

**WATER MANAGEMENT PLAN TARP – WMP1 STREAM WATER QUALITY FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA<sup>1</sup>**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management																							
		Trigger	Action	Response																					
<p><b>Performance Measure Feature</b> All watercourses within the Subsidence Area<sup>1</sup>.</p> <p><b>Performance Measure</b> No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.</p> <p>The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur<sup>2</sup>. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures.</p> <p><b>Performance Indicator</b> Exceedance of the site specific guideline values (SSGVs), as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in surface water quality from normal conditions<sup>3</sup> and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b> SSGV as listed in table below.</p>	<p><b>Locations</b></p> <table border="1"> <thead> <tr> <th>Longwall</th> <th>Potential Impact Sites</th> <th>Reference Sites</th> </tr> </thead> <tbody> <tr> <td>LW S1A</td> <td>TT7-QLa TT12-QLa TT13-QLa TT14-QLa</td> <td>TT1-QLa</td> </tr> <tr> <td>LW S2A</td> <td>TT9-QLa<sup>4</sup> TT3-QLa<sup>5</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S3A</td> <td>TT2-QLa All sites above</td> <td></td> </tr> <tr> <td>LW S4A</td> <td>BR3-QLa</td> <td>DT4-QLa</td> </tr> <tr> <td>LW S5A</td> <td>TT1-QLa</td> <td>DT3-QLa</td> </tr> <tr> <td>LW S6A</td> <td>All sites above</td> <td></td> </tr> </tbody> </table> <p>All monitoring locations are shown in Figure 21 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Monthly sampling prior to secondary extraction of relevant longwall.</p> <p><b>During Mining</b> Monthly sampling and analysis or as required by a specified action relevant to a trigger level.</p> <p><b>Post-mining</b> Monthly sampling and analysis for a minimum of 12 months following the completion of LW S6A or as required in accordance with a Watercourse Corrective Action Management Plan.</p>	Longwall	Potential Impact Sites	Reference Sites	LW S1A	TT7-QLa TT12-QLa TT13-QLa TT14-QLa	TT1-QLa	LW S2A	TT9-QLa <sup>4</sup> TT3-QLa <sup>5</sup> All sites above		LW S3A	TT2-QLa All sites above		LW S4A	BR3-QLa	DT4-QLa	LW S5A	TT1-QLa	DT3-QLa	LW S6A	All sites above		<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>Exceedance of an SSGV does not occur or occurs for less than three consecutive months.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
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<b>Level 1</b>																									
<ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.</li> <li>Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.</li> <li>Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for increasing pH level).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>																							
<b>Level 2</b>																									
<ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact site in four or five consecutive months and the same has not occurred at the reference site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water quality change).</li> <li>If increased monitoring is adopted, undertake further analysis of water quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>Review CMAs in light of findings from further investigations and consider additional remediation options.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> </ul>																							
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<ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact site in six consecutive months and the same has not occurred at the reference site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul> </li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effects unrelated to mining or the prevailing climate.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>Offer site visit with DPE and other key stakeholders.</li> <li>Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>Implement approved WCAMP, subject to land access.</li> </ul> </li> </ul>																							

Site Specific Guideline Value (SSGV)						
Parameter	TT1-QLa	TT2-QLa	TT7-QLa	TT12-QLa	TT13-QLa	TT14-QLa
No. of Values <sup>6</sup>	32	12(2)	35	13	13	13
pH (pH units)	6.5 – 8	6 – 8	6.5 – 8	6.5 – 8	6.5 – 8	6.5 – 8
EC (µS/cm)	529	350	359	350	350	350
Dissolved Aluminium (mg/L) pH > 6.5	0.06	0.17	0.06	0.1	0.092	0.11
Dissolved Copper (mg/L)	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Dissolved Iron (mg/L)	0.75	0.55	0.81	0.64	0.47	0.57
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011	0.011
Dissolved Zinc (mg/L)	0.03	0.02	0.031	0.008	0.008	0.008

Notes:

<sup>1</sup>Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.

<sup>2</sup> Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.

<sup>3</sup> As defined by the site specific guideline value (SSGV).

<sup>4</sup> Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall (with the exception of TT12-QLa, TT13-QLa, TT14-QLa which will have 12 months of baseline data). Additional sites will be included prior to commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be included in the Water Management Plan and provided to the relevant government agencies for review and approval.

<sup>5</sup> SSGVs have not been derived for TT3-QLa as the pool was dry on five of eight sampling occasions.

<sup>6</sup> Minimum number of values used in SSGV derivation – for some constituents, a greater number of values were adopted.

<sup>7</sup> Number of values used to derive SSGV for TT2-QLa, prior to commencement of mining LWS3A, is expected to be greater than 24.

<sup>8</sup> TT12-QLa, TT13-QLa, TT14-QLa – a minimum of 12 samples (12 months) would be collected prior to secondary extraction.

**WATER MANAGEMENT PLAN TARP – WMP2 STREAM WATER QUALITY FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management																							
		Trigger	Action	Response																					
<p><b>Performance Measure Feature</b> Other watercourses.</p> <p><b>Performance Measure</b> Negligible environmental consequences including beyond those predicted in the EIS.</p> <p><b>Performance Indicator</b> The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water quality changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in surface water quality from normal conditions<sup>1</sup>, indicators of exceedance of the performance measure and the actions required to be implemented in response to each level of variation or exceedance of the performance measure.</p> <p><b>Assessment Criteria</b> SSGV as listed in table below.</p>	<p><b>Locations</b></p> <table border="1"> <thead> <tr> <th>Longwall</th> <th>Potential Impact Sites</th> <th>Reference Sites</th> </tr> </thead> <tbody> <tr> <td>LW S1A</td> <td>BR12-QLa BR13-QRLa</td> <td>BR16-QLa<sup>2,3</sup></td> </tr> <tr> <td>LW S2A</td> <td>BR18-QLa<sup>2</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S3A</td> <td>BR17-QLa<sup>2</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S4A</td> <td>BR6-QLa<sup>2</sup></td> <td>DT4-QLa</td> </tr> <tr> <td>LW S5A</td> <td>All sites above</td> <td>DT3-QLa All sites above</td> </tr> <tr> <td>LW S6A</td> <td>HC13-QLa<sup>2</sup> HC16-QLa<sup>2</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above</td> <td>HC2-QLa HC17-QLa HC1-QLa All sites above</td> </tr> </tbody> </table> <p>All monitoring locations are shown in Figure 21 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Monthly sampling prior to secondary extraction or other relevant mining activity.</p> <p><b>During Mining</b> Monthly sampling and analysis or as required by a specified action relevant to a trigger level.</p> <p><b>Post-mining</b> Monthly sampling and analysis for a minimum of 12 months following the completion of LW S6A or as required in accordance with a Watercourse Corrective Action Management Plan.</p>	Longwall	Potential Impact Sites	Reference Sites	LW S1A	BR12-QLa BR13-QRLa	BR16-QLa <sup>2,3</sup>	LW S2A	BR18-QLa <sup>2</sup> All sites above		LW S3A	BR17-QLa <sup>2</sup> All sites above		LW S4A	BR6-QLa <sup>2</sup>	DT4-QLa	LW S5A	All sites above	DT3-QLa All sites above	LW S6A	HC13-QLa <sup>2</sup> HC16-QLa <sup>2</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above	HC2-QLa HC17-QLa HC1-QLa All sites above	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>Exceedance of an SSGV does not occur or occurs for less than three consecutive months.</li> </ul> <ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> <li>No response required.</li> </ul>		
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		<p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.</li> <li>Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.</li> <li>Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).</li> </ul> <ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed CMAs for consultation (e.g. limestone cobbles for increasing pH level).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>																							
		<p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact sites in four or five consecutive months and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water quality change).                         </li> <li>If increased monitoring is adopted, undertake further analysis of water quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>Review CMAs in light of findings from further investigations and consider additional remediation options.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul> <ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> </ul>																							
<p><b>Level 3</b></p> <ul style="list-style-type: none"> <li>Exceedance of an SSGV occurs at a given potential impact site in six consecutive months and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul> </li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul> <ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> </ul>																									
<p><b>Exceeds Performance Measure</b></p> <ul style="list-style-type: none"> <li>It is concluded from the Level 3 investigation that mining results in exceedance of an SSGV at a given potential impact site for six or more consecutive months.</li> </ul> <ul style="list-style-type: none"> <li>Investigate reasons for the performance measure exceedance.</li> <li>Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with future longwall extraction.</li> </ul> <ul style="list-style-type: none"> <li>Submit a report to DPE (in accordance with E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> <li>Offer site visit with DPE and other key stakeholders.</li> </ul>																									

						<ul style="list-style-type: none"> <li>Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>Implement approved WCAMP, subject to land access.</li> </ul>
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**Site Specific Guideline Value (SSGV)**

Parameter	BR12-QLa	BR13-QRLa	HC9-QLa	HC4-QRLa	HC3-QLa
No. of Values <sup>4</sup>	37	37	35	29	31
pH (pH units)	6.5 - 8	6.5 - 8	5.7 - 8	6.5 - 8	6.5 - 8
EC (µS/cm)	350	350	365	350	350
Dissolved Aluminium (mg/L) pH > 6.5	0.058	0.055	0.08	0.07	0.1
Dissolved Copper (mg/L)	0.0014	0.0014	0.002	0.002	0.0014
Dissolved Iron (mg/L)	0.52	0.61	4.2	0.61	0.5
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011
Dissolved Zinc (mg/L)	0.008	0.009	0.03	0.008	0.008

Notes:  
<sup>1</sup> As defined by the SSGV.  
<sup>2</sup> Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.  
<sup>3</sup> Data collected from BR11-QLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities. <sup>4</sup> Minimum number of values used in SSGV derivation - for some constituents, a greater number of values were adopted.

**WATER MANAGEMENT PLAN TARP – WMP3 POOL WATER LEVEL FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA<sup>1</sup>**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management																	
		Trigger	Action	Response															
<p><b>Performance Measure Feature</b> All watercourses within the Subsidence Area<sup>1</sup>.</p> <p><b>Performance Measure</b> No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.</p> <p>The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur<sup>2</sup>. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures.</p> <p><b>Performance Indicator</b> Water level decline as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in pool water level from normal conditions<sup>3</sup> and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• Comparison of baseline and operational recorded water level data (all levels).</li> <li>• Water level recession analysis for Level 2 and above.</li> </ul>	<p><b>Locations</b></p> <table border="1"> <thead> <tr> <th>Longwall</th> <th>Potential Impact Sites</th> <th>Reference Sites</th> </tr> </thead> <tbody> <tr> <td>LW S1A</td> <td>TT7-QLa TT12-QLa TT13-QLa TT14-QLa</td> <td>TT1-QLa</td> </tr> <tr> <td>LW S2A</td> <td>TT9-QLa<sup>4</sup> TT3-QLa All sites above</td> <td></td> </tr> <tr> <td>LW S3A</td> <td>TT2-QLa All sites above</td> <td></td> </tr> <tr> <td>LW S4A</td> <td>BR3-QLa<sup>4</sup> TT1-QLa All sites above</td> <td>DT4-QLa DT3-QLa</td> </tr> </tbody> </table> <p>All monitoring locations are shown in Figure 21 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.</p> <p><b>During Mining</b> Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.</p> <p><b>Post-mining</b> Continuous record and monthly manual measurements for a minimum of 12 months following the completion of LW S6A or as required in accordance with a Watercourse Corrective Action Management Plan.</p>	Longwall	Potential Impact Sites	Reference Sites	LW S1A	TT7-QLa TT12-QLa TT13-QLa TT14-QLa	TT1-QLa	LW S2A	TT9-QLa <sup>4</sup> TT3-QLa All sites above		LW S3A	TT2-QLa All sites above		LW S4A	BR3-QLa <sup>4</sup> TT1-QLa All sites above	DT4-QLa DT3-QLa	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>• The recorded water level has not declined below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).</li> </ul> <ul style="list-style-type: none"> <li>• Continue monitoring and review of data as per monitoring program.</li> <li>• No response required.</li> </ul>		
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LW S4A	BR3-QLa <sup>4</sup> TT1-QLa All sites above	DT4-QLa DT3-QLa																	
<p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>• The recorded water level has declined by greater than 10 centimetres (cm) below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level) and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li>• <i>Actions as required for Normal Condition.</i></li> <li>• Review water level trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>• Review streamflow data recorded at TT-F1 and conduct streamflow reduction assessment.</li> <li>• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment.</li> </ul> <ul style="list-style-type: none"> <li>• Report trigger exceedance to DPE and key stakeholders.</li> <li>• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>																			
<p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>• The recorded water level has declined atypically<sup>5</sup> below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li>• <i>Actions as stated in Level 1.</i></li> <li>• Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>○ Fortnightly, for sites within the active subsidence zone.</li> <li>○ Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water level change).</li> <li>• If increased monitoring is undertaken, conduct further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>• Review Water Management Plan and modify if necessary.</li> </ul> <ul style="list-style-type: none"> <li>• <i>Responses as stated in Level 1.</i></li> <li>• Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul>																			
<p><b>Level 3</b></p> <ul style="list-style-type: none"> <li>• The recorded water level has declined atypically<sup>6</sup> below the recorded baseline minimum level for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).</li> </ul> <ul style="list-style-type: none"> <li>• <i>Actions as stated in Level 2.</i></li> <li>• If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>○ Fortnightly, for sites within the active subsidence zone.</li> <li>○ Monthly, outside of the active subsidence period.</li> </ul>                             Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.</li> </ul> <ul style="list-style-type: none"> <li>• <i>Responses as stated in Level 2.</i></li> <li>• If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>• Offer site visit with DPE and other key stakeholders.</li> <li>• Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>• Implement approved WCAMP, subject to land access.</li> </ul> </li> </ul>																			

Notes:

<sup>1</sup> Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.

<sup>2</sup> Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.

<sup>3</sup> As indicated by the baseline water level and recession rate.

<sup>4</sup> Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The pool water levels for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.

