

Built Feature Management Plans (BFMPs) have been prepared by South32 Illawarra Metallurgical Coal for landholders above Appin Area 9 Longwalls 901 to 904. Inspections of dams, boreholes and natural features set out by the BFMPs are conducted by the Illawarra Coal Environmental Field Team (IMCEFT) with the consent of the relevant property/infrastructure owner and tenant (where applicable).

This report includes post-mining observations and data gathered for relevant features on Lot 1 DP810978. Additional inspections may be conducted by Illawarra Metallurgical Coal at the request of the landowner and/or if required by the various triggers in the Extraction Plan (EP). GW110671 is located approximately 230m north of LW903 (Figure 1).

Pre-mining Inspection

On 15 November 2017, a pre-mining inspection of property Lot 1 DP810978 was undertaken. Borehole GW110671 (Photo 1) and a small dam (Photo 4) were inspected. Water quality parameters and water samples, for laboratory analysis, were collected for the borehole. Observations of the dam were also recorded.

Post-mining Inspection

On 25 May 2021, a post-mining inspection of property Lot 1 DP810978 was undertaken. Borehole GW110671 (Photo 5) was inspected and sampled, and the dam was inspected with any key observations recorded (Photo 8).

Borehole GW110671

Location: 288717E, 6216340 N

Borehole Properties:

Borehole GW110671 is located approximately 230m north of Longwall 903 (Figure 1). According to the NSW Office of Water Work Summary Report, the borehole was installed on 22 February 2010, drilled to a depth of 240m. On this date, the standing water level was recorded at 82m below ground level. During the most recent inspection on 25 May 2021 the standing water level was measured to be 69.91m below ground level.

Bore Pumping Purpose and Performance:

The landholder advised that the borehole is mainly used for watering the lawn and garden.

Water Properties:

Water samples were initially collected from the borehole on 27 November 2017, and sent to Australian Laboratory Services (ALS), Sydney for analysis. Before sampling, the borehole was purged for approximately 10 minutes before water samples were collected and field parameters recorded. Results are presented in Table 1 and Table 2, respectively.

During the post-mining inspection, an odour, likened to hydrogen sulphide, was noted when the bore pump was turned on (Photo 7). Before sampling, the bore was purged for 10 minutes before water samples and field parameters were collected (Photo 6). Samples were collected, and field parameters recorded. Results are presented in Table 1 and Table 2, respectively.

Dam

The dam is located towards the north-eastern corner of the property (Figure 1). Observations on 15 November 2017 showed that the dam level was relatively low and the water in the dam was considerably turbid (Photo 4).

During the post-mining inspection on 25 May 2021, the dam level was close to full. The water in the dam was discoloured (dark brown/grey) and turbid. The dam walls remain in good condition, with no signs of leaks or slumping (Photo 8).

Table 1: Results of water analyses carried out on samples collected on 15th November 2017 and 25th May 2021, from borehole GW110671.

Analyte	Pre-mining 15 November 2017	Post-mining 25 May 2021	Units
Electrical Conductivity @ 25 degrees C	2050	2240	$\mu\text{S/cm}$
Total Dissolved Solids @ 180 degrees C	1170	1240	mg/L
Suspended Solids	<5	<5	mg/L
pH Value (pH Unit)	8.23	7.47	pH Unit
Dissolved Sulfate as SO_4^{-2}	30	22	mg/L
Total Iron	<0.05	0.33	mg/L
Dissolved Iron	<0.05	0.28	mg/L
Dissolved Manganese	0.001	0.013	mg/L
Dissolved Aluminium	<0.01	<0.01	mg/L
Dissolved Arsenic	<0.001	<0.001	mg/L
Dissolved Copper	0.002	<0.001	mg/L
Dissolved Lead	<0.001	<0.001	mg/L
Dissolved Nickel	<0.001	0.001	mg/L
Dissolved Zinc	0.008	0.017	mg/L

Table 2: Field parameters recorded on 15 November 2017 and 25 May 2021 from water collected from GW110671, using a Horiba water quality probe.

Parameter	Pre-mining 15 November 2017	Post-mining 25 May 2021	Unit
Temperature	20.15	18.79	Degrees Celsius
Dissolved Oxygen	66.9	44.9	% Saturation
ORP	364.40	173.34	mV
pH	7.53	7.11	pH Unit
Electrical Conductivity	2200	2220	$\mu\text{S/cm}$



Photo 1: Borehole GW110671, taken on 15 November 2017 during pre-mining inspection.



Photo 2: Water from GW110671, collected into a bucket. Samples and field parameters were taken from the bucket, photo taken on 15 November 2017.



Photo 3: Electric pump for GW110671, photo taken on 15 November 2017.



Photo 4: Dam located on Lot 1 DP810978, photo taken on 15 November 2017.



Photo 5: Borehole GW110671, taken on 25 May 2021 during post-mining inspection.



Photo 6: Water from GW110671. collected into a bucket. Samples and field parameters were taken from the bucket, photo taken on 25 May 2021.



Photo 7: Electric pump for GW110671, photo taken on 25 May 2021.



Photo 8: Dam located on Lot 1 DP810978, photo taken on 25 May 2021.



Figure 1: Overview of property Lot 1 DP810978 in relation to Appin Area 9 mining operations.

Built Feature Management Plans (BFMP's) have been prepared by South32 Illawarra Metallurgical Coal for landholders above Appin Area 9 Longwalls 901 to 904. Both pre- and post-mining inspections and reports of dams, boreholes and natural features set out by the BFMP's are conducted by the Illawarra Metallurgical Coal Environmental Field Team (IMCEFT) with the consent of the relevant property/infrastructure owner and tenant (where applicable).

