



DONALDSON COAL PTY LIMITED

ABEL MINE

Subsidence Management Plan

**Public Safety Management Plan
Area 1**

December 2009

Document Control

Description

Document No.	Abel SMP Area 1
Title	Public Safety Management Plan
General Description	To manage public safety in any surface areas that may be affected by subsidence from mining in Area 1 at Abel Mine
Key Support Documents	Abel Mine Area 1 SMP

Approvals

ORIGINATOR	Kevin Price	Brunskill Pty Limited		
REVIEWED	Tony Sutherland	Position Technical Services Manager – Donaldson Underground Operations	Signed 	Date 9.12.09
APPROVED	Matt Blackham	Position Manager of Mining Engineering – Abel Mine	Signed 	Date 9.12.09
APPROVED	Name Rob Regan	Position Director Mine Safety Operations Industry & Investment NSW Minerals and Energy	Signed	Date

Revisions

Version #	Date	Description	By	Checked	Approved	
					Name	Signed
1	December 2009					

The nominated Coordinator for this document is	Manager of Mining Engineering
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1 PURPOSE AND SCOPE

This Management Plan describes the processes developed, including identification of key risks and proposed management strategies, to manage Public Safety in any surface areas that may be affected by subsidence arising from mining (pillar extraction) by Abel Mine in the Subsidence Management Plan Area 1.

2 RESPONSIBILITIES AND RESOURCES

The Abel Environmental Manager is responsible for monitoring the implementation of this plan.

The Abel Manager of Mining Engineering is responsible for ensuring that sufficient resources are available to implement the requirements of this Plan.

Each of the management strategies developed to manage subsidence allocates responsibilities in relation to their implementation. Relevant personnel will be provided with a copy of appropriate documents. Training will be provided.

3 SUBMISSION

This plan is submitted to the Director Mine Safety Operations for approval.

4 BACKGROUND

The SMP application consists of pillar extraction panels Panel 1 to Panel 13 inclusive, plus one main headings development (East Mains) to be extracted on retreat as shown on the attached SMP plans. The SMP application has been prepared in accordance with the NSW Department of Mineral Resources *New Approval Process for the Management of Coal Mining Subsidence* and SMP Guideline 2003.

Abel commenced coal production in May 2008 and will progressively increase production to 4.5mtpa. The SMP application area contains 200 ha, less than 8% of the current lease area of 2755 ha.

Mining will take place in the application area under a combination of land owned by Black Hill Land Pty Limited, the Catholic Diocese of Maitland and Newcastle and a narrow strip traversing the area owned by Hunter Water Corporation. The current application seeks approval to mine coal by the pillar extraction method from the Upper Donaldson Seam at depths of cover ranging generally from 50 to 135 metres.

The layout of the panels has been designed to provide management outcomes of subsidence impacts in line with the Statement of Commitments and Project Approval while optimising resource recovery in the area. The proposed extraction panels are bounded by the lease boundary / John Renshaw Drive and cover restrictions to the north, the lease boundary / F3 Newcastle to Sydney Freeway to the east and existing and proposed main underground development workings to the south and west.

No substantial adverse environmental effects due to subsidence are predicted for the surface above the application area. The SMP application area surface is a

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combination of native bushland, cleared grazing land previously used for poultry farms and a small section of industrial land in the north east corner of the application area.

Natural features are generally limited to Viney Creek, a Schedule 2 stream and associated tributaries. No Threatened Ecological Communities are located within the application area and no adverse impacts are predicted for flora and fauna.

Man – made features include :

- Boral Asphalt Plant;
- Transgrid 330kV power line;
- Energy Australia (EA) 132kV power line;
- EA rural 11kV power lines;
- Optus fibre optic cable;
- Redundant Telstra copper communication cables;
- Hunter Water Corporation water pipeline;
- Scattered aboriginal artefacts;
- Disused, unoccupied residences proposed for demolition;
- Stock water supply line;
- Access roads and tracks;
- Various fences; and
- One small disused dam.

This Management Plan for Area 1 includes the regular inspection of surface areas, subsidence monitoring and outlines procedures and actions to be implemented to manage the safety of the general public in the surface areas of the SMP application area that may be affected by subsidence resulting from mining (pillar extraction) by Abel Mine.

