BAAL BONE COLLIERY

OPERATED BY THE WALLERAWANG COLLIERIES LIMITED

BAAL BONE COLLIERY
Subsidence Management Status Report
LW 29 - 31

Four Monthly Update

REPORT No. 10

For the period:
8th December 2010 to 7th April 2011

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1 INTRODUCTION

This Subsidence Status Management Report fulfils the requirements of Condition 19 of the Baal Bone Subsidence Management Plan (SMP) Longwalls 29 to 31 Approval Conditions. This is the tenth report and covers the period 8th December 2010 to 7th April 2011.

2 PURPOSE AND SCOPE

The purpose of this document is to report the progress of mining, provide a summary of subsidence impacts, the implemented management processes and consultation with relevant stakeholders. It also provides the opportunity for relevant stakeholders to provide feedback as required under Condition 19.

3 FACE POSITION OF THE LONGWALL

Longwall production in the second panel (LW30) of the SMP area commenced on 11 June 2010 and was completed on 2 February 2011.

Longwall 31 production commenced on 7th March 2011. During the reporting period the faceline has retreated 255m, from chainage 1914m to chainage 1671m. As of 7 April 2011, the faceline of LW31 has retreated a total of 255m.

4 SUMMARY OF SUBSIDENCE MANAGEMENT ACTIONS

Subsidence management actions undertaken throughout this reporting period are outlined below.

1. Continuation of weekly surface inspections.
2. Continuation of ongoing flora, fauna and groundwater quality monitoring programs.
3. Routine monitoring of groundwater piezometer levels.
4. Continuation of stress cell monitoring adjacent to Wolgan Escarpment.
5. Subsidence survey conducted on the following lines.
6. Completion of remediation works relating to cracking above LW 30 as weather and ground conditions permit.

5 CONSULTATION WITH STAKEHOLDERS

Consultation has been conducted with the following stakeholders during this reporting period

Dr Gang Li – Principal Subsidence Engineer, Industry & Investment NSW – Emailed data regarding stress cell movements at BBO20, also regarding Wolgan Escarpment pre mining of LW30 report.

Chris Rudens – Environmental Sustainability Branch, Industry & Investment NSW – Relating to notification of creek losing water and remediation of LW 30 subsidence crack remediation works.

Dan Kirby- Advised that completion of remediation works for the LW 30 subsidence crack.

Land and Property Management Authority- Advised that Wolgan Trig Station may be affected by mining as per SMP.

Ken Mills – Senior Geotechnical engineer, SCT Operations Pty Ltd

6 SUBSIDENCE DEVELOPMENT, OBSERVED SUBSIDENCE IMPACTS & MONITORING RESULTS

6.1 Surface Subsidence Impacts

At the start of the reporting period LW30 extraction was completed. By the 7th April 2011 the LW31 face has retreated a total of 255m from the start of the panel. Some tension cracking, as predicted, has appeared parallel to the gateroads and across the centre of the panel.

LW 30 Crack
Following various meetings, site inspections and consultation a remediation plan, including a review of Environmental Factors was developed and approved in conjunction with officers of Industry and Investment NSW and Forests NSW during the previous reporting period.

These remediation works were started on the 9th February and finished on the 24th February.
Please see imbedded PowerPoint for photos associated with the subsidence crack and repair works.

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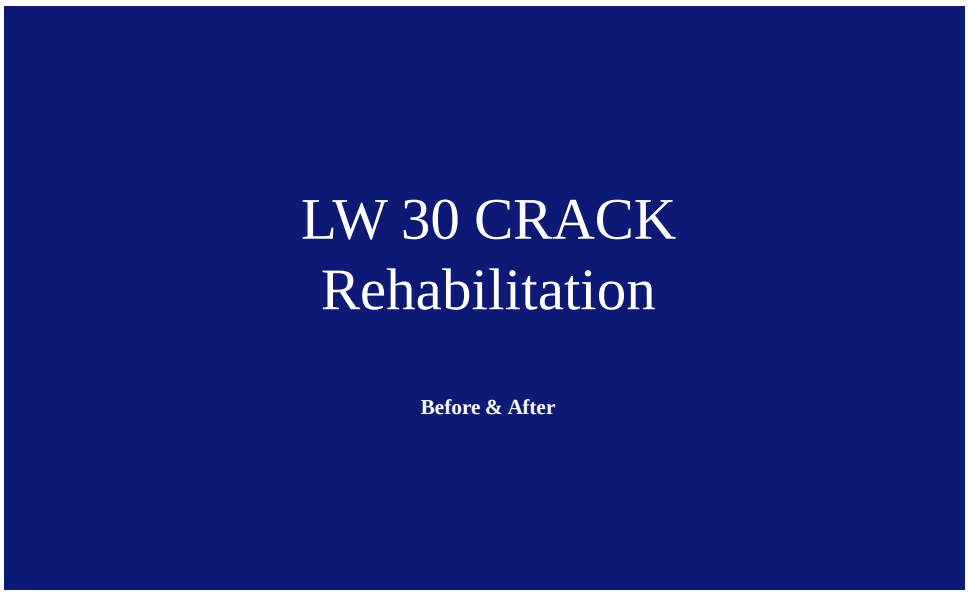

There have been no subsidence impacts observed outside the nominated angle of draw.

6.1.1 Wolgan Escarpment

Stress change monitoring instruments have been installed and commissioned in the vicinity of the two pinch points on LW31. Stress changes in the rock strata are being monitored using a remote logger as Longwalls 29, 30 and 31 are progressively extracted. Stress cells are logged on a twice daily cycle and information downloaded periodically for analysis by SCT Operations.

A review of subsidence monitoring results was conducted by SCT Operations Pty Ltd at the completion of LW 30, it was forwarded to the Principal Subsidence Engineer (Industry & Investment – Mineral Resources) and attached to the LW30 End of Panel Report. A summary is provided below.

"The subsidence behavior observed above Longwalls 29 and 30 is consistent with previous subsidence behaviour at Baal Bone Colliery with maximum subsidence in the centre of each panel and lower levels of subsidence over the intermediate chain pillars. Maximum subsidence of 1.64m observed over the centre of Longwall 30 is slightly larger than the 1.6m predicted. Such differences can be a result of local topography and natural variation and are not considered to indicate significantly different subsidence behavior."

No vertical subsidence movements have been measured in the vicinity of the Wolgan Escarpment. No significant vertical subsidence movements have been outside 64m from the goaf edge of the longwall, equivalent to an angle of draw of 18 degrees.

At the northern pinch point, low level horizontal movements and strains have been measured between the goaf of Longwall 30 and the Wolgan Escarpment

At the southern pinch point, subsidence results available at the time of the review indicate no change in vertical subsidence on any of the lines.

