Sirius Site

2-60 Cumberland Street, The Rocks NSW

Noise and Vibration

State Significant Development Application

Prepared for: Sirius Development Pty Ltd

Date: 11 March 2021

Prepared by: Mia Strembickyj

Ref: 301350202

Stantec Australia Pty Ltd
Level 6, Building B, 207 Pacific Highway, St Leonards NSW 2065
Tel: +61 2 8484 7000 Web: www.stantec.com

P:\301350202\PROJECT DOCUMENTATION\ACOUSTICS\DESIGN\REPORTS\SSDA\AC-RE-SSDA_001.DOCX

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
001	08/03/2021	Revised SSDA Issue	Mia Strembickyj	Brandon Notaras
002	11/03/2021	Updated with comments	Mia Strembickyj	Brandon Notaras

Stantec is a proud member of the Association of Australian Acoustical Consultants (AAAC).

AAAC members are competent and capable in the acoustic field. Members of the AAAC provide professional unbiased advices and recommendations in order to deliver practical innovative and cost effective solutions to their clients.

AAAC members are bind to a specific code of professional conduct which can be consulted on the AAAC website: http://www.aaac.org.au/au/aaac/ethics.aspx

Contents

Contents

Contents

List of Figures

List of Tables

1. Executive Summary

This noise and vibration impact assessment has been prepared by Stantec (Australia) Pty Ltd to accompany a detailed state significant development (SSD) development application (DA) for the refurbishment and redevelopment of 2-60 Cumberland Street, The Rocks development.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the detailed SSD DA.

This report concludes that the proposed alterations and additions of the development located at 2-60 Cumberland Street, The Rocks is suitable and warrants approval noting the following:

- Detailed noise modelling and investigation of traffic noise emissions and impacts on the façade of the proposed development will be conducted in the next stage. This will confirm the acoustic rating required for the glazed façade components.
- Detailed noise propagation modelling of building services plant and equipment to confirm compliance with the NSW EPA NPI will be conducted during detailed design.
- A construction noise and vibration assessment has been conducted, with in-principle noise and vibration mitigation measures proposed. A detailed assessment and a Construction Noise and Vibration Management Plan has previously been conducted and prepared by Acoustic Logic during the initial State Significant Development Application (SSDA) stage, dated 1st September 2020.

2. Introduction

This report supports the initial State Significant Development (SSD) Development Application (DA) for proposed alterations and additions of the residential building at 2-60 Cumberland Street, The Rocks. The SSD DA proposes a detailed design for the additions and alterations of the landmark building on the site.

This assessment discusses the potential noise impact of the development upon the nearest most-affected noise-sensitive receivers and the potential impacts of external noise sources within the proposed development.

This assessment has been prepared considering the following documents:

- State Environment Planning Policy (SEPP) (Infrastructure) 2007
- NSW Environment Protection Authority (EPA) Noise Policy for Industry, 2016 (NPI 2016)
- Department of Planning (DP&E) – Development near Rail Corridors and Busy Roads – Interim Guideline.
- NSW Road Noise Policy, 2011 (RNP 2011)
- AS/NZS 2107:2016: “Acoustics – Recommended design sound levels and reverberation times for building interiors”
- Bureau of Meteorology, Daily rainfall report.
- NSW Environment Protection Authority (EPA) Interim Construction Noise Guideline (ICNG July 2009).
- Assessing Vibration – A Technical Guideline (NSW AV-TG), issued February 2006 by the Department of Environment and Conservation NSW, now part of the NSW EPA.
- British Standard BS5228: Part 1:1997 “Noise and Vibration Control on Construction and Open Sites.”
- British Standard BS7358:1993 “Evaluation and Measurement for Vibration in Buildings” – Part 2: “Guide to Damage Levels from Groundborne Vibration”
- German Standard DIN4150-Part 3 “Structural vibration in buildings – Effects on structures
- Apartment Design Guide: Part 4 – NSW Department of Planning

This report provides:

- A statement of compliance with the SEPP acoustic requirements for the proposed development
- Indicative recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria

The work documented in this report was carried out in accordance with the Stantec Australia Quality Assurance system, which is based on Australian Standard / NZS ISO 9001.

This report is based on our understanding of the proposed project, application of the relevant state guidelines and professional experience within the acoustic field. Therefore, this report shall not be relied upon as providing any warranties or guarantees.

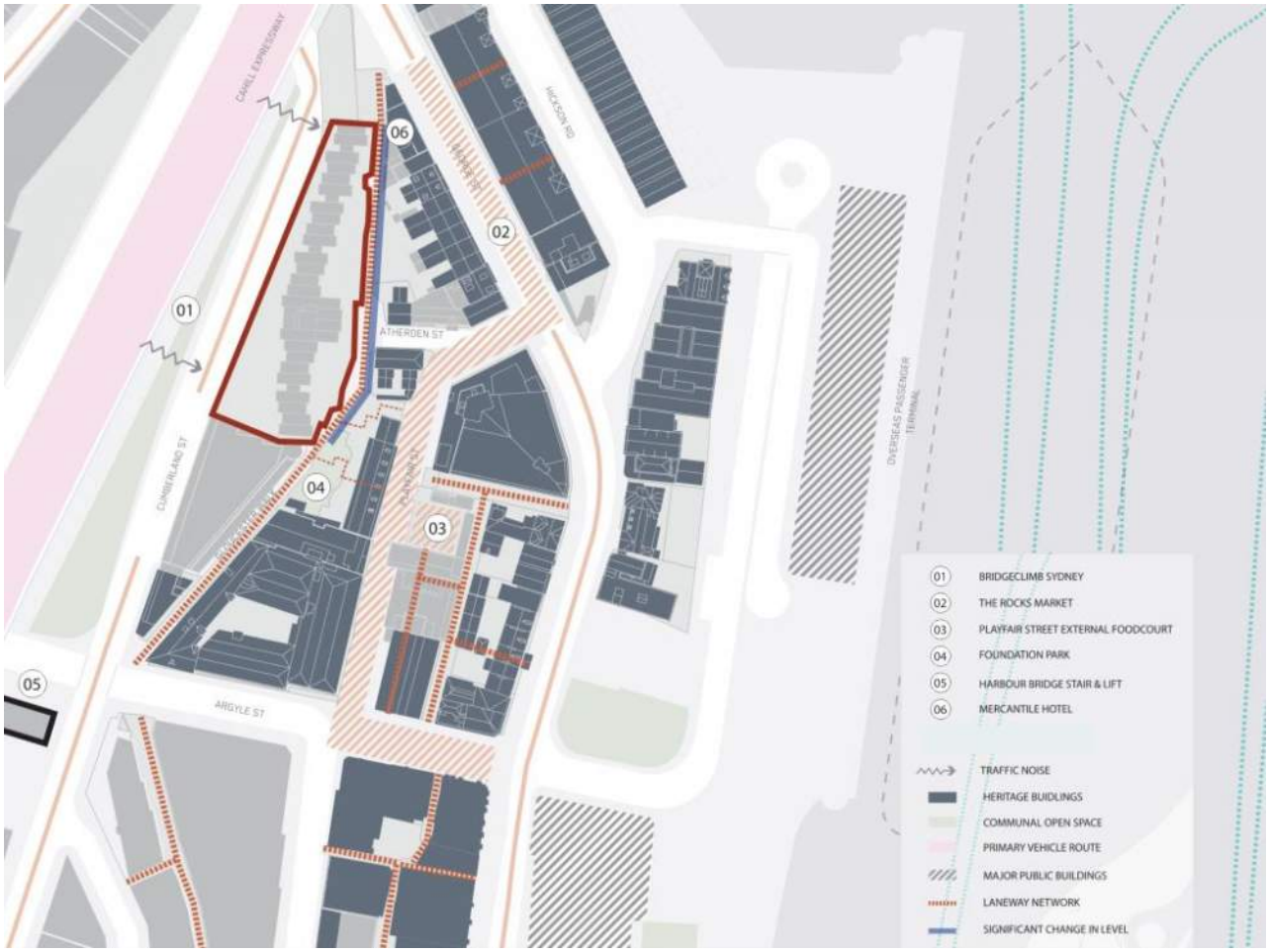
3. Project Description

3.1 Site Description

The Sirius site is located within the heritage precinct of the Rocks. It sits between the Sydney Harbour Bridge to the West and the Sydney Opera House to the East. Cumberland Street is to the west, and adjacent is the Sydney Harbour Bridge, and Gloucester Walk to the east with Circular Quat located beyond. There is also commercial, residential and hotel receivers surrounding the Sirius site.

The site location is shown in Figure 1.

Figure 1: Precinct Plan

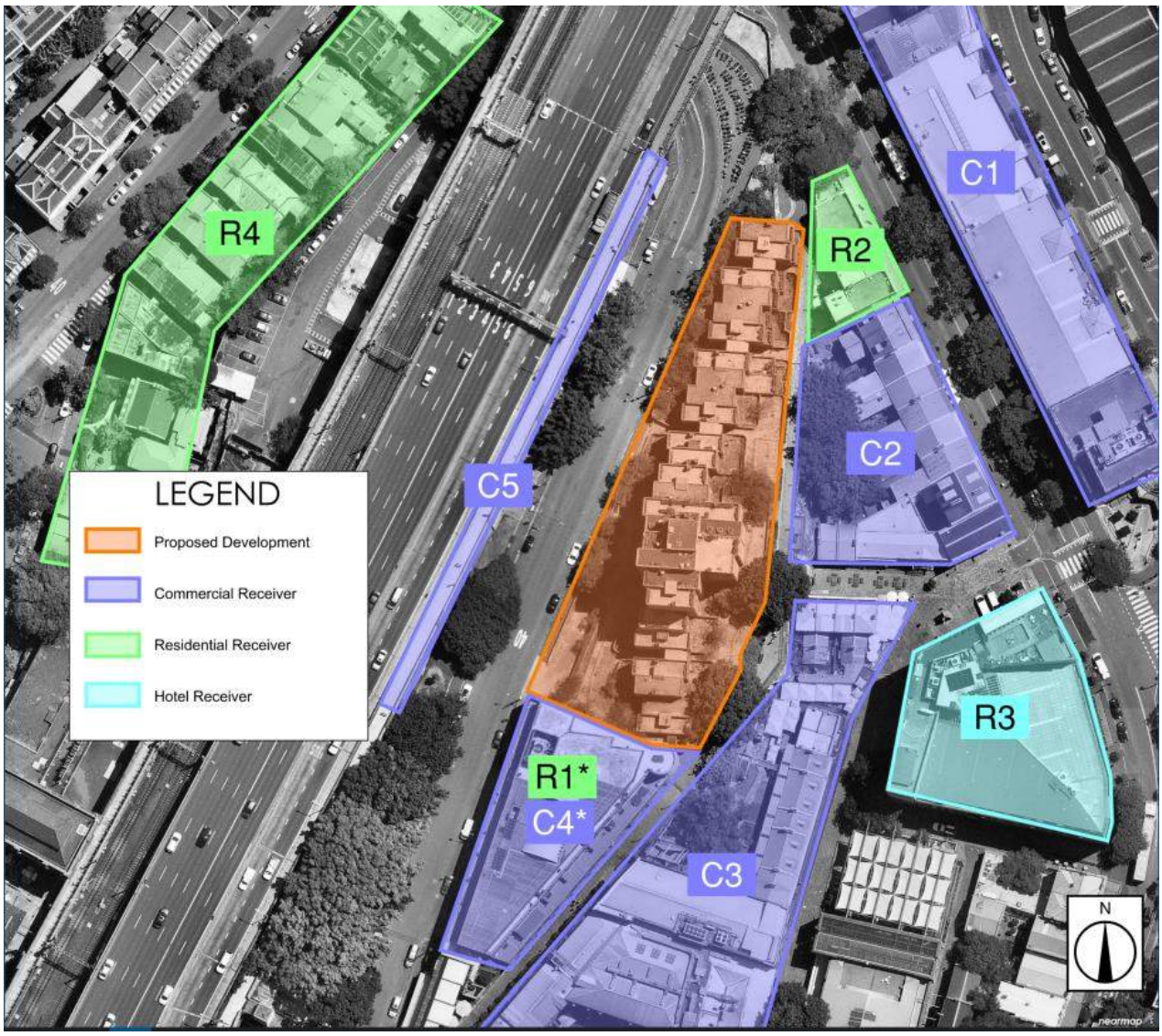


Source: BVN Architecture Design Statement – October 2020

3.2 Sensitive Receivers

There are sensitive receivers to the south and east of the Sirius site. With 88 Cumberland Street accommodating both commercial and residential tenants. Refer to Figure 2 for the location of the sensitive receivers relative to the proposed development site.

Figure 2: Site Aerial with Sensitive Receivers



Source: nearmap.com

***Note:** 88 Cumberland Street has a residential receiver located on Level 4

4. Site Noise Investigations

Site surveys were undertaken to identify the existing noise environment. These site surveys have been conducted by Stantec Australia and Acoustic Logic to obtain current background noise levels. A glossary of acoustic terminology used throughout this report is included as Appendix A.

4.1 Location

Noise monitoring equipment was installed with consideration of other noise sources that may influence the measurements, accessibility and security, and with the consent of relevant landowners. The noise monitoring locations are presented in Figure 3.

Figure 3: Overview of the Site and Measurements Location

4.1.1 Instrumentation

The following equipment was used for the noise surveys conducted by Stantec Australia Pty Ltd:

- SVAN 977 long-term noise monitor S/N 69790
- Hand-held sound spectrum analyzer B&K 2250, S/N 2709742;
- Sound Calibrator B&K Type 4231, S/N 2709826;

All equipment was calibrated before and after the measurements and no significant drift was found. All equipment carries current traceable calibration certificates that can be provided upon request.

It is noted in the Noise Impact Assessment Report prepared by Acoustic Logic (dated 27 October 2020) that the below instrumentation was used for measurements are outlined below:

- Norsonic 140 Sound Analyser
- Norsonic Sound Calibrator Type 1251
- Acoustic Research Laboratories Pty Limited noise monitor
- Rion NC—73 Calibrator

Refer to Noise Impact Assessment prepared by Acoustic Logic dated 27/10/2020 (ref. 20191508.1/2710A/R6/WY) for further information regarding the methodology and instrumentation used for the Acoustic Logic measurements.

4.2 Unattended Noise Survey Results

4.2.1 Background Noise

A noise monitor was placed at position L3 as shown in Figure 3 to measure the background and ambient noise that is representative of the surrounding noise-sensitive receivers. As reported by Acoustic Logic, the noise monitor L3 was installed from the 21st through to 30th of January 2020. The results of the unattended background and ambient noise survey is shown in Table 1 below (for the day, evening and night periods).

The local ambient noise environment is dominated by residual noise from existing industrial noise sources from surrounding buildings (plant and equipment) nearby harbour with ferry traffic throughout the majority of the day, evening and night periods.

Refer to Noise Impact Assessment prepared by Acoustic Logic dated 27/10/2020 (ref. 20191508.1/2710A/R6/WY) for further information regarding this measurement.

Table 1: Long-term noise survey summary – Background noise

Location	Equivalent Continuous Noise Level $L_{Aeq,period}$ - dB(A)			Background Noise Level RBL - dB(A)		
	Day	Evening	Night	Day	Evening	Night
L3	-	-	-	57	55	51

4.2.2 Traffic Noise

Noise monitors were placed at positions L1 and L2 as shown in Figure 3 to measure the noise generated by vehicle movements along Bradfield Highway and the Cahill Expressway during the 15-hour day and 9-hour periods established in the DPIE's Development near Rail Corridors and Busy Roads – Interim Guideline. Noise monitor L1 was installed over the period of a day on the 23rd February to 24th February of 2021 to capture an average day of noise exposure on the façade.

The results for the long-term traffic noise surveys are shown in Table 2 below (for the day and night periods).

Table 2: Long-term noise survey summary – Traffic noise

Location	Equivalent Continuous Noise Level $L_{Aeq,period}$ - dB(A)	
	Day - $L_{Aeq,15hr}$	Night - $L_{Aeq,9hr}$
L1	72	67

It is recommended further testing is conducted on the façade over the period of a week to refine the $L_{Aeq,15h}$ and $L_{Aeq,9h}$ with a suitable confidence interval. This may change the noise mitigation recommendations for the façade, and will likely only decrease the noise mitigation requirement.

4.3 Attended Noise Survey Results

4.3.1 Background Noise

Short-term noise measurements were conducted in the vicinity of surrounding noise-sensitive receivers to characterise the background and ambient noise associated with these receivers. The results of the background noise measurement conducted at location P2 (see Figure 3 for location) is provided in Table 3.

