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Proposed Mosque and Community Facilities  
Croudace Road, Elmore Vale  
Peer Review 2 - Acoustics

Report Number 630.10171-R2

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# Proposed Mosque and Community Facilities

Croudace Road, Elmore Vale

## Peer Review 2 - Acoustics

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## 1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) has been commissioned by the NSW Department of Planning and Infrastructure (DoPI) to conduct a peer review of the response prepared by Spectrum Acoustics regarding the Hunter and Central Coast Joint Regional Planning Panel's (JRPP) request for additional information in relation to the Noise Impact Assessment (NIA) prepared for the proposed mosque and community centre.

Broadly the objectives of this review were as follows:

- Review the methodology, techniques and results of the response.
- Provide opinions and recommendations as to the adequacy of and improvements required to the acoustic assessment.
- Comment on whether all issues raised in the initial peer review report prepared by SLR Consulting have been addressed.

This review has been prepared with reference to the following documents:

- *Noise Assessment Proposed Place of Worship 158A Croudace Road Elmore Vale, NSW* dated June 2010 by Spectrum Acoustics Pty Limited (hereafter referred to as the Acoustic Report).
- *RE: Proposed Mosque – Croudace Road Elmore Vale*, dated 21 March 2011 by Spectrum Acoustics Pty Ltd (hereafter referred to as the Acoustic Report Addendum).
- *DA 10/1049 – Demolition of dwelling at 158a Croudace Road, Elmore Vale, subdivision of 164 Croudace Road, Elmore Vale and construction of a mosque, community centre, funeral ceremony building and carparking area*, dated Monday 11 April 2011 by NCC (hereafter referred to as the NCC Assessment).
- *Proposed Mosque and Community Facilities Croudace Road, Elmore Vale Peer Review – Acoustics* dated 18 April 2011 by SLR Consulting Australia Pty Ltd (hereafter referred to as the Peer Review).
- *RE: Proposed Mosque – Croudace Road Elmore Vale*, letter dated 2 May 2011 by Spectrum Acoustics Pty Ltd. (attached as **Appendix A**)
- JRPP Minutes (from 5 May 2011 Panel meeting).
- *RE: Proposed Mosque – Croudace Road Elmore Vale*, letter dated 30 May 2011 by Spectrum Acoustics Pty Ltd. (attached as **Appendix B**)

## 2 PREVIOUS SLR CONSULTING RECOMMENDATIONS

Recommendations provided by SLR Consulting in the Peer Review (dated 18 April 2011) are provided in **Table 1** together with comments as to the adequacy of the response(s) by Spectrum Acoustics. Further discussion is provided in **Section 3** where the response from Spectrum Acoustics was not considered adequate.

The assessment of adequacy by SLR Consulting of the response(s) by Spectrum Acoustics also considers the JRPP Minutes (from 5 May 2011 Panel meeting) in relation to acoustics, namely;

- 2) The applicant to provide additional information regarding noise impacts and issues raised in the independent acoustic consultant report by SLR including:*
- a) Addressing the cumulative noise impacts, including under non-neutral weather conditions; and*
  - b) Noise impacts from the eastern ramp to the upper level car park.*
- This response shall be reviewed by an independent acoustic consultant appointed by the Panel.*

**Table 1 Adequacy of Response to Previous SLR Consulting Recommendations**

<b>SLR Recommendations</b>	<b>Response from Spectrum Acoustics</b>	<b>Adequate Response?</b>
<i>Clarify the method used to quantify the existing level of industrial noise in the area in order to substantiate the amenity criteria derived for the site.</i>	Refer: Spectrum Acoustics letter dated 2 May 2011	Yes
<i>Provide predictions of noise from the courtyard to receivers in Croudace Road.</i>	Refer: Spectrum Acoustics letters dated 2 May 2011 and 30 May 2011	No, some inconsistencies identified. Refer <b>Section 3.1</b> .
<i>That additional information be supplied regarding the predicted noise levels from the car park under a typical evening and night-time operational scenario.</i>	Refer: Spectrum Acoustics letter dated 2 May 2011	Yes
<i>Provide predictions of cumulative noise from typical operating scenarios for residences surrounding the proposed development.</i>	Refer: Spectrum Acoustics letters dated 2 May 2011 and 30 May 2011	No, some inconsistencies identified and additional information required. See <b>Section 3.3</b> .
<i>There is no justification in the report as to why meteorological conditions have not been considered.</i>	Refer: Spectrum Acoustics letters dated 30 May 2011	No, additional information required. See <b>Section 3.4</b> .
<i>Clarify the use of a peak vehicle flow of 100 vehicles for calculating the traffic noise impact on Croudace Road.</i>	Refer: Spectrum Acoustics letter dated 2 May 2011	Yes

