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Planning of Cyprus Club - 58-76 Stanmore Rd, Stanmore

Environmental Noise Assessment
and
Noise Mitigation Strategy 2022

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1 INTRODUCTION

Acoustic Logic (AL) have been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed mixed-use development located at 58-76 Stanmore Road, Stanmore. This report has been updated to address the Inner West Council Draft Planning Proposal Response dated 22nd December 2021.

This document addresses noise impacts associated with the following:

- Noise intrusion from aircraft and traffic to the habitable spaces of the residential apartments.
- Noise intrusion from aircraft and traffic to the commercial/retail spaces.
- Noise emissions from mechanical plant to service the project site (in principle).
- Noise emissions from the licensed premises to the surrounding receivers (patron and music).

AL have utilised the following documents and regulations in the noise assessment of the development;

- Inner West Council – *Marrickville Development Control Plan (DCP) 2011*;
- NSW Department of Industry, Office of Liquor and Gaming Guidelines;
- Australian Standard AS2021:2015 - *'Acoustics – Aircraft noise intrusion–Building siting and construction';*
- Australian Standard AS2107:2016 – *'Recommended Design Sound Levels and Reverberation Times for* Building Interiors';
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007';*
- NSW Department of Planning – 'Developments near Rail Corridors or Busy Roads – Interim Guideline'; and
- NSW Department of Environment and Heritage, Environmental Protection Agency document – *Noise Policy for Industry (NPI) 2017*.

This assessment has been conducted based on the Architectural drawings provided by *PA Studio* for this project dated 5th of November 2021, Revision C, Project Number STAN58. The noise planning strategy listed in the following reports are also considered in our assessment:

- Aircraft noise planning strategy report prepared by EMM dated April 2020 with report number: B200117 RP#1. This report concludes that a portion of the site is located within the 25-30 ANEF zone, residential and non-residential buildings could be designed and constructed to satisfy the internal design levels of AS2021-2015. The same approach has been applied and approved for developments at 63 Grove Street, St Peters and 23 Addison Road, Marrickville.
- Noise Strategy letter provided by Inner West Council dated 25 September 2020 attached to this report.

The aircraft noise mitigation measures are summarised below:

- Acoustically rated glazing assemblies.
- Masonry or concrete construction
- Insulation
- Upgraded light weight façade constructions and
- Acoustical treatment to mechanical exhaust or intake grilles in the façade.

2 SITE DESCRIPTION

The proposed mixed-use development comprises the following;

- Enclosed lower ground car park and loading dock,
- Ground level communal open space, park and pathways,
- Building A (front of site on Stanmore Road),
    - Retail suites
    - Commercial offices
    - Licensed premises/community club
    - Levels 3 and 4 total of 38 residential units
- Building C and D (middle of site bounded by Alma Avenue and Tupper Street),
    - A total of 29 residential units up to Level 3 in Building C
    - A total of 52 residential units up to Level 2 in Building D
- Building E (rear of site).
    - A total of 10 two-storey residential townhouses

Refer to Figure 1 for the current site plan and location of proposed dwellings.

Acoustic Investigation has been carried out by this office in regards to the existing properties and noise impacts surrounding the proposed development. The nearest noise receivers around the site are as follows:

- **R1: Residential Receiver 1** – Existing two-storey residential dwellings to the north at 59-79 Stanmore Road, Stanmore.
- **R2: Residential Receiver 2** – Existing three-storey residential dwellings to the East at 44-48 Stanmore Road, Stanmore and 1A Tupper Street, Enmore.
- **R3: Residential Receiver 3** – Existing singe-storey and three-storey residential dwellings East of the site at 1-17 Tupper Street, Enmore
- **R4: Residential Receiver 4** – Existing three-storey residential dwelling South of the site at 22 Tupper Street, Enmore
- **R5: Residential Receiver 5** – Existing single-storey residential dwellings West of the site at 2-4 Harrington Street, Enmore
- **R6: Residential Receiver 6** – Existing single-storey, two-storey and three-storey residential dwellings West of the site along Alma Avenue

A site map, measurement description and surrounding receivers are presented below in Figure 2.

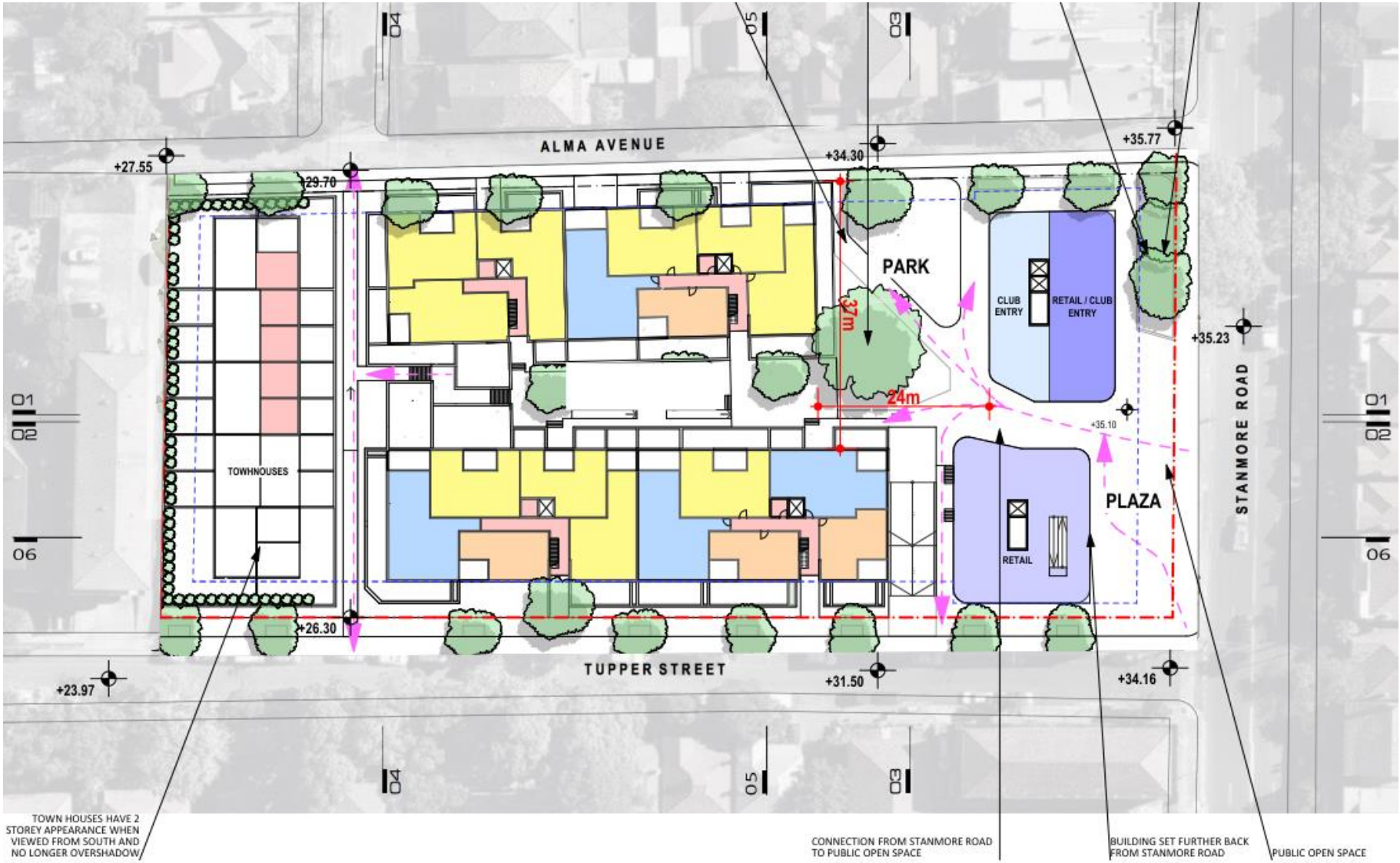


Figure 1 – Project Site Plan Ground Floor
Source: PA Studio Architectural Drawings (dated 5/11/2021)

Figure 2 - Project Site
Source: NSW Six Maps

3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}. The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

The L_{max} parameter represents the loudest noise event during a measurement period.

4 AMBIENT NOISE SURVEY

NSW EPA's Rating Background Noise Level (RBL) assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendices in this report present results of unattended noise monitoring conducted at the project site. Weather affected data was excluded from the assessment. The processed RBL (lowest 10th percentile noise levels during operation time period) are presented in Table 1.

4.1.1 Measurement Position

One unattended noise monitor was placed at the north of the site on Stanmore Road, see Figure 3 for logger placement. An attended background measurement was taken at the south of the site near the worst affected receivers, identified as R4 (22 Tupper Street, Enmore). Refer to Figure 2 for a detailed location.

Figure 3: Noise Monitor on Stanmore Road Façade

4.1.2 Measurement Period

Unattended noise monitoring was conducted from Thursday 11th of November to Saturday 20th of November 2021 to ensure that the subsequent calculations adhered to the NSW EPA Noise Policy for Industry (NPI) 2017 guidelines. Attended noise measurements were undertaken between the hours of 11:00am and 11:30am on Monday 22nd of November 2021.

4.1.3 Measurement Equipment

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix 1.

4.1.4 Summarised Rating Background Noise Levels

Summarised rating background noise levels for the project site and immediate surroundings are presented below. Weather affected data has been excluded where required by Fact Sheets A and B of NSW EPA Noise Policy for Industry guidelines. The southern rating background noise data is formulated based on the reduction in measured noise level from attended background noise measurements taken at the rear of the site (R4).

Table 1 – Stanmore Road Noise Monitor – Assessment Background Noise Levels (L_{90})

Date	$dB(A)_{90(Period)}$		
	Day (7am-6pm)	**Evening (6pm-10pm)**	**Night (10pm-7am)**
Friday, 12th November 2021	60	59	43
Saturday, 13th November 2021	60	59	47
Sunday, 14th November 2021	57	54	44
Monday, 15th November 2021	59	50	40
Tuesday, 16th November 2021	60	56	36
Wednesday, 17th November 2021	60	57	38
Thursday, 19th November 2021	61	56	38
Friday, 20th November 2021	59	59	41
Saturday, 21st November 2021	59	59	46
Median	**60**	**57**	**41**

Table 2 – Summarised Measured Noise Levels

Time of day	Rating Background Noise Level $dB(A)_{L90(Period)}$	Southern Rating Background Noise Level $dB(A)_{L90(Period)}$
Day (7am – 6pm)	60	52
Evening (6pm – 10pm)	57	49
Night (10pm – 7am)	41	33

5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around project site are from traffic movements along Stanmore Road immediately adjacent to the site (see Figure 1) and aircraft movements from Sydney Airport.

5.1 NOISE INTRUSION CRITERIA

A noise intrusion assessment has been conducted based on the requirements of the following acoustic noise criteria and standards;

- Inner West Council – *Marrickville Development Control Plan (DCP) 2011*;
- Inner West Council Correspondence to NSW Department of Planning (*dated 25 September 2020)*;
- Inner West Council Draft Planning Proposal Response (*dated 22nd December 2021*)
- EMM Consulting Aircraft Report – *58-76 Stanmore Road - Aircraft Noise Planning Strategy (ref: B200117 RP#1, dated 17 April 2020).* (See Section 5.1.7 for a summary of this report).
- NSW Department of Planning and Environment's document – 'State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007';
- NSW Department of Planning – 'Developments near Rail Corridors or Busy Roads – Interim Guideline'; and
- Australian Standard AS2107:2016 – *'Recommended Design Sound Levels and Reverberation Times for Building Interiors';*
- Australian Standard AS2021:2015 - *'Acoustics – Aircraft noise intrusion–Building siting and construction';*

5.1.1 Marrickville Development Control Plan 2011

2.6.3 Controls

C1 *Aircraft noise*

i. New development on land within an ANEF affected area must be designed and constructed in accordance with the relevant Australian Standard and other guidelines issued by relevant agencies and authorities; and

ii. The introduction of acoustic measures to reduce aircraft noise must not unacceptably detract from the streetscape value of individual buildings.

C2 *General acoustic privacy*

i. New dwellings close to high noise sources such as busy roads, rail lines and industry must be designed to locate habitable rooms and private open spaces away from noise sources or protect these areas with appropriate noise shielding devices. Development for the purpose of child care centres, educational establishments, hospitals, places of public worship and residential accommodation close to busy roads and rail lines must also comply with the relevant Australian Standards and State Environmental Planning Policies (SEPPs);

ii. Decks, balconies and verandas alongside boundaries and noisy walking surfaces or elevated side passages must be avoided where they face a residential building; and

iii. Recreation facilities such as swimming pools and barbecue areas must be located away from the bedroom areas of adjoining dwellings."

5.1.2 NSW Department of Planning and Environment's document – 'State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007';

B.7 (Development Near Busy Roads and Rail Corridors) details the requirements for development located adjacent to busy roads and rail corridors as defined by SEPP (Infrastructure) 2007. It is noted that Stanmore Road is nominated by NSW Planning as having annual average traffic volumes over 20, 000 vehicles per day. Refer to Figure 4 which locates the proposed site on map 15 of the traffic volume maps accompanying SEPP (Infrastructure) 2007.

Reference will be made to the NSW Planning document *Development near Rail Corridors or Busy Roads – Interim Guideline* for guidance as to acceptable internal noise levels for the development. The requirements of this document are detailed in Section 5.1.3

Figure 4: Site Location and SEPP (Infrastructure) 2007 Classified Roads

5.1.3 NSW Department of Planning – Development near Rail Corridors or Busy Roads – Interim Guideline

Section 3.5 of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline)' states:

> *"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.*
>
> - *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
>
> - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*
>
> - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

5.1.4 Australian Standard AS2107:2016 – 'Recommended Design Sound Levels and Reverberation Times for Building Interiors';

AS2107:2016: Recommended design sound levels and reverberation times for building interiors specifies allowable internal noise levels for internal spaces within commercial buildings. Table 1, in Section 5 of AS2107:2016, gives the following maximum internal noise levels for commercial buildings near major roads.

Table 3 – Recommended Maximum Design Sound Levels

Space /Activity Type	Recommended Maximum Design Sound Levels
Bars (Sport clubs or clubrooms)	<50 dB(A)$L_{eq(when\ in\ use)}$
Function Areas (Sport clubs or clubrooms)	40 - 45 dB(A)$L_{eq(when\ in\ use)}$
General Office Areas	40 - 45 dB(A)$L_{eq(when\ in\ use)}$
Small Retail Stores (General)	<50 dB(A)$L_{eq(when\ in\ use)}$

5.1.5 Australian Standard AS/NZS 2021:2015 *'Acoustics – Aircraft noise intrusion – Building siting and Construction'* (Aircraft Noise Intrusion)

Aircraft Noise Level

Aircraft noise levels at the site were determined using AS2021. The Standard gives aircraft noise levels for aircraft landing and taking off for locations near airports. The location of the runways was obtained from the Sydney Airport ANEF 2039. Based on the distance from the site to the runways, the flight path and the site elevation, AS2021 predicts that the loudest typical aircraft movement will be from a A330 aircraft departing from the main runway (16R).

Table 4 – Summarised Maximum Noise Levels at Assessment Location

Aircraft Type	Flight Path	Maximum Noise Level L_{ASMAX} dB(A)
Airbus A330-301	Arriving	73
	Departing	80
Airbus A380-841	Arriving	75
	Departing	76 (Short Haul) 80 (Long Haul)
Boeing 737-800	Arriving	74
	Departing	80

The Table below presents the calculations used to determine the highest noise level exposure on site based on the landing distance between the main runway and the site (DL), the take-off distance between the main runway and the site (DT) and the sideline distance between the site and the aircraft flight path (DS). Figure 5 details the site divisions used to assess a change in predicted aircraft noise level across the site.

