Gerroa Sand Quarry

Noise Monitoring Report – June 2023

Background

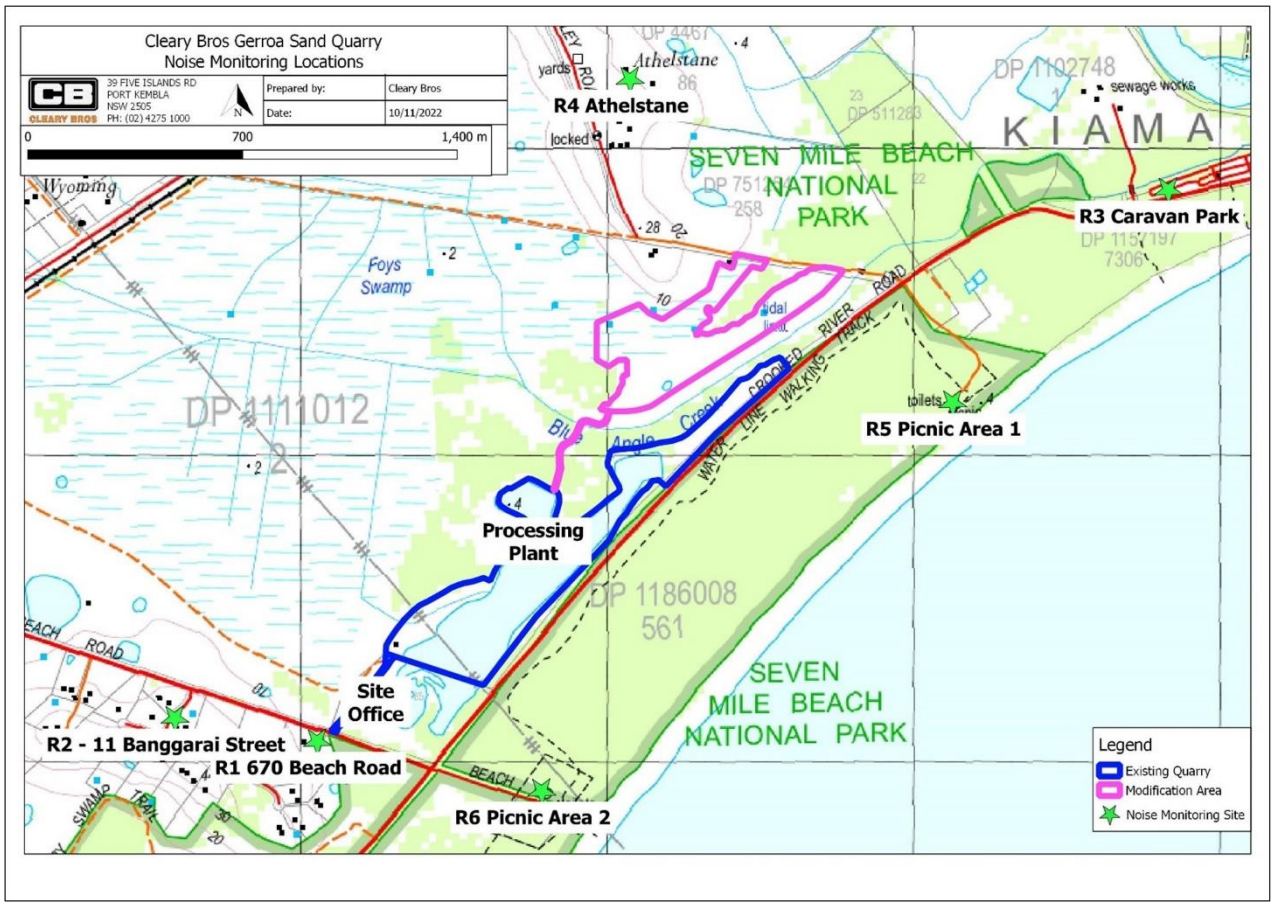
The project approval for the Gerroa Sand Resource (05/0099 Mod 1) requires preparation of a noise monitoring program for the project (schedule 3, condition 4A(c)). The Noise Management Plan (version 1 revision 4, dated 28/11/2022) details the approved noise monitoring program as follows.

Initial noise monitoring is to be undertaken within three months of the commencement of operations in the modification area. Subsequent noise monitoring will be undertaken annually during the winter months. Winter monitoring has been selected as this is the period which was identified as having the greatest likelihood of noise enhancing conditions.

Noise monitoring will be undertaken in accordance with the NSW EPA's Noise Policy for Industry (2017).

Noise monitoring locations are shown in the figure below and are as follows:

- 670 Beach Road (R1);
- 11 Bangarrai Street (R2);
- the Coralea property (as proxy for R4 Athelstane);
- receivers R5 and R6 in Seven Mile Beach National Park; and
- R3 Seven Mile Beach Holiday Park.



Operator attended measurements will be taken to quantify the maximum (LAmax) and the average (LAeq15min) intrusive noise from site activities over a 15 minute measuring period. Measurements are to be taken during the daytime while the site is in normal operation.

All measurements will be made with acoustic instrumentation carrying current NATA or manufacturer calibration certificates. Instrument calibration will be checked before and after each measurement survey.

