

# Appendix 9

## Abel Mine Subsidence Status Reports 2015\*

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\*Note: A copy of this Appendix is available on the Project CD



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**Abel Mine  
Subsidence Management Status Report  
Four Monthly Update**

**31 May 2015**

**Approved by Tony Sutherland  
Regional Technical Services Manager NSW  
Yancoal**

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## 1 INTRODUCTION

This Subsidence Management Status Report fulfils the requirements of Condition 18 of the Abel Subsidence Management Plan (SMP) Approval Conditions for Abel Area 1 dated 27 May 2010, Condition 17 of SMP Area 2 dated 7 December 2011 and SMP Area 3 dated 16 July 2013, SMP Area 4 dated 19 September 2014 and subsequent variations.

A summary of monitoring results for the period from 31 January 2015 to 31 May 2015 is presented in this report. Pillar extraction took place in Panels 25, 26, 27 & 28. Monitoring was conducted as detailed in **Section 7**.

While any adverse impacts will be immediately evident during monitoring and reported, as required under Conditions 16 (SMP Areas 2 & 3) and 17 (SMP Area 1 & SMP Area 4), there is approximately a one month lag time in collation and review of some monitoring data.

## 2 PURPOSE AND SCOPE

The purpose of this document is to report the progress of mining, provide a summary of any subsidence impacts, the implemented management processes and any consultation with relevant stakeholders.

## 3 FACE POSITIONS OF PANELS 25, 26, 27 & 28

The face positions of Panels 25, 26, 27 & 28 at fortnightly intervals are presented in **Attachment 1**.

Panel Name	Extraction Commenced	Extraction Completed
Panel 25	11 <sup>th</sup> May 2014	8 <sup>th</sup> May 2015
Panel 26	11 <sup>th</sup> August 2014	Not yet complete
Panel 27	30 <sup>th</sup> September 2014	Not yet complete
Panel 28	11 <sup>th</sup> May 2015	Not yet complete

## 4 SUBSIDENCE MONITORING AND INSPECTIONS

### 4.1 Subsidence Monitoring Program

The Subsidence Monitoring Programs are developed in consultation with the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS). Monitoring programs for the following Panels were developed and approved by the Principal Subsidence Engineer, DTIRIS in accordance with Condition 12.

Panel Name	Approved
Panel 25	9 <sup>th</sup> April 2014
Panel 26	5 <sup>th</sup> September 2014

Panel 27	22 <sup>nd</sup> September 2014
Panel 28	30 <sup>th</sup> March 2015

#### 4.2 Ausgrid Power Poles

A pre-mining subsidence survey has been conducted plus additional pole verticality checks along with post mining surveys.

Visual inspections have been conducted, when required, as detailed in the Management Plan.

#### 4.3 Hunter Water Pipeline

No action required during this period.

#### 4.4 Blackhill Road

Pre-mining subsidence survey has been conducted plus weekly surveys.

24 hour visual inspections have been conducted, as detailed in the Management Plan while in the active area.

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## 5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

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Mining operations have continued with minor impacts on the general surface in the form of cracking in the general surface area.

#### 5.1 Impacts on General Surface and Roads / Tracks

Surface cracking has occurred within predictions at the surface above Panels 25, 26, 27 & 28 in the vegetated areas, grazing areas, sealed access road and access tracks.

Remedial works have been carried out in relation to cracking over these areas in consultation with Landowners.

#### 5.3 Impacts on Ausgrid Power Poles

##### **Subsidence Impacts**

Nil during this period

##### **Notification**

Not required during this period

##### **Management Actions**

None required during this period

#### 5.4 Impacts on the Hunter Water Pipeline

##### **Subsidence Impacts**

Nil during this period

##### **Notification**

Not required during this period

##### **Management Actions**

Not required during this period

#### 5.5 Impacts on Blackhill Road

##### **Subsidence Impacts**

Minor cracking and humping to road surface <100mm

##### **Notification**

Not required during this period

##### **Management Actions**

Minor cracking and humping on road surface was remediated as outline in the Blackhill Road Management Plan.

#### 5.6 Notification under SMP Approval Conditions

There have been no observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, or any other relevant information, that would require notification under the approval conditions.

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## 6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

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### 6.1 Summary of Additional Consultation

Additional consultation was conducted with Cessnock City Council and one Resident in relating to Management Plan development, and monitoring within this period.

### 6.2 Approval Condition Compliance Status

Listed below in **Table 1, 2, 3 & 4** is the current status of compliance with the SMP Approval Conditions for Abel Area 1, 2, 3 & 4



**Table 1 SMP Approval Conditions Abel Area 1– Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 1 submitted to Principal Subsidence Engineer, approved 29 June 2010. Panel 2 submitted to Principal Subsidence Engineer,

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Condition No.	Brief Description	Date Required	Current Status
			approved 31 August 2010. Panels 3 and 4 submitted to Principal Subsidence Engineer, approved 16 December 2010. Panel 5 submitted to Principal Subsidence Engineer, approved 30 May 2011. Panel 6 submitted to Principal Subsidence Engineer, approved 13 September 2011. Panel 7 submitted 29 September 2011 to Principal Subsidence Engineer, approved 9 November 2011. Panel 8 submitted 15 March 2012 to Principal Subsidence Engineer, approved 27 March 2012. East Mains approved by the Principal Subsidence Engineer 16 July 2012
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 6 July 2010
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Optus fibre optic cable d) Any other infrastructure, if required by the Director Mine Safety Operations. Plans must be developed in consultation with the owners of the infrastructure and any Government Agency with a regulatory role for the infrastructure.	Prior to any subsidence impacts	Panel 3 Energy Australia Power line Management Plan was approved 7 February 2011. Ausgrid Panels 5 – 8 management plan was approved on the 7 July 2011. Ausgrid Power line Management Plan East Mains was approved 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 1 – 22 March 2012 Hunter Water Corporation not required for Panels 3,4,5,6,7 & 8 Optus Fibre Optic Cable was relocated outside the SMP Area.
15	Management review meetings must be convened with the relevant infrastructure owner/operators, the Mine Subsidence Board and the Principal Subsidence Engineer under any of the following	Prior to the commencement of Panel 4 extraction	Noted. Variation requested and approved (See previous Status Report for details)

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Condition No.	Brief Description	Date Required	Current Status
	circumstances i) Prior to the commencement of Panel 4 extraction, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer		Meeting held on the 15 September 2011.  Noted.
16	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 1 Submitted to Director Mine Safety Operations, approved 4 June 2010.
17	Incident and Ongoing Management reporting	Ongoing	Noted. Notification provided re – cracking Panel 1, 6 August 2010. Notification provided re – cracking Panel 4, 6 May 2011

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Condition No.	Brief Description	Date Required	Current Status
18	Subsidence Management Status Report to be updated every 14 days and provided every 4 months to: Principal Subsidence Engineer, DECC-NSW Office of Water and each operator of infrastructure referred to in Condition 14.  Must be provided, as updated from time to time, on request to: Mine Subsidence Board, Director of Environmental Sustainability, Principal Subsidence Engineer, owners/operators of any infrastructure within the application area and any other relevant stakeholders	Update every 14 days. Submitted 27 September 2010 and then every 4 months from Panel 1 approval.	Noted – first report Panel 1 completed 5 October 2010 to provide update to end September 2010. Second report provided for period 30 September 2010 to 31 January 2011. Third report covered 31 January 2011 to 31 May 2011. Fourth report covered 31 May 2011 to 30 September 2011. Fifth report covered 30 September 2011 to 31 January 2012. Sixth report covered 31 January 2012 to 31 May 2012. Seventh report covered 31 May 2012 to 30 September 2012. Report covered 30 September to 31 January 2013. Report covered 31 January 2013 to 31 May 2013. Report covered 31 May 2013 to 30 September 2013. Report covered 30 September 2013 to 31 January 2014. Report covered 31 January 2014 to 31 May 2014. Report covered 31 May 2014 to 30 September 2014. Report covered 20 September 2014 to 31 January 2015
19	End of Year report	By 31 March 2011 By March 2012 By March 2013 By March 2014	Lodged. Lodged. Lodged. Lodged.
20	Access to information – within 3 months of End of Year Report or approval of any plan, programme or strategy (a) Provide a copy to relevant agencies (b) Ensure copy available at regional office; and (c) Put a copy on website	Various	Noted and provided. Relevant agencies are MSB, DECCW, DECCW_NOW and DoP
21	Survey marks – functionality to be restored	On completion of subsidence	Noted
22	In the event of interruption to potable water supplies, water supplies of equivalent quality and quantity to be provided until such time as affected water supplies are restored		Noted

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**Table 2 SMP Approval Conditions Abel Area 2 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 15 submitted to the Principal Subsidence Engineer, approved 15 February 2012.