This report includes both pre and post-mining observations and data gathered for relevant features on Lot 3 DP1133989, particularly the registered borehole GW100673. Additional inspections may be conducted by IMCEFT at the request of the landholder or if required by the various triggers in the Extraction Plan (EP). GW100673 is located approximately 840m west of Longwall 903 (Figure 1).

Pre-mining Inspection

On 16 May 2018, a pre-mining inspection of Lot 3 DP1133989 was undertaken and one borehole, GW100673 was identified, inspected and sampled (Photo 1). Field observations were recorded, with samples collected and sent to Australian Laboratory Services (ALS) for analysis (Photo 2).

According to the landholder, approximately two weeks before the inspection, the pump ceased to operate due to a blockage with iron precipitate. Additionally, the landholder noted that the water from the settling tank (where the borehole water is pumped into) had an abnormal odour (Photo 3). The water level was measured at approximately 16m to 18m below the surface however the accuracy was deminished due to the presence of moist iron precipitate and 'mud' in the borehole.

Additional Inspection (5 June 2018)

An additional inspection of borehole GW100673 was undertaken by IMCEFT on 5 June 2018 following a report from the property owner of a small coming from the bore water. During the inspection a handheld gas meter was used to determine the gas composition around the borehole and settling tank. No methane or hydrogen sulfide was detected at the site. A gas collection apparatus was installed over the borehole to collect a gas sample. The apparatus was removed on 8 June 2018 and the collected sample analysed at the Illawarra Metallurgical Coal Gas Laboratory. Results are presented in Table 2.

Post-mining Inspection

On 29 April 2021, a post-mining inspection of property Lot 3 DP1133989 was undertaken. The borehole was inspected with water sample collected and key observations recorded. The water quality, field observations and photographic records are outlined below with water quality results presented in Table 1.

Borehole: GW100673

Location: 285906 E, 6215584 N (*Note- previous report included an incorrect coordinates, now resolved*)

Borehole Properties:

Borehole GW100673 is located approximately 840m west of Longwall 903 (Figure 1). According to the NSW Office of Water Work Summary, the borehole was drilled to a depth of 146m. The pump was set at a depth of 122m and on 4 June 1995 the standing water level was measured 49m below ground level. During the most recent inspection on 29 April 2021 the standing water level was measured to be 43.13m below ground level.

Bore Pumping Purpose and Performance:

The landholder advised that water is mainly extracted from the borehole for livestock use. The borehole operates on an automatic system (Photo 1 and Photo 4), turning on when the water level in the settling tank falls below a certain level (Photo 3 and Photo 6).

Water Properties:

Water samples were initially collected from the borehole on 16 May 2018 (Photo 2). Before sampling, the borehole was purged for approximately 3 minutes before water samples were collected. The samples were analysed at a laboratory with results displayed below (Table 1).

During the post-mining inspection on 29 April 2021, no gas or odours were detected, however the water had a slight brownish colouration (Photo 5). The landowner advised IMCEFT that an orange colour had previously been present within the borewater, but this was not observed by IMCEFT during the inspection. Additionally, the landowner advised that the pump had recently been replaced in the borehole, where they noticed a white substance covering parts of an old pipe. Before sampling, the bore was purged for 3 minutes before water samples were collected (Photo 5). The samples were analysed at a laboratory with results displayed below (Table 1).

Table 1: Results of water chemistry analysis for water samples collected on 19 February 2018 and 29 April 2021.

Analyte	GW100673 Pre-mining Inspection	GW100673 Post-mining Inspection	Units
	16 May 2018	29 April 2021	
Dissolved Arsenic	<0.001	<0.001	mg/L
Dissolved Copper	<0.001	<0.001	mg/L
Dissolved Iron	0.58	1.02	mg/L
Dissolved Lead	<0.001	<0.001	mg/L
Dissolved Nickel	<0.001	<0.001	mg/L
Dissolved Sulfate as SO4 2-	40	34	mg/L
Dissolved Zinc	0.005	0.007	mg/L
Electrical Conductivity @ 25° C (µs/cm)	2770	2910	µs/cm
pH Value (pH Unit)	7.34	7.30	pH unit
Suspended Solids	<5	<5	mg/L
Total Aluminium	<0.01	<0.01	mg/L
Total Dissolved Solids @180 ° C	1420	1620	mg/L
Total Iron	0.78	1.44	mg/L
Total Manganese	0.101	0.054	mg/L
Methane	659	n/a	mg/L
Ethane	<10	n/a	mg/L

Table 2: Results of gas composition analysis for gas sample collected on the 8th of February 2018.

Analyte	GW100673 8 June 2018 (%v/v)
Oxygen	20.5
Argon	0.914
Nitrogen	78.0
Carbon Dioxide	0.00775
Methane	0.624



Photo 1: The capped borehole GW100673. Taken 16 May 2018.



Photo 2: Water sample taken from GW100673. Taken 16 May 2018.



Photo 3: Settling tank where water from GW100673 is pumped. Taken 16 May 2018.



Photo 4: The capped borehole GW100673. Taken 29 April 2021.



Photo 5: Water sample taken from GW100673. Taken 29 April 2021.



Photo 6: Settling tank where water from GW100673 is pumped. Taken 29 April 2021.

