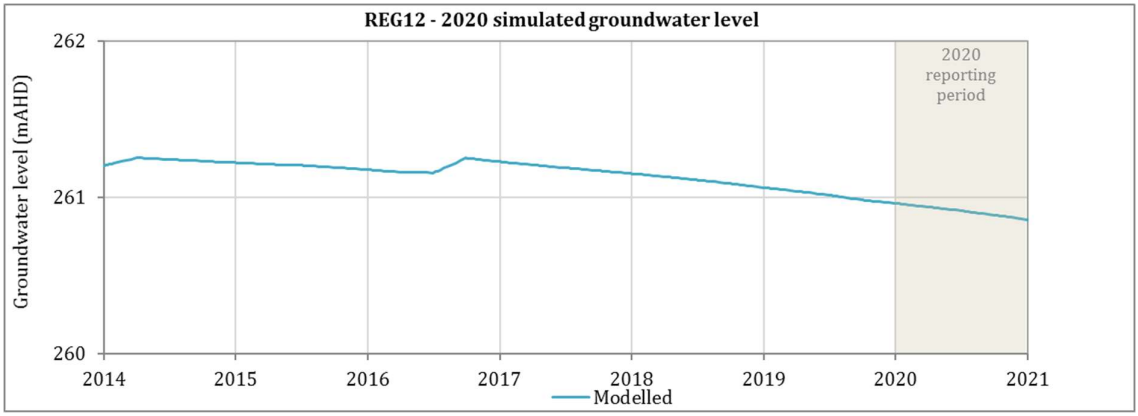

RB05a - observed water levels and CRD
Groundwater level (mAHD)
275
270
265
260
255
250
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

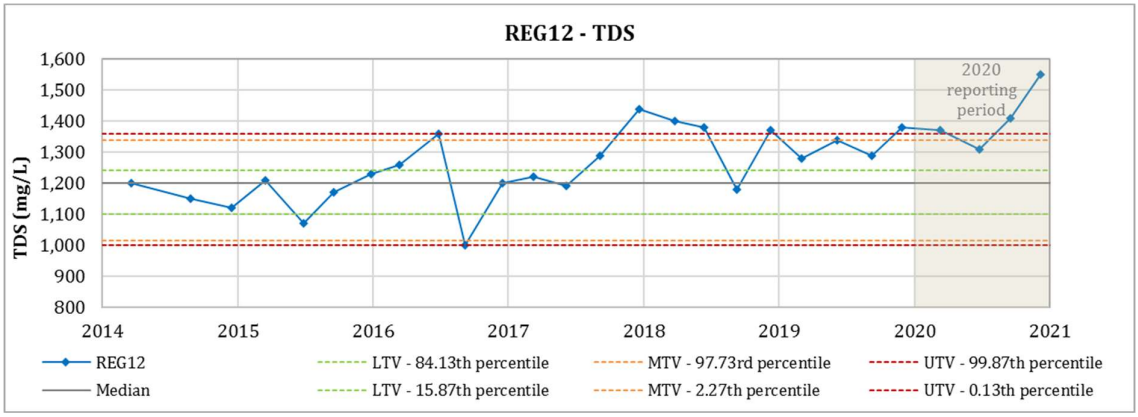

RB05a - 2020 simulated water level
Groundwater level (mAHD)
275
270
265
260
255
250
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

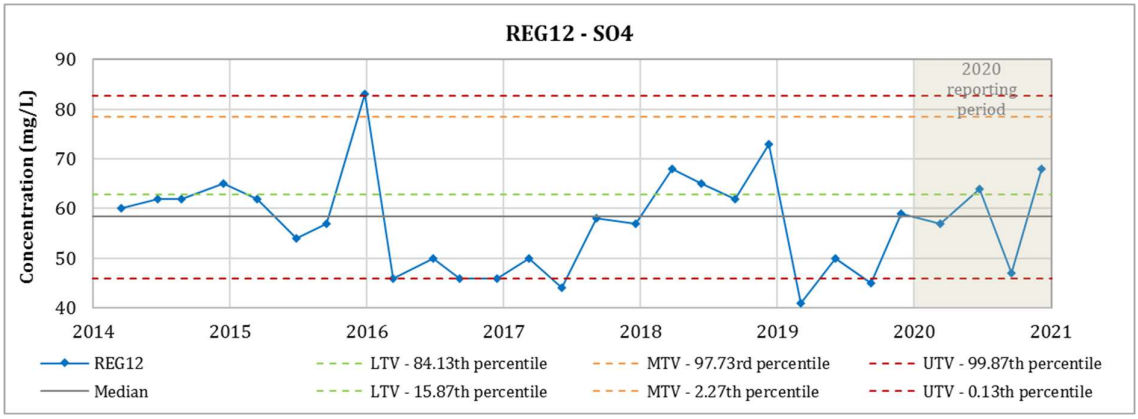

RB05a - TDS
TDS (mg/L)
1,300
1,200
1,100
1,000
900
800
700
600
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
RB05a
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

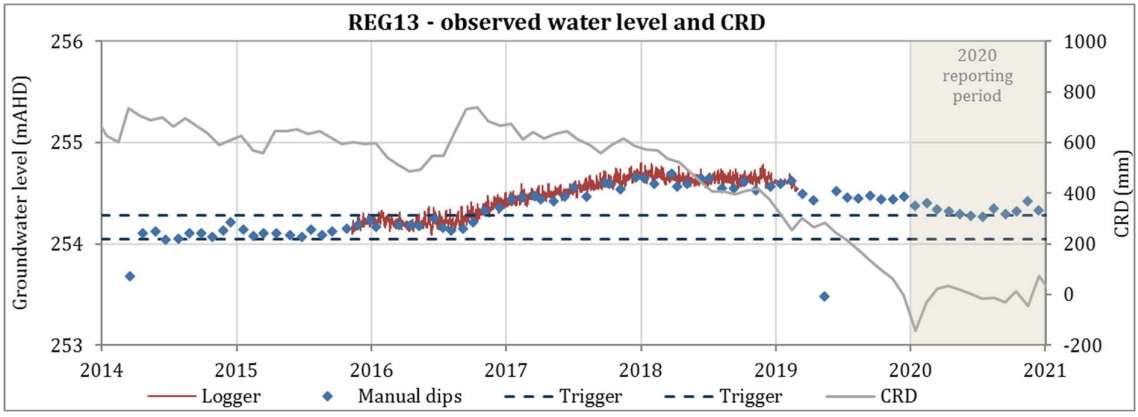

RB05a - SO4
Concentration (mg/L)
130
120
110
100
90
80
70
60
50
40
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
RB05a
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

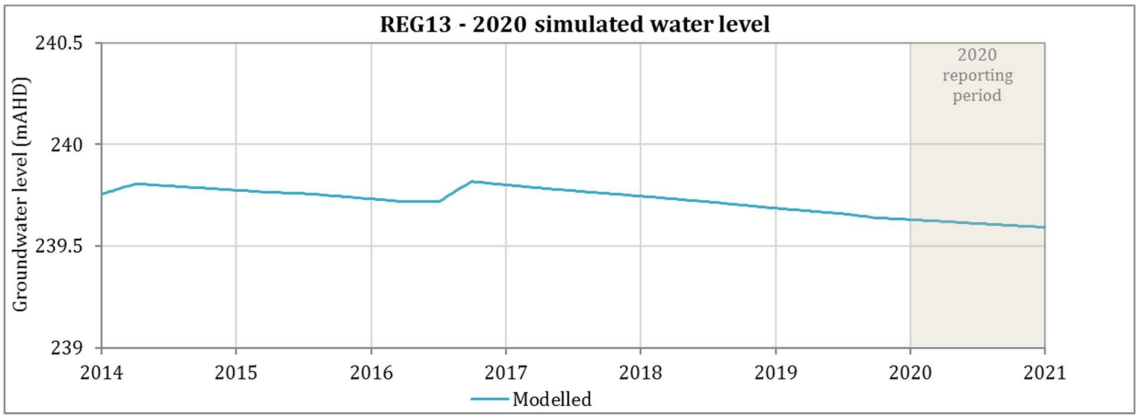

REG12 - observed water levels and CRD
Groundwater level (mAHD)
261
260
259
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
Logger2
CRD

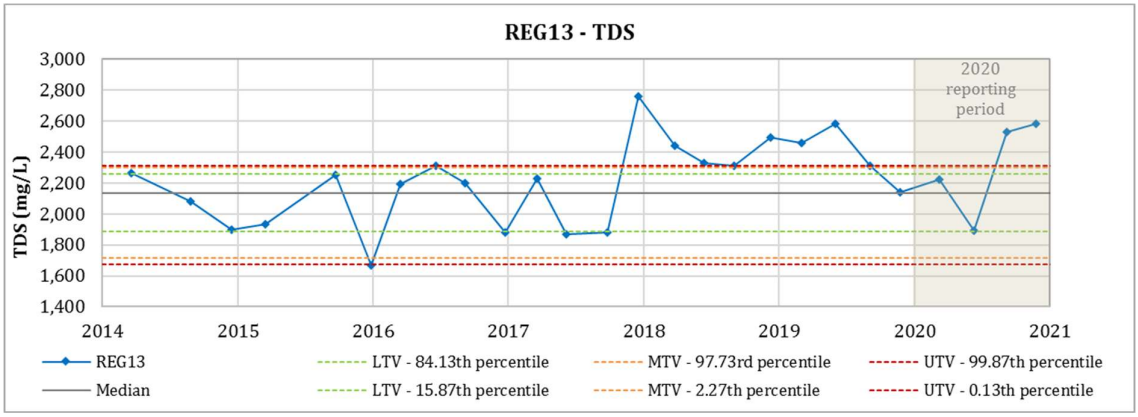

REG12 - 2020 simulated groundwater level
Groundwater level (mAHD)
262
261
260
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

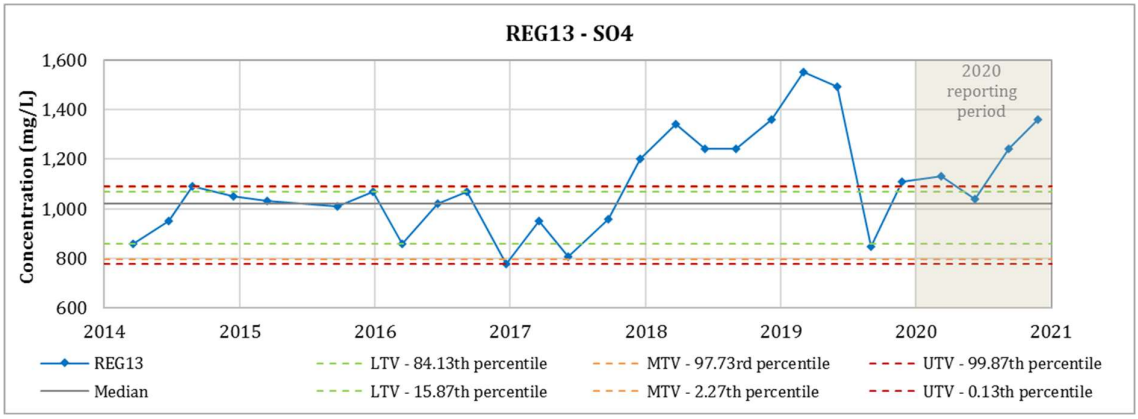

REG12 - TDS
TDS (mg/L)
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG12
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

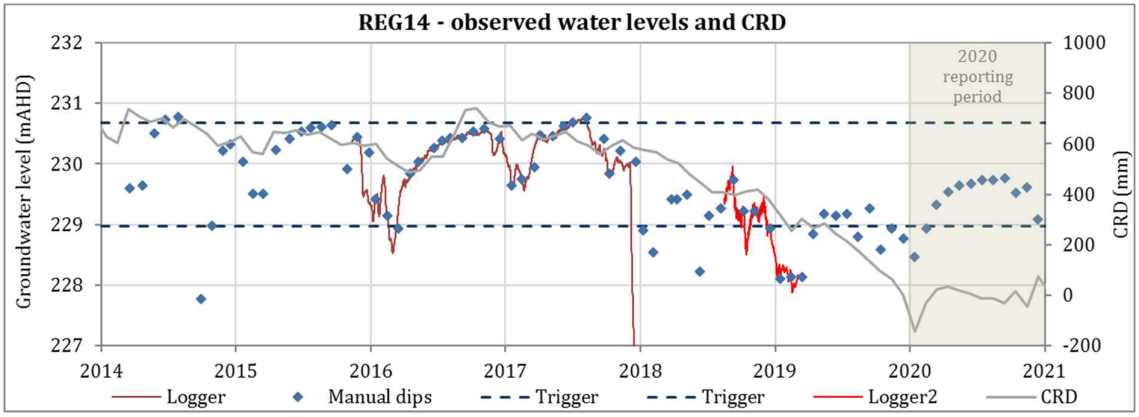

REG12 - SO4
Concentration (mg/L)
90
80
70
60
50
40
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG12
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

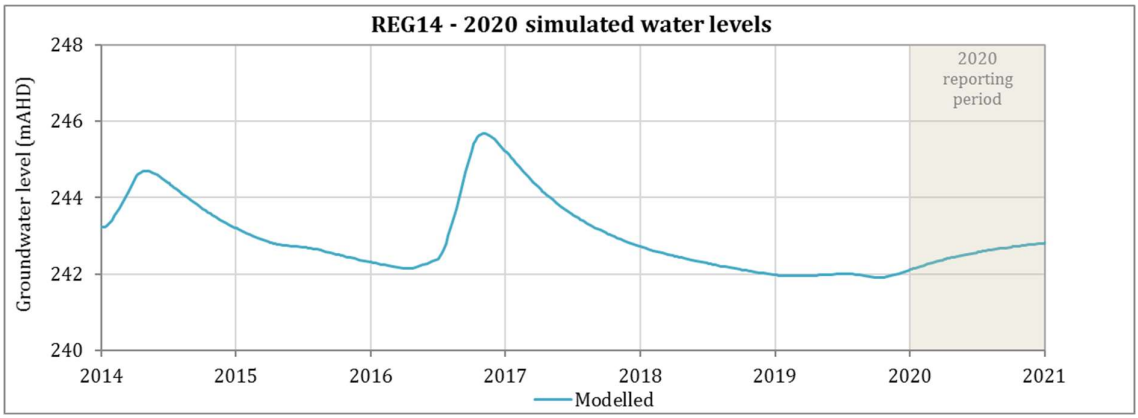

REG13 - observed water level and CRD
Groundwater level (mAHD)
256
255
254
253
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

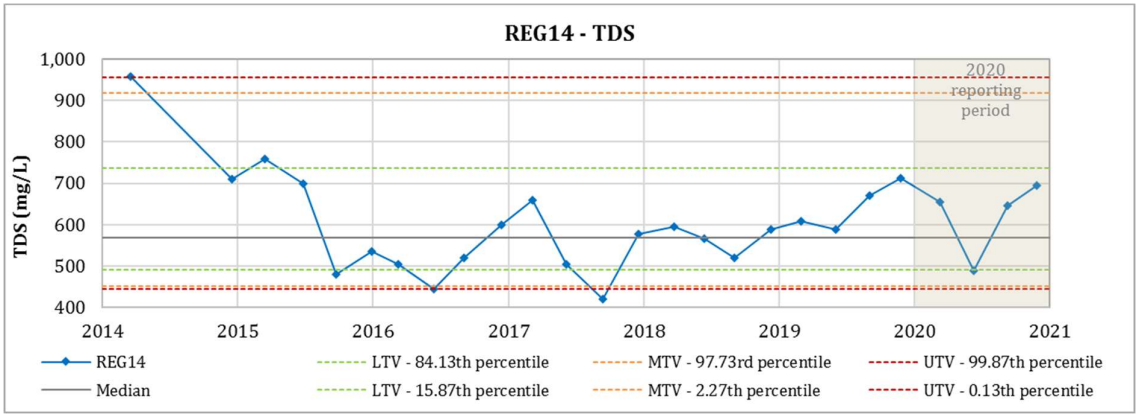

REG13 - 2020 simulated water level
Groundwater level (mAHD)
240.5
240
239.5
239
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

