Centennial Coal

SUBSIDENCE MANAGEMENT PLAN APPLCIATION

VOLUME 2 – SUBSIDENCE MANAGEMENT PLAN

Partial Extraction of Areas 700 West and 800

Clarence Colliery

November 2011

Centennial Coal
Environment Matters

CLARENCE COLLIERY

Title Block	
Name of Company ACN / ABN	Clarence Colliery Pty Limited A.C.N. 001 680 584 / A.B.N. 19 001 680 584
Name of Mine	Clarence Colliery
Title	Volume 2 - Subsidence Management Plan
Date of last revision	November 2011
Reference Number	TBA
Mining Lease no.	ML 1583 and CCL 705

Mine and Personnel Details (Clarence Colliery)	
Site Address	Clarence Colliery Road (Off Bell's Line of Road), Clarence NSW 2790
Postal Address	P.O. Box 92 Lithgow NSW 2790
Telephone No.	(02) 6353 8020
Facsimile No.	(02) 6355 2720
Mine Manager	Gregory Shields
Colliery Surveyor	Jack Blackadder
Environmental Co-ordinator	Gregory Brown
Mine Managers Signature	
Date of Signing	15/11/11

TABLE OF CONTENTS

APPENDICES

FIGURES (within report)

PLANS (accompanying)

SMP Plans (including):

- **Plan 1** 700 West SMP – **Plan 1** (CL810)
- **Plan 2** 700 West SMP – **Plan 2** (CL811)
- **Plan 3** 700 West SMP – **Plan 3** (CL812l
- **Plan 4** Not Applicable (as there are no existing or planned future workings in the seams above and/or below the proposed workings)
- **Plan 5** 700 West SMP **Plan 5** (CL813)
- **Plan 6** Borehole Illustrations and Geotechnical Log – 700 West
- **Plan 7** 700 West SMP – **Aerial** (CL814)
- **Plan 8** 800 Area SMP – **Plan 1** (CL827)
- **Plan 9** 800 Area SMP – **Plan 2** (CL828)
- **Plan 10** 800 Area SMP – **Plan 3** (CL829)
- **Plan 11** 800 Area SMP – **Plan 5** (CL830
- **Plan 12** Borehole Illustrations and Geotechnical Log – 800 Area
- **Plan 13** 800 Area SMP – **Aerial** (CL832)
- **Plan 14** Approved Plan – 700 West (CL809)
- **Plan 15** Approved Plan – 800 (CL826)

1 SMP OVERVIEW

1.1 PURPOSE OF SMP

This report has been prepared as part of the application for Subsidence Management Plan (**SMP**) approval by Clarence Colliery Pty Limited (Clarence Colliery) to undertake partial extraction mining activities within the 700 West Area (within Mining Lease (**ML**) 1583) and the 800 Area (within ML 1583 and Consolidated Coal Lease (**CCL**) 705) (hereafter referred to as 700 West / 800 Areas).

The purpose of this SMP is to outline the key risks and proposed management strategies for mining the 700 West / 800 Areas by partial extraction methods. The key elements of this SMP include:

- The identification and ranking of risks;
- The description of existing and proposed controls including pillar design standard, pillar and environmental monitoring and mitigation measures;
- Trigger Action Response Plan (**TARP**) for deviations from design predictions; and
- Ongoing consultation and reporting requirements.

1.2 STRUCTURE OF SMP APPLICATION

This document is Volume 2 of the SMP Application, and is referred to as the SMP.

The SMP Application consists of:

- Letter of Application;
- SMP Written Report (SMP Application Volume 1);
- SMP (SMP Application Volume 2); and
- SMP Approved Plan, SMP Plans (1, 2, 3, 5, 6) and Aerial Photos comprising both the 700 West and the 800 Areas

1.3 PROJECT OVERVIEW

Clarence Colliery is an underground partial-pillar extraction coal mine located approximately 15 km east of Lithgow in the Western Coalfields of NSW. Operations at the mine commenced in 1979 and are now undertaken by Clarence Colliery Pty Ltd (**Clarence Colliery**). Clarence Colliery is a joint venture company owned 85% by Centennial Coal Company Limited and 15% by SK Networks Resources Australia Pty Ltd.

The mining system for the proposed SMP Application Area is the partial-pillar extraction system which has been in place for the last twelve years carried out within ML 1583, CCL 705 and ML 1353. This system has been designed such that remnant pillars that remain within and between panels are long-term stable. Subsidence analysis results have proven this method of extraction results in extremely low levels of subsidence.

Unlike full extraction mining, partial extraction minimises subsidence through leaving a proportion of the resource in situ. This provides support to the overlying strata, minimising the breakage and falling of the overburden and maintaining the integrity of the aquifers above. Within the proposed SMP Application Area, maximum vertical long-term subsidence is predicted to not exceed 100 mm.

There have been no adverse impacts detected on the surface from partial extraction at Clarence Colliery to date. Subsidence monitoring results have been used to compare subsidence model estimates with actual results and this information has then been used to further refine the subsidence model. Modelling based on these previous results provides great confidence that further mining in the SMP Application Area using the partial pillar extraction method will have negligible impacts.

The mining of the 700 West / 800 Areas is enabled through an existing Development Consent (DA 504-00) approved in 2005. Clarence Colliery is seeking SMP approval from the Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy (**DRE**) under the NSW Mining Act (1992), for partial extraction mining activities in 700 West / 800 Areas.

The entire surface of the 800 Area is within Crown Land, being the Forests NSW-managed Newnes State Forest. The 700 West Area also includes land managed by Lithgow City Council (**LCC**) and land owned by Boral Quarries. The 700 West area also includes a small proportion of three privately owned lots of land which lie on the boundary of the southern border of the 700 West area. Two of these lots will not be directly undermined. The third lot of land owned by Zig Zag Rail Co-op Ltd is proposed to be undermined by Panel 701a currently scheduled to be extracted more than 10 years away. Further and ongoing consultation will be undertaken with the Zig Zag Railway prior to any mining activities taking place.

The predominant land uses of the surrounding area include native hardwood and pine plantation harvesting and recreational activities such as bush walking, motorcycling and four wheel drive pursuits.

The 700 West Area includes part of the catchment area draining to the Lithgow No. 2 Dam which is a water supply dam for Lithgow. Built infrastructure above the 700 West Area includes the Lithgow No.2 Dam, transfer ponds and pipeline for the Clarence–Farmers Creek water transfer system, a powerline, telecommunications and other minor infrastructure. The 800 Area is managed by Forests NSW and the only infrastructure in the area is Forests NSW vehicle tracks and Clarence Colliery monitoring bores.

Clarence Colliery has consulted with stakeholders through the preparation of the SMP Application regarding management of subsidence impacts. The potential impacts in the SMP Application Area have been determined through Risk Assessment, subsidence modelling and prediction and other specialist studies.

Whilst the Risk Assessment concluded that the majority of the existing controls in place will adequately address the potential subsidence risks to significant natural and manmade features and infrastructure, Clarence Colliery engaged specialist consultants to undertake relevant field assessment and a review of the information relating to the SMP Application Area and assess impacts for the following key issues:

- Flora and Fauna;
- Archaeology;

- Cliff line and pagoda; and
- Groundwater resources.

These specialist assessments are included in Volume 1 of this SMP Application. In addition, Clarence Colliery carried out a detailed review of subsidence monitoring (and therefore mining performance) over the last 12 years. This has provided Clarence with a high level of confidence in not only subsidence modelling and predictions but also mining performance and development of subsidence.

