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Proposed Townhouse Development 103 Paterson Street Byron Bay

ACOUSTIC REPORT



Client: Hunter Hopkins *Attn: Kosta Nisiotis*

Reference: 1021011 R01E 103 Paterson Street, Byron Bay ENV.doc Date Issued: 23 March 2021

Document Information

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Report Register

Date	Revision	Author	Reviewer	Manager
23/02/2021	R01C	Andrew Hiscox	Matthew Bechara	GP
10/03/2021	R01D	Andrew Hiscox	Matthew Bechara	GP
23/03/2021	R01E	Andrew Hiscox	Matthew Bechara	GP

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1. Introduction

This report is in response to a request by Hunter Hopkins for an environmental noise impact assessment of a proposed townhouse development located at 103 Paterson Street, Byron Bay. This environmental noise assessment was conducted in accordance with Byron Shire Council planning policies and the NSW Noise Policy for Industry. To facilitate the assessment, unattended noise monitoring was conducted to determine the criteria and assess impacts to sensitive receivers in proximity to the development. Based on the outcomes of the assessment, recommendations for acoustic treatments are specified.

2. Site Description

2.1 Site location

The site is described by the following:

103 Paterson Street, Byron Bay Lot 101 on DP839601

Refer to Figure 1 for site location.



A comprehensive site survey was conducted on 8th February 2021 and identified the following:

- a) The site is located in an R2 Low Density Residential zone as defined in the Byron Local Environmental Plan 2014.
- b) A single storey residential dwelling currently occupies the site and will be demolished to make way for the development.
- c) The surrounding area consists of residential land use.

2.2 Proposal

The proposal is to construct fourteen 2 storey townhouses consisting of the following:

- Townhouse H1 living/kitchen/dining area, powder room, one bedroom with ensuite and garage.
- Townhouses H2-H5 and T4-T5 living/kitchen/dining area, four bedrooms (one with ensuite), powder room, one bathroom, pool and garage.
- Townhouses H6-H7, T1-T3 and T6-T7 living/kitchen/dining area, four bedrooms (one with ensuite), powder room, one bathroom and garage.
- All townhouses feature outdoor patios and backyards.

Refer to the Appendices for development plans.

2.3 Acoustic environment

The surrounding area is primarily affected by noise from the surrounding road network.

3. Equipment

The following equipment was used to record noise levels:

- Acoustic Research Laboratories Type 1 Environmental Noise Logger (SN# 16-299-446)
- Pulsar Model 105 Ltd Sound Calibrator (SN # 57417)

The Environmental Noise Monitor and Sound Level Meter holds current NATA Laboratory Certification and were field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

4. Noise Monitoring and Receiver Locations

4.1 Receiver locations

The nearest representative residential receiver locations were identified as follows:

- 1. Single storey and two storey residential dwellings are located adjacent the north western site boundary at 1-5 and 80-82 Shelley Drive.
- 2. Single storey residential dwellings are located south east of the site at 11-19 Cooper Street.
- 3. Single storey residential dwellings are located adjacent the southern and western site boundaries at 105-107 Paterson Street.
- 4. Paterson Street separates the site from a two storey residential dwelling located north west of the site at 116A Paterson Street.

Refer to Figure 2 for these locations.



Figure 2: Receivers and Noise Monitoring Location

4.2 Unattended noise monitoring

An Acoustic Research Laboratories Type 1 environmental noise logger was placed at 111 Paterson Street to measure existing ambient noise levels. This location was chosen as it was considered representative of the nearest residential receivers. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between the 8th and 21st February 2021.

The environmental noise monitor was set to record noise levels in "A" weighting, Fast response with 15-minute statistical intervals. Ambient noise monitoring was conducted generally in accordance with Australian Standard AS 1055:2018 *Acoustics – Description & Measurement of Environmental Noise* and the NSW Policy for Industry 2017.

For the unattended noise monitoring location refer to Figure 2.

