Project No: 151134

Noise Assessment
Proposed "Diamond Apartments" Residential Development
7 – 11 Bent Street
Gosford, NSW

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1.0 - INTRODUCTION

This report presents the results, findings and recommendations arising from an acoustic assessment of a proposed multi-storey residential development at 7 – 11 Bent Street, Gosford, NSW.

KDC Group (the Proponent) proposes to construct a multi-storey building on the site comprising basement and ground floor parking levels and 20 residential levels.

The assessment was requested to accompany a Development Application to Gosford City Council (GCC).

2.0 - TERMS AND DEFINITIONS

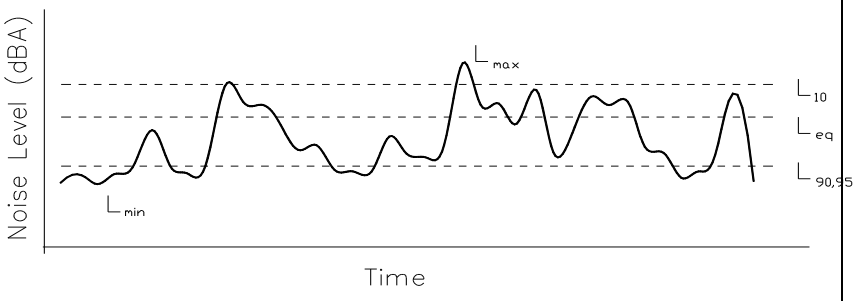
Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

TABLE 1
DEFINITION OF ACOUSTICAL TERMS

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period (for noise assessments this is typically 15 minutes).
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.

TABLE 1 (continued)

DEFINITION OF ACOUSTICAL TERMS



3.0 - CRITERIA

GCC is responsible for the approval and control of noise emissions from commercial and industrial premises within council boundaries. These approvals are generally based on procedures and criteria detailed in the *NSW Industrial Noise Policy* (INP).

The INP describes intrusive and amenity criteria applicable to industrial sites. Although intended primarily for industrial purposes, Councils usually defer to the criteria in the INP for all proposals which may emit noise to the surrounding area. These noise criteria depend on the existing background noise level at potentially affected residential receiver areas.

Spectrum Acoustics conducted an ambient noise survey opposite the site from 29 January – 2 February 2016. With traffic being the dominant noise source in the area, a minimum three day survey is required under the INP.

Table 2 presents a summary of the ambient noise levels (L90 Rating Background Levels (RBL) and existing Leq) recorded at the monitoring location. The noise levels are shown graphically in **Appendix I**.

The RBL is the median of the daily L90 levels in each assessment period (day/evening/night), over all valid days in the monitoring period.

TABLE 2

MEASURED AMBIENT NOISE LEVELS – BENT STREET GOSFORD

	Noise Levels dB(A)		
Percentile	Day	Evening	Night
L_{90}	44	41	34
L_{eq}	54	52	45

NOTE: Day = 7am – 6pm, Evening = 6pm – 10pm, Night = 10pm – 7am.

The INP specifies that in determining noise criteria, background noise levels need only be used for those times when the noise source being assessed is to operate. In this instance mechanical plant may operate at any time but garbage collection and other activities are likely to occur during daytime only.

In setting noise goals for a particular project the INP considers both Amenity and Intrusiveness criteria. The former is set to limit continuing increase in noise from industry, whilst the latter is set to minimise the intrusive impact of a particular industry.

The site under assessment is subject to traffic noise from Henry Parry Drive. During the day there would be minimal existing industrial noise impacting on the area. The intrusiveness criteria are, therefore, the acceptable levels for the receiver area. In this regard the residential areas near the site are best described acoustically as suburban.

The intrusiveness criteria are based on the Rating Background Level (RBL) for the time period, plus 5 dB(A). **Table 3** specifies the applicable base noise objectives for the proposal.

TABLE 3
BASE NOISE LEVEL OBJECTIVES

Period	Intrusiveness Criterion* L_{eq} (15 min) dB(A)	Amenity Criterion** L_{eq} (Period) dB(A)
Day	**49**	= Acceptable level = **55**
Evening	**46**	= Acceptable level = **50**
Night	**39**	= Acceptable level = **45**

* Rating Background Level (RBL) + 5dB. RBL is the median value of each ABL (Assessment Background Level) over the entire monitoring period.
** Suburban zone amenity criterion per Tables 2.1 and 2.2 of INP.

