Centennial Coal

CENTENNIAL COAL
AWABA COLLIERY
ANNUAL REVIEW

March 2017

Name of Operation	Awaba Colliery
Name of Operator	Centennial Newstan Pty Ltd
Development Consent/ Project Approval #	10_0038
Mining Lease #	CCL746, MPL327, MPL 328
Name of Holder of Mining Lease	Centennial Newstan Pty Ltd
Water License #	20BL173577, 20BL173582, 20BL173586
Name of Holder of Water License	Centennial Newstan Pty Ltd
MOP/RMP Start Date	August 2015
MOP/RMP End Date	August 2018
Annual Review Start Date	January 2016
Annual Review End Date	December 2016

I, Mick Cairney, certify that this audit report is a true and accurate record of the compliance status of Awaba Colliery for the period January 2016 – December 2016 and that I am authorized to make this statement on behalf of Centennial Newstan Pty Ltd.

Note:

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

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

Name of Authorised Reporting Officer	Mick Cairney
Title of Authorised Reporting Officer	Executive General Manager Operations
Signature of Authorised Reporting Officer	M Cairney
Date	27-3-17

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1. STATEMENT OF COMPLIANCE

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 10_0038	Yes
EPL 443	Yes
CCL 746	Yes
MPL 327	Yes
MPL 328	Yes

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Section addressed in Annual Review
Nil non-compliances					

Note: Compliance Status Key for Table 3

Risk Level	Colour Code	Description
High		Non-compliance with potential for significant environmental consequences, 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		Only to be applied where the non-compliance does not result in any risk of environmental harm (eg submitting a report to government later than required under approval conditions)

2. INTRODUCTION

Awaba Colliery was an underground coal mine operated by Centennial Newstan Pty Ltd (Centennial Newstan), within the Newstan Colliery Holding producing coal by the bord and pillar method, using continuous miners. The mine was operational from 1947 - 2012. During this time over 35 million tonnes of coal has been produced from the Great Northern Seam using a combination of first workings development, pillar extraction, pillar quartering, and pillar stripping.

An application for a Part 3A Project Approval was lodged in March 2010 by Centennial Newstan for the Awaba Colliery Mining Project (the "Project"), which sought approval from the Minister for Planning to allow ongoing and extended underground mining and associated surface operations. The project was declared by NSW Department of Planning as a Major Project under Part 3A of the EP&A Act, with Director General's Requirements (DGRs) issued on 22nd April 2010 (DA10_0038) for assessment under Section 75F of the Environmental Planning and Assessment Act (1979). The Environmental Assessment was submitted to the Department in September 2010. The Planning and Assessment Commission of New South Wales granted conditional approval to Centennial Newstan for their Part 3A Application on the 13th of May 2011.

The mine entry and primary surface facilities are located approximately 1 km south of Awaba Township and 5.5 km south west of Toronto on Wilton Road. The mine extends from the western extremity of Lake Macquarie to the eastern foothills of the Watagan Mountains.

In March 2012 the Awaba Colliery ceased mining operations as the available coal reserves were exhausted. All mine entries were decommissioned in 2012, removing access to the underground workings.

This AEMR has been developed in accordance with condition 3 of Schedule 5 of the Project Approval 10_0038.

Figure 1: Aerial photograph of Awaba Colliery surface facilities

Table 3: Awaba Colliery Environmental Contact Details

Name	Position	Email	Phone
Grant Watson	Mine Manager	Grant.Watson@centennialcoal.com.au	02 49560205
Michael Gale	Environment & Community Coordinator	Michael.Gale@centennialcoal.com.au	02 49560206

3. APPROVALS

Table 4: Environmental Approvals held by Awaba Colliery

Name	Description	Issued By	Expiry Date	Renewal Procedure
CCL746	Area above underground workings, within Crown Land.	Dept. Primary Industry (Mineral Resources)	31/12/2028	Manager Title and Property-North

Name	Description	Issued By	Expiry Date	Renewal Procedure
MPL327 *	Awaba Nitrogen Plant	Dept. Primary Industry (Mineral Resources)	05/08/2015	Manager Title and Property-North
MPL328 *	Part Awaba Stockpile	Dept. Primary Industry (Mineral Resources)	05/08/2015	Manager Title and Property-North
Mine Operations Plan (MOP)	Summary of Mining and Processing Activities – Newstan and Awaba	NSW Trade & Investment – Division of Resources & Energy	2018	MOP approved for the period August 2015 – August 2018
Awaba Colliery Project Approval PA 10_0038	Permits development and works to occur as described in the EIS	NSW Department of Planning & Environment	31/12/2015	Permits development and works to occur as described in the EIS
Environmental Protection Licence 443	Permits scheduled activity "coal mining" and discharge of water from licensed discharge points.	Environment Protection Authority	Perpetual	Requires payment and Annual Return February each year

** A renewal application has been lodged with the Department of Industry - Division of Resources & Energy and as such the mining lease remains in full force at the time of drafting this report.*

4. OPERATIONS SUMMARY

There was no mining undertaken during the reporting period. Previously mined areas can be found on Plan AW2245. The mine ceased underground operations in 2012, and the mine entries were sealed.

The Newstan Awaba Complex Mining Operations Plan was approved by DRE in August 2015 and is approved until August 2018.

4.1. EXPLORATION

No exploration drilling occurred on CCL 746 within the reporting period. Drilling is undertaken in accordance with the *Awaba East Exploration Project Review of Environmental Factors* dated August 2008, approved on the 1/9/08, and *Stage 2 Awaba East Exploration Project Review of Environmental Factors* (REF) May 2009, approved on the 13/7/09. Modifications were made to the 2008 REF and approved on the 15/12/08, & 9/4/09, and a third modification to both REF's was approved on the 4/11/09.

4.2. LAND PREPARATION

No land preparation on the Awaba lease was undertaken for Awaba operations. Works completed for subsidence rehabilitation are included in Section 6.3 below.

4.3. CONSTRUCTION

No additional mine infrastructure for Awaba operations were constructed during the report period. Works onsite were limited to necessary maintenance of existing plant, or demolition and rehabilitation of existing infrastructure.

4.4. MINING

No mining activities were undertaken in the reporting period.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The DPE in a letter dated 22 June 2016 requesting additional information to be provided within the 2015 Annual Review as detailed in **Table 5**. The DPE confirmed acceptance of the additional information on 30 June 2016.

The DRE in a letter dated 27 February 2017 considered the 2015 Annual Review to be to the satisfaction of the Secretary.

Table 5: Actions from previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Amend 2015 Annual Review Report to ensure requirements of Schedule 5 Condition 3 of DA 10_0038	Department of Planning & Environment	With the cessation of mining operations, the amount of reportable monitoring data and discussion of associated trends has reduced accordingly.	Section 6.2 and Section 7.1
Amend 2015 Annual Review Report to include Stage 2 Face Position Plan which shows the location of a reported sinkhole	Department of Planning & Environment	2015 Annual Review Report amended and resubmitted 29/07/16.	N/A

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Provide incident report for sinkhole identified on 3/2/15	Department of Planning & Environment	Sinkhole notification dated 4/2/15 provided to DP&E and notification protocol updated to ensure future notifications are made at time of sinkhole identification.	N/A
Provide incident report for discharge incident at LDP09 on 21/5/15	Department of Planning & Environment	Clarification provided to DP&E that the discharge was permissible under Condition L.2 of EPL 443 and therefore did not trigger incident reporting requirements under Schedule 5 Condition 6 of DA 10_0038.	N/A

6. ENVIRONMENTAL PERFORMANCE

Table 6: Summary of Monitoring Requirements

Monitoring Type	Status	Report Section
Noise Monitoring	Quarterly	**Section 6.1**
Air Quality Monitoring	Ongoing	**Section 6.2**
Meteorological Monitoring	Ongoing	**Section 6.7**
Surface Water Monitoring Groundwater Monitoring	Ongoing Ongoing	**Section 7.1** **Section 7.2**

6.1. NOISE

A Noise Management Plan for Awaba Colliery was developed in October 2011 as per Condition 2 of Schedule 3 and was approved by the Department of Planning and Infrastructure in November 2011.

Attended noise monitoring commenced in November 2011 at two locations identified within the Noise Management Plan and the Project Approval. The operator attended survey consists of a daytime period (7am – 6pm), an evening (6pm – 10pm) and two night surveys (10pm – 7am) for each of the monitoring locations.

Quarterly noise monitoring was undertaken in February, May, July and December 2015. The 2015 quarterly monitoring showed that the noise emissions from Awaba Colliery showed full compliance during each of the quarterly surveys with the noise criteria set out within Condition 1 of Schedule 3 along with the predictions made within the Environmental Assessment.

EPL443 dated 16 December 2015 requires that attended noise monitoring be undertaken one month prior to commencement of any mining activities and surface activities associated with mining for coal on the premises, once mining or surface activities have commenced a specific attended noise monitoring regime must be implemented as specified in Condition M8.2.

No attended noise monitoring was required during 2016 due to no operational activities occurring at Awaba during the reporting period and no potential for noise contribution from the Awaba Colliery.

The Northern Region Noise Management Plan has been developed to ensure that operational and construction noise impacts on the local community are minimised and appropriate management measures are identified and response protocols detailed should noise criteria be exceeded and to comply with statutory approval conditions. The plan was submitted to the DPE for approval in July 2016.

6.2. AIR QUALITY

6.2.1. Dust Deposition Gauges

An Air Quality & Greenhouse Gas Management Plan was established at Awaba in October 2011 in accordance with Condition 7 of Schedule 3 of the Project Approval and approved by the Department of Planning & Infrastructure in November 2011. The Northern Region Air Quality and Greenhouse Gas Management Plan has been developed to ensure that operational and construction air quality impacts on the local community are minimised, appropriate management measures identified and response protocols detailed should air quality criteria be exceeded and to comply with statutory approval conditions. The plan was submitted to the DPE for approval in July 2016.

In order to determine the effectiveness of the colliery's dust control measures, a network of dust depositional monitoring gauges have been established. Depositional gauges are located within the Colliery perimeter as well as adjoining areas. A total of four depositional gauges are utilised, all located within the Colliery boundary.

