

22 February 2019

WM Project Number: 10232-C1  
Our Ref: DM 220219 Extended Hours.doc  
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Dear Wayne

**Re: Barangaroo South Building C1  
Application for Out of Hours Work  
Noise Assessment**

## **INTRODUCTION**

Wilkinson Murray Pty Ltd has conducted a review of potential construction noise impacts associated with proposed extended hours works at the C1 building site at Barangaroo South. These works are proposed to be conducted outside approved construction hours.

Lend Lease is seeking approval to work outside the existing approved construction hours for the works detailed in this assessment. These works will occur on accession between April and September 2019.

## **HOURS OF OPERATION**

Approved working hours under SSD 8529 for the Commercial Buildings at Barangaroo South project are:

- 7:00am – 7:00pm Monday to Friday and
- 7:00am – 5:00pm on Saturdays.

The Works are proposed to be undertaken on Sunday's from 8am to 5pm and 7pm to 7am for selected activities. Once these works have been completed site construction works will revert to the normal approved hours.

## **CONSTRUCTION NOISE MANAGEMENT OBJECTIVES**

The EPA released the "Interim Construction Noise Guideline" (CNG) in July 2009. The guideline provides noise goals that assist in assessing the impact of construction noise.



The guideline recommends that outside the standard hours, the noise management levels are based on the background + 5dBA.

Based on previous noise monitoring around the site Sunday / Evening and Night background noise levels have been established at identified residential receivers. These levels, along with applicable construction noise management levels, are presented in Tables 1-3.

**Table 1 Sunday Site Specific Construction Noise Management Levels  $L_{Aeq}(15 \text{ minute})$**

| <b>Location</b>                          | <b>Measured Background Noise Level* - dBA</b> | <b>Construction Noise Management Level, <math>L_{Aeq}</math> - dBA</b> |
|------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------|
| Hickson Road Residences                  | 53                                            | 58                                                                     |
| R8 Residences                            | 48                                            | 53                                                                     |
| High Street Residences                   | 47                                            | 52                                                                     |
| Merriman Street Residences               | 43                                            | 48                                                                     |
| Balmain East Residences                  | 46                                            | 51                                                                     |
| Darling Island / Sydney Wharf Residences | 45                                            | 50                                                                     |

\* Based on measurements conducted in 2010 prior to site activation. Levels at R8 were measured in 2015.

Evening Construction Noise Management Levels are presented in Table 2

**Table 2 Evening Site Specific Construction Noise Management Levels  $L_{Aeq}(15 \text{ minute})$**

| <b>Location</b>                          | <b>Measured Background Noise Level* - dBA</b> | <b>Construction Noise Management Level, <math>L_{Aeq}</math> - dBA</b> |
|------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------|
| Hickson Road Residences                  | 51                                            | 56                                                                     |
| R8 Residences                            | 51                                            | 56                                                                     |
| High Street Residences                   | 44                                            | 49                                                                     |
| Merriman Street Residences               | 44                                            | 49                                                                     |
| Balmain East Residences                  | 45                                            | 50                                                                     |
| Darling Island / Sydney Wharf Residences | 44                                            | 49                                                                     |

**Table 3 Night Site Specific Construction Noise Management Levels  $L_{Aeq}(15 \text{ minute})$**

| <b>Location</b>            | <b>Measured Background Noise Level* - dBA</b> | <b>Construction Noise Management Level, <math>L_{Aeq}</math> - dBA</b> |
|----------------------------|-----------------------------------------------|------------------------------------------------------------------------|
| Hickson Road Residences    | 45                                            | 50                                                                     |
| R8 Residences              | 44                                            | 49                                                                     |
| High Street Residences     | 41                                            | 46                                                                     |
| Merriman Street Residences | 40                                            | 45                                                                     |
| Balmain East Residences    | 40                                            | 45                                                                     |

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|                                          |    |    |
|------------------------------------------|----|----|
| Darling Island / Sydney Wharf Residences | 39 | 44 |
|------------------------------------------|----|----|

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## PROPOSED WORKS AND EQUIPMENT

A brief description of the propose works is detailed as follows.

