

18 June 2010

TTMref: 33796 L05 West Byron Revised Acoustic Advice TTM 16 June 2010.doc

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Dear Steve,

**RE West Byron Urban Release Area
Revised Preliminary Acoustic Advice**

TTM provide the following preliminary design advice in regards to noise impacting the proposed development site. Based on site inspections and noise monitoring results, indicative acoustic treatments are listed in order to achieve compliance at the ground floor of future dwellings.

1. ROAD TRAFFIC NOISE

1.1. Measured Noise Levels

Existing traffic noise levels have been obtained from noise monitoring performed at the subject site on Tuesday 30/03/2010. The microphone was in a free-field location, approximately 70m from the nearest lane of Ewingsdale Road, and had an unobstructed line of sight to the road. The measured noise levels are presented in Table 1.

Table 1: Measured Traffic Noise Levels

Road Traffic Noise Descriptor	Time Period	Measured Level dB(A)
L _{10,18hr}	6am to midnight	57
L _{eq, 15 hour}	7am - 10pm	56
L _{eq, 9 hour}	10pm - 7am	51
Noisiest day-time L _{eq,1 hr}	7am to 8am	59
Noisiest night-time L _{eq,1 hr}	6am to 7am	56

Preliminary calculations indicate that buffer zones, acoustic barriers, or a combination of both may be required to comply with the noise criteria outlined in the EPA document 'Environmental Criteria for Road Traffic Noise 1999'.

1.2. Noise Prediction

For the purposes of road traffic noise calculations, data for Ewingsdale Road is as follows;

- Year 2008 traffic volume count of 14,120 AADT from Veitch Lister Consulting.
- 10 year growth rate of 2.2% compound increase per annum.
- Various speed limits have been assessed. Currently the speed limit is 80km/h; however speed limits of 70km/h, 60km/h, and 50km/h have been assessed due to possible future changes along Ewingsdale Road.

Traffic noise levels can be corrected based on the speed limit of the road. Table 2 details the correction factors with reference to the existing speed limit of 80km/h.

Table 2: Correction Factors for various speed limits

Speed Limit (km/h)	Correction to measured value dB(A)
80	0
70	- 0.9
60	- 1.9
50	- 2.8

The future noise levels at the noise logger position based on the various speed limits are shown in Table 3 below.

Table 3: Future Noise Levels

Road Traffic Noise Descriptor	Time Period	Future Noise Level dB(A) (free-field)			
		80km/h	70km/h	60km/h	50km/h
$L_{10,18hr}$	6am to midnight	60	59	58	57
$L_{eq,15\text{ hour}}$	7am - 10pm	58	57	56	55
$L_{eq,9\text{ hour}}$	10pm - 7am	53	52	51	50
Noisiest day-time $L_{eq,1\text{ hr}}$	7am to 8am	61	60	59	58
Noisiest night-time $L_{eq,1\text{ hr}}$	6am to 7am	58	57	56	55

1.3. Residential Component

The following section outlines buffer distances and barrier heights required in order to achieve compliance at ground floor of dwellings. The setback distances shown in the tables below are from the northern boundary of the site. In the case of acoustic barriers, the receiver location is 10m behind the acoustic barrier for all noise calculations (i.e. receiver located 10m south of the acoustic barrier).

1.3.1. Ewingsdale Road Speed Limit - 80km/h

The potential treatments based on a speed limit of 80km/h along Ewingsdale Road are summarised in Table 4.

Table 4: Potential Treatment based on a Speed Limit of 80km/h

Acoustic Barrier Location	Setback Distance (m)	Barrier Height Required (m)
No Barriers	155	n/a
Barrier located on northern site boundary	-	4.9
Barrier setback from the site boundary	25	4.0
Barrier setback from the site boundary	50	3.4

1.3.2. Ewingsdale Road Speed Limit - 70km/h

The potential treatments based on a speed limit of 70km/h along Ewingsdale Road are summarised in Table 5.

Table 5: Potential Treatment based on a Speed Limit of 70km/h

Acoustic Barrier Location	Setback Distance (m)	Barrier Height Required (m)
No Barriers	135	n/a
Barrier located on northern site boundary	-	4.5
Barrier setback from the site boundary	25	3.6
Barrier setback from the site boundary	50	3.0

1.3.3. Ewingsdale Road Speed Limit - 60km/h

The potential treatments based on a speed limit of 60km/h along Ewingsdale Road are summarised in Table 6.