Samples are taken from the depositional gauges every 28 (±2) days as per Approved Methods for the Sampling and Analysis of Air Pollutants in NSW as administered by the Environment Protection Authority. As predicted with in the Environmental Assessment for the Awaba Colliery Mining Project dust deposition levels were below the Project air quality criteria at all surrounding dwellings. The following graph Figure 2 displays Awaba's monthly dust results.

The Awaba Colliery Mining Project EA for DG's 1-4 found the monthly averages and annual averages were below 2.4 g/m2/month, which is within the development consent limit of 4 g/m2/month annual average. The EA states that the results indicated that total annual average dust deposition levels at all receptors surround the Project are predicted to be below the Project criterion of 4 g/m2/month when using a conservative background level of 2 g/m2/month.

Table 7: Summary of depositional dust results between January 2016 and December 2016 surrounding Awaba Colliery

	Insoluble Solids (Combustible Matter + Ash) g/m^2/month			
	DG1	**DG2**	**DG3**	**DG4**
Long Term Average	0.6	1.4	3.3	1.1
Average 2016 (Reporting Period)	0.6	0.8	2.9	0.7
Air Quality Criteria	4	4	4	4

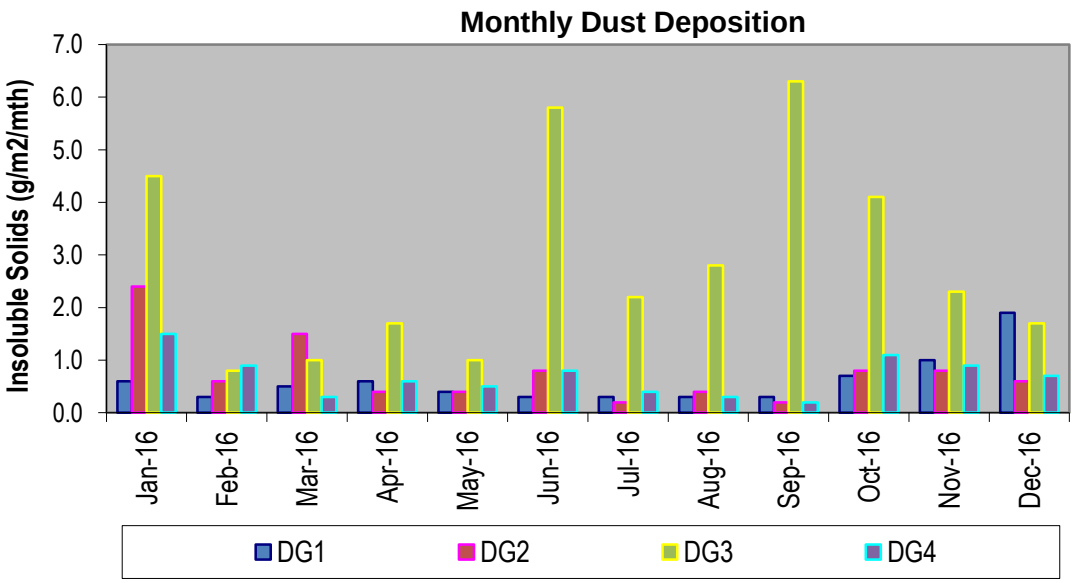

Figure 2: Awaba Monthly Dust Deposition 2016

6.2.2. High Volume Dust Sampling

A requirement of the Project Approval and the EPL was to install a high volume air sampler to evaluate the performance of the project. This was installed in 2014/2015 at the location known as the Nitrogen Plant.

High volume dust sampling was undertaken to monitor dust deposition rates and concentrations of Total Suspended Particulates (TSP) and Suspended Particles PM10.

Table 8: Annual Average PM10 and TSP

Annual Average PM10 (ug/m3) and TSP (ug/m3)		
Year	**PM10**	**TSP**
2016	10.5	16.8

The rolling annual average results for both locations were below the criteria for TSP of 90 µg/m3 (annual average), and PM10 of 30 µg/m3 (annual average), and the results were also below the PM10 24 hour limit of 50 µg/m3 during the 2016 reporting period.

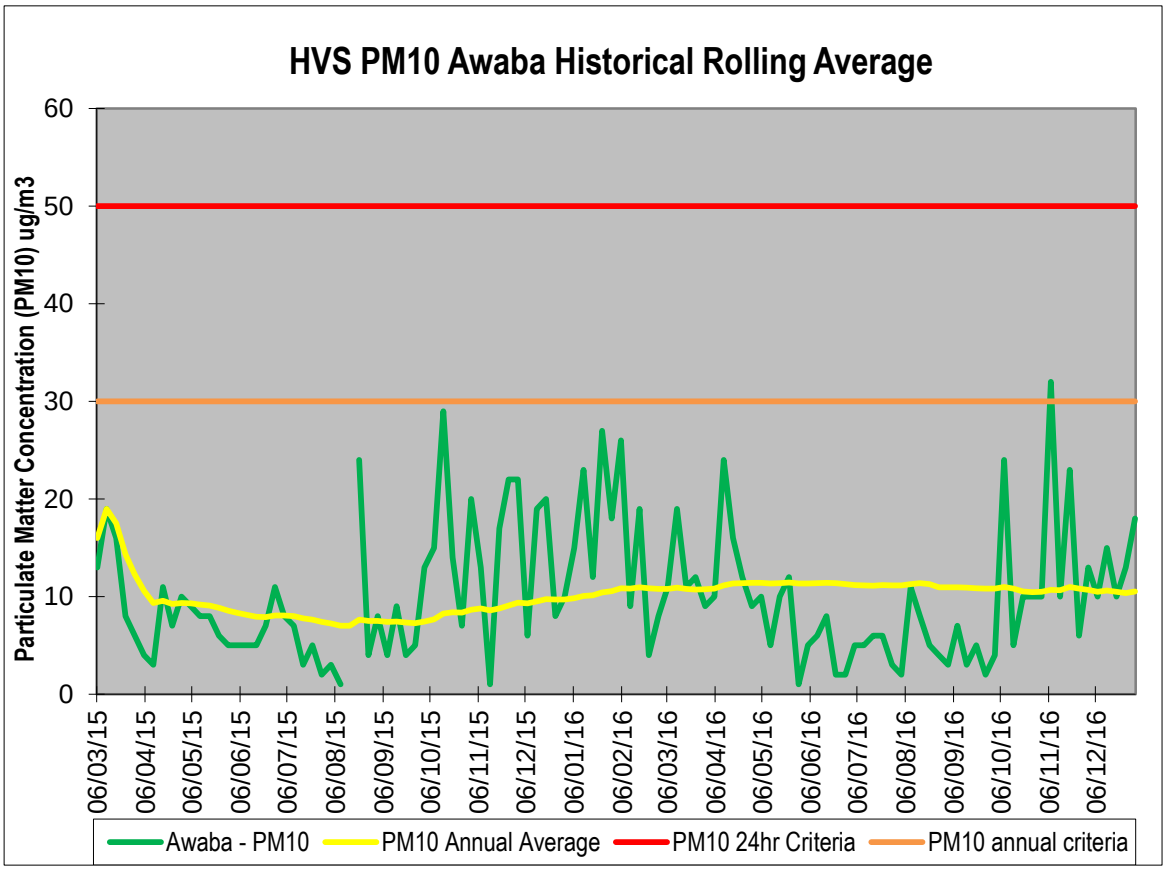

Figure 3: Awaba Rolling Annual Average and 24 hour results for High Volume Dust Sampling for PM10

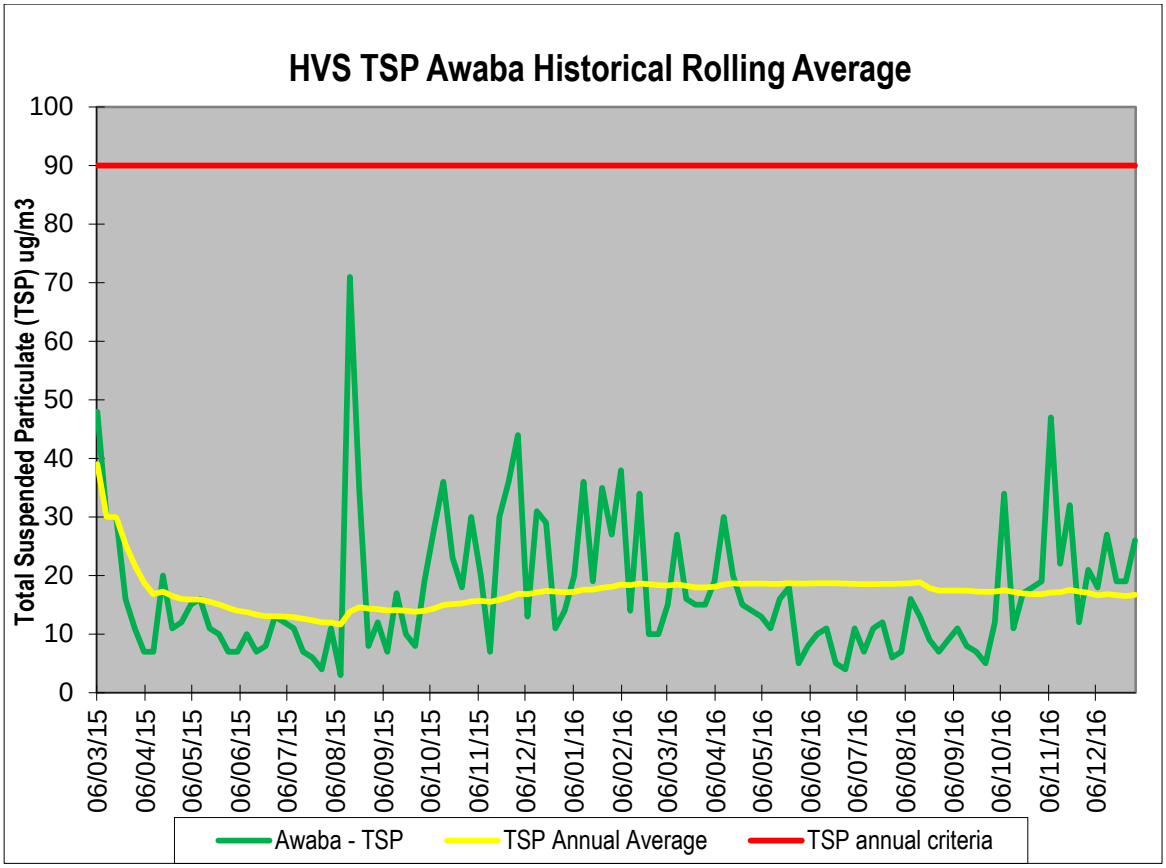

Figure 4: Awaba Rolling Annual Average and 24 hour results for High Volume Dust Sampling for TSP

6.2.3. Greenhouse Gas Monitoring

Awaba ceased operations and sealed the shafts and portals in 2012. The minimal usage & greenhouse gas information (electricity) is included within Newstan Colliery Annual Review Report.

