

BAAL BONE UNDERGROUND

GLENCORE

Q3 2021 Monitoring Summary July to September 2021



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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 July 2021 to 30 September 2021**. 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.

Sample analysis 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 PM¹⁰.

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	
		Maximum increase	Maximum total
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month
TSP	Annual	90 µg/m ³	
PM10	24 hour	50 µg/m ³	
	Annual	30 µg/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 2021 (g/m²/month)

Collection Date	EPL Point 7 DM1	EPL Point 13 DM2	EPL Point 14 DM3	EPL Point 15 DM4
5-Jan-21	0.8	0.5	0.5	0.3
4-Feb-21	0.6	0.4	0.5	0.4
8-Mar-21	0.4	0.8	0.3	0.1
8-Apr-21	0.6	0.3	0.8	0.5
10-May-21	0.1	0.4	0.4	0.3
8-Jun-21	0.5	0.5	0.6	0.5
7-Jul-21	0.3	0.2	0.2	0.3
5-Aug-21	0.4	0.3	0.3	0.3
6-Sep-21	0.8	0.3	0.3	0.3

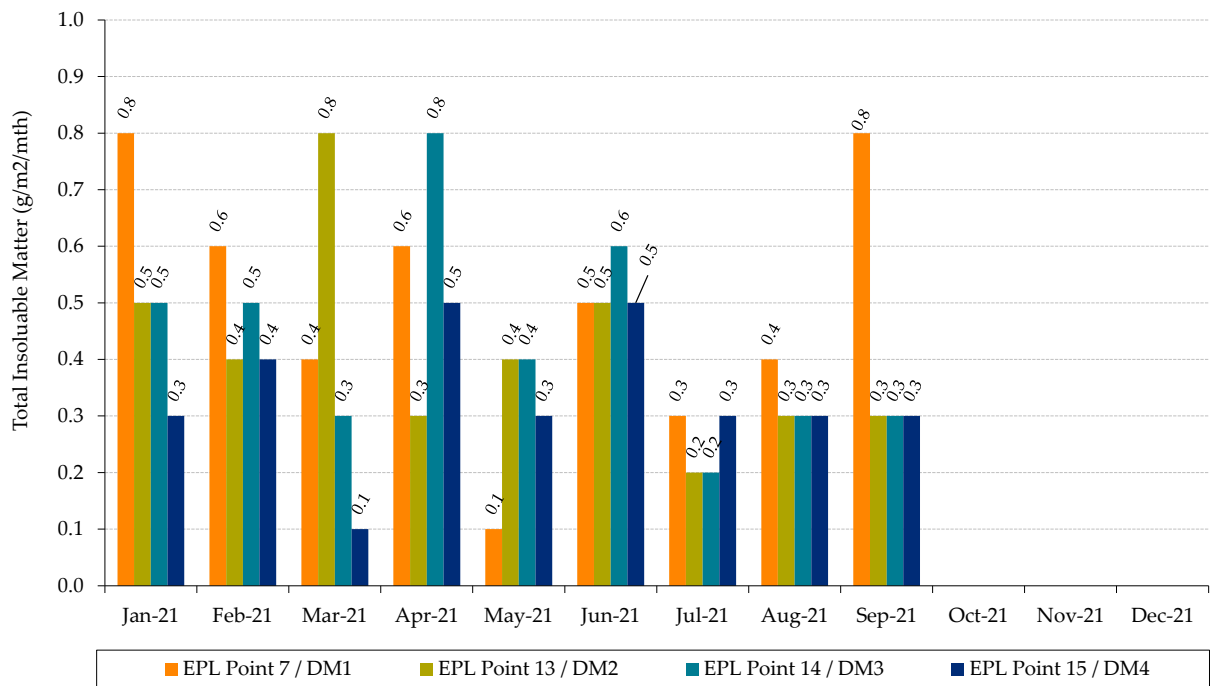


Figure 1: Monthly Total Insoluble Matter

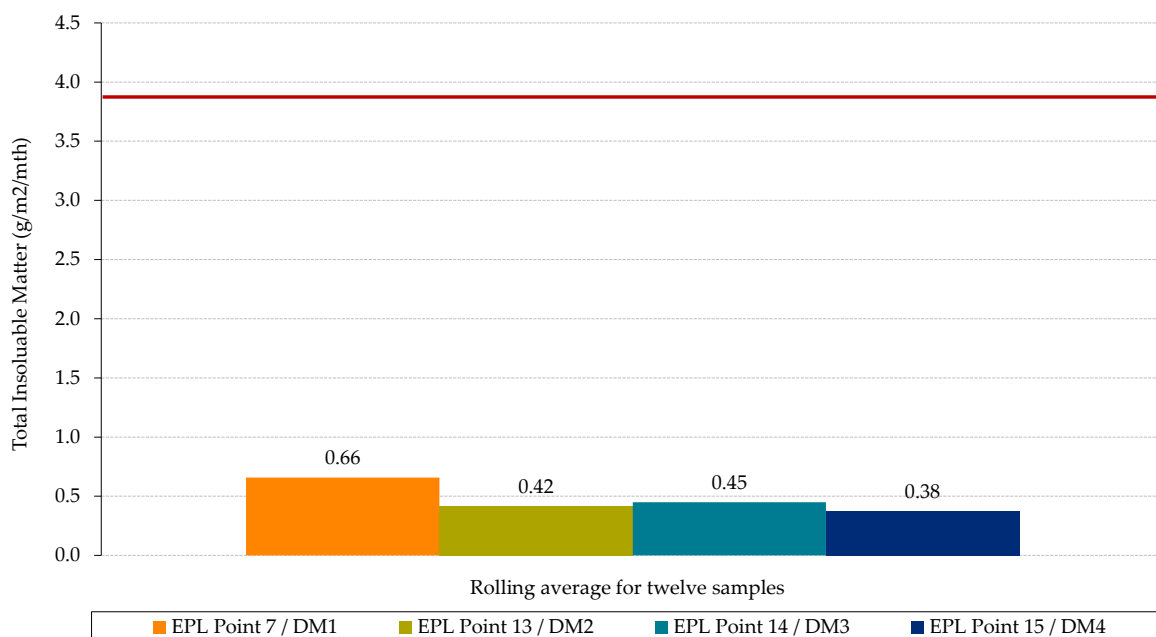


Figure 2: Rolling Average Total Insoluble Matter (12 samples until September 2021)

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

	EPL Monitoring Point 2 (LD2)	EPL Monitoring Point 16 (LDP1)