5 APPROACH TO PUBLIC SAFETY MANAGEMENT

The Mine's overall strategy to ensure Public Safety relating to the surface areas that may be affected by subsidence arising from pillar extraction is:

1. **Measure baseline information** – Established background data for the surface above the mining area by inspection and in certain areas also subsidence survey.
2. **Regular Monitoring of the effects of mining** - Continue monitoring and inspection of identified key positions relating to the extraction position
3. **Regularly assess and interpret monitoring and inspections** – Monitoring and inspection data is analysed to identify any variations from predictions, unexpected anomalies, visual impact or items presenting potential impact on Public Safety.
4. **Implement Immediate Responses** – If potential impact on Public Safety is observed or reported implement an immediate response including notification to the landowner.
5. **Re-assess any impacts** – where variations and/or impacts are greater than predictions made in the SMP, as nominated in the Trigger, Action and Management Response Plan, additional assessment/investigation of impacts will be undertaken. This will be carried out by specialist consultants, Abel personnel and appropriate stakeholders where required.

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6. **Identify and implement remedial actions** – if impacts require mitigation and /or remedial action, these actions will be implemented in conjunction with the landholder and appropriate relevant stakeholder.

6 IDENTIFICATION OF RISKS

The surface to be undermined is described in **Section 4**.

As part of the application process a Risk Assessment was conducted to examine the potential impact created by subsidence on the surface above the mining area. No public safety risks in the high risk category were identified. All risks identified had either existing controls or additional controls / further actions which have been implemented or are available to identify, control or remediate these risks. The possible Public Safety risks are listed below with a summary of the Risk Assessment results relating to surface features attached as **Appendix A**.

- Damage (cracking) to roads / trails;
- Damage (cracking) to general surface; and
- Tree falls due to subsidence

Controls, monitoring and remedial actions identified as core items have been addressed in this Management Plan including,

- Regular monitoring of areas posing potential safety risks – monitoring introduced though no high risk areas identified.
- Erection of warning signs along access roads and walkways – to include mine contact numbers to report damage and be installed prior to commencement of pillar extraction.
- Entry restrictions – identified as part of management actions and remedial measures if Public Safety Risk identified.
- Backfilling of dangerous surface cracks – noted as remedial measure if identified.
- Provision of timely notification of mining progress to the landholder, community and any other stakeholders where management of Public Safety is required – noted as part of management actions.

7 NOTIFICATION, MONITORING AND INSPECTION SCHEDULE

The subsidence from mining, in this SMP Area 1, is not expected to have a major impact on the surface. Management of Public Safety is largely controlled by programmed and targeted inspection as well as reviewing predicted subsidence against actual subsidence.

7.1 Notification

Notifications to any landholders, the general public, relevant stakeholders and appropriate authorities either have or will be provided. These include.

- Newspaper advertisements relating to the SMP Application.

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- Signposting of mining area.

7.2 Subsidence Monitoring

A description of the surface, relevant features and improvements above the proposed extraction area is contained in **Section 4** with locations of these items shown on **Plan 2** of the SMP Application.

Monitoring is conducted as per the various Management Plans and Programs submitted, consisting of a combination of subsidence surveys, surface and underground monitoring and inspections and monitoring of ecological conditions.

These Plans and Programs generally focus on intensive monitoring in the initial stages of pillar extraction and the long term monitoring of subsidence effects that may develop over time.

7.3 Subsidence Inspections

Inspections are to be conducted as per the various Management Plans and Programs submitted, consisting of a combination of visual and photographic inspections as detailed in the Management Plans and Programs and referenced in **Table 1**.

7.4 Scope and Frequency of Inspections

Regular inspections, at frequencies detailed in the Management Plans and Programs are to be initially concentrated on the current mining area, mining location and subsidence area (based on 26.5 degrees angle of draw). Inspections are concentrated on items identified in the initial pre-mining survey.

Inspections are carried out by experienced persons and follow an inspection checklist to include the items noted above.

At the completion of mining in each panel a full surface inspection will be conducted and results included in a Panel Report.

Listed below is a schedule of inspections and subsidence survey frequencies of areas of potential Public Safety risk (**Table 1**).

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Table 1: Inspection and Survey Schedule

Infrastructure Item	Visual Inspection Frequency	Visual Inspection by	Photographic Monitoring Frequency	Photographic Monitoring by	Subsidence Survey Frequency	Subsidence Survey by	Comments
• General surface over SMP area	Pre and post mining	Abel Environmental Manager or nomination					
• Specific surface features over current extraction area	Pre and post mining plus weekly during mining	As above	Pre and post mining plus if changes noted on visual inspections	Abel Environmental Officer or nomination	Pre and post mining as detailed in Subsidence Monitoring Program to be approved by Principal Subsidence Engineer	Abel survey staff or external survey contractor	
• Roads / trails	Pre and post mining plus weekly during undermining.	As above	Pre and post mining plus if changes noted on visual inspections.	As above	Pre and post mining as detailed in approved Subsidence Monitoring Program	As above	

Results of each survey will be forwarded promptly following completion to the Principal Subsidence Engineer.