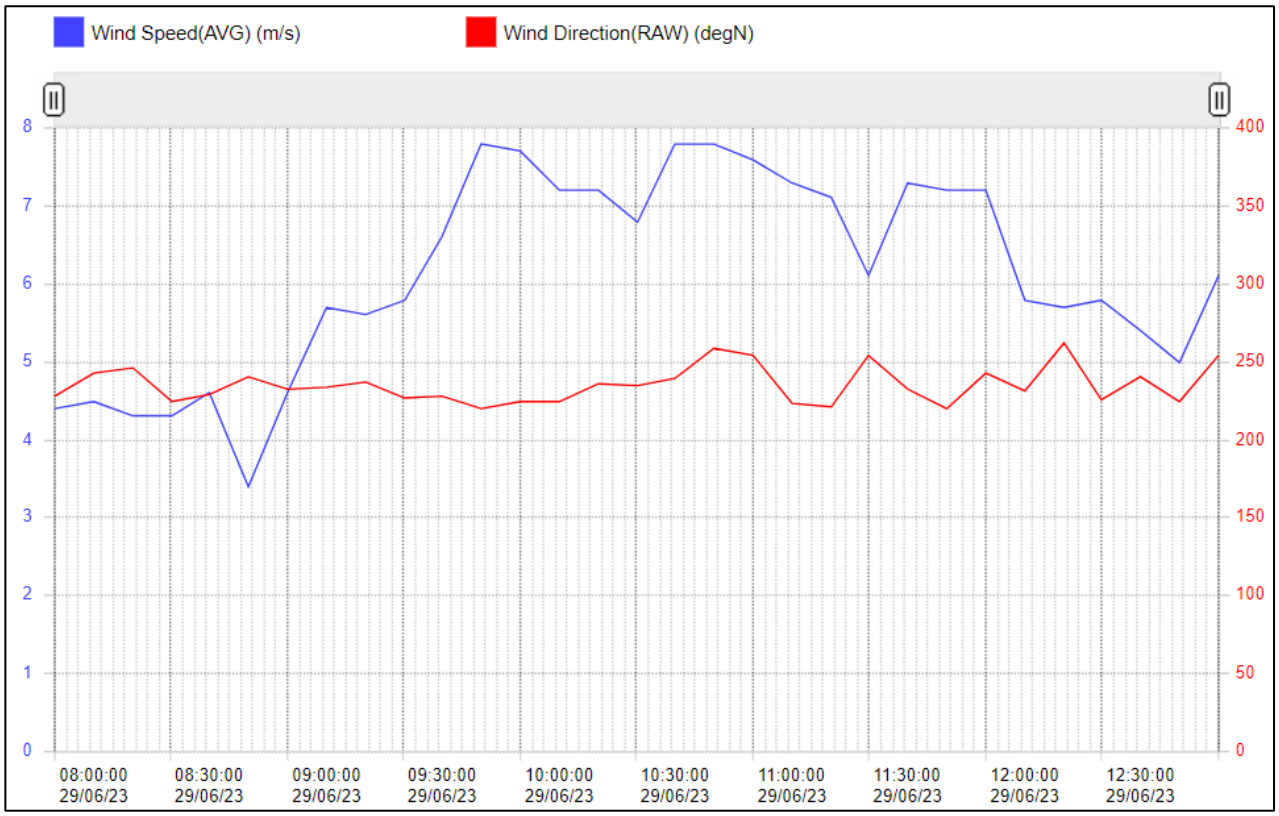
Noise measurements will be undertaken at the most affected point of the receptor boundary for residences, within the clearing at each recreational area, and at the southernmost boundary of the caravan park. Noise monitoring will be scheduled to target periods of calm conditions.

Where applicable the modification factors in Fact Sheet C of the Noise Policy for Industry will be applied to the measured noise level (these factors refer to noise that is tonal, impulsive, intermittent, irregular or with dominant low frequencies).

All noise measurements will be accompanied by qualitative and quantitative measurements of prevailing local weather conditions in line with Section B3 of the Noise Policy for Industry. The operator shall record any significant sand quarry generated noise sources and obtain the operating logs for quarry plant and equipment during the measurement period.

Noise Survey

Noise monitoring in accordance with the above methodology was undertaken on 29th June 2023, which was targeted due to the forecast for fine weather and light south-westerly winds. Meteorological conditions on the day generally aligned with the targeted conditions, although wind speeds increased to moderate at times during the survey. The below extract from the on-site weather station for the period of monitoring shows the average wind speed and direction during the period of monitoring.



Measurements were recorded using the Cirrus Optimus C171C logger, with Cirrus MK224 microphone, a Class 1 instrument (last calibrated 18/11/2021). The microphone was mounted on a mast 1.4m high, with a wind sock employed. The unit was field calibrated before and after each measurement. The closest publicly accessibly location to the receiver was chosen in each case, generally in a direct line to the site to the quarry. The only exception to this was for R3 (Athelstane), where monitoring was conducted approximately 200m south of the receiver on Cleary Bros property, and in a direct line between Athelstane and the quarry. Project-related noise levels at the receiver would be no greater than that recorded at the monitoring site in this instance. All monitoring was conducted by Mark Hammond, Quality and Environment Manager for Cleary Bros.

Operations at the quarry during the period of monitoring included continuous use of one large loader (Cat 972), one grader (Cat 12G), dredge and booster pump. In addition, 4 truck and dogs entered the site and departed with a load of sand. The loader was in operation in the processing area, while the grader, dredge, and booster pump were operating in the modification area.

Noise from quarry related activities was not detected at any of the monitoring sites at any time with the exception of site R4 (Athelstane). At this site, the grader was occasionally audible as a contributing noise source, however was never the dominant noise source. The dominant noise source at most sites was attributable to wind blowing in adjacent trees. At sites R3 (Caravan Park) and R5 (Gerroa Picnic Area) ocean waves were the dominant noise component, with wind noise in trees also contributing to the noise environment. Sites R1, R2, and R3 all experienced significant contributions from vehicles on adjacent roads (not related to quarry activities or road transport), which generally dictated the average noise levels for these sites. Other minor noise contributions included bird noise and light aircraft noise. A summary of noise levels recorded at each site and the compliance status of the Gerroa Sand Quarry is included in the table below.

ID	Location	Measured Noise Levels				Criteria	Compliant
		Background L_{A90}	Average L_{Aeq}	Maximum L_{Amax}	Quarry contribution	$dBA_{eq\text{-}15\ min}$	Yes/No
R1	670 Beach Road	36.7	63.8	84.0	Not audible	41	Yes
R2	11 Banggarai St	38.6	48.2	73.7	Not audible	40	Yes
R3	Caravan Park	43.5	52.1	69.8	Not audible	36	Yes
R4	Athelstane	40.6	45.9	63.3	Grader faintly audible (<36 dB(A))	40	Yes
R5	Picnic Area 1	44.9	48.0	63.3	Not audible	40	Yes
R6	Picnic Area 2	43.2	45.6	58.0	Not audible	40	Yes

Record sheets from each site are included at the end of the report, along with graphs showing the variations in noise levels throughout each 15 minute sample.

