



4 February 2011

Ref: 10530/3858

De Witt Consulting
P.O. Box 850
Charlestown NSW 2290

Attn: David Humhpris

RE: PROPOSED MOSQUE – CROUDACE ROAD ELMORE VALE

This letter addresses queries raised by NCC in their letter to De Witt Consulting, dated 21/12/10 (ref. no. 10/1049), in reference to the noise assessment for the proposed mosque at 158A and 164 Croudace Road, Elmore Vale.

For ease of understanding, the points raised in the NCC letter in relation to acoustic issues are addressed here in the same order as that letter.

Section 6 Landscape

Paragraph 5 on P13 details a suggestion from the Urban Design Consultative Group that part of the acoustic fence at the northern end of the site be replaced with a more visually open timber screen. The location suggested adjoins the public reserve to the northeast of the site.

A review of the layout and the proposed activities on the site has shown that, due to acoustic screening effects of the structure of the mosque and, more significantly, the Imam house it would be possible to replace that part of the proposed fence as shown (dotted in red) below in **Figure 1**.

As indicated above the section of fence that may be replaced adjoins a public reserve. The replacement screen need not have any specific acoustic properties.

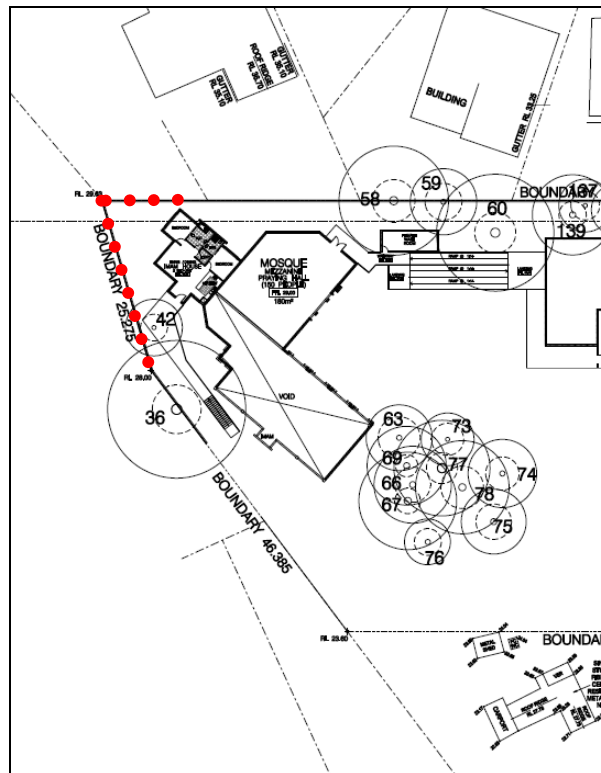


Figure 1 – Revised Acoustic Fence Location

Section 26 Environmental Issues – “Noise”

Paragraph 1 relates to the use of amplified speech for religious lectures.

The original acoustic assessment for the proposal (Spectrum Acoustic Rpt. No. 10530/3471 dated June 2010) based calculations of potential impacts on measurements made of the amplified speech of the Imam at the existing mosque in Wallsend.

As stated in that report;

“The current setup has an individual speaker mounted at the front of the room, near the Imam. The volume of the speaker is set high enough for the sermon to be heard throughout the entire mosque building, including in the entrance vestibule. The measured noise level is, therefore, considered to be a worst case and likely higher than the level that would be expected throughout the majority of the prayer hall at the proposed mosque.

The proposed mosque will be a larger building with more area for the congregation to be spread throughout. To maintain the acoustic amenity of the entire congregation whilst ensuring that all can hear the sermon a sound system with several smaller speakers mounted within the worship space should be considered rather than one (or a set) of larger speakers mounted either centrally or near the Imam.”

For the theoretical calculation of potential impacts the original assessment used a sound pressure level (SPL) of 80 dB(A) Leq (15 min) at the interior surface of the walls of the prayer hall. This is the

SPL that was measured at the existing prayer hall and is considered to be appropriate for the new hall. Maintaining the noise at a level of 80 dB(A) Leq or lower at the new prayer hall would be readily achievable through the use of small speakers mounted at regular intervals throughout the worship space as proposed. Noise levels higher than this would not be appropriate for a place of worship.

Paragraph 2 relates to potential impacts at no. 166 Croudace Road (Table 10)

Since the commencement of the original assessment there have been new double storey town houses constructed at no. 166 Croudace Street. NCC has requested an assessment of noise emissions from the upper level of the proposed car park to potentially impact on the first floor of the nearest town house at 166 Croudace Street. The lower level of the car park will be in cut relative to this receiver and noise from this level will, therefore, be shielded by the intervening retaining walls.

