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CHAIN VALLEY COLLIERY

Annual Review 2020

1 January 2020 - 31 December 2020

Author:	Lachlan McWha Delta Coal Environmental Compliance Coordinator
Authorised by:	
Date:	31 March 2021

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Chain Valley Colliery - Annual Review (AEMR) 2020

Chain Valley Colliery			
Great Southern Energy Pty Ltd trading as Delta Coal			
SSD 5465			
Delta Coal			
Consolidated Coal Lease 707, Consolidated Coal Lease 706 (part), Mining lease 1051, Mining lease 1052, Mining lease 1308, Mining Lease 1370, Mining lease 1632 (part sublease), Mining Purposes Lease 1349, Mining Purposes Lease 337, Mining Purposes Lease 1389, Mining Purposes Lease 1400, Consolidated Coal Lease 719 (part sublease), Consolidated Coal Lease 721 (part sublease), Consolidated Coal Lease 722.			
Great Southern Energy Pty Ltd			
WAL41508 / Work Approval 20MW065025			
1 st August 2020			
31st December 2023			
1 January 2020			
31 December 2020			

I, Lachlan McWha, certify that this audit report is a true and accurate record of the compliance status of Chain Valley Colliery for the period 1 January 2020 to 31 December 2020 and that I am authorised to make this statement on behalf of Great Southern Energy Pty Ltd (trading as Delta 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).

Reporting Officer	Name:	Lachlan McWha
	Title:	Environmental Compliance Coordinator
	Date:	31st March 2021
	Signature:	Loncura

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Executive Summary

Table 1 - Key Performance Indicators for the reporting period

Indicator	Value
Total full time employees (at 31 December 2020)	235
ROM coal produced on site (tonnes)	1.38 million tonnes (Mt)
Product coal transported from site via Mannering Colliery (tonnes)	1.38 Mt
Total ROM coal to export market (tonnes)	0
Total ROM coal to domestic market (tonnes)	1.38 Mt
Total truck movements on public roads	232 truck-loads
General waste produced (tonnes)	191.3
Total waste recycled (tonnes)	81.6
Waste recycling % achieved	24.7 %
Potable water consumed (ML)	140.4
Total water discharged from the operation (ML)	3,272.5
Total number of community complaints received	1
Total number of reportable environmental incidents (including approvals non-compliances) for the period	13
Total funding accrued for the Voluntary Planning Agreement with Council	\$48,205
Number of Community Consultative Committee (CCC) meetings undertaken	4
Total Scope 1 greenhouse gas emissions (CO₂ equivalent tonnes) July 2019 – June 2020	503,294

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Statement of Compliance

Summary of Non-compliances (2020 Reporting Period):

The **Thirteen** (excluding extraordinary events as per Schedule 3, Condition 11, Tables 3-5, Note D of SSD-5465) reportable environmental incidents during the reporting period were air quality or water related exceedances. These are summarised in **Table 2** and **Table 3**.

Table 2 - Statement of Compliance

Were all conditions of the relevant approval(s) complied with?				
SSD 5465	No			
EPL 1770	No			
CCL707, CCL706 (part), ML1051, ML1052, ML1308, ML1370, ML1632 (part sublease), MPL1349, MPL337, MPL1389, MPL1400, CCL719 (part sublease), CCL721 (part sublease), CCL722	Yes			
Water Access Licence 41508 / Work Approval 20MW065025	Yes			

Relevant Approval	Condition No.	Condition Description (summary)	Compliance Status	Comment	Where addressed in Annual Review
Development Consent- SSD 5465 (Mod 2)	Schedule 3- Condition 11	PM10 24 Hour Average Exceedance - Regional Dust Event ¹	Non-compliant	Multiple days of exceedances: 04/01/2020 05/01/2020 08/01/2020 24/01/2020	Section 5.1.2 and Section 10
EPL 1770	L2.4	Faecal Coliform and Total Suspended Solids Exceedance at EPA 27 discharge point.	Non-compliant	07/02/2020	Section 6.4 and Section 10

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Relevant Approval	Condition No.	Condition Description (summary)	Compliance Status	Comment	Where addressed in Annual Review
EPL 1770	L3.2	Daily Volume Discharge Limit Exceedance – LDP1 and LDP27 combined discharge.	Non-compliant	09/02/2020	Section 6.4 and Section 10
EPL 1770	L2.4	Faecal Coliform and Total Suspended Solids Exceedance at EPA 27 discharge point.	Non-compliant	09/02/2020	Section 6.4 and Section 10
Development Consent- SSD 5465 (Mod 2)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	09/04/2020	Section 5.1.1 and Section 10
Development Consent- SSD 5465 (Mod 2)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	05/06/2020	Section 5.1.1 and Section 10
Development Consent- SSD 5465 (Mod 3)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	07/07/2020	Section 5.1.1 and Section 10

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Relevant Approval	Condition No.	Condition Description (summary)	Compliance Status	Comment	Where addressed in Annual Review
EPL 1770	L3.2	Daily Volume Discharge Limit Exceedance – LDP1 and LDP27 combined discharge.	Non-compliant	26/07/2020	Section 6.4 and Section 10
EPL 1770	L2.4	Faecal Coliform and Total Suspended Solids Exceedance at EPA 27 discharge point.	Non-compliant	26/07/2020	Section 6.4 and Section 10
Development Consent- SSD 5465 (Mod 3)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	07/09/2020	Section 5.1.1 and Section 10
CVC Heritage Management Plan		Reportable Environmental Incident – disturbance of two previously unidentified Aboriginal heritage artefact (Midden Sites)	N/A	21/09/2020	Section 5.9 and Section 10
Development Consent- SSD 5465 (Mod 3)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	18/11/2020	Section 5.1.1 and Section 10

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Relevant Approval	Condition No.	Condition Description (summary)	Compliance Status	Comment	Where addressed in Annual Review
Development Consent- SSD 5465 (Mod 3)	Schedule 3- Condition 11	Depositional Dust Exceedance at DDG001 and DDG005 –dust gauge contamination unrelated to site operations.	Non-compliant	11/12/2020	Section 5.1.1 and Section 10
Development Consent- SSD 5465 (Mod 3)	Schedule 3- Condition 11	Depositional Dust Annual Average Exceedance at DDG005 –dust gauge.	Non-compliant	31/12/2020	Section 5.1.1 and Section 10

¹ DPIE consider this to be an extraordinary event as per Schedule 3, Condition 11, Tables 3 to 5, Note D of SSD 5465. No formal incident report is required.

Compliance status key for Table 3

Risk Level	Colour Code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with 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	Non-compliance which does not result in any risk of environmental harm

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1 Introduction

1.1 Background

Chain Valley Colliery (CVC) is an underground coal mine located on the southern end of Lake Macquarie approximately 60 km south of Newcastle, 80 km north of Sydney and adjacent to Vales Point Power Station (VPPS). The pit-top is located 1 km south-east of the township of Mannering Park, as shown on **Figure 1**.

Underground mining at CVC commenced in 1962 and since that time has extracted coal from three seams; namely, the Wallarah Seam, the Great Northern Seam and the Fassifern Seam, using a combination of bord and pillar and minimal mining methods. Current mining activities are generally within the Fassifern Seam.

Delta Coal is currently undertaking the mine closure/rehabilitation process for the Moonee Colliery and the Catherine Hill Bay Coal Preparation Plant.

CVC peaked with a workforce of approximately 380 personnel in the mid 1980's. At the end of the reporting period, CVC had a workforce of 235 personnel.

1.2 Mine Contacts

The Colliery contacts as at the end of the reporting period were:

Mine Manager: Dave McLean Telephone: 02 4358 0800

Email: dmclean@deltacoal.com.au

Environmental Compliance Coordinator: Lachlan McWha Telephone: 02 4358 0875

Email: lmcwha@deltacoal.com.au

Postal Address: Delta Coal

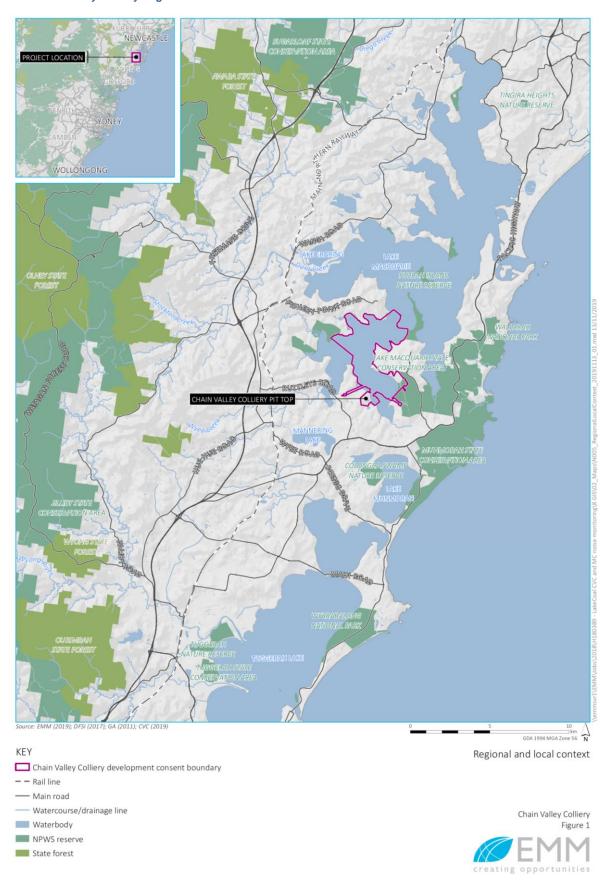
P.O Box 7115

Mannering Park NSW 2259

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Figure 1 - Chain Valley Colliery Regional Context



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2 Approvals

2.1 Development Consent SSD-5465

CVC commenced mining operations in 1962 and the mine had been operating under existing use rights until 23 January 2012 at which time major project approval (MP 10_0161) was issued under Section 75J of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The project approval permitted secondary extraction within domains referred to as Domain 1 and Domain 2, along with first workings within an area identified as Parcel A. The approval also permitted the continuation of mining within the Fassifern Seam until 31 December 2016.

The approval was subsequently modified on 30 August 2012, following approval of a Section 75W modification, to permit a revised mine layout associated with the introduction of wider minimals within the Domain 1 and 2 areas.

In 2013 the mine lodged an application for the Chain Valley Colliery Mining Extension 1 Project (SSD-5465) under Part 4 of the EP&A Act. The Mining Extension 1 Project sought approval for:

- an extension of the currently approved extraction area to allow underground mining to continue within the Fassifern Seam (refer "Site" boundary on Plan 2 (Appendix 2);
- the increase of the approved maximum rate of production from 1.2 million tonnes per annum (Mtpa) to 1.5 Mtpa of run-of-mine (ROM) coal;
- an increase in the approved hours for haulage of coal from the Colliery on private roads to Delta Electricity's VPPS;
- minor upgrades and modifications to existing approved infrastructure;
- an extension of the approved mining by a period of approximately 14 years, i.e., to around 2027; and
- the consolidation of the above with all the operations and environmental activities currently approved under MP10_0161, as modified, within a single development consent.

Development Consent for the Mining Extension 1 Project was subsequently issued under Section 89E of the EP&A Act on 23 December 2013.

On 24 April 2014 a modification (Mod 1) was sought for SSD-5465, which related to the development of an underground linkage between Chain Valley Colliery and Mannering Colliery. Concurrently, a modification (Mod 2) to Mannering Colliery's Project Approval (MP 06_0311) was sought to permit coal to be received from Chain Valley Colliery and transported via existing facilities to VPPS. The modification applications were subsequently approved on the 27 November 2014.

On the 15 July 2015 an additional modification (Mod 2) was sought for SSD-5465. The Department of Planning and Environment (DP&E) approved the modification on 16 December 2015. The modification approved the following changes to the CVC operations:

- an increase in the maximum rate of ROM coal extraction at the mine from 1.5 Mtpa to 2.1 Mtpa;
- mine design changes, primarily the re-orientation of miniwall panels in the mine's northern area;
- an increase in full-time personnel from approximately 160 to approximately 220; and
- construction of asset protection zones (APZs) around critical infrastructure to protect from bushfires.

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In May 2019 a Statement of Environmental Effects was submitted to support an additional modification (Mod 3) being sought for SSD-5465. The Department of Planning, Industry and Environment (DPIE) approved the modification on the 26th June 2020, the modification approved the following changes to the CVC operations:

- the use of alternate bord and pillar mine designs and
- an extension of allowed operations until 31 December 2027.

Chain Valley Colliery has compiled and placed on exhibition (December 2020) a Statement of Environmental Effects to facilitate the further modification of SSD-5465. Mod 4 to SSD-5465 proposes the following changes in CVC operations:

- extend the boundary of the Northern Mining Area approved for extraction under the Chain Valley Colliery consent into a mining lease area currently held by Myuna Colliery;
- allow ROM coal extracted from the Chain Valley Colliery to be transferred to either the Chain Valley or Mannering Colliery surface facilities for processing; and
- increase the maximum employee numbers permitted at Chain Valley Colliery.

2.2 Extraction Plans

The Miniwall S1/N1 Extraction plan was granted prior to Miniwalls S1 and N1 of which part of N1 was extracted during 2019. The extraction plan to support Miniwall mining of S2 and S3 was submitted by Delta Coal and approved by DPIE-Resource Assessment prior to the commencement of mining of Miniwall S2.

Delta Coal submitted an extraction plan to facilitate mining of Miniwall S4 on 11th March 2020, the Planning Secretary approved the Miniwall S4 Extraction Plan (Revision 1, dated 12 May 2020) on the 22nd June 2020.

Delta Coal has prepared a draft extraction plan to facilitate future mining of Miniwall S5 and pillar extraction in the Northern Mining Area, the plan was provided to CVC stakeholders including the DPIE on the 17th December 2020 and was pending approval at the time of preparing this annual review.

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2.3 Mining Operations Plan

The 2018 to 2020 Mining Operations Plan (MOP) and associated MOP Amendment submitted in December 2019, was the MOP approval which covered extraction of N1 and Miniwalls S1, S2, S3 and S4 as well as associated first workings and mains headings.

A 2020-2023 MOP was submitted to the NSW Resources Regulator on the 21st of July 2020 and subsequently approved on the 5 August, the revised MOP covered extraction of Miniwalls S4 and S5 and continued operations to 30 April 2021. In February 2021 an Amendment was submitted to the 2020-2023 MOP, seeking to extend mining approval to December 2023.

This Annual Review has been completed in compliance with Condition 4 of Schedule 6 within SSD-5465. A copy of the modified Development Consent is attached as **Appendix 1**.

2.4 Leases

The surface areas occupied by CVC lie within the Central Coast local government area (LGA). The facilities include the pit top area at Mannering Park and ventilation shaft site at Summerland Point.

All secondary extraction during the reporting period was undertaken beneath Lake Macquarie, i.e. part of the Lake Macquarie LGA.

The Colliery holding is shown on **Plan 1 (Appendix 2)** and the applicable mining tenements are listed in **Table 3**.

Table 3 - Mining Tenements

Mining tenement	Holder	Grant date / Renewal date	Lease expiry date	Applicability
ML 1051	Great Southern Energy Pty Ltd	7 July 1941	7 July 2022	Incorporates part of the approved mining area.
ML 1052	Great Southern Energy Pty Ltd	7 July 1941	7 July 2022	Incorporates part of the approved mining area.
MPL 1349	Great Southern Energy Pty Ltd	5 October 1967	5 October 2028	Mining purposes lease for the Chain Valley pit top area.
CCL 706 (part)	Great Southern Energy Pty Ltd	24 January 1990	29 April 2022	Incorporates historical workings within the Fassifern, Wallarah and Great Northern Seams which are, and would continue to be utilised for passive operational activities.
CCL 707	Great Southern Energy Pty Ltd	3 July 1989	30 December 2023	Incorporates historical workings within the Fassifern, Wallarah and Great Northern Seams which are, and would continue to be, utilised for passive operational activities and the Summerland Point ventilation shaft site.
ML 1308	Great Southern Energy Pty Ltd	4 May 1965	4 May 2022	Mining lease for the mine drift entries.
MPL 337	Great Southern Energy Pty Ltd	30 January 2016	30 January 2037	Mining purposes lease for a portion of the electricity cable on the bed of Chain Valley Bay connecting the pit top switchyard to the ventilation shaft site at Summerland Point.
MPL 1389	Great Southern Energy Pty Ltd	14 May 1970	14 May 2031	Mining purposes lease for a portion of the electricity cable on the bed of Chain Valley Bay connecting the pit top switchyard to the ventilation shaft site at Summerland Point.

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Mining Holder Grant Lease expiry **Applicability** tenement date / date Renewal date MPL 1400 Mining purposes lease for a portion of the Great Southern 6 November 6 Energy Pty Ltd November 2031 electricity cable on the bed of Chain Valley 1970 Bay connecting the pit top switchyard to the ventilation fan at Summerland Point. CCL 719 Centennial 3 July 22 September Part CCL 719 subleased to LakeCoal. 2020 incorporates historic workings within the (June Mannering 1989 2003) (Renewal Wallarah and Great Northern Seams which Sought) are utilised for passive operational activities. CCL 719 22 September Sub-lease from Centennial Mannering for Centennial 3 July 2020 Mannering 1989 Mannering Colliery. (Sublease B) (Renewal Sought) **CCL 721** Centennial 28 June 29 July 2026 Incorporates part of the approved mining Mannering 1989 LakeCoal, area, Part sublease to incorporated into Chain Valley Colliery holding. Includes Mannering surface facilities. ML1632 Centennial 13 April 13 October Incorporates part of the approved mining Myuna 2013 2022 sublease LakeCoal. Part to incorporated into Chain Valley Colliery holdina. CCL 722 Centennial 28 June 5 July 2019 Part sublease to LakeCoal, incorporated into 1989 (Renewal Chain Valley Colliery holding. Centennial (part) Munmorah Sought) have put application in to renew this lease, awaiting approval. ML1370 Centennial 26 7 March 2033 Incorporates part of the approved mining Septembe (part) Myuna area. Part sublease to LakeCoal. r 1995 incorporated into Chain Valley Colliery holding. Great Southern Part EL8428 7 7 December Exploration Lease. of LakeCoal Tenement Holdings. Subsurface only. Energy Pty Ltd December 2020 2015 (Renewal Sought)

It is noted that while the CVC holding boundary now incorporates a significant portion of what was the Mannering Colliery holding, Annual Reviews for the two Collieries remain separate and relate specifically to the activities occurring within the relevant approval instrument boundaries.

2.5 Licences

Environment Protection Licence (EPL) No. 1770 issued by the Environment Protection Authority (EPA) under the Protection of the Environment Operations Act 1997 covers the Collieries activities / premises.

EPL 1770 also includes the licenced daily discharge volume for mine water from the pit top settling ponds into Lake Macquarie at a maximum rate of 12,161 kL per day. EPL 1770 was last updated on 2 April 2019.

A copy of EPL 1770 is posted on the Delta Coal website, www.deltacoal.com.au or via the EPA website, http://www.environment.nsw.gov.au/licensing/ and is also provided in **Appendix 3**.

Monitoring results obtained in accordance with the license conditions are made available on the Delta Coal website (updated monthly), under the environmental reporting page: https://www.deltacoal.com.au/environment/chain-valley-colliery/chain-valley-colliery-environmental-reporting

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Delta Coal also holds WAL41508 issued under the *Water Act 1912* and permits the extraction of 4443 ML per annum.

2.6 Mine Geology

The Wallarah, Great Northern and Fassifern seams have been mined at CVC to produce a raw, crushed thermal coal with low sulphur, which is suitable for both export and domestic markets.

The Fassifern Seam is mined at a depth of approximately 160 to 200 m with the seam being approximately 30 m deeper than the Great Northern Seam, which underlies the Wallarah Seam by approximately 30 m also. **Figure 2**Error! Reference source not found. shows the typical stratigraphy at CVC including the Wallarah, Great Northern and Fassifern seams.

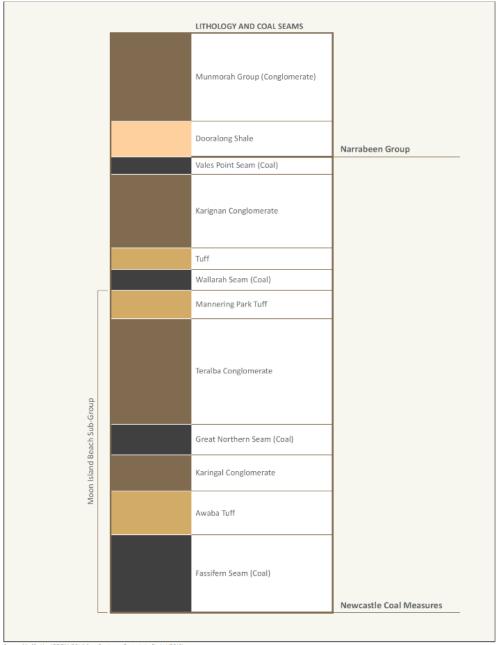
The Fassifern Seam is overlain by a tuffaceous claystone material which varies in thickness between 20 and 30 metres. The Fassifern Seam measures up to 5 metres in thickness with roadway development carrying a coal roof and floor.

Mining in the Wallarah Seam is complete in the Colliery holding area and mining was discontinued in the late 1990's. There is still some remaining resource within the Great Northern Seam. Current operations and development consent only permits mining within the Fassifern Seam.

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Figure 2 - Typical Stratigraphy at Chain Valley Colliery



Source: Modified by AECOM (2011) from Seedsman Geotechnics Pty Ltd (2010).

Typical stratigraphy at the Site



Chain Valley Colliery Mining Extension | Project - Environmental Impact Statement

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3 Operations

3.1 Exploration

There was no surface exploration drilling undertaken during the reporting period. Magnetic geophysics surveys were flown within EL8428 utilising a drone to further geological understanding of proposed future mining areas.

3.2 Land Preparation

There was no land preparation undertaken during the reporting period, as a result the surface disturbance footprint remains unchanged.

3.3 Construction/Demolition

There were no construction works undertaken during the reporting period.

Delta Coal amended the 2018-2020 MOP to allow for demolition of on-site structures. Delta Coal undertook demolition of legacy infrastructure commencing in June 2020 and was completed by November 2020, legacy infrastructure removed from CVC pit-top area included:

- · coal handling plant;
- ROM coal bin and final product bin;
- former CVC mine cottages; and
- belt winder house.

3.4 Mining

Since commencement of mining in the 1960's, CVC has been utilising bord and pillar methods with full and partial pillar extraction as the primary means of secondary coal extraction.

At the end of 2010 it was decided to change the primary extraction method to minimal mining. Minimal extraction commenced in September 2011.

During the 2017 reporting period a significant operational milestone was achieved with the connection of both CVC and MC underground and surface infrastructure through its link road project. As a result of the underground connection, CVC commenced the transport of coal to VPPS via the existing approved overland conveyor from MC in August 2017. In August 2020 CVC commenced extraction by bord and pillar mining through the implementation of herringbone mining methods.

Total production for 2020 was 1.38 Mt, which comprised:

- 2,138.5 m of longwall retreat from Miniwall S2, Miniwall S3 and Miniwall S4;
- 7,949 m of development drivage which occurred in North East Mains, Maingate S3, Maingate S4, Installation Road S5 and Maingate S5; and
- 4,814 m of bord and pillar first workings.

Mining areas in 2020 are shown in Figure 3.

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HB Mains

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Figure 3 - CVC Workings, dark pink represents extraction in 2020 period.

A production summary for the reporting period is provided in **Table 4. Figure 4** shows the past 14 years of annual ROM production, including that for the current reporting period. Note that prior to 2013 the reporting period was on a financial year basis, however, to align reporting with Development Consent requirements, this has now been moved to a calendar year basis.

Table 4 - Production Summary

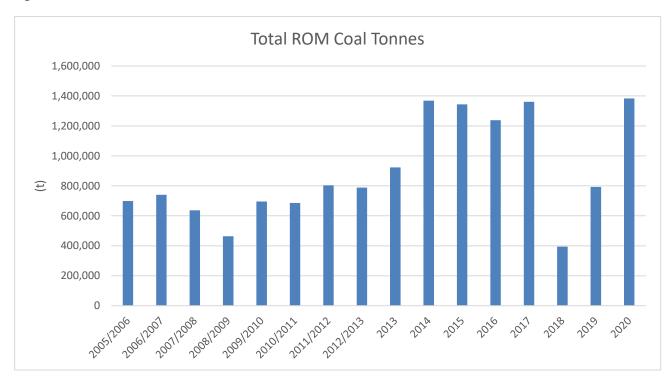
Material	Approved Limit (Mt)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock /	n/a	n/a	n/a	n/a
Overburden				
ROM Coal	2.1 Mt	0.8 Mt	1.38 Mt	1.5 Mt
Saleable Product	2.1 Mt	0.8 Mt	1.38 Mt	1.5 Mt
(Same as ROM)				
Coarse Reject	n/a	n/a	n/a	n/a

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Material	Approved Limit (Mt)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Fine Reject	n/a	n/a	n/a	n/a

Figure 4 - Annual ROM Production Levels



All coal produced was dispatched to VPPS via conveyor from Mannering Colliery, with exception to a total of 8,320 tonnes of ROM coal reclaimed during clean-up works undertaken at the CVC coal stockpiling pad. Which was transported via public roads for sale to VPPS. During the reporting period a total of 1,383,534 tonnes was dispatched to VPPS (domestic market).

3.5 Mineral Processing

CVC produces a raw, crushed thermal coal which is suitable for both export and domestic markets. During 2020 mined coal was transferred via conveyor to the surface at Mannering Colliery where it was screened and crushed to the specifications of the domestic customer Delta Electricity. No other mineral processing was carried out during the reporting period. Within the 2020 period, Mannering Colliery's above ground rotary breaker (Bradford Breaker) was decommissioned with initial crushing and sizing occurring underground before being conveyed to Mannering Colliery pit-top for further sizing and screening in the coal handling and preparation plant (CHPP). Coal is transferred from the CHPP to either the YE1 conveyor for transport directly to VPPS or for storage on the Mannering Coal Stockpile, to be transported to VPPS via conveyor at an alternate time.

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3.6 Waste Management

Delta Coal continued to implement a total waste management system for the site during the reporting period. The main waste streams currently provided for include:

- general waste, 191.3 tonne (t) (58 %);
- scrap metal, 45.5 t (14 %);
- diesel particulate filters, 19.4 t (6 %);
- pallets/timber recycling, 19.1 t (6 %);
- comingled recycling, 17 t (5 %);
- oily water, 15.7 t (5 %);
- waste oil, 8.3 t (3 %);
- sludge, 6.4 t (2 %);
- oil drums, 3.8 t (1 %);
- oily rags, 0.15 t (<1 %);
- oil filters, 0.5 t (<1 %); and
- confidential documents 0.2 t (<1 %).

The total waste management system also involves weekly site inspections by the waste management contractor to facilitate effective waste management and continual improvement along with monthly reporting, with data from key waste streams presented in **Figure 5** and **Figure 6**.

During the reporting period there was a continued focus on recycling with a large amount of scrap metal removed from site. The total waste management system will continue during the next reporting period.

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Figure 5 - CVC Major Waste Streams and Volumes

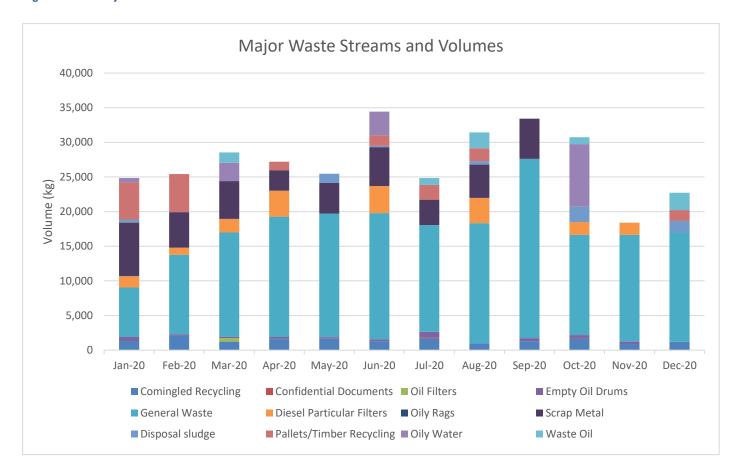
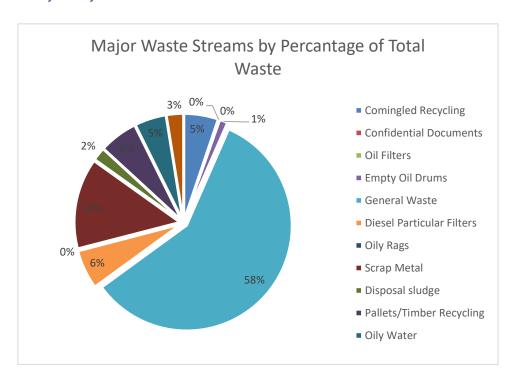


Figure 6 - Chain Valley Colliery Waste Streams



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3.7 Stockpiles

Following the linkage of both CVC and MC underground in August 2017 no coal has been transferred to the surface at CVC. There was some remnant coal remaining at the product coal stockpile area which was transported for off-site screening (due to the presence of general non-coal material), and trucked to Vales Point Power Station, the works were undertaken between 1 June 2020 and 19 October 2020. The reclaimed material was transported by road and processed off-site due to the presence of non-coal material (processed at Minion Enterprises, Carrington NSW) before being trucked to Vales Point Power Station for sale.

3.8 Hazardous Materials Management

Bulk storage of hazardous materials and dangerous goods occurs in the stores area adjacent to the workshop. The primary hazardous chemicals storage locations are:

- a 15,900 L above ground diesel tank;
- a covered, bunded area for storage of pallets of oils, and bulk fluid containers;
- 31.4 kL self-bunded diesel tank (compliant with both AS1692 and AS1940) moved from the coal stockpile area to the workshop area; and
- three 210kg LPG bottles.

The use of the chemical stores sheds at Chain Valley Colliery was discontinued within the reporting period. Chemicals were moved to a bunded storage area. A hazardous building materials survey and register update was undertaken independently by EHO Consulting Pty Ltd in March 2020.

There have been no other significant changes made to the management of hazardous materials during the reporting period.

3.9 Other Infrastructure Management

With exception to the demolition works described in Section 3.3, no significant changes have been made to other infrastructure during the reporting period. Some minor changes were made to the site buildings and general maintenance was undertaken.

3.10 Proposed Changes

Forecast changes for CVC that are likely to occur in the next reporting period include:

- continued extraction in Herringbone Mains and associated panels;
- completion of MWS4;
- commencement and completion of MWS5;
- commence construction of a sewage pump station (following Development Application approval by Central Coast Council in December 2020) at CVC adjacent to the bathhouse and a sewer pipeline to Tall Timbers Road for connection to Central Coast Council sewage system;
- continue exploration of the existing mining and extended Moonee area;
- submission of Response to Submissions report in regards to SSD-5465 Modification 4 followed by assessment and determination by the DPIE;

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- if CVC Mod 4 is approved, a second amendment of the 2020-2023 MOP will be provided to RR;
- submission of Consent Consolidation Project Environmental and Social Impact Statements to DPIE;
- variation of EPL1770 for CVC Modification 3 changes; and
- if CVC Mod 4 is approved, variation of EPL1770 to include the extension of the CVC mining domain area.

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4 Inspections and Actions Required from Previous Annual Review

4.1 Actions required from 2019 Annual Review

As detailed in **Table 5**, there were some items requiring updating from DPIE's review within the 2019 Annual Review.

Table 5 - Actions requiring updating in 2019 Annual Review

Item	Section	Action	Status
1	Section 10	Please update Table 19 to include all outstanding actions from the 2019 Independent Environmental Audit with updated expected completion dates	See Appendix 10 for IEA Action Plan

4.2 Delta Coal Environmental Management System

Environmental management at CVC is structured through the environmental management system based on the company's Environmental Policy. The site risk assessment of environmental aspects at CVC forms the basis of environmental impact mitigation and control and will be reviewed throughout the life of the Colliery.

The Environmental Management Strategy provides the overview of the environmental management system which has been visually presented in **Figure 7**. Modification 3 to SSD-5465 was granted in June 2020 and allowed the combination of CVC and Mannering Colliery management plans where practicable. A number of combined management plans for the two Delta Coal sites were submitted in 2020 and are pending Planning Secretary approval including:

- Delta Coal Environmental Management Strategy (incorporating Environmental Monitoring Program);
- <u>Delta Coal Noise Management Plan</u> (combining the Mannering Colliery Noise Management Plan and Noise Monitoring Program and CVC Noise Management Plan);
- Delta Coal Air Quality and Greenhouse Gas Management Plan (combining CVC Air Quality Management Plan and Mannering Colliery Air Quality and Greenhouse Gas Management Plan);
- <u>Delta Coal Heritage Management Plan</u> (combining CVC Heritage Management Plan, Mannering Colliery Aboriginal Cultural Heritage Management Plan and Mannering Colliery Non-indigenous Management Plan); and
- Delta Coal Land Management Plan (includes Mannering Colliery Land Management and now incorporates CVC land management requirements).

Table 6 provides the status of CVC's Environmental Management Plans.

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Figure 7 - Environmental Management Strategy Summary

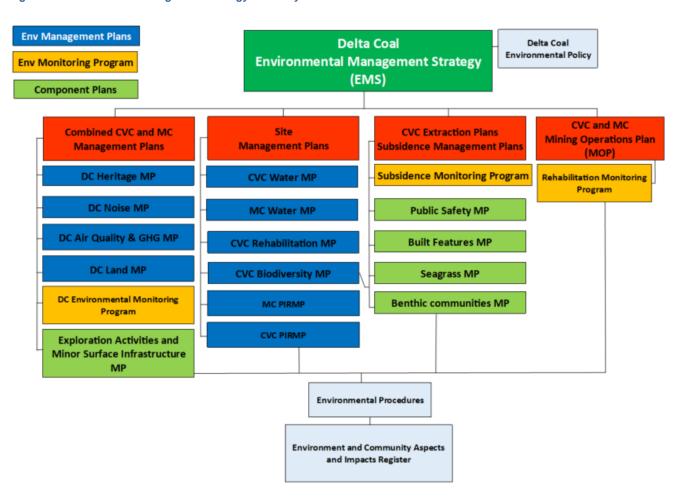


Table 6 - Primary Elements of the Environmental Management System

Document Title	Last Approved	Status as of 31 December 2020
Delta Coal Environment Policy	21st September 2020	Current
Environmental Management Strategy	November 2019	Submitted for DPIE review in November 2020, pending approval at end of reporting period.
Environmental Monitoring Program	N/A	Incorporated into combined Delta Coal EMS
Environmental Risk Assessment	December 2019	Final

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		T
	January 2019	Review to be submitted for
Water Management Plan		Secretary Approval in Q1
		2021.
	November 2020	following Modification3 to
		SSD-5465 a revised Delta
		Coal Air Quality and
		Greenhouse Gas
Air Quality Management Plan		Management Plan
Air Quality Management Plan		(incorporating CVC and
		Mannering Colliery) was
		submitted to the Planning
		Secretary for approval. In
		November 2020.
Noise Management Plan	September 2020	Review in consultation phase
Heritage Management Plan	November 2020	Review in consultation phase
Biodiversity Management Plan	December 2020	Review in consultation phase
Road Transport Protocol (Traffic Management Plan)	December 2019	Review in consultation phase
,		
Coal Haulage Drivers Code of Conduct	December 2019	Review in consultation phase
	May 2020	Final
Seagrass Management Plan		Revision anticipated for
Seagrass Management Flan		Extraction Plan S5 and NMA
		in Q1/Q2 2021
	May 2020	Final
		Revision anticipated for
Benthic Communities Management Plan		Extraction Plan S5 and NMA
		in Q1/Q2 2021
		III Q I/QZ ZUZ I
Groundwater Management Plan	December 2020	Review in consultation phase
	May 2020	Final
Built Footures Management Diss		Update anticipated with S5
Built Features Management Plan		and NMA Extraction Plan
		Q1/Q2 2021
		Q1/Q2 202T

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Final May 2020 Revision anticipated with S5 Public Safety Management Plan and NMA Extraction Plan Q1/Q2 2021 May 2020 Final Revision anticipated with S5 Rehabilitation Management Plan and NMA Extraction Plan Q1/Q2 2021 Subsidence Monitoring Program – Miniwall S4 October 2019 Final Subsidence Monitoring Program – Miniwall S5 and November 2020 Review in consultation phase Northern Mining Area Pillar Extraction Pollution Incident Response Management Plan July 2020 Final (PIRMP) **Environmental Inspection** May 2019 Final December 2020 Updated monthly on Complaints Register www.deltacoal.com.au

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5 Environmental Performance

5.1 Air Pollution

5.1.1 Depositional Dust

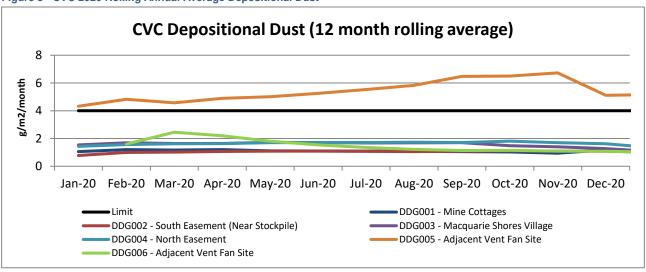
During the reporting period monitoring in accordance with the approved Air Quality Management Plan continued. Depositional dust monitoring results are shown in **Table 7** and the year-to-date averages are presented in **Figure 8.** In addition to the results during the reporting period, long term data showing the annual average depositional dust results trend from the commencement of monitoring are shown on **Figure 9**.

Table 7 - 2020 CVC Depositional Dust Monitoring

Deposit ional Dust	Limit	DDG001 - Mine Cottages	DDG002 - South Easement	DDG003 - Macquarie Shores	DDG004 - North Easement	DDG005 - Adjacent Vent Site	DDG006 - Adjacent Vent Site
Month		Insoluble Solids	Insoluble Solids	Insoluble Solids	Insoluble Solids	Insoluble Solids	Insoluble Solids
Jan-20	4	1.40	1.60	3.00	3.60	3.30	
Feb-20	4	2.50	3.20	3.10	3.90	6.60	1.60
Mar-20	4	0.70	1.40	0.80	2.40	0.70	3.30
Apr-20	4	1.10	1.00	1.70	1.30	7.70	1.70
May-20	4	0.60	0.50	1.30	1.00	2.10	0.60
Jun-20	4	0.50	0.50	0.60	0.60	5.40	0.50
Jul-20	4	0.20	0.20	0.20	0.40	6.00	0.40
Aug-20	4	0.50	0.30	0.40	0.60	4.00	0.40
Sep-20	4	0.40	1.10	1.00	0.50	9.80	0.60
Oct-20	4	0.50	0.70	0.90	2.30	0.80	1.20
Nov-20	4	0.60	0.80	0.90	0.80	73.80	0.60
Dec-20	4	5.20	1.70	1.40	2.00	9.90	0.90
2020 AVG	4	1.18	1.08	1.28	1.62	10.84	1.07

Notes: 1) For site locations refer **Figure 10.**

Figure 8 - CVC 2020 Rolling Annual Average Depositional Dust



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There was an exceedance of the annual maximum criteria for deposited dust (4g/m²/month/annual average) at point DDG005 which recorded an annual average value of 10.84 g/m²/month of insoluble solids for the 2020 reporting period. As described within post approval matter SSD-5465-PA-45 "Exceedance Notification DDG005 December 2020" (annual criteria exceedance report), the elevated results were due to dust gauge contamination (organic matter) on 7 of 12 monitoring instances during the 2020 reporting period. An additional dust gauge (DDG006) was installed at an alternative location nearby in January 2020 and was noted to be considered more representative of potential emissions from the Chain Valley Colliery Ventilation site than DDG005. Monitoring at DDG005 continued to take place at the current location in accordance with the approved Air Quality Management Plan, however samples were also collected at DDG006 for comparison. DDG005 is proposed for removal (and substitution with DDG006) in the revised Delta Coal Air Quality and Greenhouse Gas Management Plan, currently pending Planning Secretary approval. Mining activities were not considered the cause of elevated deposited dust levels at DDG005 given the localised nature of the contamination and laboratory analysis indicating the contents of the gauge to be organic/dirt contamination with no or minimal presence of coal grains.

For the period of 6 November 2020 to 7 December 2020 DDG001 exceeded the maximum monthly increase (increase by 2g/m²/month). Laboratory analysis indicated that the sample comprised approximately 30% minerals and 70% contamination and this was notified to stakeholders including DPIE on 15 December 2020 following receipt of laboratory analysis, an incident report submitted on 18 December 2020 with DPIE noting that the incident report generally met incident reporting requirements and that deposited dust criteria are an annual criteria, no further action was proposed.

Excluding DDG005 and DDG001 (8 November – 8 December 2020), deposited dust levels for the reporting period were below the EPA long term criteria annual maximum level of 4 g/m²/month at all sites. Additionally, no gauges showed annual increases in deposited dust levels above the EPA maximum of 2 g/m²/month during the reporting period. Dust deposition results show low annual averages at all other sites. Annual averages were generally similar to the maximum predicted cumulative air quality impacts identified in the EIS (May 2013) as presented in Table 7 of the Air Quality Management Plan.

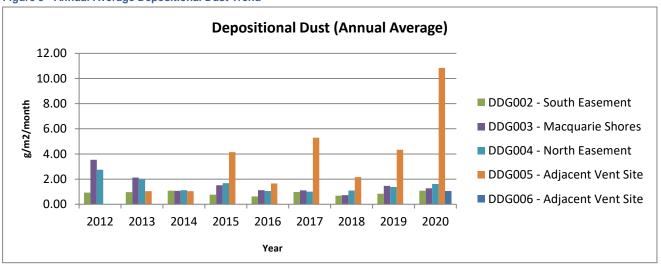


Figure 9 - Annual Average Depositional Dust Trend

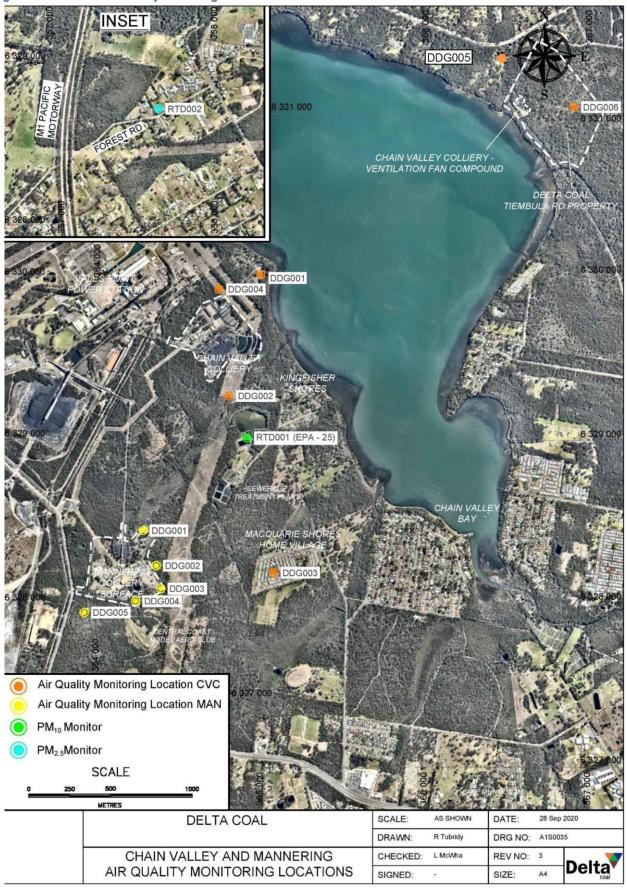
5.1.2 PM₁₀ Monitoring

The real-time air quality monitor was installed in late 2013 within the Mannering Park Wastewater Treatment Plant site. The site is identified as RTD001 with the location shown on **Figure 10**. The real-time monitor measures particulate matter less than 10 microns in size (PM10).

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Figure 10 - Delta Coal Air Quality Monitoring Locations



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Average Maximum criteria



Data capture from the real time monitor for the 2020 period (hourly) was 97.7% with 351 days monitored of 365 available days (96.2%). There were 4 exceedances of the EPA short-term 24hr average criteria (50 µg/m³) during the reporting period, occurring between 4 January and 24 January 2020. Elevated levels during this period were due to an extremely warm summer, characterised by significant bushfire events.

All events were reported to DPIE, who considered them to be extraordinary events as per Schedule 3, Condition 11, Table 3, Note C of SSD 5465.

The annual average criterion (25 μ g/m³) was not exceeded during the 2020 period. Daily results, the rolling average and relevant limits are shown on **Figure 11.**

Daily (24-hour) results ranged from a minimum of 2.8 μ g/m³ to a maximum of 92.2 μ g/m³ during 2020. The 2020 annual average of 24hr PM₁₀ results was 16.1 μ g/m³. The most comparative locations from the EIS where PM₁₀ air quality modelling was completed relate to receptors R12 and R15, with cumulative PM₁₀ annual average predictions of 22 μ g/m³ and 20 μ g/m³ respectively. The actual location of real time PM₁₀ monitoring is in between these two receivers, so a result of 16.1 μ g/m³ is consistent with modelled values.

Monitoring of the PM₁₀ via the TEOM unit commenced in late December 2013. When comparing the 2020 annual results to the previous year, the data capture rate was similar to 2019. Data from the commencement of monitoring through to the end of the reporting period is shown on **Figure 12**.

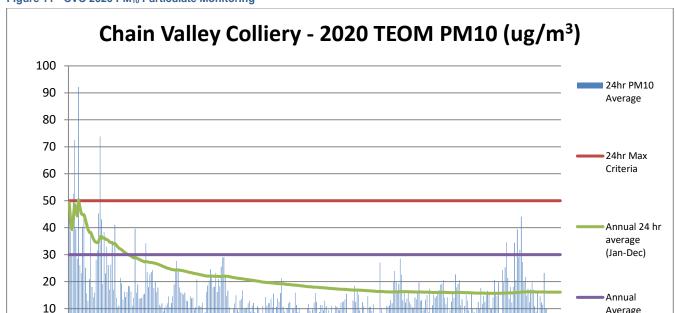


Figure 11 - CVC 2020 PM₁₀ Particulate Monitoring

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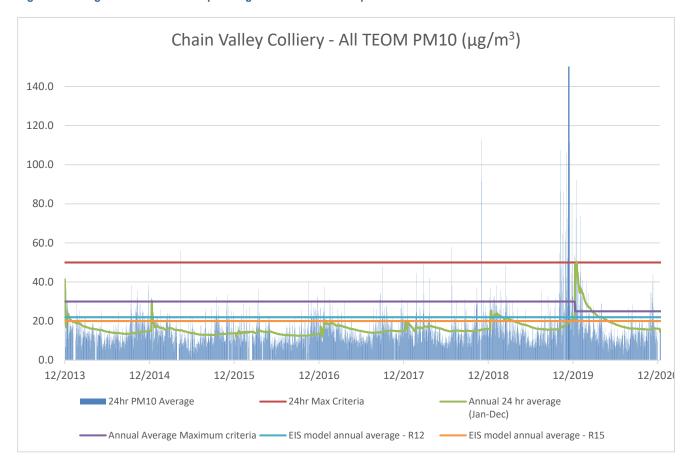


Figure 12 - Long term PM10 data compared against criteria and EIS predictions

In relation to **Figure 12**, note that the apparent spikes in the rolling 24 hour annual averages are associated with the commencement of a new calendar year when the annual average "resets", and is not reflective of significant annual average air quality changes. Additionally, seasonal variations in concentrations, particularly increases in PM_{10} load during summer, impacts the long-term data.

The operation of a water cart continued throughout the current reporting period. The water cart operates around the unsealed surface areas, including hardstands, roads, coal stockpile and handling area as well as the car park. There were no complaints received or environmental incidents unrelated to dust gauge contamination during the reporting period relating to dust.

5.1.3 PM_{2.5}

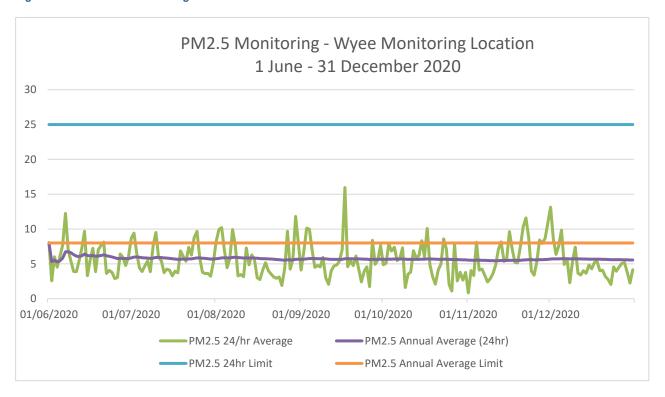
In accordance with Table 3, Condition 11 of Schedule 3 SSD-5465 (as modified), Delta Coal commenced monitoring of PM_{2.5} concentrations following the approval of Modification 3 to SSD-5465. PM_{2.5} monitoring for the 2020 period utilised Delta Electricity's PM_{2.5} Beta-attenuation monitor (BAM) located at Tingley Road, Wyee as shown on the inset on **Figure 10**. Delta Coal's current arrangement to monitor PM_{2.5} has been proposed in the Delta Coal Air Quality and Greenhouse Gas Management Plan submitted in September 2020 and pending Planning Secretary approval at the time of preparing this Annual Review (March 2020). PM_{2.5} concentrations from June 2020 to the end of the 2020 reporting period have been displayed on **Figure 13**.

No exceedances of PM_{2.5} criteria were observed in the period of 1st June 2020 to 31st December 2020. The average PM_{2.5} concentration for the period of 1 June 2020 to 31 December 2020 was 5.6 μ g/m³ with 24/hour averages between 0.8 and 15.95 μ g/m³.

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Figure 13 - CVC PM2.5 Monitoring 2020



The air quality monitoring program, including depositional dust, PM₁₀ and PM_{2.5} monitoring will continue into the 2021 reporting period.

5.2 Contaminated Land

There were no significant spills during the reporting period or reports of polluted land.

There is no known contaminated land at CVC, however it is expected that a detailed contamination study, such as an environmental site assessment would be completed at a time closer to mine closure as part of the operational rehabilitation requirements.

5.3 Threatened Flora

5.3.1 Aquatic Flora

Seagrass communities are a major feature of Lake Macquarie, which have the potential to be affected by subsidence as a result of mining activities under the Lake. To ensure protection of the seagrass communities from mining related impacts a Seagrass Protection Barrier was placed around the mapped seagrass communities, with the barrier extending out to the 26.5 degree angle of draw to the Colliery workings. Only first workings are permitted in the Seagrass Protection Barrier, which will result in negligible subsidence.

Seagrass monitoring occurred during the reporting period in accordance with the current Seagrass Management Plan with the monitoring report reproduced in **Appendix 4**. Seagrass transect locations are shown in the report.

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The discussion from the report (Laxton, May 2020) related to the results obtained during the reporting period highlighted the following:

- In May 2020, one sea bed elevation had changed by more than 150mm from the initial sea bed height recorded. This was transect E16 inner which is close to the shore. Seagrass coverage at this transect was 98.31% indicating the change in elevation had not had tangible impact;
- In May 2020 seagrass cover ranged from 75.9 to 100 percent. The health and condition of the seagrasses were good, with most seagrasses either lightly fouled with epiphytic algae or clear of epiphytic algae. Twelve out of the fifty transects had quadrants with seagrass fouled by a moderate amount of algae;
- Since 2008 seagrass coverage has been increasing throughout the study area, and percentage cover
 has been consistent since 2012. At transects where the percentage area of substratum covered was
 relatively low, such as Transects E6 (17.74%), T3 (46.20%) and T6 (53.82%), seagrass coverage has
 increased by about 80%, 49% and 25% respectively; and
- During the survey no significant subsidence was detected along the seagrass permanent transects. There were also no reductions in seagrass cover.

Results from 2008 to 2020 for percentage changes in seagrass coverage are shown in **Figure 14** and **Figure 15**.

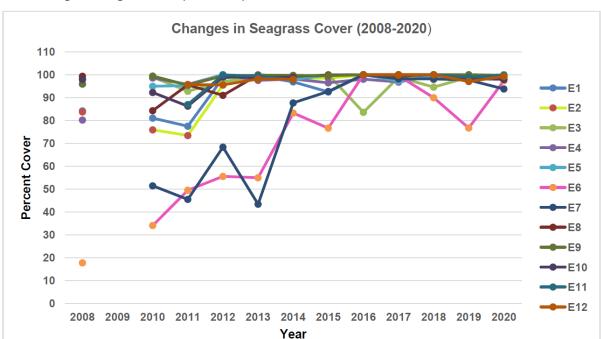


Figure 14 - Changes in Seagrass Cover (2008 - 2019), Transects E1 to E12

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Changes in Seagrass Cover (2009-2020) 110 100 90 80 70 Percent Cover 60 50 **T5** 40 30 **T7** 20 **T8** 10 0 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 Year

Figure 15 - Changes in Seagrass Cover (2009 - 2019), Transects T1 to T8

5.3.2 Terrestrial Flora

Potential impacts to threatened flora would arise from either impact or clearing of vegetation communities surrounding the pit top and ventilation shaft site which have been classified as the following communities:

Surrounding the pit top area:

- · Coastal Open Woodland;
- Swamp Oak Forest; and
- Swamp Sclerophyll Forest.

Surrounding the ventilation shaft site:

- · Coastal Open Woodland;
- Grassy Open Woodland and
- Swamp Sclerophyll forest.

Figure 16 and Figure 17 identify the approximate boundaries of the communities surrounding the surface infrastructure.

A Biodiversity Management Plan was previously completed and approved in 2014. A review and update of management plans, including the CVC Biodiversity Management Plan, was completed in 2020. The latest approved version of this document is available from the Delta Coal website.

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Annual biodiversity monitoring was undertaken by EMM Consulting in accordance with the Biodiversity Management Plan was continued during the reporting period. Fieldwork was carried out in December 2020. The report is reproduced in **Appendix 5**.

The monitoring specifically looks at:

- the Swamp Oak Floodplain Forest below the sediment dams;
- weeds (both at the pit top area and ventilation shaft site); and
- feral animal activity.

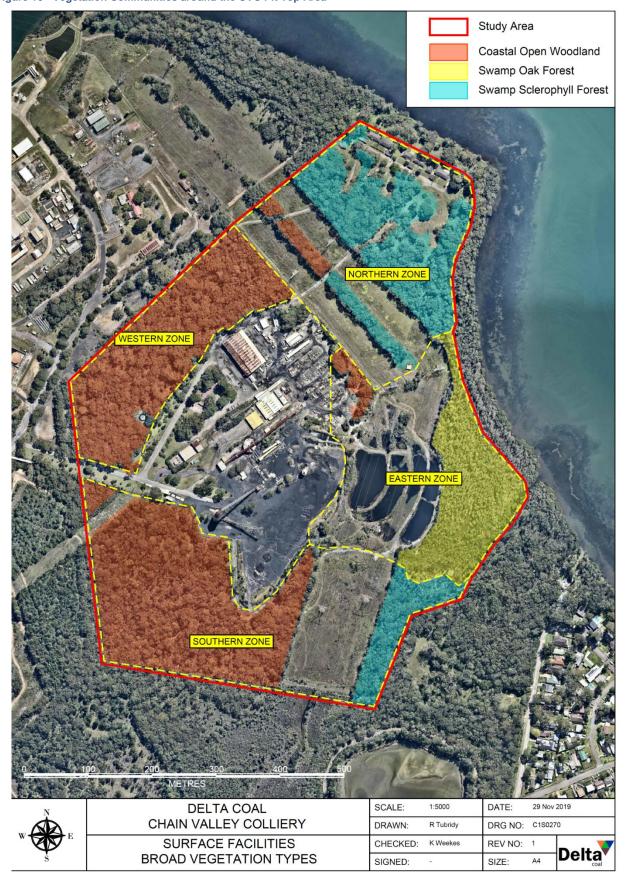
The monitoring results were assessed against the criteria and triggers within the Biodiversity Management Plan with no trigger levels being reached. Specifically, monitoring of the two established plots within the Swamp Oak Floodplain Forest, recorded a total weighted score of 68.1% which is higher than the established trigger value of 60% (refer to the Biodiversity Management Plan for details on site attributes and methodology for determining the weighted score).

No evidence of feral animals had been detected in the 2017-2019 period, however in 2020 two feral animal species were recorded using the presence of scat indicators. Seven scats from the European Fox and one scat from the Domestic Dog. Weed monitoring and management is discussed in **Section 5.5**.

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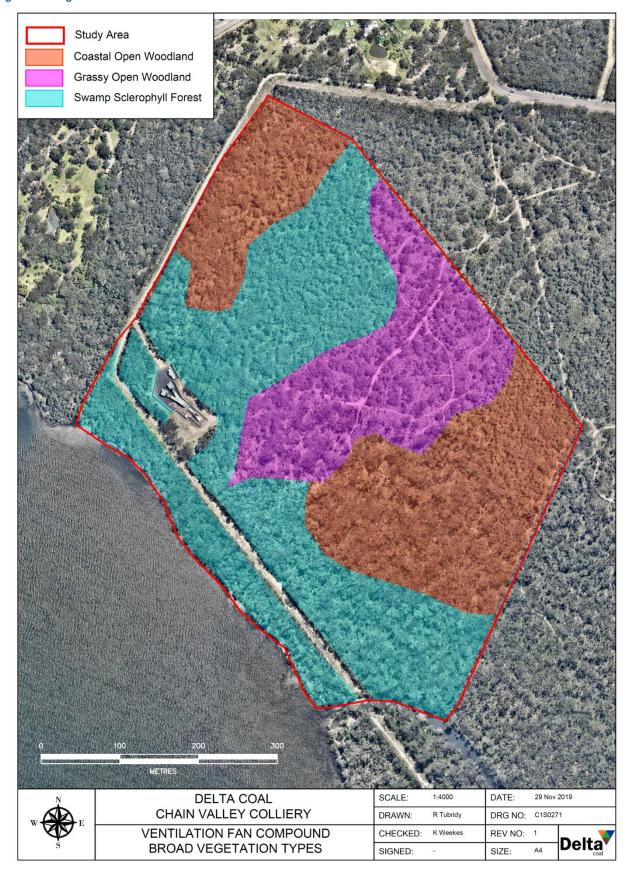
Figure 16 - Vegetation Communities around the CVC Pit Top Area



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Figure 17 - Vegetation Communities around the Ventilation Shaft Site



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Threatened Fauna

5.4.1 Terrestrial Fauna

No clearing works were undertaken during the reporting period and as a result potential to impact to threatened fauna or other native fauna was minimised.

5.4.2 Aquatic Fauna

In August 2020, 22 benthic stations were sampled. The following is a history of benthos sampling from 2014 to 2020.

By March 2014, mining beneath the lake had proceeded so that two Reference stations (R) had been redesignated Impact Stations (IM). They were:

- R3 became IM5; and
- R4 became IM6.

By September 2014, Station R5 had also become an impact station, namely IM7.

In March 2016 two more stations were added to the sampling schedule. They were:

- C5 GR 367701 6334310 and
- R7 GR 366232 6333856.

In September 2016, difficult geology beneath Bardens Bay and along parts of Summerland Point led Lake Coal to begin mining beneath Chain Valley Bay. To accommodate this change in mining direction, three additional benthos sampling stations were added. They were C6, R8 and R9:

- C6 GR 363988 6332492;
- R8 GR 364523 6332010; and
- R9 GR 365258 6331210.

The total number of Stations sampled in September 2017 was 19. In March 2018, three new stations were added to the sampling program. They were:

- C7 GR 366276 6334947;
- R10 GR 365172 6334706; and
- R11 GR 367072 6333639.

Benthic sampling locations are shown on **Figure 18**.

The mud basin off Summerland Point, in Chain Valley Bay and Bardens Bay, was found to be inhabited by 24 species of organisms greater than 1 mm in size. This list was derived from the 18 samples undertaken between February 2012 and August 2020. Polychaete worms and bivalve molluscs were the most frequently encountered animals.

During the reporting period sampling for benthic fauna was undertaken in Lake Macquarie during March and August 2020 Monitoring was undertaken in accordance with the approved Benthic Communities Management Plan.

The 18 samples of the benthos undertaken at six monthly intervals between February 2012 and August 2020 revealed the following:

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- the same suite of organisms dominated each of the 22 sample stations. These were polychaete worms and bivalves;
- stations were distinguished by the relative abundance of the dominant species;
- water depth was not in any way important in determining the species composition at a station; and
- physical variables such as salinity (conductivity), dissolved oxygen concentration and turbidity of the bottom water, measured only on the day the benthos was sampled, had little influence on the species composition of the benthos over the period sampled. However, major extinction events have occurred in the mud basin of Lake Macquarie. The evidence for this lies in the presence of large numbers of intact but dead bivalve shells entombed in the mud. The cause of extinction events appears to be prolonged dissolved oxygen depletion of bottom water. Prolonged dissolved oxygen depletion of the bottom water was measured during the water quality study conducted by Laxton and Laxton (1983 to 1997). Low concentrations of dissolved oxygen in the bottom water were also recorded during the March 2020 sampling period. Stations with low abundance of organisms correlated with low concentrations in the bottom (deep) waters.

In March and August 2020 the total number of organisms found in sediment from the 22 stations was 1032 and 1367 organisms were collected respectively, as detailed in **Table 8**. The value for August 2020 monitoring is 68% greater than monitoring in the September 2019 period following a suspected extinction event in 2019. Monitoring in 2020 suggests that Lake Macquarie is in recovery.

The results appear to support the notion that increasing the water depth by the predicted 0.8 m subsidence has, to date, had no discernible effect on the composition and abundance of organisms making up the benthos of the mud basin.

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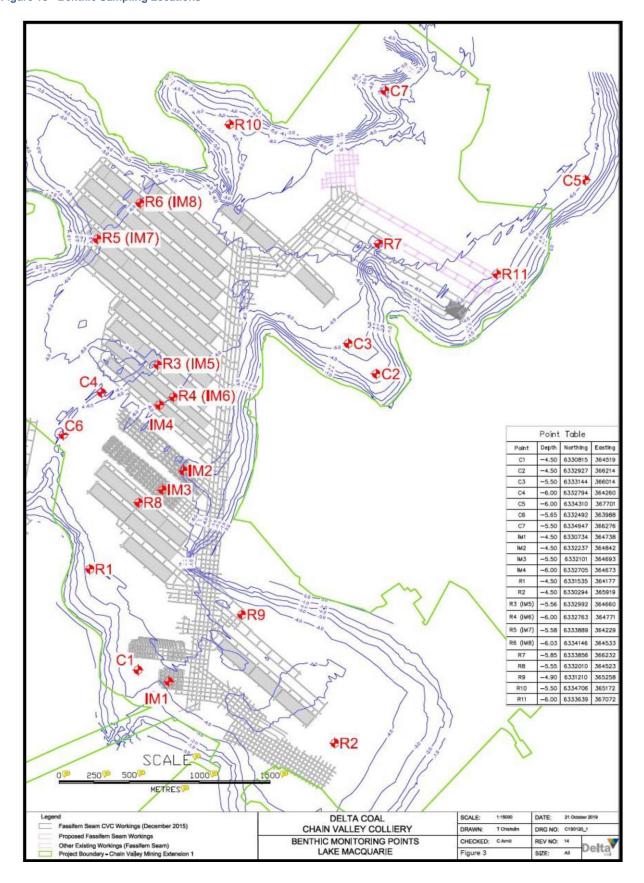
Table 8 - Number of Species found at each Station from February 2012 to August 2020

Station	C1	C2	C 3	C4	C 5	C6	C 7	R1	R2	R3	R4
Feb 2012	10	5	5	7				8	8	5	5
Sept 2012	3	6	4	4				6	3	4	5
March 2013	4	5	7	7				6	5	6	5
Sept 2013	6	6	3	7				5	6	5	4
March 2014	4	3	5	5				6	4	5	3
Sept 2014	3	4	4	8				6	5	6	6
March 2015	3	3	5	3				5	3	6	5
Sept 2015	5	4	4	3				5	3	4	6
March 2016	6	4	5	5	5			6	5	6	4
Sept 2016	7	3	6	5	4	8		8	4	5	6
March 2017	2	4	5	3	5	5		4	5	4	5
Sept 2017	4	4	4	4	4	5		4	3	6	5
March 2018	4	4	8	4	4	3	5	7	8	5	4
Sept 2018	3	4	4	6	5	5	5	4	4	5	5
March 2019	6	3	4	4	6	5	3	4	5	7	3
Sept 2019	5	6	5	5	4	5	6	4	3	7	4
March 2020	5	6	6	4	7	3	6	6	6	7	4
August 2020	6	5	4	4	3	5	5	4	5	7	4
Station	R5	R6	R7	R8	R9	R10	R11	IM1	IM2	IM3	IM4
Station Feb 2012	R5	R6	R7	R8	R9	R10	R11	IM1 7	IM2	IM3 4	IM4 5
	R5	R6	R7	R8	R9	R10	R11				
Feb 2012	R5	R6	R7	R8	R9	R10	R11	7	4	4	5
Feb 2012 Sept 2012	R5	R6	R7	R8	R9	R10	R11	7	4	4	5 5
Feb 2012 Sept 2012 March 2013	R 5	R 6	R7	R8	R9	R10	R11	7 4 7	4 4 5	4 3 5	5 5 5
Feb 2012 Sept 2012 March 2013 Sept 2013			R7	R8	R9	R10	R11	7 4 7 4	4 4 5 3	4 3 5 4	5 5 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014	4	3	R7	R8	R9	R10	R11	7 4 7 4 5	4 4 5 3 9	4 3 5 4 4	5 5 5 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014	4 3	3 3	R7	R8	R9	R10	R11	7 4 7 4 5 5	4 4 5 3 9 6	4 3 5 4 4 3	5 5 5 5 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015	4 3 3	3 3 3	R7	R8	R9	R10	R11	7 4 7 4 5 5	4 4 5 3 9 6 4	4 3 5 4 4 3 4	5 5 5 5 6 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015	4 3 3 5	3 3 3 4		R8	R9	R10	R11	7 4 7 4 5 5 5 5	4 4 5 3 9 6 4 5	4 3 5 4 4 3 4	5 5 5 5 5 6 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016	4 3 3 5 4	3 3 3 4 4	8			R10	R11	7 4 7 4 5 5 5 5 6	4 4 5 3 9 6 4 5 6	4 3 5 4 4 3 4 4 3	5 5 5 5 6 5 4 4
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016 Sept 2016	4 3 3 5 4 6	3 3 3 4 4 7	8 7	5	8	R10	R11	7 4 7 4 5 5 5 5 6 6	4 4 5 3 9 6 4 5 6 4	4 3 5 4 4 3 4 4 3 6	5 5 5 5 5 6 5 4 4
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016 Sept 2016 March 2017	4 3 3 5 4 6	3 3 3 4 4 7	8 7 4	5 3	8 5	R10	R11	7 4 7 4 5 5 5 5 6 6	4 4 5 3 9 6 4 5 6 4	4 3 5 4 4 3 4 4 3 6	5 5 5 5 5 6 5 4 4 4
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016 Sept 2016 March 2017 Sept 2017	4 3 3 5 4 6 4	3 3 3 4 4 7 4	8 7 4 4	5 3 5	8 5 4			7 4 7 4 5 5 5 5 6 6 6 3	4 4 5 3 9 6 4 5 6 4 4 5	4 3 5 4 4 3 4 4 3 6 3 5	5 5 5 5 5 6 5 4 4 4 3 4 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016 Sept 2016 March 2017 Sept 2017 March 2018	4 3 3 5 4 6 4 4 6	3 3 3 4 4 7 4 4 3	8 7 4 4	5 3 5 3	8 5 4 4	4	4	7 4 7 4 5 5 5 5 6 6 6 3 5	4 4 5 3 9 6 4 5 6 4 4 5 7	4 3 5 4 4 3 4 4 3 6 3 5 3	5 5 5 5 6 5 4 4 4 3 4 5
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2015 March 2016 Sept 2016 March 2017 Sept 2017 March 2018 Sept 2018	4 3 3 5 4 6 4 4 6 5	3 3 3 4 4 7 4 4 4 3 4	8 7 4 4 4 6	5 3 5 3 4	8 5 4 4 5	4 4	4 4	7 4 7 4 5 5 5 5 6 6 6 3 5 5	4 4 5 3 9 6 4 5 6 4 5 7	4 3 5 4 4 3 4 4 3 6 3 5 3 4	5 5 5 5 6 5 4 4 4 3 4 5 4
Feb 2012 Sept 2012 March 2013 Sept 2013 March 2014 Sept 2014 March 2015 Sept 2016 March 2016 Sept 2016 March 2017 Sept 2017 March 2018 Sept 2018	4 3 3 5 4 6 4 4 6 5 5	3 3 3 4 4 7 4 4 4 3 4	8 7 4 4 4 6 4	5 3 5 3 4 4	8 5 4 4 5	4 4 6	4 4 6	7 4 7 4 5 5 5 5 6 6 6 3 5 5 4	4 4 5 3 9 6 4 5 6 4 4 5 7 8	4 3 5 4 4 3 4 4 3 6 3 5 3 4 4 2	5 5 5 5 6 5 4 4 3 4 5 4 4 4 4

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Figure 18 - Benthic Sampling Locations



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5.5 Weed Management

Identification, treatment and ongoing monitoring are the key steps in managing weeds that surround the surface infrastructure areas (pit top area and ventilation shaft site).

During the reporting period Delta Coal engaged a land-care contractor to undertake a weed control campaign across its operational areas. The main weeds targeted included Lantana, Bitou Bush, Crofton Weed and Pampas Grass. See **Appendix 6** for the Weed Action Plan. Delta Coal will be continuing the weed control program in the 2021 reporting period.

In the reporting period, Delta Coal submitted a short-term license application to Crown Lands to conduct works for the purpose of weed management and environmental restoration works on the foreshore of Lake Macquarie adjacent the development consent SSD-5465 boundary as shown in **Figure 19**. Access was approved in June 2020.

Figure 19 - short-term license area for weed management works on Crown Lands



5.6 Blasting

No surface blasting activities were undertaken during the reporting period at CVC. From time to time, small amounts of explosives are used underground to remove geological intrusions into the coal seam to create overcasts or interseam shafts. This blasting is imperceptible from an environmental impact point of view.

5.7 Operational Noise

Relevant noise criteria from the Development Consent and EPL are provided in **Table 9**. Attended noise monitoring locations are shown on **Figure 20**.

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Table 9 - CVC Noise Criteria dB(A)

		Day	Evening	Ni	ight
Location	NMP ID	L _{Aeq(15 min)}	L _{Aeq(15 min)}	L _{Aeq(15 min)}	L _{A1(1 min)}
R8 (EPL Point 9)	ATN001	38	38	38	45
R11 (EPL Point 12)	ATN002	49	49	49	54
R12 (EPL Point 13)	R12	49	49	49	53
R13 (EPL Point 14)	R13	43	43	43	49
R15 (EPL Point 16)	ATN003	36	36	36	45
R19 (EPL Point 20)	ATN006	37	37	37	45
R22 (EPL Point 23)	ATN007	46	46	46	46
All other privately-owned land	-	35	35	35	45

It is of note that the noise limits outlined in Development Consent SSD-5465 and EPL 1770 are inconsistent, with EPL 1770 appearing to contain a typographical error for the noise limits applicable at monitoring location ATN007 (also known as EPL Point 23 or R22) from the 2015 review. This was raised with the EPA as part of the review of EPL1770 in the April 2019, however was not reflected in the update. Delta Coal intends to address the variation in to consented levels in a license variation application to be made in Q1/Q2 2021.

The long-term noise goals are reproduced in **Table 10**. Mechanisms that will be used to achieve these goals are detailed in Section 4 of the Noise Management Plan.

Table 10: CVC Long-term Noise Goals dB(A)

Location	Day L _{Aeq(15 min)}	Evening L _{Aeq(15 min)}	Night L _{Aeq(15 min)}
R11-13	41	41	41
R22	40	40	40

During the reporting period, quarterly environmental noise monitoring was undertaken on 19 and 20 March (Quarter 1), 23 and 24 June (Quarter 2), 7 and 8 September (Quarter 3) and 16 and 17 December (Quarter 4) 2020.

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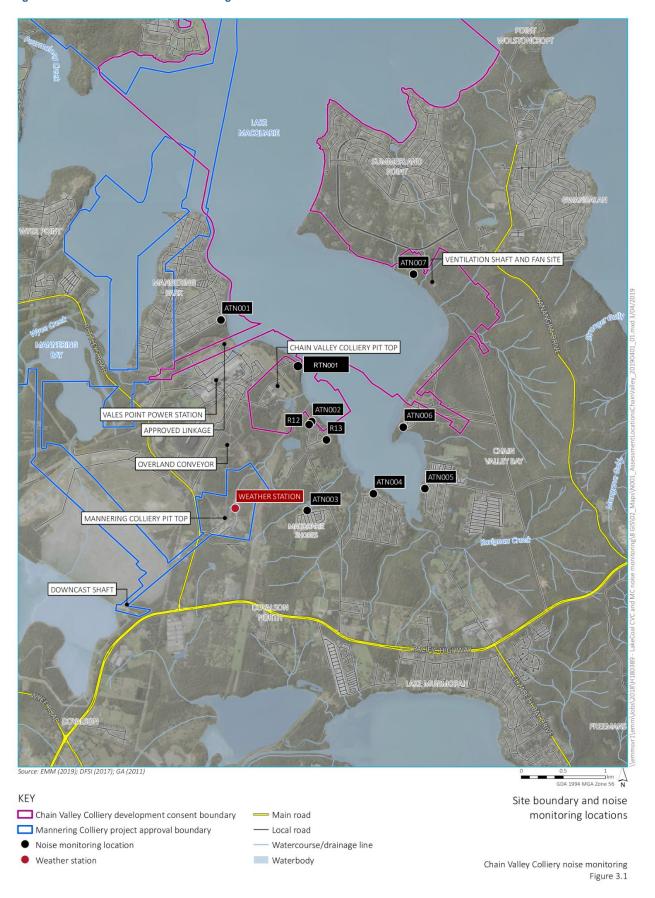
Results of the attended noise monitoring undertaken during the 2020 reporting period were in accordance with the CVC approved Noise Management Plan and are provided in **Appendix 7**. CVC was compliant with the relevant limits during 2020 noise monitoring. The Noise Management Plan was updated and submitted to DPIE for approval during the reporting period.

The real-time noise monitor located at site RTN001 is located adjacent the former mine cottages as shown on **Figure 20** and was re-established in October 2019. The noise logger has been functional throughout the 2020 reporting period, data is available to Delta Coal via a website interface.

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Figure 20 - CVC Attended Noise Monitoring Locations



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5.8 Visual, Stray Light

The pit top area and ventilation shaft site are not dominant features of the landscape. The pit top area is somewhat overshadowed by the adjacent power station. The ventilation fans were also designed to maintain a relatively low profile, below the surrounding vegetation to ensure amenity and lighting impacts were minimised.

There have been no significant changes to surface lighting during the reporting period and no visual amenity or lighting complaints were received in 2020.

A lighting and visual review was completed in 2019 as per the project approval conditions and the findings detailed in the most recent independent environmental audit (IEA). A letter was received from DPIE on 17th February 2020 noting that "no lighting complaints have been received by the site in 2018 or 2019. As such, future lighting survey reports are not considered necessary, unless otherwise directed by the Secretary".

In accordance with the relevant Australian standard, no lights are directed offsite or installed to shine above the horizontal. Additionally, the nearest residents to CVC sites are approximately 300 m away.

5.9 Aboriginal Heritage

During the reporting period 2 previously unidentified Aboriginal heritage sites (Midden sites) were disturbed during demolition works undertaken in the period of June to September 2020 for the removal of former derelict mine cottages nearby the foreshore of Lake Macquarie.

An Incident report was submitted DPIE-Compliance, DPIE-BCD, the NSW EPA as well as Registered Aboriginal Parties (RAPs) who were notified of the unexpected find on 22 October 2020 and invited to inspect the site. The sites were inspected by an independent heritage consultant (Insite Heritage) to inspect the site and provide further recommendations. The sites were added to the Aboriginal Heritage Information Management System (AHIMS) as CV002 (AHIMS Site ID 45-7-0412) and CV003 (45-7-0413). Currently CV001 a Flake site, is located adjacent the CVC settlement dams.

Access to sites CV002 and CV003 is prevented by locked gates, and the sites were fenced off to prevent any further accidental damage.

The incident report associated to the unexpected find is included as Appendix 11.

The development of a Heritage Management Plan was completed during 2012 following consultation with Aboriginal stakeholders. This plan was updated and approved during 2014, the update was again completed in consultation with Aboriginal stakeholders. The primary update of the management plan was to include additional monitoring sites associated with proposed mining activities. However, mining is not scheduled to be undertaken in these areas for a number of years.

The Heritage Management Plan was updated and submitted to DPIE for approval during the 2020 reporting period.

5.10 Natural Heritage

There are no sites or items of historic heritage within the pit top area and ventilation shaft site as determined by both the Environmental Assessment completed in 2011 and the Environmental Impact Statement that was prepared to support the Mining Extension 1 Project.

Accordingly, no ongoing monitoring or management actions were required and none have been undertaken within the reporting period.

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5.11 Spontaneous Combustion

The R_{70} self-heating rate value recorded for a sample from the middle of the Fassifern Seam is 3.03 °C/h. This rates the coal as having medium intrinsic spontaneous combustion reactivity for New South Wales conditions. This value is consistent with the rank and type of coal and agrees with previous test results obtained for the Fassifern Seam at CVC. The self-heating rates of the samples from the CVC are significantly lower than coals from the Hunter Valley, and are also lower than Spring Creek Mine in New Zealand and San Juan Mine in New Mexico.

Moist adiabatic benchmark tests of the samples from CVC indicate that self-heating is controlled by the moisture in the coal and the initial start temperature. Heating development to thermal runaway would take in the order of 48 to 72 days for the middle of the Fassifern Seam, but the top and bottom of the seam show self-heating over a protracted period, before any possible thermal runaway could take place. Similarly, the higher ash content Chain Valley Rider Seam also shows a protracted delay in self-heating due to its lower intrinsic reactivity.

While the laboratory R₇₀ analysis of the Fassifern Seam coal at CVC indicates a medium propensity for spontaneous combustion, propensity to spontaneously combust is only one factor in a complex chain of conditions that can create spontaneous combustion in underground coalmines. There have been no known underground spontaneous combustion incidences in the Fassifern Seam at CVC. Accordingly, the risk of spontaneous combustion is considered to be low. Coal stockpiling is kept to a minimum and is managed in such a way as to limit risk of combustion.

Controls in place to mitigate the risk from spontaneous combustion include:

- · sealing of extracted panels;
- consideration of spontaneous combustion issues within the mine design and utilisation of an Authority to Mine Permit;
- the development of Trigger Action Response Plans (TARP) for Spontaneous Combustion;
- · segregation of extraction panels by an inter panel pillar; and
- monitoring of mine gases using a multipoint tube bundle gas analysis system and a real time gas monitoring system.

There were no incidents of spontaneous combustion at CVC during the reporting period.

5.12 Bushfire

The pit top area contains vegetation which is considered to be bushfire prone land (Category 1) as shown on **Figure 21**. The ventilation shaft area has also been identified as containing Category 1 vegetation as shown on **Figure 22**.

As the project site is not a residential development, there are no strict requirements for fire management, with the exception of preventing fires within the project area and their spread to surrounding land.

To manage bushfire risk Delta Coal have the following management measures in place:

- a high capability for firefighting purposes through the 100 mm diameter mine water reticulation line and the mine Emergency Management System;
- firebreaks and fire trails in the vicinity of the pit top area and ventilation shaft site;
- fire hydrants and depots placed in strategic positions around the pit top area; and

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• regular training of mine firefighting crews and liaison with local rural firefighting brigades.

Figure 23 shows the approved Asset Protection Zone (APZ) area. The establishment of the APZ's was undertaken during the 2017 reporting period to improve its bushfire protection zones. As detailed in the Biodiversity Management Plan, fire trails are inspected annually prior to the start of the Bushfire Danger Period. This inspection is scheduled via the Work Order system. An inspection was undertaken in September 2020 with follow-up slashing and clearing as required.

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Figure 21 - Bushfire Prone Land Map for CVC Pit Top Area (Source: Wyong Council, 2015)



Figure 22 - Bushfire Prone Land Map for Ventilation Shaft Area (Wyong Council, 2015)



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Figure 23 - Approved APZ's for CVC



5.13 Mine Subsidence

5.13.1 Overview of Mining Progress

Please refer to **Section 3.4** for details of the mining activities undertaken during the 2020 reporting period.

5.13.2 Approvals

During the reporting period Delta Coal undertook its mining activities in accordance with its extraction plan approvals for Miniwalls S2/S3 and Miniwall S4.

In accordance with Schedule 4 of SSD-5465, no secondary extraction was undertaken within the High Water Mark Subsidence Barrier (HWMSB) or 26.5 degree angle of draw to the mapped seagrass extents.

5.13.3 Subsidence Surveys

Subsidence surveys are required to be undertaken annually as a minimum, with reference monitoring points located on shorelines nearby any mining activities. Shoreline surveys are also undertaken at intervals corresponding with key Miniwall retreat milestones.

Bathymetric surveys are also undertaken each year to gauge subsidence levels over the area of secondary extraction undertaken beneath Lake Macquarie, where land-based surveys are not possible.

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5.13.4 Performance Measures

Performance measures summarised from SSD-5465 are detailed in Table 11.

Table 11 - SSD-5465 Summary of Subsidence Performance Measures

Condition No.	Condition
Condition 1, Schedule 4	The Applicant must ensure that vertical subsidence within the High Water Mark Subsidence Barrier and within seagrass beds is limited to a maximum of 20 millimetres (mm). If at any stage predicted subsidence levels are exceeded within these areas, an ecological monitoring program shall be initiated to assess the impacts to ecological communities and threatened species and if appropriate, offsets are to be provided for any impacts detected.
Condition 2, Schedule 4	The Applicant must ensure that the development does not cause any exceedance of the performance measures in Table 6 to the satisfaction of the Planning Secretary.
Table 6, Schedule 4: Subsidence Impact Performance Measures - Natural and Heritage Features	First Workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible environmental consequences. They are to remain long term stable and non-subsiding
Condition 4, Schedule 4	The Applicant must ensure that the development does not cause any exceedances of the performance measures in Table 7, to the satisfaction of the Planning Secretary.
Table 7, Schedule 4: Subsidence Impact Performance Measures - Built Features	Trinity Point Marina Development and other built features. They are to remain: • Always safe; • Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated; • Damage must be fully compensated.

The Annual Subsidence Report as required by SSD-5465 (Appendix 9 – SD-5465 Statement of Commitments) is provided in **Appendix 8** of this report. Details are summarised in Section 5.13.5 and Section 5.13.6.

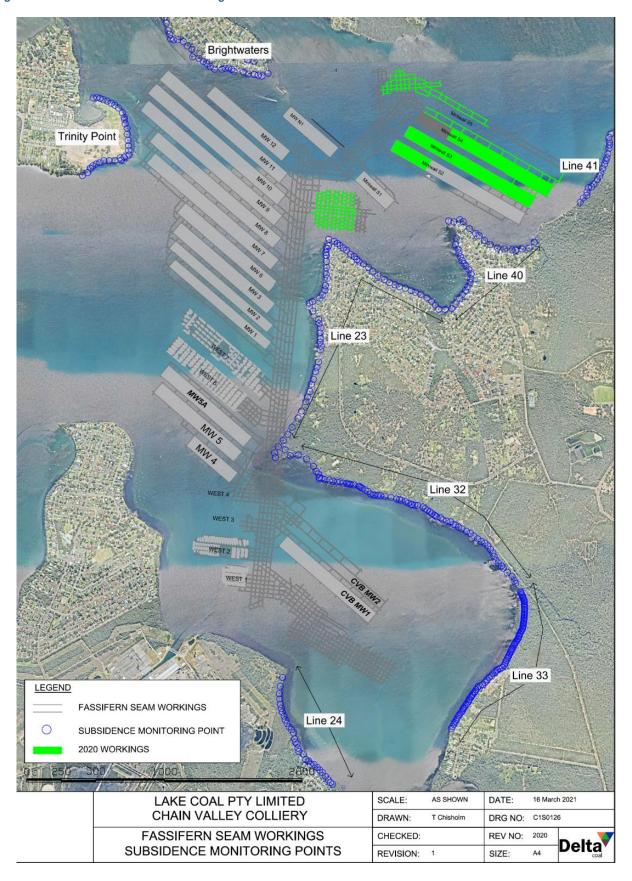
5.13.5 Foreshore Monitoring

Delta Coal completes subsidence monitoring around Trinity Point, Brightwaters, Frying Pan Bay, Summerland Point, Chain Valley Bay (**Figure 24**). Monitoring points occur along the foreshore at approximately 20 m – 30 m intervals. The results are issued to the Resources Regulator within 14 days of survey. In addition, observations are made where required to report on visual impacts or changes to public safety risk. A Subsidence Inspection Proforma is completed with each survey. The proforma includes visual inspection of steep slopes, boulder or tree instability, ponding and other potential effects of mine subsidence.

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Figure 24 - Foreshore Subsidence Monitoring Points



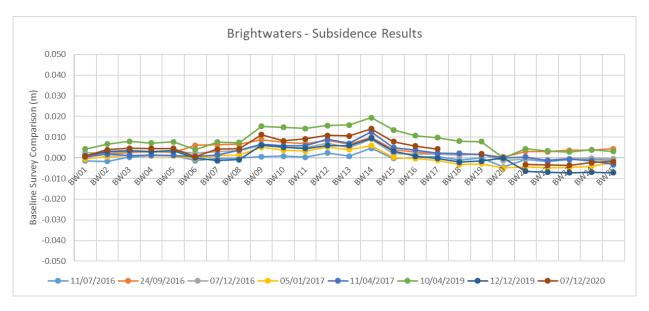
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5.13.5.1 Brightwaters

Monitoring points were installed along the Brightwaters peninsula in June 2016 to monitor the effects of Miniwall 11 and 12 extraction. Results for the reporting period are shown in **Figure 25**. Nil subsidence movement has been detected along the monitoring line.

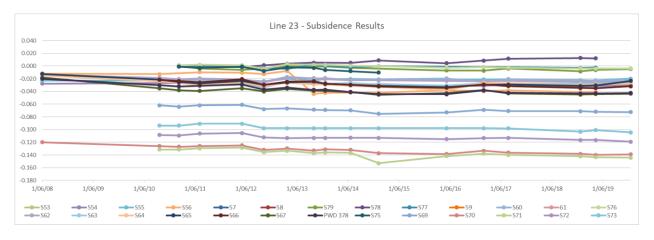




5.13.5.2 Trinity Point

Figure 26 shows the subsidence monitoring results for the reporting period at Trinity Point. Monitoring points were installed in the area in 2014 for shoreline monitoring during extraction of Miniwalls 7-12 panels. A number of marks have been disturbed / destroyed due to development / construction works along the foreshore in the area, however nil movement attributable to subsidence has been detected.

Figure 26 - Line 23 Subsidence Results



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5.13.5.3 Summerland Point, Lines S23, 23, 40 and 41

The foreshore along Summerland Point has been monitored since 1994, after secondary extraction was undertaken in the Wallarah beneath the south-western point (corresponding to mark S63 - 74). A maximum of 145mm of subsidence was measured (Point S71) since 1994. No additional subsidence was identified in monitoring results for the 2020 period.

Figure 27 - Summerland Point, Line 23 Subsidence Results

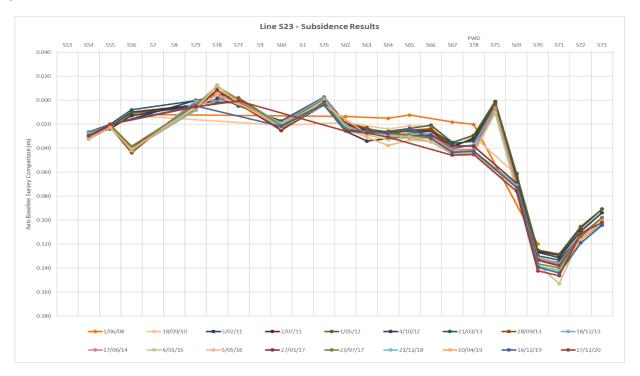
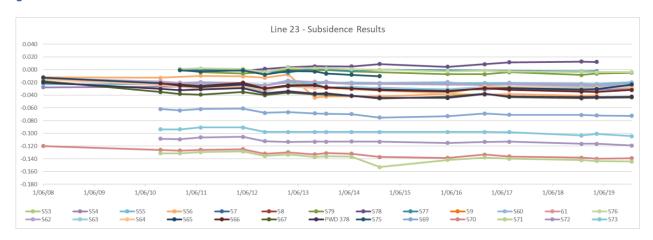


Figure 28 - Line 23 Subsidence Results



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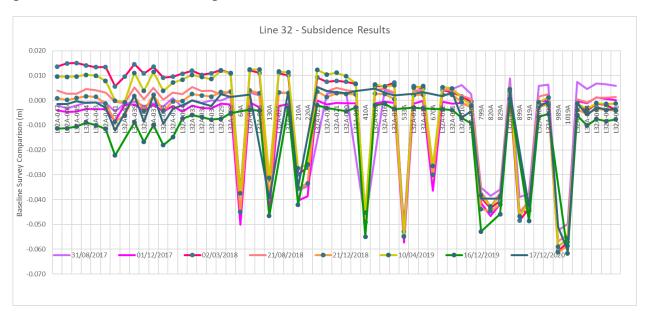


Figure 29 - Line 32 Subsidence Monitoring Results

Monitoring points along Line 40 were established in 2018 to monitor the shoreline adjacent to Miniwall S1. This line was extended in 2019 as part of the subsidence monitoring program for Miniwalls S2 and S3. Minor ground movement along the line is limited to ±5mm and appears seasonal, subsidence appears to be limited to negligible subsidence (<20mm). **Figure 30** shows the reporting period subsidence results for Line 40.

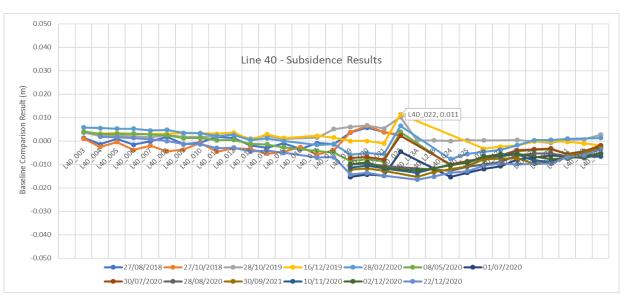


Figure 30 - Line 40 Subsidence Results

Line 41 was established in July 2020 to monitor the shoreline adjacent Miniwall S4. Monitoring has indicated to date nil to negligible subsidence (<20mm). Line 41 subsidence monitoring results are shown on **Figure 31**.

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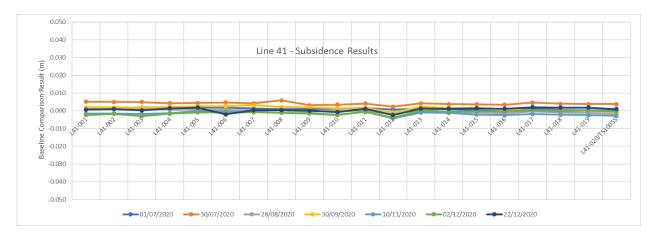


Figure 31 - Line 41 Subsidence Monitoring Results

5.13.5.4 Chain Valley Bay, Lines 24 and 33A

Monitoring Points on the foreshore of Chain Valley Bay have historically been monitored during periods of extraction in the Great Northern and Wallarah Seams in the vicinity of the shoreline. Due to the commencement of Fassifern Seam extraction in Chain Valley Bay (CVB), a Multi-Seam Mining Feasibility Investigation (MSMFI) report (*Ditton Geotechnical Services, CHV-002-7*) was commissioned by Lakecoal to assess the impact of the Fassifern seam mine workings on the previously mined Great Northern and Wallarah seam workings and potential resultant impact on the foreshore in Chain Valley Bay.

Surveys of the existing monitoring points (many of which had experienced 40-60mm of subsidence) were ongoing during the reporting period, where required additional monitoring locations were installed. Similarly to the Summerland Point monitoring, many of the monitored subsidence marks have historically experienced greater than negligible subsidence (20mm). However, no additional foreshore subsidence movement was detected during the miniwall extraction in CVB, inclusive of monitoring undertaken in the 2020 period.

Figure 32 and Figure 33 show the subsidence monitoring results for the reporting period. A specific point (989A) measured approximately 40mm of movement during the 2018 reporting period; as the adjacent monitoring points were stable this is assumed to be related to damage / movement of the specific monitoring point rather than mine-subsidence related, no suspected subsidence at this line was observed in the 2019 and 2020 reporting periods.

As the area where Line 33A monitoring marks are located is along a public reserve where regular slashing / brush cutting activities are carried out, a number of monitoring points have been disturbed / moved over time. Where this type of movement occurs, the new RL point is adopted and monitoring continues.

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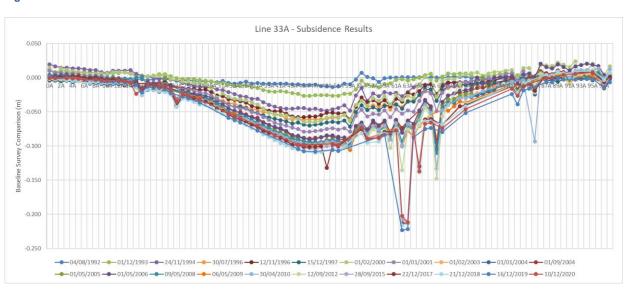
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Figure 32 - Line 24 Subsidence Results

Figure 33 - Line 33A Subsidence Results



5.13.5.5 Pelican Rock Navigational Marker

As described in CVC's Subsidence Monitoring Program, the Pelican Rock Navigation Marker is expected to be impacted by approximately 130 mm of subsidence from mining within miniwall panels S2, S3 and S4.

NSW Roads and Maritime Services (RMS) has indicated a functional impact on the marker is likely to occur at 500 mm of subsidence and 5° or 87 mm/m of tilt.

The pre-mining recorded data at Pelican Rock Navigation Marker was 1.14 m Australian Height Datum (AHD) and the navigational pole was vertical.

The following surveys were undertaken by Daly Smith after Miniwall S2 extraction in March 2020 recording the level at 1.13 m AHD and Miniwall S3 extraction in August 2020 recording the height at 1.11 m AHD. The August 2020 measurement of the Pelican Rock Navigational Marker commented that the pole was found to be vertical and its metal base to be level.

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5.13.6 Lake Floor Bathymetric Survey / Scanning

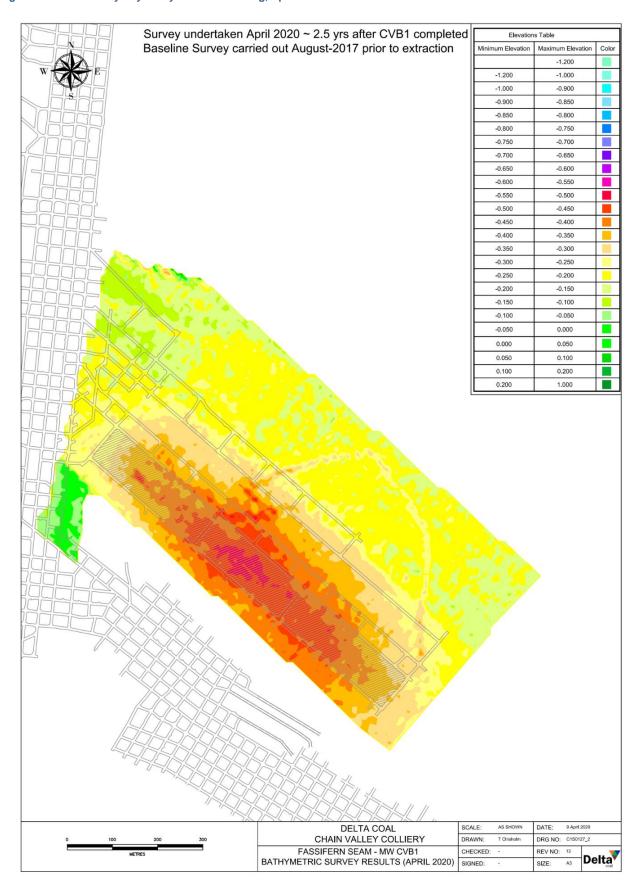
Bathymetric scans undertaken in the 2020 reporting period have been provided as Figure 34 to Figure 40.

Bathymetric surveys over the Chain Valley bay mining area (**Figure 34**) have indicated subsidence of up to 500 mm directly over the extracted area. An increased angle of draw of surface subsidence has been detected compared to other mining areas, however, measured subsidence is within extraction plan modelled predictions presented in the Extraction Plan. **Figure 35** and **Figure 36** depict subsidence over miniwalls S2 and S3 post extraction, indicating subsidence to date of less than 200 mm. **Figures 37-40** displays foreshore subsidence for Miniwalls S2-S4, subsidence (<20mm) and angle of draw are within modelled predictions.

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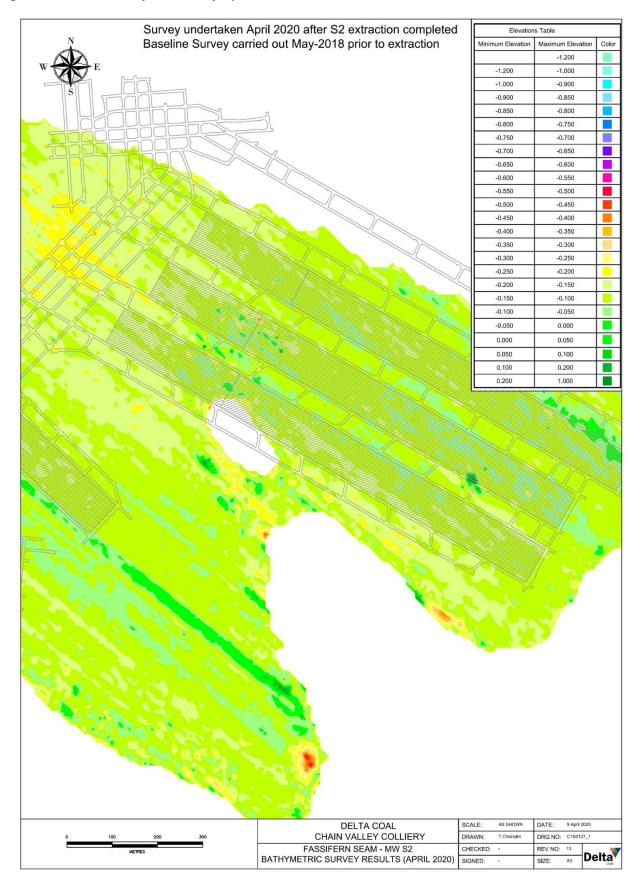
Figure 34 - Chain Valley Bay Bathymetric Monitoring, April 2020



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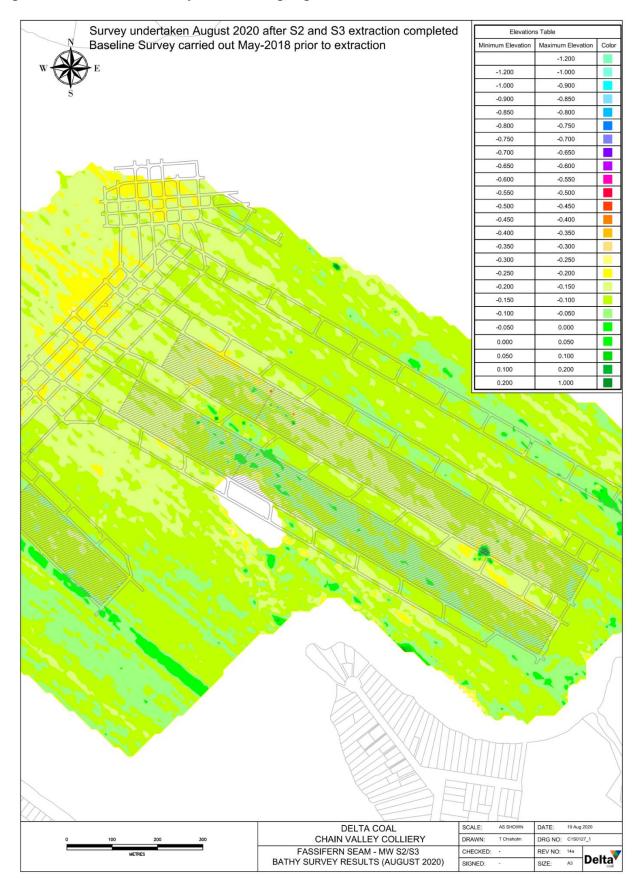
Figure 35 - Miniwall S2 Bathymetric Survey, April 2020



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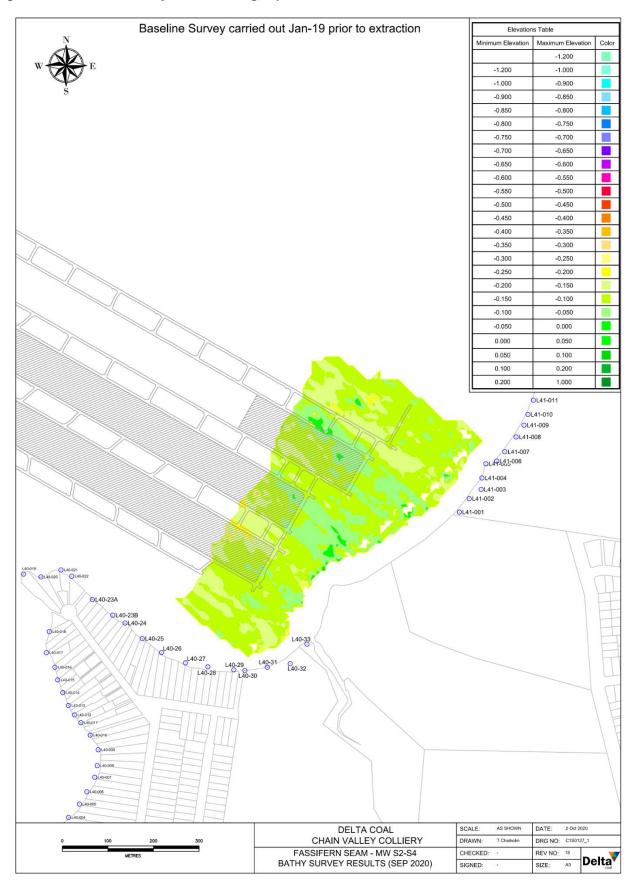
Figure 36 - Miniwalls S2 and S3 Bathymetric Monitoring, August 2020



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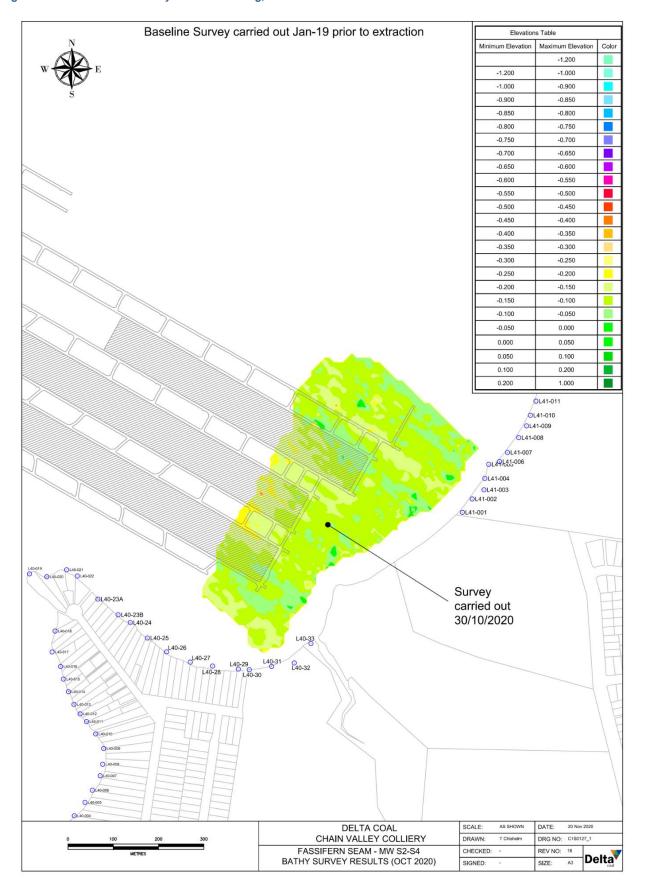
Figure 37 - Miniwalls S2-S4 Bathymetric Monitoring, September 2020



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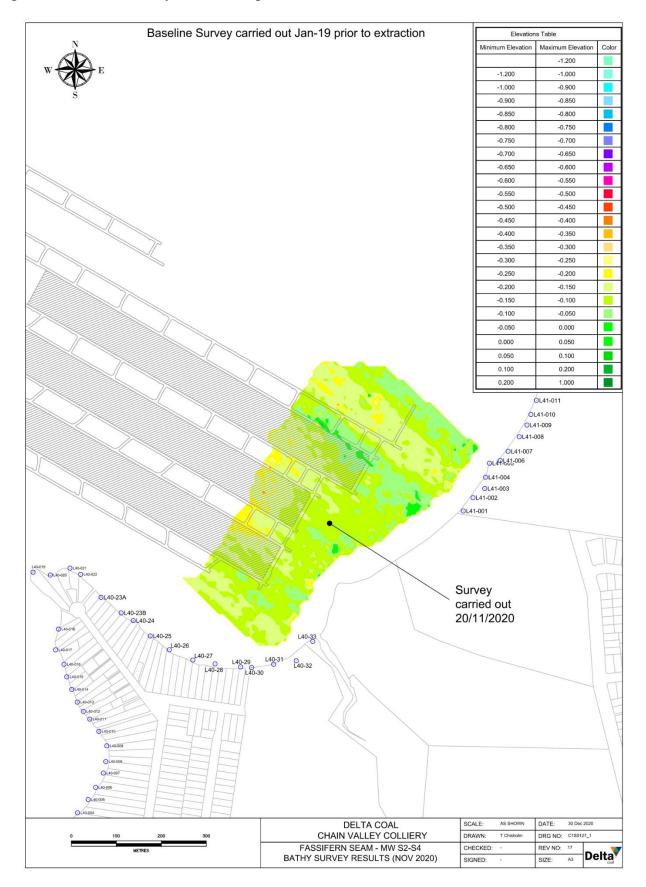
Figure 38 - Miniwalls S2-S4 Bathymetric Monitoring, October 2020



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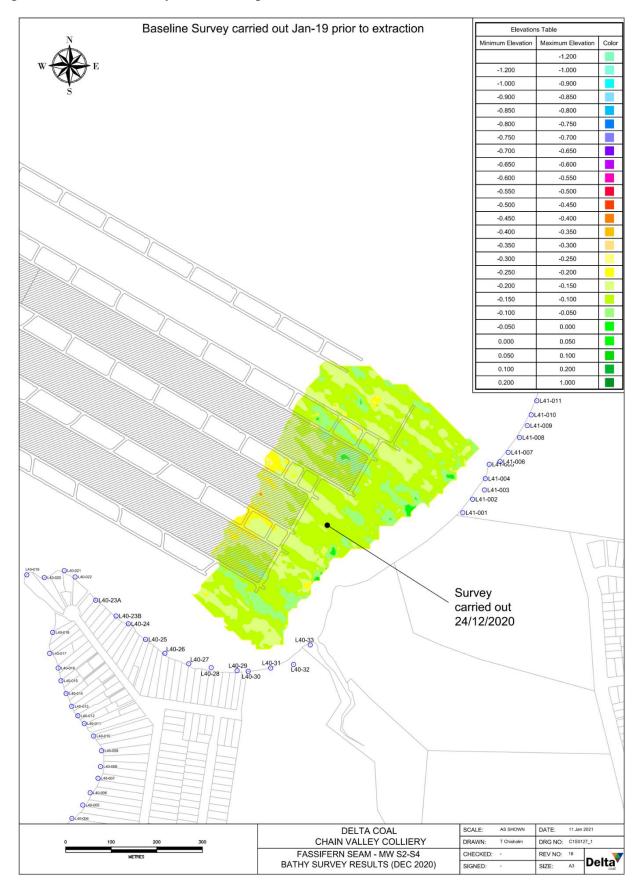
Figure 39 - Miniwalls S2-S4 Bathymetric Monitoring, November 2020



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Figure 40 - Miniwalls S2-S4 Bathymetric Monitoring, December 2020



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5.14 Hydrocarbon Contamination

Hydrocarbons are managed in accordance with the site Storage of Fuel and Chemical Standard.

Suitable bunding has been installed around all liquid storage areas with an oil separator installed on the wash down sump which treats water prior to transfer of the treated water to the site sediment dams. Spill kits are also located at hydrocarbon storage areas. All waste oil is taken off site by an external licensed waste collection company. A weekly inspection regime is in place to check waste oil levels and arrange disposal on an as required basis.

During the reporting period all contaminated material encountered on site was disposed of at a licensed waste facility by the site's approved waste management contractor.

5.15 Methane Drainage and Greenhouse Gases

Methane levels in the Fassifern seam of approximately $2-4~\text{m}^3/\text{t}$ do not warrant the need for pre or post gas drainage, and as such all methane from the mining operations are ventilated from the via the main fans at Summerland Point.

The methane levels in the return are generally low enough to ensure operations are not adversely affected by the gas levels.

Given the mining operations are being undertaken beneath Lake Macquarie and methane levels are manageable with the existing ventilation system there are no plans to install pre or post gas drainage infrastructure at this time.

Methane emissions from CVC are reported annually to the Clean Energy Regulator in accordance with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

For the July 2019 to June 2020 period CVC emitted approximately 503,294 tonnes of CO₂e as Scope 1 emissions.

5.16 Public Safety

Public safety is primarily a concern around the surface facilities at CVC being both the pit top area and the ventilation shaft site.

The public safety around the ventilation shaft site is generally afforded by:

- restricting access to the site by utilising a locked access gate across the access road;
- provision of a security fence around the entire perimeter of the compound, with locked access gates;
- security monitoring.

In relation to the pit top area, there is one sealed access road into the site which has a set of lockable gates present, which can be closed should the need arise to stop access to the site. These gates may be closed and locked at times of no expected traffic, such as during the night time period but would otherwise remain open for deliveries, employee and authorised visitor access. A security firm is also engaged to undertake scheduled site security checks and remote alarm monitoring and reporting. The security checks are random, but generally undertaken at times of higher unauthorised access risk such as nights, public holidays and weekends.

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Public access will be monitored and managed during operation of the mine through the standard incident reporting process which would include reporting of unauthorised access.

A visitor login system onsite ensures that authorised visiting members of the public are assigned a site contact and that upon login the site contact is notified immediately by email of the visitors' presence onsite.

A Built Features Management Plan was developed for the Extraction Plan associated with Miniwalls S2 and S3 and updated for the Extraction Plan S4. This included subsidence monitoring for the Pelican Rock Navigational Marker and associated foreshore infrastructure.

Public safety is also a consideration in the road coal haulage operations; this is discussed in Section 5.17.

During the reporting period there were no incidents of injury to the public as a result of Delta Coal's operations.

5.17 Other Issues and Risks

During the reporting period approximately 99% of the coal produced at CVC was sent to the VPPS via overland conveyor. This is a significant reduction in public safety risk as transport prior to August 2017 was via truck on public roads and overland conveyor.

An Independent Traffic Audit was prepared by GHD for the reporting period. Coal haulage movements along the public road network ceased in July 2017 following the commissioning of a link and overland conveyor to the adjacent Power Station. However, these movements commenced again from January 2020 as part of CVC stockpile area clean-up and minor rehabilitation works.

For the review period of January 1st to December 31st 2020 there were 232 truckloads (or approximately 8,320 tonnes) of coal transported from the Chain Valley Colliery on the public road network to Minion Enterprises' processing plant in Carrington. The processed coal was then returned to Vales Point Power Station in, 214 loads, with a minor amount of separated contamination (i.e. stone and wood posts) sent to landfill by Minion Enterprises. As a reflection of the low truck haulage activity for the review period, no public complaints or traffic accidents/incidents were received in relation to truck haulage operations.

In addition, and as part of this audit, GHD undertook a review of the Chain Valley Colliery Road Transport Protocol, which consists of the Chain Valley Colliery Drivers Code of Conduct and Coal Haulage Traffic Management Plan. GHD found no departure from the procedural requirements set out in the Protocol documents during the audit.

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5.18 Summary of Environmental Performance

In summary, environmental performance during the reporting period for CVC is detailed in **Table 13**.

Table 12 - Environmental Performance

Aspect	Approved criteria/ EIS prediction	Performance during the reporting period	Trend/ key management implications	Implemented/ proposed management actions
Noise	Chapter 9 Noise (EIS, EMGA Mitchell McLennan 2013)	In accordance with approved criteria.	Main trend (attended noise monitoring during 2020): Quarterly noise monitoring results from the AR reporting period indicate that CVC is operating within relevant limits and is not the dominant source of environmental noise within the vicinity. VPPS is audible to receivers to the north and the Pacific Highway is also audible from the south. The EIS predicted that that CVC will operate within acceptable noise limits.	There were no exceedances during 2020 quarterly attended noise monitoring (see Appendix 7 for results). Nosie management will continue to be monitored in an effective manner.
Blasting	n/a	n/a	n/a	n/a
Air Quality	Chapter 10 Quality and Greenhouse Gases (EIS, EMGA Mitchell McLennan 2013)	In accordance with approved criteria and EIS predictions	Main trend (depositional dust results 2020): Based on modelling in the EIS, total dust emissions from CVC are expected to be minor, at less than 2 grams/m²/month. The depositional dust PM10 and PM2.5 results for 2020 reflect CVC's compliance to air quality criteria, remaining generally minor at most locations for the reporting period.	The air quality monitoring program, in accordance with the approved management plan, was ongoing at the end of the reporting period. Results are detailed in Section 5.1 . Management of air quality will continue to be monitored in an effective manner.

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Biodiversity	Chapter 14 Terrestrial Ecology (EIS, EMGA Mitchell McLennan 2013)	In accordance with approved criteria and EIS predictions/surveys.	Main trend: Vegetation and habitat values broadly similar to previous years.	The biodiversity monitoring program, in accordance with the approved management plan, was ongoing at the end of the reporting period. See Appendix 5 for results. Biodiversity will continue to be monitored.
Heritage	Chapter 15 Heritage (EIS, EMGA Mitchell McLennan 2013)	No predicted impact on aboriginal or non- aboriginal heritage items was identified in the EIS.	Main Trend: Aboriginal Heritage Incidents Within the reporting period, two previously unidentified midden sites were disturbed during demolition of derelict mine cottages. The sites were secured and recorded on the AHIMS register. RAPs were consulted.	Ongoing diligence and monitoring of ground disturbance activities. Review of contractor inductions in regard to aboriginal heritage. Heritage Management Plan updated in reporting period. Ongoing consultation with RAPs.

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6 Water Management

6.1 Water Management

6.1.1 Licenced Mine Dewatering

Delta Coal holds a groundwater bore license WAL41508 under the *Water Act, 1912*, which permits the industrial dewatering of groundwater up to volume of 4443 megalitres (ML) per year. The following details groundwater extraction volumes during the reporting period.

During the 2020 reporting period, approximately 6187 kL of mine water was extracted per day from within the mine workings, before being pumped to the CVC surface facilities, where it is discharged into sediment dams prior to being discharged into Lake Macquarie under the NSW Environment Protection Authority (EPA) EPL No.1770. This daily average is increased somewhat over the reporting period when compared with 2019 data with a daily average of 5240 kL (refer to **Section 6.14** Water Balance for long term water data).

The maximum groundwater extraction on any day during 2020 peaked at 10338 kL, which reflects the automated control of pumping limits (10.5 ML) implemented on site as committed to by Delta Coal within the Environmental Impact Statement (EIS) for the current mining operations.

Delta Coal operated well within the groundwater extraction limits prescribed by license WAL41508. Groundwater extraction data is summarised in **Table 13** and **Figure 35**.

Table 13 - CVC Groundwater Extraction, 2020

Water Access Licence	Water sharing plan, source and management zone (as applicable)	Entitlement	Passive Take / inflows	Active pumping	TOTAL
WAL41508	Sydney Basin North Coast Groundwater Source	4443 ML	N/A	2265 ML	2265 ML

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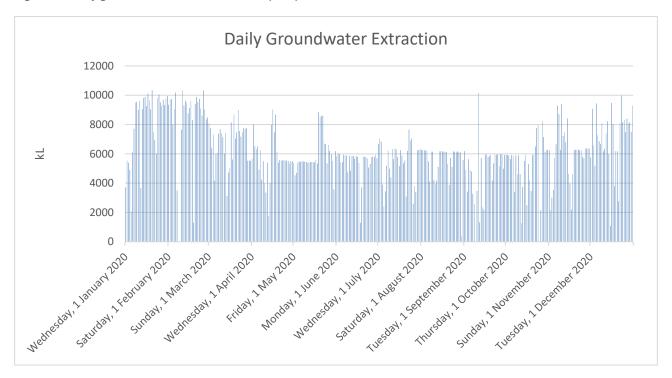


Figure 41 - Daily groundwater extraction volumes (2020)

6.1.2 Licenced Discharge under EPL 1770

Delta Coal holds EPL 1770, which licences the discharge of up to 12,161 kL per day from the site. During the 2020 reporting period the daily average discharges were 6482 kL with a maximum of 13,534 kL and a minimum of 1282 kL.

Figure 36 shows the daily discharge volumes over the reporting period. Note that discharge limits applied under EPL 1770 relate to both licenced discharge points 1 and 27 which reflect the low and high (emergency) flow discharge points at the final sediment dam.

There were three discharges via Point 27 following several rainfall events and with high rainfall intensities during the reporting period. Further detail is provided in **Section 6.4**.

As shown in **Figure 36**, there were two exceedances of the daily volumetric limit (12,161 kL) during the reporting period. Further detail is provided in **Section 6.4**.

CVC also completed an upgrade to the underground water storage and pumping network in 2016. The increased storage capacity allows UG dewatering to be restricted for longer periods of time which ultimately improves the storm surge capacity in the surface water management system. The reduction in the exceedances modelled has been attributed to this improvement project. Real time telemetry was also added to the site's discharge point in 2015 to assist with the review of actual (real time flows) during prolonged rain events.

Water quality monitoring is required, and undertaken, at the licensed discharge point (LDP1). Refer to **Plan 3** (**Appendix 2**) for the location of LDP1. Results for pH, EC, TSS and faecal coliforms are compared against the compliance limits specified in EPL 1770 are presented in **Figure 37**, **Figure 38**, **Figure 39** and **Figure 40**, respectively.

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Figure 42 - Chain Valley Colliery, LDP1 Discharge Volume (2020 Period)

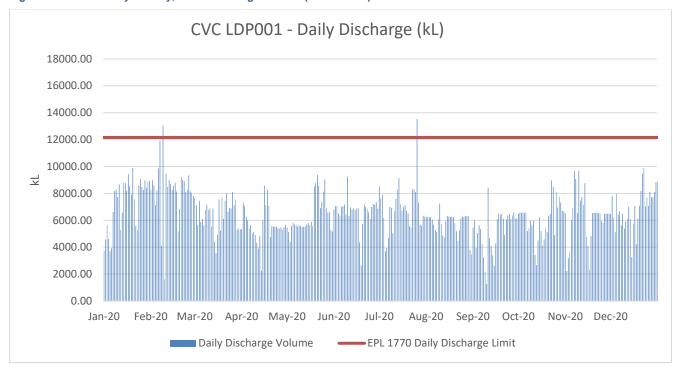
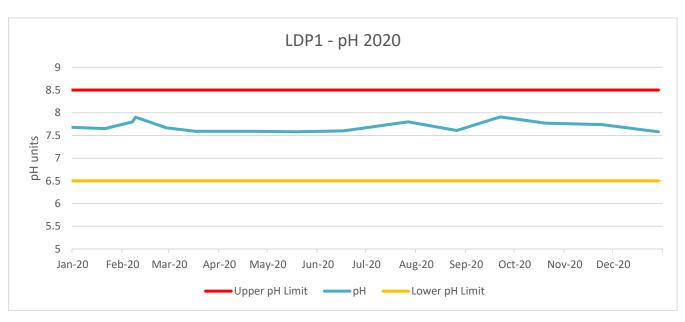


Figure 43 – pH monitoring results at LDP1



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Figure 44 - Electrical conductivity monitoring results at LDP1

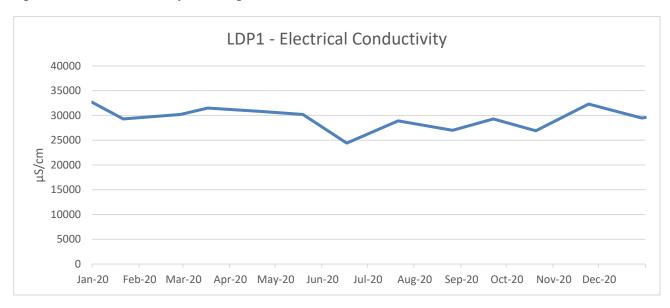
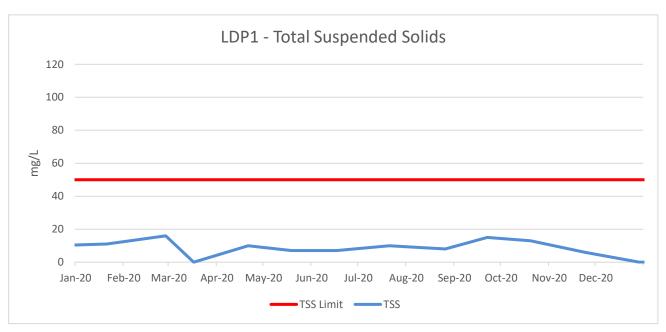


Figure 45 - Total Suspended Solids monitoring results at LDP1



Notes: 1. TSS results shown as zero were below the limit of reporting (<5mg/L)

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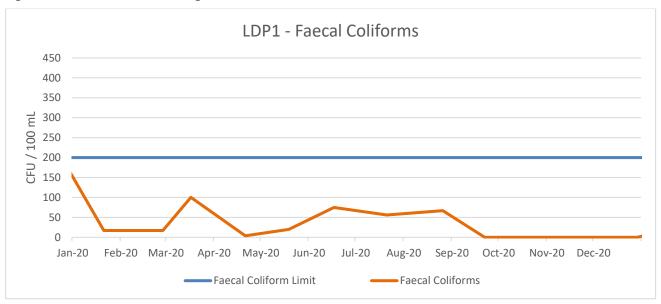


Figure 46 - Faecal Coliform monitoring results at LDP1

6.1.3 Long Term Water Management

To assess any long-term trends in both water quality and quantity, nine years of monthly sampling data (2012 to 2020 inclusive) is presented for pH (**Figure 41**), electrical conductivity (**Figure 42**), total suspended solids (**Figure 43**) and faecal coliforms from LDP1 (**Figure 44**).

