

Appendix 7

Abel Mine Subsidence Management Status Reports – Four Monthly Update – September 2014 and January 2015

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Abel Mine
Subsidence Management Status Report
Four Monthly Update

30 September 2014

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Technical Services Manager - Underground Operations
Donaldson Coal

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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 and subsequent variations.

A summary of monitoring results for the period from 31 May 2014 to 30 September 2014 is presented in this report. Pillar extraction took place in Panels 24, 24A, 25, 26, 27, East Mains and East Install Headings. 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 & EP/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 24, 24A, 25, 26, 27 EAST MAINS & EAST INSTALL HEADINGS

The face positions of Panels 24, 24A, 25, 26, 27, East Mains and East Install Headings at fortnightly intervals are presented in **Attachment 1**.

| Panel Name | Extraction Commenced | Extraction Completed |
|-----------------------|---------------------------------|---------------------------------|
| Panel 24A | 11 th March 2014 | 10 th July 2014 |
| Panel 24 | 16 th September 2013 | 10 th July 2014 |
| Panel 25 | 11 th May 2014 | Not yet complete |
| Panel 26 | 11 th August 2014 | Not yet complete |
| Panel 27 | 30 th September 2014 | Not yet complete |
| East Mains | 9 th September 2013 | 5 th July 2014 |
| East Install Headings | 8 th July 2014 | 17 th September 2014 |

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 24 / 24A | 12 th September 2013 / 26 th February 2014 |
| Panel 25 | 9 th April 2014 |
| Panel 26 | 5 th September 2014 |
| Panel 27 | 22 nd September 2014 |
| East Mains | 2 nd August 2013 |
| East Install Headings | 5 th September 2014 |

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

A pre-mining subsidence survey has been conducted along with daily visual inspections while in the active area as detailed in the Management Plan.

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.

5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

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 23, 24, 24A & East Mains 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 to road surface <100mm

Notification

Not required during this period

Management Actions

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

5.6 Notification under SMP Approval Conditions

Notification relating to cracking was provided to the Principal Subsidence Engineer on the 18th July 2014.

Abnormal surface cracking triggered by the Trigger Action Response Plan (TARP) in the Public Safety Management plan was observed on the 18th July 2014 over the southern end of Panel 25. The largest crack developed near the top of a spur and directly above the panel edge, having widths of around 200mm to 300mm.

The area has since been remediated requiring no additional action.

A full report on the cracking can be found in **Attachment 4**.

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

6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

6.1 Summary of Additional Consultation

Additional consultation was conducted with Telstra and Ausgrid 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, |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|---|--|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | 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 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) |

| 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. |
| 16 | Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations | Prior to pillar extraction | Noted. 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 |

| 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: 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.</p> |
| 19 | End of Year report | <p>By 31 March 2011 By March 2012 By March 2013 By March 2014</p> | <p>Lodged. Lodged. Lodged. 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 (b) Ensure copy available at regional office; and (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 |

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. Tailgate Headings submitted to the Principal |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|---------------------------------|---|
| 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 | <p>Prepare and submit for approval to the Director Mine Safety Operations Management Plans for</p> <ul style="list-style-type: none"> 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 | <p>An Ausgrid Powerline Management Plan & a Hunter Water Corporation Management Plan was prepared for Tailgate headings and was approved on the 21 June 2012</p> <p>An Ausgrid Powerline Management Plan was approved for Panels 20 – 22 on 2 November 2012</p> <p>TransGrid Power line Management Plan was approved for SMP Area 2 – 16 January 2013</p> <p>Blackhill and Taylors road Management Plan was approved for SMP Area 2 - 16 January 2013</p> |
| 14.2 | <p>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:</p> <ul style="list-style-type: none"> i) Allowing sufficient time to implement any required management measures or strategies that may result from | Not specified | Noted. |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|----------------------------|---|
| | 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 |
| 16 | Incident and Ongoing Management reporting | Ongoing | A variation was approved 16 January 2013 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 Engineer, approved 12 September 2013 |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|---|---------------------------------|---|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | Panel 25 submitted to the Principle Subsidence Engineer, approved 9 April 2014 |
| 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 | Panel 26 was submitted to the Principal Subsidence Engineer, approved 5 th September 2014 Submitted to Director Environmental Sustainability, approved 19 July 2013 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. |