Table 1 shows a calculation of noise emissions from the upper level car park and impacting at the boundary of the town house development at 166 Croudace Street. Car park notations are as shown in Appendix III of the original acoustic report. The basis of the sound power levels used in the calculations is as per detail in the original report. The upper level of the car park will only be used during the day and, therefore, the received noise is here assessed against the day time criterion only.

TABLE 1 CALCULATED SPL FROM CAR PARK Leq (15 min)	
Car Park Number	166 Croudace Street
16	36
17	40
18	41
19	41
20	45
21	45
Total	51
Criterion	47

The results in Table 1 show that, under the assessed scenario, there is a potential 4 dB(A) Leq (15 min) exceedance at the boundary of number 166 Croudace Street.

The noise criteria in the INP are external ones. That is, they are applicable in outdoor areas of a residence. The new town houses at 166 Croudace Street have been constructed with blank walls facing toward the proposed car park site. There are only narrow windows (most likely) to service areas facing the car park. The rear town house, which is closest to the proposed car park, has a small balcony on its western façade which may potentially be impacted by the car park noise. The centre of this balcony is approximately 5m from the boundary.

Table 2 shows a revision of Table 1 allowing for an additional 5m distance loss to the centre of the balcony.

TABLE 2 CALCULATED SPL FROM CAR PARK Leq (15 min)	
Car Park Number	166 Croudace Street Rear Balcony
16	35
17	38
18	39
19	39
20	41
21	41
Total	47
Criterion	47

The results in Table 2 show that the assessed noise from the car park will comply with the day time criterion at a theoretical reception point on the balcony of the nearest town house to the site.

In addition to the external noise criteria, to maintain the amenity of residents, it is also recommended that future internal noise levels comply with Australian Standard AS/NZS 2107-2000 "Recommended Sound Levels and Reverberation Times for Building Interiors". The Standard specifies acceptable interior sound levels for areas of occupancy, applicable to steady state or quasi steady state sounds such as building services and traffic noise. This standard is considered useful in gauging any potential adverse impacts as a result of the noise emissions from the car park.

Table 1 of AS/NZS 2107 specifies the following recommended satisfactory and maximum noise levels for residential buildings in inner suburban areas (measurements are to be made in the absence of transient acoustic events, but in the presence of normally operating building services):

Sleeping Areas	30 dB(A) to 40 dB(A) L_{eq}
Living Areas	35 dB(A) to 45 dB(A) L_{eq}
Work Areas	35 dB(A) to 45 dB(A) L_{eq}

Living areas referred to in the Standard are the normal living areas within a house or unit, for example lounge and living rooms etc. The mid point of each range is, typically, used for such assessment. For a living area (as would be impacted by day time noise) this is 40 dB(A) L_{eq} .

For a broad spectrum noise source it is generally accepted that there is a 10 dB(A) sound transmission loss from the outside of a residence, through an open window to the inside at the centre of a room. Assuming a received noise of 47 dB(A) L_{eq} (15 min) on the balcony of the nearest town house this equates to an internal noise level of less than 37 dB(A) L_{eq} (15 min), which is well within the acceptable range from the Standard.

Paragraph 3 relates to the noise from cars on the driveway (Table 11)

The original acoustic report stated;

"Based on the absolute worst case assumption that 75% of car parks will be utilised in a single 15 minute period either at the start or end of the Jumaa prayer this would equate to approximately 125 cars using the driveway in this time. For acoustic purposes the traffic, and therefore the noise emissions, would be considered to be constant.

Cars using the driveway would do so at low speeds, generally less than 10 kph. The L_w of a car moving at 10 kph was taken from the Spectrum Acoustics technical database. For the assessment of potential impacts it was assumed that the noise was constant for the entire 15 minute period during the day."

That is, to consider an absolute worst case, there was a car assumed to be passing a theoretical reception point near the driveway constantly throughout a single 15 minute period. This scenario is not likely to happen. A reassessment of the driveway noise is shown below using the DECCW accepted Intermittent Traffic Noise guidelines, as described in the original report.