The key approvals relevant to this SMP are as follows:

- Development Consent (DAM.08.76) granted by Blaxland Shire Council in 1976 following an EIS in 1975 allowing for the development of a mine and associated mine infrastructure;
- Amended Development Consent (5161/20000000/0) granted by Lithgow City Council in 1993 incorporating CCL705 (Underground Coal Mine, Reject Emplacement Areas and Associated Pit Top Facilities);
- Development Consent (DA 504-00) granted by the Department of Planning in 2005 approving partial extraction in ML1583;
- Consolidated Coal Lease 705;
- Mining Lease 1583; and
- Environmental Protection License No.726 under the *Protection of the Environment Operations Act 1997*.

1.4 SMP APPLICATION AREA

The SMP Application Area for 700 West / 800 Area has been defined using the surface area which includes a 10 degree angle of draw from the limit of proposed mining. A specific assessment has been carried out by Strata Engineering Australia Pty Ltd (**SEA**) regarding a site specific angle of draw at Clarence. Over 12 years of subsidence data was used in the evaluation. The analysis showed that it is well below the guidelines of 26.5 degree angle of draw as a result of the partial-pillar extraction system in place. The maximum angle of draw reliably recorded to date is 5.9 degrees for the V Line beyond the northern boundary of 611E Panel (SEA, 2011a). The analysis showed that previous monitoring of subsidence to date has shown that most commonly, there is no external angle of draw, and that subsidence tends to reduce to less than 20 millimetres (**mm**) within the panel boundary. To add a level of conservatism, a site specific angle of draw of 10 degrees has been used for this SMP application.

The SMP Application Area is shown in **Figure 1** and **Figure 2**.

1.5 SMP PLANS

The following plans form part of the SMP Application and are attached:

SMP Plans (including):

700 West SMP – **Plan 1** (CL810)

700 West SMP – **Plan 2** (CL811)

700 West SMP – **Plan 3** (CL812l

700 West SMP **Plan 5** (CL813)

Borehole Illustrations and Geotechnical Log – 700 West

700 West SMP – **Aerial** (CL814)

800 Area SMP – **Plan 1** (CL827)

800 Area SMP – **Plan 2** (CL828)

800 Area SMP – **Plan 3** (CL829)

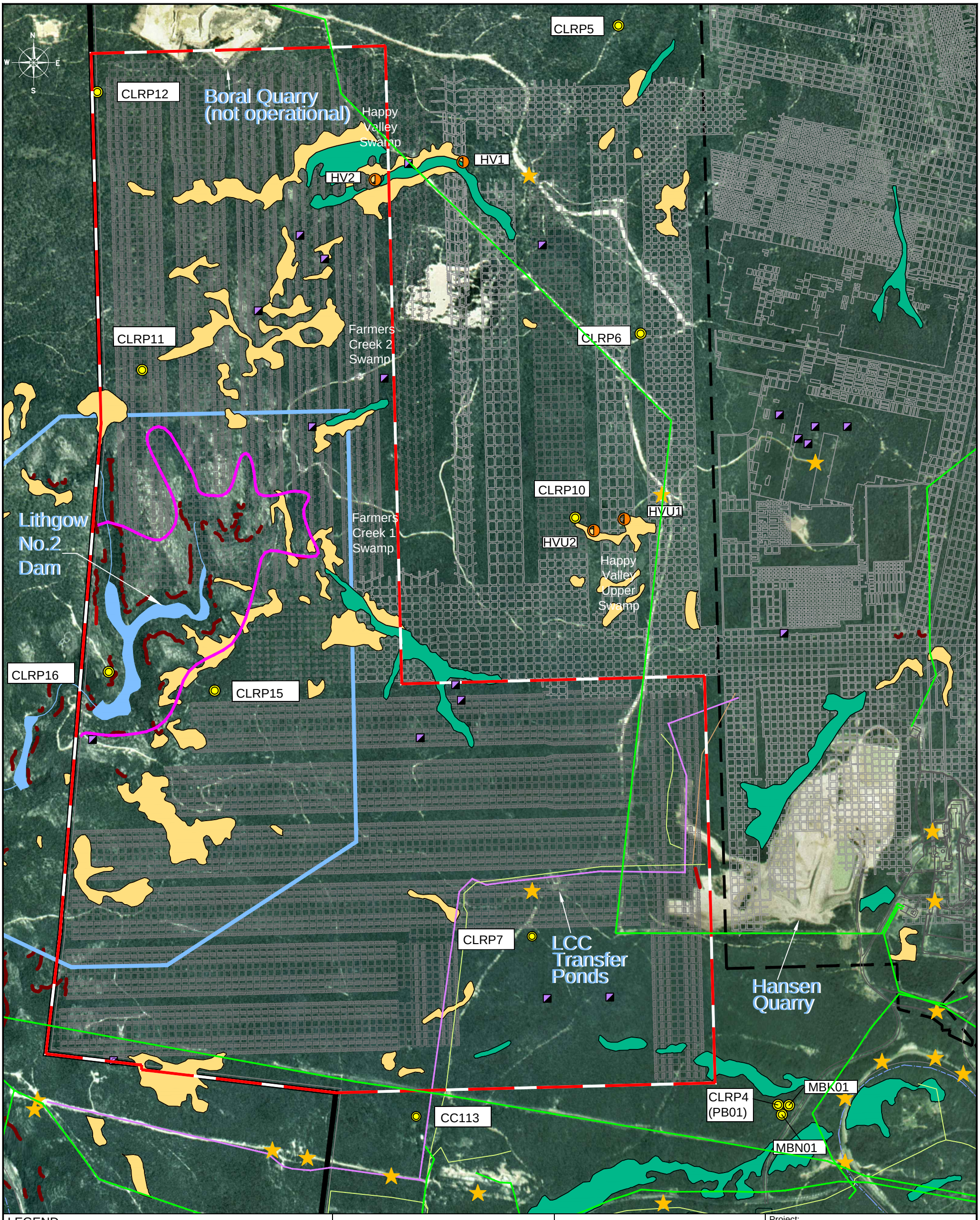
800 Area SMP – **Plan 5** (CL830

Borehole Illustrations and Geotechnical Log – 800 Area

800 Area SMP – **Aerial** (CL832)

Approved Plan – 700 West (CL809)

Approved Plan – 800 (CL826)



LEGEND

- Colliery Holding Boundary
- Mining Lease Boundary
- Lithgow No.2 Dam
- Notification Area
- SMP Application Area
- First Workings Zone (for Lithgow No.2 Dam)
- Existing Workings Area
- Proposed Workings Area (incl. Secondary Extraction)
- Newnes Plateau Hanging Swamp (Dec 2005)
- Newnes Plateau Shrub Swamp (Dec 2005)
- Known Archaeological Site
- Monitoring Bore Location
- Shallow Piezometer Location
- State Survey Marker
- Telstra Underground Cable
- Telstra Optic Fibre Cable
- Telstra Aboveground Cable
- Integral Powerline
- Cliffs and Pagodas

0 400 800m

Scale 1:15 000(A3)

Version	Date:	Author:	Checked:	Approved:
1	18/03/11	AR	BS	BS
2	24/03/11	AR	SW	BS
3	15/04/11	AR	SW	BS
4	29/07/11	LH	SW	BS
5	18/08/11	LH	SW	SW
6	14/09/11	LH	RW	RW
7	25/10/11	ZJ	RW	RW
8	09/11/11	KC	RW	RW

FIGURE 1

Surface Feature Plan - 700 West Area

GSS ENVIRONMENTAL
Environmental, Land and Project Management Consultants

Project: Clarence SMP - Partial Extraction of 700 West and 800 Areas

Client: Clarence Colliery

File: Fg1_CCC06-011_SurfPlan700_111109

Projection: MGA 94 Zone 56

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Bungleboori Creek Downstream

