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Proposed Mixed Use Residential and Commercial Development,  
“PACIFIC PINES” Lennox Head

**ENVIRONMENTAL  
NOISE IMPACT ASSESSMENT**

**2 June 2008**

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## 1.0 INTRODUCTION

This report is submitted in response to a request by Petrac Lennox Head atf, for an environmental noise impact assessment of a proposed mixed use residential commercial master plan in Lennox Head.

The report addresses further information requested by Ballina Shire Council and The NSW Department of Planning.

Environmental noise logging was conducted, and through modelling, assessment of road traffic noise impacts, and impacts associated with the commercial component impacting upon nearest noise sensitive landuses were produced. Based upon these predicted levels, recommendations regarding acoustic treatment and management principles have been provided.

### 1.1 The Proposal

The proposal is to develop the following:

- Residential areas of 600-800m<sup>2</sup> located across the bulk of the site;
- A neighbourhood Centre that includes a small supermarket, Tavern, medical centre, offices and service based commercial space, childcare, and an arts business centre;
- Retirement community plus an assisted and independent living facility;
- Parks and open space.

It is expected that the Tavern would operate 10am to midnight, 7 days per week, Cafés and Restaurants would operate between 7am to 10pm, 7 days per week, with other commercial premises operating standard business hours.

The main commercial node has been laid out such that the bulk of the activity will be screened by the commercial building to the residential areas surrounding the commercial site. The Supermarket main entry is proposed off Main Street, with back of house facilities in the (rear) car park area. This is deemed best practice in terms of mitigating noise from the commercial area.

Construction works at the site are likely to occur between 7am and 6pm Monday to Friday, and 7am to 4pm on Saturdays. No works are expected outside these hours, nor will work be conducted on public holidays or Sundays.

### 1.2 Study Site Environs

The site is bounded by Montwood Drive to the south, Hendersons Lane to the north, and Hutley Drive to the west, with residential land to the east.

The main issues associated with noise across the subject site are the extra traffic generated by the residential and potential noise from the proposed commercial node impacting nearest residential premises.

For site layout master plans, refer to Figures 1 and 2 in the Appendix to this report.

## 2.0 EQUIPMENT

The following equipment was used to record existing noise levels in the locale:

- Rion NC 73 Calibrator;
- ARL EL315 Type II Environmental Noise Logger.

## 3.0 MEASUREMENT PROCEDURE

### 3.1 Ambient Noise Measurement

A logger was located on Hutley Drive, to the west of Silkwood Road (refer to Figure No. 1 in the appendix to this report), and set to record  $L_x$ <sup>1</sup> noise statistics in 15 minute blocks, continually between 11.00 a.m. Friday 22/06/07, to 2.30 pm Friday 29/06/07.

The operation of the sound level measuring equipment was field calibrated before and after the measurement session and was found to be within 0.1 dB of the reference signal. All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory. The measurement was conducted generally in accordance with Australian Standard AS1055 1997 “*Acoustics – Description & Measurement of Environmental Noise*” and Australian Standard AS2702 - 1984 ‘*Acoustics - Methods for the measurement of road traffic noise*’.

Weather conditions during the survey were generally fine with the exception of rain over Monday to Wednesday of the week, with a temperature range of 8 to 22° C.

### 3.2 Commercial Noise Levels

All noise levels used in prediction modelling of commercial activity were sourced from previous investigations of commercial noise, and from onsite observations. Levels used were recorded as  $L_{eq}$ , and corrected for impulsiveness or tonality as per the requirements of AS1055 1997 “*Acoustics – Description & Measurement of Environmental Noise*”.

