Noise and Vibration Impact Assessment



ABN 48 612 666 172

- Addendum

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INTRODUCTION

This letter is an addendum to the Noise and Vibration Impact Assessment Report prepared by JHA Consulting Engineers for SSDA 10383. This letter aims to address the Conditions of Consent B5 and B14 from SSDA 10383, stating the following:

"B5. Prior to the issue of any relevant construction certificate for the design of mechanical plant and equipment, the Applicant must incorporate the design related noise mitigation recommendations in the Noise and Vibration Impact Assessment Report, prepared by JHA, dated 23/06/2020, into the detailed design drawings. The Certifier must verify that all the design related noise mitigation measures have been incorporated into the design to ensure the development will not exceed the recommended operational noise levels identified in the submitted Noise and Vibration Impact Assessment Report.

B14. Prior to the issue of the relevant construction certificate for the school building, an addendum to the Noise and Vibration Impact Assessment Report, prepared by JHA, dated 23/06/2020 must be submitted to the satisfaction of the Planning Secretary. The report must:

(a) be prepared by a suitably qualified acoustic consultant;

(b) include details of acoustic treatments on the floor, walls and ceiling of the internal recreation spaces within each of the floors; and

(c) demonstrate that the noise and vibration created by students using the indoor recreational areas on the upper levels do not adversely impact the amenity of the students within the classrooms of the levels immediately below."

MECHANICAL SERVICES – CONDITION OF CONSENT B5

The following general works have been undertaken by JHA Consulting Engineers to address Condition of Consent B5:

- Review of Architectural for Construction Drawings and Specification, provided by Alleanza Architects.
- Review of Mechanical Services for Construction Drawings and Specification, provided by Erbas.
- Review of Acoustic Specification for Construction, prepared by JHA Engineers.

Based on the above, JHA considers that the current mechanical services design complies with the noise level criteria and requirements of the Noise and Vibration Impact Assessment Report prepared by JHA Consulting Engineers, and the project will comply with the required acoustic outcomes.



INTERNAL RECREATION SPACES – CONDITION OF CONSENT B14

Airborne Sound Insulation Criteria

To control airborne sound transmitted into spaces via the floor, walls and ceilings, as per Green Star Building Guidelines the following criteria are applicable:

"For sound insulation compliance, the partition between the spaces should be constructed to achieve a weighted sound reduction index (R_w) of:

- At least 45 for all partitions separating enclosed spaces which are:
 - Fixed without a door.
 - Glazed partitions without a door. The Acoustic Consultant can use their discretion to determine whether an R_w of 35 or 45 is more applicable when using glazed partitions.
- At least 40 for all partitions fronting a room (from an open plan area).
- At least 35 (in composite with door and partition) for all partition types that contain a door.
- At least 50 through floors between occupied spaces."

The CSPD does not provide a methodology to nominate sound insulation ratings of internal partitions and doors, as only provides generic constructions to achieve the required sound insulation ratings.

Impact Noise Insulation Criteria

To control impact sound (e.g. footsteps) transmitted into spaces via the floor and structure, as per Green Star Building Guidelines, standardised impact sound pressure level (L'_{nTw}) will not exceed 60dB. In addition to the Green Star Building Guidelines, the CSPD Guideline also nominates a minimum impact noise criterion. This requirement only applies to floors located above regularly occupied areas. Table 1 shows the impact noise criteria for learning spaces below indoor recreational areas.

Room –	Project Impact noise criteria, L' _{nTw}	
	Green Star	CSPD
Library / Knowledge - Assisted Learning - Inquiry Hubs Primary and secondary College Teaching Spaces	60	55

 Table 1: Summary of Project Impact Noise Criteria.

Walls of Internal Recreational Areas

Based on the information obtained from the architectural drawing WCCGLA-ARC-DWG-A301 (1) and WCCGLA-ARC-SCH-FFE(B), Table 2 shows the proposed internal wall types and their sound insulation rating (R_{W}).