### 3 PEER REVIEW AND DISCUSSION

#### 3.1 Overview

The assessment of noise emissions from the proposed development by Spectrum Acoustics has been conducted in general accordance with the Industrial Noise Policy which is considered an appropriate method of assessment for this type of development. The assumptions made with regard to noise criteria, sound power levels, locations of acoustically significant sources and quantity of noise sources (eg cars) are, in general, considered appropriate for the purpose of assessing noise from the site.

Areas that require clarification and/or additional information are described in greater detail in the following sections. It is also noted that incorrect and ambiguous table headings throughout the report made it difficult to read and created uncertainty in the reader with regard to predicted noise emissions.

#### 3.2 Noise from Courtyard

Table A of Spectrum Acoustics letter dated 2 May 2011 provides a predicted sound pressure level from the courtyard at the “nearest residential boundary in Croudace Road” (at a distance of 60m) of 41 dBA. Table 3 of Spectrum Acoustics letter dated 30 May 2011 provides a predicted sound pressure level from the courtyard at Receiver 1 (distance of 50m) of 40 dBA. It is recommended that the inconsistency with regard to the distance to the receiver and the consequent change in predicted noise level be explained.

### 3.3 Cumulative Noise

Cumulative noise levels from a typical daytime operating scenario at Receivers 1 to 5 are presented in Tables 5 and 6 of Spectrum Acoustics letter dated 30 May 2011.

The typical operating scenario utilised for the purpose of assessing noise levels is considered conservative and representative of an acoustically worst-case situation however, it is noted that noise from the ramp is not included in Tables 5 and 6. (Also refer to **Section 3.6** with regard to noise from the ramp.) Furthermore, there is potential for noise from the ramp to have a significant contribution at the residence immediately east of Receiver 3. It is recommended that noise from the ramp be included in the cumulative noise assessment at all receivers including an additional receiver point at the residence immediately east of Receiver 3.

It is also noted that topography in the area surrounding the site is significant with residences in Cambronne Parade at higher elevation than those immediately adjacent the site. There is potential for barrier effects (from the 2.1m fence around the subject site) to be significantly less at these locations.

In this regard, the provision of noise contours for a typical operating scenario would be beneficial to pictorially demonstrate compliance with the relevant noise criteria at all neighbouring residences.

Cumulative noise levels from a typical daytime operating scenario at the Ramp receiver are presented in Table 13 of Spectrum Acoustics letter dated 30 May 2011. This table presents a predicted noise level ( $L_{Aeq}(15\text{minute})$ ) of 41 dBA from Car Park (parks 16-21). It is not apparent where the noise level has been predicted; what distance from the boundary, on ground level or at the balcony? Table 3 of Spectrum Acoustics report dated 21 March 2011 presents a predicted  $L_{Aeq}(15\text{minute})$  noise level of 47 dBA at the rear balcony of this receiver from the Car Park only (parks 16-21).

It is recommended that further information be supplied to clarify the location of the assessment point and the predicted cumulative noise level at this location.

### 3.4 Effects of Meteorology

As stated in the Peer Review *"SLR Consulting consider that due to the proximity of the proposed development to the nearest potentially affected residential receivers meteorological conditions would not significantly impact on the predicted noise levels presented."* However, adverse meteorological conditions (ie source to receiver winds and/or temperature inversions) have the potential to increase noise levels at residences further from the subject site than those considered in the original assessment.

It is recommended that further justification be provided as to why meteorological effects have not been considered. Alternatively, it is recommended that prevailing weather conditions be determined and an assessment of predicted noise emissions under prevailing adverse weather conditions be conducted. Presentation of noise contours under adverse weather conditions would also be extremely beneficial in this regard.