Table 3: Short-term (Attended) Background Noise Survey Results

Measurement Location	Measurement Time	$L_{Aeq, 15mins}$ dB(A)	L_{A90} dB(A)	L_{Amax} dB(A)	Comments
P5	11/02/2021 9:48am	60.5	59.6	71.2	Level 10 on the East side of Sirius Site Ambient noise dominated by Ferry Traffic (Circular Quay) and Mechanical/Pool Equipment from nearby Hotel (Rydges Sydney Harbour, 55 George Street, The Rocks)
	11/02/2021 9:30am	59.5	58.2	72.1	Level 8 on the East side of Sirius Site Ambient noise dominated by Ferry Traffic (Circular Quay) and Mechanical/Pool Equipment from nearby Hotel (Rydges Sydney Harbour, 55 George Street, The Rocks)
	11/02/2021 9:12am	58.7	57.7	70.2	Level 5 on the East side of Sirius Site Ambient noise dominated by Ferry Traffic (Circular Quay)
	11/02/2021 8:55am	57.9	56.7	66.8	Level 3 on the East side of Sirius Site Ambient dominated by Ferry Traffic (Circular Quay)

4.3.2 Traffic Noise

Short-term noise measurements of vehicle movements were carried out at location P1 on the Levels 10, 8, 5 & 3 balconies of the existing building to capture traffic movements from the Cahill Express and Bradfield Highway. Measurements were also taken of the ground level at location P1 to take measurements of vehicle movements along Cumberland Street. A summary of the results of the short-term noise measurements is provided in Table 9.

Table 4: Short-term (Attended) Traffic Noise Survey Results

Measurement Location	Measurement Time	$L_{Aeq, 15mins}$ dB(A)	L_{A90} dB(A)	L_{Amax} dB(A)	Comments
P1	11/02/2021 7:13am	74.8	72.7	86.5	Level 10 on the west side of Sirius Site, measurement taken at façade. Traffic noise majority from Bradfield Highway and Cahill Expressway.
	11/02/2021 8:02am	71.8	70.4	78.8	Level 8 on the west side of Sirius Site, measurement taken at façade. Traffic noise majority from Bradfield Highway and Cahill Expressway.
	11/02/2021 8:20am	66.2	64.0	89.0	Level 5 on the west side of Sirius Site, measurement taken at façade. Traffic noise majority from Bradfield Highway, Cahill Expressway and Cumberland Street.
	11/02/2021 8:38am	64.3	62.1	76.9	Level 3 on the west side of Sirius Site, measurement taken at façade. Traffic noise majority from Cumberland Street.
	11/02/2021 10:26am	62.0	59.8	73.3	Taken on the street level, 1.5m from kerb on Cumberland Street
P2	21/01/2020 Between 3:00pm - 4:00pm	70	-	-	Rooftop Terrace of Sirius Site, measurement was conducted approximately 15m from kerb of Cumberland Street and 45m from Bradfield Highway
P3	21/01/2020 Between 3:00pm - 4:00pm	63	-	-	Cumberland Street, approximately 2m from kerb
P4	21/01/2020 Between 3:00pm - 4:00pm	63	-	-	Sirius Site Level 4 balcony, approximately 5m from kerb

5. Operational Noise and Vibration Criteria

5.1 Internal Noise Levels

5.1.1 Department of Planning: Development near Rail Corridors and Busy Roads – Interim Guideline

The DoP's Development near Rail Corridors and Busy Roads – Interim Guideline governs the required maximum internal noise levels averaged over certain periods within bedrooms and living areas of apartments in the development. The guideline details the application of clause 102 of the State Environmental Planning Policy (SEPP) Infrastructure which states the following for residential developments:

> *"If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
>
> *In any bedroom in the residential accommodation – 35 dB(A) at any time between 10.00 pm and 7.00 am,*
>
> *Anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."*

The DoP's Development near Rail Corridors and Busy Roads – Interim Guideline also states the following in regards to an open windows (alternative means of ventilation) assessment:

> *"If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."*

Table 5 provides a summary of the criteria established in the DoP's Interim Guideline below.

Table 5: Summary of DoP's Interim Guideline criteria for residential developments adjacent to rail corridors & busy roads

Type of habitable space	Applicable Time Period	Assessment Noise Metric	Windows/Doors Closed Criteria – dB(A)	Windows/Doors Open Criteria – dB(A)
Sleeping areas (bedrooms)	10:00pm – 7:00am	$L_{Aeq,9h(night)}$	35	45
Living rooms	At any time	$L_{Aeq,15h(day)}$	40	50

5.1.2 AS/NZS 2107:2016

Australian Standard AS/NZS 2107:2016 – *'Acoustics- Recommended design sound levels and reverberation times for building interiors'* will be used to specifies target noise levels for internal spaces to the development for noise sources and particular spaces that are not covered in the other standards. Traffic noise intrusion AS 3671 refers to internal noise compliance with AS/NZS2107:2016. Refer to Table 6 for the values corresponding to residential spaces near major roads.

Table 6: Recommended internal noise levels extracted from AS/NZS 2107:2016

Type of occupancy / activity	Design sound level L_{Aeq}, dB(A) range
Residential Buildings	
Apartment common areas (e.g. foyer, lift lobby)	45 to 50
Living areas	35 to 45
Sleeping areas (night time)	35 to 40
Work areas	35 to 45
Shop Buildings	
Small retail stores (general)	< 55
Speciality shops (where detailed discussion is necessary in transactions)	< 45
Public Buildings	
Restaurants and cafeterias – Coffee shops Restaurants	 40 to 50 40 to 50

Note: The overall sound pressure level in dB(A) should conform to recommended design level given in the table above. In these spaces, a balanced sound pressure level across the full frequency range is essential. These spaces should therefore be evaluated in octave bands across the full frequency spectrum. The recommended maximum sound pressure for the individual octave bands corresponding to the overall dB(A) value

5.1.3 Project Internal Noise Level Criteria

Table 7 below outlines the project internal noise level criteria required for the proposed development, summarising the internal noise level requirements from Sections 5.1.1 and 5.1.2.

Table 7: Summarised internal noise levels

Type of occupancy / activity	Metric	Maximum Noise Level dB(A)
Residential Spaces		
Bedroom	$L_{Aeq,9h,night}$	35
Living Rooms	$L_{Aeq,15h,day}$	40
Retail		
Small retail stores (general)	$L_{Aeq,1h,average}$	55
Restaurants and cafeterias – Coffee shops		50
Restaurants and cafeterias – Restaurants		50

5.2 External Noise Emissions

5.2.1 NSW EPA Noise Policy for Industry (NPI)

In addition to the requirements of the City of Sydney Development Control Plan (DCP) 2012, the NPI sets out noise criteria to control the noise emission from industrial noise sources from activities listed in Schedule 1 of the POEO Act and regulated by the EPA. The external noise due to mechanical services from the proposed development is also addressed following the guideline in the NSW EPA's NPI.

The calculation is based on the results of the unattended ambient and background noise monitoring, addressing two components:

- Controlling intrusive noise into nearby residences (Intrusiveness Criteria)
- Maintaining noise level amenity for particular land uses (Amenity Criteria)

Once both criteria are established, the most stringent for each considered assessment period (day, evening, night) is adopted as the project-specific noise level (PSNL).

Intrusiveness Criteria

The NSW EPA NPI states the following:

> *"The intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A)."*

The intrusiveness criterion can be summarised as follows:

$L_{Aeq,\ 15\ minute} \leq$ RBL background noise level + 5 dB(A)

The intrusiveness criterion for the closest residential receivers is presented in below. Note the values from L4 have been used in this assessment as they are the most relevant to define the background and ambient noise level of the residential receivers.

Table 8: EPA NPI Intrusiveness Criteria

Period	Noise Descriptor – dB(A)	Noise Criteria – All residential receivers $L_{Aeq,15mins}$
Daytime 7am – 6pm	$L_{Aeq,15min} \leq$ RBL + 5	62
Evening 6pm – 10pm	$L_{Aeq,15min} \leq$ RBL + 5	60
Night 10pm – 7am	$L_{Aeq,15min} \leq$ RBL + 5	56

Amenity Criteria

The NSW NPI states the following:

> *"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance. The recommended amenity noise levels have been selected on the basis of studies that relate industrial noise to annoyance in communities (Miedema and Voss, 2004).*

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows "Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)"

The applicable parts of Table 2.2: Amenity noise levels which are relevant to the project are reproduced below:

Table 9: NSW NPI Table 2.2 amenity criteria for external noise levels

Type of Receiver	Noise Amenity Area	Time of Day	L_{Aeq}, dB(A) Recommended amenity noise level	Project amenity noise level $L_{Aeq, period}$
Residential	Urban[1]	Day	60	55
	Urban[1]	Evening	50	45
	Urban[1]	Night	45	40
Hotel[2]	Urban[1]	Day	65	60
	Urban[1]	Evening	55	50
	Urban[1]	Night	50	45
Commercial	All	When in use	65	60

Note 1: Urban area as defined in EPA NSW NPI Table 2.3

Note 2: 5dB(A) above the recommended amenity noise level for a residence for the relevant amenity area and time of day as stated in Table 2.2: Amenity noise levels in EPA NSW NPI

'Modifying Factor' Adjustments

The NSW NPI also states:

> "*Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level."*

In order to take into account, the potential annoying character of the noise an adjustment of 5 dB(A) for each annoying character aspect and cumulative of up to a total of 10 dB(A), is to be added to the measured value to penalise the noise for its potentially greater annoyance aspect.

Table C1 of Fact Sheet C of the NSW NPI (see Table 10 below) provides procedures for determining whether an adjustment should be applied for greater annoyance aspect.

Table 10: Table C1 from the NSW NPI – Modifying factor corrections

Factor	Assessment / Measurement	When to Apply	Correction[1]	Comments
Tonal Noise	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method *(ISO1996.2-2007 – Annex D)*.	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz.	5 dB[2,3]	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. Note: Narrow-band analysis using the reference method in *ISO1996-2:2007, Annex C* may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low Frequency Noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10–160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15dB or more and: where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2dB(A) positive adjustment applies for the daytime period.	2 or 5 dB[2]	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.
Intermittent Noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible.\	5 dB	Adjustment to be applied for night-time only.
Duration	Single-event noise duration may range from 1.5 min to 2.5 h	One event in any assessment period.	0 to 20 dB(A)	The project noise trigger level may be increased by an adjustment depending on duration of noise (see Table C3).
Maximum Adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated	Maximum correction of 10dB(A)[2]	

Factor	Assessment / Measurement	When to Apply	Correction[1]	Comments
			(excluding duration correction)	

1. Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.

2. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

3. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.

Sleep Disturbance

The NPI establishes sleep disturbance criteria for residential receivers in close proximity to industrial noise sources during the night-time period, such as vehicle movements and car door slams on private roads. The criteria for protecting the amenity of surrounding residential receivers in regards to sleep disturbance is:

- $L_{Aeq,15min}$ 40 dB(A) or prevailing RBL plus 5dB, whichever is greater, and/or
- L_{AFmax} 52 dB(A) or prevailing RBL plus 15dB, whichever is greater

Table 11 summarises the sleep disturbance criteria for the proposed development.

Table 11: Sleep Disturbance Criteria

Period	Sleep Disturbance Criteria	
	L_{AFmax} – dB(A)	$L_{Aeq,15min}$ – dB(A)
Night (10:00pm to 7:00am)	66	56

5.2.2 Project Noise Trigger Levels

The project noise trigger levels for industrial noise sources such as mechanical plant etc. are provided in Table 12. These noise levels have been derived from the Noise Policy for Industry 2017.

Table 12: Project noise trigger levels for industrial noise emissions

Period	Descriptor	Project Specific Noise Emission Levels dB(A)
Residential Receivers (R1 & R3)		
Day (7:00am to 6:00pm)	$L_{Aeq,15min}$	58
Evening (6:00pm to 10:00pm)	$L_{Aeq,15min}$	48
Night (10:00pm to 7:00am)	$L_{Aeq,15min}$	43
	L_{AFmax}	66
Commercial Receivers (C1-C5)	When in use ($L_{Aeq,period}$)	65
Hotel Receivers (R2)		
Day (7:00am to 6:00pm)	$L_{Aeq,15min}$	63
Evening (6:00pm to 10:00pm)	$L_{Aeq,15min}$	53
Night (10:00pm to 7:00am)	$L_{Aeq,15min}$	48

5.3 Traffic Noise Generation Criteria

The L_{Aeq} noise level or the "equivalent continuous noise level" correlates best with the human perception of annoyance associated with traffic noise.

Road traffic noise impact is assessed in accordance with the introduced NSW Road Noise Policy which supersedes the *NSW Environmental Criteria for Road Traffic Noise* (ECRTN, Department of Environment Climate Change and Water 1999). The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below in Table 13.

Table 13: NSW Road Noise Policy – Traffic noise assessment criteria

Road Category	Type of project/land use	Assessment Criteria – dB(A)	
		Day (7am – 10pm)	Night (10pm – 7am)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,1\ hour}$ 55 (external)	$L_{Aeq,1\ hour}$ 50 (external)

If the traffic noise at the site is already in excess of the criteria noted above, the NSW RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 Process for applying the criteria – Step 4 states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding 'no build option'.

5.4 Operational Vibration Criteria

5.4.1 Human Comfort

The NSW Environment Protection Authority (EPA) developed a document, "Assessing vibration: A technical Guideline" in February 2006 to assist in preventing people from exposure to excessive vibration levels within buildings. The guideline does not however address vibration induced damage to structures or structure-borne noise effects. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent.

Continuous & Impulsive Vibration

Structural vibration in buildings can be detected by occupants and can affect them in many ways including reducing their quality of life and also their working efficiency. Complaint levels from occupants of buildings subject to vibration depend upon their use of the building and the time of the day.

Maximum allowable magnitudes of building vibration with respect to human response are shown in Table 14. It should be noted that the human comfort for vibration are more stringent than the building damage criteria.

Table 14: Preferred and maximum weighted RMS values for continuous and impulsive vibration (m/s^2)

Location	Assessment period1	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration					
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and place of worship	Day or night-time	0.020	0.014	0.040	0.028
Impulsive vibration					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and place of worship	Day or night-time	0.64	0.46	1.28	0.92

Intermittent Vibration

Disturbance caused by vibration will depend on its duration and its magnitude. This methodology of assessing intermittent vibration levels involves the calculation of a parameter called the Vibration Dose Value (VDV) which is used to evaluate the cumulative effects of intermittent vibration. Various studies support the fact that VDV assessment methods are far more accurate in assessing the level of disturbance than methods which is only based on the vibration magnitude.

Table 15: Acceptable Vibration Dose Values for Intermittent Vibration (m/s$^{1.75}$)

Location	Daytime (7:00am to 10:00pm)		Night-time (10:00pm to 7:00am)	
	Preferred value	Maximum value	Preferred value	Maximum value
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and place of worship	0.40	0.80	0.40	0.80

5.4.2 Cosmetic Damage

Table 16 presents guide values for building vibration, based on the lowest vibration levels above which cosmetic damage has been demonstrated as per BS7385-Part 2:1993.

Table 16: Transient vibration guide values for cosmetic damage

Type of Building	Peak Particle Velocity in frequency range of predominant pulse (PPV)	
	4 Hz to 15 Hz	15 Hz and above
Residential or light commercial type buildings	15mm/s at 4Hz increasing to 20mm/s at 15Hz	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above

5.4.3 Steady-state Structural Damage

Ground vibration criteria is defined in terms of the levels of vibration emission from the construction activities which will avoid the risk of damaging surrounding buildings or structures. It should be noted that human comfort criteria are normally expressed in terms of acceleration whereas structural damage criteria are normally expressed in terms of velocity.

Most specified structural vibration levels are defined to minimize the risk of cosmetic surface cracks and are set below the levels that have the potential to cause damage to the main structure. Structural damage criteria are presented in German Standard DIN4150-Part 3 “Structural vibration in buildings – Effects on structures” and British Standard BS7385-Part 2: 1993 “Evaluation and Measurement for Vibration in Buildings”. Table 17 indicates the vibration limits presented in DIN4150-Part 3 to ensure structural damage doesn’t occur.

Table 17 - Guideline value of vibration velocity, vi, for evaluating the effects of short-term vibration

Line	Type of Structure	Vibration velocity, vi, in mm/s			
		Foundation			Plane of floor of uppermost full storey
		At a frequency of			
		Less than 10Hz	10 to 50Hz	50 to 100*Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

*For frequencies above 100Hz, at least the values specified in this column shall be applied

6. Operational Noise & Vibration Assessments

6.1 External Glazing – Road and Rooftop Plantrooms Airborne Noise Impacts

6.1.1 Noise Modelling and Assumptions

In order to provide acoustic amenity to occupants of the proposed development and comply with the project specific internal noise limits, the noise impacts of surrounding roads were assessed at the façade of the residential and retail spaces within the proposed development in accordance with the SEPP (Infrastructure) 2007.

3D acoustic modelling for noise emissions from the surrounding roads was conducted using the software SoundPlan (Version 8.2). Noise emissions and impacts from vehicle movements on the surrounding busy roads (including Cahill Expressway, Bradfield Highway and Cumberland Street), were modelled in accordance with the CoRTN prediction techniques and calibrated to measurements and logger data from around the site.

