

•)) Acoustic Assessment

Manly Lodge Mixed-Use Development

22 Victoria Parade, Manly

Prepared for Morson Group Report Reference: 19SYA0042 R01_0



ttm

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For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

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Executive Summary

TTM Consulting conducted an acoustic assessment for the proposed Manly Lodge mixed-use development at 22 Victoria Parade, Manly for Morson Group.

Noise monitoring of existing ambient and road traffic noise levels was conducted as part of a previous study in the area to understand the existing acoustic environment at the site.

Noise impact levels of the proposed development onto the local community, such as the noise from the outdoor rooftop communal areas and mechanical plant noise, were assessed. Additional road traffic noise impact generated by the proposed development was also assessed.

The development is predicted to comply with Manly Development Control Plan (DCP) 2013 and relevant standards and guidelines with the implementation of a noise management plan for the use of the rooftop communal area. A detailed acoustic assessment of mechanical plant and the acoustic louvres during detailed design stage is also recommended.

This report demonstrates that the proposed development is feasible and reasonable, whilst keeping an appropriate acoustic amenity and controlled noise impact to the local community.



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1 Introduction

TTM was engaged by Morson Group to undertake an acoustic assessment of the proposed Manly Lodge mixed-use development at 22 Victoria Parade, Manly. The assessment addresses the potential impact of the development on the local community. This report will form part of the development application for consideration by Northern Beaches Council.

The assessment is based on the following:

- Manly Development Control Plan (DCP) 2013
- Noise Survey previously conducted by TTM Consulting (Report Ref.: 15SYA0024 R01_2, Revision 2, dated 29/6/2015)
- NSW Noise Policy for Industry 2017¹
- Architectural plans by Morson Group, Issue P1, issued on 14/10/2019, as presented in Appendix A.

¹ NSW Environment Protection Authority (2017), Noise Policy for Industry



2 Site Description

The subject site is located at 22 Victoria Parade, Manly in a typical suburban area within a residential area, although in close proximity to commercial premises. The site is currently occupied by a two-storey building being used for retail / café and residential purposes.

The site fronts Victoria Parade to the north-west and is bounded by existing multi-storey residential building to the north-east and south. Across Victoria Parade to the site the Manly Village Public School.

An aerial image of the site locality is shown in Figure 1.

Figure 1: Site Locality





2.1 Noise Sensitive Receivers

The closest existing noise sensitive receivers (NSRs) to the proposed development are the residential properties surrounding the site, as shown in Figure 2, and are as follows:

- R1 North-east of site: Residential property at 28-32 Victoria Parade
- R2 South-east of site: Residential property at 17-21 Ashburner Street
- R3 North-west of site: Residential property at 18-20 Victoria Parade

Potential noise from the development may be audible at properties located further away from the site compared to the identified NSRs above. However, any noise mitigation and management measures implemented to achieve compliance at the identified NSRs ensure that compliance is also achieved at properties located further away, due to increased distance attenuation.

Figure 2: Noise Sensitive Receivers





3 Proposed Development

The proposed development involves the demolition of the existing structure at the site and the construction of a new five-storey mixed-use building comprising of the following:

- Basement Level:
 - Car parking and storage areas.
- Ground floor:
 - Retail space at the front facing Victoria Parade,
 - Restaurant Seating area,
 - Six one-bed rooms.
- Level 1, Level 2, Level 3:
 - 41 one-bed rooms across three floors.
- Level 4 & Rooftop recreational facilities:
 - Two penthouse suites,
 - Communal rooftop lounge and spa areas.



4 Noise Survey

TTM previously conducted a site inspection and a noise survey at the site between the 11th and 19th June 2015, as part of previous acoustic study by TTM Consulting (Report Ref.: 15SYA0024 R01_2, Revision 2, dated 29/6/2015). Since this acoustic study, no major developments that may impact the existing acoustic environment of the site and its surroundings have been observed. Therefore, the results of this previous acoustic study have been determined to be valid and relevant for assessment purposes of the proposed development.

