

Monitoring and inspections of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are recorded along with photographic records and observational notes. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 3<sup>rd</sup> March 2016 has progressed approximately 190m.

During an inspection on the 2<sup>nd</sup> March 2016, a gas release was identified as described below.

#### **AA9\_LW901\_001 (286880, 6214670)**

A gas emission zone was identified on 2<sup>nd</sup> March 2016 (impact AA9\_LW901\_001). The zone consists of four individual gas release points over an area approximately 5m<sup>2</sup> (Photos 1 & 2). The primary release is constant with the other three releases intermittent. The gas release zone is approximately 370m from extraction of Longwall 901 (Figure 1).

#### **Trigger Action Response Plan**

This gas emission is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B- Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR



**Photo 1:** Impact AA9\_LW901\_001 Looking downstream. Taken on 2/03/2016.



**Photo 2:** Impact AA9\_LW901\_001 Looking across stream. Taken on 2/03/2016.

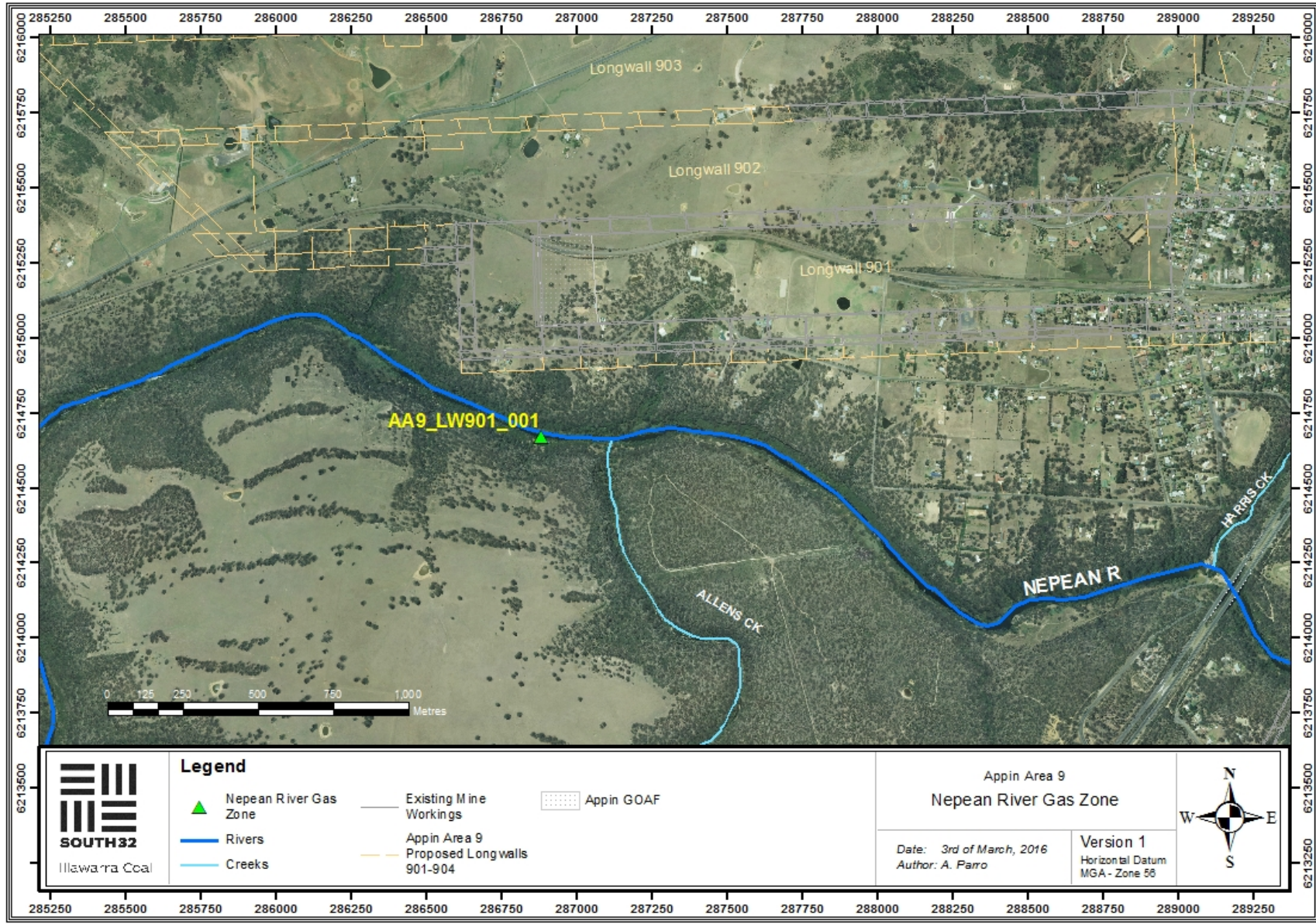


Figure 1: Location of impact AA9\_LW901\_001 relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring and inspections of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are recorded along with photographic records and observational notes. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 5<sup>th</sup> March 2016 has progressed approximately 232m.

During an inspection on the 7<sup>th</sup> March 2016, five new gas release zones were identified as described below.

**AA9\_LW901\_002 (286712 6214745)**

Impact AA9\_LW901\_002 is a gas release zone located approximately 60m upstream of monitoring point NR0 on the Nepean River (Figure 1). The zone consists of approximately twelve individual gas release points over an area approximately 12m by 5m (Photo 1). Five of these release points have constant gas release and seven have intermittent gas release. This impact is approximately 340m from Longwall 901 (Figure 1).



**Photo 1:** Impact AA9\_LW901\_002. Taken on 08/03/2016.

**AA9\_LW901\_003 (286766, 6214713)**

Impact AA9\_LW901\_003 is a gas release zone extending from approximately 18m upstream of NR0 to approximately 27m downstream of monitoring point NR0 on the Nepean River (Figure 1). The zone consists of multiple gas release points over an area approximately 45m by 6m (Photos 2 & 3). This gas release zone contains both intermittent and constant gas releases points. This impact is approximately 350m from extraction of Longwall 901 (Figure 1).



**Photo 2:** Impact AA9\_LW901\_003, looking downstream from NR0. Taken on 08/03/2016.



**Photo 3:** Impact AA9\_LW901\_003. Taken on 08/03/2016.

#### **AA9\_LW901\_004 (286820, 6214695)**

Impact AA9\_LW901\_004 is a gas release zone located approximately 63m downstream of monitoring point NR0 on the Nepean River (Figure 1). The zone consists of approximately twenty gas release points over an area approximately 20m by 8m (Photos 4 & 5). Most gas release points in this zone have constant gas releases. This impact is approximately 357m from Longwall 901 (Figure 1).



**Photo 4:** Impact AA9\_LW901\_004, looking downstream. Taken on 08/03/2016.



**Photo 5:** Impact AA9\_LW901\_004, looking downstream. Taken on 08/03/2016.

#### **AA9\_LW901\_005 (286962, 6214666)**

Impact AA9\_LW901\_005 is a gas release zone located approximately 67m upstream of monitoring point SW3 on the Nepean River (Figure 1). The zone consists of approximately ten gas release points with constant gas release over an area approximately 7m by 2m (Photos 6 & 7). This impact is approximately 380m from Longwall 901 (Figure 1).



**Photo 6:** Impact AA9\_LW901\_005, looking across stream. Taken on 08/03/2016.



**Photo 7:** Impact AA9\_LW901\_005, close up. Taken on 08/03/2016.

#### **AA9\_LW901\_006 (286997, 6214667)**

Impact AA9\_LW901\_006 is a gas release zone located approximately 32m upstream of monitoring point SW3 on the Nepean River (Figure 1). The zone consists of approximately six gas release points with constant gas release over an area approximately 3m by 4m (Photo 8). This impact is approximately 380m from Longwall 901 (Figure 1).



**Photo 8:** Impact AA9\_LW901\_006. Taken on 08/03/2016.

#### **Trigger Action Response Plan**

These impacts are Level 1 Triggers according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B- Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <math><3000\text{ L/min}</math>

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders

- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted row refers to latest impacts.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River