This model is recognised by regulatory authorities around Australia and is endorsed by the NSW DPIE for use in projects of this scale. The acoustic modelling was undertaken considering specific meteorological characteristics such as wind speeds, prevailing wind directions and temperature in accordance with the hourly weather data for a full calendar year described in the Test Reference Year for Mascot 1987 (94767 Mascot (Syd AMO) 1978-87 1987).

3D modelling was implemented in this specific situation because of the complexity of integrating all noise sources and types of noise sources to develop an overall incident façade noise level. Attenuation due to distances, building shielding and environmental absorption, together with additional noise incident on the façade due to façade reflections are taken into account within the 3D model. The results of the 3D modelling are provided in Appendix B (in the form of façade noise contours), showing the incident noise levels on the façade as a result of noise emissions from the external noise sources mentioned above. The incident noise levels are presented in $L_{Aeq,15h/9h}$ statistical forms for the purpose of demonstrating compliance with the DPIE Interim Guideline limits.

6.1.2 Closed Windows Assessment

The general limiting factor of the performance of a building façade in term of noise attenuation is the glazing. In the case of the proposed development, the traffic noise on Bradfield Highway and Cahill Expressway, places the largest acoustic demand on the facades of the sensitive spaces within the development.

In order to achieve the project internal noise limits established in Section 5.1, noise mitigation measures have been provided in Section 8.1.2.

6.1.3 Open Windows Assessment

An open windows assessment has been conducted to assess whether the habitable spaces can meet the project internal noise limits established in Section 5.1 with windows open for natural ventilation (open in accordance with the natural ventilation requirements of the National Construction Code 2019).

If there is an exceedance of the project internal noise limits with the windows open, residential space is considered noise-affected and an alternative means of ventilation is required in accordance with the requirements of the National Construction Code 2019 (i.e. an alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1).

The assessment has been conducted under the assumption the occupant has opened their windows to achieve natural ventilation (and as recommended in the DP&E Interim Guideline). That is, when the windows are open to 5% of the floor area of the room being ventilated, with a reduction of incident noise level to internal noise level of 10dB(A). Room loss has also been considered.

In order to achieve the project internal noise limits established in Section 5.1 whilst simultaneously achieving the ventilation requirements, mitigation measures have been proposed in Section 8.1.2 for the proposed development.

6.2 Mechanical Plant and Equipment Assessment

This assessment has considered the noise emissions from the mechanical plant serving the pool building located on the south west on the site. These noise sources have been used to predict the worst-case scenario noise impact of the proposed use of the site to the nearby sensitive receivers. The assessment has been conducted to achieve noise levels as per the NSW NPI. Both have been assessed at the most affected external point at the surrounding residential and commercial receivers.

In order to assess the worst-case scenario, it was assumed that the mechanical services associated with the development are running at any time throughout the daytime and evening periods (7:00am – 10:00pm). While exact equipment has not been selected for the project, the sound power levels provided in Table 18 have been assigned to each significant plant and equipment item, based on typical noise emissions data for plant and equipment of the sizes indicated.

For our assessment we have assumed the following mechanical plant and equipment is located within development will include:

- 1 x Low Load Chiller
- 2 x Main Chiller

Table 18: Maximum Sound power levels of mechanical equipment and plant for typical size

Plant and Equipment	Maximum Sound Power Level re 10^{-12} W, dB – Octave Band Centre Frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Overall dB(A)
Low Load Chiller	89	88	84	82	82	72	69	65	85
Main Chiller	93	88	88	87	85	79	72	65	89

The noise generated by the mechanical plant and equipment within the pool building plantroom has been assessed to the noise-sensitive receivers surrounding the proposed development with consideration given to the following assumptions:

- The mechanical plant and equipment will be operating during the daytime and evening periods (7:00am – 10:00pm)

Table 19 provides a summary of the results of the noise impact assessment of the mechanical plant and equipment. The noise generated by the plant and equipment has been assessed with and without the noise mitigation measures outlined in Section 8.2.

Table 19: Summary of results of mechanical noise impact assessment (with and without mitigation)

Receiver	Period	Predicted Noise Level LAeq,15min - dB(A) Without Mitigation	Predicted Noise Level LAeq,15min - dB(A) With Mitigation	PNTL LAeq,15min - dB(A)	Compliance (Yes/No)
R1	Day	64	48	58	Yes, with mitigation
	Evening			48	Yes, with mitigation
C4	When in use	65	50	63	Yes, with mitigation

Based on the results of the assessment of the noise generated by the mechanical plant and equipment, the predicted noise levels at the surrounding noise-sensitive receivers are expected to comply with the project noise trigger levels established in Section 5.2.2 upon implementation of the mitigation measures outlined in Section 8.2.

Once further information regarding the specific mechanical plant and equipment servicing the individual apartments (i.e., fan coil units etc.) is selected further assessments can be conducted. This would be expected to be conducted during the detailed design stage.

7. Construction Noise and Vibration Assessments

A Construction Noise and Vibration Management Plant (CNVMP) has previously been prepared by Acoustic Logic during the initial Significant State Development Application (SSDA) stage where the potential impact regarding noise and vibration to the surrounding sensitive receivers. Mitigation measures have been proposed in this report that will need to be followed.

Stantec does not propose to nominate any changes or additional measures to the ones recommended by Acoustic Logic, as well as the additional recommendations provided within the Construction Management Plan prepared by Dedico.

8. Operational Mitigation Measures

8.1 Road Noise Mitigation

8.1.1 Closed Windows Assessment

In order to achieve the project internal noise limits established in Section 5.1 the glazing components of the façade of the proposed development must meet the acoustic demand ratings presented in Table 20 below. The designations of acoustic demand ratings on the façade are indicated on the drawings provided in Appendix C.

The double-glazed acoustic rating (R_w) is higher than the single-glazed acoustic rating is because of the reduction in acoustic performance double-glazed units (with 12-20mm cavities) experience at lower frequencies (63 Hz to 125 Hz), which are the peak frequencies typically characteristic of traffic noise emissions.

Table 20: Acoustic demand ratings for façade of proposed development

Acoustic Demand Rating	Single-Glazed Acoustic Performance (Weighted Sound Reduction Index, Rw)	Double-Glazed Acoustic Performance (Weighted Sound Reduction Index, Rw)
1	32	34
2	34	36
3	36	38
4	40	42

In addition to the required glazing systems outlined in Table 20 and indicated in in Appendix C, the solid/non-glazed elements of the façade shall have an acoustic performance of no less than Rw 55 to ensure the resulting internal noise levels within each space in the proposed development do not exceed the project internal noise limits outlined in Section 5.1.3.

The acoustic demand ratings proposed above has been provided as a high-level analysis only. The acoustic performance of the glazing facade may be reduced at certain locations within the development during the detailed design phase of the project.

8.1.2 Open Windows Assessment

An open windows assessment has been conducted in order to assess whether the residential spaces can meet the internal noise level requirements of the DPIE Interim Guideline with windows open for natural ventilation (open in accordance with the natural ventilation requirements of the NCC). If there is an exceedance of the internal noise level criteria with the windows open, alternative means of ventilation is required in accordance with the requirements of the NCC (i.e. alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1) to the noise-affected spaces (noise-affected defined in Section 6.1.3).

The results of the acoustic façade modelling indicate that the apartments shown in Appendix D will require an alternative means of ventilation to meet the aforementioned requirements.

8.2 Mechanical and Generator Plant and Equipment

To meet the external noise emissions requirements for noise generated by the mechanical plant and equipment the following noise mitigation measures are required:

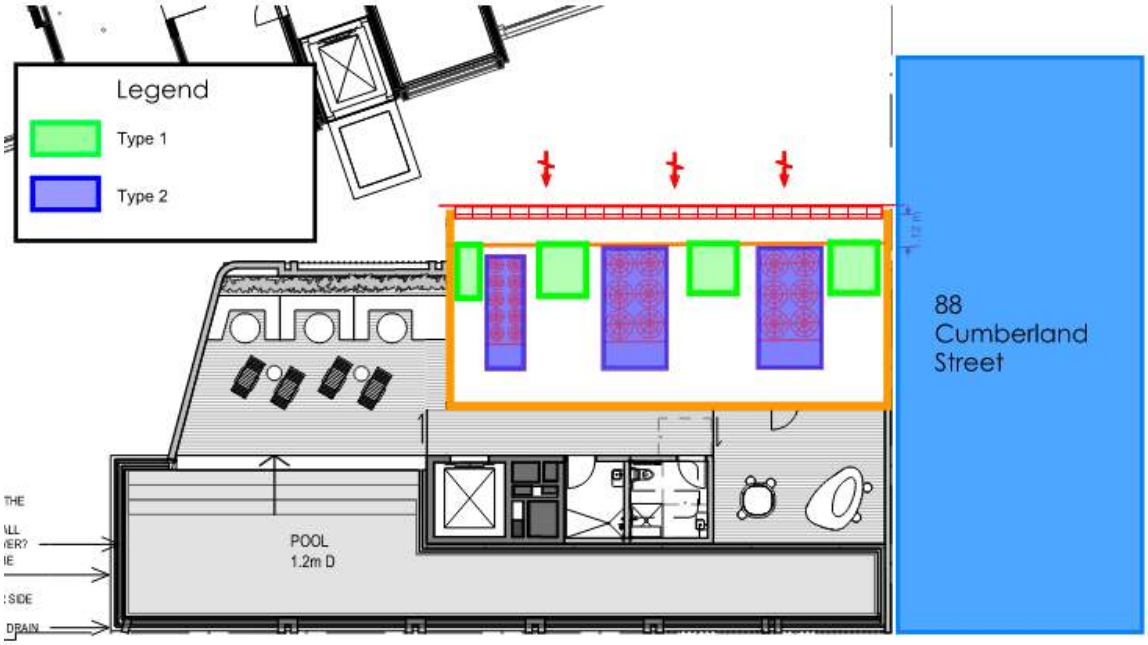
- Install acoustic attenuators to the pool building plantroom eastern façade, where indicated in Figure 4, or as shown in the architectural documentation. Acoustic attenuators must have a noise reduction of no less than the values shown in Table 21.
- Install acoustic barriers to the pool building plantroom roof, where indicated in Figure 4, to the height shown in the architectural documentation. Acoustic barriers can be solid or can be an acoustic louvre, though the barrier must have a noise reduction of no less than the values shown in Table 21.

Table 21: Insertion loss required for types of acoustic barriers

Louvre	Insertion Loss (dB) – Octave Band Centre Frequency				
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
Type 1	2	5	8	8	5
Type 2	9	14	26	31	26

Acoustic attenuators are proposed to attenuate noise emissions from air-cooled chillers at the intake interface of the plantroom, and acoustic louvres are proposed to attenuate discharge noise emissions from the air-cooled chillers. See Figure 4 for further information.

Figure 4: Acoustic barrier type designations -pool building plantroom



Additional mitigation measures for the mechanical plant should be considered during the design development stage to ensure compliance with the outlined criteria at the nearest sensitive receivers. These amelioration measures could include but not limited to the following:

- Positioning mechanical plant away from nearby receivers
- Acoustic attenuators fitted to duct work
- Screening around mechanical plant
- Acoustic insulation within duct work

It should be noted that the noise reduction requirements will likely be refined and reduced once the mechanical plant and equipment selections and designs have been progressed further during the detailed design of the proposed development. The mitigation measures proposed at this stage of the development are conservative in nature.

9. Conclusion

A noise and vibration impact assessment for the alterations and additions application for the Sirius site located within The Rocks has been conducted. This document forms part of the documentation package to be submitted to relevant authorities as part of the Stage Significant Development Application process.

This report has provided criteria, in-principle treatment and design requirements which aim to achieve the statutory criteria discussed in Section 5. In terms of noise and vibration criteria, we have provided the following:

- Noise criteria for internal noise levels according to the DPIE's Development near Rail Corridors and Busy Roads – Interim Guideline, provided in Section 5.1.1
- Noise criteria for noise emissions from the proposed expansion and redevelopment to noise-sensitive receivers in accordance with the NSW NPI Section 5.2.1
- Operational vibration criteria for human comfort and structural damage, provided in Section 5.4

Having given regard to the analysis conducted within this report, it is the finding of this noise and vibration impact assessment that the proposed development is compliant with the relevant noise and vibration criteria controls for this type of development (and as outlined in the SEARs), and it is expected to comply with the applicable regulations with regards to noise and vibration, particularly those listed above.

It is recommended the state significant development application for the proposed development is not rejected on the basis of noise and vibration, given the implementation of the mitigation measures outlined within this report.

Appendix A Glossary of Acoustic Terms

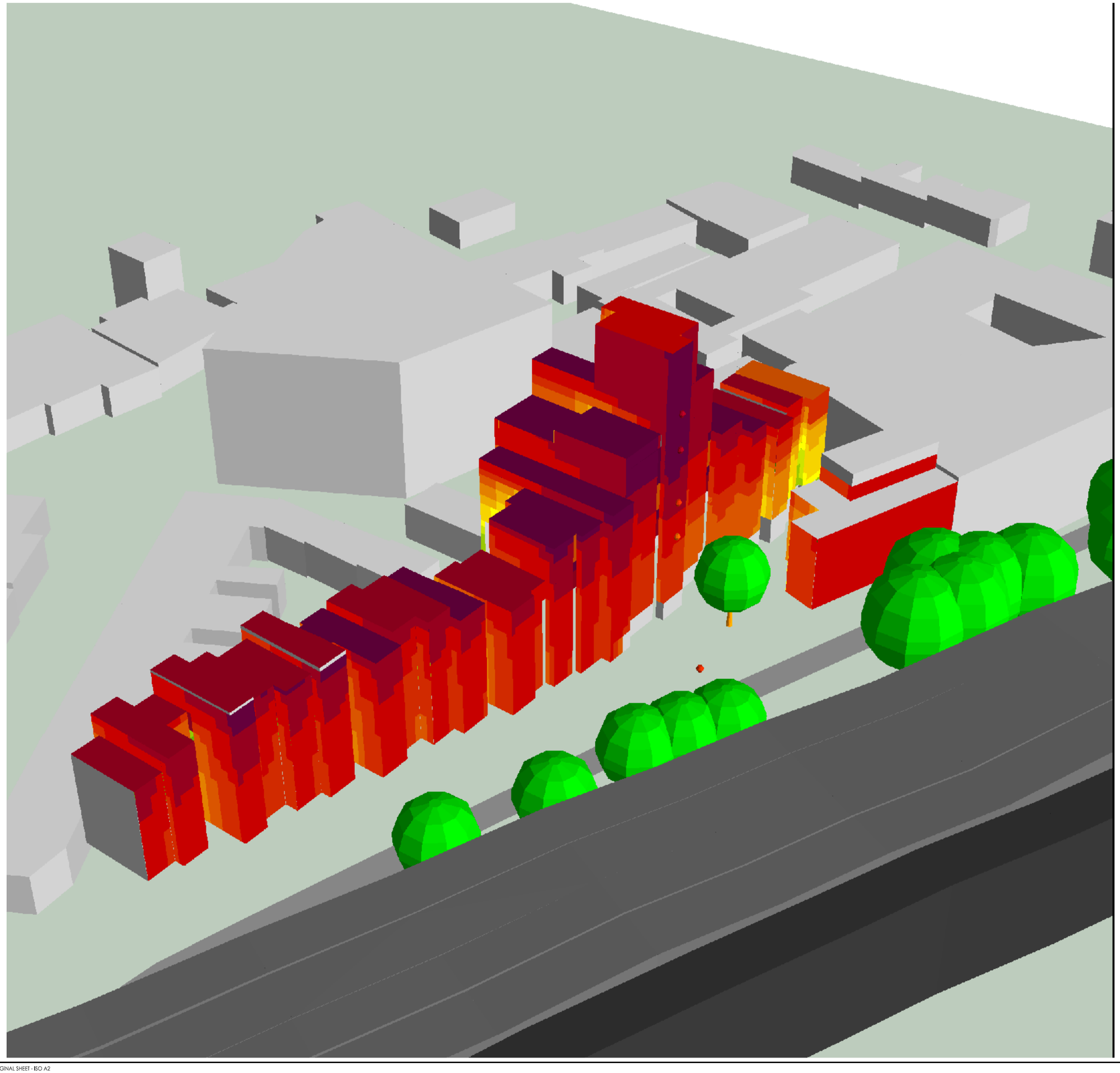
NOISE	
Acceptable Noise Level:	The acceptable LAeq noise level from industrial sources, recommended by the EPA (Table 2.1, INP). Note that this noise level refers to all industrial sources at the receiver location, and not only noise due to a specific project under consideration.
Adverse Weather:	Weather conditions that affect noise (wind and temperature inversions) that occur at a particular site for a significant period of time. The previous conditions are for wind occurring more than 30% of the time in any assessment period in any season and/or for temperature inversions occurring more than 30% of the nights in winter).
Acoustic Barrier:	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
Ambient Noise:	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment Period:	The period in a day over which assessments are made.
Assessment Location	The position at which noise measurements are undertaken or estimated.
Background Noise:	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level.
Decibel [dB]:	The units of sound pressure level.
dB(A):	A-weighted decibels. Noise measured using the A filter.
Extraneous Noise:	Noise resulting from activities that are not typical of the area. Atypical activities include construction, and traffic generated by holidays period and by special events such as concert or sporting events. Normal daily traffic is not considered to be extraneous.
Free Field:	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5m from any acoustic reflecting structures other than the ground
Frequency:	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz).
Impulsive Noise:	Noise having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent Noise:	Level that drops to the background noise level several times during the period of observation.
LAmax	The maximum A-weighted sound pressure level measured over a period.
LAmin	The minimum A-weighted sound pressure level measured over a period.
LA1	The A-weighted sound pressure level that is exceeded for 1% of the time for which the sound is measured.
LA10	The A-weighted sound pressure level that is exceeded for 10% of the time for which the sound is measured.
LA90	The A-weighted level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
LAeq	The A-weighted “equivalent noise level” is the summation of noise events and integrated over a selected period of time.