Table 5 – AS2021-2015 Maximum Noise Level on Site from Aircraft – Airbus A330

Site Portion	Landing Distance (DL)	Take-off Distance (DT)	Sideline Distance (DS)	Departure L_{Asmax}	Arrival L_{Asmax}
1	3137 m	7237 m	428 m	80	72
2	3094 m	7194 m	406 m	80	73
3	3058 m	7158 m	375 m	80	73

Figure 5: Sample Locations for Aircraft Noise Exposure Calculations

Based on the distance from the site to the runways, the flight path and the site elevation, AS2021 predicts that the loudest typical aircraft movement will be from a A330 aircraft departing from the main runway, this is reflected in the above Table. The noise level at the site as indicated by the standard is 80dB(A). This noise level will be used to predict the resultant internal noise levels. As per the Aircraft Noise Planning Strategy by EMM (*ref: B200117 RP#1, dated 17 April 2020),* this office supports the prediction that the aircraft noise level (80 dB(A)) will not vary for the northern and southern portions of the site despite being in different aircraft zones.

Site Acceptability

The northern half of the site is located between ANEF 20 and 25 contours, the southern portion of the site is located within the ANEF 25 and 30 contours, see Figure 6 and Figure 7 for detailed location within the contours in relation to the site. As per Table 2.1 of AS2021:2015 shown in Figure 8, residential developments within the 20 to 25 ANEF zones are deemed "conditionally acceptable" and those in ANEF zones greater than 25 are deemed "unacceptable". However, AS2021:2015 Note 4 states the following:

> 4 This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.

In this regard, Clause 3.2 of AS2021:2015 dictates that appropriate noise reduction measures should be integrated into the design and construction of the building envelop to ensure that the recommended internal noise levels are achieved. These recommendations have been detailed in Section 5.5 and 5.6 of this report. As per the Inner West Council correspondence to the NSW Department of Planning (*dated 25th September 2020*), nearby residential developments well within the ANEF 25-30 contours have adopted this construction methodology and been successful in ensuring that internal noise levels satisfy AS2021:2015.

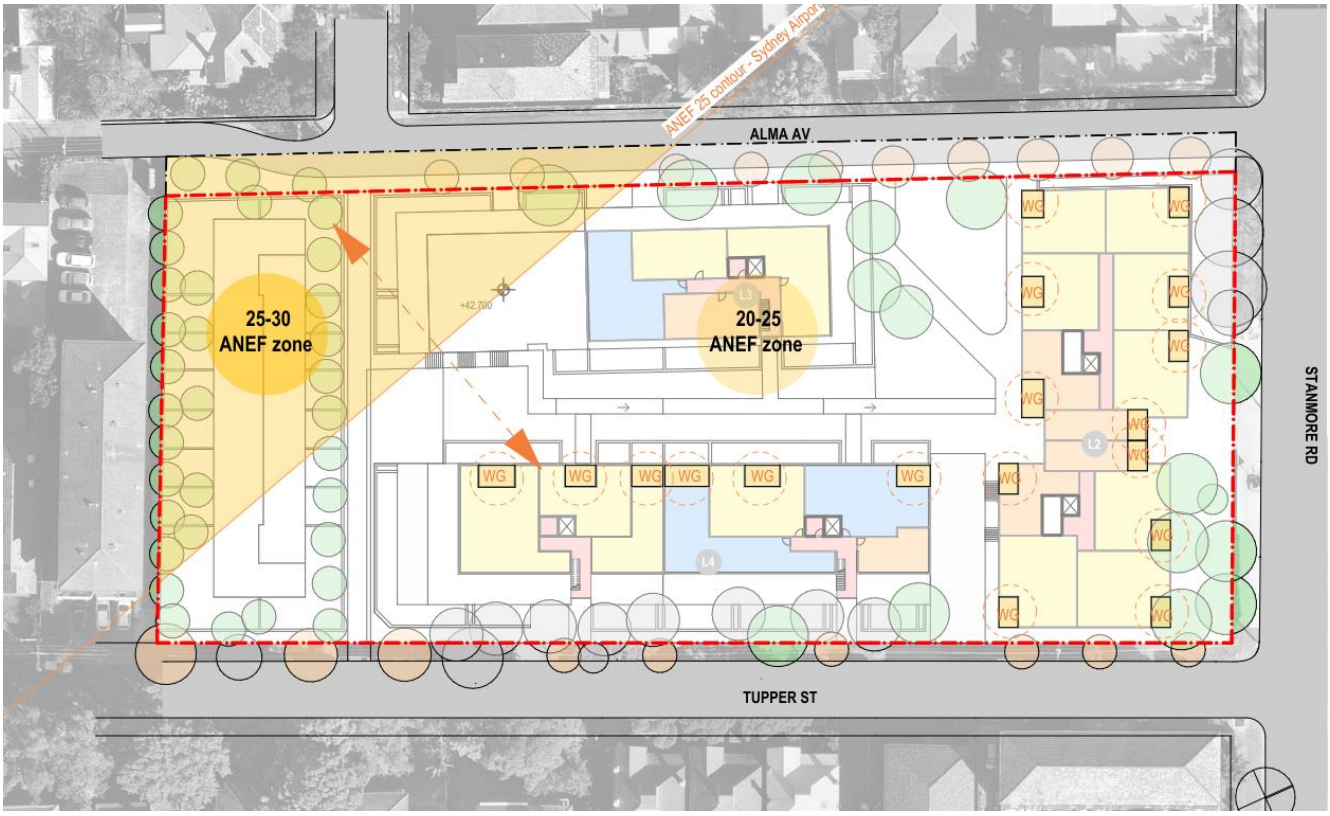


Figure 6: Noise Affectation by Flight Path

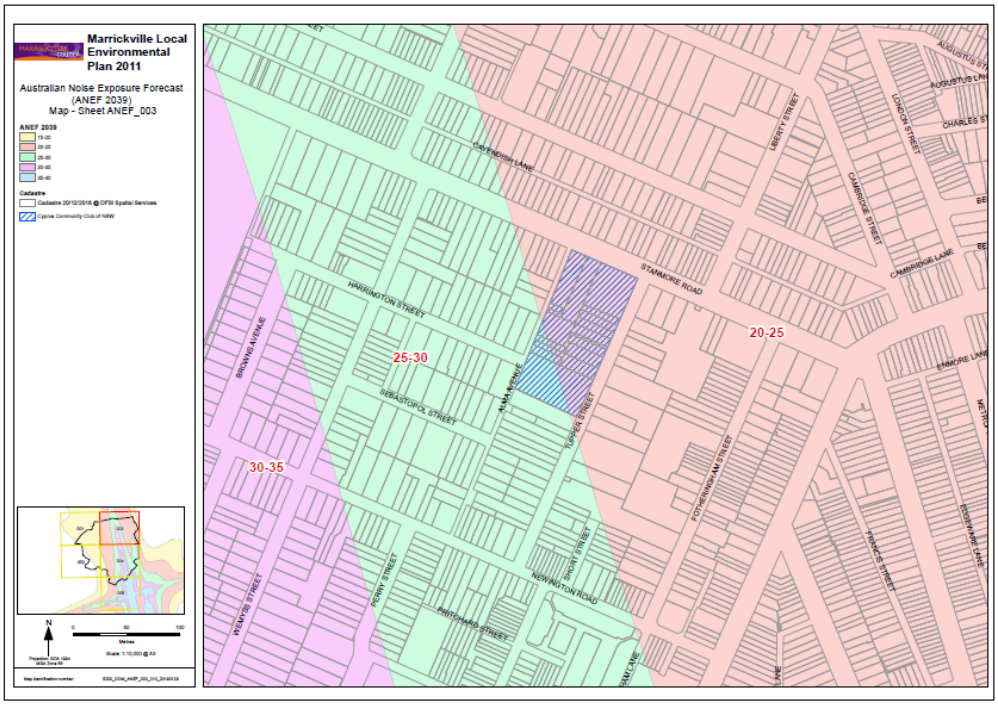


Figure 7: Marrickville Local Environmental Plan 2011 Site Location in ANEF Contours

TABLE 2.1

BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES
(To be used in conjunction with Table 3.3)

Building type	ANEF zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Figure 8: AS2021:2015 Site Acceptability Based on ANEF Zoning

Future Noise Impacts

Additionally, in line with the Inner West Council correspondence, this office notes that the Sydney Airport Masterplan 2039 details quieter noise levels due to the introduction of new aircraft. Further lessening the predicted noise impacts on the residential portions of the proposed site. This is discussed the International Civil Aviation Organisation's (ICAO) 'Balanced Approach' framework for reducing aircraft noise impacts. The ICAO's 4 Pillar approach is detailed in Figure 9 below.

Figure 15-3: ICAO 'Balanced Approach' to aircraft noise management

Figure 9: ICAO 'Balanced Approach' to aircraft noise management
Source: Sydney Airport Master Plan 2039

Pillar 1 denotes that with the use of quieter aircraft and the phasing out of louder engine designs, the noise impacts on future developments will decrease. Thus, it can be concluded that the 80dB(A)L_{ASmax} predicted on site by utilising AS2021:2015 will be the absolute maximum noise level experienced by the development and has the likelihood of further decreasing over time.

5.1.6 Noise Strategy Review by Inner West Council

Acoustic review letter provided by Inner West Council dated 25 September 2020 concluded as below:

The planning proposal is now supported by a strategy which considers Ministerial Direction 3.5 Development Near Regulated Airports and Defence Airfields and demonstrates that acceptable internal noise levels can be achieved throughout the proposed development site. Council recommends that DPIE accepts this approach in its consideration of the Gateway Submission

5.1.7 Aircraft Noise Planning Strategy by EMM

The following is a summary of the Aircraft Noise Planning Strategy conducted by EMM.

EMM has completed a review of potential noise constraints for the site, primarily focused on aircraft noise exposure utilising the ANEF 2039 and L_{ASmax} noise levels for the site in accordance with AS2021. This was done to determine the suitability to accommodate residential use within the site. The advice has also considered Sydney Airport Master Plan 2039 and a review of development consents for similar rezoning applications in the vicinity of the site. AS2021 defines the site as acceptable or conditionally acceptable for non-residential uses. For residential land uses, areas of the site are conditionally acceptable while others are categorised as unacceptable.

However, AS2021 does state that where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2 of AS2021.

The calculation of L_{ASmax} noise exposure for the site demonstrates that notwithstanding the location of the site with respect to the 25 ANEF contour, actual L_{ASmax} noise levels calculated in accordance with the procedures of AS2021 would be consistent for areas above and below the ANEF 25 contour. The calculations confirmed that the site is exposed to L_{ASmax} noise levels in order of 84-86dB(A). It was identified that approved development in the Inner West Council and specifically within the former Marrickville Council area are similarly located in ANEF25 or greater areas and exposed to L_{ASmax} noise levels of 91dB(A) or higher.

A review of development applications and approvals in the vicinity of the site confirmed that a number of alterations and additions to existing residential dwellings, secondary residential dwellings and small lot residential subdivisions were approved on the edge of the 25 ANEF contour or within the 25-30 ANEF zone. Sites identified as 63 Grove Street, St Peters and 23 Addison Road, Marrickville are of particular relevance as they were sites with a rezoning and development application for residential development and subsequently approved and constructed.

The above developments were rezoned, approved and subsequently constructed for residential use. Both of these sites contained a greater or whole portion of their respective areas within the 25-30 ANEF contours and exposed to L_{ASmax} noise levels 5-6dB higher than what would be experienced at the subject development site.

The study for the Victoria Road Precinct developed an aircraft noise strategy for areas within the ANEF 25-30 and ANEF 30-35 zones which has since been adopted by Council and incorporated into Marrickville Development Control Plan 2011 - 9.47.15 Schedule 1 – Victoria Road Precinct Aircraft Noise Policy.

Based on the review of the information and details discussed in this report, it is shown that notwithstanding that a portion of the site is located within the 25-30 ANEF zone, residential and non-residential buildings could be designed and constructed to satisfy the internal design levels of AS2021. This approach is consistent with the Victoria Road Precinct Aircraft Noise Policy, approved developments outlined at 63 Grove Street, St Peters and 23 Addison Road, Marrickville. It is further noted that the noise level of aircraft within the ANEF 25-30 zone at the site would be no greater than that for areas within the ANEF 20-25 zone.

5.2 SUMMARISED EXTERNAL NOISE INTRUSION CRITERIA

Summarised internal noise criteria for each space are summarised below.

Table 6 – Summarised Internal Noise Criteria for Aircraft

Space /Activity Type	Internal Noise Requirement dB(A)$L_{max, s}$
Private offices, conference rooms	55dB(A) L_{max}
Open offices	65dB(A) L_{max}
Shops	75dB(A) L_{max}
Social Activities	70dB(A) L_{max}
Bedrooms	50 dB(A)$_{(Lmax)}$
Living Spaces	55 dB(A)$_{(Lmax)}$
Bathrooms, toilets, laundries	60 dB(A)$_{(Lmax)}$

Table 7 – Summarised Internal Noise Criteria for Traffic

Space / Activity Type	Internal Noise Requirement
Sleeping Areas	$\leq$35 dB(A)$L_{eq(10pm-7am)}$
Living Areas	$\leq$40 dB(A)$L_{eq(anytime)}$
Bars (Sport clubs or clubrooms)	$\leq$50 dB(A)$L_{eq(when\ in\ use)}$
Function Areas (Sport clubs or clubrooms)	$\leq$45 dB(A)$L_{eq(when\ in\ use)}$
General Office Areas	$\leq$45 dB(A)$L_{eq(when\ in\ use)}$
Small Retail Stores (General)	$\leq$50 dB(A)$L_{eq(when\ in\ use)}$

5.3 EXTERNAL NOISE MEASUREMENTS

This section of the report details noise measurements conducted at the site to establish surrounding environmental noise levels impacting the development (primarily from traffic on Stanmore Road).

5.3.1 Measurement Equipment

Unattended traffic noise monitoring was conducting using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to continuously store statistical noise levels as well as audio files throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

5.3.2 Measurement Location

One unattended noise monitor was placed at the north of the site closest to the most impactful external noise source (Stanmore Road traffic). Refer to Figure 2 for a detailed location. This noise monitor had an unobstructed view of Stanmore Road, located approximately 5m from the kerb.

5.3.3 Measurement Period

Unattended noise monitoring was conducted from Thursday 11th of November to Saturday 20th of November 2021 to ensure that the subsequent calculations adhered to the NSW EPA Noise Policy for Industry (NPI) 2017 guidelines.

Attended noise measurements were undertaken between the hours of 11:00am and 11:30am on Monday 22nd of November 2021.

5.3.4 Traffic Noise Data

Unattended traffic noise data for the norther façade has been summarised below. Traffic noise levels at other façades has been formulated based on the reduction in measured noise level experienced from attended traffic noise measurements taken at the rear of the site (R4).

Table 8 – Attended Noise Measurements

Location	Time of Day	Noise Level dB(A) $L_{Aeq(period)}$
Stanmore Road Approx. 5m from kerb	Daytime 7am – 10pm	71 dB(A) $L_{eq\ (15hr)}$
	Night Time 10pm – 7am	68 dB(A) $L_{eq\ (9hr)}$

5.4 SUMMARISED EXTERNAL NOISE LEVELS

Table 9 - Summarised Traffic and Aircraft Nosie Levels at Proposed Facades Building A

Façade	Traffic Noise Level		Aircraft Noise Levels
	Daytime (7am-10pm) dB(A) $L_{Aeq\ (15hour)}$	Night time (10pm-7am) dB(A) $L_{Aeq\ (9hour)}$	All Time Periods dB(A)$_{Lmax,\ s}$
Northern Facing Façade (Stanmore Road)*	69	66	80
Eastern & Western Facing Façade*	65	62	80
Southern Facing Façade*	61	58	80

*Calculated and adjusted for distance and directivity attenuation based on attended and unattended noise measurements.

