

Bravo Resource Solutions

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CRESCENT HEAD ILMENITE STOCKPILE REHABILITATION

*Noise
Assessment*

For Greencoast Environmental Rehabilitation

Noise Assessment - Crescent Head Ilmenite Stockpile Rehabilitation

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Noise Assessment - Crescent Head Ilmenite Stockpile Rehabilitation

1. Introduction

Greencoast Environmental Rehabilitation (GER) is seeking approval under section 11A of the NSW Mining Act Mining Act 1992 to remove an existing low-grade ilmenite stockpile/dump located within GER's Exploration License 8085.

The stockpile is located at the site of a former mineral separation plant or 'dry mill', located approximately one kilometre south of the township of Crescent Head, New South Wales, on the eastern side of Point Plomer Road, on Lot 2281 Deposited Plan 1153793.

As part of the planning approval process, the proposed activity has been the subject of a Secretary's Environmental Assessment Requirements (SEARs) report (EAR Number 1180).

Green coast Environmental Rehabilitation (GER) has engaged the services of Bravo Resource Solutions (BRS) to undertake an assessment of Noise Impact.

The NSW EPA advised on the 13 November 2017 that the proposed activity is would not be classified as 'land-based extractive activity' under the Protection of the Environment Operations Act 1997 (POPEO Act).

In accordance with the Noise Policy for Industry 2017, as the activity is not listed in Schedule 1 of the PEOP Act, the Noise Policy for Industry 2017 is not applicable, however the NSW EPA has issued a EPA's "Noise guide for local government 2013".

Both the Noise Policy for Industry 2017 and noise guide for local government 2013 have been used as guides for this assessment.

2. Description of proposed activity

The proposed activity is a semi-trailer truck loading operation using either a front-end loader or small backhoe excavator to recover material from a stockpile 5-6m above natural ground level (Appendix 6.1). The trucks will turn their engines off during loading.

Activity on site is planned to occur within daylight hours only. No permanent infrastructure will be required onsite.

Worst case scenario is that the loader or excavator operates at full power for 40% of the time. The semi-trailer trucks will not be running whilst being loaded.

The stockpile's recovery will commence at the Northern end of the stockpile and progress in a Southerly direction. This has the advantage of maintaining a 5-6 metre noise barrier (The stockpile itself) between the loading operation and the nearest receptor (a private residence) located approximately 230m (Mid-point to Mid-point) from the proposed operation.

The removal of the approximately 47,500 cubic metre low grade ilmenite stockpile is expected to take approximately 100 working days and occur over a period of 6 months.

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3. Regulatory Setting

A Secretary's Environmental Assessment Requirements (SEARs) has been completed for the proposed activity. The activity has been designated local development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The NSW Department of Environment and Protection Authority (EPA) provided input into the SEARs. The EPA advised that under the Protection of the Environment Operations Act 1997, no licence will be required to be issued by the EPA, in respect of the proposal (Figure 1.).

Extractive activity

Land-based activity which involves the extraction, processing or storage of more than 30,000 tonnes (T) per year of extractive materials would require an Environment Protection Licence (EPL). It is understood from the PEA that the ilmenite to be removed is material from previous sand mining activities.

On this basis, the ilmenite has previously been extracted, and the '*conventional load and haul techniques*' that compromise the proposed activity, do not fit within the meaning of 'extraction' for the purposes of 'land-based extractive activity'. It is also noted that the definition of extractive materials in schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act) excludes substances that are minerals within the meaning of the *Mining Act 1992*.

Based on this information the EPA has formed the view that the proposed activity would not be classified as 'land-based extractive activity' as defined in the POEO Act and no licence will be required to be issued by the EPA, in respect to the proposal.

Figure 1. Extract of advice received from NSW Environmental Protection Authority, 13 November 2017.

The NSW EPA advised on the 13 November 2017 that the proposed activity is would not be classified as 'land-based extractive activity' under the Protection of the Environment Operations Act 1997 (POPEO Act).

In accordance with the Noise Policy for Industry 2017, as the activity is not listed in Schedule 1 of the PEOPO Act, the Noise Policy for Industry 2017 is not applicable, however the NSW EPA has issued a EPA's "Noise guide for local government 2013".

Both the "Noise Policy for Industry 2017" and "Noise guide for local government 2013" have been used as guides during this assessment.

The area is area is zoned rural landscape (RU2) and the adjacent areas are zoned environmental living (E4).