The project specific noise levels (PSNL) for residential receivers are the lower of the intrusiveness or amenity criteria for the specific time period(s) during which the noise may occur. The PSNL's are therefore the intrusiveness criteria.

4.0 - NOISE ASSESSMENT

The subject site and surrounding landuses are shown in **Figure 1**. The site adjoins residential receivers to the south and west and to the north across bent Street. The proposed footprint of the development is shown in **Figure 2**.

Figure 1. Project site and local area.

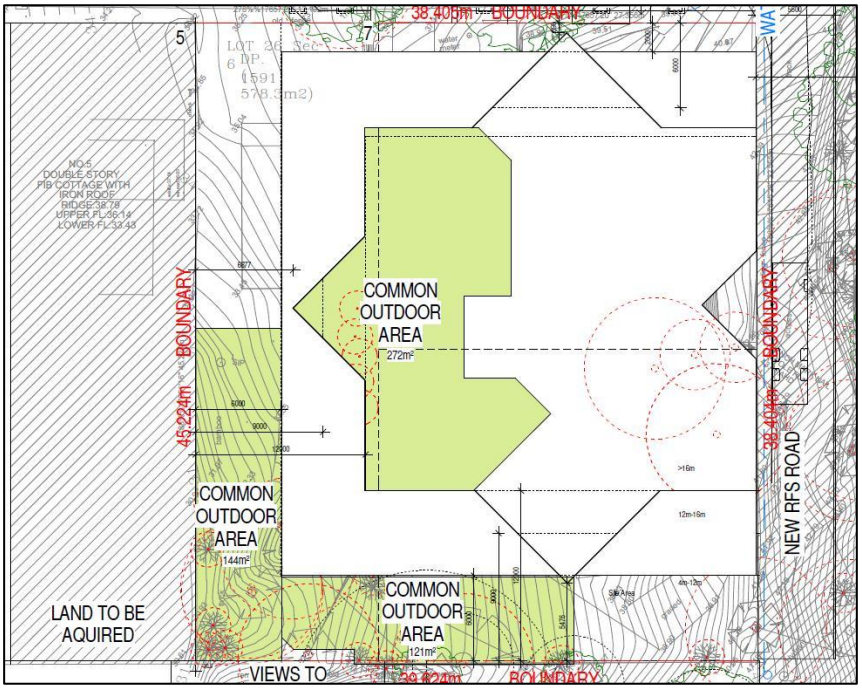


Figure 2. Footprint of proposed development.

4.1 Traffic Noise

Since road traffic is the dominant noise source in the area, assessment of the impacts of road traffic noise on the proposed development is required. The NSW Department of Planning and Infrastructure's (DP&I) document "Development near Rail Corridors and Busy Roads – Interim Guideline" recommends internal design noise levels of 40 dB(A),L_{eq} (day) and 35 dB(A),L_{eq} (night) with windows closed.

The logger location was approximately 10m below the elevation of Henry Parry Drive and the development would have residential levels looking down on this main road. Traffic noise levels at the residential facades facing Henry Parry Drive would be subjected to traffic noise levels at least 10 dB higher than the LAeq levels in Table 2. Allowing for a 12 dB difference, the estimated traffic noise levels impacting on the proposal are 66 dB(A),L_{eq} (day) and 57 dB(A),L_{eq} (night). Based on these levels the building facade would be required to attenuate 26 dB during the day and 22 dB at night.

Traffic noise reduction of up to 22 dB(A) will be achieved by standard stud wall or masonry construction with standard window glazing (nominally 4mm float glass) as illustrated in Figure B2 of the DP&I guideline. Traffic noise reduction of 22 dB or greater requires glazing upgrade.

For the required traffic noise reduction of 22-26 dB it is recommended that all windows with a direct view of Henry Parry Drive should be upgraded to 6.5mm Vlam Hush laminated glazing or equivalent.

4.2 Carpark Noise

Figure 2 shows the proposed carpark entrance on the northern side of the site. As seen in Figure 1, this is opposite existing residences with the nearest residential boundaries with residential facades being approximately 75m to the east and west. Noise emissions from carpark entries typically comprise short term impacts from automatic roller doors. The EPA typically prefers such noises to be no more than 15 dB above the night time background noise level at 1m from bedroom windows, giving a “sleep disturbance” criterion of 49 dB(A),L_{max}.