N
W
E
S

CLRP3

BUNGLEBOORI CREEK

Dumbano 3 Swamp

Dumbano Trib 1b

Dumbano Trib 1a Swamp

Dumbano 2 Swamp

CLRP14

Billabong 3 Swamp

Dumbano 1 Swamp

Billabong 2 Swamp

CC115

Dumbano Trib 2 Swamp

CLRP1

Banksia 2 Swamp

Billabong 1 Swamp

CC114

CLRP13

Banksia 1 Swamp

Wallangambe Swamp

Gooches Crater

LEGEND

- Colliery Holding Boundary
- Mining Lease Boundary
- SMP Application Area
- Existing Workings Area
- Proposed Workings Area (incl. Secondary Extraction)
- Newnes Plateau Hanging Swamp (Dec 2005)
- Newnes Plateau Shrub Swamp (Dec 2005)
- Known Archaeological Site
- Monitoring Bore Location
- Cliffs and Pagodas
- River

0 500 1.0km

Scale 1:20 000(A3)

Base Plan Data Source:

Version	Date:	Author:	Checked:	Approved:
1	25/10/11	ZJ	SW	RW

FIGURE 2

Surface Feature Plan - 800 West Area

GSS ENVIRONMENTAL
Environmental, Land and Project Management Consultants

Project: Clarence SMP - Partial Extraction of 700 West and 800 Areas

Client: Clarence Colliery

File: Fg2_CCC06-011_SurfPlan800_111025

Projection: MGA 94 Zone 56

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1.6 ROLES & RESPONSIBILITIES

It is the responsibility of all personnel and contractors working at Clarence Colliery to operate in accordance with the Centennial Coal Environmental Policy.

The Clarence Colliery Manager of Mining Engineering (Mine Manager) is responsible for the management of the mine and ensuring compliance with all relevant legislative obligations. It is the responsibility of the Mine Manager to provide sufficient resources for the implementation of this SMP. The Mine Manager shall enlist the help of other Clarence Colliery staff (i.e. Under Managers, Mine Surveyor, Mine Geologist, Environmental Coordinator) to undertake inspections and corrective actions where appropriate.

The Mine Surveyor is responsible for the implementation of the subsidence (surface deformation) monitoring component of this SMP.

The Mining Engineer (and Technical Services Superintendant or mine planner) is responsible for the co-ordination of subsidence monitoring results interpretation against the predicted subsidence levels from the mine plan.

The Environmental Coordinator has the following responsibilities in regard to subsidence:

- Consultation with stakeholders throughout the SMP process;
- Project management of specialist studies; and
- Reporting of monitoring and subsidence impacts.

1.7 TRAINING, RESOURCES AND COMMUNICATION

All employees and contractors of Clarence Colliery are required to undergo routine environmental training and awareness to ensure they are aware of their roles and responsibilities with regard to the environment. This training includes the management principles embodied in the Environmental Policy

Clarence Colliery keeps the local community informed through regular meetings of the Community Consultative Committee (**CCC**). The role of the CCC is to facilitate community involvement in the project, regular information and discussion on the progress of work. The broader consultation strategy is described in **Section 4**.

Specific reporting requirements relating to subsidence impact triggers are outlined in the TARP in **Appendix A**.

1.8 DOCUMENT CONTROL

All reports, data and plans must be retained for the life of the mine. All documentation must be archived and filed electronically in accordance with Clarence Colliery's Document Control Standard MP-1836 (currently under review).

2 SUBSIDENCE MANAGEMENT & MONITORING

This section details the specific subsidence management and monitoring required within the SMP Application Area, with focus on identified surface features within the 700 West and 800 areas. In addition, a TARP has been developed for the SMP which establishes trigger levels used to monitor against predictions made within the SMP. The TARP also provides strategic management responses to monitoring results with a focus on response to results that exceed predictions or cause actual or potential impacts and consequences. A copy of the TARP is included in **Appendix A**.

2.1 GENERAL PROCESS AND STRUCTURE

SEA carried out various assessments on the stability of proposed partial extraction workings for the SMP Application Area, which are included in the SMP Written Report (Volume 1). The assessment was based on the requirement to ensure that surface subsidence is kept to a minimum, thus subsidence should remain within that considered to be elastic overburden behaviour / displacement (100±25 mm).

The rationale underpinning the partial extraction mining for the 700 West / 800 Area is summarised below:

1. The 40 metre (**m**) (minimum, solid width) barrier pillars have a width to height (**w/h**) ratio of ≥13 and would be commonly regarded as indestructible.

2. The central spine pillars have w/h ratios of ≥8 and are also very strong and stiff, also recognised as indestructible.

3. The remnant pillars are not insignificant in size (a minimum w/h ratio of 5) and provide considerable support, at least to the immediate overburden.

4. The sandstones dominating the overburden at Clarence have considerable spanning and associated load transfer potential. Therefore, during extraction some of the load carried by the stripped pillars is transferred to the stiffer barrier pillars and spine pillars.

5. This spanning ability of the overburden is enhanced by the maintenance of subcritical span to depth ratios. Sub-panel width to depth ratios are typically much less than 50%, such that subsidence principles indicate natural arching of the overburden, significant load transfer and greatly restricted potential for any surface deformation (i.e. subsidence).

6. As depth reduces, although the spanning capability of the overburden diminishes and width to depth ratio increases, the stability of the in-pillars and in particular the remnants steadily improves and the reliance on load transfer diminishes. The system is therefore effectively self-regulating.

The use of the partial extraction mining system at Clarence Colliery is the major design factor in controlling subsidence, with no adverse impacts recorded to date.

2.2 PILLAR STABILITY

Clarence Colliery has an existing strata pillar stability monitoring program which is incorporated into the subsidence and underground monitoring programs for each SMP area. A pillar stability monitoring program will continue for the 700 West / 800 Areas and include as a minimum the monitoring summarised in **Table 1.**

Table 1 Pillar Stability Monitoring Program

Item	Monitoring Standard
Pillar Size Auditing	All pillars to be partially extracted will be sampled for width and height.
Pillar stability monitoring (visual)	Mining officials to monitor pillars for signs of deterioration during extraction. Reporting on shift reports. Once per panel, external geotechnical expertise to inspect and review partial extraction and pillar stability. Triggers and responses as mentioned in the subsidence management TARP in **Appendix A**.

At the conclusion of extraction within the SMP Application Area, results from pillar stability monitoring will be reviewed by external geotechnical expertise and results linked to surface subsidence results. Recommendations for design changes arising from this review are to be incorporated into future panel designs.

Specific requirements relating to pillar stability are outlined in the TARP in **Appendix A**.

2.3 SUBSIDENCE (SURFACE DEFORMATION)

Consideration was given to the number of restrictions due to surface topography over the 700 West and 800 areas, when determining the subsidence monitoring proposed. The main aim of the subsidence monitoring is to confirm maximum vertical displacements are within predicted levels. Further details of the proposed subsidence monitoring can be found in **Appendix B**.

700 West Area

The 700 area has five existing monitoring lines, including the 700A and 700B lines which currently extend over part of the proposed 714 panel in the 700 West Area. Ground truthing of the area west of these lines has been undertaken with a view to extending these lines to cover the 700 West panels. However, due to rugged terrain, thick vegetation and the presence of cliffs/pagodas and swamps, it is not practical to extend these lines directly west from the current position. In addition, the need to trim/clear vegetation to enable the installation of strain levelled subsidence lines conflicts with the aim of minimising disturbance and reducing public visibility and vandalism risk. There are also occupational health and safety risks with carrying equipment in for the establishment and resurvey of traditional subsidence lines where no vehicle access tracks exist.