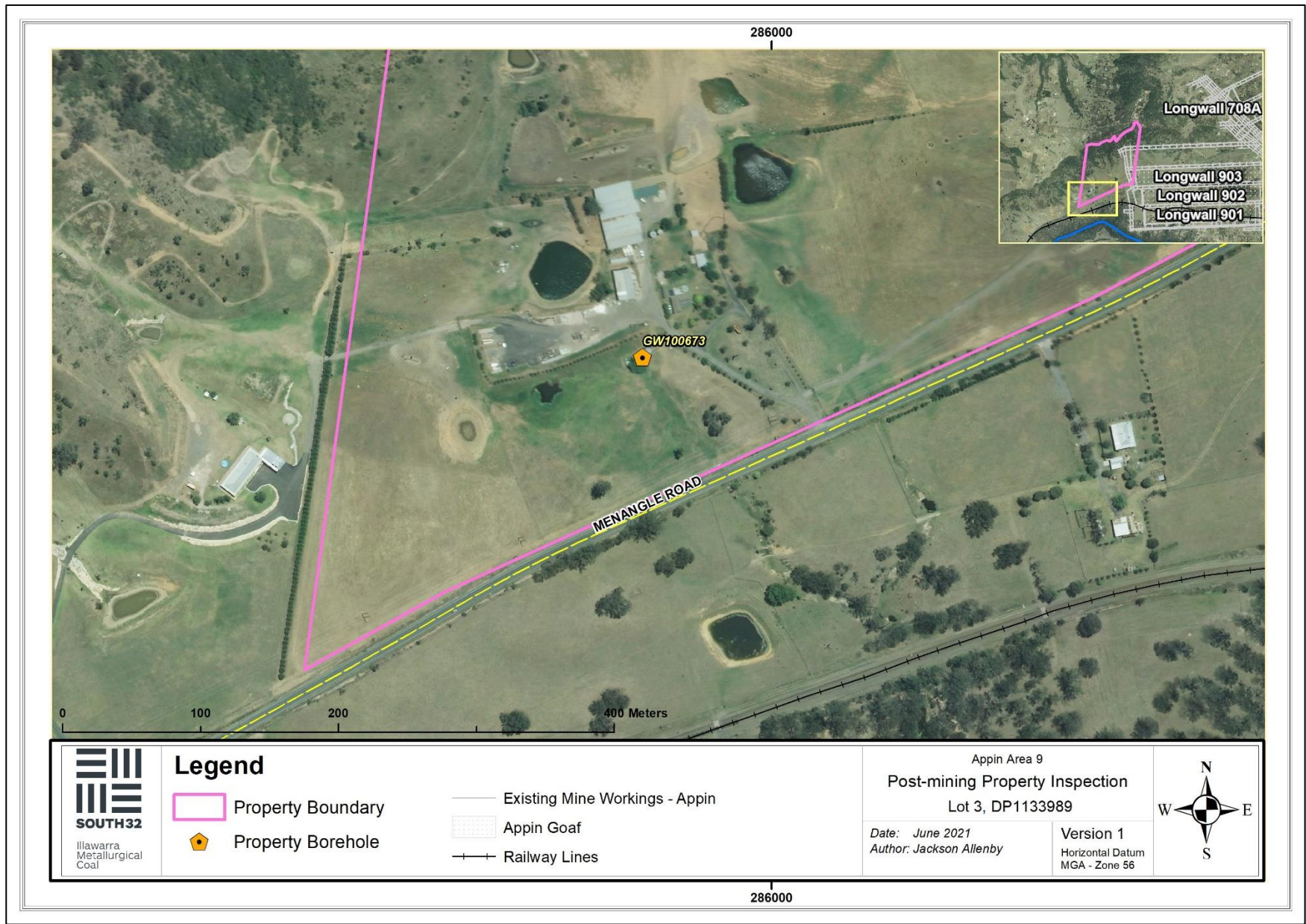


Figure 1: Borehole GW100673 on Lot 3, DP1133989 in relation to Appin Area 9 mining operations.

Built Feature Management Plans (BFMPs) have been prepared by South32 Illawarra Metallurgical Coal for landholders above Appin Area 9 Longwalls 901 to 904. Inspections of dams, boreholes and natural features set out by the BFMPs are conducted by the Illawarra Coal Environmental Field Team (IMCEFT) with the consent of the relevant property/infrastructure owner and tenant (where applicable).

This report includes post-mining observations and data gathered for relevant features on Lot 9 DP810978, specifically the registered borehole GW104602. Additional inspections may be conducted by Illawarra Metallurgical Coal at the request of the landowner and/or if required by the various triggers in the Extraction Plan (EP). GW104602 is located approximately 185m northeast of LW903 (Figure 1).

Pre-mining Inspection

On 16 April 2018 a pre-mining inspection of Lot 9 DP810978 property was undertaken. One borehole GW104602 was identified. The borehole and water outlet were inspected (Photo 1 to Photo 4). Water quality field parameters were recorded (Table 1). Water samples were collected for laboratory analysis, with results presented in Table 2. Other borehole properties are present below.

Post-mining Inspection

On 3 May 2021 a post-mining inspection of Lot 9 DP810978 was undertaken. Borehole GW104602 was inspected (Photo 5 to Photo 7), with a sample of water taken for field parameters and laboratory analysis (Table 1 and Table 2). Other borehole properties are present below.

Borehole GW104602

Location: 289029 E, 6216307 N

It should be noted the the NSW Office of Water Work Summary Report for borehole GW104602 reports a different location. The GPS location used in this report was recorded by IMCEFT during inspection of the borehole.

Borehole Properties:

Borehole GW104602 is located approximately 60m north of the main dwelling on the property (Figure 1). According to the NSW Office of Water Work Summary Report, the borehole was drilled to a depth of 231m, with the standing water level of 42m below ground level. No installation date or water level measurement date was included on the Office of Water report. A pump was installed at a depth of 130m however has since been removed. During the most recent inspection on the 3 May 2021, the standing water level was measured to be 71.71m below ground level.

Bore Pumping Purpose and Performance:

The landholder advised that the borehole is used for approximately 30-90 mins per day and that water is predominantly used for the garden and lawn via an underground sprinkler system. No pump was installed during the post-mining inspection.