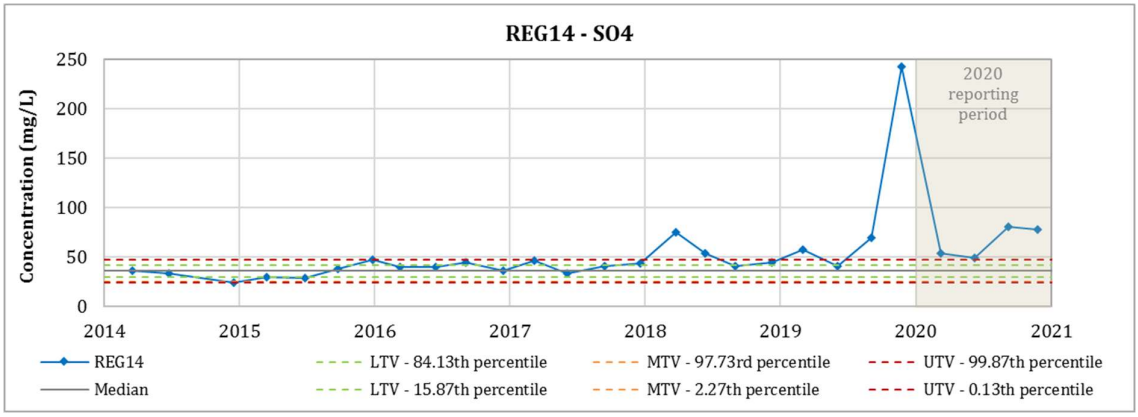

REG13 - TDS
TDS (mg/L)
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG13
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

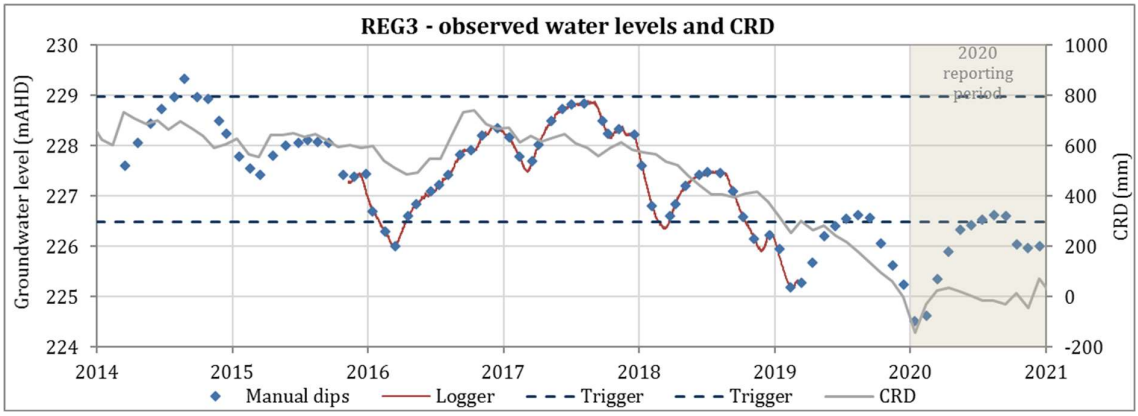

REG13 - SO4
Concentration (mg/L)
1,600
1,400
1,200
1,000
800
600
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG13
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

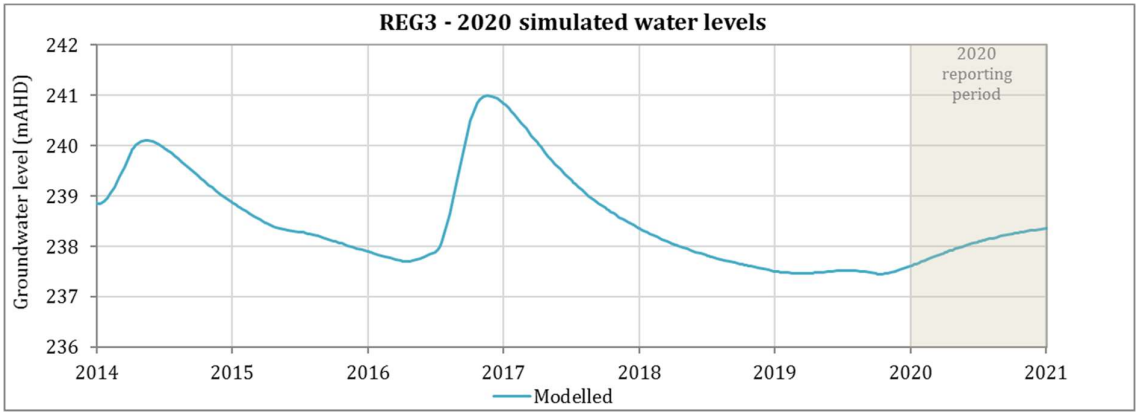

REG14 - observed water levels and CRD
Groundwater level (mAHD)
232
231
230
229
228
227
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
Logger2
CRD

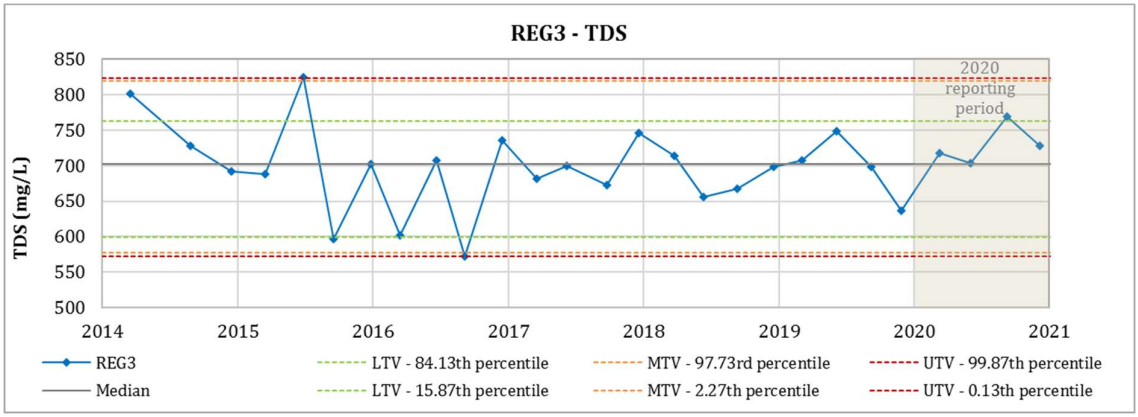

REG14 - 2020 simulated water levels
Groundwater level (mAHD)
248
246
244
242
240
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

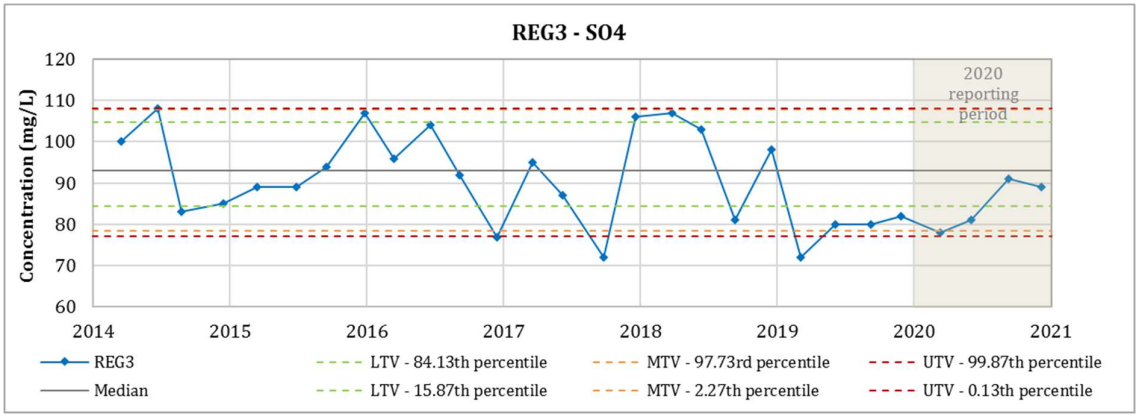

REG14 - TDS
TDS (mg/L)
1,000
900
800
700
600
500
400
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG14
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

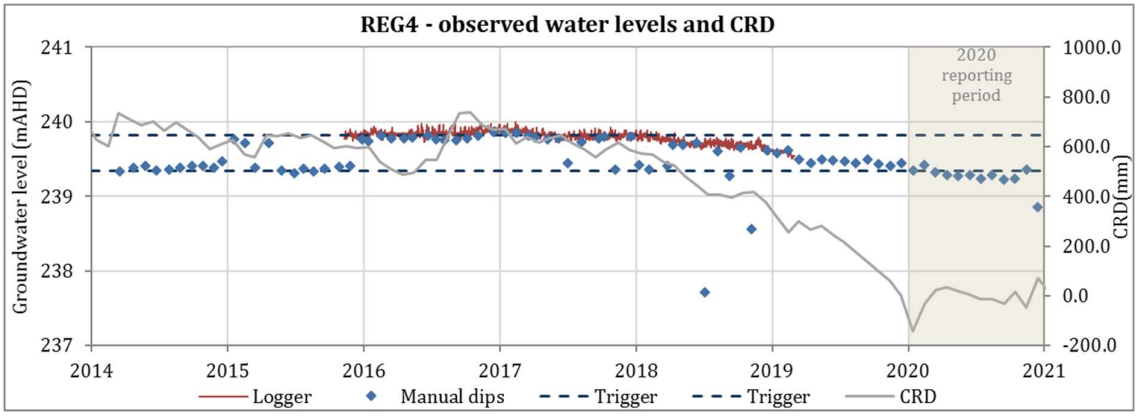

REG14 - SO4
Concentration (mg/L)
250
200
150
100
50
0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG14
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

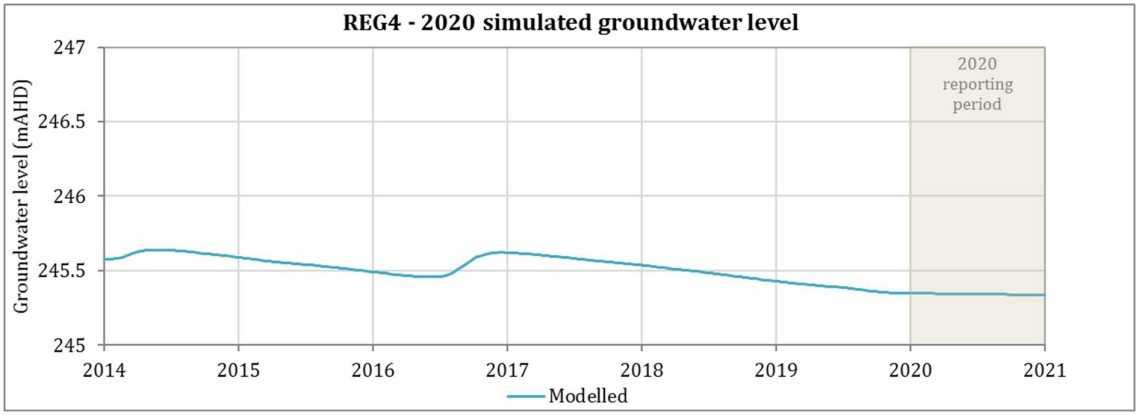

REG3 - observed water levels and CRD
Groundwater level (mAHD)
230
229
228
227
226
225
224
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Manual dips
Logger
Trigger
Trigger
CRD

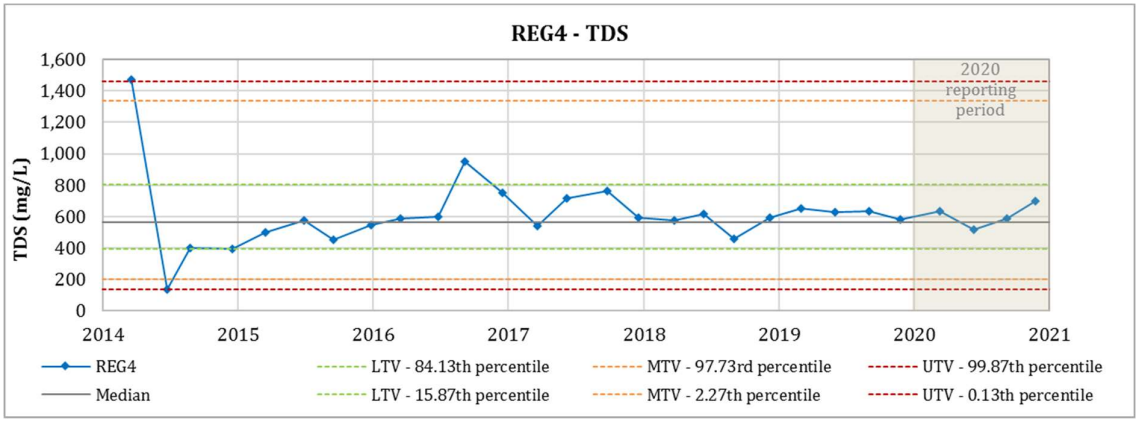

REG3 - 2020 simulated water levels
Groundwater level (mAHD)
242
241
240
239
238
237
236
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

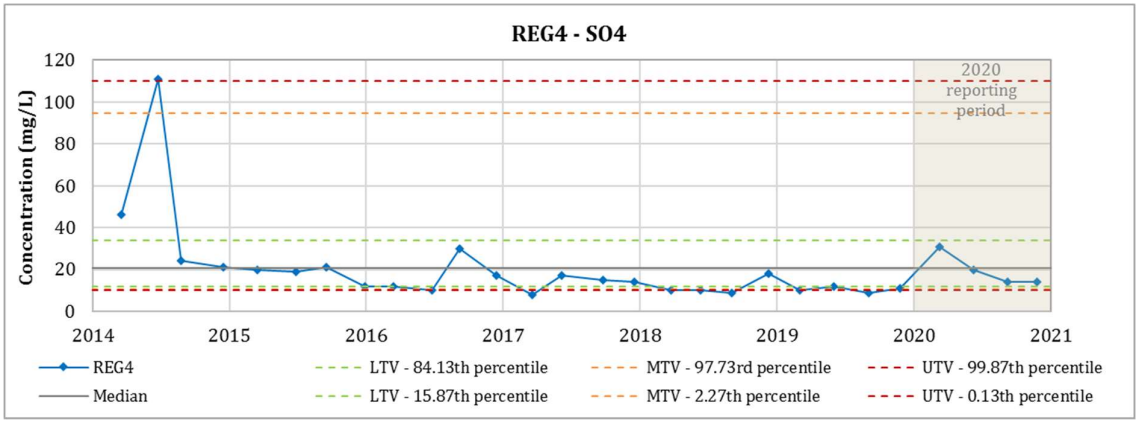

REG3 - TDS
TDS (mg/L)
850
800
750
700
650
600
550
500
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG3
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