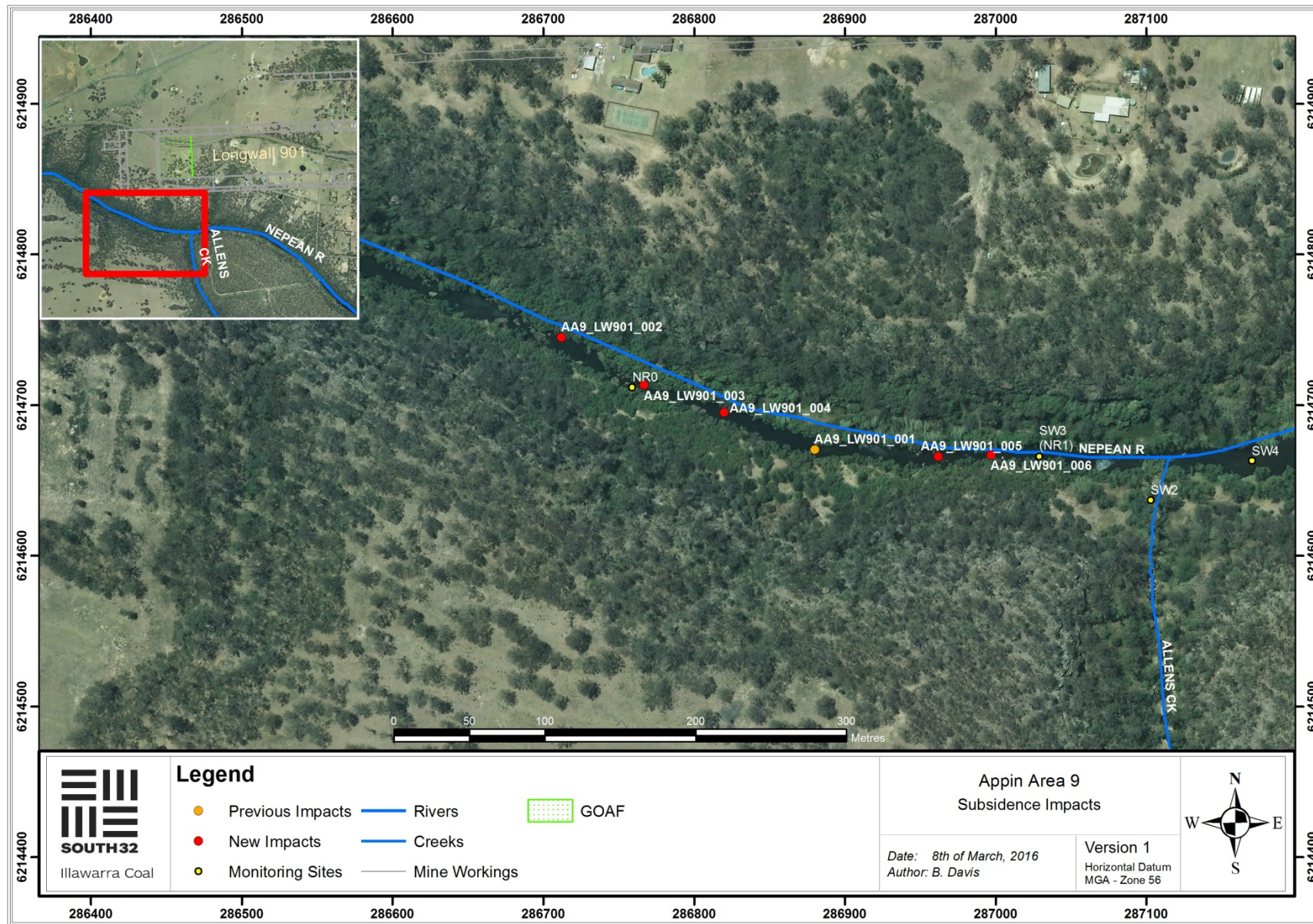


Figure 1: Location of impacts relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring and inspections of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are recorded along with photographic records and observational notes. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 12<sup>th</sup> of March 2016 has progressed approximately 275m.

During an inspection on the 15<sup>th</sup> of March 2016, one new gas release zone was identified as described below.

#### **AA9\_LW901\_007 (287506, 6214668)**

Impact AA9\_LW901\_007 is a gas release zone located approximately 320m downstream of monitoring point SW4 on the Nepean River (Figure 1). The zone consists of approximately 30 individual gas release points over an area approximately 24m by 15m (Photos 1 & 2). This impact is approximately 517m from Longwall 901 (Figure 1).



**Photo 1:** Impact AA9\_LW901\_007. Taken on 15/03/2016.



**Photo 2:** Impact AA9\_LW901\_007. Taken on 15/03/2016.

#### **Trigger Action Response Plan**

This impact is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted row refers to latest impacts.

<b>Site</b>	<b>Identification Date</b>	<b>Activating Longwall</b>	<b>Type</b>	<b>Trigger Level</b>	<b>Comment</b>
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River

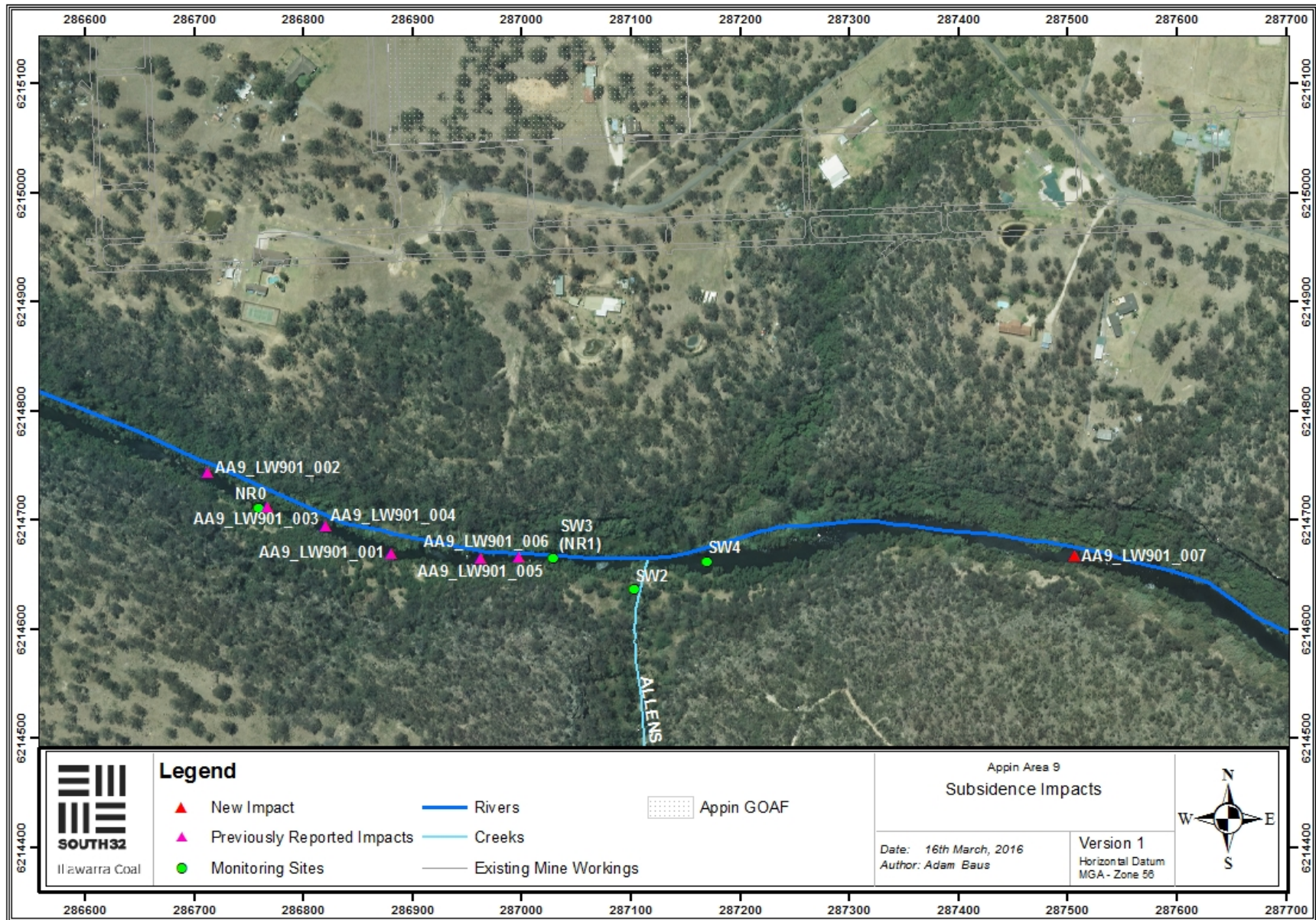


Figure 1: Location of AA9\_LW901\_007 relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring and inspections of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are recorded along with photographic records and observational notes. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 19<sup>th</sup> of March 2016 has progressed approximately 314m.

During the latest inspections on the 18<sup>th</sup> and 21<sup>st</sup> of March 2016 seven new gas release zones were identified on the Nepean River as described below. Heavy rain on the 18<sup>th</sup> of March made observations difficult and required the inspection to be continued on the 21<sup>st</sup> of March.

#### **AA9\_LW901\_008 (287065, 6214662)**

Impact AA9\_LW901\_008 was first identified on the 18<sup>th</sup> of March 2016. It is a gas release zone located approximately 35m downstream of monitoring point SW3 and 40m upstream from the Allens Creek - Nepean River confluence (Figure 1). The zone consists of approximately 8 gas release points over an area approximately 7m by 4m (Photos 1 & 2). Gas releases range from a constant to intermittent. This impact is approximately 400m from the face of Longwall 901 (Figure 1).



**Photo 1:** Impact AA9\_LW901\_008, looking downstream. Taken on 18/03/2016.



**Photo 2:** Impact AA9\_LW901\_008, looking across stream. Taken on 18/03/2016.

#### **AA9\_LW901\_009 (287249, 6214679)**

Gas release zone AA9\_LW901\_009 was first identified on the 18<sup>th</sup> of March 2016. It is located approximately 80m downstream of monitoring point SW4 on the northern bank of the Nepean River (Figure 1). The zone consists of approximately 35 individual gas releases over an area approximately 6m by 8m (Photos 3 to 5). The gas releases range from intermittent to constant. This impact is approximately 390m from the face of Longwall 901 (Figure 1).



**Photo 3:** Impact AA9\_LW901\_009, close up of releases. Taken on 18/03/2016.



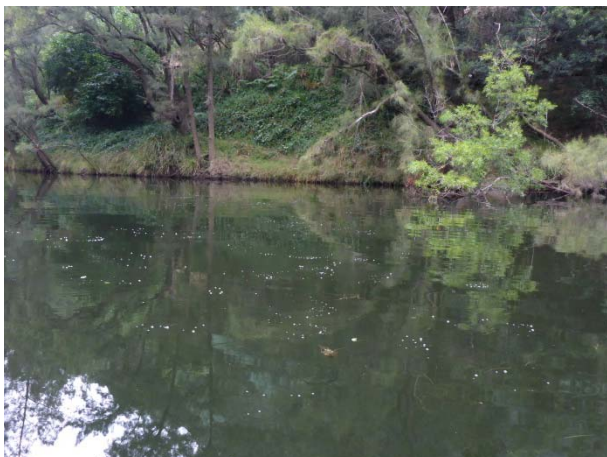
**Photo 4:** Impact AA9\_LW901\_009, looking downstream. Taken on 21/03/2016.



**Photo 5:** Impact AA9\_LW901\_009, looking across stream. Taken on 21/03/2016.

#### **AA9\_LW901\_010 (287317, 6214697)**

Gas release zone AA9\_LW901\_010 was first identified on the 18<sup>th</sup> of March 2016 (Figure 1). It is located approximately 150m downstream of monitoring point SW4. The zone consists of approximately 80 individual releases over an area approximately 50m by 20m (Photos 6 to 9). The releases range from intermittent to constant. This impact is approximately 390m from Longwall 901 (Figure 1).



**Photo 6:** Impact AA9\_LW901\_010, looking across stream at upstream end. Taken on 18/03/2016.



**Photo 7:** Impact AA9\_LW901\_010, downstream end. Taken on 18/03/2016.





**Photo 8:** Impact AA9\_LW901\_010, looking across stream at upstream end. Taken on 21/03/2016



**Photo 9:** Impact AA9\_LW901\_010, looking upstream. Taken on 21/03/2016

#### **AA9\_LW901\_011 (287036, 6214664)**

Gas release zone AA9\_LW901\_011 was first identified on the 21<sup>st</sup> of March 2016. It is located approximately 5m downstream of monitoring point SW3 (Figure 1). The zone consists of approximately 22 constant gas releases over an area approximately 7m by 8m (Photos 10 & 11). This impact is approximately 400m from Longwall 901 (Figure 1).