All equipment used for noise monitoring purpose were NATA calibrated and noise levels were captured generally in accordance with the recommendations of Australian Standard AS 1055².

The noise monitoring location is shown in Figure 3.



Figure 3: Noise Monitoring Location

² AS 1055:2018. Acoustics - Description and measurement of environmental noise



4.1 Survey Results

Table 1 presents the statistical noise levels measured from the previous acoustic study. The daily noise monitoring results are represented graphically in Appendix B. The monitoring results are used to derive the environmental noise targets applicable to the proposed development.

Table 1: Noise Monitoring Results – Ambient Noise Descriptors

Pariod	Existing Noise Levels in dB(A)					
Fellou	Rating Background Noise Levels, RBL L90	L _{eq}				
Day	47	56				
Evening	44	53				
Night	38	48				
Note:						

- Evening period is from 1800 to 2200

- Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800 (Sundays and Public Holidays)



5 Noise Criteria

The main guidelines, standards and other policy documents relevant to the assessment contained in this acoustic report include:

- Manly Development Control Plan (DCP) 2013
- NSW Noise Policy for Industry 2017.

5.1 Manly DCP 2013

The Manly DCP 2013 provides general recommendations and guidelines to ensure the acoustic amenity of the local community and adequate acoustic privacy for occupants and neighbours are preserved. Recommendations generally include:

- Section 3.4.2.4 of the DCP states:
 - a. Consideration must be given to the protection of acoustical privacy in the design and management of development.
 - b. Proposed development and activities likely to generate noise including certain outdoor living areas like communal areas in Boarding Houses, outdoor open space, driveways, plant equipment including pool pumps and the like should be located in a manner which considers the acoustical privacy of neighbours including neighbouring bedrooms and living areas.
 - c. Council may require a report to be prepared by a Noise Consultant that would assess likely noise and vibration impacts and may include noise and vibration mitigation strategies and measures.
- Section 3.9.3 of the DCP indicates the following requirements in relation to mechanical plant noise:
 - External mechanical plant systems (for pools, air conditioning and the like) must be acoustically enclosed and located centrally and away from neighbours living areas of neighbouring properties and side and rear boundaries.

5.2 NSW Noise Policy for Industry 2017

For the impact assessment, reference has been made to the NSW Noise Policy for Industry 2017 to protect the acoustic amenity of the community. The policy sets out the procedure to determine the project noise trigger levels relevant to assess noise from mechanical plant and equipment, and other industrial noise sources. The project noise trigger level applies to existing noise-sensitive receivers.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response, for example, further investigation of mitigation measures.



The project noise trigger level is the lower (that is, the more stringent) value of the project intrusiveness noise level and project amenity noise level as specified in Sections 2.3 and 2.4 of the policy.

5.2.1 Project Intrusiveness Noise Level

The Noise Policy for Industry states:

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

The intrusiveness noise level is determined as follows:

L_{Aeq, 15min} ≤ Rating Background Noise Level + 5 dB

5.2.2 Amenity Noise Levels and Project Amenity Noise Levels

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 of the Noise Policy for Industry where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance. The noise amenity area is defined as suburban residential. The relevant noise amenity levels are given in Table 2.

Table 2: Amenity Noise Levels

Noise Amenity Area of Receiver	Assessment Period	Recommended Amenity Noise Level, L _{eq} dB(A)
	Day	55
Residential Suburban	Evening	45
	Night	40

Note:

- Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays)

- Evening period is from 1800 to 2200

- Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800h (Sundays and Public Holidays)

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level for industrial developments = Recommended amenity noise level minus 5 dB(A)

For this project, the following exception to the above method to derive the project amenity noise level apply:



• Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.

For the subject area, based on the existing land uses and surrounding noise sources, it is unlikely that existing industrial noise levels will decrease in the future. The project amenity noise levels are derived in Table 3 based on the above exception.