The annual average of mine dewatering volumes for the past eleven years is also presented in **Figure 45**. Note that prior to 2013, average mine dewatering volumes were calculated using the EPL 1770 reporting period (April – March), but since this time have reflected the calendar year period consistent with Annual Review requirements.

From the below figures it is evident that despite some infrequent higher results of faecal coliforms and one TSS result over 50 mg/L, there are no significant trends or changes in the water quality parameters.

There is no obvious increase in mine dewatering volumes over the last six or seven years, however, it is expected that this will occur over time consistent with the groundwater modelling within the Chain Valley Colliery EIS that predicts an increase in groundwater make will occur to an annual average of 10.5 ML/day (at the end of mine life). The current mine dewatering levels (approximately 5.7 ML/day during 2019) are still significantly below this level.

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Figure 47 - Long term pH monitoring results at LDP1

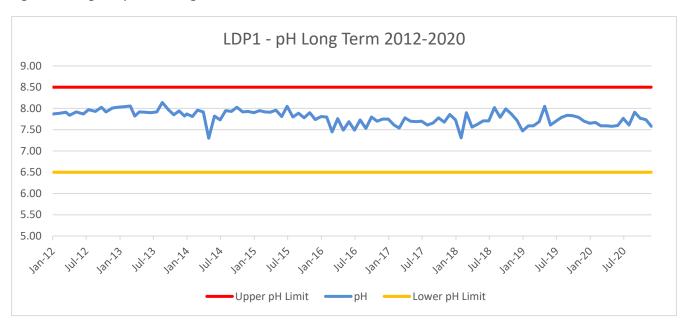
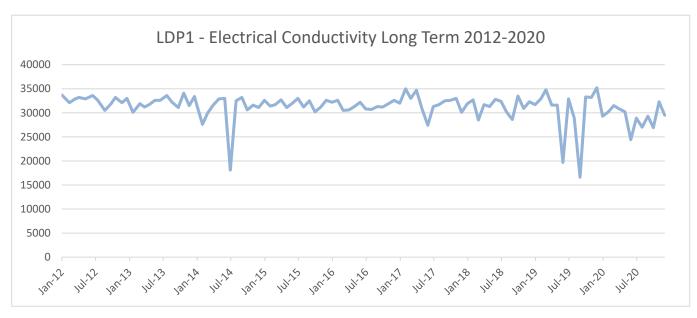


Figure 48 - Long term electrical conductivity monitoring results at LDP1



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Figure 49 - Long term total suspended solids monitoring results at LDP1

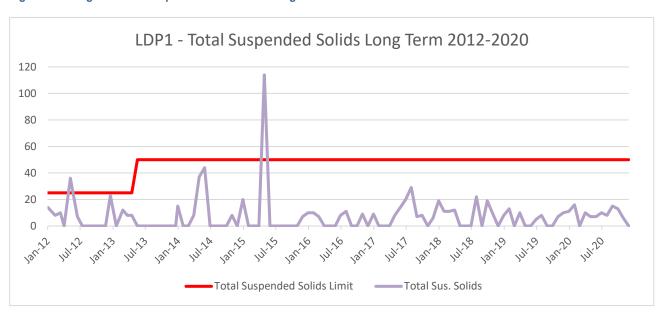
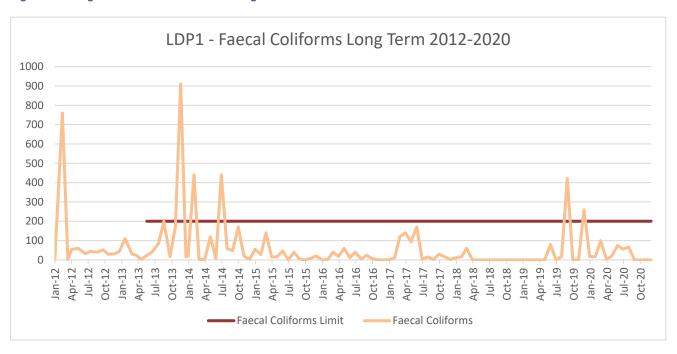


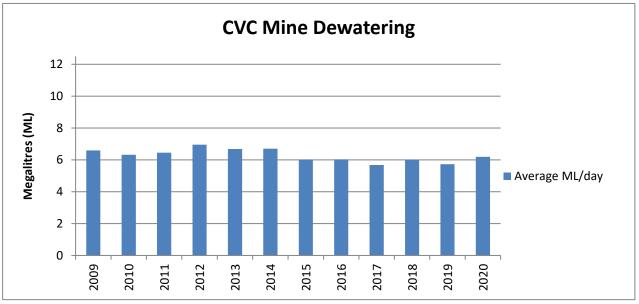
Figure 50 - Long term faecal coliform monitoring results LDP1



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Figure 51 - Long term mine dewatering volumes



6.1.4 Water Balance

A summary of the key water balance model predictions from the EIS compared with actual results over the reporting period are provided in **Table 14**.

Table 14 - Key water balance predictions and actual results during 2020

Water Balance Results (from EIS)	Reporting Period Result	Comment
Daily average discharge through the LDP1 of 10.716 ML	Daily annual average discharge of 6.5 ML/day	The water balance used the groundwater model end of mine life groundwater make to ensure model was conservative over the life of the mine. Result is significantly below the water balance prediction but not unexpected due to the assumptions used in the water balance.
Maximum discharge through LDP1 of 30.52 ML/day	Maximum discharge of 13.5 ML/day	While the maximum discharge is greater than the EPL volumetric limit, the result is significantly lower than water balance prediction as water balance was conducted using a daily time step model over a 100-year period, as a result maximum result would not be expected except in the event of a 1:100 ARI rainfall event.

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Water Balance Results (from EIS)	Reporting Period Result	Comment
Likelihood of LDP1 volumetric limit exceedance on any given day of 4% (or approximately 15 times per year)	Two exceedances of the EPL volumetric limit at LDP1.	Result reflects significance of rainfall events during the year and improvements made to both the surface and underground water management system subsequent to the EIS modelling.
Average annual rainfall 1206 mm	1468 mm	Total greater than previous year and slightly greater than anticipated annual average.
Potable water use of 161.9 ML/yr	140.4 ML	Potable water increased to previous year due to recommencement of Miniwall mining in the reporting period.

6.2 Erosion and Sediment

Mining operations and related activities that have the potential to cause erosion and/or generate sediment and impact on the surrounding catchment areas were unchanged during the reporting period and consist of:

- the exposed areas of the car park, workshop, laydown and internal access tracks;
- coal stockpiling area (not utilised for coal storage in 2020 reporting period) and coal handling equipment areas;
- vehicle and equipment movements; and
- erosion of drainage structures.

Water draining from the access road on the western side of the site runs via a number of small drainage channels through dry basins, swales or silt fencing.

The water draining from the hardstand catchment area reports to the pollution control ponds D11, D12 and D13. D13 will, if required, overflow in D9 which then flows into D10 prior to being discharged from site via the licenced discharge point. The pollution control ponds (sediment dams) and the location of the monitoring points are show on **Plan 3** (**Appendix 2**).

Runoff from the coal handling and stockpile area is contained by two main drainage channels that surround the stockpile and report to a number of sediment dams below the stockpile. Runoff from this area can contain a significant amount of coal fines due to the nature of the activities. In the 2020 reporting period, residual coal stockpiles at CVC were removed and processed off-site by a contractor for domestic sale. The majority of the runoff from this catchment area reports to D1, D2 and D6. These dams also function as primary settling ponds before discharging into dams further downstream. Both D1 and D2 report to D3 and then into D4 while D6 reports to D5 and then into D4. Once in D4 all the water flows into D9, water from D9 flows into D10 prior to discharge.

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6.3 Stream monitoring

One of the recommendations from the IEA included a requirement for reporting of stream health, channel flow and riparian vegetation monitoring of the unnamed creek. The monitoring inspections involve undertaking a visual assessment and photographs of the creek on a 6-monthly basis to identify any potential instabilities that may form as a result of operations. The results of the visual inspection of watercourse stability are recorded on a pro-forma field inspection sheet.

Monitoring has been undertaken at four locations along the unnamed creek since 2014. There has been no noticeable degradation of stream and riparian health during the reporting period.

6.4 Surface Water Pollution

There were two exceedances of the volumetric limit and three discharges via the spillway (LDP27) in the reporting period, comprising:

- 7 February 2020 39 kL discharged via LDP27 where 116 mm of rainfall was recorded in the 24/hr period at Mannering Colliery's meteorological station. Total daily discharge via LDP1 (gravity fed discharge pipe) and LDP27 (D10 spillway) was 11,862 kL. Groundwater discharge ceased on the morning of the event. A sample was collected from LDP27 discharge waters as required by EPL 1770. The sample was analysed for pH (7.7 pH units), total suspended solids (TSS) (178 mg/L), Enterococci (600 CFU/100ml) and Faecal Coliforms (~700 CFU/100ml), the sample exceeded EPL 1770 TSS and Faecal Coliform concentration limits of 50 mg/L and 200 CFU/100ml respectively;
- 9 February 2020 13,044 kL of combined discharge via LDP1 and LDP27 exceeding daily discharge limits of 12,161 kL, a total of 834 kL was discharged via LDP27. Rainfall on 9 February 2020 was 138 mm in the 24/hr period., as recorded at Mannering Colliery. A sample was collected of LDP 27 discharge waters and analysed for pH (7.9 pH units), electrical conductivity (4,670 µS/cm), TSS (478 mg/L), Faecal Coliforms (~910 CFU/100ml) and Enterococci (880 CFU/100ml). The sample exceeded EPL 1770 TSS and Faecal Coliform limits. Groundwater discharge to the sediment dams had ceased two days prior to the exceedance; and
- 26 July 2020 13,899 kL combined discharge via LDP1 and LDP27 exceeding daily discharge limits of 12,161 kL, a total of 365 kL was discharge via LDP27. Rainfall on 26 July 2020 was recorded at Mannering colliery as 131 mm in the 24/hr period. A sample was collected of the LDP27 discharge and analysed for pH (7.8 pH units), electrical conductivity (10,990 μS/cm), TSS (22 mg/L), Faecal Coliforms (~270 CFU/100ml) and Enterococci (290 CFU/100ml). The sample exceeded EPL 1770 Faecal Coliform limits. Groundwater discharge on the day was limited to 1.1 ML.

There were no exceedances of pH water quality criteria during water quality monitoring within the reporting period. Notably all exceedances of water quality limits recorded within the reporting period were in relation to significant rainfall events, all greater than 100 mm/24hr. Septic systems are maintained with a weekly/fortnightly inspection undertaken by the waste management contractor and pump outs occurring as required.

6.5 Groundwater Pollution

There was no evidence of groundwater pollution detected during the reporting period, and there has been no groundwater pollution previously identified at CVC.

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7 Rehabilitation

7.1 Buildings

Demolition of site infrastructure occurred within the reporting period, legacy infrastructure removed from CVC pit-top area included:

- · coal handling plant;
- ROM coal bin
- final product bin;
- conveyors leading from underground to CVC pit top (coal rediverted in 2017 to Mannering Colliery via the Link Road project).
- former CVC mine cottages adjacent Lake Macquarie foreshore; and
- belt winder house.

7.2 Rehabilitation of Disturbed Land

There were no significant rehabilitation works on disturbed lands during the reporting period, with exception to the removal of pit-top coal handling infrastructure at CVC and the former mine cottages, which were considered redundant infrastructure.

The former mine cottages area had active rehabilitation occur within the 2020 reporting period. The demolition of the derelict structures was completed in November 2020 and consistent with the MOP. The area was actively being rehabilitated to an open grasslands land use scenario through the collection and chemical analysis of representative soil samples and active spreading of native grass seed and fertiliser. At the completion of the 2020 annual reporting period, the rehabilitation was on-going. It is not anticipated that the rehabilitated area will be relinquished from the mining lease at this stage.

A summary of the rehabilitation statistics for Chain Valley Colliery is provided in **Table 15** and **Table 16**. A copy of the site's final rehabilitation plans is provided in **Plan 4** (**Appendix 2**). The plans are consistent with the approved CVC Mining Operations Plan.

Table 15 - Summary of rehabilitation at CVC

		Last period (2019)	This period (2020)	Next period (2021)
A.	Total mine footprint (managed by Delta Coal)	Approximately 14.70 ha	Approximately 14.70 ha	Approximately 14.70 ha
В	Total active disturbance	14.70 ha	14.70 ha	14.70 ha
C.	Land being prepared for rehabilitation	Nil	nil	Nil
D	Land under active rehabilitation	Nil	Approximately 0.69 ha	Nil
E	Completed rehabilitation	Nil	Nil	Approximately 0.69 h

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Table 16 - Maintenance activities on rehabilitated land at CVC

	Area Tre	ated (Ha)	
NATURE OF TREATMENT	This period (2020)	Next period (2021)	Comment/Control Strategies/Treatment Detail
Additional erosion control works (drains re-contouring, rock protection)	0	0	No additional works required.
Re-covering (further topsoil, subsoil sealing etc.)	0	0	n/a
Soil treatment (fertiliser, lime, gypsum etc.)	Approx 0.69	0	Fertiliser mixed with native grasses seed mix and spread on the mine cottages rehabilitation area.
Treatment/management (grazing, cropping, slashing etc.)	0	0	n/a
Re-seeding/replanting (species density, season etc.)	Approx 0.69	0	Fertiliser mixed with native grasses seed mix and spread on the mine cottages rehabilitation area.
Adversely affected by weeds (type and treatment)	Approx 7	7	Follow up works following previous reporting years (2019) extensive weed management program. As discussed in Section 5.5, weed management works were also undertaken along the Lake Macquarie foreshore on Crown Lands, covering an approximate 2 ha area.
Feral animal control (additional fencing, trapping, baiting etc.)	0	0	No feral animal control undertaken during the reporting period.

7.3 Rehabilitation Trials and Research

No rehabilitation trials or research was undertaken during the reporting period.

7.4 Further Development of the Final Rehabilitation Plan

The currently approved Rehabilitation Management Plan was updated in May 2020, it was provided to regulators and stakeholders as required by Condition 27, Schedule 3 of SSD-5465. The updated management plan was approved with the approval for CVC's S4 Extraction Plan, approved on 22 June 2020.

The contents of the currently approved plan were used to form the basis of the Mining Operations Plan for CVC which is current until 30 April 2021. The proposed final rehabilitation plan, consistent with both the Rehabilitation Management Plan and Mining Operations Plan is provided as **Plan 4** (**Appendix 2**).

7.5 Post Rehabilitation Land Use(s)

As identified in the 2020-2023 Mining Operations Plan (MOP) the post mining land uses for CVC is to revegetate the surface facilities areas to a near-native ecosystem compatible with the surrounding vegetation communities. As the goal is to return the areas of disturbance to a native plant community (or communities)

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aligned with the surrounding bushland, no introduced species (e.g., *Melaleuca armillaris*, *Pinus radiata* and non-endemic eucalypts) would be used in the revegetation program. The focus of the works would be the use

of locally occurring species plant preferentially grown from locally sourced seeds. CVC is on land owned by Delta Electricity who will, therefore, be a key stakeholder in determining the vegetation selection and landform of the area.

Some areas will be revegetated to grassland where this is consistent with the final land use and surrounds. This applies to the areas within existing high voltage power line easements, where the existing grassland vegetation communities are actively managed to ensure they have no impact to the transmission of electricity for the state. Accordingly, a grassland community is both consistent with other areas within the easement and considerate of future management requirements (as the high voltage power lines will remain following mine closure).

The final land use for each of the secondary domains is:

- Domain A Establishment of a native bushland ecosystem compatible with the surrounding vegetation communities, which includes targeting a final vegetation community comparable to:
 - Broad-Leaved Scribbly Gum Open Forest (for Mannering pit top);
 - Coastal Open Woodland (for majority of Chain Valley pit top);
 - Swamp Sclerophyll Forest (for Chain Valley upcast shaft).
- Domain B Establishment of grass cover consistent with surrounding grass species for the:
 - Areas of the Chain Valley site that are within existing high voltage power line easements;
- Domain C Retention of water management structures.

7.6 Decommissioning

During mine closure the following actions will be taken with respect to the buildings and structures associated with the mining, preparation and transport of the coal:

- any plant, structures, buildings or conveyors would be preferentially sold and/or relocated for reuse at another mining operation;
- the remaining surface conveyor plant, buildings and built structures will be demolished or removed.
 All demolition is to occur in accordance with AS 2601-2001: The Demolition of Structures (or its latest version);
- concrete pads and footings will be either completely removed or removed to a minimum 1 m below surface levels and disposed of at an appropriate place or recycled, and following removal will be covered with at least 300 mm of growth medium;
- roadways not required for access to the mine site or other areas for purposes such as bushfire management will be rehabilitated;
- asphalt hardstand will be removed;
- all services not required following mine closure will be disconnected and any stored energy dissipated;
- · mining related power lines within the domains will be removed;
- mining related surface services will be removed; and
- buried services encountered during civil works will either be completely removed or removed to 300 mm below the final landform level and remain buried. As mentioned above, all services, including buried services will be safely disconnected and have any stored energy dissipated.

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These proposed actions could be subject to change during the mine closure process depending on requests by the landowner for infrastructure to be left in accordance with alternative future land use options. Additionally, it is noted that while services will be disconnected to the majority of the site during decommissioning activities, services may remain connected to a portion of the site for beneficial use during the later rehabilitation phases (such as watering tube stock) and subsequently would be disconnected following ecosystem establishment.

The decommissioning phase will also address the following:

- risks associated with any remaining combustible materials. An assessment of combustion risk will be undertaken and specific controls implemented based on report findings.
- completion of Environmental Site Assessments, with specific focus on areas around storage tanks, oil storage areas, fuel dispensing locations, service areas, buildings housing powered plant and known locations of hazardous materials.
- undertaking any necessary contamination remediation, if required, to ensure the land is suitable for
 use as buffer land for the Vales Point Power Station. As the lands will not be used as "recreation/public
 space", nor is it planned to be used for "commercial/industrial" purposes which are land use scenarios
 within the National Environment Protection (Assessment of Site Contamination) Measure 1999, it is
 proposed that a combination of health based investigation criteria applicable to either of these
 classifications will be adopted as the rehabilitation criteria should contamination requiring remediation
 be identified.
- heritage sites, which are not anticipated to be impacted during decommissioning; and
- asbestos, a hazardous building material register was completed in February 2020 for the CVC pit top area.

7.7 Objectives

The rehabilitation objectives below have been compiled from Condition 25 within Schedule 3 of SSD-5465 and are listed in **Table 17**.

Table 17: Rehabilitation objectives

Feature	Objective
Mine site (as a whole of disturbed land and water)	 Safe, stable and non-polluting. Final land use compatible with surrounding land use.
Surface Infrastructure	 To be decommissioned and removed, unless agreed otherwise with relevant regulatory authority and landowner.
Portals and ventilation shafts	 To be decommissioned and made safe and stable. Retain habitat for threatened species (e.g. bats), where practicable (Chain Valley pit top facilities only).
Other land affected by the development	 Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems: local native plant species (unless agreed otherwise with relevant regulatory authority and landowner); and a landform consistent with the surrounding environment.
Built features damaged by mining operations	 Repair to pre-mining condition or equivalent unless: the owners agrees otherwise; or the damage is fully restored, repaired or compensated under the Mine Subsidence Compensation Act 2017.

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Feature	Objective
Community	 Ensure public safety. Minimise the adverse socio-economic effects associated with mine closure.

7.8 Other Infrastructure

There was no other rehabilitation works completed during the reporting period.

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8 Community

8.1 Community Complaints

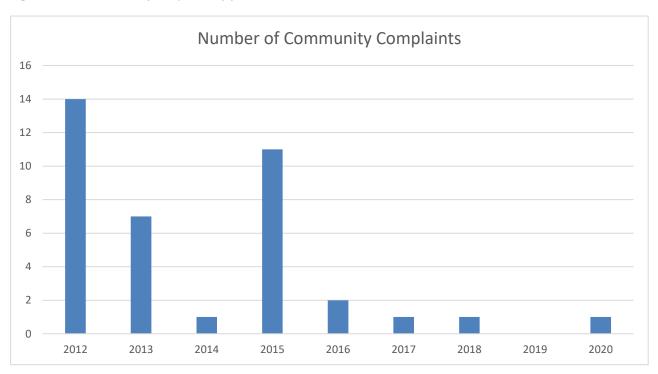
There was one community complaint received during the reporting period. The complaint was made on 9 October 2020 and related to noise associated with the demolition of redundant site infrastructure. The residence of the complainant is approximately 450m from the location of the demolition. The Environmental Coordinator met with the complainant on the day, who was satisfied knowing the works were temporary and the noise was not related to ongoing operations of the mine.

A copy of the Complaints Register is provided on the Delta Coal website. This register includes:

- the date and time of the complaint;
- the method by which the complaint was made;
- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken, the reasons why no action was taken.

The Annual total complaints and complaints by subject type trends are Figure 52 and Figure 53.

Figure 52 - Total community complaints by year



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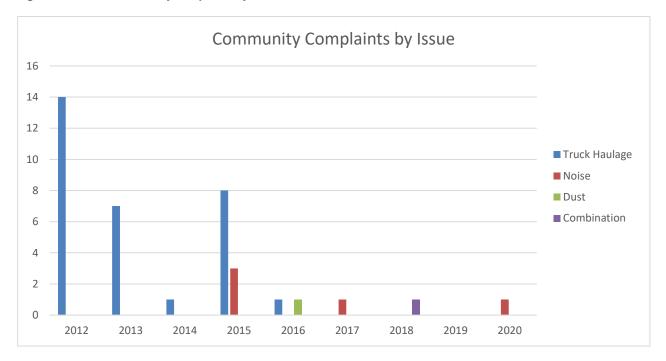


Figure 53 - Annual Community Complaints by Issue

8.2 Community Liaison

The CVC/Mannering Community Consultative Committee (CCC) continued to operate in accordance with the Community Consultative Guidelines for State Significant Development (January 2019) during the reporting period.

There were four CCC meetings held during the reporting period on the 19 February 2020, 20 May 2020, 19 August 2020 and 18 November 2020. Minutes for each of the committee meetings are available on the Delta Coal website https://www.deltacoal.com.au/community/community-consultative-committee

In addition, the Delta Coal website was updated on a monthly basis with monitoring data, management plans, reports, audits and complaint details among other items.

The community hotline number (1800 115 277) also remained in place during the reporting period and is displayed prominently and permanently on the website.

8.3 Voluntary Planning Agreement

A Voluntary Planning Agreement (VPA) with Central Coast Council was successfully established during 2017. Following extensive consultation with Central Coast Council, the Community Advisory Panel was established and met to plan and coordinate the framework for the VPA funding. The Chain Valley Colliery VPA fund was launched during September 2017 via the Council grants and sponsorship scheme.

The 2020 Chain Valley Colliery Community Funding Program was open between 17 August 2020 and 25 September 2020. The CVC Community funding program was established as a joint initiative between Delta Coal and Central Coast Council to provide funding for organisations to deliver projects that improve community infrastructure and services in the following communities:

- Summerland Point
- Gwandalan

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- · Chain Valley Bay; and
- · Mannering Park.

8.4 Community Support / Engagement

Delta Coal is committed to supporting and engaging with the local communities which surround its operations. While Delta Coal provides a monetary offsets associated with its VPA under its operating approvals, Delta Coal also supports the local community through a variety of additional avenues. This support is provided through in kind support, cash donations, staff time, and charitable donations.

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9 Independent Audit

An independent environmental audit (IEA) was undertaken by SLR in 2019. The updated Response to Audit Recommendations was submitted to DPIE on 25 June 2019 and accepted on 21 October 2019. An update was provided to DPIE on 31 December 2019. The IEA is provided in **Appendix 9**.

Throughout the 2020 period, Delta Coal have sought to complete recommendations from the 2019 IEA.

9.1 Key Audit Outcomes

Recommendations with respect to the annual review are summarised in **Table 18**.

Table 18 - Actions required from IEA

Item	Issue / Observation	Action	Status
1	Transport	REC3: Ensure transport records from this Audit period (January 2016) onwards are recorded on the website. This could be appended to the Annual Review summarising the weekly transport.	See DC website
2	Noise	REC7: Ensure accurate / consistent monitoring results are presented in Annual Reviews.	See Section 5.7 and Appendix 7
3	Air	REC9: Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review.	See Section 5.1
4	Sewage management	REC10: Include an update of sewage system during the audit period in the Annual Review.	See Section 3.10 and Table 21
5	Biodiversity management plan	REC12: Include the biodiversity monitoring reports as appendices to the Annual Review.	See Appendix 5
6	Annual Review	REC19: The Annual Reviews are set out differently to the DPE Annual Review Guidelines (2015). Ensure table of contents matches the guidelines.	This document
7	Biodiversity management plan	Include the biodiversity monitoring reports as appendices to the Annual Review.	See Appendix 5
8	IEA	Include an update on Audit Action Plan.	See Appendix 10
9	Revision of strategies, plans and programs	REC20: Include statement in future Annual Reviews stating that Management Plans have been reviewed and state which management plans will or will not be updated within 3 months.	See Section 4.2

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Item	Issue / Observation	Action	Status			
	Statement of Commitments					
10	Surface water REC24: A separate report should be completed for Stream Health Channel Flow and Riparian Vegetation Monitoring. This should compare results from previous inspections. Information to be included in the Annual Review.		See Section 6.3			
		CCL 721				
11	Condition 5	REC33: Report against compliance with the MOP in future Annual Reviews.	See Section 7			
		Additional Recommendations				
12	Surface The Annual Reviews need to provide a clear statement regarding whether discharge criteria have been met.		See Section 6.4			
13	Subsidence A separate subsidence impact assessment report should be prepared annually and appended to the Annual Review. Presentation of all future survey data in Annual Reviews would benefit from a thorough and comprehensive analysis of the subsidence monitoring being undertaken by an external consultant so that the data can be meaningfully interpreted and is comprehensible by anyone with an interest in the outcomes.		See Appendix 8			
14	Subsidence	The report should assess performance against subsidence impact performance measures from the Development Consent as well as any other commitments, triggers and management measures from Extraction Plans. This report should assess how the Extraction Plans tracked against Trigger Action Response Plan (TARP's).	See Appendix 8			
14		Include how the site is tracking against subsidence performance criteria (Schedule 4, Condition 4) in the Biodiversity Monitoring Reports, Annual Seagrass Monitoring Report and the Annual Review. This should include a table outlining if performance criteria have been met and where further information can be found.	See Appendix 8, Appendix 5 and Appendix 4			

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9.2 Action F	lanاد
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The IEA Action Plan has been included in Appendix 10.

9.3 Future Audit

The next Independent Environmental Compliance Audit is scheduled for Quarter 2 2022. An updated table of compliance with the 2019 Independent Environmental Audit will be completed as part of that audit.

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10 Incidents and non-compliances during the reporting period

All non-compliances, exceedance, and reportable incidents relating to the site's licences and approvals are summarised below in **Table 19**.

Table 19 - Summary of reportable incidents/non-compliances for 2020

Date	Description of Incident	Approval / Condition / Clause	Actions taken to address incident
4 January 2020 5 January 2020 8 January 2020 24 January 2020	PM10 24 Hour Average Exceedance (RTD 001) - Kingfisher Shores during a significant bushfire event.	Schedule 3 Condition 11 SSD-5465	An email was sent to the NSW EPA and DPIE Compliance. DPIE considered this to be an extraordinary event as per Schedule 3, Condition 11, Tables 3 to 5, Note D of SSD 5465. No formal incident report was required.
7 February 2020	Faecal Coliform and TSS concentration exceedance at LDP27.	L2.4 EPL 1770	This event was reported to DPIE and EPA and is detailed in Section 6.4. Development Application DA/845/2020 for the installation and of a sewage pump station and connection of the sites bathhouse to sewage mains was approved on 7 December 2020 and commencement of construction is anticipated in Q3 2021. The sewage pump station should improve Faecal Coliform concentrations, particularly in heavy rainfall events.
9 February 2020	Daily Volume Discharge Limit Exceedance – LDP1 & LDP27 combined discharge	L3.1 and L3.2 EPL 1770	This event was reported to DPIE and EPA and is detailed in Section 6.4. Groundwater discharge to sediment dams had ceased two days prior to the exceedance.
9 February 2020	Faecal Coliform and TSS concentration exceedance at LDP27.	L2.4 EPL 1770	This event was reported to DPIE and EPA and is detailed in Section 6.4. Development Application DA/845/2020 for the installation and of a sewage pump station and connection of the sites bathhouse to sewage mains was approved on 7 December 2020 and commencement of construction is anticipated in Q3 2021. The sewage pump station should improve Faecal Coliform concentrations, particularly in heavy rainfall events.
9 April 2020	Depositional Dust Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1 Given the contamination clearly present in the sample (DDG005), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not classified as an exceedance. DDG005 has shown evidence of contamination in previous years.

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Date	Description of Incident	Approval / Condition / Clause	Actions taken to address incident
			Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
5 June 2020	Depositional Dust Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1
			Given the contamination clearly present in the sample (DDG005), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not classified as an exceedance. DDG005 has shown evidence of contamination in previous years.
			Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
7 July 2020	Depositional Dust Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1 Given the contamination clearly present in the sample (DDG005), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not
			classified as an exceedance. DDG005 has shown evidence of contamination in previous years.
			Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
26 July 2020	Daily Volume Discharge Limit Exceedance – LDP1	L3.1 and L3.2 EPL 1770	This event was reported to DPIE and EPA and is detailed in Section 6.4.

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Date	Description of Incident	Approval / Condition / Clause	Actions taken to address incident
	& LDP27 combined discharge		Groundwater discharge ceased on the morning of the exceedance with a total of 1.1 ML discharged in the 24hr period.
26 July 2020	Faecal Coliform and TSS concentration exceedance at LDP27.	L2.4 EPL 1770	This event was reported to DPIE and EPA and is further detailed in Section 6.4.
			Development Application DA/845/2020 for the installation and of a sewage pump station and connection of the sites bathhouse to sewage mains was approved on 7 December 2020 and commencement of construction is anticipated in Q3 2021. The sewage pump station should improve Faecal Coliform concentrations, particularly in heavy rainfall events.
7 September 2020	Depositional Dust Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1
			Given the contamination clearly present in the sample (DDG005), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not classified as an exceedance. DDG005 has shown evidence of contamination in previous years.
			Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
21 September 2020	Disturbance of previously unidentified Aboriginal Heritage Artefact	CVC Heritage Management Plan	The event was reported to DPIE – biodiversity and conservation division, NSW EPA and Registered Aboriginal Parties (RAPs) immediately following confirmation of the suspected Midden sites. The noted stakeholders were issued a report detailing the event and CVC's commitments to unexpected finds in the Heritage Management Plan. The incident is described in Section 5.9.
			Following the identification of shells, Delta Coal engaged an independent Aboriginal heritage consultant. Site cards were submitted to the AHIMS register and the two sites were included in the updated Heritage Management Plan submitted for review and consultation within the reporting period.
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Date	Description of Incident	Approval / Condition / Clause	Actions taken to address incident
			sites have been secured by high visibility fencing demarcating and protecting the sites. Delta Coal is undertaking a review of the surface contractor inductions with regard to Aboriginal Heritage within the reporting period. Delta Coal key environmental and exploration staff undertook a Aboriginal Cultural Heritage training with a local provider.
18 November 2020	Depositional Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1 Given the contamination clearly present in the sample (DDG005), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not classified as an exceedance. DDG005 has shown evidence of contamination in previous years. Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
11 December 2020	Depositional Dust Exceedance	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1 Given the contamination clearly present in the sample (DDG005 and DDG001), DPIE advised that the limit was an annual average limit and as such would not be taking any further action, and this is not classified as an exceedance. DDG005 has shown evidence of contamination in previous years and the DDG001 annual average value was significantly less than the limit (1.18 g/m²/month) Given the occurrences of contamination at DDG005, it is proposed within the Delta Coal Air Quality and Greenhouse Gas Management Plan, updated in 2020, to move the dust deposition gauge onto the ventilation fan site, which was considered a more representative site for potential ventilation fan site dust emissions. The proposed alternative location for the dust gauge was established in January 2020 and has shown not shown evidence of contamination or exceedances of depositional dust limits since established.
31 December 2020	Depositional Dust Exceedance – Annual Average Limit	Schedule 3- Condition 11 SSD 5465	This event was reported to DPIE and EPA and is detailed in Section 5.1.1

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11 Activities Completed in the Reporting Period

A summary of the activities that were proposed to be undertaken during the 2019 reporting period and current status is provided in Table 20.

Table 20 - Update on activities undertaken in the 2020 reporting period

Activity Proposed in 2019 Annual Report	Status Update	31 December 2020 update, percentage complete
Ongoing use of chemical dust suppressant on unsealed access roads	Not completed in period, a watercart was operated on an as needed basis at the site, and was available for use at all times throughout the reporting period. No exceedances of air quality limits or complaints received regarding air quality due to CVC mine operations.	0%
Ongoing weed management in 2020 in accordance with Weed Action Plan	Ongoing weed management works undertaken in 2020 in accordance with Weed Action Plan.	100%
Ongoing rehabilitation monitoring planned for Q2 2020	Rehabilitation monitoring undertaken with biodiversity monitoring in Q4 2020	100%
Awaiting approval. Update of management plans will be required during Q2 2020	SEE for CVC Mod 4 – Northern Extension Area (Morriset Peninsular) submitted in November 2020.	100%
Submission of a Statement of Environmental Effects (SEE) for CVC Mod 4 - Northern Extension Area (Morriset Peninsular). This project is reliant on CVC Mod 3 approval to recommence bord and pillar mining methods at CVC	Mod 3 Approval granted in June 2020.	
Submission of updated MOP including demolition activities. Demolition to commence in Q2 2020	Amendment 1 of the 2018-2020 MOP was submitted on 8 January 2020 and was approved on 14 February 2020 and included amendment to allow for demolition and construction activities.	100%

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Activity Proposed in 2019 Annual Report	Status Update	31 December 2020 update, percentage complete
	Demolition was undertaken in Q3 2020.	
Submission of Extraction Plan for S4 Miniwall panel	The Extraction Plan for S4 Miniwall panel was submitted in March 2020 and approved in June 2020.	100%
Submission of Miniwall S5 Extraction Plan if CVC Mod 3 is delayed or declined	CVC Mod 3 approved in June 2020.	N/A
Submission of updated MOP including demolition activities and S4 Miniwall	This was addressed in Amendment 1 of the 2018-2020 MOP, approved in the period	100%
Following approval to Modification 3 of SSD-5465 and Modification 5 of MP06_0311 - Update of management plans required during Q2 2020	Modification 3 to SSD-5465 and Modification 5 to MP06_0311 was approved in June 2020. Delta Coal environmental management plans (combining CVC and Mannering Colliery operations) were developed (Section following approval, as detailed in Section 4.2. At the end of the reporting period, combined environmental management plans were pending approval from the Planning Secretary.	50% (pending Planning Secretary approval)
Removal of remnant coal and carbonaceous material in the stockpile area.	Removal of remnant coal stockpiles completed in Q3 and Q4 of 2020.	90%
Commence assessment to consolidate CVC development consent and MC project approval. Consolidation to include mining in the Great Northern Seam and site infrastructure upgrade works	Environmental and Social impact studies undertaken in 2020 for consent consolidation project as well as community consultation. Scoping report anticipated	100%

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Activity Proposed in 2019 Annual Report	Status Update	31 December 2020 update, percentage complete
	Engagement and consultation with local land owners and key stakeholders.	
Obtain licence to access Munmorah SCA and commence environmental scoping assessment and exploration in the Moonee area	Conservation Risk Assessments (CRAs) were completed and submitted to the NSW National Parks and Wildlife Service in 2020 for all exploration activities including proposed magnetometer drone surveys (to be completed in 2021), with consent being provided in September 2020.	100%
Obtain a land access licence agreement to gain access to Crown land adjacent to Lake Macquarie foreshore to conduct weed management works in this area	As discussed in Section 5.5, Delta Coal submitted a short-term access license for the purpose of land maintenance along the Lake Macquarie foreshore, which was approved in June 2020. An extensive weed management campaign was undertaken in Q4 2020.	100%
Installation of temporary chlorine dosing plant to reduce Faecal Coliforms from CVC Bath house effluent and shower water	A chlorine dosing pump was installed and commissioned for operation in June 2020. The dosing pump is installed directly to the CVC bathhouse septic tank.	100%
Submission of a Review of Environmental Factors (REF) for a sewage pump station at CVC for connection to Central Coast Council sewage system	Delta Coal submitted an REF to the NSW EPA in May 2020 and was directed to Central Coast Council as the appropriate regulatory body. Delta Coal subsequently submitted a Statement of Environmental Effects (SEE) with a Development Application (DA/845/2020) to Central Coast Council in August 2020.	100%
Housekeeping Activities	Ongoing	ongoing

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12 Activities Proposed to be Completed in Next Reporting Period

Table 21 - Activities Proposed for the 2021 Period

Activity Proposed in 2019 Annual Report	2020 Activity Status	Proposed Activities for 2021
Ongoing use of chemical dust suppressant on unsealed access roads	Not completed, however a watercart was operated throughout the period and no dust exceedances or air quality complaints occurred as a result of mine activities.	Reconsider use of chemical dust suppressant on un-sealed access roads.
Ongoing weed management as per Weed Action Plan	Completed in 2020	Ongoing weed management in 2021 period
Ongoing rehabilitation monitoring following development of a rehabilitation monitoring program and baseline monitoring.	Completed during biodiversity monitoring in Q4 2020	Rehabilitation monitoring as per the requirements of the rehabilitation monitoring program to be completed in Q2 2021.
Removal of remnant coal and carbonaceous material in the stockpile area.	Completed in Q3 and Q4 of 2020.	Review land contouring and erosion and sediment controls at the former coal stockpiling area in relation to final landform contours presented in the MOP.
Submission of Extraction Plan for S4 Miniwall panel	The Extraction Plan for S4 Miniwall panel was submitted in March 2020 and approved in June 2020.	Submission of Extraction Plan for Mninwall S5 panel in Q1 2021.
Submission of a Statement of Environmental Effects (SEE) for CVC Mod 4 - Northern Extension Area (Morriset Peninsular).	SEE submitted for CVC Mod 4 in November 2020.	Response to submissions for CVC Mod 4.

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Activity Proposed in 2019 Annual Report	2020 Activity Status	Proposed Activities for 2021
Submission of updated MOP including demolition activities and S4 Miniwall	This was addressed in Amendment 1 of the 2018-2020 MOP, approved in the period. The 2020 to 2023 MOP was approved to April 2021.	Submission of Amendment 1 to the MOP for extension of approval period and Northern Mining Area pillar extraction and Miniwall S5 works.
Commence assessment to consolidate CVC development consent and MC project approval. Consolidation to include mining in the Great Northern Seam and site infrastructure upgrade works	Environmental and Social impact studies undertaken in 2020 for consent consolidation project as well as community consultation. Engagement and consultation with local land owners and key stakeholders.	Submission of an Environmental and Social Impact Statement to facilitate consent consolidation.
Obtain licence to access Munmorah SCA and commence environmental scoping assessment and exploration in the Moonee area	Conservation Risk Assessments (CRAs) were completed and submitted to the NSW National Parks and Wildlife Service in 2020 for all exploration activities including proposed magnetometer drone surveys (to be completed in 2021), with consent being provided in September 2020.	Continued non-intrusive exploration (i.e. drone magnetometer surveys) of the Munmorah SCA / Moonee area.
Obtain a land access licence agreement to gain access to Crown land adjacent to Lake Macquarie foreshore to conduct weed management works in this area	As discussed in Section 5.5, Delta Coal submitted a short-term access license for the purpose of land maintenance along the Lake Macquarie foreshore, which was approved in June 2020. An extensive weed management campaign was undertaken in Q4 2020.	Continued land-maintenance works along the land adjacent to the foreshore in the 2021 reporting period.
Installation of temporary chlorine dosing plant to reduce Faecal Coliforms from CVC Bath house effluent and shower water	A chlorine dosing pump was installed and commissioned for operation in June 2020. The dosing pump is installed directly to the CVC bathhouse septic tank.	Decommissioning of chlorine dosing pump following completion of the CVC sewer connection.

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Activity Proposed in 2019 Annual Report	2020 Activity Status	Proposed Activities for 2021
Submission of a Review of Environmental Factors (REF) for a sewage pump station at CVC for connection to Central Coast Council sewage system	Delta Coal submitted an REF to the NSW EPA in May 2020 and was directed to Central Coast Council as the appropriate regulatory body. Delta Coal subsequently submitted a Statement of Environmental Effects (SEE) with a Development Application (DA/845/2020) to Central Coast Council in August 2020.	Sewage pump station and connection to Central Coast Council sewer, construction is anticipated to commence in Q3 2021.
N/A	N/A	If CVC Mod 4 is approved a second amendment of the 2020-2023 MOP will be provided to RR
N/A	N/A	Variation of EPL1770 for CVC Modification 3 changes
N/A	N/A	if CVC Mod 4 is approved variation of EPL1770 to include underground premises extension
Housekeeping Activities	Ongoing	Ongoing house keeping activities throughout the 2021 period.

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13 References

Documents used in the preparation of this report are detailed in **Table 22**.

Table 22: References

Reference	Title	
Legislation and Regulations	Development consent SSD-5465 (as modified) Environment Protection Licence (EPL) 1770 Mining Act 1992	
Futornal decurrents	Protection of the Environment Operations Act, 1997	
External documents	AECOM, 2011 – Environmental Assessment Chain Valley Colliery Domains 1 & 2 Continuation Project. Prepared for LakeCoal Pty Ltd.	
	EMGA Mitchell McLennan, 2013 – Environmental Impact Statement, Chain Valley Colliery Mining Extension 1 Project. Prepared for LakeCoal Pty Ltd.	
	EMM Consulting (March 2021) Biodiversity Monitoring 2020 Chain Valley Colliery.	
	Laxton, J. H. & Laxton, E. S., 2020 – Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2019)	
	Laxton, E. S. 2020 – Lake Macquarie Benthos Survey Results No. 18 (August 2020)	
	NSW DPIE (January 2019) Community Consultative Guidelines for State Significant Development	
	Total Earth Care Pty Ltd (January 2020) Weed Action Plan Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft.	
	Total Earth Care Pty Ltd (August 2020) Weed Action Plan – Addendum 1, Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft.	

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14 Acronyms / Definitions

AEMR Annual Environmental Management Report, now known as the Annual Review

Annual Review The annual environmental report compiled for CVC, the Annual Review also fulfills the

requirement for an Annual Environmental Report or an Annual Environmental Management

Report generally required by mining leases.

CCC Community Consultative Committee

CVC Chain Valley Colliery

DP&E Department of Planning & Environment (former)

DPIE Department of Planning, Industry and Environment

EA Environmental Assessment

EMS Environmental Management System

EPA NSW Environment Protection Authority

EP&A Act Environmental Planning and Assessment Act 1979

EPL Environmental Protection LicensekL Kilolitre

LDP1 Licenced Discharge Point 1 (per EPL 1770)

MC Mannering Colliery

NGER National Greenhouse and Energy Reporting

NSW New South Wales

OEH NSW Office of Environment and Heritage

PM₁₀ Particulate matter less than 10 microns in size

POEO Act Protection of the Environment Operations Act 1997

ROM Run of mine

Secretary Secretary of the Department, or nominee

TEOM Tapered element oscillating microbalance

t - CO₂-e Tonnes of carbon dioxide equivalent

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The website The website of Delta Coal - Chain Valley Colliery, which is www.deltacoal.com.au

MP10_0161 Project approval MP 10_0161, as modified, issued under Section 75J of the Environmental

Planning and Assessment Act 1979 for the Chain Valley Colliery Domains 1 & 2

Continuation Project.

SSD 5465 Development Consent SSD 5465, as modified, issued under Section 89E of the

Environmental Planning and Assessment Act 1979 for the Chain Valley Colliery Mining

Extension 1 Project.

VPPS Vales Point Power Station

WCJV Wallarah Coal Joint Venture

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15 Appendices

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Appendix 1: Development Consent SSD-5465

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Development Consent

Section 89E of the Environmental Planning & Assessment Act 1979

As delegate of the Minister for Planning and Infrastructure, I approve the development application referred to in Schedule 1, subject to the conditions in Schedules 2 to 6.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the development.

Chris Wilson
Executive Director

Development Assessment Systems and Approvals

Sydney 2013

SCHEDULE 1

Application Number: SSD-5465

Applicant: Great Southern Energy Pty Limited

Consent Authority: Minister for Planning and Infrastructure

Land: See Appendix 1

Development: Chain Valley Extension Project

Red type represents November 2014 Modification (SSD_5465 MOD 1) Blue type represents December 2015 Modification (SSD_5465 MOD 2) Green type represents June 2020 Modification (SSD-5465 MOD 3)

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DEFINITIONS

Aboriginal Object / Place	Has the same meaning as the definition of the term in section 5 of the NP&W Act
Adaptive management	Adaptive management includes monitoring subsidence impacts and subsidence effects
3.1	and, based on the results, modifying the mining plan as mining proceeds to ensure that
	the effects, impacts and/or associated environmental consequences remain within
	predicted and designated ranges and in compliance with the conditions of this consent
Affected Councils	LMCC and/or CC Council
Annual Review	The review required by Condition 4 of Schedule 6
Applicant	Great Southern Energy Pty Limited, or any person carrying out development under this
	consent
Approved mine plan	The mine plan shown in Appendix 3, as varied by any Extraction Plan approved under this
4.07	consent
APZs	The asset protection zones shown in Appendix 7A
BCA	Building Code of Australia
BCD	Biodiversity and Conservation Division within the Department
BMP	Biodiversity Management Plan
Built features	Any building or work erected or constructed on land or water, and includes dwellings and
	infrastructure such as any formed road, street, path, walk, marina or driveway; any pipeline, water, sewer, telephone, gas or other service main
Calendar Year	A period of 12 months from 1 January to 31 December
CCC	Community Consultative Committee
CC Council	Central Coast Council
Coal haulage route	The route proposed in the EIS for haulage of coal by trucks between the site and the Port
Coal Hadiage Toute	of Newcastle (as shown in Appendix 5)
Conditions of this consent	Conditions contained in Schedules 2 to 6 inclusive
Construction	The demolition of buildings or works, carrying out of works and erection of buildings
Contraction	covered by this consent
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and
,	Public Holidays
Delta Electricity	Delta Electricity, or subsequent owners of the Vales Point Power Station
Department	Department of Planning, Industry and Environment
Development	The development described in the EIS, as amended by the SEE (Mod 1), SEE (Mod 2)
•	and SEE (Mod 3)
DPIE Crown Lands	Crown Lands Group within the Department
DPIE Water	Water Group within the Department
EIS	Environmental Impact Statement titled 'Chain Valley Colliery Mining Extension 1 Project'
	dated 28 May 2013, as modified by the response to submissions, titled 'Chain Valley
	Colliery Mining Extension 1 Project Response to Submissions', dated August 2013, and
	the letter by EMM to the Applicant, dated 29 October 2013
Endangered population	As defined under the Fisheries Management Act 1994
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an
	individual or in his or her social groupings
Environmental	The environmental consequences of subsidence impacts, including: damage to built
consequences	features; loss of surface water flows to the subsurface; loss of standing pools; slope changes to streams; adverse water quality impacts; development of iron bacterial mats;
	landslides; damage to Aboriginal heritage sites; impacts on aquatic ecology; and ponding.
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence issued under the POEO Act
Evening	The period from 6pm to 10pm
Feasible	Means what is possible and practicable in the circumstances
First Workings	The extraction of coal from underground workings by bord and pillar mining methods
	(including herringbone pattern workings) and from main headings, gateroads and cut-
	throughs and the like, provided that such workings are long-term stable and do not
	generate more than 20 mm of vertical subsidence at the surface
Fisheries NSW	Fisheries Branch of the Primary Industries Group within the Department
На	Hectare
Heritage Item	An Aboriginal object, an Aboriginal place, or a place, building, work, relic, moveable
-	object, tree or precinct of heritage significance, that is listed under any of the following:
	the State Heritage Register under the Heritage Act 1977;
	a state agency heritage and conservation register under section 170 of the Heritage
	Act 1977;

	a Local Environmental Plan under the EP&A Act;
	the World Heritage List;
	the National Heritage List or Commonwealth Heritage List under the EPBC Act; or
12.1	anything identified as a heritage item under the conditions of this consent.
High Water Mark	The area of land defined:
Subsidence Barrier	a) on the surface by the highwater level of Lake Macquarie and a point 2.44 metres in elevation above that highwater level; and
	b) in the seam, where it is intersected by lines:
	drawn landwards from all points 2.44 metres elevation above the highwater level
	of Lake Macquarie; and
	drawn lakewards from the highwater level of Lake Macquarie,
	at an angle of 35 degrees from the vertical.
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm
	that may or may not be or cause a non-compliance
Land	Has the same meaning as the definition of the term in section 1.4 of the EP&A Act, except
	where the term is used in the noise and air quality conditions in Schedules 3 and 5 of this
	consent where it is defined to mean the whole of a lot, or contiguous lots owned by the
	same landowner, in a current plan registered at NSW Land Registry Services at the date
11100	of this consent
LMCC	Lake Macquarie City Council
Material harm	Is harm to the environment that:
	 involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or
	results in actual or potential loss or property damage of an amount, or amounts in
	aggregate, exceeding \$10,000, (such loss includes the reasonable costs and
	expenses that would be incurred in taking all reasonable and practicable measures to
	prevent, mitigate or make good harm to the environment)
MEG	Regional NSW – Mining, Exploration and Geoscience
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the
	development
Mining operations	The carrying out of underground mining, including the extraction, processing, stockpiling
	and transportation of coal on the site and the emplacement of coarse/fine reject material
	resulting from underground mining
Minister	Minister for Planning and Public Spaces, or delegate
Minor	Not very large, important or serious
Mitigation	Activities associated with reducing the impacts of the development
Modification 1	The modification to the development as described in SEE (Mod 1)
Modification 2	The modification to the development as described in SEE (Mod 2)
Modification 3 NCC	The modification to the development as described in SEE (Mod 3)
Negligible	Newcastle City Council Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and
Night	Public Holidays
Non-compliance	An occurrence, set of circumstances or development that is in breach of this consent
NP&W Act	National Parks and Wildlife Act 1974
Peak hour periods	7 am to 9 am and 4:30 pm to 6 pm weekdays
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
POEO Act	Protection of the Environment Operations Act 1997
Privately-owned land	Land that is not owned by a public agency, Delta Electricity (or its subsidiary) or a mining
•	company (or its subsidiary)
Public infrastructure	Linear and related infrastructure that provides services to the general public such as
	roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone,
_	telecommunications, etc.
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into
	account: mitigation benefits, cost of mitigation versus benefits provided, community views
Doggonahla acata	and the nature and extent of potential improvements
Reasonable costs	The costs agreed between the Department and the Applicant for obtaining independent
	experts to review the adequacy of any aspects of the Extraction Plan, or where such costs cannot be agreed, the costs determined by a dispute resolution process
Registered Aboriginal	As described in the <i>National Parks and Wildlife Regulation 2009</i>
Parties	110 described in the Mational Larks and Mindile Negalation 2003
Rehabilitation	The restoration of land disturbed by a development to a good condition, to ensure it is
	safe, stable and non-polluting
Remediation	Activities associated with partially or fully repairing or rehabilitating the impacts of the
	development or controlling the environmental consequences of this impact

RFS	NSW Rural Fire Service
Road Maintenance	The document prepared by McCullough Robertson Lawyers and titled 'Road Maintenance
	Agreement, signed by CC Council on 1 July 2013 and by LakeCoal on 5 July 2013
Agreement	Run-of-mine
RR	Regional NSW - Resources Regulator
SA NSW	Subsidence Advisory NSW
Safe, serviceable & repairable	Safe means no danger to users who are present; serviceable means available for its intended use; and repairable means damaged components can be repaired economically
Second Workings	Extraction of coal by longwall, miniwall, pillar extraction, pillar splitting or pillar reduction methods, and inclusive of any first workings methods that would generate more than 20 mm of vertical subsidence at the surface
SEE Mod 1	Statement of Environmental Effects titled 'Chain Valley Colliery – Modification 1, Statement of Environmental Effects, Section 96 Modification to SSD-5465' dated April 2014, as modified by the associated Response to Submissions dated 15 September 2014.
SEE Mod 2	Statement of Environmental Effects titled 'Chain Valley Colliery – Modification 2, Statement of Environmental Effects, Section 96 Modification to SSD-5465' dated 29 June 2015, including the associated Response to Submissions dated 16 September 2015.
SEE (Mod 3)	Statement of Environmental Effects titled 'Statement of Environmental Effects, Chain Valley Colliery – Modification 3', dated May 2019, prepared by EMM Consulting, including the associated Response to Submissions dated August 2019 and prepared by EMM Consulting
Site	All land within the Development Area (see Appendices 1 and 2)
SPB	Seagrass Protection Barrier is the area of land defined by:
	(a) on the surface by the extent of the seagrass beds; and
	(b) in the seam, where the seam is intersected by the lines drawn:
	landwards from the landwards boundary of the seagrass beds; and
	 lakewards from the lakewards boundary of the seagrass beds,
	at an angle of 26.5 degrees from the vertical as illustrated in Figure 1A in Appendix 3
Statement of	The Applicant's commitments in Appendix 9
commitments	The Applicant o communicate in Appendix o
Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences
	of subsidence impacts
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground
	movements, such as vertical and horizontal displacement, tilt, strain and curvature
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs
Subsidence Zone A	The area shown as Zone A in Figure 1 in Appendix 3 in which long-term stable mining systems generating no more than 20 mm of surface subsidence may be utilised
Subsidence Zone B	The area shown as Zone B in Figure 1 in Appendix 3 in which mining systems generating no more than 780 mm of surface subsidence may be utilised
Surface facilities sites	The Chain Valley Colliery surface facilities site; the Summerland Point ventilation shaft site; and any other site subject to existing or proposed surface disturbance associated with the development
TfNSW	Transport for NSW
Threatened Species	As defined under the <i>Threatened Species Conservation Act 1995</i> and the <i>Environment Protection and Biodiversity Conservation Act 1999</i>

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent.

TERMS OF CONSENT

- 2. The development may only be carried out:
 - (a) in compliance with the conditions of this consent:
 - (b) in accordance with the statement of commitments in Appendix 9;
 - (c) in accordance with the Subsidence Zones in Appendix 3;
 - (d) in accordance with all written directions of the Planning Secretary; and
 - (e) generally in accordance with the EIS, SEE (Mod 1), SEE (Mod 2) and SEE (Mod 3).
- 3. Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to:
 - (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and
 - (b) the implementation of any actions or measures contained in any such document referred to in condition 3(a).
- 4. The conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document/s listed in condition 2(e). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition 2(e), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

LIMITS ON CONSENT

Mining Operations

5. The Applicant may carry out mining operations on the site until 31 December 2027.

Note: Under this consent, the Applicant is required to rehabilitate the site and perform additional undertakings to the satisfaction of either the Planning Secretary or the RR. Consequently, this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.

Coal Extraction

6. The Applicant must not extract more than 2.1 million tonnes of ROM coal from the site in any calendar year.

Coal Transport - Public Roads

- 7. The Applicant must ensure that no laden coal trucks are dispatched from the site to public roads outside of the hours of 5:30 am to 5:30 pm, Monday to Friday, and not at all on Saturdays, Sundays or public holidays.
- 8. The Applicant must not dispatch from the site more than:
 - (a) 660,000 tonnes of product coal in any calendar year to the Port of Newcastle for export;
 - (b) 180,000 tonnes of product coal in any calendar year to domestic customers other than Vales Point Power Station:
 - (c) a total of 270 laden coal trucks per day by public roads;
 - (d) a total of 32 laden coal trucks per hour; and
 - (e) an average of 16 laden coal trucks per hour by public roads during peak hour periods, calculated monthly, until the intersection of M1 Motorway and Sparks Road Interchange (East Side unsignalised with stop sign) is upgraded to a signalised intersection.

Coal Transport – Vales Point Power Station

9. The Applicant must ensure that only private roads are used for the transport of coal by truck to Vales Point Power Station, except in an emergency. In an emergency, product coal may be transported by public roads,

with the prior written approval of the Planning Secretary, and subject to any restrictions that the Planning Secretary may impose.

- 10. The Applicant must restrict the transport of coal by truck to the Vales Point Power Station between 10 pm and 5:30 am to:
 - (a) 16 laden trucks per hour for the Spring and Autumn months; and
 - (b) zero during Winter months.

PLANNING AGREEMENT

11. Within 12 months of the date of this consent, unless otherwise agreed by the Planning Secretary, the Applicant must enter into a planning agreement with the CC Council in accordance with Division 6 of Part 4 of the EP&A Act that provides for payment to the CC Council for community enhancement purposes.

The agreement must include provision for those matters set out in condition 12 below.

If there is any dispute between the Applicant and CC Council relating to the preparation or implementation of the planning agreement, then either party may refer the matter to the Planning Secretary for resolution.

COMMUNITY ENHANCEMENT

- 12. The Applicant must pay CC Council \$0.035 for each tonne of product coal produced by the development for the purposes of improving public infrastructure and providing community projects for the communities of Summerland Point, Gwandalan, Chain Valley Bay and Mannering Park. Payments from the approval date of project approval 10_0161 must be:
 - (a) made by the end of March, for coal produced in the previous calendar year;
 - (b) made for each year that coal is produced by the colliery; and
 - (c) subject to indexation in accordance with the Australian Bureau of Statistics Consumer Price Index.
- 13. Deleted.
- 14. Deleted.

STRUCTURAL ADEQUACY

- 15. The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structure, that are part of the development are constructed in accordance with:
 - (a) the relevant requirements of the BCA; and
 - (b) any additional requirements of the SA NSW where the building or structure is located on land within declared Mine Subsidence Districts.

Notes:

- Under Part 8 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works;
- Part 8 of the EP&A Regulation sets out the requirements for the certification of the development; and
- Under section 21 of the Coal Mine Subsidence Compensation Act 2017, the Applicant is required to obtain the SA NSW's approval before constructing any improvements in a Mine Subsidence District.

DEMOLITION

16. The Applicant must ensure that all demolition work is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.

OPERATION OF PLANT AND EQUIPMENT

- 17. All plant and equipment used on site, or to monitor the performance of the development must be:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.
- 18. Deleted

ROAD MAINTENANCE CONTRIBUTION

19. The Applicant must pay Road Maintenance Fees to CC Council in accordance with its Road Maintenance Agreement with CC Council.

COMMUNITY CONSULTATIVE COMMITTEE

20. A Community Consultative Committee (CCC) must continue to operate for the development in accordance with the Department's Community Consultative Committee Guidelines: State Significant Projects (2019). The CCC must continue to operate during the life of the development, or other timeframe agreed by the Planning Secretary.

Notes:

- The CCC is an advisory committee only.
- In accordance with the Guidelines, the Committee should comprise an independent chair and appropriate representation from the Applicant, Affected Councils and the local community.
- 21. With the approval of the Planning Secretary, the Applicant may combine the CCC required by this consent with any similar CCC required by a consent or approval for any adjoining mine subject to common, shared or related ownership or management.

EVIDENCE OF CONSULTATION

- 22. Where conditions of this consent require consultation with an identified party, the Applicant must:
 - (a) consult with the relevant party prior to submitting the subject document;
 - (b) provide details of the consultation undertaken including:
 - i. the outcome of that consultation, matters resolved and unresolved; and
 - ii. details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.

STAGING, COMBINING AND UPDATING STRATEGIES, PLANS OR PROGRAMS

- 23. With the approval of the Planning Secretary, the Applicant may:
 - (a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);
 - (b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined);
 - (c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development); and
 - (d) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by an adjoining mining consent or approval, in common ownership or management.
- 24. If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.
- 25. If the Planning Secretary agrees, a strategy, plan or program may be staged without addressing particular requirements of the relevant condition of this consent if those requirements are not applicable to the particular stage.

APPLICATION OF EXISTING STRATEGIES, PLANS OR PROGRAMS

26. The Applicant must continue to apply existing management strategies, plans or monitoring programs approved prior to the approval of Modification 3, until the approval of a similar plan, strategy or program following the approval of Modification 3.

PROTECTION OF PUBLIC INFRASTRUCTURE

- 27. Unless the Applicant and the applicable authority agree otherwise, the Applicant must:
 - (a) repair, or pay the full costs associated with repairing, any public infrastructure^a that is damaged by carrying out the development; and
 - (b) relocate, or pay the full costs associated with relocating, any public infrastructure^a that needs to be relocated as a result of the development.

^a This condition does not apply to any damage to roads caused as a result of general road usage or to damage that has been compensated under the Mining Act 1992.

COMPLIANCE

28. The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.

APPLICABILITY OF GUIDELINES

- 29. References in the conditions of this consent to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, Standards or policies in the form they are in as at the date of inclusion (or later update) in the condition.
- 30. However, consistent with the conditions of this consent and without altering any limits or criteria in this consent, the Planning Secretary may, in respect of ongoing monitoring and management obligations, agree to or require compliance with an updated or revised version of such a guideline, protocol, Standard or policy, or a replacement of them.

SCHEDULE 3 ENVIRONMENTAL CONDITIONS – GENERAL

TRANSPORT

Monitoring of Coal Transport

- 1. The Applicant must:
 - (a) keep accurate records of the amount of coal transported from the site (on a weekly basis); and
 - (b) make these records publicly available on its website at the end of each calendar quarter.

Road Works

- 2. The Applicant must upgrade the Ruttleys Road and Construction Road intersection within 6 months of the date of this consent, unless the Planning Secretary directs otherwise, by:
 - (a) installing additional signage on and adjacent to Construction Road prior to the intersection;
 - (b) repairing the surface of Construction Road as required and ensuring the edge seal of the left turn lane is of sufficient width to accommodate coal trucks;
 - (c) installing or replacing "Stop" signs in accordance with Austroads guidelines;
 - (d) repainting road line markings and raised pavements associated with this intersection; and
 - (e) installing barriers to prevent trucks parking on the gravel area adjacent to the intersection and the electricity substation located in the vicinity of this intersection.

The design and construction of these works must be undertaken in consultation with, and to the relevant satisfaction of, CC Council, TfNSW and Delta Electricity and to the satisfaction of the Planning Secretary.

Road Transport Protocol

- The Applicant must prepare a Road Transport Protocol to the satisfaction of the Planning Secretary. This protocol must:
 - (a) be prepared in consultation with TfNSW, NCC, CC Council and CCC and submitted to the Planning Secretary for approval within 6 months of the date of this consent;
 - (b) describe the designated haulage routes to be used (as shown in Appendix 5); the maximum number of road movements proposed and the haulage hours permitted under this consent;
 - (c) include a Traffic Management Plan, which includes:
 - procedures to ensure that drivers adhere to the designated haulage routes;
 - measures to maximise the use of a low frequency (regular) trucking schedule rather than an intermittently-high frequency (campaign) trucking schedule, especially during the morning peak hour;
 - contingency plans to apply when (for example) the designated haulage route is disrupted, including procedures for notifying relevant agencies and affected communities of the need to implement such contingency plans;
 - procedures to ensure that all haulage vehicles associated with the development are clearly distinguishable as Chain Valley Colliery coal haulage trucks;
 - details of procedures for receiving and addressing complaints from the community concerning traffic issues associated with truck movements to and from the site;
 - measures to ensure that the provisions of the Traffic Management Plan are implemented, eg driver training in the heavy vehicle driver's Code of Conduct and contractual agreements with heavy vehicle operators: and
 - procedures for ensuring compliance with and enforcement of the heavy vehicle driver's Code of Conduct;
 - (d) include a Code of Conduct for heavy vehicle drivers that addresses:
 - travelling speeds:
 - instructions to avoid grouping or convoying of trucks;
 - instructions to drivers not to overtake each other on the haulage route, as far as practicable, and to maintain appropriate distances between vehicles;
 - instruction to drivers to adhere to the designated haulage routes;
 - instruction to drivers to be properly safety conscious and to strictly obey all traffic regulations;
 - appropriate penalties for infringements of the Code.

The Applicant must implement the approved Road Transport Protocol as approved from time to time by the Planning Secretary.

Independent Traffic Audit

 Prior to 31 March 2014, and every 12 months thereafter for each calendar year in which coal haulage from the site is undertaken utilising public roads, unless the Planning Secretary directs otherwise, the Applicant must commission a suitably qualified person, whose appointment has been approved by the Planning Secretary at least one month prior to undertaking the audit, to conduct an Independent Traffic Audit of the development. This audit must:

- be undertaken without prior notice to the Applicant, and in consultation with TfNSW, NCC, CC Council and the CCC;
- (b) assess the impact of the development on the performance and safety of the road network, including a review of:
 - haulage records;
 - accident records on the haulage route, infringements relating to the code of conduct and any incidents involving haulage vehicles;
 - · community complaints register; and
- (c) assess the effectiveness of the Road Transport Protocol; and, if necessary, recommend measures to reduce or mitigate any adverse (or potentially adverse) impacts.
- Within 1 month of receiving the audit report, or as otherwise agreed by the Planning Secretary, the Applicant must submit a copy of the report to the Planning Secretary, with a detailed response to any of the recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report.

A summary of the audit report must be included in the Annual Review.

Alternative Coal Transport Options

- 6. Prior to 31 December 2014, and every three years thereafter, the Applicant must prepare and submit to the Planning Secretary for approval, a study of the reasonable and feasible options to reduce or eliminate the use of public roads to transport coal from the development, unless otherwise agreed by the Planning Secretary. The assessment must include:
 - (a) an analysis of the capital, construction and operating costs of the alternative transport options; and
 - (b) quantified social and environmental impacts associated with road and rail transport.

NOISE

Noise Impact Assessment Criteria

7. The Applicant must ensure that the noise generated by the development at any residence on privatelyowned land does not exceed the criteria for the location in Table 1 nearest to that residence.

Table 1: Noise Criteria dB(A)

Location	Day	Evening	Nig	ıht
Location	L _{Aeq(15 min)}	L _{Aeq(15 min)}	L Aeq(15 min)	L _{A1(1 min)}
R8	38	38	38	45
R11	49	49	49	54
R12	49	49	49	53
R13	43	43	43	49
R15	36	36	36	45
R19	37	37	37	45
R22	46	46	46	46
all other orivately-owned land	35	35	35	45

Notes:

- To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and
- Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

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

Operating Conditions

- 8. The Applicant must:
 - implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;
 - regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
 - (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
 - (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;
 - (e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
 - (f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;

to the satisfaction of the Planning Secretary.

Table 2: Long-term Noise Goals dB(A)

Location	Day	Evening	Night
Location	L Aeq(15 min)	L Aeq(15 min)	L Aeq(15 min)
R11 – R13	41	41	41
R22	40	40	40

Notes:

- To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and
- Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

Noise Management Plan

- 9. The Applicant must prepare a Noise Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:
 - (a) be prepared in consultation with the EPA and submitted to the Planning Secretary for approval within 4 months of the date of this consent, unless otherwise agreed by the Planning Secretary;
 - (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
 - (c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
 - (d) include a monitoring program that:
 - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent:
 - evaluates and reports on:
 - the effectiveness of the on-site noise management system; and
 - compliance against the noise operating conditions; and
 - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

The Applicant must implement the Noise Management Plan as approved by the Planning Secretary.

AIR QUALITY

Odour

 The Applicant must ensure that no offensive odours are emitted from the site, as defined under the POEO Act.

Air Quality Criteria

11. The Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Table 3 at any residence on privately-owned land.

Table 3: Air quality criteria

Pollutant	Averaging period	Crite	rion
Particulate matter < 2.5 µm (PM _{2.5})	Annual	^{a, c} 8 µ	g/m³
Tarticulate matter < 2.5 μm (Fivi _{2.5})	24 hour	^b 25 µ	g/m³
Particulate matter < 10 µm (PM ₁₀)	Annual	^{a, c} 25	ug/m³
r articulate matter < 10 μm (r W10)	24 hour	^b 50 µ	g/m³
Total suspended particulate (TSP) matter	Annual	^{a, c} 90 μg/m ³	
^d Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes:

11A. The air quality criteria in Table 3 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the air quality criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Operating Conditions

- 12. The Applicant must:
 - implement best practice air quality management at the site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the development;
 - (b) implement best practice management to minimise the risk of spontaneous combustion and related emissions:
 - implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site;
 - (d) operate an air quality management system on site to ensure compliance with the relevant conditions of this consent;
 - (e) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note c to Table 3 above):
 - (f) regularly assess the air quality monitoring data, and modify operations on site to ensure compliance with the relevant conditions of this consent,

to the satisfaction of the Planning Secretary.

Air Quality Management Plan

13. The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:

^a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).

^b Incremental impact (i.e. incremental increase in concentrations due to the development on its own).

^c Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.

^d Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

- (a) be prepared in consultation with the EPA, and submitted to the Planning Secretary for approval within 6 months of the date of this consent;
- (b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this consent;
- (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site;
- (d) describe the proposed on-site air quality management system; and
- (e) include an air quality monitoring program that:
 - is capable of evaluating the operating conditions of this consent;
 - evaluates and reports on:
 - the effectiveness of the air quality management system; and
 - compliance against the air quality operating conditions;
 - defines what constitutes an air quality incident and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.

The Applicant must implement the Air Quality Management Plan as approved by the Planning Secretary.

METEOROLOGICAL MONITORING

- 14. During the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in the vicinity of the site that:
 - (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and
 - (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Planning Secretary following consultation with the EPA.

SOIL & WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain the necessary water licences for the development.

Water Supply

15. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of mining operations to match its available water supply, to the satisfaction of the Planning Secretary.

Water Pollution

16. Unless an EPL authorises otherwise, the Applicant must comply with Section 120 of the POEO Act.

Sewage Management

 The Applicant must manage sewage generated by the development in accordance with the requirements of an EPL.

Water Management Plan

- 18. The Applicant must prepare a Water Management Plan for the surface facilities sites to the satisfaction of the Planning Secretary. This plan must be prepared in consultation with DPIE Water and EPA, by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary and submitted to the Planning Secretary for approval within 6 months of the date of this consent. This plan must include:
 - (a) a comprehensive water balance for the development that includes details of:
 - sources and security of water supply;
 - · water make in the underground workings;
 - water transfers from the underground operations to the surface;
 - water use: and
 - any water discharges;
 - (b) management plans for the surface facilities sites, that include:
 - a detailed description of water management systems for each site, including:
 - clean water diversion systems;
 - erosion and sediment controls; and
 - any water storages;
 - measures to minimise potable water use and to reuse and recycle water;
 - measures to manage acid sulphate soils, if encountered;

- activities that would involve ground disturbance at the site; and
- monitoring and reporting procedures.
- (c) a Surface Water Management Plan which:
 - includes baseline data on surface water flows and quality of Swindles Creek;
 - details surface water impact assessment criteria, including trigger levels for investigating any
 potentially adverse impacts on surface water resources or surface water quality;
 - provides a program to monitor:
 - surface water discharges;
 - surface water flows and quality; and
 - channel stability;
- (d) a Ground Water Monitoring Program which includes a program to:
 - monitor and report groundwater inflows to underground workings;
 - predict, manage and monitor impacts to nearby groundwater bores on privately-owned land that may be impacted by the development; and
- (e) a detailed review of surface water management at the site, with particular reference to the water storages within the dirty water management system, to:
 - determine whether the capacity, integrity, retention time and management of the dirty water storages (particularly the final Pollution Control Dam) are sufficient to ensure that water discharged from the site meets the EPL limits and surface water impact assessment criteria within the Surface Water Management Plan; and
 - propose any appropriate changes to the surface water management system.

The Applicant must implement the Water Management Plan as approved by the Planning Secretary.

Note: The Planning Secretary may require the Applicant to implement upgrades and other changes identified under paragraph (e), in accordance with condition 3 of Schedule 2.

BIODIVERSITY

Biodiversity Enhancement Strategy

19. The Applicant must implement a Biodiversity Enhancement Strategy as described in the EIS and summarised in Table 4, in consultation with BCD, and to the satisfaction of the Planning Secretary.

Table 4: Summary of the Biodiversity Enhancement Strategy

Area	Offset Type	Minimum Size/Amount
Biodiversity Enhancement Area	Enhancement and restoration measures, including weed and rubbish removal, return of natural hydrological regime and regeneration with native endemic species.	3 ha (in total) of Swamp Sclerophyll Floodplain Forest and Swamp Oak Floodplain Forest endangered ecological communities within the surface facilities sites

Note: To identify the Biodiversity Enhancement Area referred to in Table 4 see the applicable figures in Appendix 7.

The Applicant must implement its preferred option of the three options set out in new dot point 1 of the Terrestrial Ecology section of its Statement of Commitments by 1 December 2016, following consultation with BCD and to the satisfaction of the Planning Secretary.

Biodiversity Management Plan

- 20. The Applicant must prepare a Biodiversity Management Plan for the surface facilities sites, for all areas that are not, or will not, be subject to condition 7 of schedule 4, to the satisfaction of the Planning Secretary. This plan must:
 - (a) be prepared by a suitably qualified person approved by the Planning Secretary; in consultation with BCD, and submitted to the Planning Secretary within 6 months of the date of this consent;
 - (b) establish baseline data for the existing habitat in the Biodiversity Enhancement Area and elsewhere on the site;
 - (c) describe the short, medium, and long term measures that would be implemented to:
 - manage the impacts of clearing vegetation;
 - manage the remnant vegetation and habitat in the Biodiversity Enhancement Area and elsewhere on the site; and
 - implement the Biodiversity Enhancement Strategy, including detailed performance and completion criteria:

- (d) include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria;
- (e) identify the potential risks to the successful implementation of the Biodiversity Enhancement Strategy, and the contingency measures that would be implemented to mitigate these risks; and
- (f) include details of who would be responsible for monitoring, reviewing, and implementing the plan.

The Applicant must implement the Biodiversity Management Plan as approved by the Planning Secretary.

20A. Within 3 months of the approval of MOD 2, the Applicant must revise the Biodiversity Management Plan to incorporate the measures required to implement its commitments described in new dot point 2 of the Terrestrial Ecology section of its Statement of Commitments, and submit it to the Planning Secretary for approval.

HERITAGE

Protection of Aboriginal Heritage

21. The Applicant must ensure that the development does not cause any direct or indirect impact on any identified heritage item located outside the approved disturbance area, beyond those predicted in the documents listed in condition 2(e) of Schedule 2.

Heritage Management Plan

- 21A. The Applicant must prepare a Heritage Management Plan for the development to the satisfaction of the Planning Secretary. This Plan must:
 - (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary;
 - (b) be prepared in consultation with BCD and Registered Aboriginal Parties;
 - (c) include consideration of the Aboriginal and non-Aboriginal cultural context and significance of the site:
 - (d) describe the procedures and management measures to be implemented on the site or within any offset area to:
 - ensure all workers receive suitable Aboriginal cultural heritage inductions prior to carrying out any activities which may cause impacts to Aboriginal objects or Aboriginal places, and that suitable records are kept of these inductions;
 - ii. protect, monitor and manage identified non-Aboriginal heritage, Aboriginal objects and Aboriginal places (including any proposed archaeological investigations of potential subsurface objects and salvage of objects within the approved disturbance area) in accordance with the commitments made in the document/s listed in condition 2(e) of Schedule 2 and including the ongoing monitoring of site 45-7-0189 at Summerland Point;
 - iii. protect non-Aboriginal heritage, Aboriginal objects and Aboriginal places located outside the approved disturbance area from impacts of the development;
 - iv. manage the discovery of suspected human remains and any new Aboriginal objects or Aboriginal places, including provisions for burials, over the life of the development;
 - v. maintain and manage reasonable access for relevant Aboriginal stakeholders to Aboriginal objects and Aboriginal places (outside of the approved disturbance area); and
 - vi. facilitate ongoing consultation and involvement of Registered Aboriginal Parties in the conservation and management of Aboriginal cultural heritage on the site; and
 - (e) include a strategy for the care, control and storage of Aboriginal objects salvaged on site, both during the life of the development and in the long term.

The Applicant must implement the Heritage Management Plan approved by the Planning Secretary.

VISUAL

Visual Amenity and Lighting

- 22. The Applicant must:
 - (a) minimise visual impacts, and particularly the off-site lighting impacts, of the Surface facilities sites;
 - (b) take all reasonable and feasible measures to further mitigate off-site lighting impacts from the development; and
 - (c) ensure that all external lighting associated on site complies with Australian Standard AS4282 (INT) 1995 Control of Obtrusive Effects of Outdoor Lighting,

to the satisfaction of the Planning Secretary.

WASTE

- 23. The Applicant must:
 - (a) minimise and monitor the waste generated by the development;
 - (b) ensure that the waste generated by the development is appropriately stored, handled and disposed of; and
 - (c) report on waste management and minimisation in the Annual Review, to the satisfaction of the Planning Secretary.

BUSHFIRE MANAGEMENT

- 24. The Applicant must:
 - (a) ensure that the development is suitably equipped to respond to any fires on site; and
 - (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the Surface facilities sites.

REHABILITATION

Rehabilitation Objectives

25. The Applicant must rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the development under the *Mining Act 1992*. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS, and comply with the objectives in Table 5.

Table 5: Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	Safe, stable and non-polluting.Final land use compatible with surrounding land uses.
Surface infrastructure	 To be decommissioned and removed, unless the RR agrees otherwise.
Portals and ventilation shafts	 To be decommissioned and made safe and stable. Retain habitat for threatened species (eg bats), where practicable.
Other land affected by the development	 Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: local native plant species (unless the RR agrees otherwise); and a landform consistent with the surrounding environment.
Built features damaged by mining operations	 Repair to pre-mining condition or equivalent unless: the owner agrees otherwise; or the damage is fully restored, repaired or compensated under the Coal Mine Subsidence Compensation Act 2017.
Community	 Ensure public safety. Minimise the adverse socio-economic effects associated with mine closure.

Notes

- These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by
 underground mining taking place after the granting of project approval MP 10_0161, and to all development surface
 infrastructure that is part of the development, whether constructed prior to or following the date of this consent.
- Rehabilitation of subsidence impacts and environmental consequences caused by mining which took place prior to the date of project approval (MP 10_0161) may be subject to the requirements of other approvals (eg under a mining lease or a Subsidence Management Plan approval).

Progressive Rehabilitation

26. The Applicant must carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.

Rehabilitation Management Plan

- 27. The Applicant must prepare a Rehabilitation Management Plan for the development, in accordance with the conditions imposed on the mining lease(s) associated with the development under the *Mining Act 1992*. This plan must:
 - (a) be prepared in consultation with BCD, DPIE Water, CC Council, LMCC and the CCC;
 - (b) be submitted to the RR within 12 months of the date of approval of this development consent;
 - (c) be prepared in accordance with any relevant RR guideline and be consistent with the rehabilitation objectives in the EIS and in Table 5;

- (d) describe how the performance of the rehabilitation would be monitored and assessed against the objectives in Table 5;
- (e) describe the process whereby additional measures would be identified and implemented to ensure the rehabilitation objectives are achieved:
- (f) provide for detailed mine closure planning, including measures to minimise socio-economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; and
- (g) be integrated with the other management plans required under this consent.

Note: The Rehabilitation Management Plan should address all land impacted by the development whether prior to, or following, the date of this consent.

EXPLORATION ACTIVITIES AND SURFACE INFRASTRUCTURE

Exploration Activities and Minor Surface Infrastructure Management Plan

- 28. Prior to carrying out exploration activities on the site under this consent that would cause temporary surface disturbance, or exploration activities within the waters or lake bed of Lake Macquarie, or the construction and/or upgrade of minor surface infrastructure on the site, the Applicant must prepare an Exploration Activities and Minor Surface Infrastructure Management Plan for the development to the satisfaction of the Planning Secretary. This Plan must:
 - (a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
 - (b) be prepared in consultation with MEG, NSW Maritime Division of TfNSW, NSW Fisheries and BCD;
 - (c) include a description of the measures to be implemented for:
 - i. managing exploration activities;
 - ii. managing construction and operation of minor surface infrastructure and associated access tracks;
 - iii. consulting with and if necessary compensating affected landowners;
 - iv. assessing noise, air quality, traffic, biodiversity, heritage, public safety and other impacts;
 - v. beneficial re-use or flaring of drained hydrocarbon gases, wherever practicable;
 - vi. avoiding significant impacts and minimisation of impacts generally;
 - vii. avoiding or minimising impacts on threatened species, populations or their habitats and EECs:
 - viii. minimising clearance and disturbance of native vegetation (including seagrasses);
 - ix. minimising and managing erosion and sedimentation; and
 - x. rehabilitating disturbed areas.

The Applicant must implement the Exploration Activities and Minor Surface Infrastructure Management Plan as approved by the Planning Secretary.

SCHEDULE 4 ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING

SUBSIDENCE

The Applicant must ensure that vertical subsidence within the High Water Mark Subsidence Barrier and
within seagrass beds is limited to a maximum of 20 millimetres (mm). If at any stage predicted subsidence
levels are exceeded within these areas, an ecological monitoring program shall be initiated to assess the
impacts to ecological communities and threatened species and if appropriate, offsets are to be provided for
any impacts detected.

Performance Measures - Natural Environment

2. The Applicant must ensure that the development does not cause any exceedance of the performance measures in Table 6 to the satisfaction of the Planning Secretary.

Table 6: Subsidence Impact Performance Measures - Natural and Heritage Features

Biodiversity	- Natural and Hemage Features
Threatened species or endangered populations	Negligible environmental consequences
Seagrass beds	Negligible environmental consequences including: negligible change in the size and distribution of seagrass beds; negligible change in the functioning of seagrass beds; and negligible change to the composition or distribution of seagrass species within seagrass beds.
Benthic communities	Minor environmental consequences, including minor changes to species composition and/or distribution.
Mine workings	
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible environmental consequences	To remain long-term stable and non-subsiding.
Second workings	To be carried out only in accordance with an approved Extraction Plan.

Notes:

- The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent (see Condition 7 below).
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be
 undertaken using generally accepted methods that are appropriate to the environment and circumstances in which
 the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In
 the event of a dispute over the appropriateness of proposed methods, the Planning Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of approval of this consent.

Offsets

- 3. If the Applicant exceeds the performance measures in Table 6 and the Planning Secretary determines that:
 - (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or
 - the remediation measures implemented by the Applicant have failed to satisfactorily remediate the impact or environmental consequence;

then the Applicant must provide a suitable offset to compensate for the impact or environmental consequence to the satisfaction of the Planning Secretary.

Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Performance Measures - Built Features

4. The Applicant must ensure that the development does not cause any exceedances of the performance measures in Table 7, to the satisfaction of the Planning Secretary.

Table 7: Subsidence Impact Performance Measures – Built Features

Built Features	Performance Measure
Trinity Point Marina Development Other built features	 Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.
	Damage must be fully repaired, replaced or fully compensated.
Public Safety	
Public Safety.	Negligible additional risk.

Notes:

- The Applicant will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or a Public Safety Management Plan (see Condition 7 below).
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be
 undertaken using generally accepted methods that are appropriate to the environment and circumstances in which
 the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In
 the event of a dispute over the appropriateness of proposed methods, the Planning Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this development consent.
- Requirements regarding safety or serviceability do not preclude preventative actions or mitigation being taken prior to
 or during mining in order to achieve or maintain these outcomes.
- Requirements under this condition may be met by measures undertaken in accordance with the Coal Mine Subsidence Compensation Act 2017.
- 5. Any dispute between the Applicant and the owner of any built feature over the interpretation, application or implementation of the subsidence performance measures in Table 7 is to be settled by the Planning Secretary, following consultation with the SA NSW and MEG. Any decision by the Planning Secretary shall be final and not subject to further dispute resolution under this consent.

Multi-Seam Mining Feasibility Investigation

- 6. Prior to the submission of an Extraction Plan related to the Chain Valley Bay mining area as shown in Appendix 3, the Applicant must prepare a detailed Multi-Seam Mining Feasibility Investigation to the satisfaction of the Planning Secretary. This plan must:
 - (a) be prepared in consultation with MEG by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary;
 - (b) assess the extent of the soft claystone floor/roof conditions within former workings in the Great Northern and Wallarah Seams;
 - (c) assess the stability of remnant coal pillars within former workings in the Great Northern and Wallarah Seams;
 - (d) give particular consideration to the risks of irregular subsidence, pillar run and long-term subsidence leading to subsidence outside of the predicted angle of draw;
 - (e) include revised multi-seam subsidence predictions for the proposed second workings; and
 - (f) recommend final design of the second workings and any necessary adaptive management measures.

Extraction Plan

- 7. The Applicant must prepare an Extraction Plan for all second workings on site, to the satisfaction of the Planning Secretary. Each Extraction Plan must:
 - (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary;
 - (b) be approved by the Planning Secretary before the Applicant carries out any second workings covered by the plan;
 - (c) include detailed plans of existing and proposed first and second workings and any associated surface development, including any applicable adaptive management measures;
 - (d) include detailed performance indicators for each of the performance measures in Tables 6 and 7;
 - (e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this consent;
 - (f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 6 and 7, and manage or remediate any impacts and/or environmental consequences;
 - (g) include a Built Features Management Plan, which has been prepared in consultation with RR and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which

- addresses in appropriate detail all items of public infrastructure and all classes of other built features:
- has been prepared following appropriate consultation with the owner/s of potentially affected feature/s:
- recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and;
- (h) include a Benthic Communities Management Plan, which has been prepared in consultation with BCD, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on benthic communities, and which includes:
 - surveys of the lake bed to enable contours to be produced and changes in depth following subsidence to be accurately measured;
 - benthic species surveys within the area subject to second workings, as well as control sites
 outside the area subject to second workings (at similar depths) to establish baseline data on
 species number and composition within the communities;
 - a program of ongoing seasonal monitoring of benthic species in both control and impact sites;
 - development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities composition, incorporating the monitoring and survey data collected; and
 - updating the model every 2 years using the most recent monitoring and survey data;
- (i) include a Seagrass Management Plan, which has been prepared in consultation with BCD, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on seagrass beds, and which includes:
 - a program of ongoing monitoring of seagrasses in both control and impact sites; and
 - a program to predict and manage subsidence impacts and environmental consequences to seagrass beds to ensure the performance measures in Table 6 are met;
- (j) include a Public Safety Management Plan, which has been prepared in consultation with RR, to ensure public safety;
- (k) include a Subsidence Monitoring Program which has been prepared in consultation with RR, to:
 - provide data to assist with the management of the risks associated with subsidence;
 - validates the subsidence predictions;
 - analyses the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; and
 - informs the contingency plan and adaptive management process;
- (I) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 6 and 7, or where any such exceedance appears likely;
- (m) include appropriate revisions to the Rehabilitation Management Plan required under Condition 27 of Schedule 3; and
- (n) include a program to collect sufficient baseline data for future Extraction Plans.

The Applicant must implement the Extraction Plan as approved by the Planning Secretary.

- 8. The Applicant must ensure that the management plans required under conditions 7(g)-(j) above include:
 - (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this consent; and
 - (b) a detailed description of the measures that would be implemented to remediate predicted impacts.

First Workings

9. The Applicant may carry out first workings within Subsidence Zones A and B as shown in Appendix 3, other than in accordance with an approved Extraction Plan, provided that the first workings are designed to remain stable and non-subsiding in the long-term and do not generate more than 20 mm of vertical subsidence at the surface, except insofar as they may be impacted by approved second workings.

Note: The intent of this condition is to ensure that first workings are built to geotechnical and engineering standards sufficient to ensure long-term stability, with negligible direct subsidence impacts.

9A. Within 3 months of the approval of MOD 1, the Applicant must produce and subsequently implement a Built Features Management Plan that considers surface infrastructure potentially affected by the first workings of the Underground Linkage between Chain Valley Colliery and Mannering Colliery, including WCS's MP01 sewer rising main, TransGrid's electricity transmission assets and infrastructure associated with the Vales Point Power Station, to the satisfaction of the Planning Secretary.

Payment of Reasonable Costs

10. The Applicant must pay all reasonable costs incurred by the Department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.

SCHEDULE 5 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

- As soon as practicable after obtaining monitoring results showing:
 - (a) an exceedance of any relevant criteria in Schedule 3, the Applicant must notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria; and
 - (b) an exceedance of any relevant air quality criteria in Schedule 3, the Applicant must send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (NSW Health, 2017) (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).

INDEPENDENT REVIEW

2. If an owner of privately-owned land considers the development to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Planning Secretary in writing for an independent review of the impacts of the development on his/her land.

If the Planning Secretary is satisfied that an independent review is warranted, then within 2 months of the Planning Secretary's decision the Applicant must:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and
 - if the development is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and
- (b) give the Planning Secretary and landowner a copy of the independent review.

SCHEDULE 6 ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

- 1. The Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Planning Secretary. This strategy must:
 - (a) provide the strategic framework for environmental management of the development;
 - (b) identify the statutory approvals that apply to the development;
 - (c) set out the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
 - (d) set out the procedures to be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - · receive record, handle and respond to complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance and any incident;
 - respond to emergencies; and
 - (e) include:
 - references to any strategies, plans and programs approved under the conditions of this consent;
 - a clear plan depicting all the monitoring to be carried out under the conditions of this consent.

The Applicant must implement the Environmental Management Strategy as approved by the Planning Secretary.

Adaptive Management

2. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and performance measures in this consent. Any exceedance of these criteria or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria or performance measures has occurred, the Applicant must, at the earliest opportunity:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- (c) implement reasonable remediation measures as directed by the Planning Secretary.

Management Plan Requirements

- Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:
 - (a) a summary of relevant background or baseline data;
 - (b) details of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures and criteria; and
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (c) any relevant commitments or recommendations identified in the document/s listed in condition 2(e) of Schedule 2:
 - (d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;
 - (e) a program to monitor and report on the:
 - impacts and environmental performance of the development; and
 - effectiveness of the management measures set out pursuant to condition 2(e) of Schedule 2:
 - (f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
 - (g) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (h) a protocol for managing and reporting any:
 - incident, non-compliance or exceedance of any impact assessment criterion or performance criterion:

- complaint: or
- failure to comply with other statutory requirements;
- (i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and
- (j) a protocol for periodic review of the plan.

Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

4. The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.

REVISION OF STRATEGIES, PLANS AND PROGRAMS

- Within three months of:
 - (a) the submission of an incident report under condition 6;
 - (b) the submission of an Annual Review under condition 8;
 - (c) the submission of an Independent Environmental Audit under condition 9; or
 - (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise).

the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.

If necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.:

REPORTING AND AUDITING

Incident Notification

6. The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name) and set out the location and nature of the incident.

Non-Compliance Notification

7. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing to compliance@planning.nsw.gov.au and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

Annual Review

- 8. By the end of March in each year after the commencement of the development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must:
 - (a) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - requirements of any plan or program required under this consent;
 - · monitoring results of previous years; and
 - relevant predictions in the document/s listed in condition 2(e) of Schedule 2:
 - (c) identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence:
 - (d) evaluate and report on:
 - the effectiveness of the noise and air quality management systems; and
 - compliance with the performance measures, criteria and operating conditions of this consent;
 - (e) identify any trends in the monitoring data over the life of the development;
 - (f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

(g) describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.

Copies of the Annual Review must be submitted to the Affected Councils and made available to the CCC and any interested person upon request.

Independent Environmental Audit

- 9. By the end of February 2022, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must:
 - (a) led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Planning Secretary;
 - (b) be led and conducted by a suitably qualified, experienced and independent team of experts (including any be expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary;
 - (c) be carried out in consultation with the relevant agencies and the CCC;
 - (d) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals);
 - (e) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent;
 - (f) recommend appropriate measures or actions to improve the environmental performance of the development and any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and
 - (g) be conducted and reported to the satisfaction of the Planning Secretary.
- 10. Within three months of commencing an Independent Environmental Audit, or other timeframe agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary.

Monitoring and Environmental Audits

11. Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.

For the purposes of the condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the consent or on the environmental impact of the development, and an "environmental audit" is a periodic or particular documented evaluation of the development to provide information on compliance with the consent or the environmental management or impact of the development.

12. Noise and/or air quality monitoring under this consent may be undertaken at suitable representative monitoring locations instead of at privately-owned residences or other locations listed in Schedule 3, providing that these representative monitoring locations are set out in the respective management plan/s.

ACCESS TO INFORMATION

- 13. Until the completion of all rehabilitation required under this consent, the Applicant must:
 - (a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website:
 - the documents referred to in condition 2(e) of Schedule 2 of this consent;
 - all current statutory approvals for the development;
 - all approved strategies, plans and programs required under the conditions of this consent;
 - the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;
 - minutes of CCC meetings;
 - regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;
 - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
 - a summary of the current progress of the development;
 - contact details to enquire about the development or to make a complaint;

- a complaints register, updated monthly;
- the Annual Reviews of the development; audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and
- any other matter required by the Planning Secretary; and keep such information up to date, to the satisfaction of the Planning Secretary. (b)

APPENDIX 1 SCHEDULE OF LAND

Notes:	
1.	All proposed secondary extraction for the Project (Mining Extension 1) is to occur under Lake
	Macquarie.
2.	The surface facilities for the Colliery are limited to "pit top area" adjacent to Vales Point Power Station,
	and the "ventilation shaft site" at Summerland Point.
3	Refer to Figure 1 of Appendix 2 for the Site

Project Related Surface Facilities						
Pit Top Area			Ventilation shaft site			
Lot	Deposited Plan		Lot	Deposited Plan		
А	379918		1	226133		
В	379918					
С	349733					
А	187570					
1B	339441					

All other areas within the Site				
Lot	Deposited Plan	Lot	Deposited Plan	
7339	1167067	20	708344	
7330	1148105	19	708344	
593	727722	18	708344	
594	727722	17	708344	
D	349733	34	714879	
1	410653	33	714879	
23	708344	32	714879	
21	708344	31	714879	
2	1043151	64	31306	
426	755266	65	31306	
427	755266	66	31306	
136	755266	67	31306	
2	515214	68	31306	
 1	515214	69	31306	
1	214300	70	31306	
2	214300	71	31306	
167	755266	72	31306	
1	388154	73	31306	
144	661695	74	31306	
19	25593	75	31306	
20	25593	76	31306	
21	25593	77	31306	
22	25593	78	31306	
23	25593	79	31306	
24	25593	139	31306	
25	25593	140	31306	
26	25593	141	31306	
27	25593	142	31306	
58	31306	143	31306	
59	31306	144	31306	
60	31306	145	31306	
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24	13120
60	13120
30	13123
31	13123
A	368634
100	1065718
102	1065718
20	1113256
7329	1148149
5	981103
9	13120
100	713777
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26	13120
27	13120
28	13120
29	13120

APPENDIX 2 DEVELOPMENT AREA

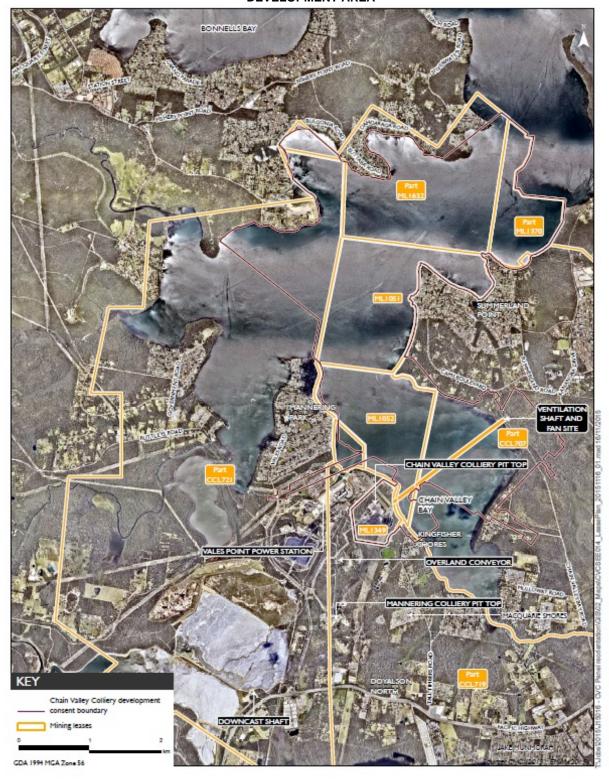


Figure 1: Chain Valley Extension Project – Development Application Area and Lease Plan (The Site)

APPENDIX 3 DEVELOPMENT LAYOUT

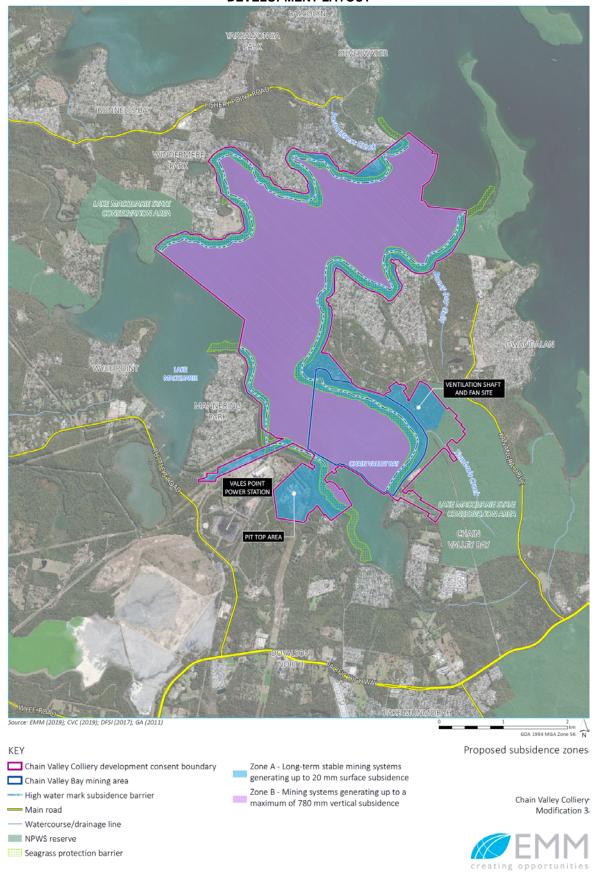


Figure 1: Mining Areas Subsidence Management Zones

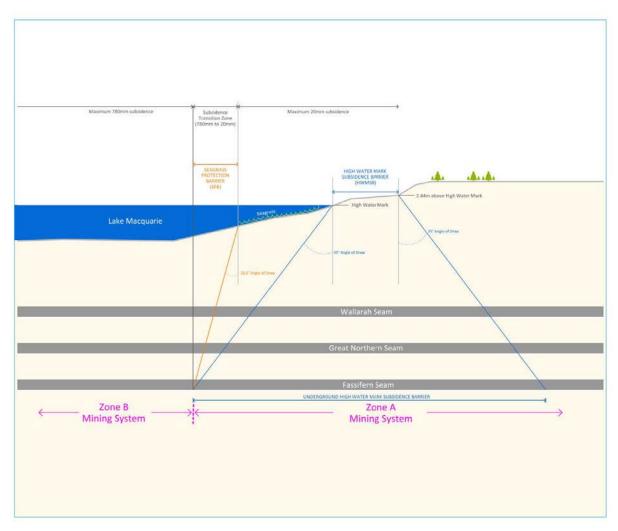


Figure 1A: High Water Mark Subsidence Barrier and Seagrass Protection Barrier

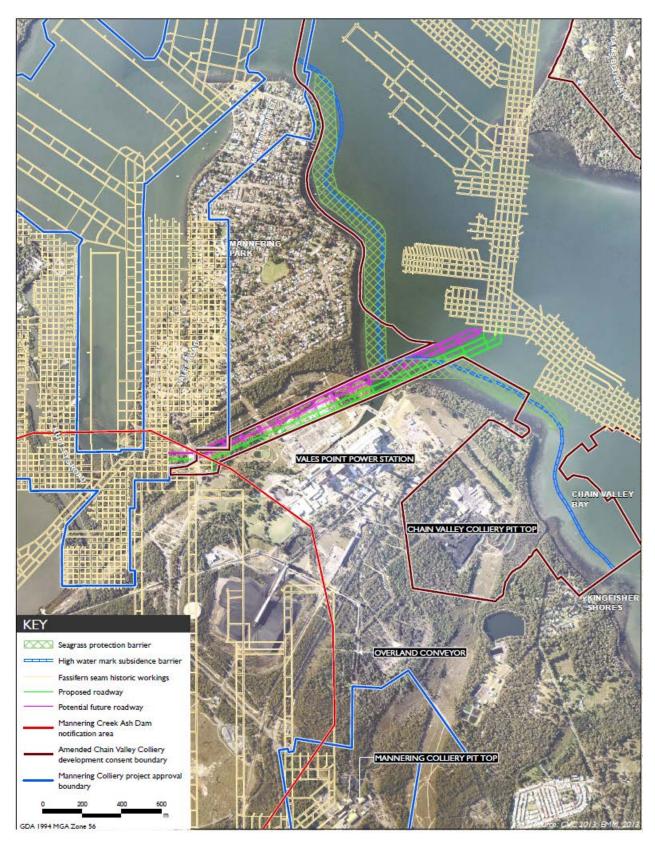


Figure 2: Location of the underground linkage to Mannering Colliery

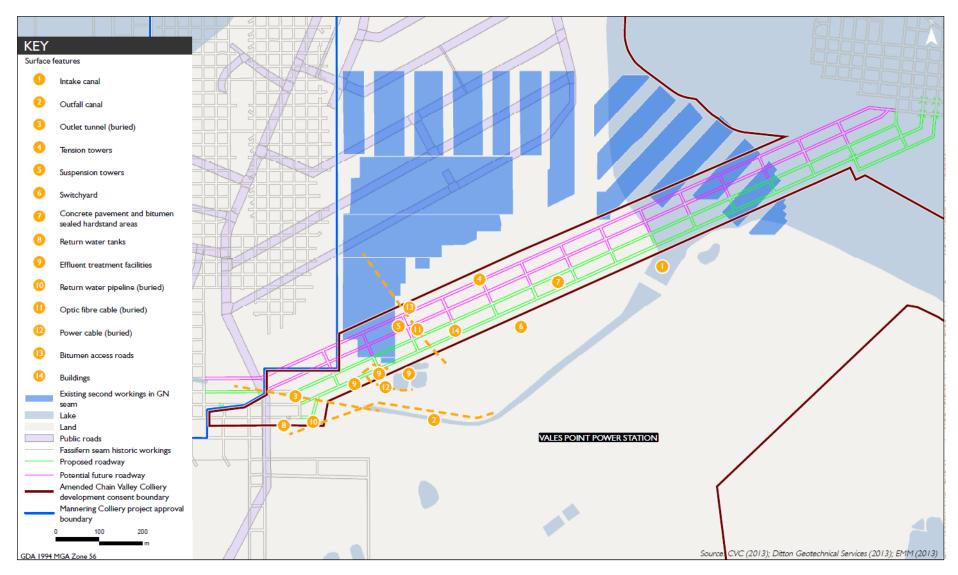


Figure 3: Location of the underground linkage and surface infrastructure

APPENDIX 4 KEY SURFACE FACILITIES



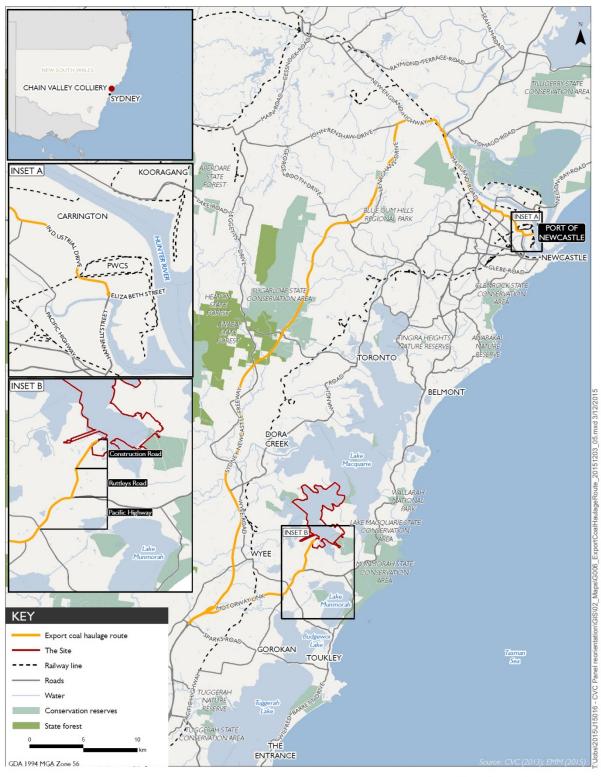
EMP DEA NOVE IN LIES Mine pit top infrastructure elements

Chain Valley Colliery Mining Extension | Project - Environmental Impact Statement

Figure 2.4

Figure 1 : General Arrangement of the Chain Valley Colliery surface facilities site

APPENDIX 5 COAL HAULAGE ROUTE – PUBLIC ROADS



EMM

Export coal haulage route

Figure 1: Export Coal Haulage Route

APPENDIX 6 NOISE RECEIVER LOCATIONS

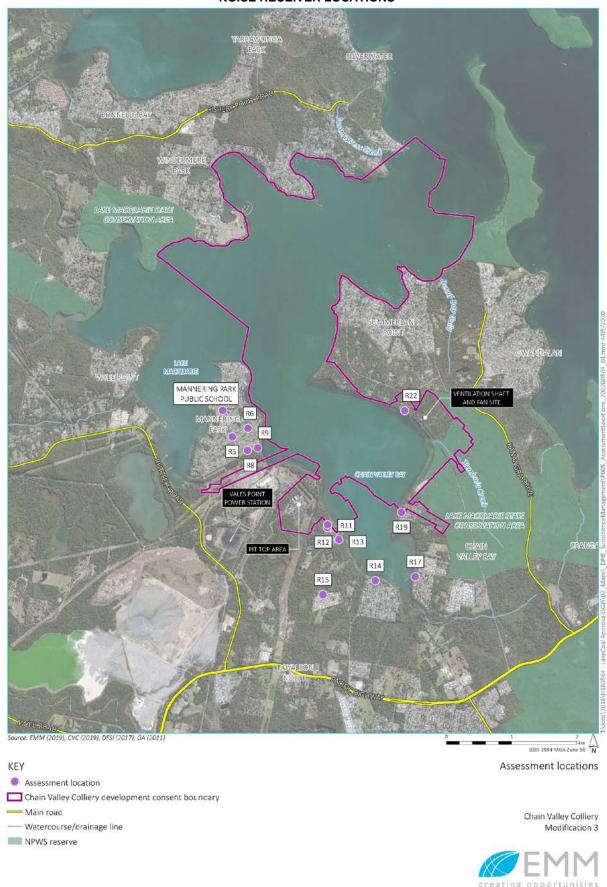


Figure 1: Noise Receiver Locations

APPENDIX 7 BIODIVERSITY ENHANCEMENT AREA





Terrestrial vegetation communities and EECs within the Colliery's supporting infrastructure areas

Chain Valley Colliery Mining Extension | Project - Environmental Impact Statement

Figure 1: Location of the Biodiversity Enhancement Area, shown in red and orange hatching

APPENDIX 7A ASSET PROTECTION ZONES



Figure 1. Location of asset protection zones

Asset protection zones Chain Valley Colliery - Modification 2

APPENDIX 8 NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

- The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
 - (a) during periods of rain or hail;
 - (b) average wind speed at microphone height exceeds 5 m/s;
 - (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
 - (d) temperature inversion conditions greater than 3°C/100 m.

Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station described in condition 14 of schedule 3.

Compliance Monitoring

- 3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
- 4. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Planning Secretary directs otherwise.
- 5. Unless otherwise agreed with the Planning Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 9 STATEMENT OF COMMITMENTS

Item Commitment

Groundwater

In addition to the management and mitigation measures undertaken at the Colliery for groundwater as described in the WMP, the following commitments specific to the Proposal will be undertaken. Some commitments are already undertaken under the WMP. Great Southern Energy Pty Limited will:

- assess whether abnormal or significant groundwater inflow changes occur in the active panels;
- maintain the water flow monitoring appliances used to measure pumped water volumes to and from the Colliery in good working order;
- maintain and plot records of daily total Colliery water pumping and annually communicate an interpretation of the findings within the Annual Review. A copy of the Annual Review will be supplied to DPIE Water;
- measure water levels and quality within private bores, where access is possible, in relevant areas to assess if any adverse effects occur due to subsidence from the Proposal; and
- develop groundwater assessment criteria and triggers, response protocols and contingency measures.

Although it is not anticipated that private bore yields would be impacted due to subsidence, should such a situated arise, Great Southern Energy Pty Limited would provide an alternative water supply until the impacted bore recovers.

Any monitored or reported adverse impacts on the yield, saturated thickness or quality of a private registered bore will be investigated by Great Southern Energy Pty Limited. In the event of a groundwater level drop of over 2 m for a period of two months or more, a notable increase in iron hydroxide, or an adverse change in salinity as a consequence of subsidence, Great Southern Energy Pty Limited will enter into negotiations with the affected landowners and SA NSW with the intent of formulating an agreement which provides for one, or a combination of:

- re-establishment of saturated thickness in the affected bore(s) through bore deepening;
- establishment of additional bores to provide a yield at least equivalent to the affected bore prior to mining;
- provision of access to alternative sources of water; and/or
- compensation to reflect increased water extraction costs (eg. due to lowering pumps or installation of additional or alternative pumping equipment).

Surface water

Management and monitoring of surface water will continue to be undertaken in accordance with the Colliery's WMP, which will be reviewed and updated as required to include the commitments made below. Great Southern Energy Pty Limited will:

- update the WMP to include any changes as a result of all modifications;
- limit the main underground pumps to a maximum pump out rate of 10.5 ML/day within 12 months of approval;
- request an amendment of EPL1770 to include a condition on the daily discharge volume limit stating that "Exceedance of the volume limit for Point 1 is permitted only if the discharge from Point 1 occurs solely as a result of rainfall at the premises exceeding 10 mm during the 24 hours immediately prior to commencement of the discharge";
- undertake daily measurements of discharge volumes and report publicly on a monthly basis via Great Southern Energy Pty Limited's website;
- continue collection of baseline water quality data to aid in the development of appropriate discharge water quality trigger values;
- engage suitably qualified expert to conduct an assessment of the metals contained within discharge water in accordance with the ANZECC water quality guidelines and provide this assessment to the EPA by 31 December 2013;
- investigate water saving measures to minimise the amount of potable water required from CC Council for Colliery operations;
- quantify the groundwater storage capacity in the Great Northern and Wallarah Seams;
- continue effluent monitoring regime of receiving soils from the AWTS in accordance with the parameters and testing frequencies identified in the Colliery's WMP. The

- results of this monitoring program will be reviewed by a suitably qualified expert and used to determine the appropriateness of the existing irrigation area to receive this effluent:
- develop a program to monitor creek line channel stability and the health of riparian vegetation within Swindles Creek. Monitoring will be undertaken in accordance with Section 8.5.2 of the Surface Water Impact Assessment (EIS Appendix E) and incorporated into the Colliery's WMP or Biodiversity Management Plan; and
- record monitoring data in accordance with the Colliery's WMP and EPL 1770.
 Monitoring data will be interpreted as it is received to ensure appropriate operational guidance on monitoring water quality within desired parameters.

 Results of water quality monitoring will be reported in the Annual Review and made available to the CCC, as well as CC Council and LMCC.

Noise

Management and monitoring of noise will continue to be undertaken in accordance with the Colliery's NMP, which will be reviewed and updated as required to include the commitments made below. Great Southern Energy Pty Limited will:

- continue attended compliance monitoring on site which will be used to identify
 potential hot spots and primary noise sources;
- continue real-time noise monitoring alerts to site personnel to enable implementation of any required rapid noise management initiatives;
- manage potential non-compliance through a noise complaint handling and response system, including the identification of responsible sources to enable targeted remedial action;
- assess if further noise mitigation options for the ventilation fans are reasonable and feasible following the receipt of attenuation proposals; and
- discuss potential management measures or agreement options with the landowner at 275 Cams Boulevard, following receipt of proposals from acoustics specialists.

In addition to the above, Great Southern Energy Pty Limited is committed to the progressive implementation of feasible measures to target long-term noise goals which are designed to reduce noise emissions from the Colliery. Long-term options for investigation include:

- modification to belt/movement alarms;
- investigation of surface conveyer and coal preparation equipment, to determine if noise reductions are possible;
- identifying sound attenuation options for the surface bulldozer and front-end loader;
- strategic placement of acoustic barriers;
- attenuation for the surface screener/shaker;
- installation of guiet rollers for surface conveyor belts;
- · acoustic treatments around compressors; and
- the use of a conveyor stacker for product coal stockpiling.

Air Quality and greenhouse gases

Management and monitoring of air quality and greenhouse gases will continue to be undertaken in accordance with the Colliery's AQGHGMP, which will be reviewed and updated as required to include the commitments made below Great Southern Energy Pty Limited will:

- investigate the use of a stacker to replace hauling between current conveyor system and stockpiles;
- undertake GHG monitoring comprising measurement of carbon dioxide and methane at the ventilation shaft and fan sites; and
- record and report annual diesel, oil, grease, acetylene and electricity use to fulfil National Greenhouse and Energy Reporting Scheme requirements.

Traffic and transport

Management and monitoring of traffic and transport will continue to be undertaken in accordance with the Colliery's RTP. In addition, Great Southern Energy Pty Limited will continue to investigate alternative options for transporting export coal to the Port of Newcastle, specifically the preferred rail transport option, requiring the construction of a private haul road to the VPPS coal unloading facility and associated infrastructure upgrades. In addition, Great Southern Energy Pty Limited will investigate options to reduce peak hour traffic would be investigated including potentially limiting the peak hourly volumes of the Colliery truck traffic which would be permitted to travel via this intersection should the Colliery not be using rail transport for export coal by five years from the granting of development consent. Alternatively, a pro-rata financial contribution to the cost of installing traffic signals at the southbound intersection of the F3 and Sparks Road interchange could be made commensurate with the percentage of Colliery generated traffic using the intersection.

Subsidence

Management and monitoring of subsidence will continue to be undertaken in accordance with the Colliery's SMP or Extraction Plans, which will be reviewed and

updated as required to include the commitments made below. Great Southern Energy Pty Limited will:

- provide raw subsidence survey data to BCD within 7 days of completion;
- undertake six-monthly bathymetric surveys of the lake bed to determine actual subsidence and undertake a comparison with predicted levels. Should measured subsidence significantly exceed predicted levels, Great Southern Energy Pty Limited will review future secondary extraction designs to limit future impacts to acceptable levels;
- install a new foreshore survey line above the first and second workings panels
 where the underground linkage passes beneath them and possibly extending from
 the foreshore to the point of connection with the MC workings;
- inspect existing conditions in the Fassifern Seam and undertake geotechnical and geological mapping in the roadways proximate to the proposed linkage in both CVC and MC workings;
- complete representative borehole core drilling and sampling of the Fassifern Seam floor at the start and finishing ends of the underground linkage and where the headings pass beneath the SPB. Development below the foreshore will be limited to two headings only until floor conditions can be confirmed;
- develop infrastructure monitoring and management plans in consultation with infrastructure owners and other relevant stakeholders;
- re-establish and re-survey Survey Line 24;
- install a suitable survey line at the starting end above Great Northern Seam first workings to provide early warning monitoring data for the tension towers and switchyard structures;
- monitor tension and suspension towers and switchyard conductor suspension frames directly above the panels, foreshore and adjacent inlet canal wall;
- ensure that a monitoring and management plan for the MP01 sewer rising main is in place prior to commencement of mining that may impact CC Council's infrastructure; and
- complete an annual subsidence report and make this report publicly available on the Colliery's website.

Marine ecology

Management and monitoring of marine ecology will continue to be undertaken in accordance with the Colliery's BCMP and SGMP, which will be reviewed and updated as required to include the commitments made below. Great Southern Energy Pty Limited will

- revise the BCMP to include the sampling locations in the assessment of the Proposal:
- undertake annual benthic surveys for the Site, or as required under the BCMP;
- commission additional independent sampling and analysis to validate results obtained during monitoring, and review future panel design if impacts due to subsidence are determined to be moderate or greater;
- revise the SGMP to include the transect locations utilised in the assessment of the Proposal;
- continue annual seagrass surveys/monitoring;
- continue six-monthly subsidence surveys (bathymetric surveys) and land-based surveys;
- include results from the BCMP and SGMP within the Colliery's Annual Review; and
- make the Annual Review and annual subsidence surveys available on the Colliery's

Terrestrial ecology

In addition to the management and mitigation measures undertaken at the Colliery for terrestrial ecology as described in the BMP, the following commitments specific to the Proposal will be undertaken. Some commitments are already undertaken under the BMP. Great Southern Energy Pty Limited will:

- investigate one of the following options in consultation with BCD to offset the biodiversity impacts arising from the proposed modification:
 - o provide \$10,000 of funding, which is equivalent to the biodiversity being lost (i.e. 5 credits x \$2,000 per credit) to existing environmental programs at the site which benefits the Swamp Sclerophyll EEC; or
 - consult with BCD to identify a suitable conservation program and provide \$10,000 of funding; or
 - o purchase and retire 5 credits on the Biobanking register.
- update the BMP to include the following:
 - the completion of pre-disturbance surveys in the survey area for Black-eyed Susan, Leafless Tongue Orchid and Variable Midge Orchid during their flowering periods (July to December, November to February and September to October, respectively);

- pre-disturbance surveys by an ecologist to determine the important components of vegetation communities and fauna habitats that should be preferentially retained in the APZs:
- installation of delineation fencing around threatened flora populations (if found) to ensure their protection during development and maintenance of the APZs:
- o condition monitoring for threatened flora populations (if found);
- o retention of hollow-bearing trees in the APZs, where possible, with details to be included in a hollow tree register;
- installation of nest boxes (or salvaged hollows) within the APZs under the supervision of a suitably qualified ecologist or wildlife carer to replace hollows where hollow-bearing trees cannot be retained;
- o measures for APZ maintenance that include weed control;
- clearing of hollow-bearing trees (if required) under the supervision of a suitably qualified ecologist;
- any injured fauna would be taken to the nearest veterinary hospital for treatment before release; and
- relocation of suitable hollow-bearing felled trees adjacent to the APZs to create additional fauna habitat;
- undertake the design of the dam embankment and spillway works in consultation with an ecologist to minimise potential impacts on the Swamp Oak Floodplain Forest EEC;
- ensure pre-clearing surveys are undertaken by an ecologist to minimise the
 potential impact to fauna and significant vegetation prior to clearing works being
 undertaken within the embankment and spillway area;
- clearly delineate the clearing footprint and cordon off surrounding vegetation as a 'no go' zone during works to the dam embankment and spillway;
- minimise disturbance areas where possible by ensuring all stockpiling of materials, parking of machinery etc. is undertaken in previously cleared areas:
- ensure that, wherever possible, dead standing timber and fallen timber will be avoided by any clearing works, or if required to be removed, be relocated into suitable habitat areas nearby;
- ensure all equipment used for the earthworks associated with the dam embankment and spillway will be cleaned of excess soil potentially containing pathogens and weed seeds prior to entering the Site;
- install sediment fencing surrounding the proposed earthwork areas, in accordance with a site-specific erosion and sediment control plan for the works;
- ensure that in the event that sedimentation dam water is released from Dam 10
 prior to the works being undertaken, it will be undertaken in a controlled manner
 over a number of days to ensure that the release does not result in significant
 erosion and sedimentation to the Swamp Oak Floodplain Forest;
- continue the management and monitoring of flora and fauna in accordance with the BMP for the life of the mine, including:
 - the condition and composition of the Swamp Oak Floodplain Forest area;
 - the condition of vegetation adjacent to the ventilation shaft and fans:
 - the location and distribution of weed infestations; and
 - the abundance and distribution of feral animal use.
- noxious weeds will be removed and continually controlled from the pit top area, allowing for natural regeneration of vegetation;
- weed invasion will be monitored as part of the Colliery's BMP; and
- the condition of the EEC areas will be monitored through the Colliery's BMP.