### 1. Dismantling of Class B Hoarding

- Proposed Hours            7:00 pm – 7 am except Impact Guns which are proposed up to 10 pm.
- Proposed Plant
  - 20 Tonne Franna Crane
  - Hiab Truck
  - 4 Tonne Forklift
  - Tower Crane
  - Scissor Lifts
  - Impact Gun/ Rattle Gun to unscrew the bolts

### 2 Dismantling of Class A hoarding works (On Sunday)

- Proposed Hours            8:00 am – 5:00pm
- Proposed Plant
  - 20 Tonne Franna Crane
  - Hiab Truck
  - 4 Tonne Forklift
  - Tower Crane
  - Scissor Lifts
  - Impact Gun/ Rattle Gun to unscrew the bolts

### 3 Dismantling of Tower Crane (On Sunday)

- Proposed Hours            8:00am – 5:00pm
- Proposed Plant
  - Crane 350 Tonne Mobile Crane
  - 20 Tonne Franna
  - Semi-Trailer
  - Scissor Lifts

- Hand Tools

#### **4 Demolition of Tower Crane Base (On Sunday)**

- Proposed Hours 8:00am – 5:00pm
- Proposed Plant
  - Concrete Saw
  - Excavator with Hammer
  - Brokk Tool

#### **5 Paving works around the C1 Building(On Sunday)**

- Proposed Hours 8:00am – 5:00pm
- Proposed Plant
  - Paving Saw
  - Delivery Truck
  - Hand Tools

#### **6 Services Commissioning works (Inside Building)**

- Proposed Hours 7:00 pm – 7:00 am ( Monday – Friday) Saturday 5:00 am – 7:00 pm  
Sunday 5:00 am – 7:00 pm
- Proposed Plant
  - Power Hand Tools
  - Hand Tools

In the case of activities 6 detailed above the activities are not noise intensive and will be contained within the building envelope. As such there will be no impacts at surrounding residences. Accordingly the remainder of this assessment will be focused on Activities 1 to 5.

Acoustically significant equipment and activities that are likely to be associated with these works, including associated sound levels, are presented in Table 4.

**Table 4      Typical Construction Plant  $L_{Aeq}$  Sound Levels - dBA**

| <b>Plant</b>            | <b>Sound Power Level</b> | <b>Sound Pressure Level at 7m</b> |
|-------------------------|--------------------------|-----------------------------------|
| 360 t Mobile Crane      | 106                      | 81                                |
| Medium Rock breaker     | 116                      | 91                                |
| Site Crane              | 104                      | 79                                |
| Concrete Saw            | 116                      | 91                                |
| Forklift                | 85                       | 60                                |
| 20 t Franna Crane       | 98                       | 73                                |
| Hand Tools              | 90                       | 65                                |
| Rattle Gun / Impact Gun | 108                      | 83                                |
| Power Tools             | 95                       | 70                                |
| Delivery Truck          | 104                      | 79                                |

## CONSTRUCTION NOISE PREDICTIONS

Site-related noise emissions were at surrounding residences was predicted based on the following:

- equipment sound level emissions and location;
- receiver locations;
- ground topography, and;
- noise attenuation due to geometric spreading.

The predictions have been conducted for each location and the highest predicted noise level has been presented. Construction scenarios have been established based on each item of plant running continuously for half of any 15 minute period.

The predicted construction noise levels at surrounding residences are summarised as follows;

### Dismantling of Class B Hoarding

Predicted construction noise levels during proposed Dismantling of Class B Hoarding are shown in Table 5.

**Table 5 Predicted Evening / Night Construction Noise Levels at Residences.**

| Location                   | Predicted Highest Construction Noise Level $L_{Aeq}(15 \text{ minute})^*$ | Construction Noise Management Level, $L_{Aeq} - \text{dBA}$ |       |
|----------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|-------|
|                            |                                                                           | Evening                                                     | Night |
| Hickson Road Residences    | 55/52                                                                     | 56                                                          | 50    |
| High Street Residences     | 38/36                                                                     | 56                                                          | 49    |
| Merriman Street Residences | 35/33                                                                     | 49                                                          | 46    |
| Balmain East Residences    | 27/27                                                                     | 49                                                          | 45    |
| Darling Island Residences  | 20/15                                                                     | 50                                                          | 45    |
| Sydney Wharf Residences    | 21/16                                                                     | 49                                                          | 44    |

\* Level with and without impact gun

A review of results indicates compliance with established noise management levels with the exception of residences at 38 Hickson Road in the night period where marginal exceedance of 2 dBA exceedance of night noise management goal is predicted. This impact can be minimised by focusing work at night, where practical, on the western and southern sides of C1 where additional shielding and distance will reduce noise levels at these receivers.

### Dismantling of Class A Hoarding

Predicted construction noise levels during proposed Dismantling of Class A Hoarding are shown in Table 6

**Table 6 Predicted Sunday Construction Noise Levels at Residences.**

| Location                   | Predicted Highest Construction Noise Level | Sunday Construction Noise Management Level, |
|----------------------------|--------------------------------------------|---------------------------------------------|
|                            | $L_{Aeq}(15 \text{ minute})$               | $L_{Aeq} - \text{dBA}$                      |
| Hickson Road Residences    | 55                                         | 58                                          |
| High Street Residences     | 32                                         | 53                                          |
| Merriman Street Residences | 47                                         | 52                                          |
| Balmain East Residences    | 35                                         | 48                                          |
| Darling Island Residences  | 27                                         | 51                                          |
| Sydney Wharf Residences    | 20                                         | 50                                          |

A review of results indicates compliance with established noise management levels at all surrounding receivers.