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 |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|---------------------------------|--|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | Submitted to Director Environmental Sustainability, approved 19 th 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 st October 2014 A Telstra Copper Cable Management Plan was approved for Panels 27, 28 & 29 on 1 st October 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 th September 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:

| PANEL 1 (W = 120 m; T = 2.35 - 3.0m) | | | |
|---|--------------|--|---|
| >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. |

| PANEL 2 (W= 150m ; T = 2.5 m) | | | |
|--------------------------------------|--------------|---------------------|--|
| < 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 | | | |

| PANEL 3 (W=160.5 m; T = 2.5 m) | | | |
|---------------------------------------|---------------|----------------------|--|
| < 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 | | | |

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

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

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

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

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

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

| PANEL 20 (W= 128 m; T = 2.7 m) | | | |
|---------------------------------------|------------------|-----------------------|--|
| >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 | | | |

| PANEL 21 (W= 212 m; T = 2.7 m) | | | |
|---------------------------------------|------------------|-----------------------|--|
| 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 | | | |

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

| EAST INSTALL HEADINGS (W= 105m; T = 2.7 m) | | | |
|---|------------------|-----------------------|--|
| 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 | | | |

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

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

| PANEL 22 (W= 180.3 m; T = 2.8 m) | | | |
|---|------------------|-----------------------|--|
| 125m Cover | Predicted | Final Measured | Comment |
| Subsidence | 150 mm | 44 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 |
| Other | | | |

| PANEL 23 (W= 215 m; T = 2.8 m) | | | |
|---------------------------------------|------------------|-----------------------|--|
| <130m Cover | Predicted | Final Measured | Comment |
| Subsidence | 1.30m | 0.983m | Measured subsidence < predictions |
| Tensile Strain | 30 mm/m | 13 mm/m | Measured tensile strains < predictions |
| Compressive Strain | 30 mm/m | 13 mm/m | Measured compressive strains < predictions |
| Other | | | |

Table 2 - Subsidence Monitoring Survey Dates

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|--------------------------|---------------------------------|---|--|---|
| Panel 1 | <i>Subsidence survey</i> | Installation and pre-mining survey 7/07/2010 | Weekly Surveys | 11/02/2011 24/06/2011 1/08/2012 |
| | <i>Subsidence Survey</i> | | | 22/12/2010 21/06/2011 20/06/2012 9/10/2013 |
| | <i>Subsidence survey</i> | 23/12/2010 | Weekly Surveys | 10/06/2011 25/10/2011 9/05/2012 |
| Panel 3 | <i>Visual inspection</i> | | Weekly Surveys | |
| | <i>Photographic monitoring</i> | 23/12/2010 | | |
| | <i>Subsidence survey</i> | 4/03/2011 | Weekly Surveys | 24/08/2011 9/05/2011 3/09/2013 |
| Panel 4 | <i>Visual inspection</i> | | Weekly Surveys | |
| | <i>Photographic monitoring</i> | 4/03/2011 | | |
| | <i>Subsidence survey</i> | 27/05/2011 | | 4/11/2011 2/05/2012 18/02/2013 14/09/2013 |
| Panel 5 | <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 |
|--------------------------|---------------------------------|---------------------|--|--|
| Panel 6 | | | | 4/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 14/09/2011 | | |
| Panel 7 | Subsidence survey | 8/02/2012 | | 2/08/2012 28/05/2013 13/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 8/02/2012 | | |
| Panel 8 | Subsidence survey | 13/02/2012 | | 31/10/2012 17/05/2013 6/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 13/02/2012 | | |
| Panel 15 | Subsidence survey | 9/02/2012 | | 27/04/2012 14/01/2013 17/05/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 9/02/2012 | | |
| Panel 20 | Subsidence survey | 29/08/2012 | | 10/01/2013 8/01/2014 9/07/2014 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 29/08/2012 | | |
| Panel 19 | 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 |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 12/07/2013 | | |
| Panel 24 | Subsidence survey | 19/02/2013 | | |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 19/02/2013 | | |
| Panel 25 | Subsidence survey | 13/03/2014 | | |
| | Visual inspection | | Daily | |

