GLENCORE

BAAL BONE COLLIERY

October to December 2019
Environmental Monitoring Summary

1. Introduction

In accordance with Schedule 5, Condition 9 of Project Approval 09_0178 this report provides a summary of environmental monitoring results for Baal Bone Colliery, for the period **1 October 2019 to 31 December 2019.** Baal Bone's licensed discharge and monitoring locations are identified in **Figure 7**.

2. Air quality

Monthly dust monitoring is carried out in accordance with Australian Standard AS3580.10.1, EPL requirements and Baal Bone's Air Quality Monitoring Program.

Monitoring is undertaken by the ALS Group Environmental Division, a NATA Accredited laboratory.

Baal Bone maintains a network of dust deposition gauges:

- Sample location DM1 (EPL monitoring point No. 7);
- Sample location DM2 (EPL monitoring point No. 13);
- Sample location DM3 (EPL monitoring point No. 14);
- Sample location DM4 (EPL monitoring point No. 15)

Locations of the dust deposition gauges are shown in **Figure 7.**

Schedule 3, Condition 10 of Project Approval 09_0178 includes air quality impact assessment criteria for the project and are summarised in **Table 1**. The pollutants to be monitored include deposited dust, TSP and PM^{10}.

In accordance with the DP&E approved Air Quality Monitoring Program, monitoring for TSP and PM10 was discontinued in June 2012. The monitoring was discontinued following Baal Bone mining operations entering care and maintenance in September 2011, and the completion of coal washing and transporting of coal off-site in December 2011 and April 2012 respectively.

Table 1: Baal Bone Air Quality Impact Assessment Criteria

Pollutant	Averaging period	Criterion	
Deposited dust	Annual	Maximum increase	Maximum total
		2 g/m^2/month	4 g/m^2/month
TSP	Annual	90 $\mu g/m^3$	
PM10	24 hour	50 $\mu g/m^3$	
	Annual	30 $\mu g/m^3$	

The monthly results for each of the monitoring locations are summarised in **Table 2**.

Figure 1 provides the monthly deposited dust results for the year to date. **Figure 2** provides the twelve month rolling average.

Table 2: Deposited dust monitoring results for 2019 (g/m²/month)

Collection Date	EPL Point 7 DM1	EPL Point 13 DM2	EPL Point 14 DM3	EPL Point 15 DM4
3/01/2019	3.0	*	2.3	3.3
4/02/2019	2.4	1.3	3.3	1.4
6/03/2019	3.8	1.2	1.5	1.2
3/04/2019	1.0	0.7	1.2	1.7
2/05/2019	2.4	3.8	0.9	0.5
29/05/2019	0.6	1.2	0.6	0.5
26/06/2019	12.1	1.2	0.9	0.6
24/07/2019	1.1	0.5	0.4	0.3
22/08/2019	0.5	0.1	0.3	0.2
25/09/2019	1.8	1.4	1.4	1.2
23/10/2019	0.8	1.0	1.2	0.8
20/11/2019	2.2	3.1	1.7	1.9
19/12/2019	1.2	1.9	2.0	1.4

*January 2019 sample collected, however sample subsequently lost by laboratory during analysis.