Table 10 - Summarised Traffic and Aircraft Nosie Levels at Proposed Facades Building C & D

Location	Traffic Noise Level		Aircraft Noise Levels
	Daytime (7am-10pm) dB(A) $L_{Aeq\ (15hour)}$	Night time (10pm-7am) dB(A) $L_{Aeq\ (9hour)}$	All Time Periods dB(A)$_{Lmax,\ s}$
Northern Facing Façade (Stanmore Road)*	64	61	80
Eastern & Western Facing Façade*	60	57	80
Southern Facing Façade*	55	52	80

*Calculated and adjusted for distance and directivity attenuation based on attended and unattended noise measurements.

Table 11 - Summarised Traffic and Aircraft Nosie Levels at Proposed Facades Building E

Location	Traffic Noise Level		Aircraft Noise Levels
	Daytime (7am-10pm) dB(A) $L_{Aeq\ (15hour)}$	Night time (10pm-7am) dB(A) $L_{Aeq\ (9hour)}$	All Time Periods dB(A)$L_{max,\ s}$
Northern Facing Façade (Stanmore Road)*	61	58	80
Eastern & Western Facing Façade*	58	55	80
Southern Facing Façade*	54	51	80

*Calculated and adjusted for distance and directivity attenuation based on attended and unattended noise measurements.

5.5 RECOMMENDED CONSTRUCTIONS

Assessment of façade requirements to achieve required indoor noise levels from both traffic and aircraft has been undertaken. The following recommendations ensure that all internal noise level restrictions detailed in Section 5.2 are adhered to.

5.5.1 Assumptions

As detailed room dimensions and window sizes are unavailable at this stage, the following assumptions have been made:

- All bedrooms have a volume of approximately 27m^3
- All bathrooms have a volume of approximately 12m^3
- All living rooms have a volume of approximately 60m^3
- Ground level retail tenancies have a volume of approximately 1200m^3
- Levels 1 and 2 of Building A have a volume of approximately 3900m^3

It is recommended that a revised noise intrusion assessment be undertaken once finalised drawings are available to ensure that the below recommended treatments remain acceptable. It is important to note that the type of use and size of a space directly effects the level of treatment necessary to achieve a compliant internal noise level.

5.5.2 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. (**Mohair Seals are unacceptable**).

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable. The recommended constructions are detailed below.

Table 12 - Recommended Glazing Construction Building A

Façade	Area	Glazing Thickness	Acoustic Seals
All	Bathrooms	5mm Float	Yes
	Club	6mm Float	
	Retail		
	Commercial (General Office Spaces)		
Northern, Eastern and Western Façades	Bedrooms	12.38mm Laminated (if total glazed area in the room is < 4m^2)	
		10.38mm Laminated/100mm airgap/4mm Float (if total glazed area in the room is > 4m^2)	
	Living rooms	12.38mm Laminated (if total glazed area in the room is < 8m^2)	
		10.38mm Laminated/100mm airgap/4mm Float (if total glazed area in the room is > 8m^2)	
Southern Façade	Bedrooms	10.38mm Laminated (if total glazed area in the room is< 4m^2)	
		10.38mm Laminated/100mm airgap/4mm Float (if total glazed area in the room is > 4m^2)	
	Living rooms	10mm Float (if total glazed area in the room is < 8m^2)	
		10.38mm Laminated (if total glazed area in the room is > 8m^2)	

Table 13 - Recommended Glazing Construction Building C, D & E

Façade	Area	Glazing Thickness	Acoustic Seals
All	Bathrooms	5mm Float	Yes
	Bedrooms	10.38mm Laminated (if total glazed area in the room is < 4m^2)	
		10.38mm Laminated/100mm airgap/4mm Float (if total glazed area in the room is > 4m^2	
	Living rooms	10mm Float (if total glazed area in the room is < 8m^2)	
		10.38mm Laminated (if total glazed area in the room is > 8m^2)	

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 14 for all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 14 - Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
10.38mm Laminated/100mm airgap/4mm Float	42
12.38mm Laminated	37
10.38mm Laminated	35
10mm Float	33
6mm Float	29
5mm Float	28

5.5.3 Entry Doors

Entry doors will be via internal corridors and subject to BCA requirements.

Façade entry doors into residential apartments/townhouses are to be constructed of minimum 40mm thick solid timber. All doors incorporating glazed elements shall have glazing thicknesses equal to those recommended in the Section above. All doorways located on the external façade of the development are to have **Raven RP10** to the top and sides and **Raven RP38** to the underside of a swing door. **Note that mohair seals in windows and doors <u>are not acceptable</u> where acoustic seals are required.**

5.5.4 External Wall Construction

External walls are of masonry construction and are acoustically acceptable without any further treatment. In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report. If lightweight elements are proposed for the façade construction, acoustic treatment will be required and an updated noise intrusion assessment is necessary.

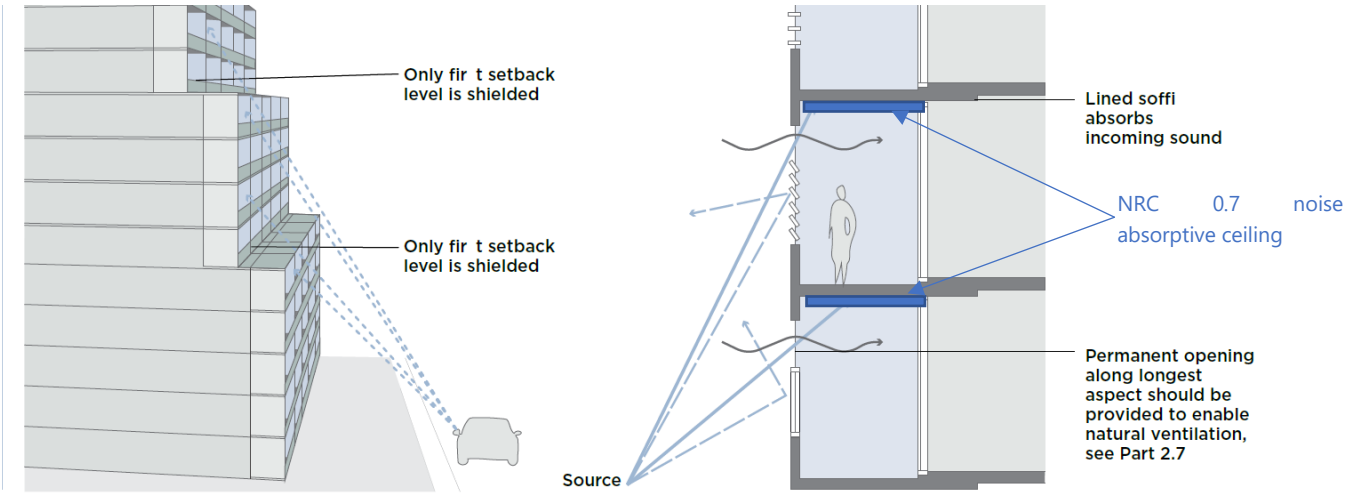
5.5.5 External Roof & Ceiling Construction

Roof constructions of masonry system (e.g. concrete slab) will be acoustically acceptable without additional treatment. If any penetrations are required through any of the external lining of any of the systems above for other building services, all gaps should be filled with acoustic sealant to ensure compliance with internal noise level requirements. If lightweight elements are proposed for the façade construction, acoustic treatment will be required and an updated noise intrusion assessment is necessary.

5.6 Potential for Natural Ventilation of Apartments

Apartment Design Guide 2015 and Draft Apartment Design Guide 2021 recommends *a partially enclosed balcony typically glazed and used to minimise noise impacts along busy roads, railway lines and from aircraft noise.*

Wintergardens provide protected open space which has permanent openings to outside to support natural ventilation and cross-ventilation. This creates potential for some degree of natural ventilation to adjacent rooms using Wintergardens. It is recommended to adopt glazing louvre for the winter garden and install noise absorptive ceiling with minimum NRC 0.7.



5.7 PREDICTED INTERNAL NOISE LEVELS

Provided that the construction recommendations in section 5.5 are fulfilled, the following internal noise levels and noise reduction values are predicted from aircraft noise intrusion.

Table 15 – Predicted Internal Noise Level after Construction

Type of Space	External Noise Level $dB(A)_{Lmax, s}$	Criteria AS2021:2015 $dB(A)_{Lmax, s}$	Predicted Internal Noise Level $dB(A)_{Lmax, s}$	Aircraft Noise Reduction (ANR) $dB(A)_{Lmax, s}$
Living room	80	<55	54	27
Bedroom		<50	47	34
Bathroom		<60	57	24
Commercial		<65	58	23
Retail		<75	55	26
Club		<70	58	23

5.8 MECHANICAL VENTILATION

With respect to natural ventilation of a dwelling, the NSW Department of Planning document *Development near Busy Roads and Rail Corridors - Interim Guideline* dictates that:

- *"If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), 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."*

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A) $L_{eq(9hr)}$, and 50dB(A) $L_{eq(15hr)}$ in living rooms).

- All living spaces may have windows open to 5% of floor area and achieve required internal noise levels for all times.

AS2021:2015 requires the installation of ventilation or air conditioning system where aircraft noise exposure exceeds ANEF 25. As internal noise levels cannot be achieved with windows open it is required that an in all areas to have alternative outside air supply system or air conditioning be installed. These should be in accordance with AS1668.2 requirements.

Any mechanical ventilation system that is installed should be acoustically designed such that the acoustic performance of the recommended constructions is not reduced by any duct or pipe penetrating the wall/ceiling/roof. Noise emitted to the property boundaries by any ventilation system shall comply with Council requirements.

6 NOISE EMISSION ASSESSMENT

6.1 NOISE EMISSION CRITERIA

The noise emission from the project site shall comply with the requirements of the following documents;

- Inner West Council – *Marrickville Development Control Plan (DCP) 2011*;
- NSW Department of Industry, Office of Liquor and Gaming Guidelines;
- NSW Environmental Protection Authority document – Noise Policy for Industry (NPI) 2017

6.1.1 Marrickville Development Control Plan 2011

C7 Noise impacts of commercial and industrial development on residential amenity:

- *All development must comply with the relevant noise control guidelines.*
- *Where sites adjoin a residential area or are located within a mixed use building, Council will consider the potential noise generation of any proposed activities including the use of equipment or machinery, the use of amplified music/noise on the site and proposed hours of operation.*

viii. All applications for noise generating uses adjacent to or located in a building containing a residential use must be accompanied by documentation from a qualified acoustic engineer certifying that the acoustic standards can be met.

There are no specific numerical criteria relating to noise emissions from licensed venues contained within the Marrickville DCP. As such, reference will be made to NSW Department of Industry, Office of Liquor and Gaming Guidelines when assessing noise impacts from patrons of the proposed venue, as detailed below.

6.1.2 NSW Department of Industry – Office of Liquor and Gaming Guidelines

When assessing noise emissions from licensed premises, noise emissions must comply with the acoustic requirements generally imposed by the NSW LG. These guidelines relate to noise generated by patrons and by music. The requirements are set out below:

- *The L_{10} noise level emitted from the premises shall not exceed 5dB above the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) between the hours of 7.00am to 12.00 midnight when assessed at the boundary of the nearest affected residential premises.*

- *L_{10} noise level emitted from the premises shall not exceed the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) after midnight when assessed at the boundary of the nearest affected residential premises.*

After midnight, noise emissions from the Place of Public Entertainment are to be inaudible within any habitable rooms in nearby residential properties.

6.1.3 NSW EPA Noise Policy for Industry (NPI) 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the suburban criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

6.1.3.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in

Table 2. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

6.1.3.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in

Table 2, the Noise Policy for Industry suggests the adoption of the 'suburban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner;

$$L_{Aeq,15min} = \text{Recommended Amenity Noise Level} - 5\ dB(A) + 3\ dB(A)$$

The amenity levels appropriate for the receivers surrounding the project site are presented in Table 16.

Table 16 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Level dB(A)$L_{eq(period)}$
Residential – Urban	Day	60	58
	Evening	50	48
	Night	45	53

The NSW EPA Noise Policy for Industry (2017) defines;

- Day as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening as the period from 6pm to 10pm.
- Night as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays

6.1.3.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- *$L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater, a detailed maximum noise level even assessment should be undertaken.*

Table 17 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residences Surrounding Site Night (10pm – 7am)	39	44 dB(A)$L_{eq,\ 15min}$; 54 dB(A)L_{Fmax}

If there are noise events that could exceed the emergence levels detailed in the table above, then an assessment of sleep arousal impact is required to be carried out, taking into account the level and frequency of noise events during the night, existing noise sources, etc. This more detailed sleep arousal test is conducted using the guidelines in the EPA Road Noise Policy. Most relevantly, the Road Noise Policy states:

For the research on sleep disturbance to date it can be concluded that:

- *Maximum internal noise levels below 50-55dB(A) are unlikely to awaken people from sleep.*
- *One to two noise events per night with maximum internal noise levels of 65-70dB(A) are not likely to affect health and wellbeing significantly.*

6.2 SUMMARISED NOISE EMISSION CRITERIA FOR PLANT/MECHANICAL EQUIPMENT

Table 18 – EPA NPI Noise Emission Criteria (Residents Surrounding North of Project Site near Stanmore Road)

Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) $L_{eq(15min)}$	Intrusiveness Criteria $L_{eq(15min)}$	EPA RNP Criteria for Sleep Disturbance
Day	60	**58**	65	N/A
Evening	57	**48**	62	N/A
Night	41	53	**46**	46 dB(A)$L_{eq,\ 15min}$ 56 dB(A)L_{Fmax}

***Project noise trigger levels are bolded above**

Table 19 – EPA NPI Noise Emission Criteria (Residents Surrounding South of Project Site away from Stanmore Road)

Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) $L_{eq(15min)}$	Intrusiveness Criteria $L_{eq(15min)}$	EPA RNP Criteria for Sleep Disturbance
Day	52	58	**57**	N/A
Evening	49	**48**	54	N/A
Night	33	53	**38**	40 dB(A)$L_{eq,\ 15min}$ 52 dB(A)L_{Fmax}

***Project noise trigger levels are bolded above**

6.3 SUMMARISED NOISE EMISSION CRITERIA FOR CLUB OPERATION (PATRON & MUSIC)

The below spectrum noise criteria is formulated based on the proposed operating hours of the community club (10am – 12am, 7 days a week).

Table 20 – External Noise Emission Goals (for Operation / Patron Noise) dB(A) $L_{10(15min)}$

Time Period	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
10am – 6pm (BG + 5)	77	70	74	66	62	60	54	50	46	**65**
6pm – 10pm (BG + 5)	74	67	71	63	59	57	51	47	43	**62**
10pm –12am (BG + 5)	64	57	61	53	49	47	41	37	33	**52**

6.4 NOISE EMISSIONS ASSESSMENT

6.4.1 Operational noise emissions from the Club (patron and music)

In order to protect the amenity of the residents and/or commercial tenants above the proposed community club (same development), 2 x 16mm fire rated plasterboard and minimum 200mm thick structural concrete slab are required to entirety of the club ceiling where are residential/commercial tenancies directly above. The cavity of the ceiling should be minimum 100mm and infilled by 75mm thick 11Kg/m^3 Glasswool.

Additionally, background noise music played in the club spaces directly below residential or commercial tenancies shall no exceed 85 dB(A) L_{eq} at any time.

Noise emissions by patron and music from the proposed club to surrounding residential receivers (outside of the development site) should be assessed at DA stage when a separate DA is lodged for the specific use of the club. During this assessment, the noise criteria summarised in Section 6.3 must be adhered to.

Detailed acoustic review should be conducted at CC stage for operational noise level noise emissions from use of the proposed community club. Based on the location and operating hours of the licensed premises, AL can confirm that it has the capacity to comply with the criteria detailed in Section 6.3, with typical standard acoustic treatments i.e. patron management controls, background music noise level limitations, specific façade treatments etc.

6.4.2 Operational Noise Emissions from the Commercial/Retail

As mechanical plant has not yet been selected at this stage, a complete assessment of mechanical noise emissions cannot be conducted at this time. Generally, this is undertaken at CC stage, once the plant selections have been undertaken. Notwithstanding, compliance with the mechanical noise emission criteria presented in Section 6.2 is both practical and reasonable with the use of one or more of (but not limited to) the following if found necessary:

- Acoustic Barriers/Screens;
- Internally lined ductwork;
- External Lagging;
- Silencers

7 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed mixed-use development to be located at 58-76 Stanmore Road, Stanmore.