ID	Composition	Sound Insulation Rating, dB
i01	13mm impact-rated plasterboard (10.5kg/m²) / 13mm fire-rated plasterboard (10.5kg/m²) / 150mm steel stud with 75mm sound insulation (@11kg/m³) / 13mm fire- rated plasterboard (10.5kg/m²) / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 55
i02	13mm impact-rated plasterboard (10.5kg/m²) / 150mm steel stud with 75mm sound insulation (@11kg/m³) / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 45
i03	13mm impact-rated plasterboard (10.5kg/m²) / 92mm steel stud with 75mm sound insulation (@11kg/m³) / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 45
i04	13mm impact-rated plasterboard (10.5kg/m ²) / 13mm fire-rated plasterboard (10.5kg/m ²) / 92mm steel stud with 75mm sound insulation (@11kg/m ³) / 13mm fire- rated plasterboard (10.5kg/m ²) / 13mm impact-rated plasterboard (10.5kg/m ²)	R _w 55
i06a	13mm impact-rated plasterboard (10.5kg/m²) / 92mm steel stud with 75mm sound insulation (@11kg/m³) / 130mm air cavity / 92mm steel stud / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 55
i06b	13mm impact-rated plasterboard (10.5kg/m²) / 92mm steel stud with 75mm sound insulation (@11kg/m³) / 75mm air cavity / 92mm steel stud / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 55
i06c	13mm impact-rated plasterboard (10.5kg/m²) / 92mm steel stud with 75mm sound insulation (@11kg/m³) / 166mm air cavity / 92mm steel stud / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 55
i07	13mm impact-rated plasterboard (10.5kg/m²) / 92mm steel stud with 75mm sound insulation (@11kg/m³) / 20mm air cavity / 92mm steel stud / 13mm impact-rated plasterboard (10.5kg/m²)	R _w 50
i08	2x16mm fire-rated plasterboard (12.5kg/m²) / 102mm C-H stud / 25mm fire-rated shaft liner (19.8kg/m²)	R _w 40
i09	190mm core-filled blockwork (2,100kg/m ³)	R _w 40
i11	2x13mm impact-rated plasterboard (10.5kg/m ²) / 92mm steel stud with 75mm sound insulation (@11kg/m ³) / 2x13mm impact-rated plasterboard (10.5kg/m ²) / 245mm air cavity / 13mm impact-rated plasterboard (10.5kg/m ²) / 92mm steel stud / 13mm impact-rated plasterboard (10.5kg/m ²)	R _w 65

 Table 2: Internal wall-types.

Flooring of Internal Recreational Areas

Internal recreational areas are shown in the figure below per architectural drawing - WCCGLA-ARC-DWG-A954(B). Flooring of internal recreational areas is designed to meet the requirements of impact noise levels.





Figure 1: External Play Areas (shown in green). Source: Architectural drawing WCCGLA-ARC-DWG-A954(B).

For the internal recreational areas, there are two different flooring systems to control impact noise to the learning spaces below. For the active playing areas, the flooring system is as follows:

- Artificial turf.
- 10mm impact rubber mat.
- Minimum 190mm concrete slab.
- 75mm soffit thermal insulation.
- 170mm-340mm air cavity.
- Nominated ceiling with 75mm sound insulation with density 32kg/m³ above the ceiling lining.

All non-active play areas, flooring will be composed by the following at a minimum:

- 120mm concrete topping slab.
- Minimum 190mm concrete slab.
- 75mm soffit thermal insulation.
- 170mm-340mm air cavity.
- Nominated ceiling with 75mm sound insulation with density 32kg/m³ above the ceiling lining.

The flooring build-up is predicted to achieve Impact Noise Insulation rating $L'_{nTw}52$ that complies with the Impact Noise criteria in Table 1 and will not adversely impact the amenity of the students within the classrooms of the levels immediately below.

External Ceiling to Internal Recreational Areas

To minimise the noise break-out from children playing in the indoor recreational areas, the ceiling of the play areas will be profiled metal ceiling as documented in the architectural drawings and WCCGLA-ARC-SCH-FFE(B). The ceiling lining will be 3mm perforated metal panel with 20% open area and with 75mm sound insulation Martini Absorb XXHD. The cavity between the perforated metal panel and the slab soffit for the outdoor ceiling system is minimum 170mm for the ground floor play area and minimum 300mm for upper levels, as per architectural Section drawings WCCGLA-ARC-DWG-A200 (2) to WCCGLA-ARC-DWG-A215 (2).

The external ceiling to internal recreation areas build-up is predicted to achieve an airborne sound insulation rating R_w55 that complies with the Green Star criteria, and will not adversely impact the amenity of the students within the classrooms.



Internal Ceiling to Internal Recreational Areas

To minimise the noise transfer between the indoor recreational areas, the ceiling / flooring is as follows:

- Carpet.
- 190mm 350mm concrete slab.
- 240mm 1,200mm ceiling cavity.
- Perforated plasterboard acoustic ceiling with nominated acoustic insulation.

The above build-up is predicted to achieve Impact Noise Insulation rating $L'_{nTw}52$ and an airborne sound insulation rating of R_w55 , that complies with the Green Star and CSPD criteria and will not adversely impact the amenity of the students within the classrooms of the levels immediately below.

CONCLUSION

This letter is made in relation to Conditions of Consent B5 and B14 on the basis of the documentation review from the following documentation by JHA Consulting Engineers:

- Review of Architectural for Construction Drawings and Specification, provided by Alleanza Architects.
- Review of Mechanical Services for Construction Drawings and Specification, provided by Erbas.
- Review of Acoustic Specification for Construction, prepared by JHA Engineers.

Based on the assessment conducted in this addendum, the acoustic treatments for the mechanical services, designed floors, walls and ceiling of the internal recreation spaces will comply with the requirements of Conditions of Consent B5 and B14 to not exceed the recommended operational noise levels identified in the submitted Noise and Vibration Impact Assessment Report, and to not adversely impact the amenity of the students within the classrooms.

I am an appropriately qualified and competent acoustic engineer and as such can certify the compliance of above.

Full Name of Designer:	Jorge Reverter Garcia
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Name of Employer:	JHA Consulting Engineers

We trust that this information meets your needs at this time. Please feel free to contact us if you need anything further.

Yours sincerely,

Jorge Reverter Acoustic Group Manager, MAAS