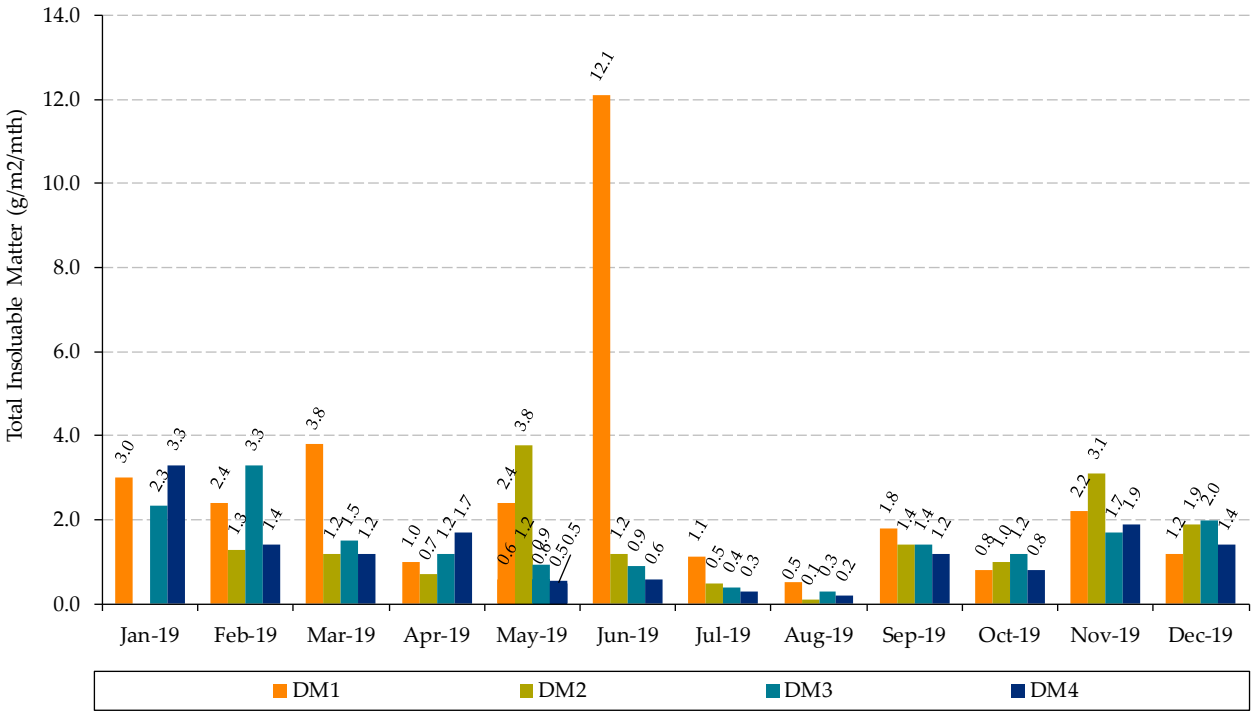

Figure 1: Monthly Total Insoluble Matter

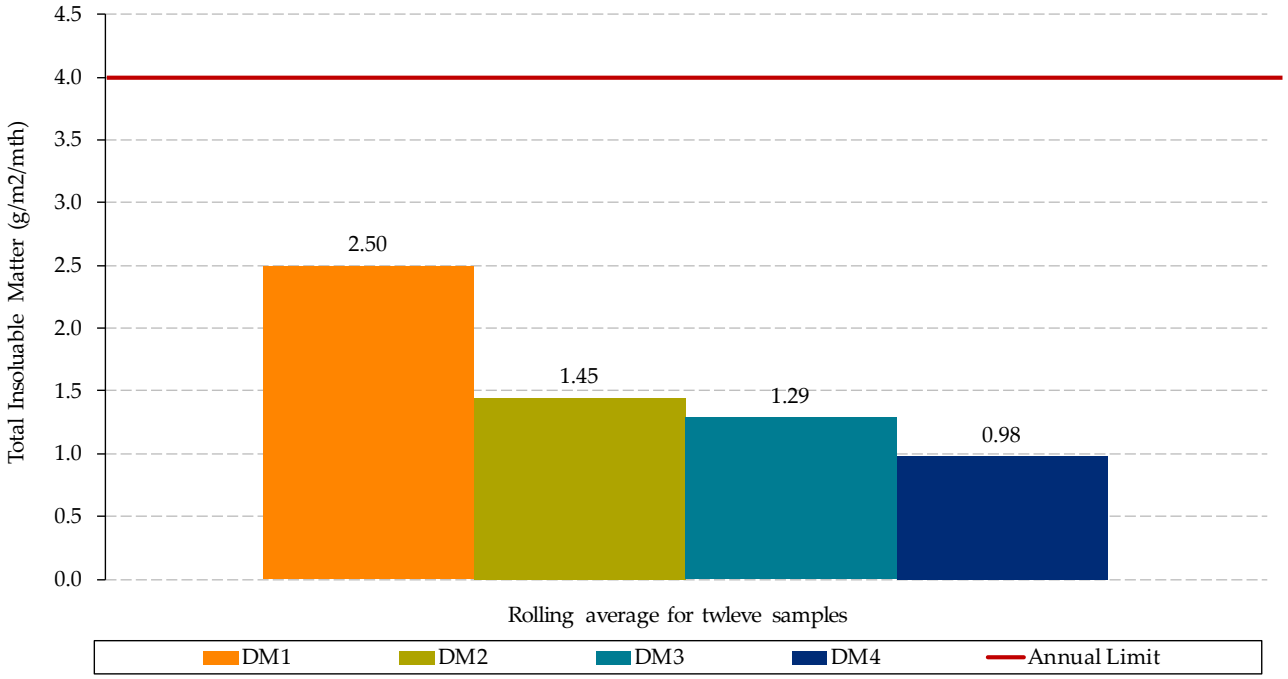

Figure 2: Rolling Average Total Insoluble Matter (12 samples until December 2019)