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8 ACTIONS AND REMEDIAL MEASURES

Abel will install appropriate warning signage, positioned along access roads and property boundaries, prior to the commencement of pillar extraction, advising of the potential for subsidence impacts. The objective of the signage is to ensure users of the access roads and surrounding area are aware of potential hazards resulting from subsidence. Mine contact details shall be included to enable any damage to be reported.

Visual inspections will identify impacts on access roads or natural features.

8.1 Public Safety Issues Identified During Inspections or Monitoring

If these inspections reveal any Public Safety issue (see **Table 2**) that requires remedial works to ensure Public Safety the person conducting the inspection shall :

- Immediately notify the Manager of Mining Engineering and/or Environmental Manager of the findings.
- 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 and landholder.

8.2 Remediation of Public Safety Issues

Following completion of the above the Manager of Mining Engineering or his nominee shall:

- Arrange inspections of area at regular intervals including installation of appropriate barriers if required, until remediation works are carried out.
- Arrange for remediation works as detailed in **Table 2**. This will require consultation with the landholder, and possibly Industry & Investment NSW – Minerals and Energy, specialist consultants and appropriate stakeholder, as noted in current Management Plans and Programs, to prepare appropriate remediation plan relating to the particular item. Notification to the general public may form a part of the remediation plan.

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Table 2: Triggers, Actions and Management Responses – Public Safety

Monitoring / Surface Element	Trigger / Response	Results within predicted / acceptable range	Irregular result - Director Mine Safety Operations and District Inspector of Coal Mines to be notified	Increased irregular result- Director Mine Safety Operations and District Inspector of Coal Mines to be notified
Subsidence Monitoring	Trigger	Subsidence results are not greater than 15% above predictions	Subsidence results are greater than 15% but less than 25% above predictions or visible surface impacts above predictions.	Subsidence results are greater than 25% above predictions
	Notification	N/A	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE), landholder and appropriate parties under the SMP Approval.	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE), landholder and appropriate parties under the SMP Approval.
	Action / Response	Continue to monitor at specified frequency	Field inspections. Review predictions. Obtain opinion from appropriate consultant, review program and consult with PSE	Review predictions. Review program and obtain opinion from appropriate consultant.
	Mitigation / Remediation	N/A	Review mine plan in consultation with landholder, appropriate consultant and PSE	Review mine plan in relation to surface features in consultation with PSE

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Monitoring / Surface Element	Trigger / Response	Results within predicted / acceptable range	Irregular result - Landholder, Director Mine Safety Operations and District Inspector of Coal Mines to be notified	Increased irregular result - Landholder, Director Mine Safety Operations and District Inspector of Coal Mines to be notified
Surface cracking on roads / trails and general surface area	Trigger	Surface cracking 10 - 100mm or 10 – 260mm if cover <80m	Surface cracking 100-300mm or 260 – 400mm if cover <80m	Surface cracking > 300mm or >400mm if cover <80m
	Notification	N/A	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE), landholder and appropriate parties under the SMP Approval.	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE) and appropriate parties under the SMP Approval.
	Action / Response	Maintain warning signs Monitor cracks over following 12 months.	Maintain warning signs and erect additional signs in immediate area. Arrange inspection with landholder Review predictions. Obtain opinion from appropriate consultant, review program and consult with PSE	Maintain warning signs and erect additional signs in immediate area including NO ROAD signs if required Arrange inspection with landholder Review predictions. Obtain opinion from appropriate consultant, review program and consult with PSE
	Mitigation / Remediation	Repair if cracks exceed 100mm by excavation and grading or fill by concrete or grout	Repair cracks by excavation, fill and grading or concrete or grout with program developed in consultation with landholder, appropriate authorities and consultants Review mine plan in consultation with appropriate consultant and PSE.	Repair cracks by excavation, fill, compaction and grading following consultation with landholder, appropriate authorities and consultants Review mine plan in consultation with appropriate consultant and PSE.