5. Existing Ambient Noise Levels

The following tables present the measured ambient noise levels from the unattended noise survey and the meteorological conditions. Any periods of inclement weather or extraneous noise are omitted from the measured data prior to determining the overall results.

5.1 Meteorological conditions

Meteorological observations during the unattended noise monitoring survey were obtained from the Bureau of Meteorology website (http://www.bom.gov.au/climate/data), shown in Table 1 below. Windspeeds are corrected for difference in height of BOM weather station and logger.

				Wi	nd	
Dav	Data	Rainfall	9	am	3	pm
Day	Date	(mm)	Speed (km/h)	Direction	Speed (km/h)	Direction
Monday	08/02/2021	17	22	S	26	S
Tuesday	09/02/2021	0	28	S	21	SSE
Wednesday	10/02/2021	0	19	ESE	15	S
Thursday	11/02/2021	11.4	14	WSW	18	ESE
Friday	12/02/2021	0.2	4	NNW	15	NNE
Saturday	13/02/2021	0	16	N	20	NNE
Sunday	14/02/2021	43.4	26	SSW	35	S
Monday	15/02/2021	3.8	16	WSW	32	S
Tuesday	16/02/2021	10.6	19	SE	27	ESE
Wednesday	17/02/2021	18.8	30	Е	34	SSE
Thursday	18/02/2021	10.2	27	Е	25	SE
Friday	19/02/2021	5.6	23	E	8	ENE
Saturday	20/02/2021	87.4	10	SW	19	SSW

Table 1: Meteorological Conditions – Byron Bay NSW

5.2 Background noise level

The measured rating background noise levels (RBL), in accordance with the NSW Noise Policy for Industry, are as follows:

Day	Date	Background L90 dBA			
		Day	Evening	Night	
Monday	08/02/2021	-	42	39	
Tuesday	09/02/2021	48	41	34	
Wednesday	10/02/2021	44	36	33	
Thursday	11/02/2021	45	34	33	
Friday	12/02/2021	45	42	39	
Saturday	13/02/2021	48	39	36	
Sunday	14/02/2021	48	40	34	
Monday	15/02/2021	46	37	35	
Tuesday	16/02/2021	47	42	37	
Wednesday	17/02/2021	50	45	38	
Thursday	18/02/2021	46	39	37	
Friday	19/02/2021	44	46	37	
Saturday	20/02/2021	45	38	37	
F	RBL		41	36	

Tabla	ъ .	Moscurod	1 00	Noico	
lable	Ζ:	Measureu	L90	Noise	Levels

Note heavy rainfall on the 8^{th} , 11^{th} , 14^{th} to 18^{th} and 20^{th} was found to affect the measurements and were therefore omitted.

Graphical presentation of the measured noise levels is presented in the Appendices.

6. Noise Criteria

The relevant noise criteria have been determined in consultation with the Byron Shire Council Development Control Plan (DCP) 2014 and NSW Noise Policy for Industry 2017.

6.1 Byron Shire Council

The Byron Shire Council DCP (2014) contains no specific acoustic criteria but specifies the following in regards to noise impacts on residential receivers:

"Development must be designed to minimise noise and vibration impacts upon occupants of surrounding dwellings. Where practicable, sources of noise must be sited away from adjoining properties, and where necessary must be screened by acoustic treatments.

Therefore, further reference was made to the NSW Noise Policy for Industry (2017)

6.2 Noise Policy for Industry

Assessment of noise in accordance with NSW EPA Noise Policy for Industry (2017) has two main components: intrusiveness and amenity criteria. These are compared to each other (after conversion of amenity noise level to $L_{Aeq,15min}$ equivalent level) to determine the overall project noise trigger level.