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<sup>1</sup>  $L_x$  is the generic term for level exceedance statistics, i.e.  $L_{10}$

## 4.0 NOISE CRITERIA

### 4.1 Road Traffic Noise

Assessment of potential noise impacts resulting from the increase in road traffic volumes are required to be conducted as per the New South Wales EPA “*Environmental Criteria for Road traffic Noise*”. As Hutley Drive and Montwood Road are collector roads and Stonyhurst Road being a Local Road, the following criteria applies to the proposed development:

TYPE OF DEVELOPMENT	CRITERIA		
	DAY (7 am– 10 pm) dB(A)	NIGHT (10 pm– 7 am) dB(A)	WHERE CRITERIA ARE ALREADY EXCEEDED
8. Land use developments with potential to create additional traffic on collector road	$L_{Aeq(1hr)}$ 60	$L_{Aeq(1hr)}$ 55	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using ‘quiet’ vehicles; and using barriers and acoustic treatments.  In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB.
13. Land use developments with potential to create additional traffic on local roads	$L_{Aeq(1hr)}$ 55	$L_{Aeq(1hr)}$ 50	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using ‘quiet’ vehicles; and using barriers and acoustic treatments.  In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB.

**Table 1:** Extract from the EPA document “*Environmental Criteria for Road traffic Noise*”.

Further to the above, we recommend applying the maximum indoor sound levels as specified in Australian Standard AS/NZS 2107:2000 ‘*Acoustics – Recommended Design Sound Level and Reverberation Times for Building Interiors*’. These levels expressed as  $L_{Aeq}$  are presented in Table 2.

Type of Occupancy / Activity	Recommended Design Sound Level, $L_{Aeq}$ , dB(A)	
7. RESIDENTIAL BUILDINGS	Satisfactory	Maximum
Houses and apartments near major roads –		
Living areas	35	45
Sleeping areas	30	40
Work areas	35	45
Apartment common areas (e.g. foyer, lift lobby)	45	55

**Table 2:** Internal noise limits for residential dwellings from AS/NZS 2107:2000.

## 4.2 Commercial Activity Noise

On-site noise associated with the proposed activities and offsite commercial premises is regulated by the NSW Industrial Noise Policy, although it was primarily intended as a guideline for large industrial uses. Such on-site noise sources include goods unloading, car door closures, and patron activity at the café, the restaurant and Tavern.

The assessment procedure has two components:

- Control of intrusive noise impacts – The limit criteria for this assessment is as follows:  
 $L_{Aeq, 15 \text{ min}} \leq \text{rating background level}^2 + 5 \text{ dB};$
- Maintaining noise level amenity for nearby residential premises. This is achieved by ensuring that the proposed development complies with the noise limit criteria set in Table 2.1 of the Policy. If we assume that the area is of an urban<sup>3</sup> nature (as defined in the Policy), the following limits apply:
 

• Daytime (7 am – 6 pm Mon-Sat; 8 am – 6 pm Sun)	60 dB(A) $L_{eq}$ ;
• Evening (6 pm – 10 pm)	50 dB(A) $L_{eq}$ ;
• Night (remaining periods)	45 dB(A) $L_{eq}$ .

By considering both criteria, the following noise limits apply:

- |  |                     |
|--|---------------------|
| • Daytime (7 am – 6 pm Mon-Sat; 8 am – 6 pm Sun) | 50 dB(A) $L_{eq}$ ; |
| • Evening (6 pm – 10 pm)                         | 43 dB(A) $L_{eq}$ ; |
| • Night (remaining periods)                      | 38 dB(A) $L_{eq}$ . |

## 4.3 Construction Site Noise Legislation

Ballina Shire Council have no specific code for management of construction noise under the Town Plan, but set standard conditions for limitation of hours of operation to 7am to 6pm, Monday to Friday, and 7am to 4pm on Saturdays, and also require that in the event of a bona fide noise complaint, then the noise impacts will be assessed against the daytime background noise level + 15 dB.

In this case, the limit of 60 dB(A) applies under the ‘background + 15 dB’ criteria for activities conducted during daytime hours.

Further to the above, Australian Standard AS 2436 – 1981 “*Guide to noise control on construction, maintenance and demolition sites*” provides extra guidance for management of on-site noise.

<sup>2</sup> The rating background level is the overall single figure background level representing each assessment period (day/evening/night over the whole monitoring period. Refer to Table 3 for ambient noise levels.

<sup>3</sup> The Policy states that an area of a urban nature has commercial or industrial activities in the locale.