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Visual Inspection / Photographic Monitoring	Trigger / Response	Results within predicted / acceptable range	Irregular result - Director Mine Safety Operations and District Inspector of Coal Mines to be notified	Irregular result - Director Mine Safety Operations and District Inspector of Coal Mines to be notified
Steep slopes damage or instability	Trigger	Visual inspection or monitoring reveals minor cracking (<100mm)	Surface cracking 100 – 200mm or visible instability	Surface cracking >200mm / Visible instability.
	Notification	N/A	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE) and appropriate parties under the SMP Approval.	Notify I & I NSW – Minerals and Energy Principal Subsidence Engineer (PSE) and appropriate parties under the SMP Approval.
	Action / Response	Field Inspections to assess requirements for additional / increased frequency monitoring	Erect warning signs and barrier tape in immediate area. Review predictions Suitably qualified external consultant to inspect and advise on further action including possible remedial / stabilisation works in consultation with PSE and landholder.	Erect warning signs and barrier tape in immediate area. Arrange inspection with landholder. Suitably qualified external consultant to inspect and advise on further action including possible remedial / stabilisation works.
	Mitigation / Remediation		Repair any cracks promptly with a sand/cement/bottom ash grout or equivalent and installation of erosion controls and surface / sub-surface slope drainage systems. Review mine plan in consultation with appropriate consultant and PSE	Repair any cracks promptly with a sand/cement/bottom ash grout or equivalent and installation of erosion controls and surface / sub-surface slope drainage systems. Review mine plan in consultation with appropriate consultant and PSE

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9 REPORTING

Results of subsidence surveys, visual inspections and photographic monitoring are to be reported at each survey to the Principal Subsidence Engineer and landholder, also in the four monthly Subsidence Management Status Reports and the Annual Environmental Management Report.

Additionally, notification will be provided to relevant Authorities of any incident or occurrence as detailed in the Triggers Actions and Management Responses.

10 REVIEW

This plan will be reviewed as necessary including:

- In the event that the Director Mine Safety Operations raises issues that necessitate a review;
- In the event that any of the landholders raise issues that necessitate a review;
- Inspections or monitoring demonstrate that the impacts are such that a review is warranted.

Any review will be conducted in consultation with the Director Mine Safety Operations and landholder. In the event of the management plan being changed a copy will be sent to the relevant agencies.

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APPENDIX A – RISK ASSESSMENT RESULTS TABLE – NATURAL FEATURES AND SURFACE IMPROVEMENTS

P#	Process	S#	Subprocess	H#	Risk Issue	Causes	Existing Controls	Loss Type	Consequence	Likelihood	Risk Rank	Risk Level	Further Actions	ALARP (Yes/No)
1	Natural Features	1.01	Creeks	1.01.01	Disruption of stream flow to Viney Creek	1. Cracking of stream bed 2. Development of ponding and storage areas	1. Mine design and layout (1,2) 2. Provision of an exclusion zone (1,2) 3. Baseline stream monitoring as per Surface water management plan (EMP) 4. Natural healing of cracks 5. Size of cracks will be limited by soil cover	R	3	D	17	M	1. Subside and stream flow monitoring 2. Refine model based on monitoring results 3. Consider Surveying creek location	Yes
1	Natural Features	1.01	Creeks	1.01.03	Erosion and bed and bank instability (Schedule 2)	1. Changing gradient 2. Surface cracking	1. Dense native and introduced vegetation along creek beds 2. Mine design Schedule 2 (Viney Creek)	R	3	D	17	M	1. Refine model based on monitoring results	Yes
1	Natural Features	1.07	Natural Vegetation	1.07.01	Falling trees striking person	1. Cracking and tilting 2. Low soil cover	1. Public Safety Management Plan, includes signage 2. Private property - no public access	P	3	D	17	M		

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P#	Process	S#	Subprocess	H#	Risk Issue	Causes	Existing Controls	Loss Type	Consequence	Likelihood	Risk Rank	Risk Level	Further Actions	ALARP (Yes/No)
4	Boral Asphalt plant	4.03	Gas and fuel storages and associated plants	4.03.01	Damage to gas and fuel storages and associated plants as a result of exceeding tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	A	3	D	17	M	1. Property Management Plan 2. Develop First Workings MP	Yes
4	Boral Asphalt plant	4.04	Waste storages and associated plants	4.04.01	Damage to Oil separator as a result of exceed tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	E	3	D	17	M	1. Property Management Plan 2. Develop First Workings MP	Yes
4	Boral Asphalt plant	4.05	Buildings, equipment and operations (general)	4.05.01	Damage to buildings generally and Asphalt plant as a result of exceed tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	A	3	D	17	M	1. Property Management Plan 2. Develop First Workings MP	Yes