Water Properties:

Water samples were initially collected from the borehole for a pre-mining water quality assessment on 16 April 2018 via the pump, which were sent to Australian Laboratory Services (ALS) for analysis. The borehole was purged for approximately 10 minutes before water samples and field parameters were collected. There were no observable indicators of iron precipitate or hydrogen sulfide during this inspection (Photo 3), however the water was noticeably effervescent after leaving the borehole outlet (Photo 4).

During the post-mining inspection on 3 May 2021, a hand bailer was used to collect water samples from the borehole as the pump had been removed (Photo 7). The borehole was therefore unable to be purged to the extent undertaken in the pre-mining inspection. A slight odour was identified, likened to hydrogen sulfide, when the water was removed from the borehole, however there were no signs of iron or salinity staining observed (Photo 5 and Photo 7). The water removed for sampling was slightly brown in colour (Photo 6). Field water quality parameters were recorded (Table 1) and samples sent to ALS for analysis, with results in Table 2.

Table 1: Water quality field parameters from sample collected from GW104602, measured using a Horiba water quality meter.

Parameter	GW104602 Pre-mining 16 April 2018	GW104602 Post-mining 3 May 2021
Temperature (°C)	23.12	20.35
Electrical Conductivity (µs/cm)	1830	1630
pH	7.28	7.40
Dissolved Oxygen (%)	56.9	32.9
Converted ORP (mV)	360	35

Table 2: Results of chemical analyses for water samples collected from GW104602.

Analytes (mg/L unless stated)	GW104602 Pre-mining 16 April 2018	GW104602 Post-mining 3 May 2021
Dissolved Arsenic	<0.001	0.003
Dissolved Copper	<0.001	<0.001
Dissolved Iron	0.1	0.12
Dissolved Lead	<0.001	<0.001
Dissolved Nickel	<0.001	0.001
Dissolved Sulfate as SO ₄ ²⁻	8	11
Dissolved Zinc	<0.005	0.014
Electrical Conductivity @ 25 °C (µs/cm)	1700	1640
pH Value (pH Unit)	7.79	7.81
Suspended Solids	<5	37
Total Aluminium	<0.01	0.05
Total Dissolved Solids @ 180 °C	954	1020
Total Iron	0.14	0.54
Total Manganese	0.048	0.095



Photo 1: Water pressure from pump. Taken on 16 April 2018.



Photo 2: Closeup of borehole GW104602. Taken on 16 April 2018.



Photo 3: Closeup of water sample taken from the borehole via the pump. Taken on 16 April 2018.

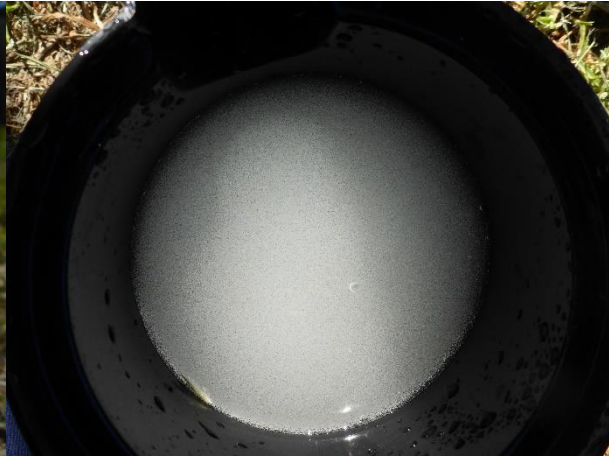


Photo 4: Closeup of water sample taken from borehole via the pump. The effervescent nature of the water is exhibited. Taken on 16 April 2018.



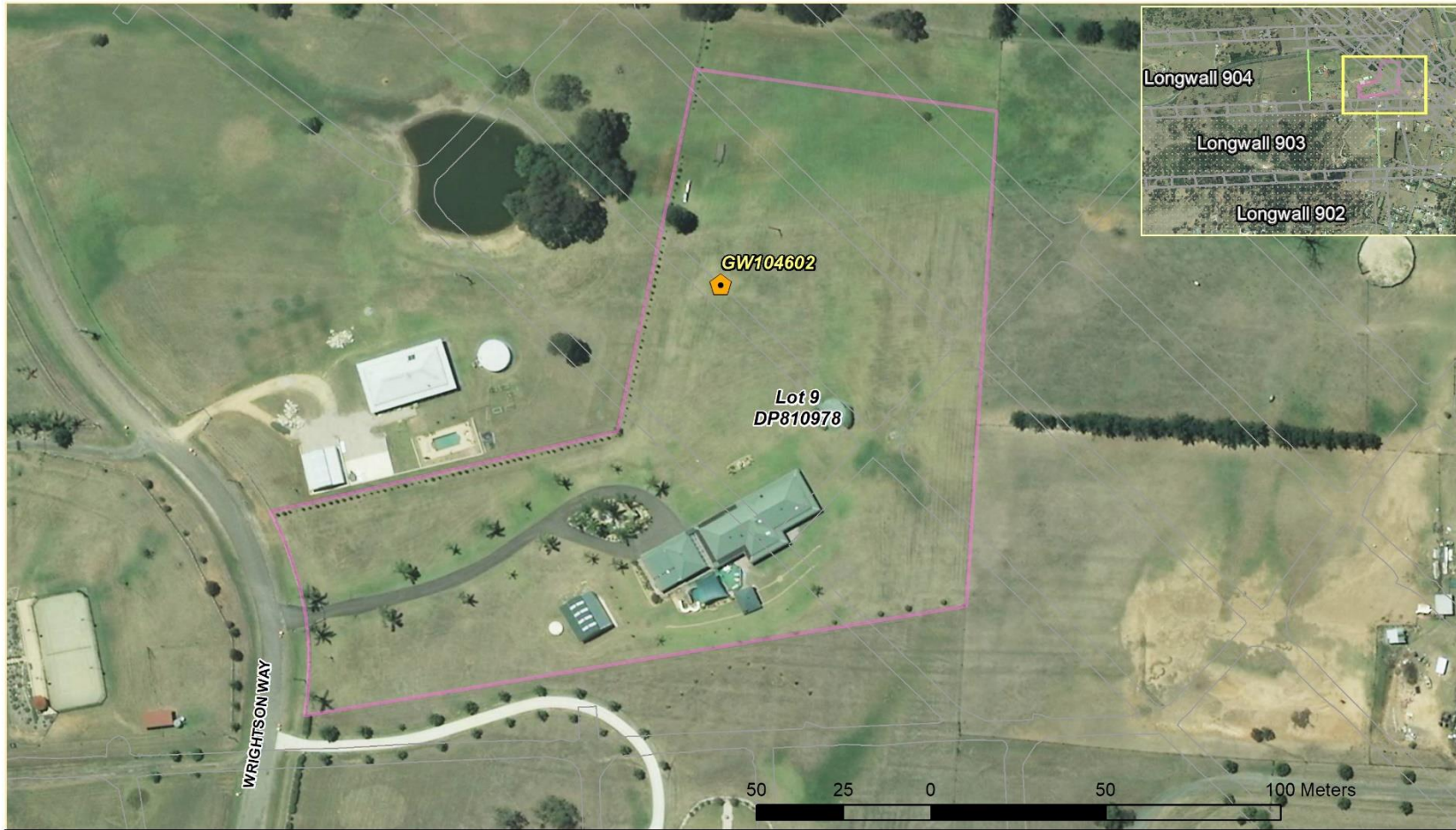
Photo 5: Closeup of borehole GW104602. Taken on 3 May 2021.



