Richard Crookes Constructions

2a-6 Hassell Street, Parramatta

Construction Noise Testing

White Noise Acoustics
303, 74 Pitt Street,
Sydney NSW 2000

ABN: 35 632 449 122

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1 Introduction

White Noise Acoustics has been engaged to undertake acoustic testing of the noise levels impacting the surrounding receivers to the 2a-6 Hassell Street project Parramatta during a period of typical construction.

This report details the acoustic testing which was undertaken on the 2nd June, 2020 during a period when concrete pouring was being undertaken at the site.

It is noted that the building site is located within a areas with construction being undertaken on other sites within the vicinity of the project which are also generating construction noise impacting on the surrounding areas.

2 Development Description

The site is located at 6 Hassell Street, Parramatta within the central area of Parramatta.

As part of this assessment construction on the site was being undertaken including the pouring of concrete with concrete trucks providing material to the site on Hassell Street.

The site location, in relation to surrounding buildings, is shown in Figure 1 below.

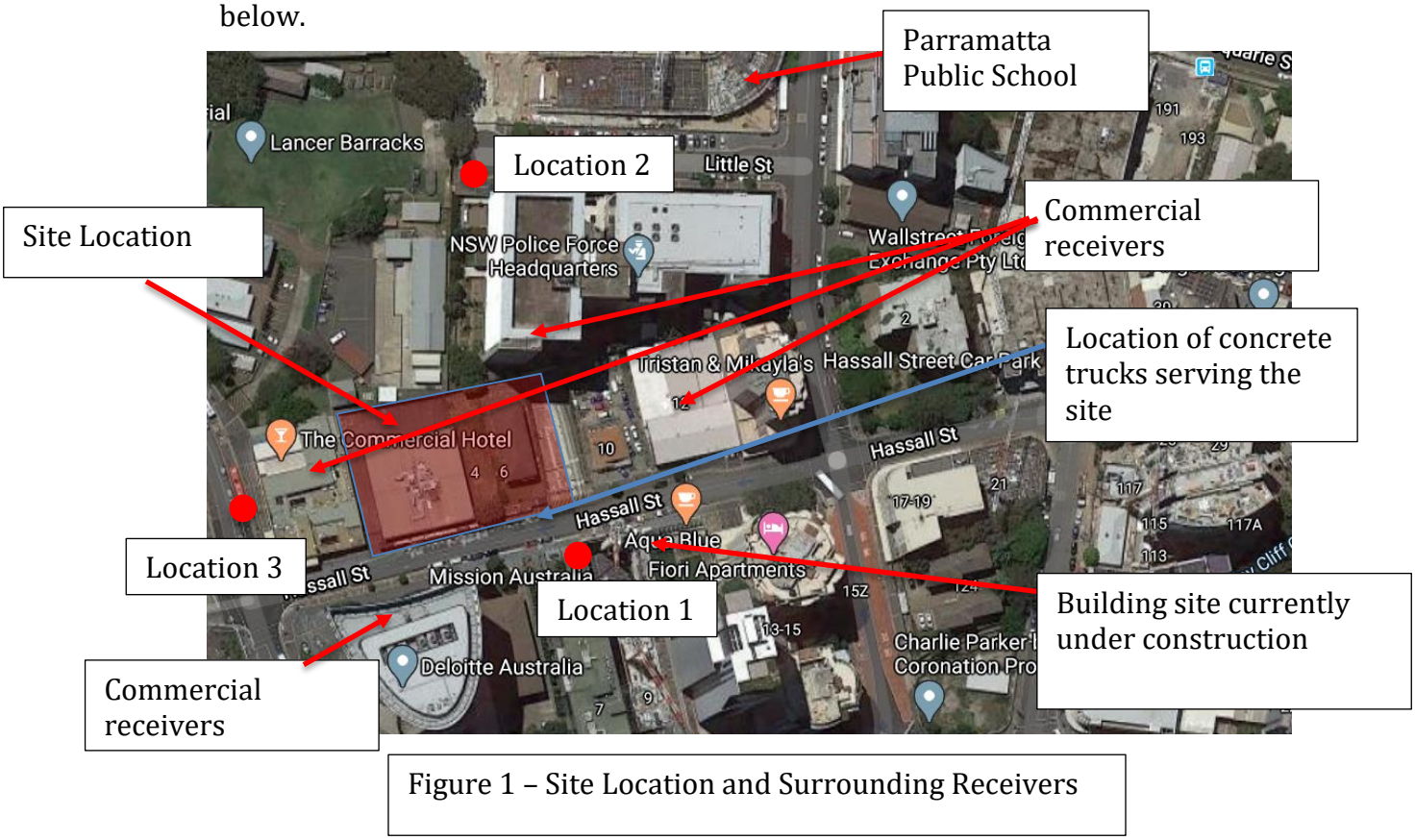

Figure 1 – Site Location and Surrounding Receivers

3 Existing Acoustic Environment

The 2b – 6 Hassall Street, Parramatta site is located with an area with Hassall Street to the south of the site which carries high volumes of traffic including heavy vehicles.

Existing environmental noise levels at the site are dominated by traffic noise generated from the surrounding major roadway and general hum from the Parramatta City centre.

As part of this assessment an acoustic survey of the existing acoustic environment at the site was undertaken. The survey included attended noise level measurements at the site, during various times of the day on the 6th March, 2020. During the testing periods there was no inclement weather periods.

Testing was conducted using a Bruel and Kjaer 2236C type meter. The meter was calibrated before and after testing and no significant drift was recorded.

As part of the previously conducted Floth *Mixed use Development, 2b-6 Hassall Street, Parramatta – Noise Impact Assessment for Development Application* report dated 11th April 2019 long term background noise levels monitoring has been undertaken at the site which has also been used in this assessment.

A summary of the acoustic survey is detailed in the tables below.

Table 1 – Results of Noise Survey at the Site

Measurement Location	Time of Measurement	$L_{A90, 15min}$ dB(A)	Comments
Macpherson Street	Day	54	Noise level at the site was dominated by vehicle movements on surrounding roadways

4 Construction Noise Criteria

This section of the report details the relevant project construction noise criteria.

4.1 Construction Noise

The assessment of construction noise impacts generated from the site has been undertaken in accordance with the requirements of the EAP Interim Construction Noise Guideline.

The EPA's Interim Construction Noise Guideline defines normal day time hours as the following:

2.2 Recommended standard hours