**Photo 10:** Impact AA9\_LW901\_011, looking downstream. Taken on 21/03/2016.



**Photo 11:** Impact AA9\_LW901\_011, looking across stream. Taken on 21/03/2016.

#### **AA9\_LW901\_012 (287191, 6214670)**

Gas release zone AA9\_LW901\_012 was first identified on the 21<sup>st</sup> of March 2016. It is located adjacent to monitoring site SW4 (Figure 1). The zone consists of two areas of constant release separated by approximately 8m (Photo 12). The upstream area consists of 12 individual releases in a 6m by 5m area (Photo 13) and the downstream area consists of 10 releases in a 5m by 5m area (Photo 14). This impact is approximately 385m from Longwall 901 (Figure 1).



**Photo 12:** Impact AA9\_LW901\_012, looking at both areas. Taken on 21/03/2016.



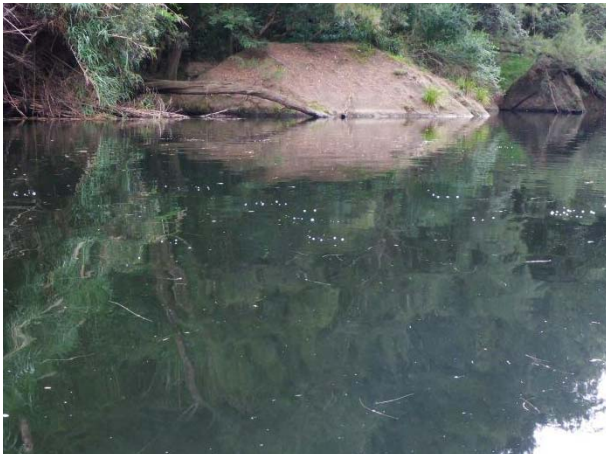
**Photo 13:** Impact AA9\_LW901\_012, upstream area. Taken on 21/03/2016.



**Photo 14:** Impact AA9\_LW901\_012, downstream area. Taken on 21/03/2016.

#### **AA9\_LW901\_013 (287377, 6214698)**

Gas release zone AA9\_LW901\_013 was first identified on the 21<sup>st</sup> of March 2016. It is located approximately 210m downstream of monitoring point SW4 (Figure 1). The zone consists of approximately 15 constant releases over an area approximately 8m by 8m (Photos 15 & 16). This impact is approximately 420m from Longwall 901 (Figure 1).



**Photo 15:** Impact AA9\_LW901\_013, looking downstream. Taken on 21/03/2016.



**Photo 16:** Impact AA9\_LW901\_013, close up of largest releases. Taken on 21/03/2016.

### AA9\_LW901\_014 (287575, 6214652)

Gas release zone AA9\_LW901\_014 was first identified on the 21<sup>st</sup> of March 2016. It is located approximately 400m downstream of monitoring point SW4 (Figure 1). The zone consists of approximately 30 constant gas releases over an area approximately 30m by 10m (Photos 17 & 18). This impact is approximately 580m from Longwall 901 (Figure 1).



**Photo 17:** Impact AA9\_LW901\_014, looking downstream. Taken on 21/03/2016.



**Photo 18:** Impact AA9\_LW901\_014, releases near southern bank. Taken on 21/03/2016.

### Trigger Action Response Plan

These impacts are Level 1 Triggers according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refer to latest impacts.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River

AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River

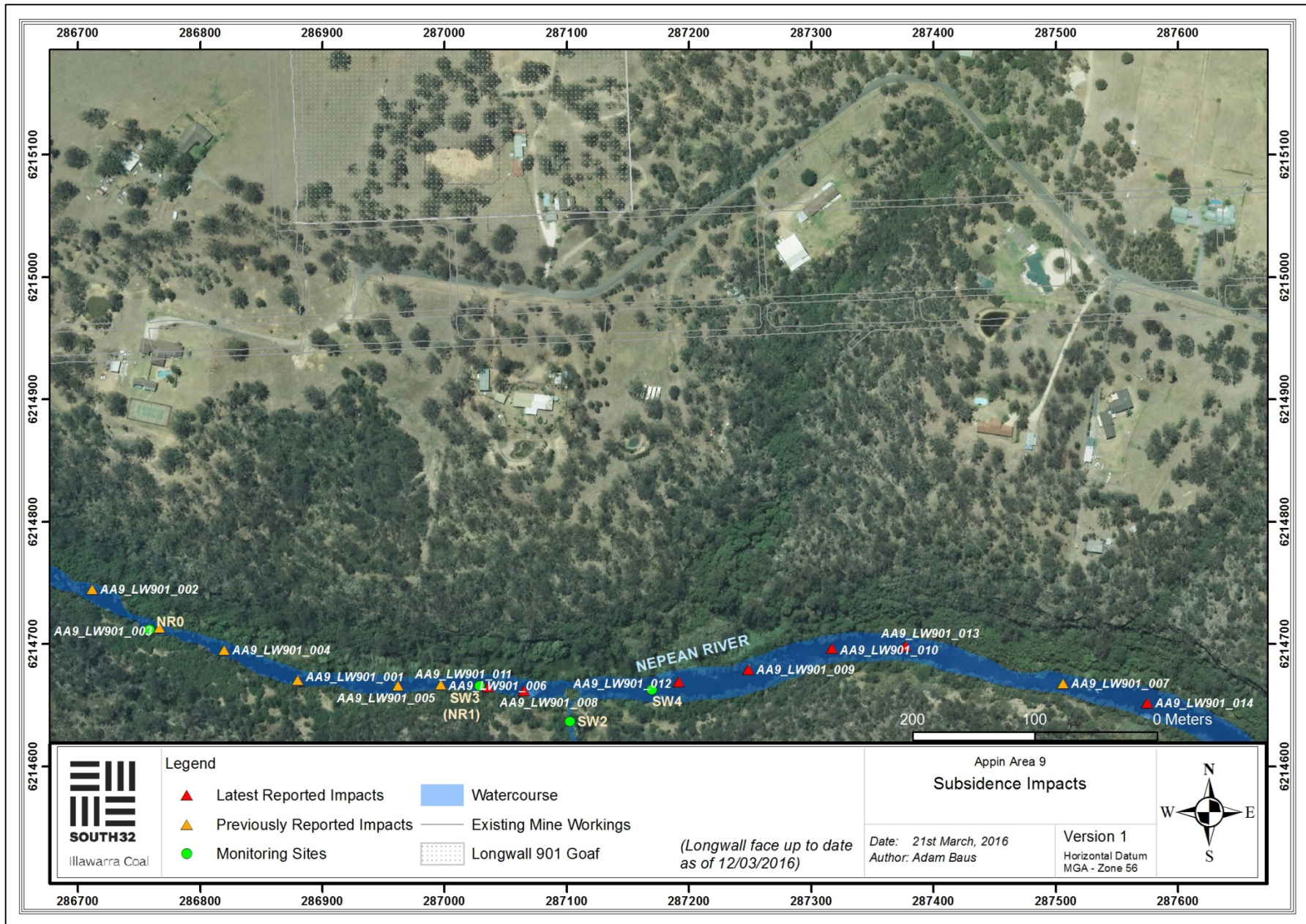


Figure 1: Location gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 19<sup>th</sup> of March 2016 had progressed approximately 314m.

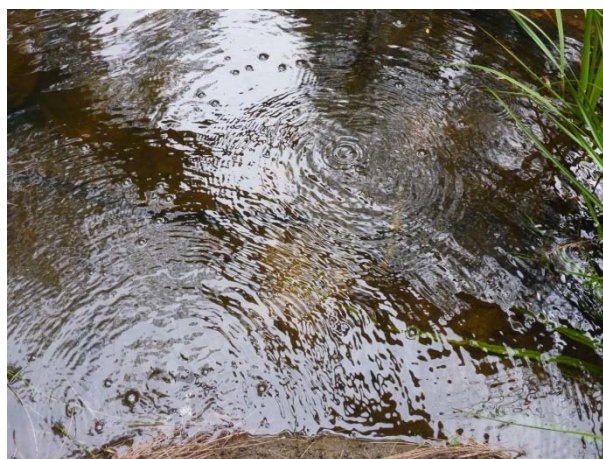
During the latest inspection on the 29<sup>th</sup> of March 2016 one new gas zone was identified and two previously reported gas zones were found to be inactive.

#### **AA9\_LW901\_015 (287102, 6214639)**

Impact AA9\_LW901\_015 was first identified on the 29<sup>th</sup> of March 2016. It is a gas release zone located on Allens Creek approximately 20m upstream of the Allens Creek – Nepean River confluence (Figure 1). The zone consists of three gas release points over an area approximately 1m by 1m (Photos 1 & 2). The gas releases occur intermittently. This impact is approximately 410m from Longwall 901 extraction.



**Photo 1:** Impact AA9\_LW901\_015, looking across stream. Taken on 29/03/2016.



**Photo 2:** Impact AA9\_LW901\_015, looking downstream. Taken on 29/03/2016.

#### **UPDATE: AA9\_LW901\_002 (286712, 6214745)**

Gas release zone AA9\_LW901\_002 was first identified on the 7<sup>th</sup> of March 2016, consisting of 12 release points of intermittent and constant frequency over an area of 12m by 4m. An inspection on the 18<sup>th</sup> of March 2016 identified that no gas releases were active in the impact zone. The most recent inspection on the 29<sup>th</sup> of March 2016 confirmed that the gas release zone is currently inactive (Photos 3 & 4).



**Photo 3:** Impact AA9\_LW901\_002. Taken on 7/03/2016.



**Photo 4:** Impact AA9\_LW901\_002- No gas present. Taken on 29/03/2016.

#### **UPDATE: AA9\_LW901\_003 (286766, 6214713)**

Gas release zone AA9\_LW901\_003 was first identified on the 7<sup>th</sup> of March 2016, consisting of intermittent and constant gas release points over an area approximately 45m by 6m. An inspection on the 18<sup>th</sup> of March 2016 identified that there had been a decrease in gas activity in the area. The most recent inspection on the 29<sup>th</sup> of March 2016 identified the gas release zone as currently inactive (Photos 5 & 6).