### 3.5 Use of Car Park – Evening and Night Periods

It was assumed that during the Isha prayer (evening period) that between 25 and 40 people would be in attendance and, consequently, that 15 cars would use the driveway and car park in a 15 minute period. Additionally, it was assumed that only car park zones 1, 3 and 5 (Refer Appendix A Spectrum Acoustics letter dated 30 May 2011) would be utilised. These are considered reasonable assumptions based on 25-40 people in attendance. Notwithstanding this, if car park zone 2 was also utilised during this time it is predicted that the evening criteria would still be achieved at the nearest potentially affected receiver to these sections of the car park (ie Receiver 1).

It is noted that during the night-time car park zones 1 and 2 would be in an exclusion zone for the purpose of minimising potential noise impacts at the nearest residences.

### 3.6 Ramp Noise

Spectrum Acoustics letter dated 30 May 2011 states the following:

*To consider a worst case it was assumed that 25 vehicles used the ramp in a single 15 minute period (there are 42 parking spaces on the upper level and two access ramps).*

It is recommended that further clarification of this assumption be provided given that the plans of the proposed development show the eastern ramp as an “up ramp” and the western ramp as a “down ramp”. There is potential for the traffic numbers to increase on the ramp if only the “up ramp” is used to access the upper car park.

The assumed sound power level of 87 dBA for individual cars travelling on the ramp seems reasonable. Notwithstanding this, it is recommended that details be provided with regard to whether the “*measurements made alongside a ramp in a Newcastle shopping centre*” were of cars travelling up or down the ramp.

## 4 SUMMARY OF RECOMMENDATIONS

SLR Consulting has reviewed the response prepared by Spectrum Acoustics regarding the JRPP request for additional information in relation to the NIA prepared for the proposed mosque and community centre.

SLR Consulting has assessed the adequacy of the response from Spectrum Acoustics (refer to **Section 2** of this report) and provided further recommendations with regard to potential improvements to the noise impact assessment (refer to **Section 3** of this report). A summary of SLR Consulting’s further recommendations is as follows:

- Corrections to be made to tables within the report to reflect the actual content of each:
  - Table 6 is labelled “Receiver 1” and does not contain Receiver 1 noise levels. Similarly for Table 11.
  - Table 13 is labelled “Receiver 1” whereas the text introduces the Table as relevant to the “Ramp receiver”.
- That the inconsistency with regard to the distance to the receiver and the consequent change in predicted noise level between Table A of Spectrum Acoustics letter dated 2 May 2011 and Table 3 of Spectrum Acoustics letter dated 30 May 2011 be explained.
- That noise from the ramp be included in the cumulative noise assessment at all receivers including an additional receiver point at the residence immediately east of Receiver 3.
- The provision of noise contours for a typical operating scenario would be beneficial to pictorially demonstrate compliance with the relevant noise criteria at all neighbouring residences.
- That further information be supplied to clarify the location of the assessment point and the predicted cumulative noise level at the Ramp receiver. (Refer to **Section 3.3** for further details.)
- That further justification be provided as to why meteorological effects have not been considered or that prevailing weather conditions be determined and an assessment of predicted noise emissions under prevailing adverse weather conditions be conducted. Presentation of noise contours under adverse weather conditions would also be extremely beneficial in this regard.
- That further clarification of the assumption regarding the number of vehicles using the eastern ramp be provided given that the plans of the proposed development show the eastern ramp as an “up ramp” and the western ramp as a “down ramp”.
- That details be provided with regard to whether the “*measurements made alongside a ramp in a Newcastle shopping centre*” were of cars travelling up or down the ramp.

## **5 CLOSURE**

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of NSW Department of Planning and Infrastructure. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR Consulting.

SLR Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.



***RE: Proposed Mosque – Croudace Road Elmore Vale, letter dated 2 May 2011 by Spectrum Acoustics Pty Ltd***



2 May 2011

Ref: 10530/3964

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

Attn: David Humhpris

**RE: PROPOSED MOSQUE – CROUDACE ROAD ELMORE VALE**

This letter is a response to queries raised in a review by SLR Consulting of the Spectrum Acoustics acoustic assessment for the proposed mosque at 158A and 164 Croudace Road, Elmore Vale. The SLR review “Proposed Mosque and Community Facilities Croudace Road, Elmore Vale Peer Review – Acoustics” (SLR review) raised a number of points which, for ease of understanding, will be addressed here in the same order as that review.

