

acoustic studio

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25 September 2017

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Dear Sarah

INNER SYDNEY HIGH SCHOOL

Assessment of Operational Noise Related to Noise Emissions from Mechanical Plant for the ISHS

This letter provides an acoustic assessment of the current scheme that is being developed for the mechanical design at the ISHS, with regard to external noise emissions to external noise sensitive receivers.

Should you have any queries or require any further information please do not hesitate to contact us.

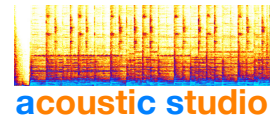
Yours sincerely

A handwritten signature in black ink, appearing to read 'Anthony Cano'.

Anthony Cano
Acoustic Engineer
Acoustic Studio Pty Ltd

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1. PLANNING APPLICATION ACOUSTIC ASSESSMENT

Acoustic Studio has completed a noise impact assessment for the proposed ISHS, including establishing relevant criteria plus a general review and comment with relation to operational noise emissions from mechanical plant proposed for the development.

The assessment has been prepared in support of the planning application of the project and addresses the requirements outlined in the Secretary's Environmental Assessment Requirements issued for the project.

The assessment is detailed in the following document.

- [1] Inner Sydney High School, Surry Hills, *Acoustic Assessment of Operation and Construction Noise and Vibration for Planning Application, (ref:20170602 FJM3161.0002.rep.revB)*.

At the time of preparing the above assessment and report, details on mechanical plant and equipment was unconfirmed and therefore only general comments were provided.

Acoustics Studio has since carried out further assessment as the mechanical design has developed, which is detailed in the sections to follow.

2. OPERATIONAL NOISE IMPACT ASSESSMENT OF ISHS MECHANICAL PLANT AND EQUIPMENT

2.1 Criteria

External noise emissions from mechanical plant are assessed in accordance with the City of Sydney (CoS) Standard Conditions of Development Consent for "Noise – Mechanical Plant and Equipment" plus the NSW Industrial Noise Policy (INP). Satisfying the NSW INP requirements will also satisfy the CoS requirements.

The project specific criteria have been established based on noise surveys of pre-existing ambient and background noise levels at the nearest noise sensitive receivers that surround the site. These project specific criteria are presented in Table 1 below.

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| Receiver Type | Period | INP Criteria | | | |
|-------------------------|------------------------------------|------------------------|--|---|-----------------------------------|
| | | Acceptable Noise Level | Amenity L _{eq} (period), dBA | Intrusiveness L _{eq} (15-minute), dBA | INP Project Specific ¹ |
| Residential | Day (7am-6pm) | 60 | 58 | 60 | 58 |
| | Evening (6pm-10pm) | 50 | 56 | 58 | 56 |
| | Night (10pm to 6am) | 45 | 52 | 48 | 48 |
| Place of Worship | When in use | 50 ² | 58 | 60 | 58 |
| Passive Recreation Area | When in use | 50 | 58 | 60 | 58 |
| Commercial premises | When in use | 65 | 58 | 60 | 58 |
| School Classroom | Noisiest 1-hour period When In Use | 45 ⁵ | 58 | 60 | 58 |

Table 1: INP project specific criteria for external noise emissions from mechanical plant

Further details are provided in Section 6.4 of the Planning Application acoustic report [1].

¹ Project Specific Criteria are based on the more stringent of the Amenity and Intrusiveness Criteria.

² The NSW INP specifies an internal ANL of 35 and 40 for school classrooms and places of worship respectively. The NSW INP also states that where internal noise levels are specified, external noise 10 dB above internal noise levels can be applied which should achieve an internal noise level where a window is adequately opened to provide natural ventilation.

2.2 Noise Sources

The noise source data that have been applied in the assessment are based on selections and manufacturer data provided by the Mechanical Consultant for the project.

This includes noise data for:

- Fans
- Condenser units
- Air cooled chillers

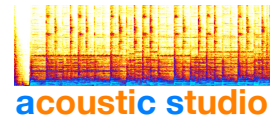
Data for the equipment that has been assessed are included in Appendix A of this report. It is noted that for certain equipment, the design is still in progress and / or equipment selections are not yet available for review. However, these items have been considered in the overall design and contingencies implemented (including allowances for noise treatment and strategic location of equipment) such that when equipment is finalised / the mechanical scheme is developed further, the design will ensure that the following equipment can achieve the relevant noise criteria.