## 5.0 RESULTS & CALCULATIONS

### 5.1 Measured Levels Logger Survey

The following ambient noise levels were recorded at the logger location:

Noise Descriptor	Time Period	Measured Level dB(A)
Daytime RBL Background Level $L_{A90}$	7:00am to 6:00pm	45
Evening RBL Background Level $L_{A90}$	6:00pm to 10:00pm	38
Night RBL Background Level $L_{A90}$	10:00pm to 7:00am	33
Road Traffic Noise Level $L_{Aeq\ 24hr}$	Midnight to midnight	54
Road Traffic Noise Level $L_{Aeq\ 1hr\ DAY}$	7:00am to 10:00pm	56
Road Traffic Noise Level $L_{Aeq\ 1hr\ NIGHT}$	10:00pm to 7:00am	52

**Table 3:** Measured ambient noise levels at noise measuring location.

### 5.2 Existing and Predicted Traffic Volumes

Traffic volumes with, and without the development (as vehicles per day – vpd) were provided by Ardill Payne & Partners as follows:

Road Name	Without Development (vpd)	With Development (vpd)
Montwood Drive	1440	2134
Stoneyhurst Road	46	700
Hutley Drive	1061	3193
Hedersons Lane*	2,300	3,000**

\* We have assumed an ultimate capacity for a local road. \*\* Stonyhurst traffic turning onto Hedersons Lane

**Table 4:** Traffic volumes with and without proposed development

### 5.3 Predicted Road Traffic Noise Levels

Attended measurements of vehicle passes on Hendersons Lane (at the intersection with Stoneyhurst Drive) were undertaken on Thursday 29<sup>th</sup> May 2008 with a Rion RI-21 Sound Level Meter. The operation of the sound level measuring equipment was field calibrated before and after the measurement session and was found to be within 0.1 dB of the reference signal. All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory.

Measurements were taken of vehicles climbing Henderson Lane towards the intersection with North Creek Road. The location was chosen as noise impacts from vehicle climbing Henderson lane would be higher than vehicle traveling along a flat section of road, or vehicle descending along Hendersons Lane. The measurements were taken as being indicative of vehicles using Montwood, Drive, Hutley Drive and Stoneyhurst Drive.

Measurements were conducted at approximately 10m from the passing vehicles. Measurements were conducted in 'A' weight with the microphone in a free-field location approximately 1.5m above ground and pointing towards the noise source. All noise measurements were conducted generally in accordance with Australian Standard AS 1055:1997 - 'Acoustics-Description and measurement of environmental noise'.

Table 3 below presents the measured noise levels from the attended survey.

Noise Level Descriptor	Measured Level at 10m from Passing Vehicles dB(A)
<b>Road Traffic Noise Measurements along Hendersons Lane</b>	
Average $L_{Aeq, passby}$	59
Average SEL $_{passby}$	71 (15 sec.)

**Table 5:** Measured vehicles pass-bys on Hendersons Lane.

Predicted  $L_{Aeq, 1hr}$  daytime and night-time levels for each of the roads have been determined by multiplying the measured SEL of a vehicle pass-by by the number of car passes for an hour (peak) for each time period. We note that peak hour volumes have been assumed to be 10% of the vehicles per day (vpd) for the daytime and 3% of the vpd for the night-time. Refer to the Appendix for an example of the calculations.

We note that the above method has been applied due to the low traffic volumes anticipated upon the local road network, and to incorporate the local road environment (i.e. undertaking of attended measurements of vehicles using a local road).

The predicted  $L_{Aeq, 24hr}$ , and  $L_{Aeq, 1hr}$  noise levels at the future Lots are as follows. A façade correction of 2.5 dB(A) has been added to the measured levels.

Assessment Location	Predicted Noise Impact Level at most exposed façade SPL dB		
	$L_{Aeq, 24hr}$	Daytime $L_{Aeq, 1hr}$	Night time $L_{Aeq, 1hr}$
Montwood Dve without development	56	59	54
Montwood Dve with development	57	61	56
Stoneyhurst Dve without development	41	44	39
Stoneyhurst with development	52	56	51
Hutley Dve without development	54	58	53
Hutley Dve with development	57	61	56
Henderson Lane without development	58	61	56
Henderson Lane with development	59	62	57

**Table 6:** Predicted road traffic noise levels resulting from additional traffic generated by proposed development.

#### 5.4 Predicted Commercial Activity Noise Impact Levels

Based upon the nearest location of onsite commercial activities (worst case activities) in relation to surrounding noise sensitive receivers, we predict the following noise impact levels as presented in Table 7 below.