- *“Clarify the method used to quantify the existing level of industrial noise in the area in order to substantiate the amenity criteria derived for the site.”*

The only potential for existing industrial noise is from mechanical plant at the Elmore Vale Shopping Centre. Observations were made during several site visits and the noise from mechanical plant was inaudible each time. The noise environment was dominated by traffic noise (particularly at those residences closest to the shopping centre on Croudace Road). The existing industrial noise was, therefore, considered to be minimal and the applicable amenity criterion to be the “Acceptable Level” from the INP.

It can be shown that, even if it was assumed that all of the measured Leq noise from the unattended logger was considered to be attributed to existing industrial noise in the area, the amenity criteria derived from this would be higher than the criteria used in the assessment (which was based on the intrusiveness criteria).

The assessment was, therefore, based on the most stringent noise criteria.

- “Provide predictions of noise from the courtyard to receivers in Croudace Road.”

Based on the same assumptions in the original assessment **Table A** shows the results of calculations of noise from the courtyard impacting on a theoretical receiver standing 5m inside the nearest residential boundary in Croudace Road.

TABLE A CALCULATED SPL AT NEAREST RESIDENTIAL RECEIVER CROUDACE ROAD - COURTYARD NOISE									
	Octave Band Centre Frequency, Hz								
Item	dB(A)	63	125	250	500	1k	2k	4k	8k
Source Lw (50 people Leq 15 min)	92	44	61	76	86	87	87	76	62
Distance loss to receiver (60m)		44	44	44	44	44	44	44	44
Barrier Loss (2.1m)		5	5	6	6	7	8	10	13
SPL @ receiver	41	<0	12	26	36	36	35	22	5
Criterion Leq (15 min) (Day/Evening)	47/42								

The results in Table A show there will be no adverse impacts.

- “Provide predictions of cumulative noise from the proposed development, for typical operating scenarios, at surrounding residential receivers.”

Due to the spatial separation of the various potential noise sources and the theoretical reception points (which are at the nearest residential boundary to the source) the cumulative effects of the noises at any single reception point will be minimal.

By way of example the worst case predicted noise from each assessed activity which may occur on site concurrently (as shown in the SLR review) was considered to be impacting on a single theoretical reception point as shown below in **Table B** (the noise level shown is from the tables from the original report as shown). Note that this calculation is not to an actual location but is merely to show that there can be no cumulative noise impacts. The worst case predicted day time noises have been used.

TABLE B CUMULATIVE RECEIVED NOISE (Leq (15 min))	
Item	dB(A)
Mechanical plant (Table 9)	34
Courtyard (Table 5)	42
Driveway (Table 11)	44
Car Park (Table 10)	41
Received Noise	47.5
Criterion (day)	47

The similar calculation of the potential cumulative impact of worst case noise from the Mosque and mechanical plant gives a resultant theoretical noise of 43.5 dB(A) Leq (15 min).

- *“Clarify the use of a peak vehicle flow of 100 vehicles for calculating traffic noise impacts on Croudace Road.”*

The traffic noise calculation was based on a theoretical split of traffic numbers entering or leaving the site. That is, of 169 vehicle potentially entering/leaving the site, 100 were considered to travel in one direction (and therefore 69 in the other direction). Modifications to the proposed management of traffic have since determined that all 169 vehicles will have to travel in the same direction to enter the site. The traffic leaving the site, however, may still split in two directions.

As stated in Page 11 of the SLR report an addition of 69 vehicles is not likely to create an exceedance of the ECRTN criteria. The actual predicted noise level will increase by just over 2 dB(A) to a resultant 52 dB(A) Leq (1 hour) which is still in compliance with the criterion.

There was one other point raised on Page 10 of the SLR review relating to noise from the car park during typical evening and night time use.

Table 10 of the original assessment showed that, as a worst case with the car park in full use, the received noise would be 41 dB(A) which is compliance with the evening criterion. The use of the car park at night will be limited to the early morning prayers when only a small number of people may attend. Based on the annotations in Table 10 of the original report car parks 5 and 6 (and maybe 3) could be in use for the early morning prayers. The worst case total received noise from these car parks would be 31 dB(A) Leq (15 min) which in compliance with the night time criterion.

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

***RE: Proposed Mosque – Croudace Road Elmore Vale, letter dated 30 May 2011 by Spectrum Acoustics Pty Ltd***

30 May 2011

Ref: 10530/3983

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

Attn: David Humhpris

**RE: PROPOSED MOSQUE – CROUDACE ROAD ELMORE VALE**

This letter addresses points raised in relation to acoustics in the “minutes of the Hunter and Central Coast Joint Regional Planning Panel meeting held at Newcastle City Hall on Thursday, 05 May at 5.30pm” (JRPP).