A motor bike access track exists near the western extremity of 700B line that runs in a north-west direction. A traditional subsidence line is not suitable adjacent to the motor bike track due to the risk of vandalism plus safety issues if pegs protrude from the ground. Clarence proposes to install marks adjacent to the motorbike track to create a subsidence line for level measurement only (i.e. no strain). The marks will have minimal protrusion to reduce vandalism and eliminate public safety risk. ‘Feno’ marks will be used where the ground is soft enough, alternatively rock marks (small pin/nail) will be installed. The location of this proposed subsidence line is shown in Plan CL792 in **Appendix B**.

Where subsidence lines will not be established, Clarence Colliery proposes to rely on photographic monitoring and visual inspection of surface features to identify subsidence impacts.

No strain or tilt monitoring is proposed for the 700 West Area. Strain monitoring requires a protruding peg that presents a public safety risk near a motorbike track. Given the historically low strain and tilt measurements at Clarence, it is proposed to use level monitoring only to measure subsidence.

800 Area

Similar to the 700 West area, the presence of rugged terrain, thick vegetation, cliffs/pagodas and swamps makes the establishment of traditional subsidence monitoring lines extremely difficult and unsafe. The area is relatively untouched by human activity, and there are no existing subsidence monitoring lines.

Only a limited area is suitable to safely establish a monitoring line for the earlier panels without the need to clear access paths. An old access road (since overgrown) could allow the establishment of a monitoring line over the first two 7 heading FCT panels. To avoid clearing vegetation close to the ground, it is proposed to measure level only without strains and tilts. Given the very low strain and tilt values measured historically, additional clearing to allow strain tape measurements would be excessive.

To minimise the public safety risk of exposed steel monitoring pegs, the use of Feno markers is proposed as for the 700 West Area. Further details are contained in **Appendix B**.

Specific requirements relating to subsidence measurements and exceedances are outlined in the TARP in **Appendix A**.

2.4 RIVERS AND CREEKS

The 700 West proposed mining passes beneath Farmers Creek and tributaries of Farmers Creek which report to Lithgow No.2 Dam. Farmers Creek is a fourth order stream under the Strahler system of stream ordering. The tributaries of Farmers Creek include first, second and third order streams.

The 800 Area passes beneath tributaries of the Dumbano and Wollangambe River. The tributaries of these rivers include first, second, third and fourth order streams.

The partial extraction mining method adopted by Clarence Colliery results in maximum predicted subsidence of 100 mm with low tilts and strains (<2 mm/m), no measured valley closure, no upsidence and no surface cracking. With this low level of movement it is considered that there will be no adverse impacts on the flow, flow characteristics (i.e. ponding, bank stabilisation) or quality of rivers and creeks from mining at Clarence Colliery.

The key issue in relation to the effects of the mining proposal on creeks relate to the loss of water from the upper (near-surface) aquifers that provide baseflow to the creeks. The monitoring of known groundwater sources is addressed in **Section 2.5**.

Surface water monitoring of Farmers Creek occurs for the 700 SMP area in accordance with both the Clarence Water Management Plan and the Dams Safety Committee Approval (refer to **Section 2.12**). This monitoring will continue during mining within the 700 West area.

2.5 AQUIFERS - KNOWN GROUNDWATER SOURCES

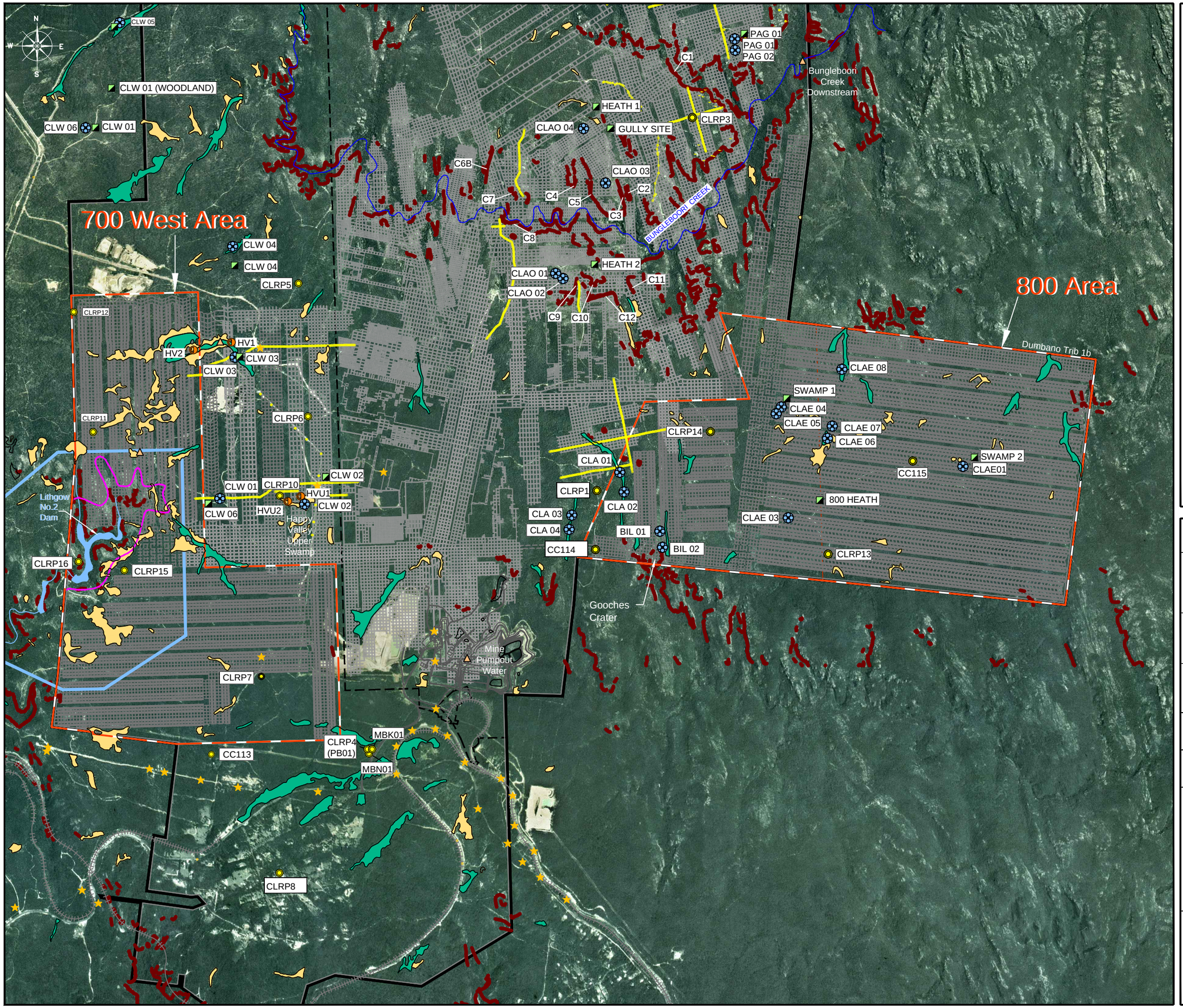
An assessment of the likely impacts on the local groundwater regime was undertaken by Aurecon (2011) specifically for the SMP Application, which is included in Volume 1. The assessment concentrated on the 'Clarence' aquifer within the Banks Wall Sandstone. The Clarence aquifer provides a potable water supply tapped by numerous bores within the village of Clarence, which is approximately 6 kilometres to the south of the SMP Application Area. The Clarence aquifer is also a source of groundwater for many of the rivers, creeks and swamps in the local area.

Groundwater monitoring over existing mine workings shows no impact on the groundwater regime above the mine, apart from in the immediate mining horizon. Aurecon (2011) has concluded that the proposed mining will have no significant impact on the groundwater regime on both a local and regional scale provided subsidence is maintained at the current low levels. This is based on extensive monitoring and an assessment of previous mining performance. Consequently there will be no groundwater impact on groundwater-dependent ecosystems within the National Park or elsewhere.