Equation 1, below, outlines the mathematical formula used in calculating the $L_{eq,T}$ noise level for intermittent traffic noise. A day time scenario of 125 vehicle movements in a 15 minute period has been used with results shown in **Table 3**.

$$L_{eq,T} = L_b + 10 \log \left[1 + \frac{ND}{T} \left(\frac{10^{(L_{max} - L_b) / 10} - 1}{2.3} - \frac{(L_{max} - L_b)}{10} \right) \right]$$

Equation 1

Where

L_b is background noise level, dB(A)

L_{MAX} is vehicle noise, dB(A)

T is the time for each group of vehicles (min)

N is number of vehicle trips

D is duration of noise of each vehicle (min)

TABLE 3 RECEIVED NOISE (Leq (15 min)) DRIVEWAY (DAY)	
Element	dB(A)
No. of Vehicle movements (per 15 minute)	125
L_w per vehicle @ 10 kph	84
Distance Loss (7.5m)	-26
Received Noise (Leq 15 min) per eqn. 1	57
Barrier loss (2.1m)	-14
Total received noise	43

Criterion – night (Leq 15 min)	47
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The results in Table 3 show that the assessed driveway noise will comply with the day time noise criterion. The results in Table 3 also correlate well with the results from the original assessment and, therefore, no further assessment is considered warranted.

Paragraph 4 relates to the noise from cars in the car park (Tables 13 and 14)

The NCC query relates to the potential for sleep disturbance from noise from cars bringing people to early morning prayers. Appendix II of the original acoustic report shows the “*Expected usage of the Facilities*”. For early morning prayers it is anticipated that there will be only 10 to 15 people present.

It is considered that the natural instinct will be for these people to park in the parking areas closest to the entrance to the prayer hall, that is, near the centre of the car parking area.

To minimise the potential for any adverse impacts signs will be erected at the top of the driveway and along the boundary fence with the residence at 158 Croudace Road, informing the congregation to respect the amenity of neighbours and not park in spaces near the fence prior to 7 am.

The exclusion zone area where parking is not permitted prior to 7 am is shown hatched in red on **Figure 2**, below. The received noise from the Lmax emissions from all other car parking spaces will not exceed the sleep disturbance criterion at any residences.

Definition of the exclusion zone can be dealt with as a condition of any development consent granted and managed on site accordingly through, amongst other things, appropriate signage and informing the congregation of the need to respect the amenity of neighbours and minimise noise.

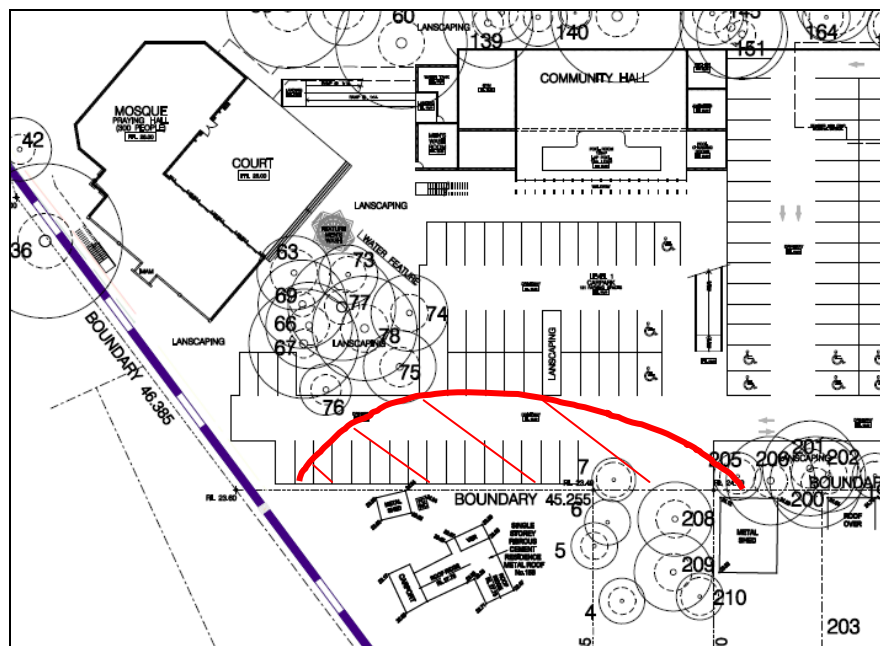


Figure 2 - Pre 7am Car Park Exclusion Zone

Paragraph 5 relates to the noise from cars entering the car park prior to 7am

The NCC query relates specifically to people arriving prior to 7 am for the Eidl Fatr and Eidul Adha prayers which commence at 7.30 am. It should first be pointed out that these are both specific one-off prayer sessions which will occur only once each per year.

Spokespeople for the proponents have indicated that, whilst the prayer session is scheduled to start at 7.30 am, not all of the congregation is, typically, present at the commencement.

