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10<sup>th</sup> October, 2013

The Planning Group NSW Pty Ltd  
PO Box 1612  
**NORTH SYDNEY NSW 2059**

**Attention:** Ms M. Higgins

**PROPOSED WOOLWORTHS DEVELOPMENT**

**10-13 FALCON STREET, CROWS NEST**

We refer to our recent site visit and meeting concerning acoustic assessments in relation to the proposed Woolworths development to occupy 10-13 Falcon Street, Crows Nest and extending through to Burlington Street.

We understand that the application is to provide a new two level supermarket occupying the basement and ground level with specialty retail tenancies at ground floor and four levels of parking above.

Acoustic assessments in relation to the subject application have been prepared by SLR Consulting Australia Pty Ltd. The SLR Consulting report of 7 March 2013 was the subject of a review by Acoustic Logic for Kerry Gordon Planning Services Pty Ltd on behalf of the Council.

The review by Acoustic Logic identified additional material was required concerning criteria and traffic. In relation to the loading dock operations the review identified a residential receiver on the first floor level of a building fronting Willoughby Road that is directly opposite the proposed loading dock.

A revised report from SLR Consulting Australia, dated 26 July 2013 has been prepared to address the matters raised by Acoustic Logic. The report provides additional ambient measurements in relation to Willoughby Lane and consideration of noise impacts associated with the potential residential receiver at 11 Willoughby Road.

The SLR Consulting report indicates there is some confusion in relation to the use of 11 Willoughby Road and indicates the operation of the proposed Woolworths development would exceed the noise criteria applicable for that development if 11 Willoughby Road has a residential flat, whilst at all other residential locations that have been assessed there is clear compliance with the Council/EPA criteria.

Based upon the location of the development, the acoustic environment of the area and the orientation of the loading dock, the projected levels that have been provided in relation to various residential receivers are consistent with what would be expected from a loading dock operation, with the exception of the assessment for 11 Willoughby Road.

The SLR Consulting report indicates that the proposed loading dock operations could give rise to noise levels greater than that permitted by the Council yet has not sought to identify any noise control measures that could be utilised to address the matter of non-compliance.

Notwithstanding the acoustic assessment indicating non-compliance with respect to 11 Willoughby Road, there is confusion expressed by SLR Consulting as to the status of a dwelling on that property and in turn the appropriate noise levels that would apply.

Following receipt of the SLR Consulting report of 26<sup>th</sup> July, 2013 a further review for Council was conducted by Acoustic Logic “Peer Review of Revised Noise Impact Assessment” dated 4<sup>th</sup> September, 2013.

The SLR Consulting report indicates noise emission from the development is satisfactory for 29 Willoughby Road and Burlington Street/Alexander Street. The Acoustic Logic second review confirms on page 7 that 29 Willoughby Road is acceptable and therefore so must Burlington Street/Alexander.

The Acoustic Logic second review identifies that the relevant issues raised in their first review were addressed but that the loading dock would create an unacceptable impact for the residential component of 11 Willoughby Road.

However the conclusion of the Acoustic Logic second review suggests the noise impact on surrounding residential receivers is unacceptable. However this conclusion can only apply to 11 Willoughby Road with respect to the loading dock.



In light of the above The Acoustic Group has been requested by The Planning Group NSW Pty Ltd to review the SLR Consulting July, 2013 report and consider appropriate noise control measures for the loading dock.

The SLR Consulting report utilised ambient background levels for 11 Willoughby Road from measurements in a shielded location at 21 Willoughby Road. As part of our review a site visit was carried out on the night of 23<sup>rd</sup> September 2013 with measurements conducted at various locations in proximity to the subject site between 10:30 PM and 11:30 PM.

## Measurement Techniques

Measurements were taken in accordance with the Australian Standard AS1055 *“Acoustics - Description and Measurement of Environmental Noise”* and the requirements of the noise measurement survey sheets contained in the *“Environment Protection Authority - Environmental Noise Control Manual”* and the ambient background measurement procedures set out in Appendix B of the EPA's *Industrial Noise Policy*.

The attended sound level measurements were recorded using a Brüel & Kjær 2250 Sound Level Meter (serial No. 2479645). The reference calibration level of the meter was checked prior to and after measurements using a Brüel & Kjær Sound Level Calibrator Type 4231 and exhibited no system drift. The calibration of the sound level meter to manufacturer's requirements is current.