Specifically, in relation to acoustics, the JRPP concluded that determination of the Development Application be deferred to enable;

*“The applicant to provide additional information in regarding noise impacts and issues in the independent acoustic consultant report by SLR including;*

*a) Addressing cumulative noise impacts, including under non-neutral weather conditions, and*

*b) Noise impacts from the eastern ramp to the upper level car park.”*

a) In the “Summary of Operational Noise Assessment” of the Proposed Mosque and Community Facilities Croudace Road, Elmore Vale Peer Review – Acoustics, Report number 630.10171, 18 April 2011 by SLR Consulting Australia Pty Ltd (SLR report) it is concluded that;

*“The Acoustic Report provides no assessment of the impact of noise sources occurring simultaneously under typical operational scenarios rather, individual noise sources from the proposed development are applied against the relevant criteria in isolation of other site noise sources. It is therefore, recommended that additional information be supplied regarding the cumulative noise contribution of the site under likely operational scenarios.”*

The proposed operation of the mosque is such that there may be occasions when more than one noise source is occurring simultaneously. As indicated in the SLR report the worst case for noise generation will occur before and after the Friday Jumaa Prayer. During this time people will be arriving at the car park and moving into the mosque. The noise may therefore be from the driveway,

car park, courtyard at the mosque and mechanical plant. There will be use of the hall, other than for quiet individual prayers and readings. The noise from all of these sources has been determined (using all sound levels and assumptions from the original assessment by Spectrum Acoustics) at each of the five representative residential receiver points shown in **Figure 1**. To look at an absolute worst case the noise from the prayers session in the mosque has also been considered to be operating at the same time as the other noises detailed above.

It should be noted that, pursuant to Islamic customs, no other facilities on the site (e.g. the community hall, etc.) are allowed to be used during prayer times. There will be no overlap of use of any ancillary facilities and, consequently, the maximum number of people using the Mosque will represent the maximum number of people on site at any one time.