**Photo 5:** Impact AA9\_LW901\_003. Taken on 9/03/2016, during follow-up inspection.



**Photo 6:** Impact AA9\_LW901\_003- no gas present. Taken on 29/03/2016.

#### **Trigger Action Response Plan**

Impact AA9\_LW901\_015 is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

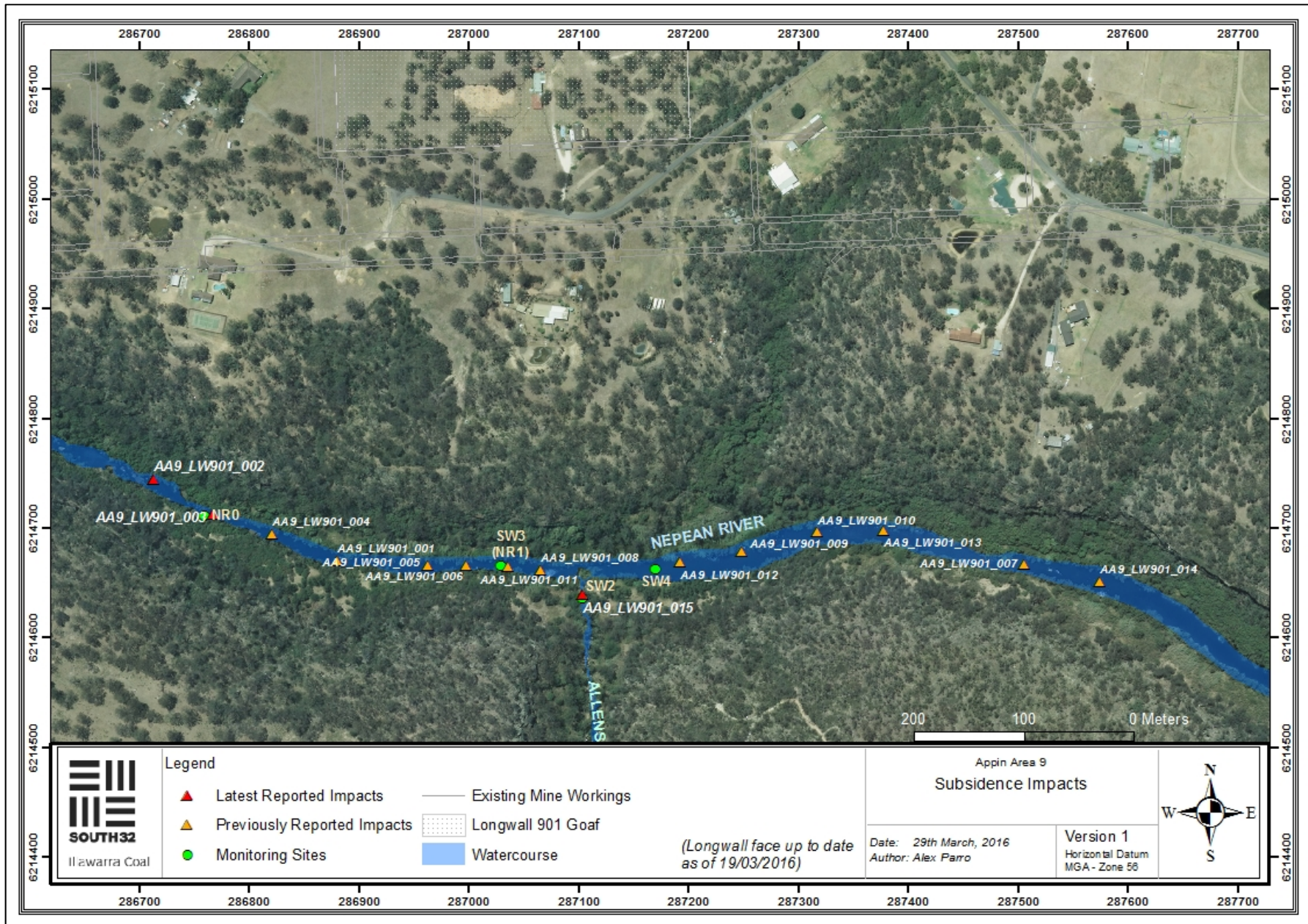
Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR



**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refer to latest impacts discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River UPDATE: Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River UPDATE: Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek



**Figure 1:** Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 26<sup>th</sup> of March 2016 had progressed approximately 400m.

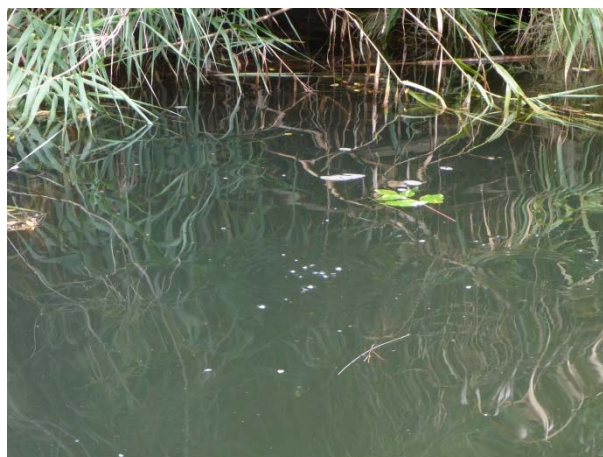
During the latest inspection on the 4<sup>th</sup> of April 2016 one new gas zone was identified and one gas zone previously reported as inactive was identified as active.

#### **AA9\_LW901\_016 (287651, 6214611)**

Impact AA9\_LW901\_016 was identified on the 4<sup>th</sup> of April 2016 on the Nepean River (Figure 1). The zone consists of five intermittent and constant gas release points over an area approximately 1m by 2m (Photos 1 & 2). This impact is approximately 580m from Longwall 901 extraction.



**Photo 1:** Impact AA9\_LW901\_016, close up of one of the constant release points. Taken on 04/04/2016.



**Photo 2:** Impact AA9\_LW901\_016, looking south. Taken on 04/04/2016.

#### **UPDATE: AA9\_LW901\_003 (286766, 6214713)**

Gas release zone AA9\_LW901\_003 was first identified on the 7<sup>th</sup> of March 2016, consisting of intermittent and constant gas releases over an area approximately 45m by 6m. A previous inspection on the 29<sup>th</sup> of March 2016 identified the gas release zone as inactive (Photo 3). On the latest inspection on the 4<sup>th</sup> of April 2016 one intermittent release was identified at this zone (Photo 4). Gas activity at this site remains significantly lower than the initial inspection.



**Photo 3:** Impact AA9\_LW901\_003, looking across stream. Taken on 29/03/2016.



**Photo 4:** Impact AA9\_LW901\_003, looking downstream, gas present. Taken on 04/04/2016.

### Trigger Action Response Plan

Impact AA9\_LW901\_016 is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refer to latest impacts discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River UPDATE: Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River UPDATE: Active
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River

AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River

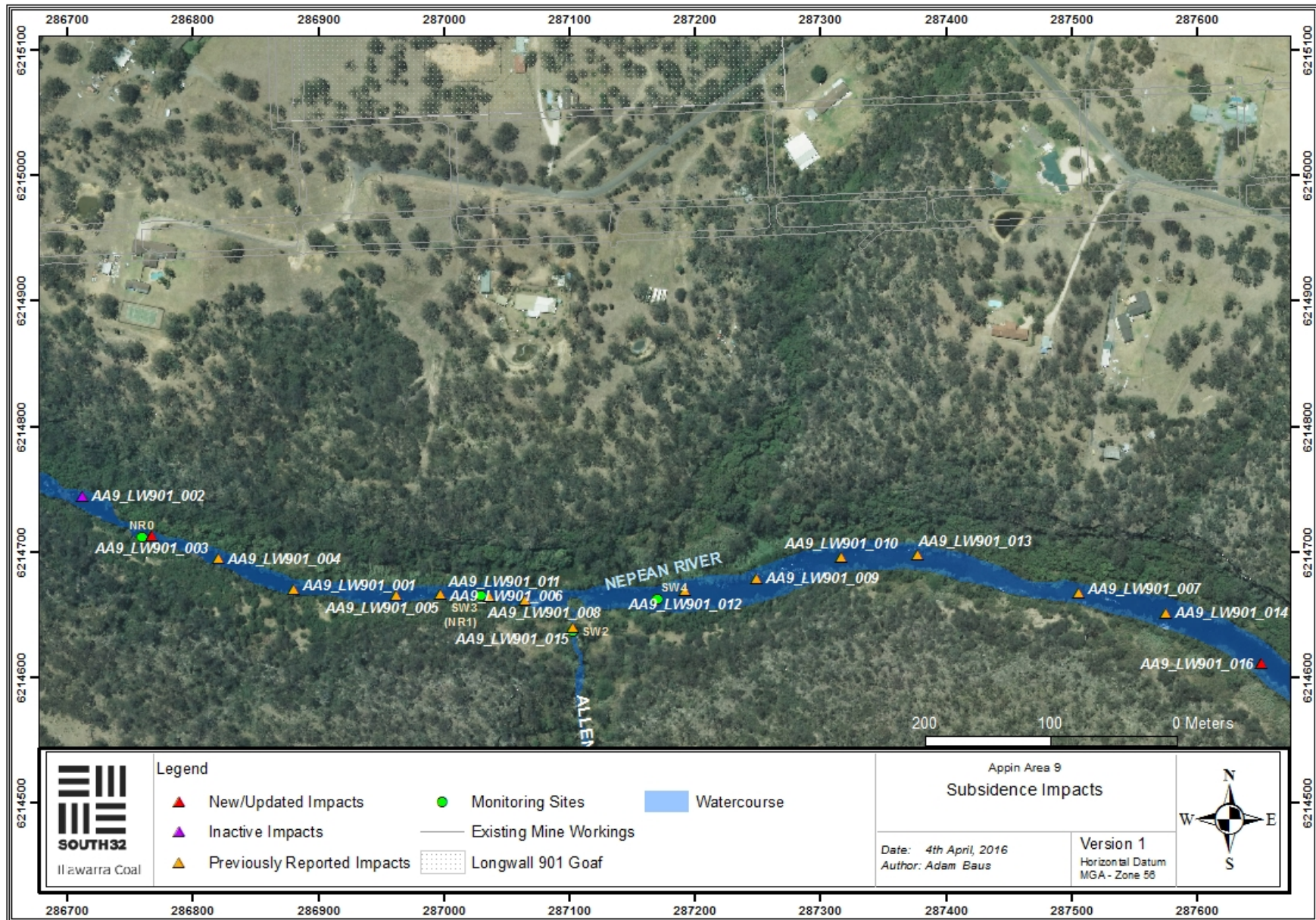


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

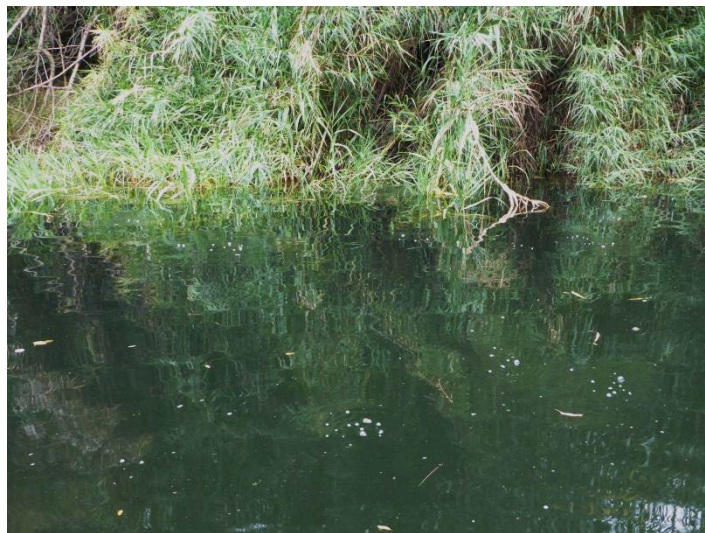


Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 2<sup>nd</sup> of April 2016 had progressed approximately 420m.

