

37.3849.R44:ZSC

31st March, 2007

Cowman Stoddart Pty Ltd
PO Box 738
NOWRA NSW 2541

Attention: Mr. S. Richardson

Dear Sirs,

ACOUSTICAL ASSESSMENT
PROPOSED SHORT MILL
SHOALHAVEN STARCHES, BOMBADERRY

1.0 Introduction

The purpose of this report is to present the results of an acoustical assessment for the proposed small flour (short) mill at the Shoalhaven Starches premises off Bolong Road, Bomaderry.

The DEC has advised that the Acoustic Assessment is to refer to the *Industrial Noise Policy* document, the *Environmental Criteria for Road Traffic Noise* document and the *Construction Site Noise* guidelines from the *Environmental Noise Control Manual*.

Pursuant to the EPA (now DEC) Licence issued for the subject premises there is a requirement under the INP for the company to achieve specific noise contribution levels at four reference residential boundaries nominated to the south and north.



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Monitoring has found the Shoalhaven Starches site to comply with the EPA (DEC) licence conditions. To ensure any new plant does not increase the overall noise emission from the site one needs to generate a noise contribution at least 10 dB below the Licence target.

The Pollution Reduction Program 7 carried out at the site utilised an acoustic design goal of 10 dB below the EPA Licence conditions. The PRP7 acoustical assessment evaluated noise propagation from the site to reference residential locations under various wind and temperature conditions and determined an effective sound power level for the proposed upgrade with respect to the nominated monitoring areas.

The design goals for 10 dB below the normal noise operating conditions of the plant was nominated by the EPA for the PRP 7 project as:

The L_{A10} (15 minute) sound pressure level contribution generated from the PRP 7 project must not exceed the following levels when measured at or near the boundary of any residential premises:

- 28 dB(A) at locations in Terara on the south side of the Shoalhaven River;
- 28 dB(A) at locations in Nowra on the south side of the Shoalhaven River;
- 32 dB(A) at locations in Meroo Street, Bomaderry; and
- 30 dB(A) at other residential locations in Bomaderry.

The acoustical assessment in the PRP7 EIS examined, by way of weather data from Stephens Environment Management and determined that in accordance with the EPA's Industrial Noise Policy document, the noise assessment did not require an assessment in terms of wind or temperature inversions, and that the design goals were to be assessed for neutral weather conditions.



The analysis of noise propagation from PRP 7, by way computer modelling using Environmental Noise Model (“ENM”), for neutral weather conditions and consideration of elevated noise sources provided an indication of the effective sound power level of the PRP 7 with respect to the nominated receiver positions. The effective sound power level obtained for that analysis was obtained by the individual point source calculation for four building locations to the effective sound power level shown in Table 1 below.

Table 1: PRP7 Elevated Source – Noise Contributions – dB(A)

	Riverview Rd	Nobbers Ln	Meroo Rd (town)	Meroo Rd (hill)
Base Effective Sound Power Level	104	104	108	105

2.0 Flour Mill INP Acoustic Design Targets

For the flour mill project the residential noise emission target has been set at 14 dB(A) below the EPA Licence reference location targets so as to ensure the flour Mill project does not increase the site noise emission levels. Therefore for design purposes in a general sense, noise targets 4 dB(A) below the PRP7 targets as set out in Table 1 above would apply.

We are instructed there will be no additional truck traffic movements associated with the Short Mill and therefore, no requirement for the ECRTN.

3.0 Acoustical Assessment

The majority of the equipment is house in one concrete building with a few holding tanks located external to the building further to the east. The overall design concept identifies different areas of equipment which may be classified as:



- 7 x Four Roller Mills
- 6 x Eight Roller Mills
- 1 x Small Hammer Mill
- 3 x Sifters
- 2 x Air Lifters
- 10 x Screw Conveyors
- 4 x Blowers

For the purpose of assessing the noise controls associated with the nominated plant we have run the EM computer model for Shoalhaven Starches for neutral weather conditions to establish in-plant shielding and the attenuation from the flour mill to the reference residential locations.

At the EIS stage the manufacturer's noise data for the various plant times have been expressed generally in a dB(A) format rather than octave bands. For this ENM assessment we have utilised a broadband spectrum to derive attenuation to residential reference locations, and additional noise data from similar plant at the Manildra flour mill.

The building construction is one of solid concrete panels for walls and metal deck roof.