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|------------------------------|---------------------------------|---------------------|--|--|
| | Photographic monitoring | 13/03/2014 | | |
| Panel 26 | Subsidence survey | 9/05/2014 | | |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 9/05/2014 | | |
| Panel 27 | Subsidence survey | 16/10/2014 | | |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 22/09/2014 | | |
| East Install Headings | Subsidence survey | 14/11/2012 | | 23/01/2013 8/01/2014 |
| | | | | |
| | | | | |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 14/11/2012 | | |
| Tailgate Headings | Subsidence survey | 18/05/2012 | | 19/12/2012 13/06/2013 14/01/2014 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 18/05/2012 | | |
| East Mains Headings | Subsidence survey | 9/07/2012 | | 14/01/2013 30/05/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 9/07/2012 | | |
| Blackhill Road | Subsidence survey | 19/02/2013 | As detailed in Management Plan | Same date as Panel surveys |

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|--|---------------------------------|--|--|--|
| | Visual inspection | | Daily Surveys | |
| | Photographic monitoring | 19/02/2013 | | |
| Hunter Water Corporation pipeline | 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 | | | |
| Ausgrid Power Poles | 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 | | |
| TransGrid Transmission Towers | 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.

10 CONCLUSIONS

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**

31 January 2015

**Approved by Tony Sutherland
Technical Services Manager - Underground Operations
Donaldson Coal**

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ATTACHMENTS

Attachment 1 – Panels 25, 26 & 27 - Face Positions

Attachment 2 – Panels 24 - Survey Results

Attachment 3 – Blackhill Road Survey Results

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 30 September 2014 to 31 January 2015 is presented in this report. Pillar extraction took place in Panels 25, 26 & 27. 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

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

| Panel Name | Extraction Commenced | Extraction Completed |
|------------|---------------------------------|----------------------|
| Panel 25 | 11 th May 2014 | Not yet complete |
| Panel 26 | 11 th August 2014 | Not yet complete |
| Panel 27 | 30 th September 2014 | 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 th April 2014 |
| Panel 26 | 5 th September 2014 |
| Panel 27 | 22 nd September 2014 |

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.

5 SUMMARY OF SUBSIDENCE IMPACTS AND MANAGEMENT ACTIONS

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 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 to road surface <100mm

Notification

Notification in relation to a 1500mm culvert in relation to cracking and pipe separation was provided to the Principal Subsidence Engineer, Cessnock City Council and the Mine Subsidence Board.

Management Actions

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

5.6 Notification under SMP Approval Conditions

Notification in relation to a 1500mm culvert beneath Blackhill Road from Panel 26 was provided to the Principal Subsidence Engineer on the 19th January 2015.

In accordance with the approved Trigger Action Response Plan of the Blackhill Road Management Plan (Abel Mine Subsidence Management Plan Approval Area 3) advised that cracking and pipe separation of up to 30mm has been observed in the 1500mm diameter culvert beneath Blackhill Road.

Remediation will occur in consultation with Cessnock City Council and the Mine Subsidence Board once subsidence in the area is complete.