Heritage

Management and monitoring of heritage will continue to be undertaken in accordance with the Colliery's HMP, which will be reviewed and updated as required to

include the commitments made below. Great Southern Energy Pty Limited will:

- review and revise the HMP to remove site #45-7-0154 and incorporate any other changes as a result of the proposed modification;
- update the HMP following approval of the Proposal to include the extended area to which it relates:
- ensure that should unanticipated Aboriginal or historic heritage artefacts be found during dam embankment and diversion works, work will cease and the site assessed by an archaeologist; and
- ensure that in the unlikely event that skeletal remains are found during dam
 embankment and diversion works, work will cease immediately in the area and the
 NSW Police Coroner called to determine if the material is of Aboriginal origin. BCD
 and relevant Aboriginal community stakeholders will be notified if the remains are
 positively identified as being of Aboriginal origin to determine their appropriate

	management prior to works recommencing.
Wastes	Management and monitoring of waste will continue to be undertaken in accordance with the Colliery's Waste Management Standard. In addition, Great Southern Energy Pty Limited will continue to try and improve its waste volumes and waste management practices in line with its objective for 60% of all wastes generated at the Colliery (excluding wastewater) to be recyclable or reusable.
Hazards	Management and monitoring of hazards will continue in accordance with the Colliery's existing hazard management measures. Periodic review of the effectiveness of existing measures will occur in accordance with the Colliery's safety management system and additional measures implemented as warranted.
Visual	Management and monitoring of visual impacts will continue to be undertaken in accordance with the Colliery's existing commitment. In addition, Great Southern Energy Pty Limited will: ensure additional surface lighting at the Colliery complies with AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
Soil	 Management and monitoring of soils will continue to be undertaken in accordance with the Colliery's WMP, which will be reviewed and updated as required to include the commitments made below. Great Southern Energy Pty Limited will: prevent disturbance of ASS where practicable during any construction activities; prepare an ASSMP where there is potential that ASS will be disturbed; test and handle any ASS disturbed in accordance with the ASSMP and treat or dispose of to an appropriately licensed facility; limit the area of any disturbance at the surface infrastructure sites and period of exposure; implement site management procedures such as watering of disturbed areas and unsecured stockpiles; ensure relevant licences and management plans are in place for the correct storage and handling of hydrocarbons; maintain suitable bunding around all hazardous liquid storage areas; maintain oil separation facilities on the wash down sump for the treatment of oily water; and remove all waste oil from site and dispose via a licensed external waste collection company.
Rehabilitation and mine closure	Rehabilitation will be undertaken in accordance with the Colliery's RMP and the MOP in force at the time. Detailed management and monitoring proposals for final rehabilitation will be included within a Mine Closure Plan to be prepared at least two years prior to cessation of mining activities.
Economic	Great Southern Energy Pty Limited will contribute \$0.035/t of coal from the Colliery into a dedicated community fund to improve public infrastructure and for the provision of community projects in the surrounding communities of Chain Valley Bay, Mannering Park, Summerland Point and Gwandalan.
Social	 Great Southern Energy Pty Limited will continue to implement management measures and monitoring programs to prevent or minimise negative impacts and enhance positive impacts in accordance with its Environment and Community Policy. Great Southern Energy Pty Limited will: maintain open and constructive communication with affected individuals and groups; participate in the CCC; provide environmental monitoring data and other relevant information in a timely manner via the Great Southern Energy Pty Limited website; be responsive to community issues and actual and/or perceived impacts from the Colliery's activities; work in partnership with stakeholders to address community needs; ensure effective management of Great Southern Energy Pty Limited's social impacts; liaise regularly with relevant government agencies and councils; provide regular Colliery updates with landowners and local residents through the CCC; continue payments, throughout the life of the Proposal, to the community fund established; and

Other

Great Southern Energy Pty Limited will commit to only carrying out mining operations consistent with the development consent granted pursuant to this Proposal.

Modification 3 Commitments

Great Southern Energy Pty Limited will undertake environmental management incorporating the requirements of any modification and in accordance with the existing environmental management processes of the various approvals, licences and management plans that apply to the development.

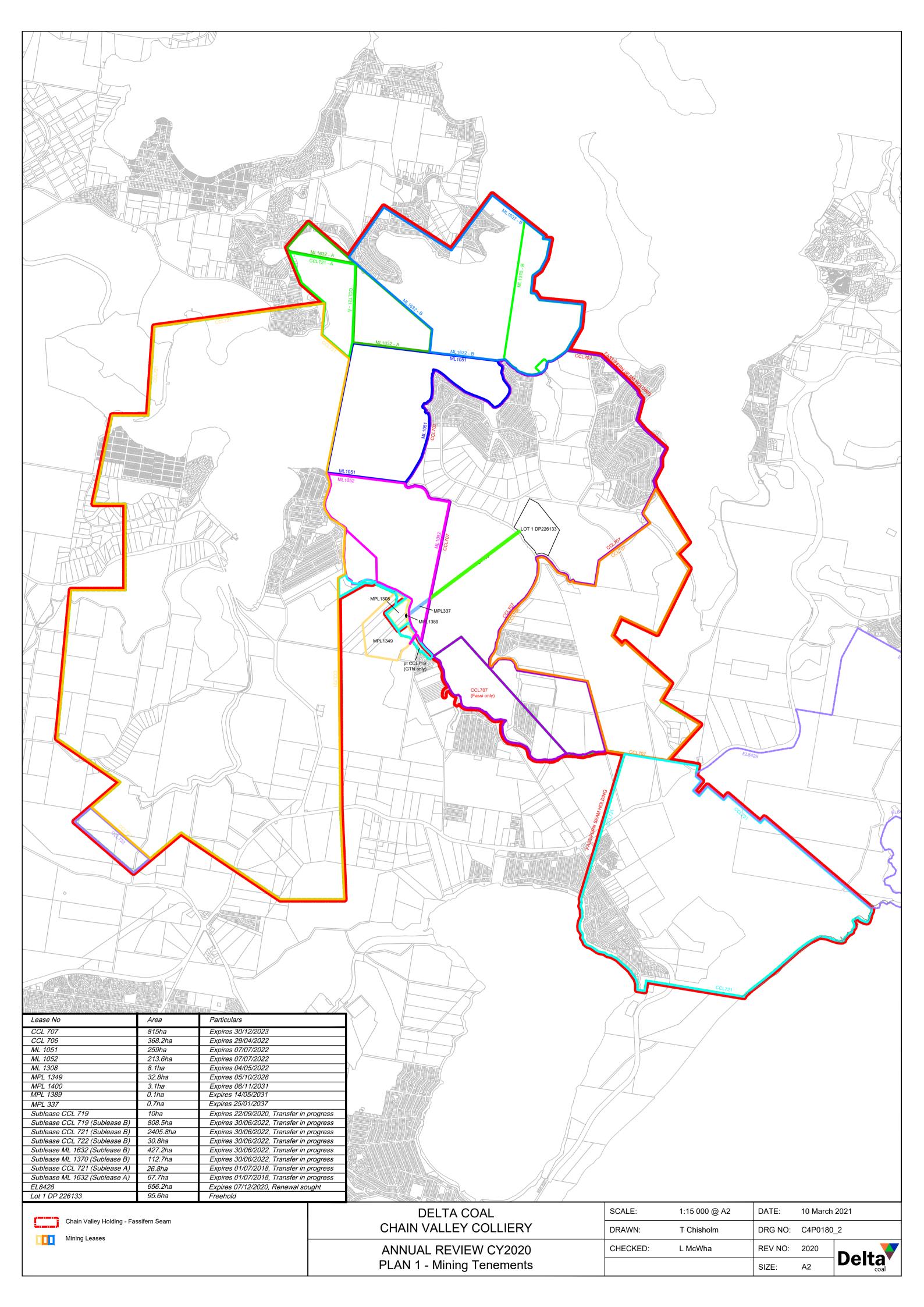
Great Southern Energy Pty Limited will apply to the EPA to vary EPL 1770 to reflect the corresponding development consent tonnage limits within EPL 1770's Mining for Coal and Coal Works activities tonnage ranges.

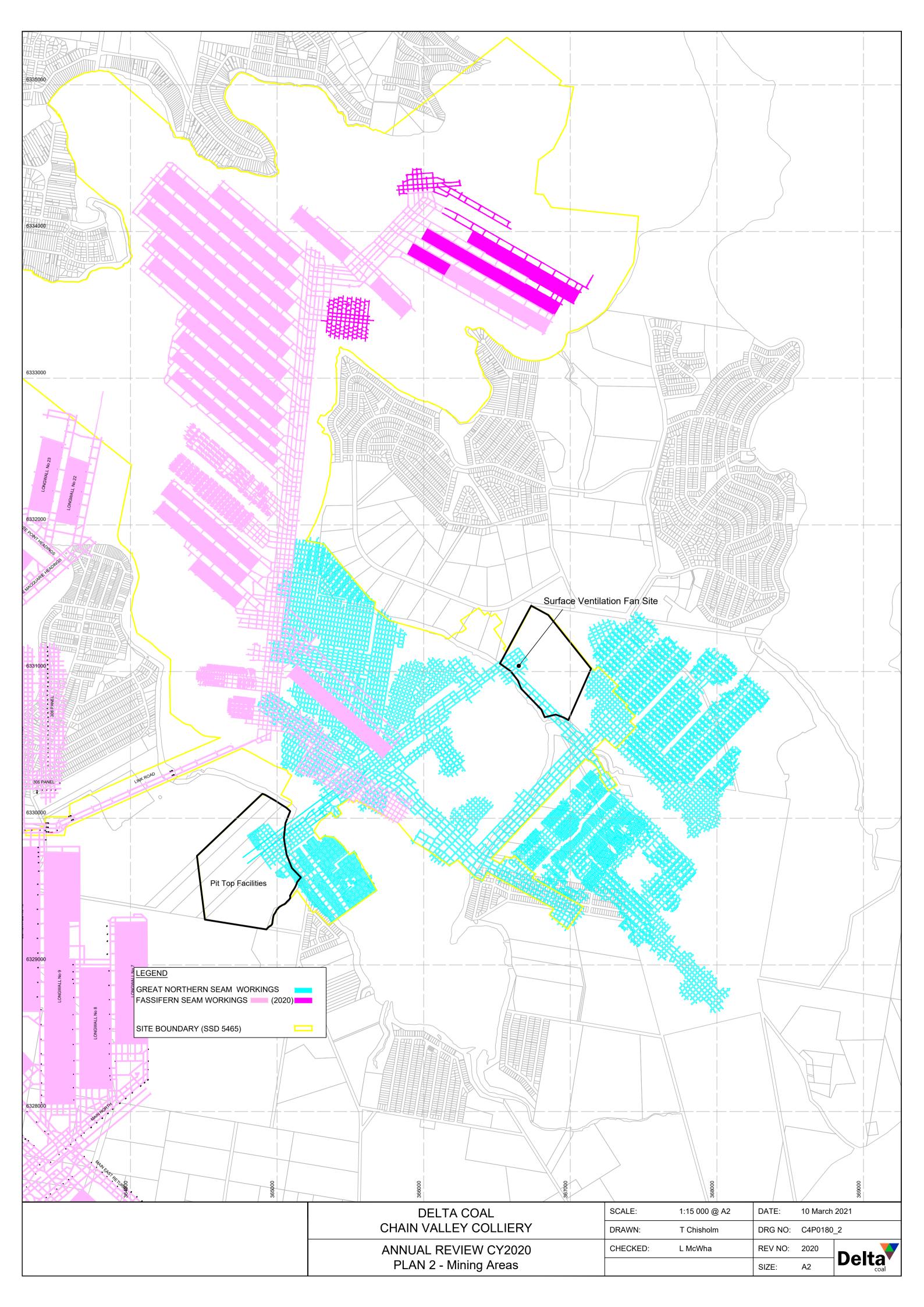
Great Southern Energy Pty Limited will commission and undertake detailed geotechnical assessments by a suitably qualified geotechnical engineer as part of the company's detailed mine plan design process.

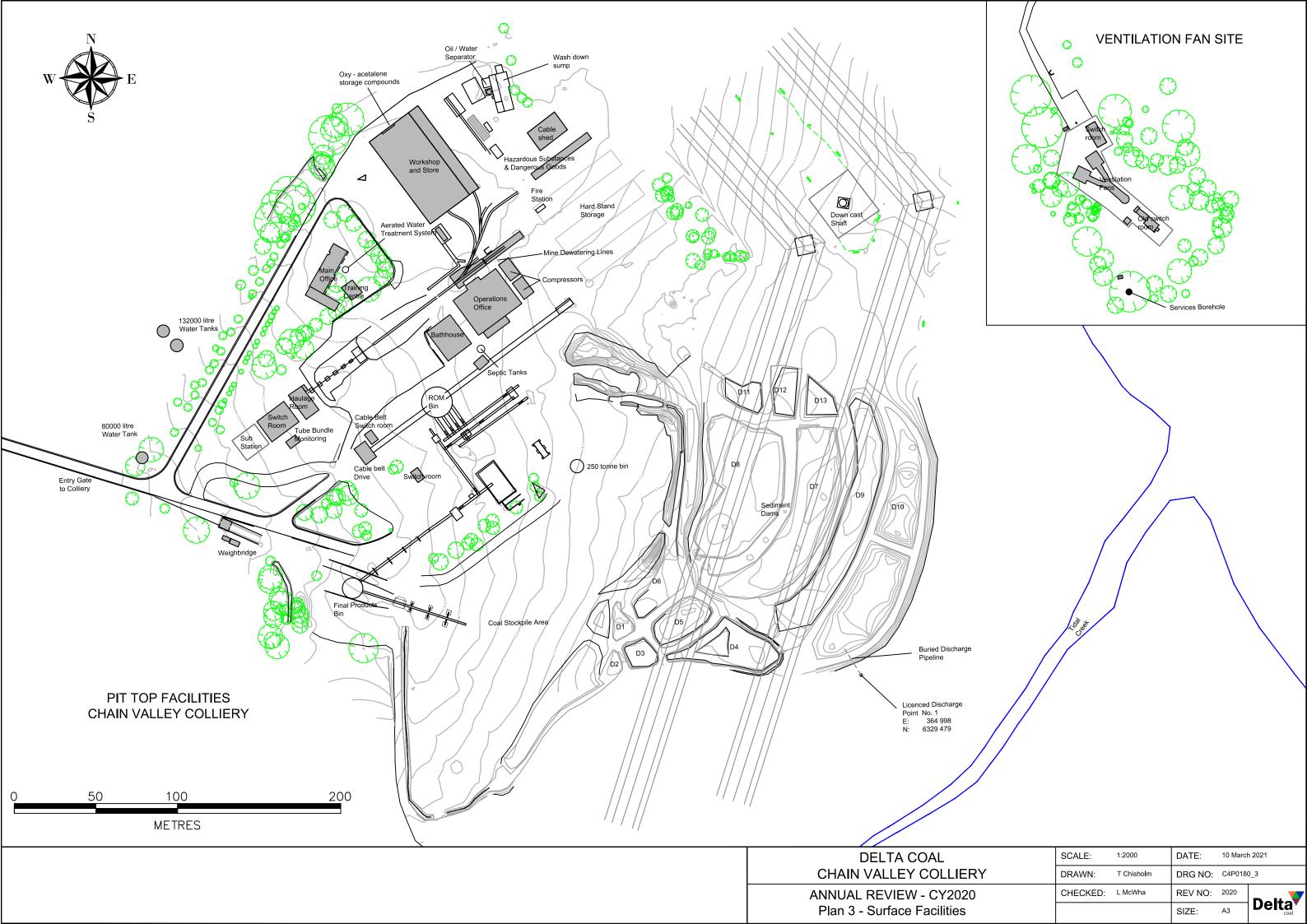


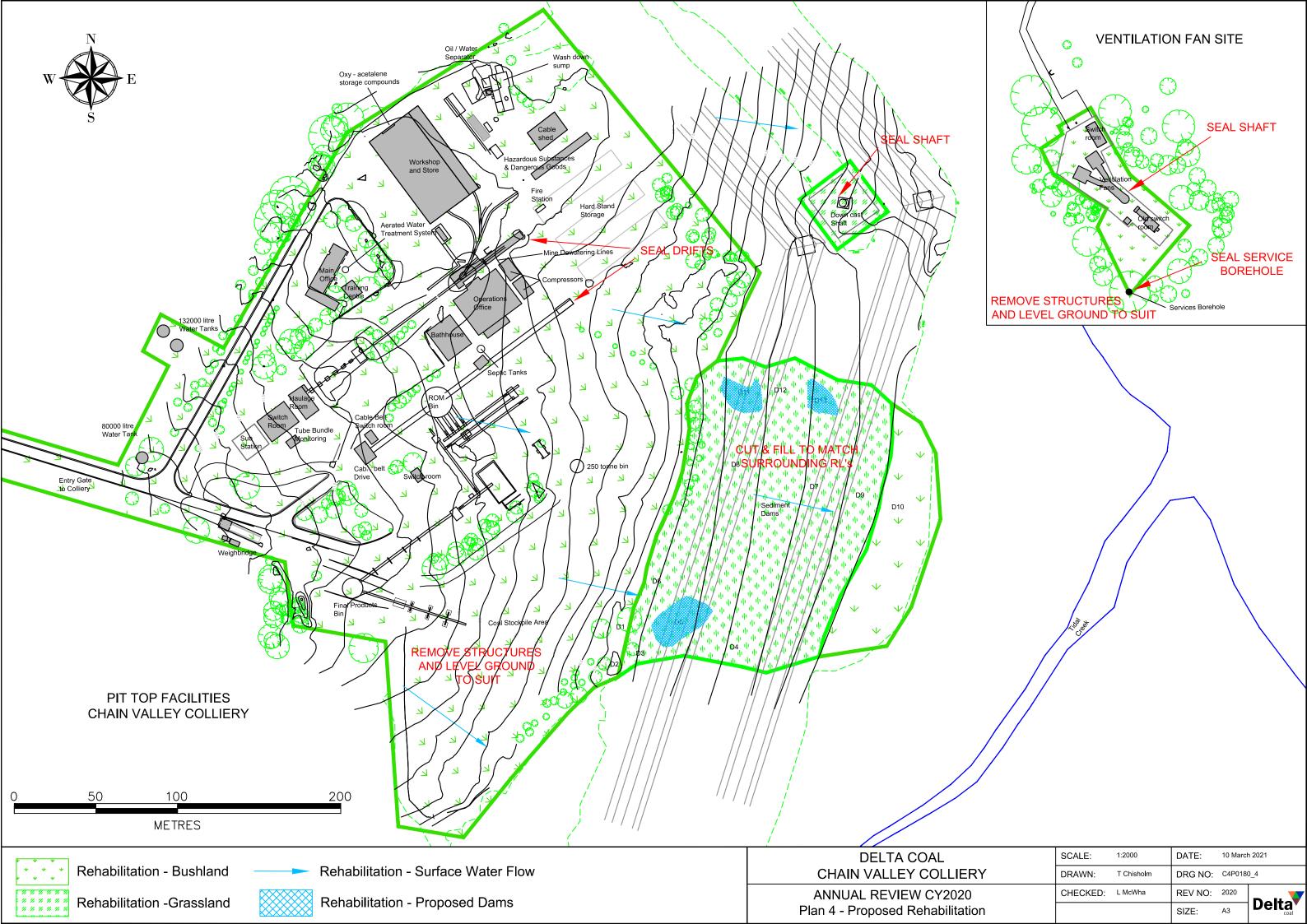
Appendix 2: Plans

	Review Date	Next Review Date	Revision No	Document Owner	Page	
			1	Environmental Compliance Coordinator	Page 108 of 118	
F	DOCUMENT UNCONTROLLED WHEN PRINTED					











Appendix 3: Environment Protection Licence 1770

Review Date	Next Review Date	Revision No	Document Owner	Page	
		1	Environmental Compliance Coordinator	Page 109 of 118	
DOCUMENT UNCONTROLLED WHEN PRINTED					





Licence Details		
Number:	1770	
Anniversary Date:	01-April	

Licensee

GREAT SOUTHERN ENERGY PTY LTD

PO BOX 7115

MANNERING PARK NSW 2259

Premises

CHAIN VALLEY COLLIERY

CONSTRUCTION ROAD

CHAIN VALLEY BAY NSW 2259

Scheduled Activity

Coal works

Mining for coal

Fee Based Activity	<u>Scale</u>
Coal works	0-2000000 T annual handing capacity
Mining for coal	> 500000-2000000 T annual production capacity

Region
North - Hunter
Ground Floor, NSW Govt Offices, 117 Bull Street NEWCASTLE WEST NSW 2302
Phone: (02) 4908 6800
Fax: (02) 4908 6810
PO Box 488G
NEWCASTLE NSW 2300



Licence - 1770

NFO	PRMATION ABOUT THIS LICENCE
Dict	tionary
Res	sponsibilities of licensee
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Dur	ration of licence
Lice	ence review
Fee	es and annual return to be sent to the EPA
Trai	nsfer of licence
Pub	olic register and access to monitoring data
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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Licence - 1770



The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

GREAT SOUTHERN ENERGY PTY LTD
PO BOX 7115
MANNERING PARK NSW 2259

subject to the conditions which follow.

Licence - 1770



1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal works	Coal works	0 - 2000000 T annual handing capacity
Mining for coal	Mining for coal	> 500000 - 2000000 T annual production capacity

A1.2 The licensee must not produce by mining activities more than 1.5 million tonnes of coal within any calendar year.

Note: These limits on the scale of the fee based activities are based on Project Approval SSD5465 granted under the S.89E of the *Environmental Planning and Assessment Act 1979* which limits extraction to 1.5 million tonnes of run of mine (ROM) coal per calendar year.

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details	
CHAIN VALLEY COLLIERY	
CONSTRUCTION ROAD	
CHAIN VALLEY BAY	
NSW 2259	

Licence - 1770



SURFACE PREMISES OF THE COLLIERY IDENTIFIED IN PLAN TITLED "EPL PREMISES PLAN FIGURE 2 - SURFACE EXTENTS" 12 MARCH 2015 DOC15/39169 AND UNDERGROUND PREMISES (MINING FOR COAL)INCLUDES ONLY MINING FOR COAL IN THE FASSIFERN COAL SEAM AND GREAT NORTHERN COAL SEAM AS IDENTIFIED IN THE PLAN TITLED "FIGURE 1: GENERAL LAYOUT OF THE CHAIN VALLEY EXTENSION PROJECT" 28/1/14 ACCOMPANYING THE LICENCE APPLICATION DOC14/10689 AND THE UNDERGROUND ROAD JOINING MANNERING COLLIERY TITLED "LOCATION OF UNDERGROUND LINKAGE" DOC14/298690-02 ACCOMPANYING SSD5465-MOD 1 APPROVAL AND THE PLAN TITLED "EPL PREMISES PLAN - FIG 1 PROJECT EXTENTS, MONITORING AND COMPLIANCE LOCATIONS" 12 MARCH 2015 DOC15/83810.

Note: An updated plan of the premises must be provided to the EPA by the licensee, to the EPA's specifications.

A3 Other activities

A3.1 This licence applies to all other activities carried on at the premises, including:

Ancillary Activity

Sewage Treatment Systems

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

- a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

Licence - 1770



EPA identi- fication no.	Type of Monitoring Point	Type of Discharge Point	Location Description
25	Air Monitoring Point Particulate Matter PM10 Thermo Fisher Scientific TEOM 1405		MPSTP Compound 220 Tall Timbers Road Doyalson NSW 2262

- P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.
- P1.3 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identi- fication no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to waters Discharge quality and volume monitoring	Discharge to waters Discharge quality and volume monitoring	Discharge to waters and monitoring from final settlement pond via low level discharge identifed as EPA 1 on plan of the premises titled "EPL premises Plan Fig 1 Project Extents, Monitoring and Compliance Locations dated 12 March 2015 DOC15/83810.
27	Discharge to waters Discharge quality and volume monitoring	Discharge to waters Discharge quality and volume monitoring	Discharge to waters via concrete high level spillway from final settlement pond adjacent to EPA 1 on plan of the premises titled "EPL premises Plan Fig 1 Project extents, Monitoring and Compliance Locations" dated 12 March 2015 DOC15/83810.

P1.4 The following points referred to in the table below are identified in this licence for the purposes of weather and/or noise monitoring and/or setting limits for the emission of noise from the premises.

Noise/Weather

EPA identi- fication no.	Type of monitoring point	Location description
9	Noise monitoring	(R8) 109 Griffith Street, MANNERING PARK, 2259
12	Noise monitoring	(R11) 35 Lakeshore Avenue, CHAIN VALLEY BAY, 2259
13	Noise monitoring	(R12) 20 Lakeshore Avenue, Kingfisher Shores, CHAIN VALLEY BAY, 2259

Licence - 1770



14	Noise monitoring	(R13) 33 Karoola Avenue, Kingfisher Shores, CHAIN VALLEY BAY, 2259
16	Noise monitoring	(R15) Short Street, Macquarie Shores, CHAIN VALLEY BAY, 2259
20	Noise monitoring	(R19) 2 Sunset Parade, CHAIN VALLEY BAY, 2259
23	Noise monitoring	(R22) 275a Cams Boulevard, CHAIN VALLEY BAY, 2259
26	Meteorological Station	Ruttleys Road Doyalson

3 Limit Conditions

L1 Pollution of waters

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.

L2 Concentration limits

- L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.
- L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.
- L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.
- L2.4 Water and/or Land Concentration Limits

POINT 1,27

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Faecal Coliforms	colony forming units per 100 millilitres				200
рН	рН				6.5-8.5





Total	milligrams per litre	50
suspended		
solids		

L3 Volume and mass limits

- L3.1 For each discharge point or utilisation area specified below (by a point number), the volume/mass of:
 - a) liquids discharged to water; or;
 - b) solids or liquids applied to the area;

must not exceed the volume/mass limit specified for that discharge point or area.

Point	Unit of Measure	Volume/Mass Limit
1	kilolitres per day	12161
27	kilolitres per day	12161

L3.2 The volumetric daily discharge limit for the premises is the combined discharge measured at EPA discharge points 1 and 27 and must not exceed 12161 kilolitres per day.

L4 Waste

L4.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and meeting the definition, if any, in the column titled "Description" in the table below.

Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled "Activity" in the table below.

Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the table below.

This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	Waste	Any other waste received on the premises for storage, treatment, processing, sorting or disposal and which receipt is not a scheduled activity under Schedule 1 of the POEO Act, as in force from time to time.	-	
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource exemption under Clause 92 of the	As specified in each particular resource recovery exemption	NA





Protection of the
Environment Operations
(Waste) Regulation
2014.

L5 Noise limits

L5.1 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.

POINT 12

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	49
Evening	Evening-LAeq (15 minute)	-	49
Night	Night-LAeq (15 minute)	-	49
Night	Night-LA1 (1 minute)	-	54

POINT 13

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	49
Evening	Evening-LAeq (15 minute)	-	49
Night	Night-LAeq (15 minute)	-	49
Night	Night-LA1 (1 minute)	-	53

POINT 14

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	43
Evening	Evening-LAeq (15 minute)	-	43
Night	Night-LAeq (15 minute)	-	43
Night	Night-LA1 (1 minute)	-	49





POINT 16

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	36
Evening	Evening-LAeq (15 minute)	-	36
Night	Night-LAeq (15 minute)	-	36
Night	Night-LA1 (1 minute)	-	45

POINT 20

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	37
Evening	Evening-LAeq (15 minute)	-	37
Night	Night-LAeq (15 minute)	-	37
Night	Night-LA1 (1 minute)	-	45

POINT 23

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	46
Evening	Evening-LAeq (15 minute)	-	46
Night	Night-LAeq (15 minute)	-	36
Night	Night-LA1 (1 minute)	-	45

POINT 9

Time period	Measurement parameter	Measurement frequency	Noise level dB(A)
Day	Day-LAeq (15 minute)	-	38
Evening	Evening-LAeq (15 minute)	-	38
Night	Night-LAeq (15 minute)	-	38
Night	Night-LA1 (1 minute)	-	45

L5.2 The licensee must ensure that noise generated on the premises does not exceed:

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- a) 35 LAeq(15min) during the day, evening or night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1; and
- b) 45 LA1(1min) during the night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1.
- Note: The licensee may provide to the EPA written evidence of any agreement with a landholder which is subject to the above noise limits. The written evidence may be submitted with a licence variation to remove the landholder from the above tables.
- L5.3 For the purpose of condition L5.1 and condition L5.2:
 - (a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays;
 - (b) Evening is defined as the period 6pm to 10pm, and
 - (c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.
- L5.4 The noise limits set out in condition L5.1 and condition L5.2 apply under all meterorological conditions except for any one of the following:
 - (a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
 - (b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
 - (c) Stability category G temperature inversion conditions.
- L5.5 For the purpose of condition L5.4:
 - (a) the meteorological data to be used for determining meteorological conditions is the data recorded at the meteorological station identified in this licence as EPA Identification Point 26.
 - (b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the *NSW industrial Noise Policy* (EPA 2000)
- Note: The weather station must be designed, commissioned and operated in a manner to obtain the necessary parameters required under the above condition.
- L5.6 For the purpose of determining the noise generated at the premises the licensee must use a Class 1 or Class 2 noise monitoring device as defined by AS IEC61672.1 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing.
- L5.7 To determine compliance:
 - 1. With the L_{Aeq(15 min)} noise limits in condition L5.1 and condition L5.2, the licensee must locate noise monitoring equipment;
 - (a) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more then 30 metres from the property boundary that is closest to the premises;
 - (b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises, or, where applicable,

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- (c) within approximately 50 metres if the boundary of a national park or nature reserve.
- 2. With the LA1(1 minute) noise limits in condition L5.1 and L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade.
- 3. With the noise limits in condition L5.1 and condition L5.2, the noise monitoring equipment must be located:
- (a) at the most affected point at a location where there is no dwelling at the location, or
- (b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).
- L5.8 A non-compliance of condition L5.1 or condition L5.2 will still occur where noise generated from the premises in excess of the appropriate limit is measured;
 - a) at a location other than an area prescribed by conditions L5.7 1(a) and L5.7 1(b), and /or
 - b) at a point other than the most affected point at a location.
- L5.9 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

- O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
 - a) must be maintained in a proper and efficient condition; and
 - b) must be operated in a proper and efficient manner.

O3 Dust

- O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust on or from the premises.
- O3.2 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation of wind-blown or traffic generated dust.

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- O3.3 All trafficable areas, coal stockpile(s) and storage areas, and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation of dust.
- O3.4 All vehicles transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage.
 - Note: Vehicles transporting coal on the private haul road from Chain Valley Colliery to Vales Point Power station are exempt from covering their load if surface coal moisture is above 8%.
- O3.5 Activities occurring in or on the premises must be carried out in a manner that will minimise the tracking of dust from the premises.

O4 Effluent application to land

- O4.1 An area must be provided for the use of effluent from the sewage treatment plant. The design of the system must be in accordance with the DEC's Environmental Guideline: Use of Effluent By Irrigation.
- O4.2 The quantity of wastewater applied to the utilisation area(s) must not exceed the capacity of the utilisation area(s) to effectively utilise the effluent.
 - For the purpose of this condition, "effectively utilise" includes the ability of the soil to absorb the nutrient, salt and hydraulic loads and the applied organic material without causing harm to the environment.

O5 Emergency response

O5.1 The licensee must maintain, and implement as necessary, a current emergency response plan for the premises. The licensee must keep the emergency response plan on the premises at all times. The emergency response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. If a current emergency response plan does not exist at the date on which this condition is attached to the licence, the licensee must develop an emergency response plan within three months of that date.

O6 Waste management

- O6.1 The licensee must ensure that any liquid and/or non liquid waste generated and/or stored at the premises is assessed and classified in accordance with the EPA's Waste Classification Guidelines as in force from time to time.
- O6.2 The licensee must ensure that waste identified for recycling is stored separately from other waste.

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O7 Other operating conditions

Sewage Treatment

- O7.1 All sewage generated on the premises must be directed, collected and treated by the sewage treatment system(s).
- O7.2 The licensee is responsible for the correct operation of the sewage treatment system(s) on their premises.
- O7.3 Correct operation involves regular supervision and system maintenance. The licensee must be aware of the system requirements and must ensure that the necessary service contracts are in place.
- O7.4 The sewage treatment system(s) must be serviced by a suitably qualified and experienced waste water technician at least once each quarterly period and a minimum of four times per year.
- O7.5 The licensee must record each inspection and any actions required or recommended by the technician; including all results from tests performed on the sewage treatment system(s) by the technician as defined in Condition O7.4.
- O7.6 All treated sewage that is discharged from the premises must be discharged through licensed discharge point "EPA Identification no. 1", as defined in condition P1.3.

Bunding

O7.7 All above ground tanks containing material that is likely to cause material harm to the environmental must be bunded or have an alternative spill containment system in place.

5 Monitoring and Recording Conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
 - a) in a legible form, or in a form that can readily be reduced to a legible form;
 - b) kept for at least 4 years after the monitoring or event to which they relate took place; and
 - c) produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
 - a) the date(s) on which the sample was taken;
 - b) the time(s) at which the sample was collected;
 - c) the point at which the sample was taken; and
 - d) the name of the person who collected the sample.

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M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 25

Pollutant	Units of measure	Frequency	Sampling Method
Particulate matter	micrograms per cubic metre	Continuous	AM-22

M2.3 Water and/ or Land Monitoring Requirements

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Biochemical oxygen demand	milligrams per litre	Once a month (min. of 4 weeks)	Grab sample
Enterococci	colony forming units per 100 millilitres	Once a month (min. of 4 weeks)	Grab sample
Faecal Coliforms	colony forming units per 100 millilitres	Once a month (min. of 4 weeks)	Grab sample
рН	рН	Once a month (min. of 4 weeks)	Grab sample
Total suspended solids	milligrams per litre	Once a month (min. of 4 weeks)	Grab sample

POINT 27

Pollutant	Units of measure	Frequency	Sampling Method
Enterococci	colony forming units per 100 millilitres	Daily during any discharge	Grab sample
Faecal Coliforms	colony forming units per 100 millilitres	Daily during any discharge	Grab sample
рН	рН	Daily during any discharge	Grab sample
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

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M3 Testing methods - concentration limits

- M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
 - a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
 - b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
 - c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.
- Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".
- M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Environmental monitoring

Requirement to monitor noise

- M4.1 To determine compliance with condition L5.1, attended noise monitoring must be undertaken in accordance with conditions L5.7 and L5.8, and
 - (a) at each one of the locations listed in condition L5.1;
 - (b) occur quarterly within the reporting period of the Environment Protection Licence with at least 2 months between monitoring periods;
 - (c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy (EPA 2000) for a minimum of 15 minutes for three of the quarters;
 - (d) the night time 15 minute attended monitoring in accordance with c) must be undertaken between the hours of 1am and 4am;
 - (e) the night time LA1 (1 min) attended monitoring in accordance with c) must be undertaken between the hours of 1am and 4am;
 - (f) one quarterly monitoring must occur during each day, evening and night period as defined in the NSW Industrial Noise Policy (EPA 2000) for a minimum of 1.5 hours during the day; 30 minutes during the evening; and 1 hours during the night, and
 - (g) each quarterly monitoring must be undertaken on a different day(s) of the week not including Saturdays, Sundays and public holidays; and
 - (h) these monitoring conditions take effect in the 2015 Reporting period.

Note: The intention of this condition is that quarterly monitoring be undertaken at each sensitive receiver. That at each sensitive receiver monitoring is undertaken over a range of different days excluding

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weekends and public holidays during the reporting period so as to be representative of operating hours. That night time 15 minute attended monitoring and the LA1 (1min) monitoring for three of the quarters be undertaken at worst case being the most stable atmospheric conditions and when noise would be most intrusive to sleep. All of the sensitive receivers do not have to be monitored on the same day, evening and night for sub condition f.

M4.2 For the Annual Reporting Period ending March 2015 the EPA will accept all monitoring required by the current Department of Planning and Environment consent (usually quarterly monitoring for noise as dB(A) Leq15minutes) for compliance with noise monitoring requirements in this licence, as a single report attached to the Annual Return for the premises.

M5 Weather monitoring

M5.1 At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below, using the corresponding sampling method, units of measure, averaging period and sampling frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively.

POINT 26

Parameter	Sampling method	Units of measure	Averaging period	Frequency
Rainfall	AM-4	millimetres	24 hours	Continuous
Wind Direction at 10 metres	AM-2 & AM-4	Degrees	1 hour	Continuous
Wind Speed	AM-2 & AM-4	metres per second	1 hour	Continuous
Temperature at 10 metres	AM-4	degrees Celsius	1 hour	Continuous
Sigma Theta	AM-2 & AM-4	Degrees	15 minutes	Continuous
Relative humidity	AM-4	percent	1 hour	Continuous

M6 Recording of pollution complaints

- M6.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M6.2 The record must include details of the following:
 - a) the date and time of the complaint;
 - b) the method by which the complaint was made;
 - c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
 - d) the nature of the complaint;
 - e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the

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complainant; and

- f) if no action was taken by the licensee, the reasons why no action was taken.
- M6.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M6.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M7 Telephone complaints line

- M7.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M7.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M7.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.
- M7.4 The licensee must notify the EPA with contact details of personnel capable of a timely response to emergencies or any other exigent circumstances.
 - (a) the nominated contact must be available at all times.
 - (b) contact details must include a telephone number and must be current.
 - (c) such notification must be made within 14 days of receiving this licence.

M8 Requirement to monitor volume or mass

- M8.1 For each discharge point or utilisation area specified below, the licensee must monitor:
 - a) the volume of liquids discharged to water or applied to the area;
 - b) the mass of solids applied to the area;
 - c) the mass of pollutants emitted to the air;
 - at the frequency and using the method and units of measure, specified below.

POINT 1

Frequency	Unit of Measure	Sampling Method
Continuous during discharge	kilolitres per day	In line instrumentation

POINT 27

Frequency	Unit of Measure	Sampling Method
Continuous during discharge	kilolitres per day	In line instrumentation

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6 Reporting Conditions

R1 Annual return documents

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
 - 1. a Statement of Compliance,
 - 2. a Monitoring and Complaints Summary,
 - 3. a Statement of Compliance Licence Conditions.
 - 4. a Statement of Compliance Load based Fee,
 - 5. a Statement of Compliance Requirement to Prepare Pollution Incident Response Management Plan,
 - 6. a Statement of Compliance Requirement to Publish Pollution Monitoring Data; and
 - 7. a Statement of Compliance Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

- R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.
- Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.
- R1.3 Where this licence is transferred from the licensee to a new licensee:
 - a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
 - b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.
- Note: An application to transfer a licence must be made in the approved form for this purpose.
- R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
 - a) in relation to the surrender of a licence the date when notice in writing of approval of the surrender is given; or
 - b) in relation to the revocation of the licence the date from which notice revoking the licence operates.
- R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').
- R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.
- R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
 - a) the licence holder; or
 - b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

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R2 Notification of environmental harm

- Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.
- R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.
- R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R3 Written report

- R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
 - a) where this licence applies to premises, an event has occurred at the premises; or
 - b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
 - and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.
- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
 - a) the cause, time and duration of the event:
 - b) the type, volume and concentration of every pollutant discharged as a result of the event;
 - c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
 - d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
 - e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
 - f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
 - g) any other relevant matters.
- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

Noise Monitoring Report

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- R4.1 The licensee must submit to the EPA a noise compliance assessment report at the end of each reporting period. The report must be submitted with the Environment Protection Licence Annual Return. The report must be prepared by a suitably qualified and experienced acoustical consultant which:
 - (a) details the noise monitoring undertaken in accordance with condition M4;
 - (b) assesses compliance with noise limits presented in condition L5.1 and condition 5.2; and
 - (c) outlines any management actions taken within the monitoring period to address any exceedences of limits contained in condition L5.1 and condition L5.2.

Note: The licensee must provide the EPA with one report, but this report may be a combination of the monitoring undertaken by the licensee as part of their quarterly monitoring program as required by the Project Approval SSD-5456 and must include LA1(1min).

7 General Conditions

G1 Copy of licence kept at the premises or plant

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Other general conditions

G2.1 Completed Programs

Program	Description	Completed Date
Coal Mine Particulate Matter Control Best Practice	Requires licensee to conduct a site specific Best Management Practice (BMP) determination to identify ways to reduce particle emissions	28-September-2012
Assessment of Potential Impacts of Metals in wastewater	The licensee must conduct an assessment of metals detected in wastewater discharges from the mine in accordance with the ANZECC water quality guidelines To obtain a greater understanding of the type and concentration of metals discharged in mine water and entering the receiving waters. To limit the concentration of metals discharged in mine water within ANZECC guidelines.	23-October-2013

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Air Quality Monitoring	The licensee must evaluate best locations and install monitoring devices as defined in Project Approval MP10_0161 under the Environent Planning & Assessment Act 1979.	31-December-2013
PRP4 - Upgrade to Clean and Dirty Water Management System	The licensee must review and upgrade separation of the Clean and Dirty Water Management System and review and upgrade bunding.	14-August-2015
PRP5 - Remediation of Dam Wall and Spillway formalisation	The licensee must design and remediate the dam wall on the final control pond and formalise a spillway to prevent dam seepage and to ensure that volumetric discharge can be monitored	27-February-2015
PRP 6 Upgrade to Sewage Treatment Systems	Assessment of options for improved disinfection of effluent from STP on licenced premises.	06-January-2015
PRP7 Sewage Treatment System Concept Design	Provide the EPA with a Concept Design and Timetable for Implementation of Upgrade to the Sewage Treatment System	19-February-2016

8 Pollution Studies and Reduction Programs

U1 PRP 8 - Construction of Sewerage System

- U1.1 By 07 July 2017 the licensee must construct a pump station, rising main and other infrastructure in order to connect the sewage from Chain Valley Colliery to Wyong Shire Council's sewerage system. The construction must be undertaken by an appropriately qualified an experienced person. The Licensee must:
 - a) obtain the appropriate approvals and permits required for the development;
 - b) construct option A or option B in accordance with the document titled "Concept Design Report for Sewage Treatment System Upgrade Chain Valley Colliery" dated 1 February 2016 and prepared by RGH Consulting Group;
 - c) include connection of sewage from the administration building to the rising main;
 - c) notify the EPA in writing at hunter.region@epa.nsw.gov.au within 2 weeks of the pump station and rising main being commissioned; and
 - d) provide the EPA with a report on commissioning of the pump station and rising main which details the final option constructed within 2 weeks of the pump station and rising main being commissioned.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples	
Act	Means the Protection of the Environment Operations Act 1997	
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997	
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009	
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.	
AMG	Australian Map Grid	
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.	
annual return	Is defined in R1.1	
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009	
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009	
BOD	Means biochemical oxygen demand	
СЕМ	Together with a number, means a continuous emission monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.	
COD	Means chemical oxygen demand	
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.	
cond.	Means conductivity	
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997	
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991	
EPA	Means Environment Protection Authority of New South Wales.	
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.	

Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

general solid waste (non-putrescible)

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flow weighted composite sample

Means a sample whose composites are sized in proportion to the flow at each composites time of collection

general solid waste (putrescible)

Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act

1997

grab sample Means a single sample taken at a point at a single time

hazardous waste Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

1997

licensee Means the licence holder described at the front of this licence

load calculation protocol

Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009

local authority Has the same meaning as in the Protection of the Environment Operations Act 1997

material harm Has the same meaning as in section 147 Protection of the Environment Operations Act 1997

MBAS Means methylene blue active substances

Minister Means the Minister administering the Protection of the Environment Operations Act 1997

mobile plant Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

1997

motor vehicle Has the same meaning as in the Protection of the Environment Operations Act 1997

O&G Means oil and grease

percentile [in relation to a concentration limit of a sample] Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.

Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as

motor vehicles.

pollution of waters [or water pollution]

plant

Has the same meaning as in the Protection of the Environment Operations Act 1997

premises Means the premises described in condition A2.1

public authority Has the same meaning as in the Protection of the Environment Operations Act 1997

regional office Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence

reporting period For the purposes of this licence, the reporting period means the period of 12 months after the issue of the

licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary

of the date of issue or last renewal of the licence following the commencement of the Act.

restricted solid waste

TM

Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

1997

scheduled activity

Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997

special waste Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

1997

Together with a number, means a test method of that number prescribed by the Approved Methods for the

Sampling and Analysis of Air Pollutants in New South Wales.

Licence - 1770



TSP Means total suspended particles

TSS Means total suspended solids

Type 1 substance

Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

more of those elements

Type 2 substance Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any

compound containing one or more of those elements

utilisation area Means any area shown as a utilisation area on a map submitted with the application for this licence

waste Has the same meaning as in the Protection of the Environment Operations Act 1997

waste type Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non -

putrescible), special waste or hazardous waste

Ms Debbie Maddison

Environment Protection Authority

(By Delegation)

Date of this edition: 10-November-2000

Licence - 1770



End Notes

- 1 Licence varied by notice 1008662, issued on 24-Oct-2001, which came into effect on 24-Oct-2001.
- 2 Licence transferred through application 141163, approved on 24-Apr-2002, which came into effect on 20-Apr-2002.
- 3 Licence varied by notice 1026573, issued on 16-Apr-2003, which came into effect on 11-May-2003.
- 4 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
- 5 Licence varied by notice 1104492, issued on 11-Dec-2009, which came into effect on 11-Dec-2009.
- 6 Licence varied by notice 1502571 issued on 21-Dec-2011
- 7 Licence varied by notice 1504446 issued on 15-Apr-2013
- 8 Licence varied by notice 1516485 issued on 20-Aug-2013
- 9 Licence varied by notice 1519380 issued on 26-Sep-2014
- 10 Licence varied by notice 1527706 issued on 15-May-2015
- 11 Licence varied by notice 1535160 issued on 30-Oct-2015
- 12 Licence varied by notice 1540199 issued on 08-Jun-2016
- 13 Licence transferred through application 1578021 approved on 01-Apr-2019 , which came into effect on 02-Apr-2019



Appendix 4: Seagrass Monitoring Report

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CHAIN VALLEY COLLIERY

Seagrass Management Plan ENVIRONMENTAL MANAGEMENT PLAN

	Katie Weekes - EMM Consulting Pty Ltd
Reviewed	Chris Armit - Delta Coal / EMM Consulting Pty Ltd
	<u> </u>
	Lachlan McWha
Authorised by:	Environmental Compliance Coordinator
	Delta Coal
Date:	10/07/2020

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1 Introduction

1.1 Purpose

The purpose of this Seagrass Management Plan is to:

- outline details of the seagrass monitoring data collected;
- outline subsidence prediction methodology;
- outline the methodology to be used to identify depth changes at monitoring locations;
- identify seagrass monitoring locations;
- identify reporting requirements;
- detail seagrass management measures;
- identify the requirements for incident or exceedances reporting and reviews of the document; and
- identify persons responsible for implementation of requirements.

The overall aim of this management plan is to promote a high level of environmental performance through the minimisation of impacts.

A formal Environmental Management System (EMS) has been developed as a systematic and structured approach to managing environmental issues at the operation. This has been developed in general accordance with the requirements of the international standard ISO 14001.

This Seagrass Management Plan is an element of the Chain Valley Colliery (CVC) Environmental Management System (EMS).

1.2 Background

CVC is an underground coal mine located on the southern side of Lake Macquarie approximately 60 km south of Newcastle and 80 km north of Sydney (see Figure 1). The pit-top is located approximately 1 km south-east of the township of Mannering park at the southern extent of Lake Macquarie, as shown on Figure 1.

Mining is currently undertaken at CVC, with the coal being transported underground to Mannering Colliery (MC) where the coal is crushed and screened and sent directly to Vales Point Power Station (VPPS).

CVC has been operating since the early 1960s. However, with changes to the Mining Act 1992 and amendments to the Environmental Planning and Assessment Regulation 2000, LakeCoal was required to obtain approval under the Environmental Planning and Assessment Act 1979 (EP&A Act) to permit continued operation of the mine.

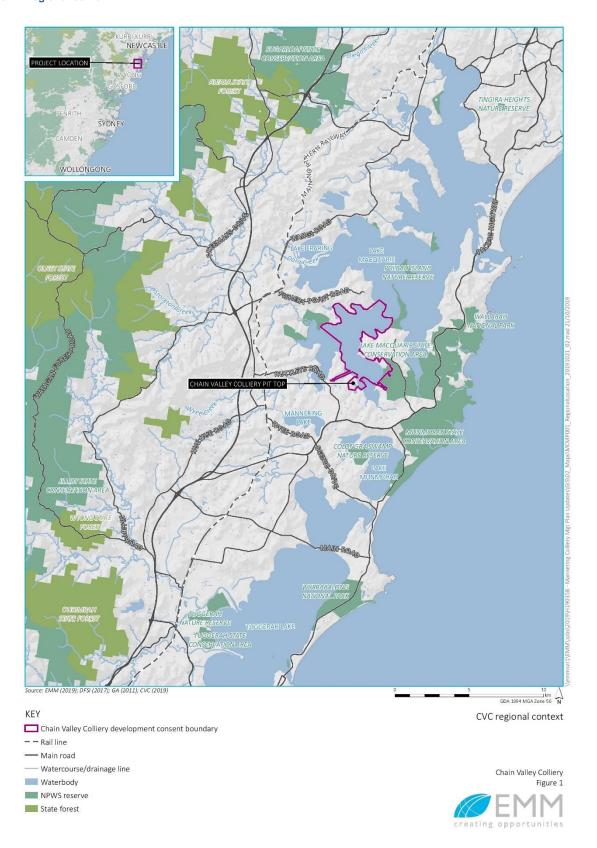
Approval of the mine was granted on 23 January 2012 (MP10_0161) following submission of an environmental assessment (EA) (AECOM, 2011). Development consent (SSD-5465) was subsequently approved on 23 December 2013 granting an approval for underground mining over an additional area of Lake Macquarie and a consolidation of approved activities granted by virtue of MP10_0161.

LakeCoal was placed into Voluntary Administration on 3 October 2018. The receivers continued operation of the mines (CVC & MC) in the period 3 October 2018 to 1 April 2019. As of 1 April 2019, Great Southern Energy Pty Ltd (trading as Delta Coal (DC)) own and operate the two underground coal mines, CVC and MC.

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Figure 1: Regional context





1.3 Consultation

The original version of this Seagrass Management Plan was provided to OEH, LMCC and DPI Fisheries for comment. Both LMCC and DPI Fisheries reviewed the Seagrass Management Plan, with comments from DPI Fisheries provided on the 28th June 2013. At that time DPI Fisheries had no objection to the plan being implemented as written. Comments from Lake Macquarie City Council were received on the 19th July 2013, which were addressed and incorporated into the document, this final version was then sent back to Council who confirmed on the 19th August 2013 that the changes had addressed their comments. The changes made previously to address Council's comments remain in the current version.

Revision 2 of the draft Seagrass Management Plan was provided to OEH, DPI Fisheries and LMCC on the 12th March 2014, with comments on the draft plan requested back by the 1st April 2014. The only response received was from OEH, dated the 21st March 2014. The OEH noted that while they encourage the development of such plans, they do not approve or endorse these documents and accordingly no comments were provided.

Revision 3 of the Seagrass Management Plan was sent to OEH, DPI Fisheries and LMCC on 4 November 2016 for review and comment. All three agencies provided comments on the revised Plan. LMCC and DPI Fisheries confirmed that the document was acceptable in its revised form while OEH noted that while they encourage the development of such plans, they do not approve or endorse these documents and accordingly no comments were provided on the content of the Plan.

Revision 4 of the Seagrass Management Plan was provided to OEH, DPI Fisheries and LMCC on 26 February 2018 with the Extraction Plan application for Chain Valley Colliery's Northern Mining Area (NMA).

Revision 5 of the Seagrass Management Plan was sent to OEH, DPI Fisheries and LMCC in May 2019. On the 5 June 2019 DPI Fisheries responded that the Seagrass Management Plan was adequate. On 5 June 2019 OEH noted that they do not approve or endorse these documents and accordingly no comments were provided on the content of the Plan.

Revision 6 of the Seagrass Management Plan was sent to DPI-Fisheries, OEH, DPIE and LMCC on 17 November 2019.

A summary of the comments received, and amendments subsequently made to the document prior to finalisation are detailed in **Table 1**. Evidence of consultation is provided in **Appendix 1**.

Table 1: Consultation Summary

Stakeholder	Comments	Response/Action
DPI- Fisheries	No comments received	Nil required
NSW DPIE-BCD	Reviewed S4 EP with no comments to make	Nil required
NSW DPIE –Resource Regulator Subsidence Engineer	No comments received	Nil required
DPIE-Resource Assessments	Comments received on 5 May 2020. Appendix 1	Updated Section 3.4
LMCC	Seagrass Management Plan (SMP) missing information to include. Appendix 1.	See updated Table 5 for unfinished statement to include additional stakeholders to send the Seagrass report to.

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Stakeholder	Comments	Response/Action
Combined CVC and MC Community Consultative Committee	No comments received	Nil required

2 Statutory Requirements

2.1 Key Legislation, Policy and Guidelines

Both State and Commonwealth environmental legislation applies to DC's operation and activities. A number of legislative requirements, government policies and guidelines are applicable. Key items relevant to this management plan are:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- Protection of the Environment Operations Act 1997 (POEO Act);
- Environmental Planning and Assessment Act 1979 (EP&A Act);
- Mining Act 1992;
- National Parks and Wildlife Act 1974;
- Biodiversity Conservation Act 2016; and
- Department of Primary Industries (2013), Policy and guidelines for fish habitat conservation and management.

Delta lands are within the LMCC and Central Coast Council local government areas (LGAs).

2.2 Development Consent SSD-5465 (as modified)

This management plan has also been completed to satisfy the requirements of Development Consent SSD–5465 (Modification 3), Schedule 4, Condition 7(i) and Schedule 4, Table 6, which states:

- "7. The Applicant shall prepare an Extraction Plan for all second workings on site, to the satisfaction of the Secretary. Each Extraction Plan must:
 - (i) include a Seagrass Management Plan, which has been prepared in consultation with OEH, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on seagrass beds, and which includes:
 - a program of ongoing monitoring of seagrasses in both control and impact sites; and
 - a program to predict and manage subsidence impacts and environmental consequences to seagrass beds to ensure the performance measures in Table 8 are met."

In addition to the above, Condition 2 within Schedule 4 of SSD-5465 (Modification 3) also requires that:

"The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 6 to the satisfaction of the Secretary."

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The relevant seagrass requirements from Table 6 within Schedule 4 of the Development Consent, including the relevant notes, are recreated in **Table 2**.

Table 2: Subsidence Impact Performance Measures - Natural and Heritage Features

Biodiversity					
Seagrass beds	Negligible environmental consequences including:				

Notes:

- •The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent (see Condition 7 below).
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of approval of this consent.

Seagrass related requirements of SSD-5465, including specific requirements that are to be addressed in this plan, and where they are addressed, are detailed in **Appendix 2**.



3 Background

3.1 Operations

CVC is an underground coal mine with current coal mining methods including development of roadways in the coal seam known as first workings and secondary extraction (miniwall). These first workings develop panels to support the installation of a miniwall, a modern secondary coal extraction method.

Lake Macquarie is the largest saline lake in New South Wales. It lies on the central coast between Sydney and Newcastle within the local government areas of Wyong and Lake Macquarie. Lake Macquarie has a catchment of 700 km² and a water surface area of 125 km² (Bell & Edwards, 1980). The lake has a permanent entrance to coastal waters at Swansea and has an average depth of around 6 m (Laxton, 2005).

The catchment of Lake Macquarie is largely rural with large areas of bush land and grazing land. The shoreline of Lake Macquarie is heavily urbanised, especially the eastern, western and northern shorelines. The region has a relatively long history of coal mining and power generation, with mining occurring since the late 1800s and the first power station at Lake Macquarie commencing operations in 1958.

CVC is situated on the southern shores of Lake Macquarie near Mannering Park, NSW. The mine has been operating since 1962. Mining is currently undertaken using miniwall methods with first workings to support the development in advance of each miniwall panel. All secondary extraction is currently occurring in the Fassifern Seam, in line with Development Consent SSD–5465. The general layout of the CVC Extension Project in respect to Lake Macquarie is shown on **Figure 2**.

3.2 Seagrass Communities

Lake Macquarie contains approximately 10% of the total area of seagrass beds in NSW (DPI 2007). The following four species of seagrass occur in Lake Macquarie:

- eelgrass (Zostera capricorni);
- paddle weed (Halophila ovalis);
- · Ruppia sp.; and
- strapweed (*Posidonia Australia*), which is listed as an endangered species under the *Fisheries Management Act*, 1994.

Seagrass distribution within estuaries is naturally influenced by light penetration, depth, salinity, nutrient status, bed stability, wave energy, estuary type, and the evolutionary stage of the estuary. Light is a major limiting factor for the growth of seagrasses and the effects of shading either by artificial structures or increased turbidity associated with sediment re-suspension are common light reducing factors in estuaries (BioAnalysis, 2008).

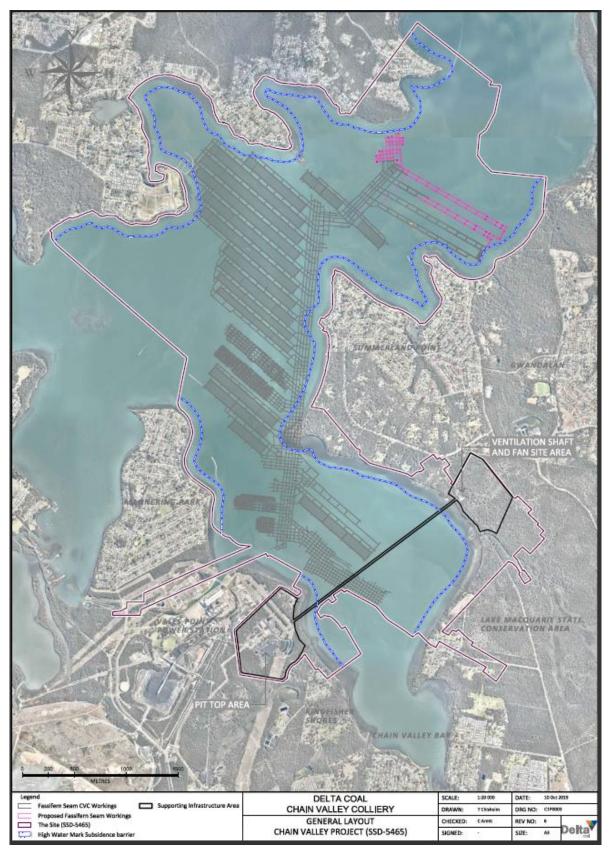
Seagrass communities in Lake Macquarie appear to have declined since 1953, though there was a general increase in the cover of seagrass in Lake Macquarie between 2000 and 2004 due to a change in light penetration following a period of lower freshwater inputs (King and Barclay 1986; Wellington 2000; Gray and Wellington 2004).

Annual surveys of seagrass communities at Summerland Point, Chain Valley and Crangan Bay (i.e. within and adjacent to the current mining areas) have been undertaken by J.H. & E.S. Laxton - Environmental Consultants Pty Ltd (Laxton Environmental Consultants) on behalf of Delta Coal (and previously LakeCoal) since 2008. Additional survey locations in Bardens Bay were added to the survey program in 2014. Two species of seagrass are present in these areas, namely, eelgrass and paddle weed.

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Figure 2: General Layout of the Chain Valley Northern Mining Domain



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The 2019 survey report Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2017) (Laxton Environmental Consultants, June 2019) reported seagrass cover along the transects ranged from 24% to 100% of the substratum in 2019. Since 2011 seagrass cover has generally increased progressively. This annual increase in seagrass cover is most likely attributable to the cessation of commercial fishing in Lake Macquarie which was known to impact on the seagrass beds through land-based netting practices.

In 2019 there were no changes in seabed height across transects greater than 0.15 m (0.15 m trigger level) compared with the datum from previous years.

Several studies have been conducted on the seagrass beds in Chain Valley Bay and Summerland Point that are relevant to this Seagrass Management Plan.

In 2007, LakeCoal engaged Laxton Environmental Consultants to identify environmental factors including seagrasses, benthic fauna and bathymetry. The study area was the area east of Mannering Park where it was found that the seagrass beds were composed of *Zostera capricorni* (eelgrass) only.

It was concluded that seagrasses in Chain Valley Bay commenced along the lake edge and appeared to have a depth limit of less than 2 m. Any mining beneath the beds could lead to subsidence which would cause a decline of seagrasses along the outer edge of the seagrass beds. It was also concluded that the distribution and density of seagrass beds in Chain Valley Bay could change due to events unrelated to underground coal mining.

In July 2008, the seagrass survey was conducted to the west of Summerland Point (see **Figure 1**), from Frying Pan Point to Sandy Beach Reserve, Summerland Point, Lake Macquarie. The 2008 seagrass survey provided the baseline data for seagrass distribution, density and condition to which annual surveys are compared. It was determined that seagrass densities in Chain Valley Bay and Crangan Bay ranged from 17.74 to 99.32% of the substratum in the -0.19 to -2.34 A.H.D zone around the shore.

Two forms of the seagrass *Zostera capricorni* were present; short leaved and long leaved forms. In Lake Macquarie, the distinction between these two forms of *Zostera capricorni* appeared to be arbitrary. In 2010 a second species of seagrass, *Halophila ovalis* (paddle weed), was discovered for the first time at transect E6 in Chain Valley Bay.

Subsequent annual seagrass surveys discovered large and unexplained changes in seagrass cover which were unrelated to underground coal mining, as no mining had impacted seagrass beds since commencement of monitoring. The precise reasons for these longer term changes in seagrass distribution are not always obvious but may be related to changes in water transparency, salinity, nutrient concentrations and the proliferation of epiphytic algae. Migration of sediment may also change the distribution of seagrasses over time. It is also thought that the cessation of commercial fishing in Lake Macquarie has positively contributed to the regrowth of seagrass beds.

Seagrass is a vital component of Lake Macquarie's marine ecosystem. It captures the sun's energy and converts it into organic matter that may be utilised by the whole food chain. Destruction of seagrass beds could lead to a reduction in available organic matter for marine flora and faunal species. Seagrass also improves water quality as it decreases sediment within the water column and takes in many nutrients and heavy metals entering the waterway. Hence, a reduction in seagrass population may also result in decreased water quality.

3.3 Seagrass Mapping

Surveys have shown that the short leaved and long leaved forms of *Zostera capricorni* present adjacent to the proposed mining operations commence along the lake edge and terminate when water depths approached 2 m.

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Further mapping undertaken as part of the Chain Valley Mining Extension 1 Project in 2011/2012, enabled the maximum depths and locations of seagrass to be considered in the mine design. This resulted in the generation of a broader seagrass protection barrier, extending to the proposed mining areas, which was then used to refine the mine design and ensure subsidence impacts to seagrass communities could be avoided. This study found that the communities were dominated by *Zostera capricorni* and that in general, the areas were characterised by patchy individuals of *Zostera*. The seagrass beds were found to exist to a maximum depth of 1.9 m.

Further visual assessments and remapping of seagrass beds within the areas of Sugar Bay, Frying Pan Bay and Point Wolstoncroft was undertaken by LakeCoal, Laxton Environmental Consultants, and Daly Smith Surveyors in February 2018.

Details from these studies have been combined to produce the mapping of seagrass over the entirety of the historic, current and future mining areas, and enabled the seagrass protection barrier to be further defined. The current seagrass mapping is shown on **Figure 3**.

3.4 Subsidence Predictions and Modelling

Subsidence predictions and modelling is undertaken by specialist geotechnical engineers for each extraction plan. The subsidence predictions and modelling assist the site technical services personnel in the mine design and planning process. The mine design and planning process is fundamental to controlling mine subsidence to consented limits.

The seagrass communities within the entirety of the proposed mining areas have been mapped and the majority of the seagrass beds appear to extend to depths around 2-2.5 m. As a result, if mining takes place beneath the seagrass beds, and subsidence takes place, it could be expected that the lower areas of the seagrass beds will potentially retreat with increased depth as a result of reduced light available for photosynthesis.

In light of Condition 7 (i) Schedule 4 and to ensure the performance measures in are met, an essential component of this Seagrass Management Plan is the seagrass protection barrier to ensure that any impacts associated with mining operations are negligible. This barrier is further described in **Section 4.2**.

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4 Seagrass Management

4.1 Management Practices

No secondary extraction is being undertaken, nor is it planned to be undertaken beneath seagrass beds.

In addition, to achieve negligible impact on seagrass beds due to subsidence effects, a seagrass protection barrier has been established. This barrier is based on the seagrass mapping and the application of an "angle of draw" of 26.5° from the seagrass area to the coal seam being mined, as depicted in Only first workings are to be undertaken within the seagrass protection barrier. In these areas, subsidence will be limited to less than 20 mm which is considered to be negligible.

The personnel responsible for the above management measures are detailed in **Section 8**.

4.2 Seagrass Protection Limits

As part of the protection of the lake foreshore, the Colliery holding mining leases require a protection barrier around the foreshore. This is known as the High-Water Mark (HWM) subsidence barrier and is shown on **Figure 4**. The barrier is approximately 130 m wide, but varies based on the depth of cover, and no secondary extraction occurs within this zone.

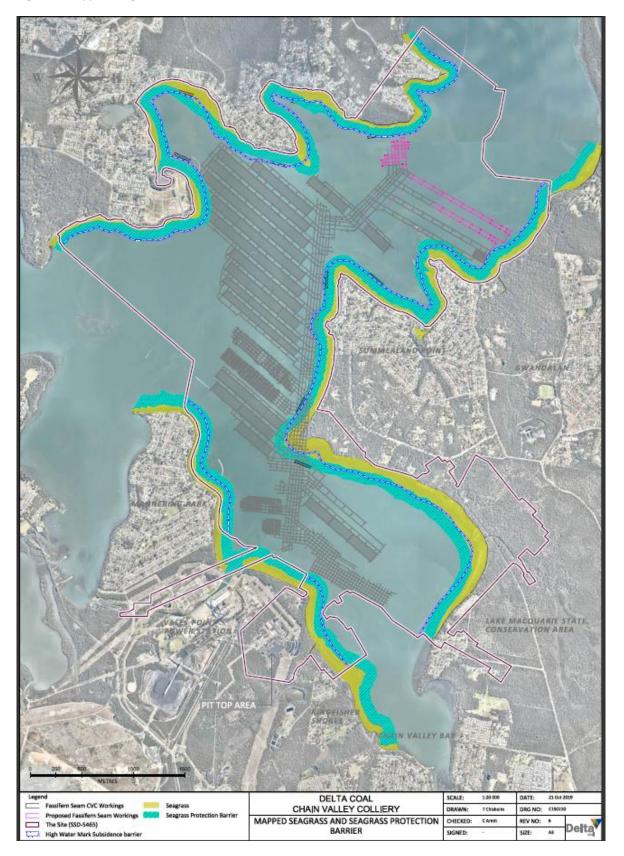
Although similar in some locations, the HWM subsidence barrier and the seagrass protection barrier are separate barriers, with the mine layout limited (among other factors) by either barrier at any specific location. The application of the HWM subsidence barrier and seagrass protection barrier is depicted on **Figure 3**.

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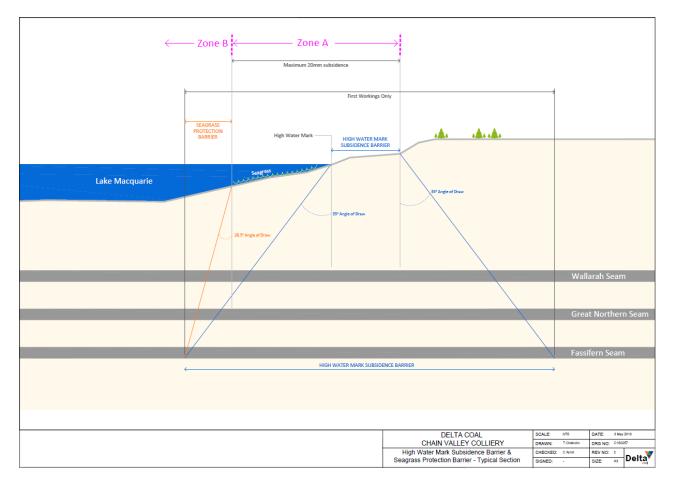
Figure 3: Mapped Seagrass and Protection Barrier



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Figure 4: Protection Barrier Schematic cross section



Despite the above barriers, which are in place to protect the seagrass and foreshore areas, monitoring thresholds have been established based on observable change to seagrass beds or bed height. The following triggers have been set:

- 20% decline in condition from the base year survey (i.e. earliest survey prior to mining occurring nearby); and
- 2. Mining induced subsidence of 150 mm or greater being recorded at one of the monitoring sites.

The DC Environmental Compliance Coordinator will notify DPI Fisheries, Lake Macquarie City Council and the Department of Planning, Industry and Environment if either of the above impact thresholds are exceeded. If deemed necessary by any of the parties, a meeting will be convened to discuss the results and determine any required future action.

It is noted that in prior years the 20% decline in baseline condition has been seen at a number of seagrass monitoring sites in the absence of any subsidence. As such, reaching the threshold may not in itself warrant the convening of a meeting or the requirement for further actions.



4.3 Seagrass Impact Mitigation

If, through the monitoring program, subsidence is found to occur in areas known to contain seagrass beds (as identified in 3) and loss of seagrass habitat has been determined to have occurred as a direct result of subsidence, DC would commit to undertaking remediation strategies to replace an equal area of any loss of seagrass habitat that has occurred.

DC's approach to managing seagrass is aimed at protection. However, if an investigation were to identify that an exceedance or incident has occurred that was a direct result of the mining activities and associated subsidence, then DC would develop a remediation plan which would be submitted to DPI Fisheries, identifying the proposed remediation strategy. The strategy would identify proposed remediation measures which could include:

- Transplanting existing communities with additional fast growing locally occurring seagrass plants;
- Regrading, topographical restoration; and/or
- Fertilising, to stimulate lateral ingrowth of seagrass communities.

The exact method of remediation would be determined based on the existing integrity of the seagrass beds, existing species and specific impacts that have occurred. The remediation strategy would be developed in consultation with DPI Fisheries and be "site specific" to ensure the most appropriate remediation methodology is implemented.

Should remediation on-site not be viable, mitigation could be undertaken at other sites within Lake Macquarie in consultation with DPI Fisheries and LMCC. Work would be completed to offset the impact arising as a result of mining activities.



5 Seagrass Monitoring

The purpose of this plan is to monitor and report on any changes in seagrass communities over time. The monitoring program also includes physical surveys to detect if there is any vertical movement that could attributable to mine subsidence and if identified, determine if subsidence has caused anything other than a negligible impact. To achieve this, the following will be undertaken:

- an annual survey of the study area with 50 seagrass transects using differential GPS survey methods.
 These differential GPS survey methods will establish the precise location and height of the lake bed
 at inner and outer ends of each transect and compare these values against those of previous years
 and the baseline survey;
- a survey to determine the maximum seaward extent of the seagrass beds and the maximum depth at which they occurred;
- photographic survey of seagrass distribution, density and condition along each transect to be recorded using a video camera enclosed within a waterproof housing and mounted on a floating platform;
- conduct annual seagrass surveys while mining operations have the potential to impact seagrass communities. Reports of annual surveys will be sent to the Department of Primary Industries – Fisheries and Lake Macquarie City Council.
- a summary of the annual seagrass survey will be included in the Annual Review;
- responding to any potential or actual non-compliances and reporting as required to regulatory bodies and other stakeholders; and
- all complaints will be recorded in the complaints register with actions taken also noted.

The detailed methods used to conduct the surveys to determine subsidence of the lake bed and the photographic surveys of seagrass distribution, density and conditions are described below. The same or similar methods should be used in future seagrass surveys to ensure consistency of results.

5.1 Seagrass Photography

A video camera fitted with a wide conversion lens and enclosed in an underwater housing is used to capture the video footage.

The camera in the underwater housing is mounted vertically in the centre of a 1 m long surfboard. This rig is towed alongside a workboat. Experimentation revealed that the best photographic results are obtained when the boat and photographic rig were poled very slowly along the transect line on windless days. Good quality photographs were obtained both in boat shadow and full sunlight although half shadow sequences could still be evaluated satisfactorily.

The water depth along most of the transect lines ranges from around 0.5 to 2 m (depending on the lake level). At the end of the transect line the water depth could be around 2 m. Transect lines are photographed from the outer end to the inner end. The beginning of each transect is marked by photographing a plate with the transect number printed in large type.

At the end of the each day's photography, the hard drive of the video camera is downloaded, the film is paused at around 1m intervals along the transect line. Each still frame is examined and the following information is recorded on a data sheet:

- 1. The file name and number of the video segment being examined;
- 2. The transect number and date the video was taken:
- 3. The percentage areas occupied by the following organisms in each still or quadrat was determined:

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- (a) % area occupied by long leaved seagrass (Zostera capricorni);
- (b) % area occupied by short leaved seagrass (Zostera capricorni);
- (c) % area occupied by the small seagrass (Halophila ovalis);
- (d) degree of fouling of the seagrass leaves by algae 1=no fouling, 2=light fouling, 3=heavy fouling;
- (e) % area occupied by the large brown alga (Sargassum sp., Hormosira banksii or Cystoseira trinodis);
- (f) % area occupied by filamentous and thallous algae (green or brown algae);
- (g) Number of the large bivalve *Pinna bicolor*;
- (h) % area of uncolonised (by macroscopic epibenthos) ground (bare ground).

At the end of the analysis of the photographs, the results are entered into a work sheet and mean values for each category of organism are calculated.

5.2 Surveying Methods

Surveyors have established base stations with their differential GPS equipment along the shore of Chain Valley Bay. A carbon fibre staff fitted with a 110mm diameter aluminium base plate (to prevent penetration into the sediment) is used to take the readings. Survey data (x, y & z coordinates) are recorded on a separate hand piece. Communication between the GPS receiver, the base stations and the hand piece is by coded radio signals.

The boat is maneuvered into position at the inshore end of each transect. The staff is placed on the lakebed and held vertically until the observation is made and recorded. The boat is then moved outwards from the shore where intermediate points along the transect were established and recorded. When the outer end of the transect is reached, the staff is placed alongside the concrete marker and the position and height of the lake bed was recorded.

The GPS datum is downloaded and the following plots made:

- a map of the position of transects in Chain Valley Bay, Summerland Point and Bardens Bay;
- a table of the coordinates of inner and outer ends of each transect and the coordinates of the base stations are made; and
- elevations of the seabed at the inner and outer ends of each transect, relative to AHD, are established and tabulated.

The results from the seagrass monitoring, including determination of compliance with seagrass impact thresholds, is undertaken and reported back to DC in a formal report to be provided following the completion of each annual seagrass survey.

5.3 Monitoring Locations

Monitoring locations have been chosen based on the proposed mining activities that will be covered by the Seagrass Management Plan, over time, as this management plan is updated to reflect future mining locations, it is anticipated that additional monitoring transects will be incorporated and others removed from the monitoring regime as time progresses. More specifically, the monitoring locations proposed to be monitored are those that are adjacent to past, current and proposed mining activities that are within the review period of this management plan.

The monitoring locations are substantially derived from the original experimental and control transects selected by Laxton Environmental Consultants and JSA Environmental Pty Ltd who completed the Marine Ecology assessment that supported the Environmental Assessment for the Mining Extension 1 Project. An additional 15 transects were added to the seagrass monitoring program as part of the latest revision to this plan to obtain

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baseline information within the areas of Frying Pan Bay, Sugar Bay and the Northern side of Point Wolstoncroft. Two additional Control Points (C5 and C6) were also added to the monitoring program in 2018.

The current monitoring locations are:

 Transects E1 to E16 	Transects primarily in Chain	Valley Bay and adjacent	t Summerland Point;
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• Transects T1 to T8 Transects adjacent Summerland Point;

• Transects C1 to C6 Control stations in Crangan Bay and Frying Pan Bay;

• Transects A1 to A6 Transects primarily in Bardens Bay;

Transect L1 Transect above potential future first workings in Chain Valley Bay;

• Transects S1 to S6 Transect adjacent Sugar Bay;

• Transects F1 to F7 Transects adjacent Frying Pan Bay and along Point Wolstoncroft.

Table 3 shows the GPS locations of the inner ends of the seagrass monitoring transects. Where available, reduced levels of the lakebed measured historically are presented. For sites that have not yet been surveyed by differential GPS, baseline depth levels will be obtained prior to any secondary extraction undertaken in the vicinity of the site. Transects in Crangan Bay were for control purposes only, i.e. no mining or subsidence impact potential, and accordingly no differential GPS depths/locations are required. Relocation of the control stations is done with hand-held GPS.



Figure 5: Locations of Seagrass Monitoring Transects

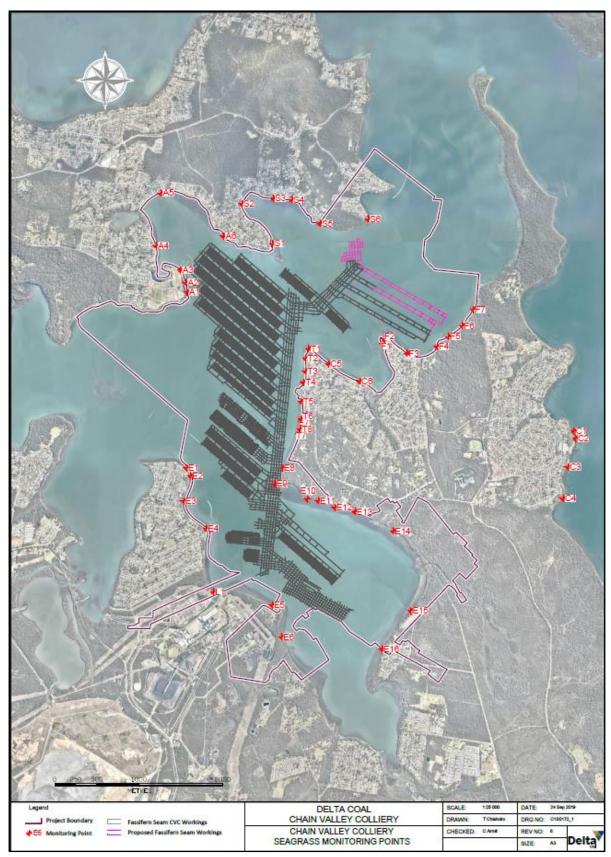




Table 3: Seagrass Monitoring Transect Coordinates

Site	Easting	Northing	Reduced Level (m) – inner transect	Reduced Level (m) – outer transect
E1	363986	6331797	-0.68	-1.00
E2	364035	6331701	-0.64	-1.78
E3	363953	6331405	-0.32	-2.34
E4	364220	6331078	-0.46	-1.69
E5	365006	6330164	-0.46	-1.68
E6	365118	6329788	-0.48	-1.21
E7	365351	6332350	-0.24	-1.68
E8	365128	6331796	-0.27	-0.99
E9	365040	6331608	-0.19	-1.07
E10	365423	6331427	-0.41	-1.74
E11	365554	6331410	-0.40	-1.09
E12	365750	6331329	-0.59	-1.50
E13	365991	6331278	-0.59	-1.44
E14	366447	6331047	-0.52	-1.34
E15	366657	6330098	-0.39	-1.22
E16	366310	6329644	-0.55	-1.08
T1	365440	6333217	-0.40	-1.15
T2	365403	6333101	-0.70	-1.31
T3	365400	6332952	-0.29	-1.01
T4	365377	6332817	-0.46	-1.12
T5	365350	6332590	-0.42	-1.38
T6	365348	6332380	-0.47	-1.61
T7	365321	6332207	-0.47	-1.64
T8	365337	6332262	-0.17	-1.14
C1	368596	6332235	N/A	N/A
C2	368619	6332147	N/A	N/A N/A
C3	368524	6331811	N/A	N/A N/A
C4	368467	6331435	N/A N/A	N/A N/A
C5	365676		N/A N/A	N/A N/A
C6	366045	6333038	N/A N/A	N/A N/A
		6332831	-0.51	-1.19
A1	363991	6333894		
A2	363974	6334009	-0.39	-0.81
A3 A4	363912	6334156	-0.33	-1.44
	363621	6334445	-0.16	-0.72
A5	363678	6335072	-0.30	-0.96
A6	364423	6334560	-0.14	-0.68
L1	364306	6330322	-1.12	-1.63
S1	365009	6334470	-0.64	-1.78
S2	364642	6334943	-0.28	-1.59
S3	365017	6335008	-0.11	-1.87
S4	365235	6334992	-0.11	-1.73
S5	365575	6334709	-0.69	-1.39
S6	366144	6334765	-0.1	-0.92
F1	366321	6333281	-0.25	-1.31
F2	366342	6333330	-0.24	-1.98
F3	366611	6333163	-0.11	-1.88
F4	366968	6333242	-0.11	-2.45
F5	367106	6333361	-0.33	-2.46
F6	367271	6333493	-0.3	-2.81
F7	367402	6333682	-0.48	-1.4

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6 Reporting

6.1 Regular reporting

In accordance with Schedule 6, Condition 13 of SSD-5465 (Mod-3) DC shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of the development consent.

The seagrass monitoring results will be reviewed on an annual basis as survey reports are received to confirm compliance with the conditions specified in the *Subsidence Impact Performance Measures - Natural and Heritage Features* found in **Table 2** and the criteria outlined in **Section 4.2**.

6.2 Annual review

In accordance with Schedule 6, Condition 4 of SSD-5465 (Mod-3), the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary, by the end of March each year, or other timing as may be agreed by the Secretary.

The Annual Review will be forwarded to the relevant authorities including the DPIE, the EPA, members of the Community Consultative Committee and local Councils (Wyong and Lake Macquarie) and will also be placed on the MC website along with a summary of environmental monitoring results.

6.3 Incident or Non-Compliance Reporting

If seagrass monitoring reveals that, as a result of mining activities, the criterion outlined in **Section 4.2** have been exceeded, then DC will conduct an investigation into the cause of the non-compliance. As detailed in Schedule 6, Condition 7 of SSD-5465 (Mod-3), relevant agencies will be notified by phone or email at the earliest opportunity of an incident that causes or threatens to cause material harm to the environment. For all other incidents, relevant agencies will be notified by phone or email as soon as practicable.

The investigation into the incident will consider any activities, plant operations or other factors that may have caused or contributed substantially to the non-compliance. The written report will be provided to any affected landowner and/or existing tenants, including tenants of mine owned properties, to the DPIE, EPA and any other relevant stakeholders within 7 days of the date of the incident or being made aware of the incident (such as receiving monitoring data).

The report will:

- describe the date, time and nature of the observation;
- identify the cause (or likely cause) of the damage;
- · describe what action has been taken to date; and
- describe the proposed measures to address the impacts and prevent further such occurrences.

DC will implement the recommendations of the investigation in order to address any potential future incidents. Additional details of the incident reporting process are provided in the Environmental Management Strategy (EMS).

Any incidents or complaints will be recorded and fully investigated to find root causes and corrective actions implemented where necessary

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7 Stakeholder Management, Response and Training

7.1 Complaint Protocol

DC has a 24-hour telephone hotline (1800 115 277) through which members of the public can lodge complaints, concerns, or to raise issues associated with the operation. This service aims to promptly and effectively address community concerns and environmental matters. All complaints are recorded and responded to. The information recorded in the complaint register includes:

- date and time the complaint was lodged;
- personal details provided by the complainant;
- nature of the complaint;
- action taken or if no action was taken, the reason why; and
- follow up contact with the complainant.

7.2 Independent Review

As detailed in Condition 2, Schedule 5 of SSD-5465 (Mod-3), an Independent Review can be requested by a landowner who "considers the development to be exceeding the relevant criteria in Schedule 3".

If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Applicant shall:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
- consult with the landowner to determine his/her concerns;
- conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 4; and
- if the development is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria.
- (b) give the Secretary and landowner a copy of the independent review.

7.3 Dispute Resolution

If any disputes are not adequately addressed by the complaints handling process then they will be handled by the Environmental Compliance Coordinator. If the response of CVC is not considered to satisfactorily address the concern of the complainant, a meeting may be convened with the complainant, Mine Manager together with the Environmental Compliance Coordinator to determine any further options to reduce potential impacts.

Any actions agreed from the meeting will be implemented by CVC. After implementation of the proposed actions the complainant will be contacted and advice sought as to the satisfaction or otherwise with the measures taken.

If no agreed outcome is determined or the complainant is still not satisfied by the action taken, then an Independent Review may be requested by the complainant. If determined to be warranted by the Secretary, an independent review will be undertaken in accordance with the process identified in Condition 2 of Schedule 5 of SSD-5465 (Mod-3).

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7.4 Training, Awareness and Competence

Training is an essential component of the implementation phase of this Seagrass Management Plan. Any person or position that has a role or responsibility under this document will be provided with a copy of the document and be advised verbally regarding their requirements by the Environmental Compliance Coordinator.

As the document owner, the Environmental Compliance Coordinator is the contact point for any person that does not understand this document or their specific requirements and will provide guidance and training to any person that requires additional training regarding this management plan.

8 Audit and Review

8.1 Review and improvement

In accordance with Schedule 6, Condition 5 of SSD-5465 (Mod-3), this management plan shall be reviewed, and if necessary revised, within 3 months of the following:

- the submission of an Annual Review;
- the submission of an incident report;
- the submission of an independent environmental audit; and
- following any modification to the project approval.

8.2 Audits

Internal and external audits of this document will be carried out as described below. Internal and external audits shall be objective and if possible be conducted by a person or organisation independent of the document being audited.

Audits shall be carried out by personnel who have the necessary qualifications and experience to make an objective assessment of the issues. The extent of the audit, although pre-determined, may be extended if a potentially serious deviation from this document is detected.

Any audit non-conformances and/or improvement opportunities will have corrective and preventative actions implemented to avoid recurrence, these actions will be loaded into the site Incident Database to ensure the actions are assigned to the relevant people and completed.

External audits will be conducted utilising external specialists and will consider this document and related documents. External auditors shall be determined based on skills and experience and upon what is to be accomplished.

An Independent Environmental Audit (IEA) was undertaken during June 2019. In accordance with SSD-5465 Schedule 6, Condition 9, IEA's will be scheduled for every three years thereafter (unless the Secretary directs otherwise) by an audit team whose appointment has been endorsed by the Secretary.



9 Records and Document Control

9.1 Records

Generally, the Environmental Compliance Coordinator will maintain all Environmental Management System records, which are not of a confidential nature. Records that are maintained include:

- · monitoring data and equipment calibration;
- environmental inspections and auditing results;
- · environmental incident reports;
- · complaint register; and
- licenses and permits.

All records will be stored so that they are legible, readily retrievable and protected against damage, deterioration and loss. Records will be maintained for a minimum of 4 years or as otherwise required under any legislation, licence, lease, permit or approval.

9.2 Document Control

This document and all others associated with the Environmental Management System (EMS) shall be maintained in a document control system which is in compliance with the site Document Control Standard which is available to all site personnel. Any proposed change to this document will be via the Environmental Compliance Coordinator. Details on document revisions are provided in **Table 4**.

Table 4: Document Revision Details

Version	Date	Details of Revision	Company	Reviewed by/ Authorised by
1	16/08/2013	Final	LakeCoal	Chris Ellis
2	09/04/2014	Final	LakeCoal	Chris Ellis
3	4/11/2016	Final	LakeCoal	Wade Covey
5	17/06/2019	Update to Delta Coal format and include proposed S2/S3 secondary workings	Delta Coal	Wade Covey Chris Armit Dave McLean
6	10/03/2020	Update to include proposed S4 secondary workings / 2019 Seagrass report	EMM Consulting	Katie Weekes Chris Armit
7	12/5/2020	Update to include DPIE comments	Delta Coal	Chris Armit

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Version	Date	Details of Revision	Company	Reviewed by/ Authorised by
8	10/07/2020	Update following S4 extraction and CVC Mod 3 approval.	Delta Coal	Lachlan McWha

Roles and Responsibilities

Roles and responsibilities specific to completing the requirements of the Seagrass Management Plan are identified in **Table 5**.

Table 5: Seagrass Management Roles and Responsibilities

Role	Responsibilities
Mine Manager	 Ensure that adequate financial and personnel resources are made available for the implementation of the Seagrass Management Plan. Ensure mine layout and workings are as approved, taking into consideration the seagrass barriers
Environment Compliance Officer	 Co-ordinate seagrass monitoring, through the use of differential GPS surveying and photographic monitoring of seagrass beds. Develop management actions in consultation with regulatory agencies as/if required from the monitoring results. Review seagrass monitoring results on an annual basis. Send Annual Seagrass Monitoring reports to DPI Fisheries, DPIE-BCD and DPIE-Compliance Compile the Annual Review (including a summary of the annual seagrass survey). Respond to any potential or actual non-compliance and report these as required to regulatory bodies and other stakeholders. Undertake reviews of this document as per Section 9 Undertake or coordinate the required audits of this document, in accordance with Section 9. Notify the DPI Fisheries, Department of Industry – Resources and Energy and Department of Planning and Environment if there are any exceedances in impact thresholds outlined in Section 4.2 Ensure complaint handling and response is undertaken, including determination of sources and potential remedial action to avoid recurrence.
Mine Surveyor	Ensure mine layout and workings are as approved, taking into consideration the seagrass barriers

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11 References & Associated Documents

Documents referenced in the preparation of the Seagrass Management Plan are detailed in Table 6.

Table 6: References and Associated Documents

Reference type	Document
Australian Standards	AS/NZS ISO 14001:2004 Environmental management systems – Requirements with guidance for use
	AS/NZS ISO 14004:2004 Environmental management systems – General guidelines on principles, systems and support techniques
Legislation and regulations	NSW DPI (2007) PrimeFacts 629 - Seagrasses.
	NSW EPA, EPL 1770 Environment Protection License 1770
	SSD-5465 Development Consent SSD-5465 (Modification 2) dated 16 December 2015 for the Mining Extension 1 Project
	POEO Act 1997 Protection of the Environment Operations Act, 1997
Delta Coal documents	EMS Environmental Management Strategy.
External documents	Bell, F.C. and Edwards, A.R. (1980) An Environmental Inventory of Estuaries and Coastal Lagoons in New South Wales. Total Environment Centre.
	BioAnalysis (2008) Assessment of seagrasses associated with proposal to expand the Lake Macquarie yacht club in Belmont Bay.
	EMM (June 2015) Chain Valley Colliery Modification 2 Statement of Environmental Effects, prepared by EMGA Mitchell McLennan (EMM) dated 29 June 2015.
	Laxton, J.H. (2005) Water Quality of Lake Macquarie. J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished Report.
	Laxton, E. and Laxton, J.H. (August 2007) Aquatic Biology of Chain Valley Bay Lake Macquarie, NSW. J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery
	Laxton, J.H. and Laxton, E. (July 2008) Seagrass Survey of Chain Valley Bay Lake Macquarie, NSW. J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.
	Laxton, J.H. and Laxton, E. (2009). Peabody Energy – Chain Valley Colliery. Aquatic Biology of Domain No. 2 off Summerland Point, Lake Macquarie, NSW. Emma and John H. Laxton. July 2009
	Laxton, J.H. and Laxton, E. (2011). Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW (Results from 2008, 2010 and 2011) J.H. & E.S. Laxton – Environmental Consultants

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P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E. (2012). Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW (Results from 2008, 2010, 2011 and 2012) J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E. (2013). Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW. (Results for 2008, 2010, 2011, 2012 and 2013). J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E.S. (2014) Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2014). J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E.S. (2015) Seagrass Survey of Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2015). J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E.S. (2016) Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2016). J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.

Laxton, J.H. and Laxton, E.S. (2017) Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2017). J.H. & E.S. Laxton – Environmental Consultants P/L. Unpublished report prepared for Chain Valley Colliery.



12 Definitions

CVC Delta Coal - Chain Valley Colliery

DC Delta Coal

DP&E Department of Planning & Environment (former)

DPIE Department of Planning, Industry and Environment

DPI Fisheries Department of Primary Industries NSW Department of Primary Industries – Fisheries

EMS Environmental Management System

EPA NSW Environment Protection Authority

EPL Environment Protection License

EP&A Act Environmental Planning and Assessment Act 1979

HWM High Water Mark

LMCC Lake Macquarie City Council

POEO Act Protection of the Environment Operations Act 1997

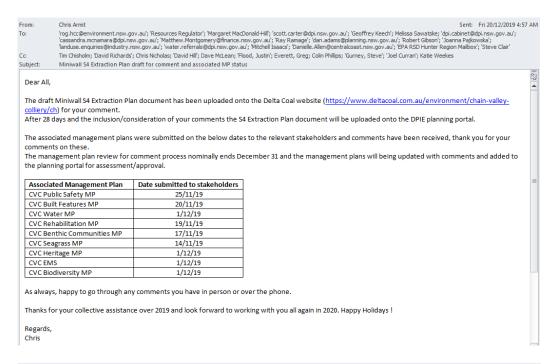
OEH Office of Environment and Heritage

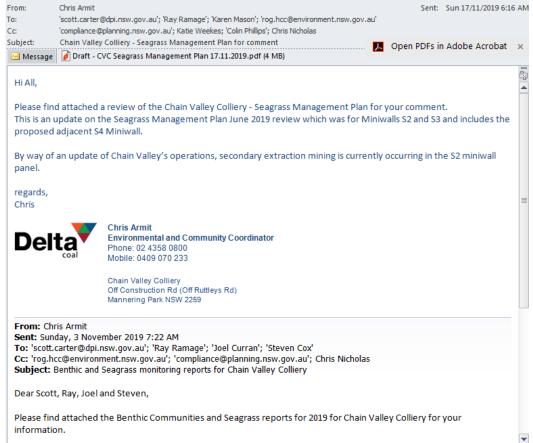
Secretary Secretary of the Department of Planning, Industry and Environment, or nominee

SSD-5465 Development Consent SSD-5465 (for the Chain Valley Colliery Mining Extension 1 Project)



Appendix 1: Consultation





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From: Geoffrey Keech [mailto:gkeech@lakemac.nsw.gov.au]
Sent: Thursday, 12 December 2019 3:41 PM
To: Chris Armit
Cc: Melissa Sawatske

Subject: LMCC response to Delta Coal Mannering Colliery and Chain Valley Colliery management plans consultation

 $Thankyou\ for\ providing\ Council\ the\ opportunity\ to\ comment\ on\ your\ management\ plans.\ I\ provide\ the\ following\ feedback:$

Plan	LMCC Comments
CVC Rehabilitation Management Plan	Any infrastructure (slabs, pits, pipes, etc.) that is
	to be abandoned and covered over should be
	mapped and this map made available to any
	future user or purchaser of the site.
	Spelling mistake "mircobat"
CVC Benthic Communities Management Plan	No comments
CVC Seagrass Management Plan	Page 25, Table 5 – Environment and Community
	Coordinator ' Send annual Seagrass Monitoring
	Reports to DPI Fisheries and' there is
	information missing here with respect to who
	the reports would be sent to.
CVC Built Features Management Plan	No comments – no identified built features fall
	within the LMCC boundary or jurisdiction.
	Central Coast Council should provide comment
	for the dwellings at Summerland Point.

 $For future iterations of these plans, could you please send the plans to \underline{Council@lakemac.nsw.gov.au} \ addressed to "Development Assessment and Certification officer."$ The plans will be allocated to a DAC officer to coordinate comments from the relevant sections of Council.

It would help us if you can include a note about the purpose of the consultation (as per the "Audit and Review" section of the management plans),

and ideally send a copy that has been marked up with the changes that have occurred, as this allows us to focus quickly on the relevant changes.

Geoffrey Keech Development Planner



T 02 4921 0025 M 0429 124 904 E gkeech@lakemac.nsw.gov.au lakemac.com.au





Date: 05/05/2020 From Colin Phillips To: Chris Armit

The Department's review of the Extraction Plan for Chain Valley Colliery Miniwall S4 has identified several areas requiring clarification or correction. I would be grateful if you would attend to the identified matters, revise the Extraction Plan and re-submit it to the Department via the Planning Portal.

The attachement conatins the Department's review.

The most important matter is reproduced below:

Appendix 13 Subsidence Report. Section 6.3 states that the High Water Mark is defined by the 2.44 m AHD land contour. This is incorrect. The High Water Mark is on the Lake shore, not 9 feet higher.

This misinterpretation flows through to Figure 21 where it is shown with the lakeside boundary of the HWMSB as expressed in the seam being the intersection of a line drawn at 35 degrees from the 2.44 m AHD contour to the Fassifern seam. This line needs to be drawn from the lake shore to the seam.

This then brings into play the question of whether the calculation of the lake side HWMSB edge has been correctly calculated. On the methodologoly presented in th Appendix 13, the calculations are most likely incorrect and will have implications as the boundary of second workings in the vicinity of the proposed starting position of Miniwall S4.

Please investigate this matter and revise these aspects of the Miniwall S4 Extraction Plan before resubmitting to the Department for consideration

DPIE Resource Assessments - Seagrass Management plan related comments	Response
7. Appendices 6 and 7 - Benthic Communities MP and Seagrass MP (Section 3.4) contains several references of subsidence of up to 1230 mm (or 1.23 m) in areas of the mine where former mine workings exist in seams overlying the Fassifern Seam. These references must be removed.	References removed
8. Appendix 7 Seagrass MP - Section 3.4 states that the Seagrass Protection Barrier is further described in Section 3.1. This is not so. Maybe this description is located in Section 4.1 or 4.2??	Reference in section 3.1 updated



Appendix 2: Development consent summary

Chain Valley Colliery SSD-5465 Summary

Relevant sections of SSD-5465 detail the requirements of the SMP and are reproduced in **Table A2** below along with identification of where the requirements are addressed in this document.

Table A2: Requirements from Chain Valley Colliery Development Consent (SSD-5465)

Condition No.	Requirements		Relevant section of this document	
Schedule 4	Environmental Conditions – Un	derground Mining		
2	Performance Measures- Natural Environment			
	The Applicant shall ensure that the develo performance measures in Table 8 to the s	ppment does not cause any exceedance of the atisfaction of the Secretary.		
	Table 8: Subsidence Impact Performance	Measures		
	Biodiversity			
	Threatened species or endangered populations Negligible environmental consequences			
	Seagrass beds	Negligible environmental consequences including:		
		 Negligible change in the size and distribution of seagrass beds; Negligible change in the functioning of seagrass beds; and Negligible change to the composition or distribution of seagrass species within seagrass beds. 		
	Benthic communities	Minor environmental consequences, including minor changes to species composition and/or distribution		
	Mine workings			
	First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible environmental consequences	To remain long-term stable and non-subsiding.		
	Second workings To be carried out only in accordance with an approve Extraction Plan.			
	Notes:	1		

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8	The Applicant shall ensure that the management plans required under conditions 7(g)-(j) above include: (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this consent; and (b) a detailed description of the measures that would be implemented to remediate predicted impacts	Section 4 and 6
	 To identify the underground mining areas approved under this consent referred to in this condition, see Appendix 3. This condition does not limit secondary extraction under a Subsidence Management Plan approved as at the date of this consent. 	
	Notes:	
	The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	
	updating the model every 2 years using the most recent monitoring and survey data.	
	development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities' composition, incorporating the monitoring and survey data collected; and	
	a program of ongoing seasonal monitoring of benthic species in both control and impact sites;	
	• benthic species surveys within the area subject to second workings, as well as control sites outside the area subject to second workings (at similar depths) to establish baseline data on species number and composition within the communities;	
	surveys of the lakebed to enable contours to be produced and changes in depth following subsidence to be accurately measured;	
	(h) include a Benthic Communities Management Plan, which has been prepared in consultation with OEH, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on benthic communities, and which includes:	document
7	Extraction Plan	This document
	environmental consequence.	
	If the Applicant exceeds the performance measures in Table 8 and the Secretary determines that: (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or (b) the remediation measures implemented by the Applicant have failed to satisfactorily remediate the impact or environmental consequence; then the Applicant shall provide a suitable offset to compensate for the impact or environmental consequence to the satisfaction of the Secretary. Note: Any offset required under this condition must be proportionate with the significance of the impact or	
3	Offsets	Section 4
	The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of approval of this consent	
	 The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this consent (see Condition 7 below). Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter. 	

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Appendix 3: Plan Approval



Mr Chris Armit Approvals Coordinator Chain Valley Colliery Delta Coal Pty Limited Off Construction Road (Off Rutleys Road) Mannering Park, NSW, 2259

22/06/2020

Dear Mr Armit,

Chain Valley Colliery (SSD 5465) Miniwall S4 Extraction Plan

I refer to the Miniwall S4 Extraction Plan which was submitted on 11 March 2020 in accordance with Condition 7 of Schedule 4 of the consent for Chain Valley Colliery (SSD 5465).

The Department has carefully reviewed the document and is satisfied that it has addressed the issues identified in the Department's review of 05 May 2020 and now satisfies the requirements of the conditions of consent for Extraction Plans (see Attachment A).

Accordingly, the Planning Secretary has approved the Miniwall S4 Extraction Plan (Revision 1, dated 12 May 2020). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Colin Phillips on 92746483.

Yours sincerely

Matthew Sprott Director

Resource Assessments (Coal & Quarries) as nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta 2150 | dpie.nsw.gov.au | 1



ATTACHMENT A

Consideration of Approval of Miniwall S4 Extraction Plan

- 1. As required by condition 7 of Schedule 4 of the consent for Chain Valley Colliery (SSD 5465), the Extraction Plan for proposed Miniwall S4 consists of an overarching document that describes the proposed mining operations and a series of specialist management plans (MPs) including a:
 - Public Safety MP;
 - Built Features MP:
 - Groundwater MP;
 - Rehabilitation MP;
 - Benthic Communities MP;
 - Seagrass MP;
 - Subsidence Monitoring MP;
 - Subsidence Prediction Report; and
 - Subsidence Management Trigger Action Response Plan (TARP).
- 2. Many of these MPs are little changed from when they were reviewed in July 2019 as part of the Extraction Plan approval process for Miniwalls S2 and S3.
- 3. In December 2019, Delta Coal forwarded its draft Extraction Plan to 10 government agencies, two Councils and members of its Community Consultative Committee, inviting comment on the Plan. It received four responses.
- 4. BCD indicated it had no comment and Transport for NSW indicated its satisfaction with the safety of the Pelican Rock Navigational Marker.
- 5. Lake Macquarie City Council provided minor comments on three of the MPs, which were incorporated by Delta Coal into revised versions of these MPs.
- The Resource Regulator indicated it was satisfied with the resource recovery that was proposed and that a revision of the rehabilitation bond would be triggered by this Extraction Plan.
- 7. Proposed Miniwall S4 at Chain Valley Colliery (CVC) represents a minor increment in coal extraction at CVC. The proposed miniwall would recover approximately 590,000 tonnes of coal and take about five months to be mined.
- 8. Miniwall S4 would be a continuation of mining beneath Lake Macquarie. It would be located adjacent to, and to the north of Miniwalls S2 and S3.
- 9. Long-term vertical subsidence is predicted to be 300 mm, compared to the approved limit for subsidence of 780 mm beneath the waters of Lake Macquarie.
- 10. Monitoring to date, has demonstrated that similar predictions of the magnitude of subsidence for Miniwall S2 have been accurate and not been exceeded.
- 11. Miniwall S4 would be located so that no more than 20 mm of vertical subsidence would occur in either the:
 - High Water Mark Subsidence Protection Barrier (HWMSB); or
 - Seagrass Protection Barrier (SPB).

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- 12. The parameters of the HWMSB were established in the 1990s, in response to unplanned subsidence of the Lake Macquarie foreshore. A zone was established in which underground mining operations must be designed so that no more than 20 mm of vertical subsidence (the practical limit for measurement of subsidence) would occur between the High Water Mark and the 2.44 m AHD land contour. A line is projected from the High Water Mark at angle of 35 degrees to the vertical. Where this line intersects with the coal seam marks the lakeside edge of the HWMSB, in which secondary extraction, such as miniwall mining, is not permitted.
- 13. The SPB is similar to the HWMSB, only that its purpose is to protect seagrass beds that fringe the foreshore and extend to a depth of two metres within the lake. The line from the lakeside edge of the SPB is projected at an angle of 26.5 degrees to its intersection with the target coal seam. No secondary coal extraction, such as miniwall mining, is permitted within this zone. The figure below shows that the 20 mm subsidence contour (in red) skirts the seagrass beds.

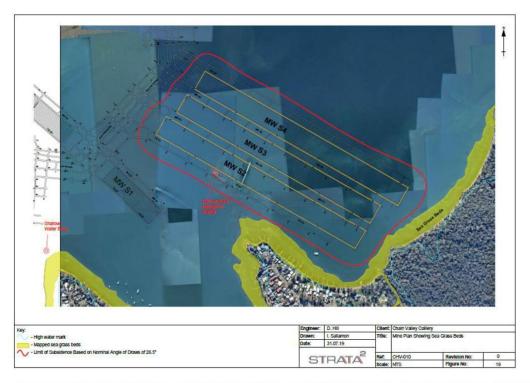


Figure 5: S2, S3 and S4 Miniwall (MWS2, MWS3 and MWS4) Surface Features (Strata2, 2019)

14. At CVC, for the assessment of the Extraction Plan for Miniwall S4, the SPB lies completely within the HWMSB. That is, if the HWMSB is protected from secondary extraction, the SPB is also protected.

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- 15. Delta Coal has provided a mine plan for Miniwall S4 based on the avoidance of secondary extraction with in both the HWMSB and the SPB. Therefore, the proposed mining layout would comply with the requirements for the protection of these sensitive features.
- 16. Miniwall S4 is planned to be extracted from the Fassifern Seam which is overlain by the Great Northern and Wallarah Seams.
- 17. One of the potential risks faced by mining in the CVC is that of reactivation of mine subsidence in areas where coal has previously been extracted from overlying coal seams. In such circumstances, a potential risk is that large-scale subsidence events could occur that could impact areas such as the lake foreshore.
- 18. This risk was recognised at the time of the grant of consent for the current operations at CVC. Conditions of consent require that secondary extraction of coal from beneath Chain Valley Bay is not to be considered unless a Multi-Seam Mining Feasibility Investigation report has been prepared to the satisfaction of the Planning Secretary.
- 19. Proposed Miniwall S4 is not located beneath Chain Valley Bay.
- 20. The seams overlying Miniwall S4 have not been mined.
- 21. The nearest existing mine workings are in the uppermost Wallarah Seam, 85 m above and 210 m to the south of proposed Miniwall S4. There are no predicted interactions with these existing mine workings.
- 22. The proposed Miniwall S4 would be located 165 to 175 m below the solid bed of Lake Macquarie and there is no prediction of connective cracking.
- 23. The only built feature predicted to be impacted by Miniwall S4 is the Pelican Rock Navigational Marker within Lake Macquarie. It is located adjacent to Miniwall S2 and may only be marginally affected by subsidence from Miniwall S4, if at all. The Navigational Marker was predicted to experience a maximum of 130 mm of subsidence, a level which Transport for NSW - Maritime Division considered would not affect its functionality, nor reduce the safety of boat traffic. This marker has been regularly monitored from prior to the commencement of Miniwall S2 up to the present. Monitoring is planned to continue until after the completion of Miniwall S4.
- 24. The Extraction Plan is supported by a Subsidence Monitoring Plan consisting of land-based surveys of the lake foreshore and regular bathymetric surveys of the lakebed.
- 25. The collected subsidence monitoring data feeds into the Subsidence Monitoring TARP so that if greater than predicted subsidence were to be recorded appropriate actions would be taken.
- 26. The maximum subsidence permitted in the mining area of Miniwall S4 is 780 mm. However, as a maximum of 300 mmm of long-term subsidence is predicted, it is quite unlikely that the TARP would need to be enacted as this miniwall is designed very conservatively to comply with this condition of consent.
- 27. Considering the above matters, it is concluded that the Extraction Plan for Miniwall S4 should be approved.

Delta Coal Mannering & CVC Collieries

Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW



by Dr Emma Laxton

May 2020

J.H. & E.S. Laxton - Environmental Consultants P/L

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Summary

Fourteen stations in Chain Valley Bay, ten off Summerland Point and four in Crangan Bay were surveyed for seagrass cover from 2011 to 2020. In 2014 six stations in Bardens Bay were added to the sampling schedule. By 2018, 50 seagrass transects were being surveyed.

The average length of transects in Chain Valley Bay, Summerland Point and Brightwaters was 56.9m, 59.9m and 55.1m respectively. The average length of transect in Bardens Bay was 26.6m. The transects with the greatest length were Transects E9 (152m), F2 (131m) and S4 (105m). The transects with the shortest lengths were Transects T2, C6 and A6, all approximately 14m in length.

In May 2020 there was only one sea bed elevation that had changed by more than 150mm from the initial sea bed height recorded. This was E16 inner which is close to the shore. Seagrass coverage at this transect was 98.31%.

In May 2020, seagrass cover ranged from 75.9 percent to 100 percent. The health and condition of the seagrasses were good, with most seagrasses either lightly fouled with epiphytic algae or were clear of epiphytic algae. Only twelve out of the fifty transects had quadrats with seagrass fouled by a moderate amount of algae.

The brown seaweed *Cystophyllum onustum* was observed at Transects E11, E14, T6, C1, C3, and C5.

Since 2008, seagrass coverage has been increasing throughout the study area, and percentage cover has been consistent since 2012. At transects where the percentage area of substratum covered was relatively low, such as Transects E6 (17.74%), T3 (46.20%) and T6 (53.82%), seagrass coverage has increased by about 80%, 49% and 25% respectively.

The growth form of *Zostera capricorni* in the Summerland Point, Frying Pan Bay and Sugar Bay region and the Crangan Bay region is predominantly short leaved. The growth form of *Z. capricorni* in Chain Valley Bay and Bardens Bay is long leaved.

The increase in percent cover of seagrasses marks the decrease in bare ground in the study area:

- from 38.13 percent in 2011 to 6.64 percent in 2020 in the Summerland Point, Frying Pan Bay and Sugar Bay region;
- from 13.32 percent to 0.92 percent in the Chain Valley Bay region; and
- a decrease of bare ground in the Crangan Bay region from 26.98 percent to 4.01 percent.
- Seagrass cover in Bardens Bay has mostly been around 95 percent.

During this survey no significant subsidence was detected along the seagrass permanent transects. There was also no reductions in seagrass cover.

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1. Introduction

Lake Macquarie is the largest saline lake in New South Wales. It lies on the central coast between Sydney and Newcastle within the local government areas of Wyong Shire and Lake Macquarie City. Lake Macquarie has a catchment of 700 square kilometers and a water surface area of 125 square kilometers (Bell & Edwards, 1980). The lake has a permanent entrance to coastal waters at Swansea and has an average depth of around 6 meters (Laxton, 2005).

The catchment of Lake Macquarie is largely rural with large areas of bushland and grazing land. The shoreline of Lake Macquarie is heavily urbanized, especially the eastern, western and northern shorelines. The region has a relatively long history of coal mining and power generation, with mining occurring since the late 1800s and the first power station at Lake Macquarie commencing operations in 1958.

Chain Valley Colliery is situated on the southern shores of Lake Macquarie near Mannering Park, NSW. The mine has been operating since 1963. Mining is continuing within the Chain Valley Coal Lease Area using the miniwall method. Prior to mining, there were three economically viable seams in the lease area, namely the Wallarah seam (mined completely of coal by 1997); the Great Northern seam, and the Fassifern seam. In 2018 Chain Valley Colliery went into voluntary receivership and was taken over by Delta Coal to provide coal for Vales Point Power Station.

Chain Valley Colliery is mining the Fassifern Seam beneath Lake Macquarie. As part of the protection of the lake foreshore, the mining leases require a protection zone. This zone, known as the High Water Mark (HWM) Subsidence Barrier, was calculated using a 35° angle of draw from the depth of mining. The zone is approximately 130 meters wide. J.H. & E.S. Laxton – Environmental Consultants P/L were engaged by Mr. Keith Harris of Chain Valley Colliery in 2007 to assess the potential effects of pillar extraction mining beneath Lake Macquarie on seagrasses, benthic fauna and bathymetry. The work in 2012-15 was supervised by Mr Chris Ellis of LDO Group. In 2016/18, the ecological studies were supervised by Mr Wade Covey. Mr Chris Armit supervised the studies in 2019 and 2020.

2. Previous surveys

J.H. & E.S. Laxton – Environmental Consultants P/L was engaged in 2007 to provide the following:

- a bathymetric survey of the study area;
- a soft bottom benthic survey of the study area; and
- a seagrass survey of the western and eastern shorelines in the area proposed for underground mining.

The bathymetric and benthic surveys were conducted on 30th and 31st July 2007 by Dr John H. Laxton and Dr Emma Laxton of J.H. & E.S. Laxton – Environmental Consultants P/L and Mr Robert Payne of Ecological Surveys & Management, and the seagrass survey was conducted by John Laxton and Emma Laxton on 27th August 2007. A report entitled:

Peabody/Lake Coal. Chain Valley Colliery. *Aquatic Biology of Chain Valley Bay Lake Macquarie, NSW* by Emma Laxton and John H. Laxton. August 2007 was prepared.

This report drew attention to the following:

- There was only one species of seagrass present in the lease area of Chain Valley Bay in 2007. It was *Zostera capricorni*. (Later surveys in 2010, 2013, 2014, 2015, 2017 and 2020 found the small seagrass *Halophila ovalis* also in the study area.)
- There could be changes to the distribution and density of seagrass beds in Chain Valley Bay that were unrelated to underground coal mining,
- It was recommended that an annual survey of seagrass beds in Chain Valley Bay be carried out over the life of the current proposal to mine the Fassifern seam.
- A pre-mining survey carried out in June/July 2008 would establish baseline conditions of seagrass beds in Chain Valley Bay.

NSW Department of Industry and Investment and Fisheries Divisions both accepted this recommendation.

A meeting was held on 17th April 2008 attended by Mine Environment Manager Mr Shaun McDonell (Contact: 02 43580880), Mr Owen Farrugia (the previous Manager of Mining Engineering Chain Valley Colliery), Mr James Sakker of NSW Department of Primary Industries, Fisheries Division (contact: 02 49163955) and Drs John and Emma Laxton of J.H. & E.S. Laxton – Environmental Consultants P/L (contact: 0429 855891).

At this meeting, and at subsequent discussions between NSW Government Departments and the mine management, the following programme was agreed upon:

- Ten experimental transects through the seagrass beds were to be established in the area to be mined in Chain Valley Bay. Four control transects were to be established in Crangan Bay, Lake Macquarie.
- The outer ends of the transects were to be marked by cast concrete blocks fitted with subsurface buoys.
- Differential GPS survey methods were to be used to establish the precise location and height of the lake bed at the inner and outer ends of each transect in Chain Valley Bay. This procedure was used to establish the baseline to detect any subsidence of the lake bed due to underground mining.
- Seagrass distribution, density and condition along each transect was to be recorded using a video camera enclosed within a waterproof housing and mounted on a floating platform.

The work was supervised by Mr Keith Harris of Lake Coal. A report entitled:

Chain Valley Colliery. Seagrass survey of Chain Valley Bay, Lake Macquarie, NSW by Dr John H. Laxton and Dr Emma Laxton. July 2008. was produced.

In 2009, a further survey of the Lake along Summerland Point (Domain No. 2) was carried out. The following aspects were investigated:

• a bathymetric survey of the study area was undertaken,

- a soft bottom benthic survey of the study area was carried out,
- a survey to determine the maximum seaward extent of the seagrass beds and the maximum depth at which they occurred was undertaken,
- a photographic seagrass survey of the shoreline of Summerland Point in the area proposed for underground mining was carried out (the original ten experimental stations and four control stations). Also eight new permanent transects (T1 to T8) were established and surveyed using the underwater video camera.

A report entitled: Peabody Energy – Chain Valley Colliery. *Aquatic Biology of Domain No. 2 off Summerland Point, Lake Macquarie, NSW.* Emma and John H. Laxton. July 2009 was prepared.

In June 2010 a video photographic resurvey of all 22 permanent seagrass transects was carried out, including a survey, using differential GPS, to determine the elevation and location of the inner and outer ends of each transect (by Pearson & Associates Pty. Ltd.).

In June 2011 a further photographic resurvey of the 22 permanent seagrass transects was carried out, including determination of the elevation of the inner and outer ends of each transect using differential GPS (Pearson and Associates Pty. Ltd). A further 6 transects through the seagrass beds were added to the schedule. These new transects were located along the eastern shoreline of Chain Valley Bay (**Figure 4.1**).

In June 2012 and June 2013, 28 transects were resurveyed using the underwater video camera mounted on the floating platform. The lake bed heights of the inner and outer ends of each transect (excluding the control transects in Crangan Bay) were measured by Pearson and Associates Pty. Ltd.

LDO Lake Coal has new plans to mine coal beneath Bardens Bay. Mr Chris Ellis required the 2014 seagrass survey to be brought forward to April so that baseline data on seagrasses and lake bed levels in Bardens Bay were available before mining commenced. Six new seagrass transects were established in Bardens Bay (A1 to A6 - **Figure 4.2**). Documents were required for submission by 23rd June 2014.

Bardens Bay around Trinity Point on the southern side is quite deep and seagrasses occupy only a narrow band along the shoreline. At the tip of Trinity Point rocks outcrop at the shoreline leaving no room for seagrasses.

In 2015, the seagrass survey was conducted between 24th and 26th May 2015. We were instructed not to resurvey Transects E10 to E16, located in Chain Valley Bay because no mining was to be undertaken in this area in the near future. A new Transect L1 was established and photographed.

The seagrass photographic survey in 2016 was undertaken between 14th and 16th June 2016. Very rough weather with heavy rainfall preceded the survey. Purchase Order 486395.

In 2017 all established seagrass transects (35) were re-photographed between June 20th and 23rd. The weather prior to sampling included a period of heavy rain which caused the water transparency in the lake to deteriorate. Seagrass photography was delayed until the lake water cleared.

In 2018 the seagrass survey was carried out between 18th and 19th May 2018. Fifteen new seagrass transects were added to the sampling schedule in 2018, bringing the total number of transects sampled to 50. The purchase order was 520872.

The 2019 seagrass survey was carried out between June 25th and June 27th. Purchase order No. D100504.

3. Seagrass survey of June 2020

The determination of the elevations of the inner and outer ends of the transects by differential GPS was undertaken on 27 March 2020. This phase of the work was carried out by Mr Robert Lewes of Daly.Smith Pty Ltd (02 4973 2745) of Morisset.

The seagrass survey was conducted between 18th and 20th May 2020. Purchase order No. D110798.

Methods

Surveying Methods

Mr Sean Price of Daly.Smith P/L and staff established base stations for their differential GPS equipment along the shore of Chain Valley Bay. A measured carbon fibre staff fitted with a 110mm diameter aluminium base plate (to prevent penetration into the sediment) was attached to the end of the staff. Survey data (x, y & z coordinates) were recorded on a separate hand piece. Communication between the GPS receiver, the base stations and the hand piece was by coded radio signals.

The boat was maneuvered into position at the inshore end of each transect. The staff was placed on the lake bed and held vertically until the observation was made and recorded. Next, the boat was moved outwards from the shore where intermediate points along the transect were established and recorded. When the outer end of the transect was reached, the staff was placed on the exact coordinates and the position and height of the lake bed was recorded.

The memory of the hand held computer was downloaded and the following plots were made:

- A map of the position of transects in Chain Valley Bay, Summerland Point, Bardens Bay, Sugar Bay and Frying Pan Bay;
- A table of the coordinates of the inner and outer ends of each transect and the coordinates of the base stations was made;
- The elevations of the seabed at the inner and outer ends of each transect, relative to AHD, were established and tabulated

Seagrass photography

A Sony Handycam 6.1 megapixel video camera (DCR-SR300E) with 40 GB hard drive fitted with a wide conversion X0.7 lens (VCL-HG737C) was inserted into an underwater housing. The underwater housing was mounted vertically in the centre of a 1m long surf board. This rig was towed alongside the 5.9m work boat. Best photographic results were obtained when the boat and photographic rig were poled very slowly along the transect line on windless days.

The water depth along most of the transect lines ranged from around 0.5 to 1.2m (depending upon the lake water level). At the end of the transect line the water depth could be around 1.8m. Transect lines were photographed from the outer end to the inner end. The beginning of each transect was marked by photographing a label with the transect number printed in large type.

At the end of the each day's photography, the hard drive of the video camera was downloaded to a desk top computer. The videos were played using Windows Media Player. The film was paused at around 1m intervals along the transect line. Each still frame was examined and the following information was recorded on a data sheet:

- 1. The file name and number of the video segment being examined.
- 2. The transect number and the date the video was taken.
- 3. The percentage areas occupied by the following plants and animals in each still photograph or quadrat:
 - (a) % area occupied by long leaved seagrass Zostera capricorni;
 - (b) % area occupied by short leaved seagrass Zostera capricorni;
 - (c) % area occupied by the small seagrass Halophila ovalis;
 - (d) degree of fouling of the seagrass leaves by algae 1=no fouling, 2=light fouling, 3=heavy fouling;
 - (e) % area occupied by the large brown alga (Sargassum sp., Hormosira banksii or Cystoseira trinodis):
 - (f) % area occupied by filamentous and thallous algae (green or brown algae);
 - (g) Number of the large bivalve *Pinna menkei*;
 - (h) % area of uncolonised ground (bare ground, no macroscopic epibenthos).