Summary

The Gerroa Sand Quarry complied with the noise criteria of the Noise Management Plan and Development Consent, with the site inaudible at all locations during the period of monitoring. The next monitoring episode is scheduled for Winter 2024.

Report Prepared by:

Mark Hammond

Quality and Environment Manager

4/7/2023

Noise Monitoring Location	R1
Noise Monitoring Address	670 Beach Road
Wind Speed and Direction	Light SW breeze
Meteorological Conditions	Clear, sunny
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed at entrance to property on Beach Road, approximately opposite entrance to quarry.

Noise dominated by wind blowing in the trees, varying between 35 to 44 dBA, interspersed with regular road traffic noise, rising to up to 84 dBA as vehicles passed near monitor. The Gerroa Sand Quarry was not audible at this location during the measurement.

Recorded Noise Levels(LA_{max}):

- Wind in trees: 44 dBA
- Local traffic (Beach Rd): cars to 84 dBA
- Birds: mostly up to 45 dBA, once to 60 dBA
- Traffic on Gerroa Road: 34 dBA
- Waves at beach: 34 dBA

Map of Noise Monitoring Location

GPS location: 34.78895°S, 150.77122°E

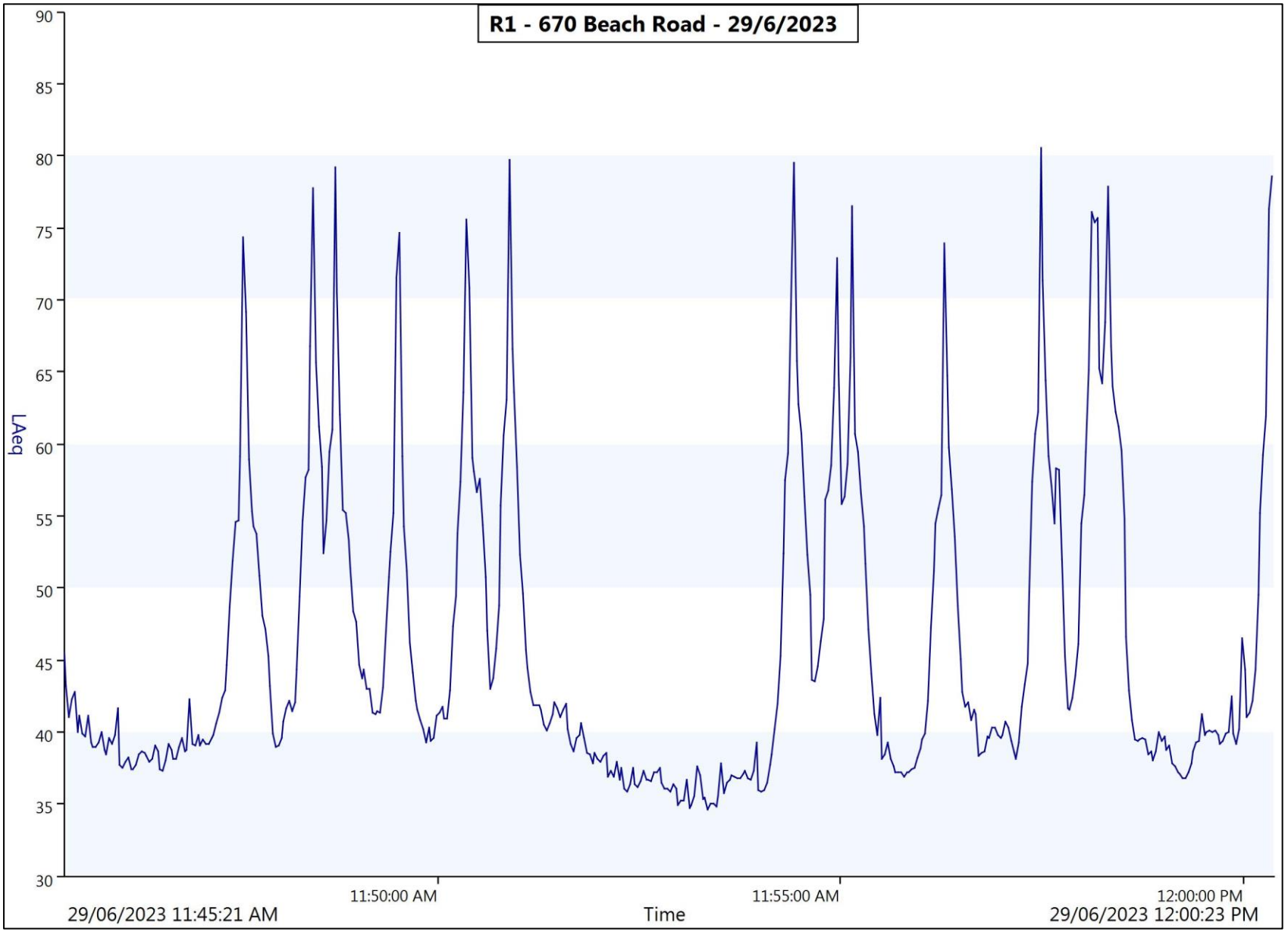
Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	11:45	12:00	36.7	63.8	84.0

Photo of Noise Monitoring Location



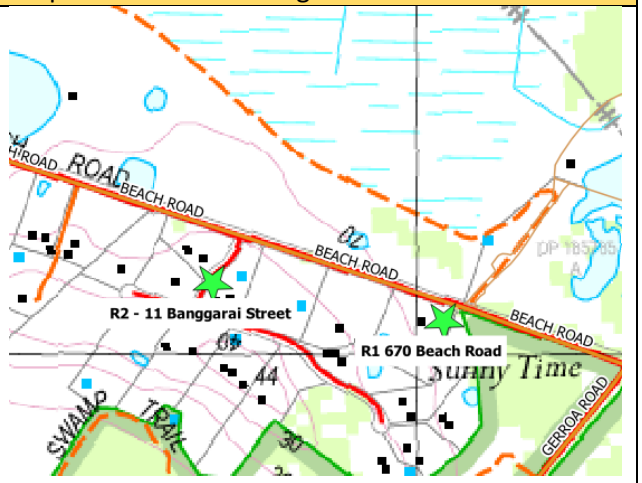
Short-term peaks generally represent local road traffic on Beach Road. Outside of these periods noise levels are dominated by wind in trees.

