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**Environmental Noise Assessment
"The Kingscliff Resort"
Casuarina Way, Kingscliff**

ACOUSTIC REPORT

Prepared For:
Leighton Properties

Date Prepared:

9 October 2009

TTMref: 24889 R10 Kingscliff Resort

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1. EXECUTIVE SUMMARY

This acoustic assessment has considered noise generated by the development and also traffic noise from Casuarina Way impacting the development.

Noise generated by the proposed development is assessed against the noise criteria outlined in the NSW Industrial Noise Policy. Traffic noise impact is assessed against the criteria outlined in the NSW Department of Environment and Climate Change document '*Environmental Criteria for Road Traffic Noise 1999*'.

At the time of ambient background noise monitoring, Casuarina Way was closed to through traffic due to construction works at the Cudgen Creek Bridge. Due to the absence of traffic noise during the monitoring period, background noise levels comprised predominately of surf noise. Therefore, the established assessment criteria are expected to be conservative. Traffic noise monitoring was conducted when the roadway reopened, with the results included in the report.

Noise levels from vehicle activity and patron activity are predicted to comply with the noise criteria when assessed at neighbouring receivers. This is due to adequate separation distance from internal driveways and car-parks. Noise from activities such as waste collection may exceed the criteria at the nearest receivers, and as such are recommended to be limited to the day period to reduce the potential for sleep disturbance.

To mitigate road traffic noise at the development, acoustic treatments are specified in accordance with AS3671:1989 to achieve the internal noise limits outlined in AS/NZS2107:2000.

Detailed mechanical plant designs are not yet available and as such we have recommended that a mechanical plant assessment is conducted prior to building approval to ensure with the noise limits specified in Section 6.1 of this report.

Provided the recommendations in Section 9 are implemented, the development can be designed to comply with the relevant noise criteria outlined in Section 6.

2. INTRODUCTION

TTM Consulting Pty Ltd has been engaged by Leighton Properties to undertake an environmental noise assessment of a proposed resort development located at Lot 490 Casuarina Way, Kingscliff. This report addresses the acoustic issues required by the New South Wales Department of Planning in the Director General's requirements.

The assessment is based on the following:

- Site Plan by JMA Architects Queensland Pty Ltd (*job: 1040 drawing: MP01.3, Issue B, dated 25/08/2009*).
- Masson Wilson Twiney traffic report (ref: *083725r02_TIA_Revision_2009-05-13, 13 May 2009*).
- Noise measurements, site inspection, analysis and predictions by TTM Acoustics.

The report includes the following:

- Description of the subject site and proposal.
- The identification of potentially affected residents.
- Establishment of the existing background noise environment at the site.
- Statement of assessment criteria relating to noise associated with the development and road traffic noise.
- The identification of potential noise sources and the predicted noise levels at identified receiver locations.
- Road traffic noise assessment and predictions from Casuarina Way, accounting for a ten year planning horizon.
- Details of any recommendations that should be incorporated into the development to minimise noise at potentially affected receivers.
- Details of any recommendations that should be incorporated into the development to minimise traffic noise intrusion.

3. SITE DESCRIPTION

3.1. Site Location

The subject site is located at Lot 490 Casuarina Way, Kingscliff. Figure 1 below details the subject site location.

Figure 1: Site and Noise Monitoring Locations



3.2. Proposal

The proposal is to construct a tourism resort consisting of the following:

- Attached and detached dwellings.
- Resort facilities located on the north of the site.
- Pool and BBQ area.
- Children's play area.
- Interpretive centre.
- Landscaped park areas.
- Maintenance and staff buildings.
- At-grade car-parking.

4. EQUIPMENT

The following equipment was used to record noise levels at the site:

- ARL 316 Environmental Noise Monitor (SN # 16-306-013).
- Rion NC 73 Calibrator.

The ARL EL316 Environmental Noise Monitor was field calibrated before and after the monitoring sessions, with no significant drift from the reference signal recorded.

5. METHODOLOGY

5.1. Unattended Noise Monitoring

5.1.1. Ambient Background Noise

An ambient noise survey was performed in order to measure the existing noise environment. The noise monitor was located on the subject site, approximately 5m from the southern site boundary and approximately 50m from Casuarina Way. During the ambient noise measurement period Casuarina Way was a no-through road, due upgrading of the bridge to the north. The noise monitoring location is shown in Figure 1.

Noise monitoring was conducted from Wednesday 24/09/2008 through to Tuesday 30/09/2008.

The noise monitor was set to record noise levels as follows;

- "A" weighting
- "Fast" response
- 15 minute statistical intervals.

Noise measurements were conducted generally in accordance with Australian Standard AS1055:1997 "*Acoustics – Description & Measurement of Environmental Noise*".

Weather conditions during the survey were generally fine. The temperature ranged from 11°C to 28°C over the measurement period (Source: Bureau of Meteorology Coolangatta 2008).

5.1.2. Road Traffic Noise

Noise monitoring was conducted a second time once Casuarina Way was re-opened in order to measure the existing road traffic noise. Monitoring was conducted between Tuesday 25/08/2009 to Wednesday 2/09/2009.