6.3. SUBSIDENCE

Monitoring in the reporting period was conducted in accordance with the Subsidence Management Plan (SMP), SMP approval conditions and the Extraction Plan (as required by Condition 11 of Schedule 3 of the Project Approval) and the associated subsidence monitoring program. Table briefly outlines the subsidence monitoring and results conducted in accordance with the relevant SMP conditions.

Table 9: Subsidence Monitoring Results

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (a) – Stage 1 23 (a) – Stage 2 24 (a) – Stage 3	***Summary of Subsidence and Environmental Monitoring Results***	The Following subsidence surveys and inspections have been completed:

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Surface Surveys – All scheduled subsidence surveys completed to December 31st, 2016. There were No Notifiable Subsidence Incidents in 2016. **Maximum subsidence** in **2016 period** – was in **Stage 2** - XLE17, -1.409m. **Stage 1** - Maximum subsidence was at XL40, -1.342m. **Stage 3** - Subsidence monitoring results in 2016 were well within predicted levels and continue to be relatively stable. Environmental inspections were carried out in January 2014. Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. The 2014 survey found no impact on Stony Creek, and was the last Ecological Survey. ***Underground Surveys –*** All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012. Underground workings are no longer accessible.
22 (b) – Stage 1 23 (b) – Stage 2 24 (b) – Stage 3	***Analysis of Subsidence and Environmental Monitoring Results***	After reporting greater than predicted subsidence in both Stage 1 and Stage 2 during 2014 – Monitoring Results for 2015 and **2016** were consistently relatively stable. January and March Surveys of **2014** found greater than predicted subsidence in Main

SMP Approval Condition No.	Requirement Summary	Comment / Description
		South **Stage 1** Area. A report was prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure. Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders. The significant increase in subsidence occurred approximately 175 to 300 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles. There have been no observed visual environmental impacts in Stage 1 Area.
22 (c) – Stage 1 23 (c) – Stage 2 24 (c) – Stage 3	***Trends in Monitoring Results***	In general - the trend in monitoring results shows that the majority of subsidence occurs during and shortly after mining extraction. In the following months the rate of subsidence decreases toward a stable environment. However after approximately 6 years of relative stability – there was greater than predicted subsidence in Main South **Stage 1** and **Stage 2** in **2014**. During 2014 – after the initial sudden increase in subsidence - results began to trend toward decreasing movement. In 2015 and **2016** surveys have consistently shown relatively stable results.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (d) – Stage 1 23 (d) – Stage 2 24 (d) – Stage 3	***Management Actions of Potential Impacts***	In general - current Public Safety and Subsidence Management Plans are considered adequate. Following greater than predicted subsidence in **Stage 1** Main South Cross line / 8NE Centreline area in 2014; All relevant government agencies and stakeholders were notified as per condition 20, after results of January survey. Centennial Newstan conducted a follow up survey – including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders. A visual inspection was carried out on 21/03/2014 - by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were included in a geotechnical report. A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence. A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014. A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Chatswood meeting – it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Monitoring frequency was increased on 04/04/2014 to provide further data until the area became stable; and to monitor any possible increased subsidence moving toward the rail corridor. Following greater than predicted subsidence in **Stage 2** Main South Crossline Extension / 8SW Centreline area - All relevant government agencies and stakeholders were notified as per condition 21, after results of the July survey. A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014. Agreement was reached with the PSE and Transport NSW - to increase monitoring frequency to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the Railway Protection Zone (along 8SW) or the Railway Mining Barrier (along 6SW) - will trigger further communication and review of the situation. Monitoring frequency was increased on 16/07/2014. A meeting to discuss the trend of consistent relatively stable monitoring results in both **Stage 1** and **Stage 2** - was held in Burwood on 12/08/2015. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Burwood meeting – it was agreed to amend the frequency of surveys from fortnightly to monthly for a period of six months (commencing from August). If results continued to be stable during this period – agreement would be made to further reduce monitoring frequency. On October 7th, 2015, official approval was granted by PSE to vary this monitoring to monthly.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		A meeting between Centennial Newstan and PSE was held on 20/07/2016 to discuss the consistent relatively stable monitoring results in **Stage 1, 2, 3**. A report reviewing the recent subsidence data, prepared by a geotechnical consultant, was distributed to Transport NSW and the PSE on 25/08/2016. In addition, a letter requesting agreement from Transport NSW to amend the monitoring program to 2 monthly for 6SW points, and 6 monthly for other nominated **Stage 1,2,3** points was submitted on 25/08/2016. Agreement to amend the monitoring program was received from Transport NSW on 08/12/2016. Agreement to amend the monitoring program was received from PSE on 09/12/2016. Following the reporting of the **Stage 2** localised sinkhole in February 2015, -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. The sinkhole has been filled. The area is being rehabilitated in accordance with the Sinkhole Rehabilitation Plan. Following the formation of the **Stage 3** Sinkhole in June 2011 -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. Rehabilitation of the site has since been completed. Due to the partial reactivation of this hole - further minor rehabilitation works were carried out during 2015, in accordance with the Sinkhole Rehabilitation Plan.

6.4. BIODIVERSITY

Awaba Colliery has previously undertaken riparian surveys along Stony Creek as a requirement of Condition 23 of Schedule 3 of the Project Approval. As mining ceased in 2012 it has been deemed that this monitoring is no longer required.

Ecological monitoring conducted in regard to the Awaba Seepage is discussed in Section 7.2.

6.5. HERITAGE

In 2012 Centennial Coal developed the Centennial's Northern Holdings Aboriginal Cultural Heritage Management Plan. This document aims to provide a consistent approach to consultation between Centennial and the Aboriginal community as well as identify standard Aboriginal cultural heritage monitoring and management requirements. A revised Northern Region Aboriginal Cultural Heritage Management Plan was submitted to DPE in July 2016 and was approved on 15 September 2016.

Scarred Tree AHIMS#45-7-0318 (RPS ST 01) was identified in the northern portion of the Main South Mining area. This area was due to be undermined and thus the site was assessed for risk of harm by using observations of similar trees which had already been undermined in the southern portion of the Main South Mining area. The risk of harm identified was that the effects of subsidence may destabilise the tree resulting in tilting and potentially its collapse. Although this risk was assessed to be low; a monitoring program was commenced to ensure that the site was not harmed. This monitoring program began in 2010 when the site was first identified. It has been running for three years and has covered the pre-mining, mining and post mining phases. It was considered that tilting of greater than 10 degrees would pose a risk that the tree may fall over and consequently posed a risk of harming the site. During the course of monitoring, less than one degree of tilt was observed and thus there was no risk of harm to the site. The physical tree condition also had not changed as a result of subsidence. All subsidence effects in the vicinity of AHIMS#45-7-0318 have now occurred. There is no further risk to the site as a result of subsidence. Monitoring ceased in 2013.

European heritage items at the Awaba Colliery have been identified within the Proposed Schedule of Heritage Sites and Items (Table 11). Each of these items has been proposed for heritage listing within the Lake Macquarie Local Government Area (LGA) Local Environmental Plan (LEP). It is important to emphasise that the items in Table 8 will not appear within the Lake Macquarie LGA LEP because they are only listed within the proposed/draft schedule.

The buildings including the Administration Office and the Workshop at the Awaba Colliery Pit Top area associated with the Awaba State Mine (AW-07) have been identified with local significance in the Lake Macquarie Inventory, in addition to the Awaba-Wangi Railway Line under the same item number (AW-07). The Water Pumping Station (AW-06) has also been identified in two previous reports as having a very high potential local heritage significance in term of representing extractive industries in the area (Suters Architects Snell 1993a; Suters Architects Snell 1996b).

Awaba Colliery also prepared and submitted a Post Mining Heritage Management Plan in accordance with Condition 31 of Schedule 3 of the Project Approval. This management plan will include a study of the significance of the existing European heritage on the site, and was submitted to various stakeholders for consultation before being submitted to the Department of Planning & Infrastructure for Approval in 2012.

Identification of the approval requirements for the long term management options of Awaba Colliery is still being decided. No changes will be made to the site until consideration has been made to whether or not the site will be maintained, renovated for future use or demolition of the site.

6.6. WASTE

Waste production from the Colliery is negligible since mine closure. The waste management system is maintained, however now only includes minimal general waste.

6.7. RAINFALL MONITORING RESULTS

The total monthly rainfall data is shown below in Table 10.

Table 10: Rainfall at Awaba Colliery for the Period January 2016 to December 2016

2016 Month	Awaba Colliery Total Rainfall (mm)
January	420
February	27.8
March	56.4
April	28.2
May	58.8
June	169
July	64.4
August	74.2
September	60.8
October	56.8
November	46.8
December	78.2
Total	1141.4

A total of 1141.4 mm of rainfall was recorded at Awaba Colliery during the reporting period. The total annual rainfall for 2016 was less than the total rainfall recorded in 2015 (1591.8mm). The wettest period was in January 2016 recording 420mm.

7. WATER MANAGEMENT

7.1. SURFACE WATER

Water monitoring is undertaken in accordance with the approved Water Management Plan, Project Approval and Environment Protection Licence 443 requirements. Water discharge occurred from licensed Discharge Point 4 between June and December 2016 and totaled 305.5 ML during the reporting period. Figure 5 shows the daily discharge volumes from LDP004. Water was also transferred from 10 South bore to the Eraring Ash Dam during the reporting period. Surface monitoring locations are provided in on Plan AW1040.

The Water Management Plan for Awaba Colliery was developed in October 2011 as per Condition 17 - 22 of Schedule 3 of the Project Approval and was approved by the Department of Planning and Infrastructure in November 2011. The surface water risk assessment (failure modes and effects analysis) was reviewed for the Awaba Colliery in 2012.

