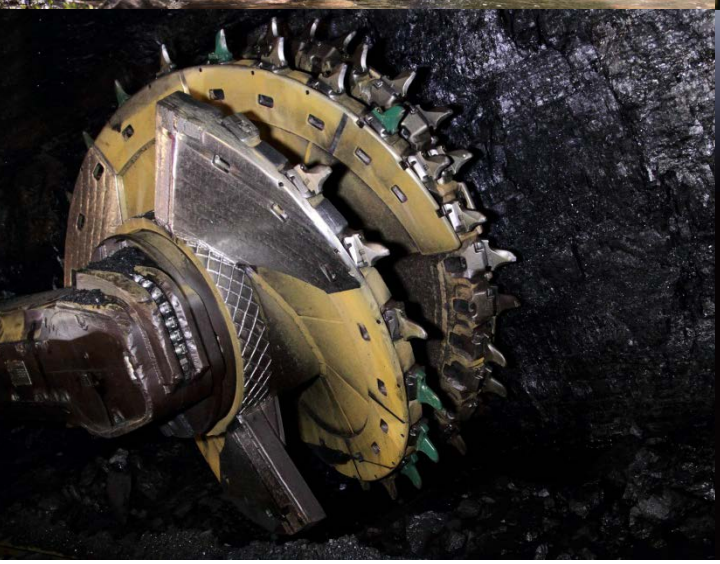





ATTACHMENT C1 – LONGWALL 37 END OF PANEL REPORT

LANDSCAPE MONITORING IMPACT REPORTS

ILLAWARRA COAL ENVIRONMENTAL FIELD TEAM, JUNE 2014 TO JANUARY 2015

West Cliff Area 5 Longwall 36 Impact Report
30 June 2014

Monthly inspections of the Georges River adjacent to Longwall 36 have been carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. These inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP) and Georges River Management Plan (GRMP).

Longwall 36 commenced on the 10th of August 2013 and extraction was completed on the 17th May 2014. At completion, Longwall 36 was approximately 130m from the Georges River. Longwall 35 was completed on 20th July 2013. Reference to Longwall 35 is made as some of the impacts discussed in this report are a result of Longwall 35. Extraction of Longwall 37 commenced on 10th of June 2014 and as of 20th June is approximately 1500m from the Georges River.

Impact WCA5_LW36_001 (E296661, N6217640)

Rock fracturing and uplift was observed on a Georges River tributary at site GR104_Pool 1 (**Figure 1**), approximately 65m from the end of Longwall 36. The impact (**Photos 1 to 4**) is comprised of two fractures approximately 1.5m and 0.5m long with a maximum uplift of 0.03m.

The observed impact is consistent with a Minor Trigger in the West Cliff Area 5 Longwalls 34 to 36 SMP.

- Small crack in a watercourse which is not observed to result in surface water loss or causing erosion or impeding flow (**Table 2**).

Photo 1: WCA5_LW36_001, fracturing and uplift of rock bed at GR104_Pool 1 looking southeast. Taken on 19/06/2014.

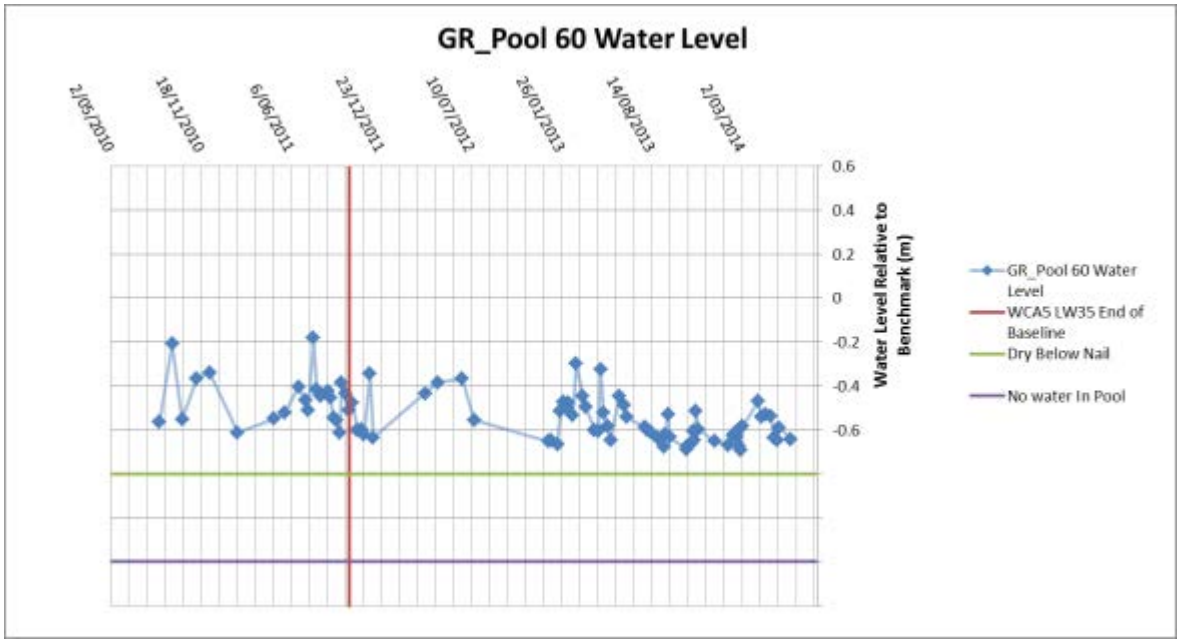
Photo 2: WCA5_LW36_001, fracturing and uplift of rock bed at GR104_Pool 1 looking northwest. Taken on 19/06/2014.

Photo 3: WCA5_LW36_001, fracturing and uplift of rock bed at GR104_Pool 1 looking south. Taken on 19/06/2014.

Photo 4: WCA5_LW36_001, fracturing and uplift of rock bed at GR104_Pool 1 looking south. Taken on 19/06/2014.

Update: Impact WCA5_LW35_023

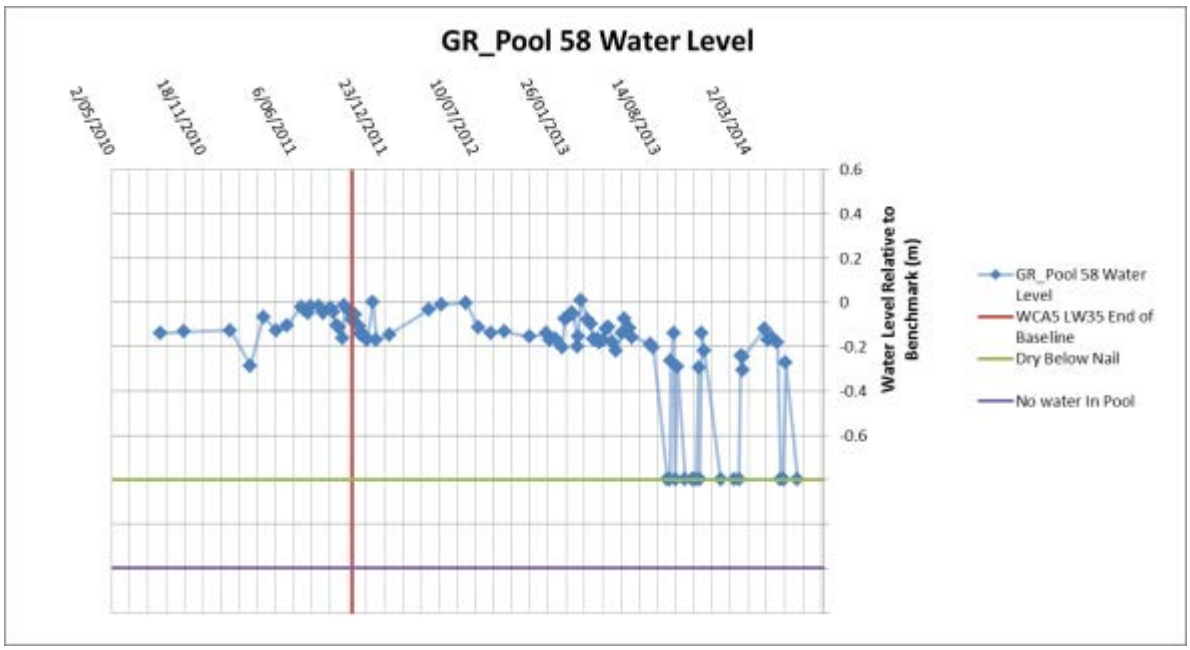
On the latest inspection GR_Pool 60 in the Georges River was observed to be at a level below that experienced in the baseline period (**Photos 5 and 6**). As shown in Graph 1, this lower-than-baseline water level has been observed previously and was reported as Impact WCA5_LW35_023.



Graph 1: Water levels recorded in GR_Pool 60.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

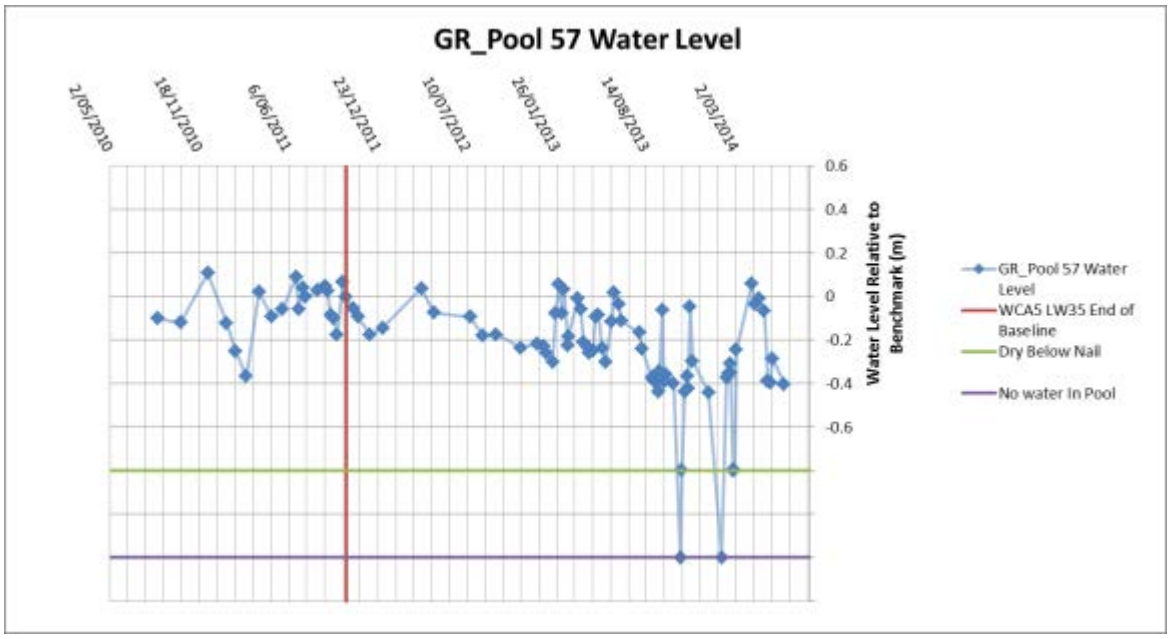
On the latest inspection of GR_Pool 58 in the Georges River the water level was 'Dry Below Nail' (**Graph 2**). This water level has previously been reported (**Photos 7 and 8**). The latest observation is a trigger according to the GRMP and is discussed in the TARP section of this report.



Graph 2: Water levels recorded in GR_Pool 58.

Update: Impact WCA5_LW35_012 (E296939, N6217250)

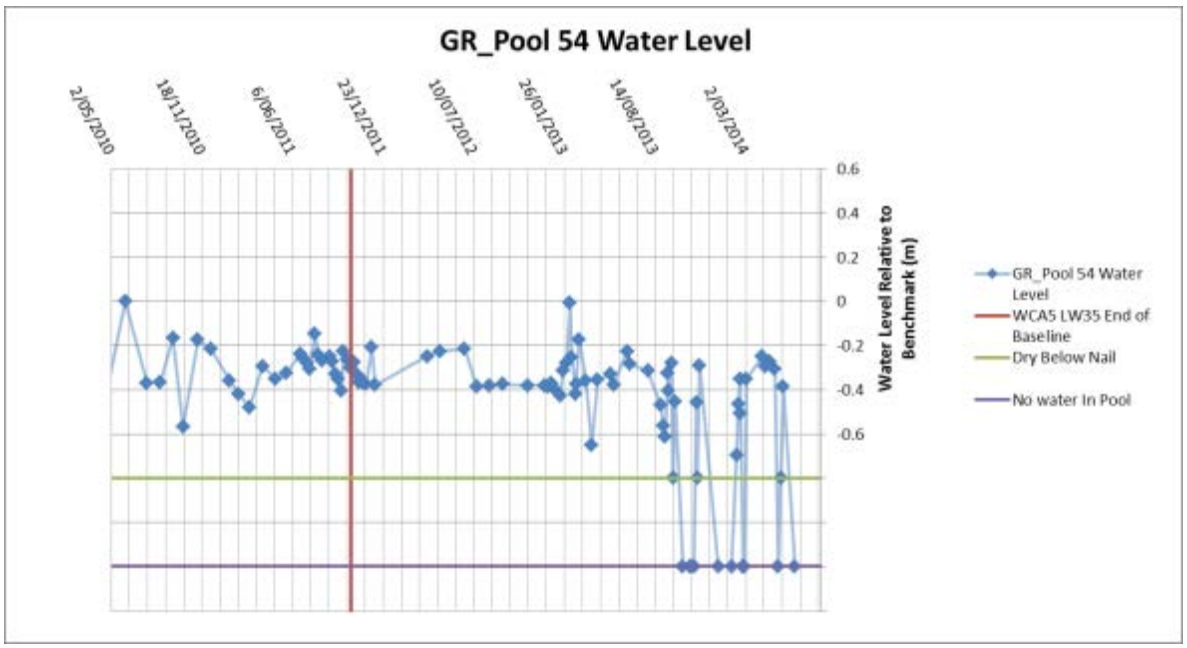
On the latest inspection of GR_Pool 57 in the Georges River it was observed to be at a level below that experienced in the baseline period (**Graph 3**). The latest observation (**Photos 9 and 10**) is a trigger according to the GRMP and is discussed in the TARP section of this report.



Graph 3: Water levels recorded in GR_Pool 57.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

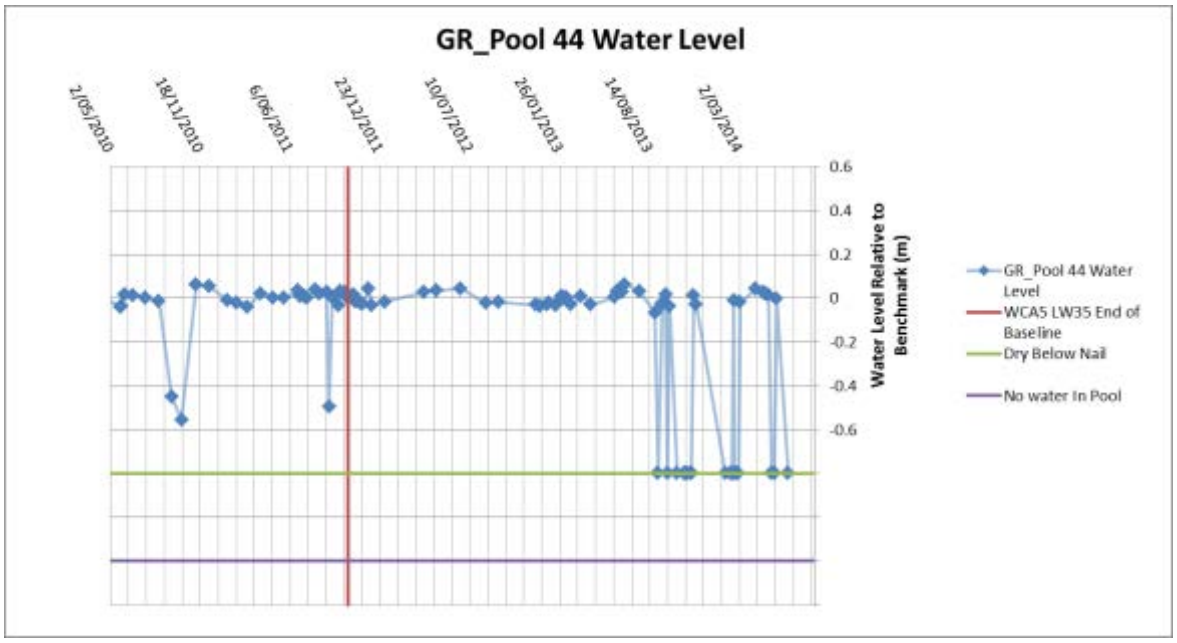
On the latest inspection of GR_Pool 54 in the Georges River it was observed to be dry. The latest observation (**Photos 11 and 12**) is a trigger according to the GRMP and is discussed in the TARP section of this report.



Graph 5: Water levels recorded in GR_Pool 54.

Impact WCA5_LW35_025 (E297159, N6216601)

On the latest inspection of GR_Pool 44 in the Georges River it was 'Dry Below Nail' (**Graph 6**). The latest observation (**Photos 13 and 14**) is a trigger according to the GRMP and is discussed in the TARP section of this report.



Graph 6: Water levels recorded in GR_Pool 44.

Photo 5: GR_Pool 60 looking upstream. Taken on 18/06/2014.

Photo 6: Pool 60 looking downstream. Taken on 18/06/2014.

Photo 7: GR_Pool 58 looking upstream. Taken on 18/06/2014.

Photo 8: GR_Pool 58 looking downstream. Taken on 18/06/2014.

Photo 9: GR_Pool 57 looking upstream. Taken on 18/06/2014.

Photo 10: GR_Pool 57 looking downstream. Taken on 18/06/2014.

Photo 11: GR_Pool 54 looking upstream. Taken on 18/06/2014.

Photo 12: GR_Pool 54 looking downstream. Taken on 18/06/2014.

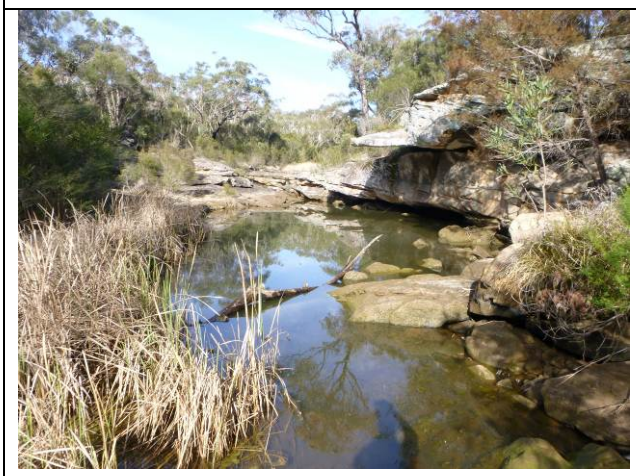


Photo 13: GR_Pool 44 looking upstream Taken on 18/06/2014.

Photo 14: GR_Pool 44 looking downstream. Taken on 18/06/2014.

Trigger Action Response Plan (TARP)

Monitoring is being conducted as outlined in the West Cliff Area 5 Longwall 34 to 36 SMP. The rock fracture (WCA5_LW36_001) is consistent with a minor trigger as defined in the SMP. Standard monitoring will continue and no corrective actions are recommended.

There have been a number of observations of pool water levels at a Level 1 Trigger as defined by the GRMP:

- Fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are able to be maintained with intervention (**Appendix A, Table 1**).

Following a Level 1 pool water level trigger the GRMP initiates additional releases into the River. However, this intervention is not available at this time due to water release restrictions under Environmental Protection Licence (EPL) 2504. Therefore the impacts are a Level 2 Trigger:

- More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention (**Appendix A, Table 1**).

A summary of impacts that have been reported is presented in **Table 1**.

Table 1: Recently reported impacts.

Site ID	Identification date	Activating longwall	Description	Impact level
WCA5_LW35_007	20/02/2013	WAC_LW35	Rock fracturing	Level 2
WCA5_LW35_008	14/03/2013	WAC_LW35	Gas Release – currently inactive	Level 1
WCA5_LW35_009	14/03/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_010	20/03/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_011	5/04/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_012	15/05/2013	WAC_LW35	Rock Fracturing	Level 2
WCA5_LW35_013	29/05/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_014	6/05/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_015	20/06/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_016	10/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_017	15/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_018	23/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_019	21/08/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_020	21/08/2013	WAC_LW35	Iron Staining	Level 1
WCA5_LW35_021	2/09/2013	WAC_LW35	Iron Staining	Level 1
WCA5_LW35_022	5/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_023	11/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_024	11/09/2013	WAC_LW35	Pool Water Level	Level 1
WCA5_LW35_025	23/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW36_001	19/06/2013	WAC_LW36	Rock Fracturing	Level 1

Corrective Management Action

The following actions are required by a Level 2 Trigger:

- Increase monitoring/inspection frequency of key sites to twice weekly
- Increase discharge from BCD to maintain pool water levels for ecosystem protection (note: additional releases can not be initiated due to EPL 2504)
- Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow
- Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s)
- Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works

to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place

- Develop and implement monitoring program to ensure effectiveness of remedial works if they are required

The following actions will be implemented prior to the next follow-up report:

- Increase monitoring/inspection frequency of key sites to twice weekly
- Review management options, including implementation of measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s)
- Assess the magnitude of pool water level reduction and develop remedial works to restore pool water level
- Any remedial actions will be considered within an overall rehabilitation plan for the Georges River

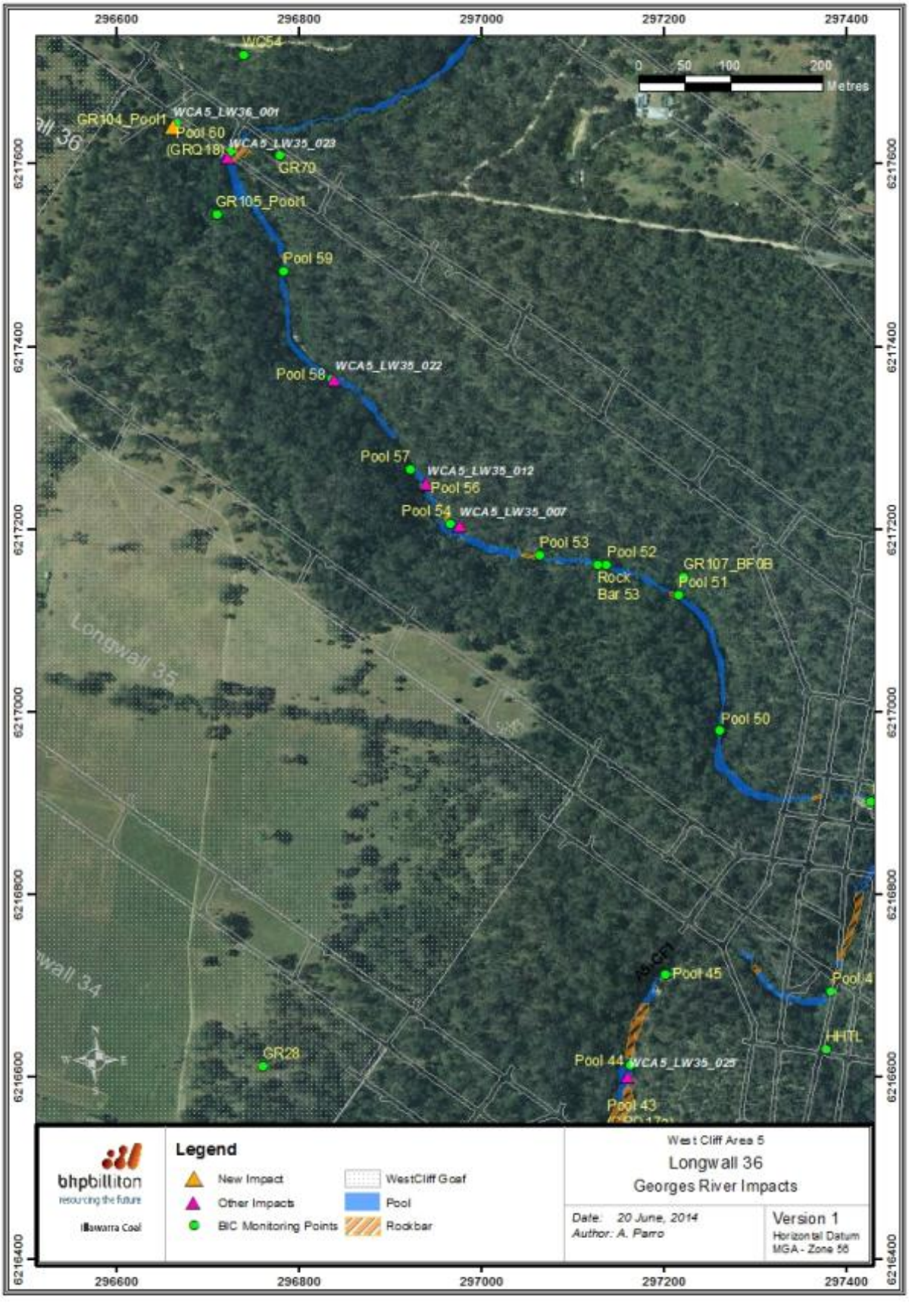


Figure 1: Map showing location of latest impact WCA5_LW36_001 and recent impacts in relation to other features.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	LW35 - 36			
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required		
Level 3 **(Exceeding Predicted Impact Criteria)**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above), including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		