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

6 SUMMARY OF COMMENTS, ADVICE AND FEEDBACK FROM CONSULTATION

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, |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|---|--|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | 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 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) |

| 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> |
| 16 | Public Safety Management Plan must be prepared and implemented to the satisfaction of the Director, Mine Safety Operations | Prior to pillar extraction | <p>Noted.</p> <p>SMP Area 1 Submitted to Director Mine Safety Operations, approved 4 June 2010.</p> |
| 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 |

| 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. |
| 19 | End of Year report | By 31 March 2011 By March 2012 By March 2013 By March 2014 Various | Lodged. Lodged. Lodged. Lodged. Noted and provided. Relevant agencies are MSB, DECCW, DECCW_NOW and DoP |
| 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 | | |
| 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 |

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. Tailgate Headings submitted to the Principal |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|---------------------------------|--|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | Subsidence Engineer, approved 4 th 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 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 management measures or strategies that may result from | Not specified | Noted. |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|--|----------------------------|---|
| | 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 |
| 16 | Incident and Ongoing Management reporting | Ongoing | A variation was approved 16 January 2013 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 Engineer, approved 12 September 2013 |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|---|---------------------------------|--|
| | | | Panel 25 submitted to the Principle Subsidence Engineer, approved 9 April 2014 Panel 26 was submitted to the Principal Subsidence Engineer, approved 5 th 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. |

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 |

| Condition No. | Brief Description | Date Required | Current Status |
|---------------|---|---------------------------------|--|
| 13 | Environmental Monitoring Program to be submitted to Director Environmental Sustainability for approval. | Prior to pillar extraction | Submitted to Director Environmental Sustainability, approved 19 th September 2014 |
| 14 | Prepare and submit for approval to the Director Mine Safety Operations Management Plans for: <ul style="list-style-type: none"> 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 st October 2014 A Telstra Copper Cable Management Plan was approved for Panels 27, 28 & 29 on 1 st October 2014. A Public Roads Management plan was approved for Area 4 on the 23 rd 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 th September 2014. Full Approval was given on the 23 rd 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:

| PANEL 1 (W = 120 m; T = 2.35 - 3.0m) | | | |
|---|--------------|--|---|
| >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. |

| PANEL 2 (W= 150m ; T = 2.5 m) | | | |
|--------------------------------------|--------------|---------------------|--|
| < 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 | | | |

| PANEL 3 (W=160.5 m; T = 2.5 m) | | | |
|---------------------------------------|---------------|----------------------|--|
| < 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 | | | |

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

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

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

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

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

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

| PANEL 20 (W= 128 m; T = 2.7 m) | | | |
|---------------------------------------|------------------|-----------------------|--|
| >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 | | | |

| PANEL 21 (W= 212 m; T = 2.7 m) | | | |
|---------------------------------------|------------------|-----------------------|--|
| 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 | | | |

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

| EAST INSTALL HEADINGS (W= 105m; T = 2.7 m) | | | |
|---|------------------|-----------------------|--|
| 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 | | | |

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

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

| PANEL 22 (W= 180.3 m; T = 2.8 m) | | | |
|---|-----------|----------------|--|
| 125m Cover | Predicted | Final Measured | Comment |
| Subsidence | 150 mm | 44 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 |
| Other | | | |

| PANEL 23 (W= 215 m; T = 2.5 m) | | | |
|---------------------------------------|-----------|----------------|--|
| <130m Cover | Predicted | Final Measured | Comment |
| Subsidence | 1.30m | 0.983m | Measured subsidence < predictions |
| Tensile Strain | 30 mm/m | 13 mm/m | Measured tensile strains < predictions |
| Compressive Strain | 30 mm/m | 13 mm/m | Measured compressive strains < predictions |
| Other | | | |

| PANEL 24 (W= 220 m; T = 2.5 m) | | | |
|---------------------------------------|-----------|----------------|--|
| <130m Cover | Predicted | Final Measured | Comment |
| Subsidence | 1.30m | 1.061m | Measured subsidence < predictions |
| Tensile Strain | 30 mm/m | 7 mm/m | Measured tensile strains < predictions |
| Compressive Strain | 30 mm/m | 9 mm/m | Measured compressive strains < predictions |
| Other | | | |