Upgrades to the pumping system at the Awaba Pollution Control Dam (PCD) were undertaken in 2014 to reduce the likelihood of discharge. Plans for the expansion of the PCD have been put on hold.

Upstream and downstream sampling has continued along Stony Creek to establish natural background concentrations, along with the introduction of an additional reference site in the Jigadee Creek catchment area as recommended in the surface water assessment completed for the Environmental Assessment.

Figures 6, 7, 8 and 9 show the pH, total suspended solids (TSS), oil & grease and electrical conductivity for discharge waters through LDP004 between June and December 2016.

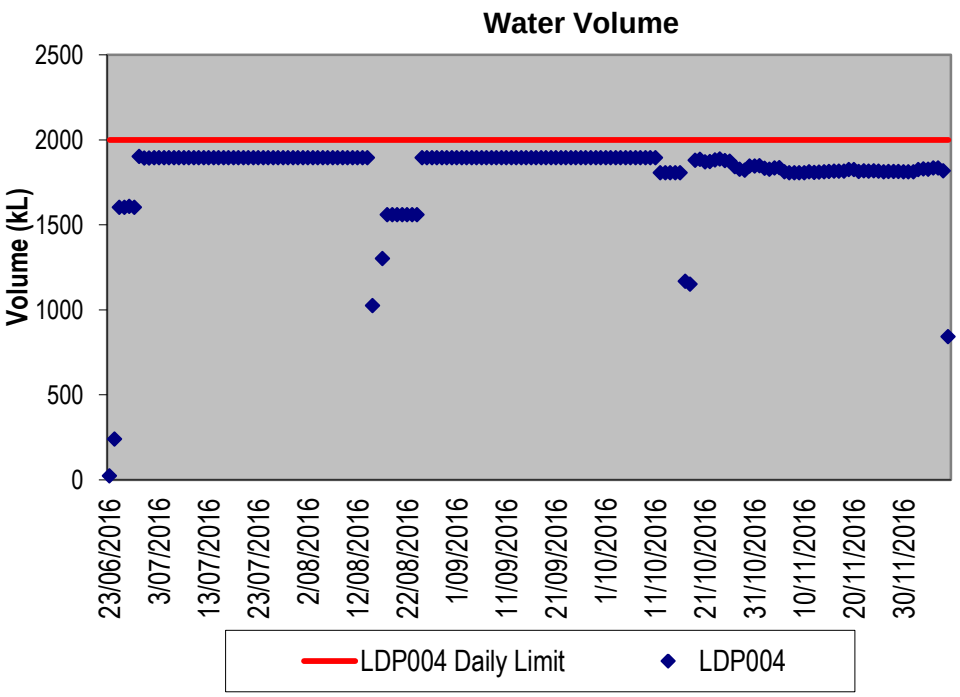

Figure 5: LDP004 daily water volume discharged

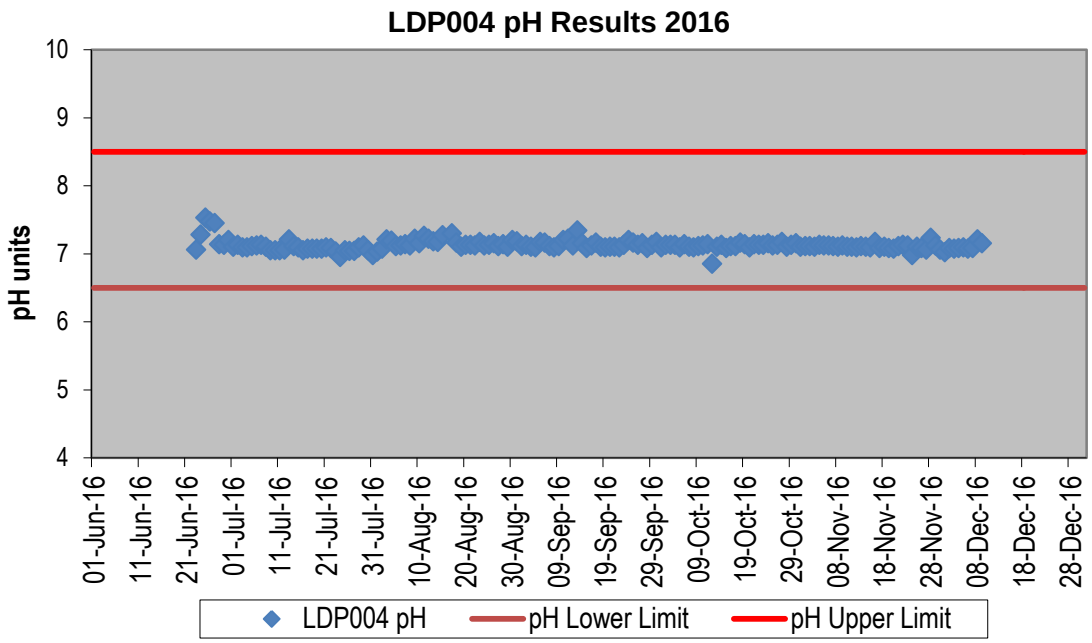

Figure 6: LDP004 pH Results 2016

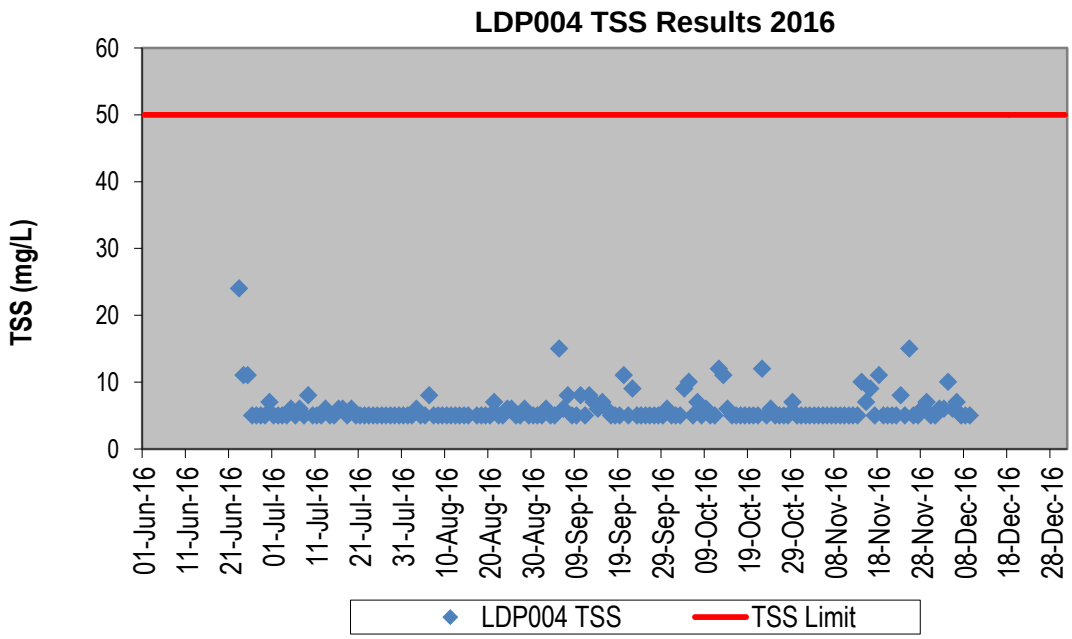

Figure 7: LDP004 Total Suspended Solids (TSS) Results 2016

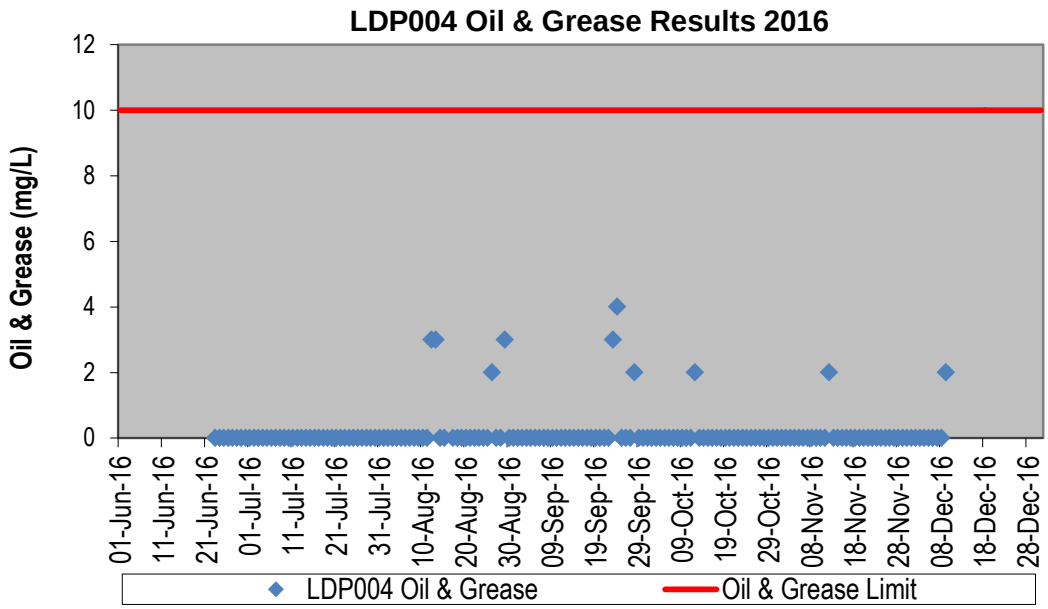

Figure 8: LDP004 Oil and Grease Results 2016

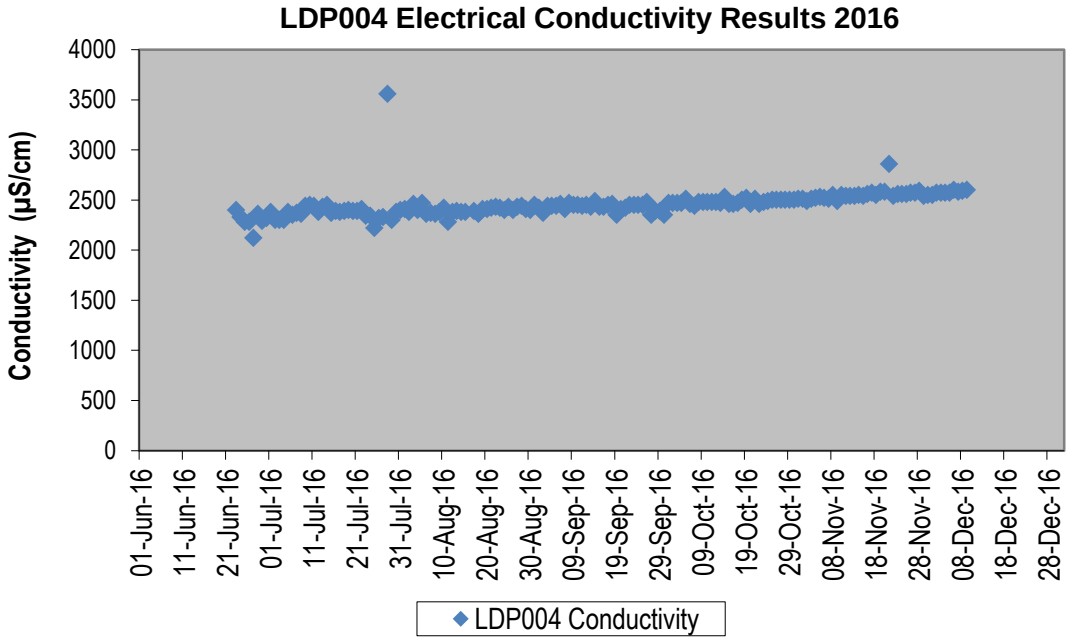

Figure 9: LDP004 Electrical Conductivity Results 2016

No other discharges occurred through EPL licenced discharge points during the reporting period.

7.2. GROUND WATER

Water underground is generated from groundwater which is released from the strata into underground mine workings. The collected water gravitates through an extensive goaf/underground dam system that allows filtration and settlement. The water can then be pumped from the mine via licensed discharge point LDP004, and via the 10 South Borehole into the Eraring Ash Dam. Pumping from LDP004 during the report period is discussed in Section 7.1.

In October 2011, a Groundwater Monitoring Program was developed in accordance with Condition 21 of Schedule 3 of the Project Approval (10_0038) and approved by the Department of Planning and Infrastructure in November 2011.

In August 2013 an inspection of an unnamed watercourse which flows to Muddy Lake identified an area of sodden ground which resulted in a water flow. This visual inspection indicated clear water with iron staining in the sediment.

The area affected is approximately 160m to the South of the nearest Awaba workings. The seepage area has shown results of low pH, high conductivity and other analytes.

Awaba Colliery workings have slowly been filling with water over several years. This rise in water level in the underground workings has occurred as a result of rainfall events infiltrating subsidence cracks and sinkholes, and groundwater infiltration. Awaba had also been receiving water under the EPL from Newstan Colliery of up to 4 ML/Day from 15 October 2011 to 27 June 2013. Ongoing monitoring is currently being undertaken at this location. The level within the workings was at 17.6m RL at the end of the reporting period.

In identification of the seepage area the following actions were undertaken:

- Initial water quality monitoring & establishment of monitoring points to determine water quality at the seepage area & downstream. After water quality returned unfavourable results, the following actions were undertaken;
- An assessment of water quality within the unnamed creek including a comparison against the Awaba Colliery underground water quality to determine if there are similarities.
- A preliminary Terrestrial Ecology Assessment.
- A preliminary Aquatic Ecology Assessment.
- Ongoing Monthly water quality monitoring & review of data.
- Monthly borehole water dipping and water quality analysis.
- Annual Terrestrial Ecology Assessment & establishment of permanent quadrats in spring 2014.
- Commencement of Biannual Aquatic Ecology Assessments in spring 2014. This has been developed to align with assessments carried out for Cooranbong Services Site.

The results of monitoring and change to the wetting regime and water quality within the seepage area has had or has the potential to have the following impacts on terrestrial and aquatic ecology:

- In the long term, an increase in the degree of waterlogging and inundation in the groundcover and changes to the flow within the creek may lead to a change in the vegetation community at the seepage area
- Changes in water quality as a result of the seepage are likely to result in the site being unable to support Swamp Sclerophyll Forest

- Changes in vegetation community that result in a loss of understory shrubs, leaf litter, hollow logs and mature trees (including Swamp Mahogany) would decrease the available foraging habitat for reptiles, ground-dwelling and arboreal mammals, bats and forest birds.
- Changes in water quality as a result of the seepage are likely to render the area unable to support threatened and migratory fauna through both loss of forage habitat and changes in water quality and chemistry resulting in an undrinkable water source.
- There is a high risk of impact to a Groundwater Dependent Ecosystem (Swamp Sclerophyll Forest).
- There was a notable decrease in the levels of macroinvertebrate taxa richness, EPT richness and SIGNAL 2 at SP5 (SW013) since the July 2012 monitoring events. The macroinvertebrate community at SP5 (SW013) is no longer considered a non impacted site.
- If the acidic seepage continues on a long term basis the site will be unable to support a diverse aquatic system and will affect aquatic fauna recruitment rates into the system.

In January 2015 a consultation session was held with the relevant government departments and the Rehabilitation Works Plan is being developed in consultation the DRE, OEH, NOW, EPA & LMCC in accordance with the Section 240 Notice from the DRE. This Rehabilitation Works Plan will include the following:

- Details of the ongoing Water Quality Monitoring,
- Details of the ongoing Macro-invertebrate Monitoring,
- Details of the ongoing Terrestrial Ecology Monitoring,
- Completing an options assessment, which will include the feasibility of rehabilitation options, and any other options which may result from consultation,
