



DONALDSON COAL PTY LIMITED

ABEL MINE

Subsidence Management Plan

Ausgrid Powerline Management Plan SMP Area 1

East Mains

June 2012

Document Control

Description

Document No.	Abel SMP Area 1
Title	Ausgrid Powerline Management Plan - East Mains
General Description	To ensure the safety and serviceability of the Ausgrid Transmission lines that may be affected by the mining of East Mains in SMP Area 1
Key Support Documents	Abel Mine Area 1 Subsidence Management Plan

Approvals

ORIGINATOR	Matthew Wright	Position Registered Mining Surveyor	Signed	Date
APPROVED	Tony Sutherland	Position Technical Services Manager – Donaldson Underground Operations	Signed	Date
APPROVED	Patrick Boyle	Position Manager- Customer Supply, Planning and Reliability (Lower Hunter) - Ausgrid	Signed	Date

Revisions

Version #	Date	Description	By	Checked	Approved	
					Name	Signed
2	20.08.12	Section 5.6	MW			
3	27.05.2013	Change to pole predictions for EA9	GL			
4	20.06.2013	Changes to inspection frequency	MW			

The nominated Coordinator for this document is	Technical Services Manager
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1 KEY CONTACTS

Organisation	Contact Person	Phone Number
Abel Mine	Charlie Spence – Manager of Mining Engineering	02 4015 1102
Abel Mine	Tony Sutherland – Technical Services Manager	02 4015 1105 0407 239 820
Abel Mine	Matthew Wright – Registered Mining Surveyor	02 4015 1118 0488 206 172
Ausgrid	Patrick Boyle – Manager – Customer Supply, Planning & Reliability (Lower Hunter)	02 4910 1701
Ausgrid	Major Customer Hotline	1800 627 002
Mine Subsidence Board	Paul Gray - Area Supervisor	(02) 4908 4356

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2 INTRODUCTION

The Management Plan has been developed to manage the risks associated with surface subsidence impacts caused by the mining of SMP Area 1 East Mains at Abel mine.

An 11kV overhead Powerline and a 132kV overhead Powerline are affected.

The 11kV Powerline is supported on single timber poles with the conductors supported by relatively inflexible ceramic pin insulators. Termination or angle structure use a string of disc insulators and the poles are generally supported with a ground anchor to balance tension on the pole. The 11kV line services a limited number of residential properties or rural properties in the Black Hill area.

The 132kV Powerline is supported by pairs of timber poles which are connected by a galvanised steel brace between the tops of the poles. The conductors are supported by relatively flexible vertical 'stringers' that will be able to tolerate some adjustment due to pole movements.

The powerlines affected within the area shown on **Figure 1**.

3 REFERENCE TO PLANS AND PROCEDURES

This plan forms part of the Abel SMP Area 1 Management Plan and should not be read in isolation. The following table shows the document hierarchy.

Management Plan	
Abel SMP Area 1 Subsidence Management Plan	
Containing:	
<ul style="list-style-type: none">• Background information• Identified risks• Subsidence Monitoring and Control Plan• Public Safety Management Plan• Individual Property, feature and infrastructure TARP's	
Ausgrid Powerline Management Plan East Mains	