6.2.1 Intrusiveness noise level

The Intrusiveness noise level is based on the $L_{Aeq (15 min)}$ associated with commercial activity being less than or equal to the measured L_{A90} Rating Background Level + 5dB as per section 2.3 of the policy. A modifying factor should also be added where appropriate to allow for tonality, impulsiveness, and intermittency or low frequency effects.

6.2.2 Amenity noise level

The Amenity noise level is determined in accordance with Section 2.4 of the policy based on the land use and relevant noise criteria specified in Tables 2.2 and 2.3.

The Noise Policy for Industry sets out acceptable noise levels for various locations. Determination of which residential receiver category applies is described in Table 2.3 of the policy.

Receiver category	Typical planning zoning – standard instrument	Typical existing background noise levels	Description
Rural residential	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime RBL <40 dB(A) Evening RBL <35 dB(A) Night RBL <30 dB(A)	Rural – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.
Suburban residential	RU5 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime RBL<45 dB(A) Evening RBL<40 dB(A) Night RBL <35dB(A)	Suburban – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.
Urban residential	R1 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime RBL> 45 dB(A) Evening RBL> 40 dB(A) Night RBL >35 dB(A)	 Urban – an area with an acoustical environment that: is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources has through-traffic with characteristically heavy and continuous traffic flows during peak periods is near commercial districts or industrial districts has any combination of the above.

Table 3: Receiver Category (Table 2.3 of the Noise Policy for Industry)

To determine the appropriate receiver category, the following observations were made:

- All receivers are zoned R2 Low Density Residential, corresponding with the typical planning zoning of the suburban category.
- The RBL values presented in Section 5.2 corresponds with the typical existing background noise levels of the urban category for all time periods.
- The surrounding acoustical environment has local traffic with characteristically intermittent traffic flows and limited commerce and industry, corresponding with the typical description of the suburban category.

Therefore, all receivers would be assessed against the suburban criteria.

6.2.3 Modifying factors

The Noise Policy for Industry includes correction factors such as tonal noise, low-frequency noise, intermittent noise and duration. Where two or more modifying factors are present, the maximum adjustment to a noise source level is 10dBA (excluding duration correction).

6.3 Project noise trigger level

To determine the project trigger noise level, the amenity noise level must first be standardised to an equivalent $L_{Aeq,15min}$ in order to compare to the intrusiveness noise level. This is done in accordance with Sections 2.2 and 2.4 of the policy as follows:

 $L_{Aeq,15min} = L_{Aeq, period} + 3dB$

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. Project amenity noise levels for industrial developments = recommended amenity noise level minus 5dB(A).

Therefore, based on the measured data presented in Section 5.2, the project specific noise limits are determined.

6.3.1 Sleep disturbance noise level

Sleep disturbance is based on the maximum noise level of events from premises during the nighttime period. The Noise Policy for Industry defines sleep disturbance as a noise from a premise at a residential location that exceeds:

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

6.3.2 Sleep disturbance

The sleep disturbance noise levels are as follows:

	All Receivers		
Time Period	Criteria Leq(15min) dBA	Criteria LAFmax dBA	
Night	41	52	

Table 4: Sleep Disturbance Criteria

6.3.3 Intrusive noise impacts

The intrusiveness noise levels are as follows:

Table 5: Intrusiveness N	Noise	Criteria
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Time Deried	All Receivers
	Criteria L _{eq (15min)} dB(A)
Day (7am-6pm Mon-Sat; 8am-6pm Sun)	50
Evening (6pm-10pm)	46
Night (10pm-7am Mon-Sat; 10pm-8am Sun)	41

6.3.4 Amenity criteria

Based on Section 2.2 and 2.4 of the policy, the amenity noise levels are as follows:

Time Deried	All Receivers
Time Penou	Criteria Leq(period) dB(A)
Day	53
Evening	43
Night	38

Table 6: Amenity criteria

6.3.5 Project specific noise criteria

The project noise trigger level is the lower (that is, the most stringent) value of the intrusiveness and amenity noise levels. Therefore, the project noise trigger levels are as follows:

Time Deried	All Receivers			
Time Periou	Criteria Leq (15min) dB(A)			
Day	50			
Evening	43			
Night	38			

Table 7: Project 9	Specific Nois	e Criteria
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7. Environmental Assessment

7.1 Onsite activities

Noise associated with the development was assessed based on previous measurements of similar activities. The calculations assume that the nominated activities are located at a representative distance within the site to each receiver location. Any relevant shielding or building transmission loss is taken into account for these activities.