Provided that the recommendations presented in Section 5.5 and winter garden with noise absorptive ceiling are adopted, internal noise levels for residential and commercial components of the proposed development will comply with the acoustic requirements of the following documents.

- Inner West Council – *Marrickville Development Control Plan (DCP) 2011*;
- NSW Department of Planning and Environment's document – 'State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007';
- NSW Department of Planning – 'Developments near Rail Corridors or Busy Roads – Interim Guideline'; and
- Australian Standard AS2107:2016 – *'Recommended Design Sound Levels and Reverberation Times for Building Interiors';*
- Australian Standard AS2021:2015 - *'Acoustics – Aircraft noise intrusion–Building siting and construction';*

External noise emissions criteria have been established in this report to satisfy the requirements from the following documents;

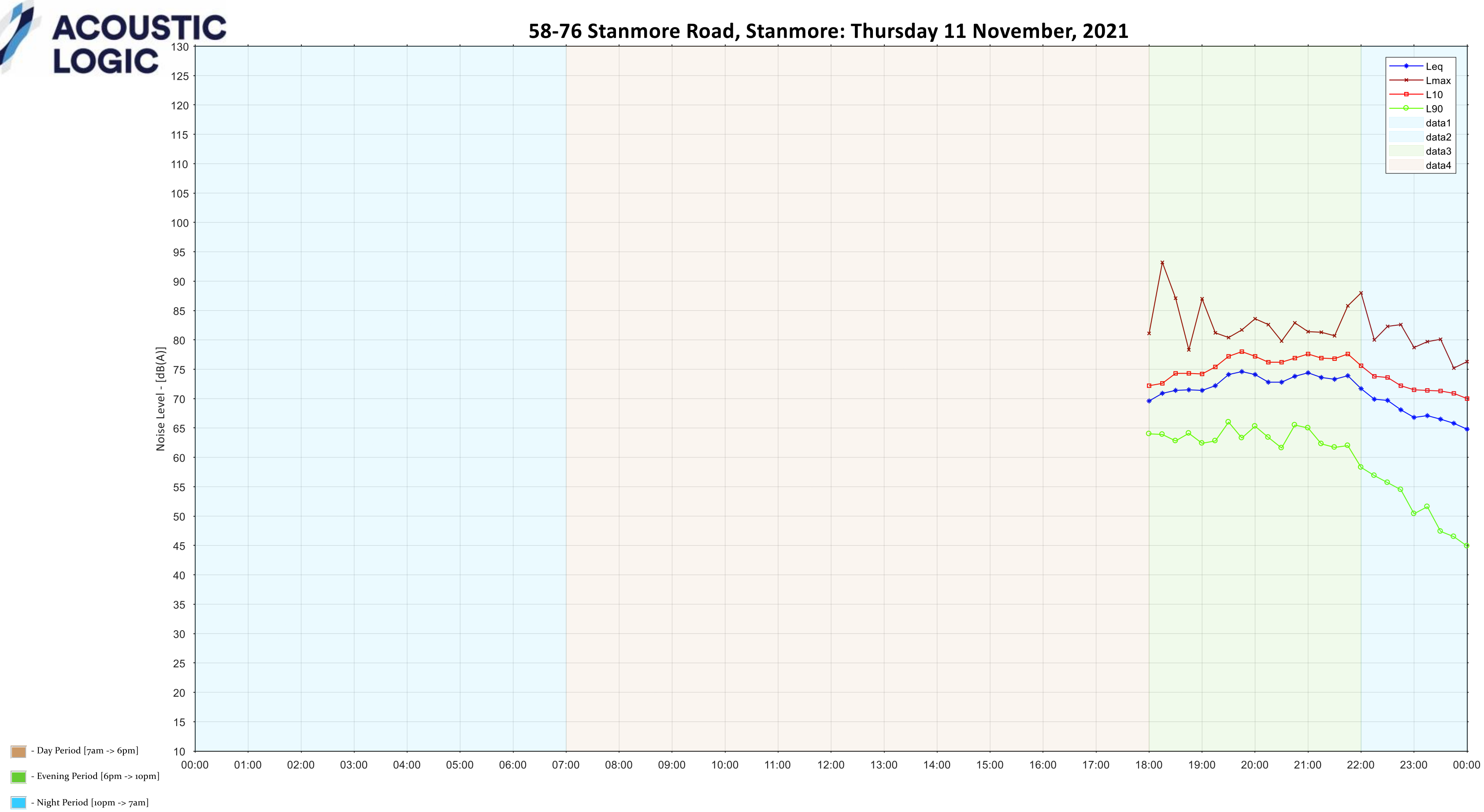
- Inner West Council – *Marrickville Development Control Plan (DCP) 2011*;
- NSW Department of Industry, Office of Liquor and Gaming Guidelines;
- NSW Environmental Protection Authority document – Noise Policy for Industry (NPI) 2017

Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Lillian Lockett

APPENDIX ONE – UNATTENDED NOISE MONITORING DATA



58-76 Stanmore Road, Stanmore: Thursday 11 November, 2021
Noise Level - [dB(A)]
Leq
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L90
data1
data2
data3
data4
00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 00:00
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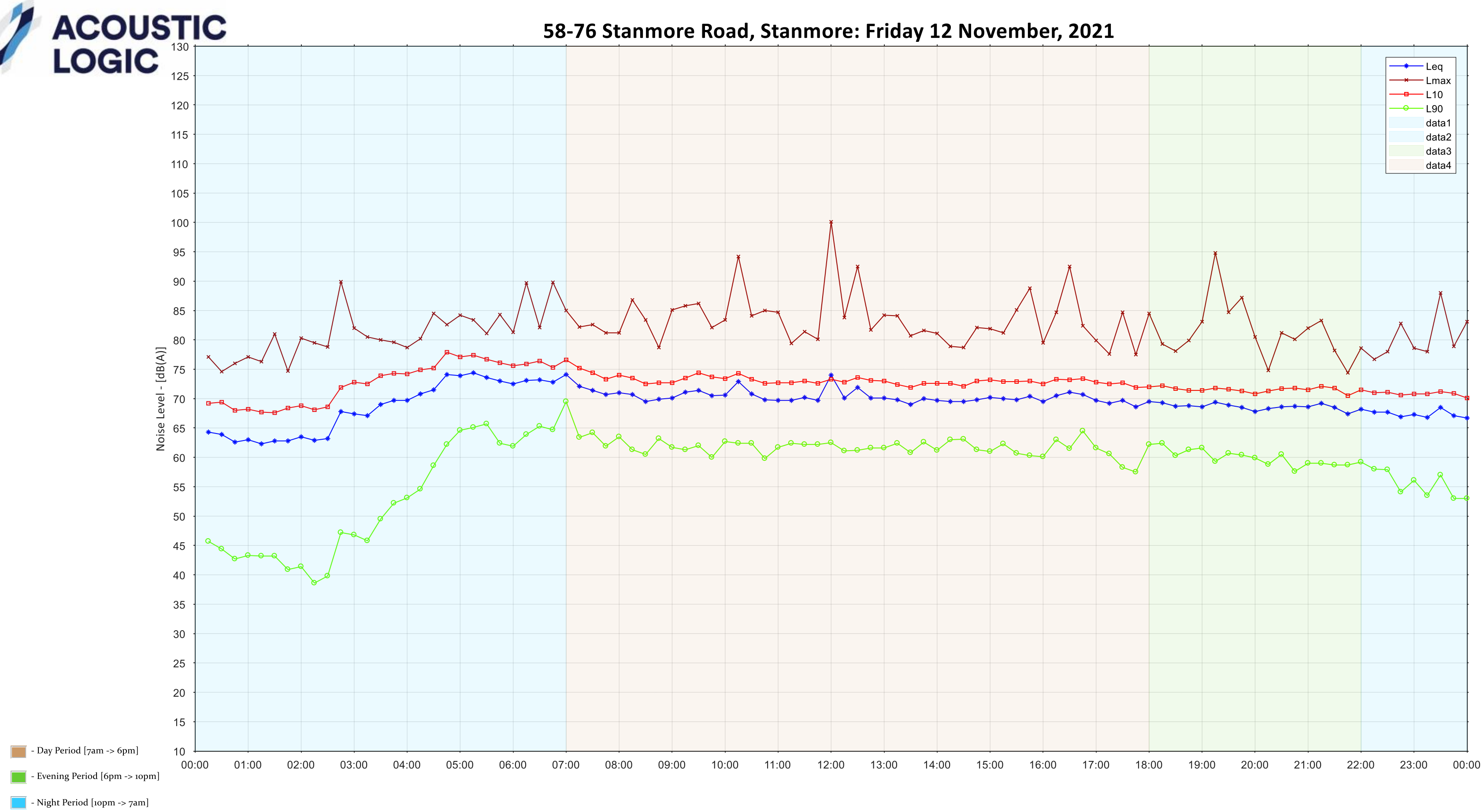
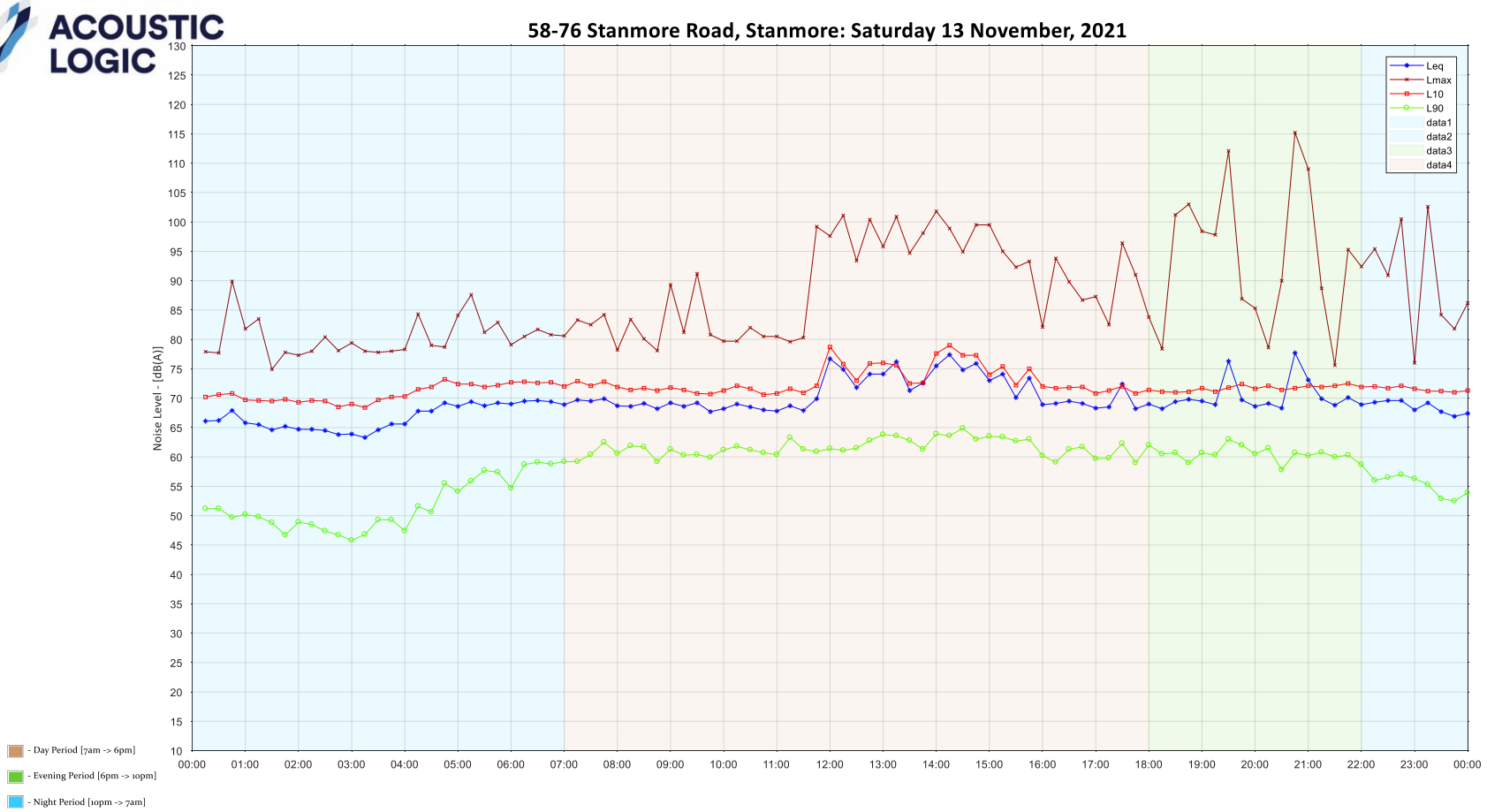
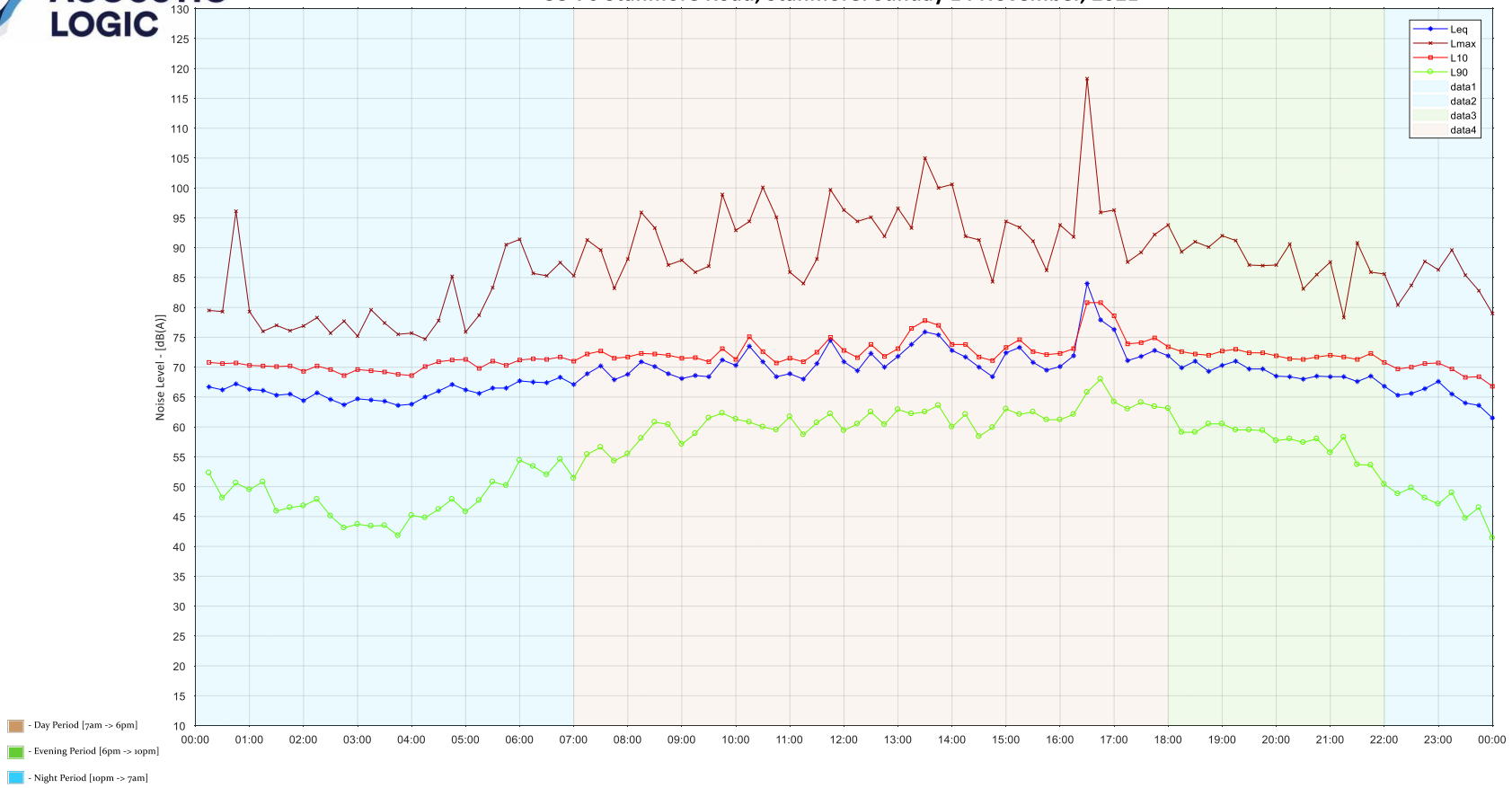
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