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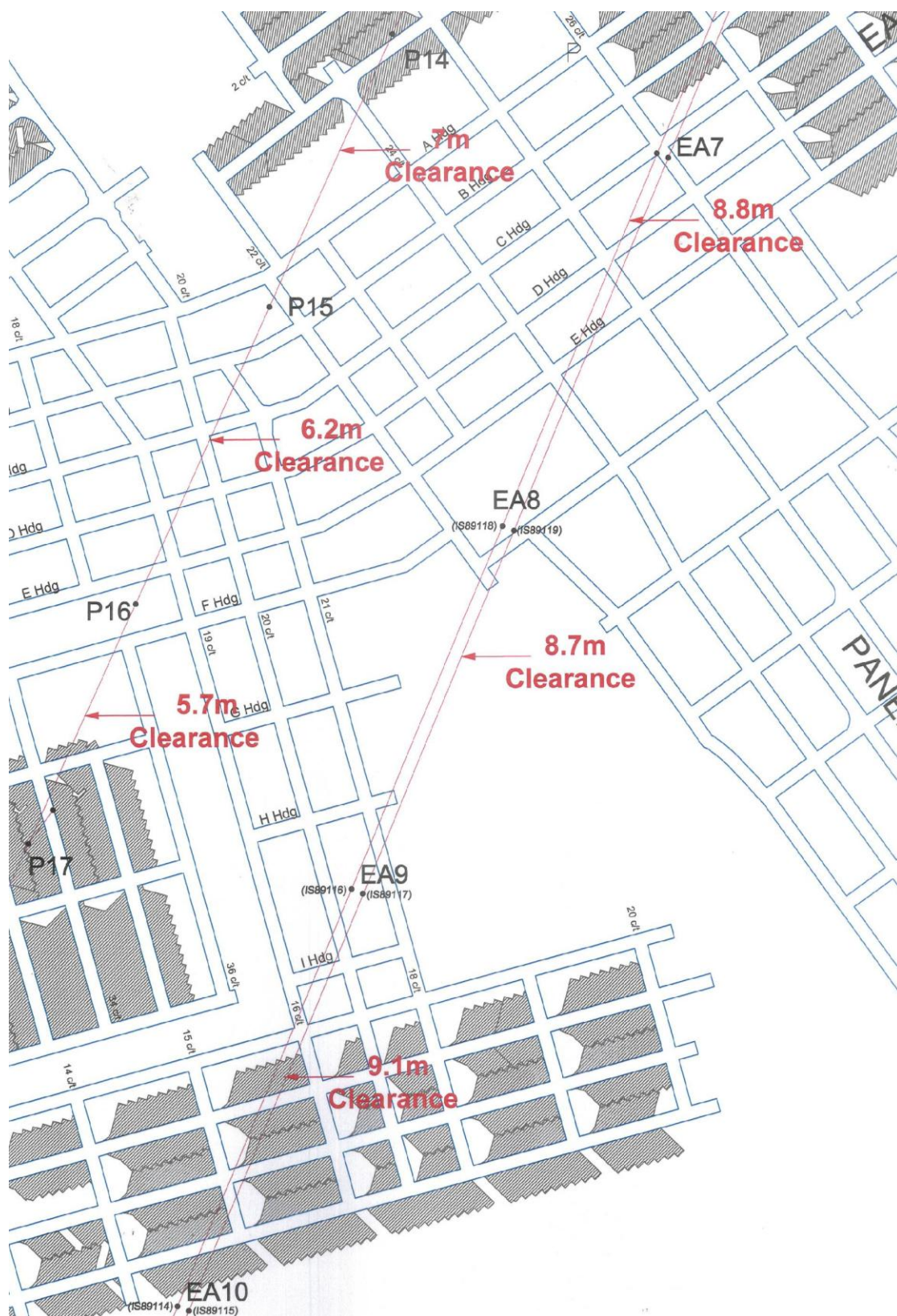


Figure 1 - Plan showing location of 11kV and 132kV powerlines above Abel SMP Area 1 East Mains with conductor clearances

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4 MANAGEMENT CONTROLS

The subsidence from the mining of Abel SMP Area 1 East Mains will impact on the surface including potential impacts on both powerlines.

Based on a review of the measured maximum panel subsidence above East Mains, the 'expected' or mean values for power pole subsidence and conductor clearance losses between the power poles for the first and final subsidence development are provided below in **Tables 1 & 2**.

Table 1 - Mean first and final Subsidence Predictions for Ausgrid 11 kV Power Poles in SMP Area 1 – East Mains

Pole No	Maximum Sub Smax (mm)	Final Tilt Tmax (mm/m)	Final Tilt Direction grid bearing	Final Ground Strain (mm/m)	Final HD Base (mm)	Final HD Top (mm)	Conductor Clearance Loss (m)
P14 <i>IS82061</i>	0.600	21	343	3	156	478	0.49
P15 <i>IS82062</i>	0.6	27	145	4	198	604	0.47
P16 <i>IS82063</i>	0.300	17	343	4	122	374	0.55
P17 <i>IS82064</i>	0.960	23	232	7	1	167	0.91

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**Table 2 - Mean first and final Subsidence Predictions for Ausgrid
132 kV Power Poles in SMP Area 1 – East Mains**

Pole Pair and Nos	Final Sub Smax (m)	Final Tilt Tmax (mm/m)	Final Tilt Direction grid bearing	Final Ground Strain (mm/m)	Conductor Clearance Loss (m)
7.1 EA7 <i>IS89120</i>	1.56	6	256	10.7	0.81
7.2 EA7 <i>IS89121</i>	1.54	8	304	10.2	0.79
8.1 EA8 <i>IS89118</i>	0.05	4	320	1.8	0.02
8.2 EA8 <i>IS89119</i>	0.03	3	320	1.5	0.02
EA9 <i>IS89116 & IS89117</i>	0.80	48	255	20	0.40

Management of the powerlines will be controlled by a programme of inspections as well as reviewing predicted subsidence against actual subsidence.

4.1 Subsidence Monitoring of the 11kV and 132kV power lines

Monitoring of subsidence will be conducted as per the Abel Subsidence Monitoring programmes that are from time to time agreed to by the Principal Subsidence Engineer.

Stable marks will be established adjacent to power poles. Monitoring will be by total station survey to provide x, y and z values to establish movement of poles. Also radiations measured to top of each pole to measure for any possible tilt. (anticipated accuracy +/- 10mm).