Table 2: West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP)

ASPECT	MONITORING				MANAGEMENT			
	SITES	PARAMETERS	FREQUENCY	PURPOSE	TRIGGER	ACTION	RESPONSIBILITY	PURPOSE
			years or as otherwise required. • General observation of active mining areas during all other monitoring.	• Identify any impacts on vegetation communities and threatened flora populations during mining. • Identify any impacts of threatened fauna if they are observed.	with no vegetation die off.			• Identify, investigate and report on impacts (in SMP and AEMR). • To provide data for any investigation into impacts.
					Moderate • Small areas (<100m²) of impacted vegetation (by rockfalls, soil slippage) that is unlikely to commence natural regeneration within 6 months. • Larger areas (>100m²) of impacted vegetation that is likely to commence natural regeneration within 6 months. • Gas emissions with minor vegetation die off and evidence of natural regeneration.	• Notification to DPIM and resource manager/s immediately. • Notify Specialists immediately. • Condition assessment to record impacts completed within 2 weeks. • Site visits with stakeholders if required. • Capture photographic record immediately. • Review monitoring program and modify if necessary within 1 month. • Implement increased monitoring if required within 2 weeks. • Develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals. • Completion of works following approvals. • Issue CMA report within 1 month of works completion. • Conduct initial follow up monitoring & reporting within 2 months of CMA completion. • Report in the End of Panel Report submitted annually with AEMR. • Summarise all actions and monitoring in AEMR by end of February (Annually).	• Manager Environment – IC. • Expert Flora Consultants.	
					Severe • Large areas (>100m²) of impacted vegetation (by rockfalls, soil slippage) that is unlikely to commence natural regeneration within 6 months. • Gas emissions with extensive vegetation die off and no evidence of self regeneration.	• Notification to DPIM and resource manager/s immediately. • Notify Specialists immediately. • Condition assessment to record impacts completed within 2 weeks. • Site visits with stakeholders if required. • Capture photographic record immediately. • Review monitoring program and modify if necessary within 1 month. • Implement increased monitoring if required within 2 weeks. • Develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals. • Completion of works following approvals. • Issue CMA report within 1 month of works completion. • Conduct initial follow up monitoring & reporting within 2 months of CMA completion. • Report in the End of Panel Report submitted annually with AEMR. • Summarise all actions and monitoring in AEMR by end of February (Annually).	• Manager Environment – IC. • Expert Flora Consultants.	
LANDSCAPE FEATURES								
Visual inspection and photographic record of cliffs, steep slopes, fire trails, and water courses.	The three categories of site inspection include: 1. General inspection of all active subsidence areas. 2. Specific targeted monitoring sites based on potential risk. 3. Re-visits to identified impact sites).	• Landform elements, including: – Slope. – Morphological type. – Dimensions. – Mode of geomorphological activity and geomorphological agent. • Land surfaces, including aspect: – Elevation.	• Two 6 monthly baseline monitoring campaigns 1 year prior to mining. • 6 monthly monitoring during mining and monthly during any substantial subsidence period. • Monitoring to continue 6 monthly for 2 years following the completion of mining.	• Identify significant landscape features at risk of experiencing adverse erosion and/or sedimentation impacts associated with subsidence from mining. • To provide pre-mining baseline survey of landscape features for comparison with post-mining. • Identify any impacts on	***Minor*** • Rock fall from a cliff which is left mostly intact, resulting in insignificant ground disturbance. • Minor surface movement with negligible soil surface exposed. • Small crack or increased ponding in a watercourse which is not observed to result in surface water loss, be causing erosion	• Continue standard monitoring. • Report in regular reporting. • Notify other relevant specialists (IC) immediately.	• Manager Environment – IC. • Expert Landscape Consultants.	• Inform stakeholders of baseline assessment. • Report to key stakeholders in SMP Application and AEMR. • Identify, investigate and report on impacts (in SMP and AEMR). • To provide data for any investigation into impacts.

ASPECT	MONITORING				MANAGEMENT			
	SITES	PARAMETERS	FREQUENCY	PURPOSE	TRIGGER	ACTION	RESPONSIBILITY	PURPOSE
	Refer to Fig. 18.1 ***Cliffs*** •A5-CF1 (Eastern side of LW35) •A5-CF2 (Eastern side of LW36) ***Watercourses*** •A5-WC1 (Leafs Gully) •A5-WC2 (Mallaty creek) •A5-WC3 (Georges River) •A5-WC4 (Nepean creek)	– Drainage height. – Disturbance of site. – Microrelief. – Erosion. – Aggradations. – Inundation. – Coarse fragments. – Rock outcrop. – Depth to free water. – Runoff. • Land capability.		landscape features during and after mining.	or impeding flow. • Small crack in a unsealed road which does not appear to be causing erosion or impeding access. • Insignificant erosion at any location localised to a small area and should naturally stabilise in the future.			
					Moderate • Rock fall or overhang collapse where the appearance of the cliff has changed and ground disturbance is likely to stabilise naturally. • Surface movement or rock displacement that exposes significant areas of soil. • Crack in a watercourse which is not observed to cause water loss, but could cause significant erosion or impede flow. • Increased ponding in a watercourse which appears to impede flow or could cause significant erosion. • Crack in unsealed road which could cause significant erosion or impede access. • Significant erosion at any location not likely to naturally stabilise in the near future.	• Report to DPIM and resource manager/s immediately. • Notify other relevant specialists (IC) immediately. • Review monitoring program within 1 month. • Condition assessment to record impacts completed within 2 weeks. • Capture photographic record immediately. • Establish monthly monitoring frequency until stabilised. • Develop site CMA in consultation with key stakeholders if required within 1 month, (pending stakeholder availability) and seek approvals. • Implement CMA if required. • Issue CMA report within 1 month of works completion. • Conduct initial follow up monitoring & reporting within 2 months of CMA completion. • Report in the End of Panel Report submitted annually with AEMR. • Summarise all actions and monitoring in AEMR by end of February (Annually).	• Manager Environment – IC. • Expert Landscape Consultants	
					Severe • Major cliff collapse or rock fall where the characteristics of the cliff change significantly and there is significant ground disturbance that is unlikely to stabilise in the medium to long term. • Mass movement of a slope causing large areas of exposed soil. • Crack or increased ponding in a watercourse which is causing significant erosion and/or	• Notification to DPIM and resource manager/s immediately. • Notify Specialists immediately. • Condition assessment to record impacts completed within 2 weeks. • Site visits with stakeholders if required. • Capture photographic record immediately. • Review monitoring program and modify if necessary within 1 month. • Implement increased monitoring if required within 2 weeks. • Develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals. • Completion of works following approvals. • Issue CMA report within 1 month of works completion. • Conduct initial follow up monitoring & reporting within 2	• Manager Environment – IC. • Expert Landscape Consultants.	

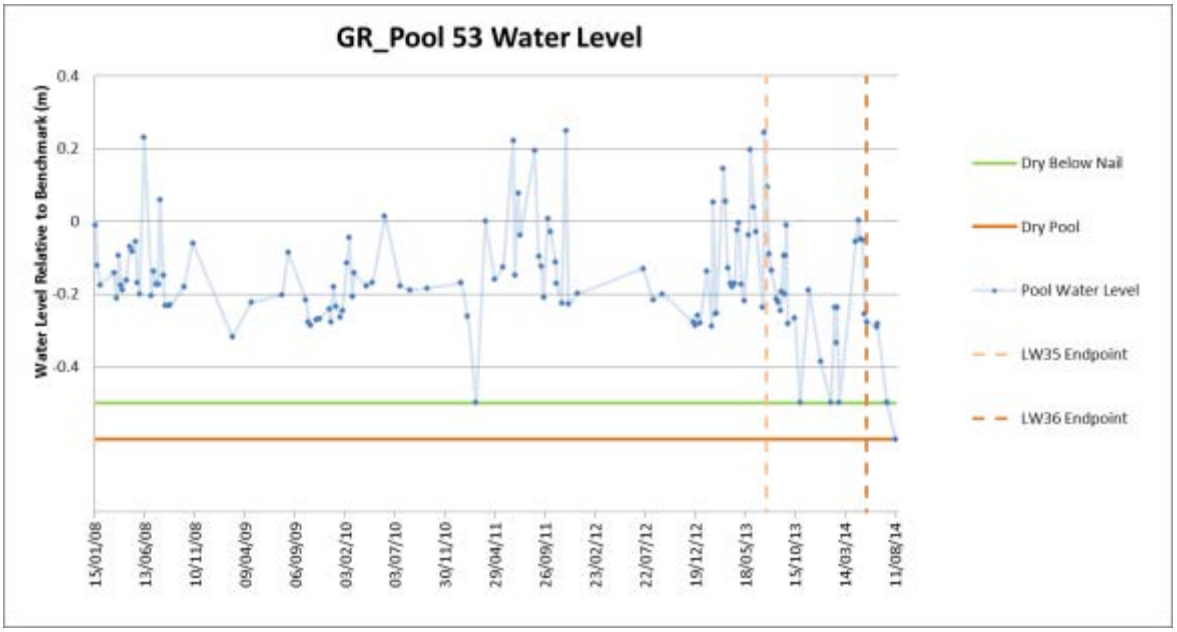
West Cliff Area 5 Longwall 36 Impact Report- Pool Level Update 15 August 2014

Inspections of the Georges River adjacent to Longwall 34 to 36 are carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. All inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 12th of August 2014. Additional pool water level triggers were identified and are discussed below. Updates to existing triggers are also included.

Impact WCA5_LW35_027 (E297062, N6217166)

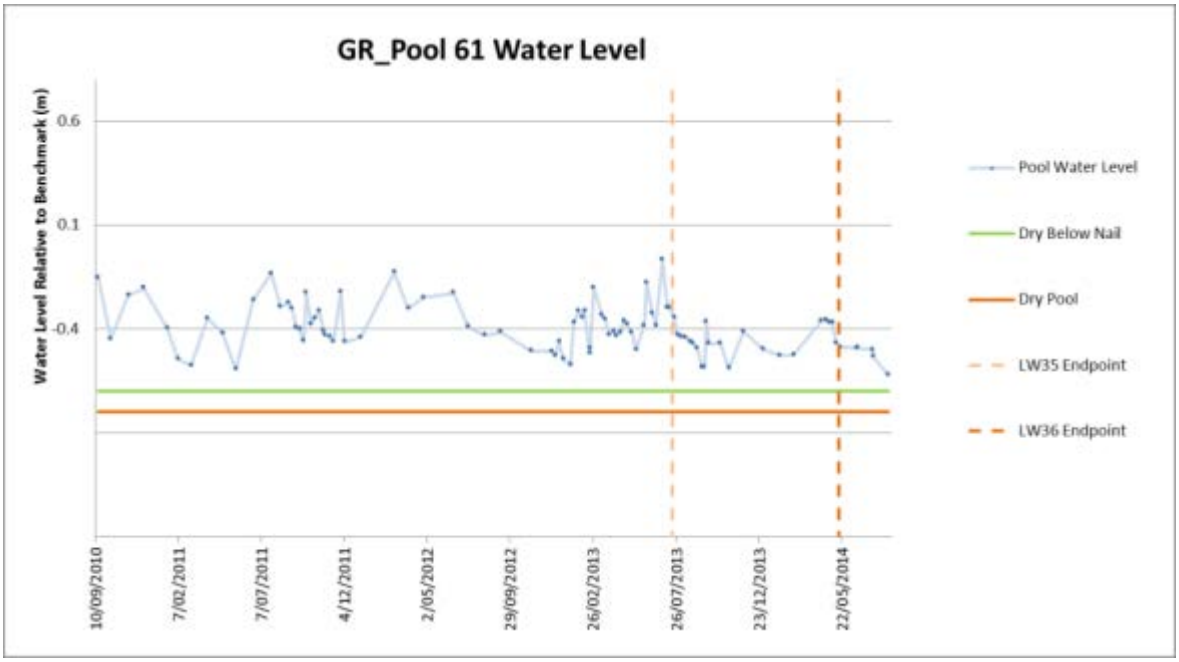
On the 12th of August 2014, GR_Pool 53 was observed to be dry. This is the first time these conditions have been observed at the site (Graph 1). Photos 1 and 2 show the latest pool conditions. The observation is a trigger according to the GRMP and is discussed in the TARP section of this report. This trigger is likely a result of low flow conditions and Longwall 35 related impacts.



Graph 1: Water levels recorded in GR_Pool 53.

Impact WCA5_LW35_028 (E296998, N6217749)

On the 12th of August 2014, GR_Pool 61 water level was observed to be at a level below baseline. This is the first time these conditions have been observed at the site (Graph 2). Photos 3 and 4 show the latest pool conditions. The observation is a trigger according to the GRMP and is discussed in the TARP section of this report. No associated fracturing has been identified in this area. This trigger is likely a result of low flow conditions and Longwall 35 related impacts identified upstream.



Graph 2: Water levels recorded in GR_Pool 61.

Existing Water Level Triggers

Water levels in the following pools were previously reported as triggers and remain at a level below baseline:

- GR_Pool 44- Impact *WCA5_LW35_025*
- GR_Pool 54- Impact *WCA5_LW35_007*
- GR_Pool 57- Impact *WCA5_LW35_012*
- GR_Pool 58- Impact *WCA5_LW35_022*
- GR_Pool 60- Impact *WCA5_LW35_023*

Photo 1: GR_Pool 53 looking upstream.
Taken on 12/08/2014.

Photo 2: GR_Pool 53 looking upstream.
Taken on 12/08/2014.

Photo 3: GR_Pool 61 looking upstream.
Taken on 12/08/2014.

Photo 4: GR_Pool 61 looking downstream.
Taken on 12/08/2014.

Trigger Action Response Plan (TARP)

A summary of impacts that have been reported is presented below.

Site ID	Identification date	Activating longwall	Description	Impact level
WCA5_LW35_010	20/03/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_011	5/04/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_012	15/05/2013	WAC_LW35	Rock Fracturing	Level 2
WCA5_LW35_013	29/05/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_014	6/05/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_015	20/06/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_016	10/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_017	15/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_018	23/07/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_019	21/08/2013	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_020	21/08/2013	WAC_LW35	Iron Staining	Level 1
WCA5_LW35_021	2/09/2013	WAC_LW35	Iron Staining	Level 1
WCA5_LW35_022	5/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_023	11/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_024	11/09/2013	WAC_LW35	Pool Water Level	Level 1
WCA5_LW35_025	23/09/2013	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_026	17/07/2014	WAC_LW35	Rock Fracturing	Level 1
WCA5_LW35_027	12/08/2014	WAC_LW35	Pool Water Level	Level 2
WCA5_LW35_028	12/08/2014	WAC_LW35	Pool Water Level	Level 2

Corrective Management Action

The following actions are required by a Level 2 Trigger:

- Increase monitoring/inspection frequency of key sites to twice weekly
- Increase discharge from BCD to maintain pool water levels for ecosystem protection (note: additional releases can not be initiated due to EPL 2504)
- Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow
- Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s)
- Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place
- Develop and implement monitoring program to ensure effectiveness of remedial works if they are required

The following actions will be implemented prior to the next follow-up report:

- Continue monitoring frequency of key sites at twice weekly while at Level 2 Trigger
- Assess the magnitude of pool water level reduction and develop remedial works to restore pool water level – this plan will be provided for Agency feedback once it has been drafted

Remedial actions will be considered within an overall rehabilitation plan for the Georges River. Recent rainfall in the catchment is likely to have mitigated all of the pool level impacts reported above and an update report will be sent following the next inspection of the River.

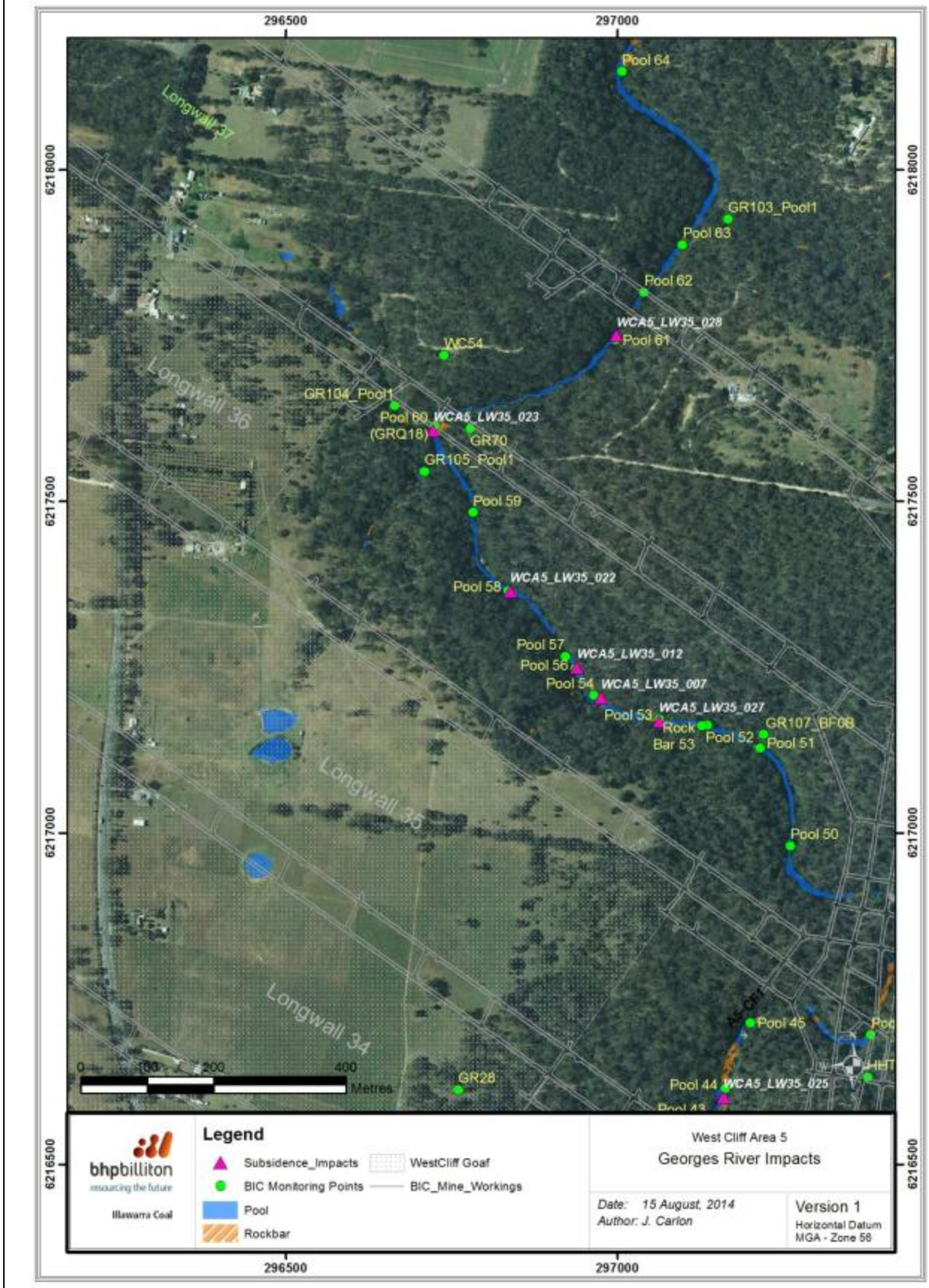


Figure 1: Location of impacts discussed in report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36			
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring,	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists

Georges River	Characteristics of level	Actions	Action by	Notification
	measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required		Update progress in monthly subsidence report
Level 3 **(Exceeding Predicted Impact Criteria)**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above), including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g.	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		Provide completion report that demonstrates successful rehabilitation outcomes

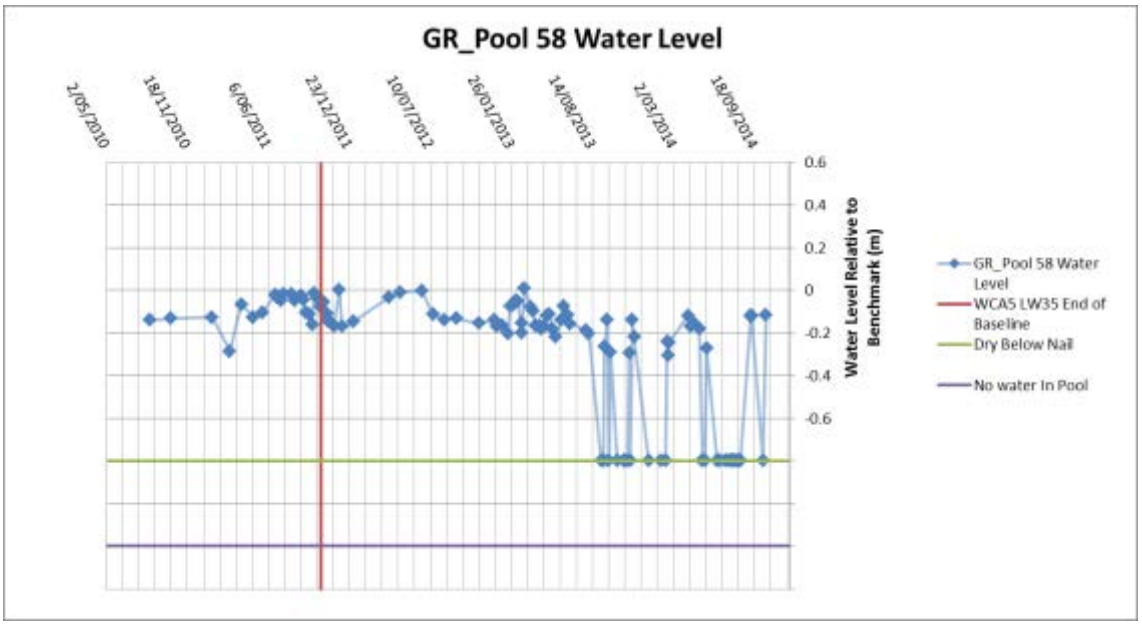
West Cliff Area 5 Longwall 36 Impact Update Report
20th October 2014

Monthly inspections of the Georges River adjacent to Longwall 34 to 37 are carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 9th of October 2014. Pool water level triggers were identified and are discussed below. A follow-up inspection was conducted on the 16th of October 2014 and pool water levels were found to have returned to above pre-mining baseline levels due to recent rain. The pool water level triggers included in this report have been previously observed and reported.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

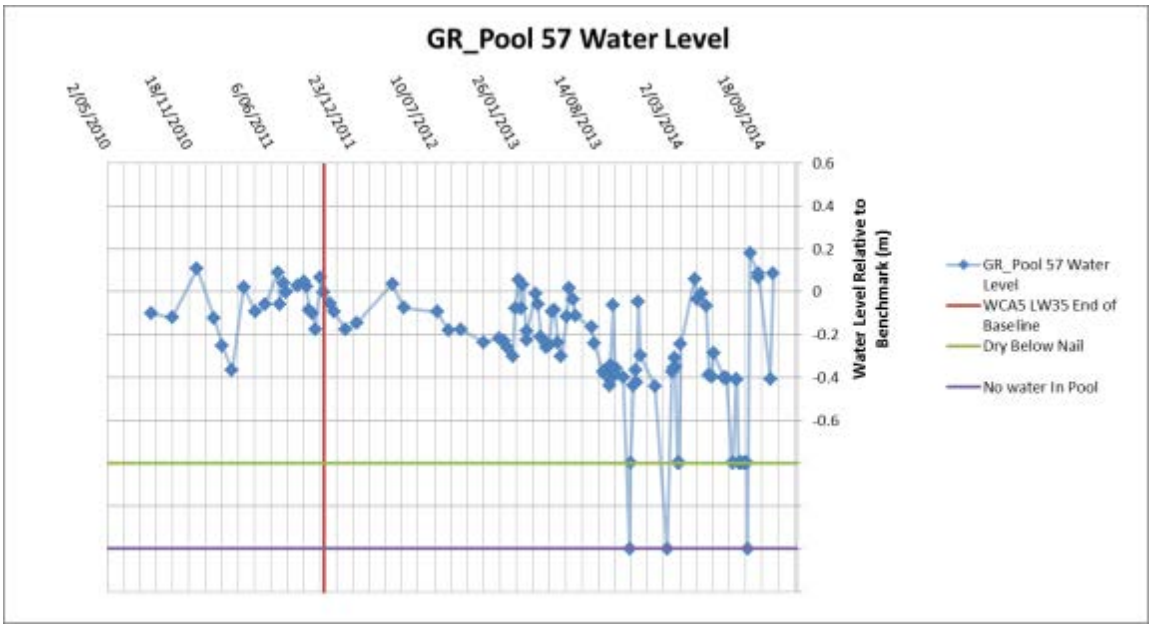
On the 9th October 2014 an inspection of GR_Pool 58 in the Georges River was conducted and the water level was found to be 'Dry Below Nail'. This water level has previously been reported. This observation is a trigger according to the GRMP and is discussed in the TARP section of this report. An inspection was conducted on 16th October 2014 and water level was found to have returned to above pre-mining level (**Graph 1**). A comparison of pool water levels for the two inspections is presented in photos 1 to 4.