Sixty-eight still photographs or quadrats were analyzed along each transect. At the end of the analysis of the photographs, the results were entered into an Excel spreadsheet and mean values for each category of organism were calculated.

4. Locations of permanent seagrass monitoring transects

Figures 4.1, 4.2 and 4.3 shows the area of Chain Valley Bay, Summerland Point, Bardens Bay, Brightwaters and Crangan Bay where the seagrass transects are located. In 2018, 2019 and 2020 a total of 50 transects were photographed:

 Transects E1 to E16 are established experimental transects in Chain Valley Bay and Summerland Point (Figure 4.1).

- Transects T1 to T8 are established experimental transects along Summerland Point (**Figure 4.1**).
- Transects C1 to C4 are established control stations in Crangan Bay (Figure 4.1).
- Transect L1 was established in Chain Valley Bay in 2015 (Figure 4.1).
- Transects A1 to A6 are establised experimental stations in Bardens Bay. They were first surveyed in 2014 (Figure 4.2).
- Transects C5 to C6 were established in 2018 (Figure 4.3).
- Transects F1 to F7 were established in 2018 (Figure 4.3), and
- Transects S1 to S6 were established in 2018 (Figure 4.3).



Figure 4.1 Locations of Transects in Chain Valley Bay, Summerland Point and Crangan Bay, Lake Macquarie.

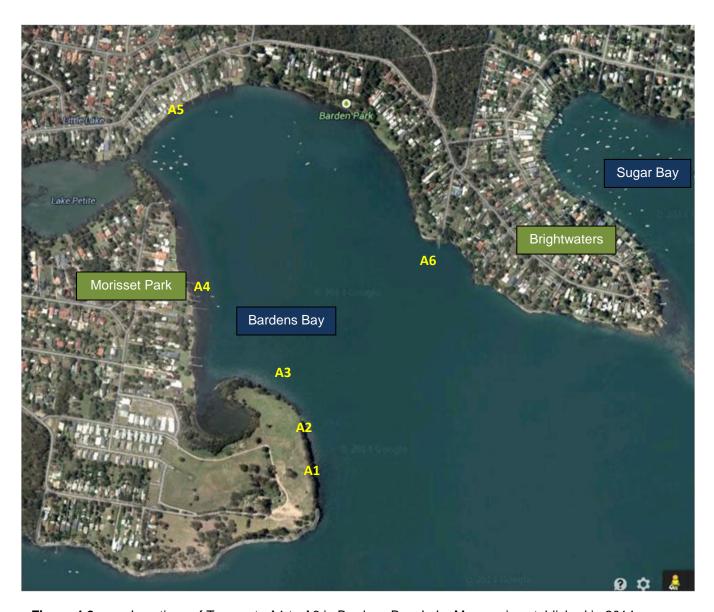


Figure 4.2 Locations of Transects A1 to A6 in Bardens Bay, Lake Macquarie established in 2014.



Figure 4.3 Location of transects C5-C6, F1-F7 and S1-S6 in Lake Macquarie established in 2018.

Tables 4.1 to 4.5 show the precise locations of the inner and outer ends of the permanent seagrass monitoring transects in Chain Valley Bay, Summerland Point, Bardens Bay, Crangan Bay and Brightwaters as determined by differential GPS.

Transects in Crangan Bay were for biological purposes only and did not require precise locations (hand held GPS coordinates were sufficient to re-locate them).

Table 4.1 Coordinates of inner and outer ends of permanent seagrass monitoring transects in Chain Valley Bay

Transect No.	Easting	Northing	Transect No.	Easting	Northing
E1 Inner	56363985.72	6331796.94	E1 Outer	56364003.72	6331816.06
E2 Inner	56364035.49	6331701.00	E2 Outer	56364077.23	6331716.71
E3 Inner	56363953.11	6331405.11	E3 Outer	56364027.16	6331417.57
E4 Inner	56364220.00	6331077.87	E4 Outer	56364259.75	6331121.87
E5 Inner	56365005.84	6330163.57	E5 Outer	56365034.05	6330224.84
E6 Inner	56365118.47	6329788.47	E6 Outer	56365174.78	6329802.22
E7 Inner	56385350.82	6332350.29	E7 Outer	56365298.68	6332344.74
E8 Inner	56365128.03	6331795.60	E8 Outer	56365096.65	6331811.91
E9 Inner	56365040.22	6331607.83	E9 Outer	56364912.70	6331523.88
E10 Inner	56365422.57	6331427.14	E10 Outer	56365395.00	6331361.69
E11 Inner	56365553.95	6331410.18	E11 Outer	56365524.48	6331343.17
E12 Inner	56365750.13	6331328.50	E12 Outer	56365734.72	6331284.93
E13 Inner	56365990.66	6331278.21	E13 Outer	56365970.63	6331190.94
E14 Inner	56366447.40	6331046.59	E14 Outer	56366371.08	6330984.10
E15 Inner	56366657.36	6330098.68	E15 Outer	56366611.13	6330167.43
E16 Inner	56366310.74	6329644.22	E16 Outer	56366272.62	6329666.71
T1 inner	56365388.39	6333100.63	T1 outer	56365400.16	6332952.03
T2 inner	56365383.99	6332949.75	T2 outer	56365377.34	6332816.66
T3 inner	56365357.00	6332831.43	T3 outer	56365350.44	6332589.92
T4 inner	56365303.47	6332575.45	T4 outer	56365347.64	6332380.21
T5 inner	56365299.87	6332338.33	T5 outer	56365320.77	6332207.30
T6 inner	56365267.87	6332207.03	T6 outer	56365336.78	6332262.48
T7 inner	56365295.26	6332270.84	T7 outer	56365267.87	6332207.03
T8 inner	56365336.78	6332262.48	T8 outer	56365295.26	6332270.84
L1 inner	56364292.51	6330367.71	L1 outer	56364304.21	6330399.90

Table 4.2 Coordinates of inner and outer ends of permanent seagrass monitoring transects off Summerland Point

Transect No.	Easting Northing		Transect No.	Easting	Northing
C5 inner	56365676.16	6333038.72	C5 outer	56365703.00	6333084.97
C6 inner	56366045.25	6332831.74	C6 outer	56366058.27	6332871.22
F1 inner	56366321.02	6333250.37	F1 outer	56366285.49	6333250.37
F2 inner	56366342.20	6333330.55	F2 outer	56366291.43	6333450.83
F3 inner	F3 inner 56366611.15		F3 outer	56366620.59	6333228.02
F4 inner	56366968.12	6333242.58	F4 outer	56366918.39	6333284.49

F5 inner	56367106.95	6333361.98	F5 outer	56367068.97	6333421.28
F6 inner	56367271.10	6333493.19	F6 outer	56367202.42	6333522.83
F7 inner	56367402.36	6333682.09	F7 outer	56367374.73	6333694.93

Table 4.3 Coordinates of inner and outer ends of permanent seagrass monitoring transects in Bardens Bay.

Transect No.	Easting Northing		Transect No.	Easting	Northing
A1 inner	56365336.78	6332262.48	A1 outer	56365295.26	6332270.84
A2 inner	56365336.78	6332262.48	A2 outer	56365295.26	6332270.84
A3 inner	56365336.78	6332262.48	A3 outer	56365295.26	6332270.84
A4 inner	56365336.78	6332262.48	A4 outer	56365295.26	6332270.84
A5 inner	56365336.78	6332262.48	A5 outer	56365295.26	6332270.84
A6 inner	56365336.78	6332262.48	A6 outer	56365295.26	6332270.84

Table 4.4 Coordinates of inner and outer ends of permanent seagrass monitoring transects in Crangan Bay.

Transect No.	Easting	Northing	Transect No.	Easting	Northing
C1 Inner	56368596	6332235	C1 Outer	56368616	6332250
C2 Inner	ner 56368619 63		C2 Outer	56368658	6332151
C3 Inner	56368524	6331811	C3 Outer	56368538	6331806
C4 Inner	C4 Inner 56368467		C4 Outer	56368486	6331421

Table 4.5 Coordinates of inner and outer ends of permanent seagrass monitoring transects off Brightwaters.

Transect No.	Easting Northing		Transect No.	Easting	Northing
S1 inner	56365009.02	6334470.41	S1 outer	56365077.72	6334481.77
S2 inner	5636642.29	6334943.57	S2 outer	56364673.53	6334939.82
S3 inner	56365017.76	6335008.93	S3 outer	56365041.97	6334932.70
S4 inner	56365235.10	6334992.86	S4 outer	56365217.43	6334889.31
S5 inner	56365575.20	6334709.08	S5 outer	36365569.66	6334693.44
S6 inner	56366144.58	6334765.21	S6 outer	56366172.04	6334761.92

The outer end of Transect A3 was relocated in July 2015. It had initially been placed in water so deep the survey staff and GPS unit could not reach the lake bed. The end of the transect was therefore moved inshore to coincide with the outer edge of the seagrass bed.

5. Transect lengths

The length of each permanent transect is shown in **Table 5.1**.

 Table 5.1
 Transect lengths in Chain Valley Bay, Summerland Point, Bardens Bay and Brightwaters

Chain Valley Bay

Transect Number	Length (m)	Transect Number	Length (m)
Transect E1	26.25	Transect E2	44.60
Transect E3	75.09	Transect E4	59.30
Transect E5	67.45	Transect E6	57.97
Transect E7	52.44	Transect E8	35.36
Transect E9	152.68	Transect E10	71.01
Transect E11	73.21	Transect E12	46.22
Transect E13	89.54	Transect E14	98.63
Transect E15	82.85	Transect E16	44.26
Transect T1	47.48	Transect T2	14.39
Transect T3	16.32	Transect T4	25.14
Transect T5	49.14	Transect T6	63.53
Transect T7	52.90	Transect T8	42.36
Transect L1	20.00		

Summerland Point

Transect Number	Length (m)	Transect Number	Length (m)
Transect C5	41.57	Transect C6	13.67
Transect F1	47.11	Transect F2	130.55
Transect F3	65.64	Transect F4	65.04
Transect F5	70.46	Transect F6	74.81
Transect F7	30.47		

Bardens Bay

Transect Number	Length (m)	Transect Number	Length (m)
Transect A1	42.60	Transect A2	24.00
Transect A3	34.80	Transect A4	26.30
Transect A5	18.30	Transect A6	13.70

Brightwaters

Transect Number	Length (m)	Transect Number	Length (m)
Transect S1	69.64	Transect S2	31.46
Transect S3	79.98	Transect S4	105.05
Transect S5	16.60	Transect S6	27.67

The average length of transects in Chain Valley Bay, Summerland Point and Brightwaters was 56.9m, 59.9m and 55.1m respectively. The average length of transect in Bardens Bay was

26.6m. The transects with the greatest length were Transects E9 (152m), F2 (131m) and S4 (105m) (**Table 5.1**). The transects with the shortest lengths were Transects T2, C6 and A6, all approximately 14m in length (**Table 5.1**).

6. Changes in Elevation of the Lake Bed

Table 6.1 shows the seabed heights at each permanent transect in Chain Valley Bay between the period 2013 to 2020. For Transects E1 to E10, the difference between seabed heights were calculated by subtracting the height gained in 2020 from the initial seabed heights recorded in 2008 (not shown). Difference between sea bed elevation for Transects E11 to E16 and T1 to T8 were calculated using the initial seabed height data from 2011 and 2010 respectively (also not shown). Transect L1 calculations were determined by subtracting height data collected in 2020 from initial seabed height data collected in 2015.

Table 6.1 Seabed heights at each transect for Chain Valley Bay (2013-2020)

Transect	2013	2014	2015	2016	2017	2018	2019	2020	Diff.
E1 Inner	-0.68	-0.68	-0.67	-0.69	-0.70	-0.68	-0.66	-0.67	-0.01
E1 Outer	-0.99	099	-1.02	-1.02	-1.02	-1.05	-0.99	-0.98	-0.02
E2 Inner	-0.67	-0.65	-0.67	-0.67	-0.67	-0.69	-0.63	-0.67	0.03
E2 Outer	-1.70	-1.84	-1.81	-1.84	-1.85	-1.80	-1.76	-1.84	0.06
E3 Inner	-0.33	-0.28	-0.31	-0.33	-0.33	-0.31	-0.30	-0.35	0.03
E3 Outer	-2.29	-2.30	-2.35	-2.33	-2.34	-2.38	-2.34	-2.33	-0.01
E4 Inner	-0.48	-0.46	-0.47	-0.47	-0.46	-0.47	-0.46	-0.47	0.01
E4 Outer	-1.69	-1.71	-1.63	-1.67	-1.66	-1.67	-1.56	-1.69	0.00
E5 Inner	-0.41	-0.38	-0.42	-0.38	-0.39	-0.43	-0.35	-0.46	0.00
E5 Outer	-1.59	-1.58	-1.55	-1.56	-1.57	-1.60	-1.53	-1.64	-0.04
E6 Inner	-0.45	-0.45	-0.48	-0.48	-0.44	-0.44	-0.48	-0.48	0.00
E6 Outer	-1.13	-1.13	-1.14	-1.16	-1.16	-1.16	-1.14	-1.17	-0.04
E7 Inner	-0.23	-0.23	-0.22	-0.16	-0.19	-0.22	-0.22	-0.21	-0.03
E7 Outer	-1.65	-1.68	-1.74	-1.72	-1.77	-1.69	-1.66	-1.72	0.04
E8 Inner	-0.28	-0.31	-0.32	-0.31	-0.25	-0.34	-0.38	-0.34	0.07
E8 Outer	-0.96	-1.00	-1.02	-1.10	-1.00	-1.04	-1.01	-0.98	-0.01
E9 Inner	-0.26	-0.28	-0.29	-0.30	-0.25	-0.29	-0.30	-0.27	80.0
E9 Outer	-1.14	-1.16	-1.18	-1.21	-1.17	-1.20	-1.31	-1.15	80.0
E10 Inner	-0.42	-0.42		-0.43	-0.42	-0.43	-0.49	-0.48	0.03
E10 Outer	-1.68	-1.73		-1.69	-1.70	-1.79	-1.80	-1.73	0.00
E11 Inner	-0.35	-0.34		-0.37	-0.35	-0.37	-0.41	-0.37	-0.09
E11 Outer	-1.04	-1.07		-1.09	-1.08	-1.10	-1.14	-1.23	0.11
E12 Inner	-0.55	-0.55		-0.59	-0.55	-0.56	-0.59	-0.58	-0.08
E12 Outer	-1.38	-1.39		-1.44	-1.41	-1.44	-1.53	-1.46	-0.04
E13 Inner	-0.54	-0.59		-0.58	-0.58	-0.58	-0.65	-0.60	-0.04
E13 Outer	-1.35	-1.40		-1.39	-1.44	-1.42	-1.46	-1.44	-0.04
E14 Inner	-0.48	-0.45		-0.45	-0.45	-0.45	-0.54	-0.50	-0.08
E14 Outer	-1.31	-1.30		-1.31	-1.32	-1.34	-1.38	-1.35	-0.05
E15 Inner	-0.37	-0.32		-0.33	-0.31	-0.32	-0.36	-0.36	-0.01
E15 Outer	-1.11	-1.13		-1.18	-1.12	-1.16	-1.17	-1.16	-0.11
E16 Inner	-0.44	-0.42		-0.46	-0.45	-0.48	-0.47	-0.42	-0.18
E16 Outer	-0.96	-0.95		-0.98	-0.98	-1.01	-0.99	-0.98	-0.14
T1 inner	-0.38	-0.47	-0.43	-0.46	-0.45	-0.48	-0.37	-0.48	80.0
T1 outer	-1.18	-1.15	-1.19	1.20	-1.21	-1.20	-1.17	-1.28	0.13

T2 inner	-0.72	-0.75	-0.74	-0.72	-0.72	-0.74	-0.83	-0.71	0.01
T2 outer	-1.34	-1.35	-1.37	-1.35	-1.37	-1.36	-1.35	-1.39	0.08
T3 inner	-0.34	-0.35	-0.34	-0.38	-0.35	-0.38	-0.37	-0.34	0.05
T3 outer	-1.03	-1.03	-1.06	-1.03	-1.04	-1.06	-1.11	-1.08	0.07
T4 inner	-0.46	-0.49	-0.46	-0.49	-0.50	-0.50	-0.38	-0.45	-0.01
T4 outer	-1.16	-1.13	-1.15	-1.15	-1.16	-1.15	-1.16	-1.15	0.03
T5 inner	-0.43	-0.48	-0.43	-0.46	-0.47	-0.52	-0.50	-0.52	0.10
T5 outer	-1.43	-1.47	-1.43	-1.44	-1.46	-1.47	-1.50	-1.49	0.11
T6 inner	-0.45	-0.45	-0.42	-0.42	-0.41	-0.42	-0.39	-0.40	-0.07
T6 outer	-1.61	-1.63	-1.68	-1.63	-1.64	-1.64	-1.64	-1.64	0.03
T7 inner	-0.18	-0.20	-0.21	-0.20	-0.12	-0.22	-0.26	-0.23	0.06
T7 outer	-1.63	-1.71	-1.67	-1.67	-1.67	-1.69	-1.69	-1.66	0.02
T8 inner	-0.13	-0.20	-0.17	-0.27	-0.18	-0.27	-0.15	-0.17	-0.03
T8 outer	-1.18	-1.18	-1.23	-1.18	-1.18	-1.24	-1.20	-1.24	0.1
L1 inner			-1.12	-1.14	-1.11	-1.12	-1.07	-1.11	-0.01
L1 outer			-1.63	-1.66	-1.70	-1.63	-1.68	-1.66	0.03

In May 2020, only one sea bed elevation in Chain Valley Bay had changed by more than 150mm from the initial sea bed height recorded, namely E16 Inner (**Table 6.1**).

Table 6.2 shows the sea bed heights at each permanent transect for Summerland Point for the period 2018 to 2020. The difference between sea bed heights was calculated by subtracting the height gained in 2020 from the seabed heights recorded in 2018.

 Table 6.2
 Seabed heights at each transect for Summerland Point (2018-2020)

Transect	2013	2014	2015	2016	2017	2018	2019	2020	Diff.
C5 inner						-0.09	-0.03	-0.12	0.03
C5 outer						-2.18	-2.17	-2.18	0.00
C6 inner						-0.08	0.01	-0.08	0.00
C6 outer						-2.06	-1.82	-2.02	-0.04
F1 inner						-0.23	-0.30	-0.27	0.04
F1 outer						-1.28	-1.22	-1.25	-0.03
F2 inner						-0.25	-0.19	-0.20	-0.05
F2 outer						-1.96	-1.94	-2.01	0.05
F3 inner						0.11	-0.12	-0.05	-0.06
F3 outer						-1.86	-1.70	-1.87	0.01
F4 inner						-0.09	-0.10	-0.12	0.03
F4 outer						-2.45	-2.44	-2.39	-0.06
F5 inner						-0.31	-0.29	-0.30	-0.01
F5 outer						-2.45	-2.48	-2.44	-0.01
F6 inner						-0.33	-0.28	-0.33	0.00
F6 outer						-2.78	-2.75	-2.80	0.02
F7 inner						-0.47	-0.45	-0.50	0.03
F7 outer						-1.46	-1.47	-1.45	-0.01

In May 2020, no sea bed elevations off Summerland Point had changed by more than 150mm from the initial sea bed heights recorded (**Table 6.2**).

Table 6.3 shows the seabed heights at each permanent transect in Bardens Bay for the period 2014 to 2020. The difference between sea bed heights were calculated by subtracting the height gained in 2020 from the initial seabed height recorded in 2014 for each transect.

Table 6.3 Seabed heights at each transect for Bardens Bay (2014-2020)

Transect	2013	2014	2015	2016	2017	2018	2019	2020	Diff.
A1 inner		-0.51	-0.57	-0.56	-0.59	-0.58	-0.52	-0.57	0.06
A1 outer		-1.19	-1.20	-1.24	-1.25	-1.25	-1.32	-1.27	0.08
A2 inner		-0.39	-0.44	-0.42	-0.45	-0.46	-0.45	-0.40	0.01
A2 outer		-0.81	-0.87	-0.86	-0.86	-0.89	-0.91	-0.88	0.07
A3 inner		-0.33	-0.34	-0.31	-0.30	-0.35	-0.25	-0.34	0.01
A3 outer		-3.44	-1.38	-1.42	-1.43	-1.44	-1.24	-1.41	-0.03
A4 inner		-0.16	-0.19	-0.16	-0.16	-0.17	-0.17	-0.21	0.05
A4 outer		-0.72	-0.73	-0.73	-0.71	-0.71	-0.68	-0.70	-0.02
A5 inner		-0.30	-0.32	-0.33	-0.30	-0.32	-0.36	-0.32	0.02
A5 outer		-0.96	-0.95	-0.95	-0.95	-0.98	-1.01	-0.98	0.02
A6 inner		-0.14	-0.16	-0.14	-0.14	-0.15	-0.20	-0.13	-0.01
A6 outer		-0.68	-0.69	-0.68	-0.68	-0.73	-0.76	-0.72	0.04

In May 2020, no seabed elevations in Bardens Bay had changed by more than 150mm from the initial seabed heights recorded in 2014 (**Table 6.3**).

Table 6.4 shows the seabed heights at each permanent transect off Brightwaters for the period 2018 to 2020. The difference between seabed heights were calculated by subtracting the height gained in 2020 from the seabed height recorded in 2018.

In May 2020, no seabed elevations off Brightwaters had changed by more than 150mm from the initial sea bed heights recorded in 2018 (**Table 6.4**).

Table 6.4 Sea bed heights at each transect for Brightwaters (2018-2020)

Transect	2013	2014	2015	2016	2017	2018	2019	2020	Diff.
S1 inner						-0.61	-0.56	0.57	-0.04
S1 outer						-1.75	-1.71	-1.77	0.00
S2 inner						-0.25	-0.23	-0.21	-0.04
S2 outer						-1.56	-1.51	-1.54	-0.02
S3 inner						-0.08	-0.15	-0.09	0.04
S3 outer						-1.84	-1.94	-1.84	0.00
S4 inner						-0.08	-0.14	-0.09	0.06
S4 outer						-1.70	-1.74	-1.76	0.05
S5 inner						-0.66	-0.66	-0.65	-0.01
S5 outer						-1.36	-1.40	-1.39	0.03
S6 inner						-0.07	-0.06	-0.06	0.00
S6 outer						-0.89	-0.89	-0.889	-0.04

7. Plant and animal species monitored in the study area

Plate 7.1 provides information about the plants monitored in the seagrass surveys of Lake Macquarie, NSW. **Plate 7.2** provides information about the bivalve *Pinna menkei*.

Plate 7.1 Plant species found in the study area of Lake Macquarie (2007 - 2020).



Kingdom: Plantae
Phylum: Magnoliophyta
Class: Liliopsida
Order: Potamogetonales
Family: Zosteraceae
Genus: Zostera
Species: Z. capricorni

Remarks: Zostera capricorni is a species of eelgrass native to the seacoasts of New Guinea, Queensland, New South Wales, Victoria, South Australia, Norfolk Island and the North Island of New Zealand. It was first discovered at Moreton Bay in Queensland in 1875.



Kingdom: Plantae
Phylum: Magnoliophyta
Class: Liliopsida
Order: Hydrocharitales

Order: Hydrocharitales Family: Hydrocharitaceae

Genus: Halophila **Species:** H. ovalis

Remarks: Halophila ovalis commonly known as paddle weed, spoon grass or dugong grass, is a seagrass in the family Hydrocharitaceae. It is a small herbaceous plant that occurs in sea beds and other saltwater environments in the Indo-Pacific. First seen at Transect E6 in Chain Valley Bay on 12th June 2010.



Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae

Order: Fucales

Family: Hormosiraceae
Genus: Hormosira
Species: H. banksii

Remarks: Hormosira banksii, also known as Neptune's necklace, Neptune's pearls, sea grapes, or bubbleweed is a species of brown alga native to Australia and New Zealand. It is abundant on lowenergy rocky reefs at midtide levels, where it outcompetes other algal species due to its high tolerance to desiccation. First recorded at Transect C1 in Crangan Bay on 12th June 2010.



Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae
Order: Fucales
Family: Sargassaceae
Genus: Sargassum

Remarks: Sargassum is a genus of brown macroalgae in the order Fucales. Numerous species are distributed throughout the temperate and tropical oceans of the world, where they generally inhabit shallow water and coral reefs, and the genus is widely known for its planktonic species.



Kingdom: Plantae
Phylum: Phaeophyta
Class: Phaeophyceae
Order: Fucales

Family: Cystoseiraceae
Genus: Cystoseira
Species: C. trinodis

Synonym: Cystophyllum onustum

Remarks: A macroalgae widespread in Australia and the Indo-Pacific region. The plants vary considerably in size and form, with tall thin plants up to 1.5m high in very sheltered and estuarine waters, or more compact thicker-stemmed plants up to 30cm high in oceanic reef pools. Characterised by small peg-like projections on the lower parts of the main branches.



Kingdom: Plantae

Green filamentous algae

Remarks: Filamentous algae are colonies of microscopic plants that link together to form threads or mesh-like filaments. These primitive plants normally grow on the surface of hard objects or other substrates under the water but they can break loose and form floating mats.

Plate 7.2. Pinna menkei are found amongst the seagrass beds of Lake Macquarie, NSW.



Kingdom: Animalia
Phylum: Mollusca
Class: Bivalvia
Order: Pteriida
Family: Pinnidae
Genus: Pinna
Species: P. menkei

Remarks: Bivalve mollusc characterised by thin, elongated, wedge-shaped and almost triangular shells with long, toothless edges. The genus is ancient, going back to the Carboniferous period.

8. Seagrass characteristics and fouling levels measured in surveys

The following plates show the various growth characteristics of the seagrass *Zostera capricorni* in regards to leaf length. In the study area, due to environmental factors, *Zostera capricorni* either had short leaf growth (**Plate 8.1**) or was long leaved (**Plate 8.4**). The plates also show the levels of fouling of seagrass beds by filamentous algae and other algal species. In this study, fouling is described as No (Level 1), Low (Level 2) or Heavy (Level 3) (**Plates 8.2, 8.3, 8.5**).



Plate 8.1 Short leaved sea grass with level 1 fouling (no fouling).



Plate 8.2 Short leaved seagrass with level 2 fouling (low fouling).

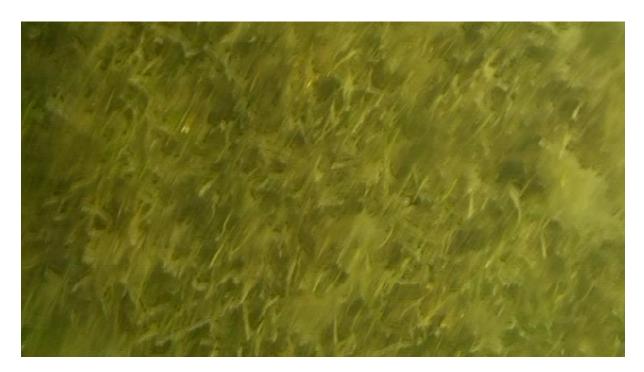


Plate 8.3 Short leaved seagrass with level 3 fouling (heavy fouling)

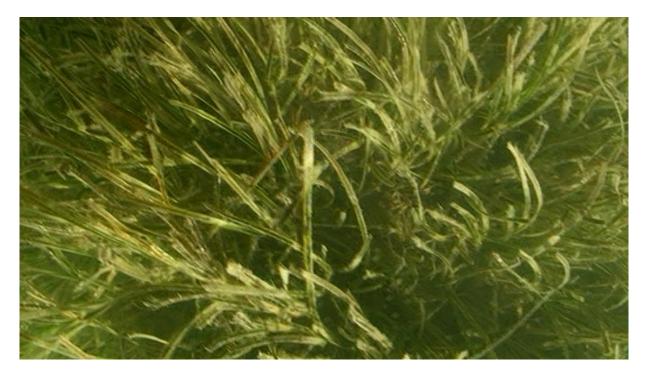


Plate 8.4 Long leaved seagrass with level 1 fouling (no fouling).



Plate 8.5 Long leaved seagrass with level 2 fouling (low fouling).



Plate 8.6 Long leaved seagrass with level 3 fouling (heavy fouling)



Plate 8.7 Algal mat and bareground.

9. Results of analysis of quadrats along permanent transects

Figures 9.1 and **9.2** show changes in the percentage cover of seagrass at Transects E1 to E12 and T1 to T8 respectively over a period of 13 years. In June 2019, seagrass cover at the transects ranged from 24.7 percent to 100 percent in the study area (**Table 9.1**, **Figures 9.1** and **9.2**). By May 2020, seagrass cover ranged from 75.9 percent to 100 percent (**Table 9.1**). In addition, the health and condition of the seagrass was good, with moderate algal fouling observed in some quadrats at twelve of the fifty transects, namely E5, E15, E16, T1, T3, A4, A6, C1, C3, F1, F2 and F3 (**Appendix 1**).

In May 2020, most seagrasses were either lightly fouled with epiphytic algae or were clear of epiphytic algae (**Appendix 1**). The brown seaweed *Cystophyllum onustum* (**Plate 7.1**) was observed at Transects E11, E14, T6, C1, C3, and C5.

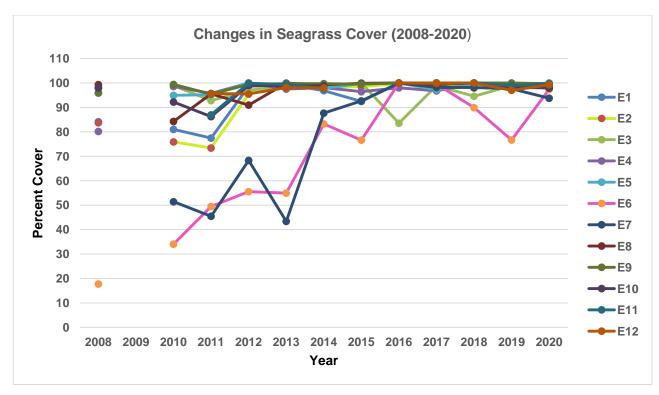


Figure 9.1 Changes in percent cover of seagrass at Transects E1 to E12

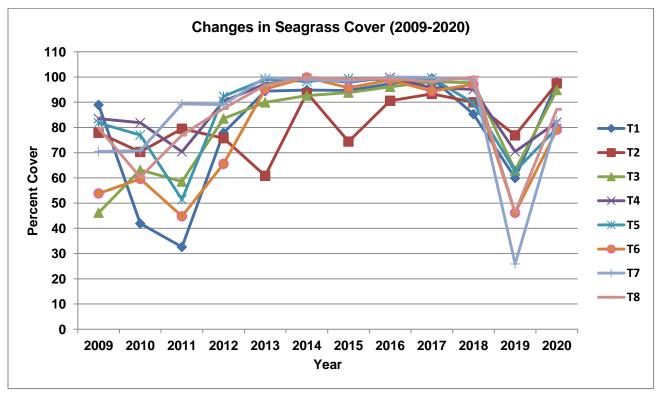


Figure 9.2 Changes in percent cover of seagrass at Transects T1 to T8

Changes in the percentage area of the substratum covered by seagrasses in the study area in 2010 to 2020, compared with the 2008 values are shown in **Table 9.1**. The table shows that since 2008, seagrass coverage has been increasing throughout the study area, and percentage cover has been consistent since 2012. At transects where the percentage area of substratum covered was relatively low, such as Transects E6 (17.74%), T3 (46.20%) and T6 (53.82%), seagrass coverage has increased by about 80%, 49% and 25% respectively.

Table 9.1 Changes in percent cover of the substratum by seagrasses in Lake Macquarie (2008-2020)

Chain Valley Bay 2008 to 2020

Transect E1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	84.15	81.01	77.75	98.62	99.44	96.85	92.44	99.88	97.96	97.87	99.12	99.04
% no seagrass	15.85	18.99	22.25	1.38	0.56	3.15	7.56	0.12	2.04	2.13	0.88	0.96
Transect E2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	83.72	75.87	73.38	95.49	99.09	98.38	98.49	99.71	100.0	97.94	97.94	98.53
% no seagrass	16.28	24.13	26.62	4.49	0.91	1.62	1.51	0.29	0.00	2.06	2.06	1.47
Transect E3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	98.29	98.97	92.76	96.97	99.16	97.66	100.0	83.53	98.90	94.56	98.97	100.0
% no seagrass	1.71	1.03	7.24	1.54	0.84	2.34	0.00	16.47	1.10	5.44	1.03	0.00
Transect E4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	80.16	98.54	95.74	100.0	97.50	98.06	96.43	98.01	96.76	99.71	99.85	98.82
% no seagrass	19.84	1.46	4.26	0.00	2.50	1.94	3.57	1.99	3.24	0.29	0.15	1.18
Transect E5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	95.88	94.93	95.19	100.0	98.82	97.01	99.82	100.0	97.22	99.41	98.97	100.0
% no seagrass	4.12	5.07	4.81	0.00	1.18	2.99	0.18	0.00	2.78	0.59	1.03	0.00
Transect E6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	17.74	34.06	49.56	55.51	54.93	83.24	76.62	100.0	99.56	89.91	76.69	97.35
% no seagrass	82.16	65.94	50.44	44.49	45.07	16.76	23.38	0.00	0.44	10.09	23.31	2.65
Transect E7	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	97.93	51.40	45.47	68.31	43.38	87.65	92.65	100.0	98.16	98.16	97.65	93.75
% no seagrass	2.07	48.60	54.53	31.69	56.62	12.35	7.35	0.00	1.84	1.84	2.35	6.25
Transect E8	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	99.32	84.26	95.56	90.96	99.93	99.26	99.85	100.0	99.34	100.0	99.34	97.87
% no seagrass	0.68	15.74	4.44	9.04	0.07	0.74	0.15	0.00	0.66	0.00	0.66	2.13
Transect E9	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	95.94	99.39	95.51	99.49	99.71	99.71	99.56	100.0	99.78	100.0	100.0	99.71
% no seagrass	4.06	0.61	4.49	0.51	0.29	0.29	0.44	0.00	0.22	0.00	0.00	0.29
Transect E10	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	97.94	92.21	86.25	98.99	98.82	98.87	NS	100.0	100.0	100.0	98.21	97.94
% no seagrass	2.06	7.79	13.75	1.01	1.18	1.13		0.00	0.00	0.00	1.79	2.06
Transect E11	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			86.93	99.85	99.49	97.65	NS	100.0	100.0	100.0	98.94	99.63
% no seagrass			13.07	0.15	0.51	2.35		0.00	0.00	0.00	1.06	0.37

Transect E12	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			95.68	95.53	98.09	97.94	NS	100.0	100.0	100.0	97.0	99.26
% no seagrass			7.32	4.47	1.91	2.06		0.00	0.00	0.00	3.0	0.74
Transect E13	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			93.97	99.26	100.0	99.93	NS	100.0	100.0	100.0	99.95	100
% no seagrass			6.03	0.74	0.00	0.07		0.00	0.00	0.00	0.05	0.00
Transect E14	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			86.54	99.34	100.0	99.68	NS	100.0	90.44	100.0	98.24	99.41
% no seagrass			13.46	0.56	0.00	0.32		0.00	9.56	0.00	1.76	0.59
Transect E15	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			90.29	99.93	99.66	92.28	NS	100.0	93.31	99.85	50.66	99.34
% no seagrass			9.71	0.07	0.34	7.72		0.00	6.69	0.15	49.34	0.66
Transect E16	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass			82.79	93.22	94.12	97.87	NS	100.0	99.94	99.71	95.0	98.31
% no seagrass			17.21	6.78	5.88	2.13		0.00	0.06	0.29	5.0	1.69
Transect T1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	88.94	41.90	32.60	77.91	94.41	94.85	94.65	97.35	99.47	85.29	59.92	97.87
% no seagrass	11.06	58.10	67.40	22.09	5.59	5.15	5.35	2.65	0.53	14.71	40.08	2.13
Transect T2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	77.91	70.29	7.95	75.74	60.83	93.68	74.41	90.59	93.31	90.00	76.87	97.50
% no seagrass	22.09	29.71	92.05	24.26	39.17	6.32	25.59	9.41	6.69	10.00	23.13	2.5
Transect T3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	46.20	63.16	58.53	83.53	89.93	92.65	93.82	96.10	98.19	97.57	63.01	94.85
% no seagrass	53.80	36.84	41.47	16.47	10.07	7.35	6.18	3.90	1.81	2.43	36.99	5.14
Transect T4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	83.51	81.89	70.37	90.37	97.28	99.41	97.94	99.85	95.76	95.07	70.44	82.06
% no seagrass	16.49	18.01	29.63	9.63	2.72	0.59	2.06	0.15	4.24	4.93	29.56	17.94
Transect T5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	81.78	77.00	51.40	92.35	99.12	98.24	99.41	98.82	99.56	89.63	62.65	79.71
% no seagrass	18.22	23.00	48.60	7.65	0.88	1.76	0.59	1.18	0.44	10.37	37.35	20.29
Transect T6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	53.82	59.63	44.77	65.59	95.22	99.85	95.74	98.82	94.41	97.13	46.18	79.12
% no seagrass	46.18	40.37	53.23	34.41	4.78	0.15	4.26	1.18	5.59	2.87	53.82	20.88
Transect T7	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	97.93	70.79	89.34	89.09	99.78	98.97	98.38	100.0	99.85	98.97	25.88	82.50
% no seagrass	2.07	29.51	10.66	10.91	0.22	1.03	1.62	0.00	0.15	1.03	74.12	17.50
Transect T8	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	95.94	60.29	76.99	87.64	96.76	99.85	99.26	99.26	98.24	100.0	46.32	87.21
% no seagrass	4.06	39.71	23.01	13.26	3.24	0.15	0.74	0.74	1.76	0.00	53.68	12.79
Transect L1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0.4		1	1	1	1	i —	99.12	99.71	07.07	97.87	0462	05.74
% seagrass % no seagrass							0.88	0.29	97.87 2.13	2.13	94.63 5.37	95.74 4.26

Summerland Point 2018-2020

Transect C5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										100.0	100.0	99.71
% no seagrass										0.00	0.00	0.29
Transect C6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.56	97.76	95.88
% no seagrass										0.44	2.24	4.11
Transect F1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										97.81	100.0	99.34
% no seagrass										2.19	0.00	0.66
Transect F2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.63	94.93	98.82
% no seagrass										0.37	5.07	1.18
Transect F3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.93	87.82	97.06
% no seagrass										0.07	12.18	2.94
Transect F4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										98.16	48.90	96.40
% no seagrass										1.84	51.1	3.60
Transect F5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.04	80.80	90.96
% no seagrass										0.96	19.2	9.04
Transect F6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										100.0	81.99	96.25
% no seagrass										10.00	18.01	3.75
Transect F7	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										98.24	97.65	87.57
% no seagrass										1.76	2.35	12.43

Bardens Bay 2014 to 2020

Transect A1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						97.97	98.09	88.97	99.85	96.18	85.15	
% no seagrass						2.03	1.91	11.03	0.15	3.82	14.85	
Transect A2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						92.38	96.99	98.75	98.38	94.93	98.09	
% no seagrass						7.62	3.01	1.25	1.62	5.07	1.91	
Transect A3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						100.0	86.40	94.85	96.69	98.01	99.26	
% no seagrass						0.00	13.60	5.15	3.31	1.99	0.74	
Transect A4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						94.51	93.97	99.12	100.0	89.78	48.98	
% no seagrass						5.49	6.03	0.88	0.00	10.22	51.02	
Transect A5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						96.37	95.59	99.71	100.0	97.35	84.50	
% no seagrass						3.63	4.41	0.29	0.00	2.65	15.50	

Transect A6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass						99.56	98.01	96.97	97.65	93.53	90.88	
% no seagrass						0.44	1.99	3.03	2.35	6.47	9.12	

Crangan Bay 2008 to 2020

Transect C1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	48.60	80.53	68.71	85.38	99.31	97.82	94.04	99.94	76.18	99.68	34.26	88.68
% no seagrass	51.40	19.47	31.29	14.62	0.69	2.18	5.96	0.06	23.82	0.32	65.74	11.32
Transect C2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	93.09	98.03	67.79	95.21	97.24	96.69	100.0	98.09	99.40	96.69	81.62	96.76
% no seagrass	6.91	1.97	32.21	4.79	2.76	3.31	0.00	1.91	0.60	3.31	18.38	3.24
Transect C3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	95.59	88.75	94.41	97.16	99.93	98.75	98.46	99.90	96.47	100.0	87.21	96.84
% no seagrass	4.41	11.25	5.59	2.84	0.07	1.25	1.54	0.10	3.53	0.00	12.79	3.16
Transect C4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass	87.25	86.56	58.09	90.40	100.0	98.49	99.49	99.96	96.47	96.76	74.56	94.93
% no seagrass	12.75	13.44	41.91	9.60	0.00	1.51	0.51	0.04	3.53	3.24	25.44	5.07

Brightwaters 2018 to 2020

Transect S1	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										62.50	24.71	99.63
% no seagrass										37.50	75.29	0.37
Transect S2	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										96.62	85.83	97.50
% no seagrass										3.38	14.17	2.50
Transect S3	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.19	97.13	98.75
% no seagrass										0.81	2.87	1.25
Transect S4	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.97	98.82	99.56
% no seagrass										0.03	1.18	0.44
Transect S5	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										99.12	67.08	75.88
% no seagrass										0.88	32.92	24.11
Transect S6	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% seagrass										100.0	99.78	100.0
% no seagrass										0.00	0.22	0.00

Table 9.2 shows the average composition, percent cover and condition of seagrass beds in the four regions of Lake Macquarie under investigation for the years 2011 to 2020. It shows that the growth form of *Zostera capricorni* in the Summerland Point, Frying Pan Bay and Sugar Bay region and the Crangan Bay region is predominantly short leaved. Alternatively, the growth form of *Z. capricorni* in Chain Valley Bay and Bardens Bay is long leaved.

Table 9.2 Average composition, % cover and condition of seagrass beds in the four regions of Lake Macquarie under investigation for the years 2011 to 2020.

Year	Total SG	% long	% short	% long 1	% long 2	% short 1	% short 2	algae	Bare Gr.
Summer	and Point,	Frying Pa	n Bay and	Sugar Ba	у				
2011	61.74	9.88	51.86	9.98	0.00	51.86	0.00	0.27	38.13
2012	82.18	38.03	44.15	38.03	0.00	44.15	0.00	0.00	17.85
2013	90.92	25.19	65.88	25.03	0.32	64.92	0.80	0.82	8.26
2014	96.74	19.73	80.27	19.93	0.00	80.27	0.00	0.00	3.26
2015	95.06	17.31	69.33	17.31	0.00	77.75	0.00	0.00	4.93
2016	98.15	20.82	77.64	28.32	0.00	77.66	0.00	0.00	1.30
2017	97.92	17.05	80.63	14.61	2.50	65.14	15.63	0.24	1.35
2018	96.22	28.00	66.03	25.44	5.36	67.00	0.91	1.31	2.28
2019	77.37	32.99	40.16	36.46	0.00	44.00	0.00	2.11	20.51
2020	93.29	35.89	57.40	33.99	1.67	56.91	0.49	0.03	6.64
Chain Va	lley Bay								
2011	85.44	41.75	43.68	40.28	1.47	43.68	0.00	0.99	13.32
2012	95.26	89.97	5.28	89.97	0.00	5.28	0.00	2.89	1.92
2013	95.63	62.25	35.84	55.83	1.06	35.84	0.00	0.25	4.00
2014	96.57	34.15	65.85	34.14	0.64	65.85	0.00	0.69	2.74
2015	94.70	70.26	18.80	58.28	11.97	24.45	0.00	1.02	5.06
2016	98.65	74.52	27.13	71.30	0.00	27.13	0.00	1.20	0.15
2017	97.63	52.60	42.79	36.35	18.19	49.82	0.11	0.60	1.62
2018	98.46	72.25	25.48	66.32	5.88	23.48	1.79	0.83	0.71
2019	93.15	84.48	8.64	84.48	0.00	15.66	0.00	0.39	6.72
2020	98.82	94.53	4.29	91.70	2.84	4.29	0.00	0.21	0.92
Crangan									
2011	72.52	28.47	44.05	28.47	0.00	43.31	0.74	0.87	26.98
2012	92.38	0.00	92.38	0.00	0.00	92.38	0.00	0.01	7.99
2013	98.82	13.79	85.52	10.84	2.96	85.52	0.00	0.02	1.02
2014	97.94	23.23	76.77	23.23	0.00	76.77	0.00	0.06	2.02
2015	98.00	23.53	74.47	23.53	0.00	74.47	0.00	0.00	2.01
2016	99.47	15.90	83.30	6.99	9.18	55.37	27.93	0.13	0.49
2017	92.48	16.73	75.75	15.99	3.20	74.71	1.05	0.02	7.57
2018	98.28	46.25	52.03	5.48	89.13	49.09	2.94	0.01	1.74
2019	69.39	39.56	29.95	39.56	0.00	29.95	0.00	0.00	30.40
2020	94.30	25.40	68.90	25.40	0.70	59.12	7.06	0.57	4.01
Bardens				Γ	Γ	ı	T		
2014	96.87	54.20	45.80	54.20	0.00	45.80	0.00	1.20	2.03
2015	94.84	68.18	26.67	68.18	0.00	26.67	0.00	0.00	2.92
2016	96.40	63.48	33.01	63.98	0.00	33.01	0.00	0.00	3.61
2017	98.78	76.02	22.75	51.51	24.51	20.59	3.78	0.03	1.23
2018	94.96	55.58	39.39	38.78	16.80	37.67	2.45	2.19	2.68
2019	84.48	73.08	6.40	73.03	11.40	11.40	0.00	0.00	15.52
2020	95.89	81.08	16.04	63.26	1.69	14.60	0.22	0.00	4.11

Table 9.2 also shows in greater detail the increase in percent cover of seagrasses, with bare ground decreasing from 38.13 percent in 2011 to 6.64 percent in 2020 in the Summerland Point, Frying Pan Bay and Sugar Bay region. In the Chain Valley Bay region, bare ground decreased from 13.32 percent to 0.92 percent. In the Crangan Bay region, bare ground decreased from 26.98 percent to 4.01 percent. Seagrass cover in Bardens Bay has mostly been around 95 percent.

Plate 9.1 shows sand deposited on seagrasses along Summerland Point after strong onshore winds in June 2011. This event demonstrated how climatic conditions can effect seagrass coverage. It also shows how the movement of sand from deeper waters due to strong winds can increase water depth in some areas whilst decreasing water depth closer to shore as sediment is deposited.



Plate 9.1 Zostera capricorni covered by sand along Summerland Point after strong southwesterly winds in 2011.

10. Extent of Coal Mining in 2020

Figure 10.1 shows the extent of mining up to March 2020.



Figure 10.1 Extent of Fassifern seam workings to March 2020.

11. Seagrass Management Plan

The mine, in conjunction with the relevant stake holders, has developed a Seagrass Management Plan. While the colliery is not mining beneath the seagrass beds, the purpose of the plan is to monitor any changes and identify if subsidence is the cause.

Elements of the plan require:

- That the July 2008 survey is to act as a baseline of seagrass distribution, density and condition. Since this time new seagrass transects have been added to the sampling schedule (now 50 transects in 2018-2019).
- Annual re-surveys of the permanent transect lines will be carried out.
- If, during the annual re-surveys, either:
 - Subsidence along the seagrass permanent transects greater than 150mm is detected, or
 - There are reductions in seagrass cover of 20% or more (compared to 2008 values),

then Mine Management will notify the relevant stakeholders of the event and convene a meeting to discuss the implications.

12. Discussion

In May 2020 the seagrasses in the study area were in good condition and mostly either lightly fouled with epiphytic algae or were clear of epiphytic algae. Seagrass cover along the transects ranged from 75.9 to 100% of the substratum. Since 2011 seagrass cover has increased progressively. This annual increase in seagrass cover was treated with some suspicion until it was realized that almost all of the beaches in the study area were used by commercial fishermen as net landing grounds. Nets up the 2-3 km in length were drawn across the lake and hauled up on beaches to extract and sort the various fish species. This fishing effort caused minor damage to seagrass beds over the 150 years of commercial fishing in Lake Macquarie. Netting was stopped eventually and the minor damage to seagrass beds began to heal. This healing process took place over the period of this study and is almost complete in most areas.

In 2019, however, at a time of very low rainfall and a very long lived high atmospheric pressure over the lake, there was some reductions in seagrass cover at some transects. This reduction in seagrass cover in 2019 was most noticeable along the shore of Summerland Point. Water level in the lake was depressed for long periods by around 0.3m. This lowered lake level caused increased water temperature over the seagrass beds and increased damaging wave attack during periods of strong westerly winds. Less water over the seagrass beds also increased the likelihood of damage by boats, waders and swimmers.

In May 2020 there was only one sea bed height greater than 0.15m (0.15m limit) compared with the datum years. This was E16 inner which is close to the shore. Seagrass coverage at this transect was 98.31%.

The results from the May 2020 seagrass monitoring programme show compliance to the Schedule 4 Environmental Conditions - underground mining of SSD5465 - Modification 2 in the Performance Measures table with respect to the Subsidence Impact Performance Measure for Natural Environment Biodiversity - Seagrass which display nil to minor environmental consequences due to underground mining.

The below summary of findings outline the historical basis for this compliance statement and the compliance is detailed in the table below.

Condition from SSD5465 - Mod 2	Compliance Status and Comments
Schedule 4 Environmental Conditions - underground mining Performance Measures - Natural Environment Biodiversity - Benthic Communities.	Compliant - See section 16 - Conclusions
Subsidence Impact Performance Measure - Minor environmental consequences, including minor changes composition and/or distribution.	
Measurements undertaken by generally accepted methods.	Compliant - See section 4 and 5
Measurements Methods fully described.	Compliant - See section 4 and 5

13. References

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Mr Robert Lewes Daly.Smith Pty. Ltd., Surveyors.

Appendix 1 – Results of Analysis of Quadrat photographs comprising each Transect (Results for May 2020)

Chain Valley Bay

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	1	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect E2

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	90	0	0	1	10	100
1	1	90	0	0	0	10	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	1	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100

2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100

Transect	E2						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Transect E4

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	1	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	1	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	20	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	0	0	100
1	1	95	0	5	0	0	100
1	1	90	0	10	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	5	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Transect	E5						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100

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Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	60	0	0	0	40	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	60	0	0	0	40	100
1	1	70	0	0	0	30	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0 0	0	0	0	100
2	1	70	U	0	0	30	100
Transect I	E 7						
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Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1.2.3	% cover	% cover	filamentous	Number	Ground	Cover

1	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100

2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	5	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	1	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Transect E	Transect E10								
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total		
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	50	0	50	1	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	90	0	10	0	0	100		
1	1	100	0	0	0	0	100		
1	1	50	0	40	0	10	100		
1	1	90	0	10	0	0	100		
1	1	100	0	0	0	0	100		
1	1	90	0	10	0	0	100		
1	1	90	0	10	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		
1	1	100	0	0	0	0	100		

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
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1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

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Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	70	0	0	0	30	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect	F13
Hansett	LIJ

Iransect I	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1.2.3	% cover	% cover	filamentous	Number	Ground	Cover

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	70	0	0	0	30	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100

1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect E16

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	0	90
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100

Transect 1	Г1						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	60	0	0	0	40	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	1	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	3	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect T2

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100

1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100

Transect 1	Г3						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	60	0	0	0	40	100
2	1	40	0	0	0	60	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	60	0	0	0	40	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100

Tra				T/	
ıra	n	SP	CT	14	L

Iransect Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	70	0	0	0	30	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	30	90

2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	20	80
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	100	0	0	0	0	100
2	1	40	0	0	0	60	100
2	1	50	0	0	0	50	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Long=1 Fouling Zostera Cystophyllum % algae Pinna % Bare Total Short=2 1,2,3 % cover % cover filamentous Number Ground Cover

Transect T5

2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100

2	1	60	0	0	0	40	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	50	0	0	0	50	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

_	ra	 _	_	 _	_

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	70	0	0	0	30	100
1	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	90	0	0	0	10	100
2	1	80	5	0	0	15	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	40	0	0	0	60	100
2	1	60	0	0	0	40	100
2	1	50	0	0	0	50	100
2	1	70	0	0	0	30	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	50	0	0	0	50	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100

2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100

Transect T7							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	1	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	70	0	0	0	30	100
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	60	0	0	0	40	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	1	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	60	0	0	0	40	100
2	1	60	0	0	0	40	100
2	1	60	0	0	0	40	100
2	1	10	0	0	0	90	100
2	1	20	0	0	0	80	100
2	1	40	0	0	0	60	100
2	1	50	0	0	0	50	100
2	1	40	0	0	0	60	100
2	1	50	0	0	0	50	100
2	1	60	0	0	0	40	100
2	1	10	0	0	0	90	100

2	1	20	0	0	0	80	100
2	1	20	0	0	0	80	100

Transect T8									
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total		
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover		
2	1	60	0	0	0	40	100		
2	1	90	0	0	0	10	100		
2	1	80	0	0	0	20	100		
2	1	80	0	0	0	20	100		
2	1	70	0	0	0	30	100		
2	1	90	0	0	0	10	100		
2	1	80	0	0	1	20	100		
2	1	90	0	0	0	10	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	90	0	0	0	10	100		
2	1	70	0	0	0	30	100		
2	1	80	0	0	0	20	100		
2	1	100	0	0	0	0	100		
2	1	80	0	0	0	20	100		
2	1	80	0	0	0	20	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	90	0	0	0	10	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	100	0	0	0	0	100		
2	1	95	0	0	0	5	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	90	0	0	0	10	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		

2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	2	80	0	0	0	20	100
2	2	80	0	0	0	20	100

Transect L1

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	80	0	0	0	20	100
1	1	70	0	0	0	30	100
1	1	80	0	0	0	20	100
1	1	80	0	0	0	20	100
1	1	90	0	0	0	10	100

1	1	40	0	0	0	60	100
1	1	50	0	0	0	50	100
1	1	60	0	0	0	40	100
1	1	70	0	0	0	30	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	5	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Summerland Point

Transect C5									
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total		
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover		
2	1	100	0	0	1	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		
2	1	100	0	0	0	0	100		

_			_				
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	10	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	10	0	0	0	100
2	1	100	0	0	0	0	100

Transect C6

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
1	1,2,3	100	% cove i	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
		95	_		0	5	
1	1		0 0	0 0	0	5 5	100
1	1	95 100					100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	50	0	0	0	50	100
2	1	70	0	0	1	30	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect F1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Long=1 Short=2	1,2,3	% cover	% cover	% algae filamentous	Number	% bare Ground	Cover
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	0	95
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	5	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100

Transect F2

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100

2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100

Transect F3							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	90	0	0	0	10	100
1	2	90	0	0	0	10	100
1	2	95	0	0	0	5	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	90	0	0	0	10	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	90	0	0	0	10	100
1	2	100	0	0	0	0	100
1	2	90	0	0	0	10	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
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2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100

Transect F4							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	80	0	0	1	20	100
2	1	100	0	0	0	0	100
2	1	90	0	0	1	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	1	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	90	0	0	1	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	70	20	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
Transect F5							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100

2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	80	0	0	0	20	100
2	1	95	0	0	0	5	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	70	0	0	0	30	100
2	1	65	0	0	0	35	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	75	0	0	0	25	100
2	1	85	0	0	0	15	100
2	1	75	0	0	0	25	100
2	1	85	0	0	0	15	100
2	1	85	0	0	0	15	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	85	0	0	0	15	100
2	1	95	0	0	0	5	100
			-	-	-	-	

2	1	75	0	0	0	25	100
2	1	85	0	0	0	15	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	85	0	0	0	15	100
2	1	85	0	0	1	15	100
2	1	80	15	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	85	0	0	0	15	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100

Transect F6 Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	85	0	0	0	15	100
2	1	65	0	0	0	35	100
2	1	75	0	0	0	25	100
2	1	75	0	0	0	25	100
2	1	85	0	0	0	15	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	1	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100

2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100

Transect F7							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	85	0	0	0	15	100
2	1	80	0	0	0	20	100
2	1	85	0	0	0	15	100
2	1	75	0	0	0	25	100
2	1	85	0	0	0	15	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	75	0	0	0	25	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	75	0	0	0	25	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	85	0	0	0	15	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100

2	1	85	0	0	0	15	100
2	1	75	0	0	0	25	100
2	1	80	0	0	0	20	100
2	1	65	0	0	0	35	100
2	1	85	0	0	0	15	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	65	0	0	0	35	100
2	1	50	0	0	0	50	100
2	1	85	0	0	0	15	100
2	1	85	0	0	0	15	100
2	1	85	0	0	0	15	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	85	0	0	0	15	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	85	0	0	0	15	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	15	110
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Bardens Bay

Transect A1							
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	70	0	0	0	30	100
2	1	60	0	0	0	40	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	60	0	0	0	40	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	60	0	0	0	40	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100

2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	2	90	0	0	0	10	100

Transect A2

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100

1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	80	0	0	0	20	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1 1	100 100	0	0 0	0	0 0	100 100
1 1	1	100	0 0	0	0 0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
_	_	100	U	U	U	U	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Transect A	A3						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

Transect A4	ŀ
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Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100

Transect A5

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover

1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	70	0	0	0	30	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	50	0	0	0	50	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

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Tra		-			_
	m		ГТ	ш	n

Long=1 Short=2	Fouling 1,2,3	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	50	0	0	0	50	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	90	0	0	0	10	100
1	2	100	0	0	0	0	100

Crangan Bay

Transect (C1						
Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	90	0	0	0	10	100
2	1	70	0	0	0	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	80	20	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	1	0	100
2	1	70	25	0	0	5	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	60	30	10	0	0	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	40	50	10	0	0	100
2	1	5	40	55	0	0	100
2	1	50	0	0	0	50	100
2	1	90	0	10	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1 1	100 100	0 0	0	1 1	0 0	100 100
2	1	90		0			
2	1	90	0 0	0	0	10 10	100
2	2	90 70		0	0		100
2	2	90	30 0	0 10	0 0	0 0	100 100
2	2	90	0	0	0	10	100
2	2	90	0	0	0	10	100
2	2	90	0	0	0	10	100
2	2	100	0	0	0	0	100
2	2	80	0	0	0	20	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	80	20	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	100	0	0	0	0	100
2	2	90	0	10	0	0	100
2	2	90	0	10	0	0	100
2	2	70	0	10	0	20	100
2	2	80	0	0	0	20	100
2	3	100	0	0	0	0	100
2	3	100	0	0	0	0	100
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2	3	100	0	0	0	0	100
2	3	90	0	0	0	10	100
2	3	80	0	10	0	10	100
2	3	80	0	20	0	0	100
2	3	90	0	0	0	10	100
2	3	100	0	0	0	0	100

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	90	0	0	0	10	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	1	5	100

Transect C3

Long=1 Short=2	•	Zostera % cover	Cystophyllum % cover	% algae filamentous	Pinna Number	% Bare Ground	Total Cover
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	2	95	0	0	0	5	100
1	2	95	0	0	0	5	100
1	2	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	20	0	0	0	100
2	1	70	0	0	0	30	100
2	1	60	40	0	0	0	100
2	1	50	30	0	0	20	100
2	1	100	0	0	0	0	100
2	2	100	0	0	0	0	100

Tra	nsect	C4

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	80	0	0	2	20	100
1	1	100	0	0	1	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	1	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100
2	1	80	0	0	2	20	100
2	1	100	0	0	1	0	100
2	1	100	0	0	0	0	100

2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	70	0	0	1	30	100
2	1	80	0	0	0	20	100
2	1	90	0	0	0	10	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Brightwaters

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Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	0	0	100
1	1	95	0	0	0	5	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

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Transect S	S2						
Long=1	Fouling	Zostera	Cystophyllu	ım % algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	50	0	0	0	50	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	0	80
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	80	0	0	0	20	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100
1	2	100	0	0	0	0	100

Transect S3

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	10	0	10	110
1	1	90	0	10	0	10	110
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	70	0	0	0	30	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	80	0	0	0	20	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

Transect S	54
------------	----

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100
2	1	100	0	0	0	0	100

2	1	100	0	0	0	0	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	95	0	0	0	5	100
2	1	100	0	0	0	0	100
2	1	90	0	0	0	10	100

Transect S5

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
0	0	0	0	0	0	100	100
1	1	40	0	0	0	60	100
1	1	65	0	0	0	35	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	85	0	0	0	15	100
1	1	75	0	0	0	25	100
1	1	85	0	0	0	15	100
1	1	90	0	0	0	10	100
1	1	80	0	0	0	20	100
1	1	80	0	0	0	20	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100

1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	65	0	0	0	35	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	85	0	0	0	15	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	85	0	0	0	15	100
1	1	90	0	0	0	10	100
1	1	100	0	0	0	0	100
1	1	85	0	0	0	15	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	85	0	0	0	15	100
1	1	80	0	0	0	20	100
1	1	75	0	0	0	25	100
1	1	65	0	0	0	35	100
1	1	85	0	0	0	15	100
1	1	95	0	0	0	5	100
1	1	100	0	0	0	0	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	90	0	0	0	10	100
1	1	95	0	0	0	5	100
1	1	95	0	0	0	5	100
1	1	50	0	0	0	50	100
1	1	85	0	0	0	15	100

Transect S	6
------------	---

Long=1	Fouling	Zostera	Cystophyllum	% algae	Pinna	% Bare	Total
Short=2	1,2,3	% cover	% cover	filamentous	Number	Ground	Cover
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100

1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100
1	1	100	0	0	0	0	100



Appendix 5: Biodiversity Monitoring Report

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Biodiversity monitoring 2020

Chain Valley Colliery

Eugene Dodd

Senior Ecologist

18 March 2021

Report Number	
H200888 RP1	
Client	
Delta Coal	
Date	
18 March 2021	
Version	
v1 Final	
Prepared by	Approved by
Mald	OlDivoz

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Katie Diver

18 March 2021

National Technical Leader

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Photographs

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1 Introduction

1.1 Rehabilitation monitoring plan requirements

Chain Valley Colliery (CVC) and Mannering Colliery (MC) are underground coal mines located at the southern extent of Lake Macquarie, approximately 60 km south of Newcastle. Both sites are operated by Great Southern Energy Pty t/a Delta Coal (Delta Coal) and produce thermal coal for the domestic and export markets.

CVC and MC operate in accordance with Development Consent SSD-5465 and Project Approval MP06_0311 respectively. SSD-5465 required the preparation of Chain Valley Colliery Biodiversity Management Plan (EMGA 2016) (BMP). The BMP includes an annual terrestrial biodiversity monitoring program which commenced in 2016, comprising:

- condition and composition of an area of Swamp Oak Forest;
- condition of vegetation adjacent to the ventilation shafts and fans;
- mapping the location and distribution of weeds; and
- abundance and distribution of feral animal use.

This report aims to detail the annual monitoring results which will be reviewed and assessed against trigger values and condition criteria identified in the BMP.

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2 Methods

2.1 Condition and composition of Swamp Oak Forest

The condition and composition of an area of Swamp Oak Forest adjacent to the sediment ponds in the pit top area (Figure 2.1) and downstream of the D10 discharge was monitored in line with the method set out in in the BMP, including:

- completion of two biobanking plots as per Section 11.1 of the BMP and the proforma in Appendix 1 of the BMP; and
- a comparison of the collected plot data against the previous years' data (specifically to monitor dieback of Melaleuca quinquenervia observed in Plot 1 during the 2017 monitoring) as well as to determine the total weighted scores for both plots to assess any other change in condition and against the trigger value identified within the BMP.

2.2 Condition of vegetation adjacent to the ventilation shafts and fans

Condition monitoring of vegetation surrounding the ventilation shaft area includes (Figure 2.2):

- observation of two Rough-barked Apple (*Angophora floribunda*) trees directly adjacent to the Ventilation Shaft, as shown in Figure 9 of the BMP, for assessment of condition and health due to their proximity to the ventilation shaft;
- the completion of four photo points, as per Figure 9 of the BMP, and assessment of any change in vegetation condition from 2017; and
- the recording of dominant species (canopy, mid-storey, understorey and ground layers) around the periphery of each side of the Ventilation Shaft area.

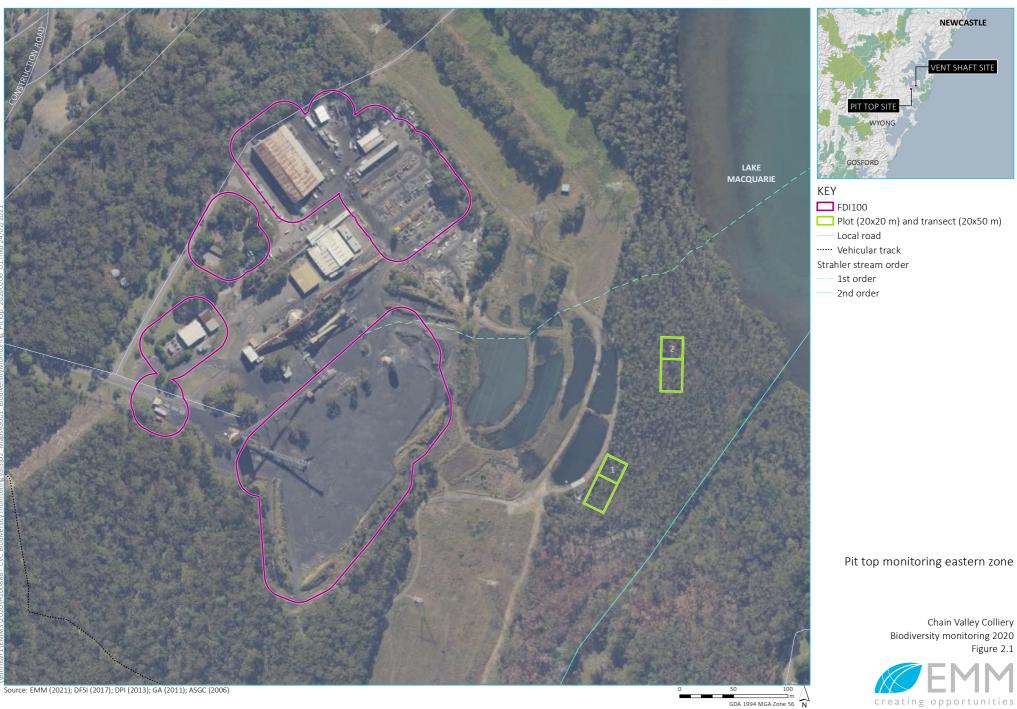
2.3 Location and distribution of weeds

Weed monitoring targets existing locations (recorded by Total Earth Care during the 2019 monitoring) and significant new weed occurrences in the eastern management zone (within the Swamp Oak Forest) as well as at the ventilation shaft area.

2.4 Abundance and distribution of feral animal use

The monitoring of feral animals is undertaken in conjunction with the weed monitoring and as per the proforma in Appendix 1 of the BMP and includes recording of activity of feral species by searching for tracks, diggings, burrows and sighting of individuals.

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Chain Valley Colliery Biodiversity monitoring 2020 Figure 2.1





Ventilation shaft monitoring

Chain Valley Colliery Biodiversity monitoring 2020 Figure 2.2



3 Results

3.1 Condition and composition of Swamp Oak Forest

The detailed monitoring results are provided in Appendix A, with the location of monitoring plots provided in Figure 2.1 with a description of the findings for each plot provided below. The weighted score for the combination for the combination of the two plots is 68.1%, which is an increase compared to 65% (2019 monitoring score). No remedial actions are required as the score is above the minimum trigger of 60%.

3.1.1 Plot 1

The condition and composition of the vegetation within Plot 1 was broadly comparable with the monitoring results from the previous year. The canopy of Swamp Oak is continuing to regenerate, with slight increase in coverage from 20.5 % to 21.5%. The ground cover was largely unchanged with one additional native species recorded; Marine Couch (*Sporobolus virginicus*).

Two additional weed species were identified; Senecio (*Senecio* sp.) and Rhodes Grass (*Chloris gayana*). The Ground Asparagus (*Asparagus aethiopicus*) identified during the 2019 monitoring is still present. Weeds are more prevalent adjacent the plot, alongside the access track.

3.1.2 Plot 2

The condition and composition of the vegetation within Plot 2 was broadly comparable with the 2019 monitoring. Swamp Oak was the only canopy species present, which retained its canopy cover from 23.5 % to 23.5 %. The ground cover was largely unchanged with one additional weed species recorded; Senecio (*Senecio* sp.).

Weed prevalence within the plot remains largely unchanged from 2019 monitoring, with no Bitou Bush (*Chrysanthemoides monilifera*) or Cassia (*Senna pendula var. glabra*) recorded, and only one Ground Asparagus (*Asparagus aethiopicus*) recorded. Weeds were frequently recorded outside of the plot. These will require ongoing management, to prevent them increasing in prevalence at the expense of native species.

3.2 Condition of vegetation adjacent to the ventilation shafts and fans

A photolog of the photo monitoring points and tree monitoring points are provided in Appendix B, with a summary of observations provided in Table 3.1.

Vegetation around the ventilation shaft compound was cleared for an asset protection zone (APZ) prior to the 2017 monitoring. This did not affect any of the tree monitoring points, however would affect the photo point monitoring, with obvious clearance of shrubs and regenerating small trees close compound.

When clearance for the asset protection zones is taken into account (APZ), vegetation condition was broadly similar to previous years, with no observable negative impact from the vent shaft. Ground cover and mid-storey cover appeared to be regenerating well, with increased height and density of native species in 2020 compared to the previous year.

Table 3.1 Monitoring point observations

Monitoring point	2020 monitoring observations
1	Vegetation appears healthy with observable growth of canopy species and midstorey species. Not comparable with the 2016 monitoring given the clearing for an asset protection zones (APZ).
2	Vegetation appears healthy with observable growth of canopy species and midstorey species compared to previous monitoring events.
3	Vegetation has increased in height and density with native midstorey species growth particularly prevalent.
4	Vegetation appears healthy with observable growth of canopy species and midstorey species. Not comparable with the 2016 monitoring given the clearing for an asset protection zones (APZ).
Tree 1	Tree appears healthy, with new growth, dense foliage within the crown and no dieback observed.
Tree 2	Tree appears healthy, with new growth and dense foliage within the crown. Small areas of dieback observed on small and isolated limbs, however this is less noticeable than observed in previous years. The tree has increase foliage cover compared to the 2016 BMP photograph.

3.3 Location and distribution of weeds

Evidence of weed control was apparent during the site survey. Weed prevalence was similar to previous years in the Swamp Oak Forest and improved at the vent shaft area.

Weed prevalence has been documented in Appendix C, with a list of recommended control measures provided for each area.

3.4 Abundance and distribution of feral animal use

No evidence of feral animals had been detected in the last three years of monitoring (2017-2019). In the 2020 monitoring four feral animal species were recorded using the presence of scats as indicators. Seven scats from the European Fox (*Vulpes vulpes*) and one scat from the Domestic Dog (*Canis lupus*) were recorded (Appendix D).

4 Summary

The 2020 biodiversity monitoring established that the vegetation and habitat values within the subject areas was broadly similar to the 2019 monitoring.

Observations and photo monitoring at the vent shaft area demonstrated increased growth of native vegetation, especially observable in the ground and midstory. The canopy within the Swamp Oak areas had also increased slightly. No remedial actions are required as the condition score remained above the trigger threshold.

Whilst evidence of successful weed control was observed in several areas, ongoing control is recommended to suppress those weeds still present and to prevent reestablishment in treated areas.



Photo no:	Plot 1	Date:	11/12/2020	Data collectors:
				E. Dodd
			_	
Plot/transect:		1		

Coordinates start transect		
Easting:	365034.00 m E	
Northing:	6329516.00 m S	

Coordinates finish transect		
Easting:	365012.00 m E	
Northing:	6329471.00 m S	

Native overstorey cover %		
(every 5m)		
	1	30
	2	20
	3	20
	4	10
	5	20
	6	25
	7	35
	8	15
	9	30
	10	10
AVG		21.5

Species	Common Name	Native
Asparagus aethiopicus	Ground asparagus	n
Ваитеа јипсеа	Twig-rush	У
Casuarina glauca	Swamp Oak	у
Fimbristylis ferruginea	Rusty Sedge	У
Gahnia clarkei	Tall Saw-sedge	У
Juncus krausii	Sea Rush	У
Selliera radicans	Creeping Brookweed	У
Sarcocornia quinqueflora subsp. quinqueflora	Samphire	У
Sporobolus virginicus	Marine Couch	У
Senecio sp.	A Senecio species	n
Chloris gayana	Rhodes Grass	n

Native plant species (#) (plot):	8

Regeneration (%) (plot):	1

Trees with Hollows (#) (plot):	0

Total length of fallen logs (m) (plot):	6	

Layer	Cover in 20x20m plot (%)	
Native midstorey	0	
Native ground (grasses)	10	
Native ground (shrubs)	0	
Native ground (other)	100.3	
Exotics	0.3	

Weeds

Weeds were largely limited to one Ground Asparagus plant, one Senicio species and one Rhodes Grass Tussock. Weeds are more prevelant adjacent the plot, alongside the access track.

Dieback of canopy

No additional dieback of canopy species from the last monitoring period. Individual Swamp Oak trees appear to be increasing in cover.

Water

Waterlogged soils with ponding areas and channels containing flowing waters.

Comments

A shoal of juvenile Mullet (Mugil sp.) were observed for the first time in a pool adjacent to the plots and the channels with the plot. Swamp Wallaby observed and scats also present.

Photo no:	Plot 2	Date: 11/12/2020	Data collectors:
			E. Dodd
Plot/transect:		2	

Coordinates start transect	
Easting:	365085
Northing:	6329629

Coordinates finish transect	
Easting:	365084
Northing:	6329580

Native overstorey cover %	
(every 5m)	
:	1 35
	2 20
3	3 20
4	4 30
ŗ	5 25
(6 20
	7 35
8	8 15
<u> </u>	9 15
10	.0 20
AVG	23.5

Species	Common Name	Native
Asparagus aethiopicus	Ground asparagus	n
Ваитеа јипсеа	Twig-rush	У
Casuarina glauca	Swamp Oak	У
Fimbristylis ferruginea	Rusty Sedge	У
Gahnia clarkei	Tall Saw-sedge	У
Juncus krausii	Sea Rush	У
Samolus repens	Creeping Brookweed	У
Selliera radicans	Swamp Weed	У
Sporobolus virginicus	Marine Couch	У
Sarcocornia quinqueflora subsp. quinqueflora	Samphire	У
Senecio sp.	A Senecio species	n

Native plant species (#) (plot):	9

Regeneration (%) (plot):	1

Trees with Hollows (#) (plot):	0

Total length of fallen logs (m) (plot):	19	

Layer	Cover in 20x20m plot (%)		
Native midstorey	0		
Native ground (grasses)	8		
Native ground (shrubs)	0		
Native ground (other)	95.07		
Exotics	0.1		

Weeds

No Bitou Bush or Cassia was recorded within the plots and only one Ground Asparagus were recorded. Weeds were frequently recorded outside of the plot.

Dieback of canopy

No additional dieback of canopy species from the last monitoring period. Individual Swamp Oak trees appear to increase in cover.

1	Water	Soils waterlogged throughout majority of area,				
1		occasional areas of shallow pooled water.				

Comments

Swamp Oak recruitment observed.

Site attribute	Benchmark	Plot 1 data	Plot 1 score	Plot 2 data	Plot 2 score	Average	Weighting %		Weighted score %
A	>6	8	4	9	4	4	25	25	25.0
В	5 to 18	21.5	3	23.5	3	3	10	7.5	7.5
С	36 to 48	0	1	0	1	1	10	2.5	2.5
D	3 to 21	10	4	8	4	4	2.5	2.5	2.5
E	0 to 0	0	4	0	4	4	2.5	2.5	2.5
F	1 to 13	100.3	1	95.07	1	1	2.5	0.625	0.6
G		0.3	4	0.1	4	4	5	5	5.0
Н	> 0	0	1	0	1	1	20	5	5.0
I		1	4	1	4	4	12.5	12.5	12.5
J	> 20	6	2	19	4	2	10	5	5.0
Total						28	100		68.1

1 trigger is <60%

		1	П	2	3	4	
A Nativ spec richn)-<50% of penchmark	50-<100% of benchmark	≥ benchmark	25%
	e over- y cover	0-10% or >200% of benchmark	>	0-<50% or -150-200% of penchmark	50-<100% or >100-150% of benchmark	Within benchmark	10%
	ve mid- ey cover	0-10% or >200% of benchmark	>	0-<50% or >150-200% of penchmark	50-<100% or >100-150% of benchmark	Within benchmark	10%
cove	/e ground- r sses)	0-10% or >200% of benchmark	>	0-<50% or >150-200% of penchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.50%
E Nativ grou (shru	ndcover	0-10% or >200% of benchmark	>	0-<50% or >150-200% of penchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.50%
F Nativ grou (othe	ndcover	0-10% or >200% of benchmark	>	0-<50% or •150-200% of penchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.50%
G Exot	ic plant	>66%	>	33-66%	>5-33%	0-5%	5%
	ber of with ws	0 (unless benchmark includes 0)		0-<50% of penchmark	50-<100% of benchmark	≥ benchmark	20%
over- spec occu	ortion of -storey ies rring as neration		0 >	-0-<50%	50-<100%	100%	12.50%
	l length of n logs	0-10% of benchmark		>10-<50% of penchmark	50-<100% of benchmark	≥ benchmark	10%
Total weighted score	Э		-				100%



B.1 Vent shaft photolog



Photograph B.1 Photo point 1

H200888 | RP1 | v1 B.1



Photograph B.2 Photo point 2



Photograph B.3 Photo point 3



Photograph B.4 Photo point 4



Photograph B.5 Tree monitoring point 1



Photograph B.6 Tree monitoring point 2



Weed Monitoring Proforma

Date:	11/12/2020
Management zone:	Pit top area - Eastern Zone
Data collectors:	Eugene Dodd

Location ID (see Figure 1) Weed species		Location (MGA 94) # plants		Area (m2)	Distance to native vegetatation (m)	Recommended control measures	
		Easting	Northing				
19	Ground Asparagus (Asparagus aethiopicus)	365027	6329499	1	0.5	1	As per BMP
20	Pampas Grass (Cortaderia selloana)	364997	6329486	2	1	0	As per BMP
_							
21	Pampas Grass (Cortaderia selloana)	364991	6329489	1	0.5	0	As per BMP
22	Ground Asparagus (Asparagus aethiopicus)	364979	6329482	,	0.5		As per BMP
	Ground Asparagus (Asparagus detiniopicus)	304979	0329482	1	0.5	0.3	Аз рег вімін
23	Ground Asparagus (Asparagus aethiopicus)	364973	6329483	1	0.5	0.5	As per BMP
23	Ground Asparagus (Asparagus detiniopieus)	304373	0323403		0.5	0.5	AS PCT DIVII
24	Ground Asparagus (Asparagus aethiopicus)	364973	6329472	4	1	0.5	As per BMP
	Bitou Bush (Chrysanthemoides monilifera				_		
24	subsp. rotundata)	364973	6329472	1	0.5	0.5	As per BMP
							·
24	Lantana (<i>Lantana camara</i>)	364973	6329472	1	0.5	0.5	As per BMP
25	Ground Asparagus (Asparagus aethiopicus)	365022	6329511	1	0.5	0	As per BMP
26	Pampas Grass (Cortaderia selloana)	365025	6329518		0.5	1	As per BMP
				Multiple plants along		_	
27-30	Ground Asparagus (Asparagus aethiopicus)	365034	6329552	roadside	2	0	As per BMP
20	Barriero Crasa (Carta derin calle nas)	205044	C220F0C	,	0.5	, ,	As you DAAD
28	Pampas Grass (Cortaderia selloana)	365041	6329596	1	0.5	1.5	As per BMP
20	Pampas Grass (Cortaderia selloana)	365039	6329599	1	0.5	2.5	As per BMP
23	Tampas Grass (cortaderia schodina)	303033	032333		0.5	2.3	AS PCT DIVII
30	Pampas Grass (Cortaderia selloana)	365031	6329635	1	0.5	3.5	As per BMP
	Bitou Bush (Chrysanthemoides monilifera						
	subsp. rotundata)	365031	6329635	Multiple seedlings	0.5	0.5	As per BMP
	Bitou Bush (Chrysanthemoides monilifera						
31	subsp. rotundata)	365027	6329645	Multiple seedlings	0.5	0.5	As per BMP
				40-50 Plants adjacent to the			
32	Sharp Rush (Juncus acutus)	365020	6329648	track	5	0	Mechanical removal most effective
	Patch of Ground Asparagus (Asparagus			Multiple plants along			
33	aethiopicus)	365032		trackside	2	0	As per BMP
	Large patches of Ground Asparagus (Asparagus		l	Multiple plants along			
34	aethiopicus) alongside bank.	365043	6329685	trackside	5	0	As per BMP
	Large patches of Ground Asparagus (Asparagus	26505-	632274	Multiple plants along	_	_	A
35	aethiopicus) alongside bank.	365057	6329718	trackside	5	0	As per BMP
35	Sharp Bush (Jungus agutus)	265057	6220740	_	0.5		Machanical removal most offertive
35	Sharp Rush (Juncus acutus)	365057	6329718	2	0.5	10	Mechanical removal most effective

Weed Monitoring Proforma

Date:	11/12/2020
Management zone:	Vent shaft - Summerland point
Data collectors:	Eugene Dodd

Location ID (see Figure 1)	Weed species	Location (MGA 94)		# plants Area (m2) \		vegetatation (m)	Recommended control measures
		Easting	Northing				
49	Lantana (<i>Lantana camara</i>)	366579	6331122	3	3 1	(As per BMP
50	Agarve sp.	366588	6331114	3	3 1	(Mechanical removal
50	Senna pendula and Lantana (Lantana camara)	366588	6331114	1	1	(As per BMP
51	Patch of Fishbone fern (Nephrolepis cordifolia)	366598	6331105	Multiple	1	(As per BMP
53	B Lantana (<i>Lantana camara</i>)	366612	6331077	5	0.5	(As per BMP
55	(Chrysanthemoides monilifera subsp. rotundata) and Lantana (Lantana camara)	366609	6331072	multiple	0.5	(As per BMP, handpull if small enough
56	Senna pendula and Cortaderia selloana	366609	6331066		0.5	(As per BMP
58	Senna pendula	366611	6331044	One bush, plus several seedlings	2	(As per BMP
59	Senna pendula	366624	6331023	One bush, plus several seedlings	1	(As per BMP
60	Senna pendula	366624	6331014	One bush, plus several seedlings	1	(As per BMP
61	Senna pendula	366633	6331007	1	0.5	(As per BMP
62	Senna pendula	366640	6331010		0.5	(As per BMP
63	Lantana (Lantana camara)	366668	6330990	1 (Recovering from previous herbicide control)	0.5	(As per BMP
66	Lantana (Lantana camara)	366661	6331055	1	1 1	(As per BMP
67	Lantana (Lantana camara)	366643	6331074	1	0.5	(As per BMP
68	Senna pendula	366647	6331064	Several small seedlings	0.5	(As per BMP

Comments

The majority of the weeds are easily accessable and small to medium in size. Most could be controlled with spot herbicide spray or cut and paint methods.



Feral Animal N	Monitoring Proforma_		
Date:	11/12/2020	Data collectors:	E. Dodd
Management	zone: Eastern Zone		

Feral animal	eral animal Location (MGA 94)					
species	Easting	Northing	Activity level	Recommended control measures		
European Fox	365085	6329629	4 scats recorded			
(Vulpes vulpes)						
European Fox	365069	6329608	2 scats recorded			
(Vulpes vulpes)						
European Fox	365089	6329746	1 scat recorded			
(Vulpes vulpes)						
Domestic Dog	366686	6331035	1 scat recorded			
(Canis lupus						
	+					
	1	l	I			

Record types: O - observed, S - scats, T - tracks, D - diggings, B - burrows







Appendix 6: Weed Action Plan

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		1	Environmental Compliance Coordinator	Page 112 of 118		
DOCUMENT UNCONTROLLED WHEN PRINTED						



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Weed Action Plan

Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

Total Earth Care Pty Ltd January 20



total earth care

Weed Action Plan

Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

January 20

Quality Control	© Total Earth Care Pt	© Total Earth Care Pty Ltd 2019				
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Prepared by:	G Teear					
Approved by	G Barron, W Thurston					
Prepared for:	Delta Coal					
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Total Earth Care Pty Ltd January 20

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Weed Action Plan Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

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1 INTRODUCTION

1.1 Background

Total Earth Care (TEC) has been commissioned by Delta Coal to prepare this update for the Weed Action Plan for the three (3) Delta Coal sites: Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft. The site is within the Central Coast LGA (formerly Wyong LGA).

A Weed Action Plan was developed for Lake Coal in 2016 to guide weed management of the aforementioned sites in a consolidated report. The sites are now managed by Delta Coal and an updated Weed Action Plan is required to assess the current weed densities on the site and provide relevant management actions that will assist in the development of updated Biodiversity Management Plans for each site. The Weed Action Plan will guide on ground weed management and assist in tracking the progress of since the previous Weed Action Plan developed in 2016.

1.2 Subject Sites and Study Area

The "Study Area" has been defined as each of the three (3) sites: Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft. Management Zones have previously been defined for these sites. Please see the Maps 1 to 3 below which indicate the boundaries of the Project Area and the existing management zones.

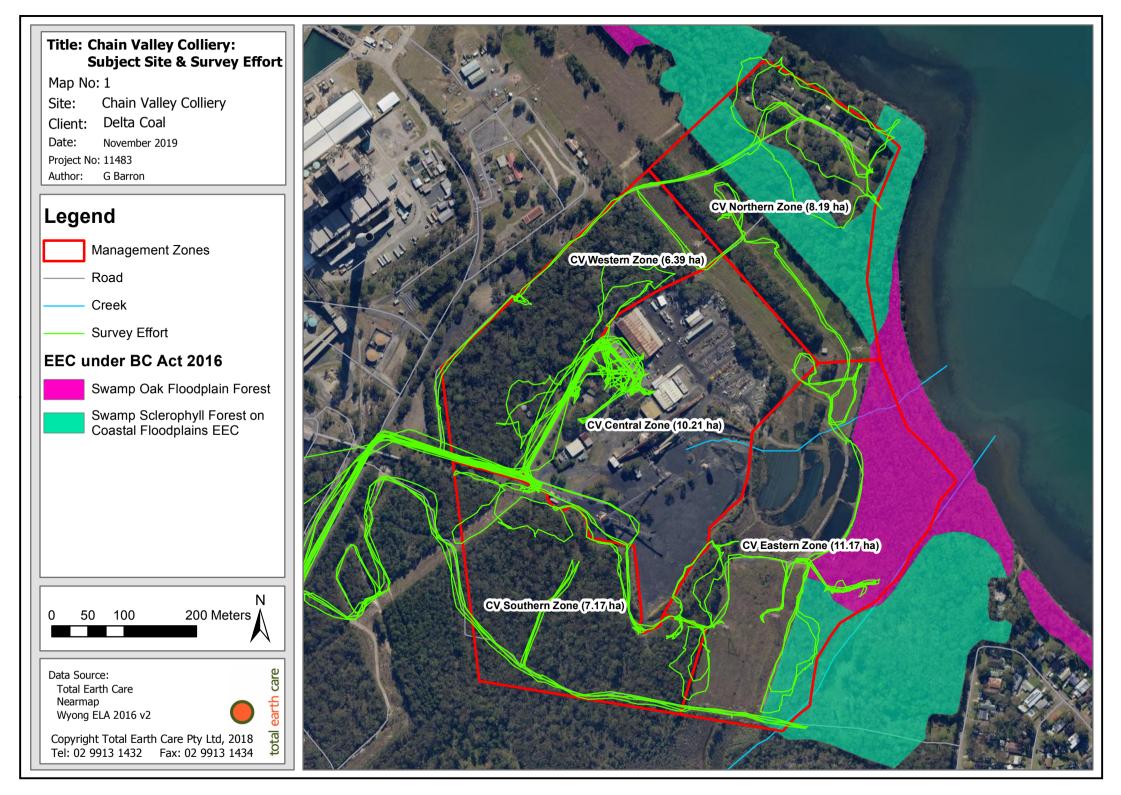
All three (3) sites fall within the Local Land Services Greater Sydney Region, bordering on the Hunter Region.

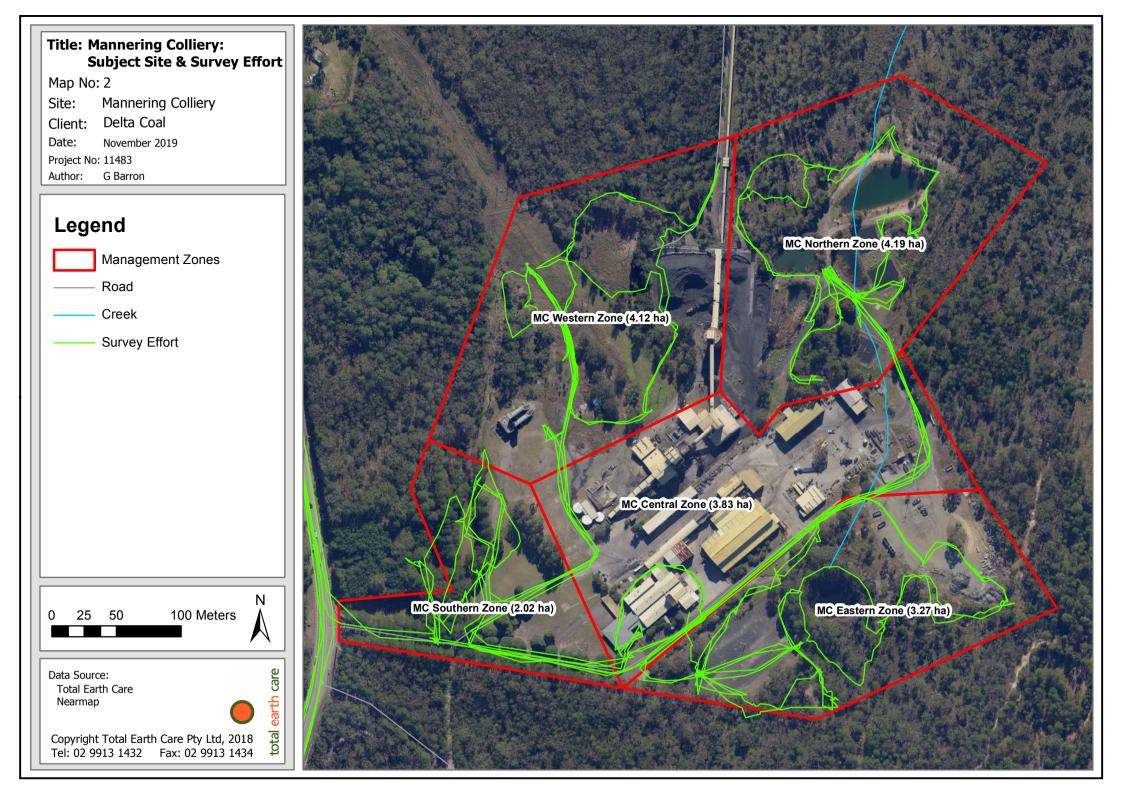
1.3 Goals and Objectives

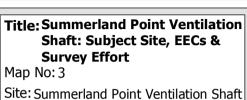
The objectives of this management program are to:

- Describe the existing flora and fauna within the subject site based on current survey effort and database searches of the subject site and surveys of the wider study area.
- Provide ground-truthed weed density maps, highlighting priority weeds under the NSW Biosecurity Act 2015.
- Report any threats to Endangered Ecological Communities.
- Provide a program for ongoing weed management and/or eradication.

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Delta Coal Client: Date: November 2019

Project No: 11483 Author: G Barron

Legend

Summerland Point

Road

Creek

Survey Effort

EEC under BC Act 2016

Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion

> Swamp Sclerophyll Forest on Coastal Floodplains EEC

Ν 100 Meters

Data Source: **Total Earth Care** SIX Maps

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Relevant Legislation and Strategies

This Weed Action Plan will be written in accordance with:

- Commonwealth laws including:
 - a. Environment Protection and Biodiversity Conservation Act 1999
- 2 NSW laws including:
 - a. Biodiversity Conservation Act 2016
 - b. Biosecurity Act 2015
- 3 Local laws LGA:
 - a. Wyong Local Environment Plan 2013
 - b. Wyong Development Control Plan 2013
- 4 Weed Strategies
 - Australian Weeds Strategy 2017-2027
 - Greater Sydney Regional Strategic Management Plan

1.4.1 NSW Biosecurity Act 2015 - Weeds

The NSW Biosecurity Act 2015, repealed the NSW Noxious Weeds Act 1993 on the 1st of July 2017.

The purpose of the NSW Biosecurity Act 2015 is to provide framework for risk-based prevention, elimination and minimisation of biosecurity risks. These include pests, diseases, contaminants, nonindigenous animals, bees, weeds and other biosecurity matter. One of the main objectives of the Biosecurity Act 2015 is to promote biosecurity issues as a shared responsibility between government, industry, and communities, i.e. private and public land managers have the same obligations under the Act. Local Council is the control authority who enforces this Act. A State Weeds Committee has been established, as well as eleven (11) Regional Weeds Committees who will provide guidance and facilitate community and stake holder input into weed management.

Under the Biosecurity Act 2015, the definition of a weed is a plant that is a pest, and the definition of a pest is a plant or animal (other than a human) that has an adverse effect on, or is suspected of having an adverse effect on, the environment, the economy or the community.

Schedule 1 describes the special provisions relating to weeds. Under this Schedule, land occupiers have a duty to:

- control weeds on roads which bound their occupied land;
- control aquatic weeds along a watercourse, river, or inland water which bound their occupied land; and
- control weeds on land extended from their occupied land if that land is an irrigation area forming any part of a public road, public reserve or public channel, or watercourse, river or inland water.

Regional Strategic Weed Management Plans have been developed which describe the land occupier's expectations for managing weeds and form the basis for an enforceable general biosecurity duty. The three (3) Delta Coal sites fall within the Greater Sydney Local Land Services area, therefore the Greater Sydney Regional Strategic Management Plan applies to these sites.

1.4.2 Australian Weeds Strategy – Weeds of National Significance (WoNS)

Australian Weeds Strategy provides a national framework for addressing weed issues. It lists thirty-two (32) weed species or genera that are required to be managed under state legislation. These are Weeds of National Significance (WoNS). Five (5) of these have been identified on site and are listed in Section 3 of this management plan.

1.4.3 NSW Biodiversity Conservation Act 2016

The NSW Biodiversity Conservation Act 2016 (BC Act), with associated regulations and maps, repealed the Threatened Species Conservation Act 1995 on the 25th of August 2017. The BC Act is now the key piece of legislation protecting threatened species, populations and ecological communities within NSW.

There are a number of Endangered Ecological Communities (EEC) mapped on the Delta Coal sites (ELA 2016). These include;

- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions:
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and

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• Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion.

Refer to Maps 1, 2 and 3 for mapped EECs. The Mannering Colliery does not contain any EECs.

One aim of the BC Act is to eliminate or manage certain Key Threatening Processes (KTPs) that threaten the survival or evolutionary development of threatened species, populations and ecological communities.

KTPs listed by the BC Act are identified as having significant impacts on the conservation of native flora and fauna. There are currently thirty-seven (37) KTPs listed under the BC Act including:

- Invasion and establishment of exotic vines and scramblers.
- ii. Invasion, establishment and spread of Lantana camara.
- iii. Invasion of native plant communities by *Chrysanthemoides monilifera* (Bitou Bush and Boneseed).
- iv. Invasion of native plant communities by exotic perennial grasses.
- v. Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.

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2 METHODS

2.1 Desktop Research

A preliminary desktop study was conducted to assess the previously mapped weed locations (Kleinfelder 2016) and existing plant community types using the Wyong ELA 2016 PCT (ELA, 2016) mapping.

2.2 Site Survey

A site survey was conducted over two (2) days on the 15th and 16th October 2019. Weather conditions were clear with maximum temperatures of approximately 25°C on the 15th and 24°C on the 16th. See Maps 1, 2 and 3 for survey effort.

A general weed survey was conducted using random meanders. Edges of bushland, creek lines, disturbed areas and any other areas likely to contain weeds were targeted as were areas where weeds were previously identified in the 2016 Weed Action Plan.

• The identification of native and exotic plant species according to *Field Guide to the Native Plants of Sydney* (Robinson, 2003), Flora of NSW, Volumes 1-4 (Harden 1992, 1993, 2000, 2002), *Weeds of the south-east: an identification guide for Australia* (Richardson et al, 2006) and PlantNET (2019), with reference to recent taxonomic changes;

Any "weed infestations" found during survey were recorded using a hand held GPS. Weed infestations are defined as:

- Areas where weeds make up >80% percentage foliage cover.
- Weeds of national significance
- Priority weeds and other weeds of regional concern as listed in the Greater Sydney Regional Strategic Weed Management Plan

Any WoNS and/or any priority weeds for the Greater Sydney Region which were identified on site, are listed in Appendix A which includes their biosecurity status under the *Biosecurity Act* 2015.

2.3 Weed Density Mapping

Weed density maps were developed for each zone. All weeds present were considered when determining the weed densities for each area.

GPS locations were mapped to provide clear locations for WoNS, significant weed infestation and Priority Weeds.

2.4 Priorities

The priorities of targeted weed work detailed in Section 4 - Management Zones, were determined by the species listing and the landholder's obligations under the *Biosecurity Act 2015* and the Greater Sydney Regional Strategic Weed Management Plan. Species listed as WoNS are considered a high priority. Other weeds that were deemed to have the potential to significantly impact biodiversity were also included as Priority Weeds.

Priority areas were determined by the resilience and condition of existing bushland and the location of weed infestations. Infestation or small outbreaks of weeds in high quality, undisturbed or resilient bushland are considered a high priority to conserve the existing biodiversity values and to prevent further spread which could become more costly to address in the future. Infestations along property boundaries, creek lines and waterways are considered high priority as weeds are more susceptible to spread onto neighbouring properties downstream or across boundary edges.

2.5 Limitations

The diurnal field survey was conducted over two (2) days during October 2019. Random meanders were conducted across the site and targeted searches for weeds along creek line, bushland edges and disturbed areas where weeds are likely to occur. Some areas were not searched due to access issues and time constraints. The central zones mainly consist of infrastructure and planted species and were not surveyed for this report.

When reviewing maps please note that the hand-held GPS equipment used is only accurate to 3 metres.

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3 RESULTS

The weed survey identified thirty-six (36) weed species under the *Biosecurity Act 2015*. These are listed in Appendix A along with the land holder's obligations under the Act. Of these, five (5) are WoNS. These are:

- Asparagus Fern (Asparagus aethiopicus)
- Bitou Bush (Chrysanthemoides monilifera subsp rotundata)
- Lantana (Lantana camara)
- Blackberry (Rubus fruticosus aggregate)
- Fireweed (Senecio madagascariensis)

Bitou Bush, Lantana and Fireweed are also listed as State Priority Weeds. Six (6) weeds are listed as Priority Weeds under the Greater Sydney Regional Strategic Weed Management Plan. These include Giant Reed (*Arundo donax*), Pampas Grass (*Cortaderia jubata*) and the above mentioned WoNS.

Weeds are mostly contained to disturbed areas, bushland edges, tracks and riparian areas across all three (3) sites. There are some small outbreaks within large resilient bushland areas which have been prioritised within this Plan. Many of these have been treated as part of primary bush regeneration efforts and require follow up treatment of new shoots.

Two (2) areas with two (2) to three (3) individual orchids of the genus Microtis were identified. One (1) area is located in the easement of the eastern zone of Chain Valley Colliery and another along the disturbed edges of the eastern zone at Mannering Colliery. These have been mapped in Map 7 and Map 11.

The current condition, locations of weed infestation and weed densities have been discussed in detail within Section 4 - Management Zones.

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MANAGEMENT ZONES

TEC have based the management zones on those created for the 2016 Weed Action Plan (Kleinfelder, 2016). The boundaries have been adjusted slightly to follow existing structural boundaries such as roads, tracks, clearings, easements and fences to allow for clearer delineation of management zones during on ground works.

The Central Zone of both the Chain Valley Colliery and Mannering Park Colliery are entirely disturbed and contain the site infrastructure. The zones are mostly void of native vegetation except for remnant canopy trees and planted native and ornamental species, as such these zones were not included in the weed survey.

Chain Valley Colliery 4.1

The Chain Valley Colliery site is made up of the following EECs:

- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

See Map 1 for EEC locations.

Chain Valley Colliery contains high quality resilient bushland in most zones. Managing weed outbreaks in these areas is a high priority to prevent degradation and further encroachment on bushland areas. Most weed outbreaks occur in the disturbed areas including cleared easements, easement edges, along tracks, creek lines and dam edges. These outbreaks are small and in their early stages of growth and therefore should be targeted before they progress any further. Bush regeneration efforts targeting Lantana and Pampas Grass (Cortaderia selloana) are evident throughout the site but now require follow up treatment. The following maps and tables provide further details on each management zone including priority weeds and management issues.



Figure 1. Eastern Zone of Chain Valley Colliery along creek line.

Weed Action Plan Page 9 of 45 Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft



Figure 2. Treated Lantana and Blackberry in Northern Zone of Chain Valley Colliery near cottages.



Figure 3. Fishbone Fern and Crofton Weed in Western Zone Area B of Chain Valley Colliery along drainage area.

4.1.1 Chain Valley Colliery - Northern Zone

Table 1. Chain Valley Colliery – Northern Zone Area Descriptions

Description	This zone is approximately 8.2 ha and includes cleared powerline easements and modified areas surrounding the cottages and bushland.
	Area A – <5% weed cover
	The most resilient area of the zone with low weed densities. Some weed encroachments on the edges of the bushland. A small area of treated Lantana and Blackberry is located to the south-east of this zone.
	Area B – 5-25% weed cover
	Highest weed densities are found along the edge of the bushland and species present include Blackberry, Asparagus Fern, Fishbone Fern (Nephrolepis cordifolia), Monstera deliciosa and Senna pendula var. glabrata.
	Area C – 25-50% weed cover
	Dense area of Blackberry, Lantana, Ochna serrulata, Wild Tobacco (<i>Solanum mauritianum</i>) and herbaceous weeds. Evidence of Blackberry and Pampas Grass being treated. Appears to have been the focus area of Bush Regeneration efforts.
	Area D – 5-25% weed cover
	Mostly ornamental exotic plant species in front of houses.
	Area E – 5-25% weed cover
	Dense patch of Monstera deliciosa.
	Area F - 5-25% weed cover
	Patch of Camphor Laurel (<i>Cinnamomum camphora</i>) and Coral trees (<i>Erythrina x sykesii</i>) including several saplings.
	Area G - 5-25% weed cover
	Bushland strip between powerline easements containing scattered small outbreaks of weeds including Senna pendula var. glabrata and Lantana.
	Area H – 5-25% weed cover
	Powerline easement with scattered Fireweed and Purple Top (Verbena bonariensis).
Priority Weeds	Lantana, Blackberry, Pampas Grass and Asparagus Fern
Priority Areas	Area A and B has the most resilience and is connected to larger tracts of bushland. Weeds should be controlled to prevent further spread.
Key	Follow up treatment of Lantana, Blackberry, Senna pendula var. glabrata
Management Issues	 in Areas A and C. Primary treatment of Asparagus Fern particularly along edges in Area B. Primary treatment of Senna pendula var. glabrata and Monstera deliciosa, and untreated areas of Lantana and Pampas Grass.
Notes	Access to this zone via dirt road from near CVC site entry. Key required. Caution to be taken driving around cottages due to rubbish and debris hidden by long grass.

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4.1.2 Chain Valley Colliery – Western Zone

Table 2. Chain Valley Colliery – Western Zone Area Descriptions

Description	This zone is approximate 6.4 ha of highly resilient bushland with predominantly low weed densities. Evidence throughout of bush regeneration efforts.								
	Area A – <5% weed cover								
	Highly resilient bushland with a very low weed density. Scattered outbreaks of Blackberry and Lantana on the side of the road that runs along the north-west boundary. All identified scattered Lantana thickets in the south-east part of the area have been treated. Some juvenile Lantana coming up in these treated areas.								
	Area B – 5-25% weed cover								
	Damp drainage areas in some places have encourage weed growth. Lantana, Crofton Weed, Asparagus Fern, Fishbone Fern and herbaceous weed species scattered throughout this zones (see Figure 3). All identified Lantana patches have been treated. Some juvenile Lantana coming up in these treated areas. Pampas Grass and some Fishbone Fern has been treated but requiring follow up treatment.								
Priority Weeds	Lantana, Blackberry, Pampas Grass, Asparagus Fern and Crofton Weed.								
Priority Areas	Both Area A and B. The surrounding bushland is highly resilient and further weed outbreaks should be prevented.								
Key Management Issues	 Follow up treatment of Lantana and Pampas Grass. Primary treatment of Crofton Weed and Fishbone Fern. Hand weeding and spraying. Priority zone. Edges and tracks should be monitored regularly. 								
Notes	Access to the track along the north-west boundary of this zone via dirt road from near CVC site entry. Key required.								

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Map No: 5

Chain Valley Colliery Site:

Delta Coal Client: Date: November 2019

Project No: 11483 Author: G Barron

- Road

Management Zones

Weed Density

< 5%

5 - 25%

25 - 50%

Key Points

- Asparagus Fern
- Blackberry & Fireweed
- Crofton Weed
- Crofton Weed & Lantana camara
- Lantana camara
- Lantana camara treated

Pampas Grass & Lantana

- camara treated and Asparagus Fern & Crofton Weed
- Senna pendula var. glabrata

80 Meters

Ν

Data Source: Total Earth Care Nearmap



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4.1.3 Chain Valley Colliery – Southern Zone

Table 3. Chain Valley Colliery – Southern Zone Area Descriptions

This zone is approximate 7.2 ha of highly resilient and mostly unbushland with predominantly low weed densities. Area A = 5-25% weed cover Scattered small outbreaks of Senna pendula var. glabrata, Black Bush, Ochna and Lantana, Lantana has been treated but some scoming up. Most weeds are along the track edge to the north and boundary of the bush and powerline easement. Area B = <5% weed cover Highly resilient bushland. Some Pinus radiata saplings coming up the track that runs along the southern part of the area. Area C = 5-25% weed cover Powerline easement containing scattered Pinus radiata saplings weeds and Oleander. Area D = <5% weed cover Resilient bushland with scattered Pinus radiata saplings along easement bushland with	kberry, Bitou small shoots are d the eastern up adjacent to
Scattered small outbreaks of Senna pendula var. glabrata, Black Bush, Ochna and Lantana, Lantana has been treated but some scoming up. Most weeds are along the track edge to the north and boundary of the bush and powerline easement. Area B - <5% weed cover Highly resilient bushland. Some Pinus radiata saplings coming up the track that runs along the southern part of the area. Area C - 5-25% weed cover Powerline easement containing scattered Pinus radiata saplings weeds and Oleander. Area D - <5% weed cover	small shoots are d the eastern
Bush, Ochna and Lantana, Lantana has been treated but some scoming up. Most weeds are along the track edge to the north and boundary of the bush and powerline easement. Area B - <5% weed cover Highly resilient bushland. Some <i>Pinus radiata</i> saplings coming up the track that runs along the southern part of the area. Area C - 5-25% weed cover Powerline easement containing scattered <i>Pinus radiata</i> saplings weeds and Oleander. Area D - <5% weed cover	small shoots are d the eastern
Highly resilient bushland. Some <i>Pinus radiata</i> saplings coming u the track that runs along the southern part of the area. Area C – 5-25% weed cover Powerline easement containing scattered <i>Pinus radiata</i> saplings weeds and Oleander. Area D – <5% weed cover	
the track that runs along the southern part of the area. Area C - 5-25% weed cover Powerline easement containing scattered <i>Pinus radiata</i> saplings weeds and Oleander. Area D - <5% weed cover	, ,
Powerline easement containing scattered <i>Pinus radiata</i> saplings weeds and Oleander. Area D – <5% weed cover	, herbaceous
weeds and Oleander. Area D - <5% weed cover	, herbaceous
Positions bushland with scattered Pinus radiata santings along or	
ivesilient bushland with scattered rinds radiata sapilities along ea	asement edge.
Area E – 5-25% weed cover	
Mostly managed lawn along driveway. Scattered <i>Pinus radiata</i> st Lovegrass (<i>Eragrostis curvula</i>) and Oleander (<i>Nerium oleander</i>) edges.	
Area F – 25-50% weed cover	
Disturbed bushland edges with scattered small outbreaks of Bito Lantana, Pampas Grass, Banana Trees and African Love Grass. Grass in this area has been treated.	
Priority Weeds Lantana, Pampas Grass, Bitou Bush and <i>Pinus radiata</i> saplings	
Priority Areas Area B is highly resilient and has very few weed outbreaks. All of this management zone should be managed to prevent further sp into Area B.	
 Follow up treatment of Pampas Grass Follow up and primary treatment of Lantana. Small shoot pulled. Primary treatment of Bitou Bush. Most can be hand pulled. Primary treatment of Pinus radiata saplings particularly at in Area B. This is a highly resilient area and invasion of Farea should be prevented. High priority zone. Monitor tracks for any weed out break 	ed. along the track Pines in this
Notes Access to the track within this zone is via a locked gate or througe easement.	gh powerline

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4.1.4 Chain Valley Colliery – Eastern Zone

Table 4. Chain Valley Colliery – Eastern Zone Area Descriptions

Description

This zone is approximate 11.17 ha of bushland cleared powerline easements and sediment ponds. These ponds consistently discharge across the bushland in Area H and into the lake to the north-east.

Area A - <5% weed cover

Small occurrences of Caster Oil and Lantana on dam walls. Scattered occurrences of *Senna pendula var. glabrata* and Narrow-leafed Cotton Bush (*Gomphocarpus fruticosus*) in the easements to the north.

Area B - 5-25% weed cover

Small amounts of scattered Whiskey Grass (*Andropogon virginicus*), Pampas Grass and Bitou Bush on easement edges and damp areas.

Area C - <5% weed cover

Small amounts of scattered Whiskey Grass, Pampas Grass, Bitou Bush and other herbaceous weeds on easement edges.

Area D - 5-25% weed cover

Encroachments of weeds from the track to the south of the area and the easement edges. Scattered small outbreaks of Asparagus Fern, *Senna pendula var. glabrata*, Lantana, African Love Grass, Blackberry Nightshade and Bitou Bush. A small Lantana thicket has been treated.

Area E - 5-25% weed cover

Dense areas of Pampas Grass in this area and across property boundary. Scattered occurrences of Crofton Weed, Lantana and Bitou Bush.

Area F - 5-25% weed cover

Cleared powerline easement containing scattered Whiskey Grass, Cotton Bush, Fireweed and herbaceous weeds. Small lantana thicket and Pampas Grass under powerline pylon.

Area G - 25-50% weed cover

Dense stand of Wild Tobacco. Asparagus Fern starting to come up. Scattered small occurrences of Bitou Bush, Lantana, Ginger Lily, Ochna, Inkweed, Crofton and Senna pendula var. glabrata. Large stands of Lantana have been treated. Coral trees, Fishbone Fern, Monstera deliciosa, Senna pendula var. glabrata and Ginger Lily along creek line in southern corner.

Area H - <5% weed cover

Parts of this area have been recently burnt and are coming up with early successional native species such as *Dodonaea triquetra*. Track edges southeast of the dam have scattered small occurrences of Bitou Bush, Asparagus Fern, Lantana, Crofton Weed and Fireweed. Some sporadic occurrences of Lantana, Bitou Bush and *Senna pendula var. glabrata* along the edges of the easement in the north of this area.

Priority Weeds

Lantana, Asparagus Fern, Bitou Bush, Pampas Grass and *Senna pendula var. glabrata*.

Priority Areas

Area G along creek line should be targeted to prevent weed propagules travelling downstream.

Area H is mostly resilient bushland that has been mapped as two EECs (see Map 1).

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Total Earth Care Pty Ltd January 20

Key Management Issues	 Prioritise treating weeds in the southern half of this zone. Follow up treatment of Lantana. Small shoots can be hand pulled. Primary treatment of Bitou Bush, Asparagus Fern, Senna pendula var. glabrata and Pampas Grass along track and easement edges.
Notes	Vehicle access via the tracks near the sediment ponds and via the track through the south-west corner of the zone.

Weed Action Plan Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft Page 18 of **45**



4.2 Mannering Colliery

Mannering Colliery has more disturbed areas and fewer large tracts of undisturbed bushland then the Chain Valley Colliery. However, the site is surrounded by bushland and therefore it is imperative that weeds are prevented from spreading into neighbouring resilient areas. Most outbreaks are small and should be targeted before they progress any further. Bush regeneration efforts targeting Lantana and Pampas Grass are evident throughout the site but now require follow up treatment. This site does not contain any EECs.

The following maps and tables provide further details on each management zone including priority weeds, priority areas and management issues.



Figure 4. Resilient bushland in Eastern Zone Area D of Mannering Colliery.

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Figure 5. Bamboo and Crofton Weed in Western Zone Area F of Mannering Colliery.



Figure 6. Crofton Weed and Juncus acutus in wetland area of Northern Zone Area B of Mannering Colliery.

4.2.1 Mannering Colliery – Northern Zone

Table 5. Mannering Colliery - Northern Zone Area Descriptions

Description

This zone is approximate 4.24 ha and consists of four (4) dams, access tracks and some patches of disturbed bushland. Water is discharged from the ponds across Area A, B and G.

Area A - 5-25% weed cover

Pinus radiata saplings, Whiskey Grass and Fireweed along track edges. Treated *Acacia saligna*. Dense stands of *Juncus acutus* in low lying areas.

Area B - 50-75% weed cover

Dense area of weeds including Lantana, Bitou Bush, Crofton Weed, Pampas Grass, Senna and *Juncus acutus*. Lantana and some Pampas Grass has been treated.

Area C - 25-50% weed cover

High density of herbaceous weeds. *Acacia saligna* present, most of which has been treated. *Juncus acutus* present. Pampas Grass present most of which has been treated. Whiskey Grass along track edges.

Area D - 25-50% weed cover

High density of herbaceous weeds across disturbed area.

Area E - 5-25% weed cover

Hydrocotyl is scattered along the dam edges and Typha within the dam.

Area F - 5-25% weed cover

Typha within the dam.

Area G - 5-25% weed cover

The edges of Area G contains *Pinus radiata* saplings. Within the low lying damp wetland areas Large stands of Lantana and Pampas Grass have been treated.

Area H - <5% weed cover

Limited access due to fencing. Scattered Crofton Weed, Lantana, Bitou Bush, Camphor Laurel trees and mature and sapling *Pinus radiata*.

A Resource Regulator identified Coolatai Grass (*Hyparrhenia hirta*) present on the western wall of the largest dam. EMM consultants confirmed the species ID.

Area I - <5% weed cover

Mostly disturbed and cleared areas. Herbaceous weeds, Whiskey Grass and Fireweed along track edges.

Area J - 50-75% weed cover

Dense and scattered stands of Bitou Bush, Lantana, Crofton and Senna. Lantana has been treated but new young shoots are coming up. Large and sapling *Pinus radiata* present. Scattered herbaceous weeds including *Bidens pilosa*, Fleabane (*Conyza sp.*) and Purple Top.

Priority Weeds

Lantana, Bitou Bush, Pampas Grass, Crofton Weed, Fireweed, Senna, *Pinus radiata, Juncus acutus, Coolatai Grass* and Senna

Priority Areas

Area J to follow up from primary weed treatment in this area.

Area B to follow up primary treatment of Lantana and Pampas Grass and prevent propagules form spreading downstream.

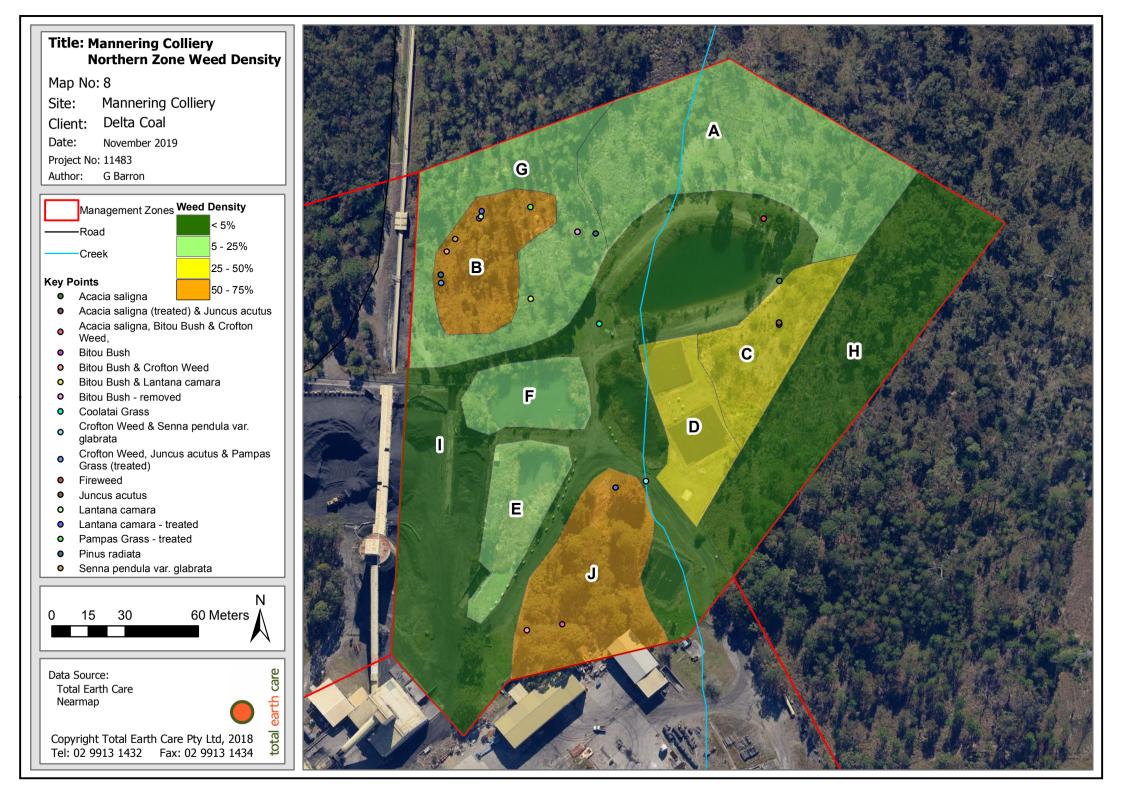
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Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

Total Earth Care Pty Ltd January 20

Key Follow up treatment of Lantana. Young, small shoots can be hand Management pulled. Follow up treatment for Pampas Grass and Crofton Weed using cut/paint, hand removal and spraying. Primary treatment of Juncus acutus Hand pull Fireweed opportunistically. Prioritise areas A, E, G and J. Easy vehicle access to most areas. No obvious access to Area H due to fence. **Notes**

Weed Action Plan Page 23 of 45 Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

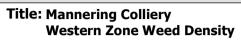


4.2.2 Mannering Colliery – Western Zone

Table 6. Mannering Colliery – Western Zone Area Descriptions

Description	This zone is approximately 4.12 ha including cleared powerline easements, a dam, and disturbed patches of remnant bushland some of which connect to greater bushland extents.
	Area A – 5-25% weed cover
	Scattered herbaceous weeds and exotic grasses. Small scattered patches of Asparagus Fern.
	Area B – 5-25% weed cover
	Powerline easements mostly consisting of exotic grasses, some Lantana patches, <i>Senna pendula var. glabrata</i> and Fireweed, particularly closer to the dam edges.
	Area C – 5-25% weed cover
	Small scattered outbreaks of Crofton Weed, Pampas Grass, Bitou Bush, Whiskey Grass and African Love Grass throughout this area.
	Area D – 25-50% weed cover
	Scattered outbreaks of Lantana, Crofton Weed, Bitou Bush, Whiskey Grass and herbaceous weeds. Lantana thickets have been treated. New shoots are coming requiring treatment.
	Area E - <5% weed cover
	Isolated patch of vegetation containing a small thicket of Lantana.
	Area F – 25-50% weed cover
	Lantana, Crofton Weed, Bitou Bush, and a large outbreak of Bamboo are dominating this area.
	Area G – 5-25% weed cover
	A fence divides this area from the rest of the western zone. A large area of Lantana is located in the northern part of this area.
Priority Weeds	Asparagus Fern, Lantana, Senna, Crofton Weed, Bitou Bush and Bamboo.
Priority Areas	Areas C, F and G are a priority within this zone due to their proximity to remnant bushland and potential for WoNS and Priority Weeds under the Biosecurity Act to spread.
Key Management Issues	 Follow up and primary treatment of Lantana. Primary treatment of Bamboo, Crofton Weed, Asparagus Fern. Opportunistic hand pulling of Fireweed.
Notes	Easy vehicle access to most areas. Area G is separated from the rest of the zone by a fence so vehicle access is limited. On foot access is possible by following the fence from the main driveway entrance to the south.