Oil and grease (mg/L)	-	10
pH	-	6.5-8.5
Total Suspended Solids (mg/L)	-	50
Dissolved Iron (mg/L)	-	1.0

Note: On 22/06/21 the EPA issued a Notice of Variation of Licence No. 765 which removed the requirement to conduct water sampling at LD2. As a part of mine closure works at Baal Bone Colliery, the sewerage treatment plant has been removed from the site, and the transpiration bed area reshaped and rehabilitated. As such the EPA removed EPA Identification Point 2 from the licence along with all associated monitoring requirements for that point.

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 2021

EPL Point	Month	EC	O&G	SO ²⁻ ₄	Fe	TSS	pH	BOD	Faecal Coliforms	N	P	
		uS/cm	mg/L	mg/L	mg/L	mg/L	-	mg/L	cos/100mls	mg/L	mg/L	
EPL Point 2 (LD2 ^a)	Jan	-	-	-	-	-	-	-	-	-	-	
	Feb	-	-	-	-	-	-	-	-	-	-	
	Mar	-	-	-	-	-	-	-	-	-	-	
	Apr	-	-	-	-	-	-	-	-	-	-	
	May	-	-	-	-	-	-	-	-	-	-	
	Jun	-	-	-	-	-	-	-	-	-	-	
	Jul	Removed from EPL 765										
	Aug											
	Sep											
EPL Point 16 (LDP1)	Jan	630	<5	297	<0.05	9.0	6.7	-	-	-	-	
	Feb	720	<5	320	1.65	11.0	6.7	-	-	-	-	
	Mar	992	<5	462	3.21	22.0	6.2	-	-	-	-	
	Apr	601	<5	345	0.86	<5	7.0	-	-	-	-	
	May	794	<5	316	1.32	<5	6.6	-	-	-	-	
	Jun	No flow							-	-	-	-
	Jul	No flow							-	-	-	-
	Aug	No flow							-	-	-	-
	Sep	No flow							-	-	-	-