Photo 6: Closeup of water sample taken from borehole via bailing from borehole. Slight dark-brownish colour is visible in water sampled from borehole. Taken on 3 May 2021.



Photo 7: Borehole GW104602 showing the current set-up and pump removed. Taken on 3/5/2021.



 SOUTH32 Illawarra Metallurgical Coal	Legend		Appin Area 9 Post-mining Property Inspection Lot 9 DP810978		
	 Borehole  Property Boundary  Existing Mine Workings	 Approved Mine Layout  Appin Goaf	Date: June 2021 Author: Jackson Allenby		

Figure 1: Map showing GW104602 in relation to Appin Area 9 mining operations.

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This report includes both pre- and post-mining observations and data gathered for the borehole and dam on Lot 15 DP803255 (Figure 1).

Pre-mining Inspection

On 2 November 2017 a pre-mining inspection of Lot 15 DP803255 property was undertaken. The borehole and dam were inspected, water samples collected, and key observations recorded (Table 1 and Table 2).

The landholder advised IMCEFT that water is extracted from the dam and feeds to ten outlets on the property. Water is extracted for approximately 6 hours, twice a week. During the pre-mining inspection, flow was measured at approximately 2 L/s (Photo 1).

Post-mining Inspections

On 6 June 2019 and 29 April 2021, post-mining inspections of Lot 15 DP803255 were undertaken for Longwalls 902 and 903 respectively. The borehole and dam were inspected and sampled, with key observations recorded. These observations, results and photographic record are outlined in this report.

Borehole: GW112437

Location: 288697 E, 6215458 N

Borehole Properties:

Borehole GW112437 is located approximately 380m south of Longwall 903 (Figure 1). According to NSW Office of Water Work Summary, the borehole is 156 m deep and was installed on 15 June 2010. The borehole has pumping equipment attached which feeds water into the adjacent dam (Dam 1), used as a holding lagoon (Photo 1, Photo 5 and Photo 9).

During the post-mining inspection for Longwall 902 (6 June 2019), the standing water level in borehole GW112437 was measured at 70.71m (+/- 0.2m). On the most recent post-mining inspection for Longwall 903 (29 April 2021), the standing water level in the borehole was measured at 77.05m (+/- 0.2m). However this latest water level measurement was taken after the pump had been running as the property owner had started the the pump prior to the sampling team's arrival.

Bore Pumping Purpose and Performance:

Water is extracted from the bore for land care and domestic uses, including all garden watering. Water is first held in Dam 1 (Photo 3, Photo 7 and Photo 11). During the both Longwall 902 and 903 post-mining inspections, the bore was pumping approximately 2 L/s, matching that observed during the pre-mining inspection (Photo 1, Photo 5 and Photo 9).

Water from the bore was purged for 5 minutes before key observations, water quality and samples were collected (Photo 2, Photo 6 and Photo 10). Water samples were also taken from the Dam 1 on the property (Photo 4, Photo 8 and Photo 12).

Water Properties:

Water taken from GW112437 appeared clear with no signs of iron staining or salinity in the water, around the borehole or around the outlet (Photo 9 and Photo 10). Water taken from Dam 1 appeared discoloured and murky with evidence of algae growth but had no visible signs of iron staining or salinity (Photo 11 and Photo 12) and no gas or odours were identified. The landowner explained that water level in Dam 1 was lower than previous inspections, but this was due to the dam level being lowered to remove weed from dam.

The comparison between pre- and post-mining in-situ water quality parameters are provided in Table 1. Water samples from GW112437 and Dam 1 were sent to ALS for laboratory analysis. The results of the laboratory analyses for both pre-mining and post-mining inspections are included in Table 2.



Photo 1: Borehole outlet into Dam 1. Taken on 2 November 2017.



Photo 2: Image of water from borehole discharge. Taken on 2 November 2017.



Photo 3: Dam 1. Taken on 2 November 2017.



Photo 4: Image of water taken from dam. Taken on 2 November 2017.



Photo 5: Borehole outlet into Dam 1. Taken on 6 June 2019.



Photo 6: Image of water from borehole discharge. Taken on 6 June 2019.



Photo 7: Dam 1. Taken on 6 June 2019.