3. Surface Water

Condition L2 of EPL 765 outlines water concentration limits for oil and grease, pH, total suspended solids and total iron. These limits are presented below in **Table 3.**

Table 3: EPL 765 concentration limits

	LD2	LDP1	WMP1
Oil and grease (mg/L)	-	10	-
pH	-	6.5-8.5	-
Total Suspended Solids (mg/L)	-	50	-
Dissolved Iron (mg/L)	-	1.0	-

The monthly results for each of the monitoring locations are summarised in **Table 4.**

Figure 3 to **Figure 6** provide monthly results for each pollutant.

Table 4: EPL Water quality results for 2019

EPL Point	Month	EC µS/cm	O&G mg/L	SO^{2-}_4 mg/L	Fe mg/L	TSS mg/L	pH -	BOD mg/L	Faecal Coliforms cos/100mls	N mg/L	P mg/L
EPL Point 2 (LD2[a])	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sept	-	-	-	-	-	-	-	-	-	-
	Oct	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-
EPL Point 11 (LDP1)	Jan	1134	<5	295	<0.05	<5	7.7	-	-	-	-
	Feb	1079	<5	256	0.06	5	7.3	-	-	-	-
	Mar	1082	<5	314	<0.05	<5	6.6	-	-	-	-
	Apr	1019	<5	341	<0.05	5	6.8	-	-	-	-
	May	1085	<5	302	<0.05	<5	7.6	-	-	-	-
	Jun	1131	<5	265	<0.05	<5	7.5	-	-	-	-
	Jul	915	<5	267	<0.05	<5	7.8	-	-	-	-
	Aug	1145	<5	315	0.24	<5	7.0	-	-	-	-
	Sept	1076	<5	316	<0.05	<5	7.8	-	-	-	-
	Oct	1103	<5	350	<0.05	<5	7.1	-	-	-	-
	Nov	1059	<5	352	<0.05	<5	7.0	-	-	-	-
	Dec	1119	<5	318	0.1	<5	6.5	-	-	-	-
EPL Point 12 (WMP1[b])	Jan	-	-	-	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-
	Sept	-	-	-	-	-	-	-	-	-	-
	Oct	-	-	-	-	-	-	-	-	-	-
	Nov	-	-	-	-	-	-	-	-	-	-
	Dec	-	-	-	-	-	-	-	-	-	-

Notes **(a)** No samples taken at LD2 during 2019 as sample location was dry
(b) No samples taken at WMP1 during 2019 as sample location was dry

Legend

BOD = Biological oxygen demand
EC = Electrical conductivity
Fe = Iron (dissolved iron)
N = Nitrogen
O & G = Oil and Grease
P = Phosphorus
SO2– = Sulfate4
TSS = Total suspended solids