Allowing just for distance loss, the calculated maximum sound pressure level of the roller door, in order to achieve the sleep disturbance criterion at the nearest residence opposite the site, is 87 dB(A). Spectrum Acoustic has previously measured maximum sound power levels up to 95 dB(A) from squeaky roller doors in need of service. For new and correctly maintained doors, maximum sound power levels are typically no greater than 75 dB(A). In order to achieve the sleep disturbance criterion, the carpark roller door must be regularly checked and maintained in good condition.

4.3 Garbage Collection

A waste bin store is to be located at the western side of the Basement 1 level with collection point set back approximately 15m from Bent Street. Recycling and mixed waste compactors would typically enter the site once a week, load up the bins and transfer them offsite. Given the necessity for waste removal, which would already occur in the street once per week, there is minimal scope for reducing noise impacts.

Management practices should be implemented such as disengaging reverse gear for the waste loading cycle so as to cancel reverse alarm. A minimum 2.1m acoustic fence should be erected along the western boundary of the loading bay to provide a noise barrier to the residence at No 3 Bent Street.

4.4 Mechanical Plant

Any external mechanical plant should be assessed as part of construction certification to ensure compliance with the noise emission criteria in Section 3 of this report.

5.0 – BCA CONSIDERATIONS

The proposal must be designed to satisfy the sound transmission requirements contained in Section F5 of the BCA 2012 with regard to Class 2 residential buildings which are summarised as follows.

F5.4 Sound insulation rating of floors

a. A floor in a Class 2 or 3 building must have an $R_w + C_{tr}$ (airborne) not less than 50 and an $L_{n,w} + C_I$ (impact) not more than 62 if it separates—
   i. *sole-occupancy units*; or
   ii. a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby or the like, or parts of a different classification.

b. A floor in a Class 9c *aged care building* separating *sole-occupancy units* must have an R_w not less than 45.

F5.5 Sound insulation rating of walls

a. A wall in a Class 2 or 3 building must—
   i. have an $R_w + C_{tr}$ (airborne) not less than 50, if it separates *sole-occupancy units*; and
   ii. have an R_w (airborne) not less than 50, if it separates a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public*

corridor, public lobby or the like, or parts of a different classification; and

iii. comply with **F5.3(b)** if it separates—

A. a bathroom, *sanitary compartment*, laundry or kitchen In one *sole-occupancy unit* from a *habitable room* (other than a kitchen) in an adjoining unit; or

B. a *sole-occupancy unit* from a plant room or lift *shaft*.

b. A door may be incorporated in a wall in a Class 2 or 3 building that separates a *sole-occupancy unit* from a stairway, *public corridor*, public lobby or the like, provided the door assembly has an R_w not less than 30.

c. Where a wall *required* to have sound insulation has a floor above, the wall must continue to—

i. the underside of the floor above; or

ii. a ceiling that provides the sound insulation *required* for the wall.

d. Where a wall *required* to have sound insulation has a roof above, the wall must continue to—

i. the underside of the roof above; or

ii. a ceiling that provides the sound insulation *required* for the wall.

F5.6 Sound insulation rating of services

a. If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one *sole-occupancy unit*, the duct or pipe must be separated from the rooms of any *sole-occupancy unit* by construction with an $R_w + C_{tr}$ (airborne) not less than—

i. 40 if the adjacent room is a *habitable room* (other than a kitchen); or

ii. 25 if the adjacent room is a kitchen or non-*habitable room*.

b. If a storm water pipe passes through a *sole-occupancy unit* it must be separated in accordance with **(a)(i)** and **(ii)**.