LAeqT	The constant A-weighted sound which has the same energy as the fluctuating sound of the traffic, averaged over time T.
Reflection:	Sound wave changed in direction of propagation due to a solid object met on its path.
R-w:	The Sound Insulation Rating R-w is a measure of the noise reduction performance of the partition.
SEL:	Sound Exposure Level is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound Absorption:	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter:	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level:	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level:	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise:	Containing a prominent frequency and characterised by a definite pitch.

Appendix B Airborne Noise Modelling

1 2 3

C B A



ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

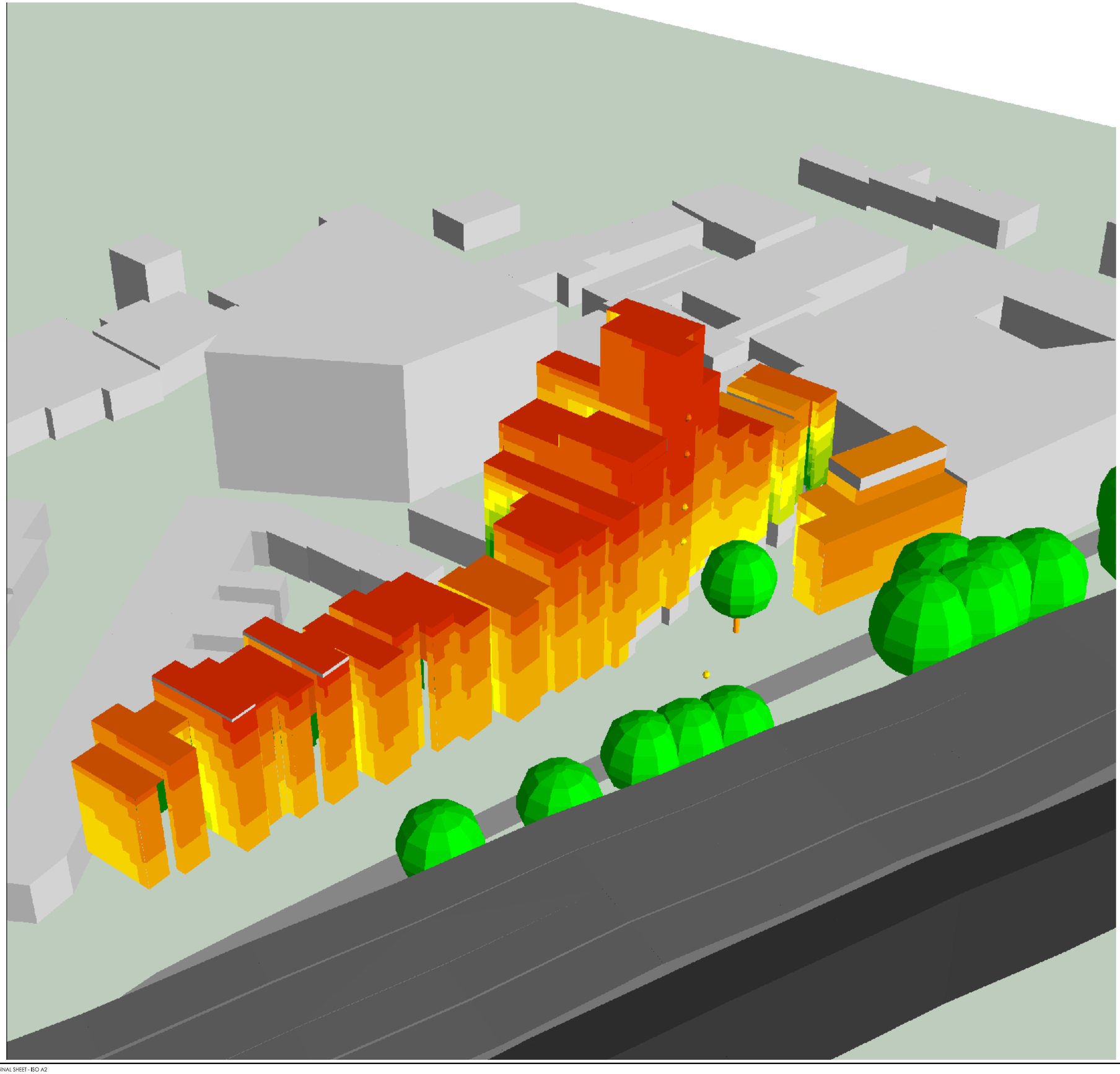
SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,15hr

Project No.	Scale
301350202	**NTS**

Revision	Drawing No.
1	**AC-SK-FNM**



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,9hr

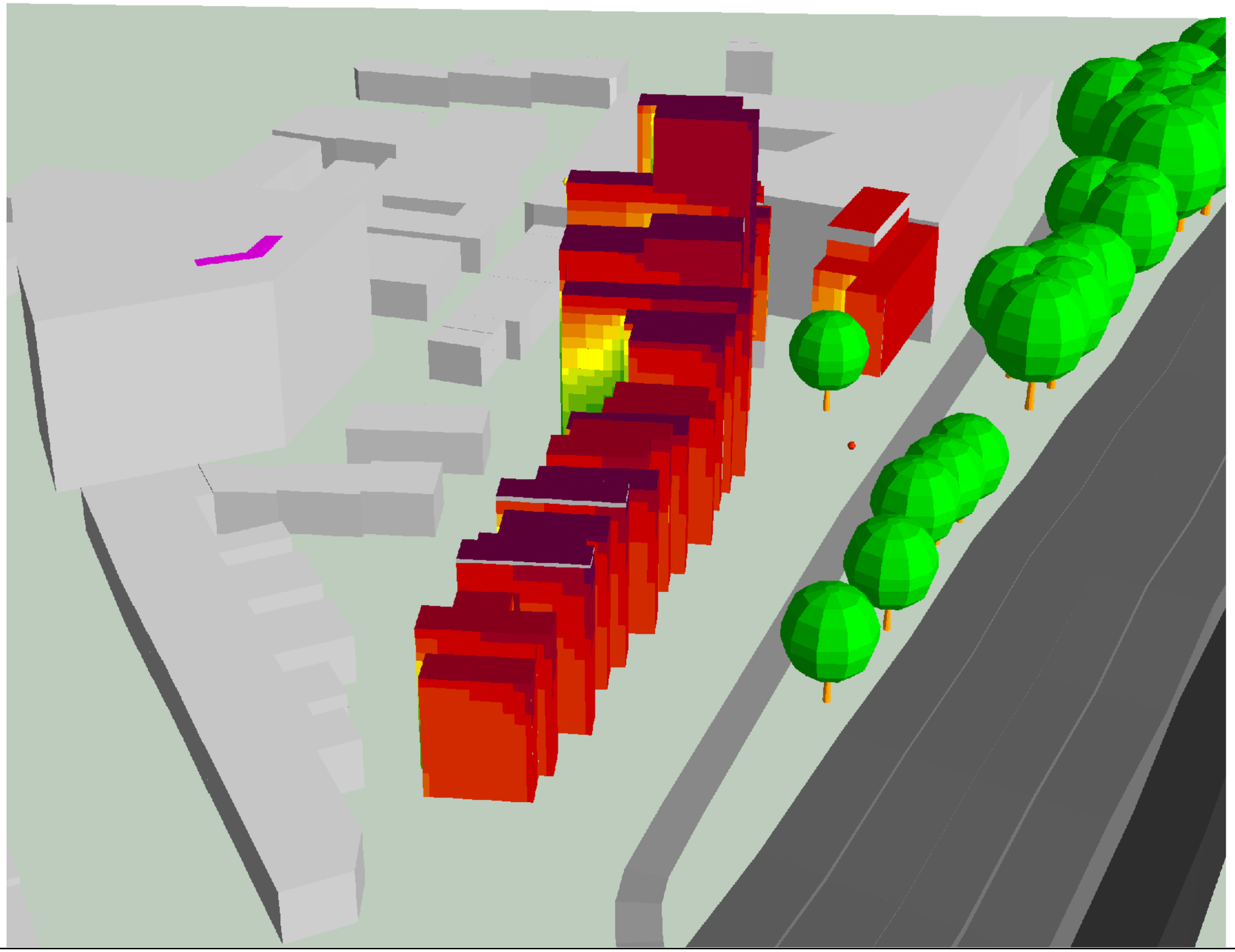
Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-FNM

ORIGINAL SHEET - ISO A2



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

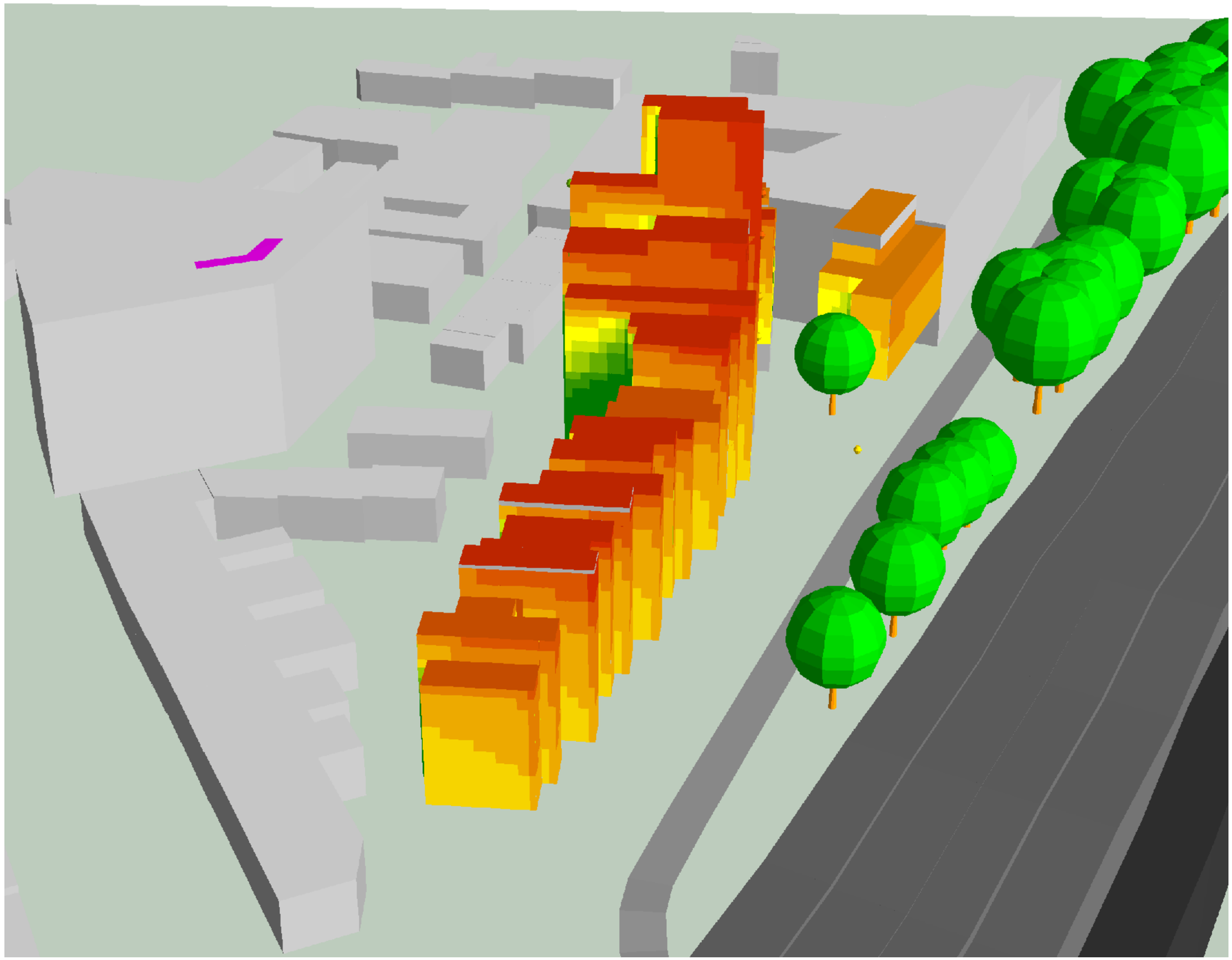
Title

FACADE NOISE MAP
LAeq,15hr

Project No.	Scale
301350202	**NTS**

Revision	Drawing No.
1	**AC-SK-FNM**

ORIGINAL SHEET - ISO A2



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

	MIS	BN	2021.03.08
REVISED SSDA ISSUE	By	Appd	YYYY.MM.DD

Revision

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: **AC-SK-FNM**	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,9hr

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-FNM

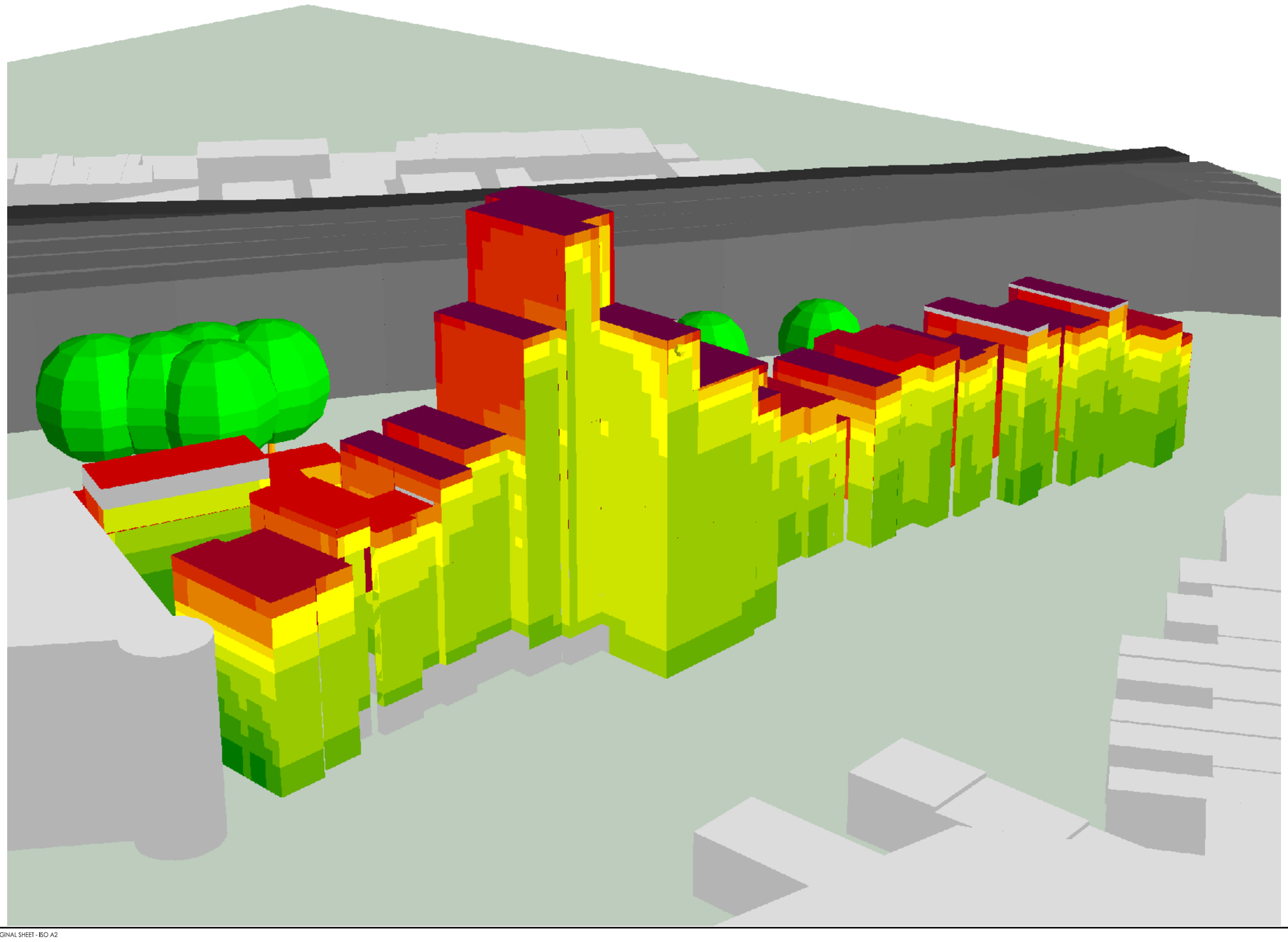
ORIGINAL SHEET - ISO A2

1 2 3

C

B

A



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**
Revision	By	Appd	YYYY.MM.DD