### Dismantling of Tower Crane (On Sunday)

Predicted construction noise levels during proposed Dismantling of Tower Crane are shown in Table 7

**Table 7 Predicted Sunday Construction Noise Levels at Residences.**

| Location                   | Predicted Highest<br>Construction Noise Level | Sunday Construction Noise<br>Management Level, |
|----------------------------|-----------------------------------------------|------------------------------------------------|
|                            | $L_{Aeq}(15 \text{ minute})$                  | $L_{Aeq} - \text{dBA}$                         |
| Hickson Road Residences    | 54                                            | 58                                             |
| High Street Residences     | 33                                            | 53                                             |
| Merriman Street Residences | 47                                            | 52                                             |
| Balmain East Residences    | 36                                            | 48                                             |
| Darling Island Residences  | 18                                            | 51                                             |
| Sydney Wharf Residences    | 20                                            | 50                                             |

A review of results indicates compliance with established noise management levels at all surrounding receivers.

### **Dismantling of Tower Crane (On Sunday)**

Predicted construction noise levels during proposed Dismantling of Tower Crane are shown in Table 7

**Table 7 Predicted Sunday Construction Noise Levels at Residences.**

| Location                   | Predicted Highest<br>Construction Noise Level | Sunday Construction Noise<br>Management Level, |
|----------------------------|-----------------------------------------------|------------------------------------------------|
|                            | $L_{Aeq}(15 \text{ minute})$                  | $L_{Aeq} - \text{dBA}$                         |
| Hickson Road Residences    | 55                                            | 58                                             |
| High Street Residences     | 33                                            | 53                                             |
| Merriman Street Residences | 47                                            | 52                                             |
| Balmain East Residences    | 37                                            | 48                                             |
| Darling Island Residences  | 16                                            | 51                                             |
| Sydney Wharf Residences    | 19                                            | 50                                             |

A review of results indicates compliance with established noise management levels at all surrounding receivers.

### **Paving works around the C1 Building (On Sunday)**

Predicted construction noise levels during proposed Paving of Tower Crane are shown in Table 7

**Table 7 Predicted Sunday Construction Noise Levels at Residences.**

| Location                   | Predicted Highest<br>Construction Noise Level | Sunday Construction Noise<br>Management Level, |
|----------------------------|-----------------------------------------------|------------------------------------------------|
|                            | L <sub>Aeq</sub> (15 minute)                  | L <sub>Aeq</sub> - dBA                         |
| Hickson Road Residences    | 56                                            | 58                                             |
| High Street Residences     | 28                                            | 53                                             |
| Merriman Street Residences | 45                                            | 52                                             |
| Balmain East Residences    | 34                                            | 48                                             |
| Darling Island Residences  | 31                                            | 51                                             |
| Sydney Wharf Residences    | 28                                            | 50                                             |

A review of results indicates compliance with established noise management levels at all surrounding receivers.

## DISCUSSION

A review of the results indicates that compliance with established out of hours noise management levels are achieved at all surrounding residential receivers with the exception of a marginal exceedance of nightworks associated with type B hoardings.

The main contributor to this exceedance have been identified as degree the operation of Franna Cranes at the North Eastern end of the C1 site. Accordingly the following mitigation measures are recommended to be adopted to reduce noise impact at the identified receivers.

- Focus early morning works on the southern and western side of the building during the night period where practicable and feasible.

It should be noted that where noise levels are within 2 dB of the noise management levels then noise will be, at times audible at residences. Therefore it is prudent adopt the following recommended management measures to ensure that the acoustic amenity of residences is protected:

- Notify, via Lend Lease Community Relations, the surrounding community when crane installation and removal activities are planned.
- Instruct workers of the issue of noise transmission to residences so that they are aware of the requirement to minimise noise emission to residences. This would include avoiding, as much as possible, metal hammering.

## CONCLUSION

A review of potential noise emissions associated with proposed C1 extended hours works based on the proposed methodology and equipment supplied by Lend Lease.

The predicted construction noise levels at residences have been compared with established noise management goals for out of hour's operations. It has been determined that compliance will be



achieved at all residences surrounding the site with the exception of the removal of Class B hoardings at night. Noting that noise management measures are proposed to mitigate impacts.

It is recommended that identified management levels are adopted and incorporated in the project noise and vibration management sub plan to ensure that noise from the proposed operations is minimised.

Based on our findings we have determined that the proposed operations, when managed under the sub plan, will not adversely impact on the acoustic amenity of surrounding residences.

I trust this information is of assistance

Yours faithfully

**WILKINSON MURRAY**

A handwritten signature in black ink, appearing to read 'Brian Clarke', written in a cursive style.

**Brian Clarke**

Senior Associate