- Pumps
- Specialist equipment (fume and dust extraction)

2.3 Methodology

The acoustic assessment has considered the following:

- The cumulative noise levels at the nearest affected noise sensitive receiver from plant and equipment operating continuously over a 15-minute period
- Operation of mechanical plant will occur during school hours in the day time period (7am to 6pm) and potential for use after hours in the evening period (6pm to 10pm)
- Project criteria at the nearest sensitive receiver locations outlined in Table 1.
- The assessment considers the worst-case (closest noise sensitive) receivers as follows
 - *West - Alfred Park (Passive Recreation Areas)* - the nearest distance from plant and equipment is at 2m (Lower ground level), with increasing distance (up to 50m) for other equipment moving progressively up the building for each level
 - *East - Residential and Commercial across Chalmers Street* - the nearest distance at 30m from plant and equipmentCompliance at these locations will result in compliance at all other locations.
- Noise levels from the use are considered over a worst case 15-minute period. Compliance at these locations will result in compliance at all other locations.
- Location of all equipment at their respective façade and level.



- The assessment considers
 - Distance attenuation
 - Shielding and reflections
 - Directivity
- The assessment also includes consideration of the following noise controls that have been incorporated to achieve the relevant criteria
 - Shielding provided by barriers around rooftop plant sufficient to break the line of site to the nearest neighbouring receivers
 - Attenuators and lined duct to be incorporated for the following equipment
 - SEF-NB-LG-01
 - OAF-NB-LG-01
 - TEF-NB-LG-01
 - GEF-NB-LG-01
 - GEF-NB-LG-02
 - RAF-NB-LIB
 - TEF-NB-G-01

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2.4 Assessment Results

| Calculation | Sound Pressure Level, in dBL _{Aeq,15min} | |
|--------------------------|--|--|
| | Commercial and Residential (Across Chalmers Street) | Passive Recreation Area (Alfred Park) |
| | East | West |
| Predicted noise level | 54 | 53 |
| Criteria (Day / Evening) | 56 / 58 | 58 (when in use) |
| Complies? | Yes | Yes |

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Table 2: Mechanical Plant Noise Emission - Assessment Results

Based on the predictions detailed above, the current mechanical design is able to comply with the relevant project specific criteria.

The mechanical design is still ongoing and not all plant selections are finalised. Where the final selections are made, or vary from the current selections that have been assessed, Acoustic Studio will review the design to ensure equivalent selections are provided and / or noise controls are incorporated as required for the final design to ensure that the cumulative noise output from plant at the nearest affected receivers is within the allowable limits.

The design considerations and controls that will be considered and implemented where required as the design is developed further include:

- Strategic selection and location of plant to ensure the cumulative noise contribution at the receiver boundary is achieved, and/or
- Noise control measures to be put in place to minimise noise impacts such as:
 - Noise enclosures as required
 - Noise barriers as required
 - Acoustic louvres as required
 - In-duct attenuation

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APPENDIX A – Plant and Equipment Noise Levels