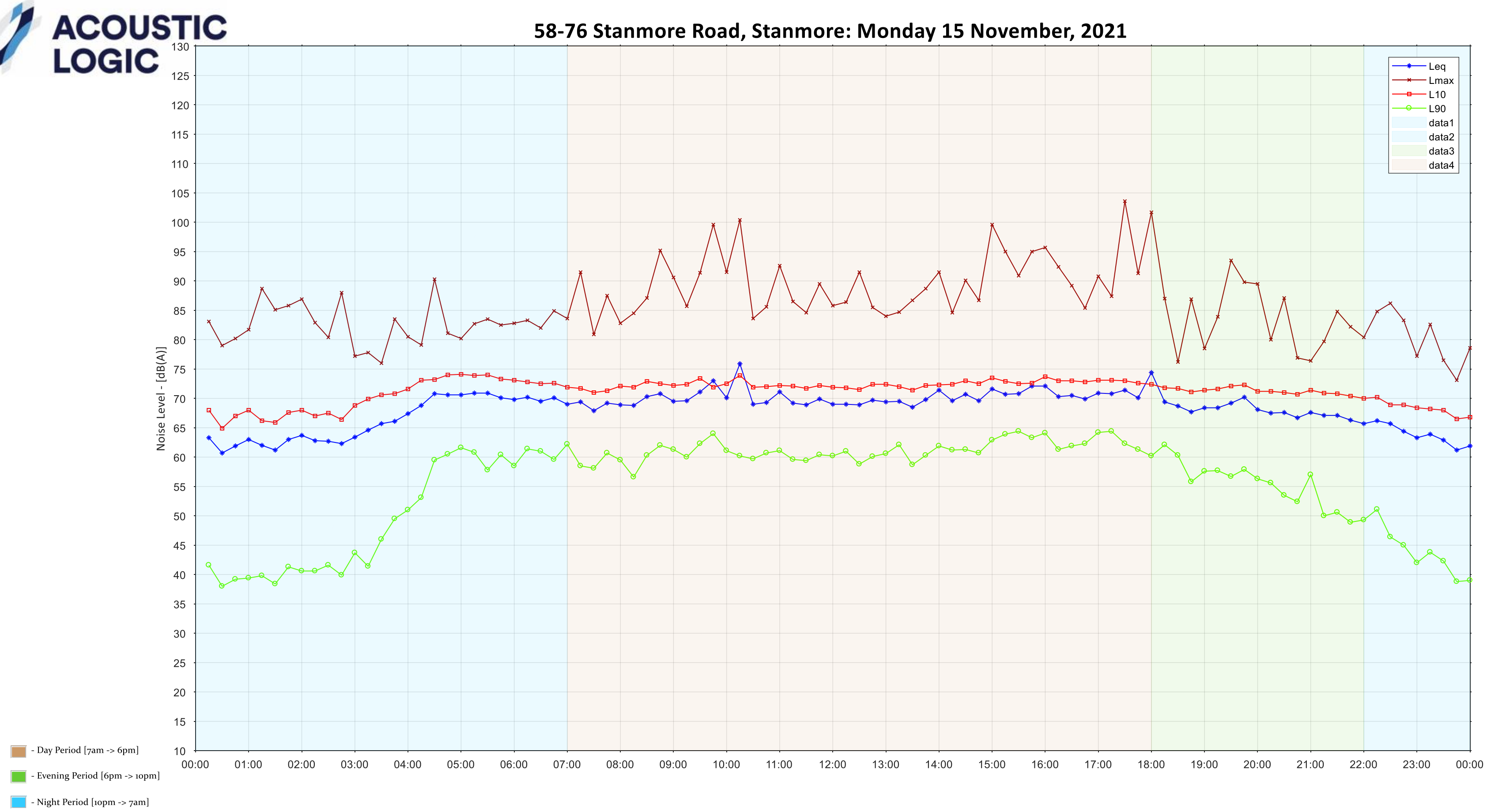


58-76 Stanmore Road, Stanmore: Friday 12 November, 2021
Noise Level - [dB(A)]
Leq
Lmax
L10
L90
data1
data2
data3
data4
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


58-76 Stanmore Road, Stanmore: Saturday 13 November, 2021
Noise Level - [dB(A)]
Leq
Lmax
L10
L90
data1
data2
data3
data4
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

58-76 Stanmore Road, Stanmore: Sunday 14 November, 2021




58-76 Stanmore Road, Stanmore: Monday 15 November, 2021
Noise Level - [dB(A)]
Leq
Lmax
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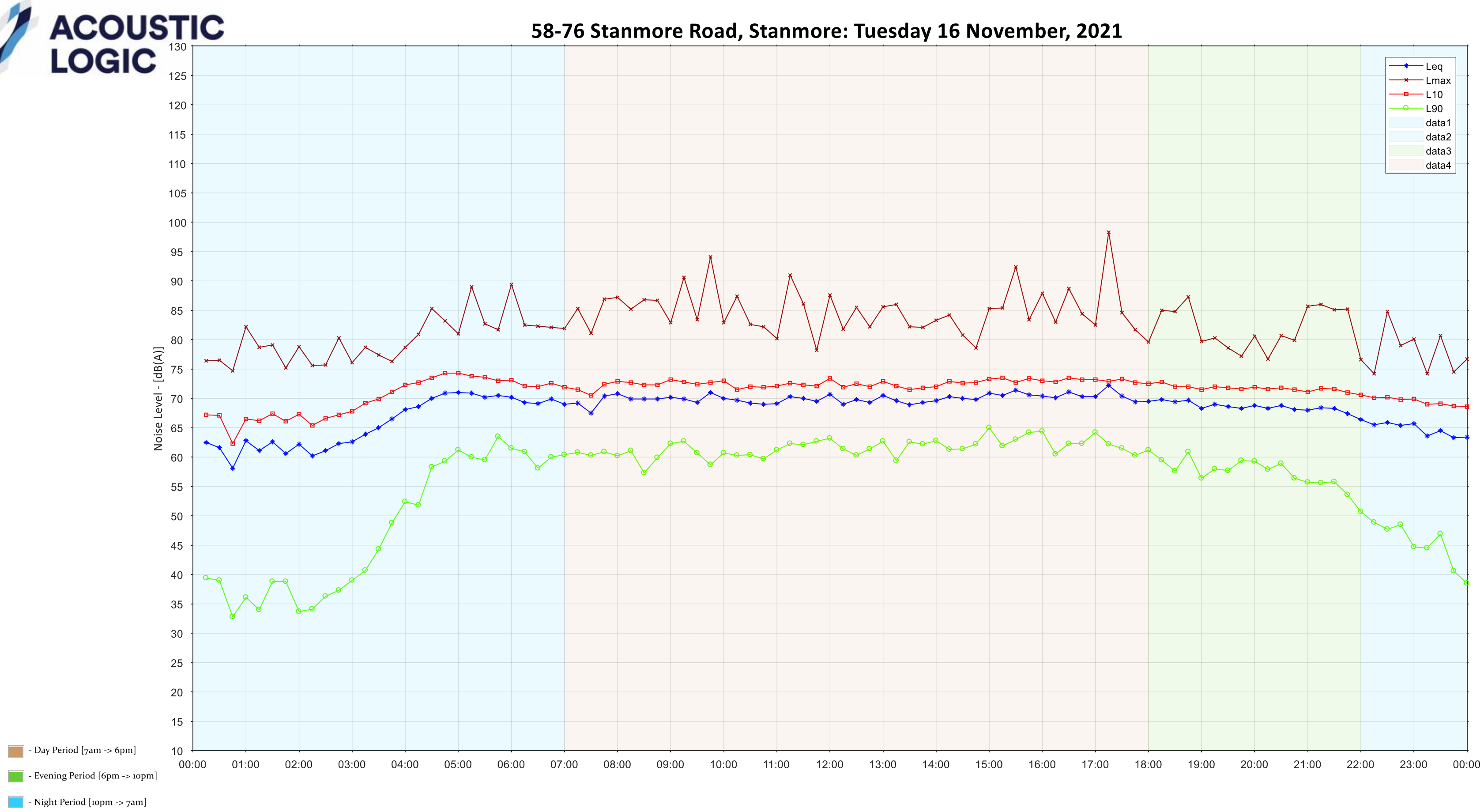
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



58-76 Stanmore Road, Stanmore: Tuesday 16 November, 2021
Noise Level - [dB(A)]
130
125
120
115
110
105
100
95
90
85
80
75
70
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60
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data4
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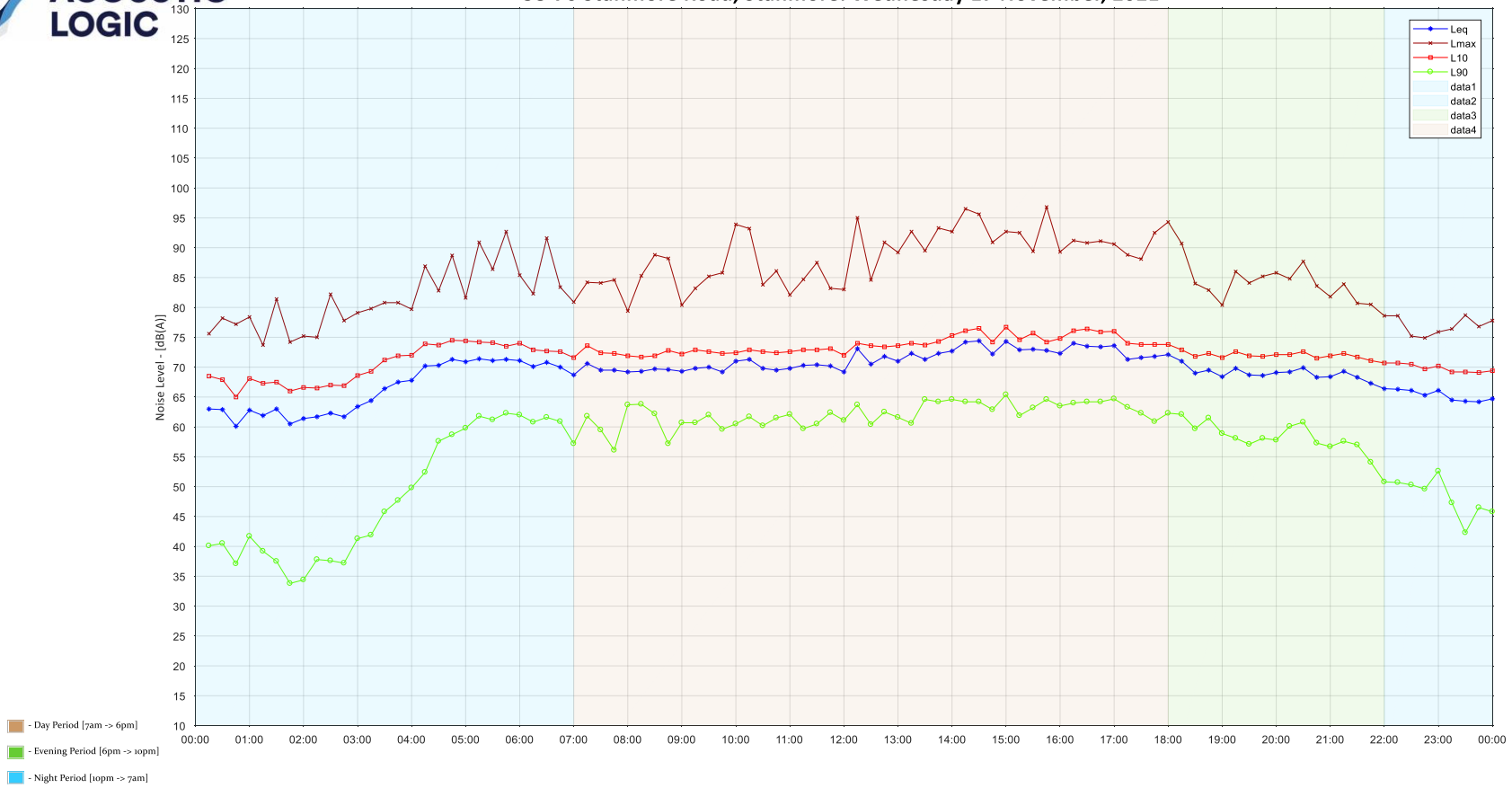
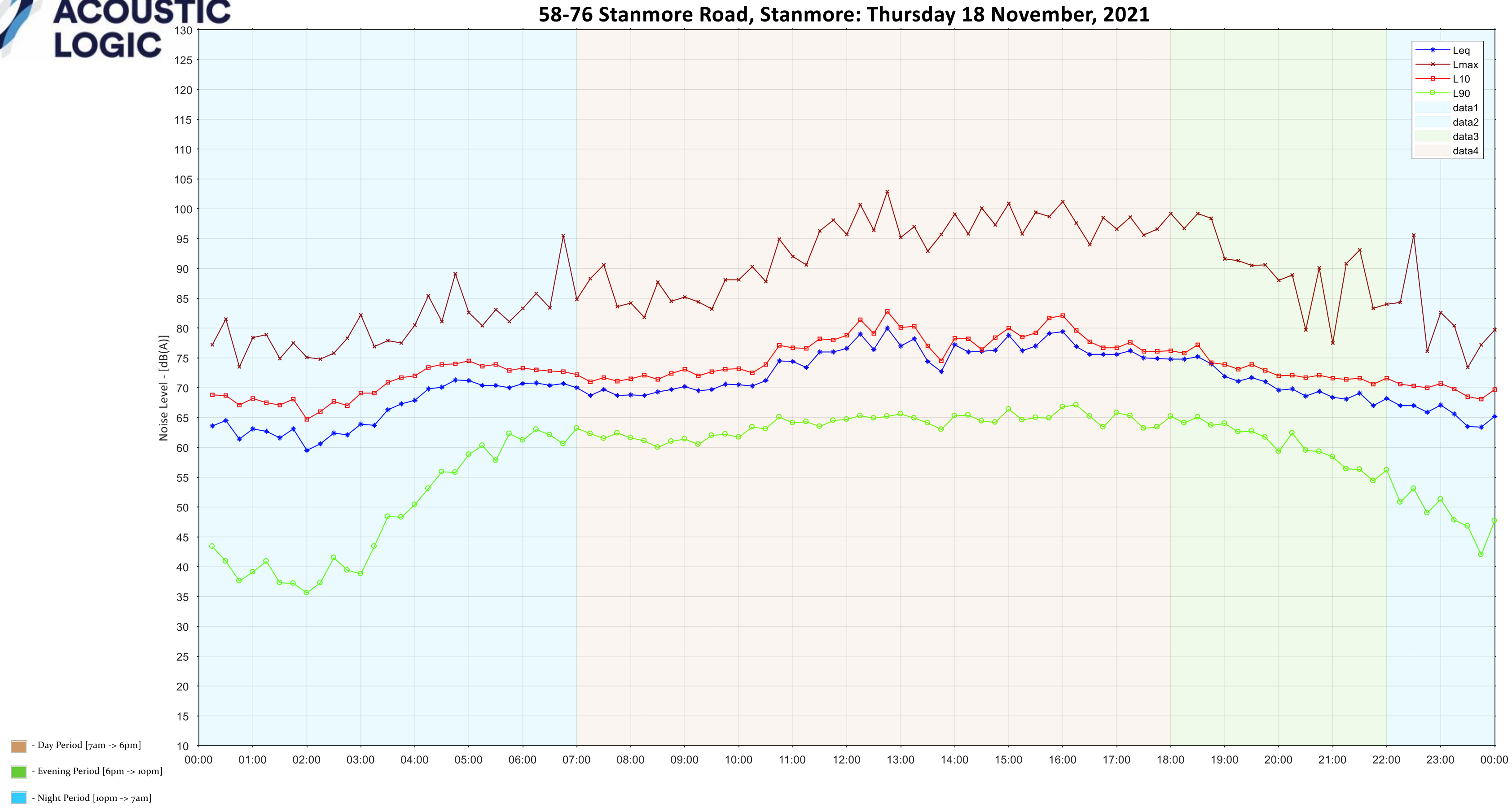
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