## Measurement Results

The weather conditions at the time of our survey were clear sky, no wind and a temperature of approximately 20° C, and as such were suitable for measurements.

Our site visit found the ambient background level for the area to be a mixture of mechanical plant and distant traffic whilst the acoustic environment exhibited a fluctuating noise associated with traffic passing the site.



At the north-eastern corner of the intersection of Burlington Street and Alexander Street, the ambient background noise level appeared to be dominated by mechanical plant coming from the direction of the council car park with noise from mechanical plant on other buildings being evident, as well as a general roar from distant traffic.

Attendance to the ground level of the car park found noise passing through the car park from mechanical plant serving buildings backing onto Willoughby Lane. There was also a noticeable tone evident in mechanical plant fixed to the underside of the first floor level of the car park. This tone bounced around the concrete surfaces of the car park and then out to the surrounding area.

For the purpose of our review a series of short-term ambient background level measurements were obtained at various locations where mechanical plant was found to dominate/control the ambient background level.

Attending Willoughby Lane and commencing from the Falcon Street end of the lane found noise from mechanical plant at the hotel on the north-eastern corner of Falcon Street and Willoughby Road to control the background level in the centre of the lane, in line with the northern boundary of the hotel (Location 1).

At the rear of 11 Willoughby Road (identified as Location 2) the ambient background level of 61 dB(A) was controlled by mechanical plant from the aforementioned hotel and also from a building to the north of 11 Willoughby Road, where there is mechanical plant located in the basement of the building having noise emitted by way of openings in the facade at street level.

In the centre of the lane, directly opposite the aforementioned low-level openings in the building to the north of 11 Willoughby Road (Location 3) an ambient background level of 68 dB(A) was obtained.

Attending the upper floor of the car park found the ambient background level was a general roar from traffic and mechanical plant. At the north-western corner of the car park (Location 4) a background level of 48 dB(A) was obtained and was influenced by mechanical plant on commercial buildings on the western side of Willoughby Lane. At the north-eastern corner of the car park on the top level (Location 5) a background level of 46 dB(A) was obtained primarily as a result of distant traffic and some mechanical plant noise.



Attendance to Burlington Street and moving to the eastern end of the building on the north-eastern corner of the intersection of Burlington Street and Alexander Street (identified as 61-63 Alexander Street and shown as Location 6) the mechanical plant from the direction of the car park was reduced by way of shielding from the commercial building on the southern side of Burlington Street such that an ambient background level of 41 dB(A) was obtained and could be attributed to the natural background level in that vicinity.

During the course of monitoring at Location 6 a garbage truck arrived to service the commercial property on the southern side of the road that resulted in an elevated background level of 57 – 58 dB(A) from the idling truck. The maximum levels associated with the operation of lifting, loading and lowering the garbage bin varied from 70 to 78 dB(A) whilst the maximum level of 82 – 85 dB(A) came about by the departure of the garbage truck from a stationary position.

The garbage truck then travelled in a westerly direction and turned south into Willoughby Lane and could be heard from Location 6 to be operating in that lane.

Appendix A sets out an aerial view of the measurement locations, including Google Street views of the rear lane with respect to Willoughby Lane.

Appendix B sets out the statistical measurement results for the 6 locations and commences with a time splice graph that shows the variation in the dB(A) level over time at Location 6 where the operation of the garbage truck between 11:01 PM and 11:04 PM is evident.

The results of the garbage truck, whilst being closer to the microphone location than that that would be experienced from the loading dock to the rear of 11 Willoughby Road, indicate the predicted levels set out in Table 4 of the SLR Consulting report are representative of large truck operations and potentially conservatively high.



The rear boundary of 11 Willoughby Road is a commercial boundary that has a roller shutter door and an extended brick wall that would provide acoustic shielding to the eastern facade of the first floor office/proposed living room and as such would obtain further attenuation by way of acoustic shielding from the proposed loading dock both in a vertical plane (by reason of the roller shutter door and extended brick wall) and in the horizontal plane by reason of the building to the north of 11 Willoughby Road extending full height out to the rear boundary.

Furthermore in light of the ambient background noise levels recorded at the rear of 11 Willoughby Road it would appear that the SLR Consulting report has used the wrong background levels for determination of the criteria used in their assessment.

### **Ambient Background Levels for 11 Willoughby Road**

With respect to clarification of the status of 11 Willoughby Road we have been provided an acoustic assessment prepared by Acoustic Dynamics Pty Ltd in relation to the proposed building works to occur at that site.