F5.7 Sound isolation of pumps

A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

6.0 – CONCLUSION

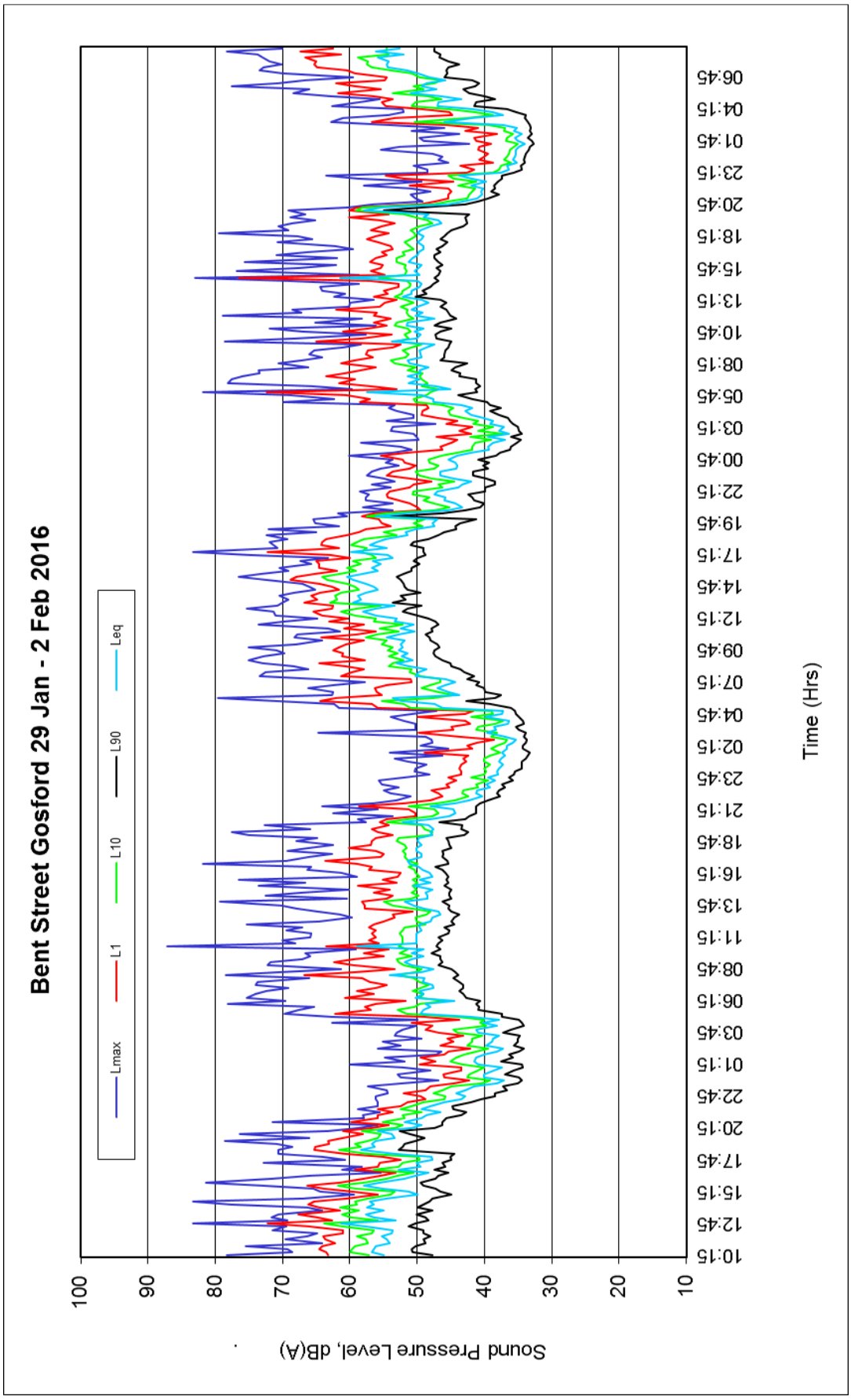
An acoustic assessment has been undertaken for the proposed "Diamond Apartments" at 7-11 Bent Street Godford NSW. The assessment has been prepared to accompany a development application to Gosford City Council.

Potential noise impacts on and from the proposal have been assessed against the relevant State guidelines and policies.

The assessment has shown that there will be no adverse impacts on or from the proposal subject to adoption of recommendations given in this report and that it could operate in compliance with noise limits as may be set by Council should the proposal be approved.

APPENDIX I

NOISE LOGGER CHART


Bent Street Gosford 29 Jan - 2 Feb 2016
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
10:15
12:45
15:15
17:45
20:15
22:45
01:15
03:45
06:15
08:45
11:15
13:45
16:15
18:45
21:15
23:45
02:15
04:45
07:15
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