

Mr Richard Sattler

Anderson Bay Sand Extraction Activity, Increase in Production and Offshore Sand Loading Facility

Development Proposal and Environmental Management Plan

Appendix E Vipac Noise Report

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Version 1.



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Attention: John Miedecke

ANDERSONS BAY SAND OFFSHORE LOADING FACILITY – NOISE EMISSIONS

A sand extraction pit has been approved for Andersons Bay in North East Tasmania. It is proposed to alter the site operations to use an offshore loading facility instead of transportation of the final product by truck to Bell Bay. This letter presents a noise assessment of the loading facility as required for its DPEMP, conducted by Vipac Engineers & Scientists in March 2016.

SUMMARY

It is proposed to build an offshore loading facility at the Andersons Bay sand pit in north east Tasmania. The facility replaces the currently proposed truck transportation of final product from the sand pit to Bell Bay. The loading facility uses a conveyor for over land transportation, and then a pumping station to transport a fluidised product to the boat off shore. The facility contains only onshore equipment with the off shore station being a passive pipe head. The loading will be a 24/7 operation lasting for nominally 24 hours.

The nearest residential dwelling in other ownership is some 1300 metres from the loading facility with either the existing dune or the developed stock piles screening view of the general plant from the residence.

A desktop noise assessment of the operations has been conducted based on:

- 24 hour operation of the site, with both extraction and loading occurring together.
- Noise sources comprise loaders, sizing screens, diesel driven pumps, and a diesel generator.
- A noise criteria of 35 dBA at night, and 45 dBA during the day apply at the nearest residence.
- Site noise emissions are predicted using the ISO 9613 algorithms.

The assessment has shown that:

- Construction noise is below the criteria.
- Operational noise levels of the combined plant are 2 dB over the night time criteria if the extraction plant is on the southern side of the dune. If the extraction plant is on the northern side of the dune the noise criteria are met.

The assessment then concludes that noise emissions from the development will be acceptable with the following recommendations:

- Broad Band reverse beacons be used for site vehicles.
- Diesel motor driven equipment be housed in a shed.
- On site stockpiles be located to the south of the conveyor loading area.
- The extraction plant be on the northern side of the dunes.



1.0 SITE DESCRIPTION

The proposed sand pit site is off Waterhouse Road approximately 7 km East of Bridport in North East Tasmania. The sand is to be extracted from a large dune directly behind Waterhouse Beach with access through the property of the pit owner on a 1 km dirt road.

The sand dune is 3 km long and runs nominally south west / north east with a maximum height of 24m above the surrounding land. To the west of the sand dune is the lost farm Golf Course, under the same ownership as the proposed pit. A narrow band of vegetation separates the sand dune from Waterhouse beach to the north, while the remaining land surrounding the sand dune is pasture land under general farming use. A low ridge (24m elevation) runs from the centre of the dune south east to Waterhouse Road, with the land between this ridge and the Golf course rising very slightly to Waterhouse Road. As a general statement the surrounding land would be considered flat.

Waterhouse Road is a dual lane, single carriageway road that travels between Bridport and Gladstone. The vehicle speed for this type of road would be 90 km/hr. The road currently carries 600 vehicles per day which includes some 80 commercial vehicles and 16 semi trailers.

There are several residential dwellings in the vicinity of the sand pit, the closest to the loading facility being nominally 1300 m south of the conveyor infeed. The Lost Farm golf course buildings are 2500m west of the loading facility and in the same ownership as the proposed sand pit so not considered a noise sensitive site.

Noises experienced by the residential dwellings is expected to be typical of a rural area viz: traffic from Waterhouse Road, wind noise from coastal location, animal noises (birds, insects, farm animals), and farm equipment noises (machinery, irrigation). Wind and animal noise would dominate at night with traffic and farm noises stronger in the day time.

Figure 1 shows the site and its general surroundings.

1.1 Site Operations

Processing will be the same as described in the initial DPMP (wheeled loaders used to recover the sand from the dune and feed a series of sizing screens, with screened product being moved to a stockpile by wheeled loader). The direction of sand extraction is now reversed and is from the NE to the SW.