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Condition No.	Brief Description	Date Required	Current Status
			Tailgate Headings submitted to the Principal Subsidence Engineer, approved 4 <sup>th</sup> June 2012 Panel 20 submitted to the Principal Subsidence Engineer, approved 9 November 2012 Panel 21 submitted to the Principal Subsidence Engineer, approved 5 November 2012 Panel 22 submitted to the Principal Subsidence Engineer, approved 11 April 2013 Panel 19 & 19A submitted to the Principal Subsidence Engineer, approved 4 February 2013
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 15 February 2012
14.1	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Telecommunication cables; d) Public roads; e) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan & a Hunter Water Corporation Management Plan was prepared for Tailgate headings and was approved on the 21 June 2012  An Ausgrid Powerline Management Plan was approved for Panels 20 – 22 on 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 2 – 16 January 2013  Blackhill and Taylors road Management Plan was approved for SMP Area 2 - 16 January 2013
14.2	Management review meetings must be convened with the relevant infrastructure owner/operator, the Mine Subsidence Board and the Principle Subsidence Engineer under any of the following circumstances: i) Allowing sufficient time to implement any required	Not specified	Noted.

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Condition No.	Brief Description	Date Required	Current Status
	management measures or strategies that may result from the said review, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer.		
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 2 Submitted to the Director Mine Safety Operations, approved 15 January 2012  A variation was approved 16 January 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

**Table 3 SMP Approval Conditions Abel Area 3 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 23 submitted to the Principal Subsidence Engineer, approved 19 July 2013 Panel 24 submitted to the Principal Subsidence

Condition No.	Brief Description	Date Required	Current Status
			Engineer, approved 12 September 2013 Panel 25 submitted to the Principle Subsidence Engineer, approved 9 April 2014  Panel 26 was submitted to the Principal Subsidence Engineer, approved 5 <sup>th</sup> September 2014
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 July 2013
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for:  A) Electricity transmission lines B) Telecommunication cables; C) Public roads; D) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 17 July 2013  A Telstra Copper Cable Management Plan was approved for Panels 23 – 24 on 17 July 2013. A revised management plan to include the Telstra Optical Fibre Cable for Panel 23 – 24 was approved 6 December 2013  Blackhill rd Management Plan was approved on 11 September 2013
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Panels 23 – 25 was approved on the 11 September 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

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**Table 4 SMP Approval Conditions Abel Area 4 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until the Secretary notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Secretary may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Secretary may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Secretary	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Secretary, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for	Prior to pillar	Panel 27 submitted to the Principal Subsidence

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Condition No.	Brief Description	Date Required	Current Status
	approval to the Principal Subsidence Engineer	extraction	Engineer, approved 22 September 2013  Panel 28 submitted to the Principal Subsidence Engineer, approved 30 March 2015
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 <sup>th</sup> September 2014
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for:  i) Electricity transmission lines ii) Telecommunication cables; iii) Public roads; iv) Farm Dams; v) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 1 <sup>st</sup> October 2014  A Telstra Copper Cable Management Plan was approved for Panels 27, 28 & 29 on 1 <sup>st</sup> October 2014.  A Public Roads Management plan was approved for Area 4 on the 23 <sup>rd</sup> December 2014
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Interim Approval was given on the 19 <sup>th</sup> September 2014. Full Approval was given on the 23 <sup>rd</sup> December 2014
16	Incident and Ongoing Management reporting	Ongoing	Noted.

## 7 SUMMARY OF SUBSIDENCE DEVELOPMENT

### 7.1 Subsidence Monitoring Program

All required subsidence monitoring lines have been installed and all pre-mining subsidence surveys completed in accordance with the agreed Subsidence Monitoring Program.

Additional surveys and inspections have also been conducted. Subsidence results to date are:

<b>PANEL 1 (W = 120 m; T = 2.35 - 3.0m)</b>			
>75m Cover	Predicted	Final Measured	Comment
Subsidence	0.95 - 1.25m	0.72 - 1.228m	Measured subsidence < predictions
Tensile Strain	10 - 18 mm/m	4 - 12 mm/m (18 mm/m)	Measured tensile strains < predictions.
Compressive Strain	13 - 23 mm/m	5 - 14 mm/m	Measured compressive strains < predictions
Tilt	22 - 40 mm/m	22 - 46 mm/m	Measured tilts < predictions. One exceedance of 15%.
Other		Cracked Joint to Hunter Water Pipeline Repaired 11kv Power Line	All necessary repairs have been carried out.

<b>PANEL 2 (W= 150m ; T = 2.5 m)</b>			
< 75m Cover	Predicted	Final Measured	Comment
Subsidence	1.30 - 1.38m	0.977 - 1.041 m	Measured subsidence < predictions
Tensile Strain	18 - 31 mm/m	4 - 6 mm/m (5 mm/m)	Measured tensile strains < predictions
Compressive Strain	23 - 40 mm/m	4 - 7 mm/m	Measured compressive strains < predictions
Tilt	40 - 67 mm/m	22 - 32 mm/m	Measured tilts < predictions
Other			
>75m Cover	Predicted	Final Measured	Comment
Subsidence	1.20 - 1.32m	0.94 - 0.966m	Measured subsidence < predictions
Tensile Strain	13 - 20 mm/m	9 mm/m (15 mm/m)	Measured tensile strains < predictions
Compressive Strain	17 - 25 mm/m	6 mm/m	Measured compressive strains < predictions
Tilt	30 - 45 mm/m	27 mm/m	Measured tilts < predictions
Other			

<b>PANEL 3 (W=160.5 m; T = 2.5 m)</b>			
< 75m Cover	Predicted	Final Measured	Comment
Subsidence	1.33 - 1.34 m	1.003 m	Measured subsidence < predictions
Tensile Strain	19 - 31 mm/m	8 - 9 mm/m (26 mm/m)	Measured tensile strains < predictions
Compressive Strain	24 - 40 mm/m	5 - 7 mm/m	Measured compressive strains < predictions
Tilt	42 - 67 mm/m	28 - 39 mm/m	Measured tilts < predictions
Other			
>75m Cover	Predicted	Final Measured	Comment
Subsidence	1.26 - 1.27 m	0.884 - 0.982 m	Measured subsidence < predictions
Tensile Strain	14 - 21mm/m	8 mm/m (10 mm/m)	Measured tensile strains < predictions
Compressive Strain	18 - 27 mm/m	4 mm/m	Measured compressive strains < predictions
Tilt	33 - 49 mm/m	30 mm/m	Measured tilts < predictions
Other			

<b>PANEL 4 (W= 160.5 m; T = 2.5 m)</b>			
<b>&lt; 75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.27-1.29m	1.065m	Measured subsidence < predictions
<b>Tensile Strain</b>	19 - 31 mm/m	6 - 10 mm/m (37.5 mm/m)	Measured tensile strains < predictions with 1 exceedance of 20% at clay cap.
<b>Compressive Strain</b>	24 - 40 mm/m	6 - 18 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	42 - 67 mm/m	36 - 60 mm/m	Measured tilts < predictions
<b>Other</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.29 - 1.32m	1.054 m	Measured subsidence < predictions
<b>Tensile Strain</b>	14 - 21mm/m	5 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	18 - 27 mm/m	5 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	42 - 67 mm/m	25 - 36 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 5 (W= 160.5 m; T = 2.5 m)</b>			
<b>&lt; 75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.27-1.43	1.154m	Measured subsidence < predictions
<b>Tensile Strain</b>	14 - 15 mm/m	10 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	15 - 19 mm/m	4 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	41 - 46 mm/m	68 mm/m	Measured tilts < predictions with 1 minor exceedance
<b>Other</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.42 - 1.43m	1.002 m	Measured subsidence < predictions
<b>Tensile Strain</b>	11 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	15 - 18 mm/m	13 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	38 - 46 mm/m	29.8 mm/m	Measured tilts < predictions
<b>Other</b>			