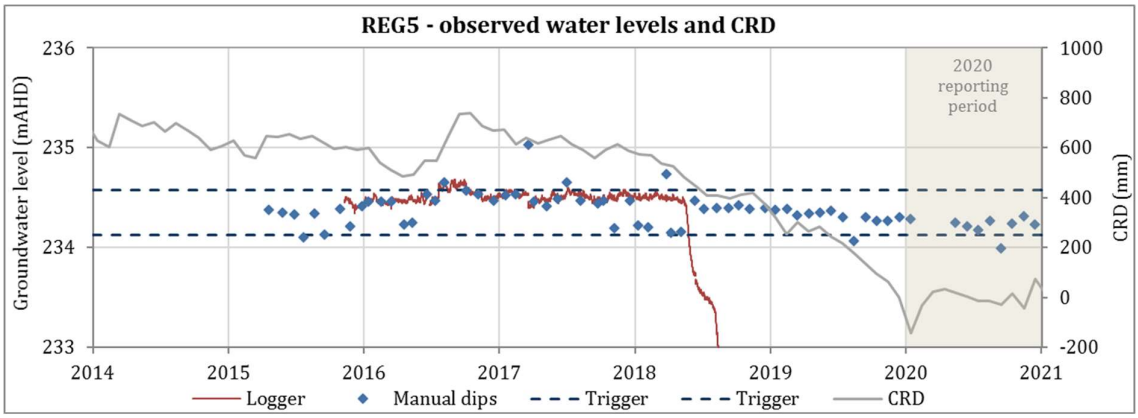

REG3 - SO4
Concentration (mg/L)
120
110
100
90
80
70
60
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG3
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

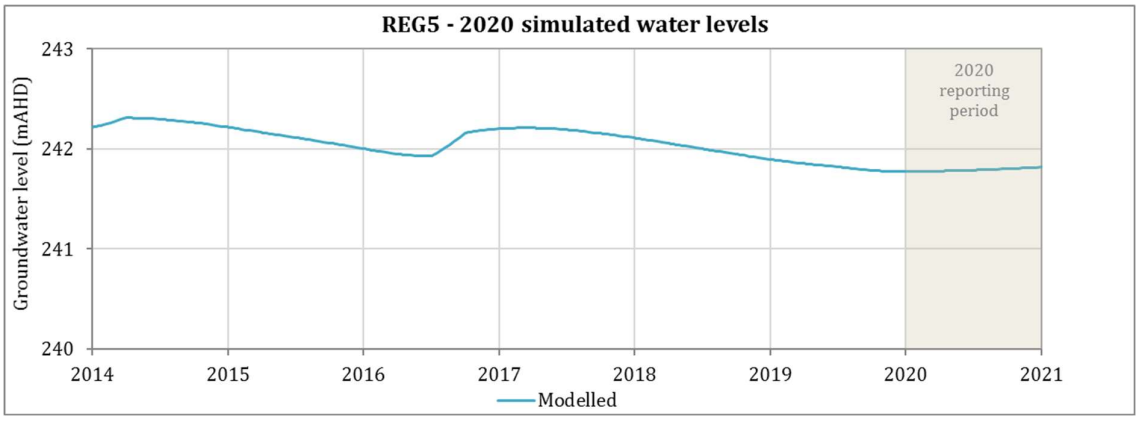

REG4 - observed water levels and CRD
Groundwater level (mAHD)
241
240
239
238
237
CRD(mm)
1000.0
800.0
600.0
400.0
200.0
0.0
-200.0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

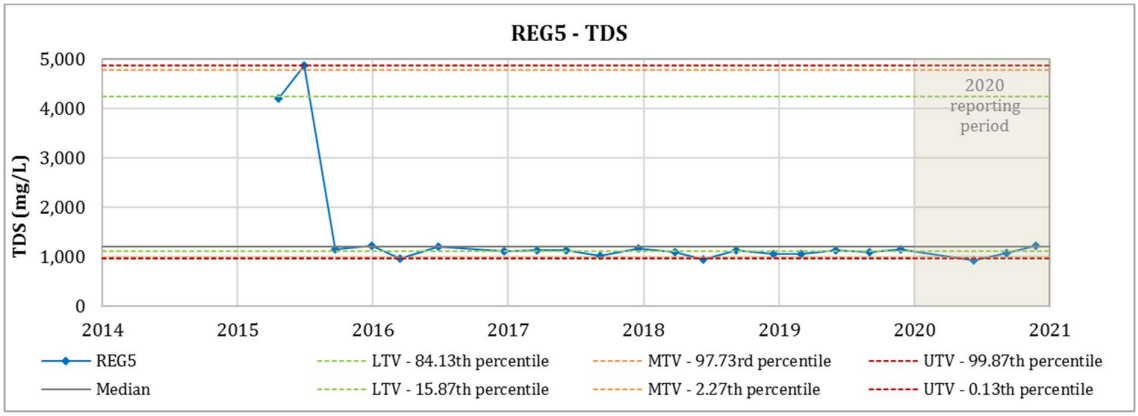

REG4 - 2020 simulated groundwater level
Groundwater level (mAHD)
247
246.5
246
245.5
245
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

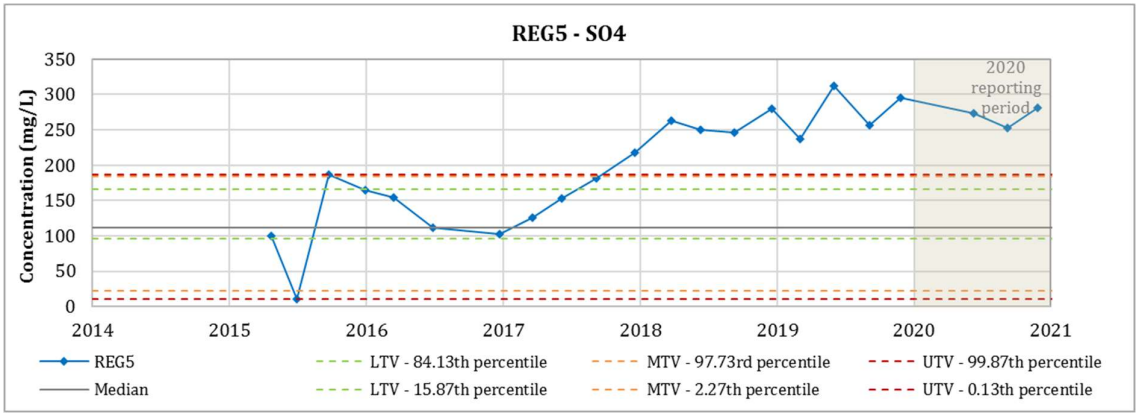

REG4 - TDS
TDS (mg/L)
1,600
1,400
1,200
1,000
800
600
400
200
0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG4
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

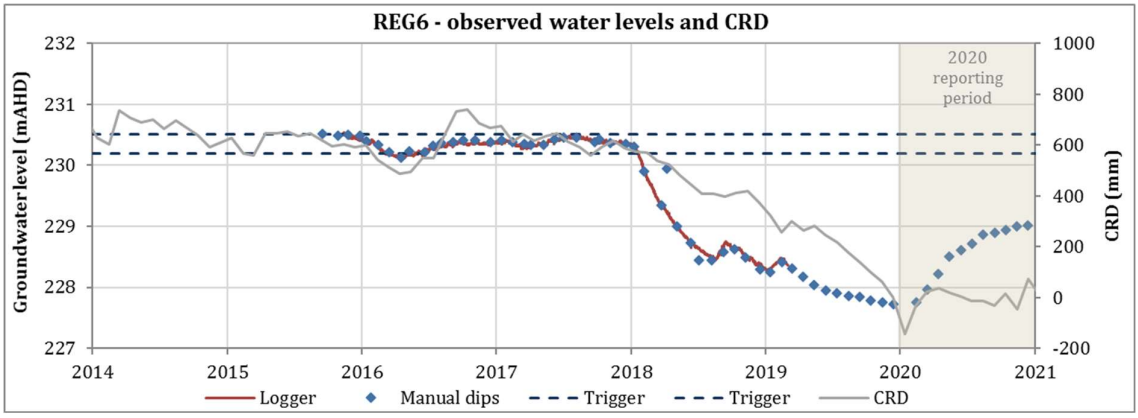

REG4 - SO4
Concentration (mg/L)
120
100
80
60
40
20
0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG4
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

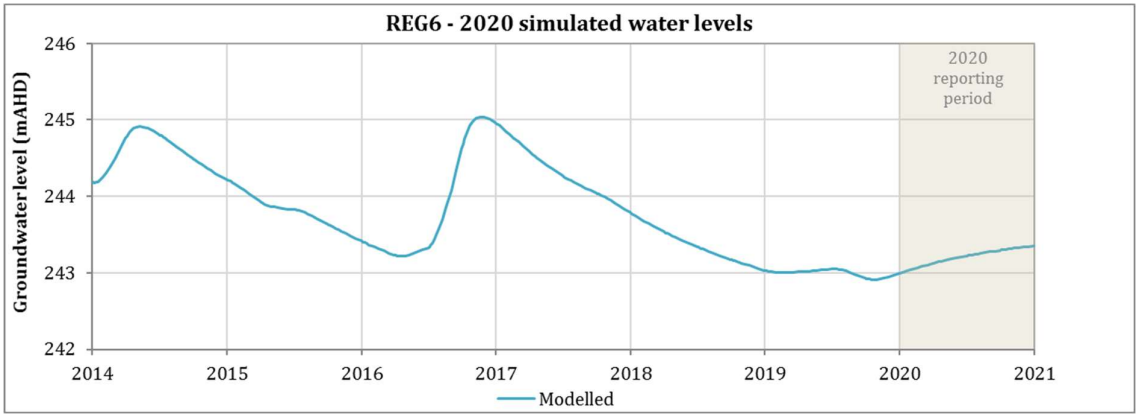

REG5 - observed water levels and CRD
Groundwater level (mAHD)
236
235
234
233
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

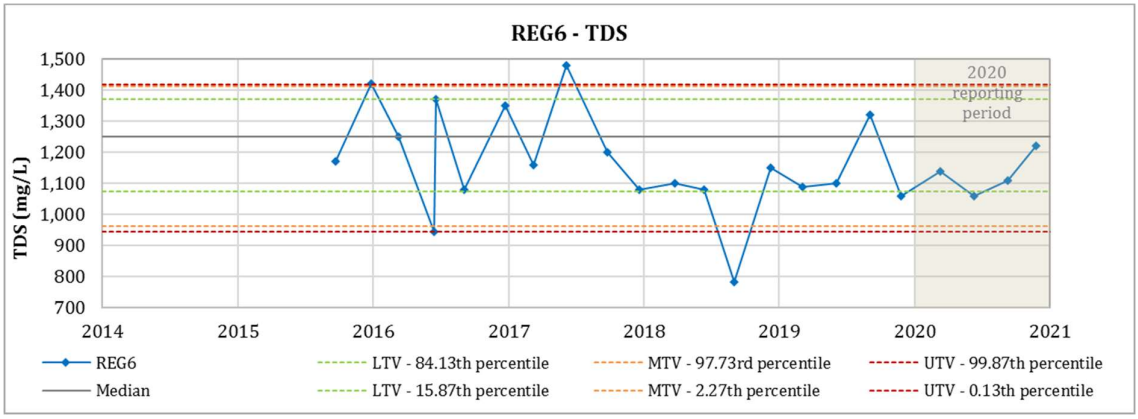

REG5 - 2020 simulated water levels
Groundwater level (mAHD)
243
242
241
240
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

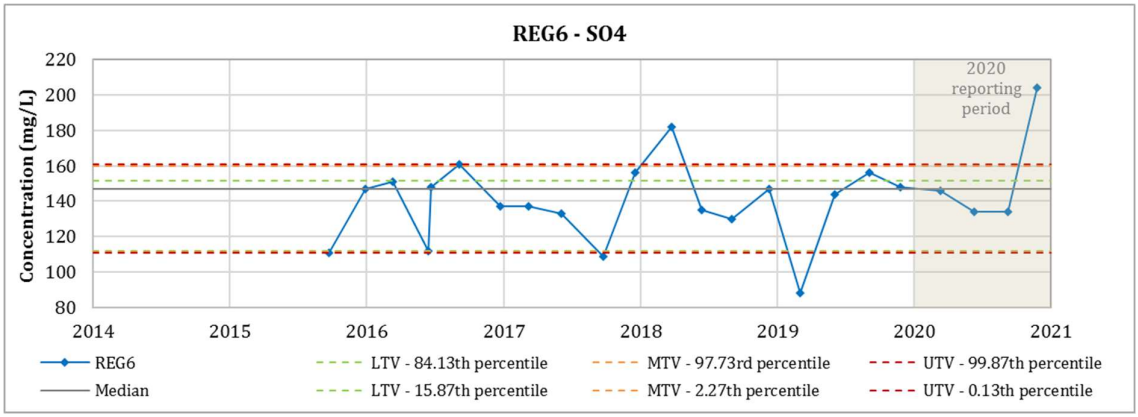

REG5 - TDS
TDS (mg/L)
5,000
4,000
3,000
2,000
1,000
0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG5
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

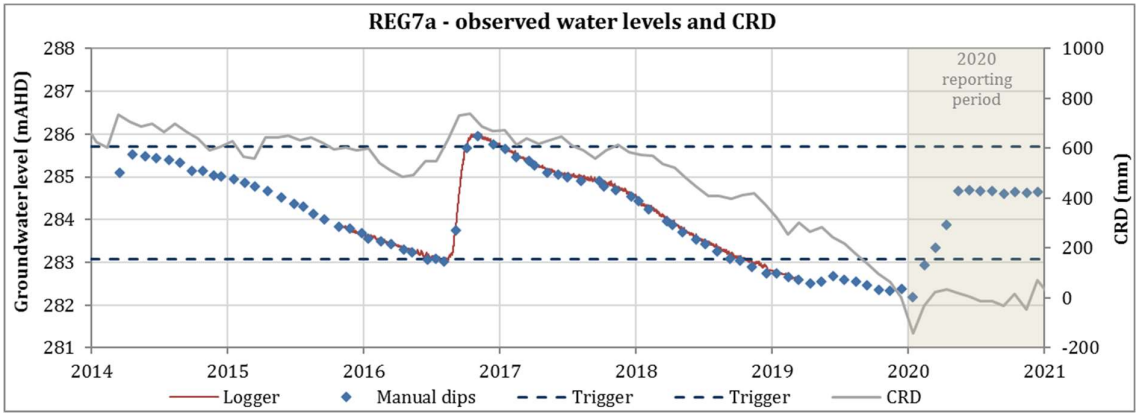

REG5 - SO4
Concentration (mg/L)
350
300
250
200
150
100
50
0
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG5
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

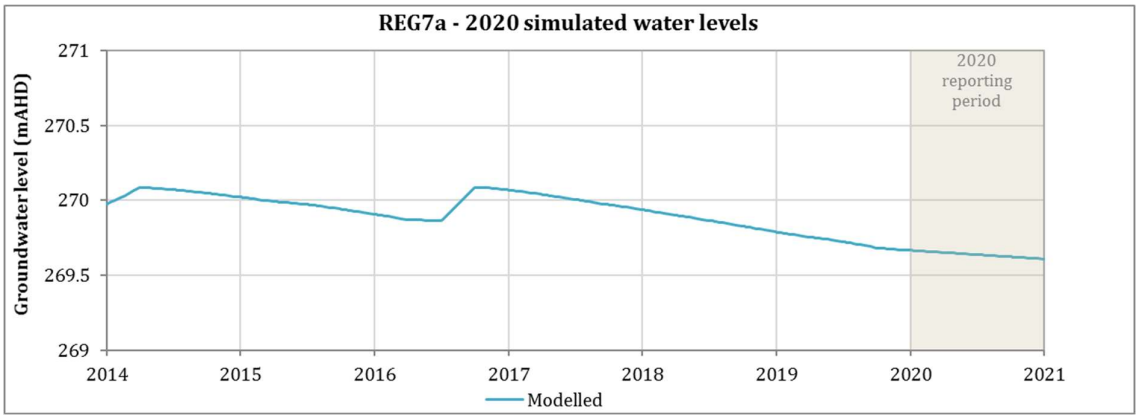

REG6 - observed water levels and CRD
Groundwater level (mAHD)
232
231
230
229
228
227
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