<sup>5</sup> 'Atypical' surface water characteristics relate to a notable and/or rapid water level decline or change in the slope of the falling limb of the hydrograph or the water level recessionary behaviour below the cease to flow level which is inconsistent with baseline conditions and cannot be attributed to climatic conditions

**WATER MANAGEMENT PLAN TARP – WMP4 POOL WATER LEVEL FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program			Management																				
				Trigger	Action	Response																		
<p><b>Performance Measure Feature</b> Other watercourses.</p> <p><b>Performance Measure</b> Negligible environmental consequences including beyond those predicted in the EIS, including:</p> <ul style="list-style-type: none"> <li>Negligible diversion of flows or changes in the natural drainage behaviour of pools.</li> </ul> <p><b>Performance Indicator</b> The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water level changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in pool water level from normal conditions<sup>1</sup> and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>Comparison of baseline and operational recorded water level data (all levels).</li> <li>Water level recession analysis for Level 2 and above.</li> </ul>	<p><b>Locations</b></p> <table border="1"> <thead> <tr> <th>Longwall</th> <th>Potential Impact Sites</th> <th>Reference Sites</th> </tr> </thead> <tbody> <tr> <td>LW S1A</td> <td>BR12-QLa BR13-QRLa</td> <td>BR16-QLa<sup>2,3</sup></td> </tr> <tr> <td>LW S2A</td> <td>BR18-QLa<sup>2</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S3A</td> <td>BR17-QLa<sup>2</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S4A LW S5A</td> <td>BR6-QLa<sup>2</sup> All sites above</td> <td>DT4-QLa DT3-QLa All sites above</td> </tr> <tr> <td>LW S6A</td> <td>HC13-QLa<sup>2</sup> HC16-QLa<sup>2</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above</td> <td>HC2-QLa HC17-QLa HC1-QLa All sites above</td> </tr> </tbody> </table> <p>All monitoring locations are shown in Figure 21 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.</p> <p><b>During Mining</b> Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.</p> <p><b>Post-mining</b> Continuous record and monthly manual measurements for a minimum of 12 months following the completion of LW S6A or as required in accordance with a Watercourse Corrective Action Management Plan.</p>			Longwall	Potential Impact Sites	Reference Sites	LW S1A	BR12-QLa BR13-QRLa	BR16-QLa <sup>2,3</sup>	LW S2A	BR18-QLa <sup>2</sup> All sites above		LW S3A	BR17-QLa <sup>2</sup> All sites above		LW S4A LW S5A	BR6-QLa <sup>2</sup> All sites above	DT4-QLa DT3-QLa All sites above	LW S6A	HC13-QLa <sup>2</sup> HC16-QLa <sup>2</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above	HC2-QLa HC17-QLa HC1-QLa All sites above	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>The recorded water level has not declined below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).</li> </ul> <p>• Continue monitoring and review of data as per monitoring program.</p> <p>• No response required.</p>		
	Longwall	Potential Impact Sites	Reference Sites																					
	LW S1A	BR12-QLa BR13-QRLa	BR16-QLa <sup>2,3</sup>																					
	LW S2A	BR18-QLa <sup>2</sup> All sites above																						
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<b>Level 2</b>																								
<ul style="list-style-type: none"> <li>The recorded water level has declined atypically<sup>4</sup> below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).</li> </ul>			<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in a water level change).</li> <li>If increased monitoring is adopted, undertake further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.</li> <li>Complete water level recession analysis for sites where Level 2 has been reached.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul>		<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul>																			
<b>Level 3</b>																								
<ul style="list-style-type: none"> <li>The recorded water level has declined atypically<sup>4</sup> below the recorded baseline minimum level for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).</li> </ul>			<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 3 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul> </li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>		<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> </ul>																			
<b>Exceeds Performance Measure</b>																								
<ul style="list-style-type: none"> <li>It is concluded from the detailed investigation that mining has resulted in an atypical<sup>3</sup> decline in water level for greater than one month (as a consecutive period).</li> </ul>			<ul style="list-style-type: none"> <li>Investigate reasons for the performance measure exceedance.</li> <li>Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with further longwall extraction.</li> </ul>		<ul style="list-style-type: none"> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> <li>Offer site visit with DPE and other key stakeholders.</li> </ul>																			

				<ul style="list-style-type: none"> <li>Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>Implement approved WCAMP, subject to land access.</li> </ul>
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Notes:

<sup>1</sup> As indicated by the baseline water level and recession rate.

<sup>2</sup> Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.

<sup>3</sup> Data collected from BR11-QLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities.

<sup>4</sup> 'Atypical' surface water characteristics relate to a notable and/or rapid water level decline or change in the slope of the falling limb of the hydrograph or the water level recessionary behaviour below the cease to flow level which is inconsistent with baseline conditions and cannot be attributed to climatic conditions.

**WATER MANAGEMENT PLAN TARP – WMP5 PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF WATERCOURSES WITHIN THE SUBSIDENCE AREA<sup>1</sup>**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> All watercourses within the Subsidence Area<sup>1</sup>.</p> <p><b>Performance Measure</b> No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.</p> <p>The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur<sup>2</sup>. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures.</p> <p><b>Performance Indicator</b> Variation in pool physical features and natural behaviour, as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in pool physical features and natural behaviour and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b> Comparison of baseline and operational pool physical features and natural behaviour.</p>	<p><b>Locations</b> Accessible pools and reaches in Teatree Hollow, Teatree Hollow Tributary and Bargo River Tributary (subject to land access).</p> <p>All monitoring locations are shown in Figure 22 of the Water Management Plan.</p> <p>Channel morphology sites CM3 and CM7, refer Figure 23.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> One observation prior to mining using fixed location photo points.</p> <p><b>During Mining</b> Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone<sup>3</sup> using fixed location photo points.</p> <p><b>Post-mining</b> Quarterly observations over 12 months for pools that are no longer within the active subsidence zone or as required in accordance with a Watercourse Corrective Action Management Plan.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>No observed impact to pool water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s)<sup>3</sup>.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Visual observation of fracturing.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Assess visual change along watercourse (upstream to downstream) to observe any spatial changes with consideration to climatic conditions.</li> <li>Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment.</li> <li>Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g., surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base or confirmed as a mining-related impact).                         </li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
<ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>Review Water Management Plan and modify if necessary.</li> <li>If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul>		
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The change in behaviour has been investigated and confirmed to be related to mining effects.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>Offer site visit with DPE and other key stakeholders.</li> <li>Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>Implement approved WCAMP, subject to land access.</li> </ul>		
<p>Notes:</p> <p><sup>1</sup>Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.</p> <p><sup>2</sup>Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.</p> <p><sup>3</sup>Survey area to include upstream, downstream and adjacent pools (to the extent of the potential impact) where a trigger exceedance has occurred at a potential impact site(s) in accordance with the TARPs.</p>				



**WATER MANAGEMENT PLAN TARP – WMP6 PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF POOLS FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program			Management																											
				Trigger	Action	Response																									
<p><b>Performance Measure Feature</b> Other watercourses.</p> <p><b>Performance Measure</b> Negligible environmental consequences including beyond those predicted in the EIS, including:</p> <ul style="list-style-type: none"> <li>Negligible diversion of flows or changes in the natural drainage behaviour of pools;</li> <li>Negligible gas releases and iron staining; and</li> <li>Negligible increase in water turbidity.</li> </ul> <p><b>Performance Indicator</b> The performance measure will be considered to be exceeded if changes in physical features and natural behaviour of pools occur for three consecutive months and the investigation outcomes indicate a mining related impact based on visual observation records for sites in Hornes Creek and the Bargo River.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in pool physical features and natural behaviour and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b> Comparison of baseline and operational pool physical features and natural behaviour.</p>	<p><b>Locations</b></p> <table border="1"> <thead> <tr> <th>Longwall</th> <th>Potential Impact Sites</th> <th>Reference Sites</th> </tr> </thead> <tbody> <tr> <td>LW S1A</td> <td>BR12-QLa BR13-QRLa</td> <td rowspan="2">BR16-QLa<sup>1,2</sup></td> </tr> <tr> <td>LW S2A</td> <td>BR18-QLa<sup>1</sup> All sites above</td> </tr> <tr> <td>LW S3A</td> <td>BR17-QLa<sup>1</sup> All sites above</td> <td></td> </tr> <tr> <td>LW S4A</td> <td rowspan="2">BR6-QLa<sup>1</sup> All sites above</td> <td>DT4-QLa DT3-QLa All sites above</td> </tr> <tr> <td>LW S5A</td> <td></td> </tr> <tr> <td>LW S6A</td> <td>HC13-QLa<sup>1</sup> HC16-QLa<sup>1</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above</td> <td>HC2-QLa HC17-QLa HC1-QLa All sites above</td> </tr> </tbody> </table> <p>All monitoring locations are shown in Figure 21 of the Water Management Plan.</p> <p><b>Pre-mining</b> One observation prior to mining using fixed location photo points.</p> <p><b>During Mining</b> Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone using fixed location photo points.</p> <p><b>Post-mining</b> Quarterly observations over 12 months for pools that are no longer within the active subsidence zone or as required in accordance with a Watercourse Corrective Action Management Plan.</p>			Longwall	Potential Impact Sites	Reference Sites	LW S1A	BR12-QLa BR13-QRLa	BR16-QLa <sup>1,2</sup>	LW S2A	BR18-QLa <sup>1</sup> All sites above	LW S3A	BR17-QLa <sup>1</sup> All sites above		LW S4A	BR6-QLa <sup>1</sup> All sites above	DT4-QLa DT3-QLa All sites above	LW S5A		LW S6A	HC13-QLa <sup>1</sup> HC16-QLa <sup>1</sup> HC4-QRLa HC9-QLa HC3-QLa All sites above	HC2-QLa HC17-QLa HC1-QLa All sites above	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>No observed impact to pool water level, overland connected flow, iron staining, gas release, turbidity or channel stability - as compared with baseline conditions.</li> </ul> <p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s).</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Visual observation of fracturing.</li> </ul> <p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).</li> </ul> <p><b>Exceeds Performance Measure</b></p> <ul style="list-style-type: none"> <li>Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The change in behaviour has been investigated and confirmed to be related to mining effects.</li> </ul>			<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> <li>No response required.</li> </ul> <p><b>Level 1</b></p> <ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Assess visual change along watercourse (upstream to downstream) to observe any spatial changes with consideration to climatic conditions.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment.</li> <li>Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base or confirmed as a mining-related impact).                         </li> </ul> <p><b>Level 2</b></p> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>Review Water Management Plan and modify if necessary.</li> <li>If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>Fortnightly, for sites within the active subsidence zone.</li> <li>Monthly, outside of the active subsidence period.</li> </ul> </li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul> <p><b>Exceeds Performance Measure</b></p> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with further longwall extraction.</li> </ul>			<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> <li><i>Responses as stated in Level 2.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> <li>Offer site visit with DPE and other key stakeholders.</li> <li>Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.</li> <li>Implement approved WCAMP, subject to land access.</li> </ul>		
	Longwall	Potential Impact Sites	Reference Sites																												
	LW S1A	BR12-QLa BR13-QRLa	BR16-QLa <sup>1,2</sup>																												
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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<sup>1</sup> Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval. <sup>2</sup> Data collected from BR11-QLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities.				

**WATER MANAGEMENT PLAN TARP – WMP7 CHANNEL STABILITY, SEDIMENTATION AND EROSION**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measure relevant<sup>1,2,3</sup>.</p> <p><b>TARP Objective</b> This TARP defines levels of variation in channel stability, erosion and sedimentation and the actions required to be implemented in response to each level of variation.</p> <p><b>Assessment Criteria</b> Comparison of baseline and operational condition of headwater streams and soft knickpoints.</p>	<p><b>Locations</b> As shown in Figure 23 of the Water Management Plan:</p> <ul style="list-style-type: none"> <li>• 10 headwater sites</li> <li>• Channel morphology sites CM1, CM4 and CM6</li> <li>• Soft knickpoints</li> </ul> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b></p> <ul style="list-style-type: none"> <li>• One observation prior to mining using fixed location photo points.</li> <li>• One inspection of 10 headwater sites.</li> </ul> <p><b>During Mining</b></p> <ul style="list-style-type: none"> <li>• Observations of knickpoint formation every month during the active subsidence period for sites within the active subsidence zone using fixed location photo points.</li> <li>• Annual inspection of 10 headwater sites.</li> </ul> <p><b>Post-mining</b></p> <ul style="list-style-type: none"> <li>• One observation of knickpoint formation at sites that are no longer within the active subsidence zone using fixed location photo points.</li> <li>• One inspection of 10 headwater sites.</li> <li>• Post-mining geomorphology survey following completion of mining.</li> </ul>	<p><b>Normal Condition</b></p>		
		<ul style="list-style-type: none"> <li>• No further development of soft knickpoints or increased erosion of headwater streams.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>• No response required.</li> </ul>
		<p><b>Level 1</b></p>		
		<ul style="list-style-type: none"> <li>• Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions as required for Normal Condition.</i></li> <li>• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, biodiversity monitoring results) necessary to inform assessment.</li> <li>• Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>○ Fortnightly, for sites within the active subsidence zone.</li> <li>○ Monthly, outside of the active subsidence period.</li> </ul>                             Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change or confirmed as a mining-related impact that resulted in increased erosion).                         </li> <li>• Consider and decide on reasonable and feasible options for remediation as relevant (e.g. enhanced vegetation establishment, rock armouring).</li> </ul>	<ul style="list-style-type: none"> <li>• Report trigger exceedance to DPE and key stakeholders.</li> <li>• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>• Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for approval (e.g. enhanced vegetation establishment, rock armouring).</li> <li>• Implement CMAs, subject to land access.</li> <li>• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<p><b>Level 2</b></p>		
<ul style="list-style-type: none"> <li>• Visually observed moderate increase in knickpoint development and/or moderate or greater increase in erosion and sedimentation of headwater streams.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions as stated in Level 1.</i></li> <li>• If mining related impact unconfirmed, increase monitoring and review of data frequency at sites where Level 2 has been reached or at other relevant sites, subject to land access, as follows:                             <ul style="list-style-type: none"> <li>○ Fortnightly, for sites within the active subsidence zone.</li> <li>○ Monthly, outside of the active subsidence period.</li> </ul> </li> <li>• Undertake an investigation to assess if the change in behaviour is related to mining effects (e.g. subsidence induced, other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>• Obtain specialist advice on further CMAs.</li> <li>• Review CMAs in light of findings from further investigations and consider additional remediation options.</li> <li>• Review Water Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Responses as stated in Level 1.</i></li> <li>• Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul> <p>If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>• Offer site visit with DPE and other key stakeholders.</li> <li>• Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>• Implement additional CMAs, subject to land access.</li> </ul>		

Notes:

<sup>1</sup> Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.