Notes (a) No samples taken at LD2 during H1 2021 to date as sample location was dry.

Legend

BOD = Biological oxygen demand

N = Nitrogen

SO₂- = Sulfate₄

EC = Electrical conductivity

O & G = Oil and Grease

TSS = Total suspended solids

Fe = Iron (dissolved iron)

P = Phosphorus

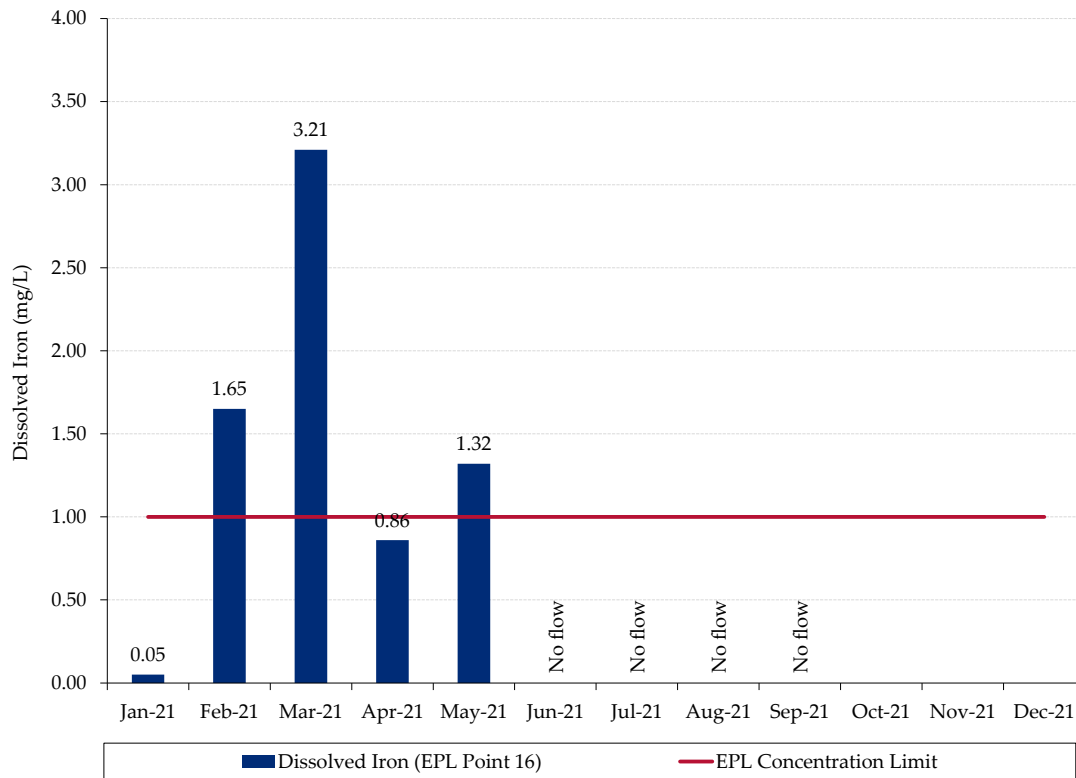


Figure 3: Monthly Dissolved Iron

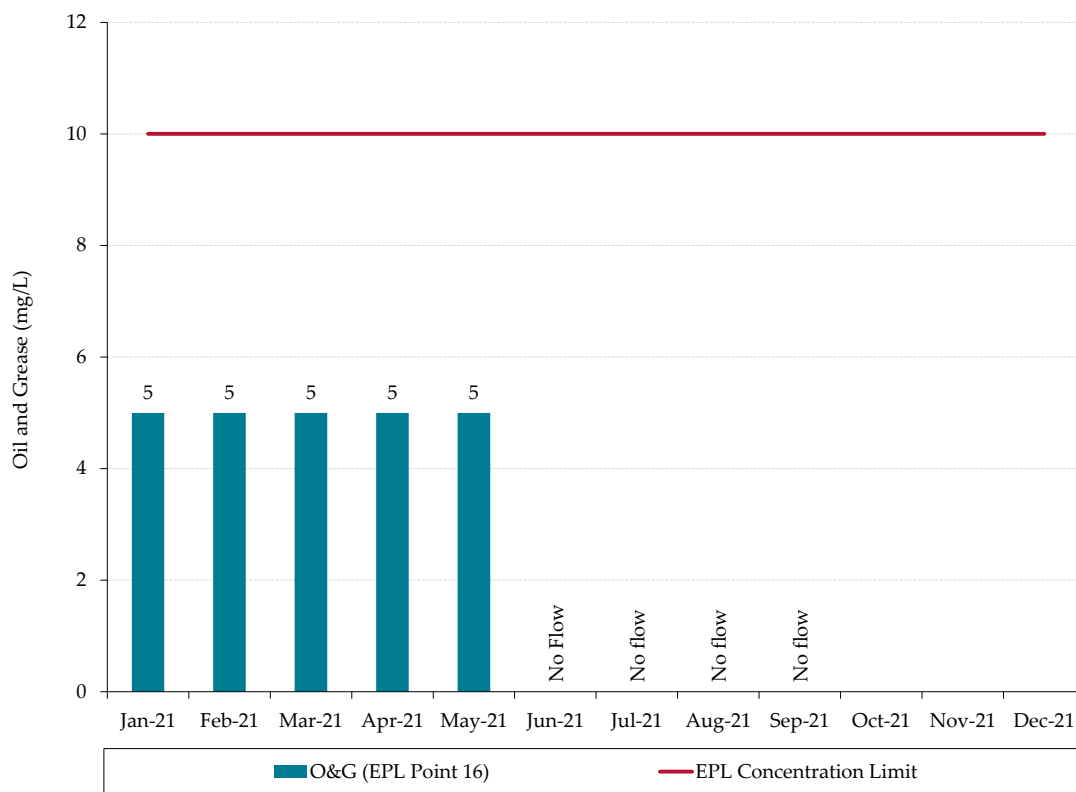


Figure 4: Monthly Oil and Grease

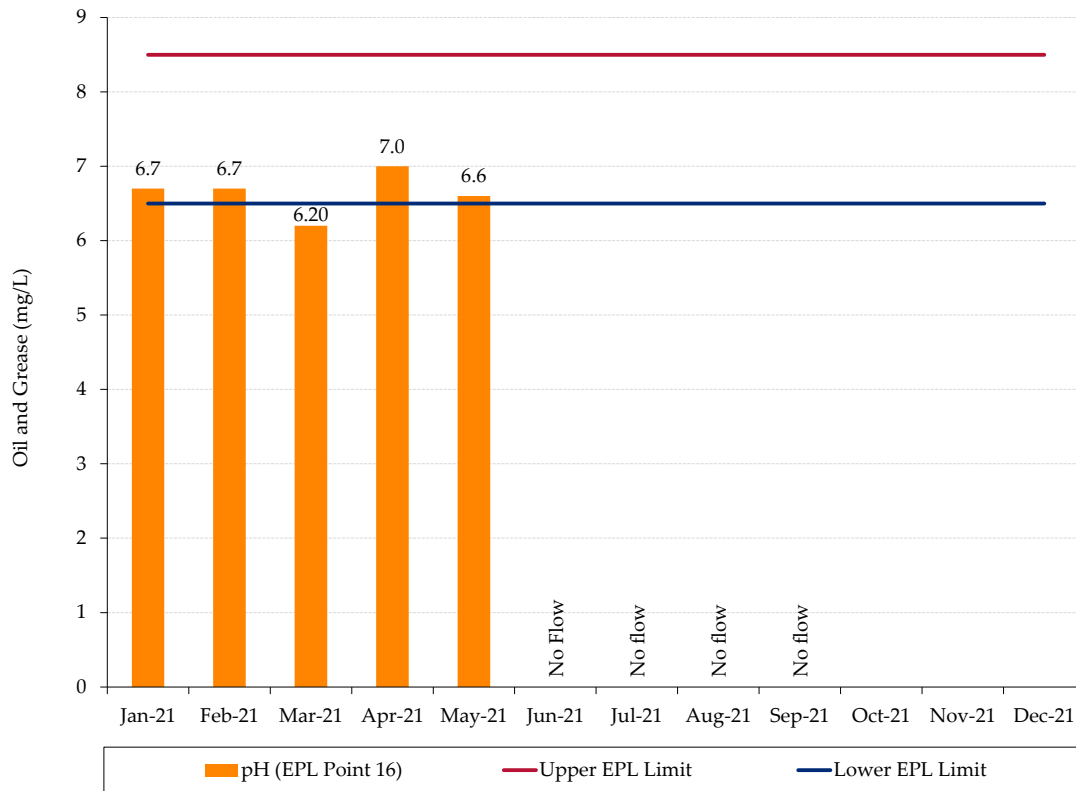


Figure 5: Monthly pH