Noise Monitoring Location	R2
Noise Monitoring Address	11 Banggarai Street
Wind Speed and Direction	Moderate SW wind
Meteorological Conditions	Clear, sunny
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed on back entrance to property on Banggarai St, 40m south of Beach Road.
Noise dominated by wind in trees, varying between 38 to 48 dBA, interspersed with semi-regular road traffic noise, rising to up to 73 dBA as vehicles passed on Beach Road. Birds also regularly audible between 44 to 56 dBA. The Gerroa Sand Quarry was not audible at this location during the measurement.
Recorded Noise Levels(LA_{max}):

- Wind in trees: 48 dBA
- Birds: 56 dBA
- Local traffic (Beach Rd): cars up to 73 dBA

Map of Noise Monitoring Location



GPS location: 34.78799°S, 150.76641°E

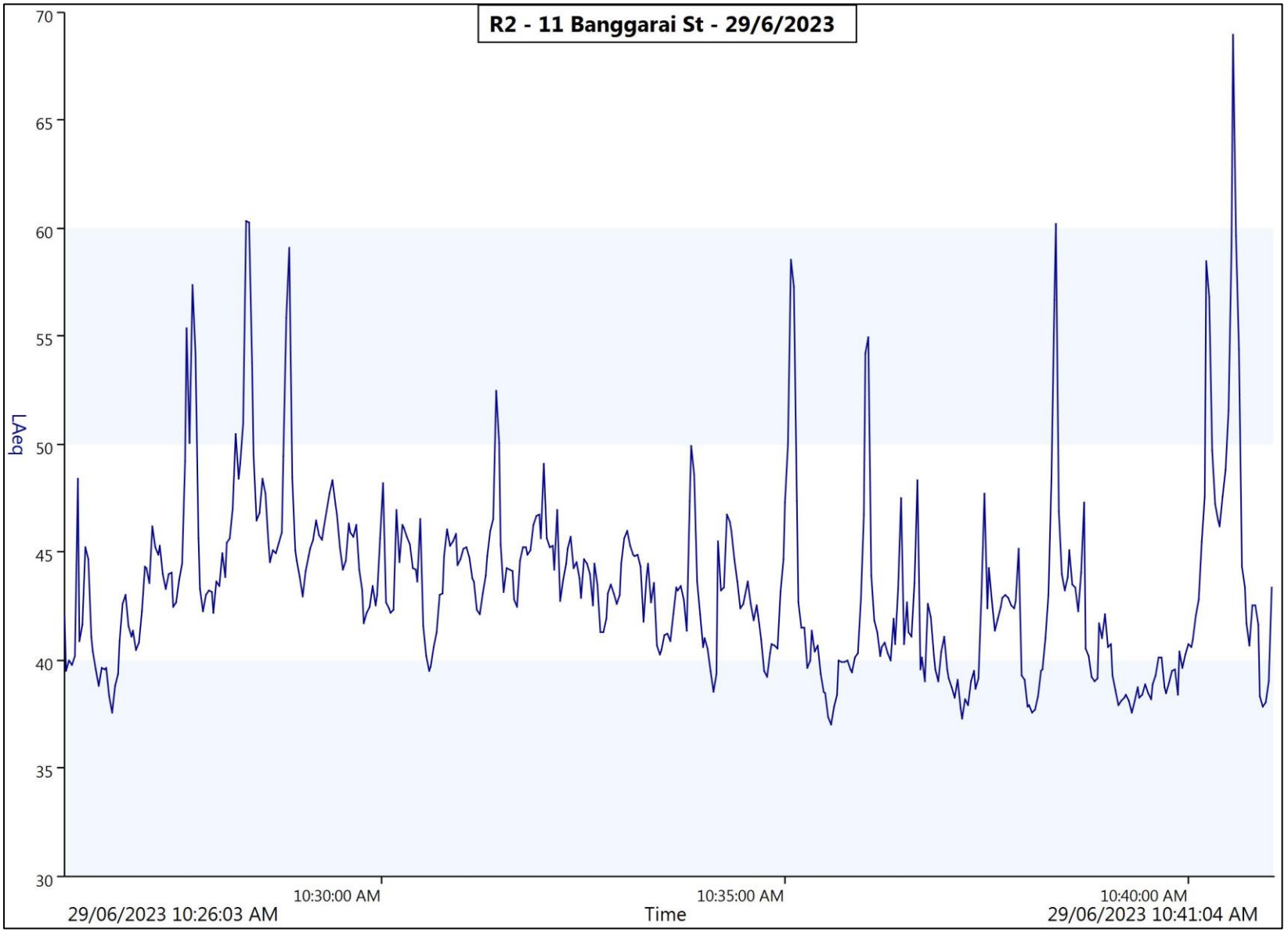
Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	10:26	10:41	38.6	48.2	73.7

Photo of Noise Monitoring Location



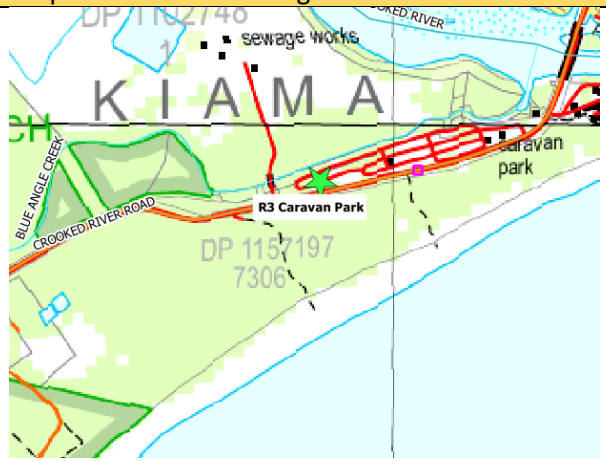
Short-term peaks >50 dB(A) generally represent local road traffic on Beach Road. Outside of these periods noise levels are dominated by wind in trees, with some contribution from birds (generally sharp peaks <50dB(A)).