When a ship requires loading, wheeled loaders will move sand from the stockpiles to a transfer conveyor which moves the sand to the foreshore pumping station. At the pumping station sand is fluidised with freshwater and pumped to the waiting ship connected to the offshore loading platform.

It is expected to take 24 hours to fill a boat with loading occurring 24/7. Two boats per week are envisaged.

The equipment associated with the loading facility operation is:

Construction			
Pipe laying	CAT980 Wheeled loader		2
Conveyor Loading			
Power generation	DG Set 350 kW		1
Conveyor Loading	CAT980 Wheeled loader		3
Conveyor	250kW Electric motor		1
Pump Station			
Slurry Pumps	Diesel driven, 750 kW		3
Feedwater Pumps	Diesel driven, 150 kW		2

It is assumed all loaders have broad band not tonal reverse beacons.

Figure 1 shows the site and surrounds and indicates the location of the loading facility infrastructure.

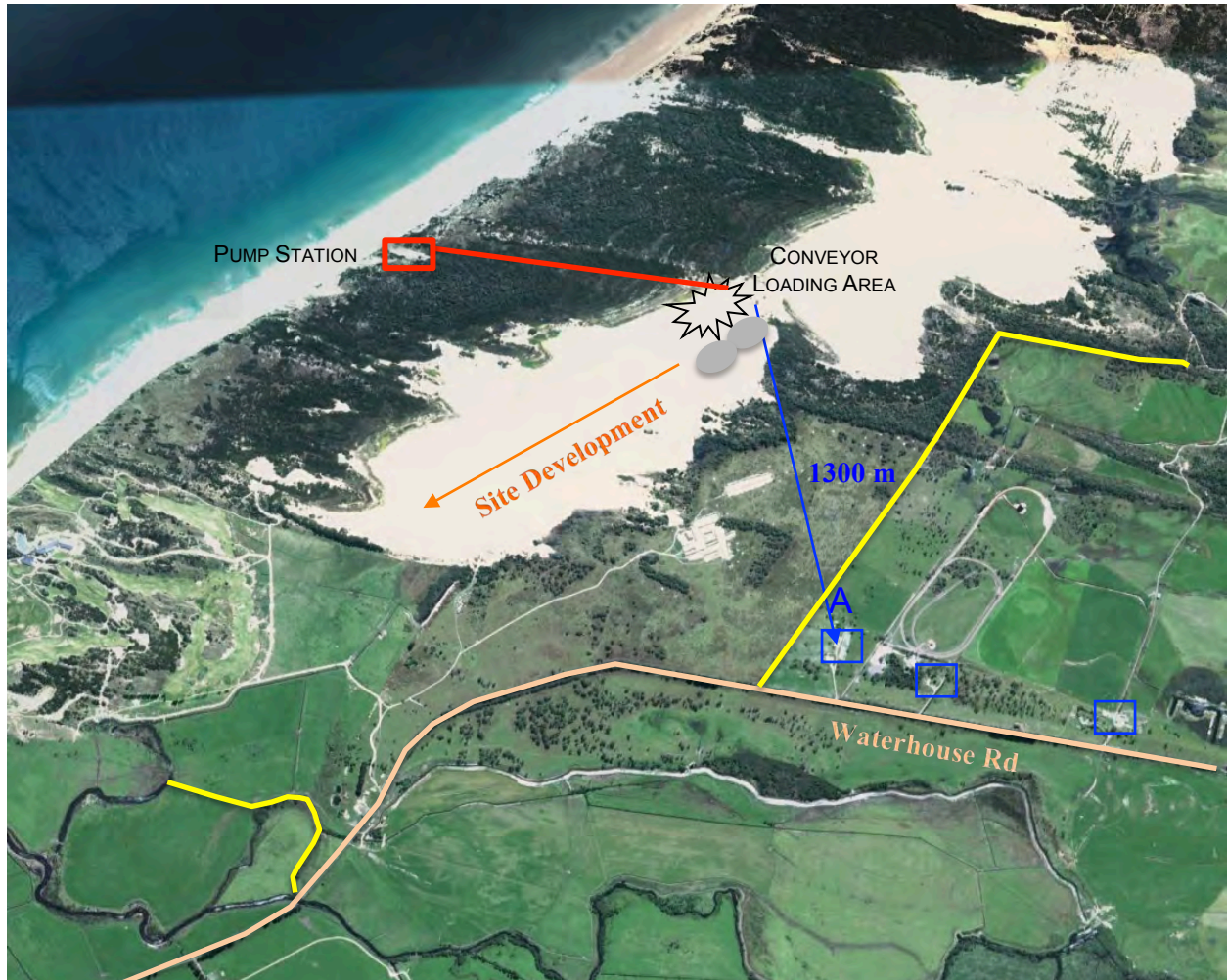


Figure 1: Aerial View of the Site and Surroundings

2.0 PREDICTED NOISE LEVELS

A desktop approach is taken for the assessment whereby the noise level for the area is assumed typical for a rural area and AS1055 then used to define the existing noise level. From the equipment proposed for the operation an appropriate sound power level from Vipac's database has been determined, and the sound pressure level at the residential locations previously identified then predicted based on the ISO9613 algorithms for sound propagation.

With noise sensitive sites being dwellings or places of occupation in other ownership, the relevant locations are the residential dwellings on Waterhouse road to the south and east of the sand pit. As the topography is flat and does not alter between dwellings, only the closest is considered in the assessment and the assumption made that if noise is acceptable there, it is acceptable at distances further from the site than it.



2.1 Existing Community Noise Levels

Australian Standard AS1055.2 1997, “Description and Measurement of Environmental Noise” provides in Appendix A a table of average background noise levels for various areas. The two area types that may be considered applicable here are R1 or R2 as detailed in Table 1. R1 is considered the most relevant.

		BACKGROUND NOISE L90 dBA	
		0700-1800	2200-0700
R1	Area with negligible transportation	40	30
R2	Area with low Density transportation	45	35

Table 1: Background Noise Levels – AS1055

2.2 Loading Facility Source Noise Levels