<b>PANEL 6 (W= 160.5 m; T = 2.5 m)</b>			
<b>&lt; 75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.21 - 1.32m	1.215m	Measured subsidence < predictions
<b>Tensile Strain</b>	14 mm/m	8 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	17 - 18 mm/m	21 mm/m	Measured compressive strains < predictions with 1 minor exceedance
<b>Tilt</b>	39 - 41 mm/m	89.6 mm/m	Measured tilts < predictions with 1 minor exceedance
<b>Other</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.32 - 1.42m	1.066 m	Measured subsidence < predictions
<b>Tensile Strain</b>	11 - 14mm/m	9 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	14 - 17 mm/m	7 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	38 - 41 mm/m	30 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 7 (W= 160.5 m; T = 2.5 m)</b>			
<b>&lt; 75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.27 - 1.32m	0.771m	Measured subsidence < predictions
<b>Tensile Strain</b>	11 - 14 mm/m	5 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	14 - 18 mm/m	2 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	41 mm/m	12 mm/m	Measured tilts < predictions
<b>Other</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.32 - 1.43m	1.336 m	Measured subsidence < predictions
<b>Tensile Strain</b>	11 - 15mm/m	23 mm/m	Measured tensile strains < predictions with 1 minor exceedance
<b>Compressive Strain</b>	14 - 18 mm/m	36 mm/m	Measured compressive strains < predictions with 1 minor exceedance
<b>Tilt</b>	41 mm/m	42.5 mm/m	Measured tilts < predictions with 1 minor exceedance
<b>Other</b>			

<b>PANEL 8 (W= 160.5 m; T = 2.5 m)</b>			
<b>&lt; 75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	< 1.32m	0.830m	Measured subsidence < predictions
<b>Tensile Strain</b>	14 - 15 mm/m	2 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	17 - 19 mm/m	3 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	42 mm/m	11.4 mm/m	Measured tilts < predictions
<b>Other</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.25 - 1.32m	0.845 m	Measured subsidence < predictions
<b>Tensile Strain</b>	10 - 14mm/m	11 mm/m	Measured tensile strains < predictions with 1 minor exceedance
<b>Compressive Strain</b>	13 - 17 mm/m	6 mm/m	Measured compressive strains < predictions with 1 minor exceedance
<b>Tilt</b>	41 mm/m	33.8 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 15 (W= 160.5 m; T = 2.5 m)</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.17 - 1.23m	1.164m	Measured subsidence < predictions
<b>Tensile Strain</b>	7 - 12mm/m	15 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	9 - 15 mm/m	13 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	19 - 32 mm/m	49 mm/m	Measured tilts < predictions with 2 minor exceedance
<b>Other</b>			

<b>PANEL 20 (W= 128 m; T = 2.7 m)</b>			
<b>&gt;75m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	150 mm	62 mm	Measured subsidence < predictions
<b>Tensile Strain</b>	2 mm/m	1 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	2 mm/m	2 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	3 mm/m	2.5 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 21 (W= 212 m; T = 2.7 m)</b>			
<b>125m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	150 mm	96 mm	Measured subsidence < predictions
<b>Tensile Strain</b>	2 mm/m	1 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	2 mm/m	1 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	3 mm/m	2.1 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>TAILGATE HEADINGS (W= 80.5 m; T = 2.8 m)</b>			
<b>&lt;110mCover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	0.88 – 0.99m	0.250m	Measured subsidence < predictions
<b>Tensile Strain</b>	8 - 9mm/m	2 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	8 - 9 mm/m	2 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	18 - 33 mm/m	7 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>EAST INSTALL HEADINGS (W= 105m; T = 2.7 m)</b>			
<b>100m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	0.9m	1.286m	Measured subsidence > predictions
<b>Tensile Strain</b>	13 – 19 mm/m	12 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	16 - 24 mm/m	9 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	24 - 35 mm/m	44 mm/m	Measured tilts > predictions
<b>Other</b>			

<b>EAST MAINS HEADINGS (W= 125m; T = 2.7 m)</b>			
<b>100m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.59m	1.408m	Measured subsidence < predictions
<b>Tensile Strain</b>	10 - 16 mm/m	11 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	13 - 20 mm/m	15 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	49 mm/m	48.6 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>Panel 19A (W= 227.9m; T = 2.6 m)</b>			
<b>100m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.42m	1.261m	Measured subsidence < predictions
<b>Tensile Strain</b>	8 - 14 mm/m	3 - 12 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	11 - 18 mm/m	4 - 13 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	40 mm/m	29 - 48 mm/m	Measured tilts < predictions with only a minor exceedance
<b>Other</b>			

<b>PANEL 22 (W= 180.3 m; T = 2.8 m)</b>			
<b>125m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	150 mm	44 mm	Measured subsidence < predictions
<b>Tensile Strain</b>	2 mm/m	1 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	2 mm/m	1 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 23 (W= 215 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.046m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	13 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	13 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 24 (W= 220 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.089m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	9 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	7 mm/m	Measured compressive strains < predictions
<b>Other</b>			

Table 2 - Subsidence Monitoring Survey Dates

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
<b>Panel 1</b>	<i>Subsidence survey</i>	Installation and pre-mining survey 7/07/2010	Weekly Surveys	11/02/2011 24/06/2011 1/08/2012
<b>Panel 2</b>	<i>Subsidence Survey</i>			22/12/2010 21/06/2011 20/06/2012 9/10/2013
<b>Panel 3</b>	<i>Subsidence survey</i>	23/12/2010	Weekly Surveys	10/06/2011 25/10/2011 9/05/2012
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	23/12/2010		
<b>Panel 4</b>	<i>Subsidence survey</i>	4/03/2011	Weekly Surveys	24/08/2011 9/05/2011 3/09/2013
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	4/03/2011		
<b>Panel 5</b>	<i>Subsidence survey</i>	27/05/2011		4/11/2011 2/05/2012 18/02/2013 14/09/2013
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	27/05/2011		
	<i>Subsidence survey</i>	14/09/2011		1/05/2012

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
<b>Panel 6</b>				4/09/2013
	Visual inspection		Weekly Surveys	
	Photographic monitoring	14/09/2011		
<b>Panel 7</b>	Subsidence survey	8/02/2012		2/08/2012 28/05/2013 13/09/2013
	Visual inspection		Weekly Surveys	
	Photographic monitoring	8/02/2012		
<b>Panel 8</b>	Subsidence survey	13/02/2012		31/10/2012 17/05/2013 6/09/2013
	Visual inspection		Weekly Surveys	
	Photographic monitoring	13/02/2012		
<b>Panel 15</b>	Subsidence survey	9/02/2012		27/04/2012 14/01/2013 17/05/2013
	Visual inspection		Weekly Surveys	
	Photographic monitoring	9/02/2012		
<b>Panel 20</b>	Subsidence survey	29/08/2012		10/01/2013 8/01/2014 9/07/2014
	Visual inspection		Weekly Surveys	
	Photographic monitoring	29/08/2012		
<b>Panel 19</b>	Subsidence survey	1/05/2013		14/09/2013 9/07/2014
	Visual inspection		Weekly Surveys	

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	Photographic monitoring	1/05/2013		
Panel 19A	Subsidence survey	7/01/2013		4/06/2013 14/09/2013 5/11/2013 7/01/2014 7/07/2014
	Visual inspection		Weekly Surveys	
	Photographic monitoring	7/01/2013		
Panel 21	Subsidence survey	7/11/2012		16/05/2013 24/01/2014 1/09/2014
	Visual inspection		Weekly Surveys	
	Photographic monitoring	7/11/2012		
Panel 22	Subsidence survey	11/04/2013		30/07/2013 28/01/2014
	Visual inspection		Weekly Surveys	
	Photographic monitoring	11/04/2013		
Panel 23	Subsidence survey	12/07/2013		8/04/2014 3/03/2015
	Visual inspection		Daily	
	Photographic monitoring	12/07/2013		
Panel 24	Subsidence survey	19/02/2013		1/10/2014 12/03/2015
	Visual inspection		Daily	
	Photographic monitoring	19/02/2013		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
<b>Panel 25</b>	<i>Subsidence survey</i>	13/03/2014		
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	13/03/2014		
<b>Panel 26</b>	<i>Subsidence survey</i>	9/05/2014		
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	9/05/2014		
<b>Panel 27</b>	<i>Subsidence survey</i>	16/10/2014		
	<i>Visual inspection</i>		3 times a week	
	<i>Photographic monitoring</i>	22/09/2014		
<b>Panel 28</b>	<i>Subsidence survey</i>	6/05/2014		
	<i>Visual inspection</i>		3 times a week	
	<i>Photographic monitoring</i>	6/05/2014		
<b>East Install Headings</b>	<i>Subsidence survey</i>	14/11/2012		23/01/2013 8/01/2014
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	14/11/2012		
<b>Tailgate Headings</b>	<i>Subsidence survey</i>	18/05/2012		19/12/2012 13/06/2013 14/01/2014
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	18/05/2012		
<b>East Mains Headings</b>	<i>Subsidence survey</i>	9/07/2012		14/01/2013 30/05/2013
	<i>Visual inspection</i>		Weekly Surveys	



Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	Photographic monitoring	9/07/2012		
<b>Blackhill Road</b>	Subsidence survey	19/02/2013	As detailed in Management Plan	Same date as Panel surveys
	Visual inspection		Daily Surveys	
	Photographic monitoring	19/02/2013		
<b>Hunter Water Corporation pipeline</b>	Subsidence survey	7/07/2010 over P1 8/09/2010 over P2	Weekly Surveys	11/02/2011 & 24/06/2011 Over P1  22/12/2010 & 21/06/2011 Over P2
	Visual inspection		As detailed in Management Plan	
	Photographic monitoring			
<b>Ausgrid Power Poles</b>	Subsidence survey	Same date as Panel surveys	Weekly Surveys	Same date as Panel surveys
	Visual inspection		Weekly Surveys	
	Photographic monitoring	Same date as Panel surveys		
<b>TransGrid Transmission Towers</b>	Subsidence survey	28/03/2012	As detailed in Management Plan	Same date as Panel surveys
	Visual inspection		Daily Surveys	
	Photographic monitoring	28/03/2012		

## 8 ADEQUACY, QUALITY AND EFFECTIVENESS

The adequacy, quality, effectiveness of the implemented management processes based on monitoring, consultation and remediation is considered to be satisfactory to date.

## 9 PROPOSED MANAGEMENT ACTIONS

To date, no additional management actions are required beyond the procedures already implemented, relating to additional visual inspections and subsidence surveys, nor is there any need

for early responses or emergency procedures to be undertaken as there have been no subsidence impacts due to the extraction of the subject Panels which have not been managed under the current TARPS and Management Plans.

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## **10 CONCLUSIONS**

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Some additional visual inspections and subsidence surveys have been introduced due to impacts. However there is no requirement to undergo additional consultation as impacts from subsidence to date have been generally within predictions and consultation with infrastructure owners and the landholder are ongoing.

Minor impacts have been remediated by Abel, in the case of general surface or the relevant infrastructure owners following consultation.

All required Management Plans and Programs have been developed and submitted. Additional and revised Management Plans are being developed for future Panels.



**Abel Mine  
Subsidence Management Status Report  
Four Monthly Update**

**30 September 2015**

**Approved by Tony Sutherland  
Regional Technical Services Manager NSW  
Yancoal**

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**ATTACHMENTS**

**Attachment 1** – Panels 26, 27, 28 & 30 - Face Positions

**Attachment 2** – Panels 25, 26 & 27 - Survey Results

**Attachment 3** – Blackhill Road Survey Results

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## 1 INTRODUCTION

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This Subsidence Management Status Report fulfils the requirements of Condition 18 of the Abel Subsidence Management Plan (SMP) Approval Conditions for Abel Area 1 dated 27 May 2010, Condition 17 of SMP Area 2 dated 7 December 2011 and SMP Area 3 dated 16 July 2013, SMP Area 4 dated 19 September 2014 and subsequent variations.

A summary of monitoring results for the period from 31 May 2015 to 30 September 2015 is presented in this report. Pillar extraction took place in Panels 25, 26, 27 & 28. Monitoring was conducted as detailed in **Section 7**.

While any adverse impacts will be immediately evident during monitoring and reported, as required under Conditions 16 (SMP Areas 2 & 3) and 17 (SMP Area 1 & SMP Area 4), there is approximately a one month lag time in collation and review of some monitoring data.

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## 2 PURPOSE AND SCOPE

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The purpose of this document is to report the progress of mining, provide a summary of any subsidence impacts, the implemented management processes and any consultation with relevant stakeholders.

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## 3 FACE POSITIONS OF PANELS 26, 27, 28 & 30

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The face positions of Panels 26, 27, 28 & 30 at fortnightly intervals are presented in **Attachment 1**.

Panel Name	Extraction Commenced	Extraction Completed
Panel 26	11 <sup>th</sup> August 2014	17 <sup>th</sup> June 2015
Panel 27	30 <sup>th</sup> September 2014	12 <sup>th</sup> August 2015
Panel 28	11 <sup>th</sup> May 2015	Not yet complete
Panel 30	22 <sup>nd</sup> June 2015	Not yet complete

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## 4 SUBSIDENCE MONITORING AND INSPECTIONS

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### 4.1 Subsidence Monitoring Program

The Subsidence Monitoring Programs are developed in consultation with the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS). Monitoring programs for the following Panels were developed and approved by the Principal Subsidence Engineer, DTIRIS in accordance with Condition 12.

Panel Name	Approved
Panel 25	9 <sup>th</sup> April 2014
Panel 26	5 <sup>th</sup> September 2014

Panel 27	22 <sup>nd</sup> September 2014
Panel 28	30 <sup>th</sup> March 2015

#### 4.2 Ausgrid Power Poles

A pre-mining subsidence survey has been conducted plus additional pole verticality checks along with post mining surveys.

Visual inspections have been conducted, when required, as detailed in the Management Plan.

#### 4.3 Hunter Water Pipeline

No action required during this period.

#### 4.4 Blackhill Road & Meredith Road

Pre-mining subsidence survey has been conducted plus weekly surveys.

24 hour visual inspections have been conducted, as detailed in the Management Plan while in the active area.

---

### 5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

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Mining operations have continued with minor impacts on the general surface in the form of cracking in the general surface area.

#### 5.1 Impacts on General Surface and Roads / Tracks

Surface cracking has occurred within predictions at the surface above Panels 26, 27, 28 & 30 in the vegetated areas, grazing areas, sealed access road and access tracks.

Remedial works have been carried out in relation to cracking over these areas in consultation with Landowners.

#### 5.3 Impacts on Ausgrid Power Poles

##### **Subsidence Impacts**

Nil during this period

##### **Notification**

Not required during this period

##### **Management Actions**

None required during this period

#### 5.4 Impacts on the Hunter Water Pipeline

##### **Subsidence Impacts**

Nil during this period

##### **Notification**

Not required during this period

##### **Management Actions**

Not required during this period

#### 5.5 Impacts on Blackhill & Meredith Road

##### **Subsidence Impacts**

Minor cracking and humping to road surface <100mm

##### **Notification**

Notification was provided on the 1<sup>st</sup> October 2015 relating to humping on the 30<sup>th</sup> September 2015 to Blackhill Road.

##### **Management Actions**

Minor cracking and humping on road surface was remediated as outline in the Blackhill Road Management Plan.

#### 5.6 Notification under SMP Approval Conditions

There have been no observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, or any other relevant information, that would require notification under the approval conditions.

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## 6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

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### 6.1 Summary of Additional Consultation

Additional consultation was conducted with Residents in relating to Management Plan development, and monitoring within this period.

### 6.2 Approval Condition Compliance Status

Listed below in **Table 1, 2, 3 & 4** is the current status of compliance with the SMP Approval Conditions for Abel Area 1, 2, 3 & 4



**Table 1 SMP Approval Conditions Abel Area 1– Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 1 submitted to Principal Subsidence Engineer, approved 29 June 2010. Panel 2 submitted to Principal Subsidence Engineer,

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Condition No.	Brief Description	Date Required	Current Status
			approved 31 August 2010. Panels 3 and 4 submitted to Principal Subsidence Engineer, approved 16 December 2010. Panel 5 submitted to Principal Subsidence Engineer, approved 30 May 2011. Panel 6 submitted to Principal Subsidence Engineer, approved 13 September 2011. Panel 7 submitted 29 September 2011 to Principal Subsidence Engineer, approved 9 November 2011. Panel 8 submitted 15 March 2012 to Principal Subsidence Engineer, approved 27 March 2012. East Mains approved by the Principal Subsidence Engineer 16 July 2012
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 6 July 2010
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Optus fibre optic cable d) Any other infrastructure, if required by the Director Mine Safety Operations. Plans must be developed in consultation with the owners of the infrastructure and any Government Agency with a regulatory role for the infrastructure.	Prior to any subsidence impacts	Panel 3 Energy Australia Power line Management Plan was approved 7 February 2011. Ausgrid Panels 5 – 8 management plan was approved on the 7 July 2011. Ausgrid Power line Management Plan East Mains was approved 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 1 – 22 March 2012 Hunter Water Corporation not required for Panels 3,4,5,6,7 & 8 Optus Fibre Optic Cable was relocated outside the SMP Area.
15	Management review meetings must be convened with the relevant infrastructure owner/operators, the Mine Subsidence Board and the Principal Subsidence Engineer under any of the following	Prior to the commencement of Panel 4 extraction	Noted. Variation requested and approved (See previous Status Report for details)