From our analysis of the proposed plant, items set out in Appendix B the provision of the concrete building without any additional noise control measures would exceed the overall EPA noise limits and obviously the more stringent criteria nominated for the project. Attenuation is required to the blower inlet, the roof fan discharges and the external conveyors to satisfy the nominated design limits, leading to the following sound pressure level contributions for the four reference locations.



TABLE 2: Noise Emission Contributions

	Riverview Rd	Nobbers Ln	Meroo Rd (town)	Meroo Rd (hill)
Ground Floor	-2.1	6.0	6.8	10.9
Motor Floor	-6.8	-5.1	-4.9	-0.8
Roll Mill Floor	-14.1	-12.4	-12.2	-8.1
Spouting Floor	-13.1	-11.4	-11.2	-7.1
Cyclone Floor	-5.1	-3.4	-3.2	0.9
Roof	17.9	19.6	19.8	23.9
External Tanks	13.7	17.6	19.8	19.9
Total	19.3	21.8	22.9	25.5
Four Mill Goal	24	24	28	26

As a result of our analysis in order to meet compliance with the residential design goals the following noise control measures are required:

- the blower inlet (at ground level) is to have an inlet silencer providing an insertion loss of not less than 20 dB(A)
- the blowers (at ground level) are to be housed in a concrete room that is independent from the external building elements
- All fan discharges through the roof to have a total sound power noise emission level no greater than 98 dB(A).
- the HP discharge fan No 1 is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 96 dB(A) with no tonal characteristics
- the HP discharge fan No 2 is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 94 dB(A) with no tonal characteristics
- the Mill Aspirator fan is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 88 dB(A) with no tonal characteristics



- the Cleaning Aspirator fan is to have a discharge silencer (vertical discharge) to produce a sound power emission level not less than 88 dB(A) with no tonal characteristics
- all external chain/bucket conveyors or elevators are to have a total sound power noise emission level not exceeding 106 dB(A).
- the roof of the building is to be a solid concrete floor or of an alternative construction having a weighted noise reduction R_w of not less than 40.

We anticipate lower internal noise emission level due to the occupational requirements for such plant but as seen by Table 2 the governing noise emission source are the noise sources external to the building.

4.0 Construction Noise

Construction noise is not part of the Licence and utilises different noise indices to that for the operating plant.

The principal noise emission construction activities for the erection of the flour mill area associated with the piling and foundation works associated with the proposed concrete slab, and pouring of the slab. The construction of the building proper and fit out of the building generate significantly lower noise levels.

Based on construction of the PRP7 project there will be piles driven throughout the site of the slab where such piles are driven by a pile driving rig.

The total works associated with the slab will take a period of up to 5 weeks, being 2 weeks for the pile driving operations and 2 weeks for the preparation/pouring of the slab. The actual pouring of the slab will take up to 7 days.

This same form of construction (including the driving of piles) has occurred on the Shoalhaven Starches site over the last ten years without receipt of any noise complaints.



On past experience it is not envisaged there would be any noise disturbance in relation to the piling operations for the proposed concrete slab, if such operations were restricted to the daytime period.

The Company has an ongoing building works program that has not given rise to any noise complaints and as such the forming and pouring of the slab and any other site works associated with the subject application is not envisaged to generate any noise impacts.

The current EPA Licence conditions relate to criteria derived from night time ambient measurements and the EPA Environmental Noise Control Manual (the “ENCM”) that utilised the concept of an average maximum (L10) noise level versus the average minimum (L90 background) level.

Contained in the ENCM are a set of Noise Control Guidelines for various types of noise emission sources. A Construction Site Noise Guideline is set out in Chapter 171 of the ENCM and indicates the following criteria may be specified in a development consent or building application:

The $L_{A10,T}$ noise levels emanating from the construction site shall not exceed the background levels by the following criteria, in the interval specified:

- 20 dB(A) for construction activity period up to 4 weeks
- 10 dB(A) for construction activity period over 4 weeks and up to 26 weeks.
- 5 dB(A) for construction activity period over 26 weeks.

Time Restrictions of Monday to Friday, 7am to 6pm, and Saturday 7am to 1pm if audible on residential premises and no construction work to take place on Sundays or Public Holidays.

The ENCM indicates the $L_{A10,T}$ sound pressure levels shall be measured or computed at any point within one metre of the boundary of the nearest affected residential premises. Measurements shall be made over a 10 to 15 minute interval (T), using the “fast” response of the sound level meter. The $L_{A10,T}$ is the A-weighted sound pressure level which is exceeded for 10 percent of the time over the measurement interval T.