The recommended standard hours for construction work are shown in Table 1; however, they are not mandatory. There are some situations, as described below, where construction work may need to be undertaken outside of these hours. The likely noise impacts and the ability to undertake works during the recommended standard hours should be considered when scheduling work.

Table 1: Recommended standard hours for construction work

Work type	Recommended standard hours of work*
Normal construction	Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm Saturday 9 am to 1 pm No blasting on Sundays or public holidays

* The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours.

4.2 Construction Noise Goals

This section of the report details the relevant construction noise criteria which is applicable to the site including the EPA's *Interim Construction Noise Guideline* (ICNG).

4.2.1 Interim Construction Noise Guideline

Noise criteria for construction and demolition activities are discussed in the *Interim Construction Noise Guideline* (ICNG). The ICNG also recommends procedures to address potential impacts of construction noise on residences and other sensitive land uses. The main objectives of the ICNG are summarised as follows:

- Promote a clear understanding of ways to identify and minimise noise from construction works;
- Focus on applying all "feasible" and "reasonable" work practices to minimise construction noise impacts;
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours;
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.

The ICNG contains a quantitative assessment method which is applicable to this project. Guidance levels are given for airborne noise at residences and other sensitive land uses.
The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with the Noise Management Levels (NMLs). The NML affectation categories for receivers have been reproduced from the guideline and are listed in the table below.

Table 2 – Noise Management Levels from Construction – Quantitative Assessment

Receiver Type	Time of Day	Noise Management Level LAeq(15minute)[1,2]	How to Apply
Residential	Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
		Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
offices, retail outlets: external	When is use	LAeq (15 min) 70 dB(A)	During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.
Schools	When in use – internally	40 LAeq (15 min) dB(A)	During construction, the proponent should regularly update schools regarding noise levels and hours of work.

Note 1 *Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.*

Note 2 *The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (EPA 2000).*

Based on the table above the suitable construction noise management levels for works undertaken on the site is detailed in the table below.

Table 3 – Site Construction Noise Management Levels

Noise Source	Time Period	Receiver Type	Construction Noise Management Level	'High Noise Affected' Level
Construction Noise	Approved hours of construction	Residential	64 dB(A) LAeq (15min)	75 dB(A) LAeq (15min)
		Commercial	-	70 dB(A) LAeq (15min)
		Schools	40 dB(A) LAeq (15min) – Internally	-
Note 1: Construction noise management levels based on the Interim Construction Noise Guideline				

5 Construction Noise Testing

This section of the report details the results of the construction noise testing undertaken at the site on the 2nd June, 2020.