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: **AC-SK-FNM**	**MIA**	**MIS**	**BN**	**2021.03.08**
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,15hr

Project No.	Scale
301350202	**NTS**
Revision	Drawing No.
1	**AC-SK-FNM**

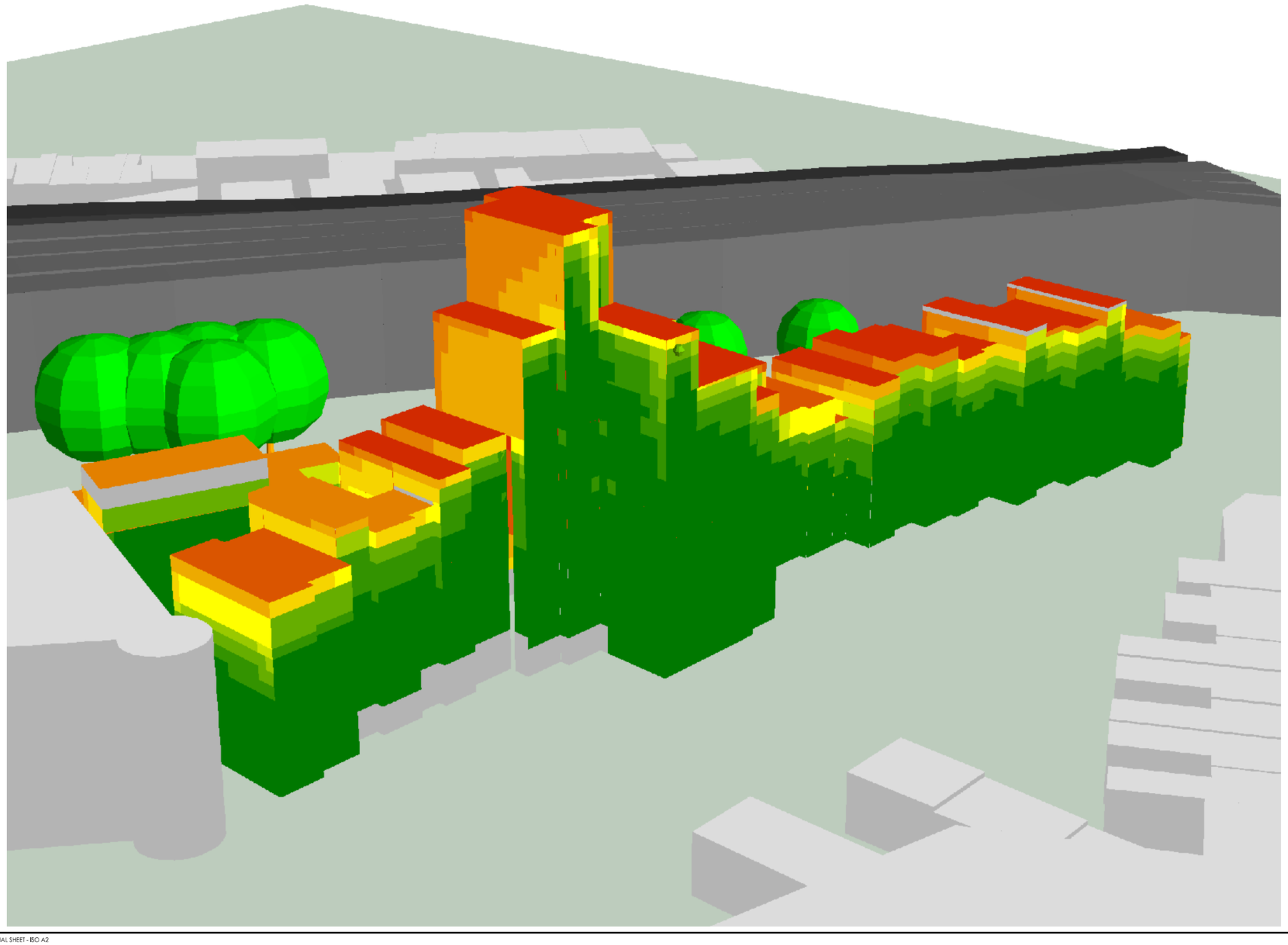
ORIGINAL SHEET - ISO A2

1 2 3

C

B

A



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,9hr

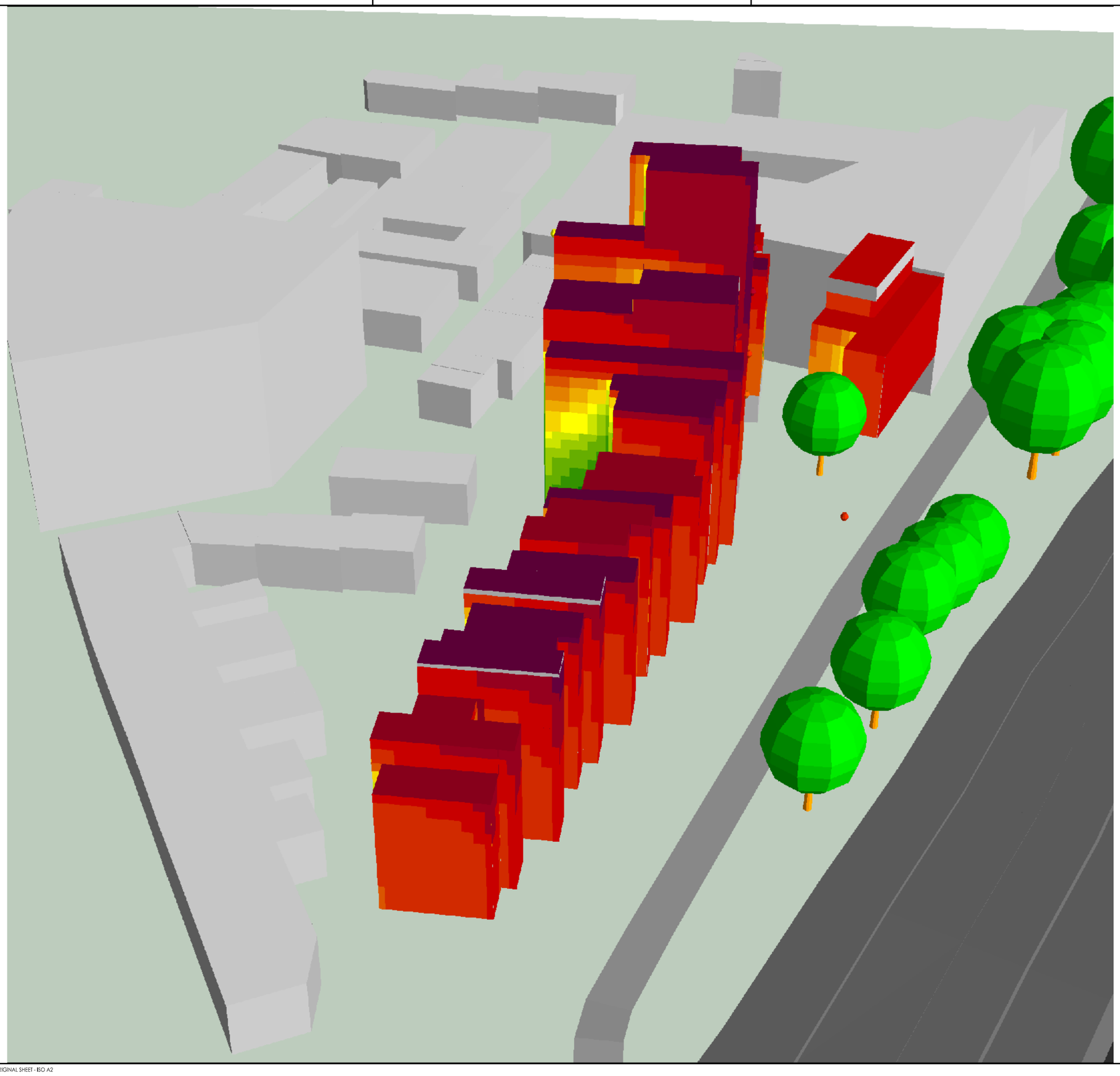
Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-FNM

ORIGINAL SHEET - ISO A2



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,15hr

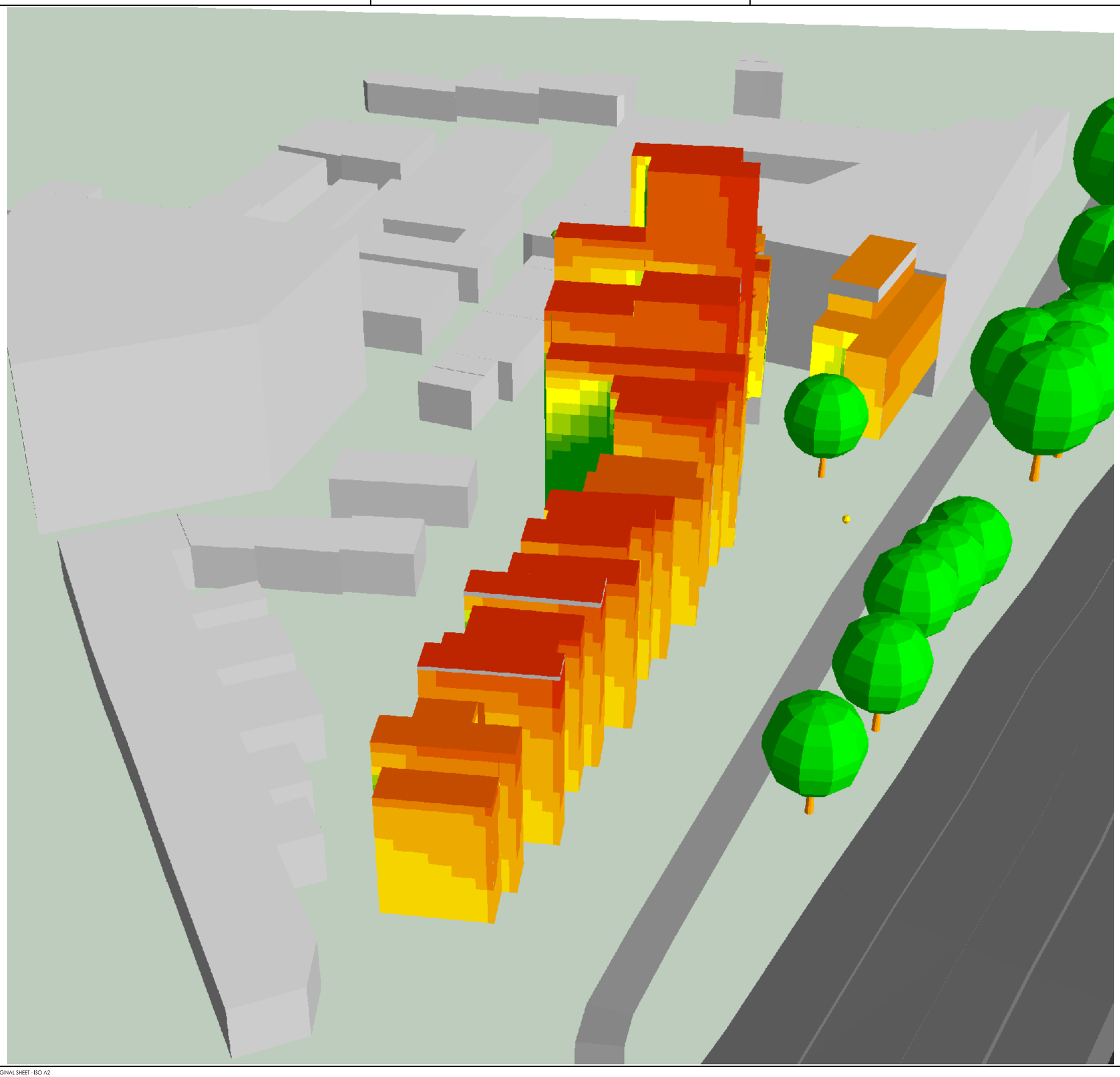
Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-FNM

ORIGINAL SHEET - ISO A2



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

Legend - in dB(A)

< 48	54 - 56	62 - 64	70 - 72
48 - 50	56 - 58	64 - 66	72 - 74
50 - 52	58 - 60	66 - 68	74 - 76
52 - 54	60 - 62	68 - 70	>= 76

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

FACADE NOISE MAP
LAeq,9hr

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-FNM

ORIGINAL SHEET - ISO A2

Appendix C Façade Acoustic Demand Rating

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

REVISED SSDA ISSUE		MIS	BN	2021.03.08
Revision		By	Appd	YYYY.MM.DD

File Name: AC-SK-FNM	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

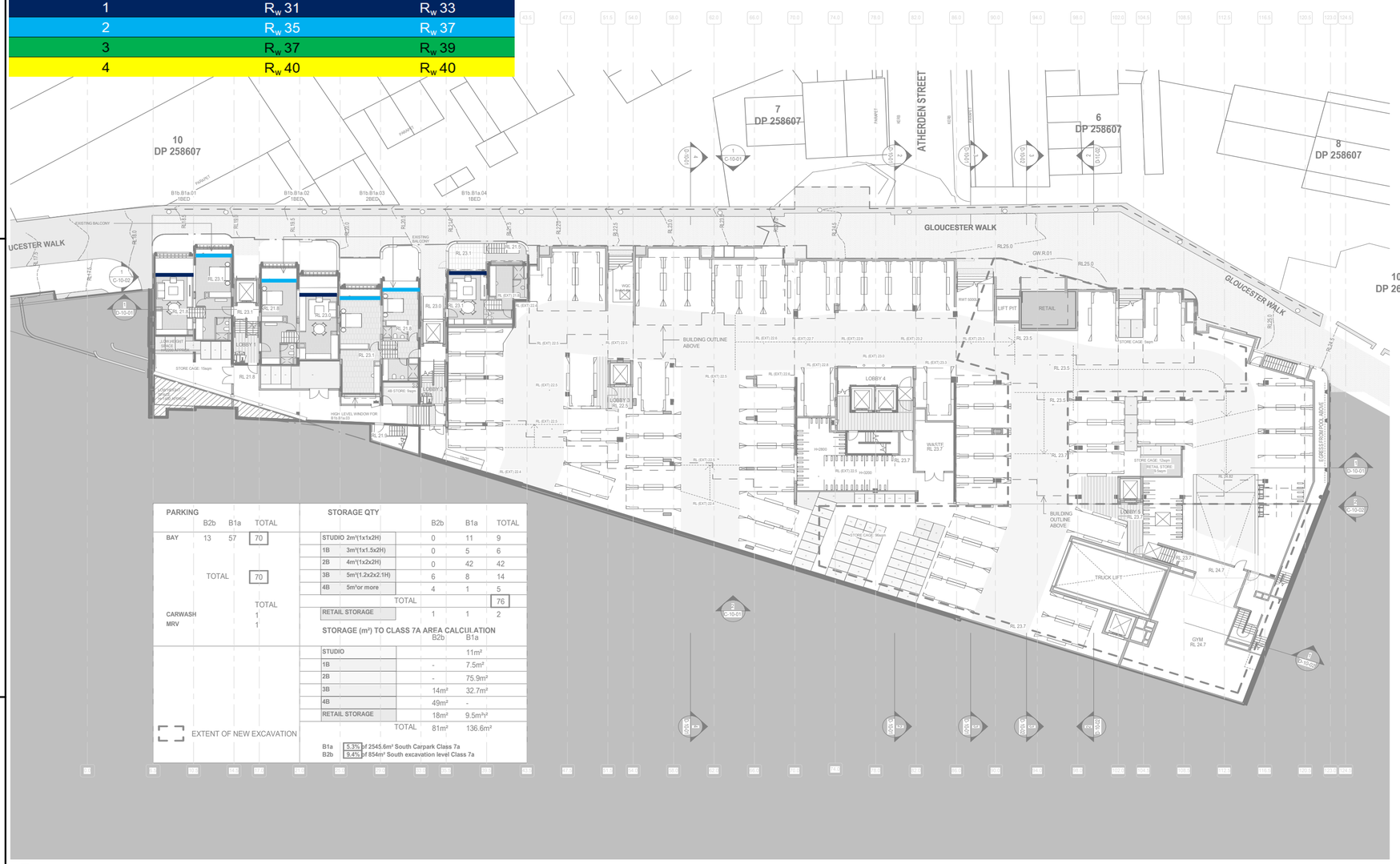
Title

ACOUSTIC FACADE DEMAND

Project No.	Scale
301350202	**NTS**
Revision	Drawing No.
1	**AC-SK-GL**

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



1 B1b-B1a_OVERALL
A-00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**
Revision	By	Appd	YYYY.MM.DD

File Name: **AC-SK-FNM**	**MIA**	**MIS**	**BN**	**2021.03.08**
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