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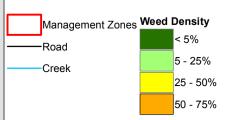


Map No: 9

Site: Mannering Colliery

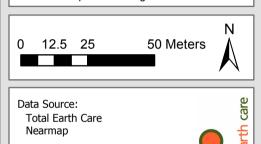
Client: Delta Coal
Date: November 2019

Project No: 11483 Author: G Barron



Key Points

- African Lovegrass & Bitou Bush
- Asparagus Fern
- Bamboo
- Bamboo, Lantana camara & Pampas
- Bitou Bush
- Bitou Bush & Lantana camara
- Crofton Weed
- Crofton Weed & Pampas Grass
- Crofton Weed, Fireweed, Lantana camara
 & Senna pendula var. glabrata
- Crofton Weed, Lantana camara & Senna pendula var. glabrata
- Lantana camara
- Lantana camara treated
- Pinus radiata
- Senna pendula var. glabrata



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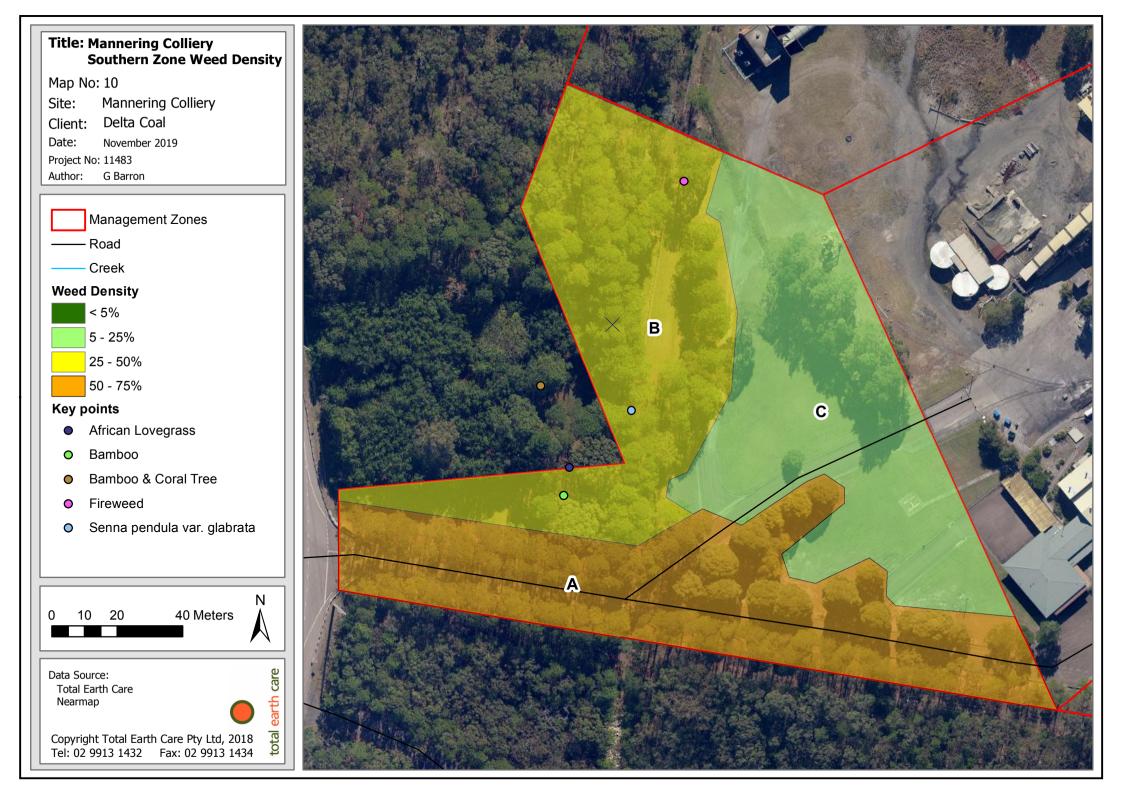


4.2.3 Mannering Colliery – Southern Zone

Table 7. Mannering Colliery – Southern Zone Area Descriptions

Description	This zone is approximately 2.02 ha. It is mostly dominated by mature <i>Pinus radiata</i> and Bamboo. This zone is a low priority due to the lack of remnant bushland and the extent of the pine forest.								
	Area A – 50-75% weed cover								
	Mature and sapling <i>Pinus radiata</i> lining the driveways.								
	Area B – 25-50% weed cover								
	High densities of mature <i>Pinus radiata</i> and Bamboo on western side of fence. Other exotic ornamental species including Oleander and Agave. Camphor Laurel trees on western side of fence. Whiskey Grass and Fireweed across managed lawn. Low priority area as dominated by <i>Pinus radiata</i> .								
	Area C – 5-25% weed cover								
	Mostly herbaceous weeds and exotic grasses.								
Priority Weeds	Bamboo, Fireweed, Camphor Laurel trees.								
Priority Areas	All areas within this zone are low priority. Other zones of the Mannering Colliery are to be prioritised over this one.								
Key Management Issues	Primary treatment of Fireweed and <i>Pinus radiata</i> saplings in Area C								
Notes	Fence divides Area B. Western side of Area B can be accessed from southern end near driveway.								

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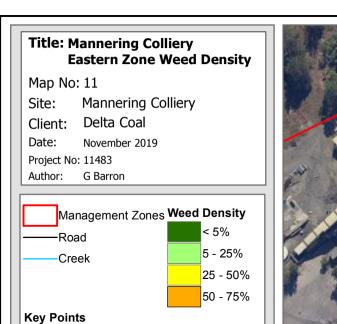


4.2.4 Mannering Colliery – Eastern Zone

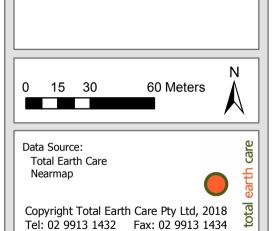
Table 8. Mannering Colliery – Eastern Zone Area Descriptions

Description	This zone is approximately 3.29 ha. This zone contains a carpark, cleared stockpile areas and dam, all bordered by bushland. The bushland is contiguous with adjacent bushland beyond the property boundary to the south. Weeds are generally confined to the bushland edges and disturbed areas.
	Area A - 5-25% weed cover
	Mostly planted ornamental exotics and some natives. Herbaceous weeds, exotic grasses and Fireweed across lawn.
	Area B – 25-50% weed cover
	Scattered herbaceous weeds, exotic and weedy grasses around edges of disturbed area.
	Area C – 5-25% weed cover
	Small area of weed encroachment including Crofton Weed. Evidence of treated Pampas Grass. Small outbreaks of Crofton Weed and Lantana present.
	Area D - <5% weed cover
	Mostly weed free bushland with some <i>Pinus radiata</i> saplings and African Lovegrass in the south-west corner of the area.
	Area E – 25-50% weed cover
	Dominated by mature and sapling Pinus radiata.
Priority Weeds	Crofton Weed, Lantana, Pampas Grass, <i>Pinus radiata</i> and Fireweed.
Priority Areas	Area C and D. These areas are highly resilient and connected to bushland to the south.
Key Management Issues	 Follow up treatment of Pampas Grass. Primary treatment of Lantana and Crofton Weed.
Notes	Site easily accessible.

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- Acacia saligna
- African Lovegrass
- African Lovegrass & Senna pendula var. glabrata
- Bitou Bush
- Crofton Weed
- Fireweed
- Lantana camara
- Orchid Microtis sp.
- Pampas Grass
- Pinus radiata
- Senna pendula var. glabrata





4.3 Summerland Point Ventilation Shaft

The Summerland Point Ventilation Shaft site is made up of the following EECs:

- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregions.

See Map 3 for EEC locations.

The site contains an unsealed road that provides access to a cleared area where the ventilation shaft infrastructure sits. The areas surrounding the ventilation shaft have been cleared and contain most of the weed species identified on the site. The site is surrounded by highly resilient bushland. Areas along the unsealed road have also been subject to some weed invasion.



Figure 7. Giant Reed within bushland at the Summerland Ventilation Shaft site. .

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Figure 8. Unsealed road and easement within the Summerland Ventilation Shaft site.



Figure 9. Vegetation adjacent to road on the Summerland Ventilation Shaft site.

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Table 9. Summerland Point Ventilation Shaft – Area Descriptions

Description	This zone is approximately 3.73 ha. This zone contains an unsealed road, a cleared area for the ventilation shaft infrastructure and remnant adjacent bushland. Weeds are generally confined to the bushland edges and disturbed areas.							
	Area A – 5-25% weed cover							
	Mostly bushland and road edges effected by weeds. Lantana thickets have been treated but required follow up treatment. Scattered small shoots of Lantana and Bitou Bush andherbaceous weeds.							
Priority Weeds	Lantana, Giant Reed, Bitou Bush							
Priority areas	Entire site – small weeds outbreaks on edges of highly resilient bushland must be targeted to prevent further spread.							
Key Management Issues	 Follow up treatment of Lantana and Bitou Bush. Small shoots can be hand pulled. Primary treatment of a small area of Giant Reed. Monitor bushland edges and road edges for new outbreaks. 							
Notes	Easy vehicle access. Key required.							
	Red-bellied black snake observed on site.							

Weed Action Plan Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft Page 33 of **45**

Title: Summerland Point Ventilation **Shaft Weed Density**

Map No: 12

Site: Summerland Point Ventilation Shaft

Delta Coal Client: November 2019 Date:

Project No: 11483 Author: G Barron



Road

Creek

Weed Density



Key Points

- Arundo donax & Lantana camara
- Bitou Bush
- Bitou Bush removed
- Crofton Weed
- Fireweed
- Lantana camara
- Lantana camara & Senna pendula var. glabrata
- Lantana camara (treated) & Senna pendula var. glabrata
- Lantana camara treated
- Senna pendula var. glabrata



Data Source: Total Earth Care SIX Maps



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5 WEED MANAGEMENT

Species specific recommended weeding techniques including recommended herbicides and ratios are included Appendix B.

Weed recruitment and outbreaks are often triggered by disturbance or clearing. Weed management is a form of disturbance that can trigger additional recruitment of weeds as areas are cleared. Therefore secondary treatment is essential to successful weeding and bush regeneration methods.

All weeding management actions on these sites must be carried out by trained bush regenerators. Bush Regeneration contractors must comply with the *Pesticides Act 1999 and the Pesticides Regulation 2017.*

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7 MONITORING GUIDELINES

Monitoring is required to assess the outcomes of the weed management work and help determine if management strategies should be amended. Monitoring should be completed every six (6) months by a qualified ecologist or bush regeneration supervisor using the following methods:

- Assessment of weed control works, native regeneration and revegetation success via permanent repeatable photographic monitoring points; and
- Mapping of weed density per zone to assess the progress of the work. The mapping included in this report can assist in the development of baseline data.

Monitoring reports must include:

- Details of the work carried out including weed management techniques and herbicide used;
- Photo monitoring points baseline and follow up photos; and
- · Recommendations for corrective measures and/or specific vegetation management required.

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Appendix A. Weed Species listed as a Biosecurity Risk

Table 10. Categories of Management under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 under the NSW Biosecurity Act 2015

Category	Management Action				
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.				
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.				
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.				
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.				
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminat or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or quality to know) of any biosecurity risk, has a duty				
RRM					
(Regional Recommended Measure)	Specific details for each species included in table.				
PoD (Prohibition on Dealings)	Must not be imported into the State or sold.				
B Zone (Biosecurity Zone)	Specific details for each species included in table.				
PM (Prohibited Matter)	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.				

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Table 11. Weeds under the Biosecurity Act recorded within the subject site listed as State or Regional Priority Weeds in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Golden Wreath Wattle	Acacia saligna				Environment	
Crofton Weed	Ageratina adenophora				Environment, Agriculture	
Scarlet Pimpernel	Anagallis arvensis				J	
Whisky Grass	Andropogon virginicus				Environment	
Giant Reed	Arundo donax			Asset Protection		RRM; Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment.
Asparagus Fern	Asparagus aethiopicus	Yes				PoD
Cobblers Pegs	Bidens pilosa					
Buffalo Grass	Bouteloua dactyloides					
Bitou Bush	Chrysanthemoides monilifera subsp rotundata	Yes	Containment			PoD, B Zone; The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south.
Camphor Laurel	Cinnamomum camphora				Environment, Agriculture, Human health	

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Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Spear Thistle	Cirsium vulgare					
Fleabane	Conyza bonariensis					
Pampas Grass	Cortaderia jubata			Asset Protection		RRM: Land managers mitigate the risk of the plant being introduced to their land. Land managers prevent spread from their land where feasible. Land managers reduce the impact on priority assets. The plant should not be bought, sold, grown, carried or released into the environment. This Regional Recommended Measure applies to Cortaderia jubata (pink pampas grass)
Panic Veldgrass	Ehrharta erecta					
African Lovegrass	Eragrostis curvula				Environment	
Coral Tree, Common Coral Tree	Erythrina x sykesii				Environment	
Fennel	Foeniculum vulgare					
Narrow-Leaf Cotton Bush / Swan Plant	Gomphocarpus fruticosus					
Ginger Lily	Hedychium gardnerianum				Environment	
Pennywort	Hydrocotyle bonariensis					
Coolatai Grass	Hyparrhenia hirta				Environment, Agriculture	
Spiny Rush, Spike Rush, Sharp Rush	Juncus acutus				Environment	

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Lantana	Lantana camara	Yes	Asset Protection			PoD
Fishbone Fern	Nephrolepis cordifolia				Environment	
Ochna	Ochna serrulata				Environment	
Bamboo, Black Bamboo, Rhizomatous Bamboo,	Phyllostachys nigra				Environment	
Inkweed	Phytolacca octandra					
Radiata Pine, Pine Wildings	Pinus radiata				Environment	
Plantain	Plantago lanceolata					
Castor Oil Plant	Ricinus communis					
Blackberry	Rubus fruticosus aggregate	Yes				PoD; All species in the Rubus fruiticosus species aggregate have this requirement, except for the varietals Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree
Fireweed	Senecio madagascariensis	Yes	Asset Protection			PoD
Senna / Cassia	Senna pendula				Environment	
Paddy's Lucerne	Sida rhombifolia					
Tobacco Bush/ Wild Tobacco	Solanum mauritianum				Environment, Agriculture	

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Blackberry Night Shade	Solanum nigrum					
Purpletop	Verbena bonarensis					

Appendix B. Species Specific Weeding Techniques

Common Name	Botanical Name	Weeding Technique	Recommended Timing for Treatment	Herbicide Application	Herbicide Group	Ratio
Golden Wreath Wattle	Acacia saligna	Chainsaw and paint with neat Glyphosate.	All year round	Glyphosate 360g/L	M	Neat
Crofton Weed	Ageratina adenophora	Hand removal, brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
Scarlet Pimpernel	Anagallis arvensis	Hand removal, spot spraying with Glyphosate.	All year round	Glyphosate 360g/L	M	1/100
Whisky Grass	Andropogon virginicus	Remove seed and crown out with knife or spot spray	Prior to flowering in March to May	Glyphosate 360g/L	M	1/100
Giant Reed	Arundo donax	Cut and paint with neat Glyphosate.	All year round	Glyphosate 360g/L	М	Neat
Asparagus Fern	Asparagus aethiopicus	Small single specimens to be crowned or Sprayed with Glyphosate/metsulfuron methyl	All year round	Glyphosate 360g/L & Metsulfuron-Methyl 600 g/kg	M & B	1/100 & 1g/10L
Cobblers Pegs	Bidens pilosa	Foliar spraying using Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Buffalo Grass	Bouteloua dactyloides	Hand removal, brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
Bitou Bush	Chrysanthemoides monilifera subsp rotundata	Small single specimens hand pulled or larger shrubs cut and painted with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Camphor Laurel	Cinnamomum camphora	Scrape and paint or drill and fill with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Spear Thistle	Cirsium vulgare	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	М	1/100
Fleabane	Conyza bonariensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Pampas Grass	Cortaderia jubata	Foliar spraying or cut/paint with Glyphosate or hand removed.	Prior to flowering in March to May	Glyphosate 360g/L	М	1/100 & Neat
Panic Veldgrass	Ehrharta erecta	Foliar spraying with Glyphosate	All year round	Glyphosate 360g/L	M	1/100

Common Name	Botanical Name	Weeding Technique	Recommended Timing for Treatment	Herbicide Application	Herbicide Group	Ratio
African Lovegrass	Eragrostis curvula	Hand pulled or brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
Coral Tree, Common Coral Tree	Erythrina x sykesii	<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Fennel	Foeniculum vulgare	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Narrow-Leaf Cotton Bush / Swan Plant	Gomphocarpus fruticosus	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100 & Neat
Ginger Lily	Hedychium gardnerianum	Physical removal. Large stands cut and painted with Glyphosate/Metsulfuron-Methyl.	All year round	Glyphosate 360g/L & Metsulfuron-Methyl 600 g/kg	M & B	Neat
Pennywort	Hydrocotyle bonariensis	Hand pulled or spot sprayed with Dicamba	All year round			
Coolatai Grass	Hyparrhenia hirta	Hand pulled or brush cut and foliar sprayed with Glyphosate. Up to three applications of Glyphosate in the same growing season will be required.	All year round	Glyphosate 360g/L	M	200ml/10l
Spiny Rush, Spike Rush, Sharp Rush	Juncus acutus	Juvenile single specimens to be dug out. Large infestations foliar spraying with Glyphosate.	All year round	Glyphosate 360g/L	M	1/100
Lantana	Lantana camara	Cut and paint, sprayed or splattered with Glyphosate. Hand pull small shoots.	All year round	Glyphosate 360g/L	M	Neat
Fishbone Fern	Nephrolepis cordifolia	Hand removal. Brush cut then sprayed with Glyphosate.	All year round	Glyphosate 360g/L	M	1/100
Ochna	Ochna serrulata	Double side scrape and paint all stems to 75% coverage.	All year round	Glyphosate 360g/L	M	Neat
Bamboo, Black Bamboo, Rhizomatous Bamboo,	Phyllostachys nigra	Chainsaw/cut close to base. Allow new shoots to return. Cut and paint new shoots with neat Glyphosate.	All year round	Glyphosate 360g/L	M	Neat
Inkweed	Phytolacca octandra	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Radiata Pine, Pine Wildings	Pinus radiata	<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	All year round	Glyphosate 360g/L	М	Neat

Common Name	Botanical Name	Weeding Technique	Recommended Timing for Treatment	Herbicide Application	Herbicide Group	Ratio
Plantain	Plantago lanceolata	Foliar spraying with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
Castor Oil Plant	Ricinus communis	Hand pulled and cut & painted with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Blackberry	Rubus fruticosus aggregate	Brush cut, crowned and scraped & painted with neat Glyphosate	Between flowering and fruiting from November to January	Glyphosate 360g/L	M	Neat
Fireweed	Senecio madagascariensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Senna / Cassia	Senna pendula	Small individuals hand removed, larger plants cut and painted with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Paddy's Lucerne	Sida rhombifolia	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Tobacco Bush/ Wild Tobacco	Solanum mauritianum	Cut & paint with Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Blackberry Night Shade	Solanum nigrum	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Purpletop	Verbena bonarensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100

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Weed Action Plan - Addendum

Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

Total Earth Care Pty Ltd August 2020



Weed Action Plan - Addendum

Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft

August 2020

Quality Control	© Total Earth Care Pt	y Ltd 2020	
Revision/Version No.	Addendum 1	Date of revision	28 August 2020
Prepared by:	G Teear		
Approved by	G Barron, W Thurstor	1	
Prepared for:	Delta Coal		
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1 INTRODUCTION

1.1 Background

Total Earth Care (TEC) previously prepared the Weed Action Plan (WAP) in January 2020 for the three (3) Delta Coal sites: Chain Valley Colliery, Mannering Colliery and Summerland Point Ventilation Shaft. This Addendum is developed to incorporate an additional area on the Lake Macquarie foreshore at the Chain Valley Colliery in the WAP. Delta Coal was granted a licence by the Minister for Water, Property & Housing on 11th June 2020 under Section 2.20 of the Crown Land Management Act 2016 for the use of the licensed area for *Environmental Rehabilitation – Vegetation Management*.

This Addendum provides guidance for managing the weeds within the license's foreshore area. Current weed densities of the licence's area are provided as well as the relevant management actions.

1.2 Subject Sites and Study Area

The "Study Area" for this Addendum includes the licensed area of Crown Land (Lot 2, DP1198253) that abuts the Chain Valley Colliery site managed by Delta Coal. This will be referred to as the "Foreshore Zone". The area included in the license extends along the foreshore of the neighbouring Delta Electricity site to the north-west, but this area was not part of the scope of this project. Please see the Map 1 below which indicates the boundaries of the Study Area. The site falls within the Local Land Services Greater Sydney Region, bordering on the Hunter Region.

2 METHODS

2.1 Desktop Research

A preliminary desktop study was conducted to assess the previously mapped weed locations (Kleinfelder 2016) and existing plant community types using the Wyong ELA 2016 PCT (ELA, 2016) mapping.

2.2 Site Survey

A site survey was conducted over one (1) day on the 4th August 2020. Weather conditions were clear with maximum temperatures of approximately 18°C. See Map 1 for survey effort. Survey methodology followed that outlined in the WAP 2020.

3 RESULTS

The weed survey identified twenty-five (25) weed species under the *Biosecurity Act 2015*. These are listed in Appendix A along with the landholder's obligations under the Act. Of these, four (4) are listed as Weeds of National Significance (WoNS). These are:

- Asparagus Fern (Asparagus aethiopicus);
- Bitou Bush (Chrysanthemoides monilifera subsp rotundata);
- Lantana (Lantana camara); and
- Fireweed (Senecio madagascariensis).

Bitou Bush, Lantana and Fireweed are also listed as State Priority Weeds. The above listed weeds are also listed as Priority Weeds under the Greater Sydney Regional Strategic Weed Management Plan.

Weeds are mostly encroaching from the lot boundaries of the land, which is managed by Delta Coal. There are some small outbreaks within large resilient bushland areas which have been prioritised within this Plan.

Approximately six (6) *Dendrobium teretifolium*, an epiphytic orchid, were recorded at the southern end of this zone attached to the trunks of Casuarinas. These have been mapped in Map 2 of this Addendum.

The current condition, locations of weed infestations and weed densities have been discussed in detail within Section 4 - Management Zones.



4 MANAGEMENT ZONE

The Foreshore Area is the Crown Land foreshore of the southern end of Lake Macquarie. The Foreshore area forms an additional management zone to those outlined in the WAP 2020. A detailed description of the zone and the weed presence is included in Table 1.

4.1.1 Chain Valley Colliery - Foreshore Area

Table 1. Chain Valley Colliery - Foreshore Area Description

	,,
Description	This zone is approximately 2.7 ha and runs along the foreshore of Lake Macquarie abutting the north-east boundary of the Chain Valley Colliery.
	Area A – <5% weed cover
	The most resilient area of this zone with low weed densities. Scattered occurrences of Bitou Bush (<i>Chrysanthemoides monilifera</i>) and Asparagus Fern (<i>Asparagus aethiopicus</i>), mostly along the lake edge. Approximately six (6) <i>Dendrobium teretifolium</i> , an epiphytic orchid, were recorded at the southern end of this zone attached to the trunks of Casuarinas.
	Area B – 50 – 75% weed cover
	Area with the highest weed density within this zone, which this mostly within the ground and shrub layer. Weed occurrences in this area mostly consist of <i>Lantana camara</i> , <i>Ochna serrulata</i> , Wild Tobacco (<i>Solanum mauritianum</i>), Bitou Bush (<i>Chrysanthemoides monilifera</i>), <i>Tradescantia fluminensis</i> and Asparagus Fern (<i>Asparagus aethiopicus</i>). The areas of densest weeds are along the western boundary of Area B.
	Area C – 50 – 75% weed cover
	Weeds are mostly within the ground layer which consists of exotic grasses, Watsonia (Watsonia meriana var. bulbillifera), Fireweed (Senecio madagascariensis), Asparagus Fern (Asparagus aethiopicus) and herbaceous weeds. Scattered occurrences and small patches of Senna pendula var. glabrata, Fishbone Fern (Nephrolepis cordifolia), Ochna serrulata, Coolatai Grass (Hyparrhenia hirta), Lantana camara, Rhodes Grass (Chloris gayana) and Crofton Weed (Ageratina adenophora) occur along the front of the cottages. Other ornamental exotic plant species are present here, most likely as plantings installed by previous residents of the cottages.
	Area D – 5-25% weed cover
	Scattered occurrences of <i>Lantana camara</i> , <i>Ochna serrulata</i> , and Asparagus Fern (<i>Asparagus aethiopicus</i>).
Priority Weeds	Lantana camara, Bitou Bush (Chrysanthemoides monilifera), Fireweed (Senecio madagascariensis) and Asparagus Fern (Asparagus aethiopicus).
Priority Areas	Area A and B has the most resilience. Weeds should be controlled to prevent further spread. Working from the lake edge towards the Chain Valley Colliery lot boundaries will help in containing weeds within the Delta Coal's land and follow best practice of working from areas of highest resilience to lowest.
Key Management Issues	 Targeted treatment of Bitou Bush (Chrysanthemoides monilifera) and Asparagus Fern (Asparagus aethiopicus) particularly along lake edges in Areas A and B. Primary and targeted treatment of Senna pendula var. glabrata, Fishbone Fern (Nephrolepis cordifolia), Ochna serrulata, Coolatai Grass (Hyparrhenia hirta), Lantana camara, Rhodes Grass (Chloris gayana) and Crofton Weed (Ageratina adenophora).
Notes	Access to this zone via dirt road from near the Chain Valley Colliery site entry. Key required. Caution to be taken driving around cottages due to rubbish and debris hidden by long grass.



Figure 1. Area C showing the small patch of Coolatai Grass present.

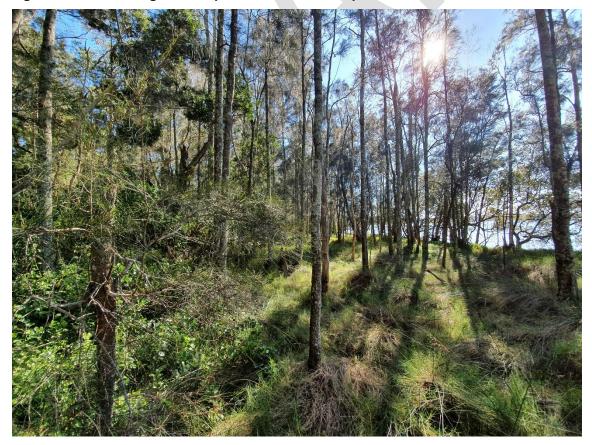
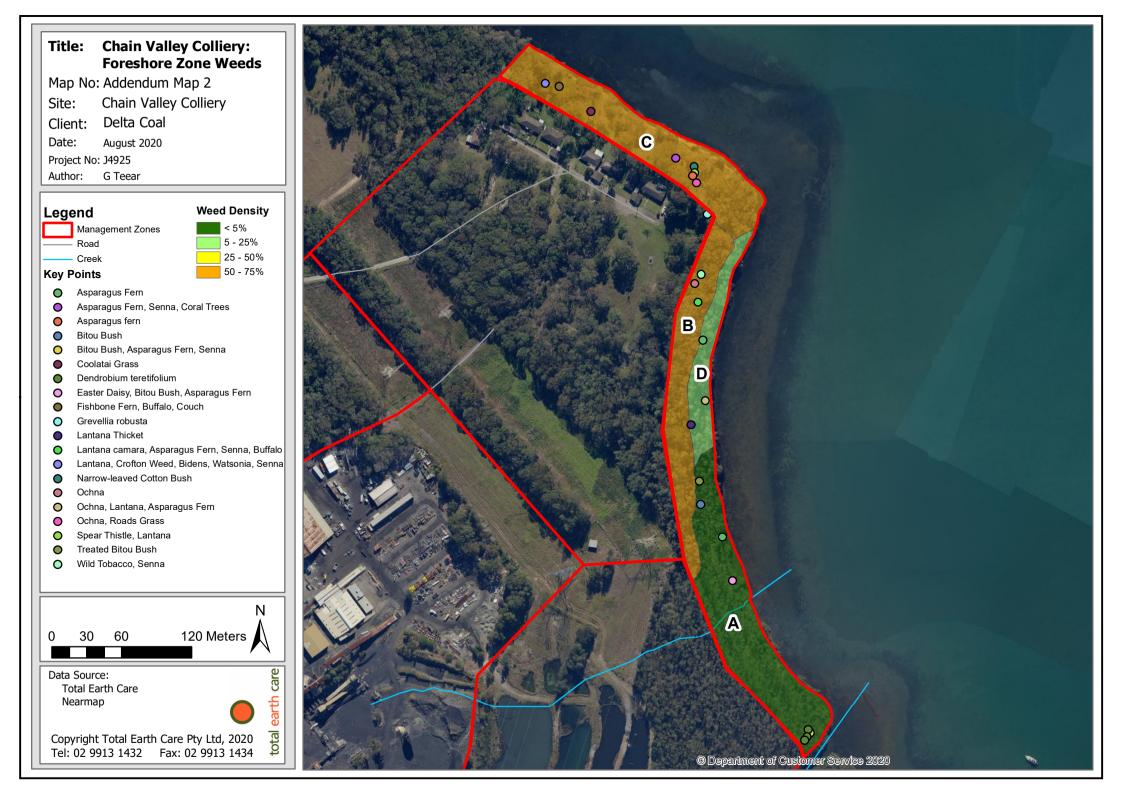


Figure 2. Boundary of Area B and D.



5 MONITORING GUIDELINES

Monitoring is required to assess the outcomes of the weed management work and help determine if management strategies should be amended. Monitoring should be completed every six (6) months by a qualified ecologist or bush regeneration supervisor using the following methods:

- Assessment of weed control works, native regeneration and revegetation success via permanent repeatable photographic monitoring points; and
- Mapping of weed density per zone to assess the progress of the work. The mapping included in this report can assist in the development of baseline data.

Monitoring reports must include:

- Details of the work carried out including weed management techniques and herbicide used;
- Photo monitoring points baseline and follow up photos; and
- Recommendations for corrective measures and/or specific vegetation management required.



Appendix A. Weed Species listed as a Biosecurity Risk

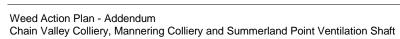
Table 2. Categories of Management under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 under the NSW Biosecurity Act 2015

Category	Management Action
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable."
RRM (Regional Recommended Measure)	Specific details for each species included in table.
PoD	
(Prohibition on Dealings)	Must not be imported into the State or sold.
B Zone	Specific details for each species included in table
(Biosecurity Zone)	Specific details for each species included in table.
PM (Prohibited Matter)	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.

Table 3. Weeds recorded within the subject site with respective categories listed in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Crofton Weed	Ageratina adenophora				Environment, Agriculture	
Whisky Grass	Andropogon virginicus				Environment	
Asparagus Fern	Asparagus aethiopicus	Yes				PoD
Cobblers Pegs	Bidens pilosa					
Buffalo Grass	Bouteloua dactyloides					
Bitou Bush	Chrysanthemoides monilifera subsp rotundata	Yes	Containment			PoD, B Zone; The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south.
Spear Thistle	Cirsium vulgare					
Fleabane	Conyza bonariensis					
Panic Veldgrass	Ehrharta erecta					
African Lovegrass	Eragrostis curvula				Environment	
Coral Tree, Common Coral Tree	Erythrina x sykesii				Environment	
Narrow-Leaf Cotton Bush / Swan Plant	Gomphocarpus fruticosus					
Pennywort	Hydrocotyle bonariensis					

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds- Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Duties for Priority Weeds of Greater Sydney
Coolatai Grass	Hyparrhenia hirta				Environment, Agriculture	
Lantana	Lantana camara	Yes	Asset Protection			PoD
Fishbone Fern	Nephrolepis cordifolia				Environment	
Ochna	Ochna serrulata				Environment	
Fireweed	Senecio madagascariensis	Yes	Asset Protection			PoD
Senna / Cassia	Senna pendula				Environment	
Paddy's Lucerne	Sida rhombifolia					
Tobacco Bush/ Wild Tobacco	Solanum mauritianum				Environment, Agriculture	
Blackberry Night Shade	Solanum nigrum					
Purpletop	Verbena bonarensis					



Appendix B. Species Specific Weeding Techniques

Common Name	Botanical Name	Weeding Technique	Recommended Timing for Treatment	Herbicide Application	Herbicide Group	Ratio
Crofton Weed	Ageratina adenophora	Hand removal, brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	М	1/100
Whisky Grass	Andropogon virginicus	Remove seed and crown out with knife or spot spray	Prior to flowering in March to May	Glyphosate 360g/L	M	1/100
Asparagus Fern	Asparagus aethiopicus	Small single specimens to be crowned or Sprayed with Glyphosate/metsulfuron methyl	All year round	Glyphosate 360g/L & Metsulfuron-Methyl 600 g/kg	M & B	1/100 & 1g/10L
Cobblers Pegs	Bidens pilosa	Foliar spraying using Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Buffalo Grass	Bouteloua dactyloides	Hand removal, brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
Bitou Bush	Chrysanthemoides monilifera subsp rotundata	Small single specimens hand pulled or larger shrubs cut and painted with neat Glyphosate	All year round	Glyphosate 360g/L	М	Neat
Spear Thistle	Cirsium vulgare	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	М	1/100
Fleabane	Conyza bonariensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Panic Veldgrass	Ehrharta erecta	Foliar spraying with Glyphosate	All year round	Glyphosate 360g/L	M	1/100
African Lovegrass	Eragrostis curvula	Hand pulled or brush cut and foliar sprayed with Glyphosate	All year round	Glyphosate 360g/L	М	1/100
Coral Tree, Common Coral Tree	Erythrina x sykesii	<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	All year round	Glyphosate 360g/L	М	Neat
Narrow-Leaf Cotton Bush / Swan Plant	Gomphocarpus fruticosus	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100 & Neat
Pennywort	Hydrocotyle bonariensis	Hand pulled or spot sprayed with Dicamba	All year round			
Coolatai Grass	Hyparrhenia hirta	Hand pulled or brush cut and foliar sprayed with Glyphosate. Up to three applications of Glyphosate in the same growing season will be required.	All year round	Glyphosate 360g/L	M	200ml/10l

Common Name	Botanical Name	Weeding Technique	Recommended Timing for Treatment	Herbicide Application	Herbicide Group	Ratio
Lantana	Lantana camara	Cut and paint, sprayed or splattered with Glyphosate. Hand pull small shoots.	All year round	Glyphosate 360g/L	M	Neat
Fishbone Fern	Nephrolepis cordifolia	Hand removal. Brush cut then sprayed with Glyphosate.	All year round	Glyphosate 360g/L	M	1/100
Ochna	Ochna serrulata	Double side scrape and paint all stems to 75% coverage.	All year round	Glyphosate 360g/L	M	Neat
Fireweed	Senecio madagascariensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Senna / Cassia	Senna pendula	Small individuals hand removed, larger plants cut and painted with neat Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Paddy's Lucerne	Sida rhombifolia	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Tobacco Bush/ Wild Tobacco	Solanum mauritianum	Cut & paint with Glyphosate	All year round	Glyphosate 360g/L	M	Neat
Blackberry Night Shade	Solanum nigrum	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100
Purpletop	Verbena bonarensis	Foliar spraying with Glyphosate, hand pulled and brush cut	All year round	Glyphosate 360g/L	M	1/100





Appendix 7: Noise Monitoring Results

	Review Date	Next Review Date	Revision No	Document Owner	Page
			1	Environmental Compliance Coordinator	Page 113 of 118
Ī		DOCI	JMENT UNCONT	ROLLED WHEN PRINTED	

								Tota	al measur	red noise l	ovols			Site noise	levels	Sito	limits	14/	eathei		Appl	lv2	
Quarter	Site	ΔΙ	Period	Date	Start time	I AFmin	LAF90.0					I Cea	I Cea-I Aea										Comments
Quarte.	0.00			Date	otart time		2 50.0	27104	22.0	., 10.0	, u max		2004 2704	2.09			EJ IIIIGA			-		-	Site noise inaudible. Vales Point Power Station (VPPS) noise and bird noise consistently
Q1	CVC	ATN001	Day	19/03/2020	16:00	41	43	55	53	67	85	67	12	IA	N/A	35	N/A	2.3	53	Α	Υ	Υ	audible. Resident noise, car passbys and wind in foliage occasionally audible.
																							Site noise inaudible. VPPS noise and insects consistently audible. Bird noise frequently
					18:00																		audible. Resident noise, car passbys, local and distant traffic and distant dogs barking
Q1	CVC	ATN001	Eve	19/03/2020		42	43	57	55	70	81	67	10	IA	N/A	35	N/A	1.3	88	F	Υ	Υ	occasionally audible.
					01:08																		Site noise inaudible. VPPS noise and insects consistently audible. Bat noise frequently
Q1	CVC	ATN001	Night	20/03/2020	01.06	43	44	44	45	46	65	67	23	IA	IA	35	35	0.4	253	F	Υ	Υ	audible. Nearby people occasionally audible.
					16:24																		Site noise inaudible. VPPS noise, resident noise and bird noise consistently audible. Car
Q1	CVC	ATN002	Day	19/03/2020	10.2	36	39	51	48	62	75	67	16	IA	N/A	49	N/A	2.3	47	Α	Υ		passbys, local traffic and distant dogs barking occasionally audible.
01	C) (C	4.711000	F	40/02/2020	19:26	45	47	40	F0			C 2	12	1.6	N1 / A	40	N1 / A	0.7			.,		Site noise inaudible. VPPS noise and insects consistently audible. Bird noise, local and distant traffic, dogs barking and aircraft noise occasionally audible.
Q1	CVC	ATN002	Eve	19/03/2020		45	47	49	50	57	64	62	13	IA	N/A	49	N/A	0.7	56	D	Y		Site conveyors and alarm barely audible on occasion. VPPS noise and insects consistently
Q1	CVC	ATN002	Night	20/03/2020	02:45	39	41	42	43	44	52	67	25	<42	<42	49	54	0.2	182	_	v		audible. Distant dog barking occasionally audible.
QΙ	CVC	ATINOUZ	Nigit	20/03/2020		33	41	42	43	44	32	07	23	\4Z	\42	43	54	0.2	102	'			Site noise inaudible. VPPS noise and bird noise consistently audible. Resident noise
Q1	CVC	ATN003	Dav	19/03/2020	16:04	38	43	53	57	63	75	60	7	IA	N/A	36	N/A	0.2	47	Α	Υ		frequently audible. Aircraft noise, local and distant traffic occasionally audible.
			.,	.,,											,		,						Site noise inaudible. VPPS noise, insects and bird noise consistently audible. Resident noise,
Q1	CVC	ATN003	Eve	19/03/2020	18:50	40	42	45	45	50	72	60	15	IA	N/A	36	N/A	1.0	59	Ε	Υ	Υ	distant and local traffic and aircraft noise occasionally audible.
																							Site noise inaudible. VPPS noise, another mine in the vicinity, insects and bird noise
					02:07																		consistently audible. Dogs barking, distant and local traffic and aircraft noise occasionally
Q1	CVC	ATN003	Night	20/03/2020		37	39	41	42	44	46	63	22	IA	IA	36	45	0.3	215	F	Υ	Υ	audible.
_					16:24																		Site noise inaudible. VPPS noise, insects and bird noise consistently audible. Resident noise
Q1	CVC	ATN004	Day	19/03/2020		31	33	51	52	63	71	66	15	IA	N/A	35	N/A	2.3	47	Α	Y		frequently audible. Car passbys and local traffic occasionally audible.
01	C) (C	4.75100.4	F	40/02/2020	19:27	4.0	40		F.4		C 2	CO	10	1.6	N1 / A	25	N1 / A	0.7			.,		Site noise inaudible. VPPS noise, insects and frogs consistently audible. Bird noise, resident
Q1	CVC	ATN004	Eve	19/03/2020		46	49	50	51	57	62	60	10	IA	N/A	35	N/A	0.7	56	D	Y		noise, car passbys, local traffic and dogs barking occasionally audible. Site noise inaudible. VPPS noise and insects consistently audible. Bat noise frequently
Q1	CVC	ATN004	Night	20/03/2020	01:54	37	41	43	44	46	55	61	18	IA	IA	35	45	0.3	186	F	v		audible.
41	cvc	A114004	Nigire	20/03/2020		37	71	43		40	33	01	10	1/3	174	33	43	0.5	100	•			Site noise inaudible. VPPS noise and insects consistently audible. Bird noise frequently
Q1	CVC	ATN005	Dav	19/03/2020	16:48	33	36	50	52	63	71	60	10	IA	N/A	35	N/A	2.3	29	Α	Υ		audible. Local traffic and dogs barking occasionally audible.
			•	.,,											,		,						Site noise inaudible. VPPS noise and bird noise consistently audible. Resident noise, local
Q1	CVC	ATN005	Eve	19/03/2020	18:43	38	43	48	50	56	72	59	11	IA	N/A	35	N/A	1.1	57	Ε	Υ	Υ	traffic and nearby music occasionally audible.
					02:10																		Site noise inaudible. VPPS noise and insects consistently audible. Bat noise occasionally
Q1	CVC	ATN005	Night	20/03/2020	02:18	40	41	43	45	46	57	64	21	IA	IA	35	45	0.2	277	F	Υ	Υ	audible.
					17:08																		Site noise inaudible. VPPS noise and bird noise consistently audible. Distant traffic
Q1	CVC	ATN006	Day	19/03/2020		31	33	38	41	47	53	55	17	IA	N/A	37	N/A	1.6	81	Α	Y		frequently audible. Distant dogs barking and wind in foliage occasionally audible.
01	C) (C	ATNIOOC	F	10/02/2020	19:02	22	25	40	44				16		N1 / A	27	N1 / A	4.2		_	.,		Site noise inaudible. VPPS noise, insects and bird noise consistently audible. Distant traffic
Q1	CVC	ATN006	Eve	19/03/2020		33	35	40	41	51	58	56	16	IA	N/A	37	N/A	1.2	51	E	Y		frequently audible. Resident noise occasionally audible. Site noise inaudible. VPPS noise and insects consistently audible. Bat noise occasionally
Q1	CVC	ATN006	Night	20/03/2020	02:39	33	35	38	39	40	53	62	24	IA	IA	37	45	0.3	200	_	v		audible.
Q1	CVC	ATINOOU	Nigit	20/03/2020		33	33	30	33	40	33	02	24	1/1	1/4	37	45	0.5	200			•	CVC vent fan noise consistent and dominant. Bird noise consistently audible. Distant dogs
Q1	CVC	ATN007	Dav	19/03/2020	17:44	42	43	46	48	53	70	65	19	35	N/A	46	N/A	1.1	148	Α	Υ	Υ	barking occasionally audible.
Q1		ATN007		19/03/2020	18:00	42	43	44	45	50	63	65	21	37 (35+2)	N/A	46	N/A	1.3	79				CVC vent fan noise consistent and dominant. Bird noise consistently audible
					01.26																		CVC vent fan noise consistent and dominant. Insects consistently audible. Bird noise and
Q1	CVC	ATN007	Night	20/03/2020	01:36	43	44	45	45	46	55	66	21	38 (36+2)	36	46	46	0.2	238	F	Υ	Υ	distant traffic occasionally audible.
					16:24																		Site noise inaudible. VPPS noise, resident noise and bird noise consistently audible. Car
Q1	CVC	R12	Day	19/03/2020	10.24	36	39	51	48	62	75	67	16	IA	N/A	49	N/A	2.3	47	Α	Υ		passbys, local traffic and distant dogs barking occasionally audible.
					19:26																		Site noise inaudible. VPPS noise and insects consistently audible. Bird noise, local and distant
Q1	CVC	R12	Eve	19/03/2020		45	47	49	50	57	64	62	13	IA	N/A	49	N/A	0.7	56	D	Y		traffic, dogs barking and aircraft noise occasionally audible.
01	C) (C	D42	NU-ba	20/02/2020	02:45	20	44	42	42	4.4		67	25	-42	-42	40	F-2	0.2	100	_	.,		Site conveyors and alarm barely audible on occasion. VPPS noise and insects consistently
Q1	CVC	KIZ	Night	20/03/2020		39	41	42	43	44	52	67	25	<42	<42	49	53	0.2	182	r	Y		audible. Distant dog barking occasionally audible. Site noise inaudible. VPPS noise, resident noise and bird noise consistently audible. Local
Q1	CVC	D12	Day	19/03/2020	16:43	35	39	46	49	55	69	55	9	IA	N/A	43	N/A	2.3	43	۸	v		traffic and dogs barking occasionally audible.
α1	CVC	1113	Day	13/03/2020		33	33	40	43	33	03	"	9	10	11/7	43	11/1	2.3	43	^			Site noise inaudible. VPPS and insects consistently audible. Bird noise, local and distant
Q1	CVC	R13	Eve	19/03/2020	19:45	48	53	54	56	57	66	58	4	IA	N/A	43	N/A	0.5	48	F	Υ		traffic, resident noise and dogs barking occasionally audible.
[`		-	-	, ,		-				-					•	-	•		-				Site noise inaudible. VPPS noise and insects consistently audible. Resident noise and distant
Q1	CVC	R13	Night	20/03/2020	03:04	36	37	39	41	42	56	59	20	IA	IA	43	49	0.3	166	D	Υ		dogs barking occasionally audible.
																							CVC inaudible. Vales Point Power Station (VPPS) noise and bird noise consistently audible.
																							Distant traffic to South and resident noise frequently audible. Wind in foliage, distant dogs
Q2	CVC	ATN001	Day	23/06/2020	16:07	43	44	54	50	66	78	69	15	IA	N/A	35	N/A	0.9	288	Α	Υ	Υ	barking and traffic passbys occasionally audible.

								Tot	al maasu	red noise l	ovols			Site noise	n lovels	Sito	limits	14/	eathe	_	Ann	lv2	1
Quarter	Site	AL	Period	Date	Start time	LAFmin	LAF90.0					LCea I	.Cea-LAea								Appl DC I		Comments
-														-									CVC inaudible. VPPS noise consistently audible. Distant traffic to South, distant dogs barking,
Q2	CVC	ATN001	Eve	23/06/2020	19:28	42	43	53	48	66	78	66	13	IA	N/A	35	N/A	1.4	272	Ε	Υ		resident noise and traffic passbys occasionally audible.
																							CVC inaudible. VPPS noise and wind in foliage consistently audible. Bird noise and distant
Q2	CVC	ATN001	Night	24/06/2020	02:28	40	42	44	46	51	60	64	20	IA	IA	35	35	2.1	306	F	N	N	traffic to South occasionally audible.
	61.46	4711000	_	22/25/2222	47.00							c=	40						202		.,		CVC inaudible. VPPS hum consistently audible and dominant. MC plant noise just audible.
Q2	CVC	ATN002	Day	23/06/2020	17:06	44	46	48	50	56	64	67	19	IA	N/A	49	N/A	1.1	283	А	Y	Y	Birds and insects frequently audible. Local traffic and residents occasionally audible.
																							CVC mostly inaudible, forklift and conveyors just audible on occasion. VPPS hum consistently
Q2	CVC	ATN002	Eve	23/06/2020	20:17	44	46	49	49	58	61	66	17	<40	N/A	49	N/A	1.4	272	Ε	Υ		audible and dominant. MC plant noise just audible. Local traffic occasionally audible.
																							CVC mostly inaudible, reverse beeper audible on occasion. VPPS hum consistently audible
																							and dominant. MC plant noise just audible. Local traffic occasionally audible. Wind in foliage
Q2	CVC	ATN002	Night	24/06/2020	02:00	43	45	48	49	51	64	68	20	<49	<54	49	54	1.8	295	E	Υ		occasionally audible.
Q2	CVC	ATN003	Day	23/06/2020	16:47	40	42	44	45	48	60	62	18	IA	N/A	36	N/A	1.0	277		v		CVC inaudible. MC plant noise consistently audible. VPPS hum consistently audible. Birds nearby and wind in foliage frequently audible. Local traffic occasionally audible.
Ų2	CVC	ATNUUS	Day	23/00/2020	10.47	40	42	44	45	46	60	62	10	IA	IN/A	30	N/A	1.9	2//	А	T		CVC inaudible. MC plant noise consistently audible and dominant, with bang and rumble
																							occasionally audible. VPPS hum consistently audible. Local traffic, residents and birds
Q2	CVC	ATN003	Eve	23/06/2020	21:15	42	44	45	47	49	55	64	19	IA	N/A	36	N/A	0.6	324	Ε	Υ		occasionally audible. Plane audible for approximately one minute.
																							CVC inaudible. VPPS hum consistently audible and dominant. MC plant noise consistently
Q2	CVC	ATN003	Night	24/06/2020	01:35	39	41	43	45	48	54	63	20	IA	IA	36	45	1.3	317	F	N		audible.
																							CVC inaudible. VPPS noise and bird noise consistently audible. Distant traffic to East
03	CVC	ATNI004	Davi	22/06/2020	16:50	37	39	51	52	66	72	62	11	IA	NI/A	35	N/A	1.0	277		v		frequently audible. Wind in foliage, distant dogs barking and nearby people occasionally audible.
Q2	CVC	ATN004	Day	23/06/2020	10.50	3/	39	21	32	00	12	62	11	IA	N/A	33	N/A	1.9	2//	А	T		CVC inaudible. VPPS noise consistently audible. Distant traffic, traffic passbys, resident noise
Q2	CVC	ATN004	Eve	23/06/2020	18:57	35	37	49	43	58	73	62	13	IA	N/A	35	N/A	1.4	273	Е	Υ		and bird noise occasionally audible.
				.,,											•		,						CVC inaudible. VPPS noise consistently audible. Insects and wind in foliage frequently
Q2	CVC	ATN004	Night	24/06/2020	01:44	37	39	46	47	57	63	60	14	IA	IA	35	45	1.1	299	F	N	Υ	audible. Dogs barking occasionally audible.
																							CVC inaudible. VPPS noise and bird noise consistently audible. Distant traffic to East
	61.46	4.711005	_	22/25/2222									40			25			255		.,		frequently audible. Wind in foliage, distant dogs barking and nearby people occasionally
Q2	CVC	ATN005	Day	23/06/2020	17:14	40	43	44	45	47	57	62	18	IA	N/A	35	N/A	1.3	255	А	Y		audible. CVC inaudible. VPPS noise consistently audible. Distant traffic to East frequently audible.
Q2	cvc	ATN005	Eve	23/06/2020	18:20	38	40	41	42	44	56	61	20	IA	N/A	35	N/A	0.5	243	F	N		Distant dogs barking and nearby people occasionally audible.
Q.2		71111005	2.0	25,00,2020	10.20	50					50	01	20		,	33	,	0.5	2.0	•			CVC inaudible. VPPS noise and lapping water consistently audible. Wind in foliage frequently
Q2	CVC	ATN005	Night	24/06/2020	01:20	42	44	48	48	50	77	67	19	IA	IA	35	45	0.9	322	D	Υ	Υ	audible.
																							CVC inaudible. VPPS noise and insects consistently audible. Distant traffic to North
Q2	CVC	ATN006	Day	23/06/2020	17:34	37	39	57	51	72	78	68	11	IA	N/A	37	N/A	0.8	265	С	Υ		frequently audible. Helicopter noise, bird noise and traffic passbys occasionally audible.
03	C) (C	ATNIOOC	F	22/05/2020	10.00	27	20	40	42	4.4		60	20		21/2	27	N1 / A	0.4	200		.,		CVC inaudible. VPPS noise and insects consistently audible. Resident noise, bird noise,
Q2	CVC	ATN006	Eve	23/06/2020	18:00	37	38	40	42	44	59	60	20	IA	N/A	37	N/A	0.4	269	А	Y		distant traffic to North and wind in foliage occasionally audible. CVC inaudible. VPPS noise and insects consistently audible. Distant traffic to East and bird
Q2	CVC	ATN006	Night	24/06/2020	01:00	36	38	40	42	44	55	60	20	IA	IA	37	45	1.7	311	F	N		noise occasionally audible.
			0	, ,																			CVC vent fan consistently audible and dominant. VPPS hum consistently audible in the
																							background. Insects just audible. Birds nearby consistently audible. Distant dog barking
Q2	CVC	ATN007	Day	23/06/2020	17:45	46	47	48	49	50	55	68	20	38	N/A	46	N/A	0.8	278	В	Υ		frequently audible. Distant traffic occasionally audible.
																							CVC vent fan consistently audible and dominant. VPPS hum consistently audible in the
Q2	CVC	ATN007	Fue	23/06/2020	18:00	46	47	47	48	49	52	68	21	40 (38+2)	N/A	46	N/A	0.4	269		v		background. Insects just audible. Birds nearby consistently audible. Distant dog barking frequently audible. Distant traffic occasionally audible.
Ų2	CVC	ATNUU7	Eve	23/00/2020	18:00	46	47	47	46	49	52	08	21	40 (36+2)	IN/A	40	N/A	0.4	209	А	T		CVC vent fan consistently audible and dominant. VPPS hum consistently audible in the
																							background. Insects just audible. Birds nearby consistently audible. Distant dog barking
Q2	CVC	ATN007	Night	24/06/2020	01:00	45	46	46	47	48	55	68	22	40 (38+2)	47	46	46	1.7	311	F	N		frequently audible. Distant traffic occasionally audible.
			_	/ /																			CVC inaudible. VPPS hum consistently audible and dominant. MC plant noise just audible.
Q2	CVC	R12	Day	23/06/2020	17:06	44	46	48	50	56	64	67	19	IA	N/A	49	N/A	1.1	283	Α	Y	Υ	Birds and insects frequently audible. Local traffic and residents occasionally audible.
																							CVC mostly inaudible, forklift and conveyors just audible on occasion. VPPS hum consistently
Q2	CVC	R12	Eve	23/06/2020	20:17	44	46	49	49	58	61	66	17	<40	N/A	49	N/A	1.4	272	Ε	Υ		audible and dominant. MC plant noise just audible. Local traffic occasionally audible.
																							CVC mostly inaudible, reverse beeper audible on occasion. VPPS hum consistently audible
																							and dominant. MC plant noise just audible. Local traffic occasionally audible. Wind in foliage
Q2	CVC	R12	Night	24/06/2020	02:00	43	45	48	49	51	64	68	20	<49	<54	49	53	1.8	295	E	Υ	Υ	occasionally audible.

2.									Tota	al measur	rad naisa l	ovols			Site noise	lovols	Sita	limits	14/	eathe	-	Appl	v2
C	Quarter	Site	ΔΙ	Period	Date	Start time	I AFmin	I AF90.0					l Cea	I Cen-l Aen									•
2 C C C 13 B W 2 1/10/10/20 C C C 13 B W 2 1/10/10/20 C C C C C C C C C C C C C C C C C C C	Quarter	Jite	AL .	Teriou	Dute	Start time	LAI IIIIII	LAI 30.0	LACY	LAI 1.0	LAI 10.0 L	Aimux	LCCY	LCCQ LACQ	LACY	LAITIUX	Блеч	LATITUA	***	***	<u> </u>	-	, , , , , , , , , , , , , , , , , , , ,
2 C C C R 13	Q2	cvc	R13	Day	23/06/2020	16:31	43	45	54	52	66	76	71	17	IA	N/A	43	N/A	2.4	281	Α	Υ	Y frequently audible. Resident noise, wind in foliage and traffic passbys occasionally audible.
Control Cont	Ω2	CVC	R13	Fve	23/06/2020	20:40	42	44	45	46	50	54	62	17	<40	Ν/Δ	43	N/A	0.4	317	F	N	
See Part No. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					25/00/2020					40	30		02		140	14/74	73	14/74	0.4				CVC inaudible. VPPS noise consistently audible. Wind in foliage frequently audible. Dogs
Control Cont	Q2	CVC	R13	Night	24/06/2020	02:03	42	44	47	48	50	72	65	18	IA	IA	43	49	2	295	E	Y	Site inaudible. VPPS noise and bird noise consistently audible. Wind in foliage frequently
3	Q3	CVC	ATN001	Day	07/09/2020	09:36	38	40	47	44	58	71	63	16	IA	N/A	35	N/A	2.6	8	Α	Υ	Y audible. Site inaudible. VPPS noise and bird noise consistently audible. Wind in foliage frequently
3 CVC ATMOOL DV 07/09/2002 DV	Q3	CVC	ATN001	Day	07/09/2020	09:51	37	39	53	48	66	80	64	11	IA	N/A	35	N/A	2.8	19	Α	Υ	Y audible.
Set Parallelies (1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	03	CVC	: ATN001	Dav	07/09/2020	10:06	38	39	56	49	68	85	66	10	IA	N/A	35	N/A	2.4	31	Α	Υ	audible. Traffic passbys, distant traffic, distant dogs barking and resident noise occasionally
Ste haudble. WPS note and bird notes consistently audible. Wind in foliage frequently audible. Traffic passiby, distant traffic, datast dogs barriage and resident notes occasionally audible. Site inaudible. VPPs note and wind in foliage consistently audible. Wind in foliage frequently audible. Wind in foliage frequently audible. Wind in foliage frequently audible. Wind in foliage consistently audible. Wind in foliage frequently audible. Wind in foliage frequ				,	51, 55, 2525											.,		.,					
Value Valu	Q3	CVC	ATN001	Day	07/09/2020	10:21	37	39	52	49	66	75	64	12	IA	N/A	35	N/A	2.8	10	Α	Υ	Site inaudible. VPPS noise and bird noise consistently audible. Wind in foliage frequently
38 CV ATMONI Day 97/69/2020 9.05.1 38 40 49 46 62 73 64 15 18 18 19 18 18 18 18 18 18 18 18 18 18 18 18 18	Q3	CVC	ATN001	Day	07/09/2020	10:36	38	40	53	49	66	78	64	11	IA	N/A	35	N/A	2.4	40	Α	Υ	Y audible. Site inaudible. VPPS noise and bird noise consistently audible. Wind in foliage frequently
2 CV ATMO21 EVE 07/09/2020 20.38 40 42 44 46 49 56 63 19 IA N/A 35 N/A 12 36 F N Y taffic and traffic passbys occasionally audible. Resident noise, distant and consistent sudible. Alter noise consistently audible. Bird one occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is a specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specific passby occasionally audible. Since the consistent sudible is specifi	Q3	CVC	ATN001	Day	07/09/2020	10:51	38	40	49	46	62	73	64	15	IA	N/A	35	N/A	3.0	38	Α	Υ	
33 CVC ATNOOL Night 07/09/2020 23:25 38 40 42 44 45 54 56 62 18 IA N/A 35 N/A 15 19 F N STATE and traffic passbys occasionally audible. Bird of large frequently audible. WPS noise consistently	Q3	CVC	ATN001	Eve	07/09/2020	20:38	40	42	44	46	49	56	63	19	IA	N/A	35	N/A	1.2	36	F	N	Y traffic and traffic passbys occasionally audible.
Q3 CVC ATNOOL Night 07/09/2020 23:10 38 40 42 43 45 52 61 19 IA IA 35 45 2.1 21 F N N noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Wind in foliage frequently audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Wind in foliage frequently audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Wind in foliage frequently audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Wind in foliage frequently audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby animals and distant traffic occasionally audible. Bird noise, resident noise, nearby a	Q3	CVC	ATN001	Eve	07/09/2020	20:53	40	42	44	45	47	56	62	18	IA	N/A	35	N/A	1.5	19	F	N	Y traffic and traffic passbys occasionally audible.
Q3 CVC ATNOOL Night 07/09/2020 23:45 38 40 53 43 58 83 62 9 IA IA 35 45 1.3 3 F N Y audible one occasion. Steenaudible. VPPS noise consistently audible. Wind in foliage frequently audible. Bird of the construction of the const	Q3	CVC	ATN001	Night	07/09/2020	23:10	38	40	42	43	45	52	61	19	IA	IA	35	45	2.1	21	F	N	N noise, resident noise, nearby animals and distant traffic occasionally audible. Site inaudible. VPPS noise consistently audible. Wind in foliage frequently audible. Bird
Q3 CVC ATNOOL Night 07/09/2020 23:40 38 40 41 42 44 59 61 20 IA IA 35 45 1.5 359 F N Y noise, resident noise, nearby animals and distant traffic occasionally audible. Wind in foliage frequently audible. Bird Site mostly inaudible, CVPS noise consistently audible. Wind in foliage frequently audible. Bird Site mostly inaudible, forkilit occasionally audible. Wind in foliage and in	Q3	cvc	ATN001	Night	07/09/2020	23:25	38	40	53	43	58	83	62	9	IA	IA	35	45	1.3	3	F	N	Y audible on one occasion.
Q3 CVC ATNOO2 Day 07/09/2020 13:44 38 40 42 42 45 54 61 19 IA IA 35 45 13 340 F N N N addible, forklift occasionally audible. VPPS hum consistently audible. Dag barking. Q3 CVC ATNOO2 Day 07/09/2020 13:49 38 40 45 46 56 64 57 12 40 N/A 49 N/	Q3	CVC	ATN001	Night	07/09/2020	23:40	38	40	41	42	44	59	61	20	IA	IA	35	45	1.5	359	F	N	Y noise, resident noise, nearby animals and distant traffic occasionally audible.
Q3 CVC ATNOO2 Day 07/09/2020 13:44 38 40 48 50 61 69 58 10 <40 N/A 49 N/A 3.3 71 A N N audible. Plane flying above. Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Birds and wind in foliage constant. Local traffic (passbys) and traffic on Real Plane flying above. Q3 CVC ATNOO2 Day 07/09/2020 14:14 39 42 56 53 71 77 69 13 <42 N/A 49 N/A 49 N/A 49 N/A 49 N/A 4.6 72 A N N Tall Timbers Road occasionally audible. PPPS hum consistently audible. Distant traffic CPPS hum consistently audible. Distant tra	Q3	CVC	ATN001	Night	07/09/2020	23:55	38	40	42	42	45	54	61	19	IA	IA	35	45	1.3	340	F	N	Y noise, resident noise, nearby animals and distant traffic occasionally audible.
CVC ATNOOZ Day 07/09/2020 13:59 38 40 45 46 56 64 57 12 <40 N/A 49 N/A 3.3 71 A N Tall Timbers Road occasionally audible. Site mostly inaudible, forklift and 'banging' noise occasionally audible. When the foliage constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and wind in foliage constant. Local traffic (passbys) and traffic or one sistently audible. Birds and wind in foliage constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic (passbys) and traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic or one sistently audible. When the foliage constant and birds almost constant. Local traffic or one sistently audible. When the foliage constant. Local traffic or one sistently audible. Birds and wind in foliage constant. Local traffic or one sistently audible. Birds and wind in foliage constant. Local traffic or one sistently audible. When the foliage constant. Local traffic or one sistently audible. When the foliage constant. Local traffic or one sistently audible. When the foliage constant. Local traffic or one sistently audible. Birds and wind in foliage constant. Local traffic or one sistently audible. Birds and wind in foliage constant. Local traffic or one sistently audible. Birds and wind in foliage constant. Local traffic or one sistently audible. Site inaudible. When the foliage constant. Local traffic or one s	Q3	CVC	ATN002	Day	07/09/2020	13:44	38	40	48	50	61	69	58	10	<40	N/A	49	N/A	3.3	71	Α	N	N audible. Plane flying above.
CVC ATNOOZ Day 07/09/2020 14:14 39 42 56 53 71 77 69 13 <42 N/A 49 N/A 4.6 72 A N N Tall Timbers Road occasionally audible. Birds and wind in foliage constant. Local traffic or consistently audible. Birds and wind in foliage constant. Local traffic or consistently audible. Birds and wind in foliage constant. Local traffic or consistently audible. Wind in foliage constant and birds almost constant. Local traffic or consistently audible. Wind in foliage constant and birds almost constant. Local traffic or consistently audible. Wind in foliage constant and birds almost constant. Local traffic or sistently audible. Wind in foliage constant and birds almost constant. Local traffic or sistently audible. Wind in foliage constant and birds almost constant. Local traffic or sistently audible. Wind in foliage constant and birds almost constant. Local traffic or sistently audible. Wind in foliage constant and birds almost constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage constant. Local traffic or sistently audible. Wind in foliage const	Q3	CVC	ATN002	Day	07/09/2020	13:59	38	40	45	46	56	64	57	12	<40	N/A	49	N/A	3.3	71	Α	N	nearby constant and wind in foliage almost constant. Local traffic (passbys) and traffic on N Tall Timbers Road occasionally audible.
Site mostly inaudible, forklift and 'banging' noise occasionally audible. VPPS hum consistently audible. Wind in foliage constant and birds almost constant. Local traffic consistently audible. Wind in foliage constant and birds almost constant. Local traffic consistently audible. Wind in foliage constant and birds almost constant. Local traffic consistently audible. Wind in foliage constant and birds almost constant. Local traffic consistently audible. Plane flying above. Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local constan	Q3	CVC	: ATN002	Day	07/09/2020	14:14	39	42	56	53	71	77	69	13	<42	N/A	49	N/A	4.6	72	A	N	consistently audible. Birds and wind in foliage constant. Local traffic (passbys) and traffic on
Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local Q3 CVC ATN002 Day 07/09/2020 14:45 41 44 52 52 61 76 65 13 IA N/A 49 N/A 3.4 67 A N N traffic and passbys occasionally audible. Plane flying above. Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local CPPS hum consistently audible. Plane flying above. Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local CPPS hum consistently audible. Plane flying above. Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local CPPS hum consistently audible. Plane flying above. Site inaudible. VPPS hum consistently audible. Distant dosparation. Local CPPS hum consistently audible. Distant dosparation. Site inaudible. VPPS hum consistently audible. Insects consistently audible. Distant dosparation. Site inaudible. VPPS hum consistently audible. Insects consistently audible. Distant traffic														-		•	-						Site mostly inaudible, forklift and 'banging' noise occasionally audible. VPPS hum consistently audible. Wind in foliage constant and birds almost constant. Local traffic
Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local Q3 CVC ATN002 Day 07/09/2020 15:00 42 44 47 49 52 65 58 11 IA N/A 49 N/A 3.5 57 A N N traffic and passbys occasionally audible. Distant dogs barking. Site inaudible. VPPS hum consistently audible. Distant dogs barking. Site inaudible. VPPS hum consistently audible. Distant dogs barking. Site inaudible. VPPS hum consistently audible. Insects consistently audible. Local traffic Q3 CVC ATN002 Eve 07/09/2020 20:35 37 39 43 43 55 60 64 21 IA N/A 49 N/A 1.4 34 F N Y Site inaudible. VPPS hum consistently audible. Distant traffic occasionally audible. Insects consistently audible. Distant traffic	Q3			•										-									Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local
Site inaudible. VPPS hum consistently audible. Insects consistently audible. Local traffic Q3 CVC ATN002 Eve 07/09/2020 20:35 37 39 43 43 55 60 64 21 IA N/A 49 N/A 1.4 34 F N Y (passbys) and distant traffic occasionally audible. WPPS hum consistently audible. Insects consistently audible. Distant traffic	Q3																						Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local
Site inaudible. VPPS hum consistently audible. Insects consistently audible. Distant traffic				•																			Site inaudible. VPPS hum consistently audible. Insects consistently audible. Local traffic
	Q3				07/09/2020		37	39	43	43	45	58	64	23	IA IA	N/A	49	,					

								Tota	al measur	ed noise level			Site noise	levels	Site I	limits	W	eathe	er	Αp	ply?	
Quarter	Site	AL	Period	Date	Start time	LAFmin	LAF90.0			AF10.0 LAFm		LCeq-LAeq				LAmax						Comments
																						Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Insects
Q3		ATN002	-	07/09/2020		38	40	42	44	46 56	66	24	<40	<40	49	54	1.5	9				consistently audible.
Q3		ATNO02	-	07/09/2020		38	40	42	43	46 54	66	24	IA	IA	49	54	1.4	2		N		Site inaudible. VPPS hum consistently audible. Insects consistently audible.
Q3	CVC	ATN002	Night	07/09/2020	23:50	39	40	42	43	44 46	66	24	IA	IA	49	54	1.5	351	F	N	Υ	Site inaudible. VPPS hum consistently audible. Insects consistently audible. Site mostly inaudible, winch briefly audible once. VPPS hum consistently audible. Insects
Q3	CVC	ATN002	Night	08/09/2020	00:05	38	40	41	42	44 50	66	25	<40	<40	49	54	0.9	324	F	N	٧	consistently audible. Distant traffic on Tall Timbers Road audible once.
٩		71111002		00,03,2020	00.05	50	.0			50	00	23	-10		.5	٥.	0.5	J2.	•		Ċ	Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Water
																						sprinklers consistently audible. Residents nearby talking, birds nearby and wind in foliage
																						frequently audible. Local traffic and traffic on Tall Timbers Road occasionally audible.
Q3	CVC	ATN003	Day	07/09/2020	12:07	35	38	43	45	54 63	58	15	<34	N/A	36	N/A	3.3	56	Α	N	N	Gardener talked to operator briefly.
																						Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Water sprinklers consistently audible. Residents nearby talking, birds nearby and wind in foliage
																						frequently audible. Local traffic and traffic on Tall Timbers Road occasionally audible.
Q3	CVC	ATN003	Day	07/09/2020	12:22	36	38	48	47	61 74	58	10	<35	N/A	36	N/A	3.4	66	Α	N	N	Gardener talked to operator briefly.
				, ,										,		,						, , , , , , , , , , , , , , , , , , , ,
																						Site inaudible. VPPS hum consistently audible. Water sprinklers consistently audible.
																						Residents nearby talking, birds nearby and wind in foliage frequently audible. Local traffic
Q3	CVC	ATN003	Day	07/09/2020	12:38	37	39	48	51	60 72	57	9	IA	N/A	36	N/A	3.1	79	Α	N	N	and traffic on Tall Timbers Road occasionally audible. Gardener talked to operator briefly.
																						Site inaudible. Water sprinklers consistently audible. Residents nearby talking on occasion. Birds nearby and wind in foliage very frequently audible. Distant traffic and traffic on Tall
Q3	CVC	ATN003	Dav	07/09/2020	12:53	36	39	46	47	56 74	56	10	IA	N/A	36	N/A	3.6	79	Α	N	N	Timbers Road occasionally audible.
				, ,										•		,						Site inaudible. VPPS hum occasionally audible. Water sprinklers consistently audible.
																						Residents nearby talking on occasion. Birds nearby and wind in foliage very frequently
Q3	CVC	ATN003	Day	07/09/2020	13:08	36	38	45	46	57 65	54	9	IA	N/A	36	N/A	3.2	82	Α	N	N	audible. Distant traffic and traffic on Tall Timbers Road occasionally audible.
																						Site mostly inaudible, forklift occasionally audible. VPPS hum occasionally audible. Water
																						sprinklers consistently audible. Residents nearby talking and cleaning on occasion. Birds nearby and wind in foliage very frequently audible. Distant traffic and traffic on Tall Timbers
Q3	CVC	ATN003	Day	07/09/2020	13:23	37	39	44	46	53 64	54	10	<35	N/A	36	N/A	3.8	68	Δ	٧	v	Road occasionally audible.
Q3	cvc	AIIIOOS	Day	07/03/2020	15.25	37	33		40	33 04	34	10	133	14/74	30	14/73	5.0	00	^		•	Site inaudible. VPPS noise consistently audible (dominant). Insects and frogs consistently
																						audible. Distant traffic and traffic on Tall Timbers Road occasionally audible. Dogs barking
Q3	CVC	ATN003	Eve	08/09/2020	20:30	36	38	40	42	45 53	63	23	IA	N/A	36	N/A	0.9	10	Ε	Υ	Υ	occasionally audible.
																						Site inaudible. VPPS noise consistently audible (dominant). Insects and frogs consistently
Q3	CVC	ATN003	Eve	08/09/2020	20:45	36	39	43	46	49 52	63	20	IA	N/A	36	N/A	1.4	11	Ε	Υ	Υ	audible. Local traffic and traffic on Tall Timbers Road occasionally audible.
Q3	CVC	ATN003	Night	08/09/2020	22:30	36	38	40	42	43 51	61	21	IA	IA	36	45	0.6	238	n	v	v	Site inaudible. VPPS noise consistently audible (dominant). Insects and frogs consistently audible.
Q3	cvc	AIIIOOS	Nigire	00/03/2020	22.50	30	30	40	72	45 51	01		1/4	174	30	43	0.0	230			•	Site inaudible. VPPS noise consistently audible (dominant). Insects and frogs consistently
Q3	CVC	ATN003	Night	08/09/2020	22:45	36	39	41	42	44 47	61	20	IA	IA	36	45	0.9	218	Ε	Υ	Υ	audible. Local traffic and traffic on Tall Timbers Road occasionally audible.
																						Site inaudible. VPPS noise consistently audible (dominant). Insects and frogs consistently
Q3	CVC	ATN003	Night	08/09/2020	23:00	38	40	41	43	45 52	62	21	IA	IA	36	45	0.6	197	Ε	Υ	Υ	audible. Traffic on Tall Timbers Road occasionally audible.
																						Site inaudible. Overland conveyor just audible. VPPS noise consistently audible (dominant).
Q3	CVC	ATN003	Night	08/09/2020	23:15	38	40	42	43	45 49	62	20	IA	IA	36	45	0.6	131	F	γ	γ	Insects and frogs consistently audible. Traffic on Tall Timbers Road occasionally audible.
٩		71111000		00,03,2020	25.15	50	.0		.5	.5 .5	02	20			50	.5	0.0	101	_	·	Ċ	Site inaudible. Local and distant traffic frequently audible. Birds, wind in foliage, dogs
																						barking and people talking nearby audible. Residents doing house work (mowing and
Q3	CVC	ATN004	Day	07/09/2020	11:46	38	41	51	50	63 78	58	7	IA	N/A	35	N/A	3.2	49	Α	Υ	Υ	cleaning) frequently audible.
																						Site inaudible. VPPS noise consistently audible (dominant). Insects just audible. Distant
Q3 Q3		ATNO04		08/09/2020		35 35	38 37	40 42	42 45	43 53 47 53	58 59	18 17	IA <35	N/A <35	35 35	N/A 45	1.3 1.0	25				traffic and traffic occasionally audible. Site mostly inaudible, alarm briefly audible once. VPPS hum consistently audible
ŲΣ	CVC	ATN004	MIGHT	08/09/2020	22:00	33	3/	42	45	4/ 55	59	1/	<33	<33	33	45	1.0	33		T	T	Site inaudible, VPPS noise consistently audible. Wind in foliage frequently audible. Bird
Q3	CVC	ATN005	Day	07/09/2020	11:18	33	36	41	42	51 64	57	16	IA	N/A	35	N/A	3.3	48	Α	Υ	Υ	noise, distant traffic, distant dogs barking and resident noise occasionally audible.
			,	. ,																		Site inaudible. VPPS noise, insects and frogs consistently audible. Nearby animals and
Q3	CVC	ATN005	Eve	08/09/2020	20:47	37	40	42	44	45 61	60	18	IA	N/A	35	N/A	1.3	16	Ε	N	Υ	distant traffic occasionally audible.
																			_			Site inaudible. VPPS noise and insects consistently audible. Bird noise, nearby animals,
Q3	CVC	ATN005	Night	08/09/2020	23:05	40	42	44	46	50 61	61	17	IA	IA	35	45	0.7	211	Е	Υ	Υ	distant and local traffic occasionally audible.
																						Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	11:39	33	35	52	41	65 80	56	4	IA	N/A	37	N/A	3.1	56	Α	N	N	and resident noise occasionally audible.
1			- 1	, ,					•			•		,		,						Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise
																						and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	11:54	32	35	43	46	52 63	62	19	IA	N/A	37	N/A	3.5	57	Α	N	N	and resident noise occasionally audible.

								Tota	l measu	red noise lev	ols		Site noise	o levels	Site	limits	W	eather	. Д	pply	7
Quarter	Site	AL	Period	Date	Start time	LAFmin	LAF90.0					eq LCeq-LAec									: PL Comments
			_	07/00/2020				·				•									Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	12:09	33	35	39	41	49	51 5	6 17	IA	N/A	37	N/A	3.3	44	AN	I N	I and resident noise occasionally audible. Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	12:24	34	36	41	44	48	51 5	7 16	IA	N/A	37	N/A	3.4	66	A N	l N	and resident noise occasionally audible.
03	CVC	ATNOOC	Day	07/00/2020	12.20	24	27	42	46	F2 .		7 14	14	NI/A	27	NI/A	2.1	70			Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	12:39	34	37	43	46	53	52 5	7 14	IA	N/A	37	N/A	5.1	79	AN	I IN	I and resident noise occasionally audible. Site inaudible. VPPS noise and nearby pump consistently audible. Bird noise, resident noise and wind in foliage frequently audible. Distant traffic, traffic passbys, distant dogs barking
Q3	CVC	ATN006	Day	07/09/2020	12:54	36	38	46	47	56	'2 E	3 17	IA	N/A	37	N/A	3.6	79	A N	I N	and resident noise occasionally audible. Site inaudible. VPPS noise and insects consistently audible. Bird noise, nearby animals and
Q3	CVC	ATN006	Eve	08/09/2020	21:08	35	38	40	42	45	52 6	0 20	IA	N/A	37	N/A	1.2	35	F N	I Y	distant and local traffic occasionally audible. Site inaudible. VPPS noise and insects consistently audible. Bird noise, nearby animals and
Q3	CVC	ATN006	Eve	08/09/2020	21:23	33	35	39	39	50	66 5	8 19	IA	N/A	37	N/A	1.6	23	D Y	Y	distant and local traffic occasionally audible. Site inaudible. VPPS noise, insects and nearby pump consistently audible. Distant dog
Q3	CVC	ATN006	Night	08/09/2020	22:00	33	35	37	39	42	53 5	8 21	IA	IA	37	45	1.0	33	E Y	Y	barking, nearby animals and resident noise occasionally audible. Site inaudible. VPPS noise, insects and nearby pump consistently audible. Distant dog
Q3		ATN006		08/09/2020	22:15	35	37	41	43		19 5		IA	IA	37	45					barking, nearby animals and resident noise occasionally audible. Site inaudible. VPPS noise, insects and nearby pump consistently audible. Distant dog
Q3		ATN006		08/09/2020		33	35	37	39		19 5		IA	IA	37	45		238			Site inaudible. VPPS noise, insects and nearby pump consistently audible. Distant dog
Q3	CVC	ATN006	Night	08/09/2020	22:45	33	35	37	39	40	19 5	9 22	IA	IA	37	45	0.9	218	E Y	Y	 barking, nearby animals and resident noise occasionally audible. Site vent fan consistently audible and dominant. Birds consistently audible. Wind in foliage frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer
Q3	CVC	ATN007	Day	07/09/2020	09:51	44	45	46	47	50	58 6	7 21	36	N/A	46	N/A	2.2	10	A Y	Y	· · · · · · · · · · · · · · · · · · ·
Q3	CVC	ATN007	Day	07/09/2020	10:08	44	45	47	48	52	58 E	7 20	36	N/A	46	N/A	2.8	19	A Y	Y	frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer audible at a distance (unrelated to CVC)
																					Site vent fan consistently audible and dominant. Birds consistently audible. Wind in foliage frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer
Q3	CVC	ATN007	Day	07/09/2020	10:23	44	45	47	48	52	50 E	7 20	36	N/A	46	N/A	2.3	142	АΥ	Y	 audible at a distance (unrelated to CVC) Site vent fan consistently audible and dominant. Birds consistently audible. Wind in foliage frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer
Q3	CVC	ATN007	Day	07/09/2020	10:38	44	45	47	48	50	55 6	7 20	36	N/A	46	N/A	2.8	42	A Y	Y	'a audible at a distance (unrelated to CVC) Site vent fan consistently audible and dominant. Birds consistently audible. Wind in foliage
Q3	CVC	ATN007	Day	07/09/2020	10:53	44	45	48	51	56	54 6	7 19	36	N/A	46	N/A	2.9	35	A Y	Υ	frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer
																					Site vent fan consistently audible and dominant. Birds consistently audible. Wind in foliage frequently audible. Distant traffic and plane flying above occasionally audible. Jackhammer
Q3		ATN007		07/09/2020		44	45	47	49		50 6		36	N/A	46	N/A					a udible at a distance (unrelated to CVC) Site vent fan consistently audible and dominant. Insects consistently audible. Distant dog
Q3		ATN007		07/09/2020	21:25	44	45	46	46		54 6		38 (36+2)	N/A	46	N/A					barking briefly audible. Distant traffic and wind in foliage occasionally audible. Site vent fan consistently audible and dominant. Insects consistently audible. Distant dog
Q3		ATNO07		07/09/2020	21:40	44	45	45	46		51 6		38 (36+2)		46	N/A 46			FN		Site vent fan consistently audible and dominant. Insects consistently audible. Distant traffic
Q3 Q3		ATN007 ATN007	_	07/09/2020 07/09/2020	22:00 22:15	44	45 45	45 45	46 46		53 6 17 6		38 (36+2) 38 (36+2)	37 37	46 46	46	2.0		FN		occasionally audible. Site vent fan consistently audible and dominant. Insects consistently audible. Distant traffic occasionally audible.
Q3		ATN007	-	07/09/2020	22:30	44	45	45	46		i) 6		38 (36+2)		46	46			FN		Site vent fan consistently audible and dominant. Insects consistently audible. Distant traffic
Q3		ATN007	_	07/09/2020		44	45	45	46		i3 6		38 (36+2)		46	46					Site vent fan consistently audible and dominant. Insects consistently audible. Distant traffic occasionally audible.
											_	_									Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Birds nearby constant and wind in foliage almost constant. Local traffic (passbys) occasionally
Q3	CVC	K12	Day	07/09/2020	13:44	38	40	48	50	61 (59 5	8 10	<40	N/A	49	N/A	3.3	71	AN	I N	 I audible. Plane flying above. Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Birds nearby constant and wind in foliage almost constant. Local traffic (passbys) and traffic on
Q3	CVC	R12	Day	07/09/2020	13:59	38	40	45	46	56	54 5	7 12	<40	N/A	49	N/A	3.3	71	A N	l N	Tall Timbers Road occasionally audible.

													a							_		
Outantas	. Ciao Al	Daviad	Data	Chaut times	I A Funda	1 4 5 0 0 0			red noise le		1000 100		Site nois			limits		eathe		App		Comments
Quarter	· Site AL	Period	Date	Start time	LAFMIN	LAF90.0	LAeq	LAFI.U	LAF10.0 L/	чгтах	rced rce	eq-LAeq	LAeq	LAMax	LAeq	LAMax	ws	WD	SC	DC		Comments
																						Site mostly inaudible, forklift and 'banging' noise occasionally audible. VPPS hum
Q3	CVC R12	Day	07/09/2020	14:14	39	42	E 6	53	71	77	69	13	<42	NI/A	49	NI/A	4.6	72	٨	N	N	consistently audible. Birds and wind in foliage constant. Local traffic (passbys) and traffic on
ЦЗ	CVC KIZ	Day	07/09/2020	14:14	39	42	56	55	/1	//	09	13	<42	N/A	49	N/A	4.0	12	А	IN		Tall Timbers Road occasionally audible.
																						Site mostly inaudible, forklift and 'banging' noise occasionally audible. VPPS hum consistently audible. Wind in foliage constant and birds almost constant. Local traffic
Q3	CVC R12	Day	07/09/2020	14:29	42	44	48	50	56	72	57	9	<44	N/A	49	N/A	3.8	72		NI.	N	(passbys) and traffic on Tall Timbers Road occasionally audible. Dog barking.
ŲЗ	CVC KIZ	Day	07/03/2020	14.23	42	44	40	30	30	12	37	9	\44	IN/A	43	IN/A	3.0	12	А	IN		Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local
03	CVC R12	Day	07/09/2020	14:45	41	44	52	52	61	76	65	13	IA	N/A	49	N/A	3.4	67	٨	N		traffic and passbys occasionally audible. Plane flying above.
Q3	CVC KIZ	Day	07/03/2020	14.43	41	44	32	32	01	70	03	13	1/4	IN/A	43	14/7	3.4	07	^	14		Site inaudible. VPPS hum consistently audible. Birds and wind in foliage constant. Local
Q3	CVC R12	Dav	07/09/2020	15:00	42	44	47	49	52	65	58	11	IA	N/A	49	N/A	3.5	57	Δ	N		traffic and passbys occasionally audible. Distant dogs barking.
٩٥	0.0	Duy	07/03/2020	15.00		• • •	.,	.5	52	03	50			,		,,,	5.5	5.	,,			Site inaudible. VPPS hum consistently audible. Insects consistently audible. Local traffic
Q3	CVC R12	Eve	07/09/2020	20:35	37	39	43	43	55	60	64	21	IA	N/A	49	N/A	1.4	34	F	N	Υ	(passbys) and distant traffic occasionally audible. Wind in foliage occasionally audible.
			,,											.,		,						Site inaudible. VPPS hum consistently audible. Insects consistently audible. Distant traffic
Q3	CVC R12	Eve	07/09/2020	20:50	37	39	41	42	45	58	64	23	IA	N/A	49	N/A	1.2	28	F	N		occasionally audible. Fauna in nearby woods occasionally audible.
																						Site mostly inaudible, forklift occasionally audible. VPPS hum consistently audible. Insects
Q3	CVC R12	Night	07/09/2020	23:20	38	40	42	44	46	56	66	24	<40	<40	49	53	1.5	9	F	N	Υ	consistently audible.
Q3	CVC R12	Night	07/09/2020	23:35	38	40	42	43	46	54	66	24	IA	IA	49	53	1.4	2	F	N	Υ	Site inaudible. VPPS hum consistently audible. Insects consistently audible.
Q3	CVC R12	Night	07/09/2020	23:50	39	40	42	43	44	46	66	24	IA	IA	49	53	1.5	351	F	N	Υ	Site inaudible. VPPS hum consistently audible. Insects consistently audible.
																						Site mostly inaudible, winch briefly audible once. VPPS hum consistently audible. Insects
Q3	CVC R12	Night	08/09/2020	00:05	38	40	41	42	44	50	66	25	<40	<40	49	53	0.9	324	F	N	Υ	consistently audible. Distant traffic on Tall Timbers Road audible once.
																						Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage,
																						distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	13:26	36	38	57	44	73	79	68	11	IA	N/A	43	N/A	3.8	68	Α	N		occasionally audible.
																						Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage,
																						distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	13:41	36	40	48	50	59	73	56	8	IA	N/A	43	N/A	3.9	71	Α	N		occasionally audible.
																						Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage,
00	0.40 0.40	_	07/00/2020	40.55	27			4-7				4.0										distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	13:56	37	40	46	47	54	71	56	10	IA	N/A	43	N/A	3.7	/5	А	N		occasionally audible.
																						Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage, distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	14:11	37	40	49	51	61	68	59	10	IA	N/A	43	N/A	4.0	67	Α	N	N	occasionally audible.
ųς	CVC KIS	Day	07/03/2020	14.11	37	40	43	31	01	00	33	10	1/2	IV/A	43	14/ 🛆	4.0	07	^	14		Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage,
																						distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	14:26	39	41	46	48	56	72	60	14	IA	N/A	43	N/A	4.1	74	Α	N	N	occasionally audible.
		,	,,											.,		,						Site inaudible. VPPS noise consistently audible. Bird noise, resident noise, wind in foliage,
																						distant traffic and traffic passbys frequently audible. Aircraft noise and dogs barking
Q3	CVC R13	Day	07/09/2020	14:41	41	44	45	47	49	57	55	10	IA	N/A	43	N/A	3.6	67	Α	N	N	occasionally audible.
																						Site inaudible. VPPS noise and wind in foliage consistently audible. Distant traffic and distant
Q3	CVC R13	Eve	07/09/2020	21:18	36	38	40	41	43	49	58	18	IA	N/A	43	N/A	1.4	18	F	N	Υ	dogs barking occasionally audible.
																						Site inaudible. VPPS noise and wind in foliage consistently audible. Distant traffic and distant
Q3	CVC R13	Eve	07/09/2020	21:33	37	38	40	41	43	46	58	18	IA	N/A	43	N/A	2.0	27	F	N	Υ	dogs barking occasionally audible.
																						Site inaudible. VPPS noise, insects and wind in foliage consistently audible. Bird noise,
Q3	CVC R13	Night	07/09/2020	22:00	36	38	40	41	43	47	59	19	IA	IA	43	49	1.6	33	F	N		resident noise and distant traffic occasionally audible.
																						Site inaudible. VPPS noise, insects and wind in foliage consistently audible. Bird noise,
Q3	CVC R13	Night	07/09/2020	22:15	37	38	40	41	44	52	59	19	IA	IA	43	49	2.0	25	F	N		resident noise and distant traffic occasionally audible.
			/ /																_			Site inaudible. VPPS noise, insects and wind in foliage consistently audible. Bird noise,
Q3	CVC R13	Night	07/09/2020	22:30	36	38	40	42	44	47	59	19	IA	IA	43	49	1.7	27	F	N		resident noise and distant traffic occasionally audible.
02	C) (C D42	NULLA	07/00/2020	22.45	25	20	40	42	45	47	F0	10			42	40	2.2	20	_			Site inaudible. VPPS noise, insects and wind in foliage consistently audible. Bird noise,
Q3	CVC R13	Night	07/09/2020	22:45	35	38	40	42	45	47	59	19	IA	IA	43	49	2.2	20	۲	IN	N	resident noise and distant traffic occasionally audible.
																						CVC inaudible. Insects and frogs (dominant) and Vales Point Power Station (VPPS) noise consistently audible. Wind in foliage frequently audible. Distant dogs barking and traffic
Q4	CVC ATNO01	Day	16/12/2020	14:11	67	70	72	73	75	75	73	1	IA	N/A	38	N/A	3.6	80	Δ	N	N	passbys occasionally audible.
Q4	CVC AINOUI	Day	10/12/2020	14.11	07	70	12	13	15	, ,	, ,	1	10	11/1	30	IN/ C	3.0	00	^	14	14	CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in
Q4	CVC ATNO01	Eve	16/12/2020	18:22	61	63	67	70	73	77	71	4	IA	N/A	38	N/A	3.3	44	E	N	N	foliage, distant dogs barking and traffic passbys occasionally audible.
ζ,	SVC AINOUI	_**	10, 12, 2020	10.22	91	03	0,	, 5	, ,		, 1	-	٠.	11/1	50	11/1	5.5		-			CVC inaudible. Insects and frogs and VPPS noise consistently audible. Nearby animals
Q4	CVC ATNO01	Night	17/12/2020	03:51	40	42	43	44	46	63	65	22	IA	IA	38	45	0.5	16	F	N		occasionally audible.
· ·			,, _ 520																			CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in
																						foliage frequently audible. Car passbys, nearby animals and aircraft noise occasionally
Q4	CVC ATN002	Day	16/12/2020	14:36	62	67	70	72	73	76	69	-1	IA	N/A	49	N/A	3.5	55	Α	N	N	audible.

								Tot	al measur	ed noise	levels			Site nois	e levels	Site	limits	w	/eathe	r	App	lv?	
Quarter	Site AL		Period	Date	Start time	LAFmin	LAF90.0					LCeq	LCeq-LAeq										Comments
												•	· ·	•		·							CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Car passbys, nearby animals, bird noise, distant traffic, dogs
Q4	CVC ATN			16/12/2020		56	60	65	68	71	73	66	1	IA	N/A	49	N/A						barking and aircraft noise occasionally audible.
Q4	CVC ATN	N002	Night	17/12/2020	01:34	35	37	38	39	46	57	63	25	IA	IA	49	54	0.7	341	F	N	Υ	CVC inaudible. Insects and frogs, VPPS noise and dripping water consistently audible CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Bird noise and wind in foliage frequently audible. Car passbys, distant dogs barking and distant traffic
Q4	CVC ATN	N003	Day	16/12/2020	15:15	57	58	59	60	61	66	64	5	IA	N/A	36	N/A	4.4	81	Α	N	N	occasionally audible. CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in
Q4	CVC ATN	N003	Eve	16/12/2020	19:45	48	52	61	65	67	68	62	1	IA	N/A	36	N/A	2.7	79	F	N	N	foliage frequently audible. Bird noise and distant traffic occasionally audible. CVC inaudible. Insects and frogs, VPPS noise and running water consistently audible. Nearby
Q4	CVC ATM	N003	Night	17/12/2020	00:15	37	38	39	40	41	66	62	23	IA	IA	36	45	0.3	23	F	N	Υ	animals, distant dogs barking and distant traffic occasionally audible. CVC inaudible. Insects and frogs (dominant), VPPS noise and wind in foliage consistently audible. Bird noise frequently audible. Car passbys, boat noise and aircraft noise occasionally
Q4	CVC ATN	N004	Day	16/12/2020	15:34	51	54	58	60	65	74	68	10	IA	N/A	35	N/A	4.8	109	Α	N	N	audible.
Q4	CVC ATN	NOOA	Evo	16/12/2020	20:10	50	57	60	61	66	73	62	2	IA	N/A	35	N/A	2.2	EΩ	_	N	N	CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage and bird noise frequently audible. Dog barking and resident noise occasionally audible.
Q4	CVC AIR	11004	Eve	10/12/2020	20.10	30	37	00	01	00	/3	02	2	IA	N/A	33	IN/A	2.2	30	Г	IN	IN	CVC inaudible. Insects and frogs and VPPS noise consistently audible. Nearby animals,
Q4	CVC ATN	N004	Night	17/12/2020	02:09	29	31	34	35	41	53	58	24	IA	IA	35	45	0.2	69	F	N	Υ	distant traffic and bird noise occasionally audible.
Q4	CVC ATM	N005	Day	16/12/2020	15:58	48	55	64	66	69	71	64	0	IA	N/A	35	N/A	4.8	30	Α	N	N	CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Bird noise, boat noise and distant traffic occasionally audible. CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in
Q4	CVC ATN	N005	Eve	16/12/2020	19:06	43	46	59	65	67	68	61	2	IA	N/A	35	N/A	3.2	35	D	N	N	foliage frequently audible. Bird noise, nearby pedestrians and distant traffic occasionally audible.
Q4	CVC ATM	N005	Night	17/12/2020	02:32	37	40	42	44	45	59	58	16	IA	IA	35	45	0.3	232	F	N	Υ	CVC inaudible. Insects and frogs and VPPS noise consistently audible. Distant traffic occasionally audible.
Q4	CVC ATM	N006	Day	16/12/2020	16:19	54	58	62	64	65	70	67	5	IA	N/A	37	N/A	4.7	45	Α	N	N	CVC inaudible. Insects and frogs (dominant) consistently audible. Wind in foliage, dog barking and nearby pedestrians frequently audible. Bird noise occasionally audible.
Q4	CVC ATN	N006	Eve	16/12/2020	19:27	46	53	65	70	72	73	65	0	IA	N/A	37	N/A	2.9	96	F	N	N	CVC inaudible. Insects and frogs (dominant) consistently audible. Wind in foliage frequently audible. Bird noise and distant dogs barking occasionally audible. CVC inaudible. Insects and frogs, nearby pump and VPPS noise consistently audible. Nearby
Q4	CVC ATM	N006	Night	17/12/2020	02:52	32	34	36	37	41	57	58	22	IA	IA	37	45	0.2	216	F	N	Υ	animals, bird noise and aircraft noise occasionally audible. CVC vent fan consistently audible. Insects and frogs (dominant) consistently audible. Wind in
Q4	CVC ATM	N007	Day	16/12/2020	16:48	73	74	77	79	80	80	77	0	<42	N/A	46	N/A	4.4	77	Α	N	N	foliage frequently audible. Distant traffic and aircraft noise occasionally audible. CVC vent fan consistently audible. Insects and frogs (dominant) consistently audible. Wind in
Q4	CVC ATN	N007	Eve	16/12/2020	19:55	54	60	75	79	81	81	75	0	<42	N/A	46	N/A	3.1	42	E	N	N	foliage frequently audible. Distant traffic and bird noise occasionally audible. CVC vent fan consistently audible. Insects and frogs consistently audible. Distant traffic and
Q4	CVC ATN	N007	Night	17/12/2020	03:20	45	46	47	48	49	59	70	23	40 (38+2)	40	46	46	0.4	14	F	N	Υ	nearby animals occasionally audible. CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Car passbys, nearby animals and aircraft noise occasionally
Q4	CVC R12	2	Day	16/12/2020	14:36	62	67	70	72	73	76	69	-1	IA	N/A	49	N/A	3.5	55	Α	N	N	audible. CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Car passbys, nearby animals, bird noise, distant traffic, dogs
Q4	CVC R12	2	Eve	16/12/2020	18:50	56	60	65	68	71	73	66	1	IA	N/A	49	N/A	3.7	23	D	N	N	barking and aircraft noise occasionally audible.
Q4	CVC R12			17/12/2020	01:34	35	37	38	39	46	57	63	25	IA	IA	49	53	0.7					CVC inaudible. Insects and frogs, VPPS noise and dripping water consistently audible
Q4	CVC R13	3	Day	16/12/2020	14:53	58	62	65	67	69	70	64	-1	IA	N/A	43	N/A	4.8	48	Α	N	N	CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Bird noise, aircraft noise and distant traffic occasionally audible. CVC inaudible. Insects and frogs (dominant), VPPS noise and dripping water consistently
Q4	CVC R13	3	Eve	16/12/2020	18:30	51	55	62	66	67	71	63	1	IA	N/A	43	N/A	2.8	69	F	N	N	audible. Dog barking occasionally audible.
Q4	CVC R13	3	Night	17/12/2020	01:50	37	39	41	43	45	55	58	17	IA	IA	43	49	0.4	89	F	N	Υ	CVC inaudible. Insects and frogs (dominant) and VPPS noise consistently audible. Wind in foliage frequently audible. Bird noise, aircraft noise and distant traffic occasionally audible.



Appendix 8: Annual Subsidence Report

Review Date	Next Review Date	Revision No	Document Owner	Page							
		1	Environmental Compliance Coordinator	Page 114 of 118							
DOCUMENT UNCONTROLLED WHEN PRINTED											



SITE:	Chain Valley Colliery and Mannering Colliery
Department:	Technical Services
REPORT TITLE:	2020 Annual Subsidence Report
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1 Introduction

1.1 Background

Chain Valley Colliery (CVC) and Mannering Colliery (MC) are underground coal mines on the southern side of Lake Macquarie, approximately 60 kilometres (km) south of Newcastle and 80 km north of Sydney.

CVC operates under Development Consent SSD-5465, as modified, which was originally granted on 23 December 2013 by the then Minister for Planning and Infrastructure under Part 4, Division 4.1 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), which relates to State significant development (SSD). The consent permits underground miniwall mining in the Fassifern Seam at a maximum rate of 2.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, with all secondary extraction confined to areas under the Lake Macquarie water body.

MC was granted project approval (MP06_0311) under Part 3A of the EP&A Act on 12 March 2008 and, as modified, permits the extraction of up to 1.1 Mtpa of ROM coal until 30 June 2022. It also permits the handling of up to 1.3 Mtpa ROM coal with that coal transported via a dedicated overland conveyor to Delta Electricity's Vales Point Power Station (VPPS) for domestic energy generation.

This Annual Subsidence report (ASR) provides an overview of subsidence monitoring data and management performance for CVC and MC in 2020. It has been prepared to be an appendix of the Chain Valley Colliery and Mannering Colliery Annual reviews.

1.2 Purpose

The purpose of this ASR is to provide an overview of subsidence performance for CVC and MC. Subsidence at CVC and MC is documented, regulated, controlled and measured consistent with the relevant conditions of SSD-5465 and MP06_0311. In addition, this ASR:

provides data to assist with the management of the risks associated with subsidence at CVC and MC compares observed subsidence against predictions in CVC's and MC's environmental assessment and approval documentation and

summarises the results of subsidence monitoring activities performed in 2020.

1.3 Scope

This ASR relates specifically to underground mining undertaken at CVC and MC in the period 1 January 2020 to 31 December 2020. Within this period, no mining was undertaken at MC. First workings and secondary extraction were undertaken at CVC and included:

First Workings

- 7,949 meters (m) of development drivage which occurred in North East Main, Maingate
 S3, Maingate S4, Installation Road S4, Installation Road S5 and Maingate S5 and
- 4,814 m of bord and pillar first workings which occurred in HB1 and HB Mains.

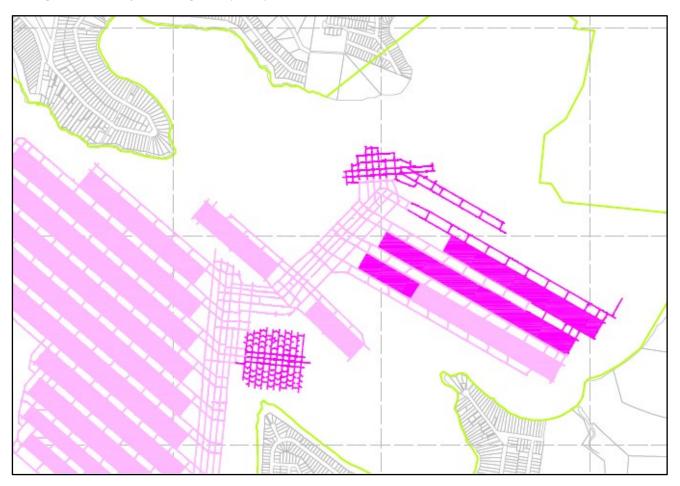
Secondary Extraction

o 2138.5 m of longwall retreat from Miniwall S2, Miniwall S3 and Miniwall S4.



Mining areas in 2020 are shown in Figure 1.

Figure 1 - CVC Fassifern Workings (dark pink represents 2020 extraction)



1.4 Approval and Legislative Requirements

1.4.1 Chain Valley Colliery

In addition to carrying out the works in accordance with the conditions of SSD-5465, as modified (Schedule 2, condition 2A), DC carries out works generally in accordance with the Environmental Impact Statement (EIS); Statement of Environmental Effects (SEE) (Mod 1); SEE (Mod 2); SEE (Mod 3); project layout plans and Statement of Commitments. An ecological and archaeological assessment was conducted in August 2019 and a Conservation Risk Assessment Approval from National Parks and Wildlife Service (NPWS) Miniwall S4 and S5 was granted in October 2019 to allow access and foreshore subsidence monitoring activities for Miniwalls S4 and S5.

1.4.2 Mannering Colliery

In accordance with Schedule 2, Condition 2 and 2A of MP06_0311 (as modified), in addition to carrying out the works in accordance with the conditions of MP06_0311, DC carries out works generally in accordance with the Environmental Assessment (EA); EA (Mod 1); EA (Mod 2); EA (Mod 3); EA (Mod 4); SEE (Mod 5); project layout plans and Statement of Commitments.



1.5 Stakeholder Engagement

DC has consulted with the local community via the CVC and MC Community Consultative Committee (CCC) on subsidence results at the four quarterly meetings. This report is appended to the 2020 Mannering Colliery Annual Review and 2020 Chain Valley Colliery Annual Review and has been provided to the CCC and applicable stakeholders and will be made publicly available on the Delta Coal website.

1.6 Supporting Documentation

This ASR has included a review of relevant sections of the following documentation:

- Laxton, J, Laxton, E & Laxton, March 2020, Lake Macquarie Benthos Survey Report No. 17. Report prepared by J.H. & E.S. Laxton – Environmental Consultants P/L for Lake Coal
- Laxton, J & Laxton, E 2020, Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW (Results for 2008 to 2020). Report prepared by J.H. & E.S. Laxton – Environmental Consultants P/L for Delta Coal
- April 2020, Benthic Communities Monitoring Statistical Analysis Report prepared by EMM Consulting for Delta Coal
- August 2020, Lake Macquarie Benthos Survey Report No. 18. Report prepared by J.H. & E.S. Laxton –
 Environmental Consultants P/L for Delta Coal
- March 2020, Daly Smith Pelican Rock Navigational Marker
- August 2020, Daly Smith Pelican Rock Navigational Marker
- 2020 Benthic Communities Management Plan, Delta Coal
- 2020 Seagrass Management Plan, Delta Coal
- 2020 Subsidence Monitoring Program, Delta Coal
- 2020 Built Features Management Plan, Delta Coal
- 2020 Public Safety Management Plan, Delta Coal
- June 2019, Pelican Rock Navigational Marker Pre-mining inspection, Delta Coal
- Jan 2019 Daly Smith Bathymetric Survey
- July 2019 Daly Smith Survey of Pelican Rock navigational marker
- July 2019 Daly Smith Bathymetric Survey
- Daly Smith Foreshore Surveys
- Feb, May, August, November Delta Coal Quarterly Combined CCC Chain Valley Colliery and Mannering Colliery Community Consultative Committee Meeting minutes and presentations and
- Conservation Risk Assessment Approval for Miniwall S4 monitoring



2 Monitoring and Comparison

2.1 Chain Valley Colliery

2.1.1 Monitoring Overview

CVC has a Subsidence Monitoring Program and the purpose of this program is to:

- define the subsidence monitoring scope;
- outline subsidence predictions
- outline the methodology to be used to monitor subsidence impacts
- identify subsidence monitoring locations
- · identify reporting requirements
- analyse the relationship between predicted and resulting subsidence effects and
- identify the requirements for incident or exceedances reporting.

Subsidence monitoring at MC is restricted to an annual survey to assess potential subsidence impacts associated with the link road project. Annual surveys assess potential impacts at a number of monitoring locations within proximity of VPPS including:

- early warning line one;
- early warning line two;
- TransGrid fence line;
- VPPS foreshore line and
- sewage treatment plant.

2.1.2 Scope of Subsidence Monitoring

2.1.2.1 Shoreline (High Water Mark)

The shoreline of Lake Macquarie is protected under Mining Lease Conditions requiring Ministerial Approval to carry out mining operations within the High Water Mark Subsidence Barrier (HWMSB). The HWMSB is defined in the seam by a line defined by an angle of draw of 35° drawn lakeward from the high water level of Lake Macquarie, and on the land side, a line drawn from the 2.44 m contour at 35° towards the land.

In accordance with Condition 1, Schedule 4 of SSD-5465, vertical subsidence within the HWMSB is limited to a maximum subsidence (S_{max}) of 20 mm.

A key objective of the mine design at CVC is to minimise vertical subsidence within the HWMSB and prevent >20mm subsidence above the high water mark.

To ensure effectiveness of the mine design, monitoring of the shoreline is carried out at fixed reference marks surveyed at regular intervals.

2.1.2.2 Seagrass

Seagrass distribution within estuaries is naturally influenced by light penetration, depth, salinity, nutrient status, bed stability, wave energy, estuary type and the evolutionary stage of the estuary.



Condition 2, Schedule 4 of SSD-5465 specifies negligible environmental impacts on the species of seagrass found within the current area of mining operations as a condition of approval. Surveys of the seagrass extents are undertaken in order to monitor impacts on the seagrass population.

Delta Coal's Seagrass Management Plan (Delta Coal 2020) outlines the methodology used to determine changes to composition and quantity of seagrass populations in Lake Macquarie as a result of mining activities at CVC.

Subsidence monitoring of the lakebed is undertaken via bathymetric survey over CVC's current mining area in order to validate subsidence predictions.

2.1.2.3 Benthic Communities

Lake Macquarie is inhabited by a diverse number of marine organisms.

Condition 2, Schedule 4 of SSD-5465 specifies minor environmental consequences on benthic communities, including minor changes to species composition and/or distribution as a condition of approval. Regular surveys of the lake bed are undertaken in order to monitor variations in the composition and density of benthos due to mining, environmental and/or other seasonal factors.

Delta Coal's *Benthic Communities Management Plan* (Delta Coal 2020) outlines the methodology used to determine changes to species diversity and abundance.

Subsidence monitoring of the lakebed is undertaken via bathymetric survey over CVC's current mining area in order to validate subsidence predictions and to determine approximate levels of subsidence on specific benthic sample locations.

2.1.2.4 Threatened Species and endangered populations

Condition 2, Schedule 4 of SSD-5465 specifies negligible environmental consequences on threatened or endangered populations as a condition of approval.

Subsidence monitoring of the lakebed is undertaken via bathymetric survey over CVC's current mining area in order to validate subsidence predictions and to determine approximate levels of subsidence are within limits.

2.1.3 Methods of Subsidence Monitoring

2.1.3.1 Overview

Subsidence monitoring at CVC includes a combination of bathymetric surveys and foreshore level monitoring. Results can be used to validate model outcomes; enable early detection of subsidence trending to increased impact levels over that predicted; and allow early application of containment, adaptive and contingency measures to prevent impacts outside approved (particularly increased impacts to the foreshore).

2.1.3.2 Bathymetric Surveys

Previous mine operators, LakeCoal, commissioned Astute Surveying in 2012 to undertake a bathymetric survey over the areas of current and proposed workings at CVC. The primary purpose of this survey was to obtain accurate baseline data for future subsidence assessments and to enable comparison with the bathymetric data provided by NSW Office of Environment and Heritage (OEH) in 2010.

The multi-beam echo sounder used during bathymetric surveys for CVC captures data at approximately ± 0.1 m resolution. The survey vessel captures a swathe of data (down to sub-metre resolution), which is used to produce a $10 \text{ m} \times 10 \text{ m}$ grid. In addition, the dynamic nature of lake bed sediment movement and



change has and will affect the depth of the lake bed over time. As a result, the collected data is not considered as accurate as land-based surveys and should be viewed in consideration of these constraints.

Since 2012, bathymetric surveys have been completed on at least an annual basis with ongoing surveys providing accurate details of the lake depth within CVC's mining areas. Future surveys can also utilise the data that has been collected to monitor subsidence levels as a result of future mining activities.

From 2013 to 2018 these surveys were carried out on an annual basis over the mining area and the results compared to the original survey. During the 2017 survey it was identified that the site had exceeded vertical subsidence predictions over the MW7-12 mining area by approximately 430mm. LakeCoal notified the relevant authorities of the exceedance and submitted an incident report on 11 November 2017. As a result of the exceedance LakeCoal committed to increasing the frequency of the surveys to 6 monthly.

In September 2020, monitoring of subsidence results for Miniwalls S2 - S4 was required to be undertaken on a monthly basis to substitute monthly foreshore monitoring as land access adjacent Miniwall S4 was not achievable.

Secondary Extraction Panel	Approved S _{max} (mm)	Predicted S _{max} (mm)	Measured S _{max} (mm)
CVB1	760	670	550
Miniwall N1	780	420	<200
Miniwall S1	780	410	<200
Miniwall S2	780	300	<200
Miniwall S3	780	300	<200
Miniwall S4	780	300	<200

Table 1 - Chain Valley Colliery Secondary Extraction Subsidence Monitoring

Monitoring will continue in accordance with the approved *Miniwall S4 Extraction Plan* during the 2021 period.

As all of Chain Valley Colliery's secondary extraction is located beneath the lakebed bathymetric surveys are used to determine the levels of subsidence that are seen across its mining areas. A bathymetric survey of Domains 1 and 2 commissioned by LakeCoal in March 2012 was compared to a bathymetric survey of Lake Macquarie undertaken by OEH in 2010, to determine the subsidence which had occurred during this period.

2.1.4 Bathymetric Monitoring

Bathymetric scans undertaken in the 2020 reporting period have been provided as Figure 2 to Figure 8.

Bathymetric surveys over the Chain Valley bay mining area (**Figure 2**) have indicated subsidence of up to 500 mm directly over the extracted area. An increased angle of draw of surface subsidence has been detected compared to other mining areas, however measured subsidence is within the extraction plan modelled predictions. **Figure 3** and **Figure 4** depict subsidence over Miniwalls S2 and S3 post extraction,



indicating subsidence to date of less than 200 mm. **Figures 5-8** displays foreshore subsidence for Miniwalls S2-S4, subsidence (<20mm) and angle of draw are within modelled predictions.



Figure 2 - Chain Valley Bay Bathymetric Monitoring, April 2020

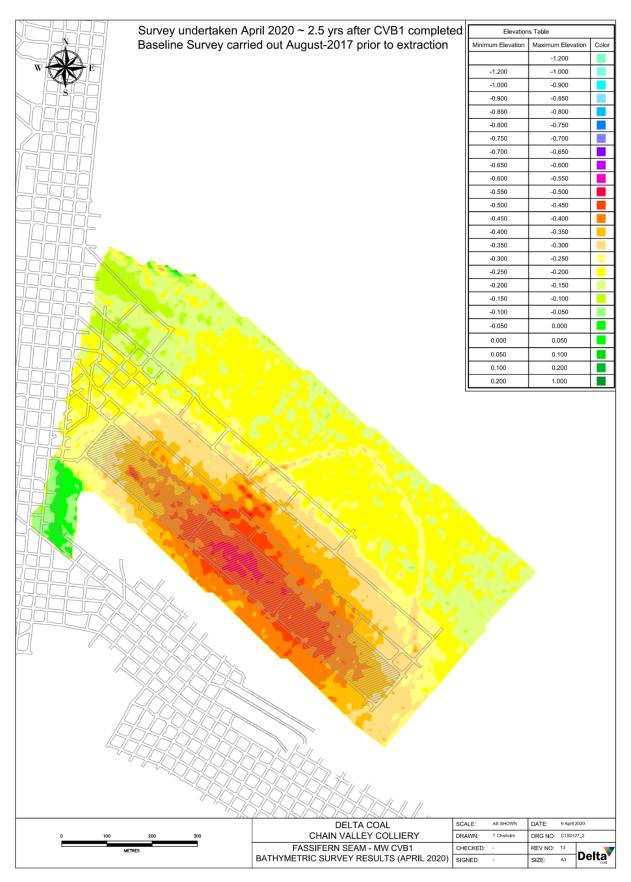


Figure 3 - Miniwall S2 Bathymetric Survey, April 2020



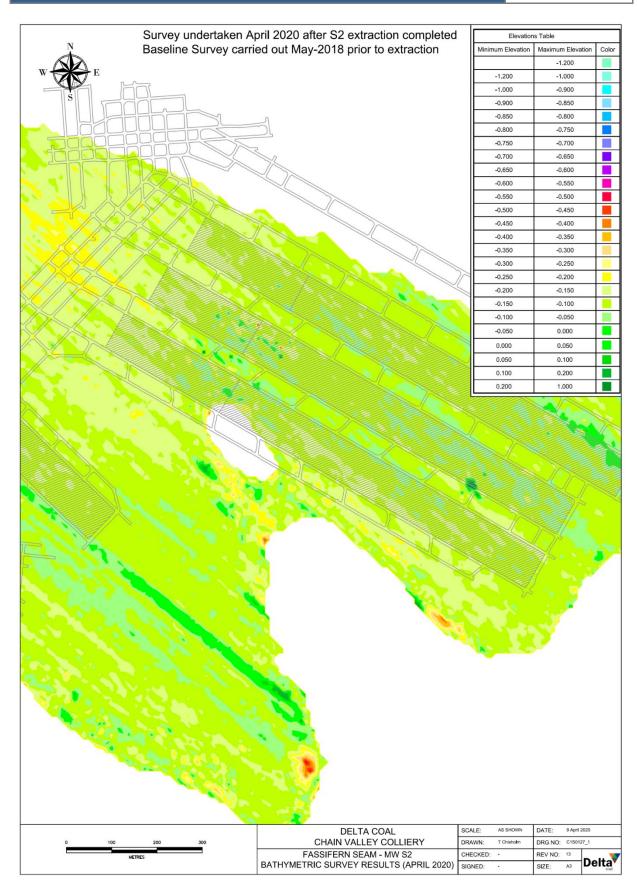


Figure 4 - Miniwalls S2 and S3 Bathymetric Monitoring, August 2020



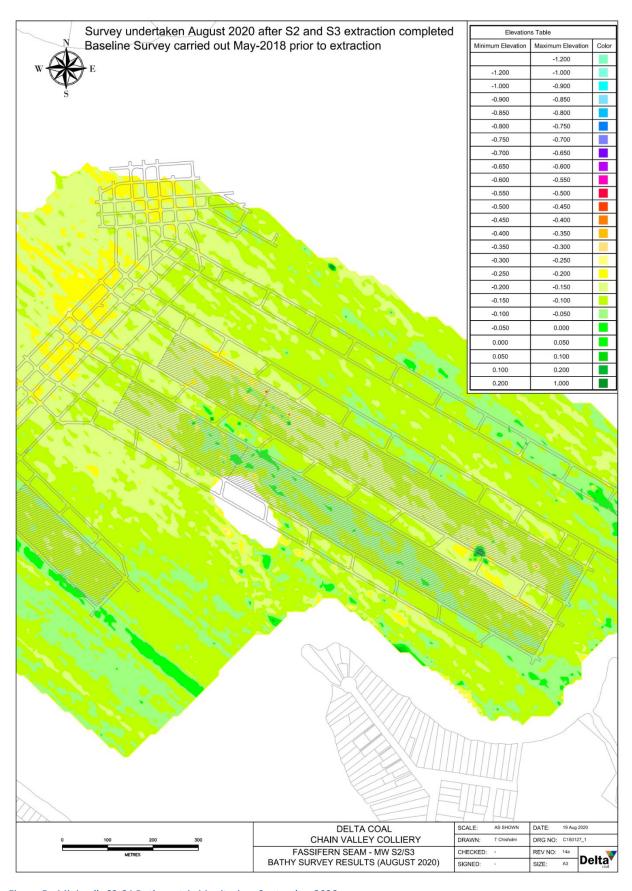


Figure 5 - Miniwalls S2-S4 Bathymetric Monitoring, September 2020



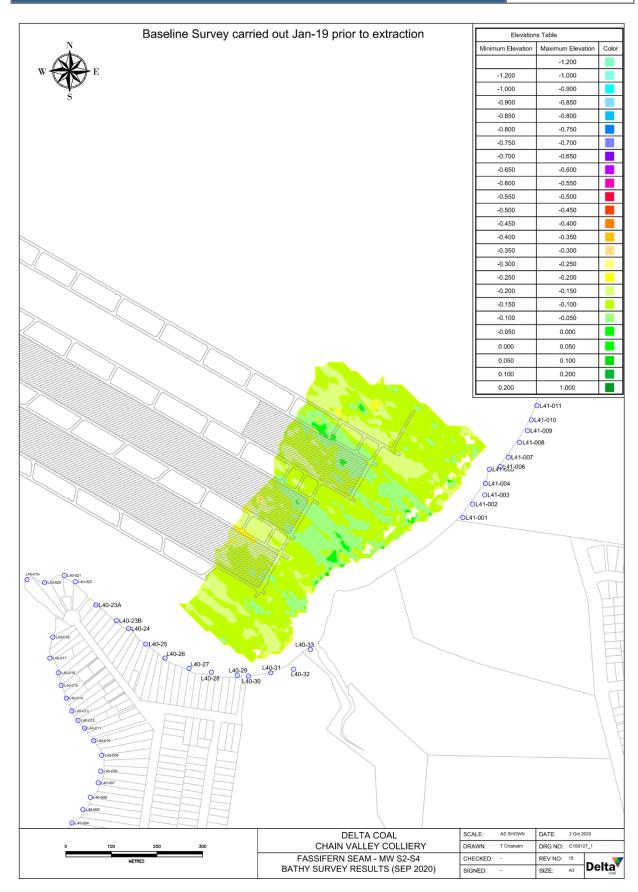


Figure 6 - Miniwalls S2-S4 Bathymetric Monitoring, October 2020



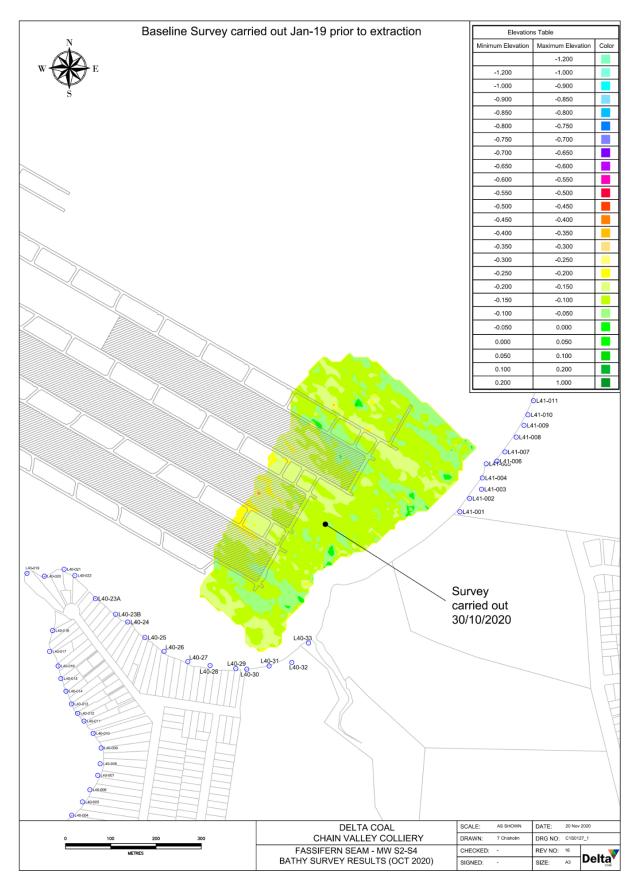


Figure 7 - Miniwalls S2-S4 Bathymetric Monitoring, November 2020



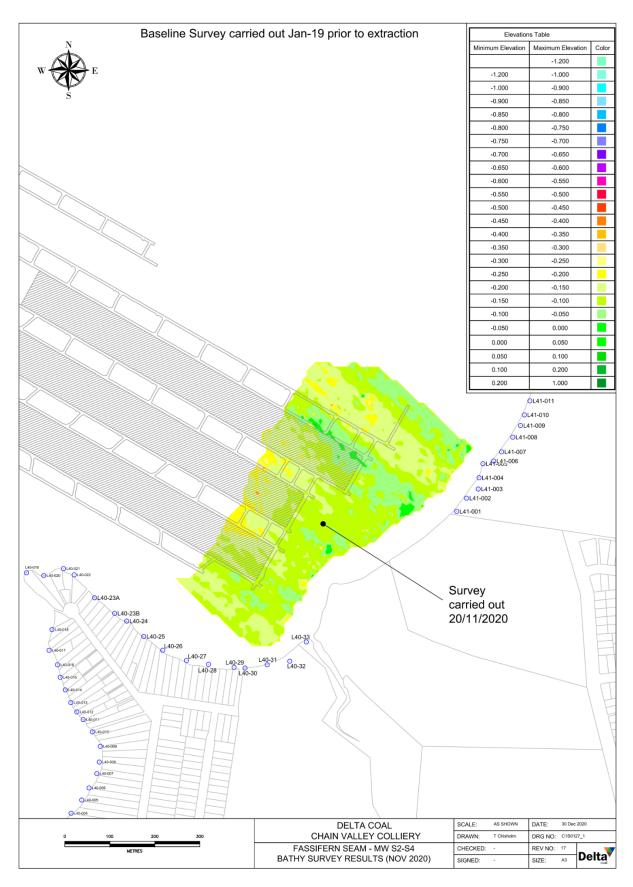
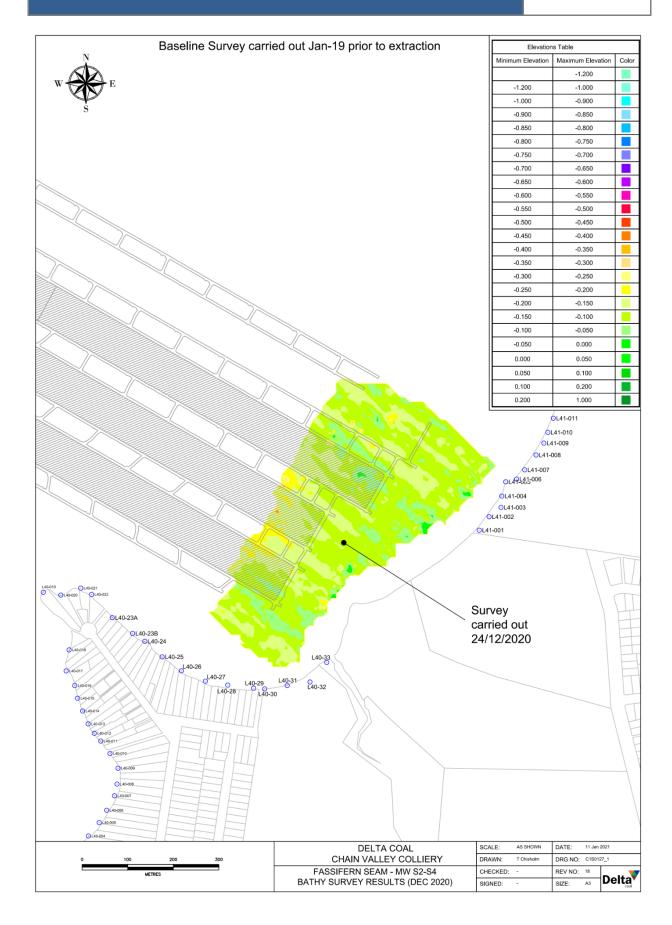


Figure 8 - Miniwalls S2-S4 Bathymetric Monitoring, December 2020



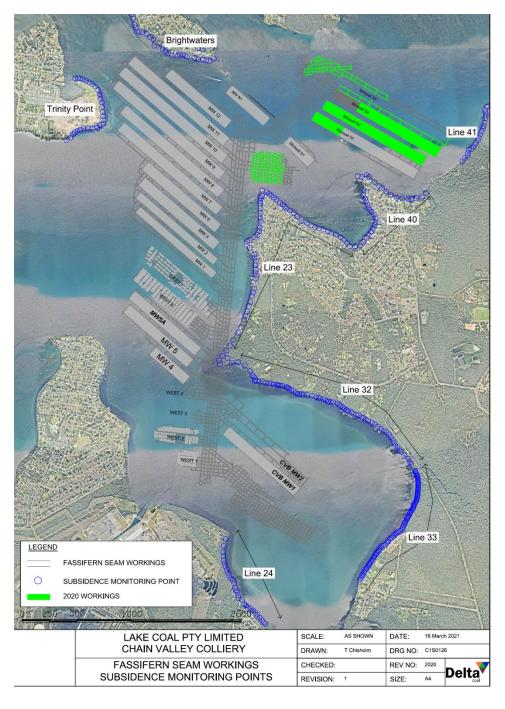




2.1.5 Foreshore Monitoring

Delta Coal completes subsidence monitoring around Trinity Point, Brightwaters, Frying Pan Bay, Summerland Point, Chain Valley Bay (**Figure 9**). Monitoring points occur along the foreshore at approximately 20 m – 30 m intervals. The results are issued to the Resources Regulator within 14 days of survey. In addition, observations are made where required to report on visual impacts or changes to public safety risk. A Subsidence Inspection Proforma is completed with each survey. The proforma includes visual inspection of steep slopes, boulder or tree instability, ponding and other potential effects of mine subsidence.