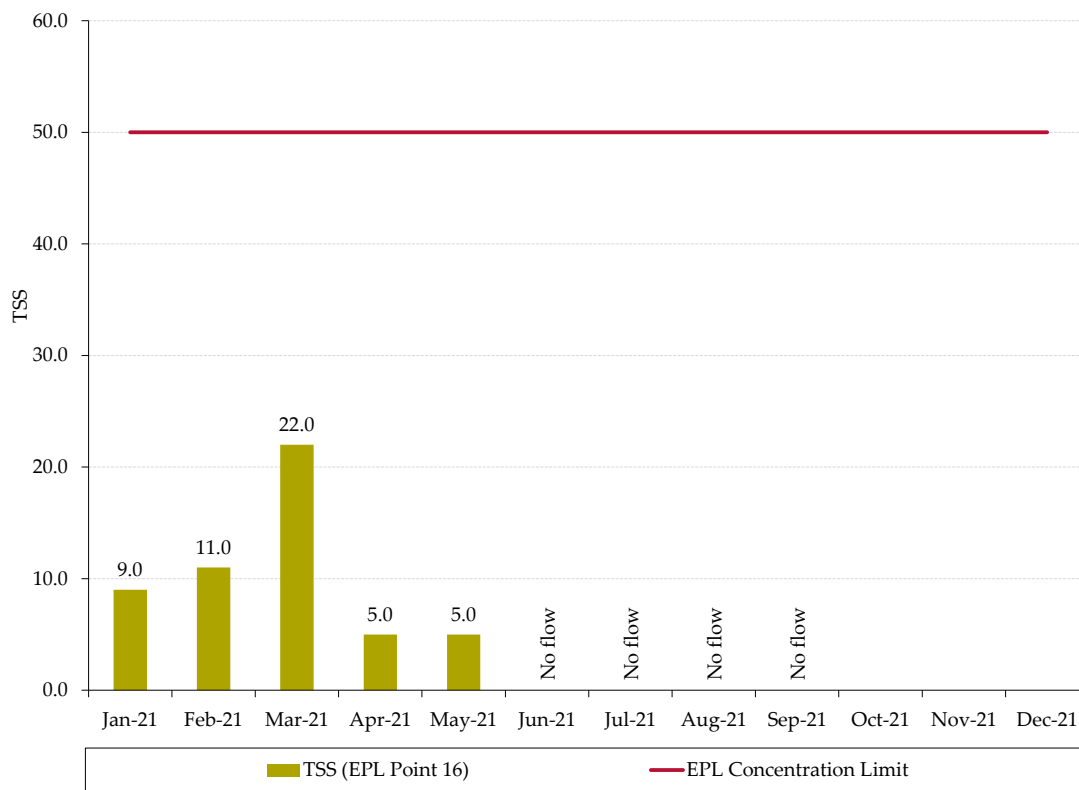


Figure 6: Monthly Total Suspended Solids

A summary of monitoring results for EPL discharge and monitoring points (those with specified concentration limits) can be found below for the 2021 reporting period to date:

- All monthly TSS results were below the EPL concentration limit of 50 mg/L; and
- All Oil and grease levels were below the EPL concentration limit of 10 mg/L.
- February, March and May 2021 results for dissolved iron exceeded the EPL limit of 1mg/L with readings of 1.65 mg/L, 3.21 mg/L and 1.32 mg/L respectively.
- March 2021 sample returned a pH reading of 6.2 which is outside of the pH concentration limits.
- From June to September 2021, there was no flow at EPL Point 16 (LDP1) during monthly sampling events – as such no samples were able to be taken.

Management actions in response to pH and dissolved iron readings outside of EPL concentration limits:

- An external consultant: Gauge Scientific has been commissioned and has provided a report to Baal Bone Colliery investigating the iron exceedances, and providing monitoring and management recommendations;
- Gauge Scientific has advised that the increased iron concentrations have not caused material harm to the environment;
- Water sampling frequency at LDP16 has been increased to weekly (when flowing);
- Additional monitoring points have been implemented around the suspected source of increased iron concentrations; and
- Written notifications were provided to the EPA on 26 April 2021 and 16 June 2021.

Note: Monthly EPL reporting can be accessed at: [Reporting documents - Baal Bone Colliery \(glencore.com.au\)](http://glencore.com.au).

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) $L_{Aeq}(15 \text{ min})$	Night dB(a) $L_{A1}(1 \text{ min})$
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 18 August 2021 during the day, evening and night periods. **Table 6** to **Table 8** provide a summary of the 2021 noise audit results.

Table 6: Noise Audit Summary (Daytime)

Location (Start time)	Measured Predicted BBC Noise	Limit	Unit	Comments
	L_{Aeq15min} dB			
Daytime Audit – 18 August 2021				
Location R1 (1651 hours)	32	46	dB	In compliance
Location R1 (1707 hours)	30	46	dB	In compliance
Location R2/3 (1609 hours)	<25	41	dB	In compliance
Location R2/3 (1626 hours)	<20	41	dB	In compliance

Table 7: Noise Audit Summary (Evening)

Location (Start time)	Measured Predicted BBC Noise	Limit	Unit	Comments
	L_{Aeq15min} dB			
Evening Audit– 18 August 2021				
Location R1 (1800 hours)	<20	46	dB	In compliance
Location R1 (1815 hours)	IA	46	dB	In compliance
Location R2/3 (2118 hours)	IA	41	dB	In compliance
Location R2/3 (2136 hours)	IA	41	dB	In compliance

Table 8: Noise Audit Summary (Night)

Location (Start time)	Measured Predicted BBCNoise	Limit	Unit	Comments
	L_{Aeq15min} dB			
Night Audit– 18 August 2021				
Location R1 (2241 hours)	<20	46	dB	In compliance
Location R1 (2257 hours)	IA	46	dB	In compliance
Location R2/3 (2200 hours)	IA	41	dB	In compliance
Location R2/3 (2216 hours)	IA	41	dB	In compliance

The audit report concluded that:

“Attended environmental noise monitoring described in this report was undertaken during the day, evening, and night periods of 18 August 2021. The purpose of the survey is to quantify and describe the acoustic environment around the site and compare with specified limits.

There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (July 2020).

Noise levels from BBC complied with the relevant noise limits during the August 2021 survey. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.”

The full August 2021 audit report and previous noise audit reports can be accessed from the Baal Bone publications web page at: [Reporting documents - Baal Bone Colliery \(glencore.com.au\)](https://www.glencore.com.au/reporting-documents-baal-bone-colliery).