Photo 8: Image of water taken from dam. Taken on 6 June 2019.



Photo 9: Borehole outlet into Dam 1. Taken on 29 April 2021.

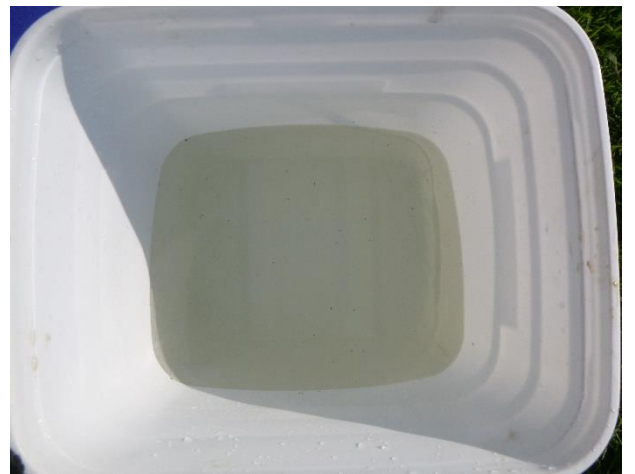


Photo 10: Image of water from borehole discharge. Taken on 29 April 2021.



Photo 11: Dam 1. Taken on 29 April 2021.



Photo 12: Image of water taken from dam. Taken on 29 April 2021.

Table 1: Field water quality parameters for borehole GW112437 and Dam 1, collected on 2 November 2017, 6 June 2019 and 29 April 2021.

Parameter	GW112437 Pre-mining 2 November 2017	GW112437 Post-mining 6 June 2019	GW112437 Post-mining 29 April 2021	Dam 1 Pre-mining 2 November 2017	Dam 1 Post-mining 6 June 2019	Dam 1 Post-mining 29 April 2021
Temperature (°C)	19.61	16.90	19.04	21.98	16.65	17.66
DO (% sat)	61.7	64.3	25.5	146.8	94.0	115.6
SpC (µS/cm)	2150	2030	2030	1780	1130	1020
pH	7.13	7.55	7.05	8.95	8.42	9.09
ORP (mV)	10	58	-4	94	70	147

Table 2: Results of water chemistry analysis for the water samples collected on the 2 November 2017, 6 June 2019 and 29 April 2021 from GW112437 and Dam 1.

Analyte (mg/L unless stated)	GW112437 Pre-mining 2 November 2017	GW112437 Post-mining 6 June 2019	GW112437 Post-mining 29 April 2021	Dam 1 Pre-mining 2 November 2017	Dam 1 Post-mining 6 June 2019	Dam 1 Post-mining 29 April 2021
Dissolved Copper	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Iron	0.25	0.44	0.97	<0.05	<0.05	<0.05
Dissolved Manganese	0.026	0.028	0.034	0.023	0.03	0.023
Dissolved Nickel	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Sulfate as SO ₄ 2-	22	23	20	11	12	8
Dissolved Zinc	0.011	<0.005	<0.005	<0.005	<0.005	<0.005
Electrical Conductivity @ 25°C (µS/cm)	2080	2160	2030	1740	1240	1060
pH Value (pH Unit)	7.76	8.29	7.51	8.8	8.41	8.68
Total Aluminium	<0.01	<0.01	<0.01	<0.01	0.12	0.10
Total Iron	0.43	0.54	1.44	0.34	0.23	0.19
Total Manganese	0.026	0.031	0.034	0.023	0.046	0.034







 <p>SOUTH32 Illawarra Metallurgical Coal</p>	<p>Legend</p> <ul style="list-style-type: none"> Lot 15 DP803255 Property Boundary  Borehole  Appin Goaf  Existing Mine Workings  Roads 	<p style="text-align: center;">Appin Area 9 Lot 15 DP803255</p> <div style="text-align: right;">  </div>
	<p><i>Date: June 2021</i> <i>Author: Jackson Allenby</i></p>	<p>Version 1 Horizontal Datum MGA - Zone 56</p>

Figure 1: Map showing property and features in relation to Appin Area 9 mining operations.

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This report includes observations and data gathered for relevant features for Lot 59-63 DP1321, including unregistered borehole 'L62_DP1321_BH1' and two dams. Additional inspections may be conducted by IMCEFT at the request of the landowner or if required by the various triggers in the Extraction Plan (EP). L62_DP1321_BH1 is located approximately 380m south of the southern edge of Longwall 903 (Figure 1).

Pre-mining Inspection

A pre-mining inspection was not undertaken for this borehole due to the borehole being unregistered at the time and not showing on initial database searches. However, historic water quality results from 7 August 1987 have been supplied, analysed by an unknown laboratory service, and are included in this report (Table 2).

Post-mining Inspections

Borehole inspections of property Lot 59-63 DP1321 have been undertaken by IMCEFT on the 2 February 2017, 24 October 2019 and the 10 May 2021. Water samples were collected on each inspection for chemical analysis at Australian Laboratory Services (ALS). Water quality filed parameters were recorded on recent inspections. Secondary dam inspections were conducted on the 29 September 2017 and 10 May 2021 where field parameters and visual observations were recorded. The water quality, observations and photographic records are outlined in this report.

Borehole L62_DP1321_BH1

Location: 287824 E, 6215400 N

Borehole Properties:

The borehole on Lot 59-63 DP1321 is located on the western edge of Lot 59 and was passed by Longwall 901 on approximately 9 July 2016, at an approximate distance of 20 m (Figure 1). On 2 February 2017, the standing water level in the borehole was measured as 10.300 m.

On 29 September 2017 the standing water level in the borehole was measured at 11.587 m below ground level.

Longwall 902 passed 30m to the north of the borehole in September/October 2018 (Figure 1). On 24 October 2019 the standing water level in the borehole was measured at 14.055m.