58-76 Stanmore Road, Stanmore: Wednesday 17 November, 2021





58-76 Stanmore Road, Stanmore: Thursday 18 November, 2021
Noise Level - [dB(A)]
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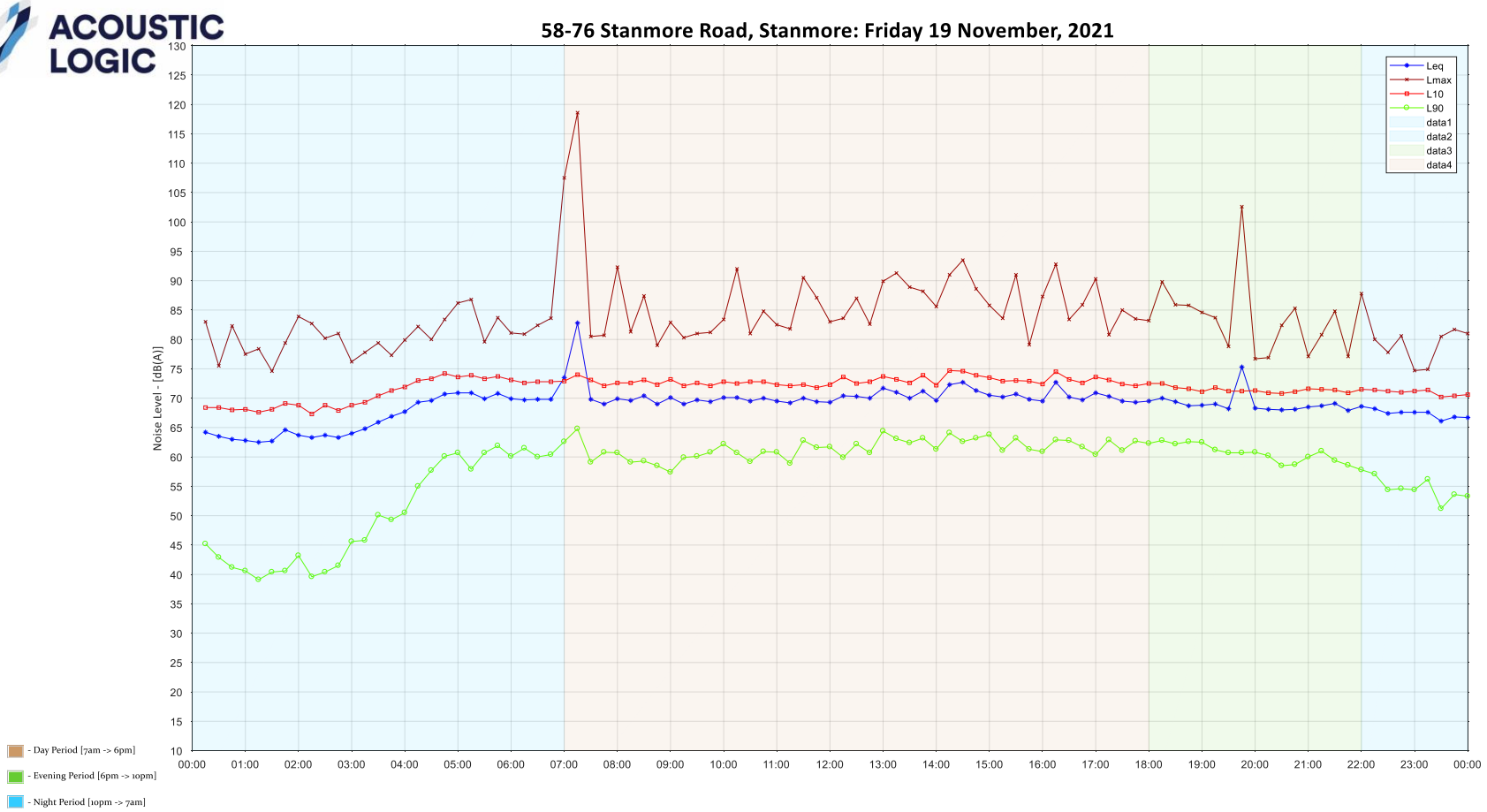
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


58-76 Stanmore Road, Stanmore: Friday 19 November, 2021
Noise Level - [dB(A)]
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Lmax
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data3
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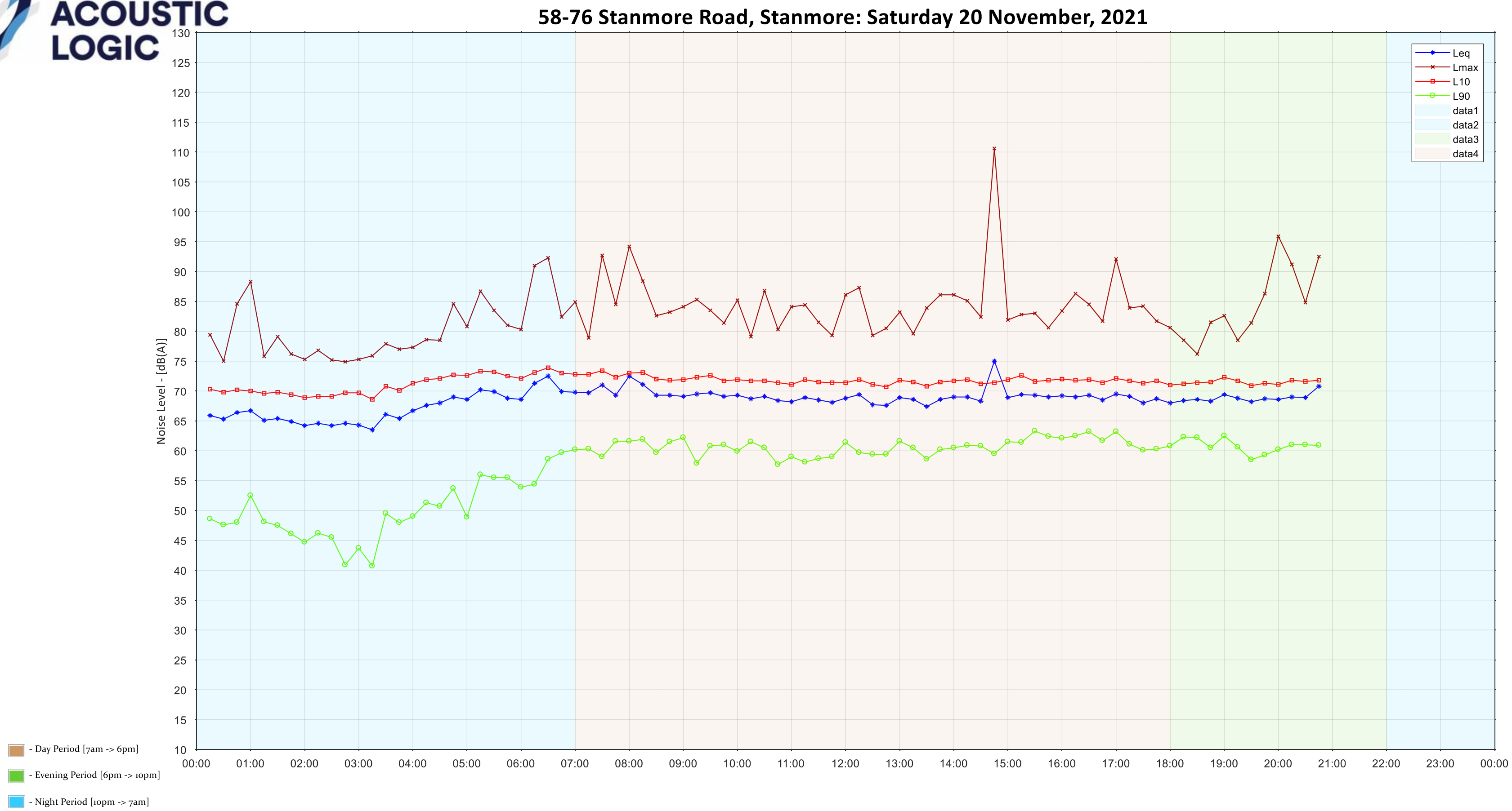
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

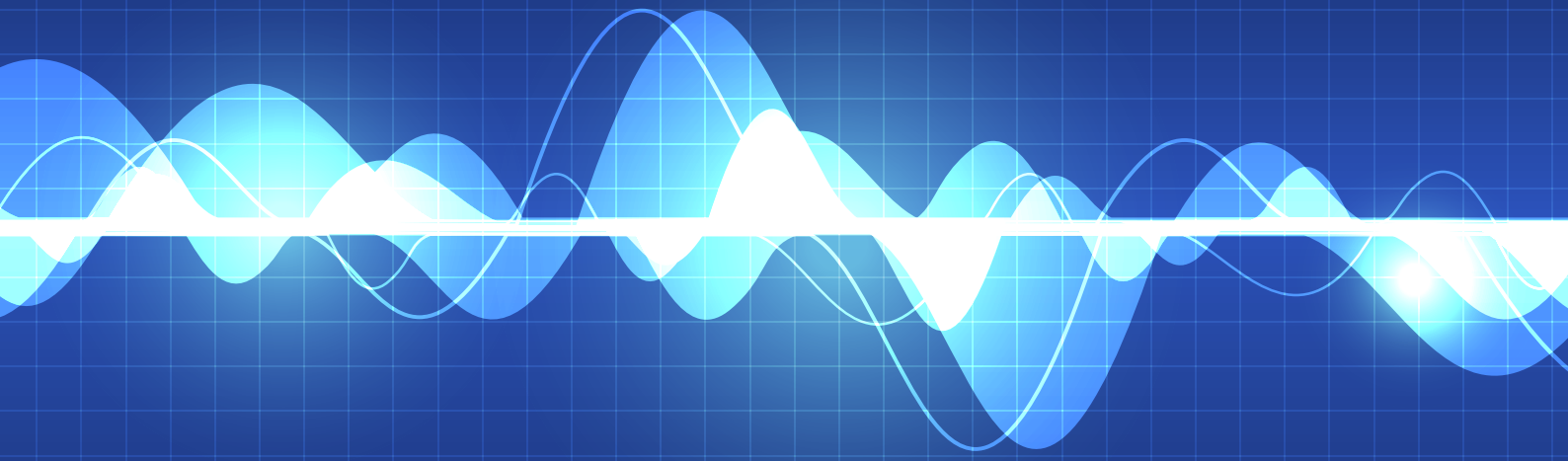

58-76 Stanmore Road, Stanmore: Saturday 20 November, 2021
Noise Level - [dB(A)]
Leq
Lmax
L10
L90
data1
data2
data3
data4
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

APPENDIX TWO – REFERENCED DOCUMENTS

58-76 Stanmore Road, Stanmore

Aircraft noise planning strategy

Prepared for Cyprus Community Club
April 2020



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Southbank VIC 3006
T 03 9993 1905

PERTH
Suite 9.02, Level 9, 109 St Georges Terrace
Perth WA 6000
T 02 9339 3184

CANBERRA
Level 8, 121 Marcus Street
Canberra ACT 2600

58-76 Stanmore Road, Stanmore

Aircraft noise planning strategy

Report Number

B200117 RP#1

Client

Cyprus Community Club

Date

17 April 2020

Version

Final

Prepared by	**Approved by**
	
James Small Associate 17 April 2020	**Najah Ishac** Director 17 April 2020

Table of Contents

Tables

Figures

1 Introduction

EMM Consulting Pty Ltd has been engaged to provide acoustic planning advice in relation to the proposed mixed-use development to be located at 58-76 Stanmore Road, 2-20 Tupper Street and 3-9 Alma Avenue, Stanmore (the site).

The site is exposed to Sydney (Kingsford-Smith) Airport flight operations and is the principal acoustic consideration for possible rezoning and potential redevelopment of the site.

In support of this planning application, this document references the following regulations and standards:

- Environmental Planning and Assessment Act 1979; and
- Australian Standard AS 2021:2015 'Acoustics - Aircraft noise intrusion - Building siting and construction'.

This document addresses potential aircraft noise impacts from Sydney Airport with regard to the acceptability of residential development on the site. The assessment identifies likely aircraft noise levels experienced at the site determined in accordance with AS2021 and Sydney Airport 2039 Master Plan.

It is anticipated that a detailed assessment of aircraft noise will need to be carried out as part of each development application for the site, which would also likely need to address:

- aircraft noise treatments to satisfy AS2021;
- road traffic noise intrusion from Stanmore Road; and
- noise generating land uses part of the future site impacting existing neighbouring land uses and other proposed uses on site.

2 Site background

2.1 Existing site conditions

The site has a combined area of approximately 9,300m^2 and currently accommodates the following uses:

- Cyprus Community Club of NSW;
- six residential dwellings; and
- vacant allotment carparking.

The site is currently zoned RE2 (Private Recreation) and R2 (Low Density Residential) and is generally bordered by R2 and R1 (General Residential) zoning. The site is located within the Inner West Council local government area (LGA).

2.2 Development proposal

The existing allotments will be consolidated and divided into three sites (Sites A-C) separated by two new laneways. Each site will generally encompass the following:

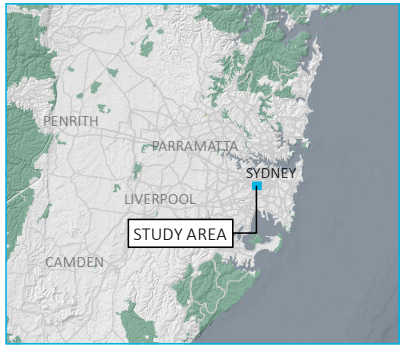
- Site A (adjoining Stanmore Road) – new club facility to replace the existing Cyprus Community Club, commercial premises and two residential flat buildings up to five storeys in height;
- Site B – central allotment – two residential flat buildings up to eight storeys in height; and
- Site C – attached dwellings up to four storeys in height.

2.3 Acoustic impacts

The site is located beneath or close to the main runway flight path for Sydney airport. Existing residences are located on the site and on neighbouring properties in a predominantly residential area.

The southwestern portion of the site falls within the Sydney Airport Australian Noise Exposure Forecast (ANEF) 25-30 contours as detailed in the Sydney Airport Master Plan 2039. The remainder of the site falls within the ANEF 20-25 contour. Refer to Figure 4.1 showing the ANEF zones overlayed on the site.

The main exposure will be aircraft approaches on runway end 16R and departure events on runway end 34L comprising the main north-south runway.



KEY

- Study area
- Rail line
- Major road
- Minor road

INSET KEY

- Main road
- NPWS reserve

T:\Jobs\2020\J200117 - 58-76 Stanmore Road, Stanmore\GIS\02 Maps\G001 SiteLocation 20200406 01.mxd 6/04/2020

Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)

0 100 200 m

GDA 1994 MGA Zone 56

N

Site location

The Cyprus Community Club
58-76 Stanmore Road, Stanmore -
Aircraft noise planning strategy
Figure 2.1

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3 Regulatory context

Residential development rezoning is addressed by Section 117 - Direction 3.5 of the Environmental Planning and Assessment Act 1979, which references AS2021. The objective of this study is to address requirements of AS2021 and to show that there is no difference in noise level for areas of the site which are defined by AS2021 as 'conditionally acceptable' between the ANEF 20-25 contour and areas which are between the ANEF 25-30 contour.