The Acoustic Dynamics report “External Noise & Vibration Intrusion Assessment, 11 Willoughby Road, Crows Nest, NSW” (dated 1 May 2013) indicates that in May 2013 the property at 11 Willoughby Road, Crows Nest, had a ground floor bakery towards Willoughby Road with a storage area at the rear of the bakery.

The first floor level is identified as containing an office space.

Therefore at the time of the SLR Consulting report reviewed by Acoustic Logic the position of 11 Willoughby Road would not be as a residential property. Therefore for that situation there would be no acoustic issue with the proposed Woolworths development.

The Acoustic Dynamics report indicates that there is a proposal for alterations and additions to convert the storage area at the rear of the bakery into a separate commercial premises and to convert the existing first-floor office space into two separate residential apartments.



The plans attached to the Acoustic Dynamics report indicates that the building envelope on the first floor level of 11 Willoughby Road has the eastern façade (for the current office and the proposed living room) not located on the rear boundary (Willoughby Lane) but is set in from the rear boundary as can be seen from the second aerial photo in Appendix A.

The Acoustic Dynamics report addresses the requirement of North Sydney Council's DCP for noise levels inside residential dwellings to achieve certain internal noise levels being no greater than 40 dB(A) for recreation/work areas and 35 dB(A) for sleeping areas.

The Acoustic Dynamics report identifies attended measurements occurring within the first floor office space at rooms identified to be living and bedrooms, and a noise logger location being at the front of the subject premises.

The Acoustic Dynamics report indicates the maximum external noise levels attributed to the proposed residential dwellings to be in the order of 64 dB(A) at the eastern end of the building. This level is higher than that recorded in the rear lane during our site visit and noticeably higher than the background level nominated for assessment purposes by SLR Consulting.

The Acoustic Dynamics report indicates that the primary source of noise is associated with an exhaust fan from the bakery which by way of normal bakery operations would result in that fan being used at night.

Based on measurements conducted in Willoughby Lane in proximity to 11 Willoughby Road and allocating shielding to the first floor office/residence it would appear that the night-time ambient background level would be in the order of 55 dB(A) without the fan for the bakery in operation. This background level is significantly higher than that nominated in the SLR Consulting report.

Accordingly the criteria used for assessment purposes set out in the SLR Consulting report is incorrect. As identified above so too are the loading dock predicted levels to the residential facade of 11 Willoughby Road by reason of acoustic shielding from the operating dock to that facade is shown in the horizontal view by the orange line in Appendix C2 and is evident by the last photo of the Google Street view in Appendix A.



How SLR Consulting obtained the background level for 11 Willoughby Road warranted further investigation in that the degree of mechanical noise detected in Willoughby Lane from the buildings from both north and south of 11 Willoughby Road are significantly greater than 55 dB(A), which in turn is greater than the 45 dB(A) level nominated by SLR Consulting.

To this end a site visit during the day time revealed the relationship of 11 Willoughby Road to the south western corner of the car park by the first 2 photos in Appendix C being at street level and then at the top floor of the existing car park. The third photo in Appendix C is from street level into the location used in the SLR Consulting report for ambient monitoring (rear of 21 Willoughby Road). The position of the logger is set in significantly from the rear boundary and is subject to acoustic shielding of the surrounding acoustic environment by way of the walls on either side of that property, bearing in mind that the SLR Consulting reports identifies the logger was located on the first floor balcony at the rear of 21 Willoughby Road. The fourth photo in Appendix C is from the top level of the car park (slightly zoomed) to indicate that a noise logger at a nominal 1.5 m above the rear balcony of that property would have an additional 2 - 2.5 m shielding to the south at least 1.5 m shielding to the west and 1.5 - 2 m shielding to the west that explains the low background level for that location.

Examination of the third and fourth photo in Appendix C indicates the inappropriateness of the logger location at the rear of 21 Willoughby Road for the purpose of assessment of 11 Willoughby Road.

## Acoustic Assessment

The SLR report nominates, by use of an incorrect ambient background level, resulting in noise targets for the night-time operations of the loading dock that are at least 10 dB lower than what should be applied to 11 Willoughby Road.

If one utilises a background level of 64 dB(A) as nominated by Acoustic Dynamics for the rear facade of 11 Willoughby Road then the predicted levels set out in the SLR Consulting report comply with both the intrusive noise target and the sleep arousal target based on that background level, except for the reversing alarm.