<sup>2</sup> It is noted that SSD 8445 does not specify a performance measure in relation to channel stability, sedimentation and erosion for all watercourses within the Subsidence Area<sup>1</sup>.

<sup>3</sup> It is noted that no soft knickpoints have been mapped in Hornes Creek or Bargo River. Therefore, assessment of 'decline in baseline channel stability' for these watercourses is not applicable.

**WATER MANAGEMENT PLAN TARP – WMP8 SHALLOW GROUNDWATER LEVEL (OPEN STANDPIPES AND PRIVATE BORES)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b></p> <ul style="list-style-type: none"> <li>No performance measure relevant.</li> </ul> <p><b>TARP Objective</b></p> <ul style="list-style-type: none"> <li>This TARP defines levels of deviation in groundwater level from 'normal' or baseline conditions and the actions to be implemented in response to each level deviation.</li> </ul> <p>This TARP supports TARP WMP13, where groundwater levels as they pertain to groundwater dependent ecosystems (GDEs) (Thirlmere Lakes) are covered.</p> <p><b>Assessment Criteria</b></p> <p>Bore specific trigger values based on baselines data for each reporting level.</p> <ul style="list-style-type: none"> <li></li> </ul>	<p><b>Locations</b></p> <p><b>Open standpipes</b></p> <p>Existing sites:</p> <ul style="list-style-type: none"> <li>P51a, P51b, P52, REA4, P53a, P53b, P53c, P54a, P54b, P54c, P55a, P55b, P55c, P56a, P56b, P56c</li> </ul> <p>Proposed sites:</p> <ul style="list-style-type: none"> <li>P50a, P50b, P50c, P57a, P57b</li> </ul> <p><b>Private bores</b></p> <ul style="list-style-type: none"> <li>GW109257, GW104008, GW112473, GW104659, GW062068, GW105395, GW104323</li> </ul> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b></p> <p>Continuous logger (hourly intervals) and monthly manual measurements of water level.</p> <p><b>During Mining</b></p> <p>Continuous logger (hourly intervals) and monthly manual measurements of water level.</p> <p><b>Post-mining</b></p> <p>Continuous record (where loggers installed) and quarterly manual measurements of water level for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Groundwater level remains consistent with baseline variability and pre-mining trends with reductions in groundwater level less than two meters.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Greater than 2 m water level reduction<sup>1</sup> for a period of 6 months following the commencement of extraction.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Undertake investigation to demonstrate if the decline will impact the long-term viability of the affected water supply works.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</li> </ul> <p>The investigation will be commenced/completed as efficiently as practicable. If the changes have been confirmed to be related to mining effects:</p> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Initiate negotiations with impacts landowners as soon as practicable. Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores, etc - as per Section 6.2.1.4 of the Water Management Plan).</li> </ul> <p>For Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores:</p> <ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan).</li> <li>Implement CMAs, subject to land access (finalise negotiations and implement the agreed "make-good" arrangements)</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Water level declines below the average between the 'maximum modelled drawdown' (Level 3 trigger) and the '2 m drawdown' (Level 1 trigger)<sup>1</sup> for a period of greater than 6 months following the commencement of extraction.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores:</p> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).</li> <li>Compare against base case and deterministic model scenarios<sup>2</sup>.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores:</p> <ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> </ul>
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Water level reduction greater than the maximum modelled drawdown<sup>1</sup> for a period of 6 months following the commencement of extraction.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores:</p> <ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase monitoring and review of data frequency for sites where Level 3 has been reached, subject to land access.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores:</p> <ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> </ul> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> </ul>		

Notes:

<sup>1</sup> Level 1, 2 and 3 triggers for water level reduction is provided in Table 6-3 in Appendix E of the Water Management Plan.

<sup>2</sup> "Deterministic" model scenario refers to the predictive scenario modelling utilised to determine the trigger level.

**WATER MANAGEMENT PLAN TARP – WMP9 SHALLOW GROUNDWATER PRESSURE (VWP SENSORS < 200 m DEPTH)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measure relevant.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in groundwater level from ‘normal’ or baseline conditions and the actions to be implemented in response to each level deviation.</p> <p><b>Assessment Criteria</b> Bore specific trigger values based on baselines data for each reporting level.</p>	<p><b>Locations</b> TBC032, TBC033, TBC009, TBC018, TBC0039 Monitoring of all VWP &lt; 200 m depth intakes.</p> <p>Reference Sites: TBC024, TBC027, TBC034, TBC038</p> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> VWPs recording pressure readings hourly. The system is telemetered so that data is transmitted continuously and can be accessed at any point in time.</p> <p><b>During Mining</b> VWPs recording pressure readings hourly. The system is telemetered so that data is transmitted continuously and can be accessed at any point in time.</p> <p><b>Post-mining</b> Continuous record of water level/pressure for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>No observable mining induced change at VWP intakes.</li> <li>Up to 5 m water level reduction in VWP intakes<sup>1</sup> following the commencement of extraction for a period of less than six months.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Greater than 5 m water level reduction in VWP intakes<sup>1</sup> following the commencement of extraction for a period of greater than six months.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related, commence/complete as soon as practicable.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Water level declines below the calculated Level 2 trigger – being the average of Level 1 (the ‘5 m drawdown’<sup>1</sup>) and Level 3 (the ‘maximum modelled drawdown’) – following the commencement of extraction for a period of greater than six months.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Review deeper VWP data at monitored sites. Determine whether additional review of data is required. Determine if review of additional existing VWP sites is required. Reasons for not increasing frequency of data review could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).</li> <li>Compare against base case and deterministic model scenarios<sup>2</sup>.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul>
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Water level reduction greater than the maximum modelled drawdown<sup>1</sup> following the commencement of extraction for a period of greater than six months.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase review of data frequency for sites where Level 3 has been reached.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Commence/complete as soon as practicable</li> <li>Undertake investigative to review model results in conjunction with field data.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> </ul>		
<p>Notes:</p> <p><sup>1</sup> Level 1, 2 and 3 triggers for water level reduction is provided in Table 6-4 in Appendix E of the Water Management Plan).</p> <p><sup>2</sup> “Deterministic” model scenario refers to the predictive scenario modelling utilised to determine the trigger level.</p>				

**WATER MANAGEMENT PLAN TARP – WMP10 GROUNDWATER LEVEL / PRESSURE DEEP VWPS (> 200 m DEPTH EXCLUDING MONITORING THE BULLI COAL SEAM)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measure relevant.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in groundwater level from 'normal' or baseline conditions and the actions to be implemented in response to each level deviation.</p> <p><b>Assessment Criteria</b> Bore specific trigger values based on modelled data for each reporting level. Model layers utilised to define predicted drawdown for each VWP logger provided in Table below.</p>	<p><b>Locations</b> TBC009, TBC0018, TBC020, TBC026, TBC032, TBC033, TBC039 Reference sites: TBC024, TBC027, TBC034, TBC038</p> <p>Monitoring of all VWP &gt; 200 m depth intakes excluding those monitoring the Bulli Coal Seam.</p> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> VWPs recording pressure readings hourly. The system is telemetered so that data is transmitted continuously and can be accessed at any point in time.</p> <p><b>During Mining</b> VWPs recording pressure readings hourly. The system is telemetered so that data is transmitted continuously and can be accessed at any point in time.</p> <p><b>Post-mining</b> Continuous record of water level/pressure for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Observed data does not exceed modelled impacts predicted drawdown by greater than 30 metres<sup>1</sup>.</li> <li>Observed drawdown exceeds the modelled predicted drawdown<sup>1</sup>, by greater than 30 metres for less than three consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Observed drawdown exceeds the modelled predicted drawdown<sup>1</sup>, by greater than 30 metres for greater than three consecutive months.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related to be commenced/completed as soon as practicable.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level monitoring results).</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
<ul style="list-style-type: none"> <li>Observed drawdown exceeds modelled predicted drawdown<sup>1</sup> by more than 30 metres greater than 6 consecutive months.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Determine suitability of increasing frequency of data review at sites where Level 2 has been reached. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).</li> <li>Review data in conjunction with VWP data from additional existing VWP sites.</li> <li>Compare against base case and deterministic model scenarios<sup>2</sup>.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Inclusion of more regional VWPs into data review to determine likely extent and depth of depressurisation.</li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul>		
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Observed drawdown exceeds modelled predicted drawdown<sup>1</sup> by 30 metres, for 12 consecutive months or more.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase review of data frequency for sites where Level 3 has been reached.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). To be commenced/completed as soon as practicable.</li> <li>Review base case and deterministic model scenarios<sup>2</sup> in conjunction with water pressure data and report findings.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> </ul>		

Notes:  
<sup>1</sup> Predicted drawdown refers to the drawdown as generated by the groundwater model and varies over time as extraction progresses. Observed drawdown will be plotted on a monthly basis against the predicted drawdown to determine if a trigger has occurred. Therefore, as the predicted drawdown will be constantly changing according to extraction progression, it is not possible to set a specific trigger limit.  
<sup>2</sup> "Deterministic" model scenario refers to the predictive scenario modelling utilised to assess the trigger level.

Sensor	Model Layer	Model Geology	Sensor	Model Layer	Model Geology
TBC09_322	8	BUSS Mid	TBC26_344	8	BUSS Mid
TBC09_343	8	BUSS Mid	TBC26_409	13	WBCS
TBC09_357	12	SBSS Lower	TBC26_432	15	Bulli Seam
TBC09_381	10	SPCS	TBC26_440	16	Eckersley
TBC09_391	15	Bulli Seam	TBC26_460	16	Eckersley
TBC09_397	17	Wongawilli	TBC32_200	8	BUSS Mid
TBC18_282	8	BUSS Mid	TBC32_237	8	BUSS Mid
TBC18_366	80.0	BUSS Mid	TBC32_257	8	BUSS Mid
TBC18_377	13	WBCS	TBC32_294	8	BUSS Mid
TBC18_404	15	Bulli Seam	TBC32_314	8	BUSS Mid
TBC18_426	17	Wongawilli	TBC33_247	8	BUSS Mid
TBC18_432	17	Wongawilli	TBC33_306	8	BUSS Mid

Number: TAH-HSEC-00360 – Appendix B Master TARP  
 Owner: Zina Ainsworth

Status: Released  
 Version: 4.0

Effective: Friday, April 12, 2024  
 Review: Monday, April 12, 2027

Performance Measure and Indicator, TARP Objective and Assessment Criteria			Monitoring Program		Management		
					Trigger	Action	Response
TBC20_211	8	BUSS Mid		TBC33_363	11	SBSS Upper	
TBC20_293	8	BUSS Mid		TBC33_384	16	Eckersley	
TBC20_375	8	BUSS Mid		TBC33_408	16	Eckersley	
TBC20_397	13	WBCS		TBC39_243	8	BUSS Mid	
TBC20_411	7	BUSS Upper		TBC39_299	8	BUSS Mid	
TBC20_434	17	Wongawilli		TBC39_354	11	SBSS Upper	
TBC20_439	4	HBSS Mid		TBC39_375	16	Eckersley	
TBC26_211	8	BUSS Mid		TBC39_402	16	Eckersley	
TBC26_278	8	BUSS Mid					