- On selection of a preferred option, a review Rehabilitation Works Plan is to be completed, with additional information with regards to the final rehabilitation completion criteria.

The Awaba Seepage Rehabilitation Works Plan period ended in January 2016. A Clean-Up Notice in regard to the Awaba Seepage was issued by the EPA on 8 April 2016 requiring the completion of environmental site investigations, evaluation of management options and the development of a design and implementation works program. An environmental site investigations report was submitted to the EPA in July 2016 and a management options report submitted to the EPA in September 2016. Centennial is continuing to consult with the relevant government departments to address the issue.

In February 2016, a bore CA13 was installed to investigate the geochemistry of the overburden strata above the mine workings and to monitor water quality in the Awaba workings adjacent to the seepage area.

A summary of monitoring undertaken at the Awaba Seepage during the reporting period is provided below. The monitoring has shown that the impacts are limited spatially to the unnamed tributary in the vicinity of the seepage and conditions appear to be improving over time.

Water Quality Monitoring

Ongoing monitoring has found the extent of impact to extend downstream to site SP12 (located approximately 600m downstream of the seepage). There have been some improvements in water quality at the seepage area over time. Concentrations of sulfate, dissolved cobalt, dissolved iron, dissolved nickel, dissolved manganese and dissolved zinc at the seepage area have reduced between spring 2013 and spring 2016. Improvements in water quality have also been observed at other sites influenced by the Awaba seepage. At the downstream site, pH has increased over time and in spring 2016 was within the ANZECC/ARMCANZ (2000) range indicating a reduced influence of the Awaba seepage on water quality at these sites.

In terms of water quality, the acidity initially observed within the Awaba seepage area was temporary and the seepage water can now be classified as neutral mine drainage. The seepage still appears to be improving in quality. This improvement is expected to continue with the gradual rise in water levels in the underground workings which reduces the oxidation contributing to the acidity of mine water and the mobilisation of metals associated with pyrite.

Water quality at the upstream reference site SP6 is still relatively good with pH and turbidity within the ANZECC/ARMCANZ (2000) range, low sulfate and total dissolved solids (TDS) and low concentrations of most metals including zinc, manganese, cobalt, iron and nickel. There has been no increase in the proportion of sulfate in water (relative to other ions) at SP6 over time although the concentration has increased slightly. There has also been an increase in the proportion and concentration of sodium in water at SP6 in spring 2016, and, consequently, EC. Increased concentrations of TDS, dissolved manganese, dissolved iron and dissolved zinc have also been observed at SP6 since spring 2016.

Aquatic Ecology Monitoring

The macroinvertebrate metrics based on monitoring data collected, suggest continued impact of the Awaba seepage on the macroinvertebrate community, however, the impact appears to be largely restricted to sites located closest to the seepage. The community condition has been improving at SP12, which now has a higher taxa richness than reference site SP6. The number of sensitive taxa at SP12 has increased with each monitoring event, though is still seen to be less than that of SP6. The similar community condition (diversity and number of sensitive taxa) between upstream reference site SP6 and the downstream site SP12 confirms that there is little, if any, influence of the Awaba seepage on the macroinvertebrate community at the downstream site SP12.

Terrestrial Ecology Monitoring

Surveys have been undertaken within a number of monitoring quadrats has been undertaken on an annual basis since 2014. At each quadrat a description of the nature and condition of the flora has been undertaken. Evidence of seepage was quantified by recording the presence of orange pooled surface water, bare ground, weeds, dead trees and shrubs. At each quadrat a fauna habitat assessment was also undertaken, assessing the nature and condition of terrestrial habitats within the quadrats and quantifying important fauna habitat features such as hollow-bearing trees, leaf litter and large wooden debris.

There appears to be a minor impact to the quality of amphibian habitat within the SP2 site closest to the seepage. The dense coverage of iron precipitate may have reduced habitat quality for amphibian species such as frogs and tadpoles. Little to no

impact to fauna habitat was observed at the remaining Awaba seepage survey sites, with all sites displaying similar fauna habitat features common to Swamp Sclerophyll Forests. A similar floral assemblage of species has been recorded at all sites, indicating the seepage has not had an impact on species diversity. Differences between sites due to seepage appear limited to a small number of dead trees and shrubs. No notable changes to habitat values have occurred since the 2014 and 2015 monitoring surveys were completed, with similar numbers of dead canopy and midstorey trees present within the quadrats. At downstream site SP12, there were no observed terrestrial ecology impacts from the seepage.

7.3. WATER BALANCE

The water balance completed for the Awaba Colliery Water Management Plan and for the Awaba Colliery Mining Project predicted that the annual average discharge (ML/year) from the Awaba underground workings would be 278.1 ML per annum. Table 11 includes the approximate quantities discharged from the Awaba Colliery licensed discharge points during 2016.