Sound data for the loading facility are based on a combination of manufacturers data, data from Vipacs data base of measurements, and generic formulations for equipment types. The determined sound power levels associated with each item of equipment are then listed in Table 2. The loaders are mobile and their sound emissions vary according to their orientation to the receiver and their engine revs. The stated sound power is for maximum engine power in second gear. Over a 15 minute period of operation such noise levels will not be maintained so that the Leq15 sound power may be expected to be 3 to 5 dBA lower.

SOUND POWER LEVEL, dBA		
Construction	Loader	112
Conveyor Loading	Loader	112
	Conveyor Motor	96
	DG Set	115
Pump Station	Diesel Slurry Pump	118
	Diesel FW Pump	111

Table 2: Site Sound Power Levels

2.4 Predicted Community Noise Levels

To predict the noise levels at the residential location A in Figure 1, the ISO 9613 algorithms have been used. These account for sound attenuation with distance, air absorption, ground effects, and barriers. The following is noted with regard the modelling:

- The model is for worst case meteorological conditions, ie. dwelling downwind of the site, or a temperature inversion.
- Modelling was done in octave bands.
- The existing sand dunes were not included in the model (in practice they will afford some acoustic screening of the pump station).
- The two stock piles were modelled as barriers 5m high between the loaders and location A.
- The slurry pumps, feedwater pumps and DG set were all placed inside a shed which had a construction of corrugated iron outer cladding, 90mm framework, and 9mm cement sheet internal lining.
- The ground was modelled as hard near the source and receiver, and relatively soft elsewhere.
- All equipment was assumed to run simultaneously and continuously.



The predicted noises levels at location A are then shown in Table 3, with the following comments relevant.

- The loading facility noise emissions are a little higher than the extraction process.
- The 3 loaders at the conveyor loading dominate noise emissions from that area. As stated in section 2.2 this will be a worst case level as it assumes maximum engine power the entire operating time.
- The extraction plant noise was for the plant on the southern side of the sand dune in view of the resident at location A. Locating the plant on the northern side of the dune will essentially eliminate the extraction plant as a noise source effecting location A.