4. Assessment of Noise Impact

4.1. Preliminary site investigation

The site and surrounds were visited to determine relevant information for a noise assessment.

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The site of the proposed activity is located approximately 1 kilometre south of the township of Crescent Head. The activity area is bordered by Point Plomer Road to the West and on the remaining three sides dense eucalyptus forest (>0.5m spacing).

The general observation of the noise environment is that vehicle traffic on Point Plomer Road is the dominant source. The Average Daily Traffic (ADT) Volume for Point Plomer Road (South of Back Beach Rd) is 4948, as provided by the Kempsey Council. The traffic volume is highly seasonal, with peak holiday periods averaging 90-100 vehicles per hour during peak times. For the purpose of this assessment 1270 average weekday traffic volumes has been assumed.

4.2. Determine existing noise levels

The monitoring location was visited by BRS during the day and evening period. This confirmed vehicle traffic movement as the dominant noise source.

It should be noted that noise traffic noise onsite peaked as high as 62db(A). Interestingly it isn't necessarily the heaviest vehicle that has the greatest noise emission. Vehicle speed, tyre specification, exhaust design and road surface conditions all have a significant impact on vehicle noise emissions.

In determining an average background level throughout the year (Accommodate for seasonal variability), results of previous noise surveys in on the NSW North Coast area were examined. For similar traffic volumes and vehicle mix, previous surveys suggest that at 50 dB(A) would be an appropriate rating background noise level (RBL) (Figure 2.).

Date	Total Vehicles	Heavy Vehicle Percentage	Average Speed (km/h)	L _{Aeq,9hr} (dBA)
25-26 November 2012	1061	34%	98	51.3
16-17 June 2013	1105	19%	101	50.4

Figure 2. Measured LAeq,9hr near Kungala Road, Halfway Creek in different seasons.

Recognising the difficulty in accounting for variability of traffic levels on Point Plomer Road, typical existing background noise levels have been adopted for the site.

In accordance with the Noise Policy for Industry, the RBL were determined to be:

- Daytime: 40dB(A)
- Evening: 35dB(A)
- Night-time: 30dB(A)

As this doesn't incorporate significant traffic noise, this is a conservative approach and should be considered a best -case scenario (Lowest RBL).

It is also noted that the main receptor of the project (House 1) is located approximately 50m from Point Plomer road. As a result, it is highly likely that the RBL measured at House 1 is higher than the chosen RBL due to traffic noise.

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4.3. Determine residential receiver category

The proposed areas and the area immediately adjacent is zoned RU2/E4 (Rural Landscape/ Environmental living). The noise in the area is dominated by traffic noise due to the proximity of Point Plomer Road.

The land zoning, the subjective assessment of the acoustic environment in the area, and the acquired background noise levels would support a rural residential land use category with reference to Table 2.3 in the Noise Policy for Industry.

The nearest receptor (House 1) is located approximate 205m to the South West of the proposed site (Appendix 6.3).

4.4. Determining project noise trigger levels

The amenity and intrusiveness noise levels (ANL) were determined as shown:

Period	Intrusiveness noise level	Project amenity noise level
Daytime	45 LAeq, 15min dB(A) (40+5)	48 LAeq 15min dB(A) (50-5+3)
Evening	40 LAeq, 15min dB(A) (35+5)	43 LAeq 15min dB(A) (45-5+3)
Night- time	35 LAeq, 15min dB(A) (30+5)	38 LAeq 15min dB(A) (40-5+3)

Notes:

1. Intrusive noise level is LAeq, 15min RBL +5
2. Project amenity noise level (ANL) is Rural ANL (Table 2.2: Amenity noise levels, Noise Policy for Industry 2017), minus 5dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level dB(A) RBL.

The project noise trigger is the lower value of the intrusiveness and amenity noise levels. Therefore, the project noise trigger levels are as follows:

- Daytime: LAeq, 15min 45 dB(A)
- Evening: LAeq, 15min 40 dB(A)
- Night: LAeq, 15min 35 dB(A)

4.5. Predicated level of noise and determine impact

The primary noise source is a Front-End Loader (FEL) or small excavator. The modelling is based upon a FEL being used 40% of the time at full power (Period of highest noise generation). This is considered worst case scenario. Previous studies suggest the full power is only used when the loader bucket is entering the stockpile, approximately 20% of the time. Small excavator noise emissions are considered similar to those of a FEL.

The predicted noise level exceeded the day time project noise trigger level by 17.9 dB(A) (Appendix 6.4).