During the latest inspection on the 8<sup>th</sup> of April 2016 one new gas zone was identified.

#### **AA9\_LW901\_017 (287156, 6214658)**

Impact AA9\_LW901\_017 was identified on the 8<sup>th</sup> of April 2016 (Figure 1). It is located on the Nepean River approximately 50m downstream of the confluence with Allens Creek. The zone consists of 14 intermittent gas release points over an area approximately 5m by 6m (Photo 1). This impact is approximately 430m from Longwall 901 extraction.



**Photo 1:** Impact AA9\_LW901\_017. Taken on 08/04/2016.

#### **Trigger Action Response Plan**

Impact AA9\_LW901\_017 is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report

- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refer to latest impact discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Active
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

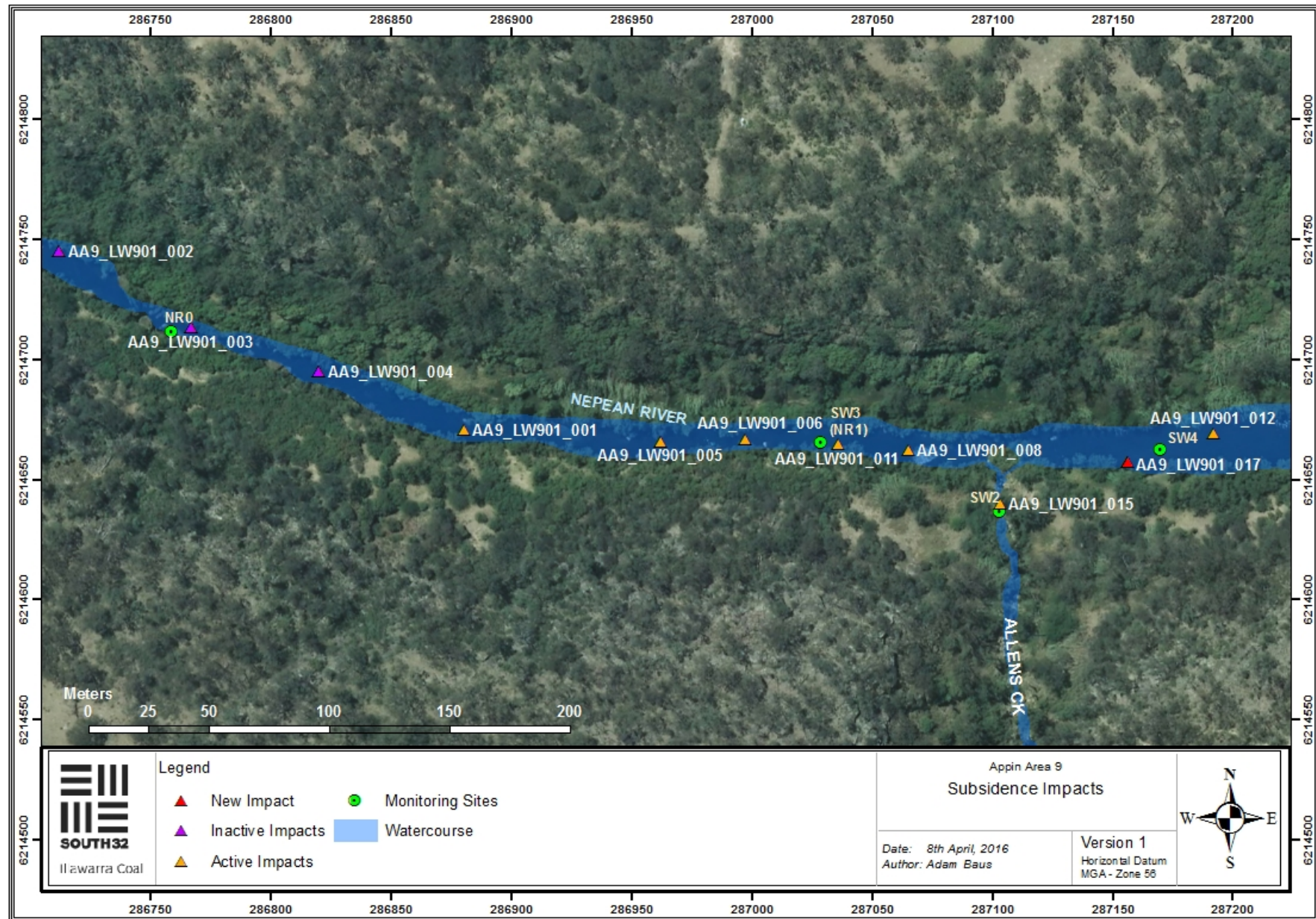


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEH, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEH, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly during active subsidence. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 16<sup>th</sup> of April 2016 had progressed approximately 510m.

During the latest inspection of the Nepean River, on the 21<sup>st</sup> of April 2016, one new gas zone (AA9\_LW901\_018) was identified.

#### AA9\_LW901\_018 (E287429, N6214691)

Impact AA9\_LW901\_018 is a gas zone located along the northern bank of the Nepean River between previously reported impacts AA9\_LW901\_013 and AA9\_LW901\_007 (**Figure 1**). The zone consists of approximately 20 constant gas release points over an area approximately 25m by 2m (**Photos 1 to 3**). This impact is approximately 375m from Longwall 901 extraction.



**Photo 1:** Impact AA9\_LW901\_018. Taken on 21/04/2016.



**Photo 2:** Impact AA9\_LW901\_018. Taken on 21/04/2016.



**Photo 3:** Impact AA9\_LW901\_018. Taken on 21/04/2016.

### Trigger Action Response Plan

Impact AA9\_LW901\_018 is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (**Appendix A, Table 1.1**).

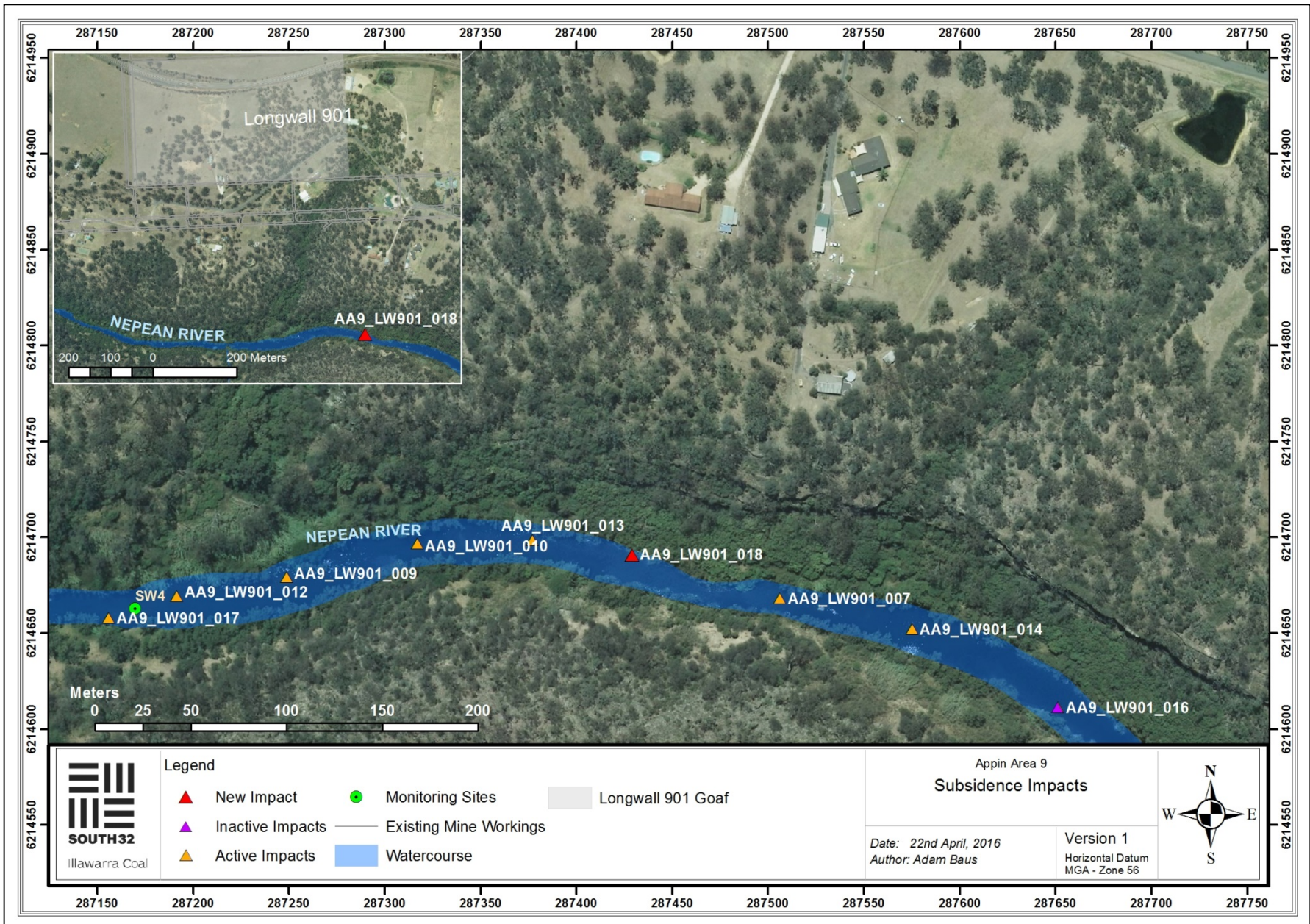
- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted row refers to latest impact discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Active
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active



**Figure 1:** Location of gas zones relative to Longwall 901, Appin Area 9. Inset shows latest impact in relation to Longwall 901 goaf.