Longwall 903 passed approximately 380 m to the north of the borehole in April 2020 (Figure 1). On 10 May 2021 the standing water level in the borehole was measured at 12.167m.

Water Properties:

Water samples were collected from borehole L62_DP1321_BH1 by IMCEFT on 3 separate occasions- 2 February 2017, 25 October 2019 and 10 May. Field parameters and water samples were taken using a bailer as the borehole did not have a pump installed.

During the Longwall 902 post-mining inspection on 24 October 2019, no signs of iron or salinity staining were observed in the collected water or around the borehole (Photo 3). A slight odour (likened to hydrogen sulfide smell) and sheen was observed on the water surface once the water sample was extracted from the borehole, whilst vegetation and sediment were also observed in the borehole (Photo 1). This is likely a result of the recent removal of the borehole pump and it now being unsealed.

During the Longwall 903 post-mining inspection on 10 May 2021, no signs of iron or salinity staining were observed in the collected water or around the borehole (Photo 4). Some sediment and water discoloration were identified from the extracted water and is likely a result of the open nature of the borehole (Photo 2). Water quality parameters were recorded (Table 1), and water samples collected. Samples were sent to ALS for laboratory analysis with results included below (Table 2).

Dam 1

Location: 287526 E, 6215498 N

Dam 1 is located on the southern end of Lot 62 DP1321 and was passed by longwall 903 on 20 February 2020, approximately 250m north of Dam 1 (Figure 1). Previously the dam was mined beneath by Longwall 902 and passed by Longwall 901, approximately 110m to the south. No gas bubbling, slumping or signs of damage to the walls of Dam 1 were observed during the post Longwall 903 inspection on the 25 May 2021 (Photo 6). Water quality field parameters for Dam 1 are presented in Table 3.

Dam 2

Location: 287495 E, 6215415 N

Dam 2 is located on the southern end of Lot 62 of DP1321, downstream of Dam 1 and was passed by Longwall 903 on 20 February 2020 at an approximate distance of 328 m (Figure 1). Previously the dam was mined beneath by Longwall 902 and passed by Longwall 901, 35m to the south. No gas bubbling, slumping or signs of damage to the walls of Dam 2 were observed during the post Longwall 903 inspection on 25 May 2021 (Photo 8).

During the Longwall 901 end of panel inspection (29 September 2017), the property owner had advised that the area directly downstream of Dam 2 had substantially decreased in moisture and vegetation health. According to the landholder, this area is perennially moisture-laden even throughout drought conditions. During the Longwall 903 end of panel inspection, this area downstream of Dam 2 had increased in moisture levels becoming boggy with some iron staining present in surface pooling on the grass (Photo 9). Water quality field parameters for Dam 2 are presented in Table 4.

Table 1: Field water quality results from borehole L62_DP1321_BH1.

Parameter	24 October 2019	10 May 2021
Temperature (°C)	20.30	18.70
Dissolved Oxygen (% sat.)	46.9	34.3
Electrical Conductivity (µs/cm)	3130	385
pH	7.12	6.95
ORP (mV)	-70	136
Time (24hr)	0905	1000

Table 2: Laboratory results for water samples collected from borehole L62_DP1321_BH1. Results from 7 August 1987 did not report laboratory.

Analyte	Unit	7 August 1987	2 February 2017	24 October 2019	10 May 2021
pH Value	pH Unit	8.2	7.53	7.58	7.05
Electrical Conductivity @ 25 degrees C	µS/cm	-	1870	3330	372
Total Dissolved Solids @ 180 degrees C	mg/L	-	1280	1760	296
Suspended Solids (SS)	mg/L	-	62	52	13
Hydroxide Alkalinity as CaCO ₃	mg/L	-	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	770	638	824	156
Total Alkalinity as CaCO ₃	mg/L	-	638	824	156
Dissolved Sulfate as SO ₄ 2-	mg/L	145*	132	9	16
Chloride	mg/L	680*	190	668	16
Dissolved Calcium	mg/L	158*	67	138	30
Dissolved Magnesium	mg/L	174*	69	147	11
Dissolved Sodium	mg/L	418*	204	308	22

Dissolved Potassium	mg/L	9.9*	10	16	9
Dissolved Aluminium	mg/L	-	0.01	<0.01	0.15
Dissolved Arsenic	mg/L	-	<0.001	0.002	n/a
Dissolved Copper	mg/L	-	0.002	<0.001	0.008
Dissolved Lead	mg/L	-	<0.001	<0.001	0.001
Dissolved Manganese	mg/L	-	0.183	0.657	0.038
Dissolved Nickel	mg/L	-	0.004	<0.001	0.004
Dissolved Selenium	mg/L	-	<0.01	<0.01	<0.01
Dissolved Zinc	mg/L	-	0.335	<0.005	0.112
Dissolved Iron	mg/L	-	<0.05	3.08	0.21
Dissolved Bromine	mg/L	-	0.5	1.3	<0.01
Dissolved Iodine	mg/L	-	<0.1	<0.1	<0.01
Total Aluminium	mg/L	-	1.11	0.10	0.53
Total Manganese	mg/L	-	0.183	0.681	0.052
Total Iron	mg/L	-	2.24	3.60	0.73
Ammonia as N	mg/L	-	0.34	7.34	0.44
Nitrite + Nitrate as N	mg/L	-	0.4	0.15	0.13
Total Kjeldahl Nitrogen as N	mg/L	-	0.6	8.1	2.2
Total Phosphorus as P	mg/L	-	0.05	0.68	0.12
Reactive Phosphorus as P	mg/L	-	<0.01	<0.01	0.02
Total Anions	meq/L	-	20.8	35.5	3.9
Total Cations	meq/L	-	18.2	32.8	3.59
Dissolved Organic Carbon	mg/L	-	10	9	4

*Data provided by historical results did not define 'total' or 'dissolved'.