Mining within the SMP Application Area will therefore have no adverse impact on the availability of future groundwater supply resources in the area (specifically the Clarence aquifer) or on aquifers feeding base flow to rivers, creeks or swamps.

Due to the difficult access of surface terrain and with the existing monitoring program in place, it is not practical to establish new piezometers for the SMP Application Area. Given the likely negligible impact on the groundwater regime from the proposed mining and limited interaction with near-surface aquifers (including the Clarence aquifer), the existing groundwater monitoring program will be sufficient to detect any potential mining related impacts. Some of the existing piezometers are located away from current mining areas (and away from the proposed 700 West / 800 Areas) and will provide valuable background data on local (and regional) hydrological conditions including the response of aquifers to rainfall.

Monitoring of groundwater will continue as per the Groundwater Monitoring Program in the Clarence Colliery Water Management Plan prepared in consultation with OEH, Sydney Catchment Authority, Lithgow City Council and DRE and approved by the Department of Planning and Infrastructure. The location of all the groundwater monitoring bores is shown in **Figure 3.**



LEGEND

- Colliery Holding Boundary
- Mining Lease Boundary
- SMP Application Area
- First Workings Zone (for Lithgow No.2 dam)
- Existing Workings Area
- Proposed Workings Area (incl. Secondary Extraction)
- Flora Monitoring Sites
- Fauna Monitoring Sites
- Surface Water Monitoring Sites
- Shallow Peizometer Location
- Monitoring Bore Location
- State Survey Marker
- Cliffs and Pagodas
- River
- Subsidence Lines
- Newnes Plateau Hanging Swamp (Dec 2005)
- Newnes Plateau Shrub Swamp (Dec 2005)

0 1.0 2.0km

Scale 1:35 000 (A3)

FIGURE 3

Baseline Monitoring

Project: Clarence SMP - Partial Extraction of 700 West and 800 Areas

Client: Clarence Colliery

File: Fg3_CCC06-011_Monitoring_111025

Projection: MGA 94 Zone 56

Version:	Date:	Author:	Checked:	Approved:
1	25/10/11	ZJ	SW	RW

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2.6 CLIFFS / PAGODAS

Strata Engineering Australia (**SEA**) (2011) carried out an assessment on the cliff lines above the proposed 700 West / 800 Areas.

The SMP Application Area contains numerous cliffs and pagodas. The cliff lines in the 700 West area consist mainly of 20 to 50 m high sheer cliffs with small (5 to 10 m high) pagodas noted along some of the crests. The pagodas are present for approximately 30% to 50% of total cliff lines. The cliffs inspected in the 700 West Area comprise of the cliff lines surrounding Lithgow No. 2 Dam and the gully area in the south-west corner. The cliff lines inspected in the 800 Area consist mainly of 20 to 30 m high sheer cliffs with small (5 to 10 m) high pagodas along approximately 20 to 30 % of the crests. These cliffs are located in the south-west corner of the 800 Area, adjacent to the natural feature known as Gooches Crater.

The overall impact on cliff line stability of the proposed partial pillar extraction technique is considered to be low to very low with no appreciable damage such as cracking or increase to natural rock fall activity expected due to mine subsidence development in the long-term. It is proposed to photograph and inspect individual cliff lines and pagodas over each panel in the SMP Application Area prior to and after extraction.

Should the impacts to any cliff line or pagoda within the SMP Application Area be greater than the impact predictions various mitigation and public safety procedures will be enacted. These mitigation strategies range from the erection of warning signs in the area notifying of potentially dangerous conditions to the inspection and recommendation of remedial actions and the review of the mine plan and layout by a qualified geotechnical engineer.

Specific requirements relating to clifflines are outlined in the TARP in **Appendix A**.

2.7 STEEP SLOPES

There are areas of steep slopes adjoining the clifflines and pagodas in both the 700 West and 800 Areas. With no impacts on steep slopes in previously mined partial extraction areas, there is a very low potential for any impact on steep slopes in this SMP Application Area.

Given there is a very low probability of impact on steep slopes from the proposed mining operations, minimal monitoring of steep slopes is required. The steep slopes in the vicinity of the cliffs and pagodas will be visually inspected on an ad-hoc basis during the inspection of cliffs and pagodas as part of the cliff line monitoring.

2.8 SPRINGS, SWAMPS, WETLANDS, WATER RELATED ECOSYSTEMS

RPS Australia Pty Ltd (**RPS**) conducted a Flora and Fauna Assessment which identified the vegetation communities known as the Newnes Plateau Shrub Swamp (**NPSS**) and Newnes Plateau Hanging Swamp (**NPHS**) within the SMP Application Area. A copy of the Flora and Fauna Assessment is included in Volume 1, and the swamp locations are shown on **Figures 1** and **2**.

In total, 16 vegetation communities were identified using the document titled 'The Vegetation of the Western Blue Mountains' (DEC, 2006). One of the vegetation communities, Map Unit 50 – *Newnes Plateau Shrub Swamp,* is listed as an Endangered Ecological Community (**EEC**) under the NSW *Threatened Species Conservation Act 1995* (**TSC Act**). In addition, NPSS and Map Unit 51 – *Newnes Plateau Hanging Swamp* is also identified in the SMP Application Area both (NPSS and NPHS) correspond to the *Temperate Highland Peat Swamp on Sandstone EEC* under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (**EPBC Act**).

Baseline monitoring of swamps for this SMP Application includes the monitoring of the Clarence aquifer, a swamp within the SMP Application Area and swamps outside the SMP Application Area that are subject to the same mining process as those within the SMP Application Area. Monitoring of other swamps and other vegetation units have been undertaken over the lease area for around 20 years.

Mitigation strategies regarding impacting aquifers by the proposed extraction are not required as the mine design provides substantial mitigation by minimising subsidence and caving within the overburden. However, the primary risk to springs and seepage into the swamps is the same as the potential impact on the aquifers above the Mount York Claystone that feed these springs and swamps systems. Subsequently, monitoring of potential impacts on swamps is focused on groundwater monitoring.

The following monitoring, management and mitigations (as outlined in Aurecon (2011) :

1. Continue the existing subsidence monitoring programs;

2. Where mine subsidence exceeds previously observed maxima, undertake a review of reasons for observed results and likely future observations, and implications for groundwater security;

3. Continue existing groundwater monitoring programs;

4. Where groundwater behaviour appears anomalous, undertake a review of reasons for observed results and likely future observations, and implications for groundwater security;

5. Continue existing swamp groundwater and vegetation monitoring programs. The lack of evidence of any impact in the existing data indicates that there is no need to extend these programs to other swamps, given the impact on the swamps that installing and conducting monitoring is likely to have, and the difficulty of access;

6. Develop an inspection regime for the remainder of the swamps in place of groundwater and vegetation monitoring;

7. In cases where continuing monitoring indicates that a potential hazard may be developing, review the mine plan; and

8. Review all results at the completion of each mining panel to ensure that mining performance does not exceed predictions.

Monitoring of subsidence and surface inspections of previous extracted sites within the area has allowed for an accurate prediction of the subsidence for the SMP Application Area.

The results from historic monitoring are used to assess the risk to other NPSS's and NPHS's that are not monitored to such detail, but are subject to the same potential impacts (less than 100 mm subsidence, 2 mm/m tilts and 1 mm/m strains). To date, the existing monitoring has not detected any mining related impacts on the NPSS's and NPHS's from partial pillar extraction. The ongoing monitoring program will continue to assess the risk of the current mining technique on these vegetation communities.