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4.2 Subsidence Inspections

Subsidence inspections will be carried out daily by mine staff while in the active area. The inspections will be carried out to assess impact on the properties surface. Observed impacts on the properties surface may indicate an impact on the powerlines. The inspection checklist will be used for this task. (Appendix A)

4.3 Scope of Inspections

Regular inspections will cover a zone defined as being 200 metres behind and 100 metres in front of the current face position. The inspections will cover the full subsidence bowl out to the 26.5° angle of draw.

Inspections will be carried out by trained persons and will follow the inspection checklist. Inspections will identify the following subsidence impacts:

- Surface cracking - edges of extraction void and start and travelling abutments particularly in rock outcrop areas.
- Surface humps (compression) - near centre of extracted panels and travelling abutment
- Step change in land surface - associated with cracking
- Damage to poles, conductors, powerlines
- Reduce ground clearances of conductors
- Tilting of poles, increased/decreased tension in conductors
- Bent crossarms or insulators

4.4 Reporting

- A monthly report detailing the outcome of inspections and subsidence monitoring data will be supplied to Ausgrid whilst mining is in the inspection zone.

Other communications will be as detailed in the Public Safety Management Plan.

4.5 Powerline Safety Issues Identified During Inspections

If any powerline safety issue is identified during inspections the person conducting the inspection shall:

- Immediately notify the Manager of Mining Engineering.
- Erect “NO ROAD” or barrier tape and warning signs if immediate remediation is not possible.
- The Manager of Mining Engineering shall immediately notify the District Inspector of Coal Mines, Landholder and the infrastructure owner.

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4.6 Remediation of Powerline Safety Issues

If any public safety issue is identified during inspections or other public safety issue is identified during assessment of monitoring or inspection results that person shall:

- Immediately contact Ausgrid and advise the identified impact
- Arrange for Ausgrid to effect immediate repairs if necessary
- Liaise with Mine Management and Mine Subsidence Board to arrange long term repairs.

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5 RESPONSIBILITIES

5.1 *Abel Manager of Mining Engineering*

- Promptly notify the District Inspector of Coal Mines of any identified public safety issue.

5.2 *Abel Technical Services Manager*

- Authorise the Plan and any amendments thereto.
- Ensure that the required personnel and equipment are provided to enable this Plan to be implemented effectively.
- Inform the Manager of Mining Engineering of impacts requiring notification to DTIRIS (Mine Safety) or Ausgrid.
- Liase with officers of Ausgrid and remediation consultants and contractors as required.

5.3 *Abel Registered Mining Surveyor*

- Ensure that subsidence inspections are conducted to the required schedule and that the persons conducting the inspection are trained in the requirements of this plan and understand their obligations.
- Review and assess subsidence monitoring results and inspection checklists
- Promptly notify Technical Services Manager of any identified public safety issue.
- Ensure all reporting is carried out.

5.4 *Abel Survey Team Member (conducting Subsidence inspections)*

- Conduct the subsidence inspection within the applicable subsidence zone to the standard required and using the subsidence inspection checklist
- Take actions to remediate any public safety issue identified during inspections.
- Where actions are beyond their capabilities immediately attempt to notify the landowner or infrastructure owner and Technical Services Manager

5.5 *Ausgrid*

- Arrange repairs as necessary
- Any necessary repairs to be arranged through consultation between Ausgrid and Abel Mine.

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5.6 *Payment of Costs in Relation to Repairs*

- Abel Mine will liaise with Mine Subsidence Board in relation to payment for any necessary repairs such that no cost will be borne by Ausgrid.

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6 TRAINING

All personnel who conduct inspections will be trained in the requirements of the Abel SMP Area 1 Subsidence Management Plan and the Ausgrid Powerline Management Plan – East Mains.

Training will be conducted on the identification of the various subsidence impacts detailed in Public Safety Management Plan and will include any safety aspects of those inspections.

7 AUDIT AND REVIEW

7.1 *Audit*

The requirements of the Ausgrid Power line Management Plan Panels East Mains are to be audited following the completion of mining in East Mains Headings.

7.2 *Review*

A review of this plan will be undertaken:

- If the mine design criteria are changed.
- Following each audit.

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APPENDIX A - INSPECTION CHECKLIST

SUBSIDENCE INSPECTION CHECKLIST – POWERLINE		
Date		
Abel Panel Number		
Face Position (Pillar No / Panel row)		
Inspection Zone Start (Panel row -200m)		
Inspection Zone End (Panel row +100m)		
Area Inspected		
INSPECTION ITEM	CHECKED	COMMENTS
Surface cracking		
Surface humps (compression)		
Step change in road pavement		
Damage to poles, crossarms, insulators and conductors. Eg leaning poles, increased sag in conductors, reduced ground clearance		
Other		

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SUBSIDENCE INSPECTION CHECKLIST - POWERLINE

Where to Inspect

200 metres behind and 100 metres in front of the current face position.