Assessment Period	Resultant Project Amenity Noise Level L _{eq} dB(A)	Existing Industrial Noise Level (Difference with Resultant Project Amenity Noise Level) L _{eq} dB(A)	Existing Industrial Noise Level minus 10 dB(A) L _{eq} dB(A)	Project Amenity Noise Level L _{eq} dB(A)		
Day	50	56 (+6 dB)	N/A	50		
Evening	40	53 (+13 dB)	43	43		
Night	35	48 (+13 dB) 38		38		
Note: - Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays) - Evening period is from 1800 to 2200 - Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800h (Sundays and Public Holidays)						

Table 3: Derivation of Project Amenity Noise Level

5.2.3 Project Noise Trigger Level

The project noise trigger level (PNTL) has been determined in Table 4.

Table 4: NSW Noise Policy for Industry Evaluated Criteria

Assessment Period	Project Intrusiveness Noise Level L _{eq,15min} dB(A)	Project Amenity Noise Level L _{eq,15min} dB(A)	Project Noise Trigger Level L _{eq,15min} dB(A)			
Day 52		50	50			
Evening	49	43	43			
Night 43		38	38			
Note: - Day-time period is from 0700 to 1800 (Monday to Saturday) and 0800 to 1800 (Sundays and Public Holidays) - Evening period is from 1800 to 2200 - Night-time period is from 2200 to 0700 (Monday to Saturday) and 2200 to 0800h (Sundays and Public Holidays)						

Table 4 shows that the project amenity noise level is more stringent than the project intrusiveness noise level for all assessment periods and therefore, make the PNTLs for this assessment.



6 Noise Assessment

This section of the report addresses impact from new noise sources introduced by the development onto the local community.

The following new sources are expected to be introduced:

- 1. Mechanical plant noise.
- 2. Patron noise from rooftop communal areas.
- 3. Additional road traffic noise generated from the development.

6.1 Mechanical Plant Noise

Mechanical plant and equipment are proposed on the ground floor level, on the north-eastern side of the building facing noise sensitive receiver, R1, as shown in Figure 4.



Figure 4: Location of Mechanical Plant



Future mechanical plant may have an adverse effect onto nearby existing noise sensitive receivers and is required to meet the PNTL derived in this report from the NSW Noise Policy for Industry 2017. The most stringent PNTL is during the night-time period for residential premises at **38 dB(A)** L_{eq} (Refer Table 4), and is required to be met at the boundary of R1.

Acoustic louvres are also proposed to mitigate the noise impact of future mechanical plant. Acoustic louvres typically provide an additional noise reduction of 10-15dB. The performance of the acoustic louvres is required to be reviewed during detailed design stage by a suitably qualified acoustic consultant once selections are made.

Based on the location of mechanical plant relative to R1 and considering the additional noise reduction from the acoustic louvres, the noise limit of each mechanical plant must achieve **66 dB(A)** L_{eq} measured at one metre from the plant to achieve compliance.

6.2 Rooftop Communal Areas

A rooftop communal area is proposed on Level 4 of the development. The area is located in proximity to existing residential properties.

The communal roof terrace will generally be used for barbeques and outdoor gatherings. Noise generated from the use of the rooftop communal area may cause an adverse impact on the neighbouring noise sensitive receivers.

Manly Lodge management will brief guests upon arrival on the adequate use of the rooftop communal area to specifically ensure any adverse impact to the acoustic amenity of the local community is minimised. The following measures are recommended to be implemented:

- Restrict use of terrace to the day-time and evening assessment periods only, which is from 7am to 10pm, or 8am to 10pm on Sundays and public holidays.
- Display signs to ensure noise is kept to a minimum after 10pm.
- Position outdoor speakers away from any windows of the adjacent properties.

Implementation of noise control treatments such as acoustic balustrades or partial roofs will also provide additional noise mitigation.

However, with the implementation of management measures to monitor the use of the rooftop communal area, its use is not expected to cause any significant impact onto nearby noise sensitive receivers.

6.3 Road Traffic Generated by Development

A maximum of five trips in the morning or evening peak hour traffic is expected to be generated by the proposed development.