If one considers the conservative view that the background level at the rear of 11 Willoughby Road would be lower than that in Willoughby Lane if the fan for the bakery is not in operation to realise a background level in the order of 55 dB(A) then the SLR acoustic report indicates night time operations to exceed the nominated limit.

However as identified above the assessment point from SLR Consulting is 22 m from the dock at the rear of 11 Willoughby Road which at ground level is a commercial property and not a residential property. The additional acoustic shielding and distance attenuation to the eastern facade of 11 Willoughby Road would realise lower noise levels and therefore would suggest compliance for the night time criteria.

Using the SLR Consulting Sound Power level of 111 dB(A) for the reversing alarm the maximum level of a truck reversing when in the loading dock with consideration of the available shielding from a plan view will vary from 54 – 76 dB(A) at the eastern façade of the residence. Taking into account shielding from the parapet wall at the rear of 11 Willoughby Road provides additional acoustic shielding to result in a maximum level of 50 to 67 dB(A) at the eastern façade.

Such maximum levels satisfy the sleep arousal target of background +15 dB(A) at the eastern façade of the first floor residence with the bakery fan off.

As the other noise sources nominated for the loading dock are lower then so will those maximum levels comply at the first floor residence.

During the day and evening periods the bakery would be in operation and the ambient background levels by way of the Acoustic Dynamic report for that residence are significantly higher than that nominated in the SLR Consulting report (by reason of using the wrong location) and therefore there is no acoustic issue of concern as the sleep arousal criterion only applies at night. The unloading operations for large delivery trucks normally takes more than 30 minutes at other Woolworths stores such that the SLR Consulting assumptions for truck noise generated whilst on site do not appear to be realistic and the additional distance attenuation and shielding will result in intrusive levels noticeably lower than suggested by SLR Consulting.



It is noted that under the Council's DCP requirements, as set out in the Acoustic Dynamic report, the residential dwelling on the first floor level of 11 Willoughby Road requires mechanical ventilation so as to satisfy the DCP requirements, and also there is acoustic upgrading of the glazing from that that would occur under standard building constructions.

## Recommendations

The SLR Consulting report indicates the operation of the loading dock would give rise to exceedance of the Council/EPA, criteria on the basis of the rear boundary 11 Willoughby Road being a residential boundary, which is not the case, and by using the wrong background levels. On the basis of the background levels nominated in the Acoustic Dynamic report there would be no issue with the operation of the loading dock.

The Acoustic Dynamics report indicates that the conversion of the first floor office to residential dwelling 11 Willoughby Road requires acoustic upgrading of the facade so as to satisfactorily attenuate the external noise level and that mechanical ventilation will be required. Two options have been nominated for glazing with option 1 (having the lower performance) as the preferred option.

There is the potential for attenuation of the fan at the bakery so as to reduce the degree of noise controls required for the proposed dwelling. However, even with the bakery fan being attenuated, the external noise levels as a result of the mechanical plant from other premises in the area (excluding Woolworths) still requires acoustic upgrading of the façade for 11 Willoughby Road and mechanical ventilation to satisfy the DCP's internal noise targets which would be satisfied by the glazing identified as option 1.

Noting that the sleep arousal criterion is applied at bedroom windows then the SLR Consulting levels for 11 Willoughby Road need to take account of the additional distance attenuation and shielding to the windows that results in compliance with the sleep arousal criterion.

Notwithstanding acoustic compliance we have been requested to consider additional noise control measures that could be implemented to further reduce the acoustic impact and permit night time operations of the loading dock with an additional acoustic safety margin.



We propose the following additional controls:

- Woolworths offer to install the option 2 glazing for 11 Willoughby Road nominated by Acoustic Dynamics.
- The walls above 2 metres and the ceiling of the loading dock be lined with 75 mm thick acoustic absorbing material having an NRC not less than 0.9 faced with HD perforated foil covering (equivalent to Bradford Ultratel 48 kg/m<sup>3</sup>).
- Other than when trucks are being unloaded, during the period 10 PM to 6 AM the roller door to the loading dock is to be closed so that internal operations that occur in the loading dock by night staff can occur without creating an acoustic impact.
- With the new loading dock in operation and the assumption that 11 Willoughby Road first floor level is operational as a residential dwelling then the loading dock should be subject to acoustic testing in that residential dwelling within 1 month of the new loading dock becoming operational to confirm the loading dock operations comply with the relevant criteria.