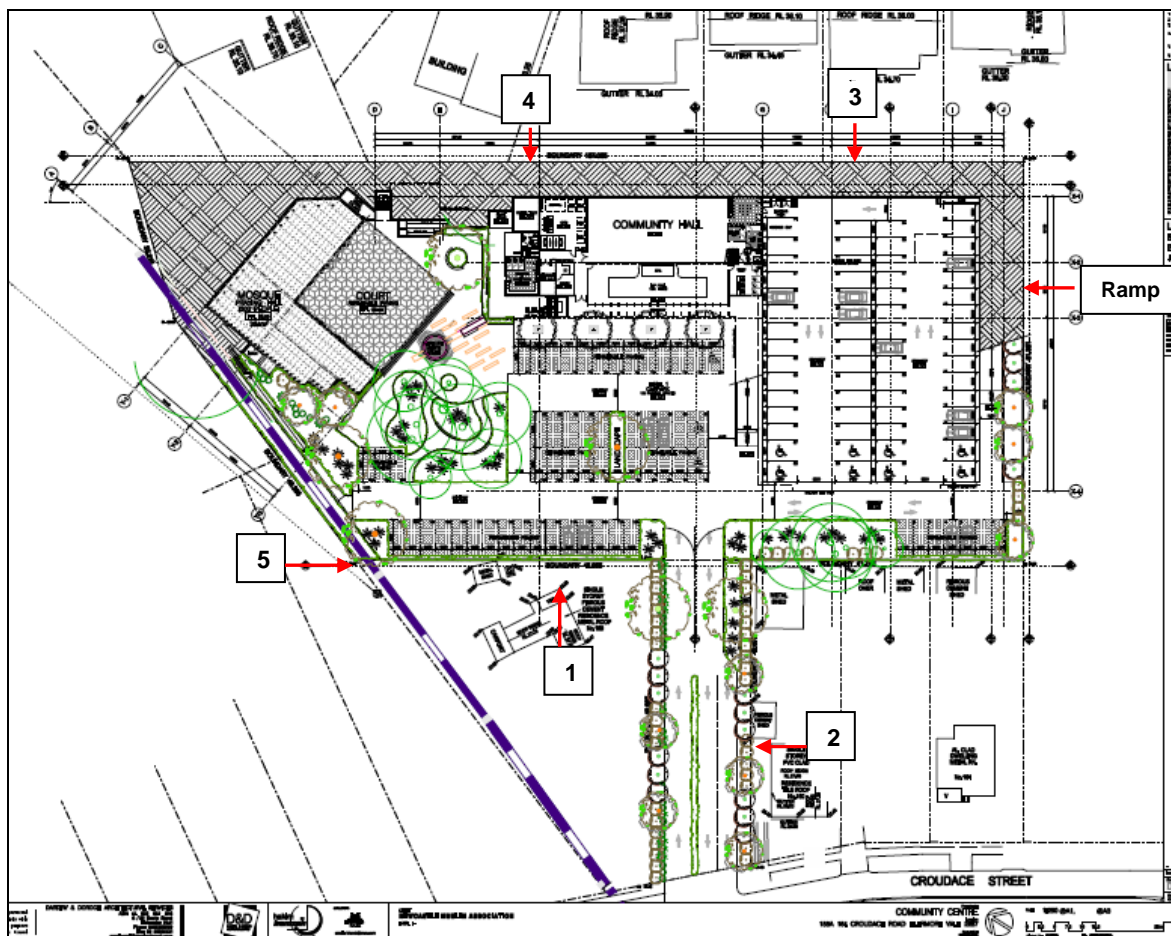


Figure 1 – Receiver Locations

For **Receiver 1** the calculation of noise from the driveway during the day is shown in **Table 1**.

TABLE 1 RECEIVER 1 NOISE (Leq (15 min)) – DRIVEWAY (DAY)	
Item	dB(A)
Sound Power Level (Leq)	84
Distance Loss to Receiver (35 m)	-39
Barrier Effects (2.1 m fence)	-13
Received Noise	32
Criterion (day)	47

For Receiver 1 the calculation of car park noise during the day is shown in **Table 2**. Car park notations as per the figure in **Appendix A**.

TABLE 2 CALCULATED SPL FROM CAR PARK Leq (15 min) (DAY)	
Car Park Number	Receiver 1
1	37.5
2	37.5
3	27.6
4	27.6
5	23.2
6	23.2
7	17.3
8	20.4
9	18.1
10	17.6
11	16.8
12	18.1
13	16.3
14	15.8
15	15.4
16	22.6
17	19.7
18	18.2
19	17.6
20	17.3
21	16.3
Total	41
Criterion	47

For Receiver 1 the calculation of noise from the courtyard during the day is shown in **Table 3**.



TABLE 3 RECEIVER 1 NOISE (Leq (15 min)) – COURTYARD (DAY)	
Item	dB(A)
Sound Power Level (Leq)	92
Distance Loss to Receiver (50 m)	-42
Barrier Effects (2.1 m fence)	-10
Received Noise	40
Criterion (day)	47

The mechanical plant for the mosque will be located in a plant room at lower ground level at the eastern side of the main mosque building. Noise from the plant will be effectively acoustically screened by the structure of the building and the received noise will be negligible.

For Receiver 1 the calculation of noise from the mosque during the day is shown in **Table 4**.

TABLE 4 CALCULATED SPL AT NEAREST RECEIVER 1 – SERMON IN MOSQUE Leq (15 min) (DAY)									
Item	dB(A)	Octave Band Centre Frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
SPL at inside of wall (Leq 15 min)	80	35	38	64	72	75	76	72	56
STL Stud Wall		20	22	25	29	33	31	38	36
Exterior SPL		15	16	39	43	42	45	34	20
SPL @ receiver Leq (15 min)	24								
Criterion (day) Leq (15 min)	47								

The worst case combined noise during the day at Receiver 1 is shown below in **Table 5**.

TABLE 5 RECEIVER 1 NOISE (Leq (15 min)) – COMBINED NOISE (DAY)	
Item	dB(A)
Driveway	32
Car Park	41
Courtyard	40
Mechanical Plant	n/a
Mosque	24
Total Received Noise	44
Criterion (day)	47

Similar calculations to those shown above were carried out for the other receivers shown in Figure 1. The results of the calculations are shown below in **Table 6**.