**WATER MANAGEMENT PLAN TARP – WMP11 GROUNDWATER QUALITY (OPEN STANDPIPES AND PRIVATE BORES)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management															
		Trigger	Action	Response													
<p><b>Performance Measure Feature</b> No performance measure relevant.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in groundwater level from 'normal' or baseline conditions and the actions to be implemented in response to each level deviation. This TARP supports TARP WMP13, where groundwater quality as it pertains to groundwater dependent ecosystems (GDEs) (Thirlmere Lakes) is covered.</p> <p><b>Assessment Criteria</b> Bore specific trigger values based on baselines data for each reporting level.</p>	<p><b>Locations</b> <b>Open standpipes</b> Existing sites: P51a, P51b, P52, REA4, P53a, P53b, P53c, P54a, P54b, P55a, P55b, P55c, P56a, P56b, P56c</p> <p>Proposed sites: P50a, P50b, P50c, P57a, P57b</p> <p><b>Private bores</b> GW109257, GW104008, GW112473, GW104659, GW062068, GW105395, GW104323</p> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> Monthly water quality sampling.</p> <p><b>During Mining</b> Monthly water quality sampling</p> <p><b>Post-mining</b> Quarterly sampling and analysis for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p> <p>Water Quality sample parameters:</p> <table border="1"> <tr> <td><b>Field Parameters</b></td> </tr> <tr> <td>PH</td> </tr> <tr> <td>EC</td> </tr> <tr> <td>TDS</td> </tr> <tr> <td>DO</td> </tr> <tr> <td><b>Laboratory Analysis</b></td> </tr> <tr> <td>Total alkalinity as CaCO<sub>3</sub>, HCO<sub>3</sub>, CO<sub>3</sub>, DOC</td> </tr> <tr> <td>Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO<sub>4</sub>)</td> </tr> <tr> <td>Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)</td> </tr> <tr> <td>Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)</td> </tr> <tr> <td>Total Nitrogen</td> </tr> <tr> <td>Total Phosphorus</td> </tr> <tr> <td>Ionic Balance (Total Anions and Total Cations)</td> </tr> </table>	<b>Field Parameters</b>	PH	EC	TDS	DO	<b>Laboratory Analysis</b>	Total alkalinity as CaCO <sub>3</sub> , HCO <sub>3</sub> , CO <sub>3</sub> , DOC	Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO <sub>4</sub> )	Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)	Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)	Total Nitrogen	Total Phosphorus	Ionic Balance (Total Anions and Total Cations)	<p><b>Normal Condition</b></p>		
		<b>Field Parameters</b>															
		PH															
		EC															
		TDS															
		DO															
<b>Laboratory Analysis</b>																	
Total alkalinity as CaCO <sub>3</sub> , HCO <sub>3</sub> , CO <sub>3</sub> , DOC																	
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Total Nitrogen																	
Total Phosphorus																	
Ionic Balance (Total Anions and Total Cations)																	
<ul style="list-style-type: none"> <li>No observable changes in salinity, pH or metals outside of the baseline variability.</li> </ul>			<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>													
<p><b>Level 1</b></p>																	
<ul style="list-style-type: none"> <li>Observed salinity and/or metals or pH outside of defined trigger levels<sup>1</sup> for 3 consecutive months or more. The effect <i>does not persist</i> after a significant rainfall recharge event.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>A similar trend or response is noted at other monitored bores or private groundwater bores.</li> </ul>			<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Actions as required for Normal Condition.</li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Undertake investigation to demonstrate if the change in quality will impact the long-term viability of the affected water supply works.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</li> </ul> <p>If the changes have been confirmed to be related to mining effects: For Private Bores:</p> <ul style="list-style-type: none"> <li>Initiate negotiations with impacted landholders as soon as practicable. Consider all reasonable and feasible options for remediation as relevant. This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners (e.g. provision of access to an alternative source of water).</li> </ul> <p>For Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul> <p>If the changes have been confirmed to be related to mining effects: For Private Bores:</p> <ul style="list-style-type: none"> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. provision of access to an alternative source of water as detailed in Section 6.2.1.4 of the Water Management Plan).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>													
<p><b>Level 2</b></p>																	
<ul style="list-style-type: none"> <li>Observed salinity and/or metals or pH outside of defined trigger levels<sup>1</sup> for 3 consecutive months or more. The effect <i>persists</i> after a significant rainfall recharge event.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The change in water quality is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>			<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Actions as stated in Level 1.</li> <li>Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water quality change).</li> <li>Review Water Management Plan and modify if necessary.</li> </ul> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Responses as stated in Level 1.</li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> </ul> <p>For Private Bores:</p> <ul style="list-style-type: none"> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> </ul>													
<p><b>Level 3</b></p>																	
<ul style="list-style-type: none"> <li>Observed salinity and/or metals or pH outside of defined trigger levels<sup>1</sup>, for greater than 6 consecutive months.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The change in water quality is determined not to be controlled by climatic or external anthropogenic factors.</li> </ul>			<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Actions as stated in Level 2.</li> <li>Increase monitoring and review of data frequency for sites where Level 3 has been reached, subject to land access.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>Undertake investigative report to demonstrate if the water quality change will impact the long-term viability of any affected water supply works.</li> </ul>	<p>For Private Bores and Open Standpipe Monitoring Bores</p> <ul style="list-style-type: none"> <li>Responses as stated in Level 2.</li> </ul> <p>For Private Bores:</p> <p>If ascertained impact is due to mining activities and has potential to impact long-term viability of supply for private groundwater bores:</p> <ul style="list-style-type: none"> <li>Develop a Rehabilitation Management Plan in consultation with DPE and landowner.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> </ul>													
<p>Notes: 1 Defined trigger levels for groundwater quality are listed in Table 6-5 of Appendix E of the Water Management Plan.</p>																	



**WATER MANAGEMENT PLAN TARP – WMP12 GROUNDWATER - SURFACE WATER INTERACTION**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measure relevant.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in surface water - groundwater interactions from 'normal' conditions and the actions to be implemented in response to each level deviation. The instigation of this TARP will be dictated by triggers exceedances in pertinent groundwater or surface water sites requiring further investigation of groundwater – surface water interactions.  Where groundwater – surface water connectivity indicates in a gaining stream, there is potential for groundwater supporting riparian vegetation. Consequently, Riparian vegetation in these situations could be a Groundwater Dependent Ecosystem (GDE), and the pertinent Performance Measure applicable: Negligible impacts including:  <ul style="list-style-type: none"> <li>Negligible change in groundwater levels; and</li> <li>Negligible change in groundwater quality.</li> </ul> Riparian GDEs are addressed through the Riparian Vegetation TARP (BMP3). Consultation through the ERG will link this TARP (WMP12) to BMP3 via actions in BMP3 to consider groundwater – surface water relationships when pertinent.</p> <p><b>Assessment Criteria</b> Bore specific trigger values based on baselines data for each reporting level. For this TARP, the aligned groundwater and surface water sites would be considered collectively to interpret potential changes/impacts to groundwater – surface water interaction.</p>	<p><b>Locations</b> <b>Open standpipes</b> P51a, P51b, P52, REA4, P53a, P53b, P53c P54a, P54b, P54c, P55a, P55b, P55c</p> <p>The aligned surface water and groundwater sites are as follows:</p> <ul style="list-style-type: none"> <li>P51a, P51b with surface water site BR2-QLa</li> <li>P52, REA4 with surface water site-TT14-QLa</li> <li>P53a, P53b, P53c with surface water site-TT14-QLa</li> <li>P54a, P54b, P54c with surface water site TT3-QLa</li> <li>P55a, P55b, P55c with surface water site TT1-QLa</li> </ul> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> Monthly manual measurements of water level and water quality.</p> <p><b>During Mining</b> Monthly manual measurements of water level and water quality.</p> <p><b>Post-mining</b> Continuous record (where loggers installed) and quarterly manual measurements of water level for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Observed (or inferred where not immediately neighbouring a surface water site) groundwater and surface water interaction remains consistent with baseline variability and/pre-mining trends, and decrease in groundwater inflow not persisting after significant rainfall recharge events.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at surface water monitoring site decline below Level 1 (in TARP WMP8) following the commencement of extraction.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <ul style="list-style-type: none"> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Observed (or inferred where not immediately neighbouring a surface water site) groundwater levels at aligned surface water monitoring site decline below Level 2 (in TARP WMP8) following the commencement of extraction.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factor.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Increase frequency of data review to fortnightly at sites where Level 2 has been reached, subject to land access. Reasons for not increasing frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).</li> <li>Compare against base case and deterministic model scenarios<sup>1</sup>.</li> <li>Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.</li> <li>Review surface water data to assess for surface water level decline at relevant site.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Water Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan, including reporting on relationship of observations to baseline and deterministic model scenarios, as necessary.</li> </ul>
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Inferred groundwater levels at surface water monitoring site decline below Level 3 (in TARP WMP8) following the commencement of extraction.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>The reduction in water level is determined not to be controlled by climatic or external anthropogenic factor.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase frequency of data review for sites where Level 3 has been reached, subject to land access.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate). Report to be commenced and completed as soon as practicable.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> </ul>		
<p>Notes: 1 <sup>1</sup>“Deterministic” model scenario refers to the predictive scenario modelling utilised to determine the trigger level.</p>				

WATER MANAGEMENT PLAN TARP – WMP13 GROUNDWATER BORES MONITORING FOR THIRLMERE LAKES

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management															
		Trigger	Action	Response													
<p><b>Performance Measure Feature</b> GDEs including Thirlmere Lakes<sup>1</sup>.</p> <p><b>Performance Measure</b> Negligible impacts including:</p> <ul style="list-style-type: none"> <li>Negligible change in groundwater levels; and</li> <li>Negligible change in groundwater quality.</li> </ul> <p><b>Performance Indicator</b> The performance measure will be considered to be exceeded if the groundwater levels or groundwater quality decline below Level 3 (in the relevant groundwater TARP triggers for water level and water quality – TARP WMP8 or WMP11) following the commencement of extraction, and the investigation outcomes indicate a mining related impact based on monitoring data for the Thirlmere Lakes.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation at Thirlmere Lakes from 'normal' conditions and the actions to be implemented in response to each level deviation.</p> <p><b>Assessment Criteria</b> Bore specific trigger values based on baselines data for each reporting level.</p>	<p><b>Locations</b> "Early warning" bores Existing sites: GW062068, GW104659, TBC039 (sensor at 65 metres in Hawkesbury Sandstone (HBSS)) Proposed sites: P50a, P50b, P50c</p> <p><b>Thirlmere Lakes bores (not trigger bores)</b> Existing sites: GW075409-1, GW075409-2, GW075410, GW075411 (paired with gauging station 212066)</p> <p>All monitoring locations are shown in Figure 24 of the Water Management Plan.</p> <p><b>Monitoring Frequency (for "early warning" bores)</b> <b>Pre-mining</b> Monthly manual measurements of water level and water quality.</p> <p><b>During Mining</b> Monthly manual measurements of water level and water quality.</p> <p><b>Post-mining</b> Continuous record (where loggers installed) and quarterly manual measurements of water level for a minimum of 12 months following the completion of active dewatering or as deemed necessary in consideration to the status of aquifer recovery or as required for future extraction activities.</p> <p>Water Quality sample parameters:</p> <table border="1"> <thead> <tr> <th>Field Parameters</th> </tr> </thead> <tbody> <tr><td>PH</td></tr> <tr><td>EC</td></tr> <tr><td>TDS</td></tr> <tr><td>DO</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Laboratory Analysis</th> </tr> </thead> <tbody> <tr><td>Total alkalinity as CaCO<sub>3</sub>, HCO<sub>3</sub>, CO<sub>3</sub>, DOC</td></tr> <tr><td>Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO<sub>4</sub>)</td></tr> <tr><td>Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)</td></tr> <tr><td>Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)</td></tr> <tr><td>Total Nitrogen</td></tr> <tr><td>Total Phosphorus</td></tr> <tr><td>Ionic Balance (Total Anions and Total Cations)</td></tr> </tbody> </table>	Field Parameters	PH	EC	TDS	DO	Laboratory Analysis	Total alkalinity as CaCO <sub>3</sub> , HCO <sub>3</sub> , CO <sub>3</sub> , DOC	Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO <sub>4</sub> )	Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)	Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)	Total Nitrogen	Total Phosphorus	Ionic Balance (Total Anions and Total Cations)	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>Groundwater levels and quality remain consistent with baseline variability and/pre-mining trends, and changes in groundwater levels/quality not persisting after significant rainfall recharge events.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		Field Parameters															
		PH															
		EC															
		TDS															
DO																	
Laboratory Analysis																	
Total alkalinity as CaCO <sub>3</sub> , HCO <sub>3</sub> , CO <sub>3</sub> , DOC																	
Dissolved Major Cations (Ca, K, Na, Mg, F, Cl, SO <sub>4</sub> )																	
Dissolved Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)																	
Total Metals (Al, As, Ba, Co, Cu, Pb, Li, Mn, Ni, Se, Sr, Zn, Fe)																	
Total Nitrogen																	
Total Phosphorus																	
Ionic Balance (Total Anions and Total Cations)																	
<p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>Level 1 trigger of TARP WMP8 for a minimum of two "early warning" bores.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Level 1 trigger of TARP WMP11 for a minimum of two "early warning" bores.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water level results).</li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <ul style="list-style-type: none"> <li>Consider all reasonable and feasible options for remediation as relevant (e.g. extending the depth of the bore, establishment of additional bores). This could include potential for implementation of make-good provisions as per Section 6.2.1.4 of the Water Management Plan for affected private bore owners.</li> <li>For monitoring sites relevant to Thirlmere Lakes or associated with surface water monitoring sites, initiate groundwater – surface water interaction TARP.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <ul style="list-style-type: none"> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. extending the depth of the bore, establishment of additional bores, compensation to affected landowners as detailed in Section 6.2.1.4 of the Water Management Plan).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>															
<p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>Level 2 trigger of TARP WMP8 for a minimum of three bores "early warning" bores</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Level 2 trigger of TARP WMP11 for a minimum of three bores ("early warning" bores and Thirlmere Lakes bores).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <ul style="list-style-type: none"> <li>Consider increasing monitoring and review of data at sites where Level 2 has been reached, subject to land access. Reasons for not increasing monitoring frequency could include solid identification causation that do not require further monitoring (e.g. singular anthropogenic impact resulting in water level change).</li> </ul> <p>Review Thirlmere Lakes monitoring bore data</p> <ul style="list-style-type: none"> <li>Compare against base case and deterministic model scenarios<sup>2</sup>.</li> <li>Review manual water level measurements for additional monitoring sites to identify potential spatial trends in water level decline.</li> <li>Review surface water data to assess for surface water level decline at relevant site.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Water Management Plan and modify if necessary.</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely. To be commenced/completed as soon as practicable.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Water Management Plan.</li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> </ul>															
<p><b>Exceeds Performance Measure</b></p>	<ul style="list-style-type: none"> <li>Level 3 trigger of TARP WMP8 for a minimum of four bores "early warning" bores</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Level 3 trigger of TARP WMP11 for a minimum of four bores ("early warning" bores and Thirlmere Lakes bores).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Review of Thirlmere Lakes bores indicated potential impacts resulting from extraction</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> </ul> <p>If the changes have been confirmed to be related to mining effects:</p> <ul style="list-style-type: none"> <li>Increase monitoring and review of data frequency for sites where Level 3 has been reached, subject to land access.</li> <li>Investigate reasons for the performance measure exceedance. To be commenced/completed as soon as practicable.</li> <li>Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> <li>Consider modifying mine plan.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE) describing remediation options and any preferred remediation measures or other course of action.</li> <li>Implement any reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> <li>Update numerical groundwater model and re-run predictive scenarios to determine the likely extent and depth of depressurisation</li> </ul>														