AS2021 states:

> This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2.

The ANR referred to in AS2021 is the aircraft noise reduction (ANR) which is the extent of noise reduction incorporated into the building fabric to mitigate external aircraft noise levels to achieve recommended internal noise levels.

3.1 Australian Standard AS 2021-2015

The fundamental tool used for building site acoustic planning purposes around aerodromes is AS2021. This is the fifth edition in this standard with the original published in 1977 and it replaces the prior edition which was published in 2000. The fundamental principles for land use planning did not change between the 2000 and 2015 versions. AS2021 states:

> The aircraft Noise Exposure Forecast (NEF) technique was first developed in the United States of America in the late 1960s. It was subsequently redefined in Australia in 1982. The NEF system is a scientifically based computational procedure for determining aircraft noise exposure levels around aerodromes. It can be used for assessing average community response to aircraft noise and for land use planning around aerodromes. In the Australian NEF system, noise exposure levels are calculated in Australian Noise Exposure Forecast (ANEF) units, which take into account the following features of aircraft noise:
>
> (a) The intensity, duration, tonal content and spectrum of audible frequencies of the noise of aircraft take offs, approaches to landing, and reverse thrust after landing (for practical reasons, noise generated on the aerodrome from aircraft taxiing and engine running during ground maintenance is not included).
>
> (b) The forecast frequency of aircraft types and movements on the various flight paths, including flight paths used for circuit training.
>
> (c) The average daily distribution of aircraft arrivals and departures in both daytime and night-time (daytime defined as 0700 hours to 1900 hours, and night-time defined as 1900 hours to 0700 hours).
>
> ANEF charts are provided for most aerodromes throughout Australia. The charts are simply plans of the aerodrome and the surrounding localities on which noise exposure contours of 20, 25, 30, 35 and 40 ANEF units have been drawn. These contours indicate land areas around an aerodrome which are exposed to aircraft noise of certain levels as defined by Clause 1.5.6; the higher the ANEF value the greater the noise exposure.
>
> In the areas outside 20 ANEF, noise from sources other than aircraft tends to predominate over aircraft noise, although individual reactions to aircraft noise may differ markedly. Within the area from 20 ANEF to 25 ANEF, aircraft noise exposure starts to emerge as an environmental problem, while above 25 ANEF the noise exposure becomes progressively more severe.

> The land use compatibility recommendations made in this Standard relate to the above ANEF contours.

Other useful context from AS2021-2015 includes:

> Prior to 1982, Australian land use recommendations were essentially similar to the criteria used in the U.S. NEF system. However, with the availability of an Australian dose/response function derived from the NAL social survey, the U.S. criteria were revised to take into account the general reaction of Australian communities to aircraft noise.
>
> In essence, this revision was limited to a firmer definition of the criterion for residential land use compatibility. In the NEF system as originally adopted in Australia, the U.S. criterion of 30 NEF was adhered to, but, in accordance with a recommendation of the House of Representatives Select Committee on Aircraft Noise made in 1970, cautious restraint was urged to be applied by land zoning authorities when applying the system to Australian conditions. Where possible, the 25 NEF contour was used rather than the 30 NEF as a conservative safeguard until the system was validated in Australia.
>
> The NAL Report provided substantial evidence to support the use of 25 ANEF as the appropriate criterion for residential land usage. The 25 ANEF as a residential land usage criterion was recommended in 1985 by the House of Representatives Select Committee on Aircraft Noise, and subsequently adopted as policy by the Commonwealth Government. The only qualification which arises from the findings of the NAL Report is that some people will find that the noise exposure at 25 ANEF is still unacceptable (refer to Figure A1 for the percentage of people affected in the 20 ANEF to 25 ANEF zone). Accordingly, the issuing authorities enter the 20 ANEF contour on all ANEF charts. It is to be stressed, however, that the actual location of the 20 ANEF contour is difficult to define accurately, because of variations in aircraft flight paths, pilot operating techniques, and the effect of meteorological conditions on noise propagation. For that reason, the 20 ANEF contour is shown as a broken line on ANEF charts.

3.1.1 Site acceptability

The Standard considers whether a building site is ‘acceptable’, ‘conditionally acceptable’ or ‘unacceptable’ on acoustic grounds. To do this, an Australian Noise Exposure Forecast (ANEF) noise contour map is needed, which shows the aerodrome’s noise footprint on the surrounding environment. The ANEF map is a function of noise levels from various aircraft that are forecast to use the airport and the number of aircraft movements. The ANEF values are used for land use planning around Airports in Australia. Most councils around the airport adopt this approach, and in the absence of such guidance in local or state policies, advice in AS 2021 is the most authoritative available.

The Australian Standard recommends an initial screening approach to determine the acceptability of a site for nominated land uses. Table 3.1 provides a reproduction of Table 2.1 from AS 2021 and the associated notes that follow the table.

Table 3.1 Building site acceptability based on ANEF zones (AS 2021)

Building Type	ANEF Zone of site		
	Acceptable	Conditionally Acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Notes:
1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.
2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).
3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases, Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.
4. This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.
5. In no case should new development take place in green field sites deemed unacceptable because such development may impact airport operations.

AS 2021 defines the terms in Table 3.1 as follows:

Acceptable

If from Table 2.1, the building site is classified as 'acceptable', there is usually no need for the building construction to provide protection specifically against aircraft noise. However, it should not be inferred that aircraft noise will be unnoticeable in areas outside the ANEF 20 contour. (See Notes 1, 2 and 3 of Table 2.1).

Conditionally acceptable

If from Table 2.1, the building site is classified as 'conditionally acceptable', the maximum aircraft noise levels for the relevant aircraft and the required noise reduction should be determined from the procedure of Clauses 3.1 and 3.2, and the aircraft noise attenuation to be expected from the proposed construction should be determined in accordance with Clause 3.3 (See Notes 1 and 3 of Table 2.1).

If an area is found to be 'conditionally acceptable' this typically means that any proposed buildings could require an improved level of building fabric above standard or light-weight materials to achieve internal noise goals set by AS 2021.

Unacceptable

If, from Table 2.1 the building site is classified as 'unacceptable', construction of the proposed building should not normally be considered. Where in the community interest redevelopment is to occur in such areas, e.g. a hotel in the immediate vicinity of an aerodrome, refer to the notes to Table 2.1.

3.1.2 Requirements for construction

If buildings are constructed in 'conditionally acceptable' areas, AS 2021 sets out required internal noise levels, based on L_{Smax} values from the loudest operating aircraft type.

A procedure is described in AS 2021 for determining the required performance of building elements to meet these levels, but this is not a requirement of the Standard and may be replaced with a more accurate method – measurements to determine external noise levels, and accurate frequency-based calculations to determine resulting internal levels. This methodology would typically be adopted during the detailed assessment of aircraft noise impacts for submission with the development application.

3.1.3 Maximum noise levels

There are areas of the subject site which are located within contours equal to or exceeding ANEF 20 and ANEF 25. As such, it is necessary to quantify the typical L_{Smax} noise level from aircraft as per AS2021 to understand the level of noise reduction required of the fabric of future buildings. The representativeness of noise data should reflect typical events at the aerodrome, which can be ambiguous in some cases, particularly when trying to estimate future operations and associated impacts. For Sydney Airport this is relatively straightforward because of its well-established flight path, movements, runways and aircraft types.

Where a site is 'conditionally acceptable', AS 2021 recommends that buildings be designed to achieve internal noise levels no greater than identified maximum values from aircraft.

Table 3.2 reproduces recommended internal maximum noise levels for various spaces as categorised in AS 2021. These are the L_{Smax} or maximum aircraft overflight noise level inside buildings. The spaces with the most onerous criteria are theatres, cinemas and recording studios, although these are often designed and constructed with highly noise attenuating building elements.

For residential buildings, it is necessary to consider aircraft noise levels of greater than 60 dB(A) L_{Smax} as an external level of 60 dB(A) is typically reduced to 50 dB(A) inside, even with a partially open window or door. This satisfies the strictest residential criterion which applies to sleeping areas and dedicated lounges.

Table 3.2 Indoor design sound levels

Building type and activity	Indoor L_{Smax} Design Sound Level, dB(A)
Houses, home units, flats, caravan parks	
Sleeping areas, dedicated lounges	50
Other habitable spaces	55
Bathroom, toilets, laundries	60
Hotels, motels, hostels	
Relaxing, sleeping	55
Social activities	70
Service activities	75
Commercial buildings, offices and shops	
Private offices conference rooms	55
Drafting, open offices	65
Typing, data processing	70
Shops, supermarkets, showrooms	75

4 Site ANEF exposure

For the purpose of siting suitability, determining planning constraints and identifying noise exposure for the site, EMM has reviewed ANEF contour maps and how they relate to the site. The review has considered the Sydney Airport ANEF 2039 approved in April 2019.

4.1 ANEF 2039

EMM has projected the ANEF 2039 over the site to identify exposure (Figure 4.1) and confirmed a portion of the site fronting Alma Avenue is located within the 25-30 ANEF zone. The extent of exposure comprises an approximate 1,800 m^2 area of land on the site.

Under the strict adoption of the land use procedures outlined in Table 3.1 this defines an area unacceptable for residential development according to AS2021. However, AS2021 notes that a determining authority (eg Council) can choose to approve residential in these zones. Examples of where the former Marrickville Council has done this is discussed later. Such an approach would require treatment to residential buildings according to AS2021. Other uses proposed for the site would be acceptable or conditionally acceptable in this relatively more affected area of the site according to AS2021.

KEY

- Study area
- ANEF 25 contour - Sydney Airport ANEF 2039
- Area of site within ANEF 25-30
- Cadastral boundary

Source: EMM (2020); DFSI (2017); DPE (2019)

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Site and Sydney Airport ANEF 2039

The Cyprus Community Club
58-76 Stanmore Road, Stanmore -
Aircraft noise planning strategy
Figure 4.1

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5 Surrounding development

A review of development applications and approvals on Inner West Council website for the surrounding area has identified numerous developments that have been approved (between 2008-2017) for alterations and additions to existing residential dwellings or the provision of secondary dwelling and small lot subdivision.

Particularly relevant to the subject site is the approved rezoning of a large industrial site identified at 63 Grove Street, St Peters (DA200500749) and a similar site at 23 Addison Road, Marrickville (DA201300025).

5.1 63 Grove Street, St Peters

A web search confirmed that 63 Grove Street was purchased as an industrial site in 2004 with a site area of approximately 7,339m^2. A rezoning application (DA200500749) was submitted to Marrickville Council in 2005 to rezone the land from industrial and subdivide the site to create a 34 lot residential subdivision with construction of two storey dwellings on each lot and was approved on 28/6/2010. A historical review of aerial photography (Google Earth) confirms that site was industrial in 2009. Subsequently the site was cleared, and construction of the residential development and internal roads completed in 2013/14 confirming approval of both the rezoning application and development for residential use.

Considering the timing of the application in 2005, the relevant ANEF to be applied to the development would have likely been ANEF 2023/24. A review of ANEF 2023/24 confirms that more than 90% of the site at 63 Grove Street was located wholly within the 25-30 ANEF zone. The site would be exposed to a L_{ASmax} noise level of 91dB(A) or greater.

This is an example of Council allowing rezoning of industrial land and subsequent development of new residential dwellings within the ANEF 25-30 contour zone.

5.2 23 Addison Road, Marrickville

The 23 Addison Road, Marrickville property was purchased as an industrial site in 2002 and resold again in 2011, with a site area of approximately 2,094m^2. A development application (DA201300025) was submitted to Marrickville Council in 2013 to to demolish the existing improvements and construct a six-storey mixed use development containing a ground floor commercial/retail tenancy and 59 car spaces with residential accommodation above consisting of 21 x 1 bedroom, 33 x 2 bedroom and 6 x 3 bedroom dwellings and widen Fotheringham Street and Stevens Lane. The previous use on the site was industrial. The development was approved on the 13 February 2014 and has since been constructed and is occupied.

Considering the timing of the application in 2013, the relevant ANEF to be applied to the development would have likely been ANEF 2033. A review of ANEF 2033 confirms the entire site is located wholly within the 25-30 ANEF zone. A review of the acoustic report submitted with the application has confirmed a calculated L_{ASmax} noise level for the site of 92dB(A).

This is an example of Council allowing rezoning of industrial land and subsequent development of new residential dwellings within the ANEF 25-30 contour zone.

5.3 Victoria Road precinct (2015)

EMM developed an aircraft noise strategy for the Victoria Road, Marrickville site in 2015, to determine its suitability to accommodate residential land use. The study adopted the noise data contained in AS2021, used to produce grid points across or in the vicinity of the site and assigned a representative aircraft noise level to each. A worst case 90 dB L_{ASmax} noise level was established for the most exposed part of the site, based on the relatively noisier but very infrequent B747-400 aircraft long range departure events (representing approximately 1.5% to 2% of movements on average, and likely reducing in the future). From this, performance requirements for facade, roof/ceiling and glazing were developed to ensure AS2021 internal design goals are achieved. Numerous construction options are provided to satisfy minimum building element sound ratings (Rw), however, internal noise criteria can be achieved using multiple design scenarios.

The findings of the 2015 study demonstrated that current building materials can be reasonably applied to achieve internal noise goals set by AS2021 such that the occupant's amenity is not compromised. The study demonstrated that although the subject site is in an ANEF zone which is susceptible to higher levels of aircraft noise, buildings can be designed to ensure internal levels are insulated appropriately. The noise result internally for potential residences within the 25-30 ANEF zone at the project site, could be the same as that for a site in a 20 to 25 ANEF. The difference being the building fabric requirements.

The findings of the study supported proposed high and medium density residential developments in terms of residential amenity provided the design guidelines, and their objectives, were achieved. We note that meetings with various stakeholders (eg Sydney Airport Corporation Limited representatives) supported the study and ultimately Council adopted the study outcomes via a DCP specific to the precinct. (Marrickville Development Control Plan 2011 - 9.47.15 Schedule 1 – Victoria Road Precinct Aircraft Noise Policy).

6 Site L_{ASmax} noise levels

The position of the 25 ANEF contour with respect to the site does not necessarily influence the L_{ASmax} noise level values for the site determined in accordance with the procedures of AS2021.

To determine the typical maximum L_{ASmax} noise exposure for the site, a grid of prediction points was developed and a worst case prediction of a Boeing 747-400 (long haul) departure and arrival on the main north-south runway (16R/34L) was considered. The aircraft is well documented as the typical representative worst case in terms of noise for Sydney Airport overflight operations.

A summary of the distance coordinates from the main north-south runway (16R/34L) and calculated L_{ASmax} noise levels for take-off and arrival are summarised in Table 6.1 and presented in Figure 6.1. The calculations utilise the centreline distance for landing (DL) and take-off (DT) in addition to the side line distance (DS) as defined in AS2021.

Table 6.1 Site L_{ASmax} noise levels – 747-400 long range

DL (m)	DS (m)	DT (m)	Departure L_{ASmax} dB(A)	Arrival L_{ASmax} dB(A)
3378	326	7250	86	81
3422	356	7294	86	80
3461	384	7333	86	80
3498	410	7370	84	78
3356	351	7228	86	80
3400	380	7272	86	80
3443	410	7315	84	78
3477	432	7349	84	78
3336	374	7208	86	80
3377	407	7249	84	78
3420	438	7292	84	78
3452	464	7324	84	77

Notes: 1. L_{ASmax} noise levels in accordance with AS2021-2015

A review of Table 6.1 confirms that the site is exposed to L_{ASmax} noise levels from departing 747-400 (long range) aircraft of typically 84-86 dB.

The grid noise levels illustrated in Figure 6.1 show that highest L_{ASmax} noise level of 86 dB occurs in areas of the site that are above and below the ANEF 25 contour. As such, the required aircraft noise reduction is the same for a building sited within or outside the ANEF 25 contour at this site.