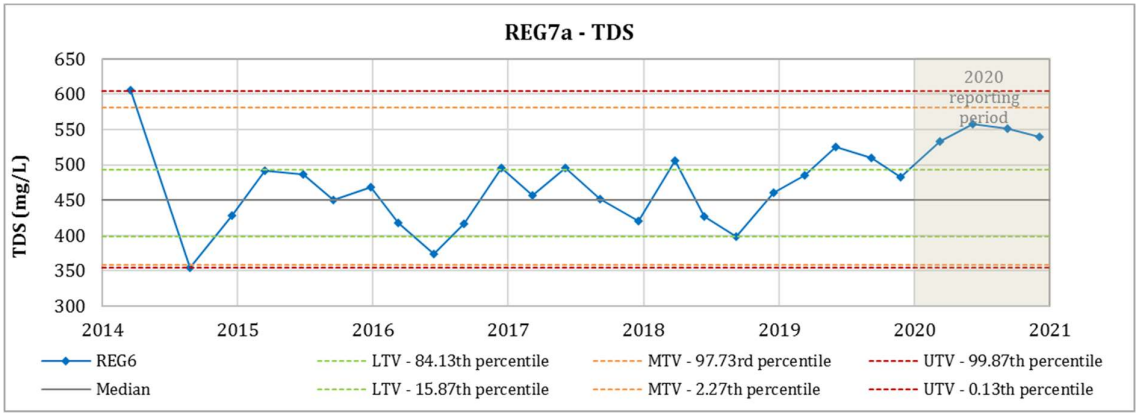

REG6 - 2020 simulated water levels
Groundwater level (mAHD)
246
245
244
243
242
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

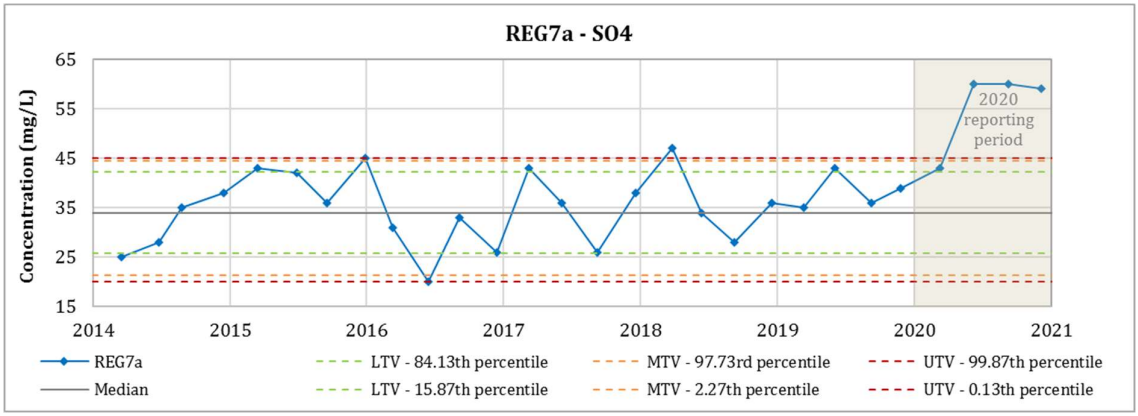

REG6 - TDS
TDS (mg/L)
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG6
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile


REG6 - SO4
Concentration (mg/L)
220
200
180
160
140
120
100
80
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG6
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

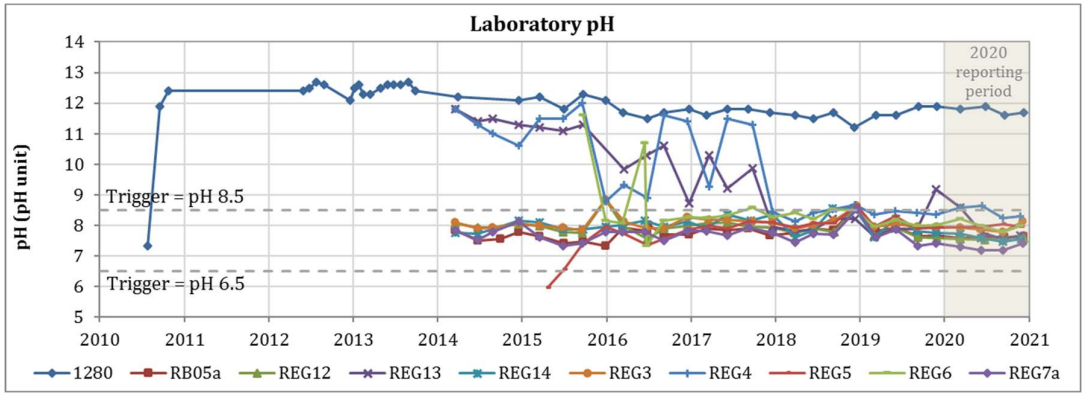

REG7a - observed water levels and CRD
Groundwater level (mAHD)
288
287
286
285
284
283
282
281
CRD (mm)
1000
800
600
400
200
0
-200
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Logger
Manual dips
Trigger
Trigger
CRD

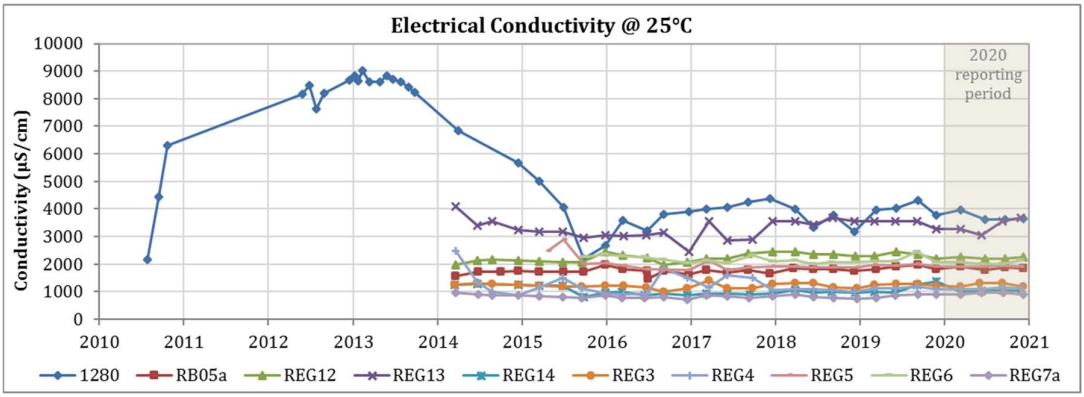

REG7a - 2020 simulated water levels
Groundwater level (mAHD)
271
270.5
270
269.5
269
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
Modelled

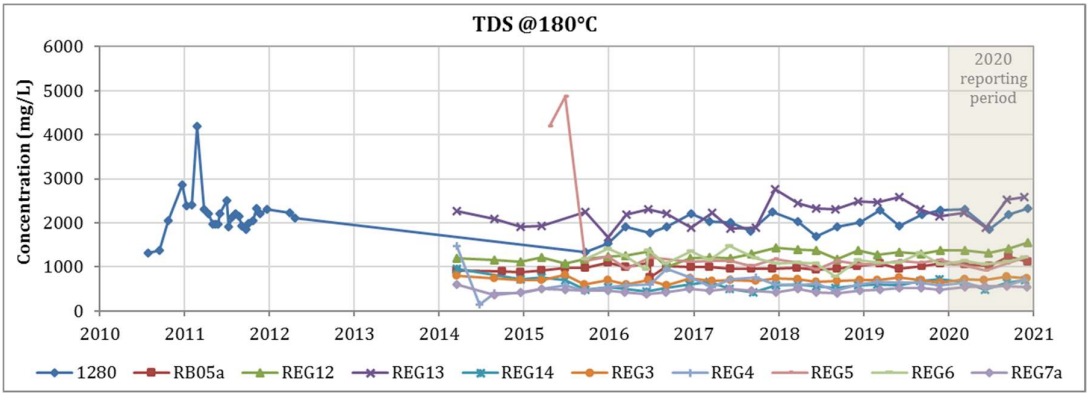

REG7a - TDS
TDS (mg/L)
650
600
550
500
450
400
350
300
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG6
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

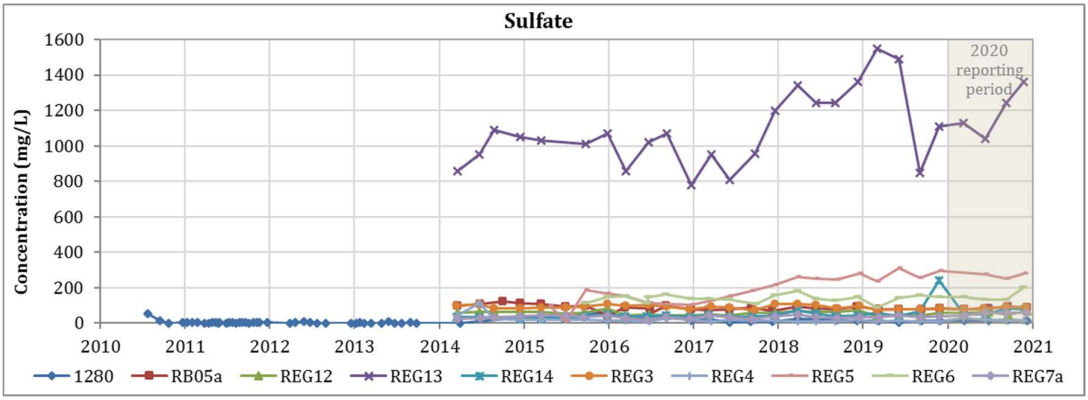

REG7a - SO4
Concentration (mg/L)
65
55
45
35
25
15
2014
2015
2016
2017
2018
2019
2020
2021
2020 reporting period
REG7a
Median
LTV - 84.13th percentile
LTV - 15.87th percentile
MTV - 97.73rd percentile
MTV - 2.27th percentile
UTV - 99.87th percentile
UTV - 0.13th percentile