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Consideration of noise mitigation is therefore required. GER demonstrated that a shielding effect of the stockpile itself plus the (+130m) of dense vegetation would reduce noise levels by more than 27 dB(A) at the nearest residential location (Appendix 6.2). Consideration of these physical and natural measures already in place were determined to be both reasonable and realistic.

With these measures incorporated, the following revised noise prediction was made:

- Daytime: 35.9 LAeq, 15min dB(A) (Appendix 6.4)

The predicted noise level is well below the project noise trigger level (45 LAeq 15min dB(A)), and the sites RBL (40LAeq, 15min dB(A)).

Considering the conservative nature of RBL used and hence the conservative nature of the project trigger noise level, the distance from the receiver, the natural attenuation provided by the stockpile itself and the surrounding vegetation, noise impacts are not expected.

As noise modelled is well below project noise trigger levels, the effect of noise-enhancing metrological conditions was not modelled in detail.

However, a preliminary examination noted that following.

- The site is well shield by dense surround trees providing a windbreak and giving it a high roughness factor (Wind Resistance).
- Based upon Bureau of Meteorology (BOM) data for Port Macquarie prominent (9am) wind direction in all seasons is from the South West (Away from the noise receptor House 1) and the late afternoon/evening wind direction is from the North East (Towards the noise receptor House 1).

Considering the project will operate in daylight hours only, the metrological conditions appear to reduce the noise as measured at the Receptor (House 1) for the majority of daylight hours.

5. Performance monitoring

Suitable noise limits were determined as per the Noise Policy for Industry 2017. These conditions appear to be easily met. As a result, a formal noise management plan is not required.

However, it is strongly recommended that GER include in its Project Execution Plan the following:

- On the commencement of operation, an initial noise audit be completed. The key aspect of the Noise Audit is to measure the noise output from the Front-End Loader used in the task to ensure actual noise output is as modelled.
- The stockpile removal sequence be designed and performed in such way to ensure the stockpile's noise shielding effect be maintained until near the end of the project.

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- Any Noise complaints should be formally recorded and investigated as per the guidelines detailed in the Noise Policy for Industry 2017 and Noise guide for local government 2013.

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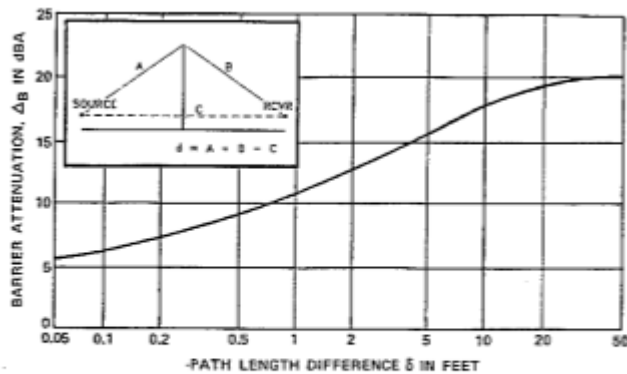


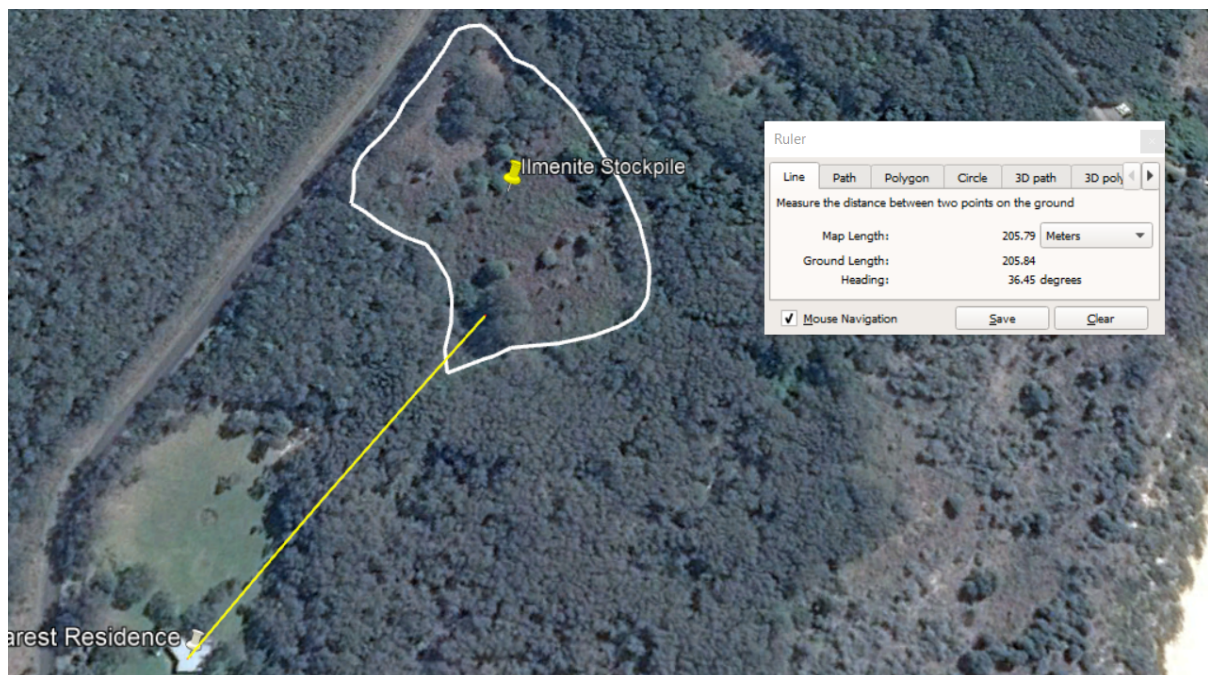
Figure 2.2; Noise Barrier Attenuation as a Function of Path Length Distance