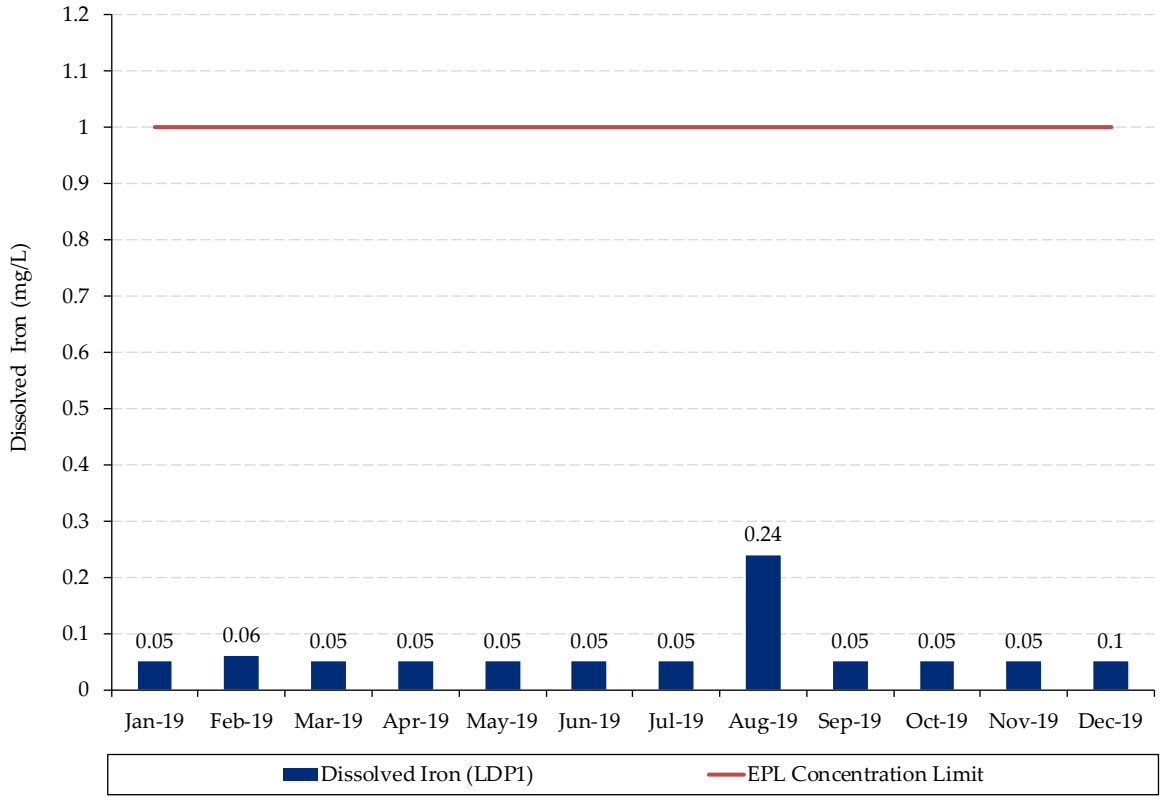

Figure 3: Monthly Dissolved Iron

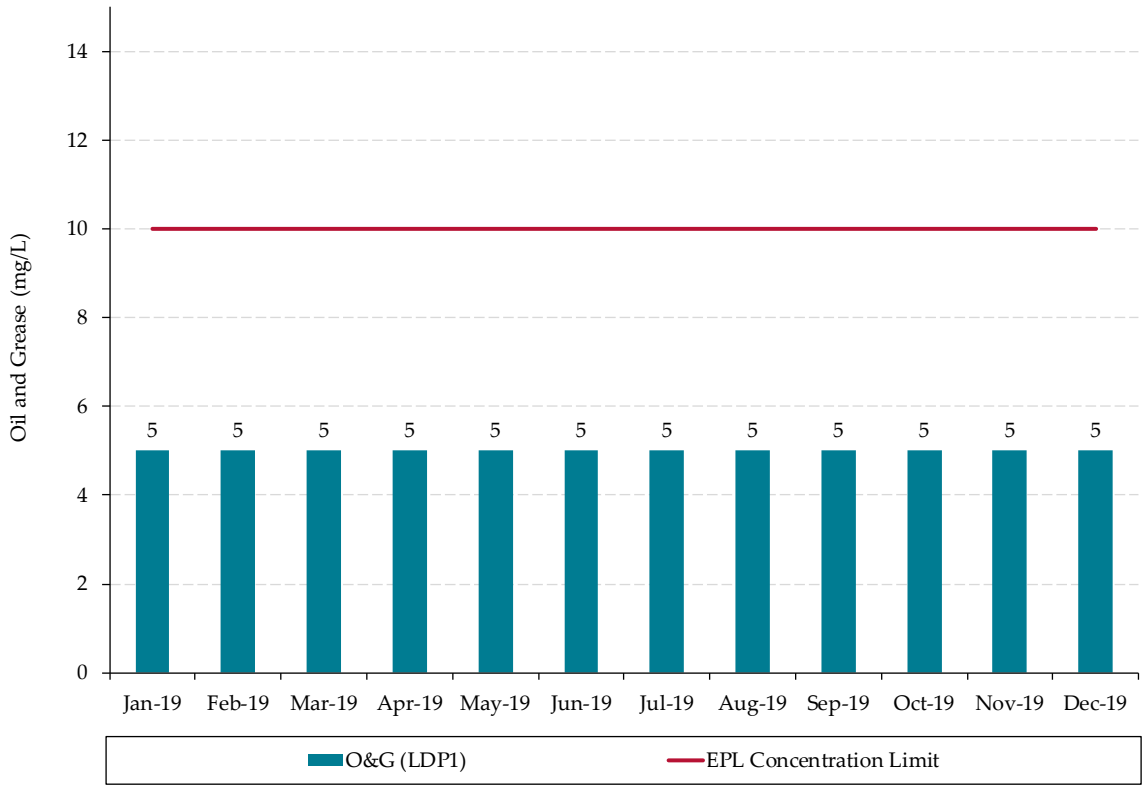

Figure 4: Monthly Oil and Grease

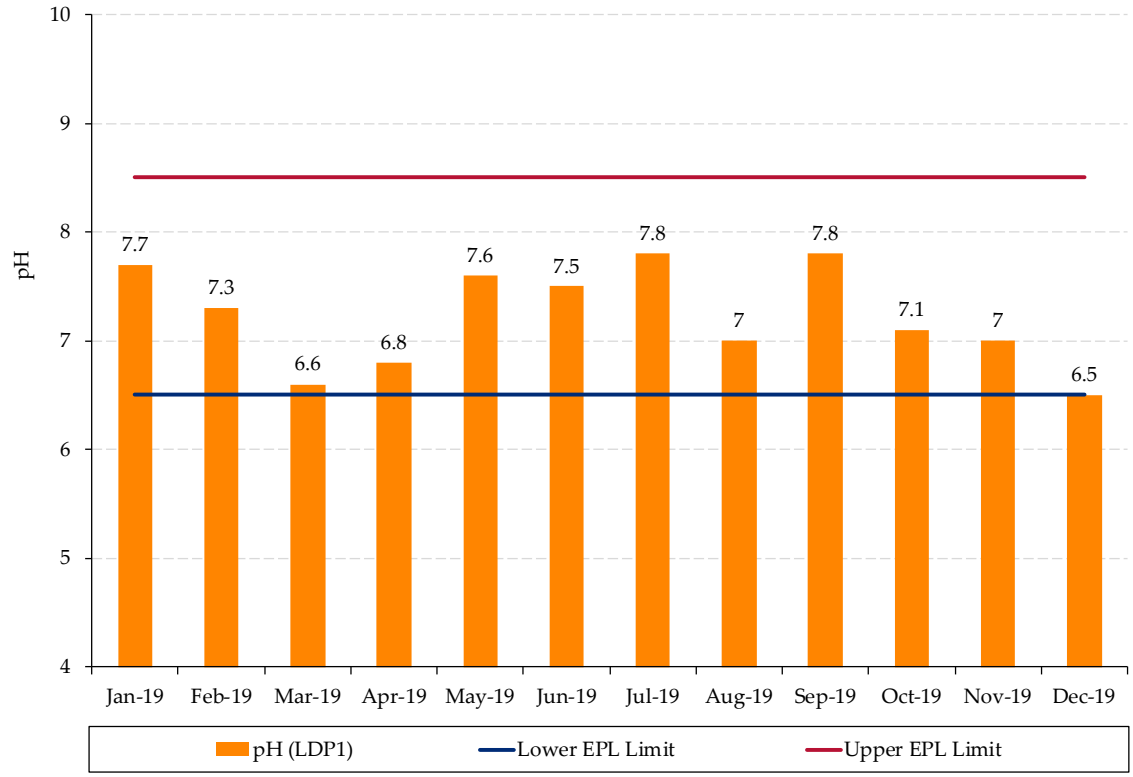

Figure 5: Monthly pH

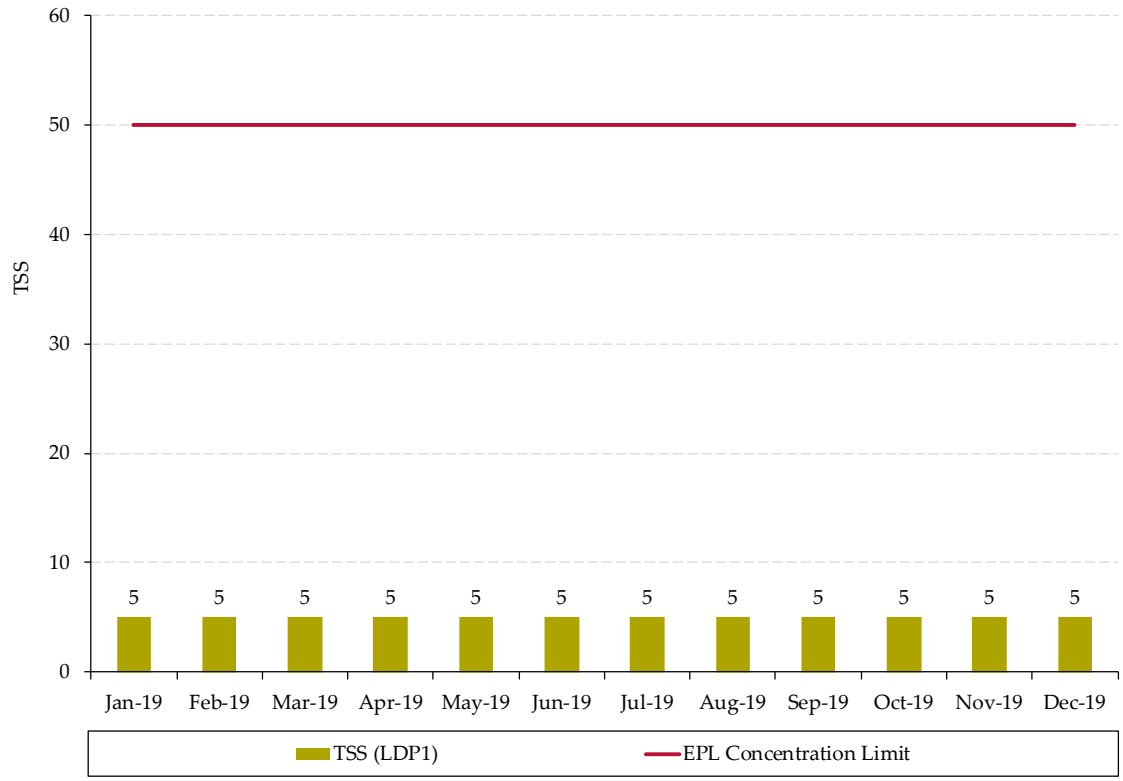

Figure 6: Monthly Total Suspended Solids

Monthly EPL reporting can be accessed at:

http://www.glencore.com.au/en/who-we-are/energy-products/baal-bone/Pages/epl-reporting.aspx

4. Noise

Noise Impact Assessment Criteria

Schedule 3, Condition 4 of Project Approval 09_0178 includes long term noise impact assessment criteria. **Table 5** outlines the assessment criteria.

Table 5: Long term noise impact assessment criteria

Location	All periods dB(a) $L_{Aeq(15\ min)}$	Night dB(a) $L_{A1(1\ min)}$
R1	46	47
R2	41	48
R3	41	48
All other privately-owned land	35	45

From 2013 onwards attended monitoring is undertaken on an annual basis at receptors R1 and R2/R3, shown in **Figure 7**.