Reflector surveys along the edge of the Wolgan Escarpment did not show any movement during 190m of longwall retreat in the early stages of mining Longwall 30. Although this period is likely to be a period of most horizontal movement, additional surveys will assist to confirm the low levels of ground movement observed in the I Line strain measurements.

Two plots showing data from start of longwall 29 to most recent are included below. There are several periods with no data due to logger failure.

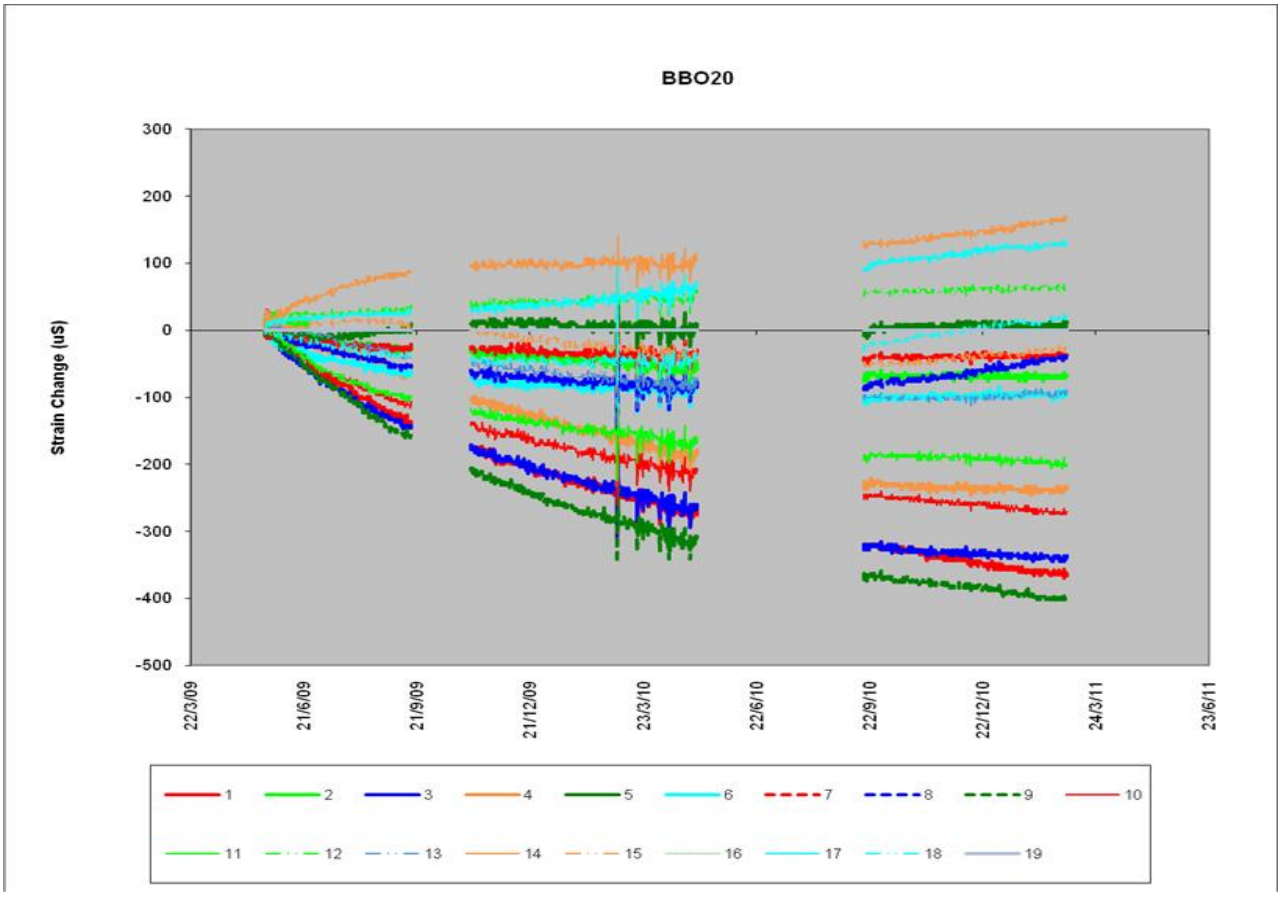

Figure 1 – Southern Stress Cell (BBO20) Monitoring – Strain changes since start of Longwall 29 (01/06/2009) to current Longwall 31 location.

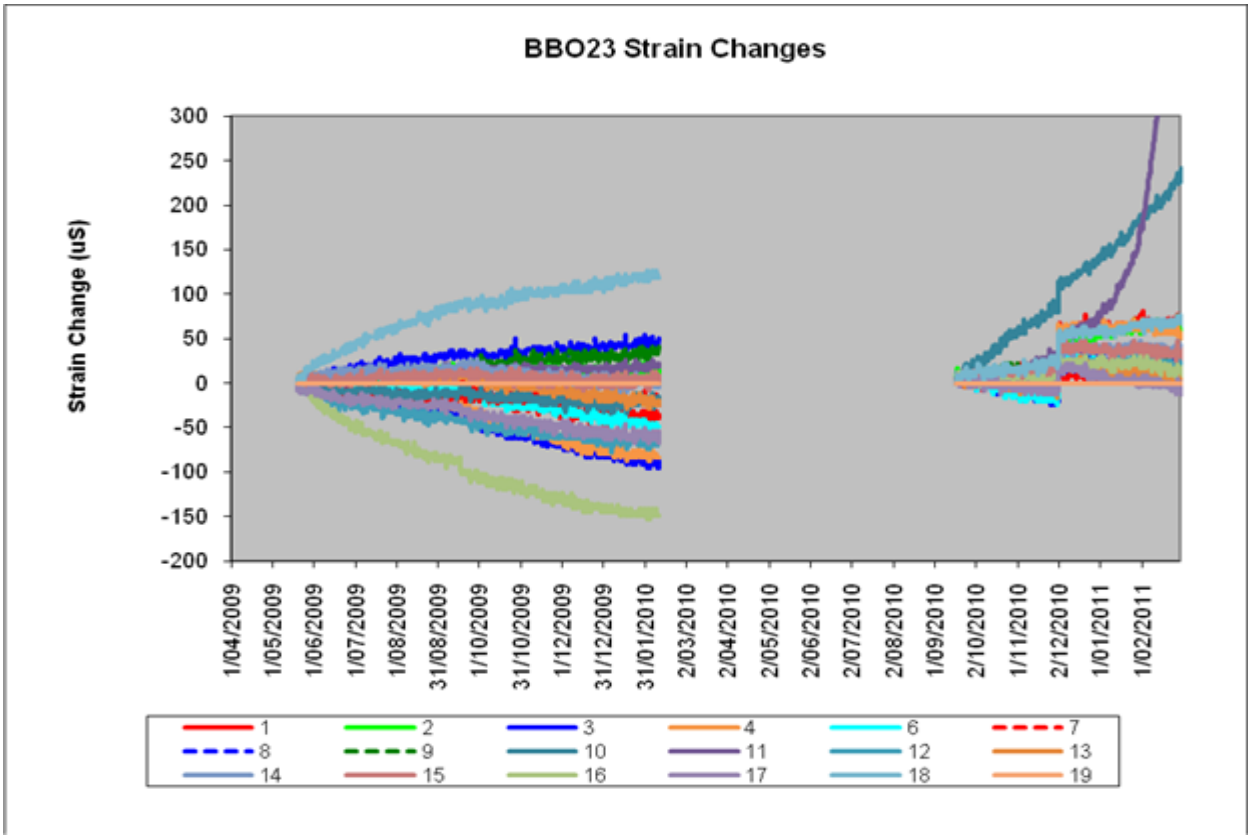

Figure 2 – Northern Stress Cell (BBO23) Monitoring - *Strain changes since start of Longwall 29 (01/06/2009) to current Longwall 31 location*