Whilst regular inspections of the swamps are recommended, additional monitoring of the swamps within the SMP Application Area is not recommended due to the low level of risk from partial pillar extraction. The monitoring of NPSS's and NPHS's over Clarence Colliery will continue on a risk based approach which will be continually reviewed through regular assessment of the ongoing monitoring program. The NPSS and NPHS will be regularly inspected and photographed as part of an environmental monitoring plan to be developed for the 700 West / 800 Areas.

2.9 FLORA AND FAUNA

RPS completed a Flora and Fauna Assessment specific to the SMP Application Area to assess the level of existing ecological information, and determine the likely impacts of the proposed mining activities. A copy of this assessment is included in the SMP Written Report (Volume 1). The SMP Application Area supports a range of native flora and fauna.

A total of 81 flora species were identified during field investigations, of which none were exotic. In the 700 West Area a stand of *Persoonia hindii* (which is listed as Endangered under the TSC Act) was recorded in the north-west section, and *Derwentia blakelyi* (listed as Vulnerable under the TSC Act) was detected in the south-east section.

In total, 16 vegetation communities were identified within the SMP Application Area, with ground surveys confirming the location of each. The 700 West Area is predominately comprised of Newnes Plateau Narrow-leaved Peppermint – Silver-top Ash Layered Open Forest, Newnes Plateau Dwarf Sheoak – Banksia Heath to the north, and Sandstone Plateau and Ridge Scribbly Gum – Silver-top Ash Shrubby Woodland and Sandstone Slopes Sydney Peppermint Shrubby Forest in the south. The 800 Area is predominately covered by Exposed Blue Mountains Sydney Peppermint – Silver-top Ash Shrubby Woodland. Both sites have scattered patches of other vegetation types throughout.

As discussed in **Section 2.8**, the NPHS and NPSS are known to occur in the area. The federal EPBC Act lists *Temperate Highland Peat Swamps on Sandstone* as an EEC, which include NPHS and NPSS. In addition, the NPSS is listed as an EEC under the NSW TSC Act.

A total of 35 species of birds were systematically recorded during combined survey periods. One threatened bird species was recorded, being the Varied Sitella. Whilst Glossy Black Cockatoos, listed as vulnerable under the TSC Act, were not observed in the SMP Application Area, *Allocasuarina* tree species, suited to the foraging requirements of this species were present. The SMP Application Area also has potential to represent a portion of the local foraging range of both the Masked Owl and Powerful Owl, due to the presence of terrestrial and arboreal mammals as prey.

Five species of terrestrial and arboreal mammals were identified as occurring within the SMP Application Area; however none of these species are listed under the TSC Act and/or EPBC Act as threatened. A total of six bat species were confidently identified, including the Eastern Bent-wing Bat which is listed as vulnerable under the TSC Act. Additional bat species known to exist in the locality that could not be confidently identified include the vulnerable Eastern False Pipistrelle, East Coast Freetail Bat and the Greater Broad-nosed Bat.

A total of seven species of frog were identified, along with six individual reptile species. However no threatened amphibian or reptile species were recorded.

No threatened invertebrate fauna was recorded during the survey, although habitat was found to be present for the Giant Dragonfly. The food plant of the Bathurst Copper Butterfly larvae, although occurring in the wider locality, was not recorded within the SMP Application Area.

A seven part test was conducted on seven threatened flora species, 32 threatened fauna species and one EEC known or likely to exist within the SMP Application Area.

RPS concluded that the potential subsidence associated with the project is unlikely to significantly impact on any threatened species, populations or ecological communities. In the unlikely event that minor surface impacts do occur (such as ponding and/or surface cracks), effects on any threatened species, populations or ecological communities are not expected to be significant because subsidence will be limited to 100 mm. Previous flora and fauna monitoring subject to such levels of subsidence has shown no impact. It is further noted that the area of potential impact will be minor relative to the remaining similar habitat areas within and neighbouring the SMP Application Area. Even for those species associated with wet areas, including swamp habitats, it is unlikely that these minor changes would alter habitat conditions such that species would not survive.

Since 2004, there have been on-going flora and fauna monitoring surveys within Clarence Colliery holdings, including the 800 Area incorporated in this SMP Application and the 700, Outbye and Eastern SMP Areas. Flora and fauna monitoring will continue to be undertaken in accordance with standard practice at Clarence Colliery, at the baseline monitoring locations shown on **Figure 3.** The existing monitoring sites in the 700 Area represent the majority of the habitat located within the 700 West Area, therefore it is not deemed necessary to establish additional monitoring. Baseline monitoring sites currently exist over the 800 Area, and these will continue to be monitored during mining in this area. The monitoring is currently undertaken during three seasons of the year (autumn, spring and summer) to ensure natural variability of fauna populations are taken into consideration.

Flora monitoring will continue within the following Swamps:

- Dumbano 3 Swamp;
- Hanging Swamps within the 800 Area;
- Dumbano 1 Swamp;
- Billabong 1 Swamp;
- Banksia 2 Swamp; and
- Happy Valley Swamp.

Fauna monitoring will continue at the three sites already established within the 800 Area and the 700 Area.

2.10 ABORIGINAL ARCHAEOLOGY AND HERITAGE

RPS completed a Cultural Heritage Assessment specific to the SMP Application Area to identify the locations of known Aboriginal archaeological sites and predict the most likely locations for other Aboriginal archaeological sites.

Rock shelters were the most common site type present in the SMP Application Area, with two shelters on tributaries of Farmers Creek and a cluster of shelters along tributaries of the Wollangambe River in the area of Gooches Swamp area. Artefact sites (scatters and isolated finds) were found close to water on flat lying areas along creek lines or on lower slopes, as well on crests and simple slopes areas. Only one scar tree site has been previously recorded, but the field survey was unable to relocate them due to bushfire damage in the area.

Clarence Colliery has identified no impacts on the surface of previously mined areas using the partial extraction mining methods, and as such it is expected that mining in the 700 West / 800 Areas will also have no impacts on any Aboriginal cultural heritage sites.

As no items of non-Indigenous cultural heritage were identified in the SMP Application Area, no impacts are predicted.

The following recommendations have been suggested by RPS (2011a), taking into consideration the significance of Aboriginal heritage, potential impacts and relevant legislation.

1. Ensure that disturbance associated with the proposed mining operations is limited to the boundaries of the SMP Application Area identified in this report. If additional works are planned outside of the SMP Application Area, additional cultural heritage investigation may be required.

2. It is recommended that any artefacts remain on site unless impact to the sites is deemed unavoidable. It is further recommended that Clarence Colliery monitors the sites on a regular basis in order to check the ongoing status of the site.

3. If impact to any sites containing artefacts is unavoidable then a surface salvage should be undertaken under a Section 90 Permit. A Control and Care Permit should be obtained in consultation with local Aboriginal Community Stakeholders and the artefacts transferred to a designated keeping place. However it is considered highly unlikely that any of the artefact sites within the 700 West or 800 Areas will be impacted upon by the proposed bord and pillar partial extraction works.

4. It is recommended that during the general course of the project a monitoring plan could be implemented for any rock shelter sites to monitor for the effects of cracking or movement. Also ongoing management of the site could include pre and post mining inspections to assess and quantify any impact. Rock shelter sites contained in the 700 West and 800 Areas are #45-1-0053 and #45-1-0054 in the Wollangambie catchment and C-S-1, C-S-2 and #45-1-0095 in the Farmers Creek catchment area.

5. It is recommended that during the course of the project work Clarence Colliery limits or avoids any proposed works in this area (out of abundance of caution) that may impact on the Gooches Crater shelter complex comprising AHIMS sites #45-1-0053 and #45-1-0054.

6. It is recommended that during the general course of the project scar tree sites could be monitored for the effects of movement. Also ongoing management of the site could include pre and post mining inspections to assess and quantify any impact. The scar tree site C-ST-1 in the 800 area is unlikely to be affected by predicted subsidence levels.