Testing was undertaken during the period of 8.00am to 9.30am at which time construction activities where being undertaken on the site including the following:

1. General construction of the site including form working and hand tools.
2. Concrete pour including concrete trucks and pumping of concrete. Trucks were located on Hassell Street.

During testing a number of noise sources within the vicinity of the site were undertaken including traffic noise and construction activities being undertaken on surrounding buildings. The results are detailed in the table below.

Table 4 – Measured Construction Noise Levels

Noise Source	Measurement Location	Measured Noise Level dB(A) LAeq (15min)	Construction Noise Management Level/ 'High Noise Affected' Level	Comments
Concrete trucks on Hassell Street and concrete pumping`	Location 1- Opposite on Hassell Street	70 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Noise level above management noise level and below High Noise affected level. Noise level included contribution from construction site opposite the site.
	Location 2 – Little Street	65 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Construction noise was generally not audible at this location and was compliant with construction noise goals for Parramatta Public School
	Location 3 – Stations Street East	67 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Construction noise was generally not audible at this location above transport noise levels
General Construction activities.	Location 1- Opposite on Hassell Street	64 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Noise level compliant with management noise level and below High Noise affected level. Noise level included contribution from construction site opposite the site.
	Location 2 – Little Street	<63 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Construction noise was generally not audible at this location and was compliant with construction noise goals for Parramatta Public School
	Location 3 – Stations Street East	<67 dB(A) LAeq (15min	64 dB(A) LAeq (15min) / 70 dB(A) LAeq (15min)	Construction noise was generally not audible at this location above transport noise levels

Based on the results of the testing detailed in the table above the following can be concluded:

1. Construction noise levels are below the 'High Noise Affected' level and therefore acceptable with some management.
2. Noise level were found to be above the 'Management Level' during periods when the concrete trucks and pumping were in operation.
3. Noise from other noise sources within the vicinity of the site including bus, car and motorbike passbys as well as construction on other building sites within the vicinity of the site was generating noise levels which were similar or greater than noise level generated from the operation of construction activities including concrete trucks and concrete pumping.

6 Conclusion

This report details the results of construction noise testing undertaken at the 2a-6 Hassell Street, Parramatta project.

Construction noise testing was undertaken at site on the 2nd June, 2020 during a period when general construction as well as concrete pouring was being conducted. The results of the testing are detailed in this report.

For any additional information please do not hesitate to contact the person below.

Regards

Ben White
Director
White Noise Acoustics

7 Appendix A – Glossary of Terms

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	*A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the L_{A90} value
Ctr	A frequency adaptation term applied in accordance with the procedures described in ISO 717.
dB (A)	'A' Weighted overall sound pressure level

Noise Reduction	The difference in sound pressure level between any two areas. The term “noise reduction” does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
NR Noise Rating	Single number evaluation of the background noise level. The NR level is normally around 5 to 6 dB below the “A” weighted noise level. The NR curve describes a spectrum of noise levels and is categorised by the level at 1000 Hz ie the NR 50 curve has a value of 50 dB at 1000 Hz. The NR rating is a tangential system where a noise spectrum is classified by the NR curve that just encompasses the entire noise spectrum consideration.
R_w	Weighted Sound Reduction Index - Laboratory test measurement procedure that provides a single number indication of the acoustic performance of a partition or single element. Calculation procedures for Rw are defined in ISO 140-2:1991 “Measurement of Sound Insulation in Buildings and of Building Elements Part 2: Determination, verification and application of precision data”.
R'_w	Field obtained Weighted Sound Reduction Index - this figure is generally up to 3-5 lower than the laboratory test determined level data due to flanked sound transmission and imperfect site construction.
Sound Isolation	A reference to the degree of acoustical separation between any two areas. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term “sound isolation” does not specify any grade or performance quality and requires the units to be specified for any contractual condition
Sound Pressure Level, L_P dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, L_W dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
Transmission Loss	Equivalent to Sound Transmission Loss and to Sound Reduction Index in terminology used in countries other than Australia. A formal test rating of sound transmission properties of any construction, by usually a wall, floor, roof etc. The transmission loss of all materials varies with frequency and may be determined by either laboratory or field tests. Australian Standards apply to test methods for both situations.