Noise Monitoring Location	R3
Noise Monitoring Address	Caravan Park
Wind Speed and Direction	Light westerly breeze
Meteorological Conditions	Sunny, clear
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed on STP access road immediately east of bridge over Blue Angle Creek, approximately 35m west of Gerroa Road.
Noise dominated by ocean noise/waves, very constant between 42 to 45 dBA, interspersed with regular road traffic noise on Gerroa Road, climbing up to 69 dBA as vehicles passed closest to monitor. The Gerroa Sand Quarry was not audible at this location during the measurement.
Recorded Noise Levels(LA_{max}):

- Ocean/waves: 45 dBA
- Gerroa Road traffic: 69 dBA
- Birds: 47 dBA
- Wind in trees: 49 dBA
- Light plane: <44 dBA

Map of Noise Monitoring Location



GPS location: 34.77369°S, 150.80034°E

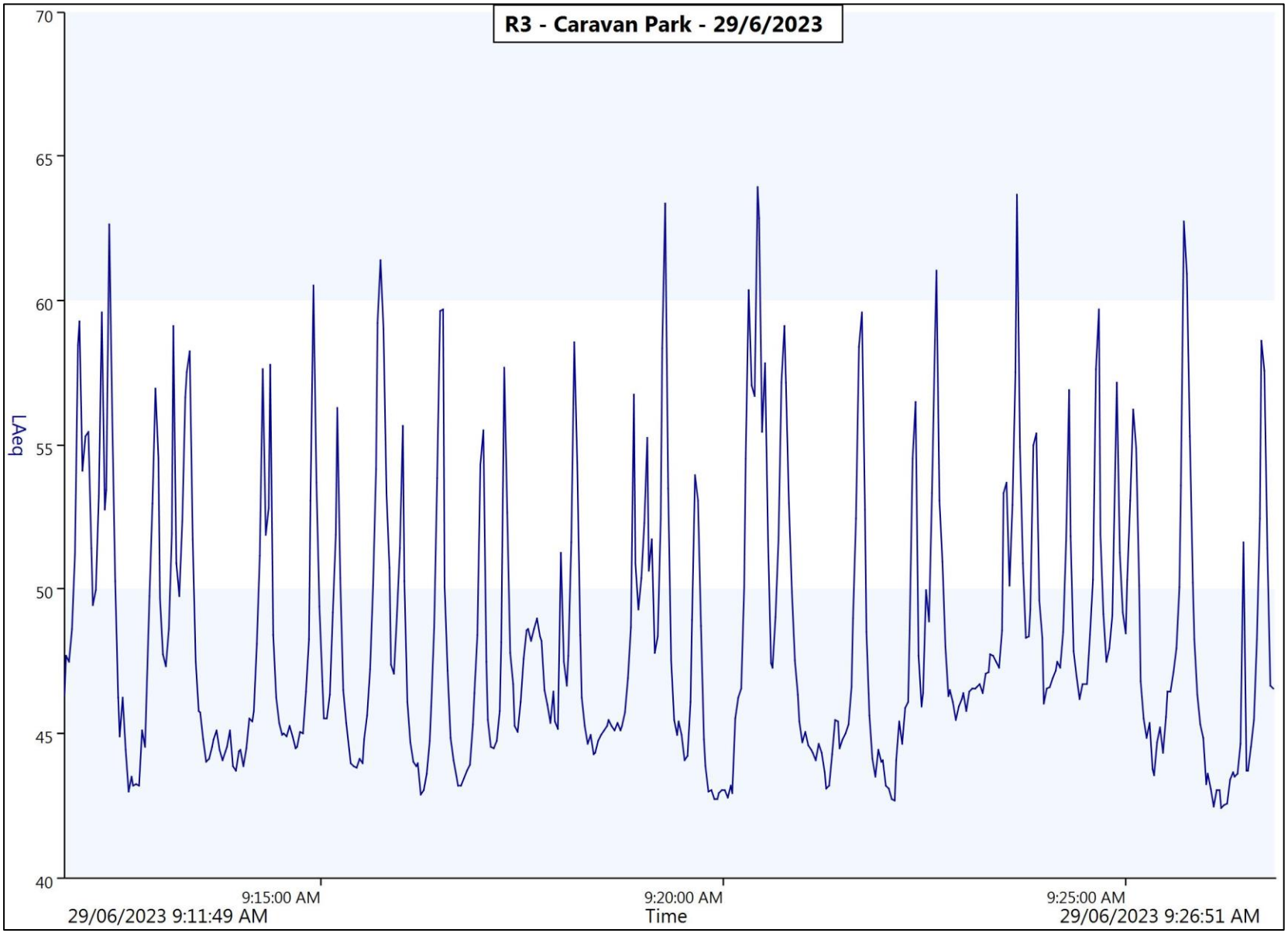
Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	9:11	9:26	43.5	52.1	69.8

Photo of Noise Monitoring Location



Short-term peaks generally represent local road traffic on Gerroa Road. Background levels around 43-46 dB(A) related to waves on Seven Mile Beach. Higher background levels around 46-47 dB(A) common in last 5 minutes related to birds.