Regional standpipe monitoring bores – Individual water quality parameters

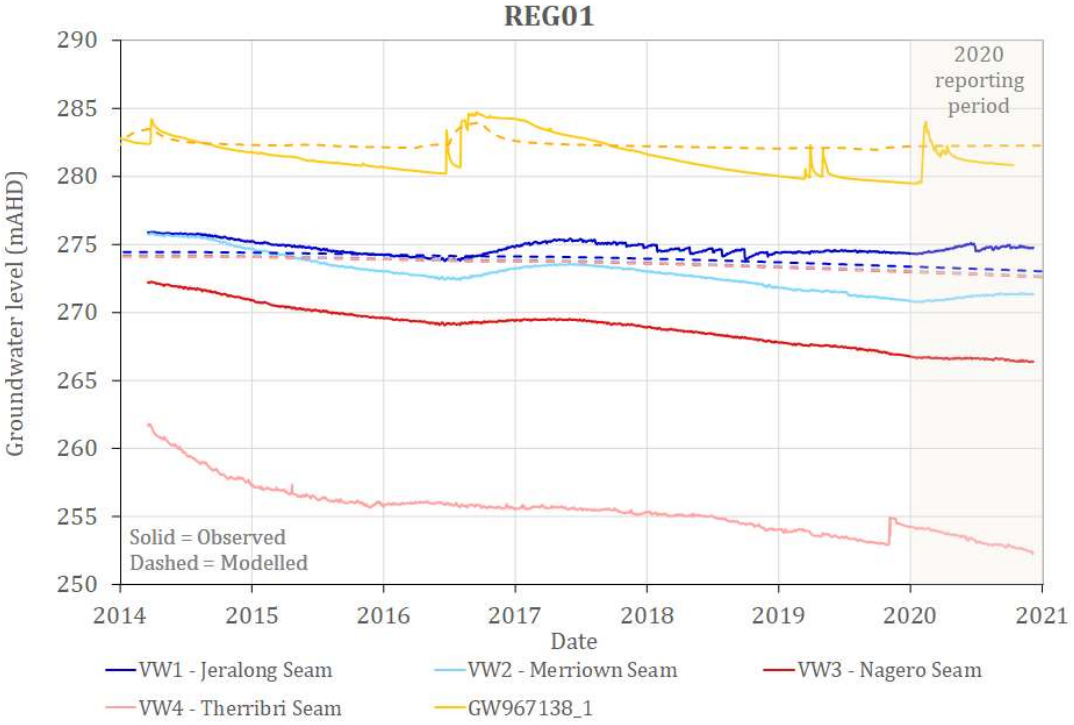


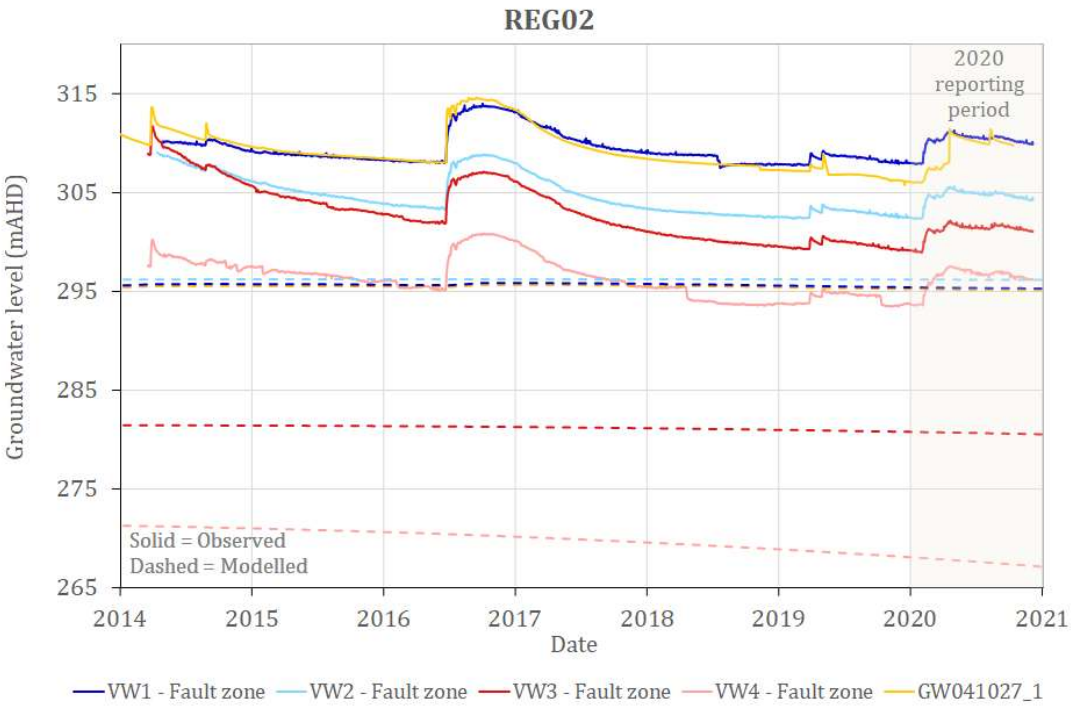


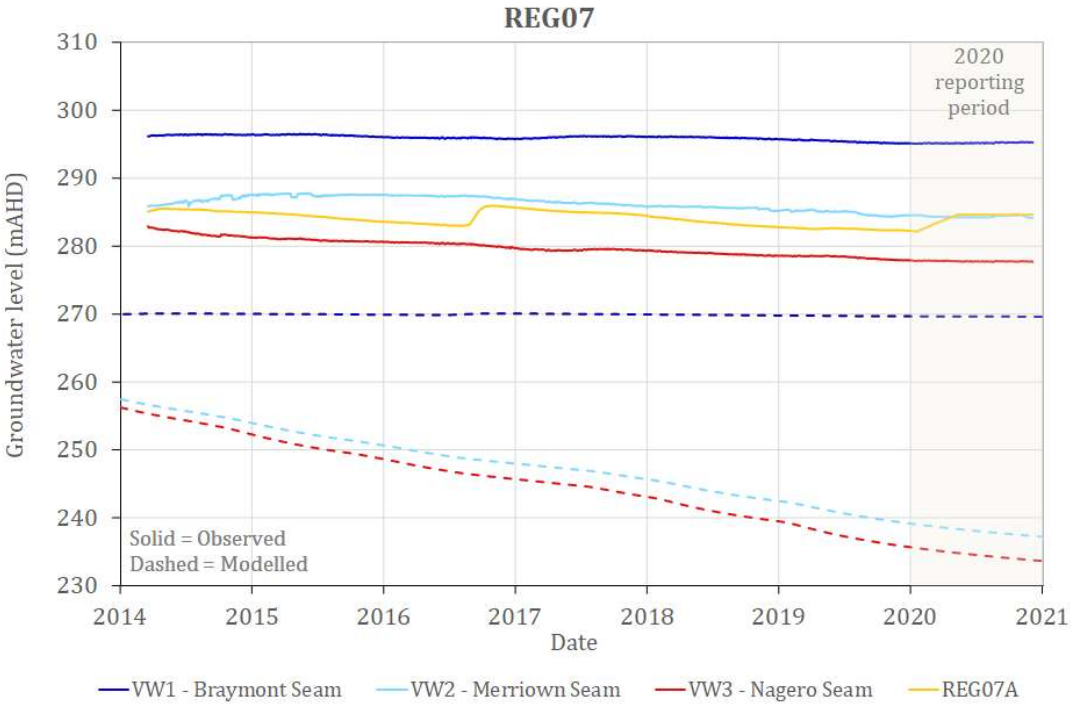


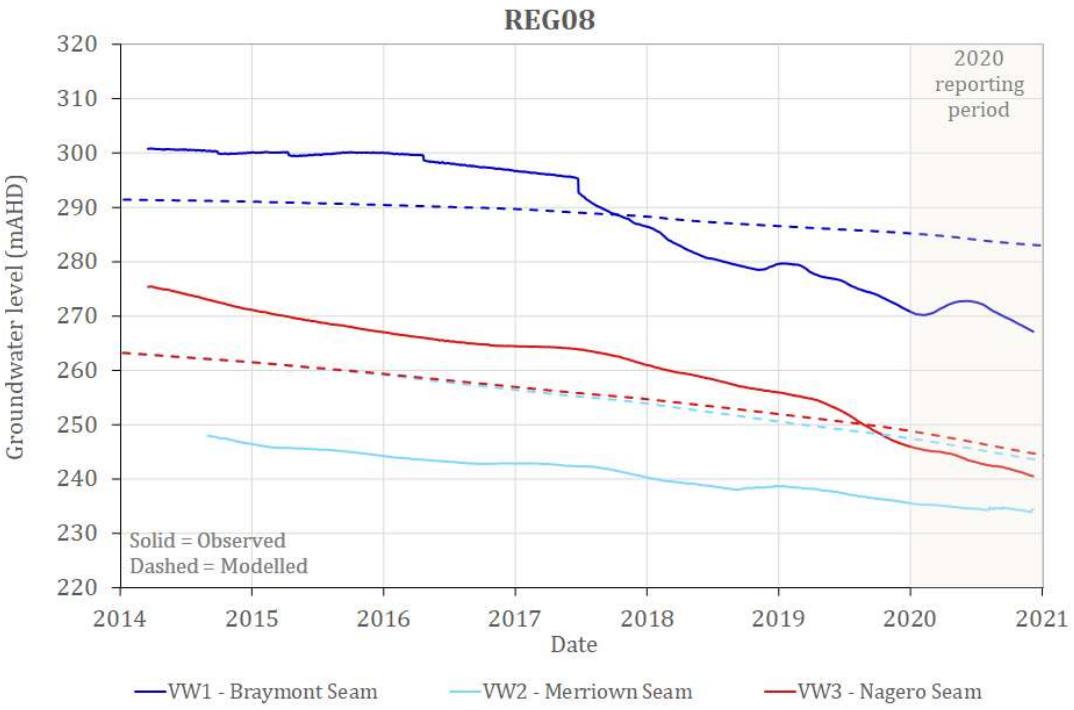


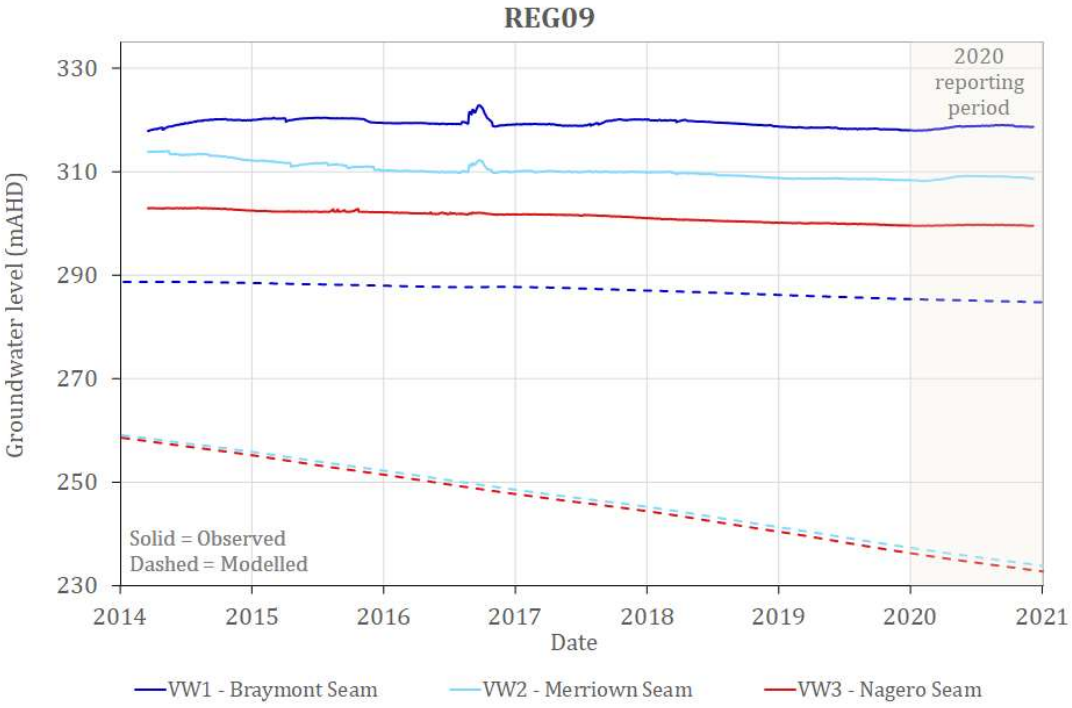
Regional Vibrating Wire Piezometers - observed and modelled (2018) water levels

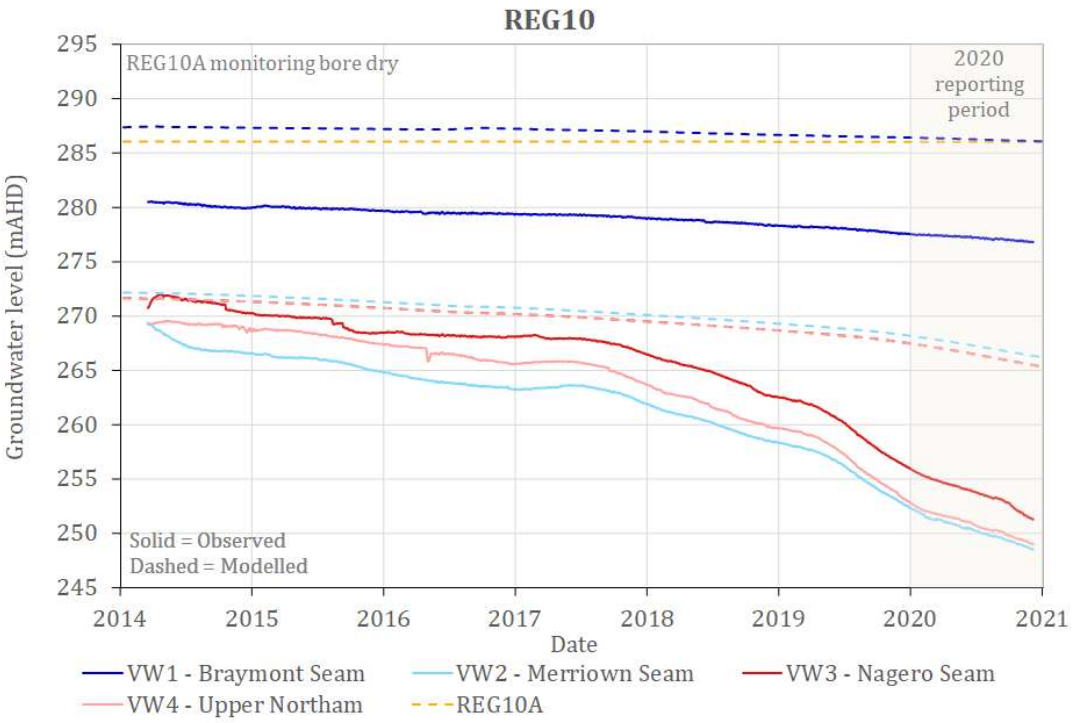


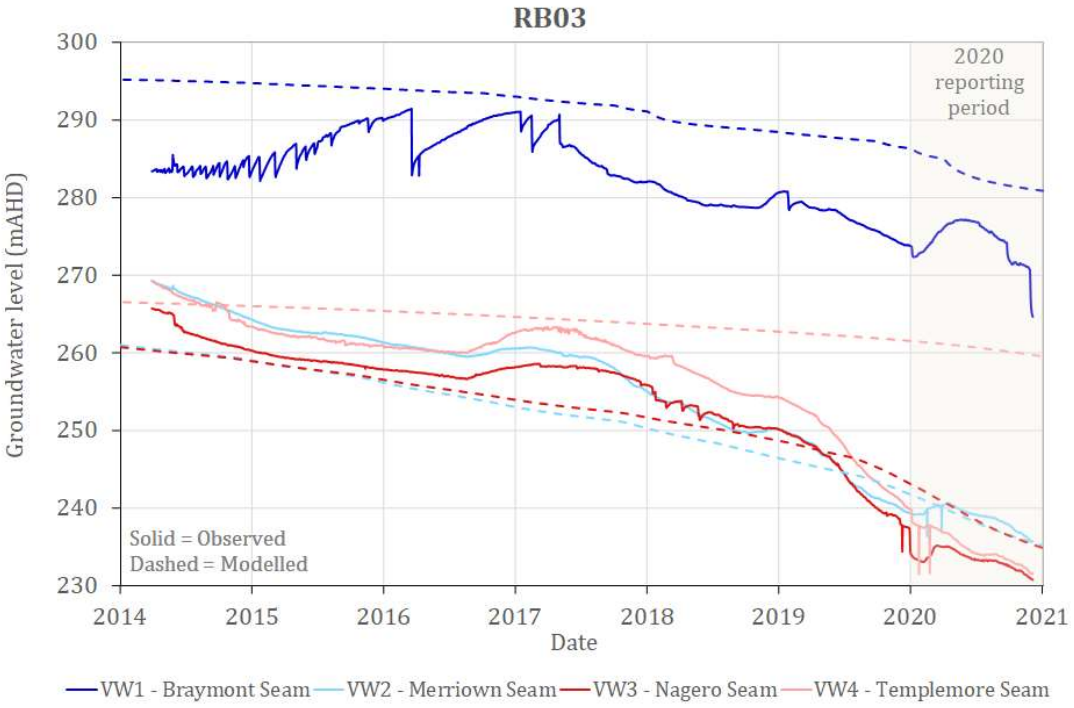


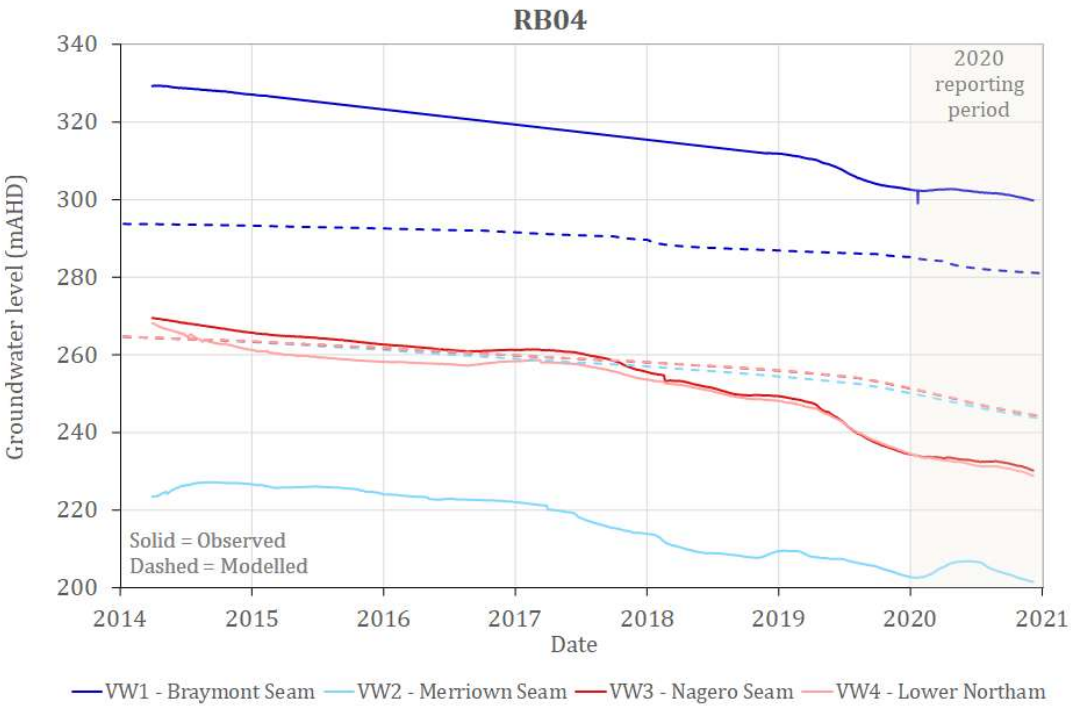

REG07
Groundwater level (mAHD)
310
300
290
280
270
260
250
240
230
2020 reporting period
Solid = Observed
Dashed = Modelled
2014
2015
2016
2017
2018
2019
2020
2021
Date
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam
REG07A


REG08
Groundwater level (mAHD)
320
310
300
290
280
270
260
250
240
230
220
2020 reporting period
Solid = Observed
Dashed = Modelled
2014
2015
2016
2017
2018
2019
2020
2021
Date
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam


REG09
2020 reporting period
Groundwater level (mAHD)
330
310
290
270
250
230
Solid = Observed
Dashed = Modelled
2014
2015
2016
2017
2018
2019
2020
2021
Date
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam


REG10
REG10A monitoring bore dry
2020 reporting period
Groundwater level (mAHD)
295
290
285
280
275
270
265
260
255
250
245
Solid = Observed
Dashed = Modelled
2014
2015
2016
2017
2018
2019
2020
2021
Date
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam
VW4 - Upper Northam
REG10A


RB03
Groundwater level (mAHD)
300
290
280
270
260
250
240
230
2014
2015
2016
2017
2018
2019
2020
2021
Date
2020 reporting period
Solid = Observed
Dashed = Modelled
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam
VW4 - Templemore Seam


RB04
Groundwater level (mAHD)
340
320
300
280
260
240
220
200
2014
2015
2016
2017
2018
2019
2020
2021
Date
2020 reporting period
Solid = Observed
Dashed = Modelled
VW1 - Braymont Seam
VW2 - Merriown Seam
VW3 - Nagero Seam
VW4 - Lower Northam