Noise Audit Results

Global Acoustics conducted the annual environmental compliance noise audit at Baal Bone Colliery on Tuesday 25 June 2019 during the day, evening and night periods. The next noise audit is scheduled for mid 2020. **Table 6** to **Table 8** provide a summary of the 2019 noise audit results.

Table 6: Noise Audit Summary (Daytime)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	$L_{Aeq15min}$ dB			
Daytime Audit – Tuesday 25 June 2019				
Location R1 (1447 hours)	31	46	dB	In compliance
Location R1 (1502 hours)	26	46	dB	In compliance
Location R2/3 (1532 hours)	<25	41	dB	In compliance
Location R2/3 (1547 hours)	<25	41	dB	In compliance

Table 7: Noise Audit Summary (Evening)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	$L_{Aeq15min}$ dB			
Evening Audit– Tuesday 25 June 2019				
Location R1 (2052 hours)	27	46	dB	In compliance
Location R1 (2107 hours)	26	46	dB	In compliance
Location R2/3 (2132 hours)	<25	41	dB	In compliance
Location R2/3 (2147 hours)	<25	41	dB	In compliance

Table 8: Noise Audit Summary (Night)

Location (Start time)	Measured Predicted Colliery Noise	Limit	Unit	Comments
	$L_{Aeq15min}$ dB			
Night Audit– Tuesday 25 June 2019				
Location R1 (2242 hours)	<25	46	dB	In compliance
Location R1 (2257 hours)	<25	46	dB	In compliance
Location R2/3 (2202 hours)	<25	41	dB	In compliance
Location R2/3 (2217 hours)	<25	41	dB	In compliance

The audit report concluded that:

"Attended monitoring was conducted in accordance with relevant EPA guidelines and Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise'. The duration of each measurement was 15 minutes. The survey purpose is to quantify and describe the existing acoustic environment around BBC and compare results with relevant limits.
Noise levels from BBC complied with the LAeq,15minute and LA1,1minute development consent criteria at all monitoring locations during the June 2019 survey."