Table 11: Water Balance

Year	LDP004 (ML)	LDP009 (ML)
2016	305.5	0

8. REHABILITATION

8.1. BUILDINGS AND INFRASTRUCTURE

No additional buildings were undertaken during the report period at Awaba. No buildings were removed during the reporting period.

In August 2016, a decommissioned diesel underground storage tank (UST) located at the Awaba pit top was remediated. The UST was excavated and removed for recycling and soil and groundwater samples collected for laboratory analysis (Figure 10). The excavation was validated with no further remediation works required. The excavation was backfilled with certified clean fill material blended with organic material to enhance in-situ bioremediation processes.

Figure 10: Remediation of diesel underground storage tank

8.2. SUBSIDENCE

Sinkhole Rehabilitation was undertaken during the reporting period in accordance with the Sinkhole Rehabilitation Management Plan. A total of five sinkholes were rehabilitated between August and November 2016 in the areas MR7 – 8, 10, 11, 15, 17. All sinkholes were located within close proximity of each other.

The following occurred during the rehabilitation process:

- Each hole when finished was raised up in height and crowned off / re-shaped to shed water into diversion drains cut in around each hole;
- Sediment controls were installed in diversion drains including gabion baskets, rock check drains and boulders. A geosynthetic clay liner was installed in the diversion drain to prevent water ingress and reactivation of erosion.
- Trees and vegetation cleared were spread over rehabilitated areas;
- Rehabilitated areas were hand seeded with native mix as specified

Sinkhole rehabilitation is planned to continue in 2017. Rehabilitation monitoring and any additional maintenance and weed management will occur on previously rehabilitated sinkholes as required.

Figure 11: Subsidence repair using rock and concrete

Figure 12: Sinkhole rehabilitation after three months of regeneration

8.3. REHABILITATION OF DISTURBED LAND

The Newstan and Awaba MOP Complex was approved in August 2015 for the period August 2015 – August 2018.

Table 12 displays a rehabilitation summary for the Newstan and Awaba Collieries.

Table 12: Newstan Awaba Rehabilitation Summary

Domain	Area Affected / Rehabilitated (ha)	
	Total Area at MOP start (Plan 3A)	Total Area at end of MOP (Plan 3A)
Mine Lease Area		
Mine Lease(s) Area	3989.9	3989.9
Domain 1: Infrastructure Area		
Active Mining Area	102	102
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-
Relinquished Lands	-	-
Total	102	102
Domain 2: Tailings Storage Facility		
Active Mining Area	56.2	54.1
Decommissioning	-	-
Landform Establishment	7.0	7.0
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	11.7	13.8
Ecosystem and Land Use Sustainability	20.8	20.8
Relinquished Lands	-	-
Total	95.7	95.7
Domain 3: Water Management Area		

Domain	Area Affected / Rehabilitated (ha)	
	Total Area at MOP start (Plan 3A)	Total Area at end of MOP (Plan 3A)
Active Mining Area	11.8	11.8
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	
Relinquished Lands	-	-
Total	11.8	11.8
Domain 5: Stockpiled Material		
Active Mining Area	12.0	12.0
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-
Relinquished Lands	-	-
Total	12.0	12.0-
Domain 8: Underground Mining Area		
Active Mining Area	0 (Area above workings is 5088 ha)	0
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-

Domain	Area Affected / Rehabilitated (ha)	
	Total Area at MOP start (Plan 3A)	Total Area at end of MOP (Plan 3A)
Relinquished Lands	-	-
Total	-	-

8.4. REHABILITATION TRIALS AND RESEARCH

No rehabilitation trials occurred during the reporting period.

9. COMMUNITY

9.1. COMPLAINTS

There were no complaints made during the 2016 reporting period regarding Awaba Colliery operations.

Table 13: Awaba Complaints Summary 2010 - 2016

Record of Complaints	
Year	**Total**
2010	0
2011	0
2012	0
2013	0
2014	0
2015	0
2016	0

9.2. COMMUNITY CONSULTATION

A Community Consultative Committee (CCC) has been in place at Newstan since 1999. In 2011 Awaba Colliery was joined into the Newstan Colliery CCC. The Committee generally meets quarterly to review the environmental performance of the mine and other relevant matters. Minutes of the meeting are kept and distributed by the independent Chairman. The minutes are also available on the Centennial Newstan website. Meetings of the Newstan and Awaba Colliery CCC were held in February, June and December during the reporting period.

9.3. COMMUNITY SPONSORSHIP

Newstan and Awaba Collieries continues to support the local community through various sponsorship avenues and in 2016 provided sponsorship to the Hunter Research Foundation.

10. INDEPENDENT AUDIT

There is no requirement for Awaba Colliery to undertake an external Independent Environmental Audit.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

There were no non-compliances during the reporting period.

12. ACTIVITES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Activities proposed for the 2017 reporting period include;

- Maintenance of the Awaba Colliery pit top and remaining buildings
- Rehabilitation of sink holes in accordance with the Sinkhole Rehabilitation Plan.
- Ongoing consultation with the EPA with regard to the seepage and Clean-Up Notice requirements.

13. PLANS

AW2245 – Great Northern Seam Workings.

AW2260 – Location of Licenced Discharge Points and Surface Water Monitoring Points

AW2261 – Location of Air, Noise, Weather, Water – Monitoring points, and Water Management Devices

14. APPENDICES

Centennial Coal

Centennial Coal Company Limited
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Centennial Newstan (Awaba) Colliery
2016 End of Year
Subsidence Status Management Report

Report Number: **9**

Reporting Period: **2016**

Distribution List:

- Director Environmental Sustainability
- Industry Coordination
- Subsidence Executive Officer
- District Inspector
- Principal Subsidence Engineer
- Subsidence Engineer
- NSW Department of Primary Industry | Water
- Office of Environment & Heritage
- Department of Planning & Environment
- Ausgrid
- RailCorp (Transport NSW),
- Subsidence Advisory NSW,
- Origin Energy,
- Telstra
- Newstan (Awaba) Mine Manager,
- Newstan (Awaba) Environmental Coordinator.

General Comments:

Stage 1:

- Approval to mine Stage 1 of Mine Subsidence Management Plan (MSMP) at Awaba Colliery was granted on 03/09/2007
- Mining completed on 26/06/2009.
- Monitoring variation from 3 to 6 monthly approved 28/06/2011.
- January and March 2014 resurveys recorded greater than predicted maximum subsidence along Main South Crossline between XL24 to XL66 – and 8NE Centreline between CL01 to CL16. Monitoring frequency was temporarily increased.
- Relatively stable results were achieved during the second half of 2014.
- Relatively stable results continued through 2015 and 2016.
- Monitoring variation from monthly to 6 monthly approved 09/12/2016.

Stage 2:

- Approval to mine Stage 2 of MSMP at Awaba Colliery was granted on 29/08/2008
- Mining completed on 08/03/2012.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- July 2014 resurvey recorded greater than predicted subsidence along Main South Crossline Extension between XLE01to XLE22 – and 8SW Centreline between 8SW22 to 8SW43. Monitoring frequency was temporarily increased.
- A Sinkhole was found and reported on 03/02/2015 near 8SW29-30. The sinkhole has been filled. The area is being rehabilitated in accordance with the sinkhole rehabilitation plan.
- Relatively stable monitoring results were achieved in 2015, and continued through 2016.
- Monitoring variation from monthly - to 2 monthly for 6SW, and 6 monthly for all other points - approved 09/12/2016.

Stage 3:

- Approval to mine Stage 3 of MSMP at Awaba Colliery was granted on 15/12/2010
- A Sinkhole was found and reported following heavy rain over the June 2011 long weekend. The sinkhole was filled. The area was rehabilitated in accordance with the sinkhole rehabilitation plan.
- Mining Completed on 22/12/2011.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- Additional amendments to Stage 3 monitoring program in consultation with Principal Subsidence Engineer (PSE) and relevant stakeholders.
- Monitoring results show subsidence within predictions.
- 4NW monitoring was temporarily increased to Monthly – to match the frequency of Stage 1 and 2.
- There continues to be relatively stable monitoring results recorded from surveys.
- 4NW Monitoring variation from monthly to 6 monthly approved 09/12/2016.

Awaba Colliery Great Northern Seam Mining Ceased 08/03/2012.

- All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012.
- Underground workings are no longer accessible.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (a) – Stage 1 23 (a) – Stage 2 24 (a) – Stage 3	**Summary of Subsidence and Environmental Monitoring Results**	The Following subsidence surveys and inspections have been completed: ***Surface Surveys –*** All scheduled subsidence surveys completed to December 31st, 2016. There were No Notifiable Subsidence Incidents in 2016. **Maximum subsidence** in **2016 period** – was in **Stage 2** - XLE17, -1.409m. **Stage 1** - Maximum subsidence was at XL40, -1.342m. **Stage 3** - Subsidence monitoring results in 2016 were well within predicted levels and continue to be relatively stable.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Environmental inspections were carried out in January 2014. Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. The 2014 survey found no impact on Stony Creek, and was the last Ecological Survey. ***Underground Surveys –*** All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012 Underground workings are no longer accessible.
22 (b) – Stage 1 23 (b) – Stage 2 24 (b) – Stage 3	**Analysis of Subsidence and Environmental Monitoring Results**	After reporting greater than predicted subsidence in both Stage 1 and Stage 2 during 2014 – Monitoring Results for 2015 and **2016** were consistently relatively stable.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		January and March Surveys of **2014** found greater than predicted subsidence in Main South **Stage 1** Area. A report was prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure. Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders. The significant increase in subsidence occurred approximately 175 to 300 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles. There have been no observed visual environmental impacts in Stage 1 Area.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		July 2014 Surveys found greater than predicted subsidence in Main South **Stage 2** Area. Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders. The significant increase in subsidence occurred approximately 250 to 350 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles. Environmental impacts in Stage 2 - Cracking that was observed and reported, associated with the greater than predicted subsidence. The Sinkhole reported on 03/02/2015 near 8SW29-30. The sinkhole has been filled. The area is being rehabilitated in accordance with the sinkhole rehabilitation plan. No visual disturbance has been identified on tracks & trails.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Stage 3 Subsidence monitoring results in 2016 were within predicted levels and continue to be relatively stable. Environmental impacts in Stage 3 - have been confined to the previously reported and rehabilitated sinkhole.
22 (c) – Stage 1 23 (c) – Stage 2 24 (c) – Stage 3	**Trends in Monitoring Results**	In general - the trend in monitoring results shows that the majority of subsidence occurs during and shortly after mining extraction. In the following months the rate of subsidence decreases toward a stable environment. However after approximately 6 years of relative stability – there was greater than predicted subsidence in Main South **Stage 1** and **Stage 2** in **2014**. During 2014 – after the initial sudden increase in subsidence - results began to trend toward decreasing movement. In 2015 and **2016** surveys have consistently shown relatively stable results.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (d) – Stage 1 23 (d) – Stage 2 24 (d) – Stage 3	**Management Actions of Potential Impacts**	In general - current Public Safety and Subsidence Management Plans are considered adequate. Following greater than predicted subsidence in **Stage 1** Main South Cross line / 8NE Centreline area in 2014; All relevant government agencies and stakeholders were notified as per condition 20, after results of January survey. Centennial Newstan conducted a follow up survey – including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders. A visual inspection was carried out on 21/03/2014 - by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were included in a geotechnical report. A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence. A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014. A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical

SMP Approval Condition No.	Requirement Summary	Comment / Description
		consultant, and Transport NSW. During the Chatswood meeting – it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation. Monitoring frequency was increased on 04/04/2014 to provide further data until the area became stable; and to monitor any possible increased subsidence moving toward the rail corridor. Following greater than predicted subsidence in **Stage 2** Main South Crossline Extension / 8SW Centreline area - All relevant government agencies and stakeholders were notified as per condition 21, after results of the July survey. A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014. Agreement was reached with the PSE and Transport NSW - to increase monitoring frequency to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the Railway Protection Zone (along 8SW) or the Railway Mining Barrier (along 6SW) - will trigger further communication and review of the situation. Monitoring frequency was increased on 16/07/2014.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		A meeting to discuss the trend of consistent relatively stable monitoring results in both **Stage 1** and **Stage 2** - was held in Burwood on 12/08/2015. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Burwood meeting – it was agreed to amend the frequency of surveys from fortnightly to monthly for a period of six months (commencing from August). If results continued to be stable during this period – agreement would be made to further reduce monitoring frequency. On October 7th, 2015, official approval was granted by PSE to vary this monitoring to monthly. A meeting between Centennial Newstan and PSE was held on 20/07/2016 to discuss the consistent relatively stable monitoring results in **Stage 1, 2, 3**. A report reviewing the recent subsidence data, prepared by a geotechnical consultant, was distributed to Transport NSW and the PSE on 25/08/2016. In addition, a letter requesting agreement from Transport NSW to amend the monitoring program to 2 monthly for 6SW points, and 6 monthly for other nominated **Stage 1,2,3** points was submitted on 25/08/2016. Agreement to amend the monitoring program was received from Transport NSW on 08/12/2016. Agreement to amend the monitoring program was received from PSE on 09/12/2016.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Following the reporting of the **Stage 2** localised sinkhole in February 2015, - The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. The location of the sinkhole was plotted and is shown on the Stage 2 Face Position plan AW2075. The sinkhole has been filled. The area is being rehabilitated in accordance with the Sinkhole Rehabilitation Plan. Following the formation of the **Stage 3** Sinkhole in June 2011 -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. Rehabilitation of the site has since been completed. The location of the sinkhole was plotted, and is shown on the Stage 3 Face Position plan AW2176. Due to the partial reactivation of this hole - further minor rehabilitation works were carried out during 2015, in accordance with the Sinkhole Rehabilitation Plan.

Grant Watson

Centennial Newstan (Awaba) Colliery – Mine Manager

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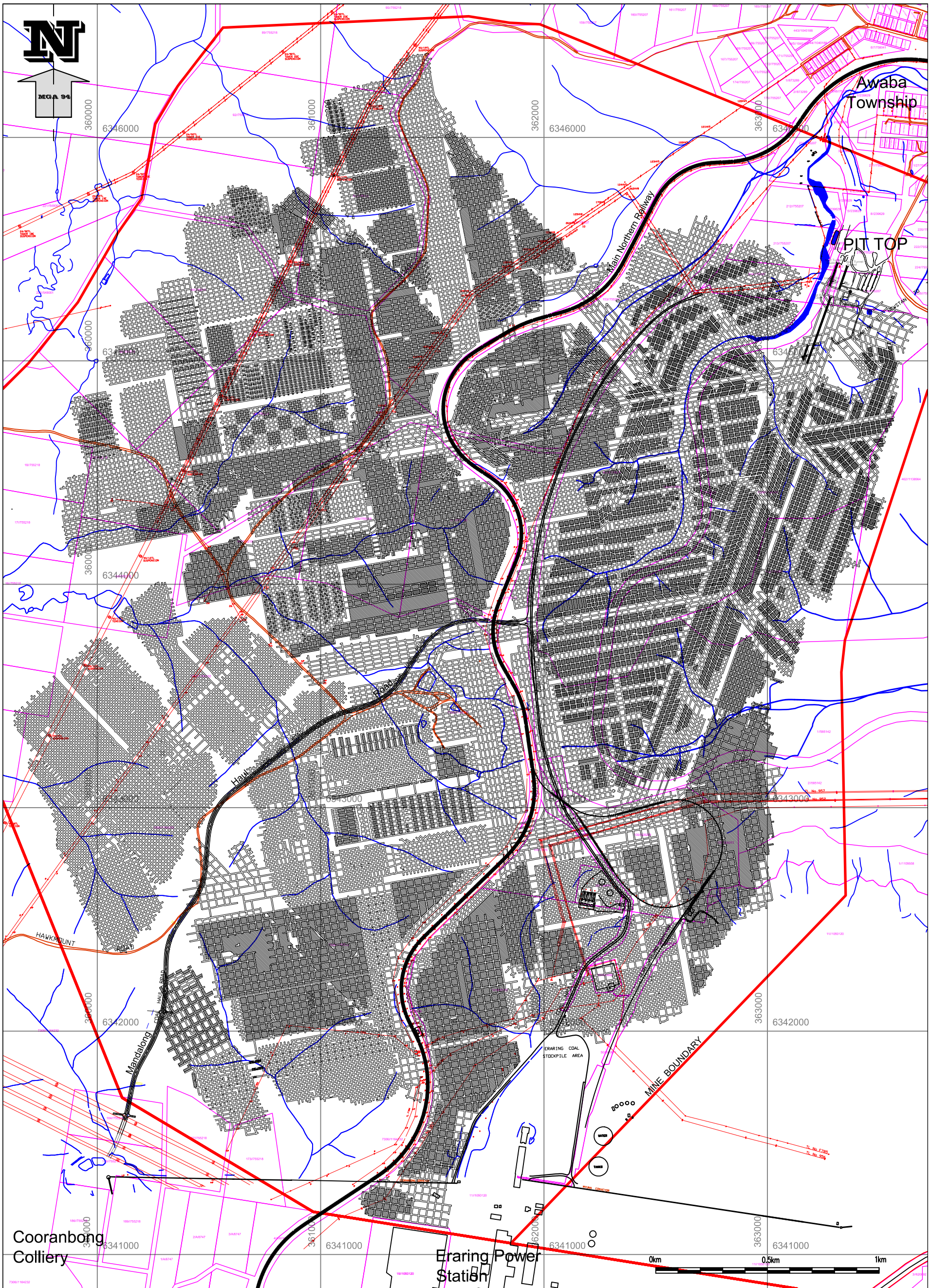


LOCATION	AWABA COLLIERY
SEAM	GREAT NORTHERN
DRAWN	C.CLUDERAY
CHECKED	
APPROVED	
SCALE	1:15000

LEGEND

- Existing Mine Workings
- Extracted Mine Workings
- Mine Boundary
- Portion Boundaries
- Major Road
- Major Creek / Dam
- Minor Creek / Water Course
- Powerlines / Towers

Centennial Newstan Pty Ltd (ACN 101 508 865)