# APPENDIX A

Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>



Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly when the longwall is within 400m of features. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 2<sup>nd</sup> of April 2017 had progressed approximately 1700m. The Longwall 901 face is currently approximately 940m from Nepean River.

During the latest inspection of the Nepean River, on the 4<sup>th</sup> of April 2017, two new gas zones were identified. No surface impacts to the Nepean River Gorge or its cliffines have been observed as a result of extraction of Longwall 901 to date.

#### **AA9\_LW901\_019 (E288075, N6214239)**

Impact AA9\_LW901\_019 is a gas zone on the Nepean River, approximately 850m from Longwall 901 extraction (Figure 1). The zone consists of approximately 16 release points over an area approximately 20m by 4m (Photos 1 to 4). Releases range from constant to intermittent.



**Photo 1:** Release at Gas Zone AA9\_LW901\_019, Nepean River. Taken on 4/04/2017.



**Photo 2:** Release at Gas Zone AA9\_LW901\_019, Nepean River. Taken on 4/04/2017.



**Photo 3:** Release at Gas Zone AA9\_LW901\_019, Nepean River. Taken on 4/04/2017.



**Photo 4:** Release at Gas Zone AA9\_LW901\_019, Nepean River. Taken on 4/04/2017.

**AA9\_LW901\_020 (E288157, N6214154)**

Impact AA9\_LW901\_020 is a gas zone on the Nepean River, approximately 940m from Longwall 901 extraction (Figure 1). The zone consists of approximately 15 release points over an area of approximately 12m by 6m (Photos 5 and 6). Releases range from constant to intermittent.



**Photo 5:** Release at Gas Zone AA9\_LW901\_020, Nepean River. Taken on 4/04/2017.



**Photo 6:** Release at Gas Zone AA9\_LW901\_020, Nepean River. Taken on 4/04/2017.

**Trigger Action Response Plan**

These latest gas releases are at Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

Table 1 presents impacts recorded for Longwall 901 to date.

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refers to latest impacts discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Active
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_019	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_020	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

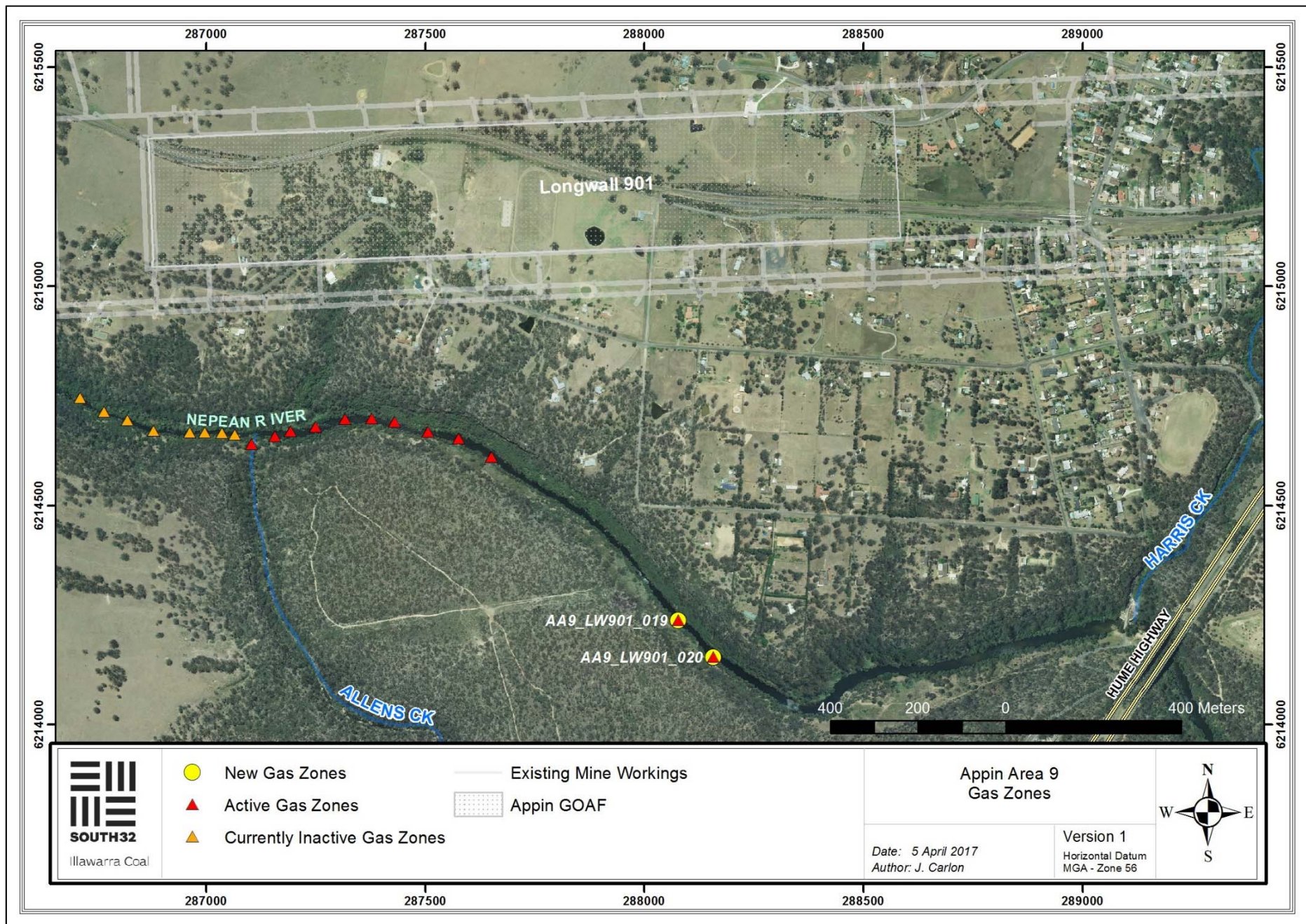


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A -Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>- NR0</li> <li>- SW3 (NR1)</li> <li>- NR2</li> <li>- If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>- chemical composition</li> <li>- dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>- dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly when the longwall is within 400m of features. Water quality and surface water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 30<sup>th</sup> of April 2017 had progressed approximately 1840m.

During the latest inspection of the Nepean River, on the 26<sup>th</sup> of April 2017, two new gas zones were identified. No surface impacts to the Nepean River Gorge or its clifflines have been observed as a result of extraction of Longwall 901 to date.

**AA9\_LW901\_021 (E288455, N6214091)**

Impact AA9\_LW901\_021 is a gas zone on the Nepean River, approximately 1000m from Longwall 901 extraction (Figure 1). The zone consists of approximately 45 intermittent releases over an area approximately 30m by 10m (Photos 1 to 7).



**Photo 1:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 2:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 3:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 4:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 5:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 6:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.



**Photo 7:** Release at Gas Zone AA9\_LW901\_021, Nepean River. Taken on 26/04/2017.

#### **AA9\_LW901\_022 (E288620, N6214128)**

Impact AA9\_LW901\_022 is a gas zone on the Nepean River, approximately 1000m from Longwall 901 extraction (Figure 1). The zone consists of approximately 20 intermittent releases over an area of approximately 8m by 5m (Photos 8 to 11).



**Photo 8:** Release at Gas Zone AA9\_LW901\_022, Nepean River. Taken on 26/04/2017.



**Photo 9:** Release at Gas Zone AA9\_LW901\_022, Nepean River. Taken on 26/04/2017.



**Photo 10:** Release at Gas Zone AA9\_LW901\_022, Nepean River. Taken on 26/04/2017.



**Photo 11:** Release at Gas Zone AA9\_LW901\_022, Nepean River. Taken on 26/04/2017.

### Trigger Action Response Plan

These latest gas releases are a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <math><3000\text{ L/min}</math>

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

Table 1 presents impacts recorded for Longwall 901 to date.



**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refers to latest impacts discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Inactive
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_019	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_020	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_021	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_022	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