## Conclusion

The SLR Acoustic Consulting reports prepared in relation to the proposed Woolworths development at Crows Nest have been subject to reviews by Acoustic Logic on behalf of the Council that identified a number of issues of concern, primarily being the change of use of the first floor of 11 Willoughby Road from office to residential occupancy.

The subsequent report prepared by SLR Consulting taking on board the request for additional material has nominated noise from the loading dock in the night time operations to exceed a criteria determined as a result of ambient measurements conducted at a different location that was shielded from the surrounding acoustic environment.



The SLR Consulting report is devoid of any night time attended noise measurements and relies upon unattended noise logger measurements which do not resolve the issue of concern that has led to the provision of incorrect baseline data. Attendance to Willoughby Lane at night reveals the acoustic environment behind 11 Willoughby Road is dominated by mechanical plant not associated with the existing Woolworths development and that the ambient background level at the rear boundary of 11 Willoughby Road is in the order of 61 dB(A).

Accordingly the assessment by SLR Consulting has been based on the wrong background levels.

Furthermore the rear boundary of 11 Willoughby Road is not a residential boundary but is a boundary of an existing (and proposed) commercial premises where the actual residential dwelling is set in from the rear boundary and as such will experience acoustic shielding from the existing and proposed loading dock both in terms of vertical view and a plan view.

If there is no treatment carried out to the exhaust fan for the bakery then noise emission from the loading dock will satisfy the Council criteria.

If however on a conservative view attenuation was provided to the exhaust fan of the bakery so as to reduce noise controls for the proposed residences then the matter of the predicted levels provided by SLR Consulting when corrected to the residential facade and compared with an ambient background level as a result of the existing mechanical plant, external to 11 Willoughby Road, reveals the operation of the loading dock will satisfy the Council criteria.

Notwithstanding acoustic compliance additional noise control measures have been nominated to provide an additional buffer for acoustic compliance.



It is recommended that with the new loading dock having been constructed and the residential dwellings at 11 Willoughby Road being completed that compliance testing be carried out of the Woolworths loading dock to confirm noise emission from that loading dock complies with the Council criteria.