Figure 9 - Foreshore Subsidence Monitoring Points





2.1.5.1 Brightwaters

Monitoring points were installed along the Brightwaters peninsula in June 2016 to monitor the effects of Miniwall 11 and 12 extraction. Results for the reporting period are shown in **Figure 10**. Nil subsidence movement has been detected along the monitoring line.

Brightwaters - Subsidence Results 0.050 0.040 0.030 Baseline Survey Comparison (m) 0.020 0.010 0.000 BNOS BNOS -0.010 -0.020 -0.030 -0.040 -0.050

Figure 10 - Brightwaters Subsidence Results

2.1.5.2 Trinity Point

Figure 11 shows the subsidence monitoring results for the reporting period at Trinity Point. Monitoring points were installed in the area in 2014 for shoreline monitoring during extraction of Miniwalls 7-12 panels. A number of marks have been disturbed / destroyed due to development / construction works along the foreshore in the area, however nil movement attributable to subsidence has been detected.

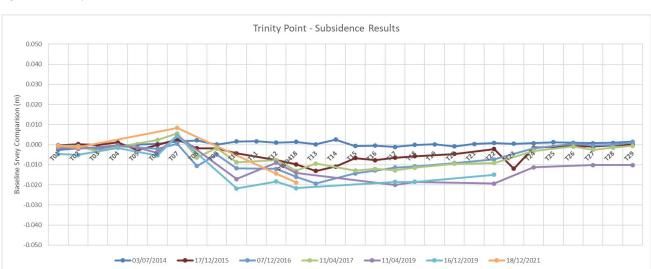


Figure 11 - Trinity Point Subsidence Results



2.1.5.3 Summerland Point, Lines S23, 23, 40 and 41

The foreshore along Summerland Point has been monitored since 1994, after secondary extraction was undertaken in the Wallarah beneath the south-western point (corresponding to mark S63 - 74). A maximum of 145mm of subsidence was measured (Point S71) since 1994.

It is noted this point, along with points #63-75 have all experienced more than negligible amounts of subsidence (20mm) since June 2008. Since 2008, when Fassifern first workings were completed, subsidence has ranged between 20-40mm, primarily due to the impact of multi-seam extraction in the Wallarah and Great Northern Seams. Ongoing subsidence movement appears to have slowed in recent years, with approximately 10mm of movement (Point S71) during the 2018, 2019 and 2020 reporting periods.

This subsidence is however linked to residual effects from both first and second workings in the Wallarah and Great Northern Seams above the Fassifern seam workings (*Ditton Geotechnical Services*, 2013 - CHV-002/2), due the presence of soft claystone floor beneath the Great Northern seam. The measured subsidence movement over time was assessed alongside the theoretical subsidence movement and indicates actual subsidence in line with expectations for Wallarah and Great Northern seam secondary pillar extraction.

The Wallarah and Great Northern Seam workings were assessed as long-term stable (*Seedsman Geotechnics*, 2008 – CV11) prior to mining in the Fassifern Seam being undertaken beneath the seams in the High Water Mark Subsidence Barrier (HWMSB). It is considered, then, that the subsidence effects along the foreshore are not a result of the 2008 Fassifern first workings or current miniwall extraction – rather due to the continuing consolidation of moisture-sensitive claystones in the Great Northern seam floor, and would occurred irrespective of the development of the Fassifern Seam roadways.

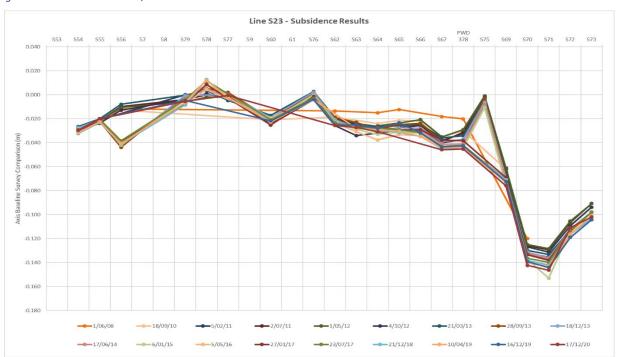


Figure 12 - Summerland Point, Line 23 Subsidence Results



Figure 13 - Line 23 Subsidence Results

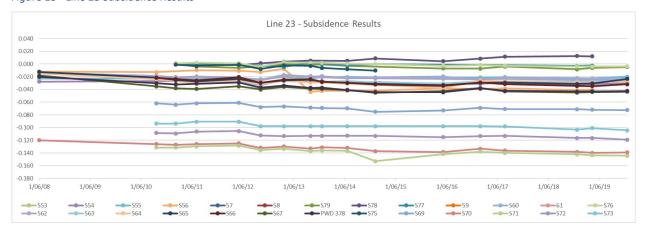
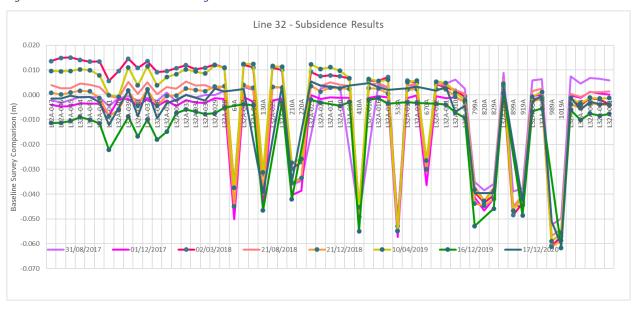


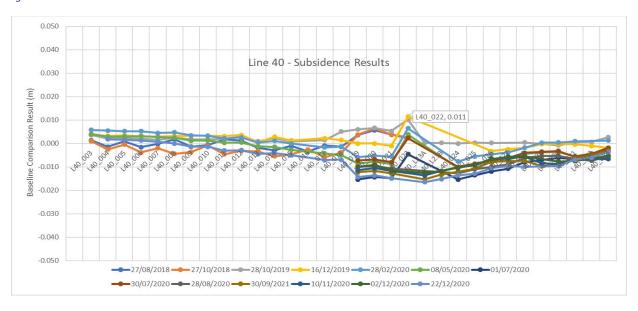
Figure 14 - Line 32 Subsidence Monitoring Results



Monitoring points along Line 40 were established in 2018 to monitor the shoreline adjacent to Miniwall S1. This line was extended in 2019 as part of the subsidence monitoring program for Miniwalls S2 and S3. Minor ground movement along the line is limited to ±5mm and appears seasonal, subsidence appears to be limited to negligible subsidence (<20mm). **Figure 15** shows the reporting period subsidence results for Line 40.

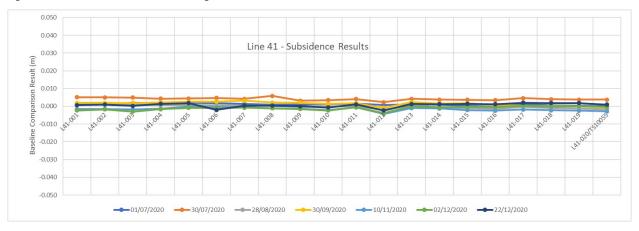


Figure 15 - Line 40 Subsidence Results



Line 41 was established in July 2020 to monitor the shoreline adjacent Miniwall S4. Monitoring has indicated to date nil to negligible subsidence (<20mm). Line 41 subsidence monitoring results are shown on **Figure 16**.

Figure 16 - Line 41 Subsidence Monitoring Results



2.1.5.4 Chain Valley Bay, Lines 24 and 33A

Monitoring Points on the foreshore of Chain Valley Bay have historically been monitored during periods of extraction in the Great Northern and Wallarah Seams in the vicinity of the shoreline. Due to the commencement of Fassifern Seam extraction in Chain Valley Bay (CVB), a Multi-Seam Mining Feasibility Investigation (MSMFI) report (Ditton Geotechnical Services, CHV-002-7) was commissioned by Lakecoal to assess the impact of the Fassifern seam mine workings on the previously mined Great Northern and Wallarah seam workings and potential resultant impact on the foreshore in Chain Valley Bay.

Surveys of the existing monitoring points (many of which had experienced 40-60mm of subsidence) were ongoing during the reporting period, and where required additional monitoring locations were installed. Similarly to the Summerland Point monitoring, many of the historically monitored subsidence marks have experienced greater than negligible subsidence (20mm), however no additional subsidence movement was detected during the miniwall extraction in CVB. **Figure 17** and **Figure 18** show the subsidence



monitoring results for the reporting period. A specific point (989A) measured approximately 40mm of movement during the report period; as the adjacent monitoring points are stable this is assumed to be related to damage / movement of the specific monitoring point rather than mine-subsidence related.

As the area where Line 33A monitoring marks are located is along a public reserve where regular slashing / brushcutting activities are carried out, a number of monitoring points have been disturbed / moved over time. Where this type of movement occurs, the new RL point is adopted and monitoring continues.

Figure 17 - Line 24 Subsidence Results

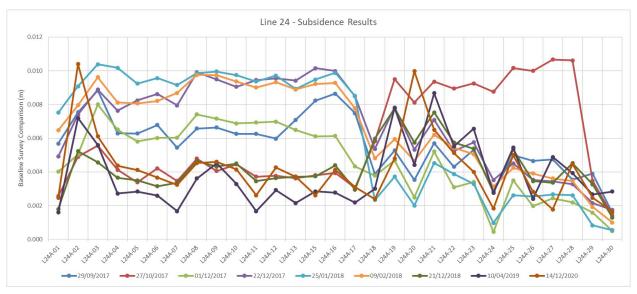
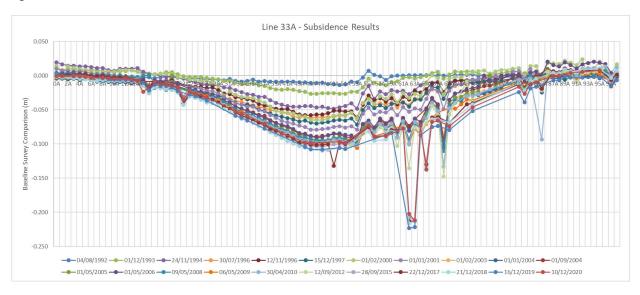


Figure 18 - Line 33A Subsidence Results



2.1.5.5 Pelican Rock Navigational Marker

As described in CVC's Subsidence Monitoring Program, Pelican Rock Navigation Marker is expected to be impacted by approximately 130 mm of subsidence from mining within miniwall panels S2, S3 and S4.

NSW Roads and Maritime Services (RMS) has indicated a functional impact on the marker is likely to occur at 500 mm of subsidence and 5° or 87 mm/m of tilt.

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The pre-mining recorded data at Pelican Rock Navigation Marker was 1.14 mm Australian Height Datum (AHD) and the navigational pole was vertical.

The following surveys were undertaken by Daly Smith after Miniwall S2 extraction in March 2020 recording the level at 1.13 m AHD and Miniwall S3 extraction in August 2020 recording the height at 1.11 m AHD. The August 2020 measurement of the Pelican Rock Navigational Marker commented that the pole was found to be vertical and its metal base to be level.

2.1.6 Timing of Subsidence Monitoring

Timing of subsidence monitoring at CVC is defined in approved extraction plans and is summarised in **Table 2**.

Table 2 - Frequency of Subsidence Monitoring

Type of monitoring	Pre-extraction requirements	During extraction requirements	Post extraction requirements
Bathymetric surveys	Single baseline survey prior to extraction	End of panel (of relevance to S2, S3 and S4)	Annual for three years unless TARP triggered
Foreshore monitoring	Baseline survey prior to commencement of extraction	Monthly intervals	Annual for three years unless TARP triggered
Pelican Rock Navigation Marker	Baseline RL and tilt measurements	End of panel (of relevance to S2, S3 and S4)	Visual inspection and confirmation from RMS of nil impacts
Seagrass bathymetric survey points	Survey during regular seagrass monitoring	N/A	N/A

2.2 Mannering Colliery

2.2.1 Monitoring Overview

Subsidence monitoring at MC includes level monitoring. Results can be used to validate model outcomes; enable early detection of subsidence trending to increased impact levels over that predicted; and allow early application of containment, adaptive and contingency measures to prevent impacts outside approved (particularly increased impacts to the foreshore).

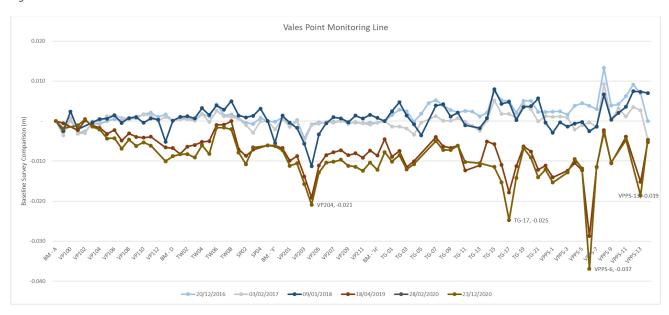
At the commencement of mining operations associated with the link road project between CVC and MC, a subsidence monitoring program was implemented. Due to the sensitive nature of the infrastructure being undermined (ie VPPS), subsidence monitoring was undertaken on a weekly basis within a 250 m radius of the mining activity. At the completion of mining, the frequency of subsidence monitoring at MC was reduced to an annual survey. Monitoring results have been presented in **Figure 19** and indicate <20 mm subsidence recorded to date. A small number of monitoring points have recorded values to >20mm movement since the baseline surveys, these appear to be damaged/disturbed and located in areas where vehicle & pedestrian traffic paths are present.

There was no mining undertaken at Mannering Colliery during 2020. Mining is approved in the Mannering Colliery project Approval (MP06_0311) but is not approved in the combined CVC and MC 2018-2020 / 2020-2023 Mining Operations Plan (MOP).

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Figure 19 - Vales Point Power Station Subsidence Results





3 Impacts to Built Features from 2020 Mining Activities

3.1 Chain Valley Colliery

No built features have been identified as requiring direct subsidence management from mining activities undertaken at CVC during 2020.

All extraction activities at CVC during 2020 occurred beneath Lake Macquarie and had no subsidence impacts on surface facilities or infrastructure.

A single navigation marker (Pelican Rock) were monitored in 2020 via the Subsidence Management TARP.

Pelican Rock Navigation Marker was inspected on 19 May 2019 prior to first workings mining beneath this feature. A survey for RL and tilt was conducted on 10 July 2019 by Daly Smith Surveyors. Miniwall mining to following the completion of Miniwall S3 extraction indicated approximately 30 mm of subsidence, within a range not considered to have an effect of the functionality of the marker.



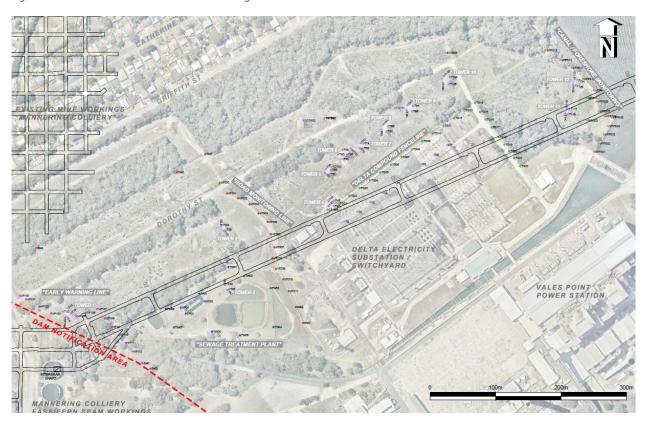
3.2 Mannering Colliery

No mining extraction activities occurred at MC during 2020. There were no built features identified as requiring direct subsidence management as a result of MC old workings during 2020.

No discernible subsidence impact from the Linkage Road Project workings was observed in 2020.



Figure 20 – Vales Point Power Station Monitoring Locations





4 Impacts to Natural Features

4.1 Chain Valley Colliery

Subsidence impact performance measures to natural and heritage features are detailed in SSD-5465 Modification 3, Table 6 as below.

Biodiversity		
Threatened species or endangered populations Negligible environmental consequences		
Seagrass beds	Negligible environmental consequences including: • negligible change in the size and distribution of seagrass beds; • negligible change in the functioning of seagrass beds; and • negligible change to the composition or distribution of seagrass species within seagrass beds.	
Benthic communities	Minor environmental consequences, including minor changes to species composition and/or distribution.	

4.1.1 Seagrass Bed Monitoring

Annual seagrass bed monitoring was undertaken in May 2020 as per the approved seagrass management plan. The Seagrass bed report is stored on www.deltacoal.com.au. **Table 3** is taken from the report and displays compliance to the subsidence impact performance measures table for 2020.

Table 3 - Seagrass Monitoring Compliance

Condition from SSD5465 - Mod 2	Compliance Status and Comments
Schedule 4 Environmental Conditions - underground mining Performance Measures - Natural Environment Biodiversity - Benthic Communities.	Compliant - See section 16 - Conclusions
Subsidence Impact Performance Measure - Minor environmental consequences, including minor changes composition and/or distribution.	
Measurements undertaken by generally accepted methods.	Compliant - See section 4 and 5
Measurements Methods fully described.	Compliant - See section 4 and 5

4.1.2 Benthic Communities Monitoring

Benthic monitoring was undertaken in March 2020 and August 2020. The Benthic Communities reports are stored on www.deltacoal.com.au. The below table is taken from the August 2020 report and displays compliance to the subsidence impact performance measures table for 2020.

The results from the August 2020 benthic communities monitoring results show compliance to the Schedule 4 Environmental Conditions – underground mining of SSD5465 - Modification 3 in the Performance Measures table with respect to the Subsidence Impact Performance Measure for Benthic communities which displays nil to minor environmental consequences due to underground mining.



Table 4 - Benthic Communities Compliance

Conditions from SSD-5465 – Mod 3	Compliance Status and Comments
Schedule 4 Environmental Conditions – underground mining Performance Measures – Natural Environment Biodiversity – Benthic Communities Subsidence Impact Performance Measure – Minor environmental consequences, including minor changes composition and/or distribution.	Compliant – See section 16 - Conclusions
Measurements undertaken by generally accepted methods. Measures Methods fully described.	Compliant – See section 4 and 5 Compliant – See section 4 and 5

In April 2020, EMM Consulting Pty Ltd were engaged by Delta Coal to undertaken statistical analysis of Benthic communities datasets recorded to date. The report concluded the following:

"Importantly, the statistical analysis of CVC's benthic monitoring data, primarily undertaken for the period September 2016 to March 2020, has not identified any statistical differences between the benthic assemblages evident at sites designated as Impact, Reference and Control. The reported changes in bed levels associated with CVC underground working also do not correlate with detectable changes in the benthic communities above.

In conclusion, the results of statistical analysis of CVC's benthic monitoring data indicate that no exceedance of the BCMP (CVC 2019) subsidence impact performance measure of "minor environmental consequences, including minor changes to species composition and/or distribution" has occurred. Consequently, CVC is not required to implement any additional investigations of benthic communities within the project study area at this time and should continue the routine monitoring of benthic assemblages."

The report also recommended the reduction in frequency of Benthic communities monitoring for CVC from 6-monthly to annually.



5 Adaptive Management – Subsidence Management Trigger Action Response Plan (TARP) Implementation and Remediation

5.1 Chain Valley Colliery

Adaptive management includes monitoring subsidence impacts and subsidence effects and, based on the results, modifying the mining plan as mining proceeds to ensure that the effects, impacts and/or associated environmental consequences remain within predicted and designated ranges and in compliance with the conditions of this consent

Triggers and performance indicators (including measured subsidence and inspections for environmental impact) are provided across a number of different management plans at CVC and include specific information regarding:

- subsidence monitoring requirements (including baseline monitoring)
- remediation
- adaptive management techniques and
- contingency plans.

A summary of these is provided in CVC's Subsidence Management TARP which aims to consolidate all subsidence management requirements into a central location, triggering a response or set of responses commensurate with the nature of the measurement or the impact that has been identified.

CVC's Subsidence Management TARP was not triggered in 2020.

There was no subsidence related remediation activities undertaken during 2020 as a result of mining activities at CVC.

5.2 Mannering Colliery

There is no subsidence management TARP at MC.

There was no subsidence related remediation activities undertaken during 2020 as associated with Mannering Colliery.



6 References

Development Consent SSD-5465

Project Approval MP06_0311

Delta Coal CVC Subsidence Management TARP

Delta Coal CVC Subsidence Monitoring Program

Lake Coal N1 / S1 Extraction Plan

Delta Coal S2/S3 Extraction Plan

Delta Coal S4 Extraction Plan

Lake Coal Mining Operations Plan 2018 to 2020

Delta Coal Mining Operations Plan 2018-2020 Amendment 1

Delta Coal Mining Operations Plan 2020-2023



Appendix 9: Chain Valley Colliery Independent Environmental Audit

Review Date	Next Review Date	Revision No	Document Owner	Page
		1	Environmental Compliance Coordinator	Page 115 of 118
DOCUMENT UNCONTROLLED WHEN PRINTED				

INDEPENDENT ENVIRONMENTAL AUDIT 2019

Chain Valley Colliery

Prepared for:

Delta Coal Off Construction Road Vales Point NSW 2259



PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Delta Coal (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.12751-R01-v0.1	24 June 2019	Chris Jones	Tracey Ball	Chris Jones



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1 Introduction

1.1 Background

The Chain Valley Colliery (CVC) is an underground coal mine located at the southern end of Lake Macquarie, approximately 60 km south of Newcastle (see **Figure 1**) which is now operated by Delta Coal. For the majority of the Independent Environmental Audit period LakeCoal Pty Ltd (LakeCoal) operated the site on behalf of Wallarah Coal Joint Venture (WCJV).

Underground mining has occurred at the Colliery since 1962 extracting coal from three seams – the Wallarah Seam, the Great Northern Seam and the Fassifern Seam, with current mining activities limited to the Fassifern Seam. The Colliery is located in the Swansea North Entrance Mine Subsidence District. Historically, underground mining was undertaken using the bord and pillar method; however in September 2011 miniwall mining was introduced.

In August 1960, J&A Brown and Abermain Seaham Collieries Ltd commenced clearing the present site with drift and shaft sinking starting a few months later. Production of coal from the Wallarah seam, commenced with the first delivery to the adjacent Delta Electricity's Vales Point power station in April 1963.

The prior owners LakeCoal were a producer of thermal coal. The company was formed in 2001 to acquire BHP Billiton's 80% share in the Wallarah Coal Joint Venture (WCJV), the remaining 20% share was owned by Sojitz. In October 2006, Peabody Energy, a US listed company acquired LakeCoal.

In November 2009 LDO Coal Pty Limited purchased LakeCoal and in March 2011 the 20% share in the WCJV which Sojitz held was acquired by LDO Coal shareholders through the entity Fassi Coal Pty Ltd. In November 2016, LakeCoal finalised commercial arrangements with investor into the business (RWE).

The WCJV had operated the Wallarah, Moonee and CVC underground coal mines and the Catherine Hill Bay Coal Preparation Plant, all located at the southern end of Lake Macquarie. At the time of LakeCoal's acquisition by LDO Coal, both the Wallarah and Moonee mines were closed.

LakeCoal is currently undertaking the mine closure/rehabilitation process for the Moonee Colliery and the Catherine Hill Bay Coal Preparation Plant. The rehabilitation process for Wallarah Colliery has been completed and the lease in that area relinquished.

CVC peaked with a workforce of approximately 380 personnel in the mid 1980's. At the end of 2018, CVC had a workforce of 209 personnel.

LakeCoal went into receivership on 3 October 2018, however has maintained coal conveyance and processing operations. Delta Coal are now the current owners and operators of the site. The transfer occurred on the 31 March 2019 with Great Southern Energy (trading as Delta Coal) being the owner and operator of Mannering Colliery and CVC. Figure 2 has been prepared by Delta Coal outlining the mining areas and relevant Extraction Plans within the audit period.



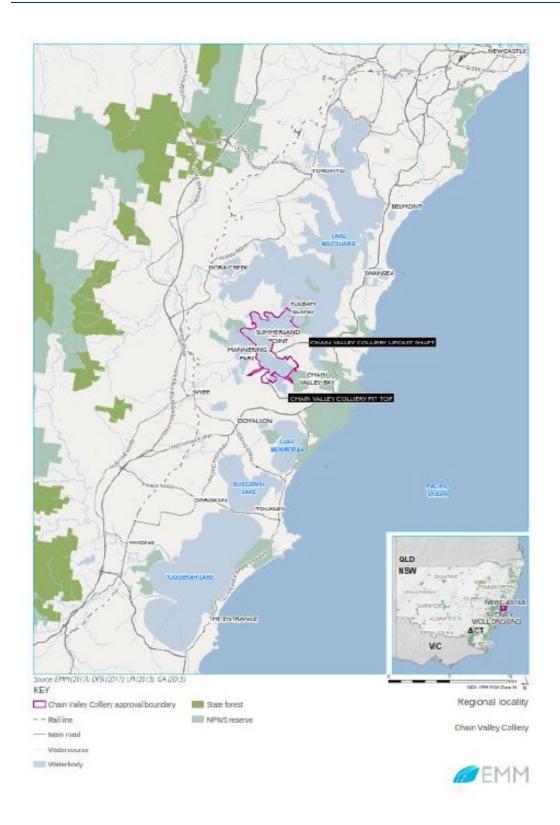
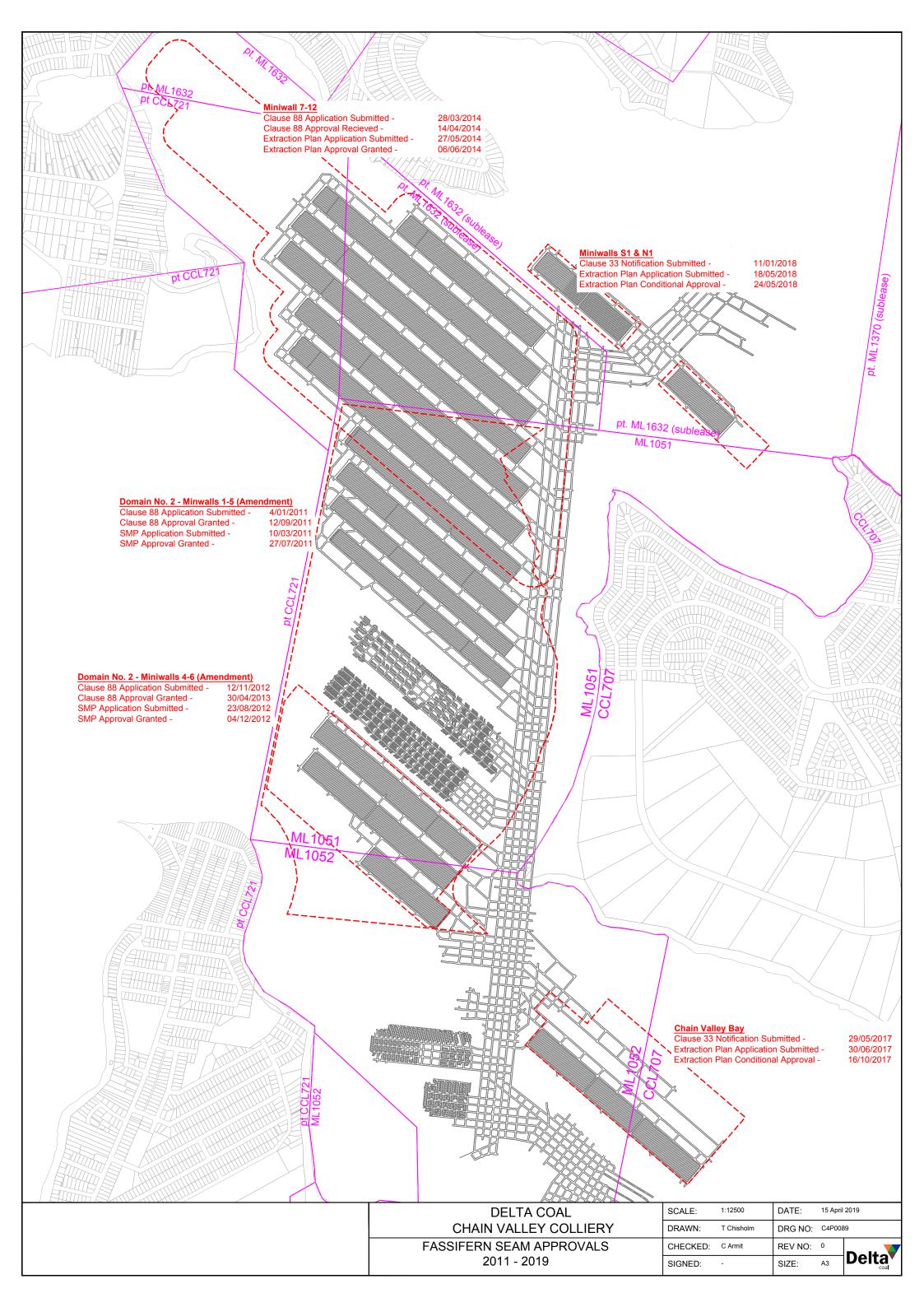


Figure 1 Locality – CVC (Prepared by EMM)





1.2 Audit Scope

This Independent Environmental Audit (Audit) covers the period from 1 January 2016 (day after previous 2015 Independent Environmental Audit) to the end of the auditing onsite (10 April 2019).

The scope of the Audit is outlined in Schedule 6, Condition 9 and 10 of Development Consent SSD 5465 (as modified), and includes:

By the end of February 2016 (or other such timing as agreed by the Secretary), and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:

- a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
- b) include consultation with the relevant agencies;
- c) assess the environmental performance of the development and assess whether it is complying with the requirements in this consent and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);
- d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
- e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.

10. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

The Audit has assessed the key approvals and documentation outlined in **Section 4**, including:

- SSD 5465 and Statement of Commitments;
- Environment Protection Licence (EPL) 1770; and
- Consolidated Coal Leases (CCL) 707 and 721.

1.3 Key Site Contacts

Contact details for key Delta Coal contact for this audit is outlined below:

Chris Armit

Environmental and Community Coordinator

Phone: 02 4358 0800 Mobile: 0409 070 233

Email: CArmit@deltacoal.com.au



1.4 Audit Methodology

The Audit was undertaken onsite by Chris Jones (Lead Auditor), Tracey Ball (Assistant Auditor) and Martin Davenport (Mine Site Noise Specialist) of SLR.

SLR was assisted by subsidence specialist Ken Mills of SCT during the Audit.

The SLR Audit team are independent of CVC as defined under Section 3.3 of the Department of Planning and Environment's (DPE) *Independent Environmental Audit Guidelines* (October 2015).

Information was provided by CVC during and following the Audit. SLR also sourced a large amount of information from the CVC/Delta Coal website.

The methodology for the Audit consisted of the following key steps:

- Introductory and close out meetings;
- Reviewing key documents provided by CVC prior to the Audit;
- Consultation with relevant government agencies as per the Independent Environmental Audit Guideline requirements prior to the site component;
- Preparation of draft Audit Tables provided to CVC prior to the site Audit;
- Site component of the Audit, including inspections and discussions with key CVC operational personnel;
- Review of additional relevant documentation obtained while onsite during the inspection or provided by CVC operations after the site inspection; and
- Client review and comment on the draft Audit report.

The site component was completed on the following days:

- 2 and 3 April 2019 including opening meeting, inspection, determination of compliance;
- 10 April 2019 On site determining compliance;
- 7 June 2019 Meeting at SLR offices to obtain further evidence to determine compliance.

Photographs taken during the site inspection is included in **Appendix A**. A large amount of evidence was viewed and collected as part of the Audit, including monitoring records, reports, and correspondence. While this key evidence has been referenced in **Section 2**, it has not been attached to this Audit report.

The Audit has been completed as per the Independent Environmental Audit Guidelines (DPE October 2015).

The Audit team assessed the approvals and documentation outlined in **Section 4**.

1.4.1 Introductory and Close out Meetings

Introductory and close out meetings were held for the Audit. At the opening meeting introductions were made by each of the meeting attendees and CVC personnel provided background details regarding the site to SLR. During the close out meeting a general discussion about compliance and areas for improvement was undertaken. **Table 1** lists those present at these meetings.



Table 1 Meeting Attendees

Name	Role	Comment
Chris Armit	Delta Coal Environment and Community Co-ordinator	Present at opening meeting. Main contact for the audit.
Chris Jones	SLR Lead Auditor	Present at opening and closing meeting
Tracey Ball	SLR Assistant Auditor	Present at opening and closing meeting
Martin Davenport	SLR Noise Specialist	Present at opening meeting
Ken Mills	SCT Subsidence Specialist	Present at opening meeting



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1.5 Consultation Requirements

Table 2 outlines the stakeholder consultation completed for CVC, undertaken in accordance with the Audit Guidelines.

Table 2 Stakeholder Consultation for the Audit

Regulatory Authority	Contact Details	Comment
DPE	Joel Curran Compliance Officer Northern Region NSW Department of Planning and Environment PO Box 1226 NEWCASTLE NSW 2300 P 02 4904 2702 E joel.curran@planning.nsw.gov.au	Email sent to DPE contact from SLR on 20 March 2019. A response was provided by the DPE on 25 March 2019 The Department sees noise and general monitoring and reporting obligations as key issues for CVC and Mannering Collieries at this time.
Environment Protection Authority (EPA)	Matthew Corradin A/Unit Head Hunter North NSW Environment Protection Authority – North Branch Landline (02) 4908 6830	Email sent to EPA contact from SLR on 20 March 2019. No response provided to SLR.
Department of Planning and Environment – Resources Regulator (DPE- RR)	Catherine Lewis Senior Inspector Environment Resources Regulator 516 High Street Maitland NSW 2320 T 02 4063 6619 E Catherine.lewis@planning.nsw.gov.au Lands Ministerial Unit NSW Department of Industry - Crown Lands Level 4, 437 Hunter Street, NEWCASTLE NSW 2300 E: lands.ministerials@industry.nsw.gov.au	Email sent to DPE-RR contact from SLR on 20 March 2019. No response provided to SLR from the RR, however a response was provided from Crown Lands. The only feedback from Crown Lands, is that SLR should consider to what extent Crown Land is involved in either project, and if so whether Access Agreements (where required) are in place in accordance with the Mining Act 1992. Crown Land is within the previous and current underground mining areas. There are recommendations to improve subsidence reporting in the future and impacts to crown lands should be highlighted when applicable.
Department of Industry – Water (DOI Water)	Mitchell Isaacs Manager Strategic Stakeholder Liaison Department of Primary Industries NSW Office of Water Level 11, 10 Valentine Ave Parramatta NSW 2124 PO Box 3720 Parramatta NSW 2124 T: 02 8838 7529 E: mitchell.isaacs@dpi.nsw.gov.au	Email sent to DoI Water contact from SLR on 20 March 2019. No response provided to SLR.



Regulatory Authority	Contact Details	Comment
Lake Macquarie City Council (LMCC)	Emma Graham (LMCC) egraham@lakemac.nsw.gov.au	Email sent to LMCC contact from SLR on 20 March 2019. No response provided to SLR.
Community Consultative Committee (CCC) Chairperson	Margaret MacDonald-Hill mmacdonald-hill@bigpond.com	Email sent to contact from SLR on 20 March 2019. The CCC Chairperson sent an email to the CCC requesting any comments. A response was provided by the CCC chairperson based on 25 March. I have reviewed the file for the audit period and other than the long delay with the implementation of the Voluntary Planning Agreement and Community Advisory Panel (condition for CVC) with the former Wyong Council (now Central Coast Council) caused by the Council itself and now satisfactorily resolved, there are no specific issues. The committee met quarterly for the entire audit period. One of the members of the CCC stated in an email to the CCC Chairperson on 25 March 2019: There have been a series of noise complaints from a fellow resident of mine. But only one person — no one else seems to hear what he hears. The colliery have taken a great deal of remedial actions.
Central Coast Council	Julie Vaughan Central Coast Council - Julie.Vaughan@centralcoast.nsw.gov.au	Email sent to contact from SLR on 20 March 2019. No response provided to SLR.



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1.6 Statement of Independence

We can confirm independence based on the following:

- No one from SLR or the proposed audit team is related to any proponent, owner, operator or other entity involved in the delivery of the project. Such a relationship includes that of employer/employee, a business partnership, sharing a common employer, a contractual arrangement outside an Independent Audit, or that of a spouse, partner, sibling, parent, or child.
- No one from SLR or the proposed audit team has any pecuniary interest in the project, proponent or related entities. Such an interest includes where there is a reasonable likelihood or expectation of financial gain (other than being reimbursed for performing the audit) or loss to the auditor, or their spouse, partner, sibling, parent, or child.
- No one from SLR or the proposed audit team have provided services (not including independent reviews or auditing) to the current project with the result that the audit work performed by themselves or their company, except as otherwise declared to the Department prior to the audit.
- No one from SLR or the proposed audit team is an Environmental Representative for the Project.
- No one from the proposed audit team can or will accept any inducement, commission, gift or any other benefit from auditee organisations, their employees or any interested party, or knowingly allow colleagues to do so.



2 Documents Reviewed and Referenced

Key documentation reviewed as part of the Audit includes:

- SSD 5465;
- EPL 1770;
- CCL 707 and 721;
- Bore Licence 20BL173107;
- Annual Reviews 2016, 2017 and 2018;
- Monitoring results for meteorological, noise, air, water and blasting;
- Rehabilitation Monitoring Reports;
- Biodiversity Monitoring Spreadsheets;
- Transport Summary Spreadsheet;
- Environmental Management Plans as per approval conditions;
- Mining Operations Plans (MOPs);
- Extraction Plans;
- Annual Returns across the Audit period;
- Complaints log;
- Voluntary Planning Agreements (VPA) Payments
- Evidence of maintenance and calibration;
- CCC Meeting Minutes across the Audit period; and
- Key consultation with government including consultation and approval letters.



3 Assessment of Compliance

The terms used in the Audit to describe the level of compliance of the site with the relevant approval documentation are outlined in **Table 3** and **Table 4**. These are requirements of the DPE's *Independent Environmental Audit Guidelines* (October 2015).

Table 3 Compliance Assessment Criteria

Assessment	Criteria	
Compliant	Where the Auditor has collected sufficient verifiable evidence to demonstrate that the intent and all elements of the requirement of the regulatory approval have been complied with within the scope of the Audit.	
Not Verified	Where the Auditor has not been able to collect sufficient verifiable evidence to demonstrate that the intent and all elements of the requirement of the regulatory approval have been complied with within the scope of the Audit. In the absence of sufficient verification, the Auditor may in some instances be able to verify by other means (visual inspection, personal communication, etc.) that a requirement has been met. In such a situation, the requirement should still be assessed as not verified. However, the Auditor could note in the report that they have no reasons to believe that the operation is non-compliant with that requirement.	
Non-Complaint	Where the Auditor has collected sufficient verifiable evidence to demonstrate that the intent of one or more specific elements of the regulatory approval have not been complied with within the scope of the Audit.	
Administrative Non - compliance	A technical non - compliance with a regulatory approval that would not impact on performance and that is considered minor in nature (e.g. report submitted but not on the due date, failed monitor or late monitoring session). This would not apply to performance-related aspects (e.g. exceedance of a noise limit) or where a requirement had not been met at all (e.g. noise management plan not prepared and submitted for approval).	
Not triggered	A regulatory approval requirement has an activation or timing trigger that had not been met at the time of the Audit inspection; therefore, a determination of compliance could not be made.	
Observation	Observations are recorded where the Audit identified issues of concern which do not strictly relate to the scope of the Audit or assessment of compliance. Further observations are considered to be indicators of potential non - compliances or areas where performance may be improved.	
Note	A statement or fact, where no assessment of compliance is required.	

Table 4 Risk Levels for Non - compliances

Risk Level	Colour Code	Description
High		Non - compliance with potential for significant environmental con- sequences, regardless of the likelihood of occurrence.
Medium		 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 - 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		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).



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4 Approvals and Documentation Assessed

Audit findings and recommendations relating to key approvals are outlined in Section 6 and 7 of this report.

4.1 Previous Audit Recommendations

The previous Audit was completed by Hansen Bailey, with the site Audit completed in May 2016 and the final Audit Report dated 22 July 2016.

The previous Audit covered the period of 1 November 2012 to 31 December 2015. Appendix 4 of the 2016 Annual Review provides an update on the 2016 Independent Environmental Audit, with several recommendations committing to a 30 June 2017 completion date. There is no update on Independent Environmental Audit actions within the 2017 AEMR, therefore it is not possible to fully determine compliance against the previous actions. Independent Environmental Audit Actions Plans should be included in every Annual Review going forward.

The requirement to review Environmental Management Plans has not been completed with this referenced numerous times in the Independent Environmental Audit Acton Plan (Appendix 4 of 2016 Annual Review). There was also a commitment to improve reporting of incidents/non – compliances during the future, with some non – compliances identified as part of this 2019 Independent Environmental Audit.

4.2 Development Consent SSD 5465

The conditions relating to SSD 5465 were assessed as part of this Audit. The Development Consent was first granted on 23 December 2013. SSD 5465 has been modified two times including:

- Mod 1 approved 27 November 2014;
- Mod 2 approved 16 December 2015; and
- Mod 3 pending approval.

The site had a moderate level of compliance against Development Consent conditions.

4.2.1 Development Consent SSD 5465 Statement of Commitments

There is a Statement of Commitments relating to SSD 5465 which contains numerous commitments relating to environmental management, monitoring and reporting. The site had a moderate level of compliance against the Statement of Commitments during this audit period.

4.3 Environment Protection Licence 1770

SLR assessed compliance against the EPL 1770 which has an anniversary date of 1 April. Conditions relate to limit conditions, operating conditions, monitoring and reporting. The site had a moderate level of compliance against the EPL during this audit period.



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4.4 Management Plans and Programs

The following management plans were assessed as part of the Audit. All the management plans reviewed are required according to SSD 5465 consent conditions with these documents placed on the CVC website. Some management plans with more recent dates were provided to SLR by Delta Coal, however there was no evidence of submission of these plans to the DPE and no evidence of approval of these plans by DPE. SLR only audited management plans on the CVC website with these outlined in the table below.

Table 5 Management Plans

Management Plan	Requirement	Comment
Road Transport Protocol	SSD 5465 Schedule 3, Condition 3	Road Transport Protocol, which includes; MSP-D-14559 – Coal Haulage Traffic Management Plan and POL-D-14926 Coal Haulage Driver Code of Conduct. Coal Haulage Traffic Management System Plan on the CVC website is dated 18/03/14. Coal Haulage Driver Code of Conduct on the CVC website
		is dated 04/10/2012.
Noise Management Plan	SSD 5465 Schedule 3, Condition 9	The management plan on the CVC website is dated 12/03/2014.
Air Quality Management Plan	SSD 5465 Schedule 3, Condition 13	The management plan on the CVC website is dated 18/07/2014.
Water Management Plan including a Surface Water Management Plan and Ground Water Monitoring Program	SSD 5465 Schedule 3, Condition 18	The management plan on the CVC website is dated 21/07/2015.
Biodiversity Management Plan	SSD 5465 Schedule 3, Condition 20	The management plan on the CVC website is dated 09/03/16.
Heritage Management Plan	SSD 5465 Schedule 3, Condition 21	The management plan on the CVC website is dated 23/06/14.
Rehabilitation Management Plan	SSD 5465 Schedule 3, Condition 27	The management plan is dated 1 March 2019. A copy of this management plan is not on the CVC website. No evidence of approval of 2019 management plan.
Extraction Plan	SSD 5465 Schedule 4, Condition 7	The management plan on the CVC website is dated 28/03/2013.
Seagrass Management Plan	SSD 5465 Schedule 4, Condition 7(i)	The management plan on the CVC website is dated 09/04/2014.
Environmental Management Strategy	SSD 5465 Schedule 6, Condition 1	The management plan on the CVC website is dated 12/10/2012.
Pollution Incident Response Management Plan	EPL 1770	The management plan on the CVC website is dated 21/09/2018.



4.5 Mining Leases

As part of this Audit, SLR assessed the two consolidated coal leases which is applicable to the Project Approval Area including CCL 721 and 707. This lease includes conditions relating to mining, rehabilitation, MOPs and group security deposits.

4.6 Water Licences

CVC has one current Groundwater Extraction Licence – Bore Licence 20BL173107. This licence is a production bore and has an annual limit of 4,443 ML. There was also a licence for Bore Licence 20BL111869 which operated during the 2015 and 2016 Annual Review periods and had an entitlement limit of 402ML.

The Water Licence for Bore Licence 20BL171958 has a condition stating:

The volume of groundwater extracted from the works authorized by this licence shall not exceed 985 megalitres in any 12 month period commencing 1st July.

Based on the information in the 2016, 2017 and 2018 Annual Reviews the site was well below the extraction licence limits during the Audit period.

4.7 Complaints

Complaints were recorded within the 2016, 2017 and 2018 Annual Reviews, with 2019 complaints provided by Site. Complaints have remaining low duri9ng the Audit period:

- Two complaints received in 2016 relating to dust;
- One complaint received in 2017 relating to noise;
- One complaint received in 2018 relating to dust, noise and vibration; and
- No complaints received in 2019 reporting period relating to start of April, as provided by Delta Coal.

4.8 Incidents and Non - compliances

There were 13 incidents and non - compliances provided to SLR during the Audit period. These are summarised in **Table 6**.

This information was provided in the Annual Reviews for 2016 - 2018.



 Table 6
 Summary of Incidents and Non - compliances

Date	Description of Incident / Non - compliance	Approval Condition	Actions Taken to Address Incident / Non - compliance
2016			
6 January 2016	Daily discharge volume exceedances from EPA Point 1 (LDP1) as a result of significant rainfall.	EPL 1770 - L3.1 – Volume and mass limits	During the 2015 reporting period the then LakeCoal completed extensive upgrades to its water management system to improve its ability to handle rainfall events. LakeCoal also restricted its underground pumping to reduce the potential for the exceedance in accordance with its approved water management plan. LakeCoal will continue to implement its approved site water management plan in the next reporting period.
11-13 January 2016	Missed data capture as a result of a power outage/trip at the Wyong waste treatment plant associated with storm activity.	EPL 1770 - M2.2 Air Monitoring Requirements	Power was restored to the unit on the next available working day (13 January 2016).
18-22 January 2016	Missed data capture as a result of a power outage /trip at the Wyong waste treatment plant.	EPL 1770 - M2.2 Air Monitoring Requirements	An electrical inspection was undertaken by the sites electrical contractor on the 24 and 25 February. The inspection identified a significant ant infestation in the circuit breaker. New circuit breakers were installed on 25 February and the area pest sprayed to try and reduce any trips of the system.
27 February - 8 March 2016	Missed data capture for the period as a result of the failure of the TEOM air conditioner.	EPL 1770 - M2.2 Air Monitoring Requirements	A new air conditioner was installed at the site on 3 March 2016. Commissioning of the new unit was undertaken from 3-8 April 2016.
22-24 April 2016	Missed data capture for the period as a result of some temperature regulation issues and water condensate blocking the filter in the unit.	EPL 1770 - M2.2 Air Monitoring Requirements	The unit was inspected and repaired on the next available working day (24 April 2016).
1 June 2016	Missed data capture on 1 June 2016 as a result of a power outage at the Wyong Treatment Plant	EPL 1770 - M2.2 Air Monitoring Requirements	An inspection of the unit was undertaken on 2 June 2016 and power was subsequently restored.

Date	Description of Incident / Non - compliance	Approval Condition	Actions Taken to Address Incident / Non - compliance
5 June 2016	Daily discharge volume exceedances from EPA Point 1 (LDP1) as a result of significant rainfall.	EPL 1770 - L3.1 – Volume and mass limits	During the 2015 reporting period LakeCoal completed extensive upgrades to its water management system to improve its ability to handle rainfall events. LakeCoal also restricted its underground pumping to reduce the potential for the exceedance in accordance with its approved water management plan. LakeCoal will continue to implement its approved site water management plan.
28 June 2016	6dB and 7dB exceedances of LA1, 1 minute Noise Criteria at R13 and ATN004 receivers respectively during Q2 2016 monitoring.	SSD 5465 Schedule 3, Condition 7	During the night time Q2 monitoring on 28 June 2016, LA1,1minute readings recorded at locations R13 and ATN004 with did not comply with the noise criteria in SSD 5465. Exceedances of 6 and 7dB respectively were recorded at each location. During the monitoring Global Acoustics (the sites principle noise monitoring consultant) identified that the elevated levels were attributed to dozer noise, specifically "track slap" which appeared to be coming from the CVCliery's product coal stockpiling activities. Following the identification of the exceedances LakeCoal notified the relevant authorities of the exceedances on 29 June 2016. The following actions were also undertaken by LakeCoal as a result of noise exceedances: A review of the sites night time operational activities were undertaken on 29 June 2016 which confirmed that the CVC product coal dozer was operating on the site product coal stockpile at the time the exceedances were recorded. Discussions with operational personnel, ME Transport (the contracting company who manage the product coal dozer) and the dozer operator were undertaken on 29 June 2016 and it was agreed that a revised operating protocol (which involved the dozer being restricted to second gear in reverse with a maximum speed of 5km/h) would be adopted for night time activities on 29 June 2016. Follow up noise monitoring was undertaken at the R13 and ATN004 receiver locations during the night time period on 29 June 2016. During the monitoring the CVC product coal dozer was in use utilising the restricted operating protocol. The results from the follow up night time monitoring undertaken at both receivers on 29 June indicated that the noise levels from the operation were within the noise criteria limits as specified within EPL 1770 and the sites Development Consent. A summary of the follow up noise monitoring results is provided below:



Date	Description of Incident / Non - compliance	Approval Condition	Actions	Taken to Add	ress Incide	ent / Non -	complianc	e			
			Table	1.2 :L _{A1,1} minute ⁽	SENERATEL	D BY CVC AG	AINST IMPAC	CT ASSESSN	MENT CRITE	ERIA	
			Location	n Date and Time	Wind Speed (m/s)	d VTG (deg/C per 100m) ¹	LA1,1min Criterion dB	Criterion Applies? 2,3	CVC L _{A1,1} min dB ⁴	Exceedance	
			ATN4	29/06/16 2302	0.3	3	45	Yes	45	Nil	
			R13	29/06/16 2226	0.2	0.5	49	Yes	40	Nil	
				detailed in to 2. Noise emission temperature 3. These are re	ne INP; on limits do not inversion condi sults for Chain ts in red are the		greater than 3 m n 4°C/100m; CVC) in the absenter relevant criter	etres per secono nce of all other n tion (if applicab	d (at a height o noise sources; d le).	f 10 metres); or	t of the
2017											
24 October 2017	1dB exceedance of night time LAeq15 min criteria at ATN007.	SSD 5465 Schedule 3, Condition 7	complia LakeCo the 201 location LakeCo	al has committ .8 reporting pe	ed to replariod in an	acing the in attempt to nal noise spo	llet and out reduce the ecialist to a	let silence low frequ	rs at the flency nois	fan site loca e impacts a g further no	tion in t this ise

Date	Description of Incident / Non - compliance	Approval Condition	Actions Taken to Address Incident / Non - compliance
9 November 2017	Exceedance of the site's approved subsidence values over the miniwall 7-12 mining area.	SSD 5465 Schedule 2, Condition 2 Statement of Commitments	LakeCoal engaged experts to undertake a detailed review of the exceedance during the reporting period. This report is expected to be finalised in Q1 2018. A preliminary review of both Bethic and Seagrass monitoring locations indicated no discernible impacts as a result of the exceedance. LakeCoal has committed to implementing any findings from this report into its proposed mine design for its northern mining area. Further detail is provided in Section 5.2.
2018			
3 April 2018	PM ₁₀ 24 Hour Average Exceedance (RTD 001) - Kingfisher Shores	SSD 5465 Schedule 3, Condition 11	As outlined in the initial notification, the TEOM recorded a 24 hour PM ₁₀ value of 50.2ug/m³ against the 24 hour average criterion of 50ug/m³ on the 19 March. A copy of the TEOM Data recorded for the month of March is provided in Attachment 2. Following a preliminary investigation of the exceedance, a follow-up phone call was made to DPE in which LakeCoal advised that it was of the opinion that the exceedance was not a direct result of its mining activities and was more likely a result of a regional dust event which was occurring at the time, noting that on 19 March, it had received automatic notifications from OEH (via oeh.airquality@environment.nsw.gov.au) that both the Central Coast and Lower Hunter Central Coast PM ₁₀ levels exceeded national air quality standards (copies attached). Notwithstanding, it was agreed that LakeCoal would submit an incident report on the event. As previously advised, based on the results of the preliminary and subsequent investigations, LakeCoal remains of the opinion that the minor exceedance of the 24 hour PM ₁₀ value of 50.2µg/m³ recorded on 19 March 2018 was not as a consequence of its activities and, in the absence of any other known local sources and the warnings received from OEH, was firmly of the opinion that the exclusion nominated in the footnote to Table 4 in SSD 5465 applies and consequently the exceedance did not represent a non–compliance with the consent. Accordingly LakeCoal did not intend to undertake any further actions as a result of the minor exceedance and request the Secretary's agreement that it did not constitute a non -compliance for the purpose of SSD 5465 for its internal compliance records.
18 July 2018	PM ₁₀ 24 Hour Average Exceedance (RTD 001)- Kingfisher Shores	SSD 5465 Schedule 3,	As outlined in the initial notification, the TEOM recorded a 24 hour PM ₁₀ value of 57.82ug/m ³ against the 24 hour average criterion of 50ug/m ³ on 18 July 2018. Following a preliminary investigation of the exceedance, a follow-up phone call was made to

Date	Description of Incident / Non - compliance	Approval Condition	Actions Taken to Address Incident / Non - compliance
		Condition 11	DPE in which LakeCoal advised that it was of the opinion that the exceedance was not a direct result of its mining activities and was more likely a result of a regional dust event which was occurring at the time, noting that on 18 July 2018, it had received automatic notifications from OEH (via oeh.airquality@environment.nsw.gov.au) that both the Central Coast and Lower Hunter Central Coast PM ₁₀ levels exceeded national air quality standards (copies attached). Notwithstanding, it was agreed that LakeCoal would submit an incident report on the event. As outlined in SSD 5465, LakeCoal is required to ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions
			generated by the development do not cause an exceedance of the criteria listed in Tables 3, 4 and 5 at any residence on privately-owned land. Table 4, "Short-term criterion for (PM_{10}) nominates a 24 hour PM_{10} criterion of $50\mu g/m^3$ as:
			 Applying to total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to other sources); and Excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary.
			Based on the results of the preliminary and subsequent investigations, LakeCoal remains of the opinion that the minor exceedance of the 24 hour PM_{10} value of $57.82\mu g/m^3$ recorded on 18 July 2018 was not as a consequence of its activities and, in the absence of any other known local sources and the warnings received from OEH, was firmly of the opinion that the exclusion nominated in the footnote to Table 4 in SSD 5465 applies and consequently the exceedance did not represent a non - compliance with the consent.
			Accordingly LakeCoal did not intend to undertake any further actions as a result of the minor exceedance and would like to request the Secretary's agreement that it does not constitute a non - compliance for the purpose of SSD 5465 for its internal compliance records.
4 December 2018	PM ₁₀ 24 Hour Average Exceedance (RTD 001)- Kingfisher Shores	SSD 5465 Schedule 3, Condition 11	The TEOM recorded a 24 hour PM_{10} value of 112.98 µg/m³ and 91.59 µg/m³ against the 24 hour average criterion of $50\mu g/m³$ on the 22 and 23 November respectively. Following a preliminary investigation of the exceedance, a follow-up phone call was made to DPE in which LakeCoal advised that it was of the opinion that the exceedance was not a direct result of its mining activities and was more likely a result of a regional dust event which was occurring at the time, noting that on 22 and 23 November 2018, it had received automatic



Date	Description of Incident / Non - compliance	Approval Condition	Actions Taken to Address Incident / Non - compliance
			notifications from OEH (oeh.airquality@environment.nsw.gov.au) that both the Central Coast and Lower Hunter Central Coast PM_{10} levels exceeded national air quality standards (copies attached). Notwithstanding, it was agreed that LakeCoal would submit an incident report on the event.
			As outlined in SSD 5465, LakeCoal is required to ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause an exceedance of the criteria listed in Tables 3, 4 and 5 at any residence on privately-owned land. Table 4, "Short-term criterion for (PM $_{10}$) nominates a 24 hour PM $_{10}$ criterion of 50µg/m 3 as:
			 Applying to total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to other sources); and Excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary.
			As previously advised, based on the results of the preliminary and subsequent investigations, LakeCoal was of the opinion that the exceedance of the 24 hour PM_{10} value of $112.98\mu g/m^3$ and $91.59~\mu g/m^3$ recorded on the 22 and 23 November 2018 respectively was not as a consequence of its activities and, in the absence of any other known local sources and the warnings received from OEH, was of the opinion that the exclusion nominated in the footnote to Table 4 in SSD 5465 applies and consequently the exceedance does not represent a non–compliance with the consent.
			Accordingly LakeCoal did not intend to undertake any further actions as a result of the exceedance and requested the Secretary's agreement that it did not constitute a non - compliance for the purpose of SSD 5465 for its internal compliance records.



5 Environmental Management – Specialist Assessments

5.1 Noise

The audit required the input of a noise specialist as per the request from DPE to CVC.

5.1.1 SLR Findings – Noise

The noise conditions associated with the CVC were assessed as part of the Independent Environmental Audit. Recommendations relating to noise conditions are outlined in **Section 6** of this document. The Independent Environmental Audit identified the following:

- Noise monitoring has been completed by independent noise consultants;
- The *Noise Management Plan* and all other management plans are out of date and not reflective of current operations;
- There were some noise exceedances during the Independent Environmental Audit period, with evidence provided of noise investigation;
- The CVC real time noise monitoring was removed in January 2019. This should have been operational during the entire Independent Environmental Audit period; and
- There were few noise complaints associated with CVC operations.

5.1.2 Noise Recommendations

Recommendations relating to noise conditions are outlined in **Section 6** of this document and are repeated below:

- Continue investigations of any noise issues and, where practicable, implement reasonable and feasible mitigation measures;
- Ensure accurate/consistent monitoring results are presented in Annual Reviews;
- The real time noise monitor should be re-established for the site. Liaise with the DPE regarding the best location as the majority of noise complaints have resulted from Mannering Colliery operations, not CVC. Mannering Colliery is also owned by Delta Coal;
- Update the Noise Management Plan; and
- There are also some recommendations relating to all management plans outlined in Section 6.

SLR

5.2 Subsidence

Chain Valley Colliery

5.2.1 Mining Areas during Audit Period

Following discussions with Delta Coal the following mining areas were determined from the audit.

Table 7 Summary of Mining Areas and Extraction Plans

Year	Longwalls	Extraction Plan Reference	
2016	MW10-11-12	MW 7-12 Extraction Plan	
2017	MW12	MW 7-12 Extraction Plan	
	MW5A	MW 7-12 Extraction Plan – MW5A Mod	
	MW CVB1	MW CVB 1-3 Extraction Plan	
2018	N1/S1	Miniwalls S1/N1	
2019	N1/S1	Miniwalls S1/N1	

5.2.2 Summary of Subsidence Performance

SLR and Ken Mills (Subsidence Specialist) from SCT have assessed the subsidence impacts relating to the CVC Mine. Details of subsidence performance is outlined in **Appendix E.** In summary:

- The site visit was successful and informative. It was difficult to gain access to much of the foreshore areas, but the site inspection provided context for the audit.
- The issues identified in the consent conditions and repeated in the Environmental Assessment, various Extraction Plans and Subsidence Management Plans (SMPs) as requiring management of potential subsidence impacts include:
 - Trinity Point Marina Development;
 - o Benthic communities on the floor of Lake Macquarie;
 - Seagrass communities along the shore of Lake Macquarie;
 - A requirement for long-term stable, non-subsiding first workings below any features requiring negligible environmental consequences;
 - Second workings to be carried out in accordance with an approved Extraction Plans;
 - Other unspecified built features;
 - Other unspecified threatened species or endangered populations; and
 - Negligible additional risk to public safety.
- The Independent Environmental Audit review indicates that all the second workings undertaken during the
 review period were carried out under approved Extraction Plans. The review further indicates that the
 subsidence related components have been carried out in general accordance with the processes described
 in the Environmental Assessments and Extraction Plans



- The 2015 MOD2 subsidence assessment notes that the May 2015 bathymetric survey showed maximum subsidence of 570mm above Miniwalls 3-6. The MOD2 subsidence assessment updates the maximum subsidence predictions from 0.62m to 0.78m. The earlier 2013 predictions for Miniwalls 7-12 were 0.44m. These were updated to 0.72m. The associated assessments that rely on maximum predicated subsidence are considered in the MOD2 assessment.
- Miniwall 12 was completed early in 2017. The 2017 Annual Review reports maximum subsidence of 8001100mm indicated by the bathymetric survey conducted in October 2017. The reference to subsidence
 exceeding predictions by approximately 430mm is not clear given that maximum subsidence of 1100mm
 exceeding predictions by 430mm would imply a prediction of 670mm. Nevertheless, maximum subsidence
 is significantly (250%) greater than the 440mm maximum subsidence predicted in the 2013 EA and 50%
 higher than the 720mm maximum subsidence predicted in the 2015 MOD2 assessment for the area above
 Miniwalls 7-12 (as per Figure 3a in DgS (2017)).
- There are several recommendations relating to monitoring, developing Extraction Plans and reporting within **Section 5.2.3**.

5.2.3 Subsidence Recommendations

Recommendations relating to subsidence are outlined within **Appendix E** Subsidence Review (SCT 2019) as well as some additional recommendations from the Lead Environmental Auditor. Recommendations regarding subsidence are outlined below:

Subsidence Predictions

A more conservative approach to assessing future impacts from further mining is recommended to build
confidence that the subsidence processes in play are understood and impacts that rely on the subsidence
impacts can be suitably assessed prior to mining.

Subsidence Monitoring

- A significant upgrade of subsidence monitoring systems and reporting protocols at CVC is recommended.
- The use of three dimensional surveying with total station survey and high quality global positioning system (GPS) control is recommended. This technology is readily available and widely used for subsidence monitoring in NSW.
- For sensitive high value features such as the marina or similar features, real-time continuous GNSS
 monitoring is available at relatively low cost and can be used to provide high confidence subsidence
 monitoring in three dimensions.
- A thorough review of the survey data and monitoring approach for Line 23 along the northern lakeshore of CVC Bay is recommended.
- A review of benthic and seagrass community monitoring systems is recommended to confirm that the
 monitoring is capable of discriminating minor and negligible impacts as required by the development
 consent conditions.

SLR

Subsidence Reporting

- A separate subsidence impact assessment report should be prepared annually and appended to the Annual Review. Presentation of all future survey data in Annual Reviews would benefit from a thorough and comprehensive analysis of the subsidence monitoring being undertaken by an external consultant so that the data can be meaningfully interpreted and is comprehensible by anyone with an interest in the outcomes; and
- The report should assess performance against subsidence impact performance measures from the Development Consent as well as any other commitments, triggers and management measures from Extraction Plans. This report should assess how the Extraction Plans tracked against Trigger Action Response Plan (TARP's).

Biodiversity and Annual Reporting

 Include how the site is tracking against subsidence performance criteria (Schedule 4 Condition 4) in the Biodiversity Monitoring Reports, Annual Seagrass Monitoring Report and the Annual Review. This should include a table outlining if performance criteria have been met and where further information can be found.

Benthic Community Management Plan

- Develop a TARP when updating the Benthic Communities Management Plan. This should address the wording of Schedule 4 Condition 2 SSD 5465. A series of triggers should be developed based on quantitative data and this should be reported in the bi annual monitoring reports and the Annual Review. An example of a trigger would be '% change in organisms between monitoring events'.
- Assess the triggers from the Extraction Plans eg. ANOVA/ANOSIM level is approaching 5% in the bi-annual monitoring reports.



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6 Audit Findings – Summary of Non - compliances

Table 8 outlines the summary of non - compliances relating to the statutory conditions of CVC and the proposed recommendation.

 Table 8
 Summary of Non - compliances

Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations			
SSD 5465 (as	SSD 5465 (as modified)						
Schedule 2 Condition 7	The Applicant shall ensure that no laden coal trucks are dispatched from the site to public roads outside of the hours of 5:30 am to 5:30 pm, Monday to Friday, and not at all on Saturdays, Sundays or public holidays	Non- Compliant (Low Risk)	Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.			
Schedule 2 Condition 8	The Applicant shall not dispatch from the site more than: (a) 660,000 tonnes of product coal in any calendar year to Port Waratah Coal Services for export; (b) 180,000 tonnes of product coal in any calendar year to domestic customers other than Vales Point Power Station; (c) a total of 270 laden coal trucks per day by public roads; (d) a total of 32 laden coal trucks per hour; and (e) an average of 16 laden coal trucks per hour by public roads during peak hour periods, calculated monthly, until the intersection of M1 Motorway and Sparks Road Interchange (East Side - unsignalised with stop sign) is upgraded to a signalised intersection.	Non- Compliant (Low Risk)	2018 Annual Review - 394,213 tonnes transported, but 0 t from public roads. 2017 Annual Review- 1,378,996 tonnes transported to power station. 254 tonnes on public roads. 2016 Annual Review - 1,175,523 tonnes to domestic market. 2,414 tonnes on public roads. a) Within this limit; b) Within this limit; c) There is no evidence provided of breakdown on public roads for 2016, 2018 and 2019 year to date; d) There is no evidence provided of breakdown on public roads for 2016, 2018 and 2019 year to date; e) Based on the Annual Review data this has been met.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.			



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
			Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	
Schedule 2 Condition 10	The Applicant shall restrict the transport of coal by truck to the Vales Point Power Station between 10 pm and 5:30 am to: (a) 16 laden trucks per hour for the Spring and Autumn months; and (b) zero during Winter months.	Non- Compliant (Low Risk)	Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.
Schedule 2 Condition 11	Planning Agreement Within 12 months of the date of this consent, unless otherwise agreed by the Secretary, the Applicant shall enter into a planning agreement with the WSC in accordance with Division 6 of Part 4 of the EP&A Act that provides for payment to the WSC for community enhancement purposes.	Administrative Non - Compliance	Administrative non - compliance prior to this audit period. The VPA was not executed with the WSC within the required date - 23 December 2014. There were numerous attempts between 2013 to 2016 to execute this agreement (based on evidence from the prior audit).	Nil Action
	The agreement must include provision for those matters set out in condition 12 below.		The VPA was executed on 1 September 2016. Evidence of payment in the 2016, 2017 and 2018 Annual Reviews. Evidence of receipts from 19 March 2018 and 23 March 2017.	
	If there is any dispute between the Applicant and WSC relating to the preparation or implementation of the planning agreement, then either party may refer the matter to the Secretary for resolution.		Historical <u>Admin - Non - Compliance</u> for not meeting 12 month date. No further action proposed	
Schedule 2 Condition 18	The Applicant must regularly review the strategies, plans and programs required under this consent and ensure that these documents are updated to incorporate measures to improve the environmental performance of the development and reflect current best practice in the mining industry. To facilitate these updates, the Applicant may at any time submit revised strategies, plans or	Administrative Non - Compliance	The following Management Plans are applicable to CVC and outlined on the CVC website: Water Management Plan - July 2015; Air Quality Management Plan - July 2014; Noise Management Plan - March 2014:	All management plans require updating due to the length of time since the previous reviews. All should in a Delta Coal template.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis. With the agreement of the Secretary, the Applicant may prepare a revision or stage of any strategy, plan or program required under this consent without undertaking consultation with all parties nominated under the applicable condition in this consent. Notes: While any strategy, plan or program may be submitted on a staged basis, the Applicant must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.		Heritage - June 2014; Biodiversity Management Plan - 16 March 2016; Seagrass Management Plan - April 2014; and Environmental Management System - 2012. Admin Non - Compliance: This condition is non - compliant as plans have not been 'regularly' updated. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed.	 Ensure there is a cross referencing table covering this condition in management plans. Additional detail including Trigger, Action, Response Tables (contingency plan) should be developed in the next round of management plan updates.
Schedule 3 Condition 1	Monitoring of Coal Transport The Applicant shall: (a) keep accurate records of the amount of coal transported from the site (on a weekly basis); and (b) make these records publicly available on its website at the end of each calendar quarter.	Non – Compliant (Low Risk)	a) Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided on the spreadsheet provided. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR is unable to determine if the site is compliant with this condition. b) Evidence of publically available information regarding transport. However this information showed most quarters in 2016 and 2017. However no coal records on the website in 2018 or 2019. Admin Non - Compliance.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent. REC 3 Ensure transport records from this Audit period (January 2016) onwards are recorded on the website. This could be appended to the Annual Review summarising the weekly transport.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
Schedule 3 Condition 2	Road Works The Applicant shall upgrade the Ruttleys Road and Construction Road intersection within 6 months of the date of this consent, unless the Secretary directs otherwise, by: (a) installing additional signage on and adjacent to Construction Road prior to the intersection; (b) repairing the surface of Construction Road as required and ensuring the edge seal of the left turn lane is of sufficient width to accommodate coal trucks; (c) installing or replacing "Stop" signs in accordance with Austroads guidelines; (d) repainting road line markings and raised pavements associated with this intersection; and (e) installing barriers to prevent trucks parking on the gravel area adjacent to the intersection and the electricity substation located in the vicinity of this intersection. The design and construction of these works must be undertaken in consultation with, and to the relevant satisfaction of, WSC, RMS and Delta Electricity and to the satisfaction of the Secretary.	Administrative Non - Compliance	'Based on site communications with Environment and Community Co-ordinator. No upgrades completed during this audit period. However there is a historical Admin Non - Compliance from the previous audit period, with these details noted by Hansen Bailey (2016). - WSC Civil Design Approval SCC11-2013 dated 1/04/14 and WSC invoice for construction assessment and certificate dated 17/07/13; - Email from Lyle Marshall & Associated (LC construction contractor) to WSC dated 21/03/14; and - Email from LC to Delta Electricity dated 29/01/14 and response from Delta Electricity dated 11/02/14 confirming approval of the proposed works. No evidence that the required Ruttleys Road and Construction Road intersection upgrade was to the satisfaction of RMS and DPE. Construction works for the intersection upgrade were completed on 14/08/2014, which is outside of 6 months of the date of approval of SSD-5465 (i.e. 23/06/2014). Historical admin non - compliance with no further action.	Nil recommendation



Schedule and Condition	Condition	Compliance Status	Evidence	Recommendations
Number				
Schedule 3 Condition 3	Road Transport Protocol The Applicant shall prepare a Road Transport Protocol to the satisfaction of the Secretary. This protocol shall: (a) be prepared in consultation with RMS, NCC, WSC, DRE and CCC and submitted to the Secretary for approval within 6 months of the date of this consent; (b) describe the designated haulage routes to be used (as shown in Appendix 5); the maximum number of road movements proposed and the haulage hours permitted under this consent; (c) include a Traffic Management Plan, which includes: • procedures to ensure that drivers adhere to the designated haulage routes; • measures to maximise the use of a low frequency (regular) trucking schedule rather than an intermittently-high frequency (campaign) trucking schedule, especially during the morning peak hour; • contingency plans to apply when (for example) the designated haulage route is disrupted, including procedures for notifying relevant agencies and affected communities of the need to implement such contingency plans; • procedures to ensure that all haulage vehicles associated with the development are clearly distinguishable as CVC Colliery coal haulage trucks; • details of procedures for receiving and addressing complaints from the community concerning traffic issues associated with truck movements to and from the site; • measures to ensure that the provisions of the Traffic Management Plan are implemented, eg driver training in the heavy vehicle driver's Code of Conduct and contractual agreements with heavy vehicle operators; and • procedures for ensuring compliance with and enforcement of the heavy vehicle driver's Code of Conduct; (d) include a Code of Conduct for heavy vehicle drivers that addresses: • travelling speeds; • instructions to drivers not to overtake each other on the haulage route, as far as practicable, and to maintain appropriate distances	Administrative Non - Compliance	Evidence of Road Transport Protocol. Road Transport Protocol, which includes; MSP-D-14559 – Coal Haulage Traffic Management Plan and POL-D-14926 Coal Haulage Driver Code of Conduct. Coal Haulage Traffic Management System Plan on the CVC website is dated 18/03/14. This plan has not been updated since the previous audit. Coal Haulage Driver Code of Conduct on the CVC website is dated 04/10/2012. Preparation: a) Evidence of consultation from 2014; b) Section 8.3; c) Overall document. Covered in Section 8; d) Code of conduct discussed in Section 8.11. Not attached to the document. Implementation: Records and training. Section 12 of this plan states - "The Manager of Mining Engineering or his representative shall formerly review this document every three years". No evidence of any review in 2017, therefore Admin Non - Compliant.	Ensure Coal Haulage Traffic Management Plan is reviewed as per the requirements of the consent and commitments in the management plan. Attach Driver Code of Conduct to the management plan.
	between vehicles; • instruction to drivers to adhere to the designated haulage routes;		22	SLR ^ॐ
	• instruction to drivers to be properly safety conscious and to strictly obey all traffic regulations; and		Page 33	
	appropriate penalties for infringements of the Code. The Applicant shall implement the approved Pead Transport Protocol. The Applicant shall implement the approved Pead Transport Protocol. The Applicant shall implement the approved Pead Transport Protocol. The Applicant shall implement the approved Pead Transport Protocol.			
1	The Applicant shall implement the approved Road Transport Protocol			

Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
Schedule 3 Condition 4	Independent Traffic Audit Prior to 31 March 2014, and every 12 months thereafter, unless the Secretary directs otherwise, the Applicant shall commission a suitably qualified person, whose appointment has been approved by the Secretary, to conduct an Independent Traffic Audit of the development. This audit must: (a) be undertaken without prior notice to the Applicant, and in consultation with RMS, NCC, WSC and the CCC; (b) assess the impact of the development on the performance and safety of the road network, including a review of: • haulage records; • accident records on the haulage route, infringements relating to the code of conduct and any incidents involving haulage vehicles; • community complaints register; and (c) assess the effectiveness of the Road Transport Protocol; and, if necessary, recommend measures to reduce or mitigate any adverse (or potentially adverse) impacts.	Administrative Non - Compliance	Admin Non - Compliance: No evidence provided by site indicating Traffic Audits were completed annually.	Ensure Traffic Audits are completed annually in accordance with this condition. Ensure the report is submitted to the DPE.
Schedule 3 Condition 5	Within 1 month of receiving the audit report, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the report to the Secretary, with a detailed response to any of the recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report. A summary of the audit report must be included in the Annual Review.	Administrative Non - Compliance	Admin Non - Compliance: No evidence provided by site indicating Traffic Audits were completed annually.	Ensure Traffic Audits are completed annually in accordance with this condition. Ensure the report is submitted to the DPE.
Schedule 3 Condition 6	Alternative Coal Transport Options Prior to 31 December 2014, and every three years thereafter, the Applicant shall prepare and submit to the Secretary for approval, a study of the reasonable and feasible options to reduce or eliminate the use of public roads to transport coal from the development. The assessment must include: (a) an analysis of the capital, construction and operating costs of the alternative transport options; and (b) quantified social and environmental impacts associated with road	Administrative Non - Compliance	Evidence provided of 2014 study with the letter dated 10 December 2014. The condition requires an audit every three years which would be in late 2017. No evidence of 2017 report provided to SLR, therefore Admin Non - Compliance.	 Ensure the Alternative Transport Options Report is completed as per the frequency in this condition.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	and rail transport.			
Schedule 3 Condition 7	Noise Impact Assessment Criteria	Non – Compliant (Low Risk)	- Exceedance of LA1(1minute) criteria of 6dB and 7dB at ATN4 and R13 in June 2016. Documented in 2016 Annual Review and Quarterly Monitoring report (Global Acoustics report 16217_R01). Corrective actions undertaken and documented in incident report dated 05/07/2016. - 1dB exceedance of LAeq(15minute) criteria at ATN007 during the daytime period in October 2017 (Q4). Documented in 2017 Annual Review. However it is noted that a discrepancy between+E52 monitoring results presented in the 2017 Annual Review and Q4 Monitoring report (Global Acoustics Report 17424_R01) where no exceedance is recorded. - No exceedances recorded during 2018 period.	Continue investigations of any noise issues and, where practicable, implement reasonable and feasible mitigation measures. Ensure accurate/consistent monitoring results are presented in Annual Reviews.
Schedule 3 Condition 8	Operating Conditions The Applicant shall: (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development; (b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent; (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8); (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review; (e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and (f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit; to	Administrative Non - Compliance	(January - April 2019). a) The 2016 Annual Review documented an investigation into repairs/maintenance of ventilation fan silencers. No further evidence during audit period. Therefore no continued implementation. Admin Non - Compliance. b) Evidence of real time noise monitoring conducted throughout 2016, 2017 and 2018 where no triggers were reported. During audit site inspection the real-time noise monitor was not in operation and has been removed from site. The Environment and Community Co-ordinator stated the real - time noise monitoring was removed in January 2019. Admin - Non Compliance as the monitor should have been active the entire IEA period. c) No evidence of reduced operations during adverse meteorological conditions. d) Evidence of inspection of silencers during 2016. No evidence of progress towards long term goal in the 2017-2019 audit period. e) Conducted as part of this Independent Audit. Note that no noise monitoring of site plant/equipment and operations was	REC 8 • The real - time noise monitor should be re-established for the site. Liaise with the DPE regarding the best location as the majority of noise complaints have resulted from Mannering Colliery operations, not CVC. Mannering Colliery is also owned by Delta Coal. Update the Noise Management Plan.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	the satisfaction of the Secretary. Table 2: Long-term Noise Goals dB(A)		conducted as part of the audit. f) No evidence of action plan. <u>Admin Non - Compliance</u> . Exceedances of long term noise goals occurred during the monitoring period. However these are longterm noise goals, not criteria.	
Schedule 3 Condition 9	Noise Management Plan The Applicant shall prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA and submitted to the Secretary for approval within 4 months of the date of this consent, unless otherwise agreed by the Secretary; (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent; (c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and (d) include a monitoring program that: • uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent; • evaluates and reports on: • the effectiveness of the on-site noise management system; and • compliance against the noise operating conditions; and • defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	Administrative Non - Compliance	Current plan dated 12 March 2014. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Compliant. Evidence from 2014; b) Compliant - Section 4; c) Compliant - Section 4; d) Compliant - Section 5 and 6 Implementation: No evidence of audit, review and update of noise management plan during audit period as prescribed in Section 9. Admin Non - Compliance. No notification to residents following recorded exceedances in accordance with Section 6.2. Admin Non - Compliance. Real time noise monitor removed from site. Admin Non - Compliance.	Nil. Previous recommendations relate to updating all management plans.
Schedule 3	The Applicant shall ensure that all reasonable and feasible avoidance	Non –	2019 - no longterm data for annual averages.	REC 9



Schedule and Condition Number	Condition				Compliance Status	Evidence	Recommendations
Condition 11	emissions genera	ated by the device in Tables 3, 4 teria for particulate mantant ticulate (TSP) matter 10 µm (PM ₁₀) titerion for particulate mantant	Averaging period Annual Annual Annual Authority Averaging period 24 hour	use exceedance of	Compliant (Low Risk)	Annual Review 2018 - Depositional dust gauges were below criteria. Short term PM ₁₀ non -compliances on 3 April 2018, 18 July 2018 and 4 December 2018. The 2018 annual average of 24hr PM ₁₀ results was 16.1 μg/m³. Daily (24-hour) results ranged from a minimum of 6.13 μg/m³ to a maximum of 112.98 μg/m³ during 2018. There were some data capture issues in 2018 relating to the TEOM. These were not reported as non - compliances in Section 1 or 7 of the Annual Review. Non - Compliance (Low Risk) for exceeding criteria. Annual Review 2017 - Excluding DDG005, deposited dust levels for the reporting period were below the EPA long term criteria annual maximum level of 4 g/m²/month at all sites. Additionally, no gauges showed annual increases in deposited dust levels above the EPA maximum of 2 g/m2/month during the reporting period. Note, the depositional dust gauge exceedance was not recorded as an exceedance in Section 1 or 7 of the Annual Review. Non -compliance relating to exceedance of DDG5 and also not reporting in Section 1 or 7 of the Annual Review. The EPA long-term annual average criteria (30 μg/m³) for PM ₁₀ was not exceeded during the 2017 period. Daily (24-hour) results ranged from a minimum of 5.39 μg/m³ to a maximum of 47.78 μg/m³ during 2017. The 2017 annual average of 24hr PM ₁₀ results was 15.1 μg/m³. Within short term criteria. It was noted there was some data capture issues The 2017 Annual Review states that 'When comparing the 2017 annual results to the previous year, the data capture rate was slightly higher in 2017. This was primarily due to power outages associated with electrical storms in 2016 and a failed air conditioner during the 2016 reporting period'. Data capture issues were not reported as non -compliances in Section 1 or 7 of the Annual Review. Annual Review 2016 - Deposited dust levels for the reporting period were below the EPA long term criteria annual	 Update the Air Quality Management Plan following this audit. Improve data capture for PM10. Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
			maximum level of 4 g/m²/month at all sites. Additionally, no gauges showed annual increases in deposited dust levels above the EPA maximum of 2 g/m²/month. Daily (24-hour) results ranged from a minimum of 2.1 μg/m³ to a maximum of 39.8 μg/m³ during 2016. For PM¹0 data capture - When comparing the 2016 annual results to the previous year, the data capture rate was slightly lower in 2016. This was primarily due to power outages associated with electrical storms, a failed air conditioner unit in February 2016 and a pest infestation in the units electrical circuit. Non - compliance relating to data capture. Field Evidence The field assessment did not identify a high number of dust sources. There are disturbed surfaces, but these are small compared to most mines. Water truck sighted. Outside sources contribute to dust. It is highly likely that other sources contribute to dust levels. Correspondence Incidents reports are prepared and provided to DPE and EPA. Sighted by the audit team. However there is often a delay in identifying short term criterion exceedances.	
Schedule 3 Condition 12	Operating Conditions The Applicant shall: (a) implement best practice air quality management at the site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the development; (b) implement best practice management to minimise the risk of spontaneous combustion and related emissions; (c) implement all reasonable and feasible measures to minimise the	Administrative Non - Compliance	Field Evidence The field assessment did not identify a high number of dust sources. There are disturbed surfaces, but these are small compared to most mines. Water truck sighted. Outside sources contribute to dust. Correspondence Incidents reports are prepared and provided to DPE and EPA.	 As per REC 9 Update the Air Quality Management Plan following this audit. Improve data capture for PM₁₀. Review possibilities of backup power supply. Ensure issues with data capture are



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	release of greenhouse gas emissions from the site; (d) operate an air quality management system on site to ensure compliance with the relevant conditions of this consent; (e) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d to Tables 3-5 above); (f) regularly assess the air quality monitoring data, and modify operations on site to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary.		a) Evidence of dust monitoring and watercart use; b) Based on discussions with Environment and Community Co-ordinator there have been no issues on the surface regarding spontaneous combustion; c) Monitoring of fuel and energy usage; d) Air quality management system - for monitoring continues to be undertaken; e) Based on discussions with Environment and Community Co-ordinator water carts are used on exposed surfaces. Product is generally a wet product, therefore no water sprays required; f) The real time air quality monitor is not being used as a management tool. During the audit period there was no system to notify persons of when the TEOM identified short term impact assessment non - compliances. Non - compliances are only identified during the monthly download. Admin non - compliance relating to not determining TEOM exceedances as soon as they occur.	reported in Section 1 and 7 of the Annual Review. • Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.
Schedule 3 Condition 13	Air Quality Management Plan The Applicant shall prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval within 6 months of the date of this consent; (b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this consent; (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; (d) describe the proposed on-site air quality management system; and (e) include an air quality monitoring program that: • is capable of evaluating the operating conditions of this consent; • evaluates and reports on:	Administrative Non - Compliance	Preparation: Evidence of Air Quality Management Plan dated 15 January 2016. The Air Quality Management Plan on the website 18 July 2014, with this approved on 24 July 2014. No evidence of approval provided by Delta Coal for 2016 Management Plan, therefore 2014 plan reviewed for adequacy. a) Section 1.4; b) Section 3; c) Section 4; d) and e) - Section 5 Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed.	Update the Air Quality Management Plan following this audit. Improve data capture for PM ₁₀ . Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	the effectiveness of the air quality management system; and compliance against the air quality operating conditions; defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.		Implementation: Evidence of monitoring; Minimal issues observed with dust management; and The real time air quality monitor is not being used as a management tool. Section 5.3 of 2014 Air Quality Management Plan states: Every 30 minutes the real time data from the monitor is sent via wireless (Next-G) connection to a web based data management system (Vista Data Vision) which is also used for the Company's real time noise monitoring system. A web based interface then allows the data to be viewed or downloaded, reports to be created and automated alarm generation when the predefined triggers are reached. Admin Non - Compliance as no alarm was set up. The only way exceedances could be determine during the audit period was by manual download or viewing of results. This generally occurred every month.	particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.
Schedule 3 Condition 17	Sewage Management The Applicant shall manage on-site sewage in accordance with NSW Environmental Guidelines: Use of Effluent by Irrigation (DEC 2004) and the National Guidelines for Sewerage Systems - Effluent Management (ANZECC 1997) or its latest version, to the satisfaction of EPA.	Administrative Non - Compliance	Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite. There is limited detail in the Water Management Plan regarding the sewage water management system. Garden Wastemaster Australia complete servicing. Evidence of one email from 6 March 2019 organising servicing. However no evidence of servicing provided. Admin Non - Compliant. Evidence of testing of wastewater through lab results.	 REC 10 Include additional detail in the Water Management Plan regarding sewage management. Include an update of sewage system during the audit period in the Annual Review. Ensure servicing is completed and records kept onsite.
Schedule 3 Condition 18	Water Management Plan The Applicant shall prepare a Water Management Plan for the surface facilities sites to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI Water and EPA, by suitably qualified	Administrative Non - Compliance	The current Water Management Plan is dated July 2015. This plan was approved by the DPE on 21 July 2015. This plan is out of date due to the age of the plan and also does not cover MOD 2. Evidence of letter to DPE from LakeCoal dated	Update the water balance or justify why the current water balance is still



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	and experienced persons whose appointment has been endorsed by the Secretary, and submitted to the Secretary for approval within 6 months of the date of this consent. This plan must include: (a) a comprehensive water balance for the development that includes details of: • sources and security of water supply; • water make in the underground workings; • water transfers from the underground operations to the surface; • water use; and • any water discharges; (b) management plans for the surface facilities sites, that include: • a detailed description of water management systems for each site, including: • clean water diversion systems; • erosion and sediment controls; and • any water storages; • measures to minimise potable water use and to reuse and recycle water; • measures to manage acid sulphate soils, if encountered; • activities that would involve ground disturbance at the site; and • monitoring and reporting procedures. (c) a Surface Water Management Plan which: • includes baseline data on surface water flows and quality of Swindles Creek; • details surface water impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on surface water resources or surface water quality; • provides a program to monitor: • surface water discharges; • surface water flows and quality; and • channel stability; (d) a Ground Water Monitoring Program which includes a program to:		28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. The Plan outlines several activities which are planned to be undertaken in 2015. Evidence of consultation in 2015 update with this outlined in Section 1.2. Preparation: a) Section 3 of the report. Most of the information of the Water Balance is from 2013 and should be reviewed; b) Section 4. Includes details of mitigation measures. Figure 4 is a detailed figure, but may require some updating based on minor changes at the pit top. Monitoring information outlined in Section 5; c) Covered in Section 4; d) Covered in Appendix B; and e) Covered in Appendix B; and e) Covered in several sections. Implementation: - The plan is a little out of date - from 2015, with some information dating back to 2013; - Evidence of surface water and groundwater monitoring in Annual Review; - Water management sighted in the field. Separation of water streams. Dams are stable; and - Some desilting of a drainage line is required.	applicable to the current operations. • Ensure dams and drainage lines are free on silt. Establish a maintenance schedule.



Schedule and	Condition	Compliance Status	Evidence	Recommendations
Condition Number				
Number	 monitor and report groundwater inflows to underground workings; predict, manage and monitor impacts to nearby groundwater bores on privately-owned land that may be impacted by the development; and (e) a detailed review of surface water management at the site, with particular reference to the water storages within the dirty water management system, to: determine whether the capacity, integrity, retention time and management of the dirty water storages (particularly the final Pollution Control Dam) are sufficient to ensure that water discharged from the site meets the EPL limits and surface water impact assessment criteria within the Surface Water Management Plan; and propose any appropriate changes to the surface water management system. The Applicant shall implement the approved management plan as approved from time to time by the Secretary. 			
	Note: The Secretary may require the Applicant to implement upgrades and other changes identified under paragraph (e), in accordance with condition 4 of schedule 2.			
Schedule Condition 20	Biodiversity Management Plan The Applicant shall prepare a Biodiversity Management Plan for the surface facilities sites, for all areas that are not, or will not, be subject to condition 7 of schedule 4, to the satisfaction of the Secretary. This plan must: (a) be prepared by a suitably qualified person approved by the Secretary; in consultation with OEH, and submitted to the Secretary within 6 months of the date of this consent; (b) establish baseline data for the existing habitat in the Biodiversity Enhancement Area and elsewhere on the site; (c) describe the short, medium, and long term measures that would be implemented to: • manage the impacts of clearing vegetation;	Administrative Non - Compliance	The Biodiversity Management Plan is dated 16 March 2016. This was approved by the DPE on 20 April 2016. Covers pit top and fan sites. Seagrass management covered under a separate plan. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Original document prepared by EMM. Updated document prepared by LakeCoal. The original document met this timeframe; b) Baseline data in Section 3.2; c) Mostly covered in Section 4 and 5, but not split into short,	Include the biodiversity monitoring reports as appendices to the Annual Review. The current monitoring is provided in a spreadsheet with an email summary. Prepare a small report outlining results, a comparison against trigger levels and potential reasons for changes. Prepare a separate section with short, medium and longterm measures in the Biodiversity Management Plan.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	manage the remnant vegetation and habitat in the Biodiversity Enhancement Area and elsewhere on the site; and implement the Biodiversity Enhancement Strategy, including detailed performance and completion criteria; (d) include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria; (e) identify the potential risks to the successful implementation of the Biodiversity Enhancement Strategy, and the contingency measures that would be implemented to mitigate these risks; and (f) include details of who would be responsible for monitoring, reviewing, and implementing the plan. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.		medium and longterm measures; d) Section 11; e) See Table 11; f) Section 13. Implementation: Section 14 refers to the resubmission of this management plan within three months of submitting the Independent Environmental Audit. The previous audit is dated July 2016. Evidence of biodiversity monitoring reports.	
Schedule 3 Condition 21	Heritage Management Plan The Applicant shall prepare a Heritage Management Plan for the development to the satisfaction of the Secretary. This Plan must: (a) be prepared in consultation with any relevant Aboriginal stakeholders; (b) be submitted to the Secretary for approval within 6 months of the date of this consent; (c) include consideration of the Aboriginal and non-Aboriginal cultural context and significance of the site; (d) detail the responsibilities of all stakeholders; and (e) include programs/procedures and management measures for: • the ongoing monitoring of site 45-7-0189 at Summerland Point; • managing the discovery of any human remains or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notification protocols; • ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal heritage within the site; (including procedures for keeping records of this);	Administrative Non - Compliance	Preparation: Plan dated 23/6/2014. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. a) Section 4.4 and 4.5; b) Condition outside of audit period; c) Section 4; d) Section 11; e) In various sections. Implementation: Evidence of some monitoring of shell midden site #45-7-0189 in Annual Reviews. Monitoring every 2 years until Year 5 (Year 1, 3 and 5). 2017 was the fifth year, hence no further monitoring required. Section 12 of the Heritage Management Plan refers to the resubmission of this management plan within three months	• Update the Heritage Management Plan, including the removal of Site #45-7-0154.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	appropriate identification, management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site; and ensuring relevant workers on site receive suitable heritage inductions prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.		of submitting the Independent Environmental Audit. This was not completed.	
Schedule 3 Condition 22	Visual Amenity and Lighting The Applicant shall: (a) minimise visual impacts, and particularly the off-site lighting impacts, of the Surface facilities sites; (b) take all reasonable and feasible measures to further mitigate off-site lighting impacts from the development; and (c) ensure that all external lighting associated on site complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting, to the satisfaction of the Secretary.	Administrative Non - Compliance	The most recent lighting audit for CVC is from 2013. Prepared by Wadco May 2013. a) and b) The pit top area and ventilation shaft site are not dominant features of the landscape the pit top area is somewhat overshadowed by the adjacent power station. The ventilation fans were designed to maintain a relatively low profile, below the surrounding vegetation to ensure amenity and lighting impacts were minimised. Some lights have been removed, including those at the stockpile. There were no complaints to visual or lighting during the audit period. c) Compliance with this requirement could not be determined due to the date of the previous Visual and Lighting audit. Therefore Admin - Non - Compliance.	REC 14 • Complete a visual and lighting assessment against the Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
Schedule 3 Condition 27	Rehabilitation The Applicant shall prepare a Rehabilitation Management Plan for the development, in consultation with OEH, DPI Water, WSC, LMCC, and the CCC, and to the satisfaction of the DRE. This plan must: (a) be submitted to the Secretary and the DRE for approval within 12 months of the date of approval of this development consent; (b) be prepared in accordance with any relevant DRE guideline and be consistent with the rehabilitation objectives in the EIS and in Table 7; (c) describe how the performance of the rehabilitation would be monitored and assessed against the objectives in Table 7; (d) describe the process whereby additional measures would be identified and implemented to ensure the rehabilitation objectives are achieved; (e) provide for detailed mine closure planning, including measures to	Administrative Non - Compliance	Evidence of Rehabilitation Management Plan. Update dated 1 March 2019. This plan appears unapproved and no evidence of this plan being sent to the DPE. Current approved Rehabilitation Management Plan is from December 2014. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Outside of audit period; b) Covers this requirement. Note, a separate MOP has also been prepared for the site; c) Section 8;	Ensure a copy of the approved Rehabilitation Management Plan is put on the website.



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Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	minimise socio-economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; and (f) be integrated with the other management plans required under this consent. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.		d) Generally covered in Section 7; e) Section 6; f)) Linked to MOP. Implementation: There is no rehabilitation onsite. Minimal surface footprint. Extraction Plans cover subsidence management.	
	Note: The Rehabilitation Management Plan should address all land impacted by the development whether prior to, or following, the date of this consent.		The Rehabilitation Management Plan is not on the CVC website, which makes this <u>Admin Non - Compliant.</u>	
Schedule 4 Condition 1	Subsidence The Applicant shall ensure that vertical subsidence within the High Water Mark Subsidence Barrier and within seagrass beds is limited to a maximum of 20 millimetres (mm). If at any stage predicted subsidence levels are exceeded within these areas, an ecological monitoring program shall be initiated to assess the impacts to ecological communities and threatened species and if appropriate, offsets are to be provided for any impacts detected.	Administrative Non - Compliance	This condition is outlined in the Annual Review (see Section 3.16.4 in 2018 Annual Review), however no update has been provided on whether the condition has been met. Based on this the auditor cannot determine compliance.	REC 16 • See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
Schedule 4 Condition 2	Performance Measures – Natural Environment The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 8 to the satisfaction of the Secretary.	Administrative Non - Compliance	The subsidence performance is outlined in the Annual Reviews. There is no specific table or section addressing if the site has met these performance measures. Reports from 2016 to 2018 titled Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay, Lake Macquarie, NSW. These reports do not assess against these performance measures as the word 'negligible' is not in the report. There is no definition of negligible. Biodiversity Monitoring Reports do not cover these performance measures. Benthic monitoring reports do not specifically address these performance measures. Despite this there is no evidence that these performance measures have been exceeded, however the auditor is not able to determine compliance based on the information	See Section 5.2 of the Main Audit Report for Subsidence Recommendations.



Schedule and	Condition		Compliance Status	Evidence	Recommendations
Condition			Status		
Number					
	Table 8: Subsidence Impact Performance Measure Biodiversity	s – Natural and Heritage Features		provided.	
	Threatened species or endangered populations	Negligible environmental consequences			
	Seagrass beds	Negligible environmental consequences including: • negligible change in the size and distribution of seagrass beds; • negligible change in the functioning of seagrass beds; and negligible change to the composition or distribution of			
	Benthic communities	seagrass species within seagrass beds. Minor environmental consequences, including minor			
	Mine workings	changes to species composition and/or distribution.			
	First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible environmental consequences	To remain long-term stable and non-subsiding.			
	Second workings	To be carried out only in accordance with an approved Extraction Plan.			
Schedule 4	Offsets		Administrative	There is no specific assessment against subsidence criteria in	REC 16
Condition 3	If the Applicant exceeds the per Secretary determines that:	formance measures in Table 8 and the	Non - Compliance	the Annual Review, therefore we cannot determine compliance.	See Section 5.2 of the Main Audit Report for Subsidence
	(a) it is not reasonable or feasible environmental consequence; or	·		The 2017 Annual Review stated there was an exceedance of predicted subsidence values over the MW7-12 mining area,	Recommendations.
	(b) the remediation measures in failed to satisfactorily remediate consequence;	nplemented by the Applicant have e the impact or environmental		but not an exceedance of the performance measures in this table.	
		a suitable offset to compensate for nsequence to the satisfaction of the			
		this condition must be proportionate act or environmental consequence.			
Schedule 4	Extraction Plan		Administrative	Preparation:	REC 16
Condition 7	on site, to the satisfaction of the (h) include a Benthic Communit	extraction Plan for all second workings be Secretary. Each Extraction Plan must: lies Management Plan, which has been EH, LMCC, and DPI Fisheries, which	Non - Compliance	Evidence of Benthic Communities Management Plans in EP 1, 3 and 4. Overall Extraction Plan and management plans have been approved by the DPE. No Benthic Communities Management Plan for EP 2 (Modification to EP 1). Plan	See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
	provides for the management o	f the potential impacts and/or		updated for each EP. The Plans cover the requirements of the	



Delta Coal

Chain Valley Colliery

Independent Environmental Audit 2019

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	environmental consequences of the proposed second workings on benthic communities, and which includes: • surveys of the lake bed to enable contours to be produced and changes in depth following subsidence to be accurately measured; • benthic species surveys within the area subject to second workings, as well as control sites outside the area subject to second workings (at similar depths) to establish baseline data on species number and composition within the communities; • a program of ongoing seasonal monitoring of benthic species in both control and impact sites; • development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities composition, incorporating the monitoring and survey data collected; and • updating the model every 2 years using the most recent monitoring and survey data;		sub conditions. Evidence of consultation included in management plans. Implementation: Evidence of bi-annual benthic communities monitoring during the Audit period. Reports are prepared every six months except no evidence of September 2018 report provided to SLR. Reports prepared by John and Emma Laxton. Results are also summarised in the Annual Review. There is no definition of what a 'minor' impact is in the Benthic Communities Management Plan or the bi-annual monitoring reports, with this being a subsidence performance criteria in Schedule 4 Condition 2. - Minor environmental consequences including minor changes to species composition of distribution. There is no definitive guide as to what constitutes reporting of an incident or non - compliance ie. 'What is greater than minor?' See Section 6 of May 2018 Benthic Communities Management Plan. As there is little interpretation of results against subsidence performance measures this is a Admin Non - Compliance. The Extraction Plan - EP3 (Appendix 1) outlines a Trigger Action Response Plan (TARP). It has triggers relating to statistical change in benthic communities. eg. Trigger Level 1 = ANOVA/ANOSIM level is approaching 5%. There is no discussion in the bi-annual reports about how the site is tracking against those triggers.	
Schedule 5 Condition 1	Notification of Landowners As soon as practicable after obtaining monitoring results showing: (a) an exceedance of any relevant criteria in Schedule 3, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until	Administrative Non - Compliance	a) 2018 - Short term PM_{10} non - compliances on 3 April 2018, 18 July 2018 and 4 December 2018. For 2018 there was evidence provided to SLR through correspondence with EPA that these dust events were regional. There was however no evidence provided of contact with 'affected landowners'	 REC 17 Define who are potentially 'affected landowners' in the Air Quality Management Plan



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	the development is again complying with the relevant criteria; and (b) an exceedance of any relevant air quality criteria in Schedule 3, the Applicant shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).		(Admin Non - Compliance). 2017 - Noise non - compliance in 2017 (24 October 2017 at ATN007 (Summerland Point). Evidence of report to the DPE on 8 November 2017. No evidence of notifying 'affected landowner/s'. 2016 - Exceedance of daily discharge limit at LDP1 on January 2016 as a result of heavy rainfall (SLR believes no affected landowners, therefore no notification required). Exceedance of night time LA1 Minute criteria at two residential receivers during Q2 2016 monitoring. b) No evidence that the 'Mine Dust and You' fact sheet was provided for 2018 dust exceedances for 'affected landowners'. However as these events were proven to be regional, the auditors do not believe this is required for the 2018 exceedances.	Affected landowners should be contacted when there is a non - compliance relating to dust or noise. This should be completed even if it is a regional dust event as Delta Coal are still recording it as a non - compliance in the Annual Review.
Schedule 6 Condition 1	Environmental Management Strategy The Applicant shall prepare an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must: (a) be submitted to the Secretary for approval within 7 months of the date of this consent; (b) provide the strategic framework for environmental management of the development; (c) identify the statutory approvals that apply to the development; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development; (e) describe the procedures that would be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the development; • receive, handle, respond to, and record complaints; • resolve any disputes that may arise during the course of the development;	Administrative Non - Compliance	EMS Document is dated 12 October 2012. The EMS was approved by DP&E with a letter dated 6/11/12. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non-Compliance. No evidence that the EMS was updated following the last audit or other modifications. Preparation: a) - NA as outside audit period; b) Framework provided as part of document; c) Approvals are listed but are out of date; d) Section 9.5; e) Covered in Several Sections 8-11; and f) Plans listed in Section 9.	Prepare a cross referencing table outlining where sub conditions have been covered. Ensure plans are reviewed as per Schedule 6 Condition 5. Include Schedule 5 Condition 2 requirement in the EMS to notify landowners of exceedances 'as soon as practical'. Define a time period for as soon as practical.



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	 respond to any non - compliance; respond to emergencies; and (f) include: copies of any strategies, plans and programs approved under the conditions of this consent; and a clear plan depicting all the monitoring required to be carried out under the conditions of this consent. The Applicant shall implement the approved management strategy as approved from time to time by the Secretary.		Implementation: There is evidence of complaints and incident management. No evidence of landowners being contacted for dust or noise exceedances. Non complaint for implementation (Admin Non - Compliance). The EMS is supposed to be reviewed every three years. Last review was 2012, therefore Admin Non - Compliance.	
Schedule 6 Condition 2	Adaptive Management The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.	Non- Compliant (Low Risk)	There have been some exceedances of criteria during the audit period. a) Exceedances noted for air (regional dust), noise and a discharge volume issue during the audit period. Also Non - Compliance relating to subsidence which is outlined in the 2017 Annual Review. Evidence of exceedance/incident reports provided; b) Incident reports submitted to the DPE, however some reports have been well after the incident or non - compliance occurred; c) Remedial measures - additional subsidence modelling completed following MW7-12 subsidence exceedance. Exceedances have generally been investigated with no further recommendations.	Nil recommendation.
Schedule 6 Condition 4	Annual Review By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must: (a) describe the development (including any rehabilitation) that was	Administrative Non - Compliance	The 2016, 2017 and 2018 Annual Reviews were reviewed as part of the IEA. a) Section 1 and 2; b) Section 3. Some sections do not report against all Development Consent criteria eg. subsidence; c) Section 7 - however this is different to the Annual Review	 REC 19 The Annual Reviews are set out differently to the DPE Annual Review Guidelines (2015). Ensure table of contents matches the guidelines.





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	Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.			
Schedule 6 Condition 7	The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Secretary and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Administrative Non - compliance	Evidence of incident notification in 'Incident Management' folder provided to SLR. Evidence provided in Annual Reviews. No evidence of any incident causing material harm requiring immediate notification. Evidence of notification to Secretary and EPA for dust incidents in 2018. One incident occurred on 18 July 2018, with the site finding this non compliance on 1 August 2018. The exceedance was then reported on 10 August 2018 (greater than 7 days - Admin Non - Compliance). It appears that short term dust exceedances are only determined during the monthly data download, with reporting sometimes occurring two to three weeks after an incident occurs. The two other dust exceedances in 2018 appear to have been reported as per this condition. 2017 - Noise non - compliance in 2017 (24 October 2017 at ATN007 (Summerland Point). Evidence of report to the DPE on 8 November 2017. Greater than 7 days - Admin Non - Compliance. There was a non - compliance relating to an exceedance of predicted subsidence. The non - compliance was determined based on bathymetric surveys (October 2017) but was not reported (as per Exceedance Report) until 13 December 2017.	Update the Air Quality Management Plan following this audit. Improve data capture for PM ₁₀ . Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE. REC 21 Ensure exceedances and other incidents are reported as per this condition (Detailed Incident Report within 7 days).
Schedule 6 Condition 8	Regular Reporting The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Administrative Non - compliance	Evidence of reporting on the Lake Coal and Delta Coal website. Note Schedule 3 Condition 1 outlines requirements to report transport.	REC 22 • Ensure website reporting meets the conditions of the Development Consent.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
			The Applicant shall: (a) keep accurate records of the amount of coal transported from the site (on a weekly basis); and (b) make these records publicly available on its website at the end of each calendar quarter. Admin Non - Compliance: This has not been completed. No EIS's shown on the LakeCoal or Delta Coal website. Information now available on the Delta Coal website. However no management plans and EIS's are on the website. No Rehabilitation Management Plan was on the website. No noise monitoring reports on website.	
Schedule 6 Condition 10	Independent Environmental Audit Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	Administrative Non - compliance	No evidence has been provided of the submission of the previous audit report. The submission timing for this audit has been extended by the DPE until 25 June 2019.	Nil recommendation
Schedule 6 Condition 11	The Applicant shall: (a) make copies of the following publicly available on its website: • the EIS; • all current statutory approvals for the development; • all approved strategies, plans and programs required under the conditions of this consent; • a comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent; • a complaints register (updated monthly); • minutes of CCC meetings; • the Annual Reviews of the development;	Administrative Non - compliance	a) and b) Copies of this information is still available on the Lakecoal website. With the exception of EIS's. Admin Non - Compliant. Information now available on the Delta Coal website. However no management plans and EIS's are on the website. No Rehabilitation Management Plan on the website. No noise monitoring reports on website.	Ensure all relevant information is brought across to the Delta Coal website.



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SSD 5465 Sta	any Independent Environmental Audit, and any other audit, and the Applicant's response to the recommendations in these audits; any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary. Attement of Commitments			
Surface water SOC's	develop a program to monitor creek line channel stability and the health of riparian vegetation within Swindles Creek. Monitoring will be undertaken in accordance with Section 8.5.2 of the Surface Water Impact Assessment (EIS Appendix E) and incorporated into the Colliery's WMP or Biodiversity Management Plan;	Administrative Non - compliance	Evidence of the Water Management Plan. Evidence of surface water monitoring, including results in Annual Reviews. Admin Non - Compliant: Evidence of photos provided of channel stability monitoring of Swindles Creek, however it does not appear to have been completed in accordance with Section 5.4 of the Water Management Plan. No evidence of: Documenting general observations of water quantity and quality; Documenting locations and dimensions of significant erosive or depositional features; Documenting evidence of erosion and exposed soils; Documenting general indicators of stream health, including abundance of flora and fauna; and Review and comparison of results to previous rounds of monitoring. There is also no timing proposed for inspections in the Water Management Plan.	A separate report should be completed for Stream Health Channel Flow and Riparian Vegetation Monitoring. This should compare results from previous inspections. Information to be included in the Annual Review.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
Noise SOC's	Management and monitoring of noise will continue to be undertaken in accordance with the Colliery's NMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: • continue attended compliance monitoring on site which will be used to identify potential hot spots and primary noise sources; • continue real-time noise monitoring alerts to site personnel to enable implementation of any required rapid noise management initiatives; • manage potential non - compliance through a noise complaint handling and response system, including the identification of responsible sources to enable targeted remedial action; • assess if further noise mitigation options for the ventilation fans are reasonable and feasible following the receipt of attenuation proposals; and • discuss potential management measures or agreement options with the landowner at 275 Cams Boulevard, following receipt of proposals from acoustics specialists. In addition to the above, LakeCoal is committed to the progressive implementation of feasible measures to target long term noise goals which are designed to reduce noise emissions from the Colliery. Long term options for investigation include: • modification to belt/movement alarms; • investigation of surface conveyer and coal preparation equipment, to determine if noise reductions are possible; • identifying sound attenuation options for the surface bulldozer and front end loader; • strategic placement of acoustic barriers; • attenuation for the surface screener/shaker; • installation of quiet rollers for surface conveyor belts; • acoustic treatments around compressors; and • the use of a conveyor stacker for product coal stockpiling.	Administrative Non - compliance	No evidence of review or update of Noise Management Plan during audit period. Admin Non - Compliance. Real time noise monitoring system removed during the audit period and has not been replaced. No evidence of progressive noise mitigation implementation	Continue investigations of any noise issues and, where practicable, implement reasonable and feasible mitigation measures. Ensure accurate/consistent monitoring results are presented in Annual Reviews. As per REC 8 The real - time noise monitor should be re-established for the site. Liaise with the DPE regarding the best location as the majority of noise complaints have resulted from Mannering Colliery operations, not CVC. Mannering Colliery is also owned by Delta Coal. Update the Noise Management Plan.
Subsidence SOC's	Management and monitoring of subsidence will continue to be undertaken in accordance with the Colliery's SMP, which will be	Non- Compliant	Subsidence is managed under Extraction Plans, not SMP's. SMP's cover past mining areas.	As per REC 16



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	reviewed and updated as required to include the commitments made below. LakeCoal will: provide raw subsidence survey data to OEH within 7 days of completion; undertake annual bathymetric surveys of the lake bed to determine actual subsidence and undertake a comparison with predicted levels. Should measured subsidence significantly exceed predicted levels, LakeCoal will review future panel designs to limit future impacts to acceptable levels; install a new foreshore survey line above the first and second workings panels where the underground linkage passes beneath them and possibly extending from the foreshore to the point of connection with the MC workings; inspect existing conditions in the Fassifern Seam and undertake geotechnical and geological mapping in the roadways proximate to the proposed linkage in both CVC and MC workings; complete representative borehole core drilling and sampling of the Fassifern Seam floor at the start and finishing ends of the underground linkage and where the headings pass beneath the SPB. Development below the foreshore will be limited to two headings only until floor conditions can be confirmed; develop infrastructure monitoring and management plans in consultation with infrastructure owners and other relevant stakeholders; re-establish and re-survey Survey Line 24; install a suitable survey line at the starting end above Great Northern Seam first workings to provide early warning monitoring data for the tension towers and switchyard structures; monitor tension and suspension towers and switchyard conductor suspension frames directly above the panels, foreshore and adjacent inlet canal wall; ensure that a monitoring and management plan for the MP01 sewer rising main is in place prior to commencement of mining that may impact Council's infrastructure; and complete an annual subsidence report and make this report publicly	(Low Risk)	Separate Extraction Plan requirements including monitoring and reporting. Some of the aspects in this condition have not been triggered, however due to a lack of a defined subsidence report it has been difficult for SLR to determine which conditions are not triggered and which are relevant. Subsidence impacts are reported in the Annual Review, however it would be preferable if a standalone subsidence report was prepared. There is not a seperate Annual Subsidence Report, therefore Admin Non - Compliant. No evidence of raw survey result being provided to OEH within 7 days of completion. Admin Non - Compliant. No evidence provided regarding - "complete representative borehole core drilling and sampling of the Fassifern Seam floor at the start and finishing ends of the underground linkage and where the headings pass beneath the SPB"	See Section 5.2 of the Main Audit Report for Subsidence Recommendations. See Section 5.2 of the Main Audit Report for Subsidence Recommendations.



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	available on the Colliery's website.			
Heritage SOC's	Management and monitoring of heritage will continue to be undertaken in accordance with the Colliery's HMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: • review and revise the HMP to remove site #45-7-0154 and incorporate any other changes as a result of the proposed modification; • update the HMP following approval of the Proposal to include the extended area to which it relates; • ensure that should unanticipated Aboriginal or historic heritage artefacts be found during dam embankment and diversion works, work will cease and the site assessed by an archaeologist; and • ensure that in the unlikely event that skeletal remains are found during dam embankment and diversion works, work will cease immediately in the area and the NSW Police Coroner called to determine if the material is of Aboriginal origin. OEH and relevant Aboriginal community stakeholders will be notified if the remains are positively identified as being of Aboriginal origin to determine their appropriate management prior to works recommencing.	Administrative Non - compliance	The most recent date of the Heritage Management Plan is 23 June 2014. The highlighted condition is from MOD 2 (December 2015). Site 45-7-0154 is still included the document. Other aspects of this statement of commitments have been met.	As per REC 13 • Update the Heritage Management Plan, including the removal of Site #45-7-0154.
EPL 1770				
L3.1	Volume and Mass Limits For each discharge point or utilisation area specified below (by a point number), the volume/mass of: a) liquids discharged to water; or; b) solids or liquids applied to the area; must not exceed the volume/mass limit specified for that discharge point or area.	Non – Compliant (Low Risk)	Discharge volumes have been recorded at site. No exceedances in 2017 or 2018 Annual Reviews. Based on information provided by Environment and Community Coordinator no exceedances for 2019. Non-compliant: There were two exceedances of the daily volumetric limit (12,161 kL) during the 2016 which were related to significant rainfall events. These exceedances occurred on the: 1. 6 January 2016 – A total of 14,152 kL was discharged 2. 5 June 2016 – A total of 16,391 kL was discharged. No further recommendations.	Nil recommendations.



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L3.2	The volumetric daily discharge limit for the premises is the combined discharge measured at EPA discharge points 1 and 27 and must not exceed 12161 kilolitres per day.	Non – Compliant (Low Risk)	There were two exceedances of the daily volumetric limit (12,161 kL) during 2016 which were related to significant rainfall events. These exceedances occurred on the: 1. 6 January 2016 – A total of 14,152 kL was discharged. 2. 5 June 2016 – A total of 16,391 kL was discharged. No further recommendations.	Nil recommendations.
L5.1	Noise Limits 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. See Appendix 2 for full list of criteria	Non – Compliant (Low Risk)	- Exceedance of LA1(1minute) criteria of 7dB at Point 14 in June 2016. Documented in 2016 Annual Review and Quarterly Monitoring report (Global Acoustics report 16217_R01). Corrective actions undertaken and documented in incident report dated 05/07/2016. - 1dB exceedance of LAeq(15minute) criteria at Point 23 during the daytime period in October 2017 (Q4). Documented in 2017 Annual Review. However it is noted that a discrepancy between+E52 monitoring results presented in the 2017 Annual Review and Q4 Monitoring report (Global Acoustics Report 17424_R01) where no exceedance is recorded. - No exceedances recorded during 2018 period. - No evidence obtained on performance during the 2019 audit period.	Nil recommendations.
L5.7	To determine compliance: 1. With the LAeq(15 min) noise limits in condition L5.1 and condition L5.2, the licensee must locate noise monitoring equipment; (a) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more then 30 metres from the property boundary that is closest to the premises; (b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises, or, where applicable, (c) within approximately 50 metres if the boundary of a national park	Administrative Non - compliance	It is noted that monitoring for LA1(1minute) noise levels is not completed at 1m from a façade - however such noise monitoring is generally not practical due to disturbance to residents during the sensitive night-time period.	Nil recommendations.