Table 6: Potential Treatment based on a Speed Limit of 60km/h

Acoustic Barrier Location	Setback Distance (m)	Barrier Height Required (m)
No Barriers	115	n/a
Barrier located on northern site boundary	-	4.1
Barrier setback from the site boundary	25	3.2
Barrier setback from the site boundary	50	2.7

1.3.4. Ewingsdale Road Speed Limit - 50km/h

The potential treatments based on a speed limit of 50km/h along Ewingsdale Road are summarised in Table 7.

Table 7: Potential Treatment based on a Speed Limit of 50km/h

Acoustic Barrier Location	Setback Distance (m)	Barrier Height Required (m)
No Barriers	95	n/a
Barrier located on northern site boundary	-	3.7
Barrier setback from the site boundary	25	2.8
Barrier setback from the site boundary	50	2.3

The above treatments are calculated to achieve compliance at ground floor of lots. Traffic noise levels may be above the criteria for upper storeys of dwellings in some instances. Noise attenuation for upper floors of dwellings can be achieved through the application of building treatments.

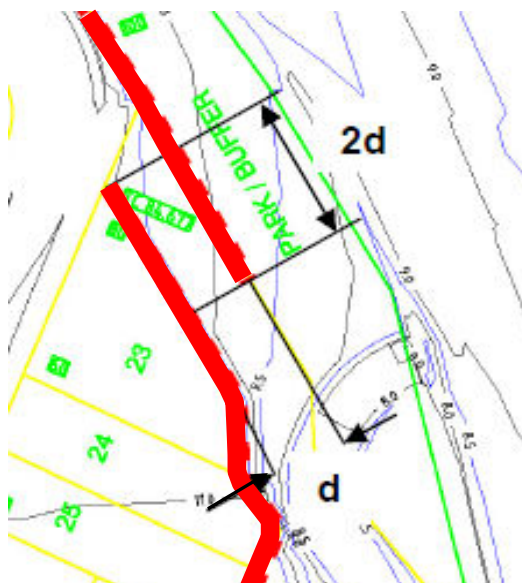
1.4. Acoustic Barrier General Recommendations

To achieve compliance at residential areas of the development, acoustic barriers may be needed depending on the dwelling setback distance. Acoustic barriers can be constructed of materials such as earth mounds, lapped timber palings, fibre cement sheet, plywood, Perspex, glass, concrete or masonry or other suitable materials.

A combination of materials may be used to achieve the required barrier height. The barrier should be designed so that the materials have a surface mass of at least 12.5kg/m². Care should be taken to ensure no significant gaps or holes are evident.

Breaks in acoustic barriers may be required for purposes such as access footpaths. In this case, certain design is required in order to maintain the noise attenuation. Figure 1 below shows that a return on the barrier would need to be twice the length of the gap.

Figure 1: Typical Acoustic Barrier Design where gaps are required



1.5. Non-Residential Component

A non-residential component may be proposed on the development site.

In accordance with the EPA 'Environmental Criteria for Road Traffic Noise', noise affected buildings can be designed to achieve the internal noise limits listed in Australian Standard AS2107:2000 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

Based on the predicted noise level at the site boundary due to a speed limit of 80km/h, rooms which are noise affected may require the following indicative building treatments;

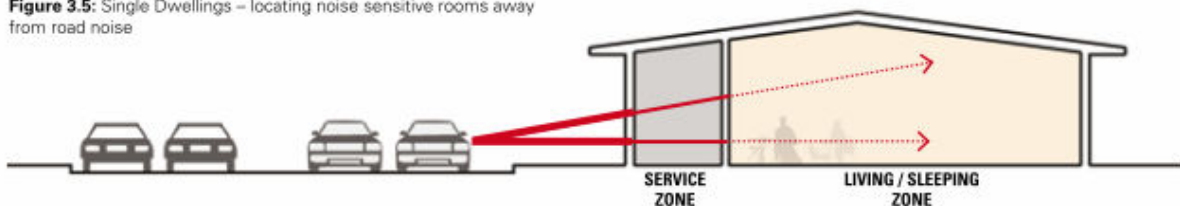
- 6.38mm laminate glass to achieve an R_w 30 rating.
- Brick veneer / masonry wall construction, or lightweight walls inclusive of acoustic treatment.
- Sheet metal or concrete tile roof, with minimum 50mm thick glasswool insulation.

1.6. Building Internal Layout

The NSW Department of Planning (DoP) guideline "Development Near Rail Corridors and Busy Roads" recommends particular building layouts to minimise potential noise from traffic. The document is not mandatory (based on the traffic volumes along Ewingsdale Rd), but in this case can be used as a guide to assist with design.