Source	Source level $L_{eq}$ @ 1m	Predicted impact level, SPL dB(A) $L_{eq}$
		Nearest Façade
Manually unloading truck in centre at grade parking commercial node	76	44
Patrons inside restaurant	73	38
Patrons Alfresco Café area	73	50
Car door closure in centre at grade parking commercial node	76	44
Medium level music in Tavern Function room	100	38
Manually unloading truck at Tavern	76	41
Medium level music in Community Hall	100	38

**Table 7:** Predicted noise impact levels from potential commercial activity

The above predictions assume the following:

- Alfresco dining occurs on the exposed side of the commercial buildings to dwellings;
- Car door closure occurs in car parking inside commercial node, but clear line of sight to receiver;
- Clear line of sight to dwellings from Tavern.



## 5.5 Predicted Construction Activity Noise Impact Levels

Sources of noise typically associated with large construction activities are as follows:

- Delivery trucks and on-site trade vehicle movements;
- Earthmoving vehicle movements (e.g. excavators); and
- Trade tools (e.g. air compressors, hammering, power tools).

Based upon typical noise decay rates, we predict the typically occurring activities (assessed at the nearest location to offsite residential dwellings – refer to the attached calculation sheet), will impact at the following levels:

Noise Source	Noise Source Level, SPL dB(A) @ 1m	Predicted Noise Impact Level, SPL dB(A)	
		Façade	Inside
Hammering scaffold	110* L10	67 – 95	59 – 87
Excavator	98 L10	55 – 83	47 – 75
Front end loader	95 L10	52 – 80	44 – 72
Road truck	85 L10	42 – 70	34 – 62
Compressed air nail gun	92* L10	49 – 77	41 – 69
Jackhammering	103* L10	60 – 88	52 – 80

\* **Denotes** Noise level corrected +5 dB for noise impulse character

**Table 8:** Predicted noise impact levels from construction activity

It must be stressed that the above impact levels assume the worst case scenario (i.e. nearest location from source to receiver) and an unobstructed line of sight from the noise source to the receiver.

Obviously, as buildings are erected, there is likely to be physical screening of construction activity noise, resulting in lower noise levels.

## 6.0 RECOMMENDED ACOUSTIC TREATMENTS

### 6.1 Recommended Acoustic Building Treatment for Control of Road Traffic Noise

We recommend the following “best practice” acoustic treatments to future dwellings fronting the local road network to minimise traffic noise intrusion (i.e. Montwood Drive, Hutley Drive, Hendersons Lane and Stoneyhurst Drive):

- Building designs should utilise the placement of non-habitable rooms (i.e. laundries, garages and bathrooms); and / or reduce the glazing areas along façades fronting the roads.
- Provision of air conditioning or sealed mechanical ventilation to habitable rooms fronting the roads to allow occupants to close external windows and doors. The installed plant should not reduce the acoustic performance of the building shell.
- For lots fronting the road, private open spaces should not be located along the road frontages. By locating private open spaces (i.e. courtyards and balconies) on the opposite side of the buildings to the roads, the buildings themselves will provide physical screening of road traffic noise (refer to sketch 1 in the Appendix).

Based upon the predicted impact levels, standard construction will be sufficient to achieve the indoor noise levels as per the requirements of AS/NZ2107.

### 6.2 Recommended Acoustic Building Treatment for Control of Commercial Noise

Based upon a worst case scenario, we recommend the following “best practice” acoustic treatments to at the commercial node:

- Alfresco dining be located in an area screened to surrounding residential premises, or be limited to daytime use only;
- Goods deliveries be conducted in the central at grade parking in the Commercial Node;
- Goods deliveries for all commercial premises be limited to 7am to 6pm;
- Tavern may provide amplified entertainment inside building, design must include sound locks to contain sound within building shell;
- Community Hall may provide amplified entertainment inside building, design must include sound locks to contain sound within building shell;
- Retirement facility to south-east of Community Hall should have outdoor open space areas well screened to the Community Hall area;
- Mechanical plant be designed and installed to achieve the noise limit criteria specified in Section 4.2, above.