Noise Monitoring Location	R4
Noise Monitoring Address	Athelstane
Wind Speed and Direction	Moderate SW wind
Meteorological Conditions	Sunny, clear
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed in paddock southeast of garage at Coralea, 200m south of Athelstane residence. Noise dominated by wind in trees, varying between 37 to 49 dBA. Occasional magpie calls up to 55 dBA. Also one light aircraft audible at up to 57 dBA. The Gerroa Sand Quarry was not faintly audible at times during the assessment, attributable to the grader in operation in the modification area, with an estimated sound level of less than 36 dBA based on the lowest background levels.

Recorded Noise Levels(LA_{max}):

- Wind in trees: 49 dBA
- Birds (magpies): 55 dBA
- Light aircraft: 57 dBA
- Gerroa Sand Quarry: <36 dBA

Map of Noise Monitoring Location

GPS location: 34.77150°S, 150.78260°E

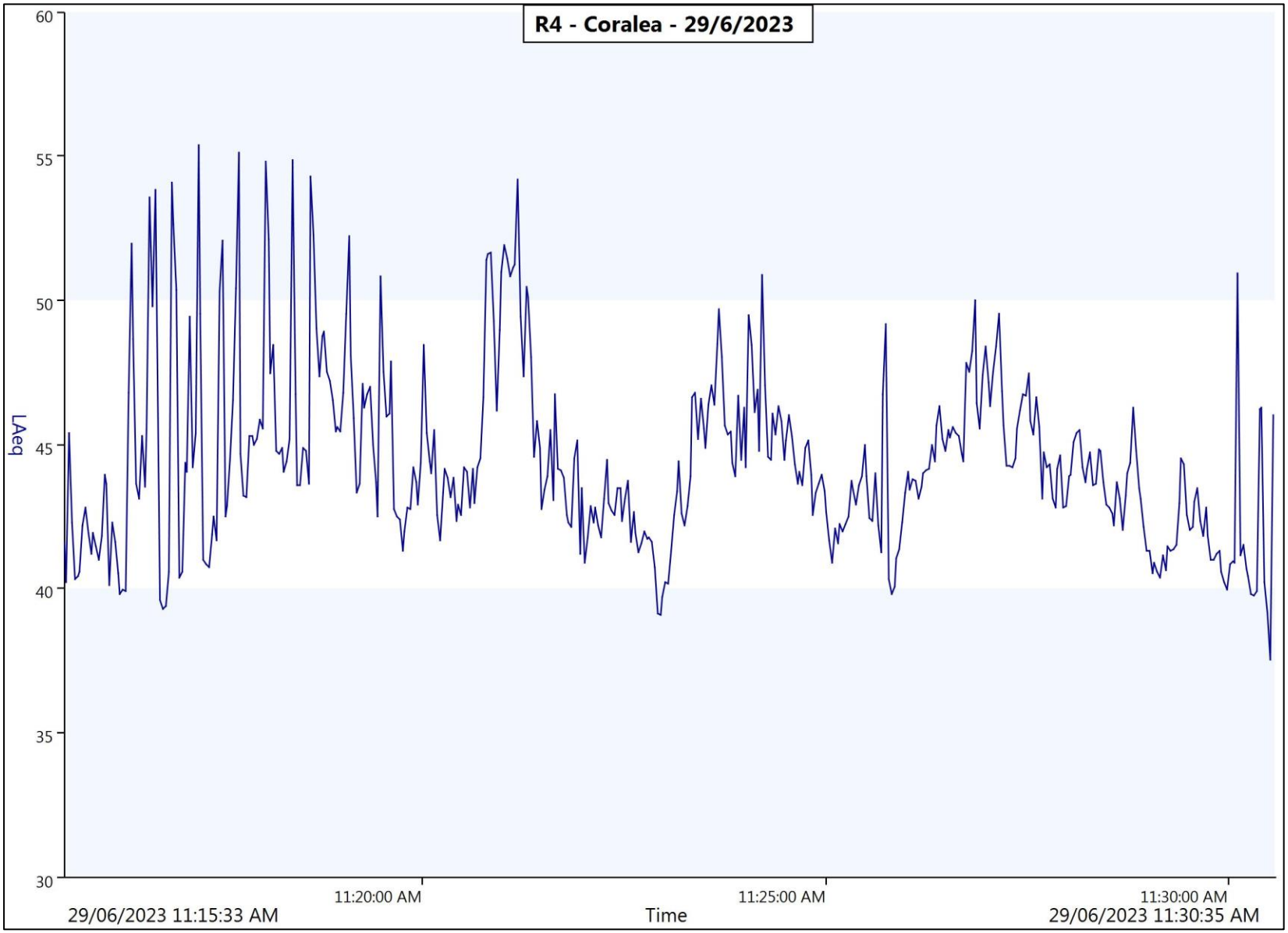
Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	11:15	11:30	40.6	45.9	63.3

Photo of Noise Monitoring Location



Short-term peaks (50-55 dB(A)) mostly in first five minutes of sampling are due to bird calls (mostly magpies). Extended peak around 11:21 related to light aircraft flying in distance. Remaining background noise levels are dominated by wind in trees.

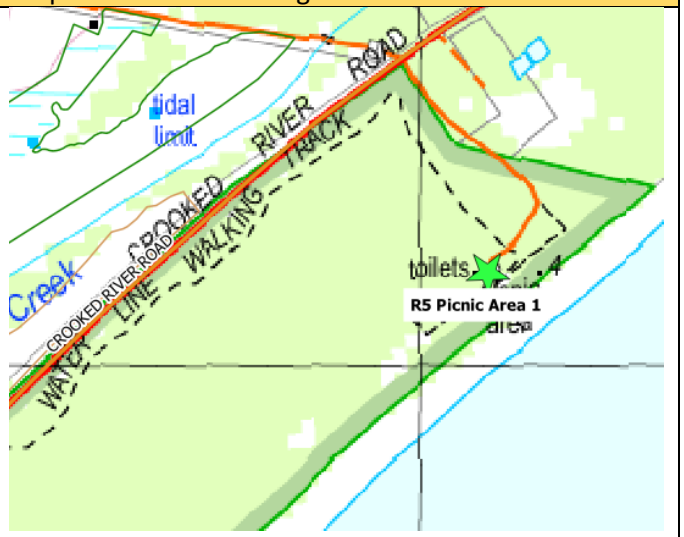
Noise Monitoring Location	R5
Noise Monitoring Address	Picnic Area 1
Wind Speed and Direction	Moderate westerly breeze
Meteorological Conditions	Sunny, clear sky, shaded site
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed near toilet block at end of access road, approximately 400m SE of Gerroa Road. Noise dominated by ocean noise/waves, very constant between 45 to 47 dBA, with wind in tree noise also contributing at times, generally <45 dBA but occasionally up to 48 dBA. The Gerroa Sand Quarry was not audible at this location during the measurement.