It is likely that "home offices" could be incorporated into some residential premises. This would be a beneficial outcome for the project as the non-residential components would face Ewingsdale Road, thereby shielding noise to any adjacent residential components to the south. The following extract from the DoP guideline simplifies this for the case of single storey buildings;

Figure 3.5: Single Dwellings – locating noise sensitive rooms away from road noise



Similarly for residential areas located on upper floors of mixed used buildings, the upstairs layout would preferably include non-noise sensitive areas positioned towards the northern façade of the buildings. The following diagram from DoP is based on residential use for both downstairs and upstairs, however the upstairs configuration would be the same in the case of commercial downstairs;

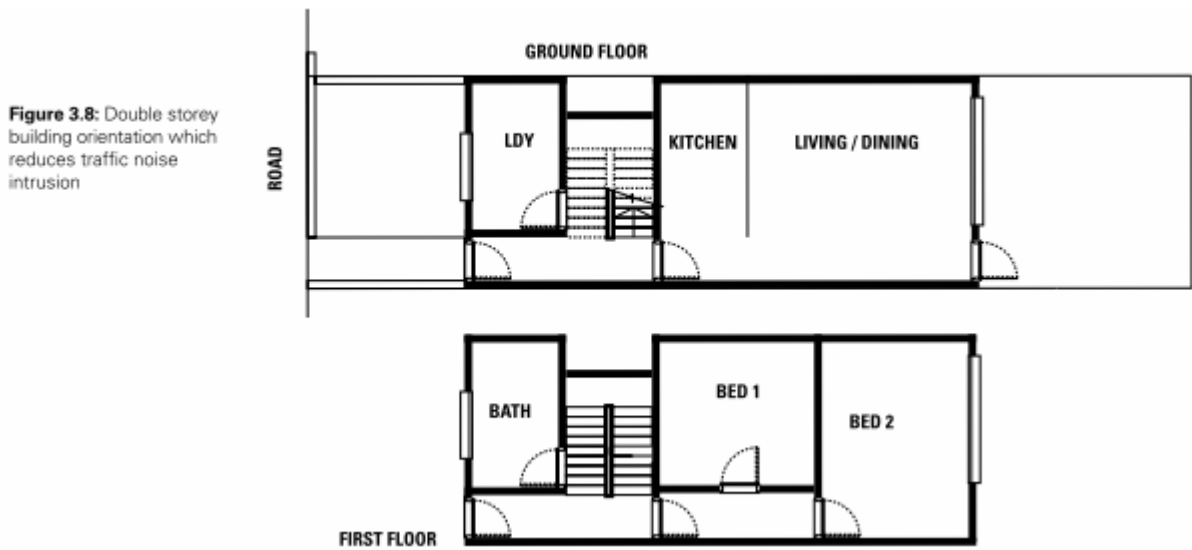


Figure 3.8: Double storey building orientation which reduces traffic noise intrusion

For positioning of private courtyards, the principle remains the same.

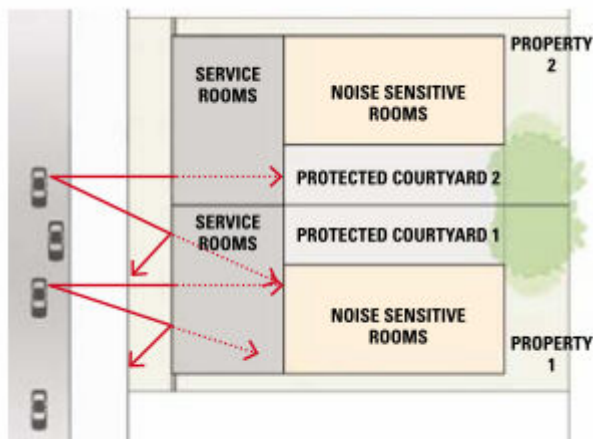


Figure 3.17: Noise shielded courtyards

For residential parts of the development that have been acoustically shielded for traffic noise and comply with the criteria, there would be no requirement to provide specific internal layout design with respect to noise. This usually means ground floor of residential areas where acoustic barriers or earthmounds have already reduced noise to meet the criteria.

It should be noted that the requirements for other factors (such as BASIX and general design) may impose specific constraints which are of greater overall significance than the acoustic design requirements. In these cases, where it is not possible to achieve layouts similar to those shown, it will be possible to incorporate acoustic treatments into the building design in order to satisfy the interior noise level criteria. This would include appropriate selection of wall, roof, glazing and other materials.

2. NOISE FROM SUNNYBRAND CHICKENS

Noise from the Sunnybrand Chicken poultry processing factory may impact the development site. Subsequently, the following section outlines the potential noise impacts at residential adjoining the chicken abattoir.

Noise monitoring was conducted to establish the existing ambient background noise levels. From the results of the noise logger the intrusive noise criteria is presented in Table 8.