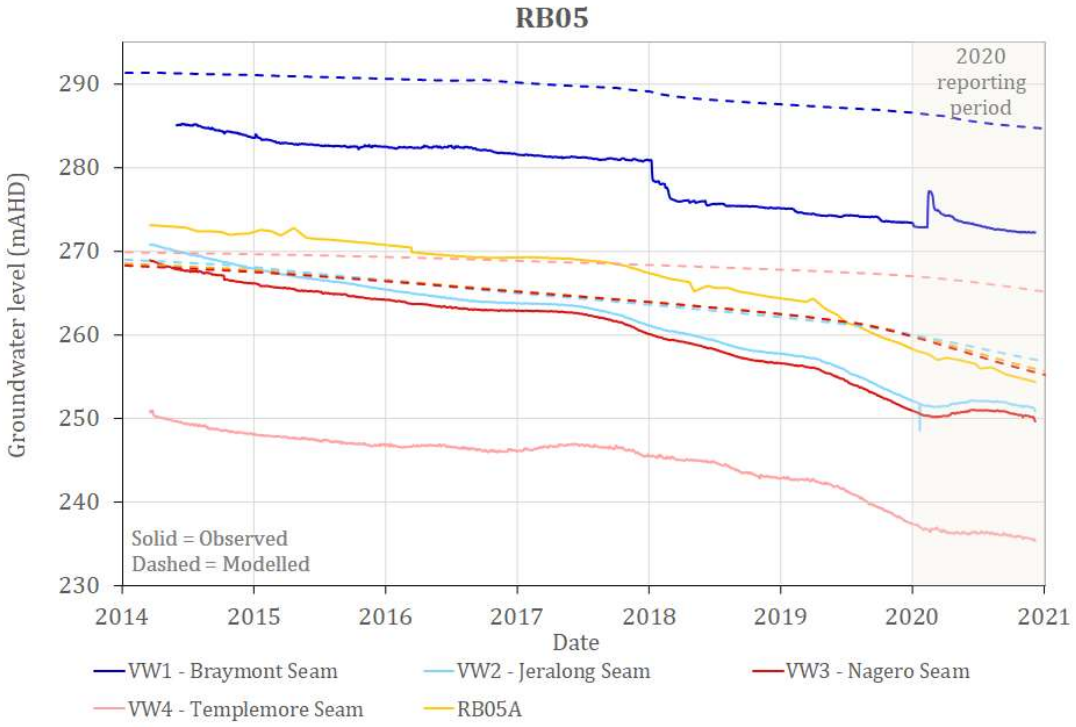

RB05
2020 reporting period
Groundwater level (mAHD)
290
280
270
260
250
240
230
Solid = Observed
Dashed = Modelled
2014
2015
2016
2017
2018
2019
2020
2021
Date
VW1 - Braymont Seam
VW2 - Jeralong Seam
VW3 - Nagero Seam
VW4 - Templemore Seam
RB05A

Table E-6
Annual trend analysis

Bore	Annual difference (m)						Geology
	Dec'14-Dec'15	Dec'15-Dec'16	Dec'16-Dec'17	Dec'17-Dec'18	Dec'18-Dec'19	Dec'19-Dec'20	
GW967138	-1.03	1.32	-0.52	-1.53	-0.72	3.01	Alluvium
REG1_VW1	-1.04	0.40	0.32	-0.52	-0.06	0.38	Jeralong seam
REG1_VW2	-1.71	-0.01	0.09	-1.22	-0.98	0.40	Merriown seam
REG1_VW3	-1.46	-0.27	-0.29	-1.16	-0.98	-0.52	Nagero seam
REG1_VW4	-2.12	-0.15	-0.39	-1.16	0.52	-2.20	Therribri seam
GW041027	-1.38	5.28	-5.22	-0.91	-0.05	2.15	Alluvium
REG2_VW1	-1.11	5.12	-4.29	-1.31	0.06	1.98	Fault zone
REG2_VW2	-2.52	4.32	-4.80	-1.00	-0.12	1.82	Fault zone
REG2_VW3	-3.15	3.67	-5.37	-1.69	-0.51	1.96	Fault zone
REG2_VW4	-1.18	4.57	-4.99	-1.84	-0.19	2.75	Fault zone
REG7A	-1.34	2.09	-1.24	-1.79	-0.37	2.28	Alluvium
REG7_VW1	-0.27	-0.31	0.37	-0.36	-0.63	0.12	Braymont seam
REG7_VW2	0.53	-0.53	-1.03	-0.40	-1.08	-0.28	Merriown seam
REG7_VW3	-0.81	-0.80	-0.43	-0.79	-0.64	-0.27	Nagero seam
REG8_VW1	-2.29	-1.65	-2.11	-2.25	-7.69	-4.25	Braymont seam
REG8_VW2	0.07	-3.08	-9.92	-8.23	-2.84	-1.55	Merriown seam
REG8_VW3	-4.24	-2.85	-2.85	-5.36	-9.76	-5.76	Nagero seam
REG9_VW1	-0.48	-0.57	1.18	-1.15	-0.88	0.58	Braymont seam
REG9_VW2	-1.50	-0.94	-0.04	-1.05	-0.58	0.35	Merriown seam
REG9_VW3	-0.44	-0.51	-0.49	-0.96	-0.64	-0.03	Nagero seam
REG10_VW1	-0.24	-0.31	-0.31	-0.71	-0.76	-0.79	Braymont seam
REG10_VW2	-1.68	-1.56	-1.10	-3.77	-5.54	-4.50	Merriown seam
REG10_VW3	-1.98	-0.38	-1.16	-4.13	-6.13	-5.31	Nagero seam
REG10_VW4	-1.37	-1.79	-1.62	-4.12	-6.33	-4.64	Upper Northam seam

Bore	Annual difference (m)						Geology
	Dec'14-Dec'15	Dec'15-Dec'16	Dec'16-Dec'17	Dec'17-Dec'18	Dec'18-Dec'19	Dec'19-Dec'20	
RB03_VW1	5.47	1.33	-8.80	-2.57	-5.20	-9.55	Braymont seam
RB03_VW2	-3.15	-1.23	-4.77	-5.68	-9.96	-4.40	Merriown seam
RB03_VW3	-2.61	-0.12	-1.41	-6.27	-11.67	-7.87	Nagero seam
RB03_VW4	-3.29	1.06	-2.13	-5.41	-13.22	-9.63	Templemore seam
RB04_VW1	-	-	-	-	-9.06	-2.99	Braymont seam
RB04_VW2	-2.16	-2.44	-8.09	-5.76	-4.89	-2.02	Merriown seam
RB04_VW3	-3.14	-1.71	-4.91	-6.77	-14.37	-4.99	Nagero seam
RB04_VW4	-3.50	-0.10	-4.06	-5.79	-12.86	-6.65	Lower Northam seam
RB05A	-1.27	-1.08	-1.93	-3.29	-5.54	-4.31	Merriown seam
RB05_VW1	-1.39	-0.79	-0.83	-5.75	-1.69	-1.23	Braymont seam
RB05_VW2	-2.57	-1.82	-2.20	-3.73	-5.09	-1.96	Jeralong seam
RB05_VW3	-1.99	-1.39	-2.22	-3.95	-5.15	-1.93	Nagero seam
RB05_VW4	-1.59	-0.71	-0.09	-2.91	-4.87	-2.87	Templemore seam
MAC1280	2.69	1.90	0.99	-2.80	-2.68	-0.49	Interburden
REG3	-0.80	0.91	-0.13	-1.99	-0.98	0.76	Boggabri Volcanics
REG4	0.30	0.09	-0.06	-0.18	-0.17	-0.60	Boggabri Volcanics
REG5	-	0.06	0.00	-0.07	-0.10	-0.21	Boggabri Volcanics
REG6	-	-0.10	-0.03	-2.06	-0.56	1.28	Boggabri Volcanics
REG12	-0.19	-0.07	0.06	-0.11	-0.05	0.08	Boggabri Volcanics
REG13	0.02	0.13	0.30	-0.09	-0.10	-0.14	Boggabri Volcanics
REG14	-0.15	0.24	-0.39	-1.10	-0.16	0.31	Basement

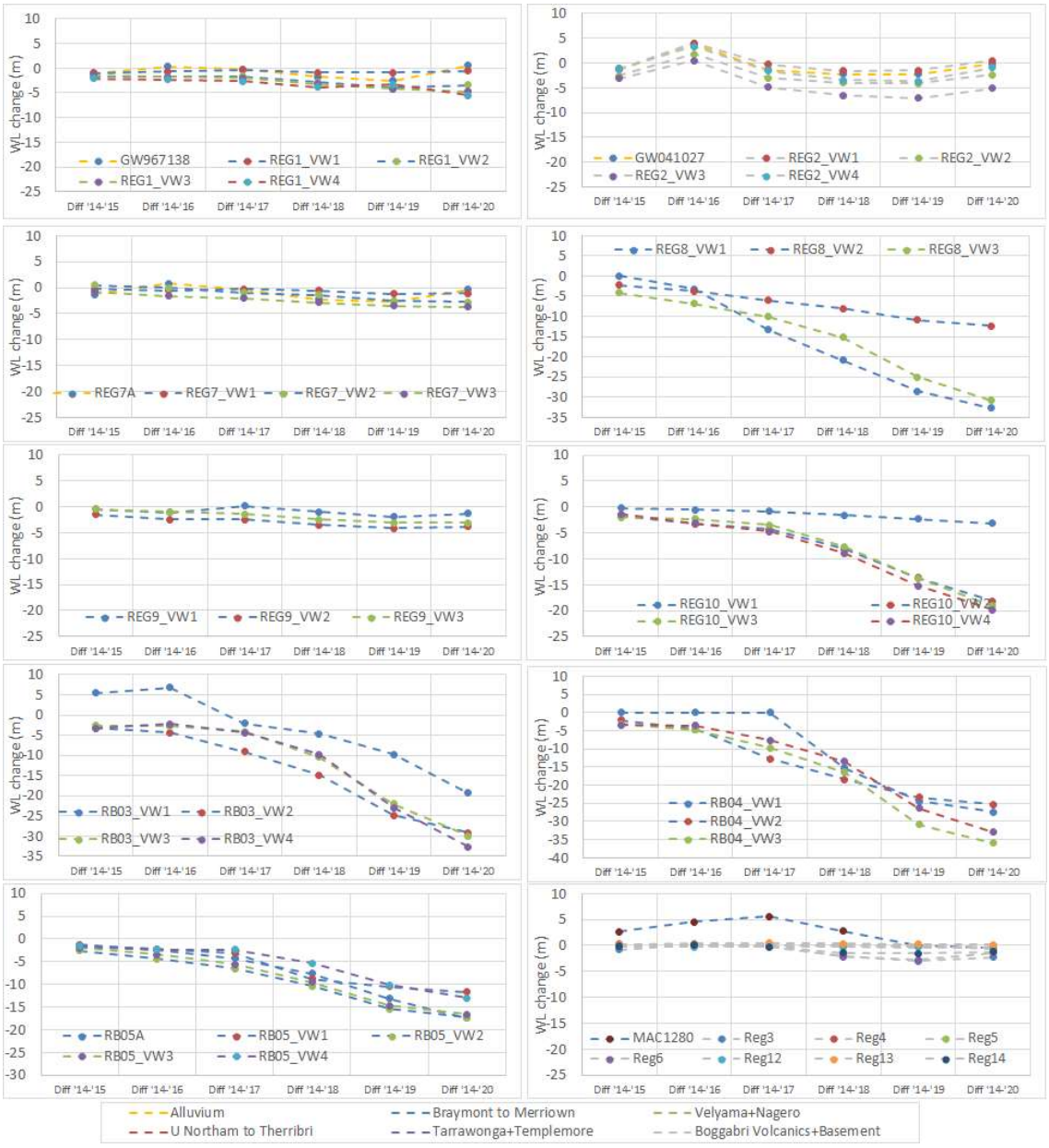
Bore	Cumulative annual difference since December 2014 (m)						Geology
	Diff '14-'15	Diff '14-'16	Diff '14-'17	Diff '14-'18	Diff '14-'19	Diff '14-'20	
GW967138	-1.03	0.29	-0.23	-1.76	-2.48	0.53	Alluvium
REG1_VW1	-1.04	-0.64	-0.32	-0.85	-0.91	-0.53	Jeralong seam
REG1_VW2	-1.71	-1.72	-1.63	-2.85	-3.83	-3.42	Merriown seam
REG1_VW3	-1.46	-1.74	-2.03	-3.18	-4.17	-4.69	Nagero seam
REG1_VW4	-2.12	-2.27	-2.66	-3.82	-3.30	-5.50	Therribri seam
GW041027	-1.38	3.90	-1.32	-2.22	-2.27	-0.12	Alluvium
REG2_VW1	-1.11	4.01	-0.28	-1.59	-1.53	0.46	Fault zone
REG2_VW2	-2.52	1.80	-3.00	-4.00	-4.12	-2.30	Fault zone
REG2_VW3	-3.15	0.52	-4.85	-6.54	-7.05	-5.09	Fault zone
REG2_VW4	-1.18	3.39	-1.60	-3.44	-3.63	-0.88	Fault zone
REG7A	-1.34	0.75	-0.49	-2.28	-2.65	-0.37	Alluvium
REG7_VW1	-0.27	-0.59	-0.22	-0.57	-1.20	-1.08	Braymont seam
REG7_VW2	0.53	0.00	-1.04	-1.44	-2.51	-2.79	Merriown seam
REG7_VW3	-0.81	-1.61	-2.04	-2.83	-3.47	-3.74	Nagero seam
REG8_VW1	0.05	-3.13	-13.24	-20.80	-28.49	-32.74	Braymont seam
REG8_VW2	-2.22	-3.73	-6.07	-8.00	-10.84	-12.39	Merriown seam
REG8_VW3	-4.15	-6.86	-10.04	-15.24	-25.00	-30.76	Nagero seam
REG9_VW1	-0.48	-1.04	0.14	-1.02	-1.90	-1.32	Braymont seam
REG9_VW2	-1.50	-2.44	-2.49	-3.53	-4.11	-3.76	Merriown seam
REG9_VW3	-0.44	-0.95	-1.44	-2.39	-3.04	-3.07	Nagero seam
REG10_VW1	-0.24	-0.55	-0.87	-1.57	-2.33	-3.12	Braymont seam
REG10_VW2	-1.68	-3.24	-4.34	-8.11	-13.65	-18.15	Merriown seam
REG10_VW3	-1.98	-2.35	-3.51	-7.64	-13.76	-19.08	Nagero seam
REG10_VW4	-1.37	-3.15	-4.77	-8.89	-15.22	-19.86	Upper Northam seam
RB03_VW1	5.47	6.79	-2.01	-4.58	-9.78	-19.33	Braymont seam

Bore	Cumulative annual difference since December 2014 (m)						Geology
	Diff '14-'15	Diff '14-'16	Diff '14-'17	Diff '14-'18	Diff '14-'19	Diff '14-'20	
RB03_VW2	-3.15	-4.38	-9.15	-14.84	-24.80	-29.20	Merriown seam
RB03_VW3	-2.61	-2.73	-4.13	-10.40	-22.07	-29.94	Nagero seam
RB03_VW4	-3.29	-2.23	-4.36	-9.77	-22.99	-32.62	Templemore seam
RB04_VW1	-	-	-	-15.29	-24.35	-27.34	Braymont seam
RB04_VW2	-2.16	-4.60	-12.69	-18.45	-23.34	-25.36	Merriown seam
RB04_VW3	-3.14	-4.85	-9.76	-16.53	-30.89	-35.88	Nagero seam
RB04_VW4	-3.50	-3.60	-7.66	-13.45	-26.31	-32.96	Lower Northam seam
RB05A	-1.27	-2.35	-4.28	-7.57	-13.11	-17.42	Merriown seam
RB05_VW1	-1.39	-2.18	-3.01	-8.77	-10.45	-11.68	Braymont seam
RB05_VW2	-2.57	-4.38	-6.59	-10.32	-15.41	-17.37	Jeralong seam
RB05_VW3	-1.99	-3.39	-5.60	-9.55	-14.71	-16.64	Nagero seam
RB05_VW4	-1.59	-2.30	-2.39	-5.30	-10.17	-13.04	Templemore seam
MAC1280	2.69	4.59	5.58	2.78	0.10	-0.39	Interburden
REG3	-0.80	0.11	-0.02	-2.01	-2.99	-2.23	Boggabri Volcanics
REG4	0.30	0.39	0.33	0.15	-0.02	-0.62	Boggabri Volcanics
REG5	-	0.06	0.06	-0.01	-0.11	-0.32	Boggabri Volcanics
REG6	-	-0.10	-0.13	-2.19	-2.75	-1.47	Boggabri Volcanics
REG12	-0.19	-0.26	-0.20	-0.31	-0.36	-0.28	Boggabri Volcanics
REG13	0.02	0.15	0.45	0.36	0.26	0.12	Boggabri Volcanics
REG14	-0.15	0.09	-0.30	-1.40	-1.56	-1.25	Basement