TABLE 6 RECEIVER 1 NOISE (Leq (15 min)) – COMBINED NOISE (DAY)				
Item	Receiver 2	Receiver 3	Receiver 4	Receiver 5
Driveway	44	35	35	30
Car Park	32	35	30	37
Courtyard	34	32	42	29
Mechanical Plant	n/a	<20	34	<20
Mosque	<20	<20	43	40
Total Received Noise	45	39	46	42
Criterion (day)	47	47	47	47

The results shown in Tables 1 to 6 show that, under the assessed worst case conditions during the day, the combined noise from all phases of the operation of the mosque will not exceed the adopted day time noise criterion at any of the representative receiver locations.

The results in Tables 1 to 6 represent the noise levels around the Friday Jumaa prayer. At other times during the evening and night there will be far fewer people in attendance at the mosque. For the Isha prayer during the evening, for example, there may be between 25 and 40 people in attendance.

For the calculation of potential cumulative noise impacts during the evening it was assumed that 15 cars used the driveway and car park in a 15 minute during the evening before and after the Isha prayer. Similarly, up to ten people were assumed to be conversing in the courtyard whilst entering or exiting the mosque. During the evening and night there will be no use of the amplification equipment inside the mosque, with resultant minimal noise emissions.

For **Receiver 1** the calculation of noise from the driveway during the evening is shown in **Table 7**.

TABLE 7 RECEIVER 1 NOISE (Leq (15 min)) – DRIVEWAY (EVENING)	
Item	dB(A)
Sound Power Level (Leq)	75
Distance Loss to Receiver (35 m)	-39
Barrier Effects (2.1 m fence)	-13
Received Noise	23
Criterion (day)	42

For Receiver 1 the calculation of car park noise during the evening is shown in **Table 8**. Note that during the evening it was considered that only car park blocks 1, 3 and 5 are to be used (based on 15 to 20 cars).

TABLE 8 CALCULATED SPL FROM CAR PARK Leq (15 min) (EVENING)	
Car Park Number	Receiver 1
1	37.5
3	27.6
5	23.2
Total	38
Criterion	42

For Receiver 1 the calculation of noise from the courtyard during the evening is shown in **Table 9**.

TABLE 9 RECEIVER 1 NOISE (Leq (15 min)) – COURTYARD (EVENING)	
Item	dB(A)
Sound Power Level (Leq) (10 people)	82
Distance Loss to Receiver (50 m)	-42
Barrier Effects (2.1 m fence)	-10
Received Noise	30
Criterion (day)	42

The mechanical plant for the mosque will be located in a plant room at lower ground level at the eastern side of the main mosque building. Noise from the plant will be effectively acoustically screened by the structure of the building and the received noise will be negligible.

The worst case combined noise during the evening at Receiver 1 is shown below in **Table 10**.

TABLE 10 RECEIVER 1 NOISE (Leq (15 min)) – COMBINED NOISE (EVENING)	
Item	dB(A)
Driveway	23
Car Park	38
Courtyard	30
Mechanical Plant	n/a
Total Received Noise	39
Criterion (Evening/Night))	42/40

Similar calculations to those shown above, for evening, were carried out for the other receivers shown in Figure 1. The results of the calculations are shown below in **Table 11**.

TABLE 11  
RECEIVER 1 NOISE (Leq (15 min)) – COMBINED NOISE (EVENING)

Item	Receiver 2	Receiver 3	Receiver 4	Receiver 5
Driveway	35	26	26	21
Car Park	20	<10	<10	36
Courtyard	24	22	32	19
Mechanical Plant	n/a	<20	34	<20
<b>Total Received Noise</b>	<b>35</b>	<b>27</b>	<b>36</b>	<b>36</b>
Criterion (Evening/Night)	42/40	42/40	42/40	42/40

The results shown in Tables 7 to 11 show that, under the assessed worst case conditions during the evening, the combined noise from all phases of the operation of the mosque will not exceed the adopted evening time noise criterion at any of the representative receiver locations. The results also show there will be no exceedance of the night time criterion.

Whilst it not specifically stated in the original assessment it is generally accepted that differences in atmospheric conditions make little significant difference to received noise at receivers within up to 200 to 300m from a noise source.

The SLR Report stated “Noise levels in the Acoustic Report (Spectrum Acoustics report) are predicted for calm conditions only. There is no justification in the report as to why meteorological conditions have not been considered. That being said SLR Consulting consider that due to the proximity of the proposed development to the nearest potentially affected residential receivers meteorological conditions would not significantly impact on the predicted noise levels presented.”