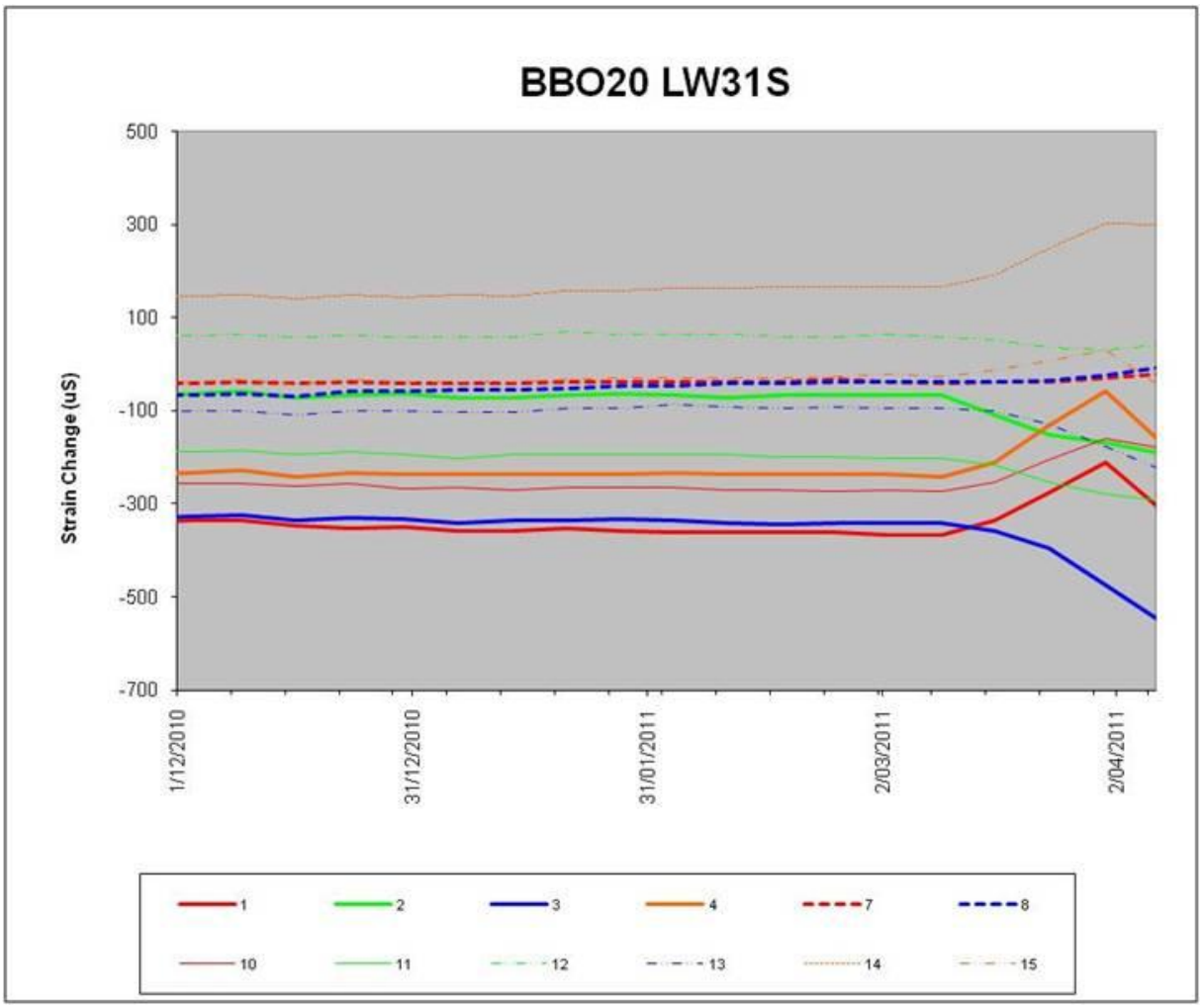

Figure 3 – Southern Stress Cell (BBO20) Monitoring - *Strain changes since just before start of Longwall 31 (01/03/2011) to (10/05/2011)*