Recorded Noise Levels(LA_{max}):

- Ocean/waves: 47 dBA
- Wind in trees: 48 dBA
- Birds: 48 dBA
- Light plane: 61 dBA

Map of Noise Monitoring Location



GPS location: 34.77960°S, 150.79374°E

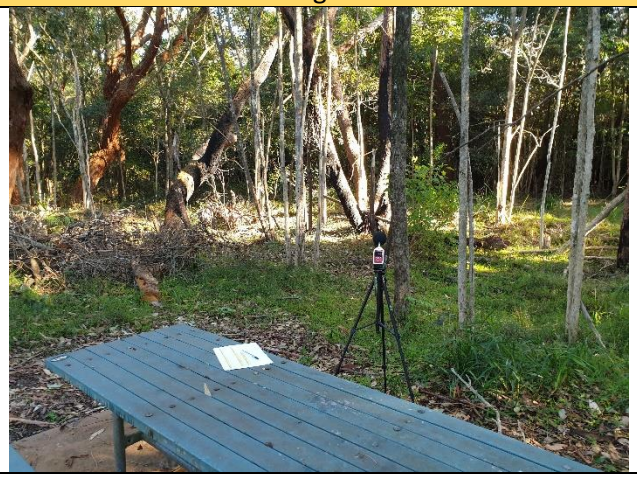
Ambient Noise Logging Results – NPfI Defined Time Periods

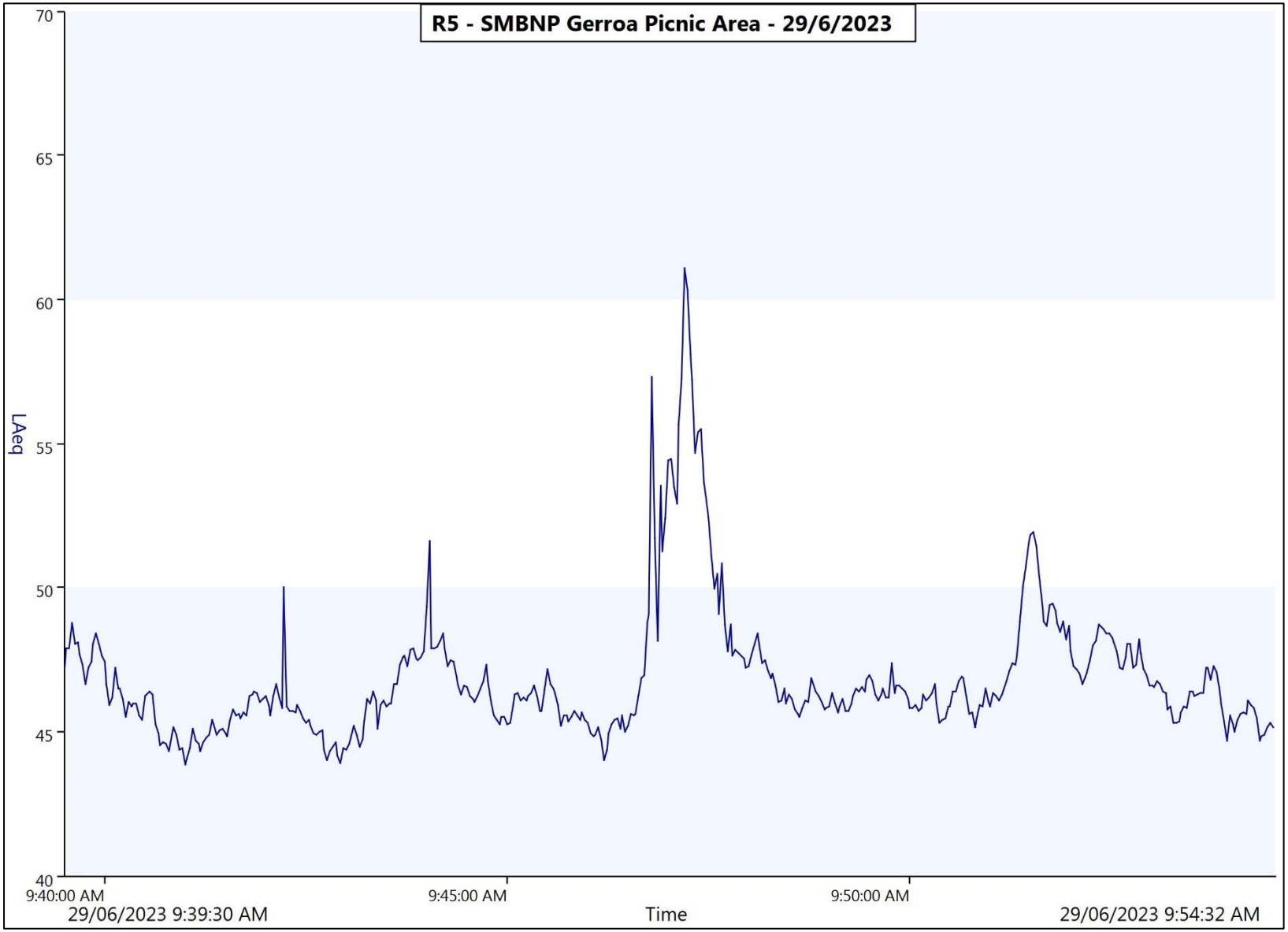
Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	9:39	9:54	44.9	48.0	63.3

Photo of Noise Monitoring Location





Wide peak up to 61 dB(A) in middle of sampling period related to a light aircraft in distance. Otherwise background levels around 46 dB(A) dominated by waves from the nearby beach, with some wider peaks above this level due to wind in the trees. Occasional sharp peak due to birds.