7.2 Project specific criteria

The noise source levels at the receiver locations are shown in Table 8. L_{Aeq} results are not shown where the calculated total is less than 0dBA.

	Receivers									
	 1. 1-5 and 80-82 Shelley Drive (NW) 2. 11-19 Cooper Street (SE) 3. 105-107 Paterson Street (S & SW) 4. 116A Paterson Street (NW) 	Lm dB(A)	(A)*	@1m dB(A)	. dB(A) Day	. dB(A) Eve	. dB(A) Night	LA	LAeq 15 min Compliance	
Receiver	Description	Source Leg@:	Correction dB	Corrected Leo	LAeq adj,T ext	LAeq adj,T ext	LAeq adj,T ext	Day	Eve	Night
	Criteria							50	43	38
	Car door closure	75	2	77	20	18	13	Yes	Yes	Yes
1	Car passby	69		69	38	36	31	Yes	Yes	Yes
	Car start	74	2	76	19	17	12	Yes	Yes	Yes
	Total				38	36	31	Yes	Yes	Yes
	Criteria					_		50	43	38
	Car door closure	75	2	77	25	23	18	Yes	Yes	Yes
2	Car passby	69		69	26	24	19	Yes	Yes	Yes
	Car start	74	2	76	24	22	17	Yes	Yes	Yes
	Total				30	28	23	Yes	Yes	Yes
	Criteria					-		50	43	38
	Car door closure	75	2	77	24	22	17	Yes	Yes	Yes
3	Car passby	69		69	31	28	24	Yes	Yes	Yes
	Car start	74	2	76	23	21	16	Yes	Yes	Yes
	Total				32	30	25	Yes	Yes	Yes
	Criteria							50	43	38
	Car door closure	75	2	77	21	19	14	Yes	Yes	Yes
4	Car passby	69		69	28	26	21	Yes	Yes	Yes
	Car start	74	2	76	20	18	13	Yes	Yes	Yes
	Total				29	27	23	Yes	Yes	Yes

Table 8: Project Specific Noise Levels

Compliance is predicted for onsite activities on the condition the recommendations presented in Section 8 are implemented.

7.3 Noise impacts – Sleep disturbance

The noise source levels and predicted levels of noise at the receiver locations are shown in Table 9.

	Receivers					
	1. 1-5 and 80-82 Shelley Drive (NW)					
	2. 11-19 Cooper Street (SE)				~	
	3. 105-107 Paterson Street (S & SW)	2			B(A	
	4. 116A Paterson Street (NW)	B(A	A)*	a	р .:	
		р Ш	dB(JB(ext	
e		@ 1	o	eq	dj,T	
ei<		S	ect	ect	ах а	
Sec	Description	Ino	Sorr	Sorr	Ā	Complies
-	Critoria	0,	0	0		Enax ub(A)
		75	2		40	52
	Car door closure	75	2	//	40	Yes
1	Car passby	74		74	52	Yes
	Car start	74	2	76	39	Yes
	Criteria					52
	Car door closure	75	2	77	45	Yes
2	Car passby	74		74	42	Yes
	Car start	74	2	76	44	Yes
	Criteria					52
	Car door closure	75	2	77	44	Yes
3	Car passby	74		74	46	Yes
	Car start	74	2	76	43	Yes
	Criteria					52
	Car door closure	75	2	77	41	Yes
4	Car passby	74		74	44	Yes
	Car start	74	2	76	40	Yes

Table 9: Predicted	Noise Impacts -	Sleep	Disturbance

Compliance is predicted for onsite activities on the condition the recommendations presented in Section 8 are implemented.