Table 2 - Subsidence Monitoring Survey Dates

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|--------------------------|---------------------------------|---|--|---|
| Panel 1 | <i>Subsidence survey</i> | Installation and pre-mining survey 7/07/2010 | Weekly Surveys | 11/02/2011 24/06/2011 1/08/2012 |
| | <i>Subsidence Survey</i> | | | 22/12/2010 21/06/2011 20/06/2012 9/10/2013 |
| | <i>Subsidence survey</i> | 23/12/2010 | Weekly Surveys | 10/06/2011 25/10/2011 9/05/2012 |
| Panel 3 | <i>Visual inspection</i> | | Weekly Surveys | |
| | <i>Photographic monitoring</i> | 23/12/2010 | | |
| | <i>Subsidence survey</i> | 4/03/2011 | Weekly Surveys | 24/08/2011 9/05/2011 3/09/2013 |
| Panel 4 | <i>Visual inspection</i> | | Weekly Surveys | |
| | <i>Photographic monitoring</i> | 4/03/2011 | | |
| | <i>Subsidence survey</i> | 27/05/2011 | | 4/11/2011 2/05/2012 18/02/2013 14/09/2013 |
| Panel 5 | <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 |
|--------------------------|---------------------------------|---------------------|--|--|
| Panel 6 | | | | 4/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 14/09/2011 | | |
| Panel 7 | Subsidence survey | 8/02/2012 | | 2/08/2012 28/05/2013 13/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 8/02/2012 | | |
| Panel 8 | Subsidence survey | 13/02/2012 | | 31/10/2012 17/05/2013 6/09/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 13/02/2012 | | |
| Panel 15 | Subsidence survey | 9/02/2012 | | 27/04/2012 14/01/2013 17/05/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 9/02/2012 | | |
| Panel 20 | Subsidence survey | 29/08/2012 | | 10/01/2013 8/01/2014 9/07/2014 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 29/08/2012 | | |
| Panel 19 | 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 |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 12/07/2013 | | |
| Panel 24 | Subsidence survey | 19/02/2013 | | 1/10/2014 |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 19/02/2013 | | |
| Panel 25 | Subsidence survey | 13/03/2014 | | |
| | Visual inspection | | Daily | |

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|------------------------------|---------------------------------|---------------------|--|--|
| | Photographic monitoring | 13/03/2014 | | |
| Panel 26 | Subsidence survey | 9/05/2014 | | |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 9/05/2014 | | |
| Panel 27 | Subsidence survey | 16/10/2014 | | |
| | Visual inspection | | Daily | |
| | Photographic monitoring | 22/09/2014 | | |
| East Install Headings | Subsidence survey | 14/11/2012 | | 23/01/2013 8/01/2014 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 14/11/2012 | | |
| Tailgate Headings | Subsidence survey | 18/05/2012 | | 19/12/2012 13/06/2013 14/01/2014 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 18/05/2012 | | |
| East Mains Headings | Subsidence survey | 9/07/2012 | | 14/01/2013 30/05/2013 |
| | Visual inspection | | Weekly Surveys | |
| | Photographic monitoring | 9/07/2012 | | |
| Blackhill Road | Subsidence survey | 19/02/2013 | As detailed in Management Plan | Same date as Panel surveys |
| | Visual inspection | | Daily Surveys | |
| | Photographic | 19/02/2013 | | |

| Survey / Monitoring Line | Survey / Monitoring Description | Pre – Mining Survey | Survey / Inspection / Monitoring Dates | Post – Mining |
|--|---------------------------------|--|--|--|
| | <i>monitoring</i> | | | |
| Hunter Water Corporation pipeline | <i>Subsidence survey</i> | 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 |
| | <i>Visual inspection</i> | | <i>As detailed in Management Plan</i> | |
| | <i>Photographic monitoring</i> | | | |
| Ausgrid Power Poles | <i>Subsidence survey</i> | Same date as Panel surveys | Weekly Surveys | Same date as Panel surveys |
| | <i>Visual inspection</i> | | Weekly Surveys | |
| | <i>Photographic monitoring</i> | Same date as Panel surveys | | |
| TransGrid Transmission Towers | <i>Subsidence survey</i> | 28/03/2012 | <i>As detailed in Management Plan</i> | Same date as Panel surveys |
| | <i>Visual inspection</i> | | Daily Surveys | |
| | <i>Photographic monitoring</i> | 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.

10 CONCLUSIONS

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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