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Source: EMM (2020); DFSI (2017); DPE (2019)

Site LAsmax noise levels – Boeing 747-400 (long range)

The Cyprus Community Club
58-76 Stanmore Road, Stanmore - Aircraft noise planning strategy
Figure 6.1

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6.1 Aircraft noise reduction (ANR) requirements

AS2021 provides the methodology adopted for calculating the aircraft noise reduction (ANR) values for building elements potentially constructed at the site.

The spectral component of aircraft noise is important in the determination of ANR for each building element, particularly when an ANR of 30 or more is required. This analysis would be undertaken as part of the detailed review of aircraft noise which would be submitted with the development application.

The overall ANR of a building is simply the external aircraft noise level (eg up to 86 dB(A) in this case) less the AS2021 internal noise goal (eg 50 dB(A) for sleep areas and dedicated lounges). A maximum ANR of 36 dB(A) is applicable to the subject site.

The aircraft noise attenuation required of each component is determined using the spectral characteristics of the aircraft flyover, the area and the acoustic transmission loss of the building element and acoustic absorption of the receiver room.

Acoustic treatments to mitigate aircraft noise intrusion will typically include a combination of the following:

- acoustically rated glazing assemblies;
- masonry or concrete construction;
- upgraded light weight façade constructions; and
- acoustic treatment to mechanical exhaust or intake grilles in the façade.

Where windows are required to be closed to achieve internal noise requirements, as is the case with the proposal, alternative sources of ventilation may be required in accordance with Section 3.3 of AS2021.

7 Additional discussion

7.1 Sydney Airport Masterplan

Sydney Airport Master Plan 2039 assists in understanding the future operations and related changes in impacts from aircraft noise.

At Section 15.6.1, page 231, the plan states:

> "..airline fleet renewal and modernisation programs continue, in many cases, to progressively introduce into service new generation, quieter aircraft (for example the Boeing B787, B737Max, Airbus A350, A320neo) in place of ageing, noisier aircraft (like the Boeing B747, B767 and Airbus A340) which are being retired.
>
> It is acknowledged that, despite the noise emitted by individual aircraft having decreased over time, the frequency of such flights has grown."

Further, at Section 6.3, page 54, the plan states:

> "We anticipate that the aviation industry's shift towards larger, quieter and more fuel efficient next generation aircraft will continue, and passenger numbers will continue to grow at a faster rate than aircraft movements. This has positive outcomes for noise and environmental impacts"

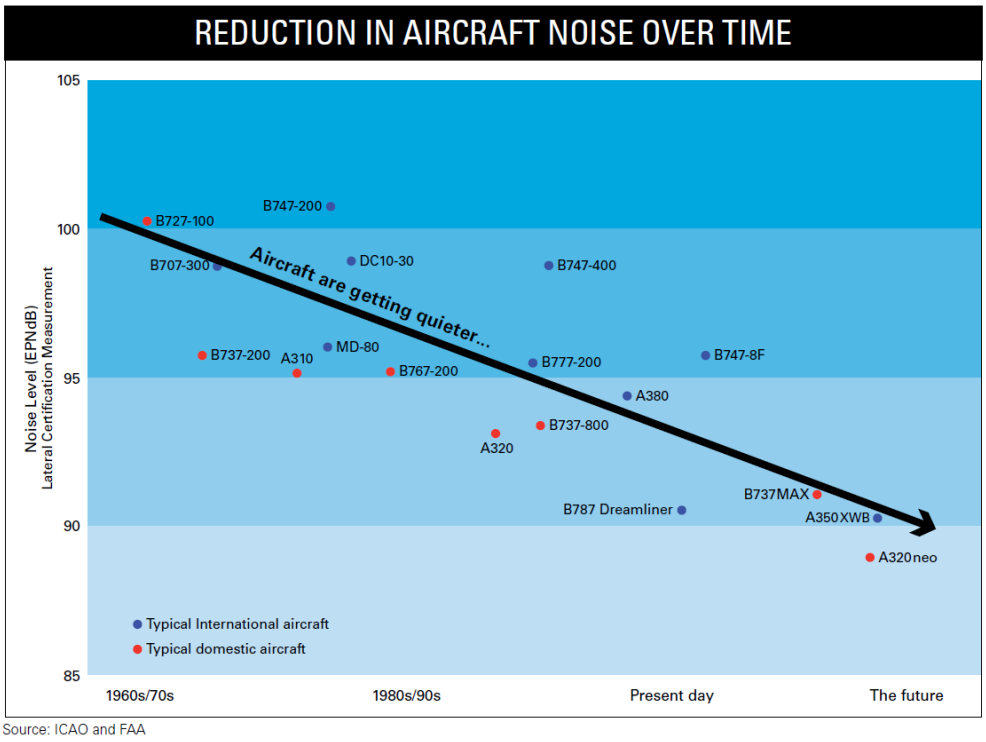
The 2039 Master Plan considers the International Civil Aviation Organisation's (ICAO) 'Balanced Approach' which utilises four pillars when managing aircraft noise. Figure 15-3 of the 2039 Master Plan illustrates aircraft noise management using these pillars (reproduced in Figure 7.1).

Source: Sydney Airport Master Plan 2039 (2019)

Figure 7.1 ICAO 'Balanced Approach'

Pillar 1 refers to aircraft noise at the source and relies on progressive implementation of aircraft noise certification standards. Aircraft which do not adhere to current standards, Chapter 14, are to be phased out as of 2020 in favour of larger wide body and quieter aircraft.

The former Sydney Airport Master Plan 2033 provides useful information in illustrating the progressive reduction in aircraft noise level. Figure 14.2 of the 2033 Master Plan depicts how improved technology has historically resulted in quieter aircraft (reproduced as Figure 7.2)



Source: Former Sydney Airport Master Plan 2039 (2014)

Figure 7.2 Reduction in aircraft noise over time

At page 182, the previous 2033 Master Plan states:

> In 2008, Airservices Australia released a report showing that an Airbus A380 departing from or arriving at Sydney Airport is between 2.1 and 6.7 decibels quieter than the 747-400, the older aircraft type it typically replaces.
>
> Airservices Australia indicates in its report that “a three decibel reduction is regarded as a halving of an aircraft’s noise energy".

Refer to Figure 7.3 demonstrating the above via actual measured noise reductions from comparable aircraft, as reported in the Master Plan at Table 14.6. The A380 has a smaller noise footprint on take-off and landing and hence reduces the impact of aircraft on the community. The reductions in L_{ASmax} noise are significant both in terms of occupant experience and implementation of noise controls for buildings.

Location of NMT	Aircraft type	Arriving or departing	Average LA max [dB(A)]	Reduction in decibels	Reduction in noise energy
Sydenham	A380	Departing	87.7	- 4.4	- 64%
	B747-400	Departing	92.1		
	A380	Arriving	93.9	- 2.6	- 45%
	B747-400	Arriving	96.5		
Leichhardt	A380	Departing	81.7	- 3.9	- 59%
	B747-400	Departing	85.6		
	A380	Arriving	84.4	- 2.1	- 38%
	B747-400	Arriving	86.5		
Annandale	A380	Departing	71.5	- 5.5	- 72%
	B747-400	Departing	77.0		
St Peters	A380	Departing	73.6	- 6.7	- 79%
	B747-400	Departing	80.3		
Croydon	A380	Departing	76.7	- 2.3	- 41%
	B747-400	Departing	79.0		

Source: Airservices Australia

Source: Former Sydney Airport Master Plan 2033 (2014)

Figure 7.3 Noise monitoring around Sydney Airport

In summary, the long-term expectations are reductions in aircraft noise levels from overflight events.

8 Summary

EMM has completed a review of potential noise constraints for the site, primarily focused on aircraft noise exposure utilising the ANEF 2039 and L_{ASmax} noise levels for the site in accordance with AS2021. This was done to determine the suitability to accommodate residential use within the site. The advice has also considered Sydney Airport Master Plan 2039 and a review of development consents for similar rezoning applications in the vicinity of the site.

AS2021 defines the site as acceptable or conditionally acceptable for non-residential uses. For residential land uses, areas of the site are conditionally acceptable while others are categorised as unacceptable. However, AS2021 does state that where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2 of AS2021.

The calculation of L_{ASmax} noise exposure for the site demonstrates that notwithstanding the location of the site with respect to the 25 ANEF contour, actual L_{ASmax} noise levels calculated in accordance with the procedures of AS2021 would be consistent for areas above and below the ANEF 25 contour. The calculations confirmed that the site is exposed to L_{ASmax} noise levels in order of 84-86dB(A). It was identified that approved development in the Inner West Council and specifically within the former Marrickville Council area are similarly located in ANEF25 or greater areas and exposed to L_{ASmax} noise levels of 91dB(A) or higher.

A review of development applications and approvals in the vicinity of the site confirmed that a number of alterations and additions to existing residential dwellings, secondary residential dwellings and small lot residential subdivisions were approved on the edge of the 25 ANEF contour or within the 25-30 ANEF zone. Sites identified as 63 Grove Street, St Peters and 23 Addison Road, Marrickville are of particular relevance as they were sites with a rezoning and development application for residential development and subsequently approved and constructed.

The above developments were rezoned, approved and subsequently constructed for residential use. Both of these sites contained a greater or whole portion of their respective areas within the 25-30 ANEF contours and exposed to L_{ASmax} noise levels 5-6dB higher than what would be experienced at the subject development site.

The study for the Victoria Road Precinct developed an aircraft noise strategy for areas within the ANEF 25-30 and ANEF 30-35 zones which has since been adopted by Council and incorporated into Marrickville Development Control Plan 2011 - 9.47.15 Schedule 1 – Victoria Road Precinct Aircraft Noise Policy.

Based on the review of the information and details discussed in this report, it is shown that notwithstanding that a portion of the site is located within the 25-30 ANEF zone, residential and non-residential buildings could be designed and constructed to satisfy the internal design levels of AS2021. This approach is consistent with the Victoria Road Precinct Aircraft Noise Policy, approved developments outlined at 63 Grove Street, St Peters and 23 Addison Road, Marrickville. It is further noted that the noise level of aircraft within the ANEF 25-30 zone at the site would be no greater than that for areas within the ANEF 20-25 zone.

We trust the above is satisfactory and if you require anything further please contact our office.

25 September 2020

Kris Walsh
Manager, Eastern and South District
NSW Department of Planning, Industry and Environment
Via email: Kris.Walsh@planning.nsw.gov.au

Dear Kris,

Re: Cyprus Club at 58-76 Stanmore Road, 2-20 Tupper Street, 3-9 Alma Avenue, Stanmore

Council has received an Aircraft Noise Planning Strategy for the Cyprus Club Planning Proposal at 58-76 Stanmore Road, 2-20 Tupper Street, 3-9 Alma Avenue, Stanmore.

The ANEF 2039 (replacing ANEF 2033) changed ANEF 25-30 contour coverage for the site from approximately 328m^2 to approximately 1,800m^2 in the south west corner of the site at Alma Avenue. The remainder of the site falls within the ANEF 20-25 contour.

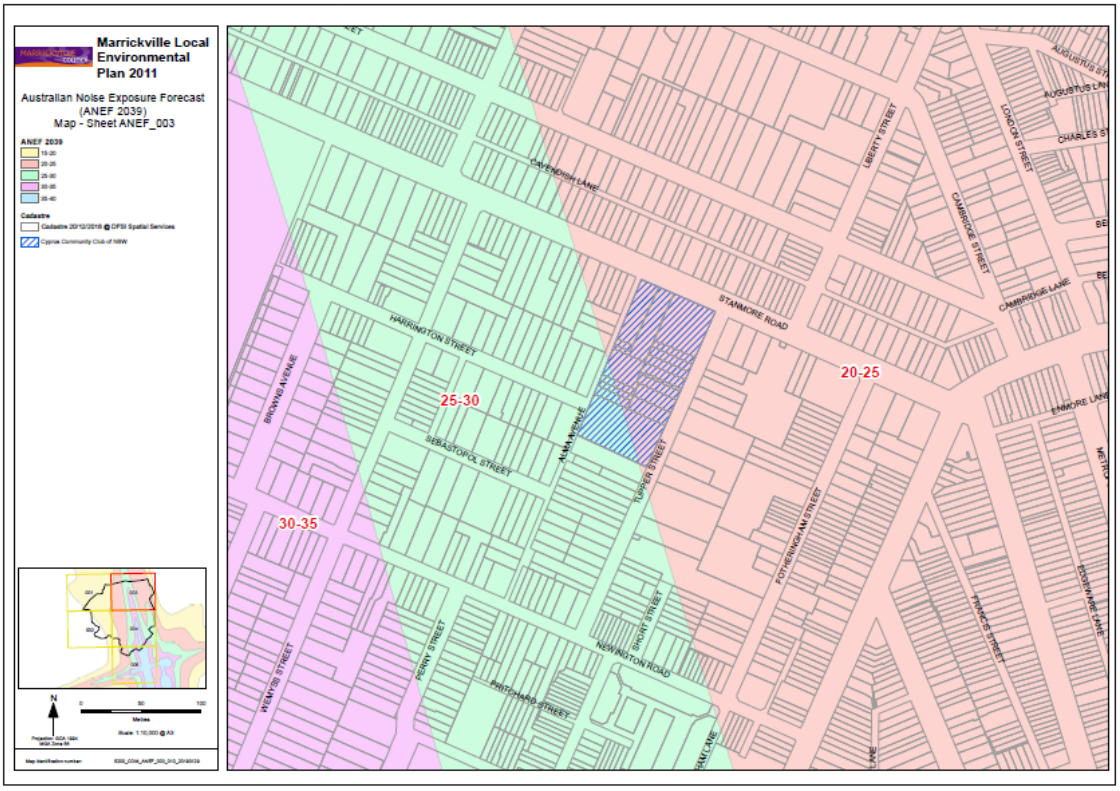


Figure 1: Shows in green shading enlarged triangular part of site (approx. doubled in size) affected by changed ANEF 25-30 contour in Sept 2018

Ministerial Direction 3.5 Development Near Regulated Airports and Defence Airfields applies to the Planning Proposal as it seeks to rezone land and allow for an increase in residential density within the ANEF 20-25 and ANEF 25-30 contours.

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An Aircraft Noise Planning Strategy has been prepared by consultants EMM. The Strategy demonstrates that residential and non-residential buildings in the 25-30 ANEF zone can be designed and constructed to satisfy the internal design noise levels of AS2021- 2015.

The following measures will be used to mitigate aircraft noise intrusion in the proposed development:

- Acoustically rated glazing assemblies;
- Masonry or concrete construction;
- Insulation
- Upgraded light weight façade constructions; and
- Acoustic treatment to mechanical exhaust or intake grilles in the façade.

This approach was deployed for the Precinct 75, St Peters under Marrickville Local Environmental Plan 2011 (MLEP 2011) amendment 18 made by Department of Planning Industry and Environment (DPIE) in June 2020. These design solutions can reduce internal acoustic noise levels to less than 50 dB in bedrooms and less than 55 dB in living spaces.

The Aircraft Noise Planning Strategy found that the aircraft noise within the ANEF 25-30 zone at the site would be no greater than that for areas within the ANEF 20-25 zone. The strategy found that the highest dB noise level (86 dB) could occur in parts of the site that are both above and below the 25 ANEF. It recommends that residential development below the 25 ANEF contour should also adopt these noise reduction measures.

The Sydney Airport Masterplan 2039 indicates that future aircraft will be quieter, able to carry more people and more fuel efficient. This factor will also lessen noise impacts on residential development on this site.

A site-specific Marrickville Development Control Plan 2011 will incorporate these measures in a similar way to the Victoria Road Precinct DCP, which had to address the same issue.

The planning proposal is now supported by a strategy which considers Ministerial Direction 3.5 Development Near Regulated Airports and Defence Airfields and demonstrates that acceptable internal noise levels can be achieved throughout the proposed development site. Council recommends that DPIE accepts this approach in its consideration of the Gateway Submission. If you have any queries, please contact Alex Kresovic on 9392 5689 or Aleksandar.kresovic@innerwest.nsw.gov.au.

Yours faithfully,

Daniel East

Acting Strategic Planning Manager