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	or nature reserve. 2. With the LA1(1 minute) noise limits in condition L5.1 and L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade. 3. With the noise limits in condition L5.1 and condition L5.2, the noise monitoring equipment must be located; (a) at the most affected point at a location where there is no dwelling at the location, or (b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).			
05.1	The licensee must maintain, and implement as necessary, a current emergency response plan for the premises. The licensee must keep the emergency response plan on the premises at all times. The emergency response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. If a current emergency response plan does not exist at the date on which this condition is attached to the licence, the licensee must develop an emergency response plan within three months of that date.	Administrative Non - compliance	A PIRMP has been prepared for the site. Latest dated 21 September 2018. Evidence of testing PIRMP - including details of tests from 21 December 2018. Although there were some incidents, it does not appear any incident required the PIRMP to be enacted. * PIRMP is kept on-site. * Observation: The PIRMP is labelled LakeCoal, has persons listed in it who are no longer at site, does not have email details for government contacts, and figures do not clearly show the location of hazardous substances and where pollution response equipment is stored.	REC 25 Update the PIRMP to include: Current site contacts; Email details for government contacts; and Figures that clearly show the location of hazardous substances and where pollution response equipment is stored.
07.2	Sewage Treatment The licensee is responsible for the correct operation of the sewage treatment system(s) on their premises.	Administrative Non - compliance	Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite. There is limited detail in the Water Management Plan regarding the sewage water management system. Garden Wastemaster Australia complete servicing. Evidence of one email from 6 March 2019 organising servicing. However no evidence of servicing provided. Evidence of testing of wastewater through lab results	Include additional detail in the Water Management Plan regarding sewage management. Include an update of sewage system during the audit period in the Annual Review. Ensure servicing is completed and



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				records kept onsite.
07.3	Sewage Treatment Correct operation involves regular supervision and system maintenance. The licensee must be aware of the system requirements and must ensure that the necessary service contracts are in place.	Administrative Non - compliance	Same as L7.2	As per REC 10
07.4	Sewage Treatment The sewage treatment system(s) must be serviced by a suitably qualified and experienced waste water technician at least once each quarterly period and a minimum of four times per year.	Administrative Non - compliance	Same as L7.2	As per REC 10
07.5	Sewage Treatment The licensee must record each inspection and any actions required or recommended by the technician; including all results from tests performed on the sewage treatment system(s) by the technician as defined in Condition O7.4.	Administrative Non - compliance	Same as L7.2	As per REC 10
M2.1	Monitoring and Recording For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	Administrative Non - compliance	There has been data capture issues identified in Annual Reviews for PM _{10.} <u>Admin Non - Compliance.</u>	Update the Air Quality Management Plan following this audit. Improve data capture for PM ₁₀ . Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.
M2.2	Air Monitoring Requirements	Administrative	There were some issues with data capture with this outlined	As per REC 9



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	POINT 25 Pollutant Units of measure Frequency Sampling Method Particulate matter micrograms per cubic mattee Continuous AM-22	Non - compliance	in Annual Reviews. See Schedule 3 Condition 11 of the Development Consent.	
M4.1		Administrative Non - compliance	Development Consent.	Continue investigations of any noise issues and, where practicable, implement reasonable and feasible mitigation measures. Ensure accurate/consistent monitoring results are presented in Annual Reviews. As per REC 8 The real - time noise monitor should be re-established for the site. Liaise with the DPE regarding the best location as the majority of noise complaints have resulted from Mannering Colliery operations, not CVC. Mannering Colliery is also owned by Delta Coal. Update the Noise Management Plan.
	undertaken at each sensitive receiver. That at each sensitive receiver monitoring is undertaken over a range of different days excluding weekends and public holidays during the reporting period so as to be representative of operating hours. That night time 15 minute attended monitoring and the LA1 (1min) monitoring for three of the quarters be undertaken at worst case being the most stable atmospheric			



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	conditions and when noise would be most intrusive to sleep. All of the sensitive receivers do not have to be monitored on the same day, evening and night for sub condition f.			
M4.2	For the Annual Reporting Period ending March 2015 the EPA will accept all monitoring required by the current Department of Planning and Environment consent (usually quarterly monitoring for noise as dB(A) Leq15minutes) for compliance with noise monitoring requirements in this licence, as a single report attached to the Annual Return for the premises.	Administrative Non - compliance	No evidence of a consolidated noise report prepared for the Annual Returns. Evidence from 2015/16, but none during the audit period.	 For future Annual Returns a single noise monitoring report should be prepared and attached to the Annual Return.
M6.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Administrative Non - compliance	*Admin Non-compliant: The Complaints Register does not include the personal details of the complainant. * Not all complaints registered in the register included the method by which the complaint was made. * There are additional complaints outlined in the Annual Review compared to the Complaints Registers provided to the auditor.	 Ensure all complaints are recorded in the internal database on site and the relevant details required under this condition are outlined in the Annual Review.
M7.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Administrative Non - compliance	*Telephone line for complaints advertised on the LakeCoal and Delta Coal websites. * However no evidence of notifying to the community that the complaints line exists.	 With the new ownership an advertisement should be placed in the paper/newsletter providing a link to the Delta Coal website and outlining the complaint management details.
M7.4	The licensee must notify the EPA with contact details of personnel capable of a timely response to emergencies or any other exigent circumstances. (a) the nominated contact must be available at all times. (b) contact details must include a telephone number and must be current. (c) such notification must be made within 14 days of receiving this	Administrative Non - compliance	* Designated representatives of the company included in the Pollution Incident Response Plan (PIRMP), dated September 2018. * Admin Non-compliant: The designated representatives of the company, included in the PIRMP, are not current.	 REC 29 Update the details of designated representatives of the company in the PIRMP.



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	licence.			
R1.5	The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	Administrative Non - compliance	The 2017-18 Annual Return is dated 4 June 2018 and was supposed to be submitted to the EPA by 30 May 2018. From the date of the Annual Return it appears it wasn't submitted to the EPA time The 2016-17 Annual Return was dated within the 60 days.	Ensure Annual Returns are completed as per the EPA requirements and submitted within the due date.
R4.1	The licensee must submit to the EPA a noise compliance assessment report at the end of each reporting period. The report must be submitted with the Environment Protection Licence Annual Return. The report must be prepared by a suitably qualified and experienced acoustical consultant which:		No evidence of a consolidated noise report prepared for the Annual Returns. Evidence from 2015/16, but none during the audit period.	Send a combined noise report for the Annual Return period to the EPA.
	(a) details the noise monitoring undertaken in accordance with condition M4;			
	(b) assesses compliance with noise limits presented in condition L5.1 and condition 5.2; and			
	(c) outlines any management actions taken within the monitoring period to address any exceedances of limits contained in condition L5.1 and condition L5.2.			
	Note: The licensee must provide the EPA with one report, but this report may be a combination of the monitoring undertaken by the licensee as part of their quarterly monitoring program as required by the Project Approval SSD-5456 and must include LA1(1min).			
U1.1	By 07 July 2017 the licensee must construct a pump station, rising	Administrative	The upgrade has been designed but not yet constructed.	REC 32
	main and other infrastructure in order to connect the sewage from Chain Valley Colliery to Wyong Shire Council's sewerage system. The construction must be undertaken by an appropriately qualified an experienced person. The Licensee must:	Non - compliance	This was supposed to be completed by 7 July 2017.	Liaise with the EPA regarding the current status of the Sewage System Project. Implement any agreed actions in terms of timing.
	a) obtain the appropriate approvals and permits required for the development;			
	b) construct option A or option B in accordance with the document			



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
CCL 721	titled "Concept Design Report for Sewage Treatment System Upgrade Chain Valley Colliery" dated 1 February 2016 and prepared by RGH Consulting Group; c) include connection of sewage from the administration building to the rising main; c) notify the EPA in writing at hunter.region@epa.nsw.gov.au within 2 weeks of the pump station and rising main being commissioned; and d) provide the EPA with a report on commissioning of the pump station and rising main which details the final option constructed within 2 weeks of the pump station and rising main being commissioned.			
Condition 3.	Mining Operations Plan (a) Mining operations must not be carried out otherwise than in accordance with: a Mining Operations Plan (MOP) which has been approved by the Director-General of the Department of Primary Industries. (b) The MOP must: i) identify areas that will be disturbed by mining operations; ii) detail the staging of specific mining operations; iii) identify how the mine will be managed to allow mine closure; iv) identify how mining operations will be carried out on site in order to prevent and or minimise harm to the environment; v) reflect the conditions of approval under: the Environmental Planning and Assessment Act 1979 the Protection of the Environment Operations Act 1997 and any other approvals relevant to the development including the conditions of this lease; and vi) have regard to any relevant guidelines adopted by the Director-General. (c) The titleholder may apply to the Director-General to amend an approved MOP at any time. (d) It is not a breach of this condition if:	Non- Compliant (Low Risk)	Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. As there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time. Both MOPs cover the required aspects of this condition. Implementation: No areas available for rehabilitation at site.	Nil recommendation



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	i) the operations constituting the breach were necessary to comply with a lawful order or direction given under the Mining Act 1992, the Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997 or the Occupational Health and Safety Act 2000; and ii) the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out. {e) A MOP ceases to have affect 7 years after date of approval or other such period as identified by the Director-General. An approved amendment to the MOP under condition 5 does not constitute an approval for the purpose of this paragraph unless otherwise identified by the Director-General.			
Condition 5	The EMR must: a) report against compliance with the MOP; b) report on progress in respect of rehabilitation completion criteria; c) report on the extent of compliance with regulatory requirements; and d) have regard to any relevant guidelines adopted by the Director-General.	Administrative Non - compliance	a) Admin Non-compliant: The 2016, 2017 & 2018 Annual Reviews do not report against compliance with the MOP. b) N/A - Rehabilitation has not commenced at the site; c) 2016, 2017 & 2018 Annual Reviews - Executive Summary & Section 3; and d) Admin Non-compliant: 2016, 2017 and 2018 Annual Reviews not prepared in accordance with the DPE Annual Review guidelines.	The Annual Reviews are set out differently to the DPE Annual Review Guidelines (2015). Ensure table of contents matches the guidelines. Ensure transport records from this Audit period (January 2016) onwards are recorded on the website. This could be appended to the Annual Review summarising the weekly transport. Include the biodiversity monitoring reports as appendices to the Annual Review. See Section 5.2 of the Main Audit Report for Subsidence Recommendations. Include an update on Audit Action Plan.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
Condition 11	Reports The lease holder must provide an exploration report, within a period of twenty-eight days after each anniversary of the date this lease has effect or at such other date as the Director-General may stipulate, of each year. The report must be to the satisfaction of the Director-General and contain the following: (a) Full particulars, including results, interpretation and conclusions, of all exploration conducted during the twelve months period; (b) Details of expenditure incurred in conducting that exploration; (c) A summary of all geological findings acquired through mining or development evaluation activities; (d) Particulars of exploration proposed to be conducted in the next twelve months period; (e) All plans, maps, sections and other data necessary to satisfactorily interpret the report.	Administrative Non - compliance	Evidence of submission for 2016, 2017 and 2018 Group Exploration Reports. LakeCoal received a PIN from the Resources Regulator on 7 November 2017 for late lodgement. In the version supplied to SLR there are no figures.	REC 33 Report against compliance with the MOP in future Annual Reviews REC 34 Ensure Group Exploration Reports meet the required timeframe. Ensure figures are included in the reports.
CCL 707				
Condition 2 1-4	Sub Condition 1 Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:- (a) ongoing mining operations and environmental management; and (b) ongoing monitoring of the project. Sub Condition 2 The Plan must be prepared in accordance with the Director-General's guidelines current at the time of lodgement.	Non- Compliant (Low Risk)	All sub conditions are non - compliant. Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. As there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time.	Nil recommendation



Schedule and Condition	Condition	Compliance Status	Evidence	Recommendations
Number				
	A Plan must be lodged with the Director-General:-			
	(a) prior to the commencement of mining operations (including mining purposes);			
	(b) subsequently as appropriate prior to the expiry of any current Plan; and			
	(c) in accordance with any direction issued by the Director-General.			
	Sub Condition 3			
	A Plan must be lodged with the Director-General:			
	(a) prior to the commencement of mining operations (including mining purposes);			
	(b) subsequently as appropriate prior to the expiry of any current Plan; and			
	(c) in accordance with any direction issued by the Director-General.			
	The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:-			
	Sub Condition 4			
	(a) area(s) proposed to be disturbed under the Plan;			
	(b) mining and rehabilitation method(s) to be used and their sequence;			
	(c) areas to be used for disposal of tailings/waste;			
	(d) existing and proposed surface infrastructure;			
	(e) existing flora and fauna on the site;			
	(f) progressive rehabilitation schedules;			
	(g) areas of particular environmental, ecological and cultural sensitivity and measures to protect these areas;			
	(h) water management systems (including erosion and sediment controls);			
	(I) proposed resource recovery; and			



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	(j) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining land use/vegetation.			
Condition 3-2	AEMR The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of: (a) the accepted Mining Operations Plan; (b) development consent requirements and conditions; (c) Department of Environment and Conservation and Department of Planning licences and approvals; (d) any other statutory environmental requirements; (e) details of any variations to environmental approvals applicable to the lease area; and (f) where relevant, progress towards final rehabilitation objectives.	Administrative Non - compliance	Annual Review covers conditions b-f. However there is minimal information regarding a review and forecast against the MOP.	The Annual Reviews are set out differently to the DPE Annual Review Guidelines (2015). Ensure table of contents matches the guidelines. Ensure transport records from this Audit period (January 2016) onwards are recorded on the website. This could be appended to the Annual Review summarising the weekly transport. Include the biodiversity monitoring reports as appendices to the Annual Review. See Section 5.2 of the Main Audit Report for Subsidence Recommendations. Include an update on Audit Action Plan. As per REC 33 Report against compliance with the MOP in future Annual Reviews.
Condition 7	Reports The lease holder must provide an exploration report, within a period of twenty-eight days after each anniversary of the date this lease has effect or at such other date as the Director-General may stipulate, of each year. The report must be to the satisfaction of the Director-General and contain the following:	Administrative Non - compliance	Evidence of submission for 2016, 2017 and 2018 Group Exploration Reports. LakeCoal received a PIN from the Resources Regulator on 7 November 2017 for late lodgement. In the version supplied to SLR there are no figures.	As per REC 34 Ensure Group Exploration Reports meet the required timeframe. Ensure figures are included in the reports.



Schedule and Condition Number	Condition	Compliance Status	Evidence	Recommendations
	(a) Full particulars, including results, interpretation and conclusions, of all exploration conducted during the twelve months period;			
	(b) Details of expenditure incurred in conducting that exploration;			
	(c) A summary of all geological findings acquired through mining or development evaluation activities;			
	(d) Particulars of exploration proposed to be conducted in the next twelve months period;			
	(e) All plans, maps, sections and other data necessary to satisfactorily interpret the report.			



7 Additional Recommended Actions

Additional recommendations relating to compliant conditions are outlined within Table 9.

Table 9 Additional Recommendations

Aspect	Recommendation		
Management Systems	It provided difficult for Delta Coal to provide requested information in a timely manner. SLR recommends a review of the management system to ensure information is correctly filed and readily available.		
Audit Preparations	Little information was provided to SLR prior to the audit which resulted in numerous additional information requests. Additional time is required by Delta Coal to prepare for the next Independent Environmental Audit. An internal audit is recommended prior to the next Independent Environmental Audit to ensure information and evidence is available to the Independent Environmental Auditor.		
Waste Management	Ensure the minor waste management issues identified during the audit are rectified, including:		
	Improve bin labelling;		
	Ensure all hydrocarbon containers (empty or full) are stored within bunds.		
Groundwater	Attempt to contact property owners and ask for permission to monitor the private groundwater bores. Some additional consultation with Council may be required.		
Surface Water Discharges	The Annual Reviews need to provide a clear statement regarding whether discharge criteria have been met.		
Future Annual Returns	LakeCoal and Delta Coal to prepare Annual Returns based on the period of the Annual Return and dates of the sale of CVC.		



8 Conclusion

Conditions were assessed across the SSD 5465, SSD 5465 Statement of Commitments), EPL 1770, CCL 707 and CCL 721. In summary:

- There were 29 Administrative Non Compliances and 7 Low Risk Non Compliances in SSD 5465;
- There were 3 Administrative Non Compliances and 1 Low Risk Non Compliance in the Statement of Commitments;
- There were 16 Administrative Non Compliances and 3 Low Risk Non Compliances in the EPL;
- There were 2 Administrative Non Compliances and 1 Low Risk Non Compliance in CCL 707; and
- There were 2 Administrative Non Compliances and 1 Low Risk Non Compliance in CCL 721.

There are a series of grouped recommendations across **Section 6** and **7**.

The majority of non - compliances and recommendations related to administrative issues, including not fully implementing the Project Approval and management plans. The field inspection did not identify any major issues that required immediate attention. The situation at the time of Independent Environmental Audit made the task of auditing more difficult than expected for SLR. This included the change in management from LakeCoal to Delta Coal and the previous Environment and Community Co-ordinator leaving LakeCoal prior to the commencement of the audit. Little information was provided to SLR prior to the Independent Environmental Audit which resulted in numerous additional information requests following the site component. Additional time is required by Delta Coal to prepare for the next Independent Environmental Audit.



APPENDIX A

Photographs



Photo 1 Previous Underground Mining Area – Lake Macquarie Shoreline



Photo 2 Cardboard included in general waste bin. Improvement Required.



Photo 3 Hydraulic oil container stored on the side within bunded area. Improvement Required.



Photo 4 Hydraulic oil container should not be stored in general waste



Photo 5 Diesel Tank stored within Bund



Photo 6 Coal Material in drain should be removed



Photo 7 The Oily water separator worked effectively during the audit period



Photo 8 Licenced discharge point in operation

APPENDIX B

Compliance Spreadsheet

Development Consent SSD - 5465

Audit Period = 1 January 2016 – 5 April 2019

Condition Number SCHEDULE 2 - ADMINI	Condition STRATIVE CONDITIONS	Compliance Status	Evidence	Recommended Action
	IISE HARM TO THE ENVIRONMENT			
1	In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.	Compliant	There have been no major incidents where there has been material harm.	
Terms of Consent				
2	2. The Applicant shall carry out the development generally in accordance with the: (a) EIS; (b) SEE Mod 1; (c) SEE Mod 2; and (d) Project Layout Plans. Note: The Project Layout Plans of the development are shown in Appendices 2 to 4 and Appendix 7A	Compliant	Based on a review of the information provided activities have generally been carried out in accordance with approvals. Although some non - compliances have been noted.	
2A	The Applicant shall carry out the development in accordance with the: (a) Statement of Commitments; and (b) conditions of this consent.	Compliant	Based on a review of the information provided activities have generally been carried out in accordance with approvals. Although some non - compliances have been noted.	
3	If there is any inconsistency between the documents in condition 2, the more recent document shall prevail to the extent of the inconsistency. The conditions of this	Note	No inconsistency found during the audit.	
4	consent shall prevail over the documents in conditions 2 and 2A(a) to the extent of any inconsistency. The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted by the Applicant in accordance with this consent; and (b) the implementation of any actions or measures contained in these documents.	Compliant	Evidence of consultation with the DPE and other agencies. Consultation in the Annual Review. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in 2016. Evidence of consultation with the DPE regarding incident management.	
Limits of Consent Mining Operations				
willing Operations	The Applicant may carry out mining operations on the site until 31 December 2027.			
5	Note: Under this consent, the Applicant is required to rehabilitate the site and perform additional undertakings to the satisfaction of either the Secretary or the DRE. Consequently this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.	Compliant	Mining operations undertaken during the audit period	
Coal Extraction				
6	The Applicant shall not extract more than 2.1 million tonnes of ROM coal from the site in any calendar year.	Compliant	Within limits based on Annual Reviews. Annual Review 2018 - 398,336 tonnes Annual Review 2017 - 1,361,205 tonnes Annual Review 2016 - 1,238,214 tonnes	
Coal Transport - Public	Roads		, page 1	
7	The Applicant shall ensure that no laden coal trucks are dispatched from the site to public roads outside of the hours of 5:30 am to 5:30 pm, Monday to Friday, and not at all on Saturdays, Sundays or public holidays	Non-Compliant (Low Risk)	Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.
8	The Applicant shall not dispatch from the site more than: (a) 660,000 tonnes of product coal in any calendar year to Port Waratah Coal Services for export; (b) 180,000 tonnes of product coal in any calendar year to domestic customers other than Vales Point Power Station; (c) a total of 270 laden coal trucks per day by public roads; (d) a total of 32 laden coal trucks per hour; and (e) an average of 16 laden coal trucks per hour by public roads during peak hour periods, calculated monthly, until the intersection of M1 Motorway and Sparks Road Interchange (East Side - unsignalised with stop sign) is upgraded to a signalised intersection.	Non-Compliant (Low Risk)	2018 Annual Review - 394,213 tonnes transported, but 0 t from public roads. 2017 Annual Review - 1,378,996 tonnes transported to power station. 254 tonnes on public roads. 2016 Annual Review - 1,175,523 tonnes to domestic market. 2,414 tonnes on public roads. a) Within this limit; b) Within this limit; c) There is no evidence provided of breakdown on public roads for 2016, 2018 and 2019 year to date; d) There is no evidence provided of breakdown on public roads for 2016, 2018 and 2019 year to date; e) Based on the Annual Review data this has been met. Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.
Coal Transport - Vales	Point Power Station			
9	The Applicant shall ensure that only private roads are used for the transport of coal by truck to Vales Point Power Station, except in an emergency. In an emergency, product coal may be transported by public roads, with the prior written approval of the Secretary, and subject to any restrictions that the Secretary may impose.	Compliant	Annual Review provides total tonnages. Evidence of signage. Evidence of Transport Management Plan. No reason to determine non - compliance.	
10	The Applicant shall restrict the transport of coal by truck to the Vales Point Power Station between 10 pm and 5:30 am to: (a) 16 laden trucks per hour for the Spring and Autumn months; and (b) zero during Winter months.	Non-Compliant (Low Risk)	Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratah Coal Service. There are no times provided in the spreadsheet. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR in unable to determine if the site is compliant with this condition.	Ensure detailed records of coal transportation are recorded and able to be provided to auditors upon request. The spreadsheets should cover the requirements of the key conditions of the Development Consent.
Planning Agreement	han a control of the second of			
11	Within 12 months of the date of this consent, unless otherwise agreed by the Secretary, the Applicant shall enter into a planning agreement with the WSC in accordance with Division 6 of Part 4 of the EP&A Act that provides for payment to the WSC for community enhancement purposes. The agreement must include provision for those matters set out in condition 12 below. If there is any dispute between the Applicant and WSC relating to the preparation or implementation of the planning agreement, then either party may refer the matter to the Secretary for resolution.	Administrative Non- Compliance	Discharge locations sighted in the field inspection. Records of discharge volume and water quality outlined in Annual Reviews.	
Community Enhancem				
Community Emiancem	viii.			

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Condition Number	Condition	Compliance Status		Noonimenaeu Action
12	The Applicant shall pay WSC \$0.035 for each tonne of product coal produced by the development for the purposes of improving public infrastructure and providing community projects for the communities of Summerland Point, Gwandalan, Chain Valley Bay and Mannering Park. Payments from the approval date of project approval 10_0161 must be: (a) made by the end of March, for coal produced in the previous calendar year; (b) made for each year that coal is produced by the colliery; and (c) subject to indexation in accordance with the Australian Bureau of Statistics Consumer Price Index.	Compliant	Updates on VPA's provide in Annual Reviews. 2019 is not included yet as not due for payment. 2016: As at the end of the reporting period \$212,477 had been accrued by LakeCoal. All funding associated with the VPA was transferred into designated VPA holding account administered by the Council during the reporting period. 2017: A further \$52,206 was accrued by LakeCoal during the reporting period in accordance with the VPA agreement. 2018: A total value of \$398,336 was accrued and paid to Central Coast Council by LakeCoal during the reporting period. A further \$15,549.90 was accrued during the reporting period, which was the total indexed contribution (31/12/18). The total Voluntary Planning Agreement (VPA) required January to September (Pre Appointment) 2018 was \$11,117.70. The total VPA required from October to December (Receivership Period) 2018 was \$4,432.20. Evidence of receipts provided to audit team.	a
Surrender of Existing Pro	oject Approval			
15	The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structure, that are part of the development are constructed in accordance with: (a) the relevant requirements of the BCA; and (b) any additional requirements of the MSB where the building or structure is located on land within declared Mine Subsidence Districts. Notes: **Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works; **Part 8 of the EP&A Regulation sets out the requirements for the certification of the development; and **Under Section 15 of the Mine Subsidence Compensation Act 1961, the Applicant is required to obtain the MSB's approval before constructing any improvements in a Mine Subsidence District.	Compliant	Based on site communication with Environment and Community Co-ordinator. Construction of the control room undertaken in audit period Based on site communication there was no further construction. A) Evidence of occupation certificate dated 15 August 2018. B) is not applicable.	od.
Demolition				
16	The Applicant shall ensure that all demolition work is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Not Triggered	Based on site communication Environment and Community Co-ordinator there was no demolition. None outlined in Annual Reviews.	
17	The Applicant shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Compliant	Evidence of maintenance records for trucks and dozers. Spreadsheet records date back to 2010.	
	IG STRATEGIES, PLANS OR PROGRAMS The Applicant must regularly review the strategies, plans and programs required under this consent and ensure that these documents are updated to incorporate			
18	measures to improve the environmental performance of the development and reflect current best practice in the mining industry. To facilitate these updates, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis. With the agreement of the Secretary, the Applicant may prepare a revision or stage of any strategy, plan or program required under this consent without undertaking consultation with all parties nominated under the applicable condition in this consent. Notes: While any strategy, plan or program may be submitted on a staged basis, the Applicant must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.	Administrative Non- Compliance	The following Management Plans are applicable to Chain Valley and outlined on the Chain Valley website: Water Management Plan - July 2015; Air Quality Management Plan - July 2014; Noise Management Plan - March 2014; Heritage - June 2014; Biodiversity Management Plan - 16 March 2016; Seagrass Management Plan - April 2014; and Environmental Management System - 2012. Admin Non - Compliance: This condition is non - compliant as plans have not been 'regularly' updated. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed.	All management plans require updating due to the length of time since the previous reviews. All should in a Delta Coal template. Ensure there is a cross referencing table covering this condition in management plans. Additional detail including Trigger, Action, Response Tables (contingency plan) should be developed in the next round of management plan updates.
Dood Maintenance Contr	district control of the control of t			
	The Applicant must pay Road Maintenance Fees to WSC in accordance with its Road Maintenance Agreement with WSC.	Compliant	Evidence of Road Maintenance Agreement on 1 July 2013 signed by both LakeCoal and Wyong Shire Council. Evidence of road maintenance fees for 2016 (23 January 2017 email), 2017 (22 Jan 2018 email). No road maintenance required in 2018 as no road haulage.	
Schedule 3 - Environmer Transport	ntal Conditions - General			
Monitoring of Coal Trans	sport			
-	The Applicant shall: (a) keep accurate records of the amount of coal transported from the site (on a weekly basis); and (b) make these records publicly available on its website at the end of each calendar quarter.	Non-Compliant (Low Risk)	a) Detailed coal records only provided for 2017. This included loads and tonnages for Delta (Vales Point), Weathertex and Port Waratal Coal Service. There are no times provided on the spreadsheet provided. SLR requested additional spreadsheets but no detailed information was provided for 2016, 2018 and 2019 year to date. As no information was provided SLR is unable to determine if the site is compliant with this condition. b) Evidence of publically available information regarding transport. However this information showed most quarters in 2016 and 2017. However no coal records on the website in 2018 or 2019. Admin Non Compliance.	See recommendation regarding detailed transport records.
Road Works				
2	The Applicant shall upgrade the Ruttleys Road and Construction Road intersection within 6 months of the date of this consent, unless the Secretary directs otherwise, by: (a) installing additional signage on and adjacent to Construction Road prior to the intersection; (b) repairing the surface of Construction Road as required and ensuring the edge seal of the left turn lane is of sufficient width to accommodate coal trucks; (c) installing or replacing "Stop" signs in accordance with Austroads guidelines; (d) repainting road line markings and raised pavements associated with this intersection; and (e) installing barriers to prevent trucks parking on the gravel area adjacent to the intersection and the electricity substation located in the vicinity of this intersection. The design and construction of these works must be undertaken in consultation with, and to the relevant satisfaction of, WSC, RMS and Delta Electricity and to the satisfaction of the Secretary.	Administrative Non- Compliance	Based on site communications with Environment and Community Co-ordinator. No upgrades completed during this audit period. However, there is a historical admin non - compliance from the previous audit period, with these details noted by Hansen Bailey (2016). - WSC Civil Design Approval SCC11-2013 dated 1/04/14 and WSC invoice for construction assessment and certificate dated 17/07/13; - Email from Lyle Marshall & Associated (LC construction contractor) to WSC dated 21/03/14; and - Email from LC to Delta Electricity dated 29/01/14 and response from Delta Electricity dated 11/02/14 confirming approval of the propos works. No evidence that the required Ruttleys Road and Construction Road intersection upgrade was to the satisfaction of RMS and DPE. Construction works for the intersection upgrade were completed on 14/08/2014, which is outside of 6 months of the date of approval of SSD-5465 (i.e. 23/06/2014). Historical admin non - compliance with no further action.	
Road Transport Protocol				

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Condition Number	Condition The Applicant shall prepare a Road Transport Protocol to the satisfaction of the Secretary. This protocol shall:	Compliance Status	Evidence	Recommended Action
3 Independent Traffic Auc	(a) be prepared in consultation with RMS, NCC, WSC, DRE and CCC and submitted to the Secretary for approval within 6 months of the date of this consent; (b) describe the designated haulage routes to be used (as shown in Appendix 5); the maximum number of road movements proposed and the haulage hours permitted under this consent; (c) include a Traffic Management Plan, which includes: • measures to maximise the use of a low frequency (regular) trucking schedule rather than an intermittently-high frequency (campaign) trucking schedule, especially during the morning peak hour; • contingency plans to apply when (for example) the designated haulage route is disrupted, including procedures for notifying relevant agencies and affected communities of the need to implement such contingency plans; • procedures to ensure that all haulage vehicles associated with the development are clearly distinguishable as Chain Valley Colliery coal haulage trucks; • details of procedures for receiving and addressing complaints from the community concerning traffic issues associated with truck movements to and from the site; • measures to ensure that the provisions of the Traffic Management Plan are implemented, eg driver training in the heavy vehicle driver's Code of Conduct and contractual agreements with heavy vehicle operators; and • procedures for ensuring compliance with and enforcement of the heavy vehicle driver's Code of Conduct; (d) include a Code of Conduct for heavy vehicle drivers that addresses: • instructions to avoid grouping or convoying of trucks; • instructions to drivers not to overtake each other on the haulage route, as far as practicable, and to maintain appropriate distances between vehicles; • instruction to drivers to adhere to the designated haulage routes; • instruction to drivers to adhere to the designated haulage route, as far as practicable, and to maintain appropriate distances between vehicles; • instruction to drivers to be properly safety conscious and to strictly obey all traffic regulations; and • a	Administrative Non- Compliance	Evidence of Road Transport Protocol. Road Transport Protocol, which includes; MSP-D-14559 – Coal Haulage Traffic Management Plan and POL-D-14926 Coal Haulage Driver Code of Conduct. Coal Haulage Traffic Management System Plan on the CVC website is dated 18/03/14. This plan has not been updated since the previou audit. Coal Haulage Driver Code of Conduct on the CVC website is dated 04/10/2012. Preparation: a) Evidence of consultation from 2014; b) Section 8.3; c) Overall document. Covered in Section 8; d) Code of conduct discussed in Section 8.11. Not attached to the document. Implementation: Records and training. Section 12 of this plan states - "The Manager of Mining Engineering or his representative shall formerly review this document every three years". No evidence of any review in 2017, therefore Admin Non - Compliant.	Ensure Coal Haulage Traffic Management Plan is reviewed as per the requirements of the consent and commitments in the management plan. Attach Driver Code of Conduct to the management plan.
4	appointment has been approved by the Secretary, to conduct an Independent Traffic Audit of the development. This audit must: (a) be undertaken without prior notice to the Applicant, and in consultation with RMS, NCC, WSC and the CCC; (b) assess the impact of the development on the performance and safety of the road network, including a review of: • haulage records; • accident records on the haulage route, infringements relating to the code of conduct and any incidents involving haulage vehicles; • community complaints register; and (c) assess the effectiveness of the Road Transport Protocol; and, if necessary, recommend measures to reduce or mitigate any adverse (or potentially adverse) impacts.	Administrative Non- Compliance	<u>Admin Non - Compliance:</u> No evidence provided by site indicating Traffic Audits were completed annually.	Ensure Traffic Audits are completed annually in accordance with this condition. Ensure the report is submitted to the DPE.
	Within 1 month of receiving the audit report, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the report to the Secretary, with a detailed response to any of the recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report. A summary of the audit report must be included in the Annual Review.	Administrative Non- Compliance	Admin Non - Compliance: No evidence provided by site indicating Traffic Audits were completed annually.	
	Prior to 31 December 2014, and every three years thereafter, the Applicant shall prepare and submit to the Secretary for approval, a study of the reasonable and feasible options to reduce or eliminate the use of public roads to transport coal from the development. The assessment must include: (a) an analysis of the capital, construction and operating costs of the alternative transport options; and (b) quantified social and environmental impacts associated with road and rail transport.		Evidence provided of 2014 study with the letter dated 10 December 2014. The condition requires an audit every three years which would be in late 2017. No evidence of 2017 report provided to SLR, therefore <u>Admin Non - Compliance</u> .	Ensure the Alternative Transport Options Report is completed as per the frequency in this condition.
Noise Noise Impact Assessme	4044			
-	The Applicant shall ensure that the noise generated by the development at any residence on privately- owned land does not exceed the criteria for the location in Table 1 nearest to that residence. Table 1 nearest to that residence. Table 1 Noise Criteria dB(A) Table 1 Noise Criteria dB(A) Table 1 Noise Criteria dB(A) Noise R1	Non-Compliant (Low Risk)	- Exceedance of LA1(1minute) criteria of 6dB and 7dB at ATN4 and R13 in June 2016. Documented in 2016 Annual Review and Quarterl Monitoring report (Global Acoustics report 16217_R01). Corrective actions undertaken and documented in incident report dated 05/07/2016. - 1dB exceedance of LAeq(15minute) criteria at ATN007 during the daytime period in October 2017 (Q4). Documented in 2017 Annual Review. However it is noted that a discrepancy between+E52 monitoring results presented in the 2017 Annual Review and Q4 Monitorin report (Global Acoustics Report 17424_R01) where no exceedance is recorded. - No exceedances recorded during 2018 period. - No exceedances recorded during the 2019 audit period (January - April 2019).	Continue investigations of any noise issues and, where practicable, implement reasonable and
Operation Conditions 8	8. The Applicant shall: (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development; (b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent; (c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8); (d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review; (e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and (f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit; to the satisfaction of the Secretary.	Administrative Non- Compliance	a) The 2016 Annual Review documented an investigation into repairs/maintenance of ventilation fan silencers. No further evidence during audit period. Therefore no continued implementation. Admin Non - Compliance. b) Evidence of real time noise monitoring conducted throughout 2016,2017 and 2018 where no triggers were reported. During audit site inspection the real-time noise monitor was not in operation and has been removed from site. The Environment and Community Coordinator stated the real - time noise monitoring was removed in January 2019. Admin - Non Compliance as the monitor should have bee active the entire IEA period. c) No evidence of reduced operations during adverse meteorological conditions. d) Evidence of inspection of silencers during 2016. No evidence of progress towards long term goal in the 2017-2019 audit period. e) Conducted as part of this Independent Audit. Note that no noise monitoring of site plant/equipment and operations was conducted as part of the audit. f) No evidence of action plan. Admin Non - Compliance. Exceedances of long term noise goals occurred during the monitoring period. However these are longterm noise goals, not criteria.	The real time again maritar about he as established for the site Linia with the DDF
Noise Management Plan	Notes: • To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and • Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.	Compliant	Quarterly noise monitoring reports indicate that noise monitoring is conducted in accordance with the Industrial Noise Policy (INP).	

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Ondition Number 9 Air Quality Odour 10 Air Quality Criteria	Condition The Applicant shall prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA and submitted to the Secretary for approval within 4 months of the date of this consent, unless otherwise agreed by the Secretary; (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent; (c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and (d) include a monitoring program that: **uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent; **evaluates and reports on: **the effectiveness of the on-site noise management system; and **compliance against the noise operating conditions; and **defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. The Applicant shall implement the approved management plan as approved from time to time by the Secretary. The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedance of the criteria listed in Tables 3, 4 and 5 at any residence on privately-owned land. **Table 3. Long-term criteria for particulate matter*	Administrative Non-Compliance Compliance	Current plan dated 12 March 2014. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Compliant. Evidence from 2014; b) Compliant - Section 4; c) Compliant - Section 4; d) Compliant - Section 4; d) Compliant - Section 5 and 6 Implementation: No evidence of audit, review and update of noise management plan during audit period as prescribed in Section 9. Admin Non - Compliance. No evidence of audit, review and update of noise management plan during audit period as prescribed in Section 9. Admin Non - Compliance. Real time noise monitor removed from site. Admin Non - Compliance. Based on records from Annual Review and discussions with Environment Community Co-ordinator there have been no odour complaints. No odours identified in field visit.	Recommended Action
	Pollutant Averaging period Carterion Total suspended particulate (TSP) matter Annual 150 µg/m² Particulate matter 10 µm (PM µ) 24 hour 150 µg/m² Table 4 Short-term criterion for periousle matter Pollutant Averaging period Carterion Particulate matter 10 µm (PM µ) 24 hour 150 µg/m² Table 5 Long-term orderio for deposited data Pullutant period deposited dust level dust level dust level 1 2 g/m²/month 1 2 g/m²/month 1 4 g/m²/month	Non-Compliant (Low Risk)	Annual Review 2018 - Depositional dust gauges were below criteria. Short term PM10 non-compliances on 3 April 2018, 18 July 2018 and 4 December 2018. The 2018 annual average of 24hr PM10 results was 16.1 µg/m3. Daily (24-hour) results ranged from a minimum of 6.13 µg/m3 to a maximum of 112.98 µg/m3 during 2018. There were some data capture issues in 2018 relating to the TEOM. These were not reported as non compliances in Section 1 or 7 of the Annual Review. Low Risk Non - Compliance for exceeding criteria. Annual Review 2017 - Excluding DDG05, deposited dust levels for the reporting period were below the EPA long term criteria annual maximum level of 4 g/m2/month at all sites. Additionally, no gauges showed annual increases in deposited dust levels above the EPA maximum of 2 g/m2/month during the reporting period. Note, the depositional dust gauge exceedance was not recorded as an exceedance in Section 1 or 7 of the Annual Review. Non compliance relating to exceedance of DDG5 and also not reporting in Section 1 or 7 of the Annual Review. The EPA long-term annual average criteria (30 µg/m3) for PM10 was not exceeded during the 2017 period. Daily (24-hour) results ranged from a minimum of 5.39 µg/m3 to a maximum of 47.78 µg/m3 during 2017. The 2017 annual average of 24hr PM10 results was 15.1 µg/m3. Within short term criteria. It was noted there was some data capture issues The 2017 annual average of 24hr PM10 results when comparing the 2017 annual results to the previous year, the data capture rate was slightly higher in 2017. This was primarily due to power outages associated with electrical storms in 2016 and a failed air conditioner during the 2016 reporting period. Data capture issues were not reported as non compliances in Section 1 or 7 of the Annual Review. Annual Review 2016 - Deposited dust levels for the reporting period were below the EPA long term criteria annual maximum level of 4 g/m2/month at all sites. Additionally, no gauges showed annual increases in deposited dust levels above the EPA max	Update the Air Quality Management Plan following this audit. Improve data capture for PM10. Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.
	Notes for Tables 3 to 5: *aTotal impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to other sources); *b Incremental impact (i.e. incremental increase in concentrations due to the development on its own); *c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and *d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary.	Note	-	
Operating Conditions			Field Evidence	
12 Air Quality Managemen	The Applicant shall: (a) implement best practice air quality management at the site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the development; (b) implement best practice management to minimise the risk of spontaneous combustion and related emissions; (c) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site; (d) operate an air quality management system on site to ensure compliance with the relevant conditions of this consent; (e) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d to Tables 3-5 above); (f) regularly assess the air quality monitoring data, and modify operations on site to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary.	Administrative Non- Compliance	The field assessment did not identify a high number of dust sources. There are disturbed surfaces, but these are small compared to most mines. Water truck sighted. Outside sources contribute to dust. Correspondence Incidents reports are prepared and provided to DPE and EPA. Sighted by the audit team. a) Evidence of dust monitoring and watercart use; b) Based on discussions with Environment and Community Co-ordinator there have been no issues on the surface regarding spontaneous combustion; c) Monitoring of fuel and energy usage; d) Air quality management system - for monitoring continues to be undertaken; e) Based on discussions with Environment and Community Co-ordinator water carts are used on exposed surfaces. Product is generally a wet product, therefore no water sprays required; f) The real time air quality monitor is not being used as a management tool. During the audit period there was no system to notify persons of when the TEOM identified short term impact assessment non - compliances. Non - compliances are only identified during the monthly download. Admin non - compliance relating to not determining TEOM exceedances as soon as they occur.	Update the Air Quality Management Plan following this audit. Improve data capture for PM10. Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
- Condition Number	Condition	Compliance Status		Recommended Action
13	The Applicant shall prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval within 6 months of the date of this consent; (b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this consent; (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; (d) describe the proposed on-site air quality management system; and (e) include an air quality monitoring program that: - is capable of evaluating the operating conditions of this consent; - evaluates and reports on: - the effectiveness of the air quality management system; and - compliance against the air quality operating conditions; - defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	Administrative Non- Compliance	Preparation: Evidence of Air Quality Management Plan dated 15 January 2016. The Air Quality Management Plan on the website 18 July 2014, with this approved on 24 July 2014. No evidence of approval provided by Delta Coal for 2016 Management Plan, therefore 2014 plan reviewed for adequacy. a) Section 1.4; b) Section 3; c) Section 4; d) and e) - Section 5 Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Implementation: Evidence of monitoring; Minimal issues observed with dust management; and The real time air quality monitor is not being used as a management tool. Section 5.3 of 2014 Air Quality Management Plan states: Every 30 minutes the real time data from the monitor is sent via wireless (Next-G) connection to a web based data management system (Vista Data Vision) which is also used for the Company's real time noise monitoring system. A web based interface then allows the data to be viewed or downloaded, reports to be created and automated alarm generation when the predefined triggers are reached. Admin Non - Compliance as no alarm was set up. The only way exceedances could be determine during the audit period was by manual download or viewing of results. This generally occurred every month.	Update the Air Quality Management Plan following this audit. Improve data capture for PM10. Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual Review. Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE.
			download of viewing of results. This generally occurred every month.	
METEOROLOGICAL MO	ONITORING		There is no current meteorological station at Chain Valley. The nearest station is at Mannering. This station at Mannering meets the	
14	During the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.	Compliant	requirements of a) and b). The 2013 Audit confirmed that the DPE and EPA (under revision of EPL 1770) approved use of Mannering Colliery monitor as representative of Chain Valley and ability to calculate temperature lapse rate by use of sigma-theta method. The system is real time, with this observed by SLR during the site visit.	
Soil and Water				
Note:	Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain the necessary water licences for the development.	Compliant	Evidence in Annual Review for Water Licence - 20BL173107 and usage.	
Water Supply				
15	The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of mining operations to match its available water supply, to the satisfaction of the Secretary.	Compliant	Evidence in Annual Review for Water Licence - 20BL173107 and usage. There is excess water at Chain Valley hence discharge occurs for most days of the year.	
Water Pollution				
16	Unless an EPL authorises otherwise, the Applicant shall comply with Section 120 of the POEO Act.	Compliant	Based on the information provided there is no evidence that the site did not comply with the POEO Act.	
Sewage Management	1 12	•		
17	The Applicant shall manage on-site sewage in accordance with NSW Environmental Guidelines: Use of Effluent by Irrigation (DEC 2004) and the National Guidelines for Sewerage Systems - Effluent Management (ANZECC 1997) or its latest version, to the satisfaction of EPA.	Administrative Non- Compliance	Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite. There is limited detail in the Water Management Plan regarding the sewage water management system. Garden Wastemaster Australia complete servicing. Evidence of one email from 6 March 2019 organising servicing. However no evidence of servicing provided. Admin Non - Compliant. Evidence of testing of wastewater through lab results.	Include additional detail in the Water Management Plan regarding sewage management. Include an update of sewage system during the audit period in the Annual Review. Ensure servicing is completed and records kept onsite.
Water Management Pla	1			
18	The Applicant shall prepare a Water Management Plan for the surface facilities sites to the satisfaction of the Secretary. This plan must be prepared in consultation with DPI Water and EPA, by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary, and submitted to the Secretary for approval within 6 months of the date of this consent. This plan must include: (a) a comprehensive water balance for the development that includes details of: * sources and security of water supply; * water make in the underground workings; * water make in the underground operations to the surface; * water use; and * any water discharges; (b) management plans for the surface facilities sites, that include: * a detailed description of water management systems for each site, including: * clean water diversion systems; * erosion and sediment controls; and * any water storages; * measures to minimise potable water use and to reuse and recycle water; * measures to manage acid sulphate soils, if encountered; * activities that would involve ground disturbance at the site; and		The current Water Management Plan is dated July 2015. This plan was approved by the DPE on 21 July 2015. This plan is out of date due to the age of the plan and also does not cover MOD 2. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. The Plan outlines several activities which are planned to be undertaken in 2015. Evidence of consultation in 2015 update with this outlined in Section 1.2. Preparation:	
	monitoring and reporting procedures.	Administrative Non-	 a) Section 3 of the report. Most of the information of the Water Balance is from 2013 and should be reviewed; b) Section 4. Includes details of mitigation measures. Figure 4 is a detailed figure, but may require some updating based on minor 	Update the water balance or justify why the current water balance is still applicable to the current operations.

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Condition Number	Condition (c) a Surface Water Management Plan which: includes baseline data on surface water flows and quality of Swindles Creek; details surface water impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on surface water resources or surface water quality; provides a program to monitor: surface water discharges; surface water flows and quality; and channel stability; (d) a Ground Water Monitoring Program which includes a program to: monitor and report groundwater inflows to underground workings; predict, manage and monitor impacts to nearby groundwater bores on privately-owned land that may be impacted by the development; and (e) a detailed review of surface water management at the site, with particular reference to the water storages within the dirty water management pollution Control Dam) are sufficient to ensure that water discharged from the site meets the EPL limits and surface water impact assessment criteria within the Surface Water Management Plan; and propose any appropriate changes to the surface water management system. The Applicant shall implement the approved management plan as approved from time to time by the Secretary. Note: The Secretary may require the Applicant to implement upgrades and other changes identified under paragraph (e), in accordance with condition 4 of schedule	Compliance Status Compliance	changes at the pit top. Monitoring information outlined in Section 5; c) Covered in Section 4; d) Covered in Appendix B; and e) Covered in several sections. Implementation: - The plan is a little out of date - from 2015, with some information dating back to 2013; - Evidence of surface water and groundwater monitoring in Annual Review; - Water management sighted in the field. Separation of water streams. Dams are stable; and - Some desilting of a drainage line is required.	Recommended Action Ensure dams and drainage lines are free on silt. Establish a maintenance schedule.
BIODIVERSITY	2			
Biodiversity Enhancem	ent Strategy			
19	The Applicant shall implement a Biodiversity Enhancement Strategy as described in the EIS and summarised in Table 6, in consultation with OEH, and to the satisfaction of the Secretary.			
	Table 6: Summary of the Biodiversity Enhancement Strategy	Compliant	Outlined in Biodiversity Management Plan (March 2016) - Section 6. Enhancement mostly includes weed management with some previous rubbish removal. Monitoring is completed with a summary outlined in the 2016-2018 Annual Reviews. Excel and email summaries of monitoring was provided to the auditors. Final weighted scores were recorded of: *80.3% - 2016; *80.3% - 2017; and *65% - 2018. No monitoring in 2019 yet. These are above the trigger levels, therefore no further action required. Excerpt from 2018 Annual Review: Annual biodiversity monitoring in accordance with the plan was continued during the reporting period, being undertaken in May 2018. The monitoring specifically looks at; - the Swamp Oak Floodplain Forest below the sediment dams; - weeds (both at the pit top area and ventilation shaft site); and - feral animal activity. The monitoring results were assessed against the criteria and triggers within the Biodiversity Management Plan with no trigger levels being reached. Specifically, monitoring of the two established plots within the Swamp Oak floodplain forest, recorded a total weighted score of 65% which is significantly higher than the established trigger value of 60% (refer to the Biodiversity Management Plan for details on site attributes and methodology for determining the weighted score). There was no feral animal activity recorded during the 2018 monitoring	Include the biodiversity monitoring reports as appendices to the Annual Review. The current monitoring is provided in a spreadsheet with an email summary. Prepare a small Biodiversity Monitoring Report outlining results, a comparison against trigger levels and potential reasons for changes.
Biodiversity Manageme	nt Plan			
20	The Applicant shall prepare a Biodiversity Management Plan for the surface facilities sites, for all areas that are not, or will not, be subject to condition 7 of schedule 4, to the satisfaction of the Secretary. This plan must: (a) be prepared by a suitably qualified person approved by the Secretary; in consultation with OEH, and submitted to the Secretary within 6 months of the date of this consent; (b) establish baseline data for the existing habitat in the Biodiversity Enhancement Area and elsewhere on the site; (c) describe the short, medium, and long term measures that would be implemented to: *manage the impacts of clearing vegetation; *manage the remnant vegetation and habitat in the Biodiversity Enhancement Area and elsewhere on the site; and *implement the Biodiversity Enhancement Strategy, including detailed performance and completion criteria; (d) include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria; (e) identify the potential risks to the successful implementation of the Biodiversity Enhancement Strategy, and the contingency measures that would be implemented to mitigate these risks; and (f) include details of who would be responsible for monitoring, reviewing, and implementing the plan. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	Administrative Non- Compliance	The Biodiversity Management Plan is dated 16 March 2016. This was approved by the DPE on 20 April 2016. Covers pit top and fan sites. Seagrass management covered under a separate plan. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Original document prepared by EMM. Updated document prepared by LakeCoal. The original document met this timeframe; b) Baseline data in Section 3.2; c) Mostly covered in Section 4.2; d) Section 14; e) See Table 11; e) See Table 11; f) Section 13. Implementation: Section 14 refers to the resubmission of this management plan within three months of submitting the Independent Environmental Audit. The previous audit is dated July 2016. Evidence of biodiversity monitoring reports.	Include the biodiversity monitoring reports as appendices to the Annual Review. The current monitoring is provided in a spreadsheet with an email summary. Prepare a small report outlining results, a comparison against trigger levels and potential reasons for changes. Prepare a separate section with short, medium and longterm measures in the Biodiversity Management Plan.
20A	Within 3 months of the approval of MOD 2, the Applicant shall revise the Biodiversity Management Plan to incorporate the measures required to implement its commitments described in new dot point 2 of the Terrestrial Ecology section of its Statement of Commitments, and submit it to the Secretary for approval.	Compliant	Mod 2 was approved 16 December 2015. Water MP is dated 15 March 2016 and revised following DPE feedback.	
Heritage Heritage Management	The state of the s			
21 Visual Visual Amenity and Lig	The Applicant shall prepare a Heritage Management Plan for the development to the satisfaction of the Secretary. This Plan must: (a) be prepared in consultation with any relevant Aboriginal stakeholders; (b) be submitted to the Secretary for approval within 6 months of the date of this consent; (c) include consideration of the Aboriginal and non-Aboriginal cultural context and significance of the site; (d) detail the responsibilities of all stakeholders; and (e) include programs/procedures and management measures for: • the ongoing monitoring of site 45-7-0189 at Summerland Point; • managing the discovery of any human remains or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notification protocols; • ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal heritage within the site; (including procedures for keeping records of this); • appropriate identification, management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site; and • ensuring relevant workers on site receive suitable heritage inductions prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions. The Applicant shall implement the approved management plan as approved from time to time by the Secretary.	Administrative Non- Compliance	Preparation: Plan dated 23/6/2014. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. a) Section 4.4 and 4.5; b) Condition outside of audit period; c) Section 4; d) Section 11; e) In various sections. Implementation: Evidence of some monitoring of shell midden site #45-7-0189 in Annual Reviews. Monitoring every 2 years until Year 5 (Year 1, 3 and 5). 2017 was the fifth year, hence no further monitoring required. Section 12 of the Heritage Management Plan refers to the resubmission of this management plan within three months of submitting the Independent Environmental Audit. This was not completed.	Update the Heritage Management Plan, including the removal of Site #45-7-0154.

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
- Condition Williber		Compliance Status		
22	The Applicant shall: (a) minimise visual impacts, and particularly the off-site lighting impacts, of the Surface facilities sites; (b) take all reasonable and feasible measures to further mitigate off-site lighting impacts from the development; and (c) ensure that all external lighting associated on site complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting, to the satisfaction of the Secretary.	Administrative Non- Compliance	The most recent lighting audit for Chain Valley is from 2013. Prepared by Wadco May 2013. a) and b) The pit top area and ventilation shaft site are not dominant features of the landscape the pit top area is somewhat overshadowe by the adjacent power station. The ventilation fans were designed to maintain a relatively low profile, below the surrounding vegetation to ensure amenity and lighting impacts were minimised. Some lights have been removed, including those at the stockpile. There were no complaints to visual or lighting during the audit period. c) Compliance with this requirement could not be determined due to the date of the previous Visual and Lighting audit. Therefore Admin-Non-Compliance.	
Waste			L) Friday of work data annidad in Annual Dudon.	
23 Bushfire Management	The Applicant shall: (a) minimise and monitor the waste generated by the development; (b) ensure that the waste generated by the development is appropriately stored, handled and disposed of; and (c) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Compliant	a) Evidence of waste totals provided in Annual Review. b) The field inspection generally noted that waste was stored well. However the following minor improvements were identified: * Some bins are not well labelled; * Cardboard contained in some general waste bins; * 1 hydraulic oil drum not contained in bund; * Numerous empty oil drums stored on there side within the bund. This may lead to some leakage of oil from drums; * 2 larger 44 gallon drums stored outside bund in a laydown area. Unknown substances. Numerous bins and spill containers were noted. c) Effective reporting in the Annual Review	Ensure the minor waste management issues identified during the audit are rectified. Including: * Improve bin labelling; * Ensure all hydrocarbon containers (empty or full) are stored within bunds.
Busilille Mallagement			The following measures are in place at Chain Valley.	
24	The Applicant shall: (a) ensure that the development is suitably equipped to respond to any fires on site; and (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the Surface facilities sites.	Compliant	* A high capability for firefighting purposes through the 100mm diameter mine water reticulation line and the mine Emergency Management System; * Firebreaks and fire trails in the vicinity of the pit top area and ventilation shaft site; * Fire hydrants and depots placed in strategic positions around the pit top area; and * Regular training of mine firefighting crews and liaison with local rural firefighting brigades	
			Evidence of firefighting equipment noted in site inspection.	!
Rehabilitation			Asset Protection Zone figures outlined in the Annual Review.	
Rehabilitation Objective	s The Applicant shall rehabilitate the site to the satisfaction of the DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy			
	Table 7: Rehabilitation Objectives Objective	Not Triggered	Based on discussions with site and a review of Annual Reviews and MOP's there has been no rehabilitation.	
	Notes: These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by underground mining taking place after the granting of project approval MP 10_0161, and to all development surface infrastructure that is part of the development, whether constructed prior to or following the date of this consent. Rehabilitation of subsidence impacts and environmental consequences caused by mining which took place prior to the date of project approval (MP 10_0161) may be subject to the requirements of other approvals (eg under a mining lease or a Subsidence Management Plan approval).	Note		
Progressive Rehabilitat	The Applicant shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance to the satisfaction of the	Not Triggered	Based on discussions with site and a review of Annual Reviews and MOP's there has been no rehabilitation.	
Rehabilitation	Secretary and DRE.	Not mygered	A TOURS OF A TOURS OF A TOUR OF A THE TOUR O	
Management Plan				
	The Applicant shall prepare a Rehabilitation Management Plan for the development, in consultation with OEH, DPI Water, WSC, LMCC, and the CCC, and to the satisfaction of the DRE. This plan must: (a) be submitted to the Secretary and the DRE for approval within 12 months of the date of approval of this development consent; (b) be prepared in accordance with any relevant DRE guideline and be consistent with the rehabilitation objectives in the EIS and in Table 7; (c) describe how the performance of the rehabilitation would be monitored and assessed against the objectives in Table 7; (d) describe the process whereby additional measures would be identified and implemented to ensure the rehabilitation objectives are achieved; (e) provide for detailed mine closure planning, including measures to minimise socio-economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; and (f) be integrated with the other management plans required under this consent. The Applicant shall implement the approved management plan as approved from time to time by the Secretary. Note: The Rehabilitation Management Plan should address all land impacted by the development whether prior to, or following, the date of this consent.	Administrative Non- Compliance	Evidence of Rehabilitation Management Plan. Update dated 1 March 2019. This plan appears unapproved and no evidence of this plan being sent to the DPE. Current approved Rehabilitation Management Plan is from December 2014 . Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed. Admin Non - Compliance. Preparation: a) Outside of audit period; b) Covers this requirement. Note, a separate MOP has also been prepared for the site; c) Section 8; d) Generally covered in Section 7; e) Section 6; f) Linked to MOP. Implementation: There is no rehabilitation onsite. Minimal surface footprint. Extraction Plans cover subsidence management. The Rehabilitation Management Plan is not on the CVC website, which makes this Admin Non - Compliant.	Ensure a copy of the approved Rehabilitation Management Plan is put on the website.
Subsidence				
1 Performance Measures		Administrative Non- Compliance	This condition is outlined in the Annual Review (see Section 3.16.4 in 2018 Annual Review), however no update has been provided on whether the condition has been met. Based on this the auditor can not determine compliance.	See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
2	The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 8 to the satisfaction of the Secretary.		I .	

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On well the Manushau	Qualities.	O	Polyton	December and add Astless
Condition Number	Condition	Compliance Status	Evidence	Recommended Action
	Table 8: Subsidence Impact Performance Measures – Natural and Heritage Features			
	Blodwersity Threatened species or endangered			
	populations Negligible environmental consequences			
	Negligible environmental consequences including:			
	 negligible change in the size and distribution of searcass beds: 		The subsidence performance is outlined in the Annual Reviews. There is no specific table or section addressing if the site has met these	
	Seagrass beds - negligible change in the functioning of seagrass beds;		performance measures.	
	and - negligible change to the composition or distribution of			
	seggras species within seagrass beds. Minor environmental consequences, including minor		Reports from 2016 to 2018 titled Seagrass Survey of Chain Valley Bay, Summerland Point, Bardens Bay and Crangan Bay,	
	changes to species composition and/or distribution.		Lake Macquarie, NSW. These reports do not assess against these performance measures as the word 'negligible' is not in the report.	
	Mine workings First workings under an approved	Administrative Non-	There is no definition of negligible.	
	Extraction Plan beneath any feature where	Compliance		See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
	performance measures in this table require International Conference and In	Compliance	Biodiversity Monitoring Reports do not cover these performance measures.	oee decilor 3.2 of the Main Addit Report for Subsidence Recommendations.
	Second workings To be carried out only in accordance with an approved Extraction Plan.			
	W. Indiana and the state of the		Benthic monitoring reports do not specifically address these performance measures.	
	Notes:		L	
	• The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the		Despite this there is no evidence that these performance measures have been exceeded, however the auditor is not able to determine	
	various management plans that are required under this consent (see Condition 7 below).		compliance based on the information provided.	
	 Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that 			
	are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant			
	management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter. • The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of			
	The requirements of this consent. approval of this consent. approval of this consent. approval of this consent.			
	application of this solution.			
Offsets				
	If the Applicant exceeds the performance measures in Table 8 and the Secretary determines that:			
	(a) it is not reasonable or feasible to remediate the impact or environmental consequence; or		There is no excising accompany against a which are existing in the Annual Pavian, therefore us accompany to the contract of th	
	(b) the remediation measures implemented by the Applicant have failed to satisfactorily remediate the impact or environmental consequence;	Administrative Non-	There is no specific assessment against subsidence criteria in the Annual Review, therefore we cannot determine compliance.	
3	then the Applicant shall provide a suitable offset to compensate for the impact or environmental consequence to the satisfaction of the Secretary.	Compliance	The 2017 Annual Review stated there was an exceedance of predicted subsidence values over the MW7-12 mining area, but not an	See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
		Compliance	exceedance of the performance measures in this table	ose decilor 3.2 of the Main Addit Report for Subsiderice Recommendations.
	Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.		exceedance of the performance measures in this table	
Performance Measures				
4	The Applicant shall ensure that the development does not cause any exceedances of the performance measures in Table 9, to the satisfaction of the Secretary.		Based on discussions with Environment and Community Co-ordinator feno peg monitoring has been completed at Trinity Point. Results	
	Table 9: Subsidence Impact Performance Measures – Built Features		outlined in Annual Review.	
	Bull Features Performance Measure Trink) Point Marina Development • Always safe. • Always safe.		outlined in Aritual Review.	
	Other built features Serviceability should be maintained		Subsidence monitoring results for Trinity Point peninsula, Brightwaters peninsular and subsidence monitoring lines numbers 23, 33, 32	
	wherever practicable. Loss of serviceability must be fully	Compliant	and 24 are included in Appendix 7 of the Annual Review. These are purely just numbers with no discussion on compliance against the	
	compensated. • Damage must be fully repaired,	Compilant	and 24 are introduced in Appendix 7 of the African review. These are purely just numbers with no discussion of compliance against the subsidence impact performance measures in this table.	See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
	replaced or fully compensated.		Casalana in pass personal action of the casalana in the casala	
	Public Safety Public Safety. Negligible additional risk.		No evidence of subsidence impacts to built features. Based on discussions with the site, the Audit team understands there has been no	
			damage to the marina. No evidence of damage in Annual Reviews.	
	Notes:			
	• The Applicant will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or a			
	Public Safety Management Plan (see Condition 7 below).			
	Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that			
	are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant	Nata	See Schedule 4 Condition 7	
	management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.	Note	See Schedule 4 Condition 7.	
	The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this development consent. Requirements regarding safety or serviceability do not preclude preventative actions or mitigation being taken prior to or during mining in order to achieve or			
	Negurinal regarding safety or serviceability do not preclude preventative actions or initigation being taken prior to or during minning in order to achieve or maintain these outcomes.			
	Intaminant tress outcomes. Requirements under this condition may be met by measures undertaken in accordance with the Mine Subsidence Compensation Act 1961.			
	,,			
	Any dispute between the Applicant and the owner of any built feature over the interpretation, application or implementation of the subsidence performance measures			
5	in Table 9 is to be settled by the Secretary, following consultation with the MSB and the DRE. Any decision by the Secretary shall be final and not subject to further	Not Triggered	Based on discussions provided and site records this has not been triggered.	
Mariel On an artist	dispute resolution under this consent.		<u> </u>	
Multi-Seam Mining Fea	sibility Investigation			
1	1			
	1			
			The 2010 American Review and idea on an older on this condition	
	1		The 2018 Annual Review provides an update on this condition.	
1	Prior to the submission of an Extraction Plan for Miniwalls 41 to 45 in Chain Valley Bay, the Applicant must prepare a detailed Multi-Seam Mining Feasibility		In accordance with the requirements of SSD 5465 LakeCoal submitted the multi-seam mining feasibility investigation required for the	
	Investigation to the satisfaction of the Secretary. This plan must:			
	(a) be prepared in consultation with DRE by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary,		mining of the miniwalls in the Chain Valley Bay Area (shown as MW41-45 in SSD 5465) during the reporting period. While the consent conceptually approved 5 miniwalls in this area (subject to the feasibility investigation) LakeCoal lodged an extraction plan for only 3	
	(b) assess the extent of the soft claystone floor/roof conditions within former workings in the Great Northern and Wallarah Seams;		miniwalls during the reporting period. Extensive consultation with the Department of Resources and Energy as well as the Department of	
6	(c) assess the stability of remnant coal pillars within former workings in the Great Northern and Wallarah Seams;	Compliant	Planning and Environment was undertaken during the reporting period as part of the Extraction Plan development for the Chain Valley Bay	
	(d) give particular consideration to the risks of irregular subsidence, pillar run and long-term subsidence leading to subsidence outside of the predicted angle of draw;		Miniwalls. As at 31 December 2017 LakeCoal had not received approval for miniwall panels CVB2 and CVB3 which were subject to further	
	(e) include revised multi-seam subsidence predictions for the proposed second workings; and		investigations /assessment.	
	(f) recommend final design of the second workings and any necessary adaptive management measures.			
			Evidence provided of:	
			- DgS Subsidence Report - Multi-Seam Mining Feasibility Study for the Proposed Miniwalls CVB1 - 4 at Chain Valley - May 2017.	
			Generally meets the requirements of Condition a-f.	
1			- Evidence of letter from DPE- RR outlining proposed changes to report.	

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Condition Number Condition	Compliance Status	Evidence	ecommended Action
Condition Name:	Compliance Status	A summary of Extraction Plans are outlined below:	
The Applicant shall prepare an Extraction Plan for all second workings on site, to the satisfaction of the Secretary. Each Extraction Plan must: (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary; (b) be approved by the Secretary before the Applicant carries out any second workings covered by the plan; (c) include detailed plans of existing and proposed first and second workings and any associated surface development, including any applicable adaptive management measures; (d) include detailed performance indicators for each of the performance measures in Tables 8 and 9; (e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this consent; (f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 8 and 9, and manage or remediate any impacts and/or environmental consequences; (g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which • addresses in appropriate detail all items of public infrastructure and other public infrastructure and all classes of other built features; • has been prepared following appropriate consultation with the owner's of potentially affected feature/s; • recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and;	Compliant	There are other Extraction Plans that have not yet been approved or Chain Valley have not implemented. With the mining of MW5A, this is a modification to Extraction Plan 1 and does not contain a full set of documentation. Preparation: a) Covered in EP 1, 3 and 4. These plans have been endorsed by Secretary with dates outlined in Section 2.1 of each report. b) Approval letters for EP1 - 4 were provided to the Audit team.; c) EP1 - 4 include detailed plans (including graphical plans) meeting this condition; d) EP 2 (Mod) not included. EP 2 - Section 4. EP 3 and 4 - Section 3.3. Also some performance measures included in Appendices; e) Detailed predictions by specialists summarised in EP reports. No predictions provided for EP 2 (Mod). Separate appendix for subsidence report; f) Subsidence Management sections are outlined in the EP 1,3 and 4. Subsidence Management plan. Wording in EP 1 (Section 6) and EP 3 and 4 (Section 4).	
7		Implementation: A summary of subsidence monitoring is provided in the Annual Review. Although there is some analysis of subsidence impacts, there is no specific assessment of how the site has tracked against the key subsidence impact performance measures in Schedule 4 Condition 2 and 4 of this Development Consent. The 2017 Annual Review states exceedance of vertical subsidence over MW7-12.	ee Section 5.2 of the Main Audit Report for Subsidence Recommendations.
(h) include a Benthic Communities Management Plan, which has been prepared in consultation with OEH, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on benthic communities, and which includes: * surveys of the lake bed to enable contours to be produced and changes in depth following subsidence to be accurately measured; * benthic species surveys within the area subject to second workings, as well as control sites outside the area subject to second workings (at similar depths) to establish baseline data on species number and composition within the communities; * a program of ongoing seasonal monitoring of benthic species in the control and impact sites; * development of a model to predict likely impact of increased depth and associated subsidence impacts and effects, including but not limited to light reduction and sediment disturbance, on benthic species number and benthic communities composition, incorporating the monitoring and survey data collected; and * updating the model every 2 years using the most recent monitoring and survey data;	Administrative Non- Compliance	Preparation: Evidence of Benthic Communities Management Plans in EP 1, 3 and 4. Overall Extraction Plan and management plans have been approved by the DPE. No Benthic Communities Management Plan for EP 2 (Modification to EP 1). Plan updated for each EP. The Plans cover the requirements of the sub conditions. Evidence of consultation included in management plans. Implementation: Evidence of bi-annual benthic communities monitoring during the Audit period. Reports are prepared every six months except no evidence of September 2018 report provided to SLR. Reports prepared by John and Emma Laxton. Results are also summarised in the Annual Review. There is no definition of what a 'minor' impact is in the Benthic Communities Management Plan or the bi-annual monitoring reports, with this being a subsidence performance criteria in Schedule 4 Condition 2. - Minor environmental consequences including minor changes to species composition of distribution. There is no definitive guide as to what constitutes reporting of an incident or non - compliance ie. "What is greater than minor?" See Section 6 of May 2018 Benthic Communities Management Plan. As there is little interpretation of results against subsidence performance measures this is a Admin Non - Compliance. The Extraction Plan - EP3 (Appendix 1) outlines a Trigger Action Response Plan (TARP). It has triggers relating to statistical change in benthic communities. eg. Trigger Level 1 = ANOVA/ANOSIM level is approaching 5%. There is no discussion in the bi-annual reports about how the site is tracking against those triggers.	ee Section 5.2 of the Main Audit Report for Subsidence Recommendations.
(i) include a Seagrass Management Plan, which has been prepared in consultation with OEH, LMCC, and DPI Fisheries, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on seagrass beds, and which includes: • a program of ongoing monitoring of seagrasses in both control an impact sites; and • a program to predict and manage subsidence impacts and environmental consequences to seagrass beds to ensure the performance measures in Table 8 are met;	Compliant	Preparation: Evidence of Seagrass Management Plans developed for EP1, 3 and 4. Evidence of trigger levels in Section 4.1 of the February 2018 document. Summary of Seagrass monitoring results from 2018 Annual Review. Seagrass cover has been high consistently at each transect since 2012, with seagrass health and condition being good. During the 2018 monitoring most sites reported similar results to the previous year and in most cases, when compared to the 2008 baseline data have shown a significant increase in seagrass cover. A significant portion of the sites sampled have achieved a 100% seagrass cover value. Implementation: There is minimal wording in the Annual Seagrass Monitoring Report or the Annual Review regarding how the site has tracked against the Subsidence Performance Criteria eg. Negligible impacts (see Schedule 4 Condition 2). Based on monitoring results there appears to be negligible change. The Seagrass Management Plan defines negligible impacts, however this definition is not based on quantitative data. There is little mention of how the site has tracked against the trigger levels in Section 4.1 of the February 2018 Seagrass Management Plan within the Annual Review. There is some mention of this in the 2018 Seagrass Monitoring Report, including Table 7.2 of the 2018 report which highlights changes where there has been a 20% change.	ee Section 5.2 of the Main Audit Report for Subsidence Recommendations.
(i) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety; (iii) include a Subsidence Monitoring Program which has been prepared in consultation with DRE, to: * provide data to assist with the management of the risks associated with subsidence; * validates the subsidence predictions; * analyses the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; and * informs the contingency plan and adaptive management process; (i) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 8 and 9, or where any such exceedance appears likely; (m) include appropriate revisions to the Rehabilitation Management Plan required under Condition 28 of Schedule 3; and (n) include a program to collect sufficient baseline data for future Extraction Plans.		j) Public Safety Management Plans prepared flor EP 3 and 4. Not required for EP1 and 2, with these EP's being approved by the DPE; k) Subsidence Monitoring Program developed for EP 1, 3 and 4. Meets requirements of consent; l) Subsidence Management TARP's have been completed for EP 3 and 4. These have sufficient detail. No TARP for EP1, however this	

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
		Compliant	document was prepared in 2013 (outside current audit period);	
			m) Rehabilitation Management Plan attached to EP's; and n) Monitoring outlined in the Subsidence Monitoring Program.	
	The Applicant shall implement the approved management plan as approved from time to time by the Secretary.		., monitoring obtained in the observation monitoring in organia.	
	Notes:			
	 To identify the underground mining areas approved under this consent referred to in this condition, see Appendix 3. This condition does not limit secondary extraction under a Subsidence Management Plan approved as at the date of this consent. 			
	, , , , , , , , , , , , , , , , , , , ,			
	The Applicant shall ensure that the management plans required under conditions 7(g)-(j) above include:			
	(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this	OEt	This information is another to an analysis to the second of the	
8	consent; and (b) a detailed description of the measures that would be implemented to remediate predicted impacts.	Compliant	This information is available in management plans.	
First Workings				
I list Workings				
		0 " 1	Revised first workings approval for the North Mining Area. 20 July 2018. Miniwalls N1/S1.	
9	The Applicant shall not carry out first workings on site that are not generally in accordance with the approved mine plan without written approval of the Secretary.	Compliant		
			This is a historical condition. Wording from prior Audit report. Not applicable to this audit period.	
	Within 3 months of the approval of MOD 1, the Applicant shall produce and subsequently implement a Built Features Management Plan that considers surface			
9A	infrastructure potentially affected by the first workings of the Underground Linkage between Chain Valley Colliery and Mannering Colliery, including WCS's MP01 sewer rising main, TransGrid's electricity transmission assets and infrastructure associated with the Vales Point Power Station, to the satisfaction of the Secretary.	Not Triggered	See CVC Link Road Built Features Management System Plan MSP-19193 dated 18/05/15. LakeCoal sought an extension from DP&E to	
			the date required to submit the Built Features Management System Plan via letter on 11/02/15. Viewed the response letter from DP&E dated 13/02/15 confirming that an extension for submission date to 27/05/15 was approved. Viewed letter from DP&E dated 4/06/15	
Payment of Reasonable	Costs		approving the CVC Link Road Built Features Management System Plan as submitted on 18/05/15.	
ayment of Reasonable			Evidence of report provided by Delta Coal titled:	
10	The Applicant shall pay all reasonable costs incurred by the Department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.	Compliant		
SCHEDULE E ADDITION			Subsidence Data Review for the Proposed Miniwalls CVB1 to CVB3 at Chain Valley Colliery (15 November 2017, DgS).	
ADDITIONAL PROCEDU				
NOTIFICATION OF LAN	DOWNERS			
			a) 2018 - Short term PM10 non - compliances on 3 April 2018, 18 July 2018 and 4 December 2018. For 2018 there was evidence provide to SLR through correspondence with EPA that these dust events were regional. There was however no evidence provided of contact with	
			'affected landowners' (Admin Non - Compliance).	
	As soon as practicable after obtaining monitoring results showing:		2017 - Noise non - compliance in 2017 (24 October 2017 at ATN007 (Summerland Point). Evidence of report to the DPE on 8 November	
	(a) an exceedance of any relevant criteria in Schedule 3, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria: and	Administrative Non-	2017. No evidence of notifying 'affected landowner/s'.	Define who are potentially 'affected landowners' in the Air Quality Management Plan?
1	(b) an exceedance of any relevant air quality criteria in Schedule 3, the Applicant shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as		2016 - Exceedance of daily discharge limit at LDP1 on January 2016 as a result of heavy rainfall (SLR believes no affected landowners,	Affected landowners should be contacted when there is a non - compliance relating to dust or noise. This should be completed even if it is a regional dust event as Delta Coal are still
	may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).		therefore no notification required).	recording it as a non - compliance in the Annual Review.
			Exceedance of night time LA1 Minute criteria at two residential receivers during Q2 2016 monitoring.	
			b) No evidence that the 'Mine Dust and You' fact sheet was provided for 2018 dust exceedances for 'affected landowners'. However as	
			these events were proven to be regional, the auditors do not believe this is required for the 2018 exceedances.	
INDEPENDENT REVIEW				
INDEPENDENT REVIEW				
	If an owner of privately-owned land considers the development to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.			
	If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Applicant shall:		Environment and Community Co-ordinator provided the site complaints records.	
2	(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:	Not Triggered	Based on discussions with the Environment and Community Co-ordinator there was a complaint to the EPA in August 2018 regarding	
	 consult with the landowner to determine his/her concerns; conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and 	mggareu	noise, dust and vibration. Other complaints have also been received during the audit period.	
	• if the development is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and		Based on discussions with the Environment and Community Co-ordinator there was no request for an independent review.	
	(b) give the Secretary and landowner a copy of the independent review.			
SCHEDULE 6 - ENVIRO	I Nmental Management, reporting and auditing			
ENVIRONMENTAL MAN	AGEMENT			
Environmental Manage	ment strategy			
	The Applicant shall prepare an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:		EMS Document is dated 12 October 2012. The EMS was approved by DP&E with a letter dated 6/11/12. Evidence of letter to DPE from LakeCoal dated 28 July 2016 stating that a series of management plans would be updated in late 2016/2017. This was not completed.	
	(a) be submitted to the Secretary for approval within 7 months of the date of this consent;		Admin Non - Compliance.	
	(b) provide the strategic framework for environmental management of the development; (c) identify the statutory approvals that apply to the development;		No evidence that the EMS was updated following the last audit or other modifications.	
	(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;			
	(e) describe the procedures that would be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the development;		Preparation: a) - NA as outside audit period;	Prepare a cross referencing table outlining where sub conditions have been covered.
	receive, handle, respond to, and record complaints;		b) Framework provided as part of document;	Ensure plans are reviewed as per Schedule 6 Condition 5.
1	 resolve any disputes that may arise during the course of the development; respond to any non-compliance; 	Compliance	c) Approvals are listed but are out of date; d) Section 9.5;	
	respond to emergencies; and		e) Covered in Several Sections 8-11;	Include Schedule 5 Condition 2 requirement in the EMS to notify landowners of exceedances 'a soon as practical'. Define a time period for as soon as practical.
	(f) include: • copies of any strategies, plans and programs approved under the conditions of this consent; and		f) Plans listed in Section 9.	
	a clear plan depicting all the monitoring required to be carried out under the conditions of this consent.		Implementation: There is avidence of compleints and incident management. No evidence of landowners being contacted for dust or paice exceedences.	
	The Applicant shall implement the approved management strategy as approved from time to time by the Secretary.		There is evidence of complaints and incident management. No evidence of landowners being contacted for dust or noise exceedances. Non complaint for implementation (<u>Admin Non - Compliance</u>).	
			The EMS is supposed to be reviewed every three years. Last review was 2012, therefore Admin Non - Compliance.	
Adoptive Man				
Adaptive Management				

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
2	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.	Non-Compliant (Low Risk)	There have been some exceedances of criteria during the audit period. a) Exceedances noted for air (regional dust), noise and a discharge volume issue during the audit period. Also non compliance relating to subsidence which is outlined in the 2017 Annual Review. Evidence of exceedance/incident reports provided; b) Incident reports submitted to the DPE, however some reports have been well after the incident or non - compliance occurred; c) Remedial measures - additional subsidence modelling completed following MW7-12 subsidence exceedance. Exceedances have generally been investigated with no further recommendations.	
3 Annual Review	(a) detailed baseline data; (b) a description of: the relevant statutory requirements (including any relevant approval, licence or lease conditions); any relevant limits or performance measures/criteria; the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: impacts and environmental performance of the development; effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing and reporting any: incidents; complaints; inon-compliances with statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan. Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	Compliant	DPE provided a letter to LakeCoal on 29 August 2016 outlining that: With the exception of the Air Quality Management Plan (AQMP), we are satisfied that Chain Valley Colliery has a comprehensive suite of approved management plans and strategies in place (subject to the proposed revision program outlined in your letter dated 28 July 2016. That letter committed to all the management plans being updated in late 2016 and early 2017. That has not been completed. Despite this, the plans contain the relevant aspects of this condition. The all management plan condition has been reviewed for the site management plans, with the exception of the EMS and the Extraction Plan (not required). Condition requirements a) - h) have generally been covered by the site management plans therefore this condition is compliant. However there is little information regarding contingency response for some plans. It is noted that plans do not contain a checklist of this condition.	All management plans require updating due to the length of time since the previous reviews. Include in a Delta Coal template. Ensure there is a cross referencing table covering this condition in management plans. Additional detail including Trigger, Action, Response Tables (contingency plan) should be developed in the next round of management plan updates.
	By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to		The 2016, 2017 and 2018 Annual Reviews were reviewed as part of the IEA.	
4	the satisfaction of the Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of previous years; and • relevant predictions in the documents listed in condition 2 of Schedule 2; (c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the current financial year to improve the environmental performance of the development.		In 2016, 2017 and 2016 Althua Reviews were reviewed as part of the IEA. a) Section 1 and 2; b) Section 3. Some sections do not report against all Development Consent criteria eg. subsidence; c) Section 7 - however this is different to the Annual Review guidelines; d) Trends covered for water management and air quality; e) Limited information on this condition in the Annual Reviews; f) Section 8; The Annual Reviews have not been prepared to cover the current Annual Review Guidelines. See link: https://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/~/media/3AA21D35168042FE813DD0FB92E00E58.ashx Therefore Admin Non - Compliance.	The Annual Reviews are set out differently to the DPE Annual Review Guidelines (2015). Ensure table of contents matches the guidelines. Ensure transport records from this Audit period (January 2016) onwards are recorded on the website. This could be appended to the Annual Review summarising the weekly transport. Include the biodiversity monitoring reports as appendices to the Annual Review. See Section 5.2 of the Main Audit Report for Subsidence Recommendations.
Revision of Strategies,	Plans and Programs			
5	Within 3 months of: (a) the submission of an annual review under Condition 4 above; (b) the submission of an incident report under Condition 7 below; (c) the submission of an audit report under Condition 9 below; or (d) any modification to the conditions of this consent, (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.	Administrative Non- Compliance	This timing has not been met. Several of the management plans were not updated since the previous audit.	Include statement in future Annual Reviews stating that Management Plans have been reviewed and state which management plans will or will not be updated within 3 months. Develop and implement a plan to update Chain Valley's Strategies, Plans and Programs.
Community Consultativ	e Committee			
	The Applicant shall continue to operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments (Department of Planning, 2007, or its latest version). Notes: The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. In accordance with the guideline, the Committee should be comprised of an independent chair and appropriate representation from the Applicant, Council, recognised environmental groups and the local community. In operating the CCC, the Department will accept the continued representation from existing CCC members.	Compliant	Evidence if CCC meeting minutes on website across the audit period. CCC appears to operate as per the guidelines. CCC committee members outlined in the Annual Review.	
REPORTING				
Incident Reporting				
7	The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Secretary and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Administrative Non- Compliance	Evidence of incident notification in 'Incident Management' folder provided to SLR. Evidence provided in Annual Reviews. No evidence of any incident causing material harm requiring immediate notification. Evidence of notification to Secretary and EPA for dust incidents in 2018. One incident occurred on 18 July 2018, with the site finding this non compliance on 1 August 2018. The exceedance was then reported on 10 August 2018 (greater than 7 days - <u>Admin Non - Compliance</u>). It appears that short term dust exceedances are only determined during the morty data download, with reporting some times occurring two to three weeks after an incident occurs. The two other dust exceedances in 2018 appear to have been reported as per this condition. 2017 - Noise non - compliance in 2017 (24 October 2017 at ATN007 (Summerland Point). Evidence of report to the DPE on 8 November 2017. Greater than 7 days - <u>Admin Non - Compliance</u> . There was a non - compliance relating to an exceedance of predicted subsidence. The non - compliance was determined based on bathymetric surveys (October 2017) but was not reported (as per Exceedance Report) until 13 December 2017.	Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE. Ensure exceedances and other incidents are reported as per this condition (Detailed Incident Report within 7 days).
Regular Reporting				

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Candition Number	Condition	Camplianas Status	Distance	Decomposed of Action
Condition Number	Condition	Compliance Status	Evidence	Recommended Action
8	The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Administrative Non- Compliance	Evidence of reporting on the Lake Coal and Delta Coal website. Note Schedule 3 Condition 1 outlines requirements to report transport. The Applicant shall: (a) keep accurate records of the amount of coal transported from the site (on a weekly basis); and (b) make these records publicly available on its website at the end of each calendar quarter. Admin Non - Compliance: This has not been completed. No EIS's shown on the LakeCoal or Delta Coal website. Information now available on the Delta Coal website. However no management plans and EIS's are on the website. No Rehabilitation Management Plan was on the website.	Ensure website reporting meets the conditions of the Development Consent.
INDEPENDENT ENVI	RONMENTAL AUDIT			
9	By the end of February 2016 (or other such timing as agreed by the Secretary), and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the development and assess whether it is complying with the requirements in this consent and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under the abovementioned approvals. Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.	Compliant	Evidence of Audit from Hanson Bailey dated July 2016. The audit covered the period from 1 November 2012 - 31 December 2015. a) 2016 report prepared by Suitably qualified experts - Hansen Bailey who were endorsed by the DPE; b) Evidence of consultation with agencies - Section 1.5.3 and Table 4. c) Performance assessed as per this condition; d) Relevant plans assessed; e) Recommendations proposed.	
10	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	Administrative Non- Compliance	No evidence has been provided of the submission of the previous audit report. The submission timing for this audit has been extended by the DPE until 25 June 2019.	
ACCESS TO INFORM	ATION			
11	The Applicant shall: (a) make copies of the following publicly available on its website: • the EIS; • all current statutory approvals for the development; • all approved strategies, plans and programs required under the conditions of this consent; • a comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent; • a complaints register (updated monthly); • minutes of CCC meetings; • the Annual Reviews of the development; • any Independent Environmental Audit, and any other audit, and the Applicant's response to the recommendations in these audits; • any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary.	Administrative Non- Compliance	a) and b) Copies of this information is still available on the Lakecoal website. With the exception of EIS's. Admin Non - Compliant. Information now available on the Delta Coal website. However no management plans and EIS's are on the website. No Rehabilitation Management Plan on the website. No noise monitoring reports on website.	Ensure all relevant information is brought across to the Delta Coal website.
NOISE COMPLIANCE				
Applicable Meteorolo 1 Determination of Met	The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following: (a) during periods of rain or hail; (b) average wind speed at microphone height exceeds 5 m/s; (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or (d) temperature inversion conditions greater than 3°C/100 m.	Compliant	Quarterly noise monitoring reports indicate that noise monitoring is with appropriate weather exclusion methodology.	
Determination of Met	COLONIO COLONI			
2 Compliance Monitori	Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.	Compliant	Evidence of meteorological data. Spreadsheet provided with measurements. 2012 audit confirmed that DPE and EPA (under revision of EPL 1770) approved use of Mannering Colliery monitor as representative of Chain Valley and ability to calculate temperature lapse rate by use of sigma-theta method.	
3	Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.	Compliant	Operator attended noise monitoring conducted on a quarterly basis. Meets this condition.	
4	Attended monitoring is to be used to evaluate compilance with the relevant conditions or this consent. This monitoring must be carried out at least 4 times in each calendar year (ie at least once every 3 months), unless the Secretary directs otherwise.	Compliant	Operator attended noise monitoring conducted on a quarterly basis. Meets this condition. Operator attended noise monitoring conducted on a quarterly basis. Meets this condition.	
5	Unless otherwise agreed with the Secretary, this monitoring is to be carried out at reast 4 unites in each calendar year (let at least office every) annother in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to: (a) monitoring locations for the collection of representative noise data; (b) meteorological conditions during which collection of noise data is not appropriate; (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.	Compliant	Quarterly noise monitoring conducted on a quarterly basis, weets this conducted using calibrated sound level meters and acoustic calibrators in accordance with the relevant standards and monitoring is conducted at representative locations. Modifying factors, are applied when triggered as evidenced in the Q4 2017 exceedance at R22 where a low frequency penalty was applicable to the measured CVC noise contribution.	

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Statement of Commitments - SSD 5465

Audit Period = 1 January 2016 - 5 April 2019

Condition Number	Condition	Compliance Status	Evidence	Recommended Action
APPENDIX 9 - STATEMENT OF	COMMITMENTS	Compliance Status	Evidence	Recommended Action
Groundwater	Commitment In addition to the management and mitigation measures undertaken at the Colliery for groundwater as described in the WMP, the following commitments specific to the Proposal will be undertaken. Some commitments are already undertaken under the WMP. LakeCoal will: - assess whether abnormal or significant groundwater inflow changes occur in the active panels; - maintain the water flow monitoring appliances used to measure pumped water volumes to and from the Colliery in good working order; - maintain and plot records of daily total Colliery water pumping and annually communicate an interpretation of the findings within the Annual Review. A copy of the Annual Review will be supplied to PPI Water; - measure water levels and quality within private bores, where access is possible, in relevant areas to assess if any adverse effects occur due to subsidence from the Proposal; and every groundwater assessment criteria and triggers, response protocols and contingency measures. Although it is not anticipated that private bore yields would be impacted due to subsidence, should such a situated arise, LakeCoal would provide an alternative water supply until the impacted bore recovers. Any monitored or reported adverse impacts on the yield, saturated thickness or quality of a private pistered bore will be investigated by LakeCoal. In the event of a groundwater level drop of over 2 m for a period of two months or more, a notable increase in iron hydroxide, or an adverse change in salinity as a consequence of subsidence, LakeCoal will enter into negotiations with the affected landowners and the Mine Subsidence Board with the intent of formulating an agreement which provides for one, or a combination of: - re-establishment of saturated thickness in the affected bore(s) through bore deepening; - establishment of saturated thickness in the affected by the dependency of the Annual Review. A copy of the Annual Review. A copy of the Annual Review and the provides a yield at least equivalent to the affected bore prior t	Compliant	Evidence of the Water Management Plan. Evidence of groundwater monitoring, including results in Annual Reviews. Annual Review supplied to Doi Water Based on discussions with the Environment and Community Co-ordinator, groundwater monitoring on private bores is completed 'where property access is granted'. There has been an attempt from LakeCoal (letter dated 23 April 2012) to contact the council to obtain further details of the owners of groundwater bores. No further information was provided to SLR in terms of whether the owners were contacted. As an attempt has been made to contact property owners regarding groundwater monitoring this condition has been called compliant.	Attempt to contact property owners and ask for permission to monitor the private groundwater bores. Some additional consultation with Council may be required.
Surface water	Management and monitoring of surface water will continue to be undertaken in accordance with the Colliery's WMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: update the WMP to include any changes as a result of the proposed modification; limit the main underground pumps to a maximum pump out rate of 10.5 ML/day within 12 months of approval; request an amendment of EPL1770 to include a condition on the daily discharge volume limit stating that "Exceedance of the volume limit for Point 1 is permitted only if the discharge from Point 1 occurs solely as a result of rainfall at the premises exceeding 10 mm during the 24 hours immediately prior to commencement of the discharge"; undertake daily measurements of discharge volumes and report publicly on a monthly basis via LakeCoal's website; continue collection of baseline water quality data to aid in the development of appropriate discharge water quality trigger values; engage suitably qualified expert to conduct an assessment of the metals contained within discharge water in accordance with the ANZECC water quality guidelines and provide this assessment to the EPA by 31 December 2013; investigate water saving measures to minimise the amount of potable water required from WSC for Colliery operations; quantify the groundwater storage capacity in the Great Northern and Wallarah Seams; continue effluent monitoring regime of receiving soils from the AWTS in accordance with the parameters and testing frequencies identified in the Colliery's WMP. The results of this monitoring program will be reviewed by a suitably qualified expert and used to determine the appropriateness of the existing irrigation area to receive this effluent; develop a program to monitor creek line channel stability and the health of riparian vegetation within Swindles Creek. Monitoring will be undertaken in accordance with Section 8.5.2 of the Surface Water Impact Assessment (EIS Appendix E) and incorporated into the Colliery's WMP or Bi	Administrative Non- Compliance	Evidence of the Water Management Plan. Evidence of surface water monitoring, including results in Annual Reviews. Admin Non - Compliant: Evidence of photos provided of channel stability monitoring of Swindles Creek, however it does not appear to have been completed in accordance with Section 5.4 of the Water Management Plan. No evidence of: - Documenting general observations of water quantity and quality; - Documenting locations and dimensions of significant erosive or depositional features; - Documenting evidence of erosion and exposed soils; - Documenting general indicators of stream health, including abundance of flora and fauna; and - Review and comparison of results to previous rounds of monitoring. There is also no timing proposed for inspections in the Water Management Plan.	A separate report should be completed for Stream Health Channel Flow and Riparian Vegetation Monitoring. This should compare results from previous inspections. Information to be included in the Annual Review.
Noise	Management and monitoring of noise will continue to be undertaken in accordance with the Colliery's NMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: continue attended compliance monitoring on site which will be used to identify potential hot spots and primary noise sources; continue real-time noise monitoring alerts to site personnel to enable implementation of any required rapid noise management initiatives; manage potential non-compliance through a noise complaint handling and response system, including the identification of responsible sources to enable targeted remedial action; assess if further noise mitigation options for the ventilation fans are reasonable and feasible following the receipt of attenuation proposals; and discuss potential management measures or agreement options with the landowner at 275 Cams Boulevard, following receipt of proposals from acoustics specialists. In addition to the above, LakeCoal is committed to the progressive implementation of feasible measures to target long term noise goals which are designed to reduce noise emissions from the Colliery. Long term options for investigation include: modification to belt/movement alarms; investigation of surface conveyer and coal preparation equipment, to determine if noise reductions are possible; identifying sound attenuation options for the surface bulldozer and front end loader; strategic placement of acoustic barriers; attenuation for the surface screener/shaker; installation of quiet rollers for surface conveyor belts; acoustic treatments around compressors; and the use of a conveyor stacker for product coal stockpiling.	Administrative Non- Compliance	No evidence of review or update of Noise Management Plan during audit period. <u>Admin Non - Compliance.</u> Real time noise monitoring system removed during the audit period and has not been replaced. No evidence of progressive noise mitigation implementation	Continue investigations of any noise issues and, where practicable, implement reasonable and feasible mitigation measures. Ensure accurate/consistent monitoring results are presented in Annual Reviews. The real - time noise monitor should be re-established for the site. Liaise with the DPE regarding the best location as the majority of noise complaints have resulted from Mannering Colliery operations, not Chain Valley. Mannering Colliery is also owned by Delta Coal. Update the Noise Management Plan.
Air Quality and greenhouse gases	Management and monitoring of air quality and greenhouse gases will continue to be undertaken in accordance with the Colliery's AQCHCMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: - investigate the use of a stacker to replace halling between current conveyor system and stockpiles; - undertake GHG monitoring comprising measurement of carbon dioxide and methane at the ventilation shaft and fan sites; and - record and report annual diesel, oil, grease, acetylene and electricity use to fulfil National Greenhouse and Energy Reporting Scheme requirements.	Compliant	The MP covers this requirement. Recording of data in Annual Reviews and site records.	
Traffic and transport	Management and monitoring of traffic and transport will continue to be undertaken in accordance with the Colliery's RTP. In addition, LakeCoal will continue to investigate alternative options for transporting export coal to the PWCS, specifically the preferred rail transport option, requiring the construction of a private haul road to the VPPS coal unloading facility and associated infrastructure upgrades. In addition, LakeCoal will: provide a detailed feasibility report of rail transport options to DP&I as part of the next coal transport options report to be submitted, by 31 December 2014. Should the report identify that coal transport via rail is feasible, and subject to obtaining necessary agreements, LakeCoal will prepare and lodge an application to modify the relevant approval so as to permit the installation and operation of facilities necessary to undertaken rail transport of coal to PWCS; discuss the potential to utilise proposed rail loading facilities associated with the Wallarah 2 Coal Project, following this project receiving approval; and investigate options to reduce peak hour traffic would be investigated including potentially limiting the peak hourly volumes of the Colliery truck traffic which would be permitted to travel via this intersection should the Colliery not be using rail transport for export coal by five years from the granting of development consent. Alternatively, and Sparks Road interchange could be made commensurate with the percentage of Colliery generated traffic using the intersection.		Evidence of document dated 10 December 2014. Outside of audit period, therefore not trigered for this period.	
Subsidence	Management and monitoring of subsidence will continue to be undertaken in accordance with the Colliery's SMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: • provide raw subsidence survey data to OEH within 7 days of completion; • undertake annual bathymetric surveys of the lake bed to determine actual subsidence and undertake a comparison with predicted levels. Should measured subsidence significantly exceed predicted levels, lakeCoal will review future panel designs to limit future impacts to acceptable levels; • install a new foreshore survey line above the first and second workings panels where the underground linkage passes beneath them and possibly extending from the foreshore to the point of connection with the MC workings; • inspect existing conditions in the Fassifern Seam and undertake geotechnical and geological mapping in the roadways proximate to the proposed linkage in both CVC and MC workings; • complete representative borehole core drilling and sampling of the Fassifern Seam floor at the start and finishing ends of the underground linkage and where the headings pass beneath the SPB. Development below the foreshore will be limited to two headings only until floor conditions can be confirmed; • develop infrastructure monitoring and management plans in consultation with infrastructure owners and other relevant stakeholders; • re-establish and re-survey Survey Line 24; • install a suitable survey line at the starting end above Great Northern Seam first workings to provide early warning monitoring data for the tension towers and switchyard structures; • monitor tension and suspension towers and switchyard conductor suspension frames directly above the panels, foreshore and adjacent inlet canal wall; • ensure that a monitoring and management plan for the MPO1 sewer rising main is in place prior to commencement of mining that may impact Council's infrastructure; and • complete an annual subsidence report and make this report publicly ava	Non-Compliant (Low Risk)	Subsidence is managed under Extraction Plans, not SMP's. SMP's cover past mining areas. Separate Extraction Plan requirements including monitoring and reporting. Some of the aspects in this condition have not been triggered, however due to a lack of a defined subsidence report it has been difficult for SLR to determine which conditions are not triggered and which are relevant. Subsidence impacts are reported in the Annual Review, however it would be preferable if a standalone subsidence report was prepared. There is not a separate Annual Subsidence Report, therefore Admin Non - Compliant. No evidence of raw survey result being provided to OEH within 7 days of completion. Admin Non - Compliant. No evidence provided regarding - "complete representative borehole core drilling and sampling of the Fassifern Seam floor at the start and finishing ends of the underground linkage and where the headings pass beneath the SPB"	Assess the subsidence conditions regarding the Statement of Commitments and review which conditions are applicable for current mining and proposed future operations. A separate subsidence impact assessment report should be prepared annually and appended to the Annual Review. This report should be prepared or peer reviewed by a subsidence specialist. This should assess subsidence performance measures from the Project Approval and triggers/commitments from the Extraction Plans.

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Marine ecology	Management and monitoring of marine ecology will continue to be undertaken in accordance with the Colliery's BCMP and SGMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will - revise the BCMP to include the sampling locations in the assessment of the Proposal; - undertake seasonal surveys (spring and autumn) for the Site as required under the BCMP; - commission additional independent sampling and analysis to validate results obtained during monitoring, and review future panel design if impacts due to subsidence are determined to be moderate or greater; - revise the SGMP to include the transect locations utilised in the assessment of the Proposal; - continue annual seagrass surveys/monitoring; - continue annual subsidence surveys (bathymetric surveys) and land based surveys; - include results from the BCMP and SGMP within the Colliery's Annual Review; and - make the Annual Review and annual subsidence surveys available on the Colliery's website.	Compliant	Evidence of benthic organism and seagrass monitoring. Evidence of monitoring reports by independent consultants. Meets the requirements of this statement of commitments. However additional recommendation provided.	See previous recommendations regarding biodiversity and Annual Reporting.
Terrestrial ecology	In addition to the management and mitigation measures undertaken at the Colliery for terrestrial ecology as described in the BMP, the following commitments specific to the Proposal will be undertaken. Some commitments are already undertaken under the BMP. LakeCoal will: investigate one of the following options in consultation with OEH to offset the biodiversity impacts arising from the proposed modification: o provide \$10,000 of funding, which is equivalent to the biodiversity being lost (i.e. 5 credits x \$2,000 per credit) to existing environmental programs at the site which benefits the Swamp Sclerophyll EEC; or o consult with OEH to identify a suitable conservation program and provide \$10,000 of funding; or o purchase and retire 5 credits on the Biobanking register. update the BMP to include the following: o the completion of pre-disturbance surveys in the survey area for Black-eyed Susan, Leafless Tongue Orchid and Variable Midge Orchid during their flowering periods (July to December, November to February and September to October, respectively); o pre-disturbance surveys by an ecologist to determine the important components of vegetation communities and fauna habitats that should be preferentially retained in the APZs; o installation of delineation fencing around threatened flora populations (if found) to ensure their protection during development and maintenance of the APZs; o condition monitoring for threatened flora populations (if found); or retention of hollow-bearing trees in the APZs, where possible, with details to be included in a hollow tree register; o installation of nest boxes (or salvaged hollows) within the APZs under the supervision of a suitably qualified ecologist or wildlife carer to replace hollows where hollow-bearing trees cannot be retained; or measures for APZ maintenance that include weed control; or only injured fauna would be taken to the nearest veterinary hospital for treatment before release; and or relocation of suitable hollow-bearing felled trees adjacent to th	Compliant	Evidence from 2016 Annual Review. LakeCoal provided an offset payment of \$10,000 for the proposed APZ's during the reporting period in accordance with the Statement of Commitment's in SSD 5465. APZ's have been established. Evidence of weed management in biodiversity management report. Limited weeds onsite. Based on discussions with site no clearing of hollow bearing trees during the audit period. Biodiversity monitoring completed however no specific report provided, only data summary spreadsheets.	As per Schedule 3 Condition 20 recommendation. Include the biodiversity monitoring reports as appendices to the Annual Review. The current monitoring is provided in a spreadsheet with an email summary. Prepare a small report outlining results, a comparison against trigger levels and potential reasons for changes. Prepare a separate section with short, medium and longterm measures in the Biodiversity Management Plan.
	undertake the design of the dam embankment and spillway works in consultation with an ecologist to minimise potential impacts on the Swamp Oak Floodplain Forest EEC; ensure pre-clearing surveys are undertaken by an ecologist to minimise the potential impact to fauna and significant vegetation prior to clearing works being undertaken within the embankment and spillway area; clearly delineate the clearing footprint and cordon off surrounding vegetation as a 'no go' zone during works to the dam embankment and spillway; minimise disturbance areas where possible by ensuring all stockpiling of materials, parking of machinery etc, is undertaken in previously cleared areas; ensure that, wherever possible, dead standing timber and fallen timber will be avoided by any clearing works, or if required to be removed, be relocated into suitable habitat areas nearby; ensure all equipment used for the earthworks associated with the dam embankment and spillway will be cleaned of excess soil potentially containing pathogens and weed seeds prior to entering the Site; install sediment fencing surrounding the proposed earthwork areas, in accordance with a site-specific erosion and sediment control plan for the works; ensure that in the event that sedimentation dam water is released from Dam 10 prior to the works being undertaken, it will be undertaken in a controlled manner over a number of days to ensure that the release does not result in significant erosion and sedimentation to the Swamp Oak Floodplain Forest area; toontinue the management and monitoring of flora and fauna in accordance with the BMP for the life of the mine, including: the condition of vegetation adjacent to the ventilation shaft and fans; the condition of vegetation adjacent to the ventilation shaft and fans; the location and distribution of feral animal use. noxious weeds will be removed and continually controlled from the pit top area, allowing for natural regeneration of vegetation; weed invasion will be monitored as part of the Colliery's BMP.	Not Triggered	Dam embankment work completed in 2014 which is outside of this period. Evidence of weed management provided. Weed management sighted during field inspection.	
Heritage	Management and monitoring of heritage will continue to be undertaken in accordance with the Colliery's HMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: review and revise the HMP to remove site #45-7-0154 and incorporate any other changes as a result of the proposed modification; update the HMP following approval of the Proposal to include the extended area to which it relates; ensure that should unanticipated Aboriginal or historic heritage artefacts be found during dam embankment and diversion works, work will cease and the site assessed by an archaeologist; and ensure that in the unlikely event that skeletal remains are found during dam embankment and diversion works, work will cease immediately in the area and the NSW Police Coroner called to determine if the material is of Aboriginal origin. OEH and relevant Aboriginal community stakeholders will be notified if the remains are positively identified as being of Aboriginal origin to determine their appropriate management prior to works recommencing.	Administrative Non- Compliance	The most recent date of the Heritage Management Plan is 23 June 2014. The highlighted condition is from MOD 2 (December 2015). Site 45-7-0154 is still included the document. Other aspects of this statement of commitments have been met.	Update the Heritage Management Plan, including the removal of Site #45-7-0154.
Waste	Management and monitoring of waste will continue to be undertaken in accordance with the Colliery's Waste Management Standard. In addition, LakeCoal will continue to try and improve its waste volumes and waste management practices in line with its objective for 60% of all wastes generated at the Colliery (excluding wastewater) to be recyclable or reusable.	Compliant	Waste management outlined in the Annual Reviews. Some minor waste management recommendations outlined in Schedule 3 Condition 23.	
Hazards	Management and monitoring of hazards will continue in accordance with the Colliery's existing hazard management measures. Periodic review of the effectiveness of existing measures will occur in accordance with the Colliery's safety management system and additional measures implemented as warranted.	Note	This is a safety condition, outside the scope of this audit.	
Visual	Management and monitoring of visual impacts will continue to be undertaken in accordance with the Colliery's existing commitment. In addition, LakeCoal will: ensure additional surface lighting at the Colliery complies with AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	Compliant	The most recent lighting audit for Chain Valley is from 2013. Prepared by Wadco May 2013. The pit top area and ventilation shaft site are not dominant features of the landscape the pit top area is somewhat overshadowed by the adjacent power station. The ventilation fans were designed to maintain a relatively low profile, below the surrounding vegetation to ensure amenity and lighting impacts were minimised. Some lights have been removed, including those at the stockpile. There were no complaints to visual or lighting during the audit period. Minimal aspects have been installed at site since the previous audit, hence condition is compliant.	

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Soil	Soil Management and monitoring of soils will continue to be undertaken in accordance with the Colliery's WMP, which will be reviewed and updated as required to include the commitments made below. LakeCoal will: • prevent disturbance of ASS where practicable during any construction activities; • prepare an ASSMP where there is potential that ASS will be disturbed; • test and handle any ASS disturbed in accordance with the ASSMP and treat or dispose of to an appropriately licensed facility; • limit the area of any disturbance at the surface infrastructure sites and period of exposure; • implement site management procedures such as watering of disturbed areas and unsecured stockpiles; • ensure relevant licences and management plans are in place for the correct storage and handling of hydrocarbons; • maintain suitable bunding around all hazardous liquid storage areas; • maintain oil separation facilities on the wash down sump for the treatment of oily water; and • remove all waste oil from site and dispose via a licensed external waste collection company.		Minimal disturbance at site, therefore no soil testing completed. Evidence of land farming areas for hydrocarbon soil. Evidence of oily water separator and management system. The field inspection generally noted that waste was stored well. However the following minor things were identified: * Some bins are not well labelled and contain a mix of substances; * Cardboard contained in some general waste bins; * 1 hydraulic oil drum not contained in bund; * Numerous empty oil drums stored on the side within bund. This may lead to some leakage of oil from drums; * 2 larger 44 gallon drums stored outside bund in a laydown area. Unknown substances.	Ensure the minor waste management issues identified during the audit are rectified. *Improve bin labelling; *Ensure all hydrocarbon containers (empty or full) are stored within bunds.
Rehabilitation and mine closure	Rehabilitation will be undertaken in accordance with the Colliery's RMP and the MOP in force at the time. Detailed management and monitoring proposals for final rehabilitation will be included within a Mine Closure Plan to be prepared at least two years prior to cessation of mining activities.	Not Triggered	No area available for rehabilitation.	
Economic	LakeCoal will contribute \$0.035/t of coal from the Colliery into a dedicated community fund to improve public infrastructure and for the provision of community projects in the surrounding communities of Chain Valley Bay, Mannering Park, Summerland Point and Gwandalan.	Compliant	The VPA was not executed with the WSC within the required date - 23 December 2014. There were numerous attempts between 2013 to 2016 to execute this agreement (based on evidence from prior audit). The VPA was executed on 1 September 2016. Evidence of payment in the 2016, 2017 and 2018 Annual Reviews. Evidence of receipts from 19 March 2018 and 23 March 2017.	
Social	LakeCoal will continue to implement management measures and monitoring programs to prevent or minimise negative impacts and enhance positive impacts in accordance with its Environment and Community Policy. LakeCoal will: • maintain open and constructive communication with affected individuals and groups; • participate in the CCC; • provide environmental monitoring data and other relevant information in a timely manner via the LakeCoal website; • be responsive to community issues and actual and/or perceived impacts from the Colliery's activities; • work in partnership with stakeholders to address community needs; • ensure effective management of LakeCoal's social impacts; • liaise regularly with relevant government agencies and councils; • provide regular Colliery updates with landowners and local residents through the CCC; • continue payments, throughout the life of the Proposal, to the community fund established; and • consider individual sponsorship opportunities throughout the life of the Proposal.	Compliant	* Evidence of CCC meeting minutes; * Monitoring data on the website; * Evidence of VPA payments; * Evidence of interactions with community through Delta Coal.	
Other	LakeCoal will commit to only carrying out mining operations in the extension areas consistent with the development consent granted pursuant to this Proposal.	Compliant	Discharge locations sighted in the field inspection. Records of discharge volume and water quality outlined in Annual Reviews.	

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Environment Protection Licence

Audit Period = 1 January 2016 – 5 April 2019

Condition Number	Condition	Compliance Status	Evidence	Recommended Action
1 Administrative Condi				
A1 A1.1	What the licence authorises and regulates This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.	Compliant	In general activities completed in accordance with this licence.	
	Scheduled Activity Fee Based Activity Scale Coal works O - 2000000 T annual handing capacity Mining for coal Mining for coal Mining for coal Scale Scale O - 2000000 T annual panding capacity annual production capacity	Compliant	From Annual Reviews: 2018 - 0.4Mt 2017 - 1.2Mt 2016 - 1.2Mt Within levels for 2019.	
A1.2	The licensee must not produce by mining activities more than 1.5 million tonnes of coal within any calendar year. Note: These limits on the scale of the fee based activities are based on Project Approval SSD5465 granted under the S.89E of the Environmental Planning and Assessment Act 1979 which limits extraction to 1.5 million tonnes of run of mine (ROM) coal per calendar year.	Compliant	Within limit during audit period.	
A2	Premises or plant to which this licence applies			
A2.1	The licence applies to the following premises: Premises Details CHAIN VALLEY COLLERY CONSTRUCTION ROAD CHAIN VALLEY BAY NEW 2599 SURFACE PREMISES OF THE COLLERY IDENTIFIED IN PLAN TITLED THE, PREMISES PANA FIGURE 2: SURFACE EXTENTS "IS MARCH 2015 DOCISSAIGN AND UNDERGROUND PREMISES (MINING FOR COLLINICATION OF COLL IN THE FASHERIN COLL SEAM AND GREAT NORTHERN COLL SEAM AS IDENTIFIED IN THE PLAN TITLED TRICINE : GENERAL LAVOUT OF THE CHAIN VALLEY EXTENSION PROJECT: 28114 ACCOMPANYING THE LICENCE EXTENSION PROJECT: 28114 ACCOMPANYING THE LICENCE EXTENSION PROJECT: 28114 ACCOMPANYING THE LICENCE MANMERING COLLERY TITLED I LOCATION OF UNDERGROUND LINKAGE" DOCISSAISSIO LOCATION OF UNDERGROUND LINKAGE" DOCISSAISSIO AND COMPILANCE LOCATIONS 12 MARCH 2015 DOCISSAISIO.	Note	Note	
	Note: An updated plan of the premises must be provided to the EPA by the licensee, to the EPA's specifications.	Note		
A3	Other activities			
A3.1	This licence applies to all other activities carried on at the premises, including: Ancillary Activity Sewage Treatment Systems	Compliant	Evidence of sewage system certification.	
A4	Information supplied to the EPA			
A4.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	Compliant	Works generally carried out in accordance with this condition.	
	Water and Applications to Land			
P1 P1.1	Location of monitoring/discharge points and areas The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point. Air EPA identi- fication no. Point Point Point Air Monitoring Point Point Particulate Matter PM10 Themo Fisher Scientific Doyalson NSW 2262 TEOM 1405	Compliant	Evidence of PM10 monitor. Evidence of data.	
P1.2	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Note	Note	
P1.3	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.			

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Condition Number	Condition	Compliance Status	Evidence	Procommonded Action
Condition Number		Compliance Status	Evidence	Recommended Action
	Water and land EPA Identi- Type of Monitoring Point Type of Discharge Point Location Description			
	fication no.			
	1 Discharge to waters Discharge to waters Discharge to waters on unitoring Discharge quality and Discharge quality and from final settlement pond via low			
	volume monitoring volume monitoring level discharge identified as EPA 1		Discharge locations sighted in the field inspection.	
	on plan of the premises tilled tEPL premises Plan fig 1 Project	Compliant		
	Extents, Monitoring and Compliance Locations dated 12		Records of discharge volume and water quality outlined in Annual Reviews.	
	March 2015 DOC15/83810. 27 Discharge to waters Discharge to waters Discharge to waters will concrete			
	Discharge quality and Discharge quality and high level spillway from final			
	volume monitoring volume monitoring settlement pond adjacent to EPA1 on plan of the premises titled EPL			
	premises Plan Fig 1 Project extents, Monitoring and			
	Compliance Locations" dated 12			
	March 2015 DOC15/83810.			
	The following points referred to in the table below are identified in this licence for the purposes of weather and/or noise monitoring and/or setting limits for the emission			
P1.4	of noise from the premises.			
	Noise			
	EPA identi- Type of monitoring point Location description			
	fication no.			
	9 Noise monitoring (R8) 109 Griffith Street, MANNERING PARK, 2259			
	12 Noise monitoring (R11) 35 Lakeshore Avenue, CHAIN VALLEY BAY, 2259	0 " 1		
	13 Noise monitoring (R12) 20 Lakeshore Avenue, (Kingfisher Shores, CHAIN VALLEY BAY, 2259	Compliant	Based on a review of monitoring data the site has been compliant with monitoring locations.	
	14 Noise monitoring (R13) 33 Karoola Avenue, Kingflisher Shores, CHAIN VALLEY BAY, 2259			
	16 Noise monitoring (R15) Short Street, Macquainte Shores, CHAIN VALLEY BAY, 2256 CHAIN VALLEY BAY, 2256			
	20 Noise monitoring (R19) 2 Sunset Parade, CHAIN VALLEY BAY 2259 BAY 2259			
	23 Noise monitoring (R22) 275s Cams Boulevard, CHAIN VALLEY BAY, 2259 VALLEY BAY, 2259			
	28 Meteorological Station Vivilian Ruttleys Road Dayalson			
2 Limit Conditions L1	Pollution of waters			
	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	Compliant	Based on the information provided to SLR, the site has generally complied with these requirements. No evidence of material harm.	
L1.1	Act 1997.		material nam.	
L2	Concentration limits			
L2.1	For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.			
L2.2	Spiritude to that area, must not exceed the concentration immal special to the area and a proposed to the area. Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.			
L2.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.			
L2.4	Water and/or Land Concentration Limits		Evidence of discharge water quality in Annual Review.	
	POINT 1,27			
	Pollutant Units of Measure 50 percentile 50 percentile 3DGM 100 percentile concentration concentration concentration concentration concentration	Compliant	Within criteria of this condition between 2016 - 2018 Annual Reviews.	The Annual Reviews need to provide a clear statement regarding whether
	limit limit limit		Based on information provided by the Environment and Community Co-ordinator there have been no exceedances	discharge criteria have been met.
	Faecal colony forming 200		during 2019.	
	millifres			
	pH pH 6.5-8.5			
	Total milligrams per litre 50			
	suspended solds			
L3	Volume and mass limits			
	Formula disability and in the state of the s			
	For each discharge point or utilisation area specified below (by a point number), the volume/mass of: a) liquids discharged to water; or;		Discharge volumes have been recorded at site.	
L3.1	b) solids or liquids applied to the area;			
	must not exceed the volume/mass limit specified for that discharge point or area.		No exceedances in 2017 or 2018 Annual Reviews. Based on information provided by Environment and Community	
		_	Co-ordinator no exceedances for 2019.	
			Non-compliant: There were two exceedances of the daily volumetric limit (12,161 kL) during the 2016 which were	
	Point Unit of Measure Volume/Mass Limit	Non-Compliant (Low Risk)	related to significant rainfall events. These exceedances occurred on the:	
	1 kilolitres per day 12161		1. 6 January 2016 – A total of 14,152 kL was discharged	
	27 kilolitres per day 12161		2. 5 June 2016 – A total of 16,391 kL was discharged.	
			No further recommendations.	
			To talifor recommendations.	
	The volumetric daily discharge limit for the premises is the combined discharge measured at EPA discharge points 1 and 27 and must not exceed 12161 kilolitres per			
	day.			
			There were two exceedances of the daily volumetric limit (12,161 kL) during 2016 which were related to significant	
			rainfall events. These exceedances occurred on the:	
L3.2		Non-Compliant (Low Risk)	1. 6 January 2016 – A total of 14,152 kL was discharged.	
			2. 5 June 2016 – A total of 16,391 kL was discharged.	
			No further recommendations.	
			To talking resonanting administration and the second secon	
L4	Waste			
	The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and			
L4.1	meeting the definition, if any, in the column titled "Description" in the table below.			
	Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled "Activity" in the table below. Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the		No evidence of waste receival.	
	ANNY WASIE LECEIVED AS DIE PIETINSES IS SUDJECT TO HIDSE HITHIS OF COMMITTIES IN THE		The evidence of muste received.	1

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0.10	0	F. Maria	Processor and Astron
Condition Number Condition	Compliance Status	Evidence	Recommended Action
Code Weste Description Activity Other Limits NA Wisste Any other waste received on the premises for storage, treatment, processing, sorting or disposal and which received sorting or disposal and which received sorting winder solved activity under Schedulert activity under PPECO Act, as in force Com time to time. NA General or Specific exempted waste conditions of a resource particular recourse comprison under conditions of a resource comprison under Company exemption (Visitation Regulation 2014.	Compliant	Evidence of waste totals provided in Annual Review. The field inspection generally noted that waste was stored well. However the following minor things were identified: * Some bins are not well labelled and contain a mix of substances; * Cardboard contained in some general waste bins; * 1 hydraulic oil drum not contained in bund; * Numerous empty oil drums stored on the side within bund. This may lead to some leakage of oil from drums; * 2 larger 44 gallon drums stored outside bund in a laydown area. Unknown substances. Numerous bins and spill containers were noted.	Ensure the minor waste management issues identified during the audit are rectified: * Improve bin labelling; * Ensure all hydrocarbon containers (empty or full) are stored within bunds.
L5 Noise Limits			
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.		- Exceedance of LA1(1minute) criteria of 7dB at Point 14 in June 2016. Documented in 2016 Annual Review and Quarterly Monitoring report (Global Acoustics report 16217_R01). Corrective actions undertaken and documented in incident report dated 05/07/2016 - 1dB exceedance of LAeq(15minute) criteria at Point 23 during the daytime period in October 2017 (Q4). Documented in 2017 Annual Review. However it is noted that a discrepancy between+E52 monitoring results presented in the 2017 Annual Review and Q4 Monitoring report (Global Acoustics Report 17424_R01) where no exceedance is recorded. - No exceedances recorded during 2018 period. - No evidence obtained on performance during the 2019 audit period. Nil recommendation with monitoring to continue.	
POINT 12	Note		
POINT 13 Time period Measurement parameter Measurement frequency Noise level dB(A) Day Doy-Lacq (15 minute) - 49 Evering Evering-Lacq (15 minute) - 49 Night Night-Lacq (15 minute) - 49 Night Night-Lacq (15 minute) - 53	Note		
POINT 14 Time period Measurement Measurement frequency Noise level dB(A)	Note		
POINT 16 Time period Measurement Measurement frequency Noise level dB(A)	Note		
POINT 20 Time period Measurement Measurement frequency Noise level dB(A) parameter Day Day-Leq (15 minute) - 37 Evening Evening-Leq (15 minute) - 37 Night Night-Leq (15 minute) - 37 Night Night-Leq (15 minute) - 45	Note		
	Note		

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
	POINT 23 Time period Measurement Measurement frequency Noise level dB(A)	Note		
	POINT 9	Note		
L5.2	The licensee must ensure that noise generated on the premises does not exceed: a) 35 LAeq(15min) during the day, evening or night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1; and b) 45 LA1(1min) during the night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1. Note: The licensee may provide to the EPA written evidence of any agreement with a landholder which is subject to the above noise limits. The written evidence may be submitted with a licence variation to remove the landholder from the above tables.	Compliant	Given compliance was generally achieved at defined noise monitoring locations, no further monitoring at other receivers was required.	
L5.3	For the purpose of condition L5.1 and condition L5.2: (a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays; (b) Evening is defined as the period 6pm to 10pm, and (c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.	Note		
L5.4	The noise limits set out in condition L5.1 and condition L5.2 apply under all meteorological conditions except for any one of the following: (a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or (b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or (c) Stability category G temperature inversion conditions.	Note		
L5.5	For the purpose of condition L5.4: (a) the meteorological data to be used for determining meteorological conditions is the data recorded at the meteorological station identified in this licence as EPA Identification Point 26. (b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW industrial Noise Policy (EPA 2000) Note: The weather station must be designed, commissioned and operated in a manner to obtain the necessary parameters required under the above condition.		Evidence of meteorological data. Spreadsheet provided with measurements. 2012 audit confirmed that DPE and EPA (under revision of EPL 1770) approved use of Mannering Colliery monitor as representative of Chain Valley and ability to calculate temperature lapse rate by use of sigma-theta method.	
L5.6	For the purpose of determining the noise generated at the premises the licensee must use a Class 1 or Class 2 noise monitoring device as defined by AS IEC61672.1 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing.	Compliant	Quarterly noise monitoring reports indicate that noise monitoring is conducted using calibrated sound level meters and acoustic calibrators in accordance with the relevant standards.	
L5.7	To determine compliance: 1. With the LAeq(15 min) noise limits in condition L5.1 and condition L5.2, the licensee must locate noise monitoring equipment; (a) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more then 30 metres from the property boundary that is closest to the premises; (b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises, or, where applicable, (c) within approximately 50 metres if the boundary of a national park or nature reserve. 2. With the LA1(1 minute) noise limits in condition L5.1 and L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade. 3. With the noise limits in condition L5.1 and condition L5.2, the noise monitoring equipment must be located; (a) at the most affected point at a location where there is no dwelling at the location, or (b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).	Administrative Non- Compliance	It is noted that monitoring for LA1(1minute) noise levels is not completed at 1m from a façade - however such noise monitoring is generally not practical due to disturbance to residents during the sensitive night-time period.	