Stantec

Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

1 LEVEL 03-04

2 LEVEL 04-05

Stantec

Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**
Revision	By	Appd	YYYY.MM.DD

File Name: **AC-SK-FNM**	**MIA**	**MIS**	**BN**	**2021.03.08**
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

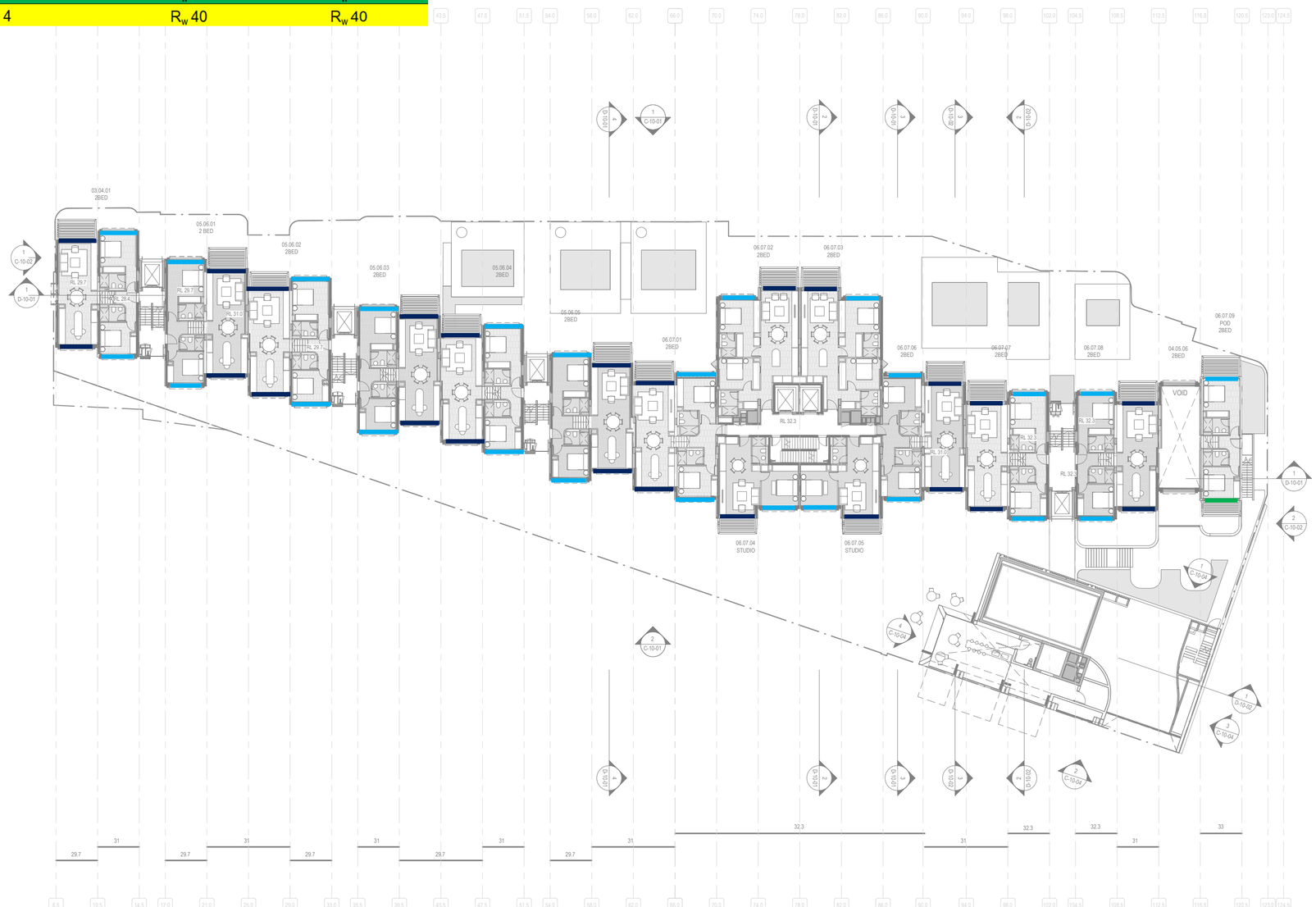
Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



1 LEVEL 05-06
00.00-00-00.00

2 LEVEL 06-07
00.00-00-00.00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

REVISED SSDA ISSUE	MIS	BN	2021.03.08
Revision	By	Appd	YYYY.MM.DD

File Name: AC-SK-FNM	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

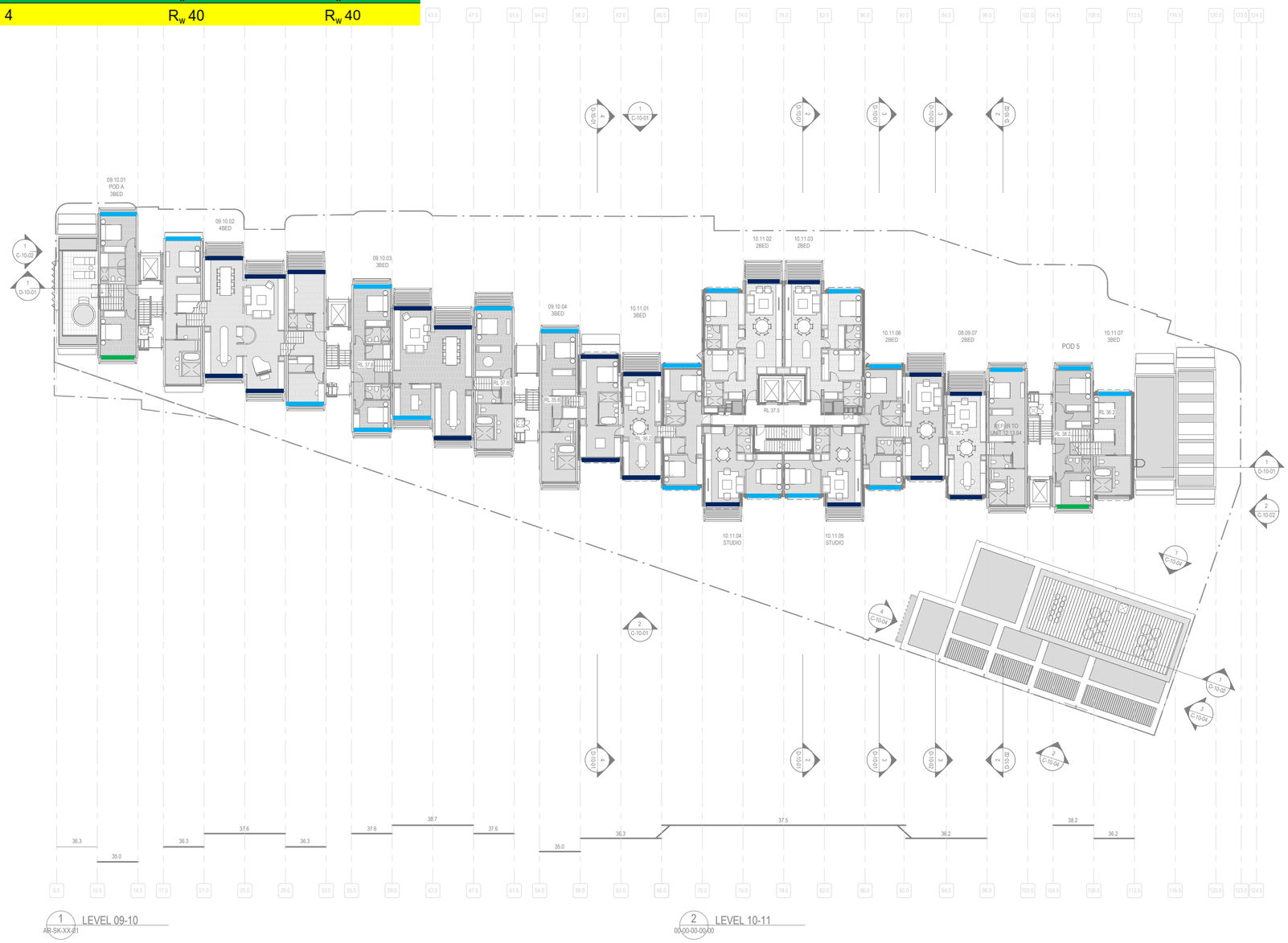
Title

ACOUSTIC FACADE DEMAND

Project No.	Scale
301350202	**NTS**
Revision	Drawing No.
1	**AC-SK-GL**

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



1 LEVEL 09-10
AR-SK-XX-01

2 LEVEL 10-11
00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

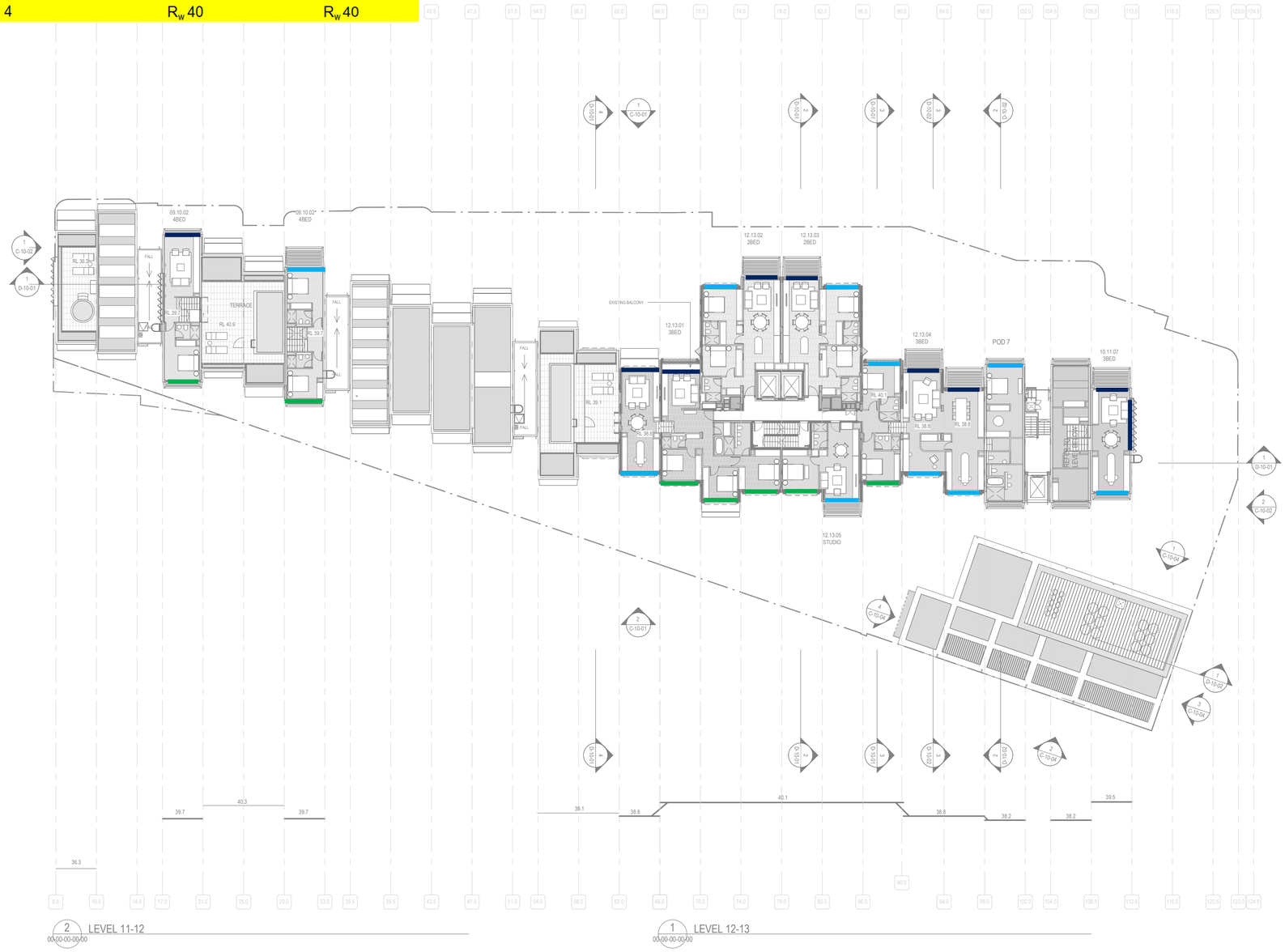
Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

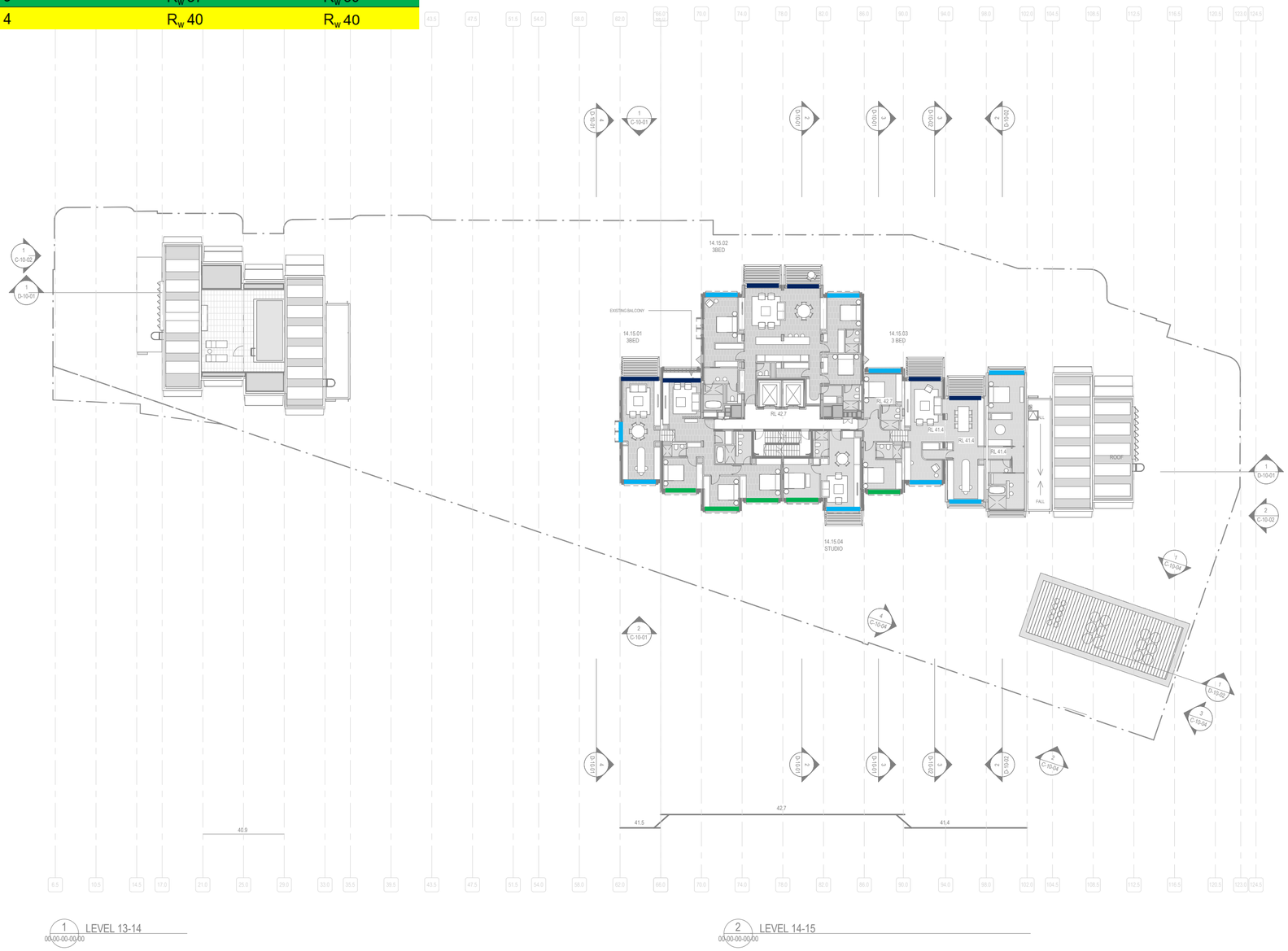
Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