Graph 1: Water levels recorded in GR_Pool 58.

Update: Impact WCA5_LW35_012 (E296939, N6217250)

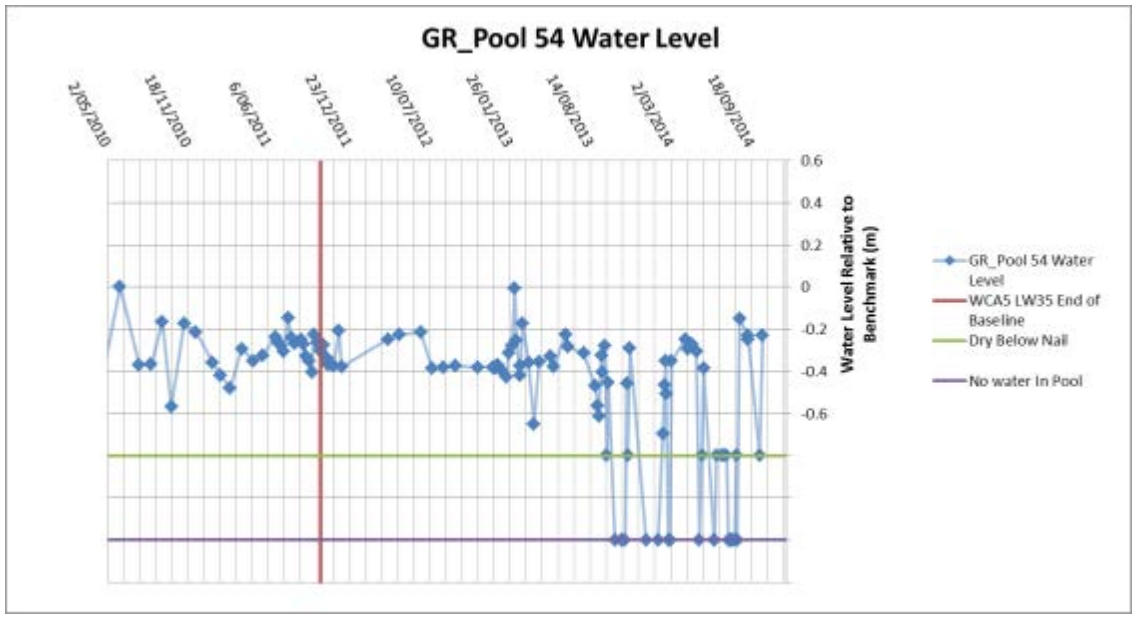
On the 9th October 2014 an inspection of GR_Pool 57 in the Georges River was conducted and the water level was found to be at a level below that experienced in the baseline period. This water level has previously been reported. This observation is a trigger according to the GRMP and is discussed in the TARP section of this report. An inspection was conducted on 16th October 2014 and water level was found to have returned to above pre-mining level (**Graph 2**). A comparison of pool water levels for the two inspections is presented in photos 5 and 6.



Graph 2: Water levels recorded in GR_Pool 57.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

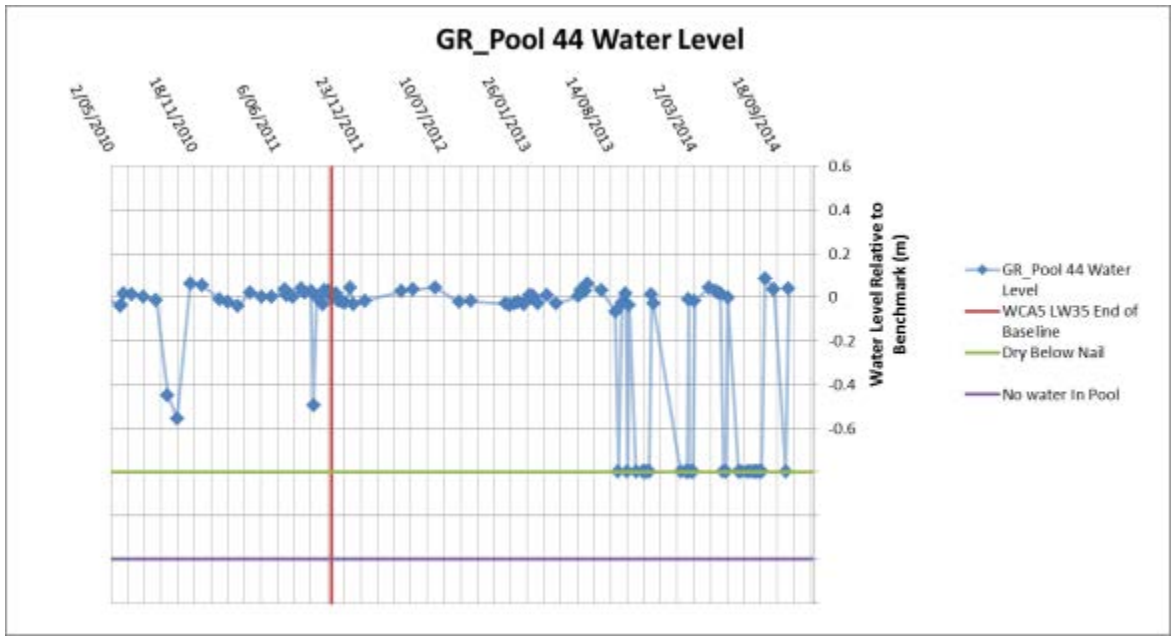
On the 9th October 2014 an inspection of GR_Pool 54 in the Georges River was conducted and the water level was found to be 'Dry Below Nail'. This water level has previously been reported. This observation is a trigger according to the GRMP and is discussed in the TARP section of this report. An inspection was conducted on 16th October 2014 and water level was found to have returned to above pre-mining level (**Graph 3**). A comparison of pool water levels for the two inspections is presented in photos 7 to 10.



Graph 3: Water levels recorded in GR_Pool 54.

Impact WCA5_LW35_025 (E297159, N6216601)

On the 9th October 2014 an inspection of GR_Pool 44 in the Georges River was conducted and the water level was found to be 'Dry Below Nail'. This water level has previously been reported. This observation is a trigger according to the GRMP and is discussed in the TARP section of this report. An inspection was conducted on 16th October 2014 and water level was found to have returned to above pre-mining level (**Graph 4**). A comparison of pool water levels for the two inspections is presented in photos 11 to 14.



Graph 4: Water levels recorded in GR_Pool 44.

Photo 1: GR_Pool 58 looking upstream.
Taken on 09/10/2014.

Photo 2: GR_Pool 58 looking upstream.
Taken on 16/10/2014.

Photo 3: GR_Pool 58 looking downstream. Taken on 09/10/2014.

Photo 4: GR_Pool 58 looking downstream. Taken on 16/10/2014.

Photo 5: GR_Pool 57 looking upstream. Taken on 09/10/2014.

Photo 6: GR_Pool 57 looking upstream. Taken on 16/10/2014.

Photo 7: GR_Pool 54 looking upstream. Taken on 09/10/2014.

Photo 8: GR_Pool 54 looking upstream. Taken on 16/10/2014.

Photo 9: GR_Pool 54 looking downstream. Taken on 09/10/2014.

Photo 10: GR_Pool 54 looking downstream. Taken on 16/10/2014.

Photo 11: GR_Pool 44 looking upstream. Taken on 09/10/2014.

Photo 12: GR_Pool 44 looking upstream. Taken on 16/10/2014.

	
Photo 13: GR_Pool 44 looking downstream. Taken on 09/10/2014.	Photo 14: GR_Pool 44 looking downstream. Taken on 16/10/2014.

Trigger Action Response Plan (TARP)

These impacts have previously been reported as Level 2. The following actions will be implemented:

- Continue monitoring as required by the SMP
- Release additional water from BCD (when permitted)

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

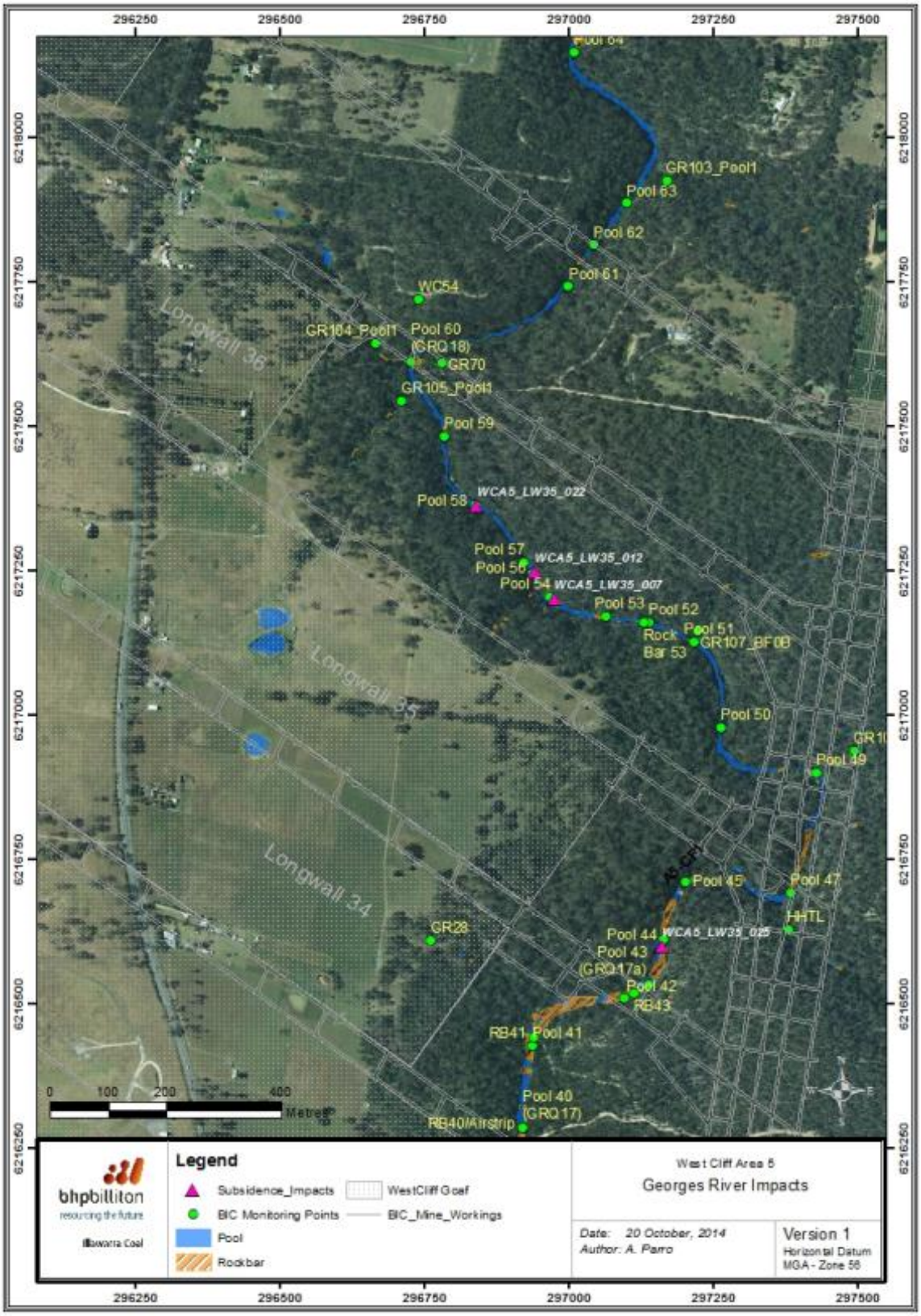


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	LW35 - 36			
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required		
Level 3 **(Exceeding Predicted Impact Criteria)**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above), including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		

West Cliff Area 5 Longwall 36 Impact Update Report
28th November 2014

Monthly inspections of the Georges River adjacent to Longwall 34 to 37 are carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 27th of November 2014. Pool water level triggers were identified and are discussed below. The pool water level triggers included in this report have been reported previously.

Subsidence movement monitoring is undertaken in accordance with the West Cliff Colliery Longwall 37 Subsidence Monitoring Programme (Rev 1). Monitoring lines are established over key rockbars in the Georges River and these are known as E to R Lines.

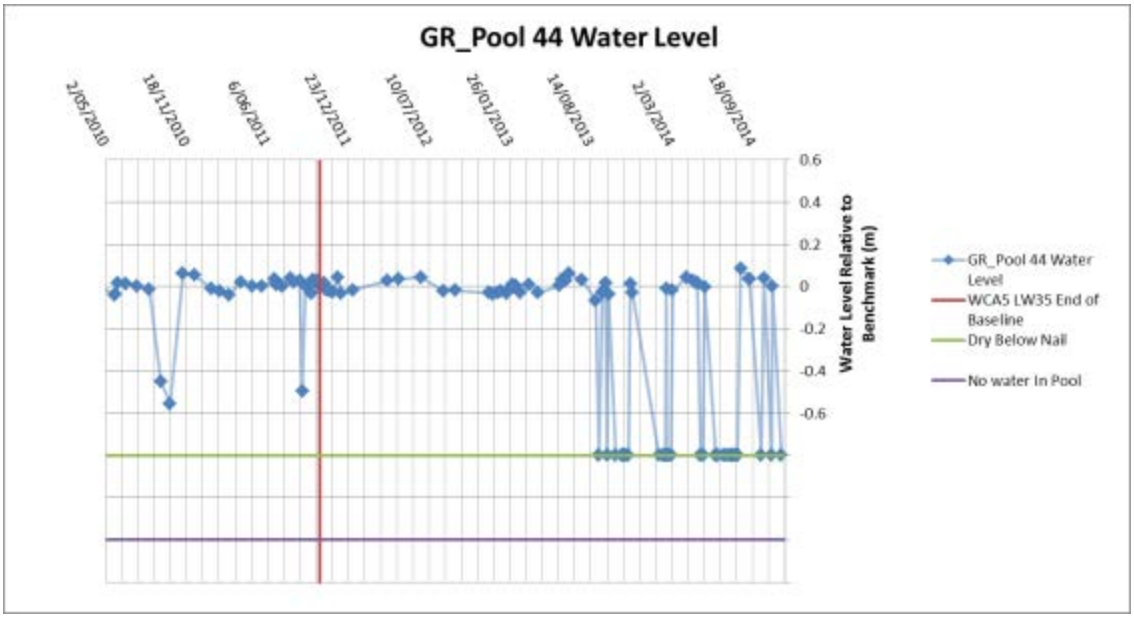
The monitoring for Longwall 37 includes:

- I to R lines at the start and end of each longwall in full 3D
- at reference mark 600m and 500m, lines L to R are surveyed in 2D
- survey frequency is increased to weekly from reference mark 400m

The most recent Georges River cross-line surveys were conducted 27 November 2014. Residual movements were measured at a number of lines and in particular the N line movements are a trigger under the GRMP. N line closure increased from 200mm to 207mm as measured on 7 November.

Update: Impact WCA5_LW35_025 (E297159, N6216601)

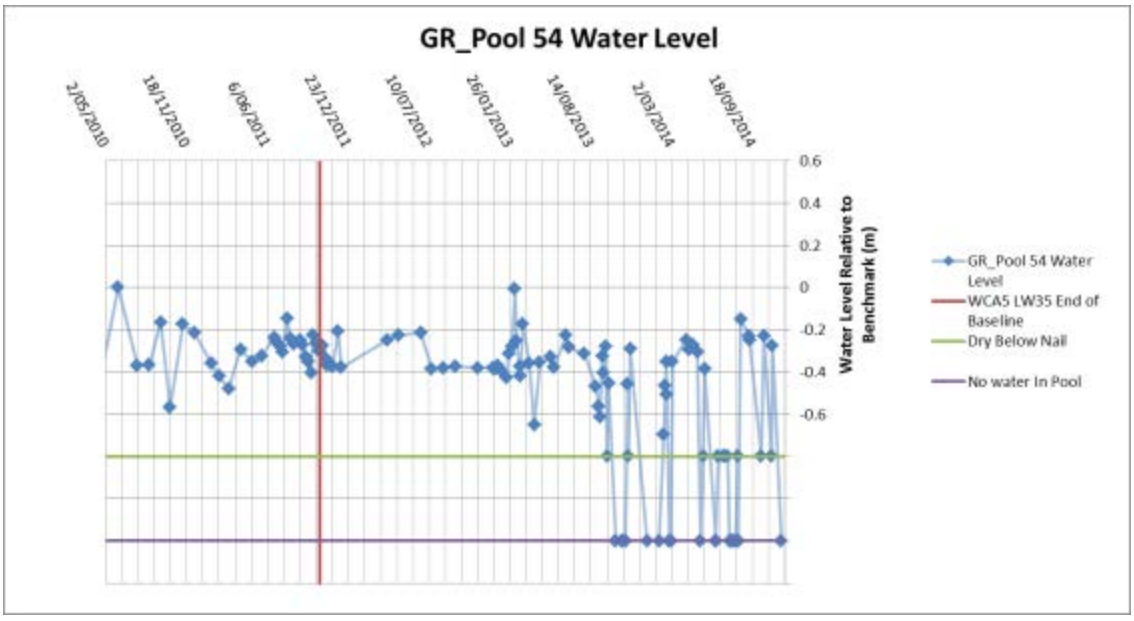
On the latest inspection of GR_Pool 44 the pool water level was 'Dry Below Nail' (Graph 1). This water level has been reported previously, is below the baseline period and is a trigger in the GRMP. Photos 1 and 2 show the latest pool conditions.



Graph 1: Water levels recorded in GR_Pool 44.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

On the latest inspection of GR_Pool 54 the pool was dry (Graph 2). This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 3 and 4 show the latest pool conditions.

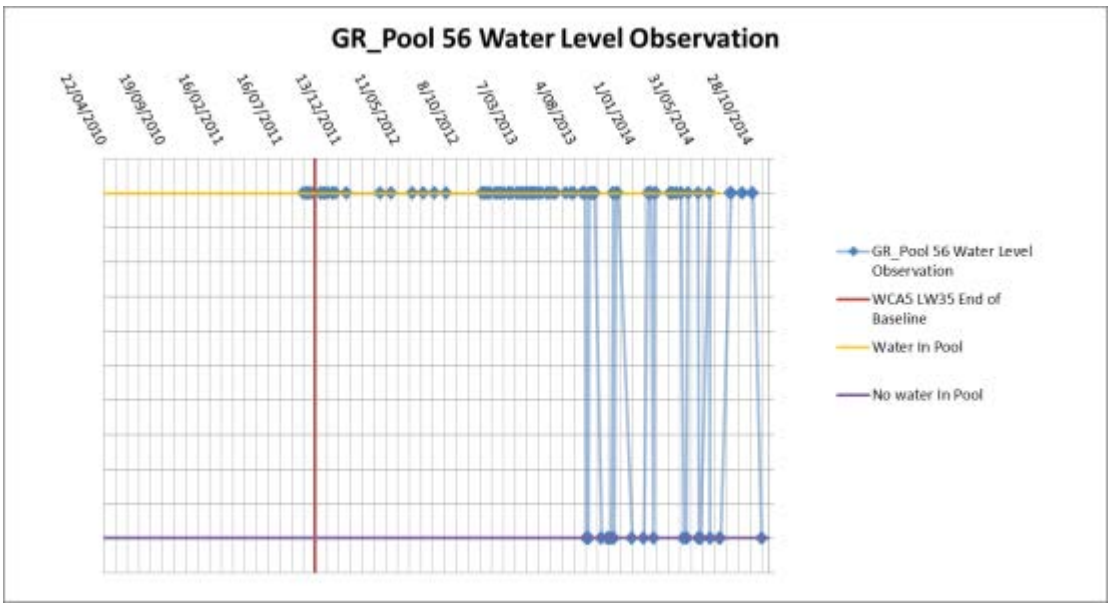


Graph 2: Water levels recorded in GR_Pool 54.

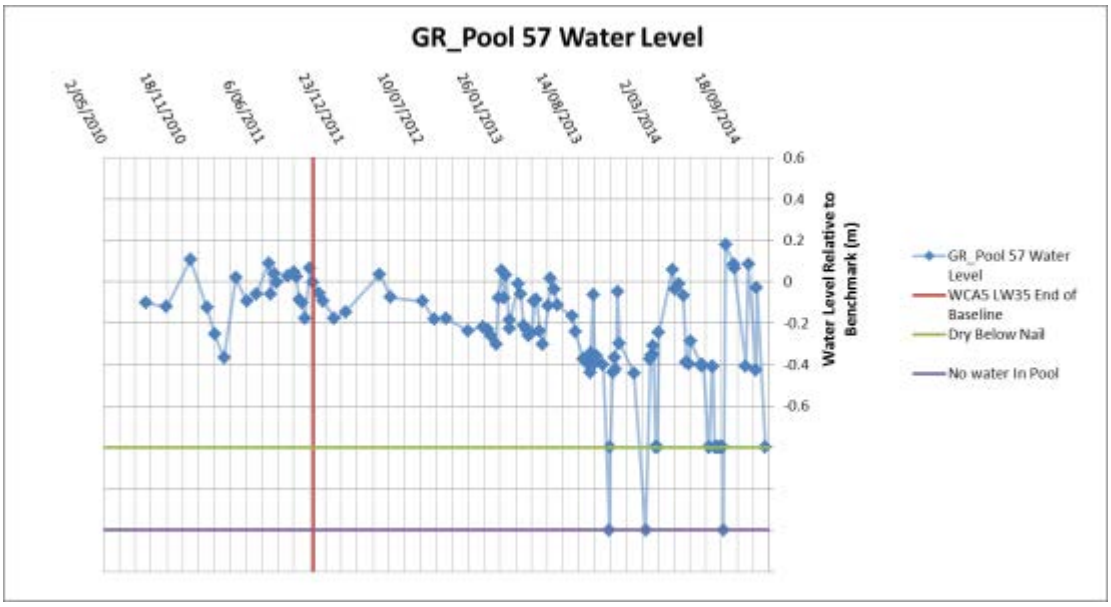
Update: Impact WCA5_LW35_012 (E296939, N6217250)

On the latest inspection of GR_Pool 56 the pool was dry (Graph 3). This water level has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 5 and 6 show the latest pool conditions.

On the latest inspection of GR_Pool 57 the pool was 'Dry Below Nail' (Graph 4). This water level has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 7 and 8 show the latest pool conditions.