We have assumed that the Community Hall achieves a building shell noise reduction of  $R_w$  40, and the Tavern  $R_w$  30 (i.e. for music noise mitigation).

### 6.3 Recommended Acoustic Treatments for Construction Noise

We recommend that the construction works observe the following treatments and principles to manage potential noise emissions to surrounding dwellings:

- Ensuring that works are strictly limited to 7 a.m. and 6 p.m. Monday to Friday, and 7am to 4pm on Saturdays.
- Trucks and equipment should not arrive or queue outside the site before 7am Monday to Saturday.
- Onsite equipment should not be started before 7am Monday to Saturday.
- Truck and equipment speeds be limited to 20km/hr at the site.
- Truck and equipment speeds be limited to 40km/hr through residential areas surrounding the site.
- All reasonable and feasible acoustic treatments (i.e. residential mufflers and plant enclosures) should be installed and maintained (refer to AS 2436 – 1981 ‘*Guide to noise control on construction, maintenance and demolition sites*’).
- No alarm bells/paging systems should be used. Cordless telephones are a suitable substitute.
- Vehicles have a modified beeper installed (commonly termed a “croaker”, as they sound similar to a frog croak).
- Drivers be instructed to operate equipment in a manner that does not generate unnecessary noise, through avoiding excessive revving, and avoidance of impact with solid objects.
- Maintenance of equipment. Regular maintenance of stationary and mobile equipment, including off-site vehicles. By maintaining equipment, noise emissions from older equipment will be similar to that of new equipment.
- Use and siting of equipment. By locating noisy equipment as far away from noise sensitive premises as is practical, distance separation will reduce potential noise impacts. Unloading building materials should be conducted as far away from noise sensitive premises as possible.
- Machines/equipment which discharge noise in a certain direction should be orientated away from residential properties to minimize noise annoyance.
- Machines/equipment should be turned off when not in use or throttled down to a minimum.
- All onsite roads be well maintained (no potholes) and levelled as required to minimise truck bounce as they move around the site.
- Drainage grating over trafficable areas be well secured to prevent them rattling when a vehicle traverses over the grate.
- Assign the task of managing noise emissions to a person (the ‘responsible person’) that is contactable at all times (e.g. 24 hours per day), and is likely to be present on-site most of the time that activity is occurring. This person would be responsible for handling noise complaints sensitively, and ensuring that work does not commence before the times specified above. The ‘responsible person’ should maintain a Noise Complaint Record, with an example recording form attached to this report.
- The ‘responsible person’ should also conduct regular observations of noise levels from the construction activities. Should any noise sources be identified as being able to be practically relocated further away from the residential area, the ‘responsible person’ should undertake to have the source relocated.
- Providing local residents with an indicative schedule of the works program, in particular, a clear notification of the times when new or noisy activities are to be conducted proximate to the residential premises. This notification should also include contact details of the ‘responsible person’ should residents wish to discuss the onsite activity.

## **7.0 DISCUSSION & CONCLUSIONS**

### **7.1 Onsite Commercial Activity Noise**

It is noted that we have assessed the worst case situation with the noise sources at the nearest location to receivers and the worst case noise source for a commercial node.

The commercial area has basic noise mitigation measures integrated into the general design, with buildings located such that they screen the most active parts of the commercial area to the residential areas. This is achieved through locating the car parking in the centre of the area, with the commercial buildings around the perimeter of the parking area. By locating loading and car parking within this partially screened (and well separated by distance) location, less acoustic treatments are required.

The Tavern and Community Hall are located away from residential premises, with the nearest residential uses being the retirement community. As these retirement buildings will be multi-unit design, there are opportunities to locate open space areas away from the Tavern, and treat the buildings upon detailed design stage.