Extract from “Noise Control Earth Bunds, Guidelines for the use of Earth Berms to Control Highway Noise”, January 1997, Ministry of Transportation and Highways, British Columbia.

Vegetation coverage -
 (120m of NSW mid-north coast dense eucalyptus forest, >0.5m spacing) 7dB(A) (120m of mid-north dense eucalyptus forest, >0.5m spacing)

As per “The effects of vegetation on road traffic noise” Jeffrey PENG; Rob BULLEN; Simon KEAN, Inter-noise 2014 Conference Melbourne 2014.

6.3. Location plan of nearest residence and distance



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6.4. Noise model results

Run 1 - No Shielding

Roadway Construction Noise Model (RCNM)

File Edit View Options Help

Input Data

Case Description: Crescent Head Ilmenite Stockpile Removal

Receptor

	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Night-time Baseline (dBA)
1	House 1	Residential	40.0	35.0	35.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

Equipment

Receptor #1: House 1

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (meters)	Estimated Shielding (dBA)	
1	<input checked="" type="checkbox"/>	Front End Loader	<input type="checkbox"/>	40%	80.0	<input checked="" type="checkbox"/>	79.1	205.0	0.0
2	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
3	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
4	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
5	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
6	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			

Results

Receptor #1: House 1

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
1	Total	66.9	62.9	N/A	45.0	N/A	40.0	N/A	N/A	N/A	17.9	N/A	22.9	N/A	N/A
2	Front End Loader	66.9	62.9	N/A	45.0	N/A	40.0	N/A	N/A	N/A	17.9	N/A	22.9	N/A	N/A
3															
4															
5															

*Total Lmax is the value for the loudest piece of equipment.

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Run 2 - With Shielding

Roadway Construction Noise Model (RCNM)
File Edit View Options Help

Input Data

Case Description: Crescent Head Ilmenite Stockpile Removal

Receptor	Description	Land Use	Daytime Baseline (dBA)	Evening Baseline (dBA)	Nighttime Baseline (dBA)
1	House 1	Residential	40.0	35.0	35.0
2					
3					
4					

Noise Metric: Leq

Noise Limit Criteria

Receptor #1

Noise Limits

Equipment Receptor #1: House 1

	Active	Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Distance to Receptor (meters)	Estimated Shielding (dBA)
1	<input checked="" type="checkbox"/>	Front End Loader		40%	80.0	79.1	205.0	27.0
2	<input type="checkbox"/>							
3	<input type="checkbox"/>							
4	<input type="checkbox"/>							
5	<input type="checkbox"/>							
6	<input type="checkbox"/>							

Results

Receptor #1: House 1

	Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Lmax*	Leq	Day		Evening		Night		Day		Evening		Night	
				Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	Total	39.9	35.9	N/A	45.0	N/A	40.0	N/A	N/A	N/A	None	None	N/A	N/A	
1	Front End Loader	39.9	35.9	N/A	45.0	N/A	40.0	N/A	N/A	N/A	None	None	N/A	N/A	
2															
3															
4															
5															

*Total Lmax is the value for the loudest piece of equipment.