Yours faithfully,

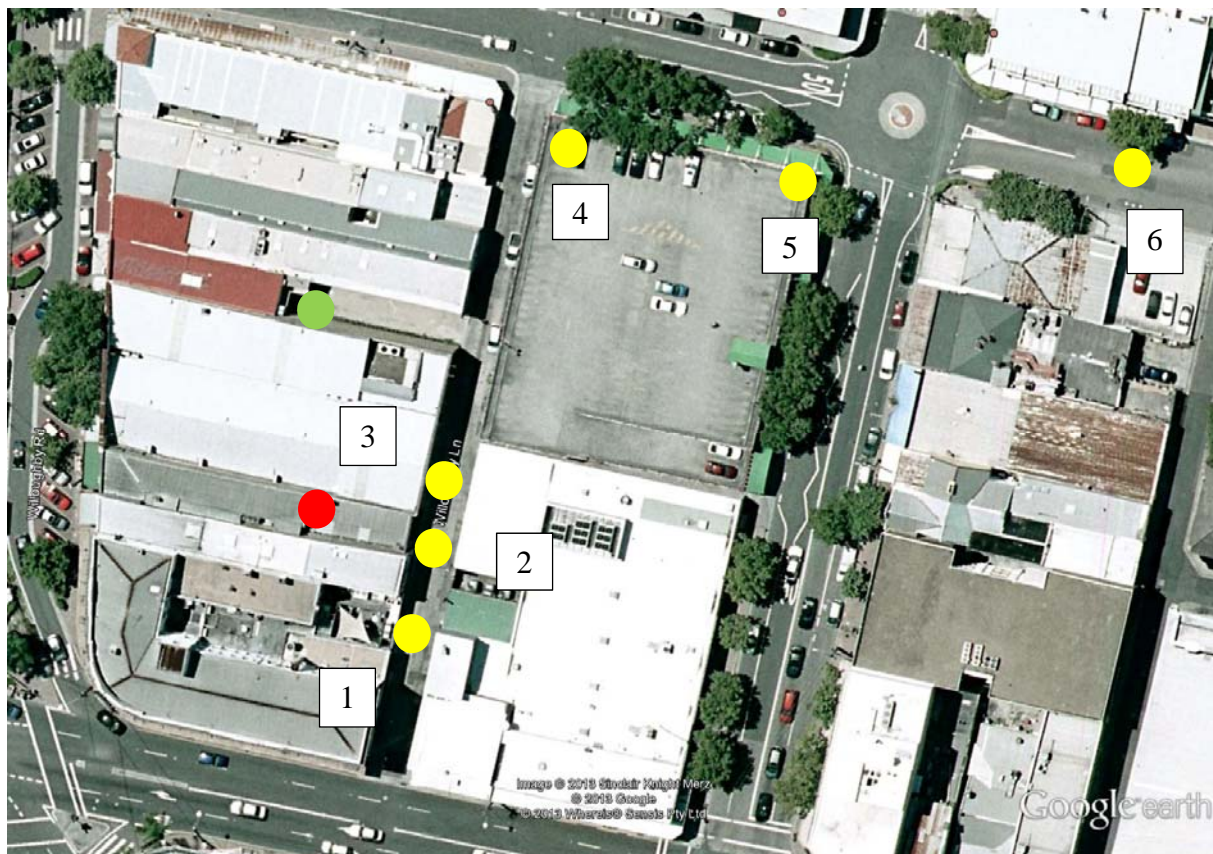
**THE ACOUSTIC GROUP PTY LTD**



**STEVEN E COOPER**



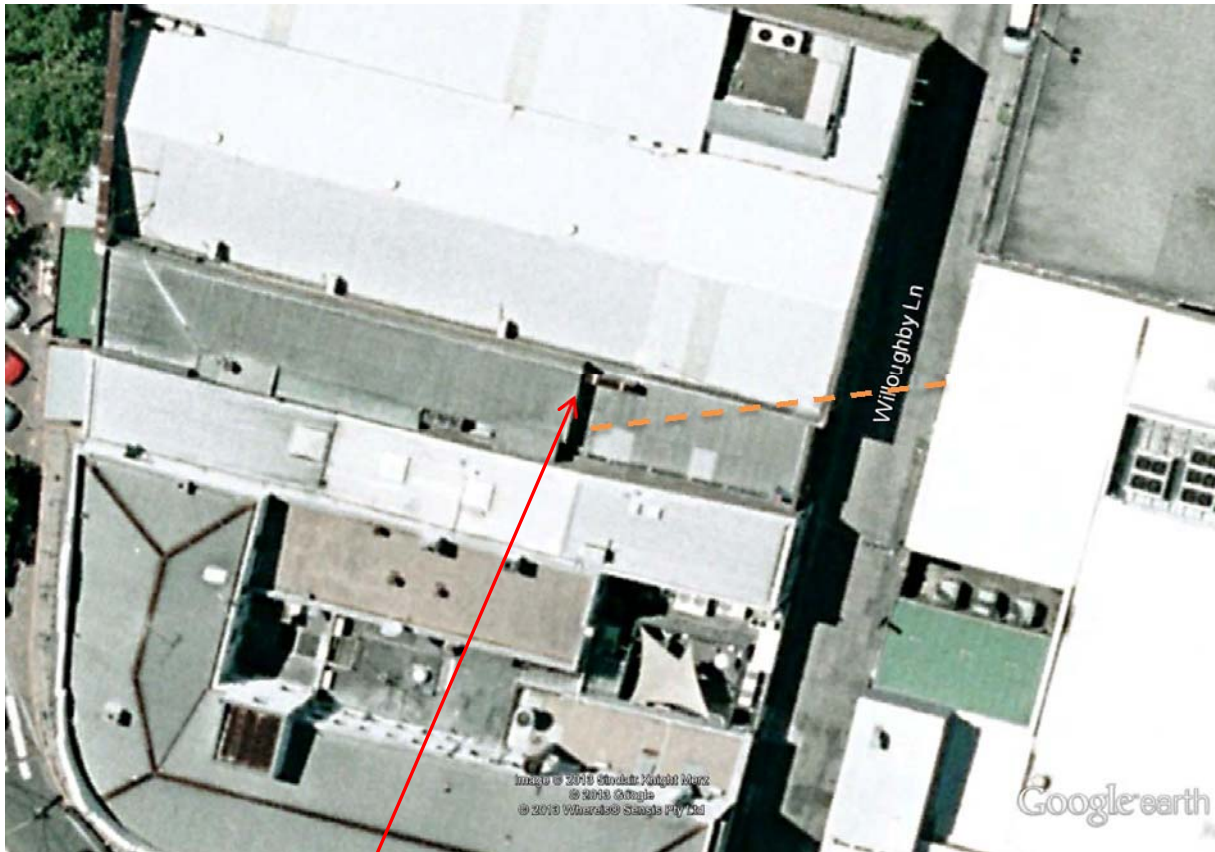
## **APPENDIX A:      Measurement Locations**