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Condition No.	Brief Description	Date Required	Current Status
	circumstances i) Prior to the commencement of Panel 4 extraction, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer		Meeting held on the 15 September 2011.  Noted.
16	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 1 Submitted to Director Mine Safety Operations, approved 4 June 2010.
17	Incident and Ongoing Management reporting	Ongoing	Noted. Notification provided re – cracking Panel 1, 6 August 2010. Notification provided re – cracking Panel 4, 6 May 2011

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Condition No.	Brief Description	Date Required	Current Status
18	Subsidence Management Status Report to be updated every 14 days and provided every 4 months to: Principal Subsidence Engineer, DECC-NSW Office of Water and each operator of infrastructure referred to in Condition 14.  Must be provided, as updated from time to time, on request to: Mine Subsidence Board, Director of Environmental Sustainability, Principal Subsidence Engineer, owners/operators of any infrastructure within the application area and any other relevant stakeholders	Update every 14 days. Submitted 27 September 2010 and then every 4 months from Panel 1 approval.	Noted – first report Panel 1 completed 5 October 2010 to provide update to end September 2010. Second report provided for period 30 September 2010 to 31 January 2011. Third report covered 31 January 2011 to 31 May 2011. Fourth report covered 31 May 2011 to 30 September 2011. Fifth report covered 30 September 2011 to 31 January 2012. Sixth report covered 31 January 2012 to 31 May 2012. Seventh report covered 31 May 2012 to 30 September 2012. Report covered 30 September to 31 January 2013. Report covered 31 January 2013 to 31 May 2013. Report covered 31 May 2013 to 30 September 2013. Report covered 30 September 2013 to 31 January 2014. Report covered 31 January 2014 to 31 May 2014. Report covered 31 May 2014 to 30 September 2014. Report covered 30 September 2014 to 31 January 2015. Report covered 31 January 2015 to 31 March 2015
19	End of Year report	By 31 March 2011 By March 2012 By March 2013 By March 2014	Lodged. Lodged. Lodged. Lodged.
20	Access to information – within 3 months of End of Year Report or approval of any plan, programme or strategy (a) Provide a copy to relevant agencies (b) Ensure copy available at regional office; and (c) Put a copy on website	Various	Noted and provided. Relevant agencies are MSB, DECCW, DECCW_NOW and DoP
21	Survey marks – functionality to be restored	On completion of subsidence	Noted
22	In the event of interruption to potable water supplies, water supplies of equivalent quality and quantity to be provided until such time as affected water supplies are restored		Noted

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**Table 2 SMP Approval Conditions Abel Area 2 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for	Prior to pillar	Panel 15 submitted to the Principal Subsidence

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Condition No.	Brief Description	Date Required	Current Status
	approval to the Principal Subsidence Engineer	extraction	Engineer, approved 15 February 2012. Tailgate Headings submitted to the Principal Subsidence Engineer, approved 4 <sup>th</sup> June 2012 Panel 20 submitted to the Principal Subsidence Engineer, approved 9 November 2012 Panel 21 submitted to the Principal Subsidence Engineer, approved 5 November 2012 Panel 22 submitted to the Principal Subsidence Engineer, approved 11 April 2013 Panel 19 & 19A submitted to the Principal Subsidence Engineer, approved 4 February 2013
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 15 February 2012
14.1	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Telecommunication cables; d) Public roads; e) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan & a Hunter Water Corporation Management Plan was prepared for Tailgate headings and was approved on the 21 June 2012  An Ausgrid Powerline Management Plan was approved for Panels 20 – 22 on 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 2 – 16 January 2013  Blackhill and Taylors road Management Plan was approved for SMP Area 2 - 16 January 2013
14.2	Management review meetings must be convened with the relevant infrastructure owner/operator, the Mine Subsidence Board and the Principle Subsidence Engineer under any of the following circumstances:	Not specified	Noted.

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Condition No.	Brief Description	Date Required	Current Status
	i) Allowing sufficient time to implement any required management measures or strategies that may result from the said review, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer.		
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 2 Submitted to the Director Mine Safety Operations, approved 15 January 2012  A variation was approved 16 January 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

**Table 3 SMP Approval Conditions Abel Area 3 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 23 submitted to the Principal Subsidence Engineer, approved 19 July 2013

Condition No.	Brief Description	Date Required	Current Status
			Panel 24 submitted to the Principal Subsidence Engineer, approved 12 September 2013 Panel 25 submitted to the Principle Subsidence Engineer, approved 9 April 2014  Panel 26 was submitted to the Principal Subsidence Engineer, approved 5 <sup>th</sup> September 2014
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 July 2013
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for:  A) Electricity transmission lines B) Telecommunication cables; C) Public roads; D) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 17 July 2013  A Telstra Copper Cable Management Plan was approved for Panels 23 – 24 on 17 July 2013. A revised management plan to include the Telstra Optical Fibre Cable for Panel 23 – 24 was approved 6 December 2013  Blackhill rd Management Plan was approved on 11 September 2013
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Panels 23 – 25 was approved on the 11 September 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

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**Table 4 SMP Approval Conditions Abel Area 4 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until the Secretary notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Secretary may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Secretary may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Secretary	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Secretary, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 27 submitted to the Principal Subsidence Engineer, approved 22 September 2013  Panel 28 submitted to the Principal Subsidence

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Condition No.	Brief Description	Date Required	Current Status
			Engineer, approved 30 March 2015
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 <sup>th</sup> September 2014
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for: <ul style="list-style-type: none"> <li>i) Electricity transmission lines</li> <li>ii) Telecommunication cables;</li> <li>iii) Public roads;</li> <li>iv) Farm Dams;</li> <li>v) Any property or infrastructure if required by the Director of Mine Safety Operations.</li> </ul>	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 1 <sup>st</sup> October 2014  A Telstra Copper Cable Management Plan was approved for Panels 27, 28 & 29 on 1 <sup>st</sup> October 2014.  A Public Roads Management plan was approved for Area 4 on the 23 <sup>rd</sup> December 2014
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Interim Approval was given on the 19 <sup>th</sup> September 2014. Full Approval was given on the 23 <sup>rd</sup> December 2014
16	Incident and Ongoing Management reporting	Ongoing	Noted.

## 7 SUMMARY OF SUBSIDENCE DEVELOPMENT

### 7.1 Subsidence Monitoring Program

All required subsidence monitoring lines have been installed and all pre-mining subsidence surveys completed in accordance with the agreed Subsidence Monitoring Program.

Additional surveys and inspections have also been conducted. Subsidence results to date are:

<b>PANEL 20 (W= 128 m; T = 2.7 m)</b>			
>75m Cover	Predicted	Final Measured	Comment
Subsidence	150 mm	62 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	2 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.5 mm/m	Measured tilts < predictions
Other			

<b>PANEL 21 (W= 212 m; T = 2.7 m)</b>			
125m Cover	Predicted	Final Measured	Comment
Subsidence	150 mm	96 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.1 mm/m	Measured tilts < predictions
Other			

<b>EAST INSTALL HEADINGS (W= 105m; T = 2.7 m)</b>			
100m Cover	Predicted	Final Measured	Comment
Subsidence	0.9m	1.286m	Measured subsidence > predictions
Tensile Strain	13 – 19 mm/m	12 mm/m	Measured tensile strains < predictions
Compressive Strain	16 - 24 mm/m	9 mm/m	Measured compressive strains < predictions
Tilt	24 - 35 mm/m	44 mm/m	Measured tilts > predictions
Other			

<b>EAST MAINS HEADINGS (W= 125m; T = 2.7 m)</b>			
<b>100m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.59m	1.408m	Measured subsidence < predictions
<b>Tensile Strain</b>	10 - 16 mm/m	11 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	13 - 20 mm/m	15 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	49 mm/m	48.6 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 22 (W= 180.3 m; T = 2.8 m)</b>			
<b>125m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	150 mm	44 mm	Measured subsidence < predictions
<b>Tensile Strain</b>	2 mm/m	1 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	2 mm/m	1 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 23 (W= 215 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.046m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	13 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	13 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 24 (W= 220 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.089m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	9 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	7 mm/m	Measured compressive strains < predictions
<b>Other</b>			