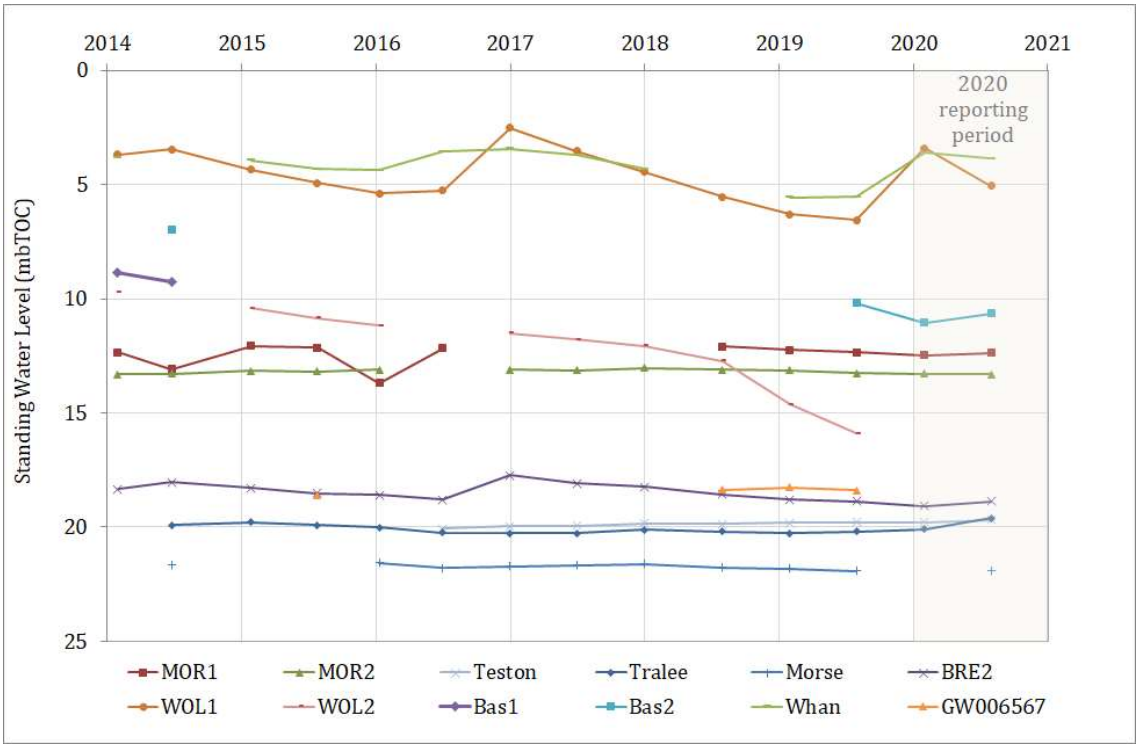
Colour scale (m change)

Rise 5 to 10	2 to 5	1 to 2	1 to -1	-1 to -2	-2 to -5	-5 to -10	-10 to -15	>-15 Fall

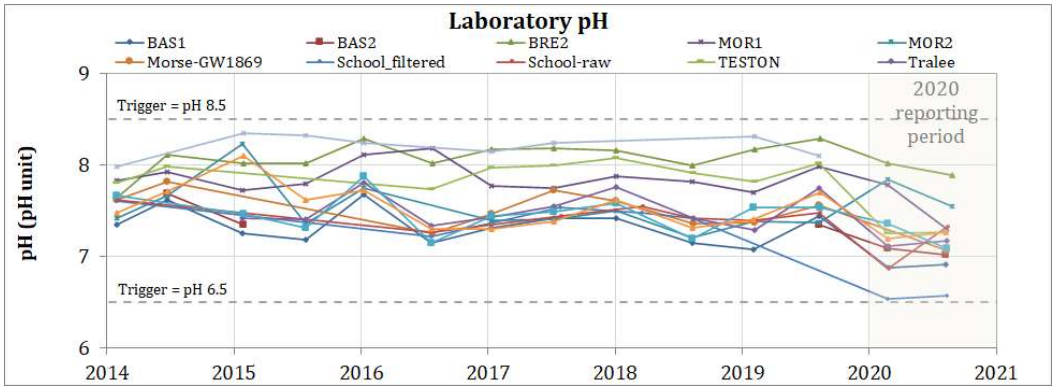
Cumulative annual difference in water level since December 2014

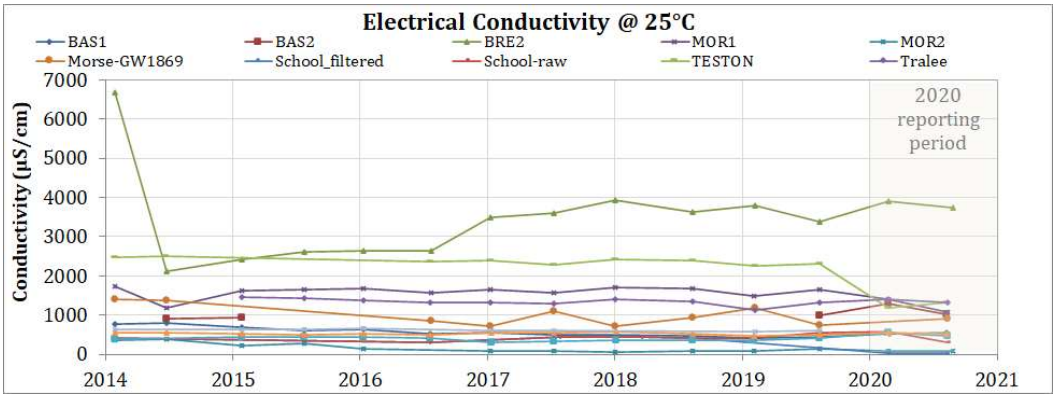


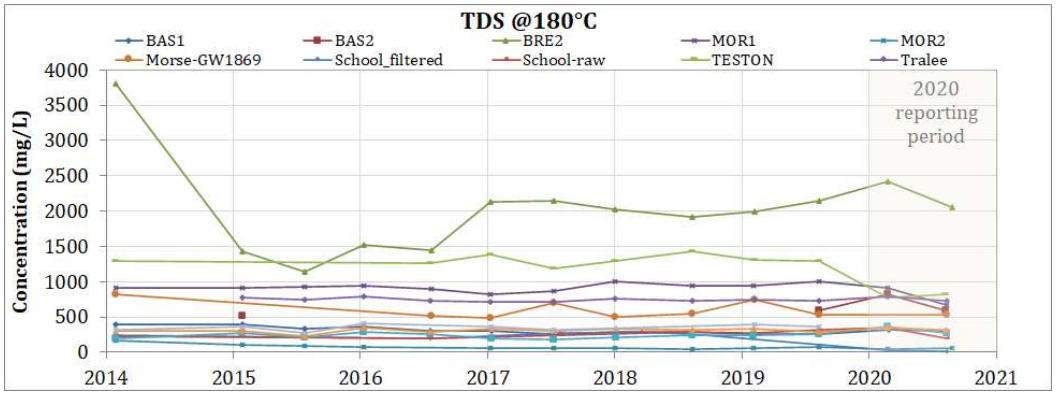
Private Groundwater Bores – Water levels

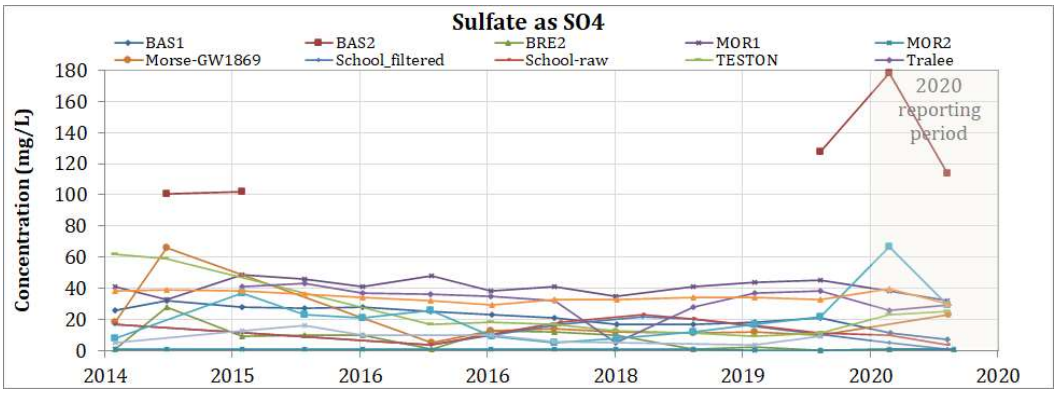


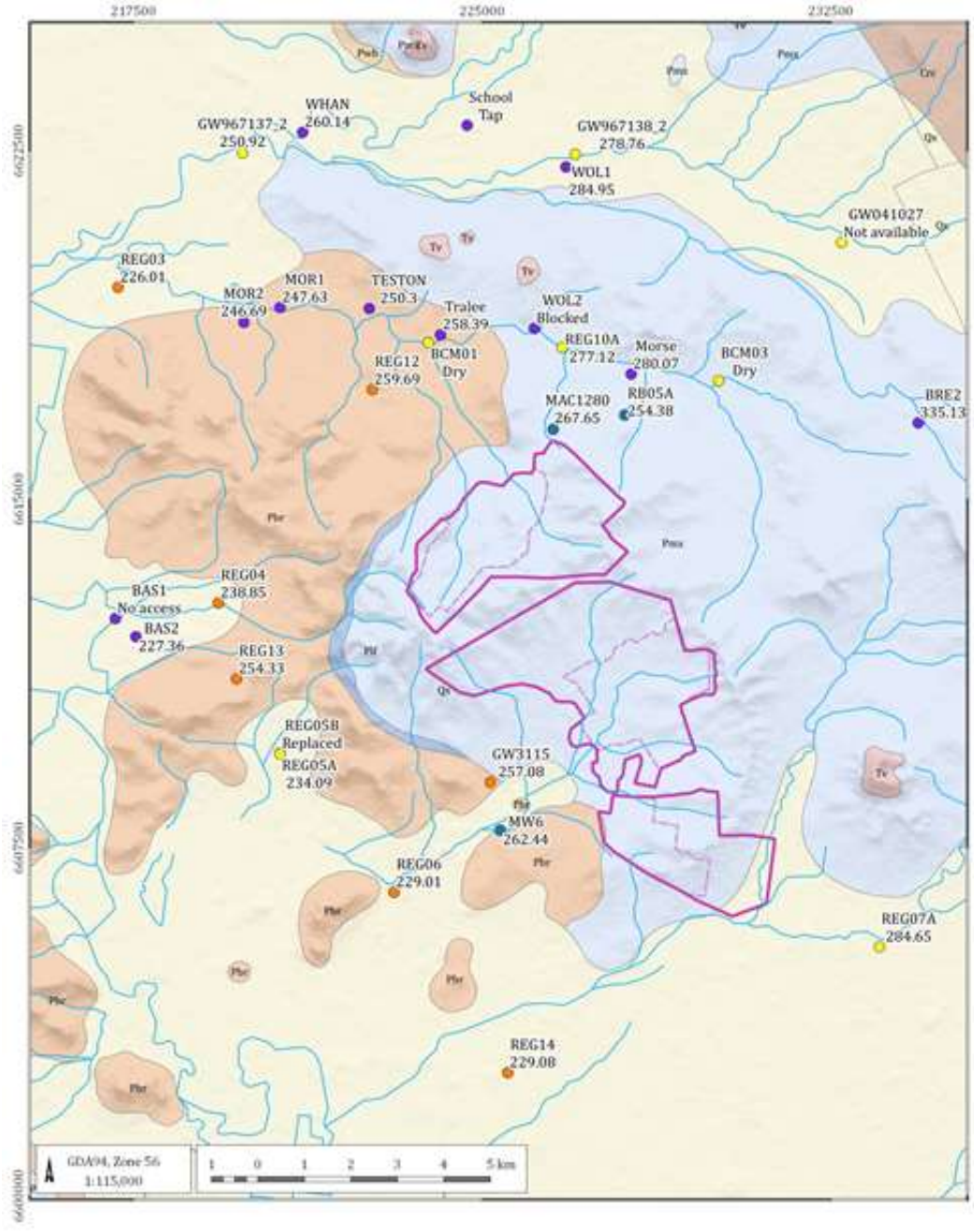
Private Groundwater Bores – Individual water quality parameters











LEGEND

Standpipe piezometer water levels – late 2020 (mAHD)

- Alluvium bore
- Permian bore
- Private bore
- Boggabri Volcanics bore
- Drainage
- Mine maximum open cut pit outline
- Approx. 2020 mining extent

Gunnedah Coalfield rock unit (1:100k)

- Qx - Quaternary Sediments
- Tv - Tertiary Volcanics
- Pmx - Maules Creek and Goonbri formations
- Plf - Leard Formation
- Pbr - Boggabri Volcanics
- Cbc - Currabubula Formation
- Crc - Rocky Creek Conglomerate

Maules Creek Mine Annual Review (G1850S2)

Approximate groundwater elevations in standpipe bores - late 2020

AGE

DATE 25/02/2021

FIGURE No: **E-1**

Table E-7

Additional (non-Maules Creek mine) bores used in this report

Bore ID	Type	Network	Easting (GDA95 Z56)	Northing (GDA95 Z56)	Ground Elevation (mAHD)	Bore Depth (m)	Screen/Sensor Depth (mbgl)	Target Geology
GW967137	SP	DPI Water	219846	6622452	258.79	84	8-11	Alluvium
GW967138	SP	DPI Water	227001	6622422	288.55	89.6	7-10	Alluvium
GW041027	SP	DPI Water	232730	6620523	318.45	83.5	8.3-14.3	Alluvium
IBC2102	SP	Boggabri Coal	226892	6611771	322	85	78-82	Merriown Seam
IBC2103	SP	Boggabri Coal	226898	6611773	321.8	59	50-56	Jeralong Seam
IBC2104	SP	Boggabri Coal	228336	6612215	331.1	87	80-84	Braymont Seam
IBC2105	SP	Boggabri Coal	228321	6612212	331.4	160	151-157	Merriown Seam
IBC2110 (MW3)	SP	Boggabri Coal	225939	6607684	272.8	100	91-97	Boggabri Volcanics
IBC2111	SP	Boggabri Coal	225950	6607683	272.7	45	36-42	Boggabri Volcanics
IBC2181	SP	Boggabri Coal	226848	6612477	335.2	114	105-111	Merriown Seam
MW6	SP	Tarrawonga Coal	225385	6607871	264.41	32	29-32	Alluvium
GW3115	Bore	Private/Boggabri	225174	6608903	280 (estimated)	TBC	TBC	Boggabri Volcanics