As a result of the above discussions it is not considered warranted to carry out further assessment of noise under non-neutral atmospheric conditions.

b) The upper level car park will only be used during the day. It will be closed off at all other times. **Figure 2** shows a cross section through the site which shows that the eastern ramp to the upper level car park rises in cut from existing ground level to the proposed FFL of the car park.

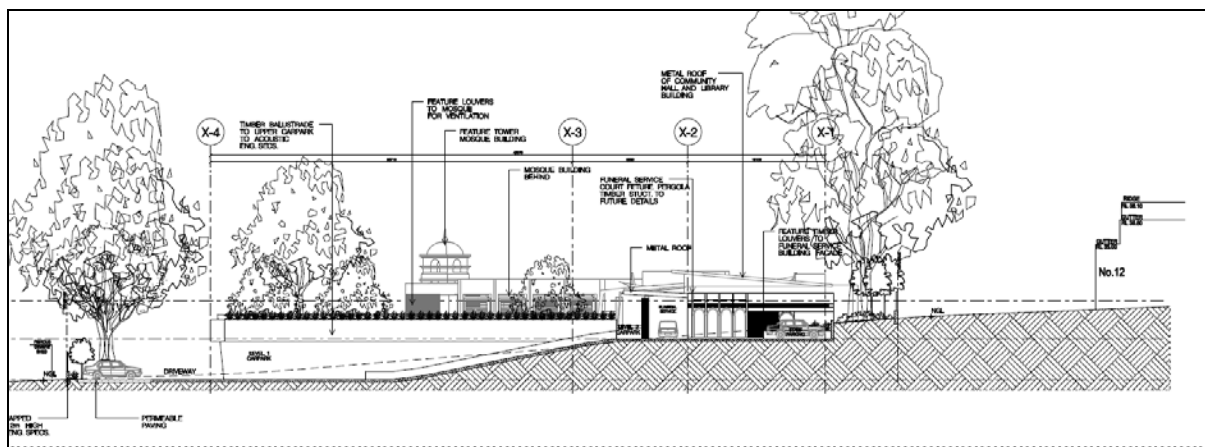


Figure 2 – Site Cross Section

There will be a 2.1m high acoustic barrier along the boundary of the site adjacent to the ramp. Where the ramp rises above natural ground level then there will be a 2.1m high acoustic barrier at the boundary of the nearest residence.

**Table 12** shows a calculation of noise impacts during the day from cars using of the eastern ramp. The calculation has been made to the most potentially affected receiver location marked as ramp on Figure 1.

To consider a worst case it was assumed that 25 vehicles used the ramp in a single 15 minute period (there are 42 parking spaces on the upper level and two access ramps).

The ramp is approximately 35m long (although part of this is in cut). A vehicle travelling at 10 kph will travel this distance in 12.5 seconds. Assuming a sound power level of 87 dB(A) (an average of ten measurements made alongside a ramp in a Newcastle shopping centre), this equates to a level of 68 dB(A) Leq (15 min) for each car. For 25 cars this is a sound power level of 82 dB(A) Leq (15 min).

TABLE 12	
RECEIVED NOISE (Leq (15 min)) – EASTERN RAMP (DAY)	
Item	dB(A)
Sound Power Level (Leq)	82
Distance Loss to Receiver (5 m)	-22
Barrier Effects (2.1 m fence)	-14
Received Noise	46
Criterion (day)	47

The results in Table 12 show that, under the assessed conditions there will be no exceedance of the day time noise criterion as a result of vehicles using eastern ramp to the upper level car park.

To ensure there are no cumulative noise impacts, **Table 13** shows the combined noise at the Ramp receiver as a result of the day time operation of the site.

TABLE 13	
RECEIVER 1 NOISE (Leq (15 min)) – COMBINED NOISE (DAY)	
Item	dB(A)
Driveway	<20
Car Park (parks 16 to 21)	41
Courtyard	23
Mechanical Plant	n/a
Mosque	<20
Ramp	46
Total Received Noise	47
Criterion (day)	47

The results shown in Table 13 show that, under the assessed worst case conditions during the day, the combined noise from all phases of the operation of the mosque will not exceed the adopted day time noise criterion at the representative receiver location closest to the eastern ramp.

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

APPENDIX A

CAR PARK NOTATIONS