Traffic generated is expected to be insignificant on Victoria Parade and is not expected to cause any significant increase in road traffic noise impact to other developments during peak hour.



7 TTM Recommendations

Based on the results of the acoustic assessment, recommendations have been made to ensure compliance with the relevant noise criteria is achieved.

7.1 Mechanical Plant Noise

Plant may need to be acoustically treated to prevent noise emissions from adversely impacting NSRs. This may include selecting the quietest plant possible, or treating the plant and equipment with enclosures, acoustic louvres, barriers, duct lining and silencers, etc.

A detailed mechanical plant noise assessment should be conducted by a suitably qualified acoustic consultant once plant selections are made. The noise assessment should include noise source levels of plant, location, adjustments for mechanical plant noise characteristics and application of practical and effective noise control to verify compliance with the relevant noise criteria derived in this report.

The effectiveness and performance of the acoustic louvres should also be reviewed and investigated to ensure compliance with the relevant noise criteria.

7.2 Rooftop Communal Areas

The rooftop area is not expected to cause any significant impact onto nearby noise sensitive receivers. The area is expected to be used for social outdoor gatherings generally in the day-time or evening assessment periods only by the Manly lodge guests.

It is recommended to implement a noise management plan to manage the rooftop area. The noise management plan will be used as a formal document to brief all guests upon arrival on the appropriate use of the rooftop area.

The noise management plan is also recommended to be reviewed regularly to include any feedback from local community, if any.



8 Conclusion

Following a noise assessment conducted by TTM for Morson Group specifically for the proposed Manly Lodge mixed-use development at 22 Victoria Parade, Manly, TTM concludes the following:

- The noise emissions of individual mechanical plant, including corrections for tonal and impulsive noise characteristics, must not exceed 66 dB(A) measured at one metre from the source.
- A detailed noise assessment of the mechanical plant during the detailed design stage is recommended. The noise assessment should include noise source levels of plant, location, adjustments for plant noise characteristics, the cumulative noise effect of all plant noise, and practical effective noise control where required to verify compliance with the criteria.
- The effectiveness and performance of the acoustic louvres should be reviewed and investigated to ensure compliance with the relevant noise criteria as part of the detailed mechanical plant noise assessment.
- The rooftop communal area is to be suitable for recreational use by the guests, with the implementation a noise management plan.
- The noise management plan is recommended to be reviewed on a regular basis.
- Noise from additional road traffic generated from the development is predicted to be insignificant.

The assessment and recommendations contained in this report demonstrate the development is feasible and reasonable, whilst keeping an appropriate acoustic amenity and controlled noise impact to the local community.



Appendix A Relevant Development Plans























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Appendix B Noise Monitoring Graphs























Appendix C Glossary



In this acoustic report unless the context of the subject matter otherwise indicates or requires, a term has the following meaning:

TERM	DEFINITION
ABL	The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night-time (for each day). It is determined by calculating the 10^{th} percentile (lowest 10^{th} percent) background level (L _{A90}) for each period.
Adverse Weather	Weather effects that increases noise (i.e. wind and temperature inversion) that occurs at a site for a significant period of time (i.e. wind occurring more than 30% of the time in any assessment period in any season and / or temperature inversion occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources both near and far.
Assessment Period	The period in a day over which assessments are made: day (0700 to 1800h), evening (1800 to 2200h) or night (2200 to 0700h) or actual operating period if only a part of a period(s).
A – Weighting Filter	A-weighting is the most commonly used of a family of curves defined in the International standard IEC 61672:2003 and various national standards relating to the measurement of sound pressure level. A-weighting is applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is excluded. Usually described using the L90 measurement parameter.
C – Weighting Filter	The C-weighting approximates the sensitivity of human hearing at industrial noise levels (above about 85 dB(A)). The C-weighted sound level (i.e., measured with the C-weighting) is more sensitive to sounds at low frequencies than the A-weighted sound level and is sometimes used to assess the low-frequency content of complex sound environments and entertainment noise.
Decibel	The ratio of sound pressures which we can hear is a ratio of 106 (one million:one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (Lp) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
dB(A)	The unit generally used for measuring environmental, traffic or industrial noise is the A- weighted sound pressure level in decibels, denoted dB(A). An A-weighting network can be built into a sound level measuring instrument such that sound levels in dB(A) can be read directly from a sound level meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. It is worth noting that an increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.
Equivalent Continuous Sound Level (L _{eq})	Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{eq} . This is a notional steady level which would, over a given period of time, deliver the