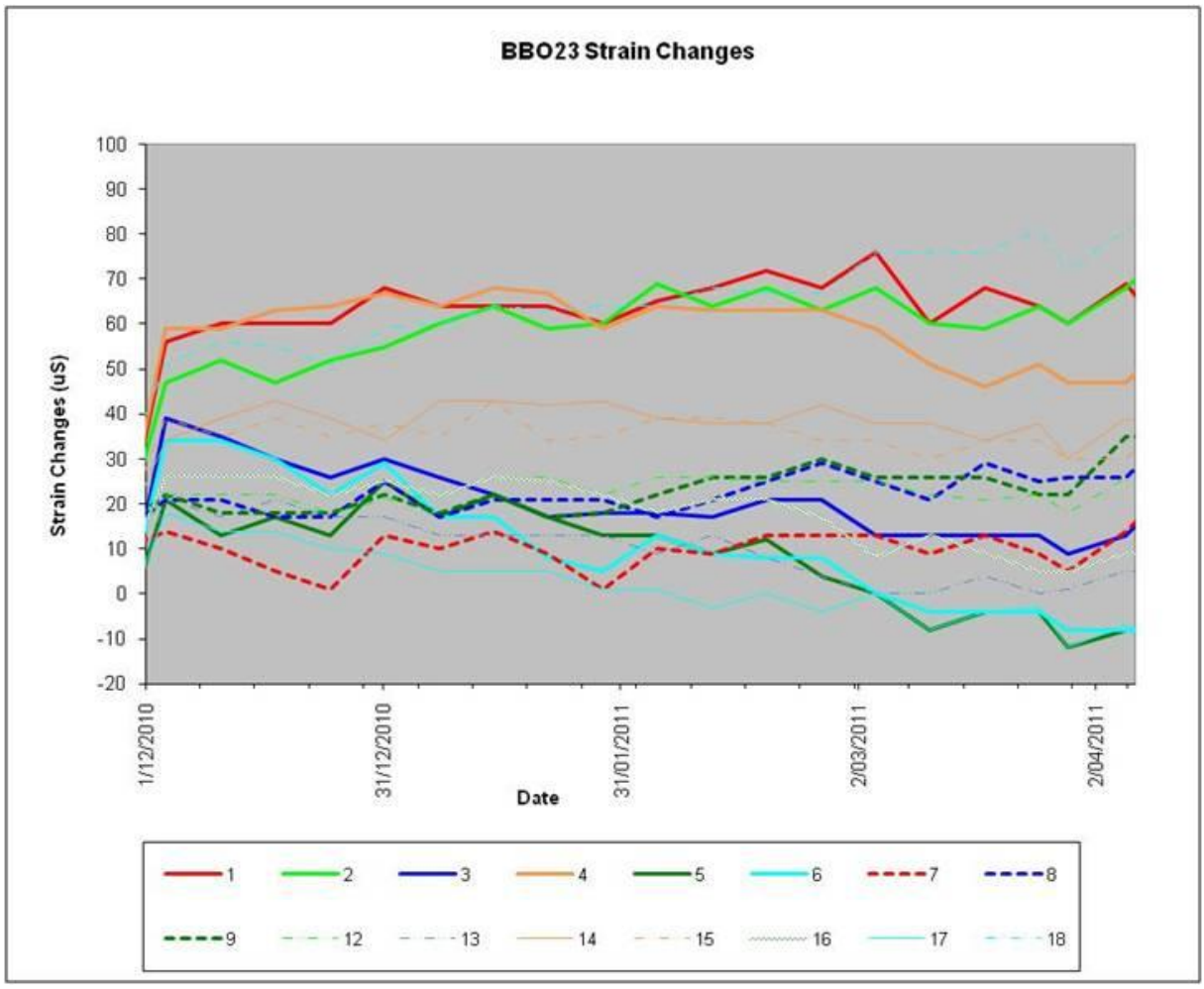

Figure 4 –Northern Stress Cell (BBO23) Monitoring - *Strain changes since just before start of Longwall 31 (01/03/2011) to (10/05/201)*

Summary of Observations

"The strain changes observed on BB020 since 1st March 2011 area considered to provide a very strong indication of stress changes at site. There continues to be a high correlation between independent gauges (0.993 on 12 degrees of freedom) consistent with a excellent point measurement of the stress changes at the point of measurement.
The stress changes measured have now started to stabilize with longwall retreat and have rotated over towards the caving zone that has formed.
The first detectable stress change occurred on march 11 and started to increase more significantly from 13th march 2011.
At 12th April the stress changes observed were 0.83MPa in compression parallel to the Wolgan Escarpment and zero stress effectively in a direction perpendicular to the escarpment 9a combination of tension and compression of equal magnitude).
These changes are consistent with the stress changes that would be expected around the start of the longwall panel.
The pre-mining in situ stress measured at the Northern pinch point was 2.3MPa so the stress changes measured to date are approximately 36% of the original at BB023." **Ken Mills, SCT Operations**

At present the strain gauges at the Northern Stress cell do not have enough correlation to give as confident results as BBO20. Glass prisms that were installed along the escarpment following

recommendations from Dr Ken Mills in report BBO 3378a (report sent to I&I prior to commencement of LW 31) are giving more accurate readings of cliff movements in the Northern Pinch Point region than the previous plastic reflectors and results are listed in Table 1.

6.1.2 Rock Features

To date there has been no adverse or unpredicted subsidence impacts on identified rock features in the vicinity of the SMP area.

6.1.3 Surface Drainage Depressions

To date there has been one unpredicted subsidence impact observed on surface drainage depressions within the SMP area, in LW 30, details of which were included in the previous Status Report and End of Panel Report**.** Apart from this incident some minor fractures, within predicted ranges and below TARP trigger values, as identified in the SMP Environmental Monitoring Program, have been identified.

Inspections of the area during or immediately following runoff producing rainfall events (ie. 25mm / 24 hour period) have continued during longwall mining; there has been no observable change to pre-mining flow characteristics and/or stream morphology during this reporting period.

On 4th March Baal Bone received a letter from Industry and Investment asking for details on any observations of the creek undertaken since the group inspection as part of the Subsidence crack notification for LW 30.

Baal Bone replied stating that the company did not think repairs to the creek were necessary as noted below.

“Due to the ephemeral nature of the creek, it does not hold any significant ecosystems or endangered flora or fauna refuges. It is not currently proposed that it be rehabilitated, as over time it may self rehabilitate as it has a silty stream bed which may fill any underlying cracking that may have occurred during Longwall 30.

It is proposed however that Baal Bone continue the monitoring stated above with additional photo points near the Longwall 30 crack area and upstream and downstream of the longwall 29-31 area until LW 31 is complete and reassess any subsidence/ upsidence impacts and/or required remediation on the stream at that stage.”

The presentation embedded below shows the results of this monitoring.

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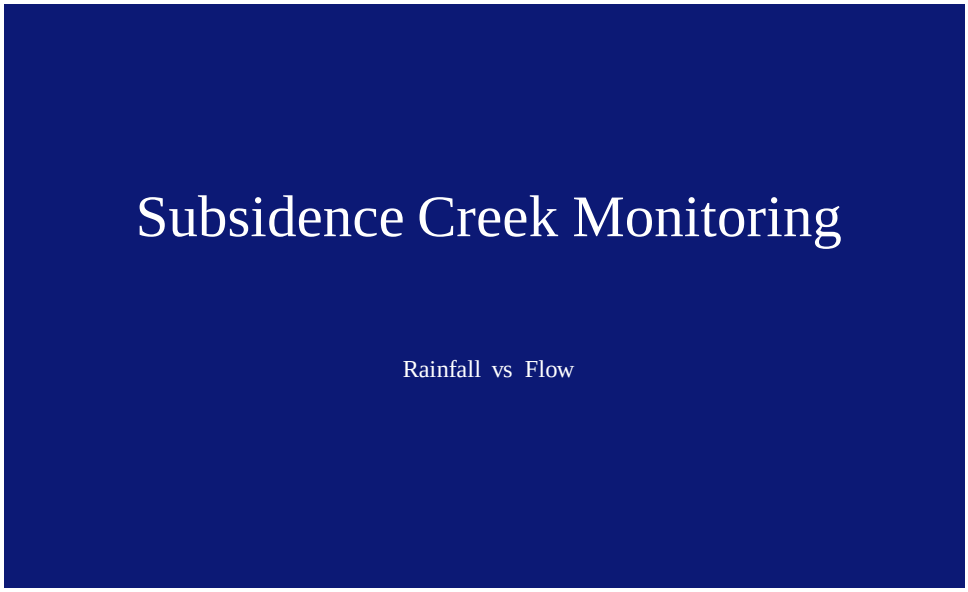


6.1.4 Fire Trails and Tracks

To date there have been no subsidence impacts on any fire trails or tracks in the SMP area; ongoing weekly inspections are continuing.