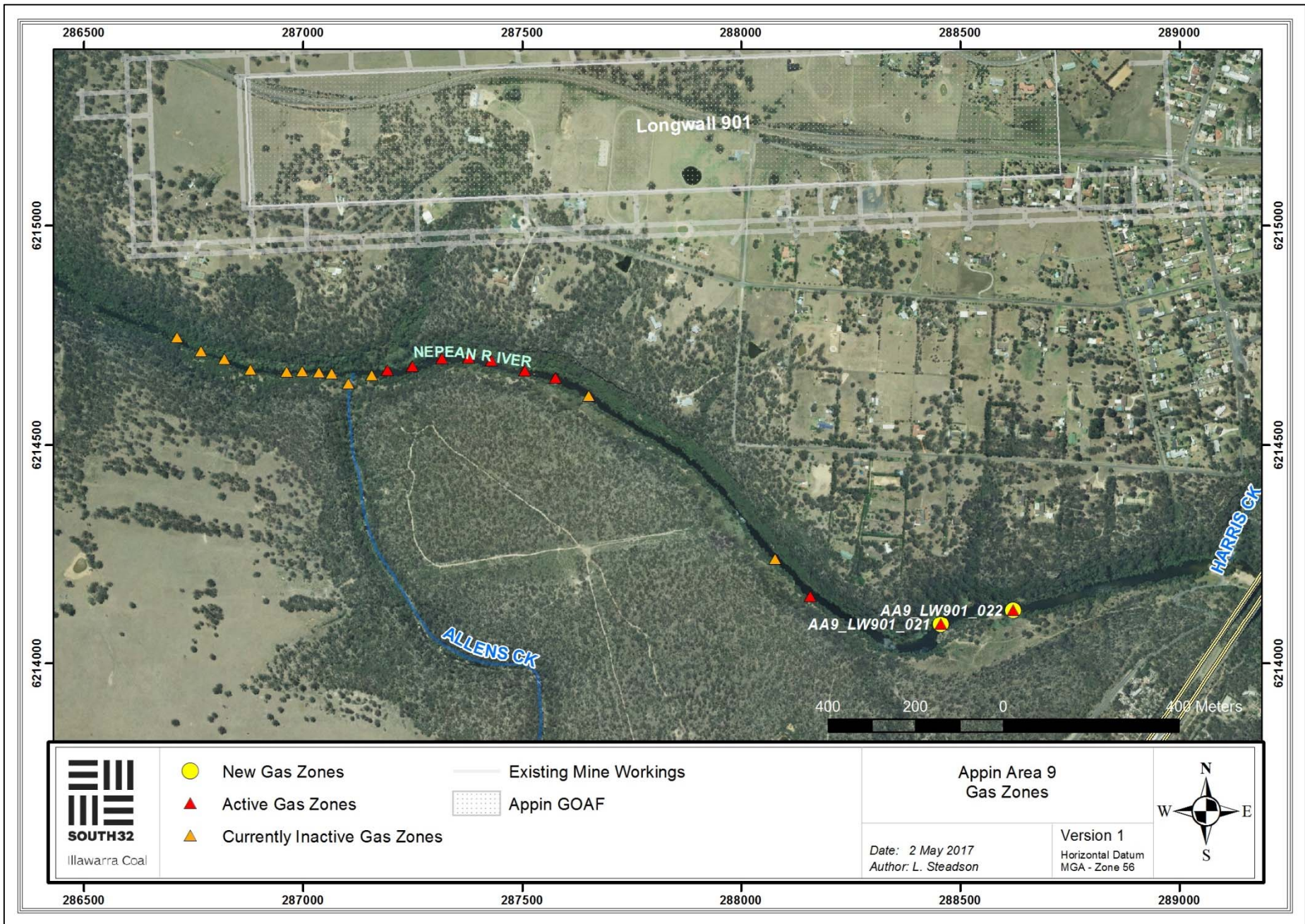


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A -Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>- NR0</li> <li>- SW3 (NR1)</li> <li>- NR2</li> <li>- If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>- chemical composition</li> <li>- dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>- dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly when the longwall is within 400m of features. Water quality and surface water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 21<sup>st</sup> May 2017 had progressed approximately 1920 m.

During the latest inspection of the Nepean River, on the 24<sup>th</sup> of May 2017, two new gas zones were identified. Additionally, impact AA9\_LW901\_019 was observed as being active; during the previous inspection on 26<sup>th</sup> April 2017 this zone was observed as being inactive. No surface impacts to the Nepean River Gorge or its clifflines have been observed as a result of extraction of Longwall 901 to date.

#### **AA9\_LW901\_023 (E288253, N6214102)**

Impact AA9\_LW901\_023 is a gas zone on the Nepean River, approximately 1000m from Longwall 901 extraction (Figure 1). The zone consists of one intermittent release of light intensity (Photo 1).



Photo 1: AA9\_LW901\_023, looking downstream (taken 24/05/2017).

#### **AA9\_LW901\_024 (E288218, N6214128)**

Impact AA9\_LW901\_024 is a gas zone on the Nepean River, approximately 1000m from Longwall 901 extraction (Figure 1). The zone consists of one intermittent release of light intensity (Photo 2).



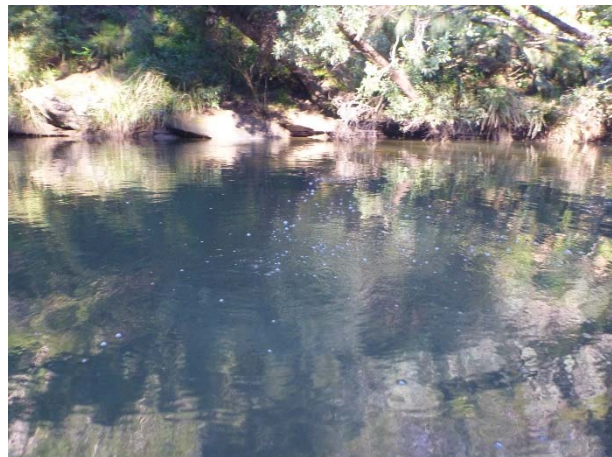
**Photo 2: AA9\_LW901\_024, looking across stream (Taken 24/05/2017).**

**AA9\_LW901\_019 (E288075, N6214239)**

Impact AA9\_LW901\_019 was first observed on the 4<sup>th</sup> of April 2017 and observed as inactive during an inspection on the 26<sup>th</sup> of April 2017. During the inspection on the 24<sup>th</sup> of May 2017, the gas zone was active. This gas zone consists of approximately 20 releases, ranging from light to medium intensity, and intermittent to constant frequency.



**Photo 3: Impact AA9\_LW901\_019, looking towards bank (Taken 24/05/2017).**



**Photo 4: Impact AA9\_LW901\_019, looking across stream (Taken 24/05/2017).**

**Trigger Action Response Plan**

These latest gas releases are a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 2).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report

- Summarise actions and monitoring in the AEMR

Table 1 presents impacts recorded for Longwall 901 to date.

**Table 1: Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refers to latest impacts discussed.**

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Inactive
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_019	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_020	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_021	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_022	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_023	5/05/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_024	5/05/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

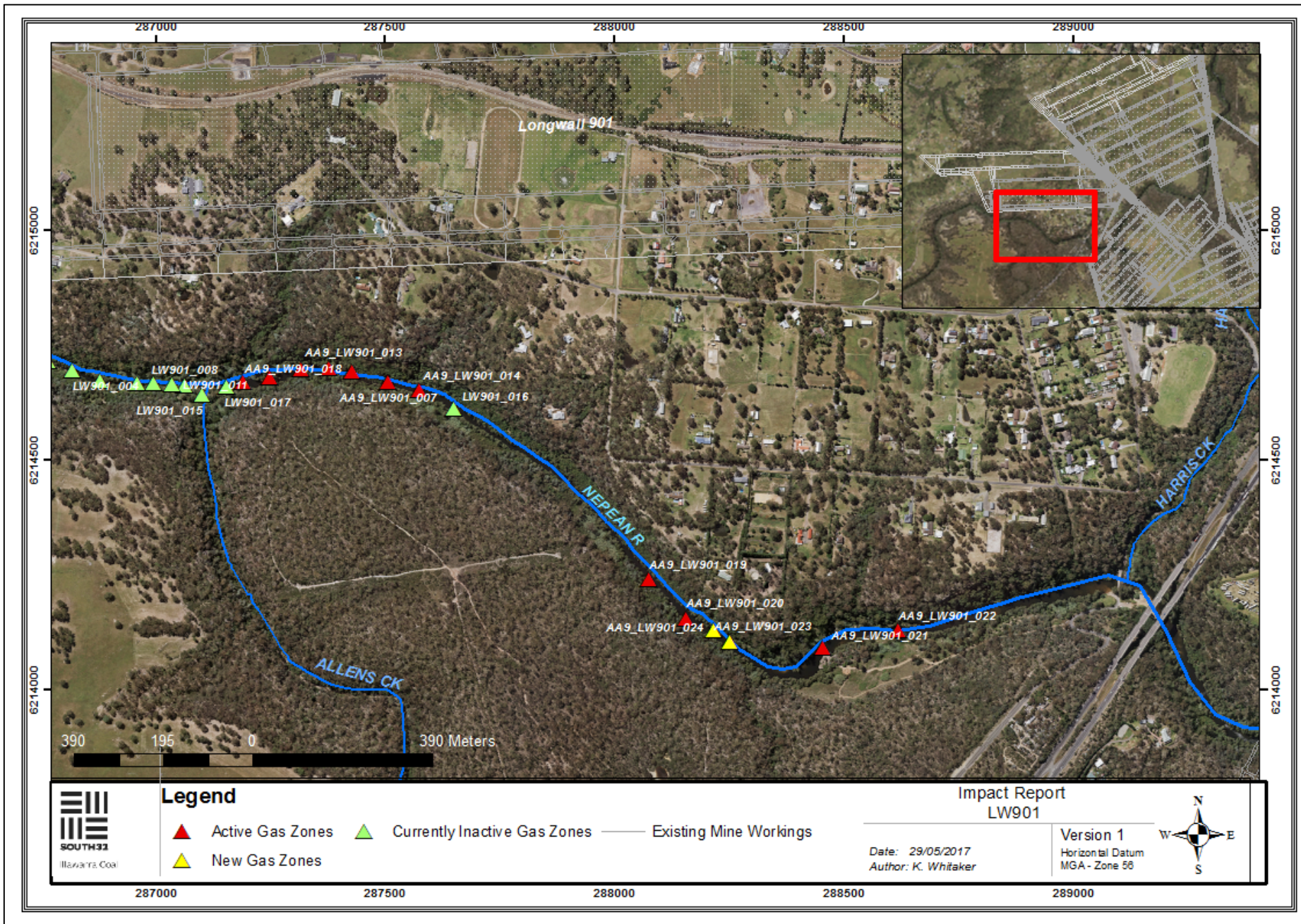


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

APPENDIX A

Table 2: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions stated for Level 1</i></li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> <li><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></li> <li><i>Strata Gas Emission Plume:</i></li> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Actions stated for Level 2</i></li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> <li><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></li> </ul>



Monitoring of the Nepean River and its tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly when the longwall is within 400m of a features. Water quality and water levels are measured along with photographic and observational records. Longwall 901 began extraction on the 19<sup>th</sup> of January 2016 and as of the 16<sup>th</sup> of July 2017 had progressed approximately 2000m.

During the latest inspection of the Nepean River on the 17<sup>th</sup> of July 2017, one new gas zone was identified. No surface impacts to the Nepean River Gorge or its clifflines have been observed as a result of extraction of Longwall 901 to date.

**AA9\_LW901\_023 (E288292, N6214083)**

Impact AA9\_LW901\_023 is a gas zone on the Nepean River, approximately 1000m from Longwall 901 extraction (Figure 1). The zone consists of approximately 10 release points over an area approximately 1m<sup>2</sup> (Photo 1).



**Photo 1:** Impact AA9\_LW901\_023. Taken on 17/07/2017)

**Trigger Action Response Plan**

The latest gas release is a Level 1 Trigger according to the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 1.1).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

Table 1 presents impacts recorded for Longwall 901 to date.