### **7.2 Road Traffic Noise**

The road traffic noise impacts from the local road network are predicted to be within 1 dB(A) of the noise criterion at the nearest residential dwellings with the exception of Hendersons Lane. As the average person cannot typically detect a 3 dB(A) variation in sound pressure level; a 1 dB(A) exceedance is unlikely to cause annoyance. For outdoor recreation areas, physical screening provided by residential dwelling building envelope will provide further screening of traffic noise to within compliant levels, provided they are located on the opposite side of the dwellings to the road. Further, standard building construction will be sufficient to achieve the indoor criteria as specified in AS/NZ2107.

Road traffic noise impacts from Henderson Lane are predicted to be above the noise criterion; however the increased noise from traffic associated from the development is not predicted to increase noise levels by more than 2 dB(A).

We have provided best practice acoustic treatments in Section 6, for those dwellings fronting the local road network, to minimise road traffic noise intrusion.

### **7.3 Construction Noise**

Ballina Shire Council generally apply conditions under the development approval that limit hours of operation, and in the event of a bona fide noise complaint, require that the activity should not exceed the background noise level + 15 dB for activities occurring during daytime hours. We have assessed background noise levels during the daytime, and conclude that the criteria would be approximately 60 dB(A) for daytime.

Based upon the assumed noise source levels, it is not possible to strictly comply with the “background + 15” criteria for all potential activities such as hammering, nor has any construction site within 200m of an existing residential premises ever complied with the criteria (assuming a noise limit of 60 dB(A), and an unobstructed line of sight from source to receiver).

The key to managing noise impacts is to ensure that all practical steps are taken to minimise noise from the site – if the residents adjacent are aware that the Builder is mindful of noise impacting upon their residential premises, they will tend to be less annoyed than if they feel no regard is made as to their amenity. Good communication is an important factor in managing noise from the site, as a good relationship between the Builder and the residents will further ensure that should an issue arise, it can be dealt with in a reasonable manner.

There are limited practical options for control of onsite activity noise, apart from the management principles listed in Section 6.3, above, but it must be noted that the recommended treatments are considered 'best practice' in terms of management of noise for building activities.

Further, given that construction activities are likely to run for an extended period, it would be advantageous to keep surrounding residents and commercial operators abreast of the works progress; and give prior notice of any activities which may cause unexpected noise intrusion. In the unlikely event of a noise complaint, the complaint must be dealt with sensitively and respectfully, with the noise abated as soon as possible.

Report Compiled by:

A handwritten signature in black ink, appearing to read 'M Lopez', is positioned above the printed name.

**Matthew Lopez** BEng  
Consultant



## APPENDIX

**Figure No. 1: Subject Site & Logger Location**





Figure No. 2: Subject Site Layout & Locale



- Neighbourhood Centre
- Retirement Village/  
Low-medium density housing
- Residential
- Community Use
- Park

#### Keynotes

- |                              |                                  |
|------------------------------|----------------------------------|
| 1. Neighbourhood Centre      | 9. Hutley Drive south            |
| 2. Retirement Community      | 10. Montwood Drive link          |
| 3. Central Pond              | 11. Stoneyhurst Drive link       |
| 4. New brook and linear park | 12. Central residential precinct |
| 5. Sports facilities         | 13. North west residential       |
| 6. Fig tree parks            | 14. Northern ridge residential   |
| 7. Link to Henderson Farm    | 15. Eastern slope residential    |
| 8. Hutley Drive north        | 16. Southern residential         |



Figure No. 3: Commercial Node Site Layout



*The Neighbourhood Centre*

Keynotes

1. Main Street
2. Hutley Drive
3. Retail core
4. Tavern
5. Medical centre
6. Arts business centre
7. Childcare centre
8. Assisted Living facility
9. Offices/service businesses
10. Home-based businesses
11. Rear parking