Due to the location of the plant being significantly removed from residential premises and the existing ambient levels, primarily as a result of traffic in the area, normal construction activities are not envisaged to create a noise impact. However, the proposed concrete foundation slab requires the driving of piles (by a pile rig) into the ground, which creates a greater level of noise than for normal building and excavation works. Notwithstanding the previous pile driving operations complying with the relevant noise targets, the NSW EPA previously required construction noise for the short mill to be assessed.

5.0 Noise Emission From Proposed Construction Plant

In order to consider the likelihood of noise emission from the proposed construction, we have utilised noise data from previous projects, as set out in Table 3 below.

Table 3: Sound Power Noise Emission Levels of Plant Items – dB(A)

ITEM	TYPICAL PLANT OR EQUIPMENT	MAX. NOISE LEVEL L ₁₀ at 7 metres	SOUND POWER LEVEL
Bulldozer	Caterpillar D7, D8, D9	88	113
Front End Loader	Wheeled	90	115
Scraper	Caterpillar 631	89	114
Scraper	Caterpillar 651	85	110
Grader	Caterpillar 16	85	110
Compactor	Caterpillar 825	85	110
Crane	Truck Mounted	85	110
Piling Hammer	for piles	93	118
Concrete Truck		83	108
Concrete Pump		84	109
Concrete Vibrators		80	105
Helicopter		78	103



On the basis of the noise emission levels set out in the above Table, the total sound power level of the plant is significantly less than the maximum level permitted by the EPA Construction Noise Guideline. The piling operations generate a maximum level 9 dB(A) below that indicated by the permitted sound power level.

Therefore other than the piling operations, all other construction activities would not exceed background +10 dB(A) and therefore would satisfy the EPA secondary criterion of background +10 dB(A) for construction works of 4 – 26 weeks.

6.0 Conclusion

An acoustical assessment of the proposed short mill at the Shoalhaven Starches plant has been undertaken with reference to the INP requirements and the EPA Licence for the plant.

For the short mill a design target of 14 dB(A) below the EPA Licence conditions at the residential reference locations has been used. As a result of these design goals the proposed mill is to be housed in a concrete building with silencers specified for the various fan discharges/inlets.

The construction of the short mill will satisfy the EPA construction noise limits as demonstrated previously.

We trust the above satisfies your immediate requirements.