FANS

| Fan Location | Fan Designation | Sound Level dB(A) |
|-------------------|-----------------|-------------------|
| GYM | SEF-NB-LG-01 | 49 @ 3m |
| B1 staff study | OAF-NB-B-02 | 40 @ 3m |
| B1 Switchroom | OAF-NB-N-03 | 47 @ 3m |
| Basement FCU | OAF-NB-B-01 | 49 @ 3m |
| LG FCU | OAF-NB-LG-01 | 54 @ 3m |
| LG Toilets | TEF-NB-LG-01 | 56 @ 3m |
| LG Store | GEF-NB-LG-01 | 46 @ 3m |
| Waste room LG | GEF-NB-LG-02 | 53 @ 3m |
| Library OA | OAF-NB-GF-01 | 47 @ 3m |
| Lib Relief | RAF-NB-LIB | 62 @ 3m |
| Toilet GF | TEF-NB-G-01 | 48 @ 3m |
| Cafe kitchen | KEF-NB-CAFE | 44 @ 3m |
| L1 Toilet | TEF-NB-L01-01 | 40 @ 3m |
| L2 Store | GEF-NB-L02-01 | 40 @ 3m |
| L2 Workshop Store | GEF-NB-L02-02 | 40 @ 3m |
| OA FCU L2 | OAF-NB-L02-01 | 53 @ 3m |
| OA FCU L2 | OAF-NB-L02-02 | 53 @ 3m |
| OA FCU L2 | OAF-NB-L02-03 | 51 @ 3m |
| L2 toilet | TEF-NB-L02-01 | 27 @ 3m |
| L3 Store | GEF-NB-L03-01 | 40 @ 3m |
| L3 Workshop Store | GEF-NB-L03-02 | 40 @ 3m |
| OA FCU L3 | OAF-NB-L03-01 | 53 @ 3m |
| OA FCU L3 | OAF-NB-L03-02 | 53 @ 3m |
| OA FCU L3 | OAF-NB-L03-03 | 51 @ 3m |
| OA FCU L3 | OAF-NB-L03-04 | 41 @ 3m |
| L3 toilet | TEF-NB-L03-01 | 27 @ 3m |
| L4 toilet | TEF-NB-L04-01 | 27 @ 3m |
| Store L5 | GEF-NB-L05-01 | 27 @ 3m |
| Kitchen Prep | GEF-NB-L05-02 | 38 @ 3m |
| OA FCU L5 | OAF-NB-L05-01 | 42 @ 3m |
| OA FCU L5 | OAF-NB-L05-02 | 45 @ 3m |
| L5 toilet | TEF-NB-L05-01 | 27 @ 3m |
| L6 toilet | TEF-NB-L06-01 | 27 @ 3m |
| L6 Scienc Prep | GEF-NB-L06-01 | 34 @ 3m |
| L6 Store | GEF-NB-L06-02 | 34 @ 3m |
| OA FCU L6 | OAF-NB-L06-01 | 56 @ 3m |
| OA FCU L6 | OAF-NB-L06-02 | 56 @ 3m |
| OA FCU L6 | OAF-NB-L06-03 | 55 @ 3m |
| OA FCU L6 | OAF-NB-L06-04 | 52 @ 3m |
| Store L7 | GEF-NB-L07-02 | 27 @ 3m |
| L7 Scienc Prep | GEF-NB-L07-01 | 34 @ 3m |
| OA FCU L7 | OAF-NB-L07-01 | 53 @ 3m |
| OA FCU L07 | OAF-NB-L07-02 | 52 @ 3m |
| OA FCU L7 | OAF-NB-L07-03 | 53 @ 3m |
| OA FCU L7 | OAF-NB-L07-04 | 48 @ 3m |
| L7 toilet | TEF-NB-L07-01 | 27 @ 3m |
| L8 toilet | TEF-NB-L08-01 | 27 @ 3m |
| L9 toilet | TEF-NB-L09-01 | 27 @ 3m |
| L9 Scienc Prep | GEF-NB-L09-01 | 34 @ 3m |
| L9 Store | GEF-NB-L09-02 | 34 @ 3m |
| OA FCU L9 | OAF-NB-L09-01 | 56 @ 3m |
| OA FCU L9 | OAF-NB-L09-02 | 56 @ 3m |
| OA FCU L9 | OAF-NB-L09-03 | 55 @ 3m |
| OA FCU L9 | OAF-NB-L09-04 | 52 @ 3m |
| L10 toilet | TEF-NB-L10-01 | 27 @ 3m |
| L10 Scienc Prep | GEF-NB-L10-01 | 34 @ 3m |
| L10 Store | GEF-NB-L10-02 | 34 @ 3m |
| OA FCU L10 | OAF-NB-L10-01 | 56 @ 3m |
| OA FCU L10 | OAF-NB-L10-02 | 56 @ 3m |
| OA FCU L10 | OAF-NB-L10-03 | 55 @ 3m |
| OA FCU L10 | OAF-NB-L10-04 | 52 @ 3m |
| L11 toilet | TEF-NB-L11-01 | 27 @ 3m |
| L11 Scienc Prep | GEF-NB-L11-01 | 34 @ 3m |
| L11 Store | GEF-NB-L11-02 | 34 @ 3m |
| OA FCU L11 | OAF-NB-L11-01 | 56 @ 3m |
| OA FCU L11 | OAF-NB-L11-02 | 56 @ 3m |
| OA FCU L11 | OAF-NB-L11-03 | 55 @ 3m |
| OA FCU L11 | OAF-NB-L11-04 | 52 @ 3m |
| Roof Plant | SPF-01 | 77 @ 3m |
| Roof Plant | SPF-02 | 77 @ 3m |
| Roof Plant | SEF-01 | 76 @ 3m |
| Roof Plant | RAF-01 | 56 @ 3m |
| Roof Plant | SEF-01 (ALT) | 68 @ 3m |
| Roof Plant | KEF-01 | 54 @ 3m |
| Roof Plant | DEF-01 | 60 @ 3m |
| Roof Plant | OEF-01 | 55 @ 3m |

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CHILLERS

- 2 x SMARTD, AD065.2EH08.F2AKHA.A010AA.010 – 70 dB(A) at 3m

CONDENSER UNITS

- 2 x Daiken REYQ10TY1 – 57 dB(A) @ 1m
- 2 x Daiken REYQ12TY1 – 59 dB(A) @ 1m
- 3 x Daiken REYQ16TY1 – 61 dB(A) @ 1m
- 3 x Daiken REYQ18TY1 – 62 dB(A) @ 1m
- 2 x Daiken REYQ20TY1 – 65 dB(A) @ 1m

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