The full July 2019 audit report and previous noise audit reports can be accessed from the Baal Bone publications web page at:

http://www.glencore.com.au/en/who-we-are/energy-products/baal-bone/Pages/epl-reporting.aspx

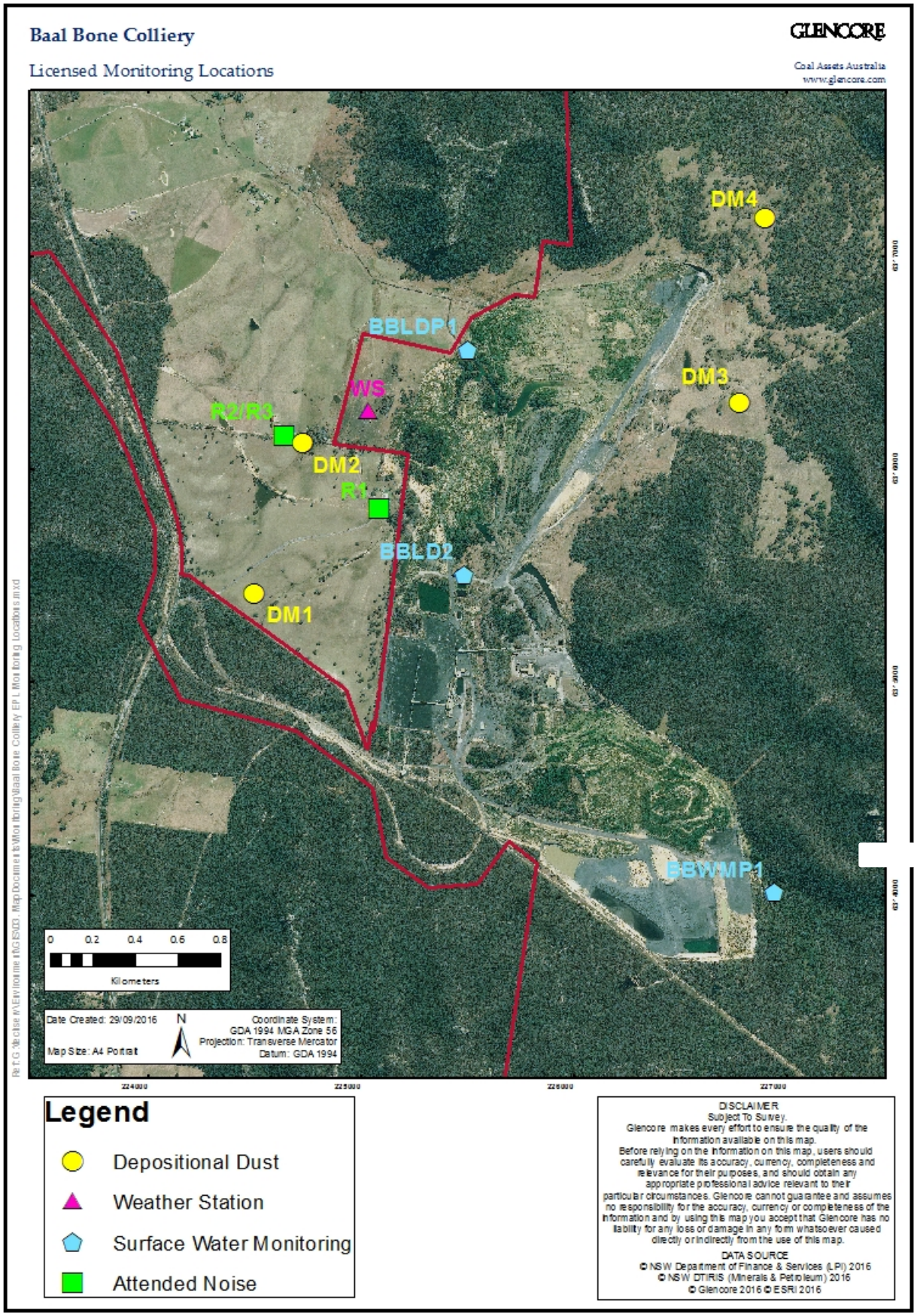

Figure 7. Baal Bone Monitoring Points