				<ul style="list-style-type: none"> <li>• in the vicinity of Thirlmere Lakes, and to determine whether any additional</li> <li>• management actions are required such as modifying the mine plan</li> </ul>
<p>Notes:</p> <p><sup>1</sup> It is noted that the only Groundwater Dependent Ecosystem (GDE) pertinent to the Tahmoor South Project is that of Thirlmere Lakes<sup>2</sup> "Deterministic" model scenario refers to the predictive scenario modelling utilised to determine the trigger level.</p>				

LAND MANAGEMENT PLAN TARP – LMP1 CLIFFS

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> Any cliff within Subsidence Area<sup>1</sup> beyond the extent of longwalls<sup>2</sup>.</p> <p><b>Performance Measure</b> Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 0.5% of the total face area of such cliffs within Subsidence Area).</p> <p><b>Performance Indicator</b> This performance measure will be considered to be triggered if more than 0.5% of the total face area of the cliffs within the 600 m Environmental Features Study Area is impacted by mining (e.g. by occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing).</p> <p><b>TARP Objective</b> This TARP defines measures to manage potential impacts on cliff lines and the actions required to be implemented in response to exceedance of defined trigger levels.</p> <p><b>Assessment Criteria</b> Extent of surface cracking, rockfalls, displacement or dislodgement of boulders or slabs observed.</p>	<p><b>Locations</b> Cliffs (BC1 and BC2) within the 600 m Environmental Features Study Area as illustrated in Figure 3 of the Land Management Plan.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> Visual inspection baseline before mining by a geotechnical engineer, subject to land access (Cliff BC1 prior to LW S6A, Cliff BC2 prior to LW S3A).</p> <p><b>During Mining</b> None required (as the identified cliffs are located near the finishing ends of the longwalls).</p> <p><b>Post-mining</b> Visual inspection at the completion of mining by a geotechnical engineer, subject to land access (Cliff BC1 after LW S6A, Cliff BC2 after LW S3A, S4A, S5A and S6A).</p>	<b>Normal Range of Condition</b>		
		<ul style="list-style-type: none"> <li>Surface cracking &lt; 10 mm wide above the cliff line, on the cliff face, or in the underside of overhangs.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Surface cracking &gt; 10 mm wide above the cliff line, on the cliff face, or in the underside of overhangs.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Discuss findings and obtain other relevant information from key specialises (e.g. subsidence monitoring results).</li> </ul> <p>If it is concluded that the cliff has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Consider and decide on reasonable and feasible options to support the cliff line, where relevant (e.g. repairing cracks, installation of support (e.g. rockbolts)).</li> <li>Erect hazard/warning signs and restrict access to areas where necessary.</li> <li>Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of potential cliff instability and monitoring results relevant to the cliff locations.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. repairing cracks, installation of support).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
<ul style="list-style-type: none"> <li>Rockfalls, collapse of overhang, displacement or dislodgement of boulders or slabs observed.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Determine the percentage area of impacted area relative to the total face area.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, or the effect is unrelated to mining such as environmental effects, tree root jacking).</li> </ul> <p>If it is concluded that cliff line has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Increase frequency of monitoring by geotechnical consultant during active subsidence period at sites where Level 2 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of potential cliff instability and monitoring results relevant to the cliff locations.</li> <li>Notify and consult with affected landowner(s).</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Land Management Plan and modify if necessary.</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> </ul> <p>If it is concluded that cliffs have been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders if relevant.</li> <li>Notify DAWE of any predictions of an exceedance of a performance measure (if relevant) within two business days.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> </ul>		
<b>Exceeds Performance Measure</b>				
<ul style="list-style-type: none"> <li>More than 0.5% of the total face area of the cliffs within the 600 m Environmental Features Study Area is impacted due to mining (e.g. by occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> <li>Consider modifying mine plan for future longwalls located near cliffs.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE) describing remediation options and any preferred remediation measures or other course of action.</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> </ul>		

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
				<ul style="list-style-type: none"> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>
<p>Notes:</p> <p><sup>1</sup> Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.</p> <p><sup>2</sup> It is noted that there are no cliff lines located directly above Longwalls S1A-S6A. Therefore, the performance measure for 'Any cliff located directly above longwalls' is not relevant.</p>				

LAND MANAGEMENT PLAN TARP – LMP2 NATURAL STEEP SLOPE (EXCLUDING CONSTRUCTED STEEP SLOPES ASSOCIATED WITH ROADS, RAILWAY AND THE TAHMOOR MINE SITE)

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> All land within the Subsidence Area<sup>1,2</sup>.</p> <p><b>Performance Measure</b> No greater subsidence impact or environmental consequences than predicted in the EIS<sup>3</sup>.</p> <p><b>Performance Indicator</b> This performance measure will be considered to be triggered if mining results in mine subsidence-induced slope instability, which would be a greater subsidence impact or consequence than predicted in the EIS.</p> <p><b>TARP Objective</b> This TARP defines measures to manage potential impacts on natural steep slopes<sup>4,5</sup> and the actions required to be implemented in response to exceedance of defined trigger levels.</p> <p><b>Assessment Criteria</b> Extent of surface cracking and stepping, ground bulging, buckling and shearing for steep slopes<sup>4</sup>.</p>	<p><b>Locations</b> Natural steep slopes (WC1, WC2 and WC3)</p> <p>Locations of natural steep slopes shown in Figure 3 of the Land Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Visual inspection baseline one month before active subsidence period by a geotechnical engineer, subject to land access.</p> <p><b>During Mining</b> Monthly visual inspection during active subsidence period by a geotechnical engineer, subject to land access.</p> <p><b>Post-mining</b> Quarterly visual inspection for 12 months following active subsidence period by a geotechnical engineer, or as required in accordance with a Rehabilitation Management Plan, subject to land access.</p>	<b>Normal Range of Condition</b>		
		<ul style="list-style-type: none"> <li>Discontinuous surface cracking &lt; 10 mm wide on steep slope (e.g. other than natural desiccation cracking).</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>No localised ground bulging, buckling or shearing.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Persistent<sup>6</sup> surface cracking 10 - 20 mm, or stepping (including shearing) across a crack 10 – 20 mm high on steep slope.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Localised ground bulging or buckling (between 100 – 200 mm) is observed on steep slope.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Geotechnical consultant inspection to assess cause and determine need for further action/investigation.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results).</li> </ul> <p>If it is concluded that the slope has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Consider and decide on reasonable and feasible options for remediation as relevant (e.g. backfilling or grout filling of surface cracking, re-profiling of compression humps).</li> <li>Erect warning signs and restrict access to areas where necessary.</li> <li>Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of potential slope instability and monitoring results relevant to the steep slope locations.</li> <li>Consider additional specific monitoring at the impact site and implement if feasible and effective.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. backfilling or grout filling of surface cracking, re-profiling of compression humps, re-direct drainage)</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
<ul style="list-style-type: none"> <li>Persistent<sup>5</sup> surface cracking &gt; 20 mm wide or stepping &gt; 20 mm high on slope.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Localised ground bulging or buckling &gt; 200 mm is observed on steep slope.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Slope instability &lt; 300 m<sup>3</sup> is observed or assessed as likely by a geotechnical engineer based on the extent of surface cracking or deformation.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced cracking, or the effect is unrelated to mining such as wet weather or other environmental effects).</li> </ul> <p>If it is concluded that the slope has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Increase frequency of monitoring by geotechnical consultant during active subsidence period at sites where Level 2 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of potential slope instability and monitoring results relevant to the steep slope locations.</li> <li>Assess potential for slope instability (and if an exceedance of the performance measure is possible).</li> <li>Consider actions to avoid or reduce the likelihood and/or consequence of slope instability and implement if feasible and effective.</li> <li>Notify and consult with affected landowner(s).</li> <li>Review CMAs with regards to the findings from further investigations and consider additional remediation options.</li> <li>Review Land Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> </ul> <p>If it is concluded that the slope has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders if relevant.</li> <li>Notify DAWE of any predictions of an exceedance of a performance measure (if relevant) within two business days.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> </ul>		
<b>Exceeds Performance Measure</b>				
<ul style="list-style-type: none"> <li>Subsidence-induced impacts or environmental consequences that result in slope instability &gt; 300 m<sup>3</sup>.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of mine subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed with DPE) describing temporary protection measures and long-term remediation options and any preferred remediation measures or other course of action.</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>		

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p>Notes:</p> <p><sup>1</sup> Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.</p> <p><sup>2</sup> Steep slopes are defined as greater than 18.4°. There are three steep slopes identified within the 600 m Environmental Features Study Area that are also located within the Subsidence Area<sup>1</sup>. As no other steep slopes have been identified within the 600 m Environmental Features Study Area, the performance measure for 'all land outside the subsidence area' is not relevant.</p> <p><sup>3</sup> EIS predictions are summarised in the Subsidence Predictions and Impact Assessment Report by MSEC (2022), and the relevant predictions for steep slopes is provided in Section 4.2 of the Land Management Plan.</p> <p><sup>4</sup> All road embankments and road cutting identified in Figure 3 of the Land Management Plan will be managed in accordance with the Wollondilly Shire Council Management Plan. All railway embankments within the Study Area will be managed in accordance with the Main Southern Railway Management Plan. All steep slopes on the Tahmoor Mine Site will be managed in accordance with the Tahmoor Mine Site Management Plan.</p> <p><sup>5</sup> TARPs for the management of constructed steep slopes will be provided as part of the Wollondilly Shire Council Management Plan (road embankments and cuttings), Main Southern Railway Management Plan (rail embankments) and the Tahmoor Mine Site Management Plan (mine site slopes). These yet to be prepared TARPs will be included in this Appendix B Master TARP following preparation and approval by the infrastructure owner.</p> <p><sup>6</sup> For the purpose of this TARP, persistent cracking is a tension crack/s that combine to form a potential backscarp or failure plane for slope instability. The length is proportional to the size of the failure surface.</p>				

LAND MANAGEMENT PLAN TARP – LMP3 FARM DAMS

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> Other privately-owned built features and improvements, including... farm dams.</p> <p><b>Performance Measure</b></p> <ul style="list-style-type: none"> <li>Always safe.</li> <li>Serviceability should be maintained wherever practicable.</li> <li>Loss of serviceability must be fully compensated.</li> <li>Damage must be fully repairable, and must be fully investigated and repaired or else replaced or fully compensated at the cost of the Applicant.</li> </ul> <p><b>Performance Indicator</b> This performance measure will be considered to be triggered if mining results in damage to a farm dam such that the dam is not safe and serviceable and/or any damages cannot be fully repairable and/or compensated.</p> <p><b>TARP Objective</b> This TARP defines measures to manage potential impacts on farm dams and the actions required to be implemented in response to exceedance of defined trigger levels.</p> <p><b>Assessment Criteria</b> Dam embankment integrity, water level and seepage observations.</p>	<p><b>Locations</b> Identified farm dams within the Study Area. Locations shown in Figure 8 of the Land Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Dam embankment integrity and water level observation by a geotechnical consultant one month before active subsidence period using fixed location photo points.</p> <p><b>During Mining</b> Dam embankment integrity and water level observation every week during the active subsidence period by Tahmoor Coal, and every month during the active subsidence period by a geotechnical consultant, using fixed location photo points.</p> <p><b>Post-mining</b> Dam embankment integrity and water level observation using fixed location photo points on a quarterly basis for 12 months following completion of active subsidence by a geotechnical consultant, or as required in accordance with a Rehabilitation Management Plan.</p>	<b>Normal Range of Condition</b>		
		<ul style="list-style-type: none"> <li>No cracks develop within dam embankment (e.g. other than natural desiccation cracking).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Development of isolated cracks (&gt; 10 mm wide) within the dam wall (e.g. other than natural desiccation cracking).</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Development of isolated seepage without suspended solids (e.g. clear water) from the face or toe of the farm dam embankment.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Geotechnical consultant inspection to assess cause and determine need for further action/investigation.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results).</li> </ul> <p>If it is concluded that dam has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Consider and decide on reasonable and feasible options for remediation as relevant (e.g. backfilling surface cracking, reinstatement).</li> <li>Notify and consult with affected landowner.</li> <li>Erect warning signs and restrict access to areas where necessary and permitted by the landowner.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE, SA NSW and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE, SA NSW and landowner with proposed corrective management actions (CMAs) for consultation (e.g. backfilling surface cracking, reinstatement).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Development of persistent longitudinal or arcuate cracking within dam wall &gt; 20 mm.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Development of seepage with suspended solids (e.g. turbid water) from the face or toe of the farm dam embankment.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency at sites where Level 2 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequence of potential dam break, and monitoring results relevant to the dam locations.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Land Management Plan and modify if necessary.</li> <li>Geotechnical Consultant to advise on the need for a reduction in the dam water level (e.g. half dam volume) to reduce the risk of a dam break failure.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Advise DPE, SA NSW and key stakeholders of any required amendments to Land Management Plan.</li> <li>Provide findings of CMA review to DPE, SA NSW and landowner for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> </ul>
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Development of persistent longitudinal or arcuate cracking within dam wall &gt; 20 mm.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Subsidence monitoring identifies subsidence-induced impacts or environmental consequences that result in any slope instability to the farm dam embankment.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, or the effect is unrelated to mining such as environmental effects).</li> </ul> <p>If it is concluded that the dam has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Increase frequency of monitoring by geotechnical consultant during active subsidence period at sites where Level 3 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequence of potential dam break, and monitoring results relevant to the dam locations.</li> <li>Reduction of dam water level in accordance with advice from Geotechnical Consultant.</li> <li>Review predictions of mine subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> <li>Assess potential for the safety and serviceability of the dam to be lost (and if an exceedance of the performance measure is possible).</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> </ul> <p>If it is concluded that the dam has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Repair or replace farm dam in consultation with DPE and SA NSW and landowner.</li> <li>Provide alternate water supply for landowner, if required.</li> <li>Notify DAWE of any predictions of an exceedance of a performance measure (if relevant) within two business days.</li> </ul>		
<b>Exceeds Performance Measure</b>				

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Owner: Zina Ainsworth

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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
		<ul style="list-style-type: none"> <li>Mining results in damage to a farm dam such that the dam is not safe and serviceable and/or any damages cannot be fully repairable and/or compensated.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 3.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of mine subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 3.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed with DPE) describing temporary protection measures and long-term remediation options and any preferred remediation measures or other course of action.</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>