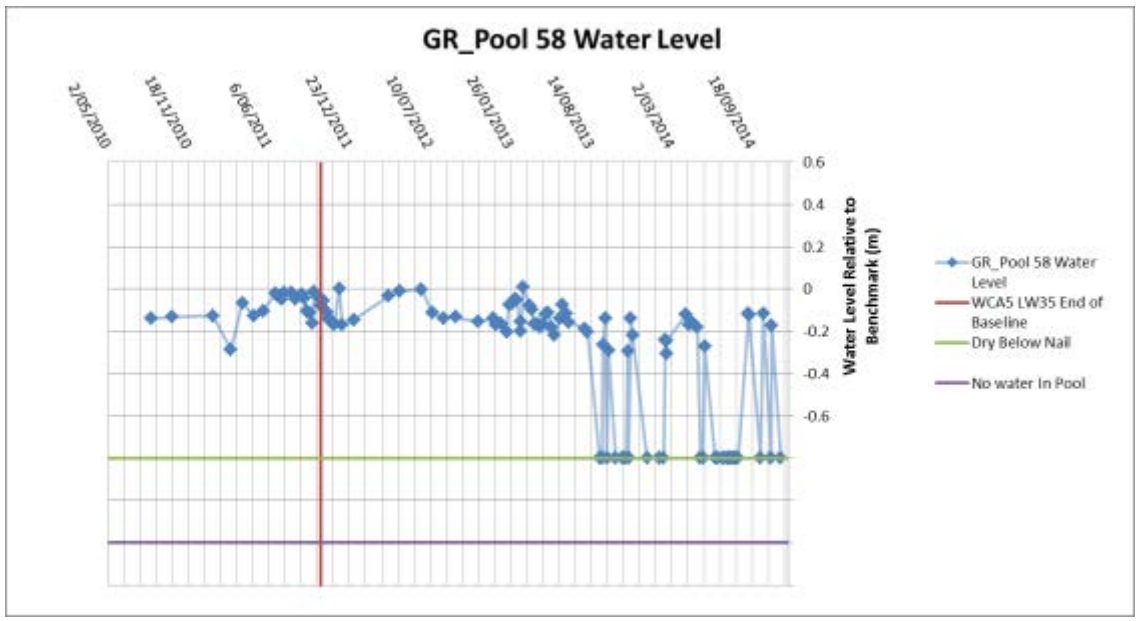
Graph 3: Water level observations recorded in GR_Pool 56.



Graph 4: Water levels recorded in GR_Pool 57.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

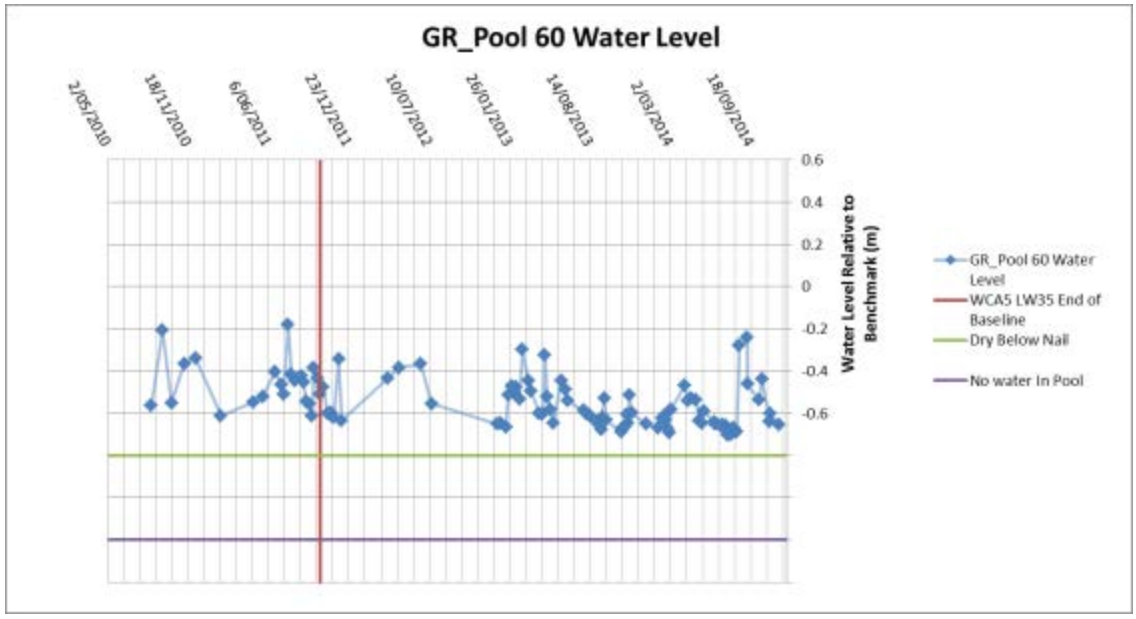
On the latest inspection of GR_Pool 58 the pool was 'Dry Below Nail' (Graph 5). This water level has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 9 and 10 show the latest pool conditions.



Graph 5: Water levels recorded in GR_Pool 58.

Update: Impact WCA5_LW35_023 (E297159, N6216601)

On the latest inspection of GR_Pool 60 the pool water level was lower than that experienced in the baseline record (Graph 6). This water level has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 11 and 12 show the latest pool conditions.



Graph 6: Water levels recorded in GR_Pool 60.

Photo 1: GR_Pool 44, looking upstream. Taken on 27/11/2014.

Photo 2: GR_Pool 44, looking downstream. Taken on 27/11/2014.

Photo 3: GR_Pool 54, looking upstream. Taken on 27/11/2014.

Photo 4: GR_Pool 54, looking downstream. Taken on 27/11/2014.

Photo 5: GR_Pool 56, looking upstream. Taken on 27/11/2014.

Photo 6: GR_Pool 56, looking downstream (towards GR_Pool 57). Taken on 27/11/2014.

Photo 7: GR_Pool 57, looking upstream. Taken on 27/11/2014.

Photo 8: GR_Pool 57, looking downstream. Taken on 27/11/2014.

Photo 9: GR_Pool 58, looking upstream. Taken on 27/11/2014.

Photo 10: GR_Pool 58, looking downstream. Taken on 27/11/2014.

Photo 11: GR_Pool 60, looking upstream. Taken on 27/11/2014.

Photo 12: GR_Pool 60, looking downstream. Taken on 27/11/2014.

Trigger Action Response Plan (TARP)

The subsidence movement reported is a Level 2 trigger under the GRMP: Survey Cross Lines >200mm closure measured as a result of LW35 – 36. The impacts have previously been reported as Level 2, as stated in the Georges River Trigger Action Response Plan (Appendix A, Table 1).

The following actions will be implemented:

- Continue monitoring as required by the SMP
- Release additional water from BCD (when permitted)

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

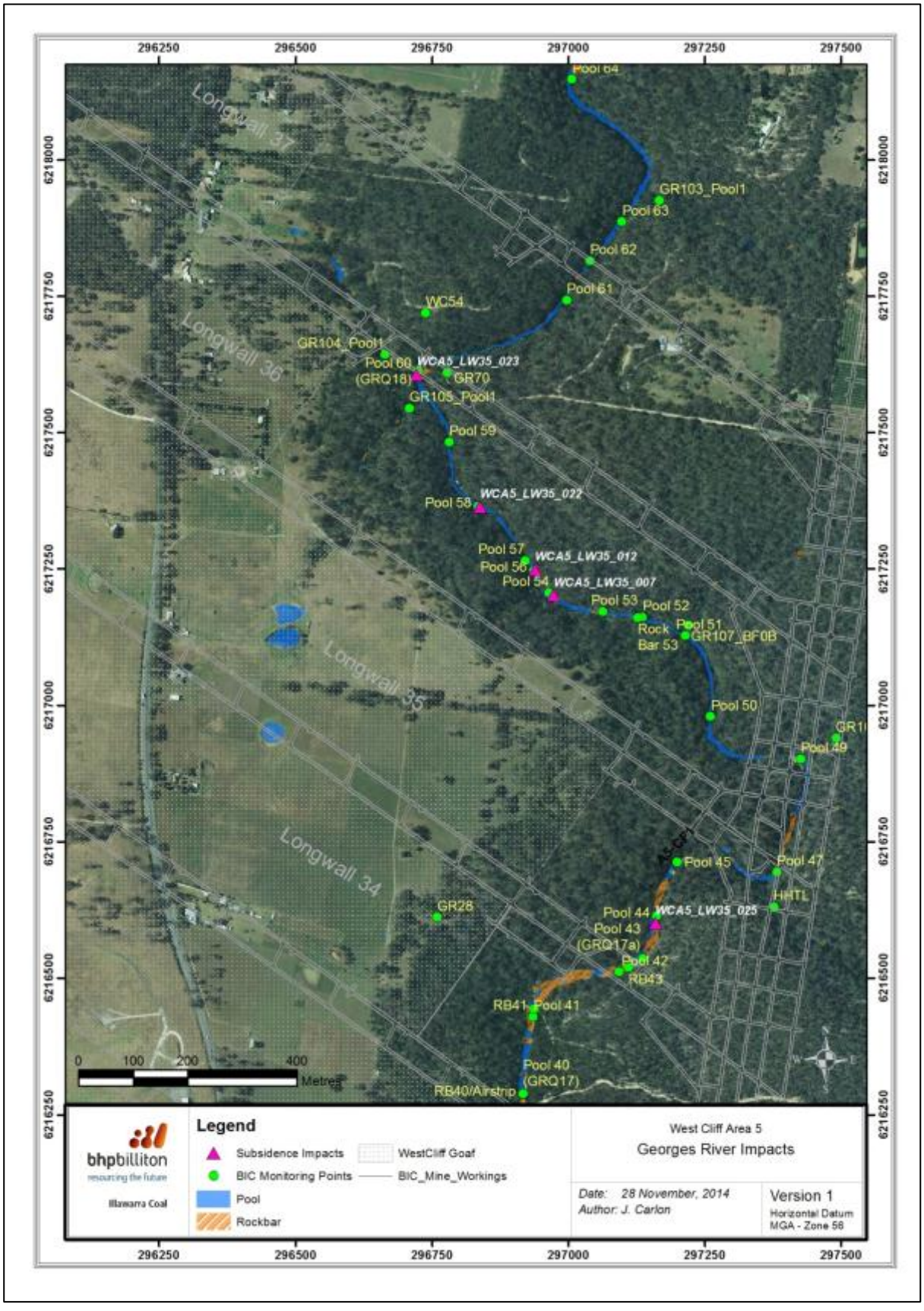


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

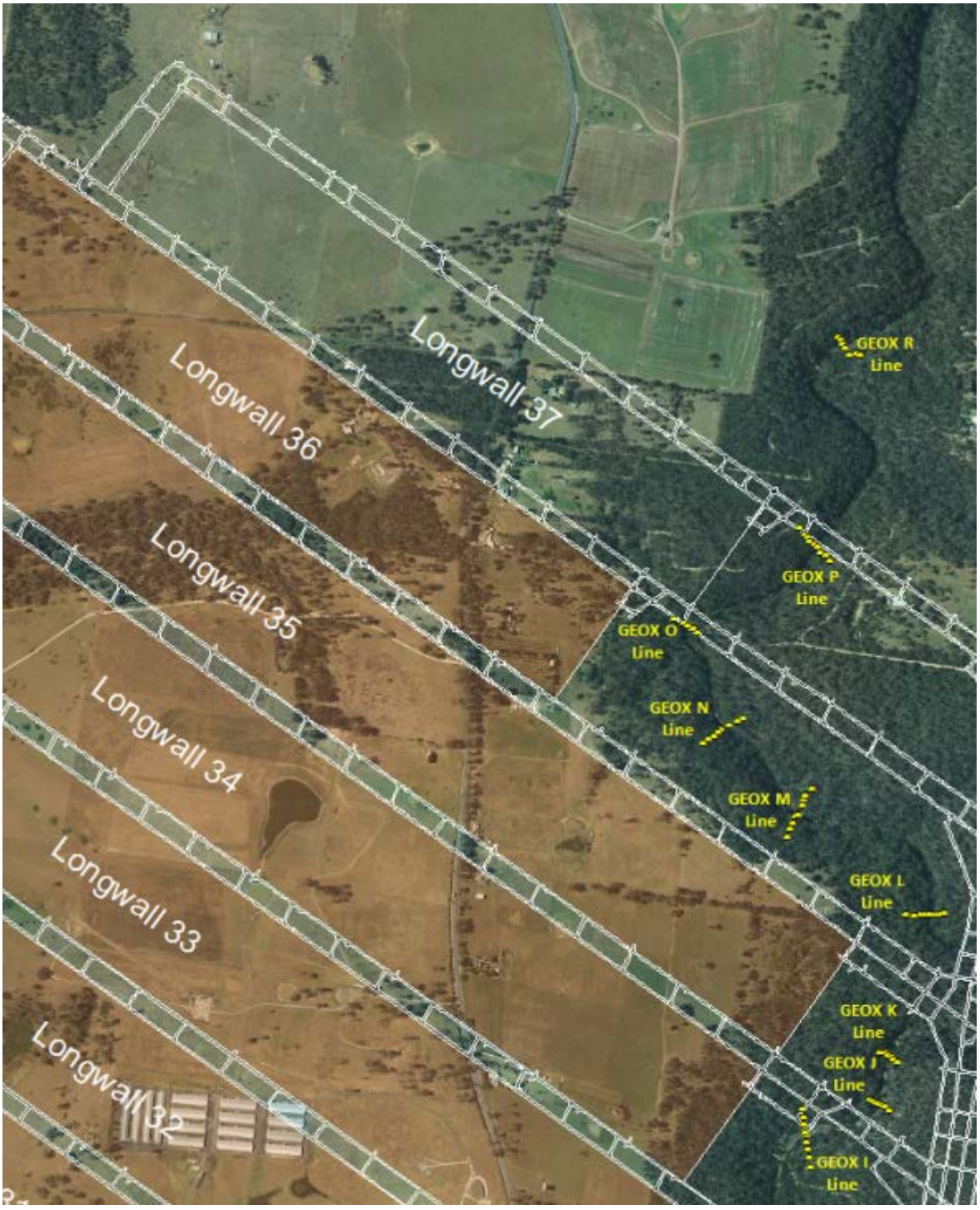


Figure 2: Location of the Georges River cross-line monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report
Level 3 **(Exceeding Predicted Impact**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above),	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of

Georges River	Characteristics of level	Actions	Action by	Notification
Criteria)	including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

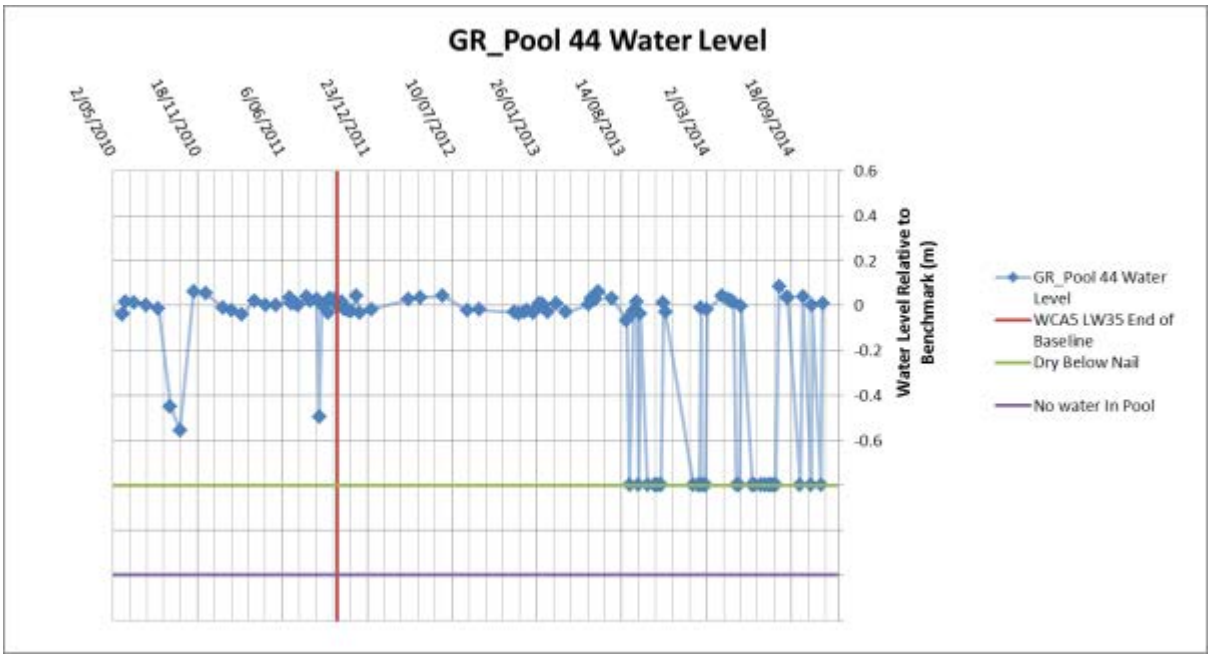
West Cliff Area 5 Longwall 36 Impact Update Report
5th December 2014

Twice-weekly inspections of the Georges River adjacent to Longwall 34 to 37 are being carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 27th of November 2014 where pool water levels were below baseline level. On a follow up inspection 1st of December 2014 all pool water levels were above baseline levels as a result of increased catchment inflows.

Update: Impact WCA5_LW35_025 (E297159, N6216601)

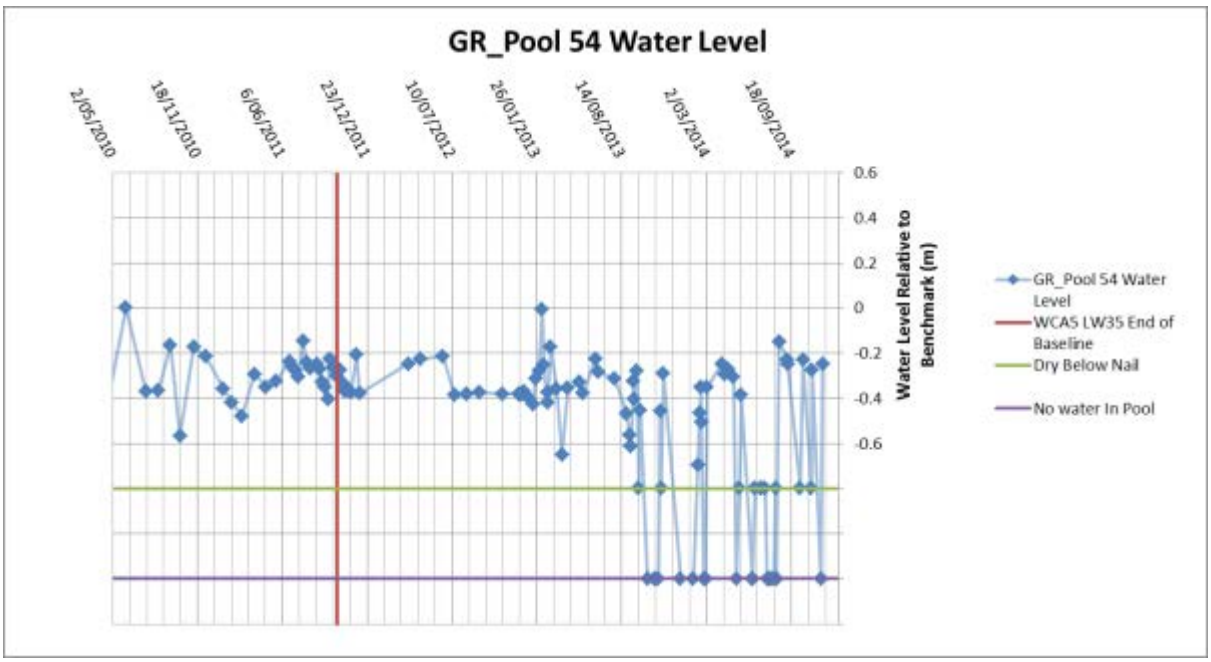
GR_Pool 44 levels are now above baseline (Graph 1). Photos 1 to 4 show a comparison of pool conditions from the inspections.



Graph 1: Water levels recorded in GR_Pool 44.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

GR_Pool 54 levels are now above baseline (Graph 2). Photos 5 to 8 show a comparison of pool conditions from the inspections.

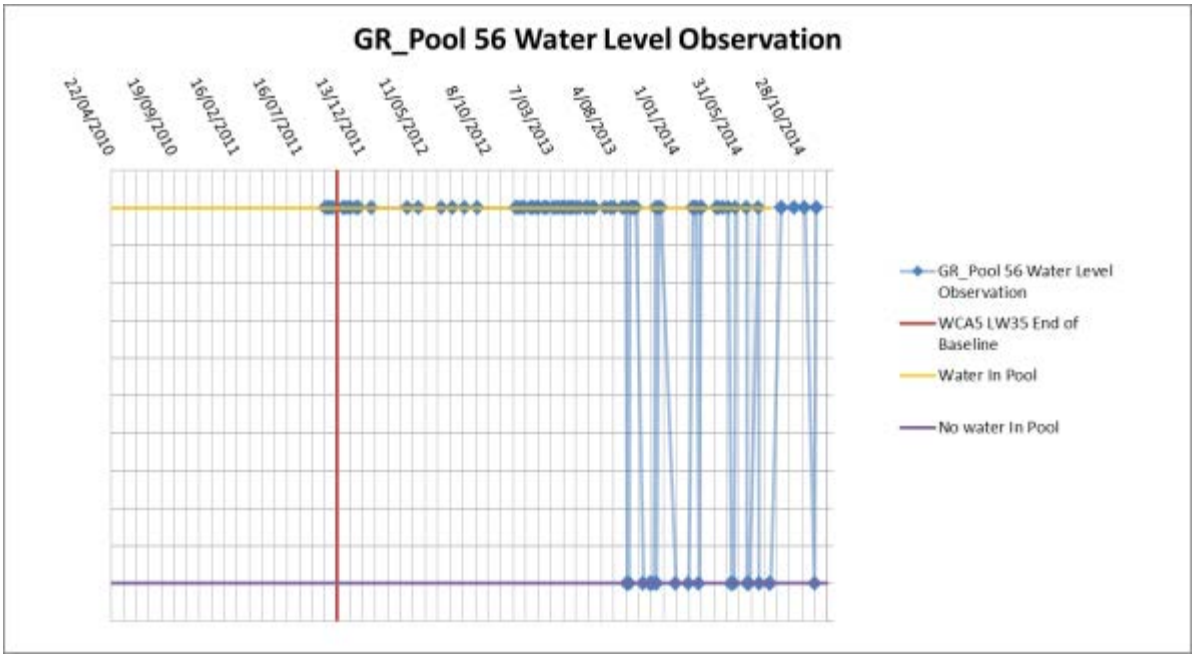


Graph 2: Water levels recorded in GR_Pool 54.

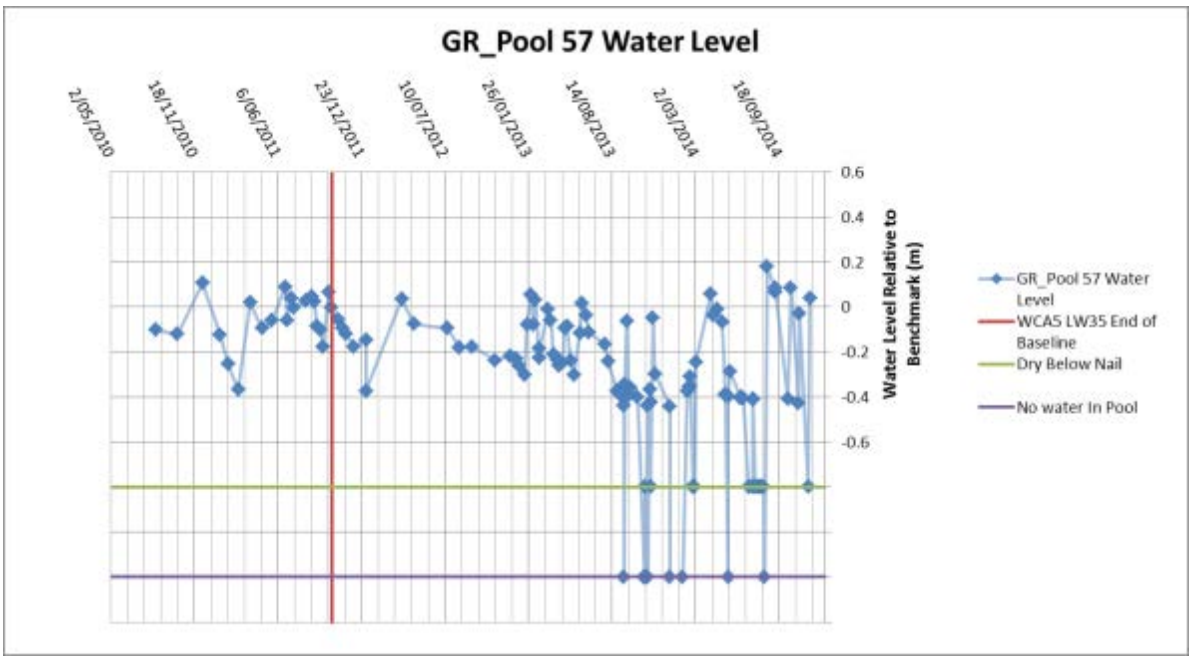
Update: Impact WCA5_LW35_012 (E296939, N6217250)

GR_Pool 56 levels are above baseline (Graph 3). Photos 9 to 11 show a comparison of pool conditions from the inspections.

GR_Pool 57 levels are above baseline (Graph 4). Photos 12 to 15 show a comparison of pool conditions from the inspections.