Cover the full subsidence bowl out to the 26.5° angle of draw.

What to look for

- Surface cracking - edges of extraction void and start and travelling abutments particularly in rock outcrop areas.
- Surface humps (compression) - near centre of extracted panels and travelling abutment
- Step change in land surface - associated with cracking
- Damage to poles, conductors, powerlines
- Any effect that may cause a safety risk. – If unsure report immediately.
- Low hanging conductors

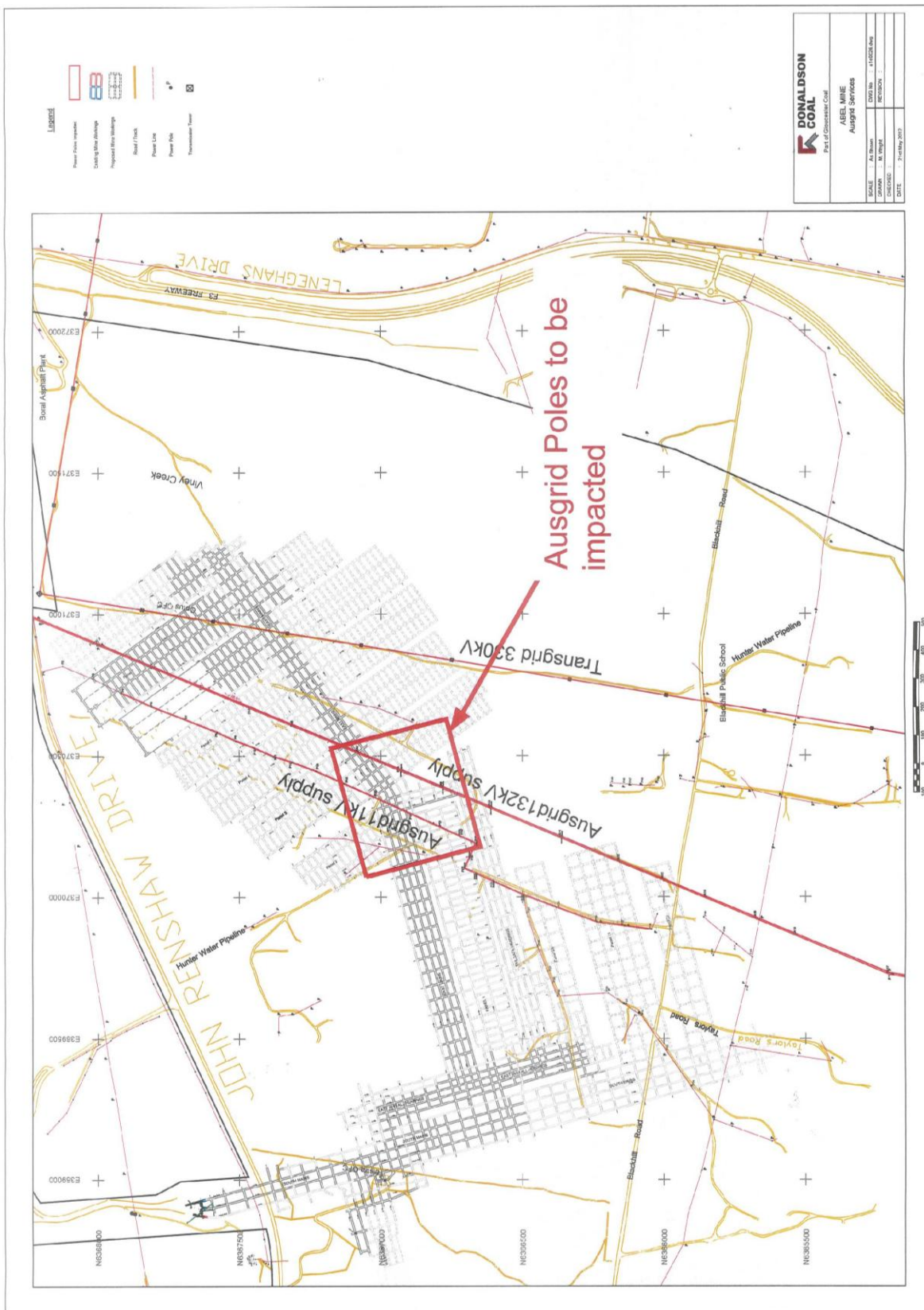
Actions if there is damage to the road

- Immediately notify the:
 - Manager of Mining Engineering
 - Technical Services Manager or Registered Mining Surveyor
 - Energy Australia

If repairs or remediation work is required these will be undertaken by Energy Australia.

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APPENDIX B - LOCATION PLAN



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