8. Recommendations

8.1 Onsite Activities

Based on the predicted noise levels and subjective assessment of the site and surrounds, noise impacts at all residential receiver locations are predicted to comply with the assessment criteria on the condition an acoustic barrier is constructed to the height and extent shown in Figure 3 with the barrier height relative to the ground level of the site. The acoustic barrier should be constructed using either 16mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 9kg/m2 and shall be free of gaps and holes.



8.2 Waste collection

We recommend that waste collection be conducted in accordance with the surrounding residential properties with recommended hours of 7am to 6pm weekdays and 8am to 6pm weekends.

8.3 Onsite mechanical plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the criteria stated in Section 6.3 with an assessment undertaken by qualified acoustic consultant to be conducted prior to installation.

8.4 Optional acoustic barrier

To further improve the acoustic amenity to neighbouring properties, we recommend installing an acoustic barrier to the height and extent shown in Figure 4. Note that assessment of private recreation areas is not required in accordance with the NSW Noise Policy for Industry, therefore the barriers presented in Figure 4 are optional. The optional acoustic barrier should be constructed using either 16mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 9kg/m2 and shall be free of gaps and holes.



9. Conclusion

An environmental noise assessment was conducted for the proposed residential townhouse development located at 103 Paterson Street, Byron Bay. On the condition the recommendations detailed in Section 8 are implemented, the development is predicted to comply with the NSW Noise Policy for Industry and the Byron Shire Council assessment requirements.

Should you have any queries please do not hesitate to contact us.

Regards,

Andrew Hiscox Acoustic Consultant aCOUSTICWOrkS)))

10. Appendices

10.1 Noise Monitoring Charts



111 Paterson Street, Byron Bay

Road Traffic Noise Monitoring Tuesday 9/02/2021 90 80 ----L1 Sound Pressure Level dB(A) 70 ---L10 60 - Leg 50 - L90 40 30 20 1:00 2:00 4:00 2:00 8:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 5:00 6:00 9:00 10:00 11:00 12:00 13:00 14:00 Time 24hrs









111 Paterson Street, Byron Bay





111 Paterson Street, Byron Bay





111 Paterson Street, Byron Bay





111 Paterson Street, Byron Bay





111 Paterson Street, Byron Bay



10.2 Development Plans























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22 March 2021 Reference: 1021011 L01A 103 Paterson Street, Byron Bay ENV RFI response.doc

Planit Consulting Pty Ltd Luke Blandford

Dear Luke,

RE: 103 Paterson Street, Byron Bay - Information request response

This letter is in response to a request by Byron Shire Council for further information (received by Acoustic Works on 16th March 2021) regarding the acoustic report prepared for 103 Paterson Street, Byron Bay. The information request relates to an acoustic report prepared by Acoustic Works (ref: *1021011 R01D 103 Paterson Street, Byron Bay ENV.docx*). To resolve outstanding issues, Acoustic Works provides the following response.

Council Request

"11. The proposal is inconsistent with Chapter D1 Residential Accommodation in Urban, Village and Special Purpose Zones of Byron DCP 2014 as the development generates excessive shadow impacts and a lack of privacy and acoustic impacts with multiple swimming pools between dwellings on site and adjoining the site;"

Response

The acoustic report (ref: *1021011 R01D 103 Paterson Street, Byron Bay ENV.docx*) assesses the noise impacts from common areas to sensitive receivers in the surrounding area. Note that private recreation areas are not required to be assessed under the NSW Noise Policy for Industry.

We trust that this information meets with your current requirements. Should you have any queries please do not hesitate to contact Acoustic Works.

Yours faithfully,

Andrew Hiscox Acoustic Consultant acousticworks)))