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Somation Hambon	• • • • • • • • • • • • • • • • • • •	Compilation Ctatal	<u> </u>	A COMMISSION ACCOUNTS
L5.8	A non-compliance of condition L5.1 or condition L5.2 will still occur where noise generated from the premises in excess of the appropriate limit is measured; a) at a location other than an area prescribed by conditions L5.7 1(a) and L5.7 1(b), and /or b) at a point other than the most affected point at a location.	Noted		
L5.9 4 Operating Condition	For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.	Compliant	Modifying factors, are applied when triggered as evidenced in the Q4 2017 exceedance at Point 23 where a low frequency penalty was applicable to the measured CVC noise contribution.	
4 Operating Condition				
01	Activities must be carried out in a competent manner	Compliant	Generally activities have been completed in a competent manner.	
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Compliant	a) and b). From a review of records and inspection of waste in the field operations have generally been carried out in a competent manner. Evidence of waste totals provided in Annual Review. The field inspection generally noted that waste was stored well. However the following minor things were identified: * Some bins are not well labelled and contain a mix of substances; * Cardboard contained in some general waste bins; * 1 hydraulic oil drum not contained in bund; * Numerous empty oil drums stored on the side within bund. This may lead to some leakage of oil from drums; * 2 larger 44 gallon drums stored outside bund in a laydown area. Unknown substances. Numerous bins and spill containers were noted.	Ensure the minor waste management issues identified during the audit are rectified: * Improve bin labelling; * Ensure all hydrocarbon containers (empty or full) are stored within bunds.
O2	Maintenance of plant and equipment			
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	Compliant	Evidence of maintenance records for trucks and dozers. Spreadsheet records date back to 2010.	
O3	Dust			
03.1	The premises must be maintained in a condition which minimises or prevents the emission of dust on or from the premises.	Compliant	Non - compliance relating to dust criteria are outlined in Schedule 3 Condition 11. The field assessment did not identify a high number of dust sources. There are disturbed surfaces, but these are small compared to most mines. Water truck sighted. It is highly likely that other sources contribute to dust levels.	Ensure TEOM is setup with alarms/notifications for when results are approaching or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the EPA and DPE. Ensure exceedances and other incidents are reported as per this condition
O3.2 O3.3	Activities occurring in or on the premises must be carried out in a manner that will minimise the generation of wind-blown or traffic generated dust. All trafficable areas, coal stockpile(s) and storage areas, and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will	Compliant		(Detailed Incident Report within 7 days).
03.4	minimise the generation of dust. All vehicles transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage.	Compliant Compliant	No reason to determine otherwise. No evidence of non - compliance. No complaints regarding truck haulage.	
03.5	Activities occurring in or on the premises must be carried out in a manner that will minimise the tracking of dust from the premises.	Compliant	The field assessment did not identify a high number of dust sources. There are disturbed surfaces, but these are small compared to most mines. Water truck sighted. Outside sources contribute to dust. It is highly likely that other	
04	Effluent application to land	Compilant	sources contribute to dust levels.	
O4.1	An area must be provided for the use of effluent from the sewage treatment plant. The design of the system must be in accordance with the DEC's Environmental Guideline: Use of Effluent By Irrigation.	Compliant	Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite. There is limited detail in the Water Management Plan regarding the sewage water management system.	
	The quantity of wastewater applied to the utilisation area(s) must not exceed the capacity of the utilisation area(s) to effectively utilise the effluent.		Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite.	
O4.2	For the purpose of this condition, "effectively utilise" includes the ability of the soil to absorb the nutrient, salt and hydraulic loads and the applied organic material without causing harm to the environment.	Compliant	There is limited detail in the Water Management Plan regarding the sewage water management system. A series of laboratory results for treated effluent testing provided for this audit.	
			The system currently operates below the capacity.	
O5	Emergency response		A DIDMD has been proposed for the site Laborat data of Co. 1. 1. 2000	
O5.1	The licensee must maintain, and implement as necessary, a current emergency response plan for the premises. The licensee must keep the emergency response plan on the premises at all times. The emergency response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. If a current emergency response plan does not exist at the date on which this condition is attached to the licence, the licensee must develop an emergency response plan within three months of that date.	Administrative Non- Compliance	A PIRMP has been prepared for the site. Latest dated 21 September 2018. Evidence of testing PIRMP - including details of tests from 21 December 2018. Although there were some incidents, it does not appear any incident required the PIRMP to be enacted. * PIRMP is kept on-site. * Observation: The PIRMP is labelled LakeCoal, has persons listed in it who are no longer at site, does not have email details for government contacts, and figures do not clearly show the location of hazardous substances and where pollution response equipment is stored.	* Update the PIRMP to include: - Current site contacts; - Email details for government contacts; and - Figures that clearly show the location of hazardous substances and where pollution response equipment is stored.
O6	Waste management			

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Condition Number	Condition	Compliance Status	Eviderice	Recommended Action
			Detailed testing program of waster was sighted.	
O6.1	The licensee must ensure that any liquid and/or non liquid waste generated and/or stored at the premises is assessed and classified in accordance with the EPA's Waste Classification Guidelines as in force from time to time.	Compliant	Waste has been stored at the premises generally consistent with the EPA's Guideline. Evidence of waste	
			management including recycling and disposal.	
O6.2	The licensee must ensure that waste identified for recycling is stored separately from other waste.	Compliant	The field inspection generally noted that waste was stored well. However the following minor things were identified: * Some bins are not well labelled and contain a mix of substances; * Cardboard contained in some general waste bins; * 1 hydraulic oil drum not contained in bund; * Numerous empty oil drums stored on the side within bund. This may lead to some leakage of oil from drums; * 2 larger 44 gallon drums stored outside bund in a laydown area. Unknown substances.	Ensure the minor waste management issues identified during the audit are rectified. Including: * Improve bin labelling; * Ensure all hydrocarbon containers (empty or full) are stored within bunds.
			Numerous bins and spill containers were noted.	
			Traincroad bind and spin containers were noted.	
07	Other operating conditions			
	Sewage Treatment		Despite minimal evidence of servicing being provided based on information provided, it appears sewage from the	
07.1	All sewage generated on the premises must be directed, collected and treated by the sewage treatment system(s).	Compliant	site is treated onsite based on reporting in the Annual Review.	
07.2	The licensee is responsible for the correct operation of the sewage treatment system(s) on their premises.	Administrative Non- Compliance	Sewage system - 2 systems. Envirocycle for offices and second system is a septic system that handles the bathhouse and toilet facilities. This water is treated onsite.	Include additional detail in the Water Management Plan regarding sewage management. Include an update of sewage system during the audit period in the Annual Review.
			There is limited detail in the Water Management Plan regarding the sewage water management system. Garden Wastemaster Australia complete servicing. Evidence of one email from 6 March 2019 organising servicing.	Ensure servicing is completed and records kept onsite.
07.3	Correct operation involves regular supervision and system maintenance. The licensee must be aware of the system requirements and must ensure that the necessary service contracts are in place.	Administrative Non- Compliance	However no evidence of servicing provided. Evidence of testing of wastewater through lab results	
07.4	The sewage treatment system(s) must be serviced by a suitably qualified and experienced waste water technician at least once each quarterly period and a minimum of	Administrative Non-		
	four times per year. The licensee must record each inspection and any actions required or recommended by the technician; including all results from tests performed on the sewage	Compliance Administrative Non-		
O7.5	treatment system(s) by the technician as defined in Condition O7.4.	Compliance		
O7.6	All treated sewage that is discharged from the premises must be discharged through licensed discharge point "EPA Identification no. 1", as defined in condition P1.3.	Compliant	Treated water is discharged through this point.	
	Bunding			
07.7	All above ground tanks containing material that is likely to cause material harm to the environmental must be bunded or have an alternative spill containment system in place.	Compliant	Evidence of bunding sighted during the field inspection around fuel tanks. Other chemicals stored within bunded area and report to the oily water separator.	
5 Monitoring and Rec	ording Conditions Monitoring records			
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Compliant	Based on the evidence provided this condition has been met. Evidence of raw monitoring data for air and water.	
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Compliant	Evidence of raw monitoring data. Evidence of data dating back four years.	
	c) produced in a regible form to any additionsed direction the EFA who asks to see them.			
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Compliant	Evidence of chain of custody forms and monitoring results for air and water. Meets condition a-d requirements.	
M2	Requirement to monitor concentration of pollutants discharged			
IVIZ	requirement to monitor concentration of policiams discriminged			
M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	Administrative Non- Compliance	There has been data capture issues identified in Annual Reviews for PM10. <u>Admin Non - Compliance.</u>	Update the Air Quality Management Plan following this audit. Improve data capture for PM10. Review possibilities of backup power supply. Ensure issues with data capture are reported in Section 1 and 7 of the Annual
M2.2	Air Monitoring Requirements			Review.
1412.2				Ensure TEOM is setup with alarms/notifications for when results are approaching
	POINT 25	Administrative Non- Compliance	There were some issues with data capture with this outlined in Annual Reviews. See Schedule 3 Condition 11 of the Development Consent.	or have exceeded the short term criterion for particulate matter. This will ensure exceedances are immediately detected and reported as soon as possible to the
	Pollutant Units of measure Frequency Sampling Method	Compilation	Solidonia Comonia	EPA and DPE.
	Particulate matter micrograms per cubic metre Continuous AM-22			
M2.3	Water and/ or Land Monitoring Requirements			
	POINT 1			
	Pollutant Units of measure Frequency Sampling Method			
	Biochemical oxygen milligrams per litre Once a month (min. of 4 Grab sample demand weeks)			
	Enterococci colory forming units per Once a month (min. of 4 Grab sample 100 millilitres weeks)			
	Faecal Coliforms colony forming units per Once a month (min. of 4 Grab sample			
	pH pH Once a month (min. of 4 Grab sample weeks) Total suspended millioname per litre Once a month (min. of 4 Grab sample			
	Total suspended milligrams per litre Once a month (min. of 4 Grab sample solids weeks)	Compliant	Based on evidence provided (Annual Review monitoring results) surface water discharge monitoring was completed	1
	POINT 27		as per this schedule.	
	POINT 27 Pollutant Units of measure Frequency Sampling Method			
	Enterococci colony forming units per Daily during any Grab sample 100 millitires discharge			
	Gescharge Faecal Coliforms colony forming units per Daily during any Grab sample 100 millilitres discharge			
	pH pH Daily during any Grab sample discharge			
	Total suspended milligrams per litre Daily during any Grab sample solids			
M3	Testing methods - concentration limits			

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Candition Number	Condition	Commission of Status	Eddown	Parameter de di Antino
Condition Number	Condition 1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:	Compliance Status	Evidence	Recommended Action
M3.1	a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. Note: The Protection of the Environment Operations (Clean Air) Regulation 2010 requires testing for certain purposes to be conducted in accordance with test methods	Compliant	Based on evidence provided monitoring has generally been completed as per these requirements. Spreadsheet with results provided. Note, for PM10 monitoring there were some times during the audit period where there was a failure of the unit.	
	contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".			
M3.2	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.	Compliant	Discharge monitoring appears to have been completed in accordance with requirements. Grab samples are tested at the laboratory. Discharge point sighted in the field inspection.	
M4	Environmental monitoring			
	Requirement to monitor noise To determine compliance with condition L5.1, attended noise monitoring must be undertaken in accordance with conditions L5.7 and L5.8, and			
M4.1	(a) at each one of the locations listed in condition L5.1; attended noise monitoring must be undertaken in accordance with conditions L5.7 and L5.6, and (a) at each one of the locations listed in condition L5.1; (b) occur quarterly within the reporting period of the Environment Protection Licence with at least 2 months between monitoring periods; (c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy (EPA 2000) for a minimum of 15 minutes for three of the quarters; (d) the night time 15 minute attended monitoring in accordance with c) must be undertaken between the hours of 1am and 4am; (e) the night time LA1 (1 min) attended monitoring in accordance with c) must be undertaken between the hours of 1am and 4am; (f) one quarterly monitoring must occur during each day, evening and night period as defined in the NSW Industrial Noise Policy (EPA 2000) for a minimum of 1.5 hours during the day; 30 minutes during the evening; and 1 hours during the night, and (g) each quarterly monitoring must be undertaken on a different day(s) of the week not including Saturdays, Sundays and public holidays; and (h) these monitoring conditions take effect in the 2015 Reporting period. Note: The intention of this condition is that quarterly monitoring be undertaken at each sensitive receiver. That at each sensitive receiver monitoring is undertaken over a range of different days excluding weekends and public holidays during the reporting period so as to be representative of operating hours. That night time 15 minute attended monitoring and the LA1 (1min) monitoring for three of the quarters be undertaken at worst case being the most stable atmospheric conditions and when noise would be most intrusive to sleep. All of the sensitive receivers do not have to be monitored on the same day, evening and night for sub condition f.	Administrative Non- Compliance	- Q1 2016 - monitoring at Point 12/Point 13 conducted for only 15 minutes during the evening period - Q2 2016 - monitoring during the night-time period conducted prior to 1:00 am. Non - Compliance Q3 2016 - monitoring conducted prior to 1:00am. Non - Compliance Q4 2016 - monitoring conducted prior to 1:00am and within 2 months of Q3 2016 monitoring. Non - Compliance Q3 2017 monitoring conducted within 2 months of Q2 2017 monitoring 2018 monitoring has been completed as per requirements 2019 Q1 - monitoring conducted prior to 1:00am Measurements are generally taken over a range of days however on occasion some quarters are conducted on the same days. It is noted that following 2016 with the exception of Q1 2017 and Q1 2018 where extended noise monitoring was conducted in accordance with (f) night time noise monitoring during the night time was conducted between 1am and 4am.	Update Noise Management Plan. Ensure monitoring is completed in accordance with Noise Management Plan.
M4.2	For the Annual Reporting Period ending March 2015 the EPA will accept all monitoring required by the current Department of Planning and Environment consent (usually quarterly monitoring for noise as dB(A) Leq15minutes) for compliance with noise monitoring requirements in this licence, as a single report attached to the Annual Return for the premises.	Administrative Non- Compliance	No evidence of a consolidated noise report prepared for the Annual Returns. Evidence from 2015/16, but none during the audit period.	For future Annual Returns a single noise monitoring report should be prepared and attached to the Annual Return.
M5 M5.1	Weather monitoring At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below,			
	Using the corresponding sampling method, units of measure, averaging period and sampling frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively. POINT 26 Parameter Sampling method Units of measure Averaging period Frequency Rainfall AM-4 millimetres 24 hours Continuous I to metrics AM-2 & AM-4 Degrees 1 hour Continuous Wind speed AM-2 & AM-4 metric per second 1 hour Continuous Temperature at 1 AM-4 degrees Celsius 1 hour Continuous Signal theta AM-2 & AM-4 Degrees 15 minutes Continuous Rebitive AM-4 percent 1 hour Continuous	Compliant	Evidence of meteorological data from Mannering weather station. Spreadsheet provided with measurements. 2012 audit confirmed that DPE and EPA (under revision of EPL 1770) approved use of Mannering Colliery monitor as representative of Chain Valley and ability to calculate temperature lapse rate by use of sigma-theta method.	
M6	Recording of pollution complaints			
M6.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Compliant	Evidence of complaints greater than 4 years.	
M6.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Administrative Non- Compliance	*Admin Non-compliant: The Complaints Register does not include the personal details of the complainant. Not all complaints registered in the register included the method by which the complaint was made. There are additional complaints outlined in the Annual Review compared to the Complaints Registers provided to the auditor.	Ensure all complaints are recorded in the internal database on site and the relevant details required under this condition are outlined in the Annual Review.
M6.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Compliant	Evidence of complaints greater than 4 years.	
M6.4 M7	The record must be produced to any authorised officer of the EPA who asks to see them. Telephone complaints line	Note		
M7.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	Compliant	Community hotline advertised on the Lake Coal website (now redundant). Also contact line provided on Delta Coal website.	
M7.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make	Administrative Non-	*Telephone line for complaints advertised on the LakeCoal and Delta Coal websites.	With the new ownership an advertisement should be placed in the paper/newsletter providing a link to the Delta Coal website and outlining the
M7.3	a complaint. The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.	Compliance Noted	* However no evidence of notifying to the community that the complaints line exists. Outside of audit period.	complaint management details.
M7.3 M7.4 M8	The licensee must notify the EPA with contact details of personnel capable of a timely response to emergencies or any other exigent circumstances. (a) the nominated contact must be available at all times. (b) contact details must include a telephone number and must be current. (c) such notification must be made within 14 days of receiving this licence. Requirement to monitor volume or mass	Noted Administrative Non- Compliance	* Designated representatives of the company included in the Pollution Incident Response Plan (PIRMP), dated September 2018. * <u>Admin Non-compliant:</u> The designated representatives of the company, included in the PIRMP, are not current.	Update the details of designated representatives of the company in the PIRMP.
M8.1	For each discharge point or utilisation area specified below, the licensee must monitor: a) the volume of liquids discharged to water or applied to the area; b) the mass of solids applied to the area; c) the mass of pollutants emitted to the air; at the frequency and using the method and units of measure, specified below.			
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Part		Recommended Action	Evidence	Compliance Status	Condition	Condition Number
Fig. 12 The state of the control of	mended Action	Recommended Action	Evidence	Compliance Status	Condition	Condition Number
Experience states are secured by the control of the			Data for volume monitoring provided. Also summarised in Annual Review.	Compliant		
The control of the						
The state of the control of the cont						
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Section 2015 Secti						
Part Control Contr						
The Advances of Control Cont						6 Reporting Condition
Company Comp						R1
2 - Changes of Company						
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2 - 2 - Security of the control of t			Evidence of			
2.1 Substanced Configuration (and Price in particular of the configuration of the Configurati				Compliant		R1.1
Part			·		7. a Statement of Compliance - Environmental Management Systems and Practices; and	
Second Continue to the continue of the conti					8. a Statement of Compliance - Environmental Improvement Works.	
Second Continue to the continue of the conti					At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.	
A to the form separate powers delicated the state delicative pure to end or the treat disease and state are and the separate great of the state of t						
At a Thus the must a quantity is controlled as a finding of the order of the control of the cont			Evidence of:	0 " 1		D4.0
Into the first control from the internation according to the first operation of the control of the control of part of the control of the control of part of pa			2016-17 AR and 2017-18 AR. The 2018-19 was not due at the time of the audit. Completed on EPA form.	Compliant		R1.2
In the opportunity of the control of					Where this licence is transferred from the licensee to a new licensee:	
13.3 When we want may make an any may are found with the special control the proposal property of the property			Evidence of:			
Action to strong price of a special comment of the special comment o	Annual Returns based on the period of the	LakeCoal and Delta Coal to prepare Annual Returns based			b) the new licenses must propose an Appual Poture for the period commencing on the date the application for the transfer of the licenses is granted and ending on the	
Size of a spot and to in the spot and to miss on the approach from the type poster. Fig. 4 Fig. 4 Fig. 5 The Annual Research is a few accounts a secondary for a few accounts of the few accounts		Annual Return and dates of the sale of Chain Valley.	LakeCool and Dolta Cool are in the process of property constraint constraint.	Compliant		R1.3
R1 4 The Annual Ristant for the specified or statement and programs and strong final product promotering of the principle of	-	1				
R12 On the first due the reporting period por encloses. The Annual Robusts in Encountering and a second of the Server in the Color Server in the			,		Note: An application to transfer a licence must be made in the approved form for this purpose.	
R12 On the first due the reporting period por encloses. The Annual Robusts in Encountering and a second of the Server in the Color Server in the					Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing	
The Amend Relative is the secondary of the Removal and the sequence of the Commission of the Commissio					on the first day of the reporting period and ending on:	
The Annual Return for the supporting period must be supported to the PRA by registered post and later than 65 days after the one of each reporting period of in the season of a streetward period of the Annual Return see competed on the Annual Re				Not Triggered		R1.4
The Annual Return for the exposing printed must be exposed to the EPA free granted point of later than 50 days after the end of each reporting parted or in the case of the Annual Return appeared it secret is stortified to the EPA free parted of an annual return of each reporting parted or in the case of the Annual Return as granted (the first of days after the date the treatment of the secret than 1 and 1					D) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	
The Annual Return for the appearing period must be expected to the EPA from going depth of the EPA from a state of each reporting period or in the coles of annual return of an annual return or an annual return of copy after the date the transfer was granted (the full coles). R1.8 The licenses must return a copy of the Annual Return as object of the EPA from a period of all least 4 years after the Annual Return was due to be expected to the EPA. When the Annual Return as Return is appeared it secret it submitted by the EPA for a period of all least 4 years after the Annual Return was due to be expected to the EPA. When the Annual Return is the Annual Return is a copy of the Annual Return was due to be expected to the EPA. When the Annual Return is the Completed to the EPA for a period of all least 4 years after the Annual Return was due to be expected by: 10.1 The Indiana on the annual Return is the Completed on the Maintening and Completed by: 10.2 Notification of an indiana of the Annual Return is a period of all least 4 years after the Annual Return was due to be expected by: 10.3 The Indiana of the Annual Return is appeared it when the Coley. Congleted Congl	-					
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Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Compliants Summary must be signed by: a) the illoence holder, or b) by a person approved in writing by the EPA to sign on behalf of the iconoce holder. R2 Notification a environmental harm Note: The iconose or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act. R2 Notifications must be made by telephoning the Environment Line service on 131 555. R2 The iconoce must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. Where an authorised officer of the EPA suspects on reasonable grounds that: a) where the iconoce applies by whiches or mobile plant, an event has occurred at the premises; or with the carrying out of the activities authorised officer may requise a written isconece applies by whiches or mobile plant, an event has occurred at the premises; or with the southerd and the event the caused, is caused in the premises; or with the carrying out of the activities authorised officer may requise a written inconocephical by the event. R3 The license must provide written details of the provided in the carrying out of the activities authorised by this iscence, applies by whiches or mobile plant, an event has occurred at the premises; or with the carrying out of the activities authorised officer may requise a written inconocephical port in the inconocephical plant is included in the event. R3 The license must require a report which includes any or at all the blowing information as the cause, it is explained in the event and supply the report of the event. B3 The license must make all reasonable inquiries in includes any or at all the blowing information as the cause, it caused in caused in caused in the proof of the event. B3 The license must make all reasonable inquiri			The 2016-17 Annual Return was dated within the 60 days.	2		
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R1.7 a) he licensee holder; or b) by a person approved in writing by the EPA to sign on behalf of the license holder. R2 Notification of environmental harm Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the moldert in accordance with the requirements of Part 5.7 of the Act. R2.1 Notifications must be made by telephoning the Environment Line service on 131 555. R2.2 The licensee must provide writin details of the notification to the EPA within 7 days of the date on which the incident occurred. Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises. The licensee must provide writin details of more premises and the event has caused, is causing of site by a cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a writine report of the certain and concentration of every pollutant discharged as a result of the event: Based on discussions with the Environment and Community Co-ordinator this condition has not been triggered. The request may require a report which includes any or all of the following information: a) the cause, the analysis cause in the authorised of every pollutant discharged as a result of the event: b) the type, volume and concentration of every pollutant discharged as a result of the event: c) the varies, didders and this cause, didders and concentration of the event: c) the varies, address and business hours beginned in the request of the license and the license applies to which the license applies to whic						
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			Based on discussions with the Environment and Community Co-ordinator this condition has not been triggered.	Not Triggered		R3.3
been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;						
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and					f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and	
g) any other relevant matters.						
The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee					The FPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licenses. The licenses	
R3.4 The EPA hay make a written request to include decials in relation to any or the above matter's it is not satisfied with the frequest. Not Triggered Based on discussions with the Environment and Community Co-ordinator this condition has not been triggered. In the EPA hay make a written request to include decials in the request.			Based on discussions with the Environment and Community Co-ordinator this condition has not been triggered.	Not Triggered		R3.4
R4 Other reporting conditions					Other reporting conditions	R4
		1			Noise Monitoring Report	i

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
R4.1	The licensee must submit to the EPA a noise compliance assessment report at the end of each reporting period. The report must be submitted with the Environment Protection Licence Annual Return. The report must be prepared by a suitably qualified and experienced acoustical consultant which: (a) details the noise monitoring undertaken in accordance with condition M4; (b) assesses compliance with noise limits presented in condition L5.1 and condition 5.2; and (c) outlines any management actions taken within the monitoring period to address any exceedances of limits contained in condition L5.1 and condition L5.2. Note: The licensee must provide the EPA with one report, but this report may be a combination of the monitoring undertaken by the licensee as part of their quarterly monitoring program as required by the Project Approval SSD-5456 and must include LA1(1min).	Administrative Non- Compliance	No evidence of a consolidated noise report prepared for the Annual Returns. Evidence from 2015/16, but none during the audit period.	Send a combined noise report for the Annual Return period to the EPA.
7 General Conditions			<u>-</u>	
G1	Copy of licence kept at the premises or plant			
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	Compliant	A copy of the licence was provided by the Environment and Community Co-ordinator.	
G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Noted		
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	Compliant	A copy of the licence was provided by the Environment and Community Co-ordinator. A copy was included in hard copy.	
G2	Other general conditions			
G2.1	Completed Programs			
8 Pollution Studies and	PRP Description Completed Date Coal Mine Particulate Matter Control Best Best Management Practice (BMP) determination to identify ways to reduce particle emissions Assessment of Potential Impacts of Metals in wastewater and selected in wastewater discharges from the mine in accordance with the ANZECC water qualify guidelines. To obtain a greater understanding of the type and concentration of metals discharged in mine water and entering the receiving waters. To limit the concentration of metals discharged in mine water within ANZECC guidelines. Air Quality Monitoring The licensee must evaluate best locations and install monitoring devices as defined in Project Approval MPIO_01st under the Environent Planning & Assessment Act 1979. PRP4 - Upgrade to Clean and Dirty Water Management System and review and upgrade bunding. PRP5 - Remediation of Dam Wall and Spillway formalisation PRP6 - Remediation of Sewage Treatment System and services and services and services are provided as a spillway to prevent dams seepage and to ensure that volumetric discharges can be provided by the provided management of proteins of improved disented ton of effects on the filter of the provided disented on the provided of the provided disented on the provided of t	Compliant	PRP 7 is relevant to the audit period. Document is dated 19 February 2016. Evidence of email submission provided	
U1.1	PRP 8 - Construction of Sewerage System By 07 July 2017 the licensee must construct a pump station, rising main and other infrastructure in order to connect the sewage from Chain Valley Colliery to Wyong Shire Council's sewerage system. The construction must be undertaken by an appropriately qualified an experienced person. The Licensee must: a) obtain the appropriate approvals and permits required for the development; b) construct option A or option B in accordance with the document titled "Concept Design Report for Sewage Treatment System Upgrade Chain Valley Colliery" dated February 2016 and prepared by RGH Consulting Group; c) include connection of sewage from the administration building to the rising main; c) notify the EPA in writing at hunter-region@epa.nsw.gov.au within 2 weeks of the pump station and rising main being commissioned; and d) provide the EPA with a report on commissioning of the pump station and rising main which details the final option constructed within 2 weeks of the pump station a rising main being commissioned.	Administrative Non- Compliance	The upgrade has been designed but not yet constructed. This was supposed to be completed by 7 July 2017.	Liaise with the EPA regarding the current status of the Sewage System Project. Implement any agreed actions in terms of timing.

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Consolidated Coal Lease 721

Audit Period = 1 January 2016 - 5 April 2019

Condition Number	Condition	Compliance Status	Evidence	Recommended Action
Mining Lease Condition				
1	Notice to Landholders Within a period of three months from the date of granting or renewal of this lease or within such further time as the Minister may allow, the lease holder must serve on each landholder of the land a notice in writing indicating that this lease has been granted/renewed and whether the lease includes the surface. An adequate plan and description of the lease area must accompany the notice. If there are ten or more landholders affected, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this lease has been granted/renewed; state whether the lease includes the surface and must contain an adequate plan and description of the lease area.	Not Triggered	Not within period.	
2	Environmental Harm The proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or			
3	rehabilitation of the development. Mining Operations Plan	Compliant	Based on information provided there is no evidence of material harm.	
	(a) Mining operations must not be carried out otherwise than in accordance with: a Mining Operations Plan (MOP) which has been approved by the Director-General of the Department of Primary Industries. (b) The MOP must: i) identify areas that will be disturbed by mining operations; ii) detail the staging of specific mining operations; iii) identify how the mine will be managed to allow mine closure; iv) identify how mining operations will be carried out on site in order to prevent and or minimise harm to the environment; v) reflect the conditions of approval under: the Environmental Planning and Assessment Act 1979 the Protection of the Environment Operations Act 1997 and any other approvals relevant to the development including the conditions of this lease; and vi) have regard to any relevant guidelines adopted by the Director-General. (c) The titleholder may apply to the Director-General to amend an approved MOP at any time. (d) It is not a breach of this condition if: i) the operations constituting the breach were necessary to comply with a lawful order or direction given under the Mining Act 1992, the Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997 or the Occupational Health and Safety Act 2000; and ii) the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out. (e) A MOP ceases to have affect 7 years after date of approval or other such period as identified by the Director-General. An approved amendment to the MOP under condition 5 does not constitute an approval for the purpose of this paragraph unless otherwise identified by the Director-General.	Non-Compliant (Low Risk)	Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. As there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time. Both MOPs cover the required aspects of this condition. Implementation: No areas available for rehabilitation at site.	
4	Environmental Management Reporting The lease holder must lodge Environmental Management Reports (EMR) with the Director- General annually or at dates otherwise directed by the Director-General.	Compliant	Evidence of Annual Reviews from 2016, 2017 and 2018. Evidence of lodgements.	
5	The EMR must:	Compilant	Evidence of Affilial Neviews from 2010, 2017 and 2010. Evidence of loagements.	
	a) report against compliance with the MOP; b) report on progress in respect of rehabilitation completion criteria; c) report on the extent of compliance with regulatory requirements; and d) have regard to any relevant guidelines adopted by the Director-General.	Administrative Non- Compliance	a) Admin Non-compliant: The 2016, 2017 & 2018 Annual Reviews do not report against compliance with the MOP. b) NIA - Rehabilitation has not commenced at the site; c) 2016, 2017 & 2018 Annual Reviews - Executive Summary & Section 3; and d) Admin Non-compliant: 2016, 2017 and 2018 Annual Reviews not prepared in accordance with the DPE Annual Review guidelines.	Report against compliance with the MOP in future Annual Reviews. As per recommendations in Schedule 6 Condition 4.
6	Additional environmental reports may be required on specific surface disturbing operations or environmental incidents from time to time as directed in writing by the Director-General and must be lodged as instructed.	Compliant	Additional reporting was prepared for subsidence. Work appears to have been completed as per the direction and feedback from the Resources Regulator.	
7	Rehabilitation			
	Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.	Not Triggered	No areas available for rehabilitation.	
8	Subsidence Management			
	(a) The lease holder shall prepare a Subsidence Management Plan prior to commencing any underground mining operations which will potentially lead to subsidence of the land surface. (b) Underground mining operations which will potentially lead to subsidence include secondary extraction panels such as longwalls or miniwalls, associated first workings (gateroads, installation roads and associated main headings, etc), and pillar extractions, and are otherwise defined by the Applications for Subsidence Management Approvals guidelines (EDC17) (c) The lease holder must not commence or undertake underground mining operations that will potentially lead to subsidence other than in accordance with a Subsidence Management Plan approved by the Director-General, an approval under the Mine Health & Safety Act 2004, or the document New Subsidence Management Plan Approval Process - Transitional Provisions (EDP09). (d) Subsidence Management Plans are to be prepared in accordance with the Guideline for Applications for Subsidence Management Approvals. (e) Subsidence Management Plans as approved shall form part of the Mining Operations Plan required under Condition 3 and will be_subject to the Annual Environmental Management Report process as set out under Condition 4. The SMP is also subject to the requirements for subsidence monitoring and reporting set out in the document New Approval Process for Management of Coal Mining Subsidence - Policy.	Compliant	Subsidence Management Plans prepared prior to this audit period. Several Extraction Plans prepared during the audit period. They are prepared under a separate Extraction Plan Guideline and do not specifically need to cover this condition.	
9	Working Requirement			
10	The lease holder must: (a) ensure that at least 142 competent people are efficiently employed on the lease area on each week day except Sunday or any week day that is a public holiday, OR (b) expend on operations carried out in the course of prospecting or mining the lease area, an amount of not less than \$2,485,000 per annum whilst the lease is in force. The Minister may at any time or times, by instrument in writing served on the lease holder, increase or decrease the expenditure required or the number of people to be employed. Control of Operations	Compliant	Operations meet sub condition b.	
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Condition Number	Condition (a) If an Environmental Officer of the Department believes that the lease holder is not complying with any provision of the Act or any condition of this lease relating to the	Compliance Status	Evidence	Recommended Action
	(a) If an Environmental Officer of the Department believes that the lease holder is not complying with any provision of the Act or any condition of this lease relating to the working of the lease, he may direct the lease holder to:-			
	(i) cease working the lease; or		Discharge locations sighted in the field inspection.	
	(ii) cease that part of the operation not complying with the Act or conditions; until in the opinion of the Environmental Officer the situation is rectified. (b) The lease holder must comply with any direction given. The Director-General may confirm, vary or revoke any such direction.	Not Triggered	Records of discharge volume and water quality outlined in Annual Reviews.	
	(c) A direction referred to in this condition may be served on the Mine Manager.		3- 1	
11	Reports			
	The lease holder must provide an exploration report, within a period of twenty-eight days after each anniversary of the date this lease has effect or at such other date			
	as the Director-General may stipulate, of each year. The report must be to the satisfaction of the Director-General and contain the following: (a) Full particulars, including results, interpretation and conclusions, of all exploration conducted during the twelve months period;		Evidence of submission for 2016, 2017 and 2018 Group Exploration Reports.	
	(b) Details of expenditure incurred in conducting that exploration;	Administrative Non-	LakeCoal received a PIN from the Resources Regulator on 7 November 2017 for late lodgement.	Ensure Group Exploration Reports meet the required timeframe.
	(c) A summary of all geological findings acquired through mining or development evaluation activities; (d) Particulars of exploration proposed to be conducted in the next twelve months period;	Compliance	Lake Coal received a 1 HV Horn the Nesources Negulator Of 7 November 2017 for late lougement.	Ensure figures are included in the reports.
	(e) All plans, maps, sections and other data necessary to satisfactorily interpret the report.		In the version supplied to SLR there are no figures.	
12	Licence to Use Reports			
12				
	(a) The lease holder grants to the Minister, by way of a non-exclusive licence, the right in copyright to publish, print, adapt and reproduce all exploration reports lodged in any form and for the full duration of copyright			
	(b) The non-exclusive licence will operate as a consent for the purposes of section 365 of the Mining Act 1992.	Note		
13	Confidentiality (a) All exploration reports submitted in accordance with the conditions of this lease will be kept confidential while the lease is in force, except in cases where:	Note		
	(a) All exploration reports submitted in accordance with the conditions of this lease will be kept confidential while the lease is in force, except in cases where: (i) the lease holder has agreed that specified reports may be made non-confidential.			
	(ii) reports deal with exploration conducted exclusively on areas that have ceased to be part of the lease.	Note		
	(b) Confidentiality will be continued beyond the termination of a lease where an application for a flow-on title was lodged during the currency of the lease. The confidentiality will last until that flow-on title or any subsequent flow-on title, has terminated.	Note		
	(c) The Director-General may extend the period of confidentiality.			
14	Terms of the non-exclusive licence	Note		
	The terms of the non-exclusive copyright licence granted under condition 12 are:			
	(a) the Minister may sub-licence others to publish, print, adapt and reproduce but not on-licence reports. (b) the Minister and any sub-licensee will acknowledge the lease holder's and any identifiable consultant's ownership of copyright in any reproduction of the reports,			
	including storage of reports onto an electronic database.			
	(c) the lease holder does not warrant ownership of all copyright works in any report and, the lease holder will use best endeavours to identify those parts of the report for which the lease holder owns the copyright.	Note		
	(d) there is no royalty payable by the Minister for the licence.			
	(e) if the lease holder has reasonable grounds to believe that the Minister has exercised his rights under the non-exclusive copyright licence in a manner which adversely affects the operations of the lease holder, that licence is revocable on the giving of a period of not less than three months notice.			
	aneste the operations of the reason fortion is reflectable of the grilling of a period of not test than the months relief.			
15	Blasting			
	(a) Ground Vibration The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does			
	not exceed 5 mm/second in more than 5% of the total number of blasts over a period of 12 months at any welling or occupied premises as the case may be, unless			
	determined otherwise by the Department of Environment and Climate Change. (b) Blast Overpressure	Not Triggored	No surface blooting has been undertaken during the guidt period	
	(D) palast 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	Not Triggered	No surface blasting has been undertaken during the audit period.	
	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 be, unless			
	determined otherwise by the Department of Environment and Climate Change.			
16	Safety			
	Operations must be carried out in a manner that ensures the safety of persons or stock in the vicinity of the operations. All drill holes shafts and excavations must be appropriately protected, to the satisfaction of the Director-General, to ensure that access to them by persons and stock is restricted. Abandoned shafts and excavations	N/A	This is not a safety audit.	
	opened up or used by the lease holder must be filled in or otherwise rendered safe to a standard acceptable to the Director-General.	IVA	This is not a safety addit.	
17	Exploratory Drilling (a) At least twenty eight days prior to commencement of drilling operations the lease holder must notify the relevant Department of Water and Energy Regional			
	Hydrologist of the intention to drill exploratory drill holes together with information on the location of the proposed holes.			
	(b) If the lease holder drills exploratory drill holes he must satisfy the Director-General that: (i) all cored holes are accurately surveyed and permanently marked in accordance with Departmental guidelines so that their location can be easily established;			
	(ii) all holes cored or otherwise are sealed to prevent the collapse of the surrounding surface;			
	(iii) all drill holes are permanently sealed with cement plugs to prevent surface discharge of groundwater's; (iv) if any drill hole meets natural or noxious gases it is plugged or sealed to prevent their escape;	Not Triggered	Based on site communications no exploration drilling in this lease area.	
	(v) if any drill hole meets an artesian or sub-artesian flow it is effectively sealed to prevent contamination of aquifers.			
	(vi) once any drill hole ceases to be used the hole must be sealed in accordance with Departmental guidelines. Alternatively, the hole must be sealed as instructed by the Director-General.			
	(vii) once any drill hole ceases to be used the land and its _immediate vicinity is left in a clean, tidy and stable condition.			
18	Prevention of Soil Erosion and Pollution			
.,	Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion,			
	unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan. For the purpose of this condition, water shall be taken	Compliant	The field inspection around the pit top and other areas did not identify any significant areas of erosion.	
	to include any watercourse, waterbody or groundwaters. The lease holder must observe and perform any instructions given by the Director-General in this regard.			
19	Transmission lines, Communication lines and Pipelines			
	Operations must not interfere with or impair the stability or efficiency of any transmission line, communication line, pipeline or any other utility on the lease area without	Not Triggered	Based on information provided to SLR this has not been triggered.	
	the prior written approval of the Director-General and subject to any conditions he may stipulate.			
20	Fences, Gates			
	(a) Activities on the lease must not interfere with or damage fences without the prior written approval of the owner thereof or the Minister and subject to any conditions			1
	the Minister may stipulate. (b) Gates within the lease area	Not Triggered	Based on information provided to SLR this has not been triggered.	
21	Roads and Tracks			
	(a) Operations must not affect any road unless in accordance with an accepted Mining Operations Plan or with the prior written approval of the Director-General and subject to any conditions he may stipulate.			
	(b) The lease holder must pay to the designated authority in control of the road (generally the local council or the Roads and Traffic Authority) the cost incurred in fixing	Not Triggered	Based on information provided to SLR this has not been triggered.	
	any damage to roads caused by operations carried out under the lease, less any amount paid or payable from the Mine Subsidence Compensation Fund.			
22	Trees and Timber			
	(a) The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder who is entitled to the use of the timber, or if such a			
	landholder refuses consent or attaches unreasonable conditions to the consent, without the approval of a warden. (b) The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on the lease area except such as directly obstructs or prevents the	Not Triggered	Record on information provided to SLD this has not been triggered	
	carrying on of operations. Any clearing not authorised under the Mining Act 1992 must comply with the provisions of the Native Vegetation Act 2003.	Not Triggered	Based on information provided to SLR this has not been triggered.	
	(c) The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.			
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Condition Number 25	Condition Resource Recovery	Compliance Status	Evidence	Recommended Action
	(a) Notwithstanding any description of mining methods and their sequence or of proposed resource recovery contained within the Mining Operations Plan, if at any time the Director- General is of the opinion that minerals which the lease entitles the lease holder to mine and which are economically recoverable at the time are not being recovered from the lease area, or that any such minerals which are being recovered are not being recovered to the extent which should be economically possible or which for environmental reasons are necessary to be recovered, he may give notice in writing to the lease holder requiring the holder to recover such minerals. (b) The notice shall specify the minerals to be recovered and the extent to which they are to be recovered, or the objectives in regard to resource recovery, but shall not specify the processes the lease holder shall use to achieve the specified recovery. (c) The lease holder must, when requested by the Director-General, provide such information as the Director-General may specify about the recovery of the mineral resources of the lease area. (d) The Director-General shall issue no such notice unless the matter has firstly been thoroughly discussed with and a report to the Director-General has incorporated the views of the lease holder. (e) The lease holder may object to the requirements of any notice issued under this condition and on receipt of such an objection the Minister shall refer it to a Warden for inquiry and report under Section 334 of the Mining Act, 1992. (f) After considering the Warden's report the Minister shall decide whether to withdraw, modify or maintain the requirements specified in the original notice and shall give the lease holder written notice of the decision. The lease holder must comply with the requirements of this notice.	Not Triggered	Based on information provided to SLR this has not been triggered.	
26	Indemnity			
	The lease holder must indemnify and keep indemnified the Crown from and against all actions, suits, claims and demands of whatsoever nature and all costs, charges and expenses which may be brought against the lease holder or which the lease holder may incur in respect of any accident or injury to any person or property which may arise out of the construction, maintenance or working of any workings now existing or to be made by the lease holder within the lease area or in connection with any of the operations notwithstanding that all other conditions of this lease shall in all respects have been observed by the lease holder or that any such accident or injury shall arise from any act or thing which the lease holder may be licensed or compelled to do.	Note	- Exceedance of LA1(1minute) criteria of 6dB and 7dB at ATN4 and R13 in June 2016. Documented in 2016 Annual Review and Quarterly Monitoring report (Global Acoustics report 16217_R01). Corrective actions undertaken and documented in incident report dated 05/07/2016. - 1dB exceedance of LAeq(15minute) criteria at ATN007 during the daytime period in October 2017 (Q4). Documented in 2017 Annual Review. However it is noted that a discrepancy between+E52 monitoring results presented in the 2017 Annual Review and Q4 Monitoring report (Global Acoustics Report 17424_R01) where no exceedance is recorded. - No exceedances recorded during 2018 period. - No exceedances recorded during the 2019 audit period (January - April 2019).	
28	Security			
	(a) The single security in the sum of \$1,905,000 must be given and maintained with the Minister by the lease holder for the purpose of ensuring the fulfilment by the lease holder of obligations under CCL 719 and CCL 721. If the lease holder fails to fulfil any one or more of the obligations under this lease, then the security held may be applied at the discretion of the Minister towards the cost of fulfilling such obligations. For the purpose of this clause the lease holder shall be deemed to have failed to fulfil the obligations of the lease if the lease holder fails to comply with any condition or provision hereof, any provision of the Act or regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder. (b) The lease holder must provide the security required by sub-clause (a) in one of the following forms: (i) cash, (ii) a security certificate in a form approved by the Minister and issued by an authorised deposit-taking institution	Compliant	Security deposit provided to SLR for this audit. Dated August 2018 with RCE value of \$3,109,607. Evidence of approval letter from Resources Regulator dated 19 October 2018.	
29	Prescribed Dam			
	(a) Notwithstanding any Mining Operations Plan, the lease holder must not mine within any part of the lease area which is within the notification area of the Mannering Creek Ash Dam, Colongra Creek Ash Dam and Vales Point Ash Dam without the prior written approval of the Minister and subject to any conditions he may stipulate. (b) Where the lease holder desires to mine within the notification area he must: (i) at least twelve (12) months before mining is to commence or such lesser time as the Minister may permit, notify the Minister of the desire to do so. A plan of the mining system to be implemented must accompany the notice; and (ii) provide such information as the Minister may direct. (c) The Minister must not, except in the circumstances set out in sub-paragraph (ii), grant approval unless sub-paragraph (i) of this paragraph has been complied with. This sub-paragraph is complied with if: (ii) the Dams Safety Committee as constituted by Section 7 of the Dams Safety Act 1978 and the owner of the dam have been notified in writing of the desire to mine referred to in paragraph (b). (iii) the Director-General has complied with any reasonable request made by the Dams Safety Committee or the owner of the dam for further information in connection with the mining proposal. (iv) the Dams Safety Committee has made its recommendations concerning the mining proposal or has informed the Minister in writing that it does not propose to make any such recommendations; and (v) where the Dams Safety Committee has made recommendations or any of them - in accordance with a determination under sub-paragraph (ii) of this paragraph. (vi) Where the Minister does not accept those recommendations or any of them - in accordance with a determination under sub-paragraph (ii) of this paragraph. (vi) Where the Minister does not accept those recommendations or the Dams Safety Committee on where the Dams Safety Committee has failed to make any recommendations and has not informed the Minister in writing that it does not propose to	Compliant	There are no prescribed dams.	
30	Suspension of Mining Operations			
31	The holder of a consolidated mining lease may not suspend mining operations in the mining area other than in accordance with the consent of the Minister. Cooperation Agreement The licence holder must make every reasonable attempt, and be able to demonstrate their attempts, to enter into a cooperation agreement with the holder(s) of any overlapping petroleum title(s). The cooperation agreement should address but not be limited to issues such as: - access arrangements - operational interaction procedures dispute resolution - information exchange well location - timing of drilling - potential resource extraction conflicts and rehabilitation issues.	Not Triggered Note		
Special Conditions	Davidan			
32	The lease holder, unless with the consent of the Minister and subject to such conditions as the Minister may impose, shall not conduct mining operations on those parts of the subject area within the highwater level subsidence control zone defined: (a) on the surface by the highwater level of Lake Macquarie and Pallamanaba Creek and a point 2.44 metres in elevation above that highwater level; (b) in the seam by a line defined by an angle of draw of 35° drawn landwards from the line drawn vertically beneath a point 2.44 metres in elevation above the highwater level of Lake Macquarie and Pallamanaba Creek; (c) in the seam by a line defined by an angle of draw of 35°drawn lakewards from the line drawn vertically beneath the highwater level of Lake Macquarie.	Compliant	Based on the information provided, mining has been completed within approved limits.	

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Condition Number	Condition	Compliance Status	Evidence	Recommended Action
33	Any approval or consent given by the Minister including any approval or consent given pursuant to any condition or term contained in a lease consolidated into this lease to the effect that the lease holder may conduct mining operations on those parts of the subject area within the highwater level subsidence control zone as defined in Condition 32 shall be deemed to be a consent given for the purposes of the said Condition 32, subject to the same conditions of that approval or consent Provided however that this clause shall also apply to any barrier 60.35 metres wide within the said zone.	Compliant	Based on the information provided, mining has been completed within approved limits.	
34	The lease holder shall not work or cause to be worked any seam of coal within the subject area without leaving, if the Minister by order given in writing to the lease holder so directs, a barrier of such width or a protective pillar or pillars of such size or sizes as is specified in the order, against any surface improvements or any feature whether natural or artificial.	Compliant	Based on the information provided, mining has been completed within approved limits.	
35	Unless with the consent of the Minister first had and obtained, and subject to such conditions as he may impose, the lease holder shall not conduct mining operations on those parts of the subject area: (a) beneath the main buildings of the Munmorah and Vales Point Power Stations constructed on the excepted surface of the subject area; (b) within the marginal zone which is the area contained by an angle of draw of 35°. . measured outwards from the external walls of the main buildings of the Munmorah and Vales Point Power Station to the floor of the seam.	Compliant	Based on the information provided, mining has been completed within approved limits.	
36	Any approval or consent given by the Minister, including any approval or consent given pursuant to any condition, or term contained in a lease consolidated into this lease, to the effect that the lease holder may conduct mining operations on those parts of the subject area within the barrier defined in Condition 35 shall be deemed to be a consent given for the purposes of the said Condition 35, subject to the same conditions of that approval or consent.	Compliant	Based on the information provided, mining has been completed within approved limits.	
37	The lease holder shall be limited to the following purposes and conditions within the specified areas described on Plan No. 06180 marked Plan 'B'. Condition 12 noted on Plan 'B' is replaced by Condition 37.	Compliant	Based on the information provided, mining has been completed within approved limits.	

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Consolidated Coal Lease 707

Audit Period = 1 January 2016 – 5 April 2019

Condition Number	Condition	Compliance Status	Evidence	Recommended Action	
Mining Lease Condi					
Notice to Landholde	rs				
1	Within a period of three months from the date of grant/renewal of this lease or within such further time as the Minister may allow, the lease holder must serve on each landholder of the land a notice in writing indicating that this lease has been granted/renewed and whether the lease includes the surface. An adequate plan and description of the lease area must accompany the notice. If there are ten or more landholders affected, the lease holder may serve the notice by publication in a newspaper circulating in the region where the lease area is situated. The notice must indicate that this lease habeen granted/renewed; state whether the lease includes the surface and must contain an adequate plan and description of the lease area.	Not Triggered is	Outside of the audit period.		
	I on, Environmental Management Process (MREMP)				
2. Mining Operation	s Plan (MOP)			T	
1	Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:- (a) ongoing mining operations and environmental management; and (b) ongoing monitoring of the project.		Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. At there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time. Both MOPs cover the required aspects of this condition.		
2	The Plan must be prepared in accordance with the Director-General's guidelines current at the time of lodgement.	-	MOP prepared in accordance with the DPE - RR Guidelines.		
3	A Plan must be lodged with the Director-General:- (a) prior to the commencement of mining operations (including mining purposes); (b) subsequently as appropriate prior to the expiry of any current Plan; and (c) in accordance with any direction issued by the Director-General.	Non-Compliant (Low Risk)	Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. At there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time. Both MOPs cover the required aspects of this condition.		
4	The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:- (a) area(s) proposed to be disturbed under the Plan; (b) mining and rehabilitation method(s) to be used and their sequence; (c) areas to be used for disposal of tailings/waste; (d) existing and proposed surface infrastructure; (e) existing flora and fauna on the site; (f) progressive rehabilitation schedules; (g) areas of particular environmental, ecological and cultural sensitivity and measures to protect these areas; (h) water management systems (including erosion and sediment controls); (l) proposed resource recovery; and (j) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining land use/vegetation.		Two MOPs provided for this audit. MOP 1 - 1 April 2015 - 31 March 2018. MOP 2 - 1 October 2018 - 31 December 2020. There appears to be a gap in the MOPs between March and October 2017. There has been no evidence of the reason why there was a gap and whether the site was approved to operate without a MOP in that period. At there is no information provided this condition is non - compliant. There is now an approved MOP therefore there is no further recommendation relating to this period of time. Both MOPs cover the required aspects of this condition. Conditions a-j.		
5	The Plan when lodged will be reviewed by the Department.	Note			
6	The Director-General may within two (2) months of the lodgement of a Plan, require modification and re-lodgement.	Note			
7	(7) If (2) months of the lodgement of a Plan, the lease holder may proceed with implementation of the Plan.	Note			
8	During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) - (7) above.	Note			
3. Annual Environm	3. Annual Environmental Management Report (AEMR)				
1	Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General.	Compliant	Annual Reviews prepared and submitted for 2016, 2017, 2018. There are recommendations relating to the Annual Review from this audit which are covered within Schedule 6 Condition 4 of the Development Consent.		
2	The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of: (a) the accepted Mining Operations Plan; (b) development consent requirements and conditions; (c) Department of Environment and Conservation and Department of Planning licences and approvals; (d) any other statutory environmental requirements;		Annual Review covers conditions b-f. However there is minimal information regarding a review and forecast against the MOP.	Ensure the Annual Review reports on the progress of the operation against the MOP.	
	(e) details of any variations to environmental approvals applicable to the lease area; and (f) where relevant, progress towards final rehabilitation objectives.				

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3	After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.	Note		
4	The lease holder shall, as and when directed by the Minister, co-operate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies and the local council.	Note		
4. Subsidence Ma	inagement			
	(a) The lease holder shall prepare a Subsidence Management Plan prior to commencing any underground mining operations which will potentially lead to subsidence of the land surface. (b) Underground mining operations which will potentially lead to subsidence include secondary extraction panels such as longwalls or miniwalls, associated first workings (gate roads, installation roads and associated main headings, etc.), and pillar extractions, and are otherwise defined by the Applications for Subsidence Management Approvals guidelines \((EDG17)\) ((c) The lease holder must not commence or undertake underground mining operations that will potentially lead to subsidence other than in accordance with a Subsidence Management Plan approved by the Director-General, an approval under the Coal Mines Regulation Act 1982, or the document New Subsidence Management Plan Approval Process - Transitional Provisions (EDP09). (d) Subsidence Management Plans are to be prepared in accordance with the Guideline for Applications for Subsidence Management Approvals. (e) Subsidence Management Plans as approved shall form part of the Mining Operations Plan required under Condition 2 and will be subject to the Annual Environmental Management Report process as set out under Condition 3. The SMP is also subject to the requirements for subsidence monitoring and reporting, set out in the document New Approval Process for Management of Coal Mining Subsidence - Policy.	Compliant	Subsidence Management Plans prepared prior to this audit period. Several Extraction Plans prepared during the audit period. They are prepared under a separate Extraction Plan Guideline and do not specifically need to cover this condition. No additional Subsidence Management Plans prepared in the audit period	Discharge locations sighted in the field inspection. Records of discharge volume and water quality outlined in Annual Reviews.
5. Working Requ	rement			
	The lease holder must: (a) ensure that at least 43 competent people are efficiently employed on the lease area on each week day except Sunday or any week day that is a public holiday, OR (b) expend on operations carried out in the course of prospecting or mining the lease area, an amount of not less than \$752,500 per annum whilst the lease is in force. The Minister may at any time or times, by instrument in writing sensed on the I lease holder, increase or decrease the expenditure required or the number of people to be employed	Compliant	Operations meet sub condition a and b.	
6. Control of Ope	(a) If an Environmental Officer of the Department believes that the lease holder is not complying with any provision of the Act or any condition of this lease relating to the working of the lease, he may direct the			
	lease holder to:- (I) cease working the lease; or (ii) cease that part of the operation not complying with the Act or conditions; until in the opinion of the Environmental Officer the situation is rectified. (b) The lease holder must comply with any direction given. The Director- General may confirm, vary or revoke any such direction. (c) A direction referred to in this condition may be sensed on the Mine Manager.	Not Triggered	Based on information provided to SLR this has not been triggered.	
7. Reports				
8. Licence to Use	The lease holder must provide an exploration report, within a period of twenty- eight days after each anniversary of the date this lease has effect or at such other date as the Director-General may stipulate, of each year. The report must be to the satisfaction of the Director-General and contain the following: (a) Full particulars, including results, interpretation and conclusions, of all exploration conducted during the twelve months period; (b) Details of expenditure incurred in conducting that exploration; (c) A summary of all geological findings acquired through mining or development evaluation activities; (d) Particulars of exploration proposed to be conducted in the next twelve months period; (e) All plans, maps, sections and other data necessary to satisfactorily interpret the report.	Administrative Non- Compliance	Evidence of submission for 2016, 2017 and 2018 Group Exploration Reports. LakeCoal received a PIN from the Resources Regulator on 7 November 2017 for late lodgement. In the version supplied to SLR there are no figures.	Ensure Group Exploration Reports meet the required timeframe. Ensure figures are included in the reports.
	(a) The lease holder grants to the Minister, by way of a non-exclusive licence, the right in copyright to publish, print, adapt and reproduce all exploration reports lodged in any form and for the full duration of			
	copyright. (b) The non-exclusive licence will operate as a consent for the purposes of section 365 of the Mining Act 1992.	Note		
9. Confidentiality	-			
	(a) All exploration reports submitted in accordance with the conditions of this lease will be kept confidential while the lease is in force, except in cases where: (I) the lease holder has agreed that specified reports may be made non- confidential. (ii) reports deal with exploration conducted exclusively on areas that have ceased to be part of the lease. (b) Confidentiality will be continued beyond the termination of a lease where an application for a flow-on title was lodged during the currency of the lease. The confidentiality will last until that flow-on title or any subsequent flow-on title, has terminated. (c) The Director-General may extend the period of confidentiality.	Note		
10. Terms of the	non-exclusive licence			

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	The terms of the non-exclusive copyright licence granted under condition 8 (a) are:			
	(a) the Minister may sub-licence others to publish, print, adapt and reproduce but not on-licence reports.			
	(b) the Minister and any sub-licensee will acknowledge the lease holder's and any identifiable consultant's ownership of copyright in any reproduction of the reports, including storage of reports onto an electronic database.	Note		
	(c) the lease holder does not warrant ·ownership of all copyright works in any report and, the lease holder will use best endeavours to identify those parts of the report for which the lease holder owns the copyright.	110.0		
	(d) there is no royalty payable by the Minister for the licence.			
	(e) if the lease holder has reasonable grounds to believe that the Minister has exercised his rights under the non-exclusive copyright licence in a manner which adversely affects the operations of the lease holder, that licence is revocable on the giving of a period of not less than three months notice.			
11. Blasting				
	(a) County Wheating			
	(a) Ground Vibration			
	The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does not exceed 5 mm/second 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 be, unless determined otherwise by the Department of Environment and Conservation.			
	(b) Blast Overpressure	Not Triggered	No above ground blasting has been undertaken during the audit period.	
	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 be, unless determined otherwise by the Department of Environment and Conservation.			
12. Safety				
	Operations must be carried out in a manner that ensures the safety of persons or stock in the vicinity of the operations. All drill holes shafts and excavations must be appropriately protected, to the satisfaction of the Director-General, to ensure that access to them by persons and stock is restricted. Abandoned shafts and excavations opened up or used by the lease holder must be filled in or otherwise rendered safe to a standard acceptable to the Director-General.	N/A	This is not a safety audit.	
13. Rehabilitation				
	(a) Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that:-			
	there is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion.			
	the state of the land is compatible with the surrounding land and land use requirements.			
	• the landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land.	Not Triggered	No areas available for rehabilitation. Minimal disturbance required during	
	• in cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re- established with close reference to the flora survey included in the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density.		the audit period.	
	• the land does not pose a threat to public safety.			
	(b) Any topsoil that is removed must be stored and maintained in a manner acceptable to the Director-General.			
14	The lease holder must comply with any direction given by the Director-General regarding the stabilisation and revegetation of any mine residues, tailings or overburden dumps situated on the lease area.	Not Triggered	Based on information provided to SLR this has not been triggered.	
15. Exploratory Di	illing		There are no tailings or overburden areas.	
15. Exploratory Di				
	(1) At least twenty eight days prior to commencement of drilling operations the lease holder must notify the relevant Department of Natural Resources regional hydrogeologist of the intention to drill exploratory drill holes together with information on the location of the proposed holes.			
	(2) If the lease holder drills exploratory drill holes he must satisfy the Director- General that:-			
	(a) all cored holes are accurately surveyed and permanently marked in accordance with Departmental guidelines so that their location can be easily established;			
	b) all holes cored or otherwise are sealed to prevent the collapse of the surrounding surface;			
15	(c) all drill holes are permanently sealed with cement plugs to prevent surface discharge of groundwater's;	Not Triggered	Based on discussions with Environment and Community Co-ordinator there has been no exploration for several years. Nothing mentioned in the	
	(d) if any drill hole meets natural or noxious gases it is plugged or sealed to prevent their escape;		Annual Reviews.	
	(e) if any drill hole meets an artesian or sub-artesian flow it is effectively sealed to prevent contamination of aquifers.			
	(f) once any drill hole ceases to be used the hole must be sealed in accordance with Departmental guidelines. Alternatively, the hole must be sealed as instructed by the Director-General.			
	(g) once any drill hole ceases to be used the land and its immediate vicinity is left in a clean, tidy and stable condition.			
	19/			
16. Prevention of	Soil Erosion and Pollution			
	Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion, unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan. For the purpose of this condition, water shall be taken to include any watercourse, waterbody or groundwater's. The lease holder must observe and perform any instructions given by the Director-General in this regard.	Compliant	The field inspection around the pit top and other areas did not identify any significant areas of erosion.	
17. Transmission	Inlines, Communication lines and Pipelines			
18. Fences, Gates	Operations must not interfere with or impair the stability or efficiency of any transmission line, communication line, pipeline or any other utility on the lease area without the prior written approval of the Director-General and subject to any conditions he may stipulate.	Not Triggered	Based on information provided to SLR this has not been triggered.	
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	(a) Activities on the lease must not interfere with or damage fences without the prior written approval of the owner thereof or the Minister and subject to any conditions the Minister may stipulate.			
	(a) remains of the fact of the	Not Triggered	Based on information provided to SLR this has not been triggered.	
	(b) Gates within the lease area must be closed or left open in accordance with the requirements of the landholder.			
19. Roads and Trac	I ks			
	a) Operations must not affect any road unless in accordance with an accepted Mining Operations Plan or with the prior written approval of the Director-General and subject to any conditions he may stipulate.			
	and the state of t			
	(b) The lease holder must pay to the designated authority in control of the road (generally the local council or the Roads and Traffic Authority) the cost incurred in fixing any damage to roads caused by operations carried out under the lease, less any amount paid or payable from the Mine Subsidence Compensation Fund.	Not Triggered	Based on information provided to SLR this has not been triggered.	
	carried out under the lease, less any amount paid or payable noin the wine Subsidence Compensation r und.			
20	Access tracks must be kept to a minimum and be positioned so that they do not cause any unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible	Compliant	Minimal tracks. Only around pit top and vent shaft area.	
	after they are no longer required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Natural Resources.			
21. Trees and Timb				
	The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder who is entitled to the use of the timber, or if such a landholder refuses consent or attaches unreasonable	•		
	conditions to the consent, without the approval of a warden.			
	The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on the lease area except such as directly obstructs or prevents the carrying on of operations. Any clearing not			
	authorised under the Mining Act 1992 must comply with the provisions of the Native Vegetation Act 2003.	Not Triggered	Based on information provided to SLR this has not been triggered.	
	(c) The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.			
23. Resource Recov	rery			
	(a) Notwithstanding any description of mining methods and their sequence or of proposed resource recovery contained within the Mining Operations Plan, if at any time the Director-General is of the opinion that minerals which the lease entitles the lease holder to mine and which are being recovered are			
	not being recovered to the extent which should be economically possible or			
	(which for environmental reasons are necessary to be recovered, he may give notice in writing to the lease holder requiring the holder to recover such minerals.			
	(b) The notice shall specify the minerals to be recovered and the extent to which they are to be recovered, or the objectives in regard to resource recovery, but shall not specify the processes the lease holder shall			
	use to achieve the specified recovery.			
	(c) The lease holder must, when requested by the Director-General, provide such information as the Director-General may specify about the recovery of the mineral resources of the lease area.			
		Not Triggered	Based on information provided to SLR this has not been triggered.	
	(d) The Director-General shall issue no such notice unless the matter has firstly been thoroughly discussed with and a report to the Director-General has incorporated the views of the lease holder.			
	(e) The lease holder may object to the requirements of any notice issued under this condition and on receipt of such an objection the Minister shall refer it to a Warden for inquiry and report under Section 334 of the			
	Mining Act, 1992.			
	(f) After considering the Warden's report the Minister shall decide whether to withdraw, modify or maintain the requirements specified in the original notice and shall give the lease holder written notice of the decision			
	The lease holder must comply with the requirements of this notice			
24. Indemnity				
•				
	The lease holder must indemnify and keep indemnified the Crown from and against all actions, suits, claims and demands of whatsoever nature and all costs, charges and expenses which may be brought against			
	The lease holder in which the lease holder may incur in respect of any accident or injury to any person or property which may arise out of the construction, maintenance or workings now existing or to	N-4-		
	be made by the lease holder within the lease area or in connection with any of the operations notwithstanding that all other conditions of this lease shall in all respects have been observed by the lease holder or that	Note		
	any such accident or injury shall arise from any act or thing which the lease holder may be licensed or compelled to do.			
05 01-1-0				
25. Single Security	(extended)			T
	(a) The single security given and maintained with the Minister by the lease holder for the purpose of ensuring the fulfilment by the lease holder of obligations under Mineral Lease 1051 (Act 1906), Ministry Durance Lease 1050 (Act 1906), Ministry			
	1052 (Act 1906), Mineral Lease 1308 (Act 1906), Mining Purposes Lease 211 (Act 1906), Mining Purposes Lease 1349 (Act 1906), Mining Purposes Lease 1389 (Act 1906), Mining Purposes Lease 1400 (Act 1906), Consolidated Coal Lease 706 (Act 1973) and Mining Purposes Lease 337 (Act 1973) is extended to apply to this lease.	,	Security deposit provided to SLR for this audit.	
	The state of the s	Compliant		
	(b) If the lease holder fails to fulfil any one or more of the obligations under this lease, then the security held may be applied at the discretion of the Minister towards the cost of fulfilling such obligations. For the	So.ripliant	Dated August 2018 with RCE value of \$3,109,607. Evidence of approval letter from Resources Regulator dated 19 October 2018.	
i			letter from Resources Regulator dated 19 October 2016.	
	purpose of this clause the lease holder shall be deemed to have failed to fulfil the obligations of the lease if the lease holder fails to comply with any condition or provision hereof, any provision of the Act or			
	purpose of this clause the lease holder shall be deemed to have failed to fulfil the obligations of the lease if the lease holder fails to comply with any condition or provision hereof, any provision of the Act or regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder.			
28. Suspension of I	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder.			
28. Suspension of I	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder.	Note		
	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder. ### Act or regulations made thereunder. ###################################	Note		
	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder. ### Act or regulations made thereunder. ###################################	Note		
	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder. Aining Operations	Note Note		
	regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder. ### Act or regulations made thereunder. ###################################			

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APPENDIX C

Audit Certification Form

Davalanment Name	Chain Valley Collieny
Development Name	Chain Valley Colliery
Development Consent No.	SSD 5465
Description of Development	Underground Coal Mine
Development Address	Off Construction Road, Vales Point NSW 2259
Operator	Delta Coal
Operator Address	Off Construction Road, Vales Point NSW 2259
Title of Audit	Chain Valley Colliery 2019 Independent Environmental Audit

I certify that I have undertaken the independent Audit and prepared the contents of the attached independent Audit report and to the best of my knowledge:

The Audit has been undertaken in accordance with relevant approval condition(s) and in accordance with the Auditing standard AS/NZS ISO 19011:2014 and Post Approval Guidelines – Independent Audits

The findings of the Audit are reported truthfully, accurately and completely;

I have exercised due diligence and professional judgement in conducting the Audit;

I have acted professionally, in an unbiased manner and did not allow undue influence to limit or over-ride objectivity in conducting the Audit;

I am not related to any owner or operator of the development as an employer, business partner, employee, sharing a common employer, having a contractual arrangement outside the Audit, spouse, partner, sibling, parent, or child;

I do not have any pecuniary interest in the Audited development, including where there is a reasonable likelihood or expectation of financial gain or loss to me or to a person to whom I am closely related (i.e. immediate family);

Neither I nor my employer have provided consultancy services for the Audited development that were subject to this Audit except as otherwise declared to the lead regulator prior to the Audit; and I have not accepted, nor intend to accept any inducement, commission, gift or any other benefit (apart from fair payment) from any owner or operator of the development, their employees or any interested party. I have not knowingly allowed, nor intend to allow my colleagues to do so.

Note.

The Independent Audit 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.

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).

Signature	
Name of Lead / Principal Auditor	Chris Jones
Address	10 Kings Road, New Lambton NSW 2305, Australia
Email Address	cjones@slrconsulting.com
Auditor Certification (if relevant)	Principal Environmental Auditor
Date:	24 June 2019



APPENDIX D

Endorsement of SLR



Chris Armit
Environment and Community
Lake Coal
PO Box 7115
MANNERING PARK NSW 2259

Contact: Leah Cook Phone: 02 65753403

Email: leah.cook@planning.nsw.gov.au

compliance@planning.nsw.gov.au

Chain Valley Colliery and Mannering Colliery 2019 Independent Environmental Audit Scope and Team Endorsement

Dear Mr Armit,

Thank you for providing a copy of SLR's Independent Environmental Audit (IEA) proposal for Chain Valley and Mannering Collieries, for endorsement of the team in accordance with SSD 5465, as modified and PA 06_0311, as modified.

The Department has reviewed the information provided and endorses the scope of the IEA and proposed audit team with the following personnel:

- Chris Jones Lead Auditor
- Tracey Ball Senior Assistant Auditor
- Martin Davenport Noise specialist

The Department has also requested that the audit team includes an independent subsidence specialist (endorsement pending) and their audit findings should be incorporated into the SLR report.

The Department expects that the audit will be conducted in accordance with the Independent Audit Guideline, October 2015. A copy of this guideline is available at: http://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/independent-audit-guideline-2015-10-23.ashx\

Please ensure that your audit team consults with relevant agencies to ascertain any aspects that the agencies wish the audit to address. Evidence of agency consultation and clear referencing to audit findings in relation to any agency request is to be provided in the audit report.

Please note that the Chain Valley approval has a tighter timeframe for delivery of the audit report and response to audit recommendations (RAR) (6weeks for the date of inspection, unless otherwise agreed). Please ensure that the RAR includes responses to all non-compliances and auditor recommendations with clear timeframes (dd-mm-yyyy) for implementation of the proposed corrective action.

Please contact me if you require any further clarification.

25/2/19

Yours sincerely

Leah Cook

Team Leader - Compliance

As Nominee of the Secretary

Department of Planning & Environment

L1, Suite 14, 1 Civic Avenue Singleton NSW 2330 | PO Box 3145 Singleton NSW 2330 | T 02 6570 3400 | compliance@planning.nsw.gov.au www.planning.nsw.gov.au

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Hi Chris

After due consideration, I, as nominee of the Secretary, approve an extension of time for the submission of the Chain valley IEA to 25th June 2019.

Any further concerns please contact the compliance team. Regards,

Leah Cook

Team Leader - Compliance Department of Planning & Environment Suite 14, Level 1, 1 Civic Av PO Box 3145 Singleton NSW 2330 http://www.planning.nsw.gov.au E: leah.cook@planning.nsw.gov.au compliance@planning.nsw.gov.au

P: 02 6575 3403 M: 0429 191 164







Please consider the environment before printing this e-mail.

From: Chris Armit <CArmit@deltacoal.com.au> Sent: Wednesday, 3 April 2019 3:54 PM

To: Leah Cook <Leah.Cook@planning.nsw.gov.au>; DPE PSVC Compliance Mailbox <compliance@planning.nsw.gov.au>; Joel Curran < Joel.Curran@planning.nsw.gov.au> Cc: Christopher Jones <ciones@slrconsulting.com>; Tracey Ball <tball@slrconsulting.com>

Subject: CVC IEA Reporting - Time Extension Request

Dear Leah,

We have commenced our CVC and Mannering IEA's this Tuesday, 3rd April 2019. I have been requested by Chris Jones (SLR Consulting) to seek from the secretary or secretary's nominee an extension of time required to submit a copy of the Chain Valley Independent Environmental Audit report to the proposed date of the 31st May 2019.

Currently, the 6 week due date would be 14th May, this is a proposed extension of approximately 2.5 weeks to account for personnel annual leave over the Easter/School holiday period. See below applicable CVC Mod 2 – IEA reporting condition.

10. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, submit a copy of the audit report to the Secretary, together with its response to any contained in the audit report.

Chris Jones does not seek an extension for the Mannering IEA as it already has a 12 week completion period from audit start which gives an achievable report submission date of 25th June 2019.

Regards, Chris

APPENDIX E

Review of Subsidence (SCT 2019)



6 June 2019

Christopher Jones Associate – Env Man Permitting & Compliance SLR Consulting Australia Pty Ltd 10 Kinas Rd **NEW LAMBTON NSW 2305**

HEAD OFFICE Cnr Kembla & Beach Streets Wollongong NSW 2500 Australia PO Box 824 Wollongong NSW 2520 Australia Telephone +61 2 4222 2777 Fax: +61 2 4226 4884 Email: sctnsw@sct.gs

BRISBANE OFFICE

Telephone/Fax: 0428 318 009 (international +61 428 318 009) Email: p.cartwright@sct.gs

BENDIGO OFFICE
Telephone: +61 3 5443 5941 Email: s.macgregor@sct.gs

CHA4988

Dear Chris

Independent Audit of Subsidence Related Issues for Chain Valley Colliery 2016-2019

Chain Valley Colliery (CVC) is an underground coal mine located at the southern end of Lake Macquarie approximately 40km south of Newcastle. CVC is required under Section 9 of Schedule 6 of Modification 2 of Development Consent SSD-5465 to undertake an Independent Environment Audit (IEA) by the end of February 2016 and every 3 years thereafter. CVC commissioned SLR Consulting Australia Pty Ltd (SLR) as the lead auditor for the 2019 IEA with SCT Operations Pty Ltd (SCT) providing an independent specialist review of subsidence related compliance as requested by the Department of Planning and Environment (DPE). This report presents the outcomes of our review of subsidence related compliance at CVC for the period 1 January 2016 to 5 April 2019 during which mining took place in Fassifern Seam miniwall panels MW10-12, MW5A, MW CVB1, N1 and S1.

Our review indicates that CVC is generally compliant or likely to be generally compliant with the development consent conditions and their commitments in relation to subsidence. There are multiple areas for improvement in monitoring systems and analysis and reporting of subsidence results. The monitoring systems in place for benthic and seagrass communities appear unlikely to be able to discriminate impacts to a level that would ensure subsidence related impacts are minor or negligible as required in the development consent conditions.

1. SCOPE OF WORKS

The scope of works as outlined in Jones (2019) requires the subsidence specialist to:

 Attend a one day site visit scheduled for 2 April 2019 to complete site inspections and review available information on site.

 Assess compliance for all subsidence related conditions in the Development Consent (SSD-5465), Consolidated Coal Leases and Statement of Commitments.

The outcomes of the one day site visit are presented in Section 3.

The following documents were reviewed as a basis to understand commitments made by LakeCoal Pty Ltd (LakeCoal) to manage subsidence impacts, regulatory requirements for management of subsidence impacts as conditions of approval and information provided by LakeCoal to confirm compliance or otherwise with these approval conditions.

Project Applications

- EMM 2015 Chain Valley Colliery Modifications 2: Statement of Environmental Effects | Section 96 Modification to SSD-5465 prepared for LakeCoal Pty Limited by EMM dated 29 June 2015.
- 2. Chain Valley Colliery Extraction Plan MW7 to MW12 prepared by Lake Coal dated 28 March 2013.
- 3. Chain Valley Colliery SMP Application MW7 to MW12: Application for Subsidence Management Plan Approval Written Report. Letter dated 3 March 2014.
- 4. Chain Valley Colliery Extraction Plan Miniwalls CVB1 to CVB3 prepared by Lake Coal ENV 00015 Rev 4 dated 28 June 2017.
- 5. Chain Valley Colliery Subsidence Monitoring Program Miniwalls CVB1 to CVB3 prepared by Lake Coal ENV 00014 dated 9 June 2017.
- 6. Chain Valley Colliery Extraction Plan Miniwalls S1 to N1 Prepared by Lake Coal Rev 1 dated 3 May 2018.

Project Approvals

- 7. Mod 2 Consolidated Consent SSD-5465 December 2015 which includes:
 - a. Schedule 4: Environmental Conditions Underground Mining Subsidence.
 - b. Appendix 9: Statement of Commitments in relation to Subsidence (Pg38) and Marine ecology (Pg39).
- 8. Chain Valley Colliery Extension Project (SSD 5465): Variation to Extraction Plan MW7-12 to include MW5A. Letter of Approval from DPE dated 13 February 2017.
- 9. Chain Valley Colliery Extension Project (SSD 5465): Extraction Plan Northern Mining Area Approval of Miniwalls N1 and S1. Letter of Approval from DPE dated 24 May 2018.

 Chain Valley Colliery Extension Project (SSD 5465) Approval of First Workings for Northern Mining Area. Letter of Approval from DPE dated 20 July 2018.

Compliance Monitoring

- Chain Valley Colliery Annual Review 2016: 1 January 2016 –
 31 December 2016. Document reference RPT 00024 dated 28 April 2017.
- 12. Chain Valley Colliery Annual Review 2017: 1 January 2017 31 December 2018. Document reference RPT 00041.
- Chain Valley Colliery Annual Review 2018: 1 January 2018 –
 31 December 2018. Document reference RPT 00059.
- 14. DgS 2017 Subsidence Data Review for Proposed Miniwalls CVB1 to CVB3 at Chain Valley Colliery. A letter report prepared by Ditton Geotechnical Services Pty Ltd (DgS) addressed to Adrian Moodie and date 15 November 2017.

2. BACKGROUND

This section brings together information available from a range of sources reviewed during the IEA as context for the audit.

CVC has been operating as an underground mine since 1962. The colliery has extracted coal from the Wallarah Seam, the Great Northern Seam and more recently the Fassifern Seam. Figure 1 reproduced from EMM (2015) shows the workings in the Wallarah and Great Northern Seams and Fassifern Seam to 2015 and the additional workings in the Fassifern Seam applied for under Modification 2 (MOD2) to SSD 5465.

All three coal seams dip gently to the southeast. The overburden depth to the uppermost Wallarah Seam ranges from approximately 80m in the north (Borehole EBU11) to 160m in the southeast. The Wallarah Seam is nominally 2.6m thick. The interburden to the Great Northern Seam comprises mainly conglomerate strata ranging in thickness from 10m in the north (EBU11) to 30m in the south. The Great Northern Seam and Fassifern Same mining sections are nominally 3m thick although the Fassifern Seam is somewhat thicker. In places, the Fassifern Seam is separated from the Great Northern Seam by approximately 80m of interburden comprising predominantly conglomerate strata but this reduces to 30m in the south under Chain Valley Bay.

CVC mine the Wallarah Seam using bord and pillar mining over an area of approximately 12km^2 located mainly (80%) under the Gwandalan / Summerland Point peninsular and (20%) under Lake Macquarie (Chain Valley Bay). Full extraction is limited to the land areas. First workings and partial extraction mining extends below Summerland Point, the lakeshore and Chain Valley Bay. Mining in the Wallarah Seam ceased in 1997.

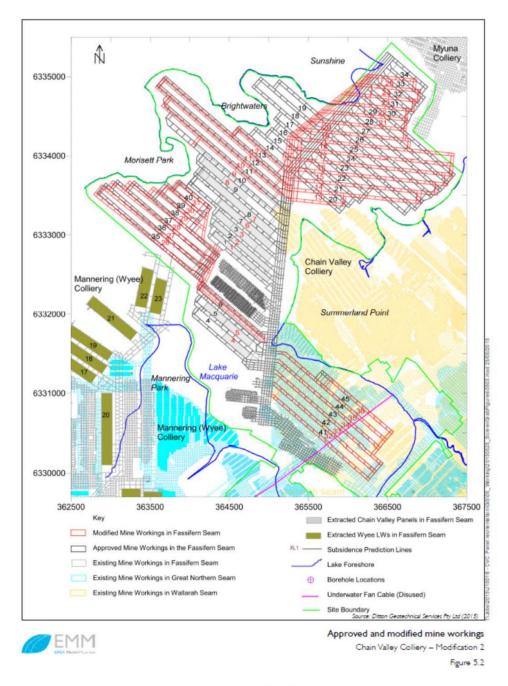


Figure 1: Plan showing proposed mining layout (from MOD2 EA)

The Great Northern Seam was mined over an area of approximately 4.5km², half below Chain Valley Bay and half below the southern part of the Gwandalan / Summerland Point peninsular. There are areas of full extraction including under both the lake and the peninsular and a similar sized area of partial extraction. There are large areas of small standing pillars along the northern shore of Chain Valley Bay south of Summerland Point.

The Fassifern Seam has been mined since 2006 as a series of narrow panels, initially pillar extraction panels with place changing and then from the latter half of 2011 as minimal panels. All the panels are located under Lake Macquarie in areas at least 26.5° angle of draw from the lakeshore.

Since 1979, CVC was operating under existing use right under the Mining Act 1992 until an Environmental Assessment process as required by a change in legislation was undertaken between 2009 and 2012 culminating in project approval MP 10_0161 on 23 January 2012. A modification was approved on 30 August 2012. In December 2013, a development consent (SSD 5465) was received for the Chain Valley Extension Project under Section 89E of the Environmental Planning and Assessment Act 1979 for CVC to continue mining via miniwall methods to the north of a previously approved boundary. This consent was modified as Modification 1 in November 2014 and MOD2 in December 2015. The IEA is being undertaken to comply with Section 9 of Schedule 6 of MOD2 of Development Consent SSD-5465.

In 2006, CVC was operated by Lake Coal Pty Ltd on behalf of the Wallarah Coal Joint Venture with Lake Coal holding an 80% shareholding in the joint venture. In March 2011 the remaining 20% was acquired by a consortium of shareholders through the entity Fassi Coal Pty Ltd. On 3 October 2018, Lake Coal Pty Ltd and Fassi Coal Pty Ltd were placed into voluntary administration and subsequently purchased on 1 April 2019 by Great Southern Energy trading as Delta Coal.

3. SITE INSPECTION

A site inspection was conducted by the author on 2 April 2018 as part of the IEA team to meet with CVC Environment and Community Coordinator, Mr Chris Armit, and to gain an understanding of:

- the history of mining at CVC
- the approvals under which the colliery is operating
- the monitoring data available
- the processes for reporting environmental impacts and
- conduct a surface inspection of the lakeshore at Summerland Point and Trinity Point.

The site visit was successful and informative. It was difficult to gain access to much of the foreshore areas, but the site inspection provided context for the audit.

Table 1 summarises the panels that were mined during each calendar year during the audit period from 1 January 2016 to 5 April 2019.

Table 1: Panels mined during audit period

Year	Miniwalls	Extraction Plan
2016	MW10, 11 & 12	Miniwalls 7-12 Extraction Plan (EP1)
	MW12	EP1
2017	MW5A	EP1 Miniwall 5A Modification (EP2)
	MWCVB1	Miniwalls CVB1-3 Extraction Plan (EP3)
2018	N1/S1	Miniwalls N1/S1 Extraction Plan (EP4)
2019	N1/S1	Miniwalls N1/S1 Extraction Plan (EP4)

The primary source of information of environmental impacts available for the audit were the three Annual Review (AR) reports for 2016, 2017 and 2018. No information was reviewed for the period 1 January 2019 to 5 April 2019.

4. OUTCOMES OF REVIEW

The issues identified in the consent conditions and repeated in the EA and various EPs and Subsidence Management Plans (SMPs) as requiring management of potential subsidence impacts include:

- Trinity Point Marina Development.
- Benthic communities on the floor of Lake Macquarie.
- Seagrass communities along the shore of Lake Macquarie.
- A requirement for long-term stable, non-subsiding first workings below any features requiring negligible environmental consequences.
- Second workings to be carried out in accordance with an approved EP.
- Other unspecified built features.
- Other unspecified threatened species or endangered populations.
- Negligible additional risk to public safety.

Given that subsidence from the mining undertaken during the IEA review period has been entirely under Lake Macquarie only the first five items are considered further in this audit review. The fifth item relating to second workings being carried out in accordance with an approved EP is the subject of this audit more generally.

Our review of the AR reports indicates that the monitoring to manage these features involves:

- monitoring of vertical subsidence along the lakeshore at selected sites
- annual bathymetric monitoring of the lake floor elevation
- surveys of benthic communities at multiple sites (the number varies) around the periphery of mining areas

surveys of seagrass communities.

The following conclusions are drawn from the information presented in the AR reports and DgS (2017).

4.1 Trinity Point Marina Development

Lakeshore subsidence monitoring indicates that there was approximately 10mm of subsidence at Trinity Point during the mining of adjacent miniwalls. Such low levels of subsidence are not expected to be perceptible or to cause any significant impact to the built features of the Trinity Bay Marina. On this basis, the relevant consent condition is considered to have been met.

Improvements related to the presentation of survey data for the Trinity Point Marina Development and the survey technique have been identified during the audit and it is recommended that these improvements be included in future ARs.

The data from Trinity Point Marina Development is not presented in the 2016 AR despite being referenced as Table 3.7 (a table which appears in the report but presents Greenhouse Gas Emission data).

The survey data is presented in the 2017 AR but in tabular form. The location of the monitoring points is difficult to relate to the location on the ground and changes are difficult to discern from the tabular data. Graphical presentation of the data and a figure showing where the ground movements have occurred and during which period of mining would assist with drawing meaning from the results and managing the potential for impacts.

There was no surveying data presented in the 2018 AR as there was no mining nearby.

A recommendation for the presentation of all future survey data would be to include a thorough and comprehensive analysis of the subsidence monitoring undertaken and independently reported so that the data can be meaningfully interpreted and comprehended by anyone with an interest in the outcomes.

The data presented in the ARs is for vertical level only. Subsidence monitoring based on levelling alone as a measure of ground movements is at the very basic end of contemporary subsidence monitoring practice. Three dimensional surveying with total station survey technology and high quality GNSS (i.e. GPS) control is readily available and widely used for subsidence monitoring. The benefits in terms of understanding the nature and extent of ground movements are significant. Horizontal movements are typically greater than the vertical movements in areas beyond the immediate footprint of mining. To measure and report only vertical subsidence movements is to miss most of the ground movements.

For sensitive high value features such as the marina, real-time continuous GNSS monitoring is available at relatively low cost and can be used to provide high confidence subsidence monitoring in three dimensions. A significant upgrade of subsidence monitoring systems and reporting protocols at CVC is recommended.

4.2 Benthic Communities

The development consent conditions for benthic communities require no more than minor environmental consequences, including minor changes to species composition and/or distribution. The ARs discuss the results of surveys being undertaken six monthly and annually during the audit period. There is no evidence of a 2019 survey yet, but it anticipated that this survey has been undertaken and will be included in the 2019 AR. SCT does not have expertise in benthic communities, but specialist survey reports included in the AR are interpreted as indicating mining subsidence has not had any significant impacts on the benthic communities. On this basis, the relevant consent condition is considered to have been met.

There are two issues that have been identified in the audit that are not critical but do suggest that the benthic community monitoring may not be able to deliver the outcomes anticipated in the development consent conditions.

The benthic communities appear to be being surveyed in areas outside the area where subsidence is greatest so the association between the survey data gathered and impacts from mining subsidence appears tenuous. These communities are noted in the AR as being insensitive to water depth so there may be no need to consider the effects of subsidence increasing water depth. If that is the case, it is difficult to understand why there is a need to undertake the monitoring at all.

Second, the surveying being undertaken appears to be of a nature that would make a definitive assessment of whether impacts were of "minor environmental consequences" somewhat challenging. The Benthic Communities Management Plan presents a statistical approach to quantifying the results that is to be conducted every three years. It is unclear whether this triennial statistical analysis has been completed. No results were found in the three ARs relating to the audit period. Even with statistical analysis, it is unclear how any quantitative changes that were able to be determined could be meaningfully linked to subsidence, especially give the spatial difference between the sampling and the areas of subsidence. The monitoring is interesting and may be useful in a broader sense, but it does not appear to be suitable as an auditable consent condition.

4.3 Seagrass Communities

The approach that CVC has adopted to protect the seagrass communities is based on a Seagrass Protection Barrier (SPB) equivalent to 26.5° angle of draw from the edge of the seagrass beds or 35° angle of draw from the lakeshore whichever is greater so that there is no secondary extraction directly below the seagrass beds or even close to them. The survey data presented indicates that there may have been some movement on the northern lakeshore of Chain Valley Bay due to earlier mining, but the data does not appear to have been analysed with the rigour required to confirm or otherwise any impacts to the seagrass communities. On balance, the relevant consent condition is considered likely to have been met, but further work is recommended to confirm this to the level required in the consent conditions.

Where only one seam has been mined, the SPB approach is expected to limit subsidence to less than about 20mm at the edge of the seagrass beds and less than about 200mm at the edge of extraction. The bathymetric survey data from Miniwalls 7-12 supports this expectation.

In areas where more than one seam has been mined, a protection barrier based on angle of draw is likely to be less effective. The northern shore of Chain Valley Bay is an area where there is pre-existing mining in two seams below the lakeshore. Bathymetric surveying shows that the mining of Miniwall CVB1 caused subsidence of 300-350mm at 110m from the panel edge. This same surveying indicates that subsidence has reduced to low levels at 250m from the panel edge which is still well away from the edge of the seagrass beds and therefore there is unlikely to have been any impacts from mining Miniwall CVB at the edge of the seagrass beds.

The lakeshore subsidence monitoring on Line 23 indicates that there has been approximately 140mm of subsidence at Pegs 70 and 71 (Table 3.19) and Pegs 71 and 72 (Figure 3.18) since the line was installed in 1994. The apparent additional 20-40mm of subsidence during the period of mining Miniwall CVB1 is plotted in Figure 2 (reproduced from the 2017 AR and 2018 AR). The same figure is shown in both reports without any update during 2018.

The subsidence observed is in an area where the Great Northern Seam and Wallarah Seam were mined in a way that would only be expected to cause low level subsidence. An assumption is made in the 2017 AR that there has been some ongoing movement associated with this previous mining. This assumption may be true, but the IEA review could not find evidence in the data presented to confirm if there is an ongoing trend through 2018 (and 2019) or if the offset observed during the period of monitoring is due to a shift in the survey control or other similar effect. Such information would be necessary to inform an assessment of whether there had been any significant impact to the seagrass beds in the area.

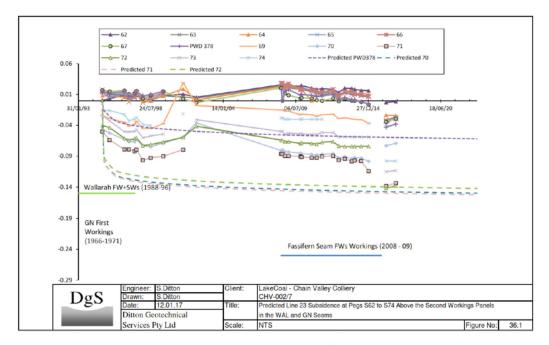


Figure 2: Line 23 subsidence monitoring (from 2017 & 2018 AERs)

The explanation provided that the subsidence is not due to mining Miniwall CVB1 and relates to earlier mining may be reasonable but similarly there may be other explanations. The mismatch between the data for Pegs 70, 71 and 72 presented in the table and the figure and the general lack of focus on the detail of the data do not build confidence in the information presented or in the ability of the monitoring to identify if the seagrass communities have been protected as required. A thorough review of the survey data and the generation of a subsidence report is recommended as is ongoing monitoring of this lakeshore.

It is not clear that the development consent conditions relating to the seagrass communities exempt CVC from the impacts due to earlier mining and the related commitments for offsets and other management controls as has been assumed in the 2017 and 2018 ARs.

4.4 Long-Term Stable First Workings

The information presented in the reports reviewed does not allow the long-term stability of the first workings to be assessed with confidence because the bathymetric survey method used does not have a high enough resolution to be unequivocal and lakeshore survey monitoring data is not convincing. Nevertheless, long-term stability is considered likely given the mining geometries involved. The data presented in Figure 2 suggests the possibility of some lack of long-term stability in the overlying seams. A close and thorough examination of this survey data is recommended to confirm whether this is the case or a result of survey related issues.

The relevant consent condition is considered likely to have been met without there being clear evidence to support this.

4.5 Second workings carried out in accordance with an approved EP

The IEA review indicates that all the second workings undertaken during the review period were carried out under approved EPs. The review further indicates that the subsidence related components have been carried out in general accordance with the processes described in the EA and EP.

The adequacy of the approaches described in the approved EA and EP to resolve compliance or otherwise of the impacts on benthic communities and seagrass communities is considered questionable but the challenges of finding better methodologies is recognised.

Improvements are recommended in relation to ground surveying along the lakeshore. The survey data that has been collected does not appear to have been thoroughly analysed. Thorough analysis may confirm that there is not any ongoing subsidence on the northern shore of Chain Valley Bay. If there is ongoing subsidence, this should be being monitored on a regular and ongoing basis. The use of a three-dimensional, continuous reading GNSS monitoring station with real-time monitoring should be considered.

The annual bathymetric subsidence monitoring appears to have been too infrequent to monitor subsidence for the management of panel design that was outlined in the Miniwall 7-12 EA. There does not appear to have been a design response when changes in subsidence were observed. The estimates of maximum subsidence have been increased and then further exceeded, but there has been no change in design. It is unclear if the commitment to six monthly bathymetry surveys after the subsidence observed in the 2017 AR has been adhered to.

Table 4 of the 2013 Miniwalls 7-12 EA indicates maximum subsidence of 440mm. The EA explains the subsidence monitoring plan as including:

In addition, regular and routine monitoring of the foreshore, lake bed, seagrass communities and benthic communities provide a means to verify and validate that predicted subsidence levels are not being exceeded, that the resultant levels of subsidence are not resulting in excessive impacts beyond those predicted. The mine design can then be adapted and refined as required if exceedances occur or are likely to occur.

Annual bathymetric surveys of the lake bed will be used to validate and confirm the predicted vertical subsidence around the miniwall panels. In addition ongoing surveys of benthic and seagrass communities will ensure that the resultant vertical subsidence levels are not resulting in more significant impacts than predicted. Appendix 2 and 3 contain the mines Benthic Community and Seagrass Management Plans.

The 2015 MOD2 subsidence assessment notes that the May 2015 bathymetric survey showed maximum subsidence of 570mm above Miniwalls 3-6. The MOD2 subsidence assessment updates the maximum subsidence predictions from 0.62m to 0.78m. The earlier 2013 predictions for Miniwalls 7-12 were 0.44m. These were updated to 0.72m. The associated assessments that rely on maximum predicated subsidence are considered in the MOD2 assessment.

Miniwall 12 was completed early in 2017. The 2017 AR reports maximum subsidence of 800-1100mm indicated by the bathymetric survey conducted in October 2017. The reference to subsidence exceeding predictions by approximately 430mm is not clear given that maximum subsidence of 1100mm exceeding predictions by 430mm would imply a prediction of 670mm. Nevertheless, maximum subsidence is significantly (250%) greater than the 440mm maximum subsidence predicted in the 2013 EA and 50% higher than the 720mm maximum subsidence predicted in the 2015 MOD2 assessment for the area above Miniwalls 7-12 (as per Figure 3a in DgS (2017)).

The sequence of significantly higher than predicted subsidence levels does not appear to have caused impacts greater than predicted, notwithstanding the absence of convincing assessment methodologies or that results for 2019 are not available. However, a more conservative approach to assessing future impacts from further mining is recommended to build confidence that the subsidence processes in play are understood and impacts that rely on the subsidence impacts can be suitably assessed prior to mining.

4.6 Other Issues

A range of other subsidence related compliance issues are presented in the IEA matrix. These are discussed in that matrix.

5. RECOMMENDATIONS

Recommendations from the IEA subsidence review are consolidated in this section.

A more conservative approach to assessing future impacts from further mining is recommended to build confidence that the subsidence processes in play are understood and impacts that rely on the subsidence impacts can be suitably assessed prior to mining.

A significant upgrade of subsidence monitoring systems and reporting protocols at CVC is recommended.

Presentation of all future survey data in ARs would benefit from a thorough and comprehensive analysis of the subsidence monitoring being undertaken by an external consultant so that the data can be meaningfully interpreted and is comprehensible by anyone with an interest in the outcomes.

The use of three dimensional surveying with total station survey and high quality GNSS (GPS) control is recommended. This technology is readily available and widely used for subsidence monitoring in NSW.

For sensitive high value features such as the marina or similar features, real-time continuous GNSS monitoring is available at relatively low cost and can be used to provide high confidence subsidence monitoring in three dimensions.

A review of benthic and seagrass community monitoring systems is recommended to confirm that the monitoring is capable of discriminating minor and negligible impacts as required by the development consent conditions.

A thorough review of the survey data and monitoring approach for Line 23 along the northern lakeshore of Chain Valley Bay is recommended.

If you have any queries or require further clarification of any of these issues, please don't hesitate to contact me directly.

Yours sincerely

Ken Mills

Principal Geotechnical Engineer

References

DGS 2017 Subsidence Data Review for Proposed Miniwalls CVB1 to CVB3 at Chain Valley Colliery. A letter report prepared by Ditton Geotechnical Services Pty Ltd (DgS) addressed to Adrian Moodie and date 15 November 2017.

EMM 2015 Chain Valley Colliery – Modifications 2: Statement of Environmental Effects | Section 96 Modification to SSD-5465 prepared for LakeCoal Pty Limited by EMM dated 29 June 2015.

Jones C. 2019, email 4 March 2019.

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Appendix 10: Independent Environmental Audit Action Plan

	Review Date	Next Review Date	Revision No	Document Owner	Page				
			1	Environmental Compliance Coordinator	Page 116 of 118				
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Independant Environmental Audit - Actions Register, Status Update as of 31 December 2020

CVC	Recommendations	Cancelled	Pending	Complete	Ongoing	Request extension	Overdue	
Schedule 2, Condition 7	REC 1			1				
Schedule 2, Condition 18	REC 2			1				
Schedule 3, Condition 1	REC 3			1				
Schedule 3, Condition 3	REC 4			1				
Schedule 3, Condition 4	REC 5			1				
Schedule 3, Condition 6	REC 6			1				
Schedule 3, Condition 7	REC 7			1				
Schedule 3, Condition 8	REC 8			1				
Schedule 3, Condition 11	REC 9			1				
Schedule 3, Condition 17	REC 10			1				
Schedule 3, Condition 18	REC 11			1				
Schedule 3, Condition 20	REC 12			1				
Schedule 3, Condition 21	REC 13			1				
Schedule 3, Condition 22	REC 14			1				
Schedule 3, Condition 27	REC 15			1				
Schedule 4, Condition 1	REC 16			1				
Schedule 5, Condition 1	REC 17			1				
Schedule 6, Condition 1	REC 18			1				
Schedule 6, Condition 4	REC 19			1				
Schedule 6, Condition 5	REC 20			1				
Schedule 6, Condition 7	REC 21			1				
Schedule 6, Condition 8	REC 22			1				
Schedule 6, Condition 11	REC 23			1				
Statement of Commitments	REC 24			1				
EPL 1770, O5.1	REC 25			1				
EPL 1770, M4.2	REC 26			1				
EPL 1770, M6.2	REC 27			1				
EPL 1770, M7.2	REC 28			1				
EPL 1770, M7.4	REC 29			1				
EPL 1770, R1.5	REC 30			1				
EPL 1770, R4.1	REC 31			1				
EPL 1770, U1.1	REC 32			1				
CCL 721, Condition 5	REC 33			1				
CCL 721, Condition 11	REC 34			1				
		Cancelled	Pending	Complete	Ongoing	Request extension	Overdue	Total
	Chain Valley	(34		· ·		



Appendix 11: Aboriginal Heritage Artefact Disturbance Event, Incident Report

R	eview Date	Next Review Date	Revision No	Document Owner	Page				
			1	Environmental Compliance Coordinator	Page 117 of 118				
	DOCUMENT UNCONTROLLED WHEN PRINTED								



26 October 2020

ATTN: Biodiversity and Conservation Division
Department of Planning, Industry & Environment

Dear Sir /Madam,

RE: Chain Valley Colliery, Indigenous Heritage Midden Sites, CV002 and CV003

Introduction

In the period between June and September 2020, Delta Coal undertook demolition of several mine cottages historically operated by Chain Valley Colliery (CVC) as shown on **Figure 1**.

Following completion of demolition works, a site inspection, undertaken by a Delta Coal employee, identified potential midden sites at the site exposed by the clearing of kerb and gutters of a bitumen road and the adjacent front yard with an additional site exposed by the installation of a sediment fence. These demolition activities were being undertaken as part of the progressive rehabilitation of the site under the approved Mining Operations Plan and development consent SSD-5465 as modified.

Background

Immediately following identification of the shells, Delta Coal sought to engage an independent Aboriginal Heritage consultant to undertake assessment and provide confirmation of the suspected midden sites. Delta Coal engaged Angela Besant, Senior Archaeologist of Insite Heritage Pty Ltd to undertake an inspection of the site as soon as reasonably practicable. The archaeological site inspection was undertaken on Friday, 16th October 2020, where the sites were measured and confirmed. On the Monday, 19th October Insite Heritage issued Delta Coal with a letter report describing the midden sites as well as providing site cards submitted to the Aboriginal Heritage Information Management System (AHIMS), the letter report is provided in **Attachment A**. Details regarding the Midden sites are identified in **Table 1**.

Table 1: CV002 and CV003 Midden Site Details

ID	AHIMS Site Card	Easting	Northing	Aboriginal Heritage Site Type
CV002	45-7-0412	365049	6330081	Midden Site
CV003	45-7-0413	365006	6330070	Midden Site

Registered Aboriginal Parties (RAPs) were notified of the unexpected find on the 22nd October 2020 and were invited to inspect the site where Delta Coal would make provisions for site access. The area is operated by Delta Coal within Development Consent SSD-5465 boundaries and is secured by Delta Coal with a locked gate and authorised access permitted to the site only.



Figure 1: Regional Context

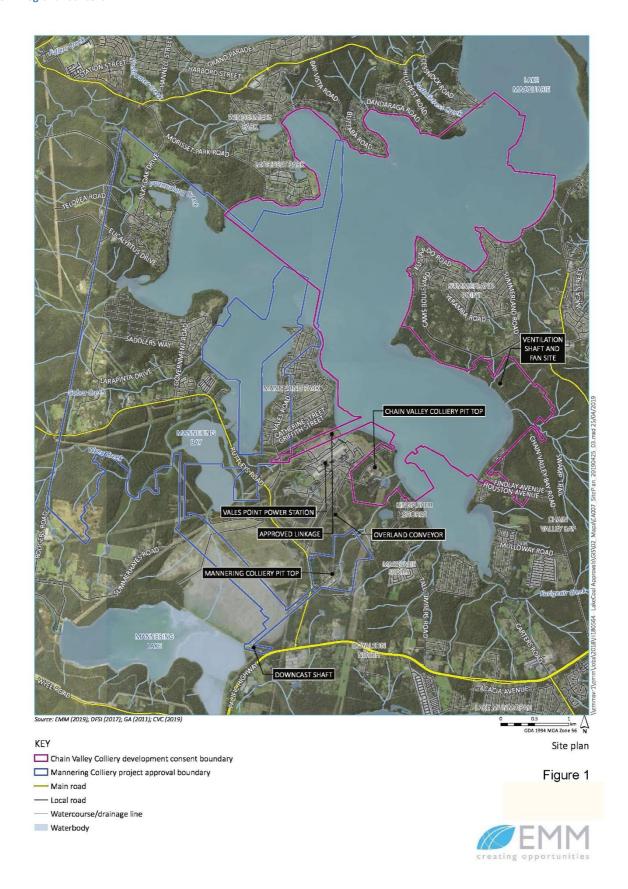




Figure 2: CV002 and CV003 Midden Site Locations





Chain Valley Colliery Heritage Management Plan Commitments

Delta Coal has included the two sites within a draft Delta Coal Heritage Management Plan, which has been provided to the RAPs and is planned for submission to the Department of Planning, Infrastructure and Environment (DPIE) in order to seek approval from the Planning Secretary.

Section 5.1.6 of the CVC Heritage Management Plan (Unexpected Finds Protocol), outlines the following with respect to unexpected heritage finds procedure:

"In the event any new Aboriginal sites are discovered as part of any future archaeological investigations, or should unanticipated Aboriginal objects be found during approved site clearing or construction activities, the following actions will be undertaken:

- work will halt in the vicinity of the site;
- the site Manager and Environment and Community Coordinator are to be notified;
- the site will be assessed by a qualified archaeologist with the RAPs;
- where possible the site should be avoided, but if this is not feasible and the site is likely to be impacted, appropriate mitigation measures will be determined in consultation with the Aboriginal stakeholders;
- work will only recommence once the Environment and Community Coordinator advises that the site can be avoided or statutory approval for impact has been obtained; and
- an AHIMS site card will be completed and submitted in compliance with s.89A of the NPW Act 1974 within 21 days of discovering the site."

Section 6.3 of the CVC Heritage Management Plan outlines the following with respect to incident and non-compliance reporting:

"If site inspections reveal that, as a direct result of CVC, there has been unpredicted damage to a site, then Delta Coal will conduct an investigation into the source of the damage with a suitably qualified and experienced archaeologist. The report will be provided to relevant people and/or groups, Councils and the Secretary of DPIE. The report will be provided to relevant people and /or groups including RAPs and BCD.

The Report will:

- describe the date, time and nature of the observation
- identify the cause (or likely cause) of the damage;
- describe what action has been taken to date; and
- describe the proposed measures to address the damage and prevent further such occurrences."

This incident report has been prepared in order to document and further substantiate Delta Coals compliance with the above requirements identified from the CVC Heritage Management Plan.

Cause of Damage

It is assumed that exposure and disturbance to the Midden sites occurred during the final process of the demolition project. The sites had not previously been identified in AHIMS searches, nor were they identified during a detailed site walkover undertaken with the Delta Coal project manager, Delta Coal environmental compliance coordinator and demolition contractor representatives prior to demolition works on the 3rd June 2020, it is noted that the vegetation covering present at the site would have precluded potential identification of



the Midden sites prior to disturbance. Follow up site inspections undertaking during the demolition project did not identify the Midden lenses.

Contractor Inductions

The Delta Coal surface induction contains an environmental awareness component and assessment which is required to be completed with satisfactory assessment results prior to an individual (employee or contractor) being permitted to conduct works on a Delta Coal site. The environmental awareness presentation identifies previously identified indigenous and non-indigenous heritage at Delta Coal operated sites (Chain Valley Colliery and Mannering Colliery) and clearly depicts the following:

- No clearing / land disturbance without authority;
- Due diligence process to apply (i.e. process outlined in land clearing/disturbance permit;
- Significant penalties exist for damaging or destroying Aboriginal sites without consent; and
- Identified heritage items located on pit top have been demarcated to prevent impact.

During this review of the incident and Delta Coals surface inductions, it was noted that while the location of existing sites are identified, as well as the requirement for heritage due diligence prior to works which may potentially disturb or clear ground. However, potential unexpected finds or heritage items likely to be present within CVC leases are not addressed. As such it is considered that improvement can be made to the site inductions.

Actions taken to date (26/10/2020)

Following identification of shells on the soil surface at the site by Delta Coal representatives, Delta Coal undertook the actions listed in the following order:

- 1. Delta Coal secured the site with locked gate to main access road, temporary fencing and sought to engage an independent, suitably qualified and experienced indigenous cultural heritage consultant;
- 2. Angela Besant of Insite Heritage confirmed the site as a Midden site to Delta Coal on the 19th October 2020;
- 3. Delta Coal notified RAPs to the site and invited members of the RAPs to attend and inspect the sites;
- 4. Delta Coal has provided an updated Delta Coal Heritage Management Plan which includes the two new sites; and
- 5. Delta Coal is undertaking a review of site inductions and training pertaining to indigenous heritage items.

Proposed Actions

In regards to the management of the site, Delta Coal is proposing to:

- Fence-off the two sites to demarcate the Midden sites and prevent any further unintentional damage;
- Delta Coal will update its site induction to briefly address potential unexpected cultural heritage sites and improve clarity regarding the unexpected finds procedure for suspected heritage sites; and
- Delta Coal is seeking to have key and relevant surface employees and contractors attend Aboriginal Cultural Heritage Awareness training



Yours faithfully,

Lachlan McWha

Environmental Compliance Coordinator

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ATTACHMENT A

INSITE HERITAGE, ABORIGINAL ARCHAELOGICAL MANAGEMENT REPORT



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Aboriginal Archaeological Management Report

Construction Rd Mannering Park

Report to

Delta Coal

October 2020

Introduction & Proposed Works

Insite Heritage Pty Ltd were commissioned by Great Southern Energy Pty Ltd T/as Delta Coal (Delta Coal) to provide an Aboriginal Heritage Management Report, with reference to the Chain Valley Colliery Heritage Management Plan, for the management of midden material exposed by the demolition of cottages and tarred and curbed road located within the Chain Valley Colliery lease area.

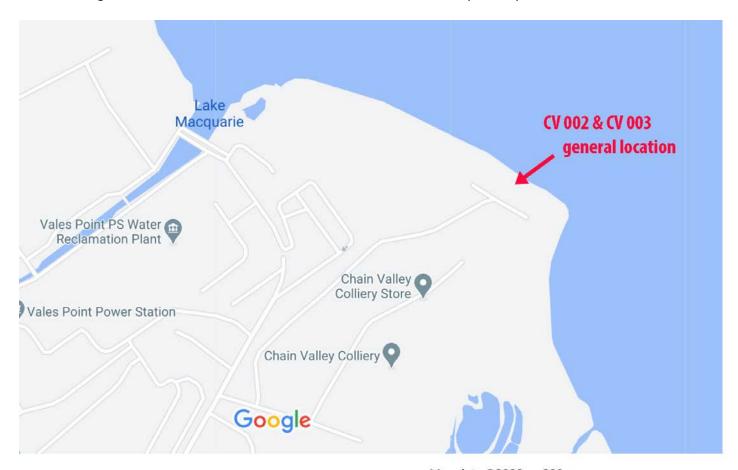


Figure 1 General location of midden lenses Delta Coal - Google Earth

The lenses of midden were exposed by the final clearing of construction material and the installation of sediment fencing to contain runoff from the demolition footprint. The demolished buildings were of brick on concrete slab construction. The roadway was tarred with concrete curbing (Figure 1).

The buildings were required to be demolished as they had become derelict and were being used by squatters, creating security and safety issues at the colliery site.

The sites have been placed on the AHIMS database having not been previously recorded.

CV002 is located at what was the rear of a cottage and CV003 was located on the margin of the curb and gutter of the tar access road (Figure 2). Lenses of midden are shown in Plates 1-3.

Relevant Legislation

Aboriginal heritage is protected in NSW under the *National Parks & Wildlife Act 1974*. Section 90 of the Act states that it is an offence to destroy, deface, damage or desecrate, or cause or permit the destruction, damage or desecration of an Aboriginal object or Aboriginal Place without prior consent of the Director General of the Office of Environment & Heritage.

Chain Valley Coal Heritage Management Plan

There are two relevant sections section within the CVC Heritage Management Plan applicable to the exposure of previously unknown Aboriginal heritage sites.

5.1.6 Unexpected Finds Procedure

In the event any new Aboriginal sites are discovered as part of any future archaeological investigations or should unanticipated Aboriginal objects be found during approved site clearing or construction activities, the following actions will be undertaken:

- Work will halt in the vicinity of the site;
- The site Manager and Environment and community Coordinator are to be notified;
- The site will be assessed by a qualified archaeologist with the RAPs;
- Where possible the site should be avoided, but if this is not feasible and the site is likely to be impacted, appropriate mitigation measure will be determined in consultation with Aboriginal stakeholders
- Work will only recommence once the Environment and Community Coordinator advises that the site can be avoided or statutory approval for impact has been obtained; and
- An AHIMS card be completed and submitted in compliance with s.89A of the NPW Act 1974.

6.3 Incident or Non-Compliance Reporting

This section requires that in the event of unpredicted damage to a site, Delta Coal will conduct an investigation into the source of the damage with a suitably qualified archaeologist. A report will be provided to the relevant people including RAPs and BCD.

The report will include:

- The date time and nature of observed damage
- Identify the cause of the damage
- Describe what action has been taken to date; and
- Describe the proposed measure to address the damage an prevent further such occurrences.



Figure 2 The lenses of midden material in the context of the development that was required to be demolished.



Plate 1 CV002 one of the discontinuous lenses of midden exposed over a length of 6 metres.

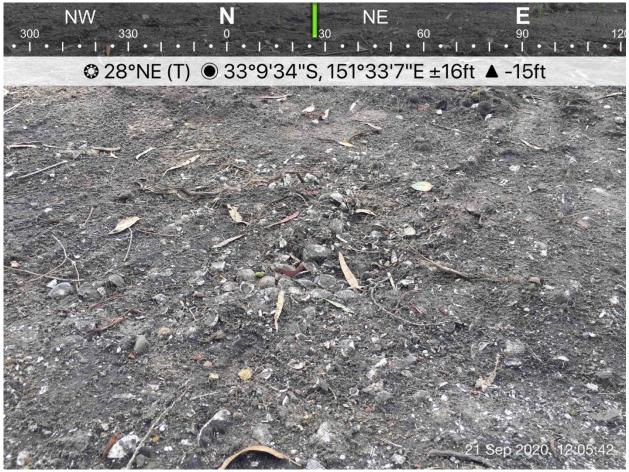


Plate 2 Exposed lens of midden CV 003



Plate 3 CV003 cordoned off.

Management Recommendations

The site inspection with the archaeologist (Angela Besant Insite Heritage), confirms that the lenses of shell exposed by the demolition / site clearance process, are lenses of midden and not natural shell deposits.

Accordingly, the lenses of shell have been placed on AHIMS as CV002 located 365049E 6330081N and CV003 365006E 6330070 N. Once reviewed and given an ID by AHIMS the site cards shall be forwarded to Delta Coal for their records.

The sites are currently secured by the use of a locked gate and lenses of shell demarcated by the use of cones and tape. Delta Coal propose to fence the site off with permanent/ semi-permanent fencing (stakes, wire and high visibility marking).

In order to comply with the Heritage management plan for the site the following recommendations are made:

- 1. Organise a site inspection with RAPs as soon as feasible.
- 2. Prepare the report required under S.6.3 of the Heritage Management Plan and forward to RAPs and BCD.
- 3. Update the management plan with the location of the sites.

Delta Coal, as part of the internal processes for permitting ground disturbance at the site requires consideration of environmental factors including cultural heritage sites. A review of AHIMS listed sites and a site walkover was undertaken prior to disturbance. Internal review completed by Delta Coal did not report any previously identified midden site, primarily due to the existing development of the site.

Regards,

Insite Heritage Pty Ltd

angle Best

Angela Besant
Snr Archaeologist

Insite Heritage.

References

- Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. NSW
 Office of Environment and Heritage (formerly Dept. of Environment, Climate Change & Water)
 2010.
- Chain Valley Colliery Heritage Management Plan

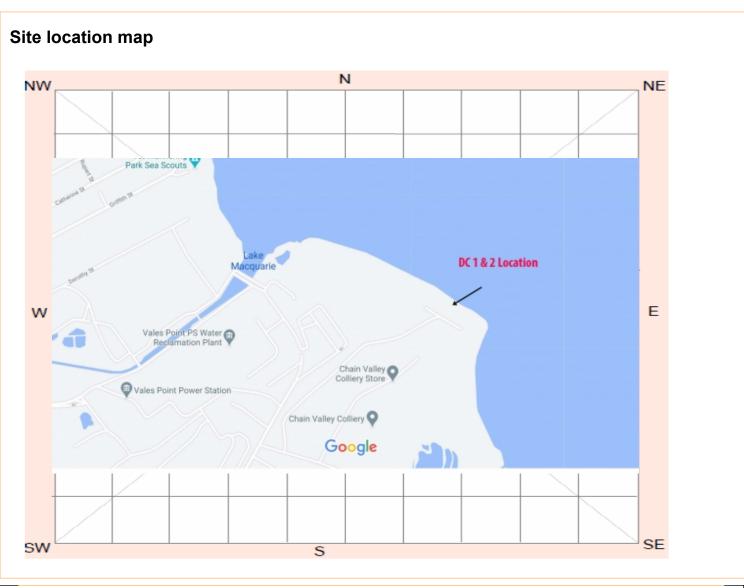
AHIMS Site Cards #45-7-0412 & #45-7-0413



Aboriginal Site Recording Form

AHIMS Registrar PO Box 1967, Hurstville 2220 NSW

AHIMS site ID): 45-7-0412]		Date recorded:	18-10-2020			
Site Location	Information	1								
Easting: 3	65049		Northing:	6330081		Coordinates must	be in GDA (MGA)			
Horizontal Ad	ccuracy (m):	10								
Zone: 56		Location	on method:	Non-Dif	ferential (GPS				
	Recorder Information (The person responsible for the completion and submission of this form) Title Surname First name									
Title		ame			A I	First name				
Ms. Besant Angela Organisation: Insite Heritage										
Address: PO Box 98 Wangi Wangi 2267										
Site Context	Information									
Land Form Pattern:	Coastal Plain			Land	l Use:	Mining				
Land Form Unit:	Plain			Vege	tation:	Cleared				
Distance to Water (m):		rimary eport:	Midden Len	ns Managem	ent Repo	ort to Delta Coal				
How to get to the site:										
Other site information: Shell exposed by demolition in location which would have been at the rear of a cottage - work was ceased in the area and the site to be managed as prescribed by the CHMP and in consultation with RAPs										



Site contents information	open/closed site: Open	Site condition: Disturbed
		Scarred Trees
Features:	features feature(s) feature	Vidth of eature (s) (cm) Scar Depth Regrowth (cm) Scar shape Tree Species
1. Shell	100 6	1
Description:		
L		Scarred Trees
Features:	features feature(s) fe	Vidth of eature (s) (cm) Scar Depth Regrowth (cm) Scar shape Tree Species extent (m)
2.		
Description:		

Features:	Number of feature(s) feature (s) extent (m) extent (m) Scarred Trees Scar Depth Regrowth (cm) (cm) Scar shape Tree Species
3.	
Description:	
	Scarred Trees
Features:	Number of features Length of feature (s) feature (s) extent (m) Extent (m) Scar Depth Regrowth (cm) Scar shape Tree Species
4.	
Description:	
	Scarred Trees
Features:	Number of features Length of Width of feature (s) feature (s) extent (m) extent (m) Scar Depth Regrowth (cm) (cm) Scar shape Tree Species
5.	
Description:	
	tion in location which would have been at the rear of a cottage - work was ceased in the area and s prescribed by the CHMP and in consultation with RAPs

Site plan



Site photographs lens of shell shell exposed by sediment controls Description: Description: overview of the location of the demolition of a row of brick on slab cottages View west over clearance area Description: Description: Site restrictions Gender General Location Do you want to **Restriction type:** Restrict this site?: Why is this site restricted?: **Further information contact** Title First name Surname Organisation: Address: Phone: E-mail:



Aboriginal Site Recording Form

AHIMS Registrar PO Box 1967, Hurstville 2220 NSW

AHIMS site ID): 45-7-0413					Date recorded:	18-10-2020	
Site Location	Information	1						
Easting: 3	65006		Northing:	6330070		Coordinates must be	e in GDA (MGA)	
Horizontal Accuracy (m): 10								
Zone: 56		Location	on method:	Non-Diffe	rential GPS	6		
Recorder Information (The person responsible for the completion and submission of this form)								
Title	Surn	ame			ngolo	First name		
Ms. Besar Organisation:	Insite Heritage			[A	ngela			
Address:	PO Box 98 War	ıgi Wang	i 2267					
Phone: 04128	336031	E-mail:	angela@i	nsiteheritage.	.com.au			
Site Context	Information							
Land Form Pattern:	Coastal Plain			Land	Use: Mini	ng		
Land Form Unit:	Plain			Vegeta	ation: Clea	ared		
Distance to Water (m):		rimary eport:	Midden Len	s Manageme	nt Report t	o Delta Coal		
How to get to the site: The site is located at the end of Construction Rd Mannering Park on Delta Colliery land. Permission to enter required.								
Other site information:	Shell exposed be margins of concein the area and in consultation v	rete curb the site to	on the margo to be manage	gin of a tar roa	ad. work w	as ceased		



Site contents information	open/closed site: Open	
		Scarred Trees
Features:	features feature(s)	Width of feature (s) extent (m) Scar Depth Regrowth (cm) (cm) Scar shape Tree Species
1. Shell	100 12	2
Description:		
		Scarred Trees
Features:	features feature(s)	Width of feature (s) extent (m) Scar Depth Regrowth (cm) Scar shape Tree Species
2.		
Description:		

	Scarred Trees
Features:	Number of feature(s) feature (s) extent (m) extent (m) Scar Depth Regrowth (cm) (cm) Scar shape Tree Species
3. Description:	
	Scarred Trees
Features:	Number of feature(s)
4.	
Description:	
	Scarred Trees
eatures:	Number of feature(s) feature (s) extent (m) feature (s) feature (s
5.	
Description:	
Other Site Shell exposed by dem road. work was cease	polition in location which would have been at the margins of concrete curb on the margin of a tar and in the area and the site to be managed as prescribed by the CHMP and in consultation with RAPs

Site plan



Site photographs O 28°NE (T) ● 33°9'34"S, 151°33'7"E ±16ft ▲ -15ft area of lens of midden shell Sydney cockle lens DC2 Description: Description: O 354°N (T) ■ 33°9'34"S, 151°33'8"E ±16ft ▲ 16ft View north to Lake Macquarie from DC2 View to DC2 over area of demolition Description: Description: Site restrictions Gender General Location Do you want to Restriction type: Restrict this site?: Why is this site restricted?: **Further information contact** Title Surname First name Organisation: Address: Phone: E-mail:



Appendix 12: DPIE Letter – 2020 Annual Review

To be Provided

Review Date	Next Review Date	Revision No	Document Owner	Page			
		1	Environmental Compliance Coordinator	Page 118 of 118			
DOCUMENT UNCONTROLLED WHEN PRINTED							