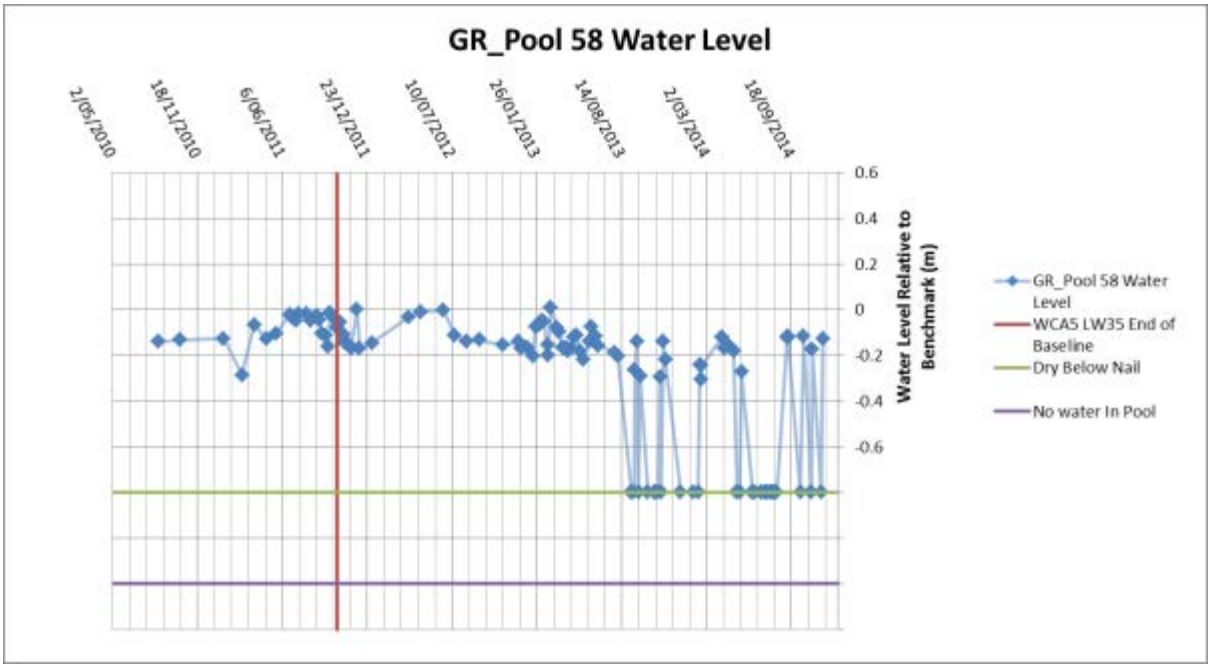
Graph 3: Water level observations recorded in GR_Pool 56.



Graph 4: Water levels recorded in GR_Pool 57.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

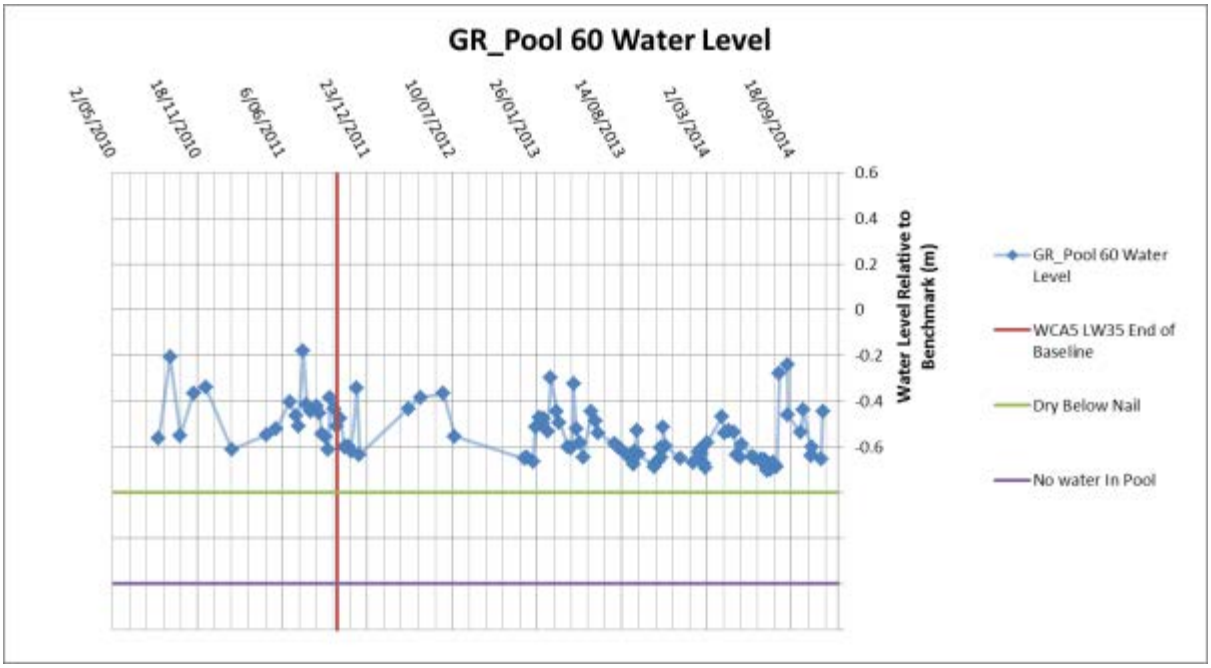
GR_Pool 58 levels are above baseline (Graph 5). Photos 16 to 19 show a comparison of pool conditions from the inspections.



Graph 5: Water levels recorded in GR_Pool 58.

Update: Impact WCA5_LW35_023 (E297159, N6216601)

GR_Pool 60 levels are above baseline (Graph 6). Photos 20 to 23 show a comparison of pool conditions from the inspections.



Graph 6: Water levels recorded in GR_Pool 60.

Photo 1: GR_Pool 44, looking upstream. Taken on 27/11/2014.

Photo 2: GR_Pool 44, looking downstream. Taken on 27/11/2014.

Photo 3: GR_Pool 44, looking upstream. Taken on 1/12/2014.

Photo 4: GR_Pool 44, looking downstream. Taken on 1/12/2014.

Photo 5: GR_Pool 54, looking upstream. Taken on 27/11/2014.

Photo 6: GR_Pool 54, looking downstream. Taken on 27/11/2014.

Photo 7: GR_Pool 54, looking upstream. Taken on 1/12/2014.

Photo 8: GR_Pool 54, looking downstream. Taken on 1/12/2014.

Photo 9: GR_Pool 56, looking upstream. Taken on 27/11/2014.

Photo 10: GR_Pool 56, looking downstream (towards GR_Pool 57). Taken on 27/11/2014.

Photo 11: GR_Pool 56, looking upstream. Taken on 1/12/2014.

Photo 12: GR_Pool 57, looking upstream. Taken on 27/11/2014.

Photo 13: GR_Pool 57, looking downstream. Taken on 27/11/2014.

Photo 14: GR_Pool 57, looking upstream. Taken on 1/12/2014.

Photo 15: GR_Pool 57, looking downstream. Taken on 1/12/2014.

Photo 16: GR_Pool 58, looking upstream. Taken on 27/11/2014.

Photo 17: GR_Pool 58, looking downstream. Taken on 27/11/2014.

Photo 18: GR_Pool 58, looking upstream. Taken on 1/12/2014.

Photo 19: GR_Pool 57, looking downstream. Taken on 1/12/2014.

Photo 20: GR_Pool 60, looking upstream. Taken on 27/11/2014.

Photo 21: GR_Pool 60, looking downstream. Taken on 27/11/2014.

	
Photo 22: GR_Pool 60, looking upstream. Taken on 1/12/2014.	**Photo 23:** GR_Pool 60, looking downstream. Taken on 1/12/2014.

Trigger Action Response Plan (TARP)

These impacts have previously been reported as Level 2, as stated in the Georges River Trigger Action Response Plan (Appendix A, Table 1). The following actions will be implemented:

- Continue monitoring as required by the SMP (return to weekly inspections);

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

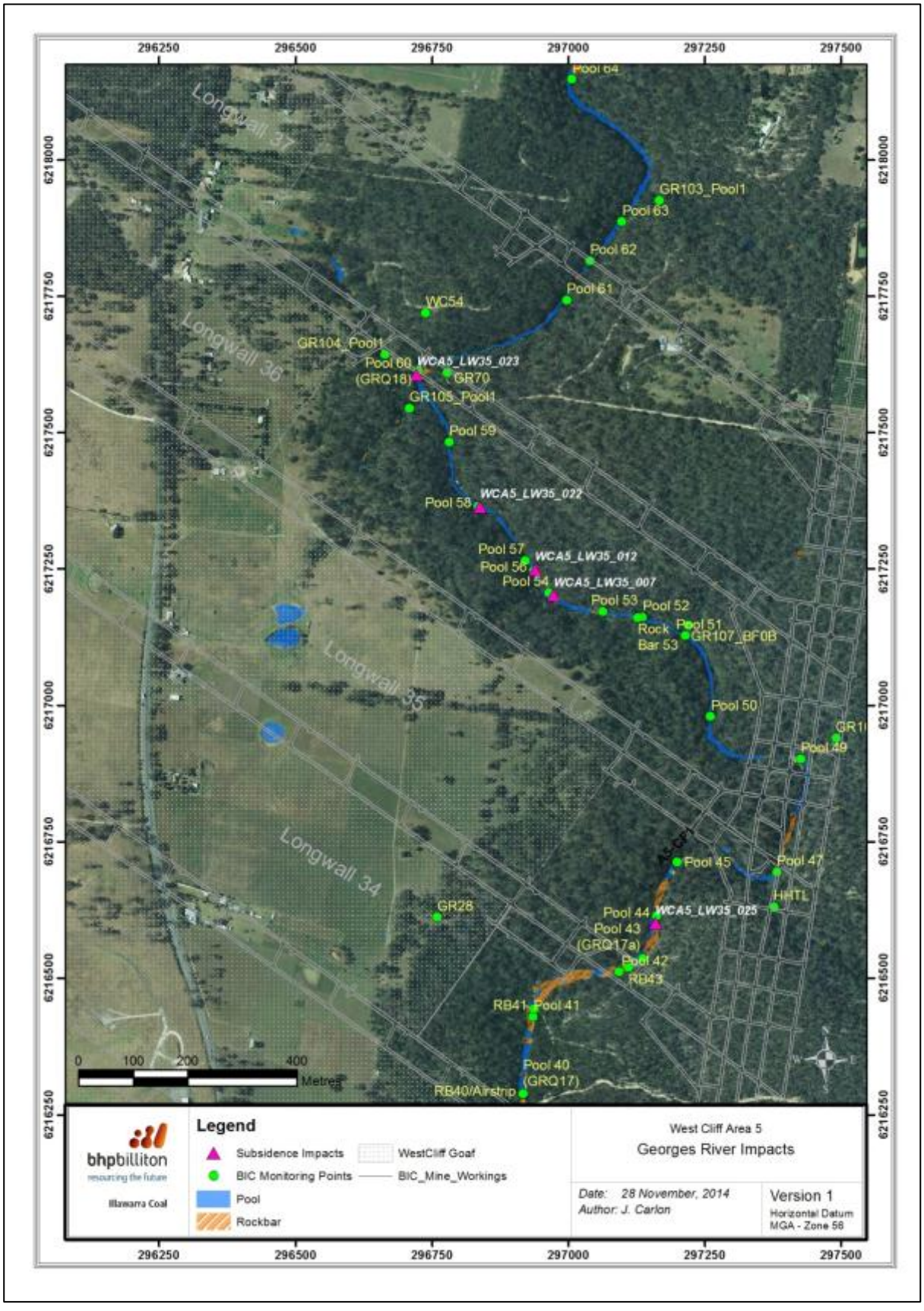


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report
Level 3 **(Exceeding Predicted Impact**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above),	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of

Georges River	Characteristics of level	Actions	Action by	Notification
Criteria)	including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

West Cliff Area 5 Longwall 35 Impact Report
22 July 2014

Weekly inspections of Georges River adjacent to longwall mining has been carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. These inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP). On the 17th July 2014 an impact, likely to be a result of previous Longwall 35, was identified.

Longwall 35 commenced on 13th October 2011 and was completed on 20th July 2013 extracting approximately 3290m (**Figure 1**).

Impact WCA5_LW35_026 (E297152, N6216659)

On the 17th July 2014 a small rockfall was identified from the underside of an overhang approximately 10m upslope from the Georges River (**Figure 1**). The volume of rock which has fallen from the overhang is approximately 0.17m³ with an area of disturbance of approximately 2.25m² (**Photos 1 to 3**). The impact is approximately 190m from Longwall 35 and more than 1000m from Longwall 36 and 37. Aboriginal archaeological site 52-2-2234 is approximately 5m from the impact site and has not been affected. For further discussion on archelogical sites see the West Cliff Area 5 Longwall 36 End of Panel Report.

Photo 1: WCA5_LW35_026, close up of impact. Photo taken 17/08/14.

Photo 2: WCA5_LW35_026, view of impact looking north. Photo taken 17/08/14.

Photo 3: WCA5_LW35_026, view of impact looking southwest. Photo taken 17/08/14

The observed impact is minor and within predictions according to the West Cliff Area 5 LW34-36 Subsidence Management Plan (**Table 2**): Rock fall from a cliff which is left mostly intact, resulting in insignificant ground disturbance.

Table 1: Recently reported impacts. The highlighted row is impact WCA5_LW35_026.

Site ID	Identification date	Activating Longwall	Description	Impact level
WCA5_LW35_007	20/02/2013	WCA5_LW35	Rock fracturing/ Pool Water Level	Level 1
WCA5_LW35_008	14/03/2013	WCA5_LW35	Gas Release – currently inactive	Level 1
WCA5_LW35_009	14/03/2013	WCA5_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_010	20/03/2013	WAC_LW35	Gas Release - currently inactive	Level 1
WCA5_LW35_011	5/04/2013	WCA5_LW35	Gas Release - currently inactive	Level 1

WCA5_LW35_012	15/05/2013	WCA5_LW35	Rock Fracturing/ Pool Water Level	Level 1
WCA5_LW35_013	29/05/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_014	3/06/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_015	20/06/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_016	10/07/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_017	15/07/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_018	24/07/2013	WCA5_LW35	Rock Fracturing/ Pool Water Level	Level 1
WCA5_LW35_019	21/08/2013	WCA5_LW35	Rock Fracturing	Level 1
WCA5_LW35_020	21/08/2013	WCA5_LW35	Iron Staining	Level 1
WCA5_LW35_021	2/09/2013	WCA5_LW35	Iron Staining	Level 1
WCA5_LW35_022	5/09/2013	WCA5_LW35	Pool Water Level	Level 1
WCA5_LW35_023	11/09/2013	WCA5_LW35	Pool Water Level	Level 1
WCA5_LW35_024	11/09/2013	WCA5_LW35	Pool Water Level	Level 1
WCA5_LW35_025	23/09/2013	WCA5_LW35	Pool Water Level	Level 1
WCA5_LW35_026	17/07/2014	WCA5_LW35	Rockfall	Within Predictions /Minor Impact

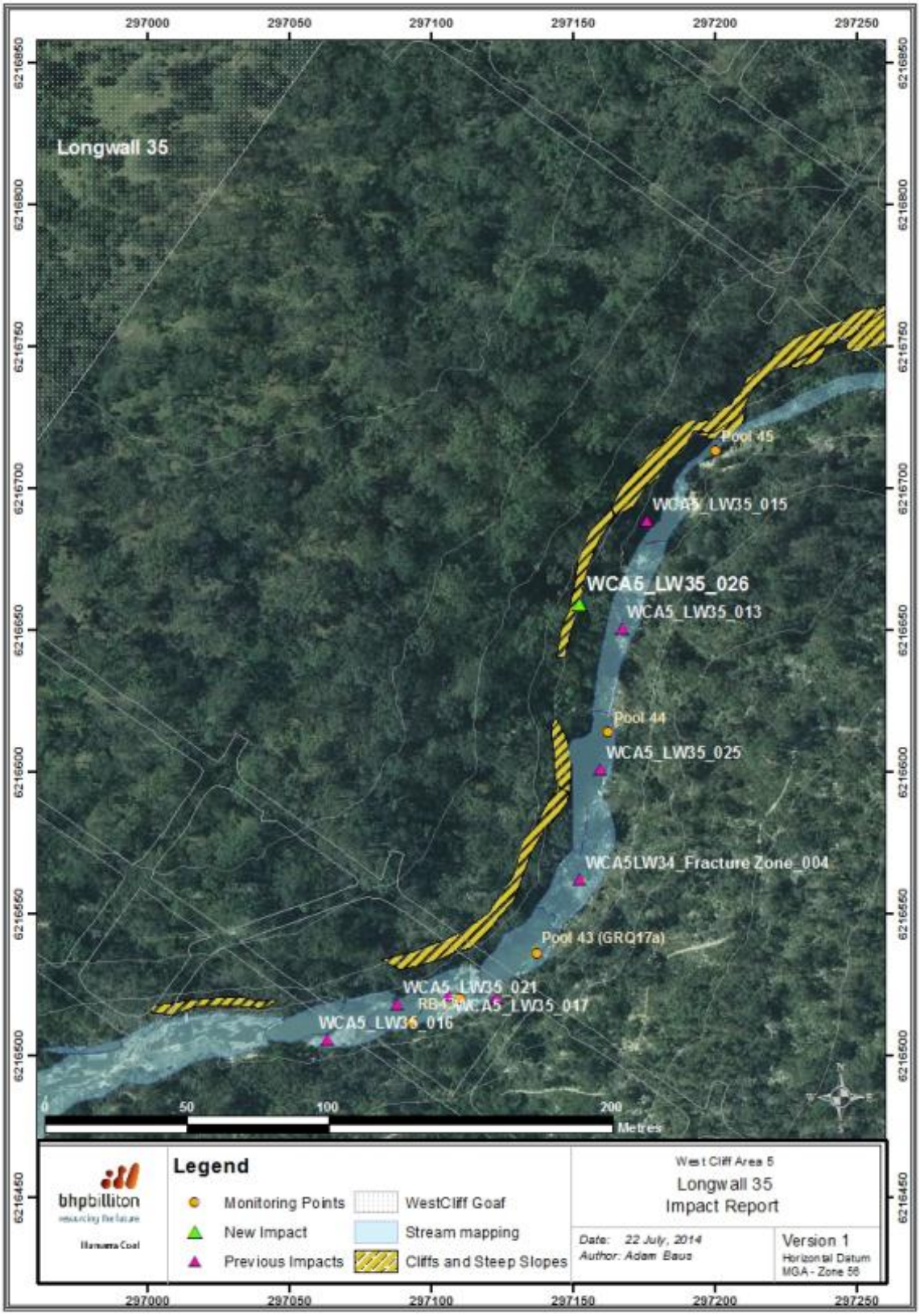


Figure 1: Map showing location of WCA5_LW35_026 and other impacts in relation to Longwalls 35 and 34

Appendix A

Table 2: Excerpt from the West Cliff Area 5 Longwalls 34 to 36 SMP, Monitoring and Management Table.

Georges River	Trigger	Actions	Responsibility	Purpose
Within Predictions (Minor Impacts)	• Rock fall from a cliff which is left mostly intact, resulting in insignificant ground disturbance. • Minor surface movement with negligible soil surface exposed. • Small crack or increased ponding in a watercourse which is not observed to result in surface water loss, be causing erosion, or impeding flow. • Small crack in an unsealed road which does not appear to be causing erosion or impeding access. • Insignificant erosion at any location localised to a small area and should naturally stabilise in the future. • Small areas (<100m2) of impacted vegetation (by rockfalls, soil slippage) that would commence natural regeneration within 6 months. • Minor gas emissions with no vegetation die off.	• Continue monitoring program. • Capture a photographic record • Summaries all actions and monitoring in Subsidence Mangement Status and Impact reports, End of Panel Reports and AEMRs.	• Manager Environment – IC • Expert Landscape Consultants	• Inform stakeholders of • Baseline assessment • Report to key stakeholders in SMP Application and AEMR. • Identify, investigate and report on impacts (in SMP and AEMR). • To provide data for any • investigation into impacts.
Exceeding Predictions	• Major reduction in pool water level or complete loss of pool water during reduced surface flows. (>50% decline in any pools monitored). • Major reduction in aquatic habitat for an extended timeframe (> 2 pools) or complete loss of habitat. • Macquarie Perch identified as using Georges River and mortality occurs in proximity to identified mining impact	• Notification to DPIM and resource manager/s immediately • Notify Ecological Specialists and other relevant Specialists immediately. • Site visit with stakeholders within 1 month. • Review monitoring program and modify if necessary within 2 weeks. • Implement and conduct additional monitoring or increase frequency if required within 2 weeks.	• Manager Environment – IC • Expert Landscape Consultants	

Georges River	Trigger	Actions	Responsibility	Purpose
		• Notify other relevant specialists (IC) immediately. • If required, develop site CMA in consultation with key stakeholders within 1 month, (pending stakeholder availability) and seek approvals. • Completion of works following approvals. • Conduct initial follow up monitoring & reporting within 2 months of CMA completion. • Issue CMA report within 1 month of works completion. • Report in the End of Panel Report. • Summarise all actions and monitoring in AEMR. • Consider adaptive management approach for future longwalls.		

West Cliff Area 5 Longwall 36 Update Report
11 November 2014

Monthly inspections of the Georges River adjacent to Longwall 34 to 37 are carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

Subsidence movement monitoring is undertaken in accordance with the West Cliff Colliery Longwall 37 Subsidence Monitoring Programme (Rev 1). Monitoring lines are established over key rockbars in the Georges River and these are known as E to R Lines.

The monitoring for Longwall 37 includes:

- I to R lines at the start and end of each longwall in full 3D
- at reference mark 600m and 500m, lines L to R are surveyed in 2D
- survey frequency is increased to weekly from reference mark 400m

The most recent Georges River cross-line surveys were conducted 30 October and 7 November 2014. Residual movements were measured at a number of lines and in particular the M line movements are a trigger under the GRMP. M line closure increased from 199mm to 201mm as measured 30 October and increased to 303mm by 7 November.

Inspection of the Georges River 6 November 2014 identified no additional impacts and pool water levels were above pre-mining baseline levels.

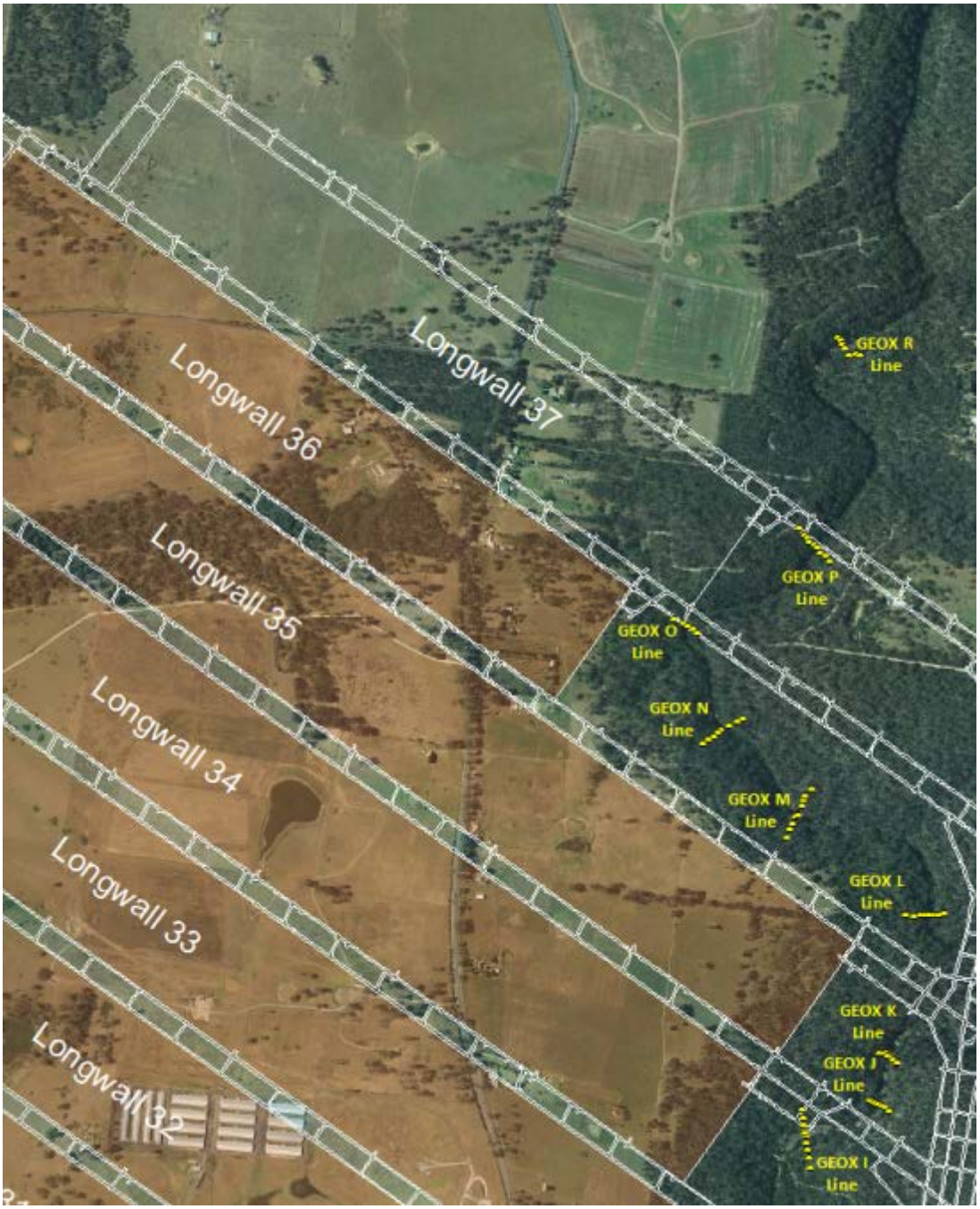
Trigger Action Response Plan (TARP)

The subsidence movements reported are a Level 2 trigger under the GRMP: Survey Cross Lines >200mm closure measured as a result of LW35 – 36. Impacts in the Georges River have previously been reported as Level 2. The following actions are being implemented:

- Continue monitoring as required by the SMP
- Release additional water from BCD (when permitted)

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

Figure 1: Location of the Georges River cross-line monitoring sites.



Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	LW35 - 36			
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required		
Level 3 **(Exceeding Predicted Impact Criteria)**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above), including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

Georges River	Characteristics of level	Actions	Action by	Notification
		are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		

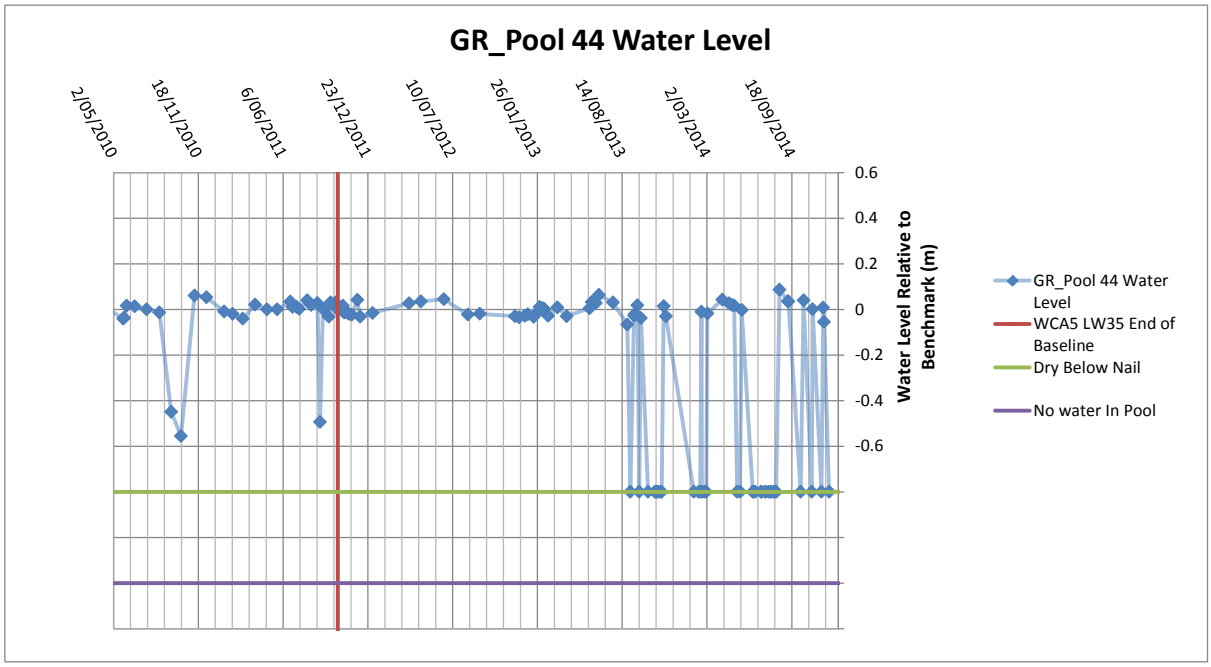
West Cliff Area 5 Longwall 36 Impact Update Report
16th of December 2014

Weekly inspections of the Georges River adjacent to Longwall 35 to 37 are being carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 15th of December 2014; pool level triggers were identified and are discussed below. The pool water level triggers included in this report have been reported previously.

Update: Impact WCA5_LW35_025 (E297159, N6216601)

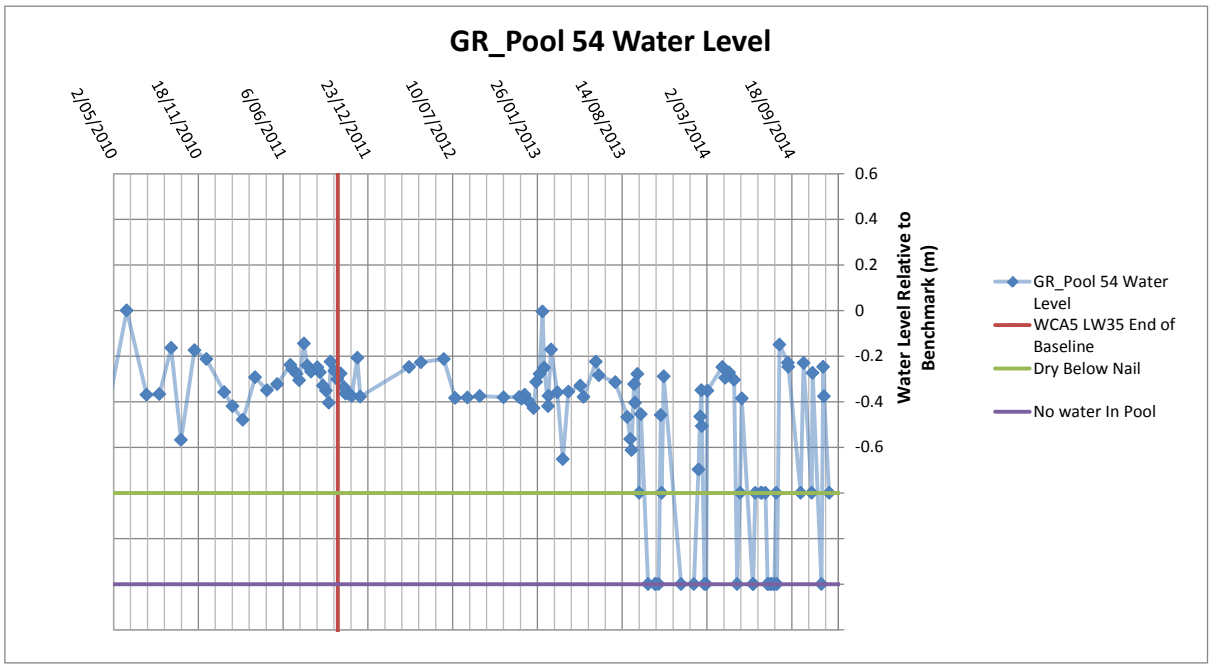
On the latest inspection of GR_Pool 44 the pool water level was 'Dry Below Nail' (Graph 1). This water level has been reported previously, is below baseline levels and is a trigger in the GRMP. Photos 1 and 2 show the latest pool conditions.



Graph 1: Water levels recorded in GR_Pool 44.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

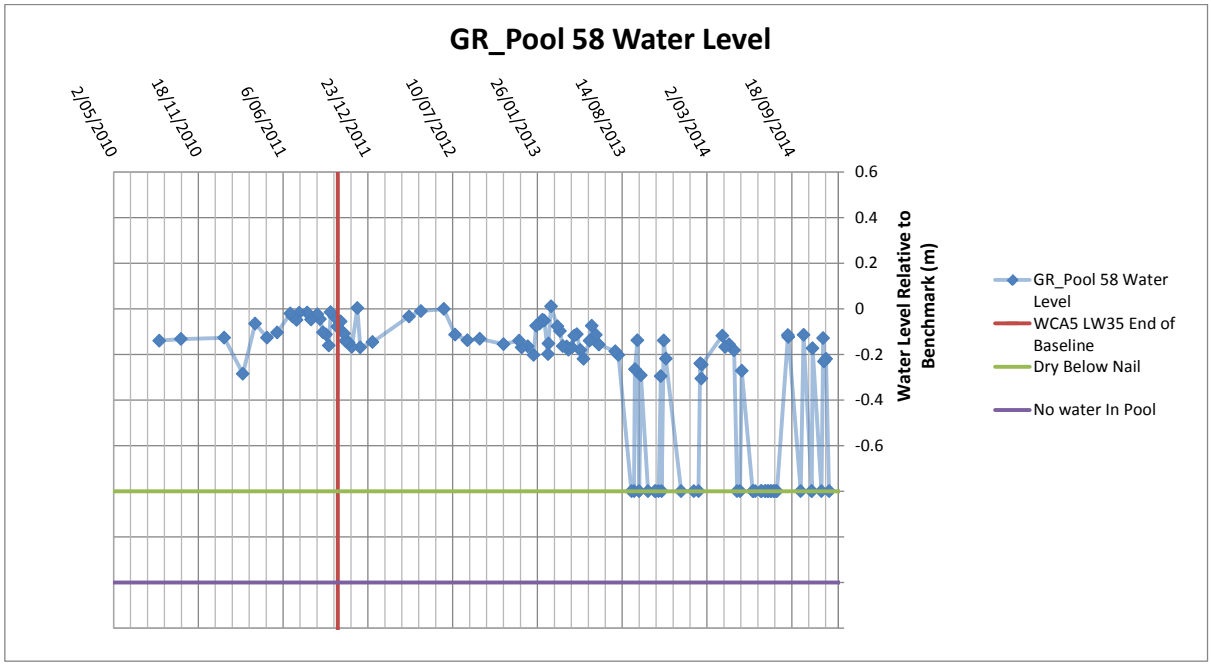
On the latest inspection of GR_Pool 54 the pool water level was 'Dry Below Nail' (Graph 2). This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 3 and 4 show the latest pool conditions.



Graph 2: Water levels recorded in GR_Pool 54.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

On the latest inspection of GR_Pool 58 the pool water level was 'Dry Below Nail'. This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 5 and 6 show the latest pool conditions.



Graph 3: Water levels recorded in GR_Pool 58.

Photo 1: GR_Pool 44, looking upstream. Taken on 15/12/2014.

Photo 2: GR_Pool 44, looking downstream. Taken on 15/12/2014.

Photo 3: GR_Pool 54, looking upstream. Taken on 15/12/2014.

Photo 4: GR_Pool 54, looking downstream. Taken on 15/12/2014.

Photo 5: GR_Pool 58, looking upstream. Taken on 15/12/2014.

Photo 6: GR_Pool 58, looking downstream. Taken on 15/12/2014.

Trigger Action Response Plan (TARP)

These impacts have previously been reported as Level 2, as stated in the Georges River Trigger Action Response Plan (Appendix A, Table 1). The following actions will be implemented:

- Continue monitoring as required by the SMP (return to twice weekly inspections);
- Release additional water from BCD (when permitted)

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

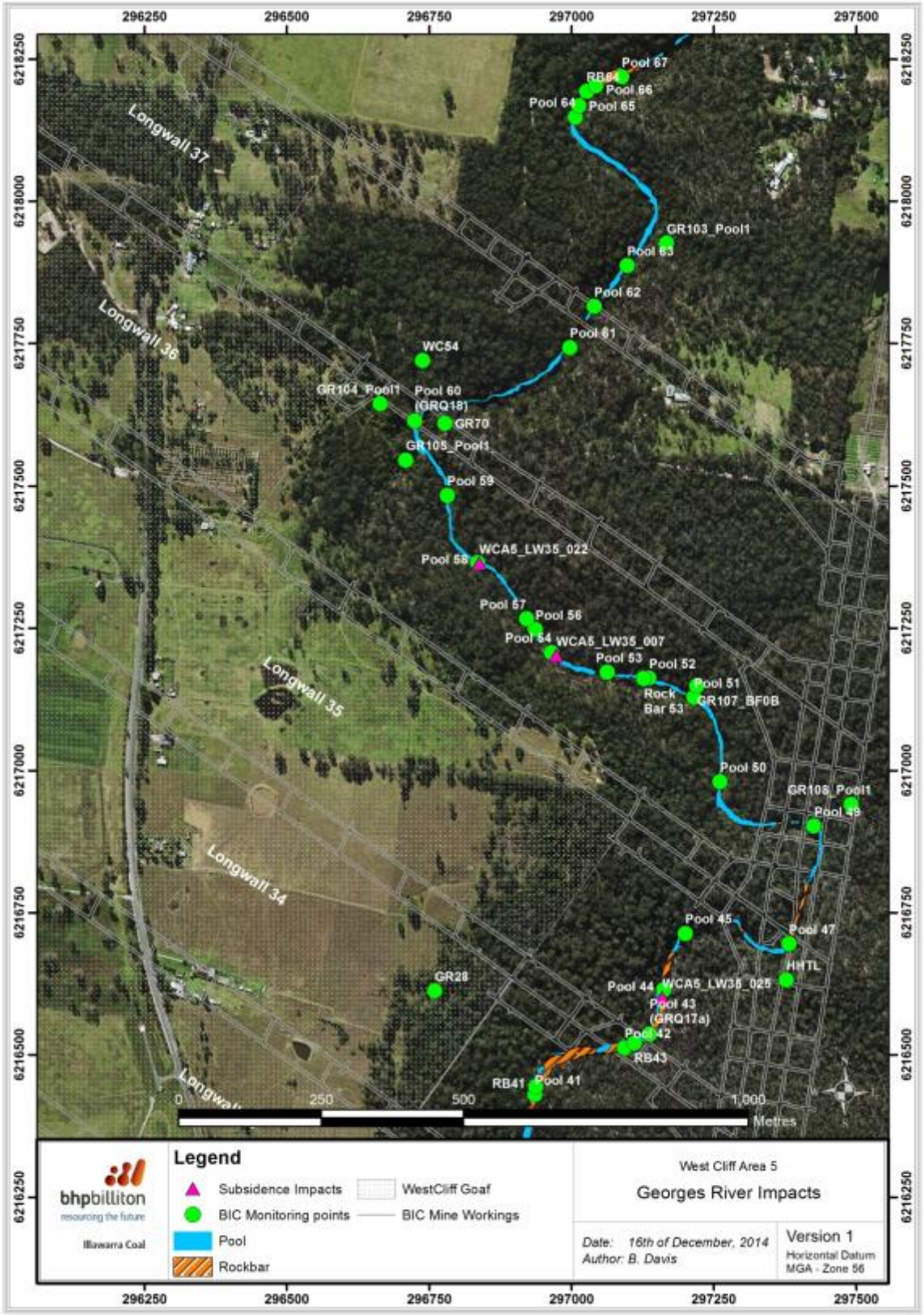


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report
Level 3 **(Exceeding Predicted Impact**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above),	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of

Georges River	Characteristics of level	Actions	Action by	Notification
Criteria)	including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

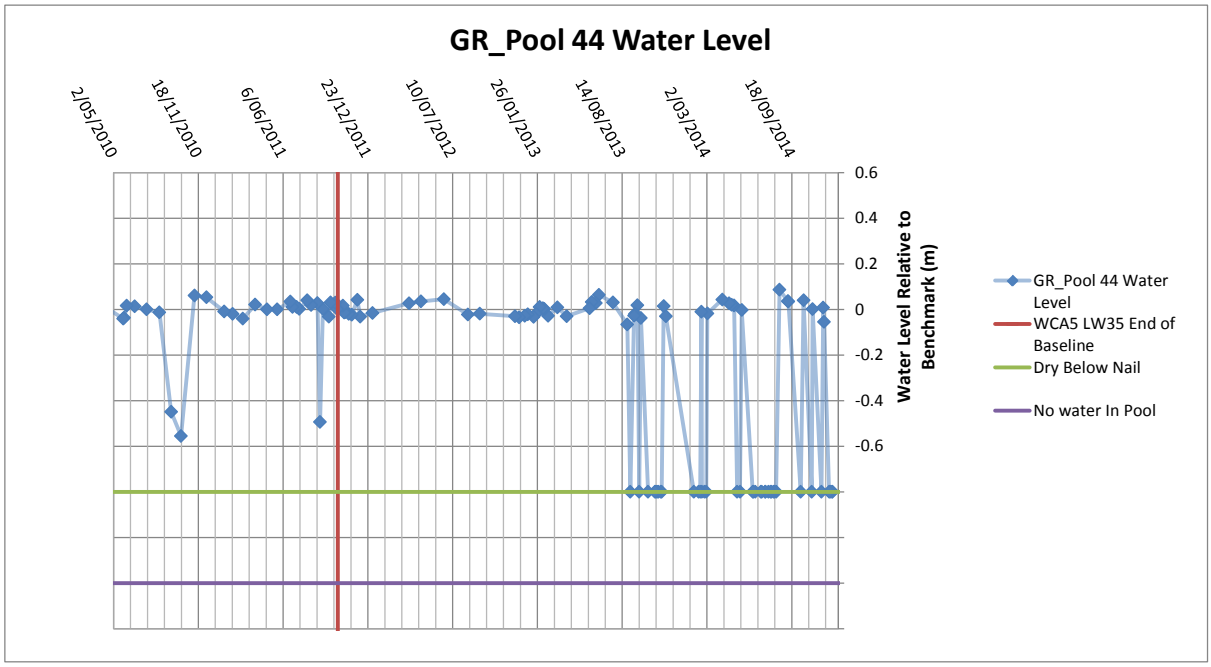
West Cliff Area 5 Longwall 36 Impact Update Report
23rd of December 2014

Weekly inspections of the Georges River adjacent to Longwall 35 to 37 are being carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify potential subsidence impacts. Inspections are conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 23rd of December 2014. One new pool water level trigger was identified, along with previously reported triggers. Details are discussed below. Figure 1 shows the location of impacts.

Update: Impact WCA5_LW35_025 (E297159, N6216601)

On the latest inspection of GR_Pool 44 the pool water level was 'Dry Below Nail' (Graph 1). This water level has been reported previously, is below baseline levels and is a trigger in the GRMP. Photos 1 and 2 show the latest pool conditions.



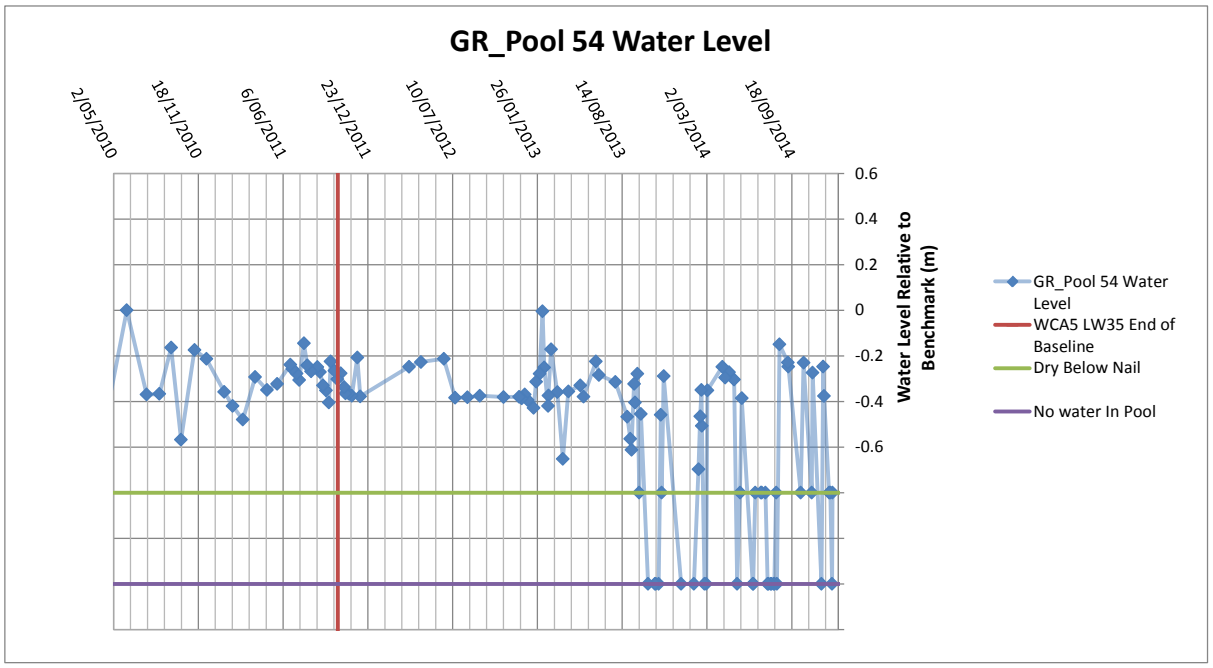
Graph 1: Water levels recorded in GR_Pool 44.

Photo 1: GR_Pool 44 looking upstream. Taken or 23/12/2014

Photo 2: GR_Pool 44 looking downstream. Taken o 23/12/2014

Update: Impact WCA5_LW35_007 (E296975, N6217204)

On the latest inspection of GR_Pool 54 the pool was dry (Graph 2). This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 3 and 4 show the latest pool conditions.



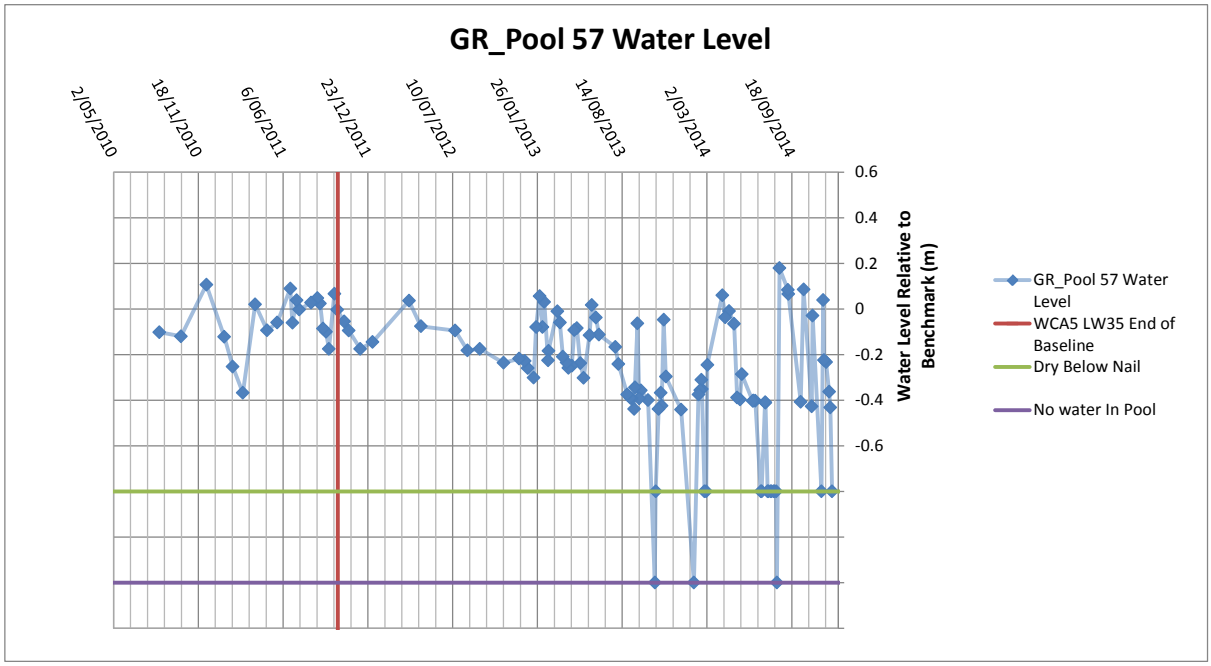
Graph 2: Water levels recorded in GR_Pool 54.

Photo 3: GR_Pool 54 looking upstream. Taken on 23/12/2014

Photo 4: GR_Pool 54 looking downstream. Taken on 23/12/2014

Update: Impact WCA5_LW35_012 (E296939, N6217250)

On the latest inspection of GR_Pool 57 the pool water level was 'Dry Below Nail' (Graph 3). This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 5 and 6 show the latest pool conditions.