6.1.5 Swamp

Seasonal photographic monitoring of the Coxs River Swamp has continued as scheduled.

6.1.6 Fauna

Four sites within and near the Baal Bone Colliery Longwall 29-31 SMP Area were surveyed for fauna by Biodiversity Monitoring Services during December 2010 and January 2011. Three of these sites have been surveyed since 2005.

Results from this survey were reported in the previous Subsidence Management Status Report (No 9).

No further surveys have been conducted through this reporting period.

6.1.7 Flora

Gingra Ecological Surveys submitted their Spring 2010 survey on 8 December 2010.

Systematic vegetation monitoring quadrats were established within the SMP area in January 2007.

Prior to the establishment of monitoring sites the SMP area was the subject of a flora survey conducted over a 3 day period in October 2005.

Results from the Spring survey were reported in the previous Subsidence Management Status Report (No 9).

An additional survey has been conducted during this period with the report due later this month.

6.1.8 Underground Water Make

Data continues to be collected from the mines dewatering bores, flow meters and data loggers regarding mines water discharges and underground water storage levels. Review of this data is continuing and the mine water model is currently being reviewed along with the post-closure mine water make model for inclusion in Baal Bone's Detailed Mine Closure Plan.

6.1.9 Ground Water, Aurecon *latest report*

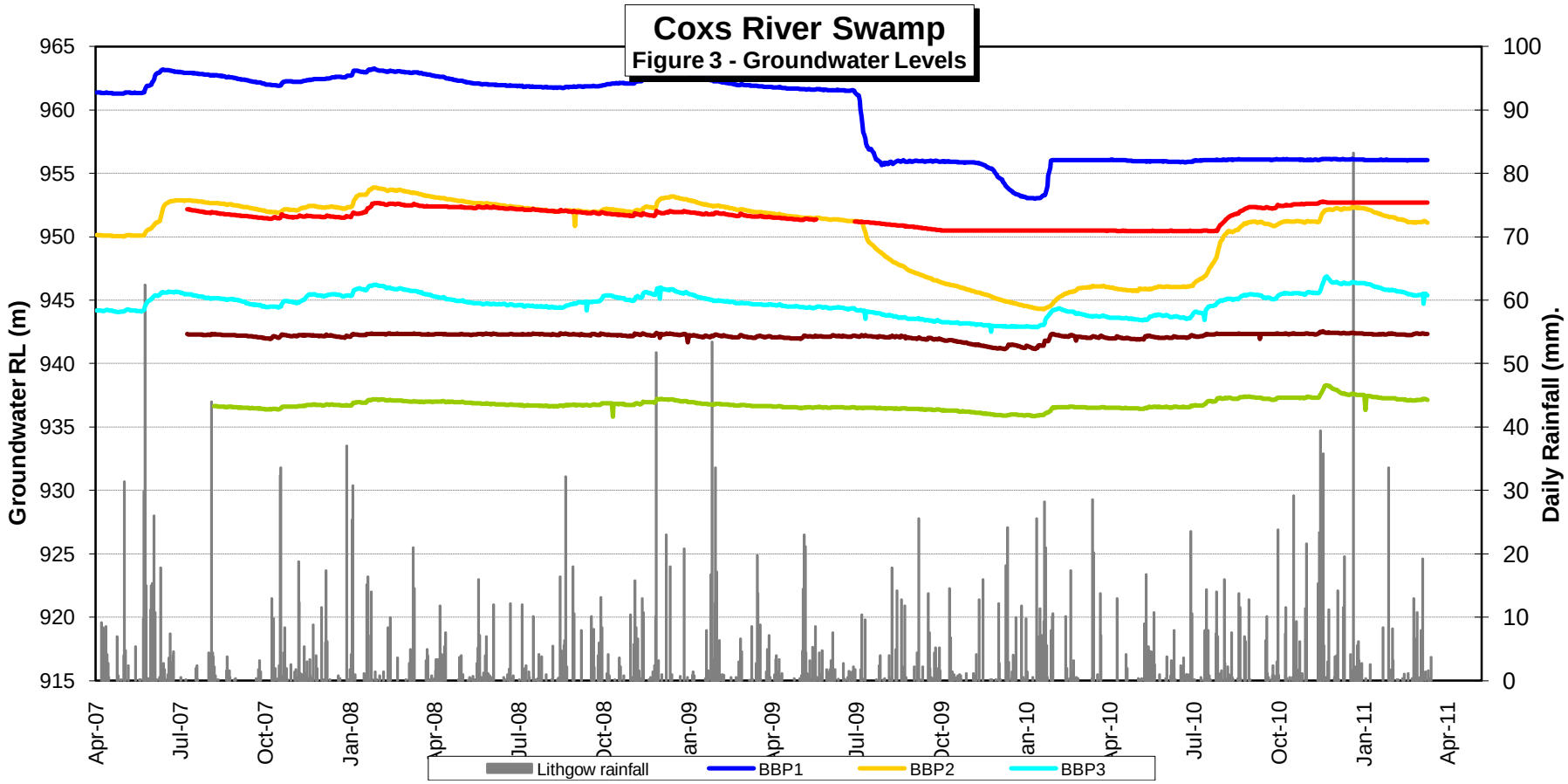
Aurecon monitors data loggers in the six piezometers on a regular basis to gather baseline data regarding groundwater level fluctuations in the vicinity of the Coxs River Swamp. Baseline data obtained prior to commencement of mining confirms a strong correlation between groundwater levels and prevailing climatic conditions, most particularly the relationship to rainfall.

"Rainfall over the current period have typically been around the long-term average with January falls slightly higher than average (114 mm) and February and March falls being slightly lower than the average (57.2 and 77.2 mm respectfully). The long-term rainfall excess / deficit appears to have returned back to neutral levels indicating that we have come out of the dry period that had lasted from May 09 to Oct 10.

Overall, the groundwater has remained fairly stable at all piezometer locations over the current period, with only a slight decline in level observed at BBP2 and BBP3. These piezometers have typically shown the greatest reaction to rainfall events in the past (Figure 5 below). A north to south downstream groundwater gradient exists, indicating that the flow is progressing down through the swamp from the north. At the top end of the swamp, the groundwater levels between BBP2 and BBP6 have virtually converged, so that there is no positive gradient in this area. When on site, this area is typically much wetter and boggier than the remainder of the swamp.

There are no abnormal trends indicated within the dataset."

Figure 5- Coxs River Swamp Groundwater Levels



6.2 Subsidence Development (Summary of Survey Results)

Additional monitoring prisms have been installed and surveyed adjacent to the southern "pinch point" of the Wolgan escarpment to provide further information.