1 LEVEL 13-14

2 LEVEL 14-15

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

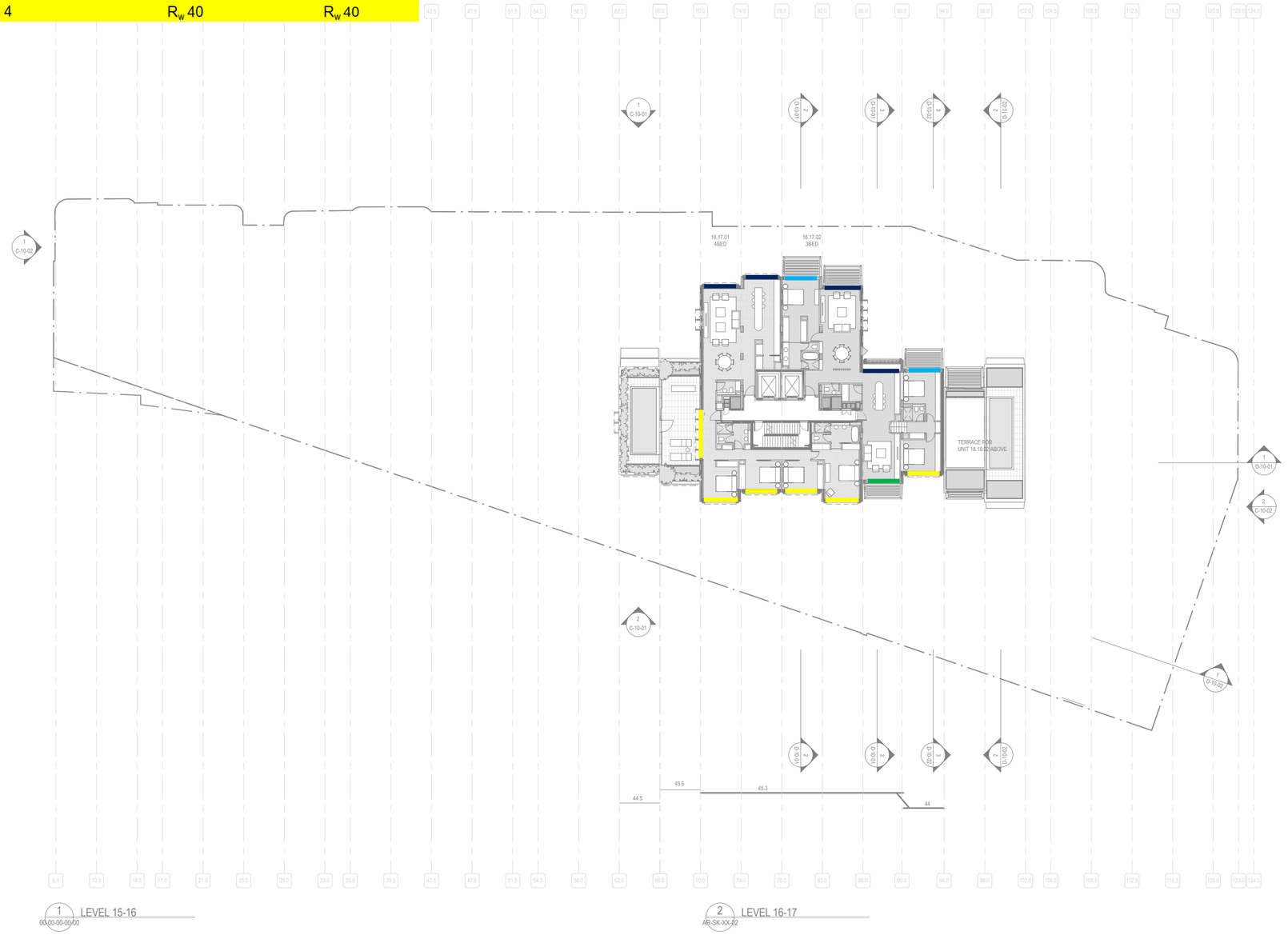
Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



1 LEVEL 15-16
00-00-00-00-00

2 LEVEL 16-17
AR-SK-XX-02

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

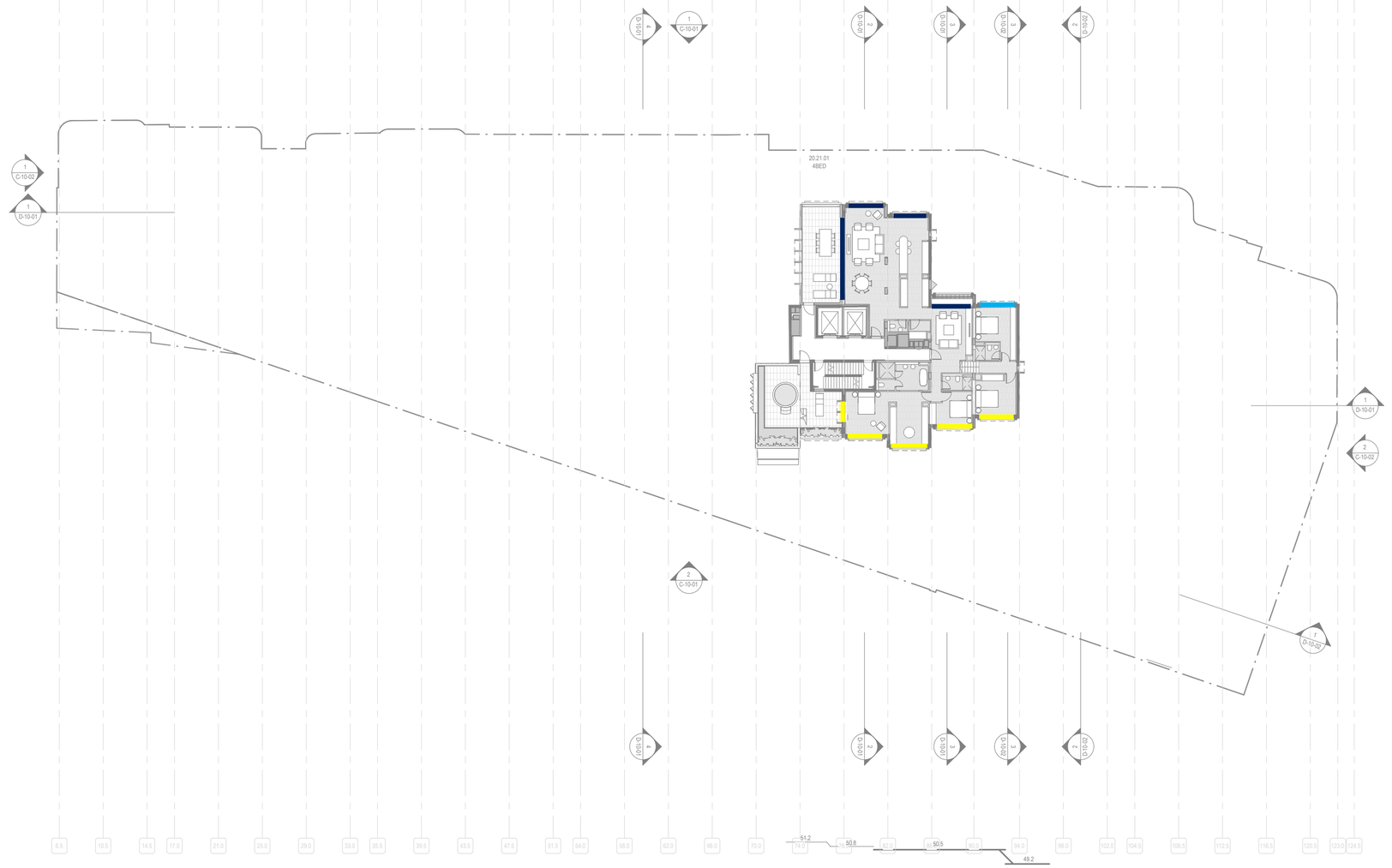
Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40



Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

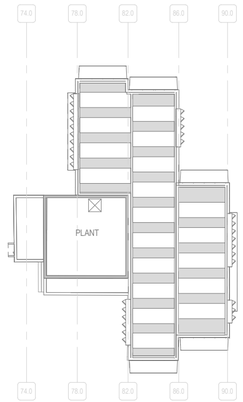
Revision
1

Drawing No.
AC-SK-GL

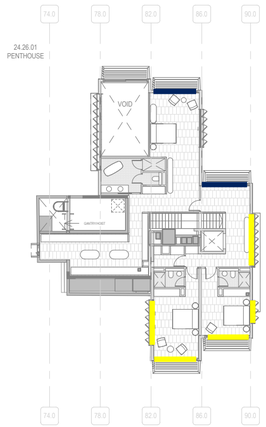
ORIGINAL SHEET - ISO A2

Acoustics Demand Rating	SGU Acoustic Performance	DGU Acoustic Performance
1	R_w 31	R_w 33
2	R_w 35	R_w 37
3	R_w 37	R_w 39
4	R_w 40	R_w 40

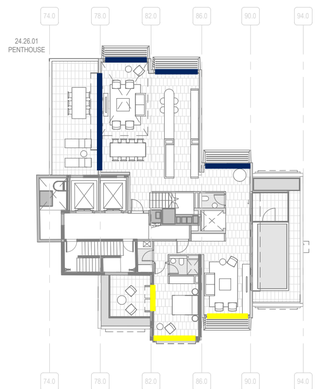
3 C-10-01 LEVEL 27



2 C-10-01 LEVEL 26
1 : 200



1 C-10-01 LEVEL 24-25
1 : 200



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

ACOUSTIC FACADE DEMAND

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-GL

ORIGINAL SHEET - ISO A2

Appendix D Noise-Affected Habitable Spaces

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

1 LEVEL 01-02
00-00-00-00

2 LEVEL 02-03
00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	MIS By	BN Appd	2021.03.08 YYYY.MM.DD
REVISED SSDA ISSUE			

File Name: AC-SK-FNM	MIA Dwn.	MIS Dsgn.	BN Chkd.	2021.03.08 YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project
SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title
NOISE AFFECTED SPACES

Project No.	Scale
301350202	**NTS**
Revision	Drawing No.
1	**AC-SK-NA**

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

1 LEVEL 03-04
00-00-00-00-00

2 LEVEL 04-05
00-00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**

File Name: **AC-SK-FNM**	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	**MIS**	**BN**	**2021.03.08**

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.	Scale
301350202	**NTS**

Revision	Drawing No.
1	**AC-SK-NA**

Noise Affected Space

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

1 LEVEL 05-06
00-00-00-00-00

2 LEVEL 06-07
00-00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	MIA	MIS	BN	2021.03.08
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.	Scale
301350202	**NTS**
Revision	Drawing No.
1	**AC-SK-NA**

Noise Affected Space

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**

File Name: **AC-SK-FNM**	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	**MIS**	**BN**	**2021.03.08**

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

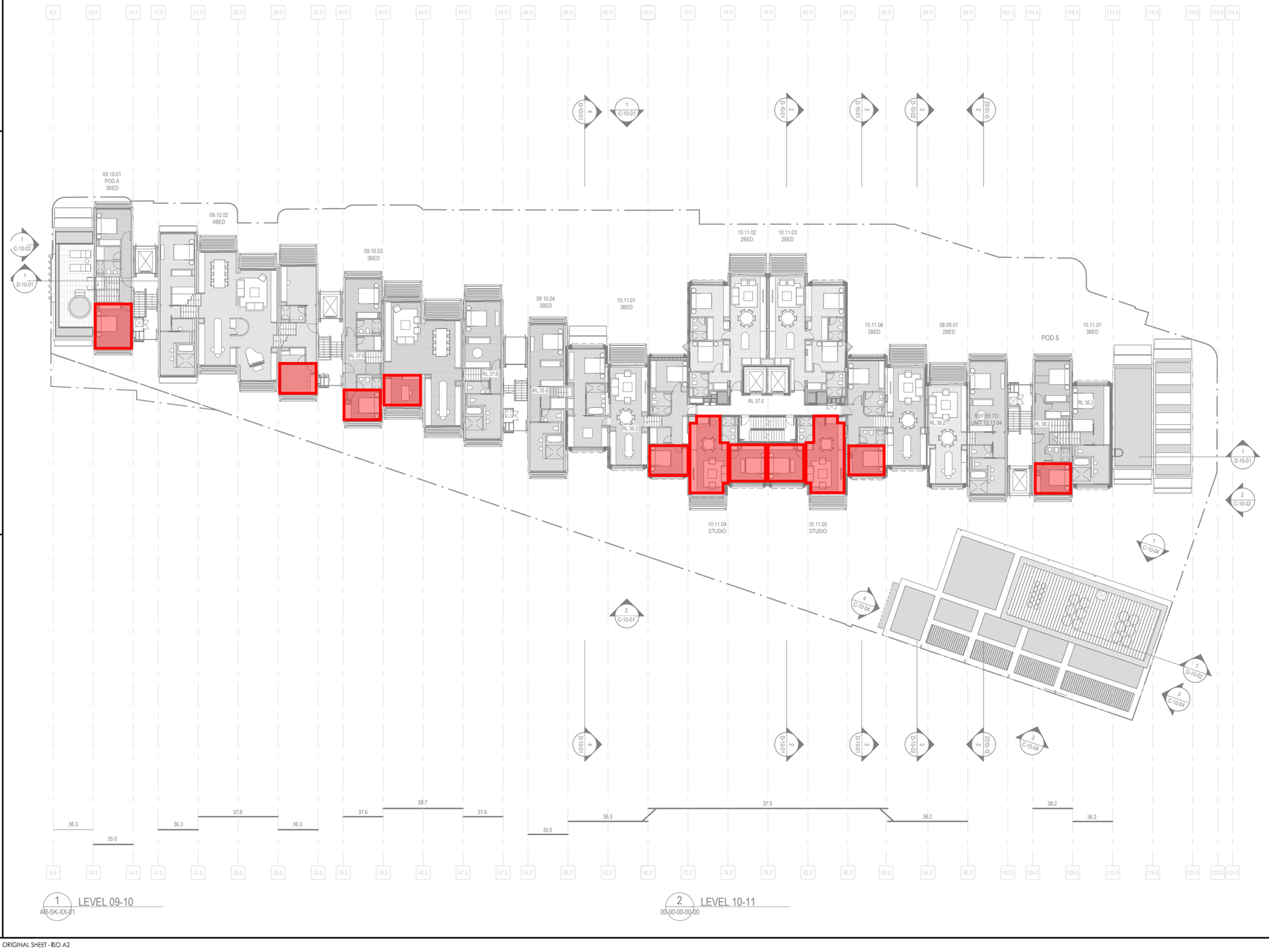
Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

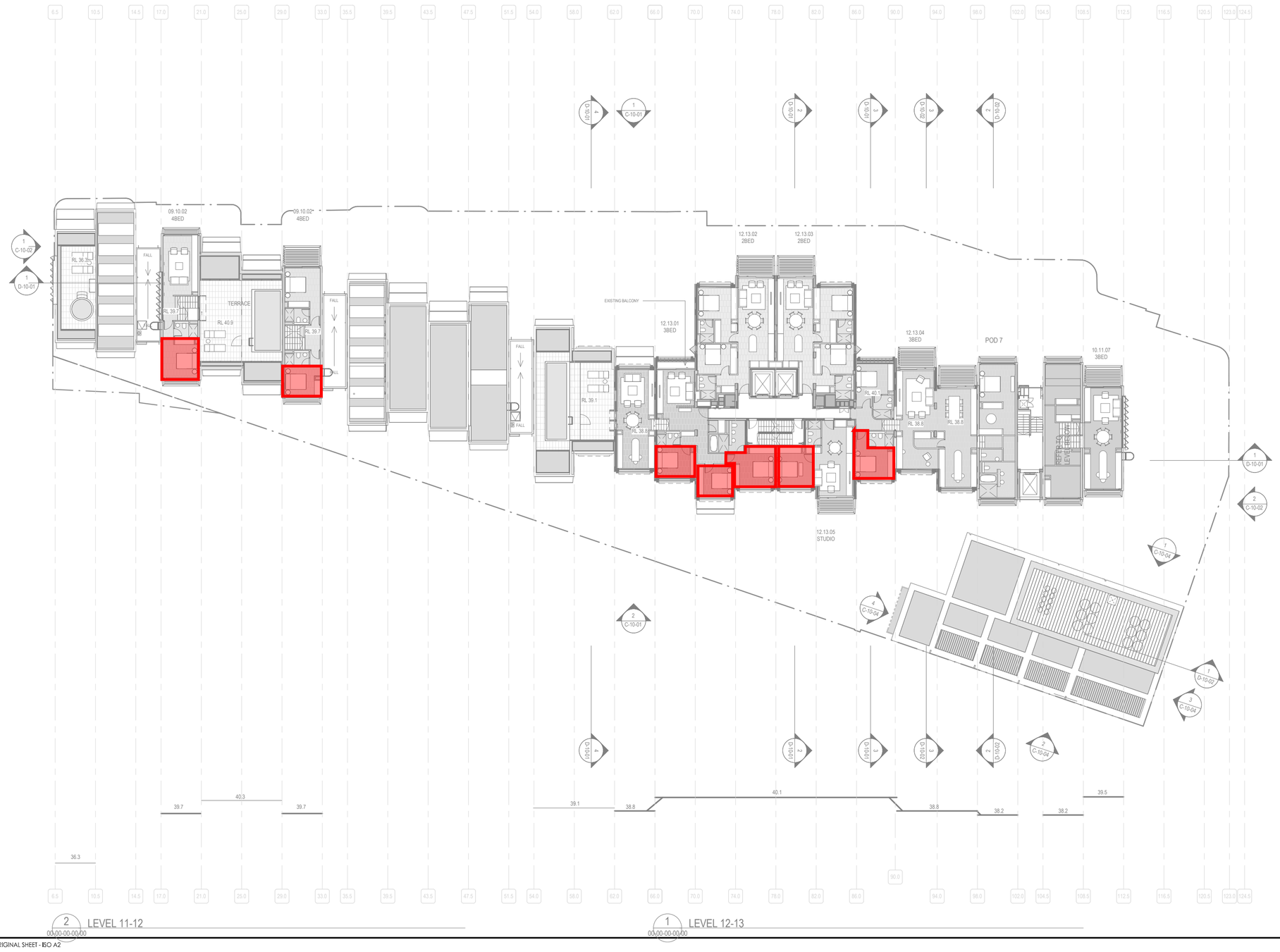
Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