- TAG attended measurement location
- SLR logger location
- Residential receiver

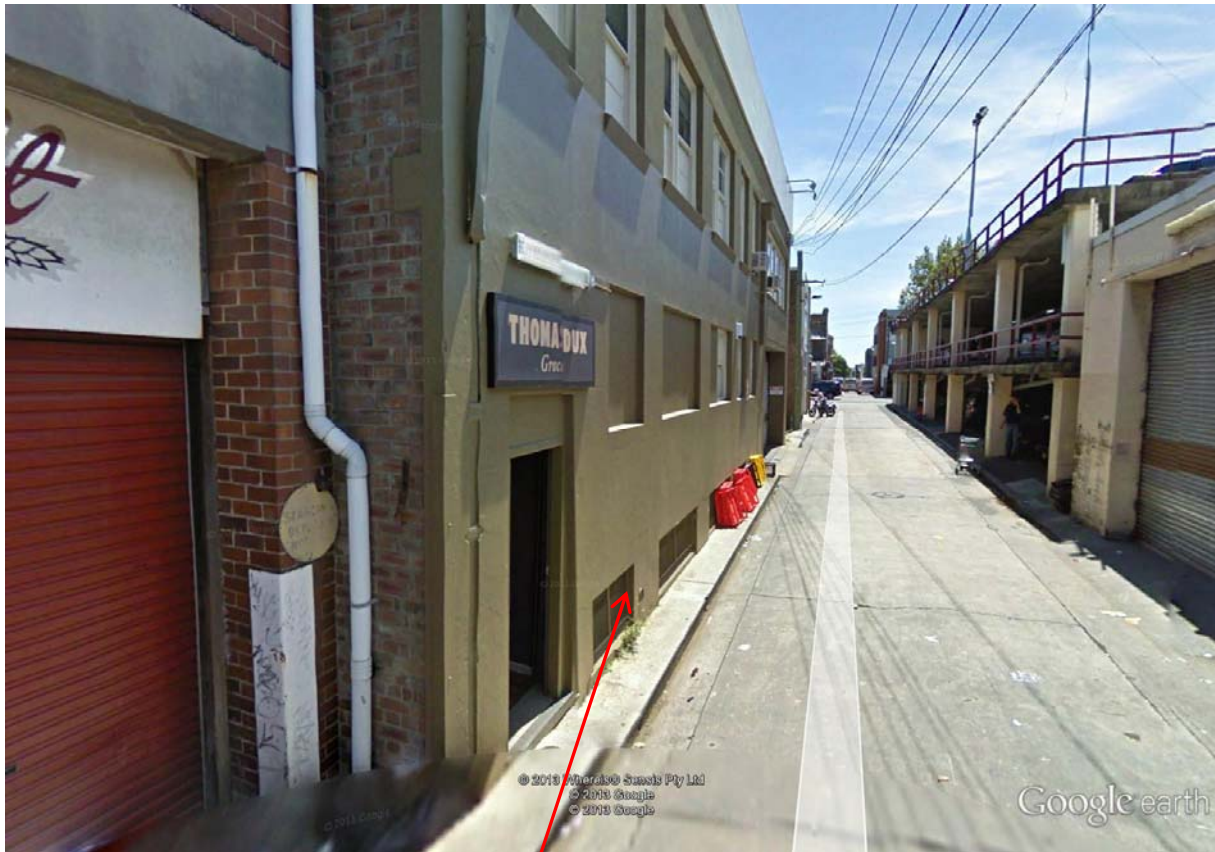






Eastern end of 1st floor office/proposed living room



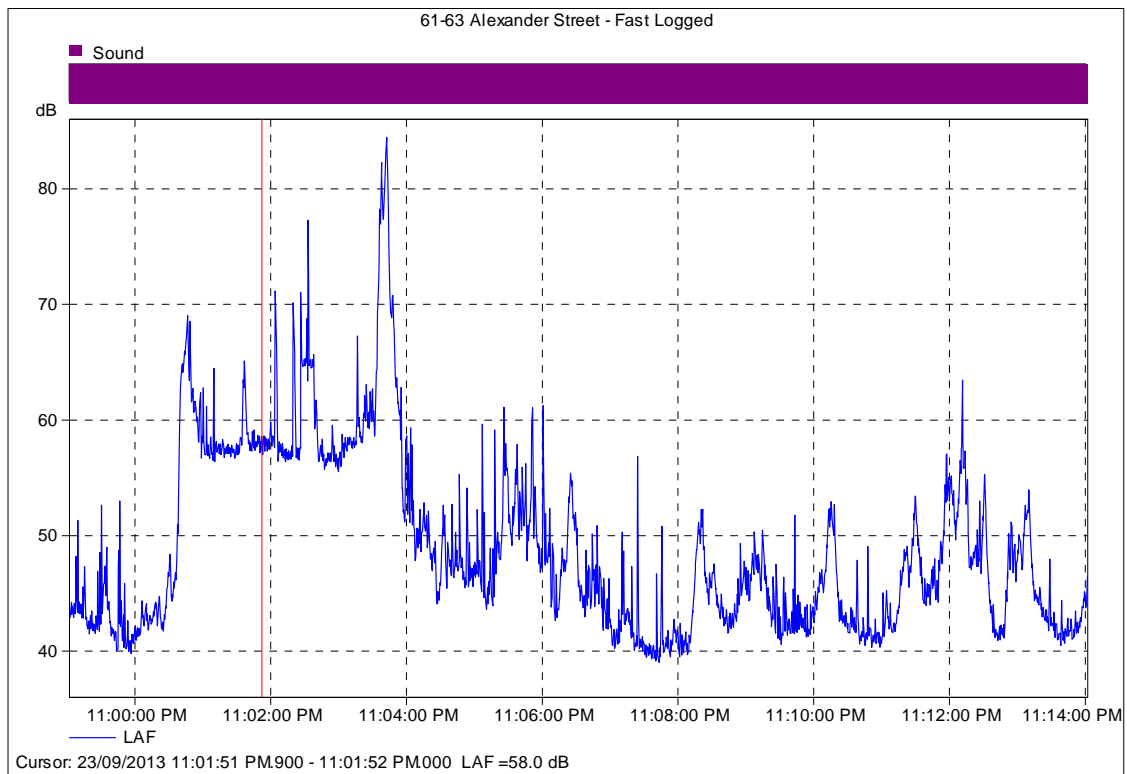


Ventilation duct openings for plant







**APPENDIX B:**

Location	Parameter	dB(A)	A-weighted Octave Band Centre Frequency (Hz)								
			31	63	125	250	500	1k	2k	4k	8k
1	Ambient L <sub>10</sub>	64	66	66	72	63	60	59	57	49	38
	Ambient Leq	62	63	65	72	62	59	57	55	48	37
	Ambient L <sub>90</sub>	61	60	63	70	61	57	55	53	47	36
2	Ambient L <sub>10</sub>	64	66	73	77	65	61	59	56	48	41
	Ambient Leq	63	63	71	76	63	60	56	52	46	40
	Ambient L <sub>90</sub>	61	60	68	74	61	59	52	48	44	37
3	Ambient L <sub>10</sub>	69	67	72	76	72	67	63	62	75	48
	Ambient Leq	69	65	71	75	71	66	62	61	54	47



Location	Parameter	dB(A)	A-weighted Octave Band Centre Frequency (Hz)								
			31	63	125	250	500	1k	2k	4k	8k
	Ambient L <sub>90</sub>	68	63	69	74	70	65	61	60	54	46
4	Ambient L <sub>10</sub>	53	62	63	58	55	50	49	45	39	28
	Ambient Leq	51	59	61	59	52	48	45	42	36	27
	Ambient L <sub>90</sub>	48	52	54	54	50	46	42	38	29	18
5	Ambient L <sub>10</sub>	52	63	63	58	52	48	47	43	35	27
	Ambient Leq	49	60	60	56	51	46	44	39	32	24
	Ambient L <sub>90</sub>	46	53	55	52	49	44	40	33	23	14
6	Ambient L <sub>10</sub>	58	63	69	61	57	56	54	51	44	37
	Ambient Leq	62	60	70	69	63	60	55	52	47	40
	Ambient L <sub>90</sub>	41	50	52	47	45	39	34	29	21	13



**APPENDIX C:**



View of rear of 11 Willoughby Road from street level, south western corner of car park.







View of 11 Willoughby Road from top floor of car park, south western corner.





View into SLR Consulting logger location from street level.







View into SLR Consulting logger location from top floor of car park.