Additional surveys of various subsidence monitoring lines have been undertaken during this reporting period. Results of these surveys are listed below and are within the predicted range with one minor exceedance of 38mm on E Line. A summary of the results are presented in **Table 1** below.

Table 1 – Summary of Subsidence Survey Results

Line	Survey Date	SMP Prediction Subsidence (mm)	Measured Subsidence (mm)	SMP Prediction Strain (mm/m)	Measured Strain (mm/m)	SMP Prediction Tilt (mm/m)	Measured Tilt (mm/m)	SMP Prediction Horizontal Movement (mm)	Measured Horizontal Movement (mm)
E Line	10-03-2011	1400 - 1600	1638	9 - 21	14.2	32 - 52	27.1	400	216
F Line	21-01-2011	1400 – 1600	1418	9 – 21	12.0	32 – 52	26.1	400	333
G Line	09-03-2011	1400 – 1600	50	9 - 21	2.3	32 – 52	0.9	400	61
H Line	21-01-2011	1400 – 1600	5	9 - 21	1.1	32 - 52	0.4	400	24
	14-03-2011		5		1.0		0.3		12
	17-03-2011		23		1.3		0.4		28
	22-03-3011		38		1.1		0.3		25
	25-03-2011		44		1.1		0.6		29
	30-03-2011		75		1.0		0.7		20
	04-04-2011		123		1.2		1.6		23

	06-04-2011		162		1.4		1.8		49

Line	Survey Date	SMP Prediction Subsidence (mm)	Measured Subsidence (mm)	SMP Prediction Strain (mm/m)	Measured Strain (mm/m)	SMP Prediction Tilt (mm/m)	Measured Tilt (mm/m)	SMP Prediction Horizontal Movement (mm)	Measured Horizontal Movement (mm)
I Line	21-01-2011	1400 - 1600	5	9 - 21	0.7	32 - 52	0.2	400	16
	14-03-2011		2		0.9		0.1		15
	17-03-2011		9		0.8		0.5		18
	22-03-2011		4		0.8		0.5		20
	25-03-2011		3		0.9		0.3		20
	30-03-2011		4		0.8		0.3		10
	04-04-2011		3		1.1		0.3		10
	06-04-2011		7		0.9		0.4		13
Northern Pinch Point Reflectors	04-04-2011		22						12

Line	Survey Date	SMP Prediction Subsidence (mm)	Measured Subsidence (mm)	SMP Prediction Strain (mm/m)	Measured Strain (mm/m)	SMP Prediction Tilt (mm/m)	Measured Tilt (mm/m)	SMP Prediction Horizontal Movement (mm)	Measured Horizontal Movement (mm)
Southern Pinch Point Reflectors	11-03-2011		15						7
	14-03-2011		13						7
	17-03-2011		15						7
	22-03-2011		15						8
	25-03-2011		14						8
	30-03-2011		20						8
	04-04-2011		15						12
	06-04-2011		14						10

Line	Survey Date	SMP Prediction Subsidence (mm)	Measured Subsidence (mm)	SMP Prediction Strain (mm/m)	Measured Strain (mm/m)	SMP Prediction Tilt (mm/m)	Measured Tilt (mm/m)	SMP Prediction Horizontal Movement (mm)	Measured Horizontal Movement (mm)
Southern Pinch Point Prisms	14-03-2011		1						2
	17-03-2011		1						5
	22-03-2011		2						6
	25-03-2011		3						6
	30-03-2011		4						6
	04-04-2011		1						6
	06-04-2011		1						8

7 ADEQUACY, QUALITY AND EFFECTIVENESS

The adequacy, quality and effectiveness of the implemented management response processes, based on compliance with approval conditions, are considered to be satisfactory to date. Notification, consultation and development of a remediation program with regard to the surface cracking are also considered to be appropriate.

8 PROPOSED ADDITIONAL / OUTSTANDING MANAGEMENT ACTIONS

There are no current proposed or outstanding management actions to report.

9 CONCLUSIONS

During the reporting period LW30 was completed on 2 February 2011. LW31 commenced on 7th March 2011. As of 7 April 2011, the faceline of LW31 had retreated a total of 255m.

Routine scientific and survey monitoring of impacts on rock features, escarpments, and surface and groundwater regimes continued, as did seasonal monitoring of flora and fauna.

Anomalous groundwater behaviour in several monitoring bores as reported previously appears to have stabilised and is showing signs of normalising.

All other monitoring results are within expected / predicted parameters. Routine and scheduled seasonal monitoring will continue.

FIGURE 6: Proposed Subsidence Survey and Data Monitoring Locations (Source: *Baal Bone Colliery LW29-31 SMP Subsidence Monitoring Program*)