Table 3: Field water quality results from Dam 1.

Parameter	29 September 2017	10 May 2021
Temperature (°C)	18.79	19.39
DO (% sat)	105.0	71.2
SpC (us/cm)	175	95
pH	5.43	7.39
ORP (mV)	61	146
Depth (m)	0.1	0.1
Time (24hr)	1106	1040

Table 4: Field water quality results from Dam 2.

Parameter	29 September 2017	10 May 2021
Temperature (°C)	19.92	18.86
DO (% sat)	83.9	67.1
SpC (us/cm)	251	103
pH	9.04	6.98
ORP (mV)	72	165
Depth (m)	0.1	0.1
Time (24hr)	1113	1045



Photo 1: Water extracted from borehole. Taken on 24 October 2019.



Photo 2: Water extracted from borehole. Taken on 10 May 2021.



Photo 3: Looking in to borehole. Taken on 24 October 2019.



Photo 4: Looking at the borehole, with new collar. Taken on 10 May 2021.



Photo 5: Dam 1, looking upstream from southern bank, taken 29 September 2017.



Photo 6: Dam 1 looking across-stream from western bank, taken 10 May 2021.



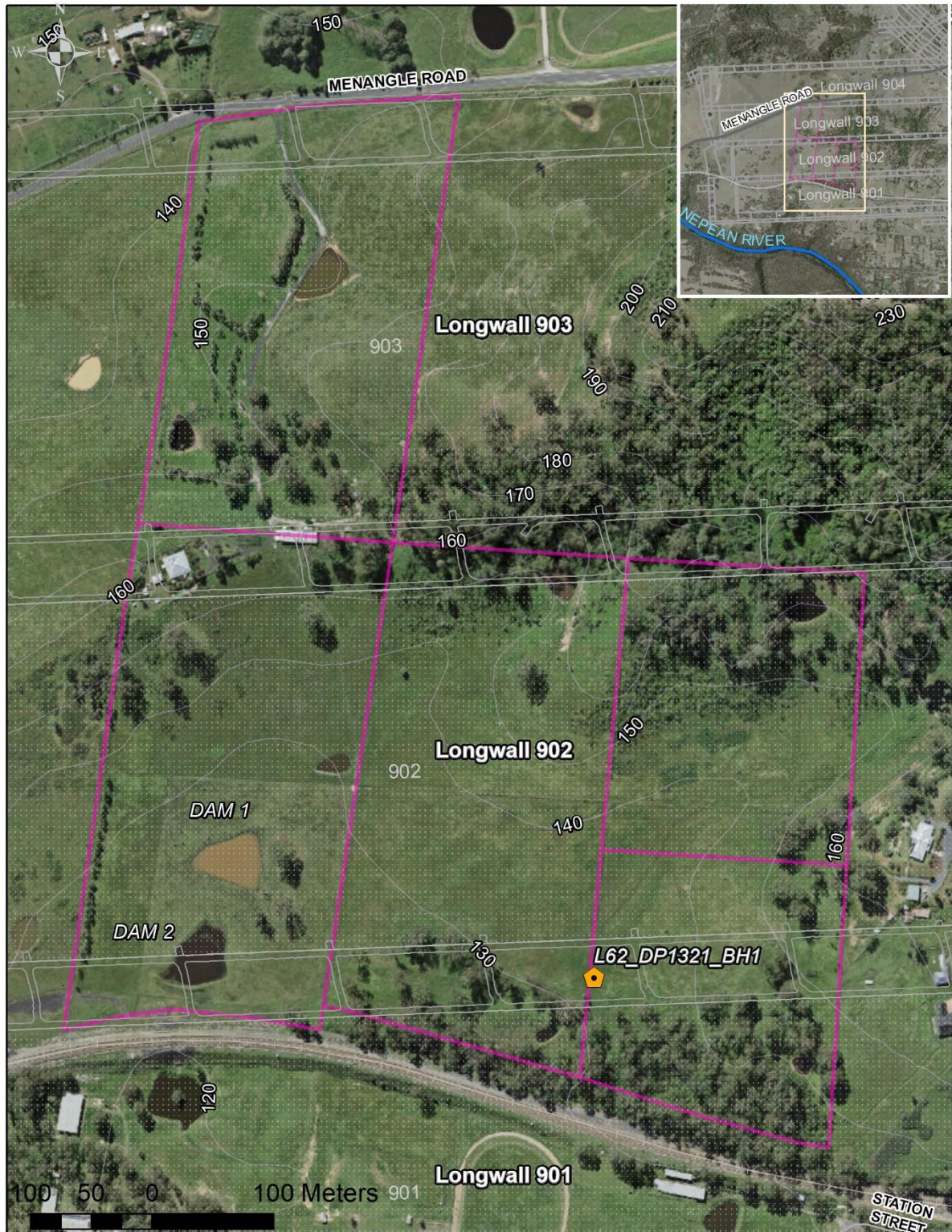
Photo 7: Dam 2 looking across-stream from eastern bank, taken 29/09/2017.



Photo 8: Dam 2 looking across-stream from western bank, taken 10/05/2021.



Photo 9: Iron staining downstream of Dam 2, taken 10/05/2021.



<p>SOUTH32 Illawarra Metallurgical Coal</p>	Legend		Appin Area 9 Post-mining Inspection Lot 59 - 63 DP1321	
	Borehole Property (Lot) Boundaries 10m Surface Contours	Appin Goaf Existing Mine Workings Railway Line	<i>Date: June, 2021</i> <i>Author: Jackson Allenby</i>	

Figure 1: Map showing Lot 59 – 62 DP1321 and inspected features in relation to Appin Area 9 mining operations.