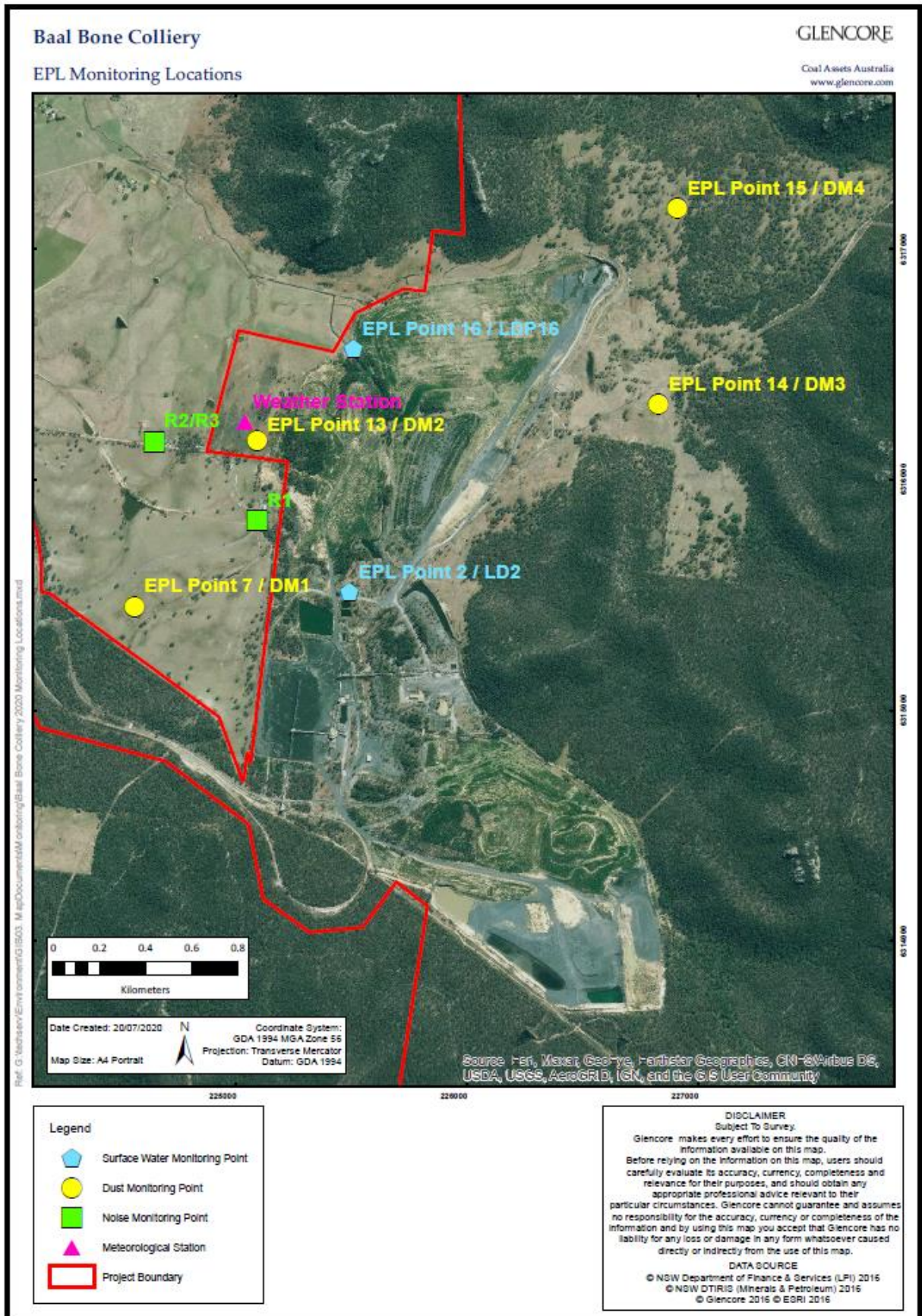


Figure 7: Baal Bone Colliery EPL Monitoring Points