Table 8: Intrusive Noise Criteria

Time Period	Noise Level Limits SPL (dB(A))
Day (7am-6pm)	52
Evening (6pm - 10pm)	50
Night (10pm - 7am)	47

The major noise source from the factory, as observed on-site, was the operation of refrigeration containers located in proximity to the site boundary (shown in Figure 2 below). The refrigeration containers operate continuously 24 hours per day. Therefore, noise at future residential will need to comply with the night time criteria. Other uses along the common boundary included staff rooms, offices, and storage areas.

Figure 2: Location of Refrigeration Containers



Attended measurements were taken of noise emanating from the refrigeration containers. The noise source level was found to be approximately 88 dB(A) Leq at 1m.

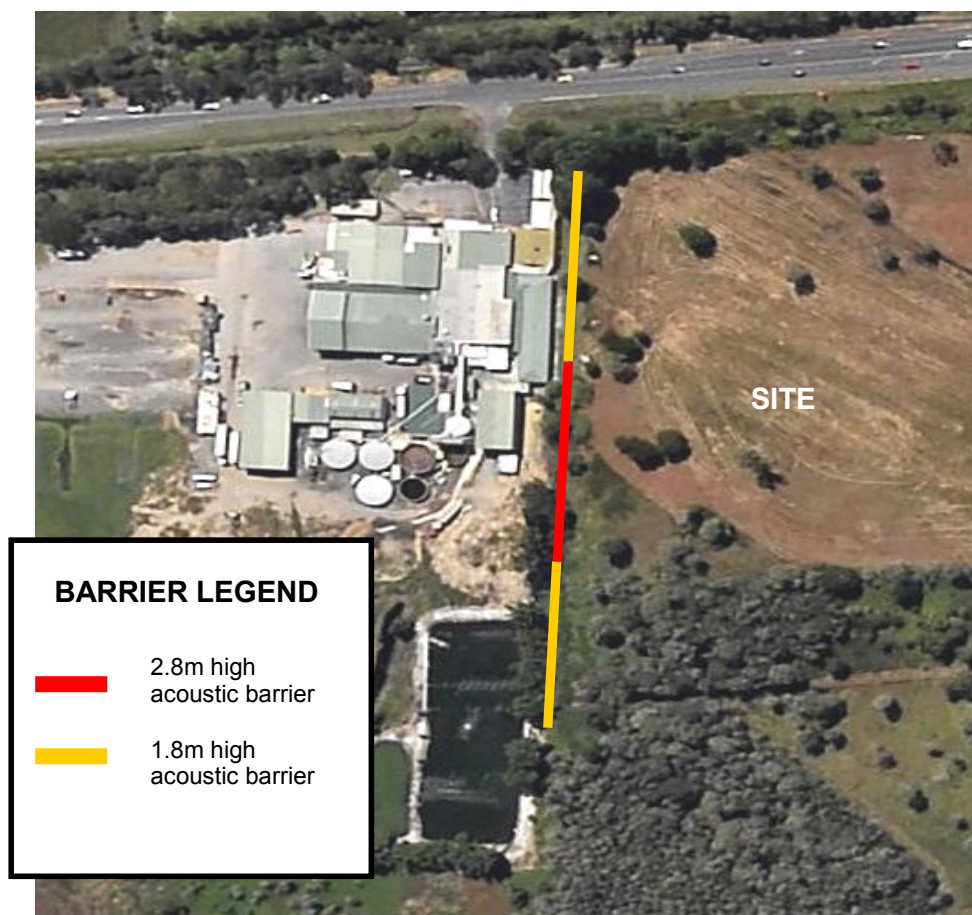
To comply with the noise limit of 47 dB(A) in accordance with the NSW Industrial Noise Policy, the potential acoustic treatment is listed in Table 9 below.

Table 9: Treatment to achieve compliance for noise from Abattoir

Acoustic Barrier Location	Setback Distance (m)	Barrier Height Required (m)
No Barriers	105	n/a
Barrier located on western site boundary	-	3.6
Barrier setback from the site boundary	20	2.8

The barrier heights shown in the table above are not be required for the entire length of the site boundary. Figure 3 below shows the required extents and heights of acoustic barriers in order to reduce noise from Sunnybrand Chickens to acceptable levels.

Figure 3: Possible Acoustic Barriers along western boundary



3. CONCLUSION

Based on the results of noise monitoring, acoustic treatment would be required in order to reduce noise levels at the proposed development. Where noise levels at future dwellings are predicted to be above the criteria, attenuation can be achieved through the application of building treatments.

If you have any queries, please do not hesitate to call us to discuss.

Yours faithfully,

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