AWABA COLLIERY

Great Northern Seam Workings

Note: Mining Ceased 08/03/2012

Note: Workings Sealed August 2012

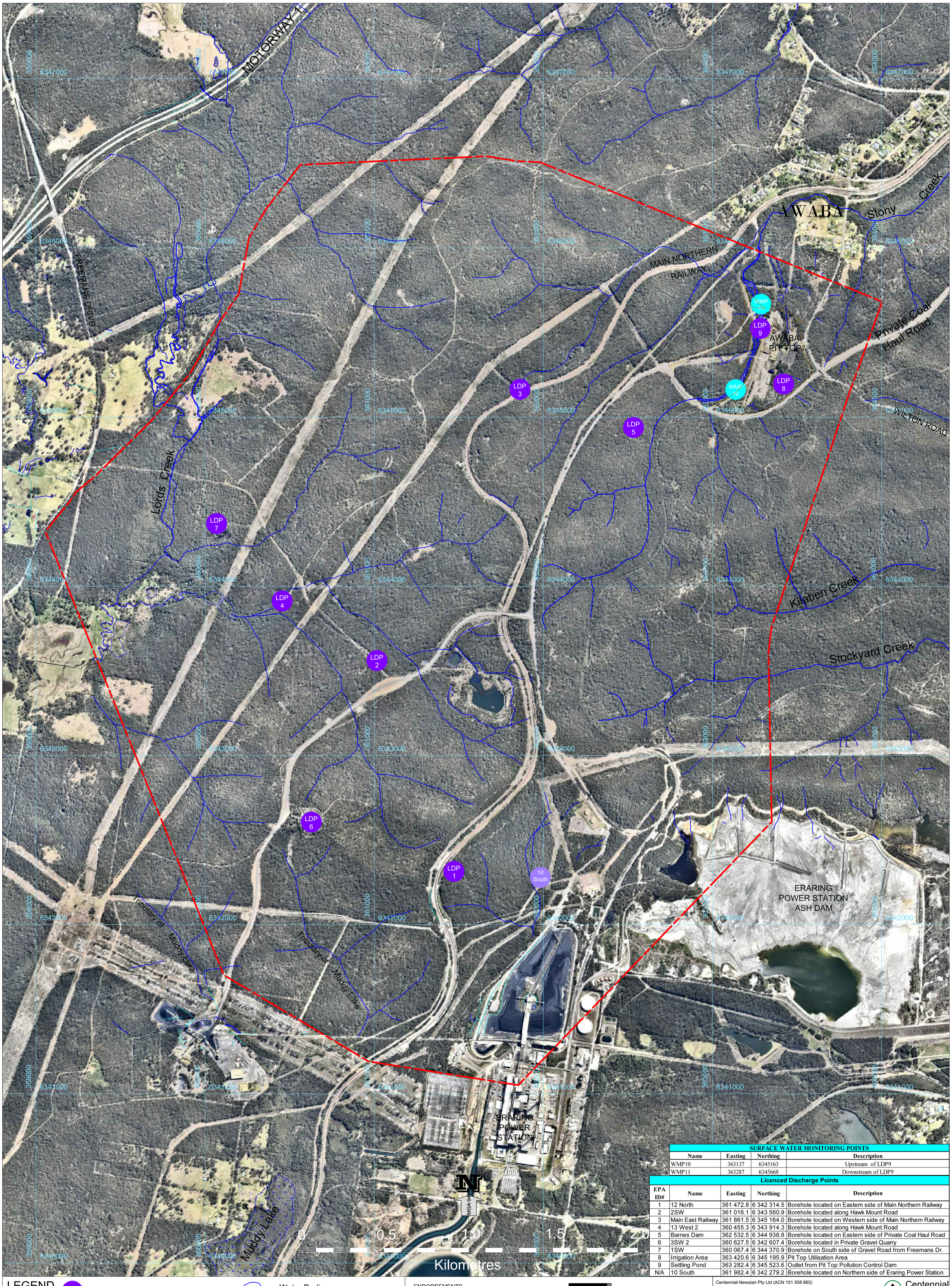
Centennial Newstan

AW2245

PDF FILE: N:\SHARED\PDF\2015\AEMR_Grn Workings_Final.pdf

11/02/2015

A3



SURFACE WATER MONITORING POINTS			
Name	Easting	Northing	Description
WMP10	363137	6345163	Upstream of LDP9
WMP11	363287	6345668	Downstream of LDP9

Licenced Discharge Points				
EPA ID#	Name	Easting	Northing	Description
1	12 North	361 472.8	6 342 314.5	Borehole located on Eastern side of Main Northern Railway
2	2SW	361 016.1	6 343 560.9	Borehole located along Hawk Mount Road
3	Main East Railway	361 861.5	6 345 164.0	Borehole located on Western side of Main Northern Railway
4	13 West 2	360 455.3	6 343 914.3	Borehole located along Hawk Mount Road
5	Barnes Dam	362 532.5	6 344 938.8	Borehole located on Eastern side of Private Coal Haul Road
6	3SW 2	360 627.5	6 342 607.4	Borehole located in Private Gravel Quarry
7	1SW	360 067.4	6 344 370.9	Borehole on South side of Gravel Road from Freemans Dr.
8	Irrigation Area	363 420.6	6 345 195.9	Pit Top Utilisation Area
9	Settling Pond	363 282.4	6 345 523.6	Outlet from Pit Top Pollution Control Dam
N/A	10 South	361 982.4	6 342 279.2	Borehole located on Northern side of Eraring Power Station

LEGEND

- LDP 2 — Licenced Discharge Point
- 10 South — Discharge Point
- WMP 10 — Water Monitoring Point
- Water Bodies
- Creek
- Underground Premises Boundary
- Surface Premises Boundary

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 06/10/2016.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*
- *Plan prepared by C.Cluderay - Registered Mining Surveyor (BOSSI #3284)*

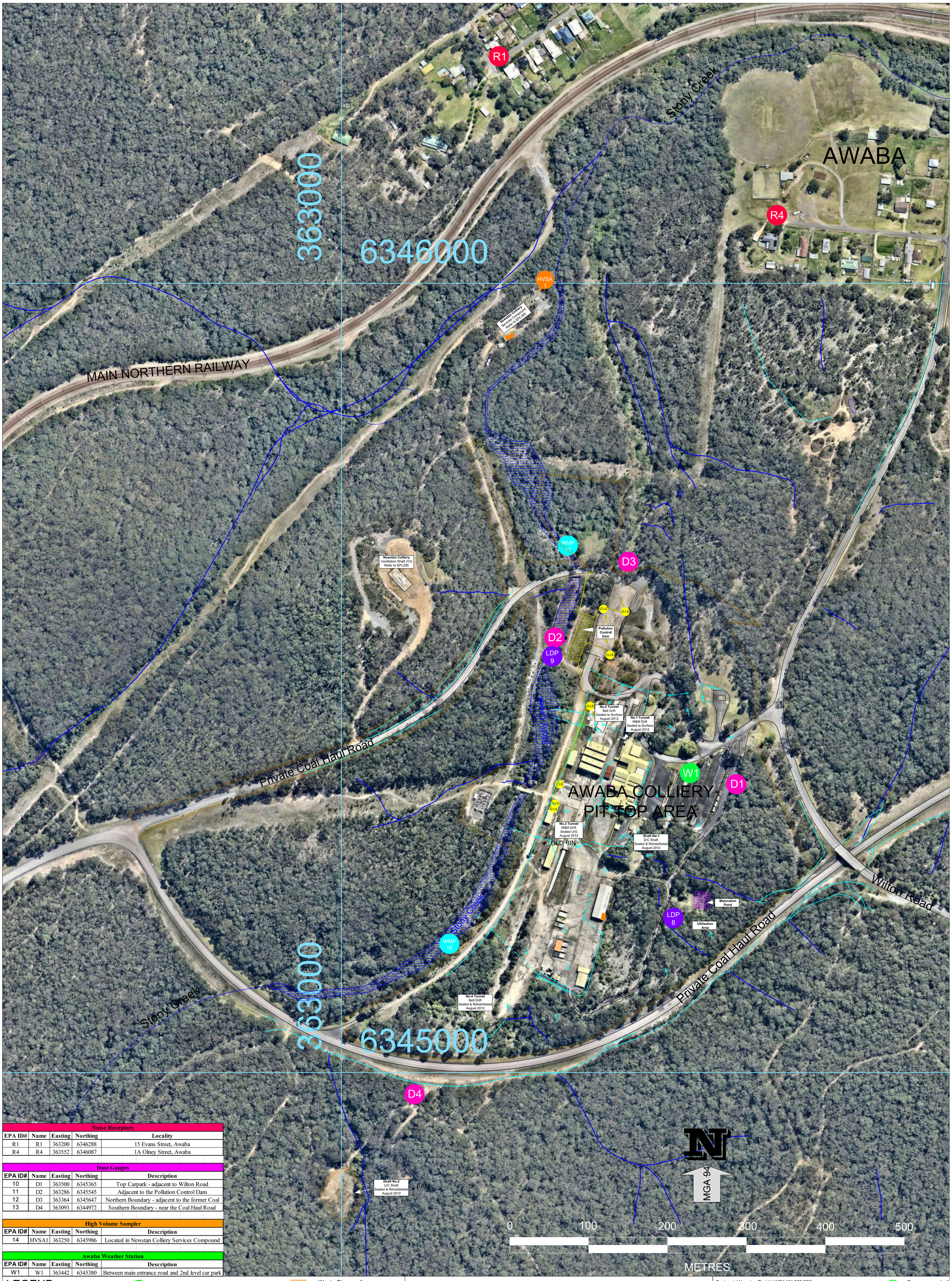
NOTE: This Plan to be Viewed in Conjunction with AW2261 (showing Surface Premises Water Management Devices)

Centennial Newstan Pty Ltd (ACN 101 508 865)
AWABA COLLIERY
Surface

Centennial Newstan

TITLE: Location of Licenced Discharge Points, and Surface Water Monitoring Points

REVISION: C.Cluderay	ORIGINAL DRAWN: 14/03/2016 - C.Cluderay	All Distances are in metres unless otherwise shown.	A0
DATE: 12/01/2017	Plot File: N:\Shared\Pdf\2017\AW2260_2017-0112.pdf		
CHECKED: M.Gale	SCALE: 1 : 7000		AW2260
APPROVED: G.Watson			



Noise Receptors				
EPA ID#	Name	Easting	Northing	Locality
R1	R1	363200	6346288	15 Evans Street, Awaba
R4	R4	363552	6346087	1A Olney Street, Awaba

Dust Gauges				
EPA ID#	Name	Easting	Northing	Description
10	D1	363500	6345365	Top Carpark - adjacent to Wilton Road
11	D2	363286	6345545	Adjacent to the Pollution Control Dam
12	D3	363364	6345647	Northern Boundary - adjacent to the former Coal
13	D4	363093	6344972	Southern Boundary - near the Coal Haul Road

High Volume Sampler				
EPA ID#	Name	Easting	Northing	Description
14	HVSA1	363250	6345986	Located in Newstan Colliery Services Compound

Awaba Weather Station				
EPA ID#	Name	Easting	Northing	Description
W1	W1	363442	6345380	Between main entrance road and 2nd level car park

LEGEND

- R1 Noise Monitoring Location
- D4 Dust Gauge
- HVSA 1 High Volume Sampler
- W1 Weather Monitoring Station
- LDP 1 Licenced Discharge Point
- WMP 10 Water Monitoring Point
- D.I.S Drive in Sump
- Waste Storage Area
- Bunded Area
- Clean Water Systems
- Dirty Water Systems
- Water Bodies
- Creek
- Surface Premises Boundary

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 06/10/2016.*
- *Surface Premises Boundary Co-ordinates supplied by C.Tindall - GIS Coordinator, Centennial Coal.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*
- *Plan prepared by C.Cluderay - Registered Mining Surveyor (BOSSI #3284)*

NOTE: This Plan to be Viewed in Conjunction with AW2260 (showing All Licenced Discharge Points & Details)

Centennial Newstan Pty Ltd (ACN 101 508 865)
AWABA COLLIERY
Surface

Centennial Newstan

TITLE: Location of Air, Noise, Weather, Water - Monitoring points, and Water Management Devices

REVISION: C.Cluderay	ORIGINAL DRAWN: 14/03/2016 - C.Cluderay	All Distances are in metres unless otherwise shown.	A0
DATE: 02/03/2017	Plot File: N:\Awaba_Survey\Shared\Pdf\2017\AW2261_2017-0302.pdf		
CHECKED: M.Gale	SCALE: 1 : 1500		AW2261
APPROVED: G.Watson			