Table 2 - Subsidence Monitoring Survey Dates

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
<b>Panel 20</b>	<i>Subsidence survey</i>	29/08/2012		10/01/2013 8/01/2014 9/07/2014
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	29/08/2012		
<b>Panel 21</b>	<i>Subsidence survey</i>	7/11/2012		16/05/2013 24/01/2014 1/09/2014
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	7/11/2012		
<b>Panel 22</b>	<i>Subsidence survey</i>	11/04/2013		30/07/2013 28/01/2014
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	11/04/2013		
<b>Panel 23</b>	<i>Subsidence survey</i>	12/07/2013		8/04/2014 3/03/2015
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	12/07/2013		
<b>Panel 24</b>	<i>Subsidence survey</i>	19/02/2013		1/10/2014 12/03/2015
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	19/02/2013		
<b>Panel 25</b>	<i>Subsidence survey</i>	13/03/2014		
	<i>Visual inspection</i>		Daily	
	<i>Photographic</i>	13/03/2014		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	<i>monitoring</i>			
<b>Panel 26</b>	<i>Subsidence survey</i>	<i>9/05/2014</i>		
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	<i>9/05/2014</i>		
<b>Panel 27</b>	<i>Subsidence survey</i>	<i>16/10/2014</i>		
	<i>Visual inspection</i>		3 times a week	
	<i>Photographic monitoring</i>	<i>22/09/2014</i>		
<b>Panel 28</b>	<i>Subsidence survey</i>	<i>6/05/2014</i>		
	<i>Visual inspection</i>		<i>3 times a week</i>	
	<i>Photographic monitoring</i>	<i>6/05/2014</i>		
<b>East Install Headings</b>	<i>Subsidence survey</i>	<i>14/11/2012</i>		<i>23/01/2013</i> <i>8/01/2014</i>
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	<i>14/11/2012</i>		
<b>East Mains Headings</b>	<i>Subsidence survey</i>	<i>9/07/2012</i>		<i>14/01/2013</i> <i>30/05/2013</i>
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	<i>9/07/2012</i>		
<b>Blackhill Road</b>	<i>Subsidence survey</i>	<i>Same date as Panel</i>	<i>As detailed in Management Plan</i>	Same date as Panel surveys
	<i>Visual inspection</i>		<i>Daily Surveys</i>	
	<i>Photographic monitoring</i>	<i>Same date as Panel</i>		
<b>Ausgrid Power Poles</b>	<i>Subsidence survey</i>	Same date as Panel surveys	Weekly Surveys	Same date as Panel surveys
	<i>Visual inspection</i>		Weekly Surveys	

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	<i>Photographic monitoring</i>	Same date as Panel surveys		

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## 8 ADEQUACY, QUALITY AND EFFECTIVENESS

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The adequacy, quality, effectiveness of the implemented management processes based on monitoring, consultation and remediation is considered to be satisfactory to date.

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## 9 PROPOSED MANAGEMENT ACTIONS

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To date, no additional management actions are required beyond the procedures already implemented, relating to additional visual inspections and subsidence surveys, nor is there any need for early responses or emergency procedures to be undertaken as there have been no subsidence impacts due to the extraction of the subject Panels which have not been managed under the current TARPS and Management Plans.

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## 10 CONCLUSIONS

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Some additional visual inspections and subsidence surveys have been introduced due to impacts. However there is no requirement to undergo additional consultation as impacts from subsidence to date have been generally within predictions and consultation with infrastructure owners and the landholder are ongoing.

Minor impacts have been remediated by Abel, in the case of general surface or the relevant infrastructure owners following consultation.

All required Management Plans and Programs have been developed and submitted. Additional and revised Management Plans are being developed for future Panels.

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**Abel Mine**  
**Subsidence Management Status Report**  
**Four Monthly Update**

**31 January 2016**

Approved by Tony Sutherland  
Regional Technical Services Manager NSW  
Yancoal

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**Attachment 2** – Panels 23, 24 & 25 - Survey Results

**Attachment 3** – Blackhill & Meredith Road Survey Results

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## 1 INTRODUCTION

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This Subsidence Management Status Report fulfils the requirements of Condition 18 of the Abel Subsidence Management Plan (SMP) Approval Conditions for Abel Area 1 dated 27 May 2010, Condition 17 of SMP Area 2 dated 7 December 2011 and SMP Area 3 dated 16 July 2013, SMP Area 4 dated 19 September 2014 and subsequent variations.

A summary of monitoring results for the period from 30 September 2015 to 31 January 2016 is presented in this report. Pillar extraction took place in Panels 28 & 30. Monitoring was conducted as detailed in **Section 7**.

While any adverse impacts will be immediately evident during monitoring and reported, as required under Conditions 16 (SMP Areas 2 & 3) and 17 (SMP Area 1 & SMP Area 4), there is approximately a one month lag time in collation and review of some monitoring data.

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## 2 PURPOSE AND SCOPE

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The purpose of this document is to report the progress of mining, provide a summary of any subsidence impacts, the implemented management processes and any consultation with relevant stakeholders.

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## 3 FACE POSITIONS OF PANELS 28 & 30

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The face positions of Panels 28 & 30 at fortnightly intervals are presented in **Attachment 1**.

Panel Name	Extraction Commenced	Extraction Completed
Panel 28	11 <sup>th</sup> May 2015	Not yet complete
Panel 30	22 <sup>nd</sup> June 2015	Not yet complete

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## 4 SUBSIDENCE MONITORING AND INSPECTIONS

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### 4.1 Subsidence Monitoring Program

The Subsidence Monitoring Programs are developed in consultation with the Department of Resources and Energy. Monitoring programs for the following Panels were developed and approved by the Principal Subsidence Engineer, DTIRIS in accordance with Condition 12.

Panel Name	Approved
Panel 28	30 <sup>th</sup> March 2015

### 4.2 Ausgrid Power Poles

A pre-mining subsidence survey has been conducted plus additional pole verticality checks along with post mining surveys.

Visual inspections have been conducted, when required, as detailed in the Management Plan.



#### 4.3 Hunter Water Pipeline

No action required during this period.

#### 4.4 Blackhill Road & Meredith Road

Pre-mining subsidence survey has been conducted plus weekly surveys.

24 hour visual inspections have been conducted, as detailed in the Management Plan while in the active area.

---

## 5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

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Mining operations have continued with minor impacts on the general surface in the form of cracking in the general surface area.

### 5.1 Impacts on General Surface and Roads / Tracks

Surface cracking has occurred within predictions at the surface above Panels 28 & 30 in the vegetated areas, grazing areas, sealed access road and access tracks.

Remedial works have been carried out in relation to cracking over these areas in consultation with Landowners.

### 5.3 Impacts on Ausgrid Power Poles

#### Subsidence Impacts

Nil during this period

#### Notification

Not required during this period

#### Management Actions

None required during this period

### 5.4 Impacts on the Hunter Water Pipeline

#### Subsidence Impacts

Nil during this period

#### Notification

Not required during this period

#### Management Actions

Not required during this period

## 5.5 Impacts on Blackhill & Meredith Road

### Subsidence Impacts

Minor cracking and humping to road surface <100mm

### Notification

Notification was provided on the 1<sup>st</sup> October 2015 relating to humping on the 30<sup>th</sup> September 2015 to Blackhill Road.

### Management Actions

Minor cracking and humping on road surface was remediated as outline in the Blackhill Road Management Plan.

## 5.6 Notification under SMP Approval Conditions

There have been no observed and/or reported subsidence impacts, incidents, service difficulties, community complaints, or any other relevant information, that would require notification under the approval conditions.

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## 6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

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### 6.1 Summary of Additional Consultation

Additional consultation was conducted with Residents in relating to Management Plan development, and monitoring within this period.