		Sound Pressure Level dBA
Loading Facility	Construction	27
	Pumping station	29
	Conveyor Loading	34
Extraction	from previous report ¹	33
Total		37

Table 3: Predicted Community Noise Levels at Location A

3.0 NOISE ASSESSMENT

The loading and extraction operations are to occur 24/7, and so both day and night time emissions must be considered. The assessment comprises determining an appropriate criteria and comparing the predicted noise levels against this.

3.1 Criteria

The relevant state policy for environmental noise levels is the Tasmanian Environmental Protection Policy 2009 (Noise), which requires that an individual be able to work or study without unreasonable interference from noise. To determine what might constitute unreasonable noise from the proposed sand pit, various regulations/policies/standards, both state and national, are referred to.

In this manner the criteria in Table 4 are identified.

Description	Source	Metric	Criteria dBA
Noise Limit	Tas Quarry Code of Practice	Leq 15 min	Ambient + 10
Intrusive Criteria	NSW INP	Leq 15	Background + 5
Attenuation Dist.	Dorsett Planning Schm. 2016, E11.6.1, A2	metres	500
Annoyance	Tas EPP, Moderate Annoyance Outdoor, day	Leq 16hr	50
	Tas EPP, Serious Annoyance Outdoor, day	Leq 16hr	55
Sleep Disturbance	Tas EPP – Outside Window	Leq 8hr	45

Table 4: Assessment Criteria for Sand Pit Noise

¹ ‘Andersons Bay Sand Pit – Noise Emissions’, Vipac Report No. 4643, 18-2-2014



The intrusive criteria of Table 4 will be the tightest given it is a rural area with no current commercial / industrial development. With the background noise quietest at night, and the sleep disturbance criteria only operating at night, it is the night time period that will control the assessment, and only this period is then assessed, with the assumption if it passes this period, it will pass all other time periods.

The background level from Table 1 is 30 dBA at night and 40 dBA during the day. The criteria used for the assessment are then:

Night Time	Intrusive Noise	35 dBA
	Sleep Disturbance	45 dBA
Day Time	Intrusive Noise	45 dBA

It is noted the attenuation distance required in the Dorsett Interim Planning Scheme for a quarry or pit using vibratory screens is 500 metres and that the nearest residence (1300m), is well beyond this distance.

3.2 Assessment

The noise assessment for favourable noise propagation conditions (ie. light wind source to receiver or a developed temperature inversion), is summarised in Table 5. It is seen from the Table that the loading facility meets the criteria during construction but during normal operation when they are combined with the extraction plant the total site noise emissions exceed the night time criteria by 2 dBA. In considering this breach, the following should be recognised.

- The noise levels are predictions not actual noise levels.
- The extraction plant is for no screening, if the plant is on the north side of the dune it will indeed be screened, and the extraction plant noise emissions then negligible at location A. The noise criteria would then be met.
- For both the extraction plant and the loading facility, the loaders are assumed to operate at full engine power 100% of the time. This does not occur in practice and their Leq15 noise emissions may be expected to be 3 to 5 dBA lower. The noise criteria would then be met.
- Designating the development as a quarry or pit with vibratory screening, the nearest residence is well outside the planning scheme attenuation distance of 500m.

Based on these comments, the following recommended to achieve acceptable operation of the loading facility:

- Broad Band reverse beacons be used in place of tonal ones on all trucks and loaders.
- Diesel driven equipment be housed in sheds constructed from corrugated iron outer lining and 9mm cement sheet internal lining.
- The sand stockpiles be located to the south of the conveyor loading area.
- The extraction operation be located on the northern side of the dune.
- A noise survey be conducted once the plant is operating under normal conditions.

	Sound Pressure Level, dBA	
	Operation	Construction
Extraction Plant	33	
Loading Facility	35	27
<hr style="border-top: 1px dashed black;"/>		
Total	37	27
Criteria	35	45
Pass / Fail	FAIL	PASS

Table 5: Assessment Summary



J.Miedecke & Partners

Andersons Bay Sand Offshore Loading Facility – Noise Emissions

Should you have any queries, please do not hesitate to call this office directly.

Yours faithfully

A handwritten signature in black ink, appearing to read "Bill Butler", written over a light grey rectangular background.

VIPAC ENGINEERS & SCIENTISTS LTD

Bill Butler