## Traffic Noise 1 hour LAeq

SEL = 70.8 11914923.52

794328.2347

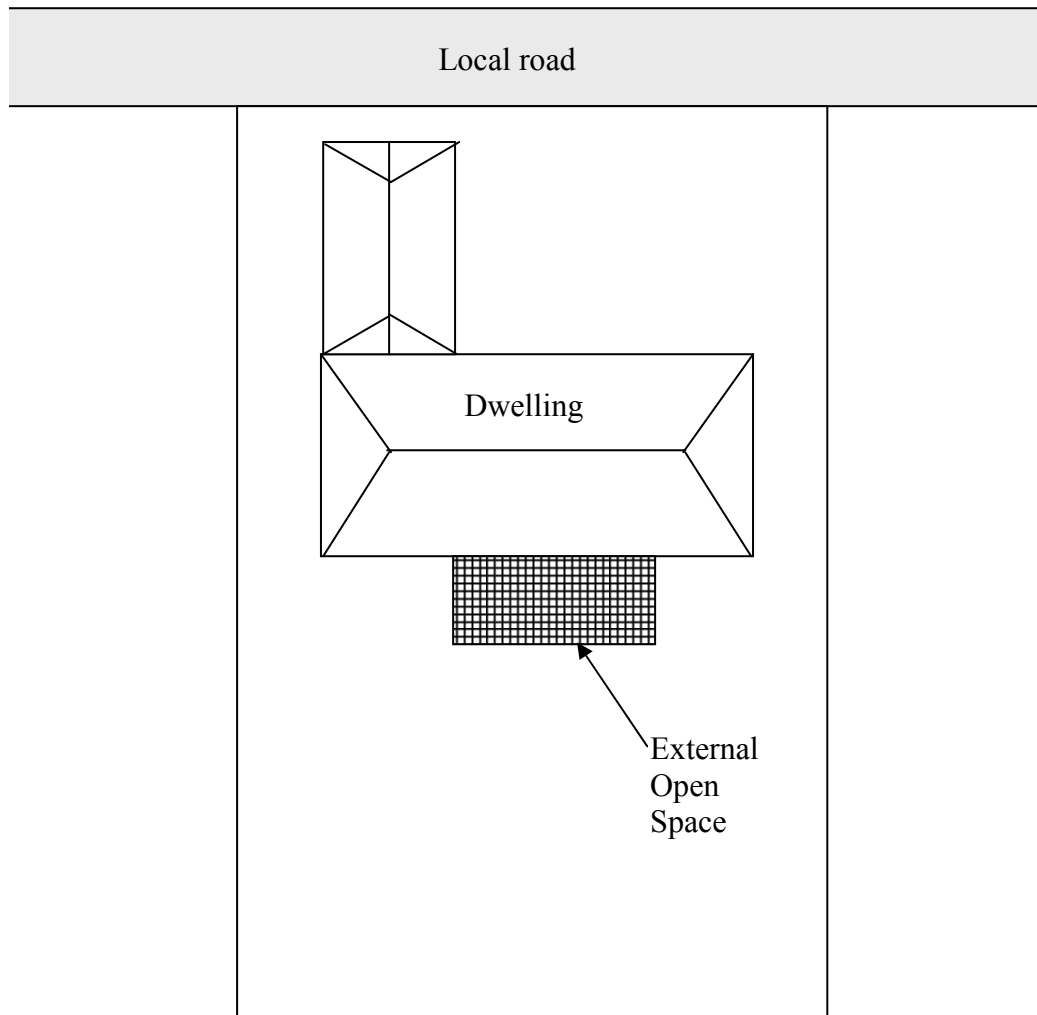
LAeq (pass) = 59.0 dB(A) 15 sec LAeq

SEL x number of cars = 1715748987 92.34453751 3600 seconds per hour  
144 number of cars per hour

LAeq 1hr = 56.8 dB(A)

Façade corection = 59.3 dB(A)