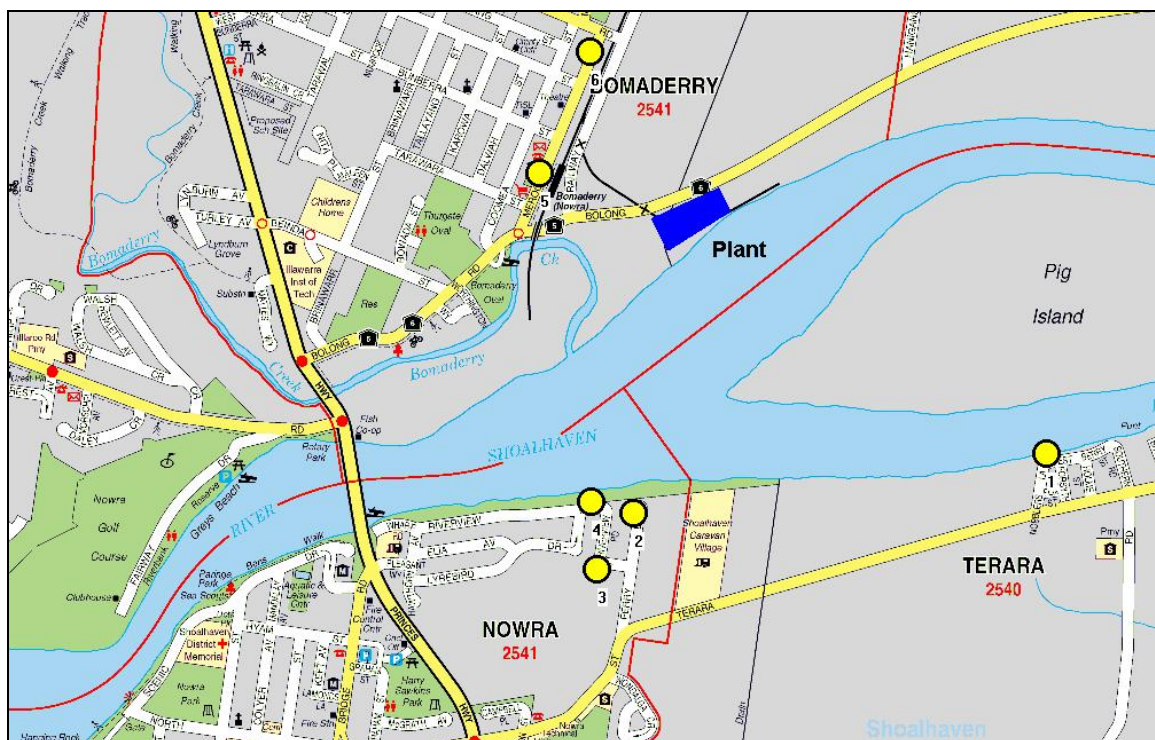
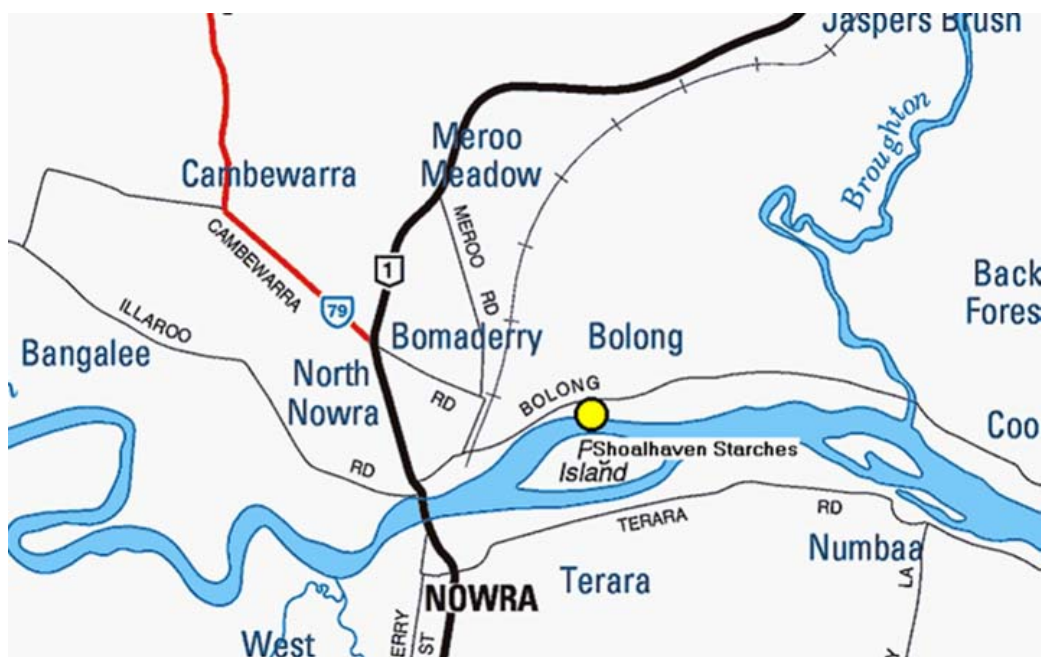
Yours faithfully,

THE ACOUSTIC GROUP PTY LTD


STEVEN E. COOPER



APPENDIX A: Site and Reference Measurement Locations



APPENDIX B: Proposed Plant - Noise Data

Ground Floor

Blower 1	96 dB(A) @ 1 m
Blower 2	96 dB(A) @ 1 m
Blower 3	97 dB(A) @ 1 m
Blower 4	97 dB(A) @ 1 m
Elevator	96 dB(A) @ 1 m
Blower Inlet Grille	Lw 101

Motor Floor

Roller Mill Motors	Lw 98
Detacters	Lw 81
Hammer Mill	Lw 99

Roll Mill Floor

Four Roller Mills	Lw 87
Eight Roller Mills	Lw 89
Combi Cleaners	Lw 95

Spouting Floor

Sifter	Lw 93
HP Fan (for hammer mill)	Lw 100
Combi Cleaner Fan	Lw 98

Cyclone Floor

HP Fans	Lw 107 (radiated)
Mill Aspirator Fan	96 dB(A) @ 1 m
Cleaning Aspirator Fan	97 dB(A) @ 1 m
Elevator Heads	68 dB(A) @ 1 m

Roof

HP Fan 1 Discharge	Lw 117 (in duct)
HP Fan 2 Discharge	Lw 109 (in duct)
Mill Aspirator Fan	Lw 107 (in duct)
Cleaning Aspirator Fan	Lw 106 (in duct)



Wheat Silos

Chain Conveyor	Lw 80
Bucket Elevator	Lw 76