In locations such as the current project site, where background noise levels are steadily increasing from about 6am due to the movement of traffic, the INP allows for the assessment of impacts against noise criteria determined for what are termed shoulder periods. The INP indicates that, "as a rule of thumb it may be appropriate to assign a shoulder period rating background level as the mid point value between the rating background levels of the two assessment periods that are on either side of the shoulder period."

The project specific noise level for the shoulder period for the assessment, based on the data from the original report, is set at **43 dB(A) Leq (15 min)**.

Table 10 from the original report shows that the worst case predicted car park noise is 41 dB(A) Leq (15 min) which would not exceed the shoulder period noise goal if 126 car parking spaces were occupied in a single 15 minute period.

Table 2, above in the current letter, shows a worst case predicted noise of 47 dB(A) Leq (15 min) at 166 Croudace Road as a result of noise from the car park. The results in Table 2 relate to noise from the upper level of the car park. Parking spaces in this section of the car park are the farthest away from the prayer hall and, therefore, likely to be the last to be occupied (which would be after 7 am).

In relation to noise from cars on the driveway calculations were carried out to determine the maximum number of vehicles that could enter the car park in a 15 minute period during the shoulder period before the noise goal would be exceeded. The final result of these calculations is shown below in

Table 4.

TABLE 4 RECEIVED NOISE (Leq (15 min)) DRIVEWAY (MORNING SHOULDER)	
Element	dB(A)
No. of Vehicle movements (per 15 minute)	125
Lw per vehicle @ 10 kph	84
Distance Loss (7.5m)	-26
Received Noise (Leq 15 min) per eqn. 1	57
Barrier loss (2.1m)	-14
Total received noise	43
Criterion – Morning Shoulder (Leq 15 min)	43

The results in Table 4 show that, during the morning shoulder period, there will be no adverse impacts as a result of the assessed noise from 125 cars on the driveway in a 15 minute period. That rate of car movements is considered the worst case for car park use during the day and is unlikely to occur prior to 7am.

Paragraph 6 relates to construction noise impacts (Table 17)

The construction noise criterion is 52 dB(A). **Table 5** shows an assessment of potential construction noise impacts at receivers in Andretta Avenue as a result of general construction works taking place approximately 20m away on the site of the proposed car park (note this is a revision of Table 17 from the original report).

TABLE 5 CONSTRUCTION NOISE dB(A) Leq (15 min) ANDRETTA AVENUE	
General construction noise, dB(A)Leq	104
Distance Loss to Receiver, (20 m)	34
Received Noise	70
Criterion	52
Impact	18

The results in Table 5 show, that under the assessed conditions, there will be exceedances of the construction noise criterion at residential receivers surrounding the site. These exceedances will be of a short term nature and will occur only during the day. The received noise will result in received noise in the "noise affected" category but below the "highly affected" category of the DECCW's Interim Construction Noise Guideline.

It must be noted that the exceedance shown is for the noise associated with the initial phase of construction involving heavy machinery undertaking excavation work and site preparation as described previously. This phase of the construction will be only short term in nature.

The original acoustic report detailed a series of recommendations that will allow the management of noise emissions to minimise adverse impacts. In addition to these it is further recommended that, where it is logistically practical, the acoustic fences proposed to be constructed around the site be erected prior to the commencement of the initial ground preparation works, or at the earliest opportunity during this phase of construction.

NCC has requested clarification of whether pile driving or rock breaking will be conducted on site. Whether or not either of these site preparation methods will be required will be dependent upon the outcomes of a geotechnical study which is yet to be carried out.

Should a geotechnical study determine that either pile driving or rock breaking is required, and define the locations and extent of any such activities, a noise and vibration assessment must be carried out. The assessment must consider the potential for any adverse noise and vibration impacts and, if

warranted, recommend management plans and techniques and/or control measures to mitigate the impacts. This can be dealt with as a condition of any consent granted.

Additional Comments

In addition to the comments raised by NCC that were specific to acoustics, engineering consultants have been requested to address factors relating extreme flood events and the requirement for drainage through the acoustic barrier along the eastern boundary of the site. The barrier in this location will be a composite construction of a fence on top of a retaining wall.

To maintain the acoustic integrity of the fencing and, if required, allow for the necessary passage of water through the barrier it is recommended that any "gaps" in the barrier be constructed with, acoustically suitable, hinged gates. The gates would allow for water to pass through but when not in use the gates would close to cover the gaps and maintain the acoustic integrity of the barrier.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED



Ross Hodge

Acoustical Consultant