LAND MANAGEMENT PLAN TARP – LMP4 AGRICULTURAL LAND

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measures relevant.</p> <p><b>TARP Objective</b> This TARP defines measures to manage potential impacts on agricultural land and the actions required to be implemented in response to exceedance of defined trigger levels.</p> <p><b>Assessment Criteria</b> Changes to agricultural land such as to impact the use of the land for agricultural productivity<sup>1</sup>.</p>	<p><b>Locations</b> Identify agricultural land uses within the Study Area (refer to Figure 8 in the Land Management Plan).</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> Visual inspection prior to the commencement of mining from fixed photo points.</p> <p><b>During Mining</b> Weekly inspections along local roads and farm dams.</p> <p><b>Post-mining</b> Visual inspection at the completion of each longwall for land within the predicted limit of subsidence for each longwall.</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Negligible impact to agricultural productivity or use of land, negligible effects from mining-induced changes in slope (tilt) on ponding / flooding (reversal of natural slope), or increase in soil / tunnel erosion (increase in slope).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Minor impact to agricultural land from subsidence resulting in increased flooding or ponding within predicted impacts.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Minor impact to drainage systems due to increased ponding / flooding or increased soil / tunnel erosion that can be remediated.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>Surface cracking affecting safety of livestock.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results).</li> <li>Consider and decide on reasonable and feasible options for remediation as relevant (e.g. adjustment of farm gate levels, fence tensioning, backfilling of surface cracking).</li> <li>Consider increasing monitoring and review of data frequency at sites where Level 1 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of further impacts on agricultural land use and monitoring results relevant to the agricultural land.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. adjustment of farm gate, fence tensioning, backfilling of surface cracking).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
<b>Level 2</b>				
<ul style="list-style-type: none"> <li>Significant impact and change to agricultural land functionality or agricultural productivity greater than predicted (e.g. excessive subsidence and mining-induced changes in slope (tilt), resulting in substantial ponding / flooding (reversal in natural slope), excessive soil / tunnel erosion (increase in slope), or excessive surface cracking affecting safety of livestock that require livestock to be relocated from a property in order to rehabilitate the land.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, or the effect is unrelated to mining such as environmental effects).</li> </ul> <p>If it is concluded that agricultural land has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Increase frequency of monitoring during active subsidence period at sites where Level 2 has been reached, subject to land access. Considerations will take into account position of LW face relative to impact site, rate of longwall retreat, current weather conditions, development of conventional subsidence above longwall, consequences of further impacts on agricultural land use and monitoring results relevant to the agricultural land.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Land Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> </ul> <p>If it is concluded that the agricultural land has been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders if relevant.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> </ul>		

Notes:  
<sup>1</sup> It is noted that the management of rural structures used for agricultural and farming purposes located in the Study Area are discussed in the Built Features Management Plan (e.g. poultry sheds, greenhouses, greenhouses, hothouses, irrigation systems, and tanks), the Water Management Plan (e.g. watercourses and groundwater bores), and the separate TARP for farm dams as part of this Land Management Plan.

**BIODIVERSITY MANAGEMENT PLAN TARP – BMP1 AQUATIC HABITAT AND MACROINVERTEBRATE INDICATORS (STREAM HEALTH)**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> Aquatic habitat</p> <p><b>Performance Measure</b> Negligible environmental consequences to aquatic and riparian ecosystems beyond those predicted in the EIS<sup>1</sup>.</p> <p><b>Performance Indicator</b> This performance measure will be considered to be triggered if subsidence impacts cannot be remediated in a manner that restores aquatic habitat.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in aquatic habitat and associated stream health from normal conditions and the actions required to be implemented in response to each level of deviation.</p> <p><b>Assessment Criteria</b> Reduction in aquatic habitat through loss of pools or associated reduction in stream health (AUSRIVAS assessment).</p>	<p><b>Locations</b></p> <ul style="list-style-type: none"> <li>AUSRIVAS stream health sampling at aquatic ecology monitoring sites 7, 8, 12, 13, 16, 17.</li> <li>Quantitative macroinvertebrate sampling at aquatic ecology monitoring sites 7, 8, 12, 13, 14, 15, 16, 17.</li> </ul> <p>Refer to Figure 9 of the Biodiversity Management Plan for the location of aquatic ecology monitoring sites.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Bi-annually (Spring and Autumn).</p> <p><b>OR</b></p> <p><b>During Mining</b> Bi-annually (Spring and Autumn).</p> <p><b>Post-mining</b> Bi-annually (Spring and Autumn) for 12 months following the completion of LW S6A or as required in accordance with a Rehabilitation Management Plan and/or if required to monitor a corrective management action(s).</p>	<b>Normal conditions</b>		
		<ul style="list-style-type: none"> <li>Visual monitoring indicates aquatic pool habitat parameters are similar to baseline observations at aquatic ecology monitoring sites.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>AUSRIVAS score equal to or greater than Band C.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for two consecutive sampling occasions.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>AUSRIVAS score of Band D recorded for two consecutive sampling occasions at one or more aquatic ecology monitoring site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation of BACI quantitative macroinvertebrate data to assess Level 1 observations and determine if mining related or the response to environmental conditions (e.g. drought) within the catchment.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results).</li> <li>Consider and decide on reasonable and feasible options for remediation, where relevant (e.g. limestone cobble for pH management).</li> <li>Following investigation, any declines detected that are not attributable to mining impacts (e.g. are a result of environmental conditions or stochastic events) are to be considered 'normal condition' and are continued to be included in the ongoing development of the ecological monitoring dataset.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for pH management).</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Continue monitoring to determine if a Level 2 TARP trigger will occur.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for three consecutive sampling occasions.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>AUSRIVAS score of Band D recorded for three consecutive sampling occasions at one or more aquatic ecology monitoring site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency where Level 2 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the inclusion of additional sites within impact area.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Biodiversity Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Biodiversity Management Plan.</li> <li>Continue monitoring to determine if a Level 3 TARP trigger will occur.</li> </ul>
		<b>Level 3</b>		
<ul style="list-style-type: none"> <li>Visual monitoring indicates reduction in aquatic pool habitat compared to baseline observations at aquatic ecology monitoring sites for four consecutive sampling occasions.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>AUSRIVAS score of Band D recorded for four consecutive sampling occasions at one or more aquatic ecology monitoring site(s).</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase monitoring frequency for sites where Level 3 has been reached and at corresponding reference sites, subject to land access.</li> <li>Add additional monitoring sites as required.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effects unrelated to mining or the prevailing climate).</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 2.</i></li> <li>If it is concluded that pools/aquatic habitat have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, <b>subject to land access.</b></li> <li>Continue monitoring to determine if an exceedance of the performance measure will occur.</li> </ul> </li> </ul>		
<b>Exceeds Performance Measure</b>				
<ul style="list-style-type: none"> <li>Structural integrity of the bedrock base of permanent pools or controlling rockbars in third order and above reaches of Teatree Hollow and Teatree Hollow tributary and/or pool TT2 cannot be restored e.g. pool holding capacity is not reinstated to pre-mining conditions after WCAMP completion.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 3.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 3.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>		

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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
Notes: <sup>1</sup> EIS predictions for aquatic habitat are summarised in Table 19 of the Biodiversity Management Plan.				

**BIODIVERSITY MANAGEMENT PLAN TARP – BMP2 AMPHIBIAN POPULATIONS**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> No performance measures relevant.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in amphibian populations and habitat from normal conditions and the actions required to be implemented in response to each level of deviation.</p> <p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>Decline in amphibian populations (species abundance and richness) attributed to mining effects.</li> <li>The presence of a significant interaction (P-value &lt;0.05) between Before/After and Control/Impact indicates an effect on amphibian assemblages<sup>1,2</sup>.</li> </ul>	<p><b>Locations</b> Amphibian monitoring and photo-point monitoring at all amphibian monitoring sites (sites i01-i03 and c04-c06).</p> <p>Refer to Figure 10 of the Biodiversity Management Plan for the location of amphibian monitoring sites.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Bi-annually (Spring and Autumn).</p> <p><b>During Mining</b> Bi-annually (Spring and Autumn).</p> <p><b>Post-mining</b> Bi-annually (Spring and Autumn) for 12 months following the completion of LW S6A or as required in accordance with a Rehabilitation Management Plan and/or if required to monitor a corrective management action(s).</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Monitoring indicates amphibian populations (richness and abundance) are stable<sup>3</sup> and habitat parameters are predominantly within a reasonable range of baseline data (supported by statistical analyses).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Monitoring indicates amphibian populations (species abundance) have reduced significantly below baseline values<sup>4</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Actions as required for Normal Condition.</li> <li>Undertake an investigation of quantitative/qualitative monitoring data to assess the cause and determine if differences are mining related or are in the response to environmental conditions (e.g. drought) within the catchment. Cross check biodiversity monitoring data against other related environmental data (e.g. aquatic monitoring results or subsidence monitoring results) upon identification of the potential trigger.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results).</li> <li>Investigate whether any surface water TARP indicators have been triggered.</li> <li>Consider and decide on reasonable and feasible options for remediation, where relevant.</li> <li>Following investigation, any significant differences detected that are not attributable to mining impacts (e.g. are a result of environmental conditions or stochastic events) are to be considered 'normal condition' and are continued to be included in the ongoing development of the ecological monitoring dataset.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation.</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Continue monitoring to determine if a Level 2 TARP trigger will occur.</li> </ul>
		<b>Level 2</b>		
<ul style="list-style-type: none"> <li>Monitoring indicates amphibian populations (species abundance and richness) have reduced significantly below baseline values<sup>4</sup> over two consecutive sampling seasons that, following investigation, is attributed to mining impacts<sup>5</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Actions as stated in Level 1.</li> <li>Consider increasing monitoring and review of data frequency where Level 2 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Biodiversity Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Responses as stated in Level 1.</li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> <li>Continue monitoring to determine if a Level 3 TARP trigger will occur.</li> </ul>		
<b>Level 3</b>				
<ul style="list-style-type: none"> <li>Monitoring indicates amphibian populations (species abundance and richness) have reduced significantly below baseline values<sup>4</sup> over four consecutive sampling seasons that, following investigation, is attributed to mining impacts<sup>5</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Actions as stated in Level 2.</li> <li>Increase monitoring and review of data frequency for sites where Level 3 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area, where relevant.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects.</li> </ul>	<ul style="list-style-type: none"> <li>Response as stated in Level 2.</li> <li>If it is concluded that amphibian habitat have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> </ul> </li> </ul>		

Notes:

<sup>1</sup> Multivariate statistical analyses have been performed to test whether there is a difference between frog assemblages at future control and impact (using the baseline data). The non-significant interaction (P-value of >= 0.05) between Control/Impact sites indicates that established future Control and Impact sites are suitable for mining and post-mining monitoring purposes, as they support similar amphibian assemblages (taxa and numbers of individuals), and similar microhabitats.

<sup>2</sup> Baseline amphibian surveys did not identify the presence of Red-crowned Toadlet (*Pseudophryne australis*) (listed as Vulnerable under the BC Act) or Giant Burrowing Frog (*Heleioporus australiacus*) (listed as Vulnerable under the BC Act and EPBC Act) within the LW S1A-S6A Study Area. Red-crowned Toadlet and Giant Burrowing Frog were recorded during the Tahmoor Amphibian Monitoring Program in 2013, outside the Study Area for LW S1A-S6A. Giant Burrowing Frog was recorded at Cow Creek, and Red-crowned Toadlet was recorded at Hornes Creek (Niche, 2018a). If recorded in the future during amphibian monitoring, the presence of threatened frog species would be reported, and further investigations will be initiated to determine ongoing presence of threatened species in the locality and assess whether updates to the BMP and associated TARPs are required.

<sup>3</sup> Stable is defined as no significant interaction between Before/After and Control/Impact indicating the mining activity has not affected amphibian assemblages (which comprises of all detected amphibian species recorded during monitoring surveys).

<sup>4</sup> Determined by BACI interaction analyses. Significantly below baseline values is determined to be a P-value result of less than or equal to 0.05 for Before, After, either/or Control and Impact groups. The detection of a significant interaction between Before/After and Control/Impact indicates the mining activity has an effect on amphibian assemblages. All detected amphibian species are to be recorded during monitoring surveys. The amphibian data will be subject to statistical hypothesis testing. Species richness and abundance are population metrics used to assess amphibian populations in the locality.

<sup>5</sup> Mining impacts results in a decline in water quantity or quality influencing habitats.