APPENDIX F

ATTENDED NOISE MONITRORING RESULTS

LAeq, 15minute GENERATED BY MCCM AGAINST OPERATIONAL NIGHT NOISE CRITERIA

Table F-1 – January 2020 Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	29/01/2020 22:34	1.1	0	35	Yes	IA	Nil
NM2	29/01/2020 23:45	3.0	0	39	Yes	<20	Nil
NM3	29/01/2020 23:30	1.7	0	35	Yes	IA	Nil
NM4	29/01/2020 23:15	0.9	0	35	Yes	IA	Nil
NM5	29/01/2020 22:06	1.3	0	35	Yes	IA	Nil
NM6	30/01/2020 00:14	3.6	0	35	No	IA	NA

Table F-2 - February Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	17/02/2020 22:30	1.4	0.0	35	Yes	IA	Nil
NM2	17/02/2020 23:17	1.8	0.0	39	Yes	30	Nil
NM3	17/02/2020 23:45	3.3	0.0	35	No	<25	NA
NM4	17/02/2020 22:54	2.2	0.0	35	Yes	IA	Nil
NM5	17/02/2020 22:00	1.1	0.0	35	Yes	IA	Nil
NM6	17/02/2020 23:43	3.3	0.0	35	No	<20	NA

Table F-3 - March Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	17/03/2020 22:27	4.5	0.0	35	No	IA	NA
NM2	17/03/2020 23:30	3.5	0.0	39	No	25	NA
NM3	17/03/2020 23:45	2.8	0.0	35	Yes	NM	Nil
NM4	17/03/2020 23:00	3.4	0.0	35	No	<25	NA
NM5	17/03/2020 22:00	3.9	0.0	35	No	IA	NA
NM6	17/03/2020 23:56	2.5	0.0	35	Yes	<20	Nil

Table F-4 - April Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	01/04/2020 22:30	0.4	0.0	35	Yes	39	**4**
NM1	01/04/2020 23:13	0.4	0.0	35	Yes	IA	Nil
NM2	02/04/2020 00:03	0.2	0.0	39	Yes	<20	Nil
NM3	01/04/2020 23:30	0.2	0.0	35	Yes	IA	Nil
NM4	01/04/2020 23:41	0.1	0.0	35	Yes	IA	Nil
NM5	01/04/2020 22:00	0.2	0.0	35	Yes	IA	Nil
NM6	01/04/2020 23:56	0.3	0.0	35	Yes	IA	Nil

Table F-5 - May Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	14/05/2020 22:30	3.2	0.0	35	No	IA	NA
NM2	14/05/2020 23:30	2.6	0.0	39	Yes	<30	Nil
NM3	14/05/2020 23:30	2.6	0.0	35	Yes	<25	Nil
NM4	14/05/2020 23:01	2.7	0.0	35	Yes	<20	Nil
NM5	14/05/2020 22:00	3.6	0.0	35	No	IA	NA
NM6	15/05/2020 00:01	1.8	0.0	35	Yes	IA	Nil

Table F-6 - June Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	03/06/2020 22:30	0.6	0.0	35	Yes	<25	Nil
NM2	03/06/2020 23:30	0.1	0.0	39	Yes	28	Nil
NM3	03/06/2020 23:39	0.1	0.0	35	Yes	<25	Nil
NM4	03/06/2020 23:00	0.3	0.0	35	Yes	<20	Nil
NM5	03/06/2020 22:00	0.3	0.0	35	Yes	IA	Nil
NM6	03/06/2020 23:59	0.1	0.0	35	Yes	NM	Nil

Table F-7 - July Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	09/07/2020 00:04	1.4	0	35	Yes	IA	Nil
NM2	08/07/2020 23:35	1.1	0	39	Yes	IA	Nil
NM3	08/07/2020 22:00	2.3	0	35	Yes	<20	Nil
NM4	08/07/2020 23:08	1.5	0	35	Yes	<25	Nil
NM5	09/07/2020 00:35	2.6	0	35	Yes	IA	Nil
NM6	08/07/2020 22:36	3.2	0	35	No	<25	NA

Table F-8 - August Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	03/08/2020 22:26	1.6	0.0	35	Yes	IA	Nil
NM2	03/08/2020 23:11	1.9	0.0	39	Yes	IA	Nil
NM3	04/08/2020 00:02	1.3	0.0	35	Yes	IA	Nil
NM4	03/08/2020 22:50	1.1	0.0	35	Yes	IA	Nil
NM5	03/08/2020 22:00	2.1	0.0	35	Yes	<25	Nil
NM6	03/08/2020 23:37	1.5	0.0	35	Yes	IA	Nil

Table F-9 - September Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	01/09/2020 22:30	0.6	0	35	Yes	<25	Nil
NM2	01/09/2020 23:30	0.5	0	39	Yes	<20	Nil
NM3	01/09/2020 23:31	0.5	0	35	Yes	IA	Nil
NM4	01/09/2020 23:00	0.5	0	35	Yes	IA	Nil
NM5	01/09/2020 22:00	0.7	0	35	Yes	<20	Nil
NM6	01/09/2020 23:58	0.4	0	35	Yes	IA	Nil

Table F-10 - October Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	01/10/2020 22:30	1.6	0.0	35	Yes	35	Nil
NM2	01/10/2020 23:30	2.1	0.0	39	Yes	35	Nil
NM3	01/10/2020 23:35	1.3	0.0	35	Yes	IA	Nil
NM4	01/10/2020 23:00	1.7	0.0	35	Yes	<30	Nil
NM5	01/10/2020 22:00	1.2	0.0	35	Yes	<30	Nil
NM6	01/10/2020 23:55	2.8	0.0	35	Yes	<25	Nil

Table F-11 - November Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	09/11/2020 22:30	2.2	0.0	35	Yes	23	Nil
NM2	09/11/2020 23:30	1.0	0.0	39	Yes	29	Nil
NM3	09/11/2020 23:30	1.0	0.0	35	Yes	23	Nil
NM4	09/11/2020 23:00	1.5	0.0	35	Yes	25	Nil
NM5	09/11/2020 22:00	3.5	0.0	35	No	IA	NA
NM6	09/11/2020 23:55	0.8	0.0	35	Yes	24	Nil

Table F-12 - December Noise Monitoring

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP L_{Aeq} dB [2]	Exceedance dB [3]
NM1	08/12/2020 22:30	2.2	0.0	35	Yes	23	Nil
NM2	08/12/2020 23:30	0.9	0.0	39	Yes	31	Nil
NM3	08/12/2020 23:31	0.9	0.0	35	Yes	IA	Nil
NM4	08/12/2020 23:00	1.9	0.0	35	Yes	24	Nil
NM5	08/12/2020 22:00	2.3	0.0	35	Yes	IA	Nil
NM6	08/12/2020 23:55	1.0	0.0	35	Yes	<20	Nil

(1). Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres);
(2). Estimated or measured LAeq,15minute attributed to MCCM;
(3). NA in exceedance column means criterion is not applicable, either due to atmospheric conditions outside those specified in project approval or due to property acquisition by MCC; and
(4). Indicates the application of a 2dB low frequency modifying factor.
IA/NM – Inaudible NM – Not measurable

LA1, 1minute GENERATED BY MCC AGAINST OPERATIONAL NIGHT NOISE CRITERIA

Table F-13 - January Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	29/01/2020 22:34	1.1	0	45	Yes	IA	Nil
NM2	29/01/2020 23:45	3.0	0	45	Yes	<20	Nil
NM3	29/01/2020 23:30	1.7	0	45	Yes	IA	Nil
NM4	29/01/2020 23:15	0.9	0	45	Yes	IA	Nil
NM5	29/01/2020 22:06	1.3	0	45	Yes	IA	Nil
NM6	30/01/2020 00:14	3.6	0	45	No	IA	NA

Table F-14 – February Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	17/02/2020 22:30	1.4	0.0	45	Yes	IA	Nil
NM2	17/02/2020 23:17	1.8	0.0	45	Yes	35	Nil
NM3	17/02/2020 23:45	3.3	0.0	45	No	<25	NA
NM4	17/02/2020 22:54	2.2	0.0	45	Yes	IA	Nil
NM5	17/02/2020 22:00	1.1	0.0	45	Yes	IA	Nil
NM6	17/02/2020 23:43	3.3	0.0	45	No	<20	NA

Table F-15 - March Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	17/03/2020 22:27	4.5	0.0	45	No	IA	NA
NM2	17/03/2020 23:30	3.5	0.0	45	No	45	NA
NM3	17/03/2020 23:45	2.8	0.0	45	Yes	NM	Nil
NM4	17/03/2020 23:00	3.4	0.0	45	No	26	NA
NM5	17/03/2020 22:00	3.9	0.0	45	No	IA	NA
NM6	17/03/2020 23:56	2.5	0.0	45	Yes	<20	Nil

Table F-16 - April Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	01/04/2020 22:30	0.4	0.0	45	Yes	39	Nil
NM1	01/04/2020 23:13	0.4	0.0	45	Yes	IA	Nil
NM2	02/04/2020 00:03	0.2	0.0	45	Yes	<20	Nil
NM3	01/04/2020 23:30	0.2	0.0	45	Yes	IA	Nil
NM4	01/04/2020 23:41	0.1	0.0	45	Yes	IA	Nil
NM5	01/04/2020 22:00	0.2	0.0	45	Yes	IA	Nil
NM6	01/04/2020 23:56	0.3	0.0	45	Yes	IA	Nil

TableF-17 – May Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	14/05/2020 22:30	3.2	0.0	45	No	IA	NA
NM2	14/05/2020 23:30	2.6	0.0	45	Yes	38	Nil
NM3	14/05/2020 23:30	2.6	0.0	45	Yes	<25	Nil
NM4	14/05/2020 23:01	2.7	0.0	45	Yes	<20	Nil
NM5	14/05/2020 22:00	3.6	0.0	45	No	IA	NA
NM6	15/05/2020 00:01	1.8	0.0	45	Yes	IA	Nil

Table F-18 - June Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	03/06/2020 22:30	0.6	0.0	45	Yes	27	Nil
NM2	03/06/2020 23:30	0.1	0.0	45	Yes	39	Nil
NM3	03/06/2020 23:39	0.1	0.0	45	Yes	27	Nil
NM4	03/06/2020 23:00	0.3	0.0	45	Yes	<20	Nil
NM5	03/06/2020 22:00	0.3	0.0	45	Yes	IA	Nil
NM6	03/06/2020 23:59	0.1	0.0	45	Yes	NM	Nil

Table F-19 - July Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	09/07/2020 00:04	1.4	0	45	Yes	IA	Nil
NM2	08/07/2020 23:35	1.1	0	45	Yes	IA	Nil
NM3	08/07/2020 22:00	2.3	0	45	Yes	<20	Nil
NM4	08/07/2020 23:08	1.5	0	45	Yes	<25	Nil
NM5	09/07/2020 00:35	2.6	0	45	Yes	IA	Nil
NM6	08/07/2020 22:36	3.2	0	45	No	26	NA

Table F-20 – August Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	03/08/2020 22:26	1.6	0.0	45	Yes	IA	Nil
NM2	03/08/2020 23:11	1.9	0.0	45	Yes	IA	Nil
NM3	04/08/2020 00:02	1.3	0.0	45	Yes	IA	Nil
NM4	03/08/2020 22:50	1.1	0.0	45	Yes	IA	Nil
NM5	03/08/2020 22:00	2.1	0.0	45	Yes	29	Nil
NM6	03/08/2020 23:37	1.5	0.0	45	Yes	IA	Nil

Table F-21 - September Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	01/09/2020 22:30	0.6	0	45	Yes	<25	Nil
NM2	01/09/2020 23:30	0.5	0	45	Yes	23	Nil
NM3	01/09/2020 23:31	0.5	0	45	Yes	IA	Nil
NM4	01/09/2020 23:00	0.5	0	45	Yes	IA	Nil
NM5	01/09/2020 22:00	0.7	0	45	Yes	22	Nil
NM6	01/09/2020 23:58	0.4	0	45	Yes	IA	Nil

Table F-22 - October Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	01/10/2020 22:30	1.6	0.0	45	Yes	37	Nil
NM2	01/10/2020 23:30	2.1	0.0	45	Yes	41	Nil
NM3	01/10/2020 23:35	1.3	0.0	45	Yes	IA	Nil
NM4	01/10/2020 23:00	1.7	0.0	45	Yes	<30	Nil
NM5	01/10/2020 22:00	1.2	0.0	45	Yes	<30	Nil
NM6	01/10/2020 23:55	2.8	0.0	45	Yes	<25	Nil

Table F23 – November Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	09/11/2020 22:30	2.2	0.0	45	Yes	28	Nil
NM2	09/11/2020 23:30	1.0	0.0	45	Yes	34	Nil
NM3	09/11/2020 23:30	1.0	0.0	45	Yes	<25	Nil
NM4	09/11/2020 23:00	1.5	0.0	45	Yes	30	Nil
NM5	09/11/2020 22:00	3.5	0.0	45	No	IA	NA
NM6	09/11/2020 23:55	0.8	0.0	45	Yes	25	Nil

Table F-24 - December Noise Monitoring – Night

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MCCP $L_{A1,1min}$ dB [2]	Exceedance dB [3]
NM1	08/12/2020 22:30	2.2	0.0	45	Yes	28	Nil
NM2	08/12/2020 23:30	0.9	0.0	45	Yes	35	Nil
NM3	08/12/2020 23:31	0.9	0.0	45	Yes	IA	Nil
NM4	08/12/2020 23:00	1.9	0.0	45	Yes	28	Nil
NM5	08/12/2020 22:00	2.3	0.0	45	Yes	IA	Nil
NM6	08/12/2020 23:55	1.0	0.0	45	Yes	<20	Nil

Notes:

1. *Noise emission limits do not apply during periods of rainfall or wind speeds greater than 3 metres per second (at 10 metres);*
2. *Estimated or measured LAeq,15minute attributed to MCCM;*
3. *Estimated or measured LA1,1minute attributed to MCCM;*
4. *NA in exceedance column means atmospheric conditions outside those specified in Project Approval and criterion is not applicable.*

IA – Inaudible NM – Not measurable

APPENDIX G

DPI&E RESPONSE TABLE

TABLE F-1

Item	DP&E response	MCCM response
1	Section 6.4.2 of the AR does not provide a discussion on previous years attended noise monitoring data or comparison with predictions made in the Environmental Assessment (EA). Please revise Section 6.4.2 to include a discussion with previous years data and predictions made in the EA	Section 6.4.2 has been updated, comparisons have been made to the EA predications and previous year's data.
2	Section 9.3 shows in an increase in the number of traffic related complaints during the reporting period. Section 9.3.1 does not address this increase when discussing the trends. Please revise Section 9.3.1 to include a discussion on the increase in traffic related complaints in the 2019 reporting period;	Section 9.3 has been revised to address the increase in traffic complaints.
3	Section 10 of the AR does not include an update on the findings from the 2018 Independent Environmental Audit (IEA). Please revise Section 10 to include a status update on the findings from the 2018 IEA. If actions are complete, please include that in the current status column	2018 IEA findings status table has been included as Table 19.
4	The Department notes some tables within the AR are unnamed and unnumbered. Please revise to name and number all tables throughout the AR	Tables located on page 56 and 69 have been named accordingly Table 12 Groundwater Trigger Events Table 18 Summary of Rehabilitation Audit
5	Additionally, the Department notes that Section 6.6.2 of the AR reports on the status of Tylophora linearis and Pomaderris queenslandica. Sections 7.2.5 and 7.2.6 of the approved Biodiversity Management Plan (BMP) require that an annual report on the implementation of the Propagation and Translocation Program for each species will be submitted by the end of March each year. As yet the Department is yet to receive these reports	Tylophora linearis and Pomaderris queenslandica annual reports were supplied to the Department on 4 May 2020.