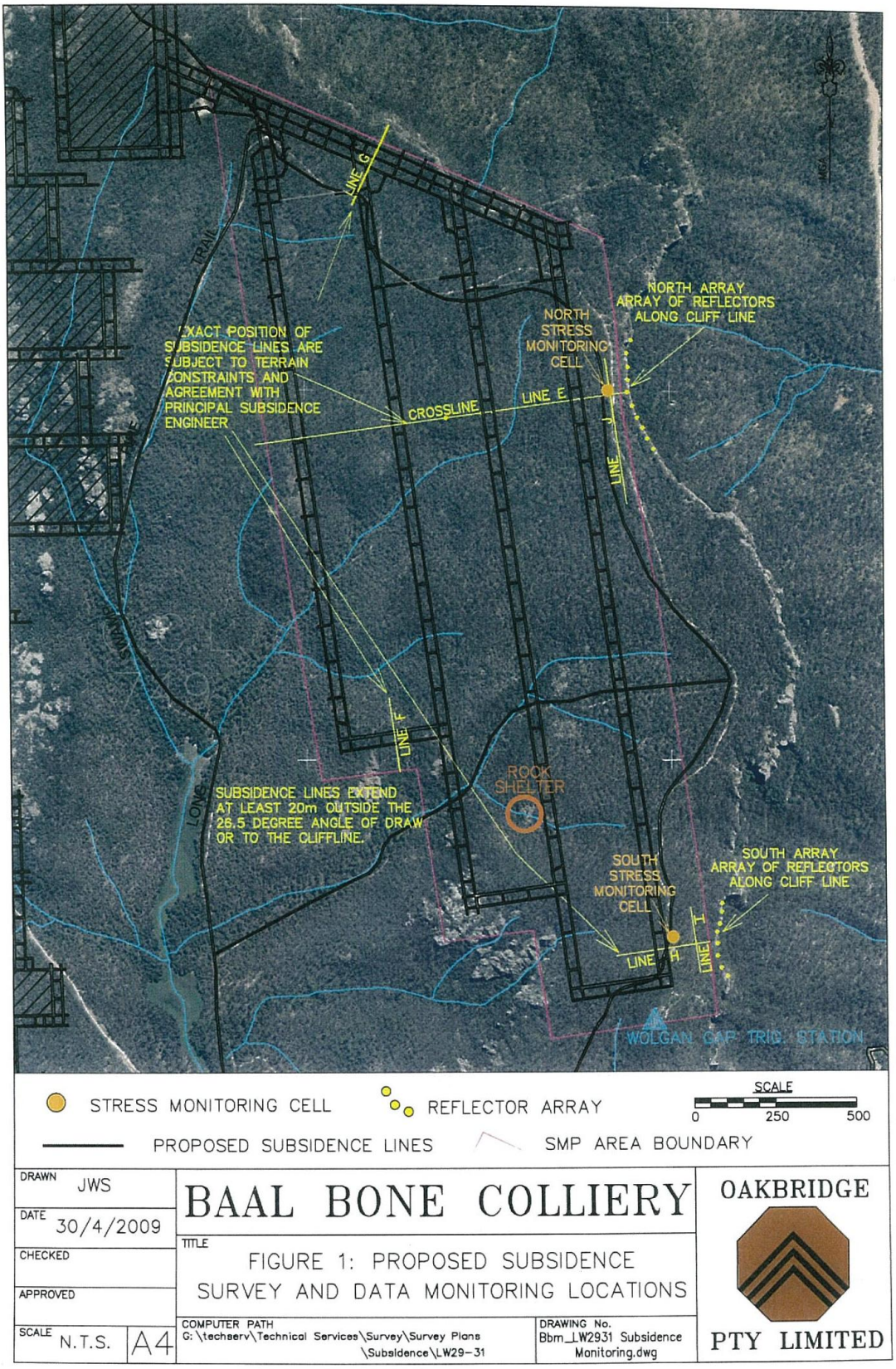
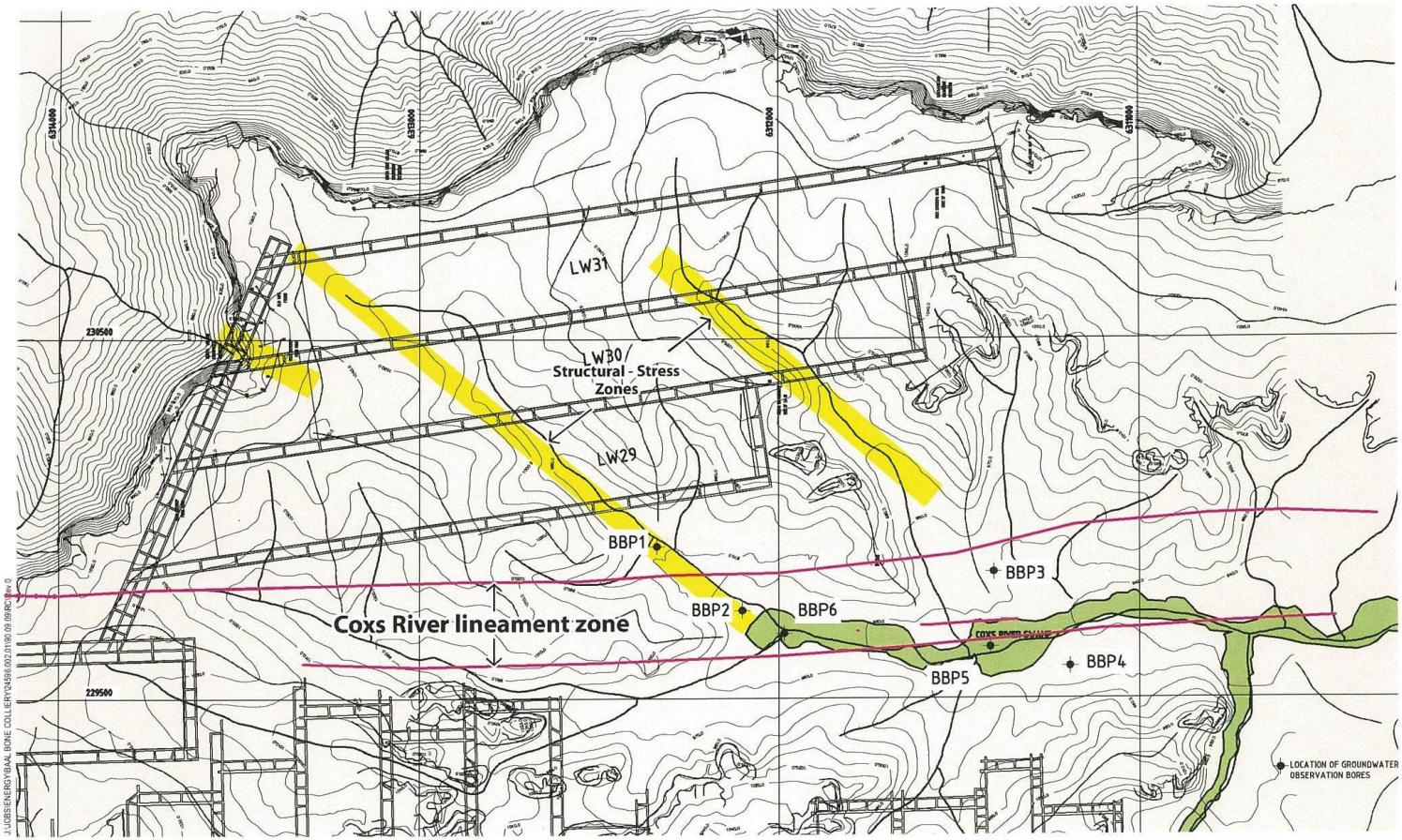