**BIODIVERSITY MANAGEMENT PLAN TARP – BMP3 RIPARIAN VEGETATION**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b></p> <p>1. Aquatic habitat.</p> <p>2. GDEs including Thirlmere Lakes<sup>1</sup>.</p> <p><b>Performance Measure</b></p> <p>1. Negligible environmental consequences to aquatic and riparian ecosystems beyond those predicted in the EIS<sup>2</sup>.</p> <p>2. Negligible impacts including:</p> <ul style="list-style-type: none"> <li>Negligible change in groundwater levels; and</li> <li>Negligible change in groundwater quality.</li> </ul> <p><b>Performance Indicator</b></p> <p>1. This performance measure will be considered to be triggered if subsidence impacts cannot be remediated in a manner that restores aquatic habitat.</p> <p>2. The performance measure will be considered to be exceeded if the groundwater levels or groundwater quality decline below Level 3 (in the relevant groundwater TARP triggers for water level and water quality – TARP WMP8 or WMP11) following the commencement of extraction, and the investigation outcomes indicate a mining related impact based on monitoring data for riparian vegetation.</p> <p><b>TARP Objective</b></p> <p>This TARP defines levels of deviation in riparian vegetation condition from normal conditions and the actions required to be implemented in response to each level of deviation.</p> <p><b>Assessment Criteria</b></p> <p>Dieback and reduced condition of riparian vegetation community within the Study Area.</p>	<p><b>Locations</b></p> <p>Permanent floristic plots, vegetation condition assessment, photo-point monitoring and plant taxonomy at all riparian vegetation monitoring sites (sites i01-i03 and c04-c06).</p> <p>Refer to Figure 10 of the Biodiversity Management Plan for the location of monitoring sites.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b> Bi-annually (Spring and Autumn).</p> <p><b>During Mining</b> Bi-annually (Spring and Autumn).</p> <p><b>Post-mining</b> Bi-annually (Spring and Autumn) for 12 months following the completion of LW S6A or as required in accordance with a Rehabilitation Management Plan and/or if required to monitor a corrective management action(s).</p>	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>Monitoring indicates riparian vegetation parameters are predominantly within a reasonable range of baseline data<sup>3</sup>, specifically that Vegetation Integrity (VI) scores are within 10% of baseline.</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Monitoring indicates native vegetation cover (percent cover) is within a reasonable range of baseline data<sup>4</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<p><b>Level 1</b></p> <ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of average baseline score, over two consecutive sampling event (and cannot be attributed to climatic conditions or natural attrition).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Monitoring indicates native vegetation cover (percent cover) has reduced significantly below baseline values<sup>4</sup> over two consecutive sampling event.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation of quantitative/qualitative data to assess the cause and determine if mining related or the response to environmental conditions (e.g. drought) within the catchment.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results).</li> <li>Consider and decide on reasonable and feasible options for remediation, where relevant.</li> <li>Following investigation, any significant differences detected that are not attributable to mining impacts (e.g. are a result of environmental conditions or stochastic events) are to be considered 'normal condition' and are continued to be included in the ongoing development of the ecological monitoring dataset.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation.</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Continue monitoring to determine if a Level 2 TARP trigger will occur.</li> </ul>
		<p><b>Level 2</b></p> <ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of baseline score, over four consecutive sampling event (and cannot be attributed to climatic conditions or natural attrition).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Monitoring indicates native vegetation cover (percent cover) has reduced significantly below baseline values<sup>4</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Actions as stated in Level 1.</li> <li>Consider increasing monitoring and review of data frequency where Level 2 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Biodiversity Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> <li>Continue monitoring to determine if a Level 3 TARP trigger will occur.</li> </ul>
		<p><b>Level 3</b></p> <ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of baseline score, over six consecutive sampling event (and cannot be attributed to climatic conditions or natural attrition).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Monitoring indicates native vegetation cover (percent cover) has reduced significantly below baseline values<sup>4</sup> over six consecutive sampling events.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase monitoring and review of data frequency for sites where Level 3 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area, where relevant.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>	<ul style="list-style-type: none"> <li><i>Response as stated in Level 2.</i></li> <li>If it is concluded that riparian habitat have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> <li>Continue monitoring to determine if an exceedance of the performance measure will occur.</li> </ul> </li> </ul>
		<p><b>Exceeds Performance Measure</b></p> <ul style="list-style-type: none"> <li>This performance measure will be triggered if subsidence impacts cannot be remediated in a manner that restores habitat.</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>A mining related impact has occurred to riparian vegetation (Level 3 triggered of this TARP) and a Level 3 TARP trigger has occurred for groundwater levels or groundwater quality (Level 3 of TARP WMP8 or WMP11) in a corresponding location.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 3.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> <li>Consider modifying mine plan.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 3.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>

Number: TAH-HSEC-00360 – Appendix B Master TARP  
 Owner: Zina Ainsworth

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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p>Notes:</p> <p><sup>1</sup> Where groundwater – surface water connectivity indicates a gaining stream, there is potential for riparian vegetation to be supported by groundwater. Consequently, riparian vegetation in these situations could be a Groundwater Dependent Ecosystem (GDE). Discussion of findings through the Tahmoor Coal Environmental Response Group will enable linkage of this TARP to WMP12 to consider groundwater – surface water relationships when pertinent.</p> <p><sup>2</sup> EIS predictions for riparian vegetation are summarised in Table 18 of the Biodiversity Management Plan.</p> <p><sup>3</sup> No significant interaction between Before/After and Control/Impact indicating the mining activity has not affected riparian assemblages.</p> <p><sup>4</sup> Determined by BACI interaction analyses. Significantly below baseline values is determined to be a P-value result of less than or equal to 0.05 for Before, After, either/or Control and Impact groups. The detection of a significant interaction between Before/After and Control/Impact indicates the mining activity has an effect on riparian assemblages.</p>				

**BIODIVERSITY MANAGEMENT PLAN TARP – BMP4 THREATENED SPECIES, THREATENED POPULATIONS AND ENDANGERED ECOLOGICAL COMMUNITIES**

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> Threatened species, threatened populations, or endangered ecological communities.</p> <p><b>Performance Measures</b> No greater subsidence impacts or environmental consequences than predicted in the EIS<sup>1</sup>. Negligible impacts on threatened species, populations, or communities due to remediation of subsidence cracking.</p> <p><b>Performance Indicator</b> This performance measure will be triggered if subsidence impacts cannot be remediated in a manner that restores habitat.</p> <p><b>TARP Objective</b> This TARP defines levels of deviation in Shale Sandstone Transition Forest (STFF) TEC and threatened flora species from normal conditions and the actions required to be implemented in response to each level of deviation.</p> <p><b>Assessment Criteria</b> Decline or significant negative change in condition class of the TEC and threatened flora species (e.g. <i>Pomaderris brunnea</i>, <i>Persoonia bargoensis</i> and <i>Grevillea parviflora</i> subsp. <i>parviflora</i>).</p> <p>This TARP excludes the monitoring of threatened fauna species and habitat<sup>2,3</sup>.</p>	<p><b>Locations</b> Permanent floristic plots within the 600 m buffer study area, subject to land access.</p> <p>Refer to Figure 10 of the Biodiversity Management Plan for the location of monitoring sites.</p> <p><b>Monitoring Frequency</b> <b>Pre-mining</b> Annually</p> <p><b>During Mining</b> Bi-annually (Spring and Autumn).</p> <p><b>Post-mining</b> Bi-annually (Spring and Autumn) for 12 months following the completion of LW S6A or as required in accordance with a Rehabilitation Management Plan and/or if required to monitor a corrective management action(s).</p>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Monitoring indicates STFF TEC parameters are within a reasonable range of average baseline data (Vegetation Integrity (VI) scores are within reasonable range of baseline [within 10 %]).</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Monitoring indicates target threatened flora species<sup>4</sup> numbers are stable (within reasonable range of baseline numbers).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of average baseline score.</li> </ul> <p>AND/ OR</p> <ul style="list-style-type: none"> <li>Monitoring indicates target threatened flora species<sup>4</sup> are in decline or signs dieback are evident.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>Undertake an investigation of quantitative/qualitative data to assess the cause and determine if mining related or the response to environmental conditions (e.g. drought) within the catchment.</li> <li>Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results).</li> <li>Consider and decide on reasonable and feasible options for remediation, where relevant.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation.</li> <li>Implement CMAs, subject to land access.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Continue monitoring to determine if a Level 2 TARP trigger will occur.</li> </ul>
		<b>Level 2</b>		
		<ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of the average baseline VI score, over two consecutive sampling events.</li> </ul> <p>AND/ OR</p> <ul style="list-style-type: none"> <li>Monitoring indicates target threatened flora species<sup>4</sup> are in decline or visual signs of dieback are continued, over two consecutive sampling seasons.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions stated in Level 1.</i></li> <li>Consider increasing monitoring and review of data frequency where Level 2 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area.</li> <li>Review CMAs in light of findings from further investigations and consider additional reasonable and feasible options.</li> <li>Review Biodiversity Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>Provide findings of CMA review to DPE and key stakeholders for consultation.</li> <li>Implement additional CMAs, subject to land access.</li> <li>Advise DPE and key stakeholders of any required amendments to Land Management Plan.</li> <li>Continue monitoring to determine if a Level 3 TARP trigger will occur.</li> </ul>
		<b>Level 3</b>		
<ul style="list-style-type: none"> <li>Monitoring indicates the VI score has reduced further than 10 % of baseline score, over four consecutive sampling event.</li> </ul> <p>AND/ OR</p> <ul style="list-style-type: none"> <li>Monitoring indicates target threatened flora species<sup>4</sup> are in decline or visual signs of dieback are continued, over four consecutive sampling seasons.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 2.</i></li> <li>Increase monitoring and review of data frequency to fortnightly at sites where Level 3 has been reached and at other relevant sites, subject to land access.</li> <li>Consider the addition of monitoring sites within impact area, where relevant.</li> <li>Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing, other catchment changes, effect unrelated to mining or the prevailing climate).</li> <li>Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>	<ul style="list-style-type: none"> <li><i>Response as stated in Level 2.</i></li> </ul> <p>If it is concluded that threatened species, habitats or endangered ecological communities have been damaged by subsidence impacts:</p> <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> <li>If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> <li>Continue monitoring to determine if an exceedance of the performance measure will occur.</li> </ul>		
<b>Exceeds Performance Measure</b>				
<ul style="list-style-type: none"> <li>Subsidence impacts cannot be remediated in a manner that restores habitat for TECs, or threatened flora.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 3.</i></li> <li>Investigate reasons for the performance measure exceedance.</li> <li>Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 3.</i></li> <li>Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>		

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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p>Notes:</p> <p><sup>1</sup> EIS predictions for threatened species, threatened populations and endangered ecological communities are summarised in Section 4.1 of the Biodiversity Management Plan.</p> <p><sup>2</sup> Baseline amphibian surveys did not identify the presence of Red-crowned Toadlet (<i>Pseudophryne australis</i>) (listed as Vulnerable under the BC Act) or Giant Burrowing Frog (<i>Heleioporus australiacus</i>) (listed as Vulnerable under the BC Act and EPBC Act) within the LW S1A-S6A Study Area. Red-crowned Toadlet and Giant Burrowing Frog were recorded during the Tahmoor Amphibian Monitoring Program in 2013, outside the Study Area for LW S1A-S6A. Giant Burrowing Frog was recorded at Cow Creek, and Red-crowned Toadlet was recorded at Hornes Creek (Niche, 2018a). If recorded in the future during amphibian monitoring, the presence of threatened frog species would be reported, and further investigations will be initiated to determine ongoing presence of threatened species in the locality and assess whether updates to the BMP and associated TARPs are required.</p> <p><sup>3</sup> During the 2020 biodiversity surveys, there were 11 threatened fauna species encountered within the LW S1A-S6A Study Area (Niche 2020). Potential habitat for these species within the Tahmoor South EIS Project Area, includes riparian hollow-bearing trees, potential overhangs (only two cliff lines are being monitored within the project area), and disused buildings. No caves were encountered during surveys completed by Niche, nor have any caves been reported by MSEC (2018). Furthermore, cliff line environments which may indicate cave-like habitat, are generally limited to the Nepean River to the north of the Study Area with some scattered cliff lines along the Dogtrap Creek, and Hornes Creek. Given the cliffs are located outside the predicted limit of subsidence as a result of the extraction of LW S1A-S6A, the probability that cave roosting habitat would be impacted is very low. Furthermore, no hollow-bearing trees, bridges or culverts within the Study Area that provide roosting habitat for threatened bats are likely to be substantially impacted by subsidence. As such, roosting habitat for threatened microbats is unlikely to be impacted by the extraction of LW S1A-S6A. Subsidence is unlikely to affect any resources or habitat features on which these species depend such that it would result in any measurable changes to their breeding or foraging behaviour or habitat. Further, individuals have not been incidentally encountered during other baseline monitoring surveys (irregular occurrence in the study area). Therefore, as these threatened fauna species are considered highly mobile (consisting of bats and birds) and the species (and habitat) is considered unlikely to be impacted by mining practices, they have not been addressed further in the biodiversity TARPs.<sup>4</sup> Threatened flora species monitored are <i>Pomaderris brunnea</i>, <i>Persoonia bargoensis</i> and <i>Grevillea parviflora</i> subsp. <i>Parviflora</i>.</p>				