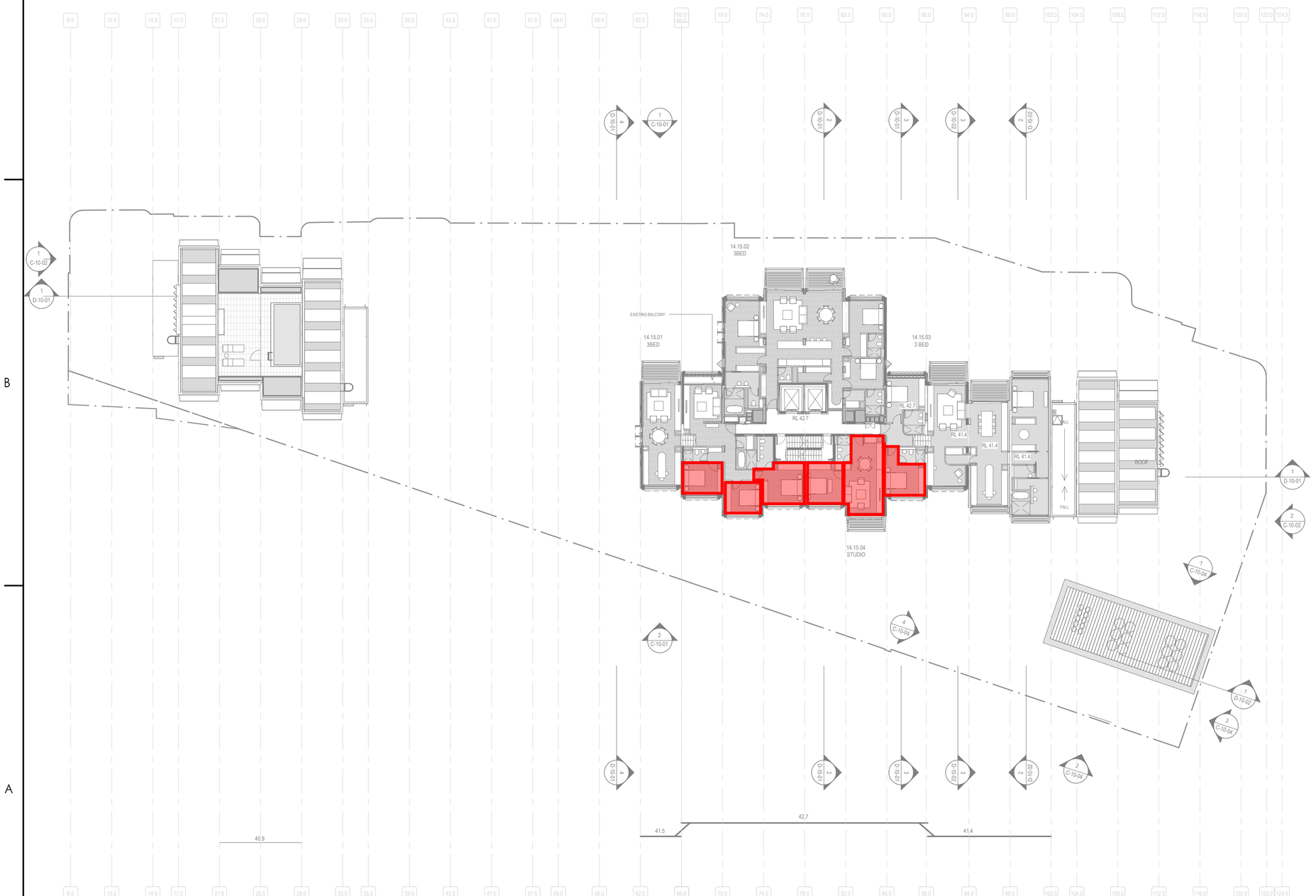
Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



1 LEVEL 13-14
00-00-00-00-00

2 LEVEL 14-15
00-00-00-00-00

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

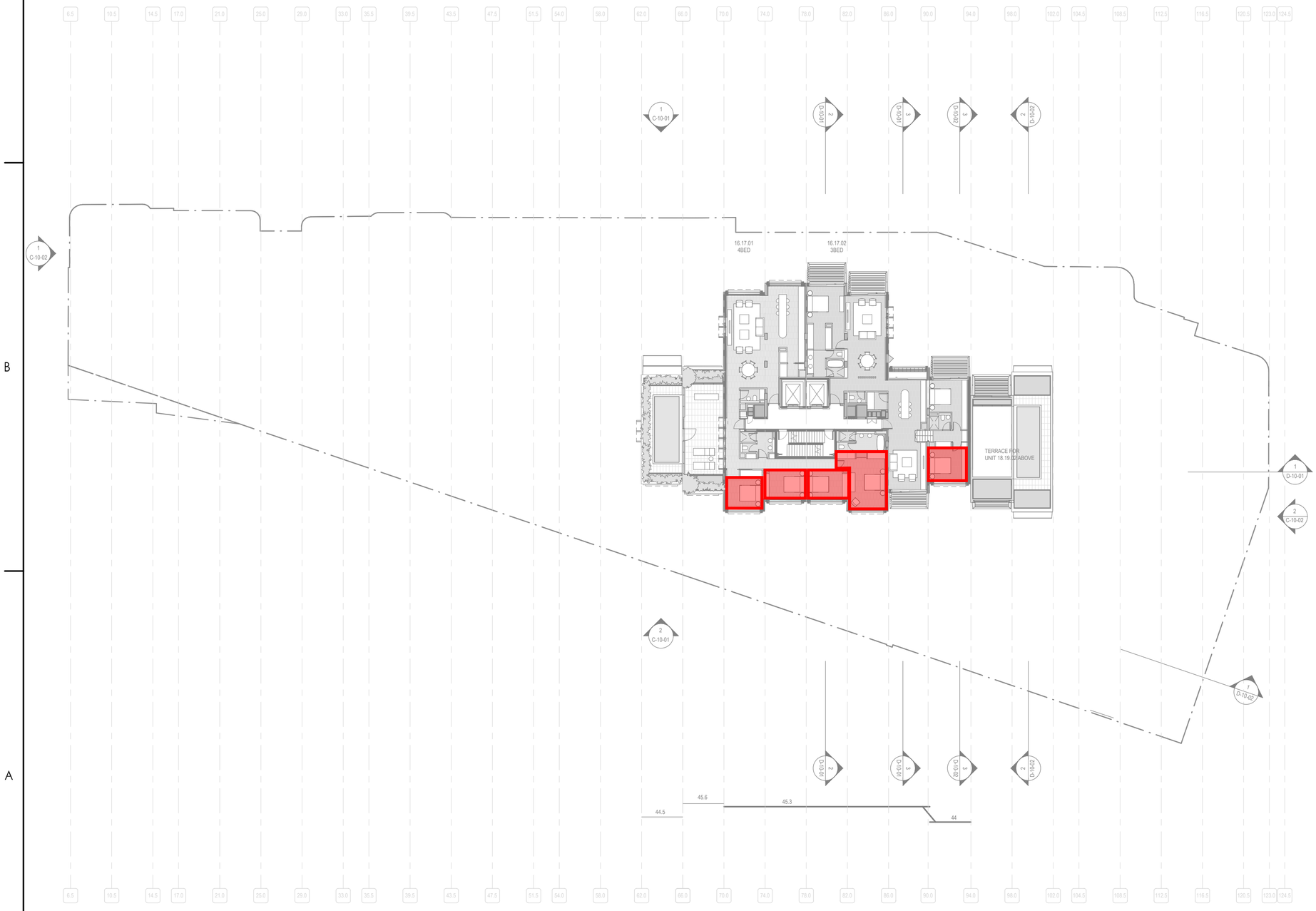
Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



1 LEVEL 15-16
00-00-00-00-00

2 LEVEL 16-17
AR-SK-XX-02

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	**MIS**	**BN**	**2021.03.08**

File Name: **AC-SK-FNM**	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	**MIS**	**BN**	**2021.03.08**

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

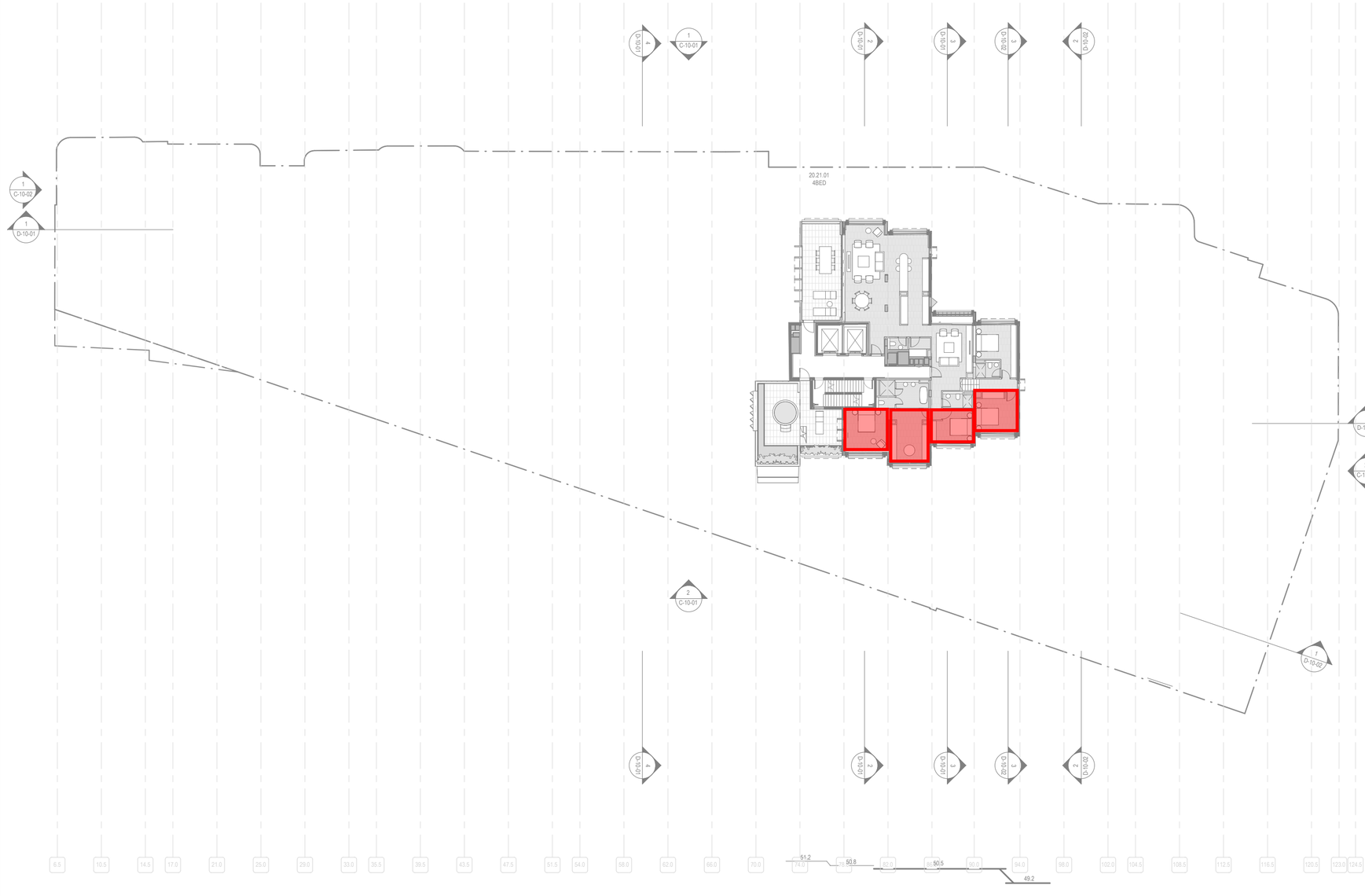
Revision
1

Drawing No.
AC-SK-NA

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-NA

ORIGINAL SHEET - ISO A2

Noise Affected Space

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.
	MIA	MIS	BN
			YYYY.MM.DD
			2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

Revision
1

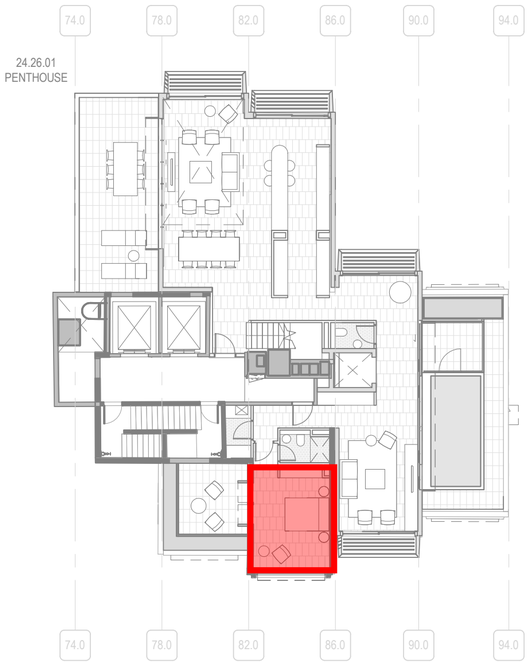
Drawing No.
AC-SK-NA

ORIGINAL SHEET - ISO A2

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



1 C-10-01 LEVEL 24-25
1 : 200

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title

NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

Revision
1

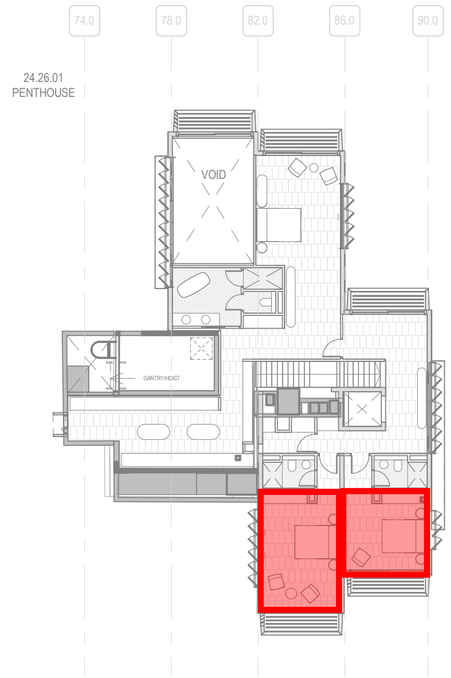
Drawing No.
AC-SK-NA

ORIGINAL SHEET - ISO A2

Noise Affected Space	

DRAWING NOTES

1. A noise affected space is classified as a space in which occupants cannot rely on opening the windows in the space to achieve the natural ventilation requirements of the NCC and simultaneously meet the acoustic requirements internal to the space.



2 C-10-01 LEVEL 26
1 : 200

ORIGINAL SHEET - ISO A2

Stantec

Stantec
Level 6, Building B, 207 Pacific Hwy
ST LEONARDS NSW 2065
02 8484 7000

www.stantec.com

Notes

Revision	By	Appd	YYYY.MM.DD
REVISED SSDA ISSUE	MIS	BN	2021.03.08

File Name: AC-SK-FNM	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	MIA	MIS	BN	2021.03.08

Issue Status

PRELIMINARY

NOT FOR CONSTRUCTION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project
SIRIUS DEVELOPMENT

SIRIUS SITE, 2-60 CUMBERLAND STREET, THE ROCKS NSW 2000

Title
NOISE AFFECTED SPACES

Project No.
301350202

Scale
NTS

Revision
1

Drawing No.
AC-SK-NA

Design with
community in mind

Level 6, Building B
207 Pacific Highway
St Leonards NSW 2065
Tel +61 2 8484 7000

For more information please visit
www.stantec.com

Stantec