Noise Monitoring Location	R6
Noise Monitoring Address	Picnic Area 2
Wind Speed and Direction	Light to moderate westerly
Meteorological Conditions	Sunny, clear
Quarry Activities	1 x loader (972), 1 x grader (12G), dredge, booster pump, 4 x T&D loads of sand
Noise Instrumentation Used	Cirrus Optimus 171C, Serial No G066240 Cirrus MK224, Serial No 210944D
Calibration Date	18/11/2021
Weather Instrument Used	Vaisala WXT536

Logger deployed in northern extent of clearing of the picnic area, approximately 300m SE of Gerroa Road, and 100m north of picnic area access road.
Noise dominated by wind in trees, varying mostly between 46 to 50 dBA. During quitter times, wave noise from ocean audible around 42-44 dBA. Traffic on Gerroa Road was not faintly audible at times. The Gerroa Sand Quarry was not audible at this location during the measurement.
Recorded Noise Levels(LA_{max}):

- Wind in trees: 50 dBA
- Ocean/waves: 44 dBA
- Vehicles on Gerroa Road: < 42 dBA

Map of Noise Monitoring Location

GPS location: 34.79040°S, 150.77921°E

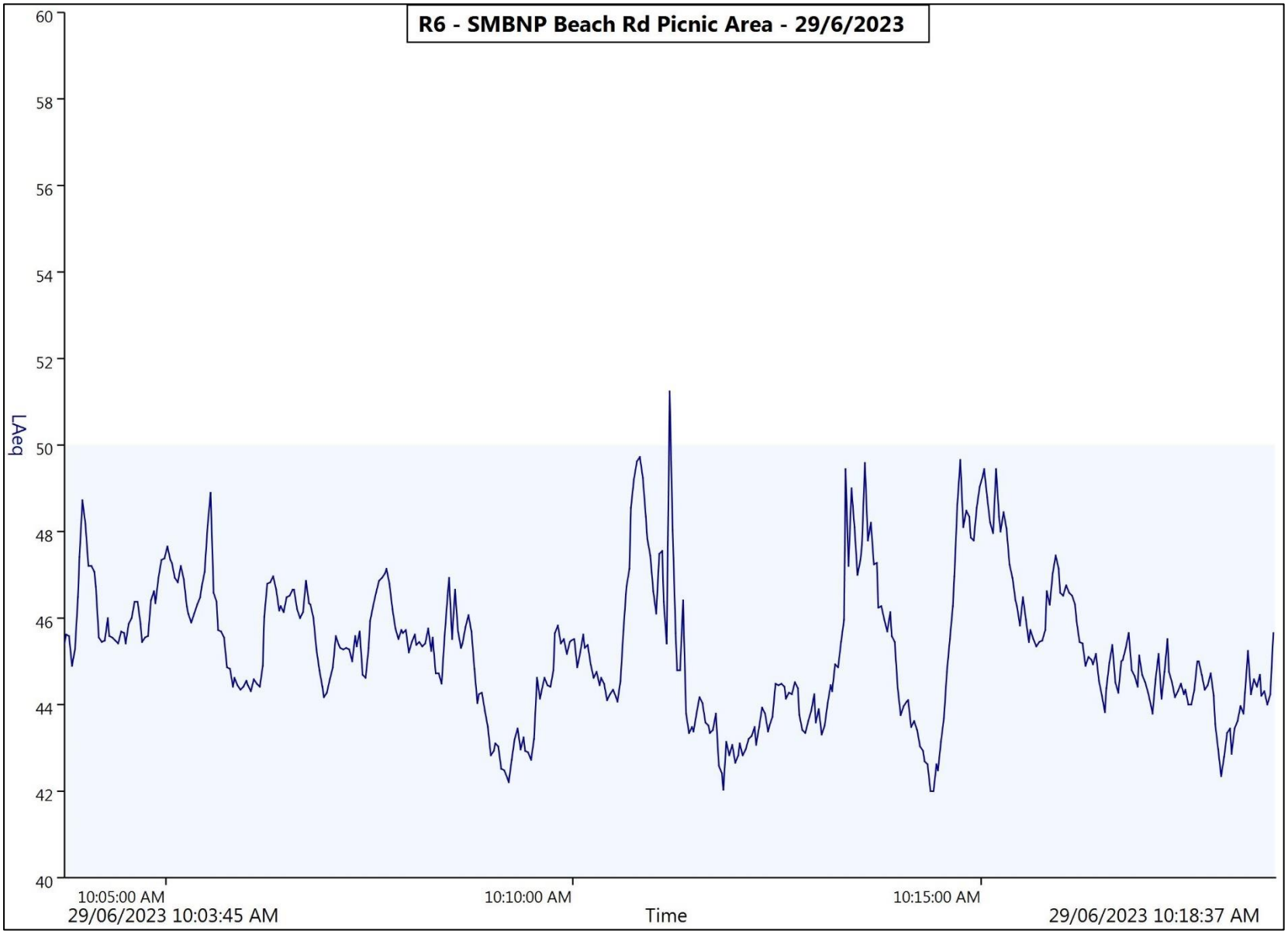
Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LA_{eq}	L_{10}	L_1
Daytime	N/A	N/A	N/A	N/A
Evening				
Night-time				

Attended Noise Monitoring Results

Date	Start Time	End Time	Measured Noise Level (dBA)		
			L_{A90}	L_{Aeq}	L_{Amax}
29/6/2023	10:03	10:18	43.2	45.6	58.0

Photo of Noise Monitoring Location



Noise levels dominated throughout by wind in trees. Some low level background contributions by waves on Seven Mile Beach during calmer periods (where noise levels were 42-44 dB(A)).