TERM	DEFINITION
	same sound energy as the actual time-varying sound over the same period, similar to the average. Hence fluctuating levels can be described in terms of a single figure level.
Extraneous Noise	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated during holiday periods and during special events such as concert or sporting events.
Fast Time Weighting	125 ms integration time while the signal level is increasing and decreasing.
Frequency	The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.
LAeq	See equivalent continuous sound level definition above. This is the A-weighted energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environmental. This measure is also a common measure of environmental noise and road traffic noise.
L _{Aieq,T}	Equivalent continuous A-weighted sound pressure level over the measurement period T with impulse time weighting.
L _{Ceq,T}	The equivalent continuous C-weighted sound pressure level (integrated level) that, over the measurement period T, has the same mean square sound pressure (referenced to 20 μ Pa) as the fluctuating sound(s) under consideration.
LC, Peak	The C-weighted Peak sound pressure level during a designated time interval or a noise event.
Maximum Noise Levels L _{max}	The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.
Minimum Noise Levels L _{min}	The minimum noise level over a sample period is the minimum level, measured on fast response, during the sample period.
Noise Sensitive Receiver (NSR)	A noise sensitive receiver is any person or building or outside space in which they reside or occupy that has the potential to be adversely impacted by noise from an outside source, or noise not generated by the noise sensitive receiver.
Octave Bands	Octave bands are frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or centre frequency.
One-Third Octave Bands	One-Third Octave Bands are frequency ranges where each octave is divided into one-third octaves with the upper frequency limit being 1.26 times the lower frequency. They are identified by the geometric mean frequency of each band, or centre frequency.



TERM	DEFINITION
Project-Specific Noise Levels	They are target noise levels for a particular noise generating facility. They are based on the most stringent of the intrusive or amenity criteria derived from the NSW Industrial Noise Policy.
RBL	The Rating Background Level for each period is the median value of the ABL values for the period over all the days measured. There is a therefore an RBL value for each period – daytime, evening and night-time.
Shoulder Periods	Where early morning (5 am to 7 am) operations are proposed, it may be unduly stringent to expect such operations to be assessed against the night-time criteria (especially if existing background noise levels are steadily rising in these early morning hours). In these situations, appropriate noise level targets may be negotiated with the regulatory/consent authority on a case-by-case basis.
Sound Level Difference (D)	The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor, the weighted sound level difference, D_w , is sometimes used (see BS EN ISO 717-1).
Sound Power	The sound power level (L_w) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level varies as a function of distance from a source. However, the sound power level is an intrinsic characteristic of a source (analogous to its volume or mass), which is not affected by the environment within which the source is located.
Statistical Noise Levels	For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{10} , the level exceeded for ten per cent of the time period under consideration, has been adopted in this country for the assessment of road traffic noise. The L_{90} , the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_1 , the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A-weighted statistical noise levels are denoted L_{A10} , dBL _{A90} etc. The reference time period (T) is normally included, e.g. dBL _{A10, 5min} or dBL _{A90, 8hr} .
L _{A1}	The L_{A1} level is the A-weighted noise level which is exceeded for 15 of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.
L _{A10}	The L_{A10} level is the A-weighted noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.
L _{A50}	The L_{A50} level is the A-weighted noise level which is exceeded for 50% of the sample period.
L _{A90}	The LA90 level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the LA90 level for 10% of the time. This measure is a commonly referred to as the background noise level.
Tonality	Noise containing a prominent frequency and characterised by a definite pitch.