HERITAGE MANAGEMENT PLAN TARP – HMP1 ABORIGINAL CULTURAL HERITAGE SITES

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
<p><b>Performance Measure Feature</b> Aboriginal cultural heritage sites (listed in Appendix 4 of SSD 8445).</p> <p><b>Performance Measure</b> No greater subsidence impacts or loss of heritage values than predicted in the EIS<sup>1</sup>.</p> <p><b>Performance Indicator</b> <b>Open camp site (Remembrance Drive 2013.1) and Isolated find (TC14-2-19)</b> No performance indicators are currently established as impacts are predicted to be negligible<sup>2</sup>.</p> <p><b>Rockshelter with art and deposit (Teatree Hollow 2013.1)</b> This performance measure will be considered to be triggered if more than 10% of rockshelters (i.e. more than two) in the Tahmoor South Domain (including A and B series longwalls) are impacted by:</p> <ul style="list-style-type: none"> <li>subsidence monitoring identifies obvious perceptible change, e.g. rockfall, cracking, or toppling within rockshelters; and</li> <li>these subsidence impacts result in impacts to the heritage values of the site, e.g. cracking, spalling or collapse of the art work panels that result in damage or loss of the art.</li> </ul> <p>This performance measure cannot be exceeded during the extraction of the A series longwalls, even if the above-mentioned performance indicators are fully triggered for Teatree Hollow 2013.1. Such impacts would not exceed the 10% threshold of impacts to the 19 total rockshelters in the longwalls A and B Study Area.</p> <p><b>TARP Objective</b> This TARP defines levels of impacts to Aboriginal cultural heritage values from existing conditions identified at the time of their discovery, to indicators that subsidence impacts have or may occur, to indicators of exceedance of the performance measure and the actions required to be implemented in response to each level of impact or exceedance of the performance measure.</p> <p><b>Assessment Criteria</b> Discussion of performance measure indicators and their definitions is provided in Section 4.1.2 and Section 5.1 of the Heritage Management Plan.</p>	<p><b>Locations</b> Teatree Hollow 2013.1.</p> <p>Location shown in Figure 3 of the Heritage Management Plan.</p> <p>Monitoring of stone artefact sites Remembrance Drive 2013.1 and TC14-2-19 is not required as impacts are not anticipated.</p> <p><b>Monitoring Frequency</b></p> <p><b>Pre-mining</b></p> <ul style="list-style-type: none"> <li>Visual inspection by archaeologist with RAPs (completed).</li> <li>Baseline recording, sampling and photogrammetry (completed).</li> <li>Structural geotechnical review prior to secondary workings.</li> </ul> <p><b>During Mining</b></p> <ul style="list-style-type: none"> <li>Fortnightly visual inspection of the rockshelter (monitoring overall rockshelter stability) during periods of active subsidence for LW S1A, S2A, S3A and S4A, to be completed from a safe distance.</li> <li>Monitoring of GNSS units / survey lines in proximity to the rockshelter (refer to Subsidence Monitoring Plan for more detail), reviewed on a monthly basis during periods of active subsidence for LW S1A, S2A, S3A and S4A.</li> </ul> <p><b>Post-mining</b></p> <ul style="list-style-type: none"> <li>Visual inspection by archaeologist with RAPs at the completion of LW S1A, S2A, S3A and S4A.</li> </ul>	<b>Normal Condition</b>		
		<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates no detectable environmental consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>No response required.</li> </ul>
		<b>Level 1</b>		
		<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates potential detectable environmental consequences, but with negligible impacts to the heritage value of Teatree Hollow 2013.1<sup>3</sup>.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as required for Normal Condition.</i></li> <li>An archaeologist to inspect the rock shelter within the area of potential impact and confirm Level 1 trigger is correct and that art panels have not been affected.</li> <li>Detailed photographic recording of any damage to be documented and marked on the shelter base plan.</li> <li>Undertake an investigation to assess cause and determine if mining related.</li> <li>Consider and decide on reasonable and feasible options for remediation as relevant which could form corrective management actions (CMAs) in consultation with an archaeologist and RAPs. Engage specialists where relevant to address impact types (e.g. consult an engineer to discuss management of rockfall or toppling of shelter).</li> <li>Consider increasing monitoring and review of data frequency if it is determined that the shelter structural stability or art panels are at an increased risk of impact from the Level 1 trigger event, subject to land access.</li> <li>Review Heritage Management Plan and modify if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Report trigger exceedance to DPE and key stakeholders.</li> <li>Notify RAPs within seven days of the event and co-ordinate a site inspection with at least one RAP representative.</li> <li>Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Provide DPE, RAPs, and Heritage NSW with proposed corrective management actions (CMAs) for consultation (e.g. structural support for shelter or additional measures for art panels in response to level of increased risk of impacts).</li> <li>Consider the development of a Rehabilitation Management Plan, and/or an update to the Heritage Management Plan in consultation with DPE, Heritage NSW and RAPs and key stakeholders (e.g. if additional mitigation or alternative methods not covered in the Heritage Management Plan are proposed).</li> <li>Implement CMAs.</li> <li>Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>Advise DPE and key stakeholders of any required amendments to Heritage Management Plan.</li> </ul>
<b>Level 2</b>				
<ul style="list-style-type: none"> <li>Aboriginal heritage site monitoring indicates environmental consequences to Teatree Hollow 2013.1<sup>4</sup>.</li> </ul>	<ul style="list-style-type: none"> <li><i>Actions as stated in Level 1.</i></li> <li>Increase monitoring and review of data frequency for sites where Level 2 has been reached at Teatree Hollow 2013.1, subject to land access</li> <li>Investigate exceedance of subsidence prediction.</li> <li>Review mine design/predictions against mine criteria.</li> </ul>	<ul style="list-style-type: none"> <li><i>Responses as stated in Level 1.</i></li> <li>If it is concluded that heritage items have been damaged by subsidence impacts:                             <ul style="list-style-type: none"> <li>Offer site visit with DPE and key stakeholders.</li> <li>Develop a Rehabilitation Management Plan in consultation with DPE and key stakeholders. Developed CMAs are to be incorporated into this plan.</li> <li>Implement Rehabilitation Management Plan, subject to land access.</li> </ul> </li> </ul>		

Notes:  
<sup>1</sup> EIS predictions for aboriginal cultural heritage sites summarised in Section 4.1 of the Heritage Management Plan.  
<sup>2</sup> Subsidence movements are not expected to have observable effects on these two sites as they are located in open terrain with a very gently sloping gradient. The predicted likelihood of impact on artefact sites is considered extremely unlikely and subsidence movements are unlikely to constitute 'harm' as defined by the NPW Act. As such, these sites will not be monitored and therefore performance measures cannot be established.  
<sup>3</sup> Visible perceptible change, such as rockfall, cracking, or toppling within the rockshelter similar to naturally caused examples and which does not impact the art panels.  
<sup>4</sup> Visible perceptible change that results in impacts to the heritage values of the site, such as cracking, spalling or collapse of the art work panels that result in damage or loss of the art.

HERITAGE MANAGEMENT PLAN TARP – HMP2 HISTORICAL HERITAGE ITEMS

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management					
		Trigger	Action	Response			
<p><b>Performance Measure Feature</b> Historic heritage sites (listed in Appendix 4 of SSD 8445).</p> <p><b>Performance Measure</b> No greater subsidence impacts or loss of heritage values than predicted in the EIS<sup>1</sup>.</p> <p><b>Performance Indicator</b> This performance measure will be considered to be triggered if subsidence impacts cannot be repaired in a manner that preserves the heritage value of the historical heritage items (Wirrimbirra Sanctuary, Bargo Cemetery, Bargo Railway Bridge North, Picton Weir, Tahmoor Mine Site, Bargo Railway Viaduct, Great Southern Road (partial)).</p> <p><b>TARP Objective</b> This TARP defines levels of impacts to historic heritage sites from existing conditions identified at the time of their recording as part of the project EIS, to indicators that subsidence impacts have or may occur, to indicators of exceedance of the performance measure and the actions required to be implemented in response to each level of impact or exceedance of the performance measure.</p> <p><b>Assessment Criteria</b> The historic heritage values related to each site are based on significance assessment criteria adopted as part of the EIS for the project (Niche 2012). TARP assesses impacts in relation to the historically significant values of each heritage item. The significance of each item is summarised in Table 12 of the Heritage Management Plan.</p>	<p><b>Locations</b></p> <ul style="list-style-type: none"> <li>• Wirrimbirra Sanctuary (Australian Wildlife Sanctuary).</li> <li>• Bargo Cemetery.</li> <li>• Bargo Railway Bridge North (Wellers Road Overbridge).</li> <li>• Picton Weir.</li> <li>• Tahmoor Colliery (Tahmoor Mine Site).</li> <li>• Bargo Railway Viaduct.</li> <li>• Great Southern Road (partial).</li> </ul> <p>Locations of historical heritage items are shown in Figure 4 of the Heritage Management Plan.</p> <p><b>Monitoring Frequency</b></p> <p><b>Wirrimbirra Sanctuary</b> Pre-mining:  <ul style="list-style-type: none"> <li>• Visual assessment by a heritage consultant as part of SoHI (completed).</li> <li>• Pre-mining condition and structural assessment as per the Australian Wildlife Sanctuary Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul>                     During mining: Regular monitoring as per the Australian Wildlife Sanctuary Management Plan.                      Post-mining:  <ul style="list-style-type: none"> <li>• Visual inspection by a heritage consultant at the completion of LW SSA.</li> <li>• Inspections and assessments as per the Australian Wildlife Sanctuary Management Plan.</li> </ul> </p> <p><b>Bargo Cemetery</b> Pre-mining:  <ul style="list-style-type: none"> <li>• Baseline recording and visual assessment by heritage consultant (completed, see Appendix D).</li> <li>• Pre-mining assessments as per the Bargo Cemetery Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul>                     During mining: Regular monitoring as per the Bargo Cemetery Management Plan.                      Post-mining:  <ul style="list-style-type: none"> <li>• Visual inspection by a heritage consultant at the completion of Longwalls LW S6A.</li> <li>• Inspections and assessments as per the Bargo Cemetery Management Plan.</li> </ul> </p> <p><b>Bargo Railway Bridge North</b> Pre-mining:  <ul style="list-style-type: none"> <li>• Visual assessment by a heritage consultant.</li> <li>• Pre-mining condition and structural assessment as per the Main Southern Railway Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul>                     During mining: Regular monitoring as per the Main Southern Railway Management Plan.                      Post-mining:  <ul style="list-style-type: none"> <li>• Visual inspection by a heritage consultant at the completion of Longwalls LW S6A.</li> <li>• Inspections and assessments as per the Main Southern Railway Management Plan.</li> </ul> </p> <p><b>Picton Weir</b> Pre-mining:  <ul style="list-style-type: none"> <li>• Pre-mining condition and structural assessment as per the Picton Weir Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul>                     During mining: Regular monitoring as per the Picton Weir Management Plan.                      Post-mining: Inspections and assessments as per the Picton Weir Management Plan.</p> <p><b>Tahmoor Colliery</b> Pre-mining:  <ul style="list-style-type: none"> <li>• Pre-mining condition and structural assessment as per the Tahmoor Mine Site Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul>                     During mining: Regular monitoring as per the Tahmoor Mine Site Management Plan.                      Post-mining: Inspections and assessments as per the Tahmoor Mine Site Management Plan.</p> <p><b>Great Southern Road (partial)</b> Pre-mining: Pre-mining condition as per the Wollondilly Shire Council Management Plan.                      During mining: Regular monitoring as per the Wollondilly Shire Council Management Plan.                      Post-mining: Inspections and assessments as per the Wollondilly Shire Council Management Plan.</p>	<p><b>Normal Condition</b></p> <ul style="list-style-type: none"> <li>• Historical heritage site monitoring indicates no detectable environmental consequences.</li> </ul>			<ul style="list-style-type: none"> <li>• Continue monitoring and review of data as per monitoring program.</li> </ul>	<ul style="list-style-type: none"> <li>• No response required.</li> </ul>	
		<p><b>Level 1</b></p>			<ul style="list-style-type: none"> <li>• Historical heritage site monitoring indicates potential detectable environmental consequences, but with negligible impacts to the heritage value of the heritage site(s).</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions as required for Normal Condition.</i></li> <li>• Co-ordinate a site inspection with a structural engineer.</li> <li>• Consult with a qualified archaeologist or heritage architect to determine whether impacts to heritage sites have occurred.</li> <li>• Consider increasing monitoring and review of data frequency for sites subject to a Level 1 trigger event, subject to land access.</li> <li>• Detailed photographic recording of any damage to be documented.</li> <li>• Erect warning signs and restrict access to areas where necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• Report trigger exceedance to DPE and Heritage NSW.</li> <li>• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</li> </ul>
		<p><b>Level 2</b></p>			<ul style="list-style-type: none"> <li>• Historical heritage site monitoring indicates environmental consequences to heritage site(s) but to a level that could be repaired in a manner that preserves the heritage value of the site(s).</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions as stated in Level 1.</i></li> <li>• Consider and decide on reasonable and feasible options for remediation as relevant which could form corrective management actions (CMAs) that would result in the repair of the item to a level that preserves the heritage value of the site(s).</li> <li>• Increase monitoring and review of data frequency for sites subject to a Level 2 trigger event, subject to land access.</li> <li>• Review Heritage Management Plan and modify if necessary.</li> <li>• Investigate exceedance of subsidence prediction.</li> <li>• Review mine design/predictions against mine criteria (e.g. for Picton Weir – review environmental consequences after extraction of LW SSA and determine if LW S6A should be shortened).</li> <li>• Undertake an investigation to determine if an exceedance of the performance measure is likely.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Responses as stated in Level 1.</i></li> <li>• Advise DPE and key stakeholders of any required amendments to Heritage Management Plan.</li> </ul> If it is concluded that heritage items have been damaged by subsidence impacts: <ul style="list-style-type: none"> <li>• Offer site visit with DPE and Heritage NSW.</li> <li>• Provide DPE and Heritage NSW with proposed corrective management actions (CMAs) for consultation.</li> <li>• Implement CMAs, subject to land access.</li> <li>• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</li> <li>• If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</li> </ul>
		<p><b>Exceeds Performance Measure</b></p>			<ul style="list-style-type: none"> <li>• This performance measure will be considered to be triggered if subsidence impacts cannot be repaired in a manner that preserves the heritage value of the historic heritage item.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions as stated in Level 2.</i></li> <li>• Investigate reasons for the performance measure exceedance.</li> <li>• Engage heritage specialist to determine if impacts to the heritage values of the site are irreparable even after reasonable remediation attempts have been made under the TARP.</li> <li>• Review predictions of subsidence impacts and environmental consequences associated with further longwall extraction based on the outcomes of the investigation.</li> <li>• Consider modifying mine plan.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Responses as stated in Level 2.</i></li> <li>• Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).</li> <li>• Implement reasonable remediation measures as directed by DPE, subject to land access.</li> <li>• Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.</li> <li>• Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).</li> </ul>

Number: TAH-HSEC-00360 – Appendix B Master TARP

Status: Released

Effective: Friday, April 12, 2024

Owner: Zina Ainsworth

Version: 4.0

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Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	Action	Response
	<b>Bargo Railway Viaduct</b> Pre-mining: <ul style="list-style-type: none"> <li>• Visual assessment by a heritage consultant.</li> <li>• Pre-mining condition and structural assessment as per the Main Southern Railway Management Plan.</li> <li>• Install monitoring system as per the Subsidence Monitoring Plan.</li> </ul> During mining: Regular monitoring as per the Main Southern Railway Management Plan. Post-mining: <ul style="list-style-type: none"> <li>• Visual inspection by a heritage consultant at the completion of Longwalls LW S6A.</li> <li>• Inspections and assessments as per the Main Southern Railway Management Plan.</li> </ul>			
Notes: <sup>1</sup> EIS predictions for historical heritage sites summarised in Section 4.2 of the Heritage Management Plan.				