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P#	Process	S#	Subprocess	H#	Risk Issue	Causes	Existing Controls	Loss Type	Consequence	Likelihood	Risk Rank	Risk Level	Further Actions	ALARP (Yes/No)
4	Boral Asphalt plant	4.06	Buildings, equipment and operations that are sensitive to surface movements	4.06.01	Damage to items sensitive to surface movement (tower, burner, conveyors) as a result of exceed tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	A	3	D	17	M	1. Property Management Plan 2. Develop First Workings MP	Yes
1	Natural Features	1.01	Creeks	1.01.04	Erosion and bed and bank instability (Schedule 1)	1. Changing gradient 2. Surface cracking	1. Dense native and introduced vegetation along creek beds	R	4	C	18	M		Yes
3	Farm Land and Facilities	3.05	Wells, bores	3.05.01	Physical loss of monitoring bores	1. Subsidence 2. Cracking	Nil identified	A	4	C	18	M	1. Replace bores if required	Yes
1	Natural Features	1.01	Creeks	1.01.05	Decline in water quality (Schedule 2)	1. Increased erosion	1. Dense native and introduced vegetation along creek beds 2. Mine design 3. Water quality monitoring	R	4	D	21	L	1. Monitoring	Yes

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3	Farm Land and Facilities	3.02	Internal Access tracks	3.02.01	Cracking of road surface resulting in potential vehicle accident	1. Subsidence	1. Speed limited road 2. Property Management Plan for the site 3. Restricted access	P	4	D	21	L	1. Appropriate signage 2. Develop MP	
4	Boral Asphalt plant	4.01	Workshops	4.01.01	Damage to workshop structure as a result of exceeding tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	A	4	D	21	L	1. Property Management Plan 2. Develop First Workings MP	Yes
1	Natural Features	1.01	Creeks	1.01.02	Associated loss of flow to Weakley's Flat Creek	1. Disruption of stream flow to Schedule 1 streams 2. Cracking of stream bed 3. Development of ponding and storage areas	1. Post mining remediation as per Project Approval 2. Natural healing of cracks 3. Size of cracks will be limited by soil cover 4. Sufficient surface gradients to minimise ponding potential and prevent stream capture 5. Baseline stream flow monitoring of Weakley's Flat Creek as per SWMP	R	5	C	22	L	1. Refine model based on monitoring results	Yes

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1	Natural Features	1.01	Creeks	1.01.06	Decline in water quality (Schedule 1)	1. Increased erosion	1. Dense native and introduced vegetation along creek beds 2. Water quality monitoring	R	5	C	22	L	1. Monitoring	Yes
3	Farm Land and Facilities	3.01	Agricultural utilisation or agricultural suitability of farm land	3.01.01	Temporary loss of access to grazing area	1. Need for mitigation work		A	5	C	22	L	1. Review agistments arrangements within the Property Management Plan	Yes
3	Farm Land and Facilities	3	Fences	3.03.01	Fences become unserviceable due to damage	1. Subsidence	1. Existing property management plan for the site	A	5	C	22	L	1. Review agistments arrangements within the Property Management Plan	Yes
3	Farm Land and Facilities	3.07	Water Reticulation systems	3.07.01	Temporary loss of water supply to particular areas	1. Subsidence	1. Multiple troughs	A	5	C	22	L	1. Sufficient repair supplies onsite	Yes
3	Farm Land and Facilities	3.04	Farm dams	3.04.01	Water loss from dam adjacent to Transgrid Tower 31B	1. Tilting 2. Cracking of dam, wall or floor	1. Empty dam - no longer used	A	5	D	24	L		Yes

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P#	Process	S#	Subprocess	H#	Risk Issue	Causes	Existing Controls	Loss Type	Consequence	Likelihood	Risk Rank	Risk Level	Further Actions	ALARP (Yes/No)
4	Boral Asphalt plant	4.02	Site offices	4.02.01	Damage to site offices as a result of exceeding tolerable limits set for Principal Residences	1. Subsidence	1. Regarded as a Principal Residence under Project Approval	A	5	D	24	L	1. Property Management Plan 2. Develop First Workings MP	Yes
1	Natural Features	1.04	Land prone to flooding or inundation	1.04.01	Subsidence increases the extent of flooding	1. Quantity of subsidence	1. Mine design				n/a	n/a	1. Review flood studies undertaken by Coal & Allied	
3	Farm Land and Facilities	3.06	Any other feature considered significant	3.06.01	Nil identified - Derelict cottages to be demolished						n/a	n/a		

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