**Table 1:** Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted rows refers to latest impacts discussed.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Inactive
AA9_LW901_016	04/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_019	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_020	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

AA9_LW901_021	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_022	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_023	17/07/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

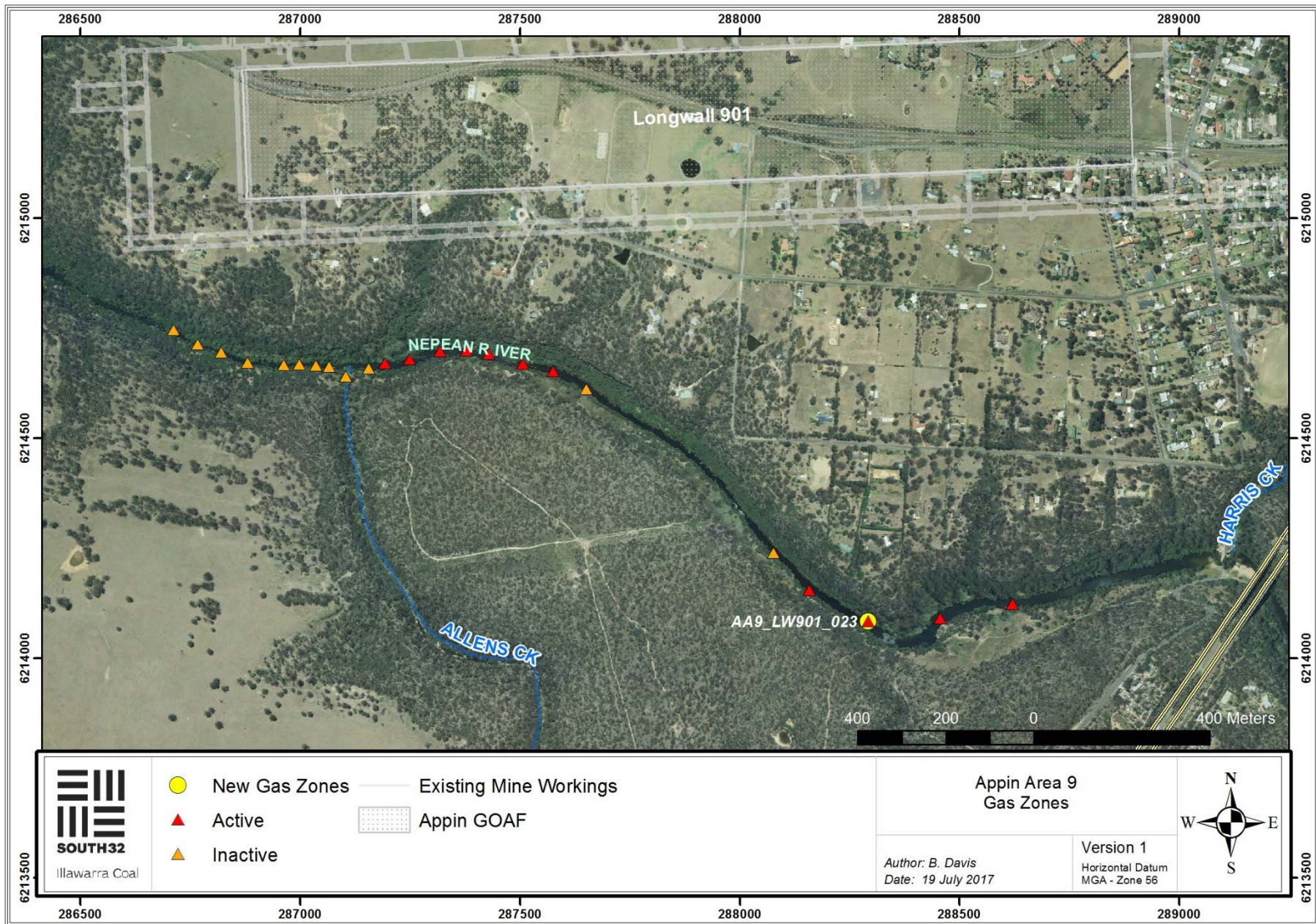


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.

# APPENDIX A -Table 1.1: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>- NR0</li> <li>- SW3 (NR1)</li> <li>- NR2</li> <li>- If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEHL, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>- chemical composition</li> <li>- dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>- dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEHL, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Coal Environmental Field Team (ICEFT) on a monthly basis prior to mining and weekly when the longwall is within 400m of features. Water quality and surface water levels are measured along with photographic and observational records. Longwall 901 began extraction on 19<sup>th</sup> of January 2016 and was completed on 8<sup>th</sup> September 2017, with a total length of 2028m.

Monthly monitoring continues for the Longwall 901 post-mining period. During the latest inspection of the Nepean River, on the 31<sup>st</sup> of January 2018, one new gas zone was identified. No surface impacts to the Nepean River Gorge or its clifflines have been observed resulting from extraction of Longwall 901.

#### **AA9\_LW901\_026 (E288012, N6214310)**

Impact AA9\_LW901\_026 consists of a single gas release on the Nepean River, approximately 770m from Longwall 901 extraction (Figure 1). The release is constant with low intensity (Photo 1 and 2).



#### **Trigger Action Response Plan**

This latest gas zone is a Level 1 Trigger per the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 2).

- Identification of strata gas plume of flow rate <3000 L/min

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

Table 1 presents impacts recorded for Longwall 901 to date

**Table 1: Subsidence impacts recorded for Longwall 901, Appin Area 9. Highlighted row refers to latest impact, discussed. Activity on last inspection is based on inspection date 31/01/2018.**

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment	Activity on Last Inspection
AA9_LW901_001	2/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_002	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_003	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_004	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_008	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_013	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_015	29/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Allens Creek	Inactive
AA9_LW901_017	08/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_019	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_020	4/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_021	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_022	26/04/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active
AA9_LW901_023	17/07/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_024	5/05/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_025	5/05/2017	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Inactive
AA9_LW901_026	31/01/2018	LW901	Gas Zone	Level 1	Gas Zone in Nepean River	Active

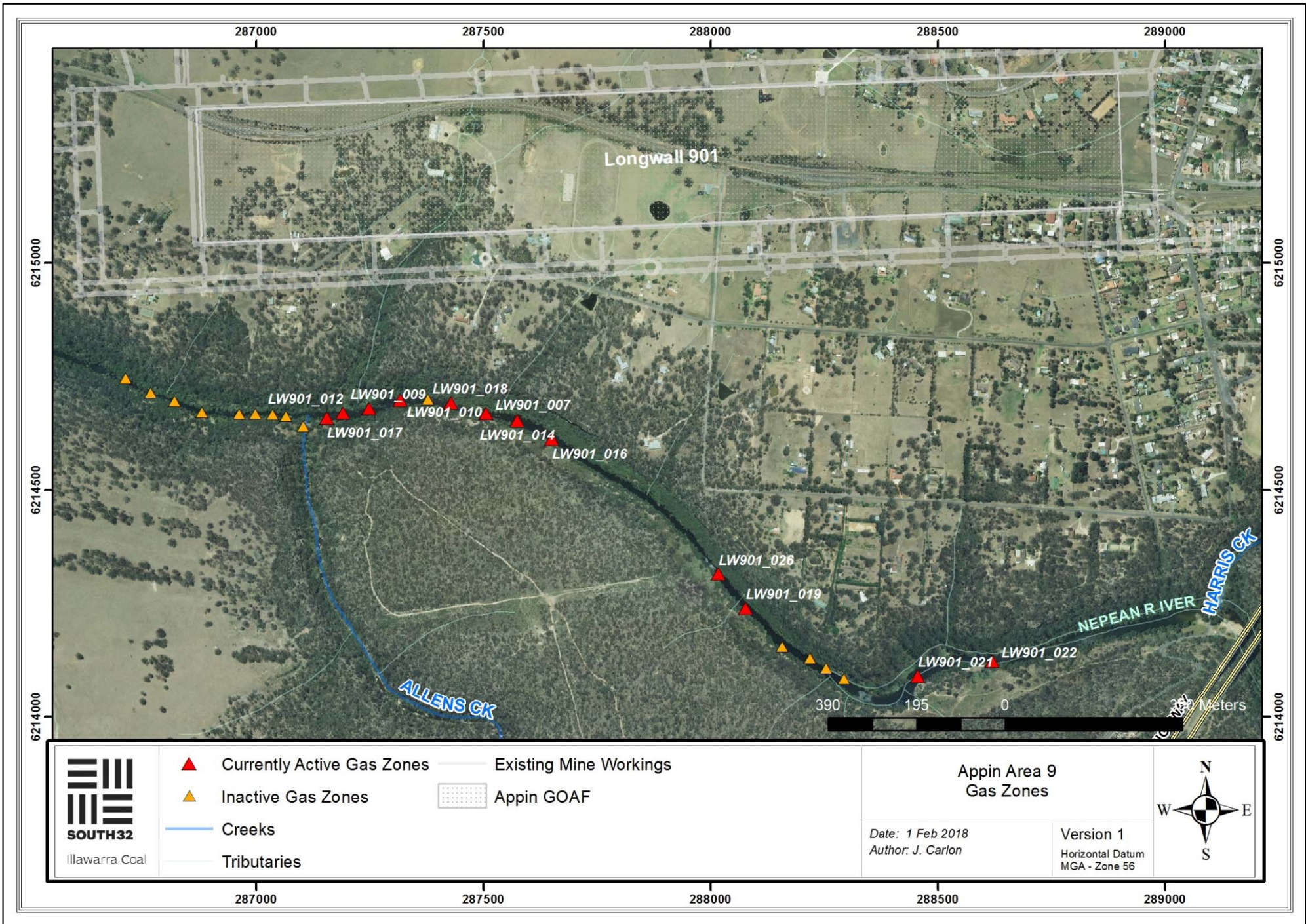


Figure 1: Location of gas zones relative to Longwall 901, Appin Area 9.



APPENDIX A

Table 2: AA9 Master TARP, Key Monitoring, Triggers and Response

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
<p>Adjacent and downstream sites:</p> <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<p><b>Level 1*</b></p> <p>Impact monitoring sites when comparing the baseline period to the mining period for that site:</p> <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEH, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<p><b>Level 2*</b></p> <p>Impact monitoring sites when comparing the baseline period to the mining period for that site:</p> <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<p><b>Level 3*</b></p> <p>Impact monitoring sites when comparing the baseline period to the mining period for that site:</p> <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEH, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>