### 6.2 Approval Condition Compliance Status

Listed below in **Table 1, 2, 3 & 4** is the current status of compliance with the SMP Approval Conditions for Abel Area 1, 2, 3 & 4

**Table 1 SMP Approval Conditions Abel Area 1– Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 1 submitted to Principal Subsidence Engineer, approved 29 June 2010. Panel 2 submitted to Principal Subsidence Engineer,

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Condition No.	Brief Description	Date Required	Current Status
			approved 31 August 2010. Panels 3 and 4 submitted to Principal Subsidence Engineer, approved 16 December 2010. Panel 5 submitted to Principal Subsidence Engineer, approved 30 May 2011. Panel 6 submitted to Principal Subsidence Engineer, approved 13 September 2011. Panel 7 submitted 29 September 2011 to Principal Subsidence Engineer, approved 9 November 2011. Panel 8 submitted 15 March 2012 to Principal Subsidence Engineer, approved 27 March 2012. East Mains approved by the Principal Subsidence Engineer 16 July 2012
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 6 July 2010
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Optus fibre optic cable d) Any other infrastructure, if required by the Director Mine Safety Operations. Plans must be developed in consultation with the owners of the infrastructure and any Government Agency with a regulatory role for the infrastructure.	Prior to any subsidence impacts	Panel 3 Energy Australia Power line Management Plan was approved 7 February 2011. Ausgrid Panels 5 – 8 management plan was approved on the 7 July 2011. Ausgrid Power line Management Plan East Mains was approved 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 1 – 22 March 2012 Hunter Water Corporation not required for Panels 3,4,5,6,7 & 8 Optus Fibre Optic Cable was relocated outside the SMP Area.
15	Management review meetings must be convened with the relevant infrastructure owner/operators, the Mine Subsidence Board and the Principal Subsidence Engineer under any of the following	Prior to the commencement of Panel 4 extraction	Noted. Variation requested and approved (See previous Status Report for details)

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Condition No.	Brief Description	Date Required	Current Status
	<p>circumstances</p> <p>i) Prior to the commencement of Panel 4 extraction, and/or</p> <p>ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer</p>		<p>Meeting held on the 15 September 2011.</p> <p>Noted.</p>
16	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 1 Submitted to Director Mine Safety Operations, approved 4 June 2010.
17	Incident and Ongoing Management reporting	Ongoing	Noted. Notification provided re – cracking Panel 1, 6 August 2010. Notification provided re – cracking Panel 4, 6 May 2011

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Condition No.	Brief Description	Date Required	Current Status
18	<p>Subsidence Management Status Report to be updated every 14 days and provided every 4 months to:</p> <p>Principal Subsidence Engineer, DECC-NSW Office of Water and each operator of infrastructure referred to in Condition 14.</p> <p>Must be provided, as updated from time to time, on request to: Mine Subsidence Board, Director of Environmental Sustainability, Principal Subsidence Engineer, owners/operators of any infrastructure within the application area and any other relevant stakeholders</p>	<p>Update every 14 days. Submitted 27 September 2010 and then every 4 months from Panel 1 approval.</p>	<p>Noted – first report Panel 1 completed 5 October 2010 to provide update to end September 2010. Second report provided for period 30 September 2010 to 31 January 2011. Third report covered 31 January 2011 to 31 May 2011. Fourth report covered 31 May 2011 to 30 September 2011. Fifth report covered 30 September 2011 to 31 January 2012. Sixth report covered 31 January 2012 to 31 May 2012. Seventh report covered 31 May 2012 to 30 September 2012. Report covered 30 September to 31 January 2013. Report covered 31 January 2013 to 31 May 2013. Report covered 31 May 2013 to 30 September 2013. Report covered 30 September 2013 to 31 January 2014. Report covered 31 January 2014 to 31 May 2014. Report covered 31 May 2014 to 30 September 2014. Report covered 30 September 2014 to 31 January 2015. Report covered 31 January 2015 to 31 March 2015. Report covered 31 May 2015 to September 2015.</p>
19	End of Year report	<p>By 31 March 2011</p> <p>By March 2012</p> <p>By March 2013</p> <p>By March 2014</p>	<p>Lodged.</p> <p>Lodged.</p> <p>Lodged.</p> <p>Lodged.</p>
20	<p>Access to information – within 3 months of End of Year Report or approval of any plan, programme or strategy</p> <p>(a) Provide a copy to relevant agencies</p> <p>(b) Ensure copy available at regional office; and</p> <p>(c) Put a copy on website</p>	Various	Noted and provided. Relevant agencies are MSB, DECCW, DECCW_NOW and DoP
21	Survey marks – functionality to be restored	On completion of subsidence	Noted
22	In the event of interruption to potable water supplies, water supplies of equivalent quality and quantity to be provided until such time as affected water supplies are restored		Noted

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**Table 2 SMP Approval Conditions Abel Area 2 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for	Prior to pillar	Panel 15 submitted to the Principal Subsidence

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Condition No.	Brief Description	Date Required	Current Status
	approval to the Principal Subsidence Engineer	extraction	Engineer, approved 15 February 2012. Tailgate Headings submitted to the Principal Subsidence Engineer, approved 4 <sup>th</sup> June 2012 Panel 20 submitted to the Principal Subsidence Engineer, approved 9 November 2012 Panel 21 submitted to the Principal Subsidence Engineer, approved 5 November 2012 Panel 22 submitted to the Principal Subsidence Engineer, approved 11 April 2013 Panel 19 & 19A submitted to the Principal Subsidence Engineer, approved 4 February 2013
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 15 February 2012
14.1	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for a) Hunter Water Corporation water pipelines; b) Electricity transmission lines c) Telecommunication cables; d) Public roads; e) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan & a Hunter Water Corporation Management Plan was prepared for Tailgate headings and was approved on the 21 June 2012  An Ausgrid Powerline Management Plan was approved for Panels 20 – 22 on 2 November 2012  TransGrid Power line Management Plan was approved for SMP Area 2 – 16 January 2013  Blackhill and Taylors road Management Plan was approved for SMP Area 2 - 16 January 2013
14.2	Management review meetings must be convened with the relevant infrastructure owner/operator, the Mine Subsidence Board and the Principle Subsidence Engineer under any of the following circumstances:	Not specified	Noted.

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Condition No.	Brief Description	Date Required	Current Status
	i) Allowing sufficient time to implement any required management measures or strategies that may result from the said review, and/or ii) When a review is requested by the said infrastructure owners/operators or the Mine Subsidence Board or the Principal Subsidence Engineer.		
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	SMP Area 2 Submitted to the Director Mine Safety Operations, approved 15 January 2012  A variation was approved 16 January 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

**Table 3 SMP Approval Conditions Abel Area 3 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until Director General notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Director General may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Director General may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Director-General	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Director-General, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 23 submitted to the Principal Subsidence Engineer, approved 19 July 2013

Condition No.	Brief Description	Date Required	Current Status
			Panel 24 submitted to the Principal Subsidence Engineer, approved 12 September 2013 Panel 25 submitted to the Principle Subsidence Engineer, approved 9 April 2014  Panel 26 was submitted to the Principal Subsidence Engineer, approved 5 <sup>th</sup> September 2014
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 July 2013
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for:  A) Electricity transmission lines B) Telecommunication cables; C) Public roads; D) Any property or infrastructure if required by the Director of Mine Safety Operations.	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 17 July 2013  A Telstra Copper Cable Management Plan was approved for Panels 23 – 24 on 17 July 2013. A revised management plan to include the Telstra Optical Fibre Cable for Panel 23 – 24 was approved 6 December 2013  Blackhill rd Management Plan was approved on 11 September 2013
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Panels 23 – 25 was approved on the 11 September 2013
16	Incident and Ongoing Management reporting	Ongoing	Noted.

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**Table 4 SMP Approval Conditions Abel Area 4 – Compliance Status**

Condition No.	Brief Description	Date Required	Current Status
1	Carry out activity strictly in accordance with the SMP Approved Plan	Not specified	Noted and complied with
2	Carry out activity generally in accordance with the SMP; subject to the conditions of the Approval.	Not specified	Noted and complied with
3	Obligation for actions, including remediation of subsidence impacts, to continue until the Secretary notification that action has been completed to his or her satisfaction	Not relevant at this time	Noted
4	Secretary may vary conditions of Approval by notice in writing	At any time by Director General	Noted
5	Secretary may suspend or revoke approval	Not specified	Noted
6	Leaseholder must implement the SMP and carry out any additional practicable measures to prevent and/or minimise any harm to the environment	Ongoing	Noted
7	Notice of Approval to be provided within 30 days to DoP, DECC-NOW, DECCW, Council, MSB, local Aboriginal Land Council, owners / operators of infrastructure and landowners		Complete
8	Plans, programs, reports or strategies must be developed having regard to any guidelines adopted by the Secretary	Not specified	Noted and adopted
9	Leaseholder must implement any plan, program or strategy required and approved pursuant to this Approval	Not specified	Noted and adopted
10	Any modifications to plans, programs, reports or strategies already approved must have regard to the matters set out in Condition 7	Not specified	Noted
11	Leaseholder must comply with any written direction given by the Secretary, Director Environmental Sustainability, Director Mine Safety Operations or Principal Subsidence Engineer.	Not specified	Noted
12	Subsidence Monitoring Program for the panels must be submitted for approval to the Principal Subsidence Engineer	Prior to pillar extraction	Panel 27 submitted to the Principal Subsidence Engineer, approved 22 September 2013  Panel 28 submitted to the Principal Subsidence

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Condition No.	Brief Description	Date Required	Current Status
			Engineer, approved 30 March 2015
13	Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval.	Prior to pillar extraction	Submitted to Director Environmental Sustainability, approved 19 <sup>th</sup> September 2014
14	Prepare and submit for approval to the Director Mine Safety Operations Management Plans for: <ul style="list-style-type: none"> <li>i) Electricity transmission lines</li> <li>ii) Telecommunication cables;</li> <li>iii) Public roads;</li> <li>iv) Farm Dams;</li> <li>v) Any property or infrastructure if required by the Director of Mine Safety Operations.</li> </ul>	Prior to any subsidence impacts	An Ausgrid Powerline Management Plan was approved on 1 <sup>st</sup> October 2014  A Telstra Copper Cable Management Plan was approved for Panels 27, 28 & 29 on 1 <sup>st</sup> October 2014.  A Public Roads Management plan was approved for Area 4 on the 23 <sup>rd</sup> December 2014
15	Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations	Prior to pillar extraction	Interim Approval was given on the 19 <sup>th</sup> September 2014. Full Approval was given on the 23 <sup>rd</sup> December 2014
16	Incident and Ongoing Management reporting	Ongoing	Noted.