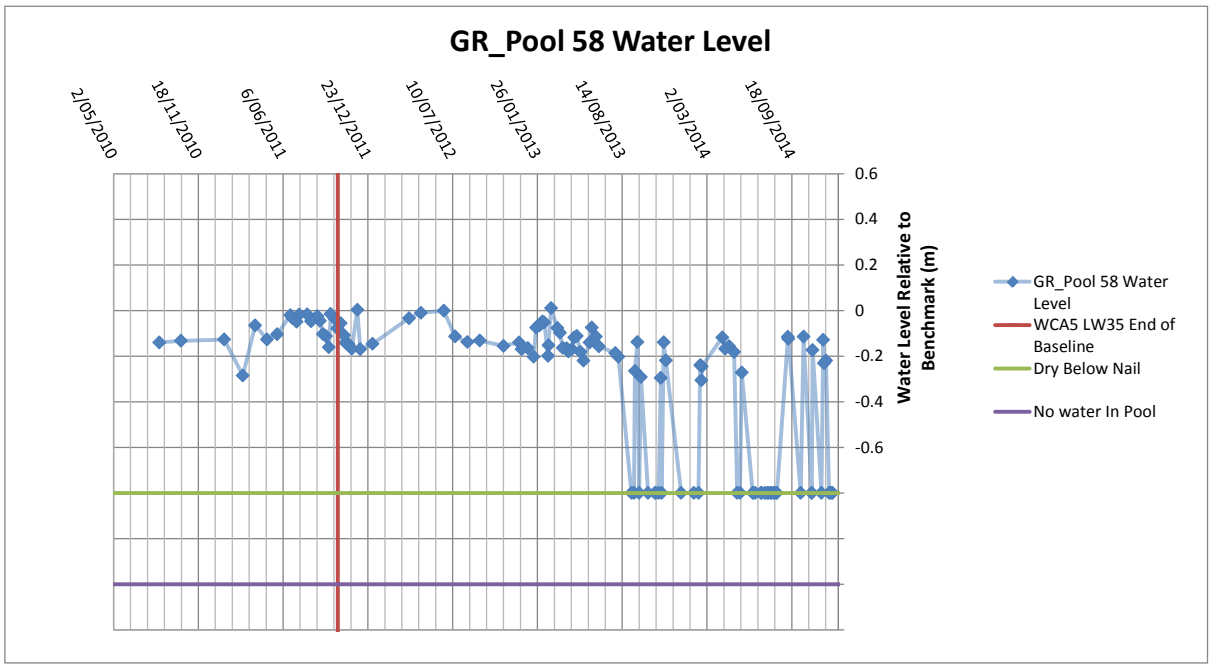
Graph 3: Water levels recorded in GR_Pool 57

Photo 5: GR_Pool 57 looking upstream. Taken on 23/12/2014

Photo 6: GR_Pool 57 looking downstream. Taken on 23/12/2014

Update: Impact WCA5_LW35_022 (E296838, N6217364)

On the latest inspection of GR_Pool 58 the pool water level was 'Dry Below Nail' (Graph 4). This has been reported previously, is below the lowest level experienced in the baseline period and is a trigger according to the GRMP. Photos 7 and 8 show the latest pool conditions.



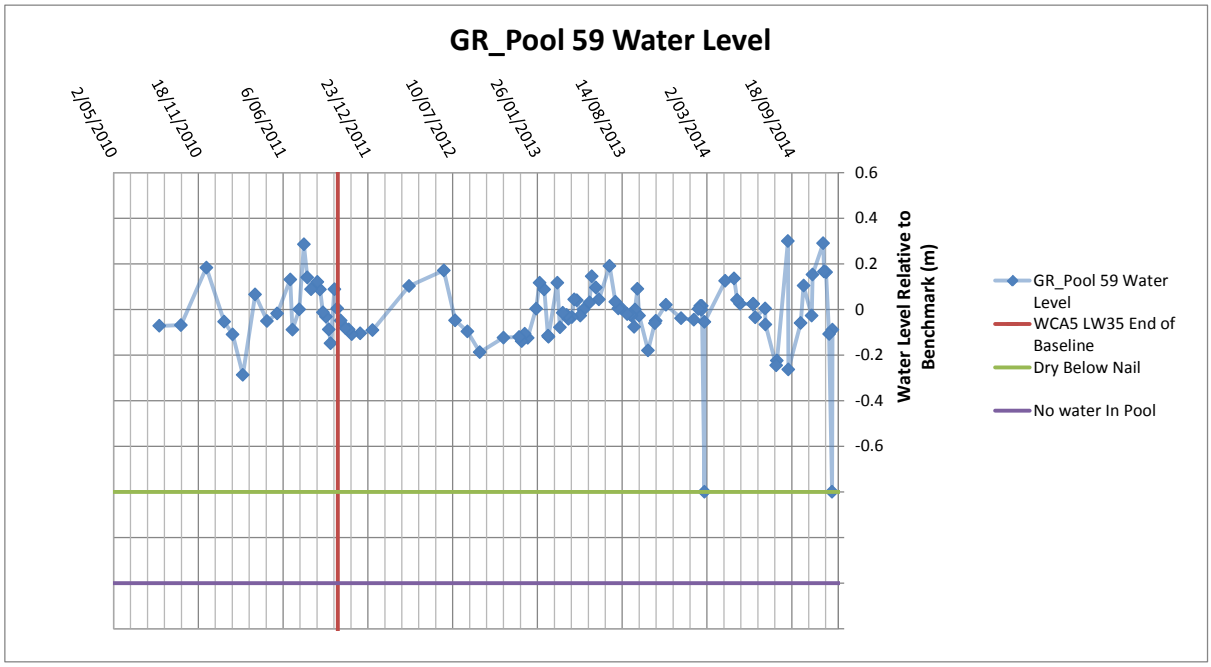
Graph 4: Water levels recorded in GR_Pool 58

Photo 7: GR_Pool 58 looking upstream. Taken on 23/12/2014

Photo 8: GR_Pool 58 looking downstream. Taken on 23/12/2014

Impact WCA5_LW35_029 (E296781, N6217482)

On the 22nd of December 2014 an inspection of GR_Pool 59 was conducted and the water level was observed to be 'Dry Below Nail'. This was below the lowest level experienced during the baseline period and is a trigger according to the GRMP. An additional inspection was carried out on the 23rd of December 2014, where it was observed that pool water level had returned to above baseline levels (Graph 5). Photos 9 to 12 show a comparison of pool conditions between the two days.



Graph 5: Water levels recorded in GR_Pool 59

Photo 9: GR_Pool 59 looking upstream. Taken on 22/12/2014

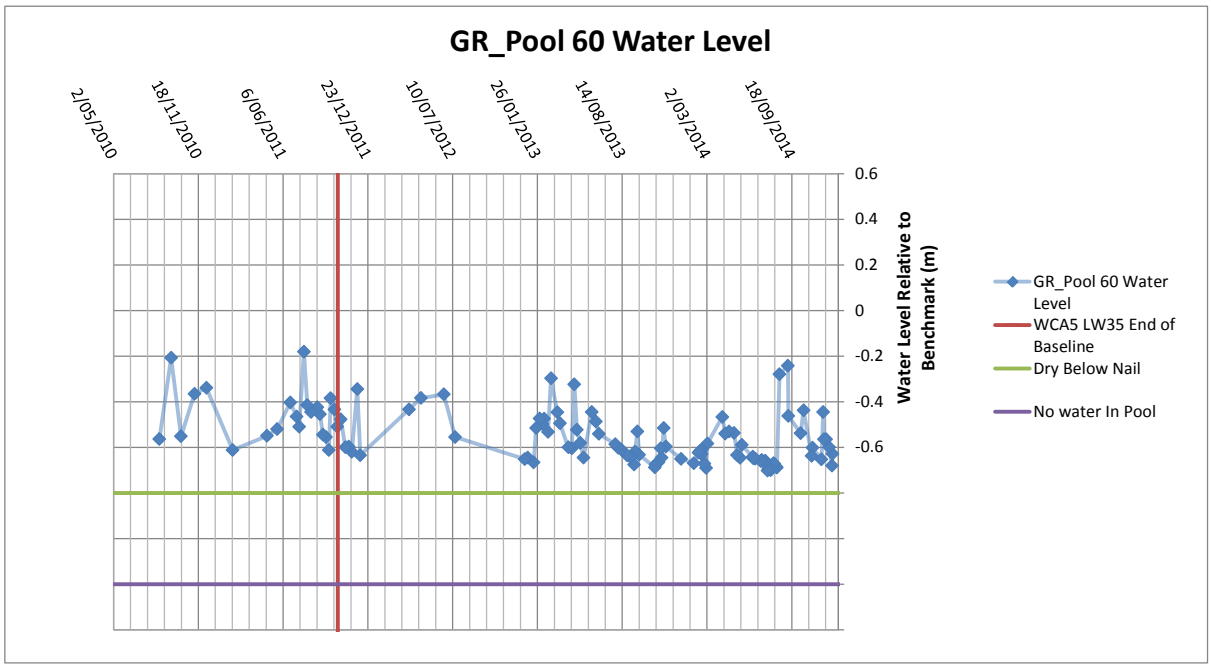
Photo 10: GR_Pool 59 looking downstream. Taken on 22/12/2014.

Photo 11: GR_Pool 59 looking upstream. Taken on 23/12/2014

Photo 12: GR_Pool 59 looking downstream. Taken on 23/12/2014

Update: Impact WCA5_LW35_023 (E297259, N6216971)

On the latest inspection of GR_Pool 60 the pool water level was observed to be below baseline levels (Graph 6). This has been reported previously and is a trigger according to the GRMP. Photos 13 and 14 show the latest pool conditions.



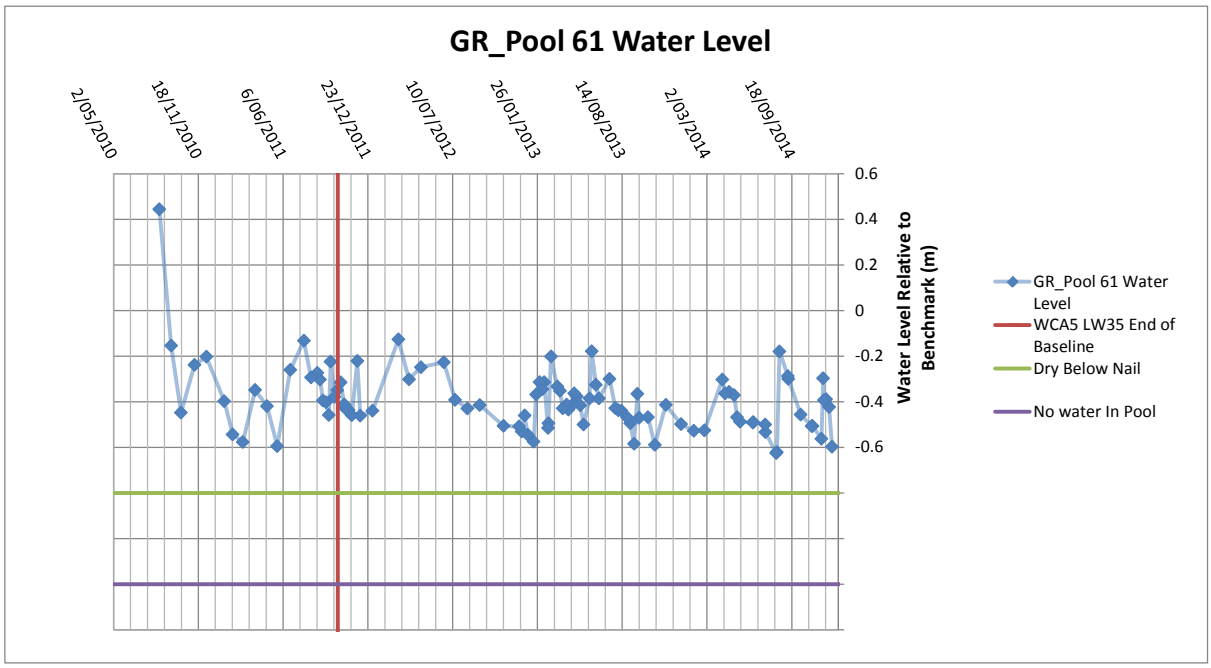
Graph 6: Water levels recorded in GR_Pool 60

Photo 13: GR_Pool 60 looking upstream .Taken on 23/12/2014

Photo 14: GR_Pool 60 looking upstream. Taken on 23/12/2014

Update: Impact WCA5_LW35_028 (E296998, N6217749)

On the latest inspection of GR_Pool 61 the pool water level was observed to be below baseline levels (Graph 7). This has been reported previously and is a trigger according to the GRMP. Photos 15 and 16 show the latest pool conditions.



Graph 7: Water levels recorded in GR_Pool 61

Photo 15: GR_Pool 61 looking upstream. Taken on 22/12/2014

Photo 16: GR_Pool 61 looking downstream. Taken on 22/12/2014

Trigger Action Response Plan (TARP)

Pool water levels have previously been reported as Level 2, as stated in the Georges River Trigger Action Response Plan (Appendix A, Table 1). The following actions are being implemented:

- Continue monitoring as required by the SMP (return to twice weekly inspections);
- Release additional water from BCD (when permitted)

An assessment of pool water level reduction and remedial works to restore pool water level is being drafted.

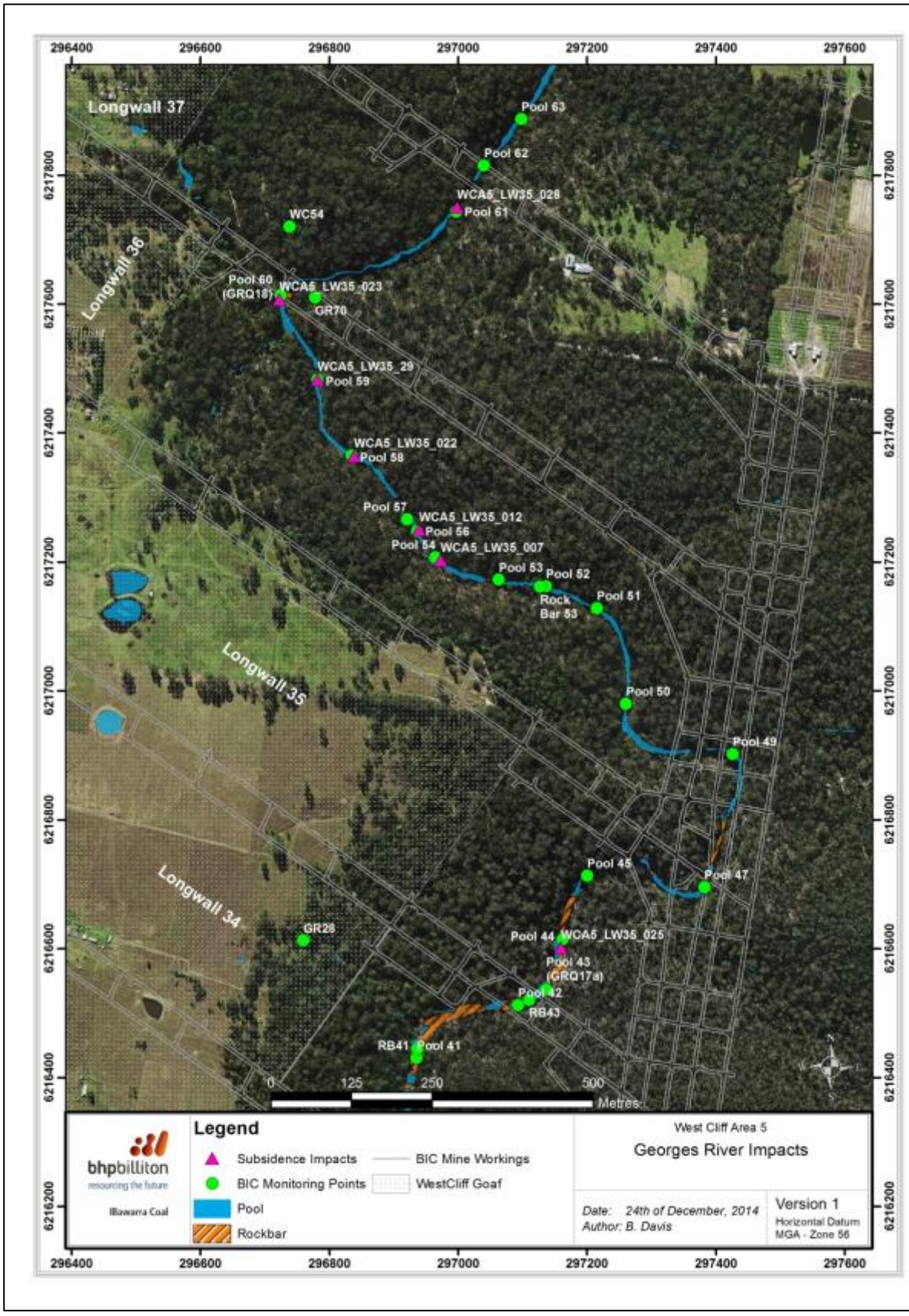


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of LW35 - 36	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report
Level 3 **(Exceeding Predicted Impact**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above),	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of

Georges River	Characteristics of level	Actions	Action by	Notification
Criteria)	including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates successful rehabilitation outcomes

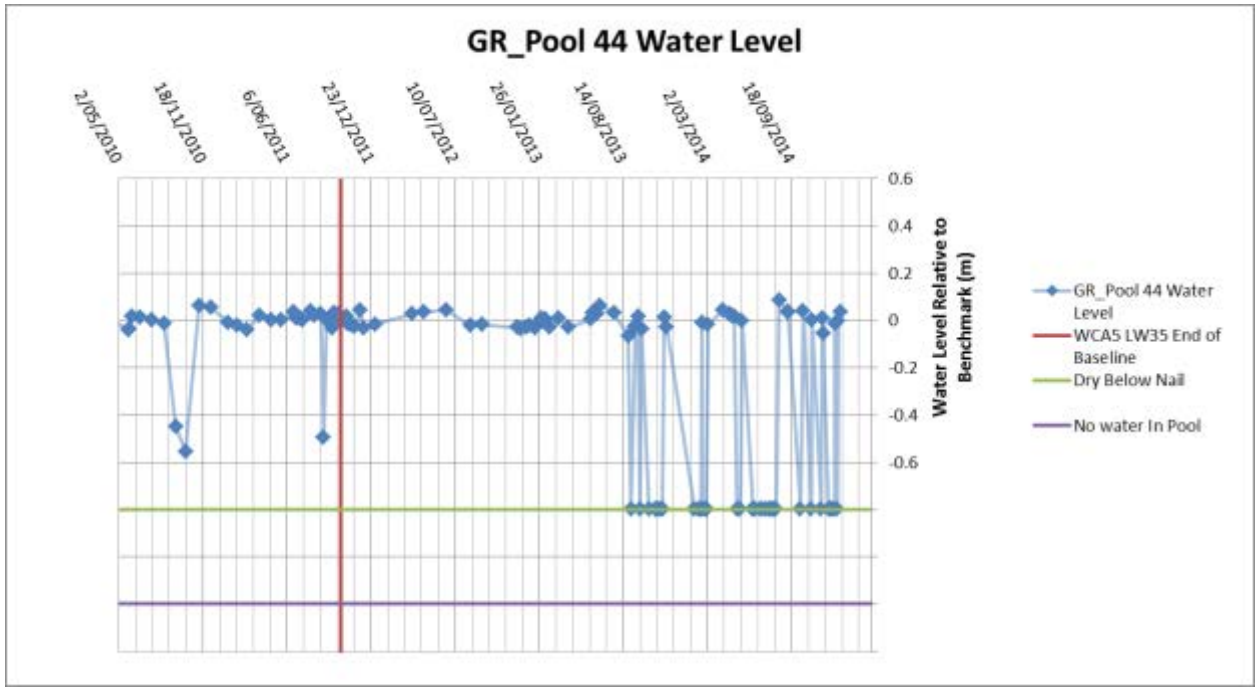
West Cliff Area 5 Longwall 36 Impact Update Report
13th of January 2015

Weekly standard inspections of the Georges River adjacent to Longwall 35 to 37 are being carried out by the Illawarra Coal Environmental Field Team (ICEFT) to identify any potential new subsidence impacts. Targeted twice-weekly inspections are currently undertaken to monitor recently reported below baseline water levels. Monitoring is conducted in accordance with the approved West Cliff Area 5 Longwalls 34 to 36 Subsidence Management Plan (SMP), West Cliff Area 5 Longwalls 37 and 38 Extraction Plan (EP) and Georges River Management Plan (GRMP).

An inspection of the Georges River was carried out on the 12th of January 2015. Pool water levels were found to have returned to above baseline levels due to recent rainfall and catchment inflows. Details are discussed below.

Update: Impact WCA5_LW35_025 (E297159, N6216601)

Water levels in GR_Pool 44 were previously reported as below baseline. On the latest inspection of GR_Pool 44 the pool water level was above pre-mining baseline levels (Graph 1). Photos 1 and 2 show the latest pool conditions.

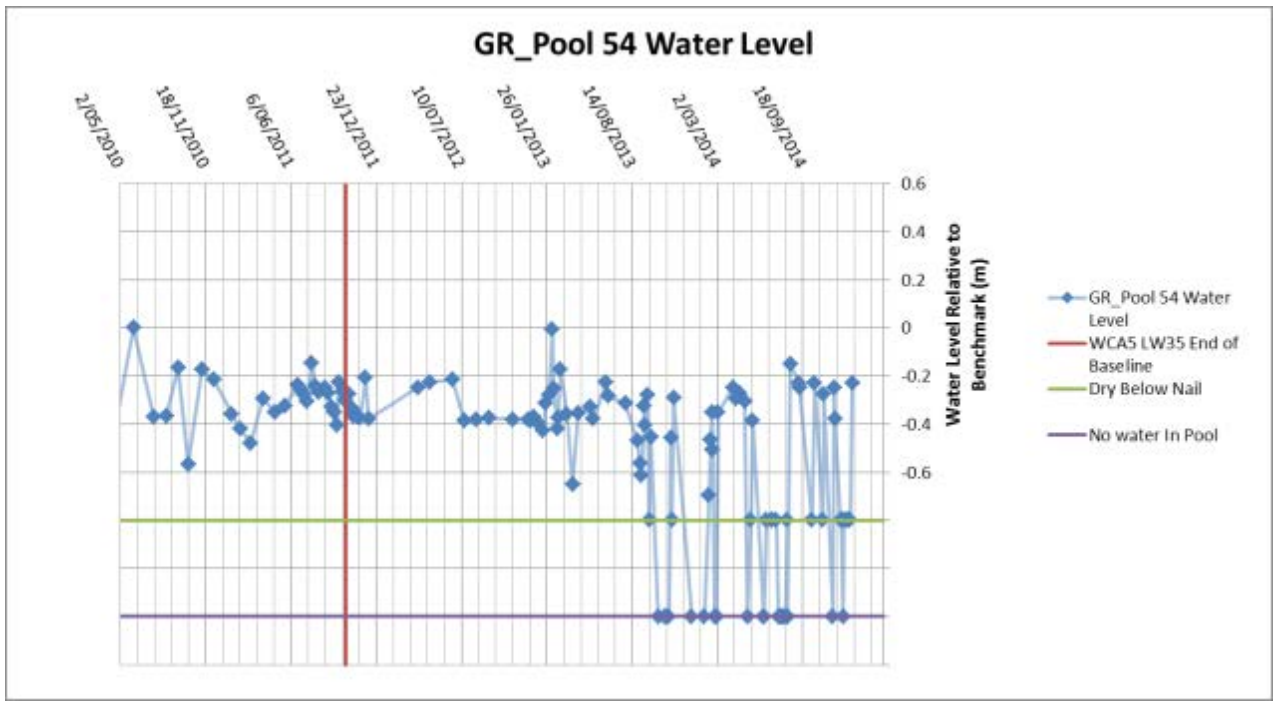


Graph 1: Water levels recorded in GR_Pool 44.

	
Photo 1: GR_Pool 44 looking upstream. Taken on 12/01/2015.	Photo 2: GR_Pool 44 looking downstream. Taken on 12/01/2015.

Update: Impact WCA5_LW35_007 (E296975, N6217204)

On the latest inspection of GR_Pool 54 the pool water level was above baseline levels (Graph 2). Photos 3 and 4 show the latest pool conditions.