FIGURE 7: Location of Groundwater Observation Bores and Geological Structures

aurecon



Baal Bone Colliery Groundwater Response Strategy

FIGURE: Location of Groundwater Observation Bores and Geological Structures

FIGURE 8: Survey Monitoring and Stress Cell Location of North Pinch Point Area

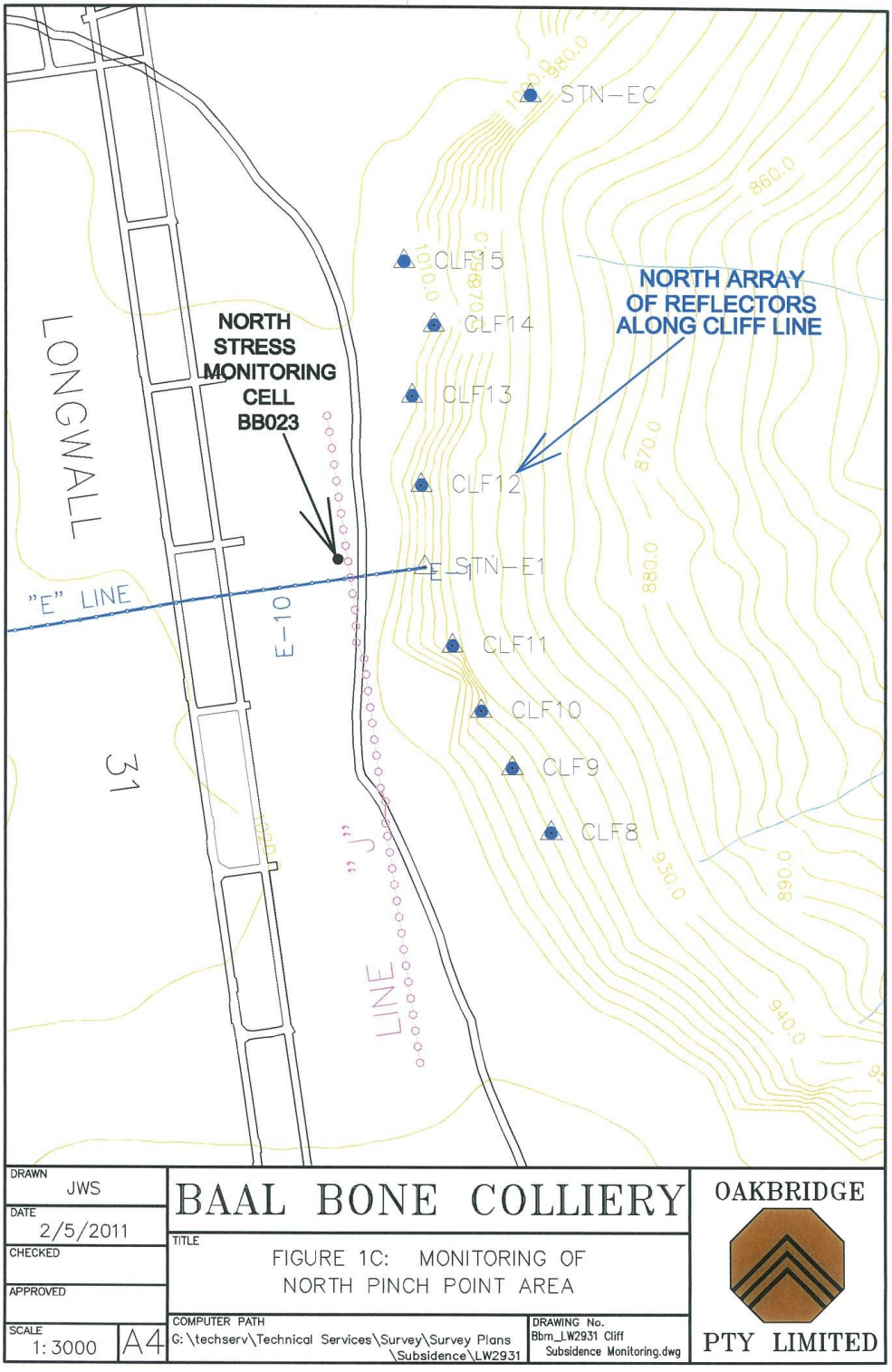


FIGURE 9: Survey Monitoring and Stress Cell Location of South Pinch Point Area

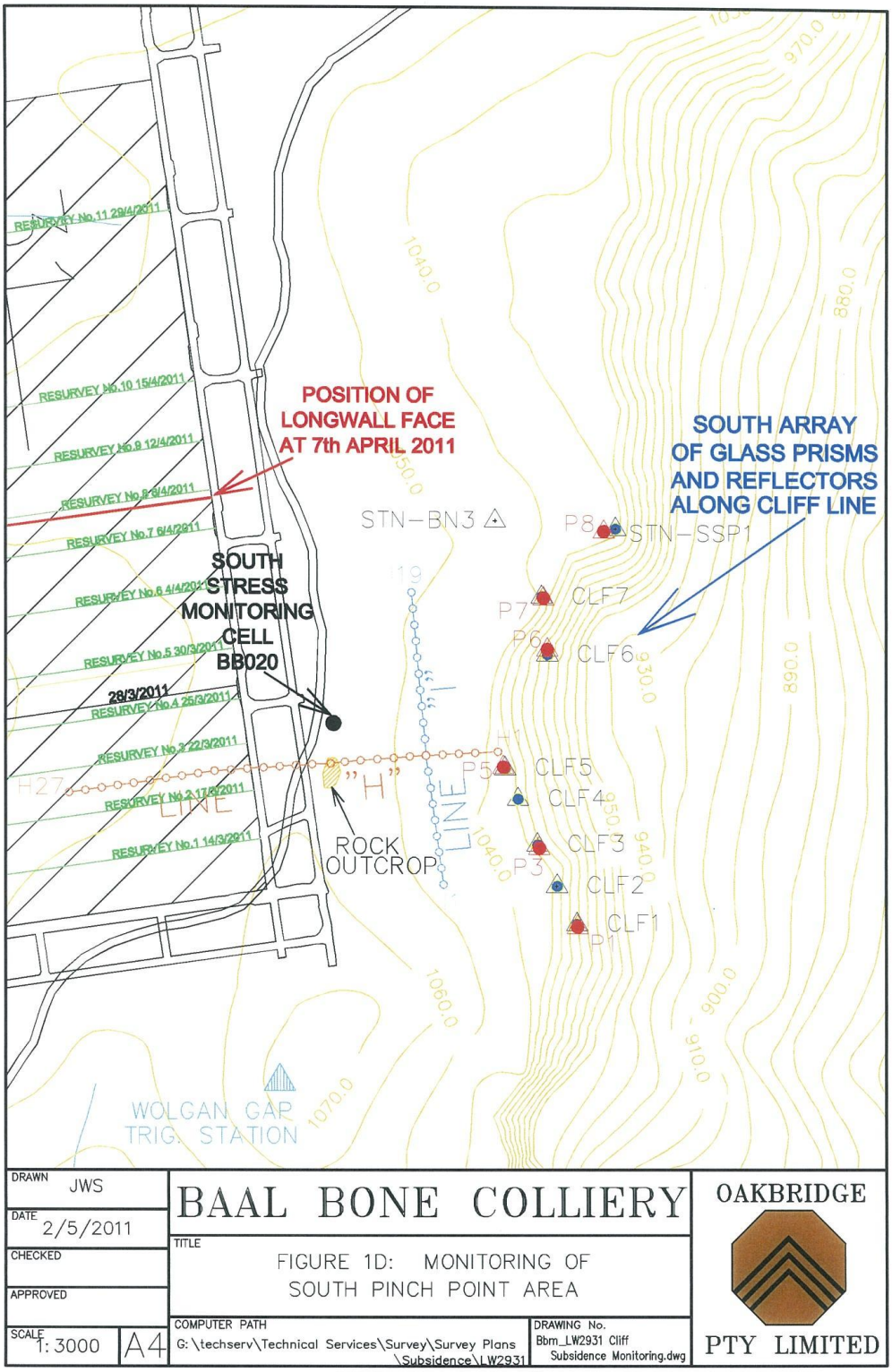


FIGURE 10 – Longwall Extraction Timing