## 7 SUMMARY OF SUBSIDENCE DEVELOPMENT

### 7.1 Subsidence Monitoring Program

All required subsidence monitoring lines have been installed and all pre-mining subsidence surveys completed in accordance with the agreed Subsidence Monitoring Program.

Additional surveys and inspections have also been conducted. Subsidence results to date are:

<b>PANEL 20 (W= 128 m; T = 2.7 m)</b>			
>75m Cover	Predicted	Final Measured	Comment
Subsidence	150 mm	62 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	2 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.5 mm/m	Measured tilts < predictions
Other			

<b>PANEL 21 (W= 212 m; T = 2.7 m)</b>			
125m Cover	Predicted	Final Measured	Comment
Subsidence	150 mm	96 mm	Measured subsidence < predictions
Tensile Strain	2 mm/m	1 mm/m	Measured tensile strains < predictions
Compressive Strain	2 mm/m	1 mm/m	Measured compressive strains < predictions
Tilt	3 mm/m	2.1 mm/m	Measured tilts < predictions
Other			

<b>EAST INSTALL HEADINGS (W= 105m; T = 2.7 m)</b>			
100m Cover	Predicted	Final Measured	Comment
Subsidence	0.9m	1.286m	Measured subsidence > predictions
Tensile Strain	13 – 19 mm/m	12 mm/m	Measured tensile strains < predictions
Compressive Strain	16 - 24 mm/m	9 mm/m	Measured compressive strains < predictions
Tilt	24 - 35 mm/m	44 mm/m	Measured tilts > predictions
Other			

<b>EAST MAINS HEADINGS (W= 125m; T = 2.7 m)</b>			
<b>100m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.59m	1.408m	Measured subsidence < predictions
<b>Tensile Strain</b>	10 - 16 mm/m	11 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	13 - 20 mm/m	15 mm/m	Measured compressive strains < predictions
<b>Tilt</b>	49 mm/m	48.6 mm/m	Measured tilts < predictions
<b>Other</b>			

<b>PANEL 22 (W= 180.3 m; T = 2.8 m)</b>			
<b>125m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	150 mm	44 mm	Measured subsidence < predictions
<b>Tensile Strain</b>	2 mm/m	1 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	2 mm/m	1 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 23 (W= 215 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.046m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	13 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	13 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 24 (W= 220 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.089m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	9 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	7 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 25 (W= 220 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	1.087m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	21 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	9 mm/m	Measured compressive strains < predictions
<b>Other</b>			

<b>PANEL 26 (W= 220 m; T = 2.5 m)</b>			
<b>&lt;130m Cover</b>	<b>Predicted</b>	<b>Final Measured</b>	<b>Comment</b>
<b>Subsidence</b>	1.30m	0.803m	Measured subsidence < predictions
<b>Tensile Strain</b>	30 mm/m	9 mm/m	Measured tensile strains < predictions
<b>Compressive Strain</b>	30 mm/m	9 mm/m	Measured compressive strains < predictions
<b>Other</b>			

**Table 2 - Subsidence Monitoring Survey Dates**

<b>Survey / Monitoring Line</b>	<b>Survey / Monitoring Description</b>	<b>Pre – Mining Survey</b>	<b>Survey / Inspection / Monitoring Dates</b>	<b>Post – Mining</b>
<b>Panel 20</b>	<i>Subsidence survey</i>	<i>29/08/2012</i>		<i>10/01/2013</i> <i>8/01/2014</i> <i>9/07/2014</i>
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	<i>29/08/2012</i>		
<b>Panel 21</b>	<i>Subsidence survey</i>	<i>7/11/2012</i>		<i>16/05/2013</i> <i>24/01/2014</i> <i>1/09/2014</i>
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic monitoring</i>	<i>7/11/2012</i>		
<b>Panel 22</b>	<i>Subsidence survey</i>	<i>11/04/2013</i>		<i>30/07/2013</i> <i>28/01/2014</i>
	<i>Visual inspection</i>		Weekly Surveys	
	<i>Photographic</i>	<i>11/04/2013</i>		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
	<i>monitoring</i>			
<b>Panel 23</b>	<i>Subsidence survey</i>	<i>12/07/2013</i>		<i>8/04/2014</i> <i>3/03/2015</i> <i>28/10/2015</i>
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	<i>12/07/2013</i>		
<b>Panel 24</b>	<i>Subsidence survey</i>	<i>19/02/2013</i>		<i>1/10/2014</i> <i>3/03/2015</i> <i>22/10/2015</i>
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	<i>19/02/2013</i>		
<b>Panel 25</b>	<i>Subsidence survey</i>	<i>13/03/2014</i>		<i>3/12/2015</i> <i>22/09/2015</i>
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	<i>13/03/2014</i>		
<b>Panel 26</b>	<i>Subsidence survey</i>	<i>9/05/2014</i>		
	<i>Visual inspection</i>		Daily	
	<i>Photographic monitoring</i>	<i>9/05/2014</i>		
<b>Panel 27</b>	<i>Subsidence survey</i>	<i>16/10/2014</i>		
	<i>Visual inspection</i>		3 times a week	
	<i>Photographic monitoring</i>	<i>22/09/2014</i>		
<b>Panel 28</b>	<i>Subsidence survey</i>	<i>6/05/2014</i>		
	<i>Visual inspection</i>		3 times a week	
	<i>Photographic monitoring</i>	<i>6/05/2014</i>		
	<i>Subsidence survey</i>	<i>30/11/2015</i>		

Survey / Monitoring Line	Survey / Monitoring Description	Pre – Mining Survey	Survey / Inspection / Monitoring Dates	Post – Mining
<b>Panel 30</b>	Visual inspection		3 times a week	
	Photographic monitoring	30/11/2015		
<b>East Install Headings</b>	Subsidence survey	14/11/2012		23/01/2013 8/01/2014
	Visual inspection		Weekly Surveys	
	Photographic monitoring	14/11/2012		
<b>East Mains Headings</b>	Subsidence survey	9/07/2012		14/01/2013 30/05/2013
	Visual inspection		Weekly Surveys	
	Photographic monitoring	9/07/2012		
<b>Blackhill Road</b>	Subsidence survey	Same date as Panel	As detailed in Management Plan	Same date as Panel surveys
	Visual inspection		Daily Surveys	
	Photographic monitoring	Same date as Panel		
<b>Ausgrid Power Poles</b>	Subsidence survey	Same date as Panel surveys	Weekly Surveys	Same date as Panel surveys
	Visual inspection		Weekly Surveys	
	Photographic monitoring	Same date as Panel surveys		

## 8 ADEQUACY, QUALITY AND EFFECTIVENESS

The adequacy, quality, effectiveness of the implemented management processes based on monitoring, consultation and remediation is considered to be satisfactory to date.

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## **9 PROPOSED MANAGEMENT ACTIONS**

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To date, no additional management actions are required beyond the procedures already implemented, relating to additional visual inspections and subsidence surveys, nor is there any need for early responses or emergency procedures to be undertaken as there have been no subsidence impacts due to the extraction of the subject Panels which have not been managed under the current TARPS and Management Plans.

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## **10 CONCLUSIONS**

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Some additional visual inspections and subsidence surveys have been introduced due to impacts. However there is no requirement to undergo additional consultation as impacts from subsidence to date have been generally within predictions and consultation with infrastructure owners and the landholder are ongoing.

Minor impacts have been remediated by Abel, in the case of general surface or the relevant infrastructure owners following consultation.

All required Management Plans and Programs have been developed and submitted. Additional and revised Management Plans are being developed for future Panels.