7. All relevant Clarence Colliery staff should be made aware of their statutory obligations for heritage under NSW NPW Act (1974) and the NSW Heritage Act (1977), which may be implemented as a part of the normal induction process.

8. The location of any Aboriginal cultural heritage sites in the SMP Application Area should be included in the Clarence Colliery environmental management framework for the SMP Application Area, so that all relevant staff members are aware that these areas will require management.

9. If further Aboriginal site/s are identified in the SMP Application Area, then all works in the area should cease, the area cordoned off and contact made with the OEH Environment Line phone no. 131 555, a suitably qualified archaeologist and the relevant Aboriginal stakeholders, so that it can be adequately assessed and managed.

10. In the unlikely event that skeletal remains are identified, work must cease immediately in the vicinity of the remains and the area cordoned off. The proponent will need to contact the NSW Police Coroner to determine if the material is of Aboriginal origin. If determined to be Aboriginal, the proponent must contact the OEH Environment Line 131 555, a suitably qualified archaeologist and representatives of the local Aboriginal Community Stakeholders to determine an action plan for the management of the skeletal remains, formulate management recommendations and to ascertain when work can recommence.

11. If, during the course of development works, significant European cultural heritage material is uncovered, work should cease in that area immediately. The NSW Heritage Branch should be notified and works only recommence when an appropriate and approved management strategy is instigated.

The above recommendations will be considered in the development of an Environmental Management Plan specific to the 700 West / 800 Areas.

2.11 STATE FOREST – FORESTRY MANAGEMENT ZONE 2

The 800 Area is located wholly within Forestry Management Zone (**FMZ**) 2. The 700 West Area is located within FMZ 4, with small areas of FMZ 2 present. The FMZs relevant to Clarence Colliery are broadly defined by NSW Forests as:

- **FMZ 2** – Specific management and protection of natural and cultural conservation values, where it is not possible or practical to include them in Zone 1; and
- **FMZ 4** – Management of native forests for timber production utilising the full range of silvicultural options as appropriate and for conservation of broad area habitat and environmental values that are not dependant on the structure of the forests.

There are no monitoring requirements specific to the FMZ 2 and FMZ 4 that are not already addressed through other programs. Monitoring, mitigation and management in relation to natural and cultural conservation values of the land are addressed in other sections of this document.

2.12 LITHGOW NO.2 DAM

The Lithgow No.2 Dam lies within the 700 West Area of this SMP Application. A Dam Notification Area is in place around the Dam. In addition, Development Consent DA504-00 placed a 'First Workings Subsidence Protection Zone' (i.e. only first workings allowed within the zone) around the dam.

Lithgow No.2 Dam was built by the Public Works Department of Lithgow City Council in 1907 as a water supply dam to service Lithgow. The Dam is a concrete arch dam, located in a Hawkesbury sandstone formation with a free overfall spillway and a straight gravity section on the right abutment. The dam is a maximum 26.5 m high and the crest length is 71 m.

SEA (2011a) investigated the magnitude and nature of horizontal displacements with specific regard to the gradual approach of the workings to Lithgow No.2 Dam. It was concluded that horizontal movements due to first workings are negligible.

Following recommendation by the Dams Safety Committee (**DSC**), Stage 1 (first workings only) was approved by the former Industry and Investment NSW on the 17th August 2010. As part of this SMP Application there will be:

- Limited development (i.e. first workings only) along the northern margin of the water body (within the approved First Workings Zone);
- No mining within 400 m of the dam wall; and
- No secondary extraction within the First Workings Zone (as approved by development consent DA 504-00 in 2005).

Whilst Stage 1 (first workings associated with Panels 716 and 718) has been approved, further applications (or variations as necessary) to enable secondary extraction and further first workings (in the south of the Notification Area) will be prepared. Whilst previous assessments indicate that it is very unlikely that mining operations will impact on the Lithgow No. 2 Dam wall or reservoir, further work will be carried out to support an application to DRE to be assessed by the DSC. This will be followed up with other application(s) to enable secondary extraction in the southern part of the Notification area.

Table 2 details the existing monitoring undertaken in relation to the Lithgow No.2 Dam.

Table 2 Existing Lithgow No.2 Dam Monitoring Program

Parameter	Technique	Frequency
Visual (additional to LCC routine inspections)	Appropriately trained person to visually inspect using checklist	Monthly
Photographic	Photograph from same positions to monitor changes in the dam wall	Two monthly
Surface Water Chemistry	Grab Sample	Two monthly
First workings subsidence / Far field displacement	Survey subsidence pegs	Pre mining, post first workings, pots secondary extraction
Pillar / roof / rib geotechnical monitoring	Gel extensometers, tell tales	As required and in accordance with the requirements of the DRE
Mine Groundwater Quality	Grab sample from underground storage dam or from dripper	Three monthly
Mine Groundwater Make	Weir and water meter	Continuous
Groundwater levels	Multi-level piezometer installations accompanied with packer testing	Continuous
Groundwater quality	Grab samples from various formations between the surface and mine (Banks Wall Sandstone and the Burro Mukko Formation)	Monthly
Dam wall movement	Survey of survey pins on dam wall and control points	Winter / summer

Parameter	Technique	Frequency
Seepage	Control points on plunge pool wall – volume by calculation or visual inspection	Monthly
Dam wall assessment	Dam wall condition, crack map	Initial inspection, after mining in 700 area

This monitoring program will continue during mining of the 700 West Area, and during first workings within the dam notification area. All monitoring will be undertaken in accordance with the DSC approval, which is contained within Volume 1.

2.13 ROADS

There are no gazetted public roads within the SMP Application Area, however there are a number of unpaved NSW Forests access tracks and fire trails throughout the 700 West and 800 Areas.

Given the low levels of subsidence from previous mining at Clarence Colliery, and the predicted maximum level of subsidence (100 mm) for the SMP Application Area, it is highly unlikely that mining operations will impact on these access tracks. Clarence has not found any damage to fire trails or four wheel drive tracks caused by subsidence from previous partial pillar extraction activities.

The monitoring program for access tracks will include an inspection pre and post mining. If surface cracking is present actions from continued observation to excavating and re-compacting to close the cracks will be undertaken.

Specific requirements relating to the roads are outlined in the TARP in **Appendix A**.

2.14 ELECTRICITY AND TELECOMMUNICATION LINES

Integral Energy overhead powerlines traverse the SMP Application Area in the 700 West Area; the location of which is shown on **Figure 1**. This is a 66kV powerline on wooden poles and provides electricity to Clarence Colliery, Hanson Quarry and Springvale Colliery/ Delta Electricity Water Transfer Scheme. There are also Telstra telecommunications cables that encroach within the south-east of the 700 West area which are shown on **Figure 1**. These are:

- Aboveground Cable;
- Underground Cable; and
- Underground Optic Fibre Cable.

Given the low levels of subsidence from previous mining at Clarence Colliery, and the predicted low levels (100 mm) of subsidence for the SMP Application Area, the risk of damage to the powerline or telecommunication lines is considered low.

The regular visual inspection of access tracks for surface cracks will incorporate an inspection of the areas surrounding the powerline and telecommunication assets, and will include an inspection post mining. If there is evidence of ground movement, surface cracking or damage Clarence Colliery would record the observation, consult with the relevant stakeholders and take actions to stabilise the site and/or remediate the infrastructure.

Further details of the monitoring, mitigation and management of the infrastructure will be detailed in a Management Plan to be developed in consultation with Telstra.

2.15 POTENTIAL PUBLIC SAFETY RISKS

Potential public safety risks from the partial extraction mining operation are limited to cracks in roads and the destabilisation of cliff line / pagodas leading to small isolated rock falls. As previously mentioned, the likelihood of the partial extraction mining operation resulting in significant surface impacts is low. Given the potentially high consequence of an injury to the public however, it is considered appropriate to undertake monitoring of roads and cliff lines, and to designate appropriate response actions in the event impacts are discovered.