**Sketch No. 1: Indication of Dwelling Orientation adjacent to local road**



Manually unloading truck in commercial centre	76	dB(A) Leq @ 1m
Distance to receiver	55	m
Distance attenuation	-34.8	dB(A)
Obstructions		dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	43.7	dB(A)
Patrons inside restaurant/café	73	dB(A) Leq @ 1m
Distance to receiver	25	m
Distance attenuation	-28	dB(A)
Inside to outside	-10	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	37.5	dB(A)
Patrons restaurant/café Alfresco	73	dB(A) Leq @ 1m
Distance to receiver	20	m
Distance attenuation	-26	dB(A)
Obstructions	0	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	49.5	dB(A)
Car door closure at grade parking commercial	76	dB(A) Leq @ 1m
Distance to receiver	55	m
Distance attenuation	-34.8	dB(A)
Obstructions	0	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	43.7	dB(A)
Low level amplified music in Tavern	100	dB(A) Leq @ 1m
Distance to receiver	75	m
Distance attenuation	-37.5	dB(A)
Inside to outside closed doors	-25	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	40.0	dB(A)
Manually unloading truck at Tavern	76	dB(A) Leq @ 1m
Distance to receiver	75	m
Distance attenuation	-37.5	dB(A)
Obstructions	0	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	41.0	dB(A)
Low level amplified music in Community Hall	100	dB(A) Leq @ 1m
Distance to receiver	30	m
Distance attenuation	-29.5	dB(A)
Inside to outside closed doors	-35	dB(A)
Façade reflection	2.5	dB(A)
Impact at façade	38.0	dB(A)

#### NEAREST POINT TO RECEIVER

Hammering scaffold	110.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>94.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>87.0</b>	<b>dB(A) L10</b>

Excavator	98.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>82.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>75.0</b>	<b>dB(A) L10</b>

Road truck	95.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>79.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>72.0</b>	<b>dB(A) L10</b>

Road truck	85.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>69.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>62.0</b>	<b>dB(A) L10</b>

Compressed air nail gun	92.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>76.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>69.0</b>	<b>dB(A) L10</b>

Jack Hammering	103.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	10.0	m
Distance attenuation	-18.0	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>87.5</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>80.0</b>	<b>dB(A) L10</b>

#### FURTHEREST POINT TO RECEIVER

Hammering scaffold	110.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>66.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>59.2</b>	<b>dB(A) L10</b>

Excavator	98.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>54.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>47.2</b>	<b>dB(A) L10</b>

Road truck	95.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>51.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>44.2</b>	<b>dB(A) L10</b>

Road truck	85.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>41.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>34.2</b>	<b>dB(A) L10</b>

Compressed air nail gun	92.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>48.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>41.2</b>	<b>dB(A) L10</b>

Jack Hammering	103.0	dB(A) L10
Distance from source	1.0	m
Distance to receiver	350.0	m
Distance attenuation	-45.8	
Obstructions	0.0	dB(A)
Façade reflection	2.5	dB(A)
<b>Impact at façade</b>	<b>59.7</b>	<b>dB(A) L10</b>
<b>Impact inside</b>	<b>52.2</b>	<b>dB(A) L10</b>

## NOISE COMPLAINT RECORD

### Initial Complaint Recording

Date & Time of record: \_\_\_\_\_

Name \_\_\_\_\_ of \_\_\_\_\_ Complainant \_\_\_\_\_ (if \_\_\_\_\_ given):

Complainant \_\_\_\_\_ Telephone \_\_\_\_\_ Number: \_\_\_\_\_

Address of complainant (if given): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Identification and description of noise source (e.g. hammering between 10am and 4pm): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Time \_\_\_\_\_ of \_\_\_\_\_ day \_\_\_\_\_ noise \_\_\_\_\_ is \_\_\_\_\_ occurring:  
\_\_\_\_\_

Number of days the noise has occurred: \_\_\_\_\_

### Complaint Investigation & Remediation

Liaison with noise source operator: \_\_\_\_\_

Recommended \_\_\_\_\_ control \_\_\_\_\_ (e.g. \_\_\_\_\_ relocate \_\_\_\_\_ plant):  
\_\_\_\_\_

Verification \_\_\_\_\_ that \_\_\_\_\_ noise \_\_\_\_\_ controls \_\_\_\_\_ have \_\_\_\_\_ been \_\_\_\_\_ implemented:  
\_\_\_\_\_

### Follow-up Complainant

Contact \_\_\_\_\_ date: \_\_\_\_\_

Complainant comment (e.g. is noise still annoying ? – if yes, refer to Note below): \_\_\_\_\_

### NOTE

If complainant is still affected after all reasonable steps have been taken to ameliorate the noise, specialist advice should be sought from a qualified acoustical consultant.



CARTER RYTENSKILD GROUP  
Traffic and Acoustical Consultants

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