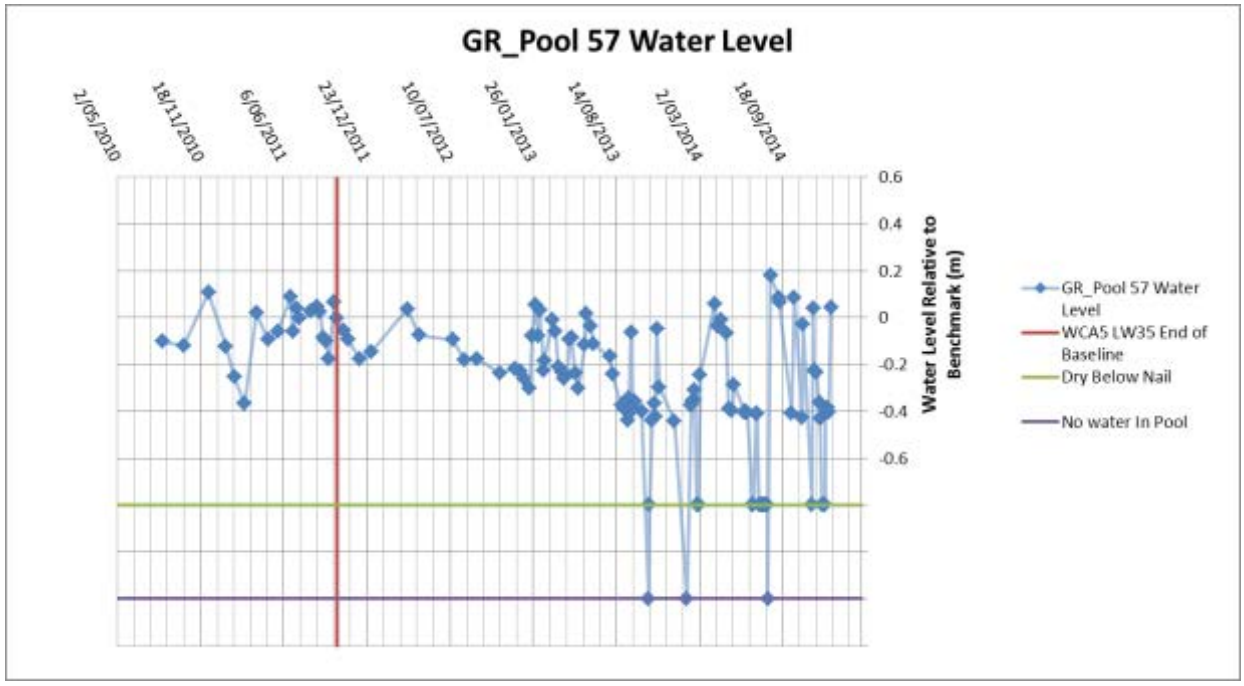


Graph 2: Water levels recorded in GR_Pool 54.

	
Photo 3: GR_Pool 54 looking upstream. Taken on 12/01/2015.	Photo 4: GR_Pool 54 looking downstream. Taken on 12/01/2015.

Update: Impact WCA5_LW35_012 (E296939, N6217250)

On the latest inspection of GR_Pool 57 the pool water level was above baseline levels (Graph 3). Photos 5 and 6 show the latest pool conditions.

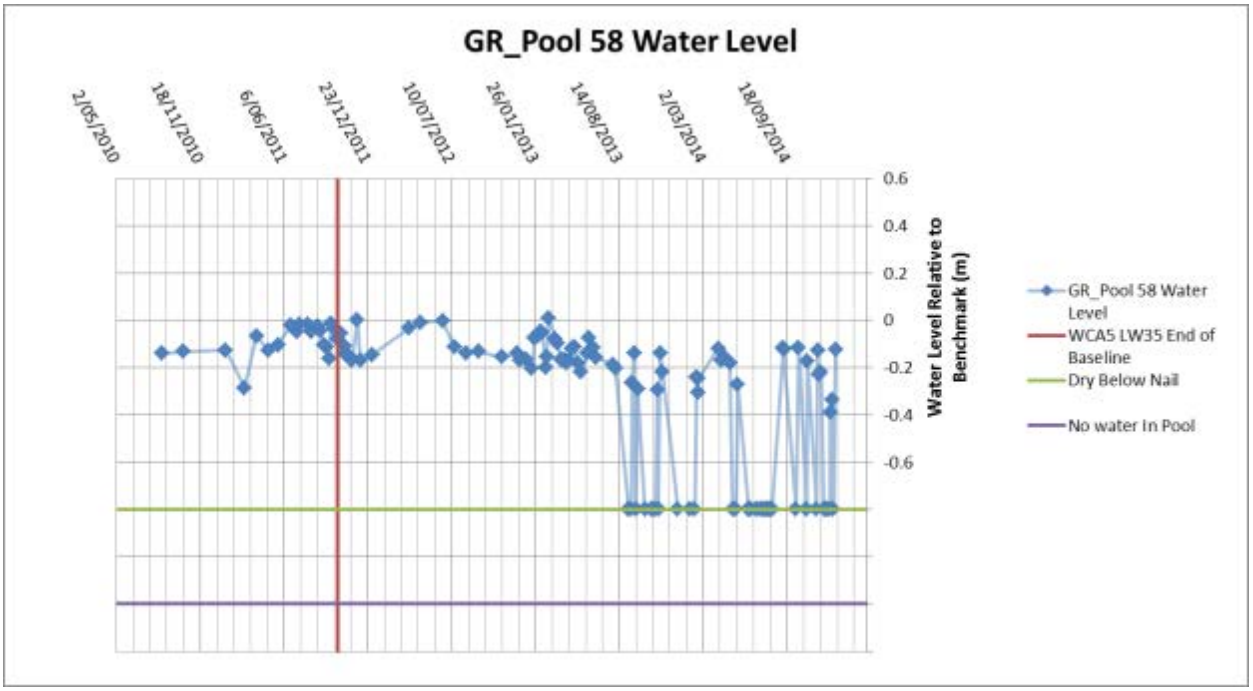


Graph 3: Water levels recorded in GR_Pool 57

	
Photo 5: GR_Pool 57 looking upstream. Taken on 12/01/2015.	Photo 6: GR_Pool 57 looking downstream. Taken on 12/01/2015.

Update: Impact WCA5_LW35_022 (E296838, N6217364)

On the latest inspection of GR_Pool 58 the pool water level was above baseline levels (Graph 4). Photos 7 and 8 show the latest pool conditions.

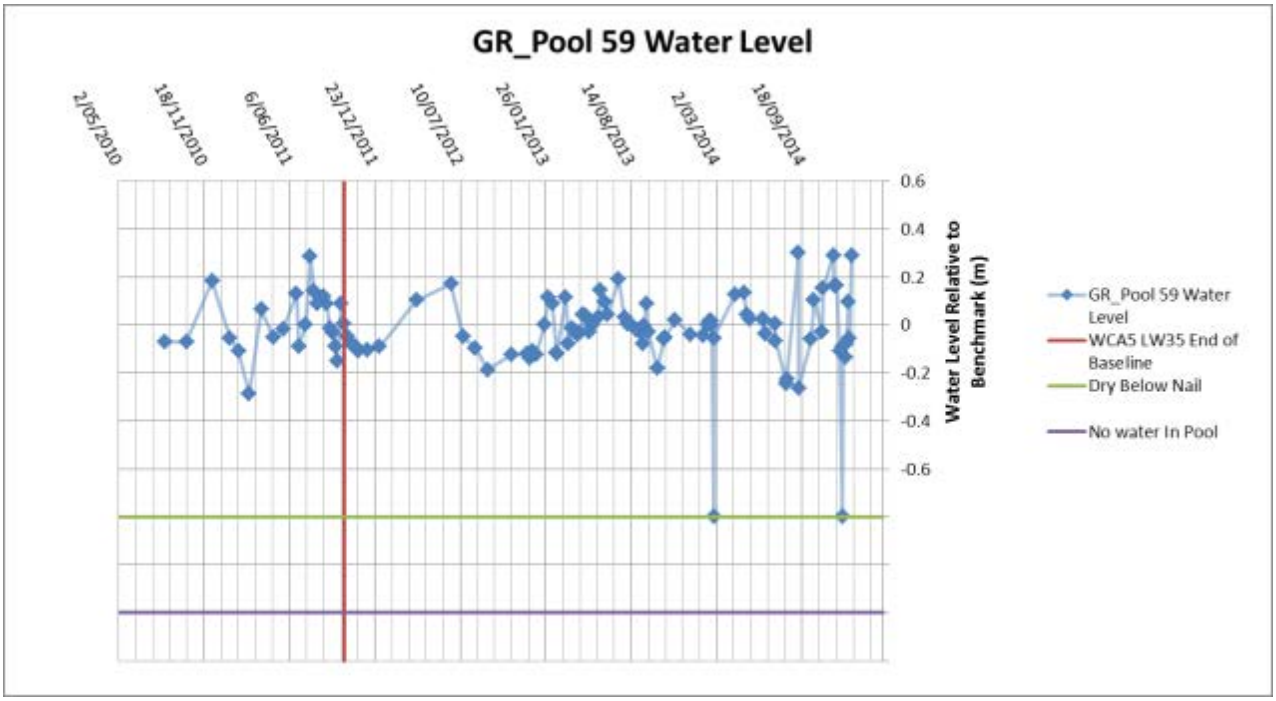


Graph 4: Water levels recorded in GR_Pool 58

	
Photo 7: GR_Pool 58 looking upstream. Taken on 12/01/2015.	Photo 8: GR_Pool 58 looking downstream. Taken on 12/01/2015.

Impact WCA5_LW35_029 (E296781, N6217482)

On the latest inspection of GR_Pool 59 the pool water level was above baseline levels (Graph 5). Photos 9 and 10 show the latest pool conditions.



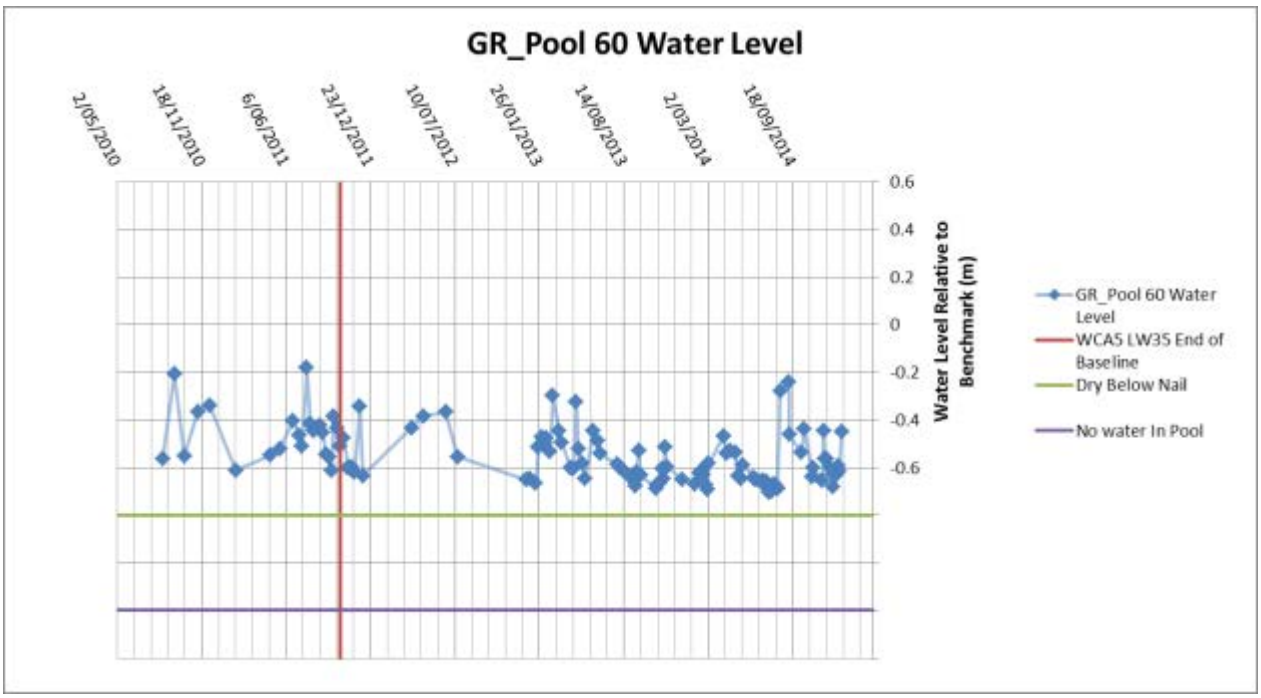
Graph 5: Water levels recorded in GR_Pool 59

Photo 9: GR_Pool 59 looking upstream. Taken on 12/01/2015.

Photo 10: GR_Pool 59 looking downstream. Taken on 12/01/2015.

Update: Impact WCA5_LW35_023 (E297259, N6216971)

On the latest inspection of GR_Pool 60 the pool water level was above baseline levels (Graph 6). Photos 11 and 12 show the latest pool conditions.

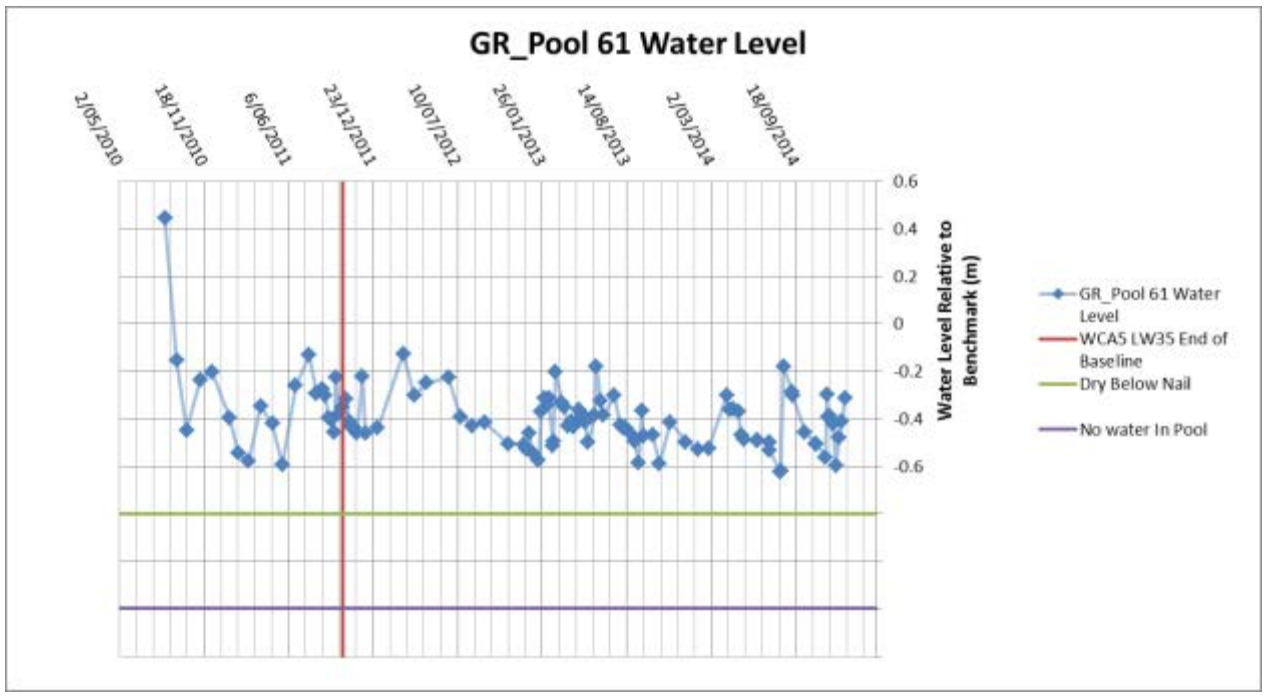


Graph 6: Water levels recorded in GR_Pool 60

	
Photo 11: GR_Pool 60 looking upstream. Taken on 12/01/2015.	Photo 12: GR_Pool 60 looking upstream. Taken on 12/01/2015.

Update: Impact WCA5_LW35_028 (E296998, N6217749)

On the latest inspection of GR_Pool 61 the pool water level was above baseline levels (Graph 7). Photos 15 and 16 show the latest pool conditions.



Graph 7: Water levels recorded in GR_Pool 61

	
Photo 13: GR_Pool 61 looking upstream. Taken on 12/01/2015.	Photo 14: GR_Pool 61 looking downstream. Taken on 12/01/2015.

Trigger Action Response Plan (TARP)

These impacts have previously been reported as Level 1 or Level 2, as stated in the Georges River Trigger Action Response Plan (Appendix A, Table 1). The following actions will be implemented:

- Continue monitoring as required by the SMP (return to weekly inspections);

An assessment of pool water level reduction and remedial works to restore pool water level is being submitted.

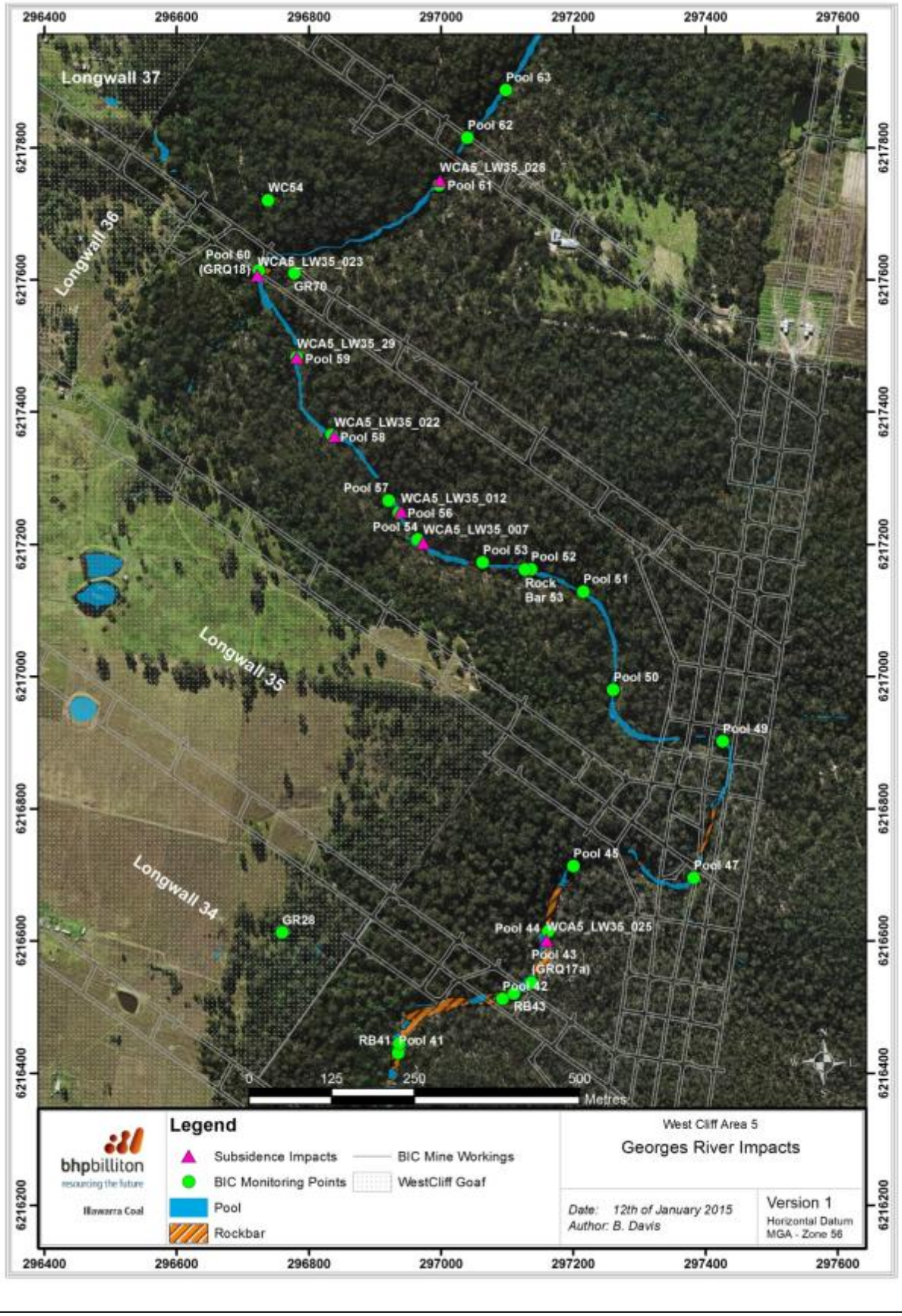


Figure 1: Location impacts discussed in this report and Georges River monitoring sites.

Appendix A

Table 1: Georges River Trigger Action Response Plan

Georges River	Characteristics of level	Actions	Action by	Notification
Normal	• No observable mining induced fractures in rockbars or base of Georges River • No reduction in water level of mapped pools under similar flows comparing pre-mining and post-mining – pools generally full • Where no discharge from BCD occurs, Georges River becomes ephemeral - some pools drain naturally at pre-mining rate • Survey Cross Lines: <100mm closure measured	• No remedial action necessary • Monthly review meeting • Continue monitoring program	Manager Approvals	None necessary Notify agencies for information only if BCD discharges reduce/cease and pool water levels drop due to natural causes
Level 1 **(Within Predicted Impact Criteria)**	• Fracturing in rockbar or bed of the Georges River which does not cause reduction of water level in mapped pools, when comparing pre-mining baseline and post mining • Iron staining greater than pre-mining levels • Gas releases • Water chemistry parameters do not exceed first trigger point when comparing against upstream/downstream and/or	• No remedial action necessary • Monthly review meeting • Continue monitoring program • Increase Survey Monitoring Programme to weekly for all Georges River Cross Lines	Manager Approvals Manager Survey	Notify agencies of Level 1 impacts in monthly subsidence report

Georges River	Characteristics of level	Actions	Action by	Notification
	pre-mining and post-mining results • Survey Cross Lines: >100mm closure measured as a result of LW35 - 36			
Level 2 **(Within Predicted Impact Criteria)**	• More than negligible diversion of flows or changes in the natural drainage behaviour of pools for less than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water level in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for less than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in water cloudiness for less than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact • Survey Cross Lines: >200mm closure measured as a result of	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD to maintain pool water levels for ecosystem protection • Develop and following appropriate approvals implement remedial action such as manual crack filling with local materials e.g. sand and debris to reduce rockbar bypass flow • Review management options, including implementation of; measures to reduce the level of observed impacts and mine plan changes to ensure Level 3 impacts are not induced by future longwall(s) • Within three months of the completion of the longwall, assess the magnitude of pool water level reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may	Manager Approvals	Notify agencies of Level 2 impacts within 24 hours of confirmation Notify agencies of gas release, iron staining and/or minor water quality changes in monthly report Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly

Georges River	Characteristics of level	Actions	Action by	Notification
	LW35 - 36	affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works if they are required		subsidence report
Level 3 **(Exceeding Predicted Impact Criteria)**	Exceed Subsidence Impact Performance Measures as specified in the Bulli Seam Operations Project Approval (see Section 2 above), including: • More than negligible diversion of flows or changes in the natural drainage behaviour of pools for more than 20% of the stream length subject to vertical subsidence >20mm e.g. fracturing in rockbar or bed of the Georges River which causes reduction of water levels in mapped pools, which are unable to be maintained with intervention • More than negligible iron staining or gas releases for more than 20% of the stream length subject to vertical subsidence >20mm e.g. iron staining or gas releases resulting in a measurable ecological impact • More than negligible increase in	• Increase monitoring/inspection frequency of key sites to twice weekly • Increase discharge from BCD or Appin East Main Dam to provide a minimum refuge water level in pools for minimum ecosystem protection • Implement remedial action such as manual crack filling with sand or hand mortaring to reduce rockbar bypass flow • Review management options, including implementation of additional mitigation and contingencies measures to reduce the level of observed impacts (e.g. maintenance watering of aquatic plants and relocation of aquatic fauna) and mine plan changes to ensure further Level 3 impacts in other parts of the Georges River are not induced by future longwall (s) • Within three months of the completion of the longwall, assess the magnitude of pool water level	Manager – Approvals	Notify agencies of Level 3 impacts within 24 hours of confirmation Confirm implementation of action(s) with agencies Notify relevant technical specialists Update progress in monthly subsidence report Provide completion report that demonstrates

Georges River	Characteristics of level	Actions	Action by	Notification
	water cloudiness for more than 20% of the stream length subject to vertical subsidence >20mm e.g. water cloudiness resulting in a measurable ecological impact	reduction. If ongoing mining induced pool water level reduction is occurring, develop remedial works to restore pool water level. Implement remedial works as soon as subsidence movements within Area 5 that may affect the rehabilitation works are complete and appropriate approvals are in place • Develop and implement monitoring program to ensure effectiveness of remedial works		successful rehabilitation outcomes