The monitoring to be undertaken for roads and cliff lines is described in **Section 2.13** and **Section 2.6** respectively.

Specific requirements relating to the roads and cliff lines are outlined in the TARP in **Appendix A**.

3 SUBSIDENCE MONITORING SUMMARY

Monitoring is currently undertaken in accordance with the requirements of the Water Management Plan (Clarence Colliery 2007a) and the Environmental Monitoring Program (Clarence Colliery 2007b). In addition, an Environmental Monitoring Program and Subsidence and Underground Monitoring Program is in force for each of the existing SMP areas (700, Outbye Areas, 314/316 Panels and Eastern Area).

A separate Subsidence and Underground Monitoring Program and Environmental Management Plan will be prepared for the 700 West / 800 Areas. These will be finalised following granting of any SMP approval.

Table 3 provides a summary of minimum monitoring commitments for the 700 West / 800 Areas.

Table 3 Monitoring Program

Feature	Monitoring Sites	Frequency	Parameter/Method
Pillar Stability	All panels to be mined	Prior to mining	Re-surveyed to confirm actual dimension
	All pillars to be partially extracted in each panel	During mining of each panel	Pillar size auditing: sampled for height and width.
	Pillars in every Panel	Every shift during extraction	Mining officials to monitor pillars for visual signs of deterioration
	Pillars in every Panel	Once per panel	External geotechnical expertise to inspect and review partial extraction and pillar stability
	General	Conclusion of each extraction panel	Results from the Pillar Stability Monitoring Program will be reviewed by external geotechnical expertise
Subsidence (surface deformation)	Additional subsidence lines to be constructed over proposed 714 and 716 panels and 806, 808 and 810 panels	Prior to extraction, at completion of extraction, 3, 12 and 24 months after completion of mining	The feno marks will be monitored by digital level survey for vertical (z) displacements.
Groundwater	As per Clarence Water Management Plan	Continuous	Groundwater levels (Depth)
		Quarterly	Quality (pH, EC, Fe, Mn, Al, As, Cd, Cu, Pb, Zn, Se and Cr)
Surface Water	Farmers Creek - as per Clarence Water Management Plan	Monthly/ Quarterly	Flow, pH, EC, Fe, Mn, Al, As, Cd, Cu, Pb, Zn, Se and Cr.

Feature	Monitoring Sites	Frequency	Parameter/Method
Clifflines and Pagodas	Accessible clifflines in the 700 West / 800 Area	Prior to and after extraction.	Visual inspections with photographic records.
Steep Slopes	Various (adjacent to Cliff lines)	Prior to and after extraction.	Visual inspections
Swamps	NPHS and NPSS	Prior to and after extraction.	Photographic records of accessible swamps taken from appropriate view points
Flora and Fauna	Existing monitoring locations (as shown on **Figure 3**)	Summer, Autumn & Spring each year	As per the Environmental Management Plan
Lithgow No.2 Dam	In accordance with DSC approval		
Access Tracks	Various access tracks throughout the SMP Application Area	Prior to and after extraction	Visual inspection for surface cracks.

The location of the baseline monitoring sites for groundwater, cliff lines, flora and fauna is shown in **Figure 3**.

4 STAKEHOLDER CONSULTATION STRATEGY

External stakeholders have been consulted and their comments considered in the development of the SMP. Further detail regarding stakeholder consultation undertaken during the SMP development is contained within the SMP Application Volume 1. Clarence Colliery considers that the consultation process has adequately addressed the feedback received from stakeholders.

Clarence Colliery has established an ongoing consultation program in relation to the underground operations. Ongoing consultation is carried out with a number of stakeholders on the progress of the mine and overall environmental performance, including subsidence related matters. An overview of the proposed consultation program should the SMP Application for the 700 West / 800 Area be approved is shown in **Table 4.**

Table 4 Subsidence Stakeholder Consultation Process

Stakeholder	Communication Method	Frequency
Relevant Government agencies (including OEH, DP&I, DRE, Lithgow Council)	Annual Environmental Management Report (AEMR)	Annual
DRE	Annual inspection and meeting	Annual
	Mining Operations Plan (MOP)	As required under MOP
	Subsidence Management Status Report	Every 4 months
	End of year report	Annual
Community Consultative Committee Forests NSW Interest Groups	Updates on mine progress, subsidence impacts and success of management measures. This will be by a combination of written and verbal information.	CCC – at least twice annually Others – at least Annual

Stakeholder Engagement Plan

Clarence Colliery has a Stakeholder Engagement Plan to provide a framework for efficient and effective stakeholder management. The Stakeholder Engagement Plan enables engagement with stakeholders to be planned, adequately resourced, appropriately documented and undertaken through a structured process.

Community Consultative Committee

Clarence Colliery has formed a CCC which consists of nominated and endorsed members of the community and representatives of Clarence Colliery. The CCC meets at least twice annually, with extraordinary meetings held when matters of community importance arise. The purpose of the CCC is to provide members with regular information on the environmental performance and management of the mine, to enable site inspections and provide an update on the procurement of any relevant approvals obtained by the mine.

Stakeholder Register

During the development of the SMP Clarence Colliery developed a Stakeholder Register with persons and organisations identified from the results of previous consultation and through advertisements in the local paper. The Stakeholder Register is included in **Appendix C**. The persons and organisations will be consulted in accordance with the identified stakeholder consultation process or as required during the SMP depending on the results of subsidence.

5 REVIEW AND REPORTING

An overview of the proposed reporting program should the SMP Application for the 700 West / 800 Areas be approved is outlined below. The final format of the reporting program would be dependent on the reporting conditions in the SMP Approval.

Annual Environmental Management Report (AEMR)

Annual reporting would be contained within the AEMR. A summary of all the environmental monitoring would be provided in the AEMR every year. The results of monitoring would be compared against the impact assessment criteria in the individual monitoring programs/plans and limits contained in the Project Approval and Environment Protection Licence to assess the effectiveness of the SMP on an ongoing basis.

Status Reports

A Status Report would be submitted at regular intervals should the SMP be approved, as required by the SMP Approval. The Status Report would include but not be limited to:

- The progression of mining;
- A summary of management actions undertaken by the Leaseholder;
- A summary of the results of consultation with the stakeholders;
- A summary of the observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, and any other relevant information reported;
- A summary of subsidence development based on monitoring information from the subsidence monitoring programs, including a statement with regard to any identified trend in the development of ground deformations/subsidence movements in the application area, as compared with defined triggers and/or the predicted subsidence to facilitate early detection of potential subsidence impacts;
- A summary with regard to the adequacy, quality and effectiveness of the implemented management processes based on the monitoring and consultation information summarised above; and
- A statement regarding any management actions to be undertaken or the need for early responses or emergency procedures to ensure adequate management of any potential subsidence impacts due to mining.

Incident Notification

In the event of any significant subsidence impacts associated with the 700 West and 800 Areas, Clarence Colliery would provide to the Principal Subsidence Engineer, Mine Subsidence Board, NSW Office of Water and OEH notification within 24 hours of occurrence or identification of the impact. The same information would be made available to other relevant stakeholders if requested. Significant subsidence impacts would include:

- Any significant unpredicted and/or higher than predicted subsidence and/or abnormalities in development of subsidence;
- Any observed subsidence impacts adverse to groundwater resources and/or the natural environment that may be affected by mining;

- Any observed subsidence impacts adverse to the serviceability and/or safety of infrastructure and other built structures that may be affected by mining;

- Any other relevant information regarding subsidence impacts requiring prompt notification regarding the 700 West and 800 Areas.

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