The traffic noise monitor was located directly north of the site, along Casuarina Way. The microphone was in a free-field position, approximately 7m from the nearest lane of the road, and 1.3m above natural ground level. For the noise monitoring location refer to Figure 1.

The noise monitor was set to record noise levels as follows;

- "A" weighting
- "Fast" response
- 15 minute statistical intervals.

Road traffic noise monitoring was conducted generally in accordance with Australian Standard AS2702:1984 *'Acoustics - Methods for the Measurement of Road Traffic Noise'*.

Weather conditions during the road traffic noise survey were generally fine. The temperature ranged from 6°C to 30°C over the measurement period (Source: Bureau of Meteorology 2009).

5.2. Noise Source Measurement

Noise source levels from similar investigations for vehicle and people activity were used in this assessment. The measurements were conducted generally in accordance with Australian Standard AS1055: 1997 *"Acoustics – Description & Measurement of Environmental Noise"*.

6. NOISE CRITERIA

6.1. Environmental Noise

On-site noise sources from commercial premises are regulated by the NSW Industrial Noise Policy, published by the NSW Department of Environment and Climate Change (formerly known as Environmental Protection Authority). On-site noise sources investigated under the Policy are as follows:

- Car park activity;
- Mechanical plant; and
- Truck movements and deliveries.

The assessment procedure has two components:

1. Control of intrusive noise impacts. The limit criteria for this assessment is;

$$L_{Aeq, 15 \text{ min}} \leq \text{Rating Background Level} + 5 \text{ dB};$$

2. Maintaining noise level amenity. This is achieved by ensuring that the proposed development complies with the noise limit criteria set in Table 2.1 of the Industrial Noise Policy.

6.1.1. Amenity Criteria

The amenity criterion is intended to limit the absolute noise generation from all sources to a level that is consistent with the general environment and land use. The Industrial Noise Policy sets out acceptable noise levels for various locations. Table 2.1 on page 16 of the Industrial Noise Policy specifies categories for receiver locations including rural, suburban, urban and urban/industrial interface (for existing situations only). Under the policy the nearest residences would be assessed against the suburban criteria.

The acceptable noise levels based on the suburban category and the measured logger data, are shown in Table 1 below.

Table 1: Amenity criteria-residential

Time period	Criteria $L_{eq}(\text{period})$
Daytime (7am-6pm Mon-Sat; 8am-6pm Sun)	47
Evening (6pm-10pm)	38
Night (10pm-7am Sun-Fri, 10pm-8am Sat)	36

6.1.2. Intrusive Noise Criteria

The intrusive noise criteria requires that the $L_{eq(15\text{ min})}$ associated with commercial activity should not exceed the measured RBL (L_{90} rating background level) +5 dB(A). An adjustment factor should also be added where appropriate to allow for tonality, impulsiveness, and intermittency or low frequency characteristics.

Table 2: Intrusive noise criteria

Time period	Criteria $L_{eq(15\text{min})}$ dB(A)
Daytime	46
Evening	46
Night	44

6.2. Road Traffic Noise

Road traffic noise from Casuarina Way is assessed under the DEC (formally Environmental Protection Authority) of NSW. The applicable criterion is referenced from the '*Environmental Criteria for Road Traffic Noise 1999*' document.

Table 1 of the policy lists the traffic noise criteria for residential land use developments affected by arterial traffic noise to be assessed as:

- 55 dB(A) $L_{eq(15\text{ hour})}$ (7am-10pm); and
- 50 dB(A) $L_{eq(9\text{ hour})}$ (10pm-7am).

The above levels include 2.5 dB(A) for noise reflected from building façades.

Where the above limits cannot be met, buildings should be designed to comply with the internal noise levels outlined in Australian Standard AS/NZS 2107:2000 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

7. ENVIRONMENTAL NOISE

Noise emissions from the development are predicted to the nearest receivers. These noise levels have been compared to the noise objectives determined using the criteria set out in Section 6.

7.1. Noise Source Levels

Noise measurements were performed using a Casella CEL593 sound level meter. The sound level meter was calibrated before and after the measurements using a Rion NC-73 calibrator. No significant drift was recorded.

Table 3: Noise sources

Noise Source	Noise Level dB(A) at 1m	Type of Noise Source
Car Door Closure	77 L _{max}	Transient
Car Passby	78 L _{max}	Transient
Truck Operation	85 L _{max}	Transient
Truck Reverse Alarm*	95 L _{max}	Transient
Band playing in function room	95 L _{max}	Transient
Waste Collection	94 L _{max}	Transient

* Note a 5 dB(A) penalty has been applied to this source to account for the tonal characteristic of noise produced.

Noise levels for voice are based on published data contained in *Harris CM, Handbook of Acoustical measurements and Noise Control – 3rd ed. Ch 16.3, Mc-Graw-Hill Inc.* The average A-Weighted Sound Levels (long term averages) of speech for different individual vocal efforts under quiet conditions at a distance of 1 metre are as follows;

Table 4: Voice Noise Levels

Vocal Effort	Male dB(A)	Female dB(A)
Casual	53	50
Normal	58	55
Raised	65	62
Loud	75	71

The voice levels used for assessment are from the "Loud" category with an associated noise level of 75 dB(A) for an individual male.

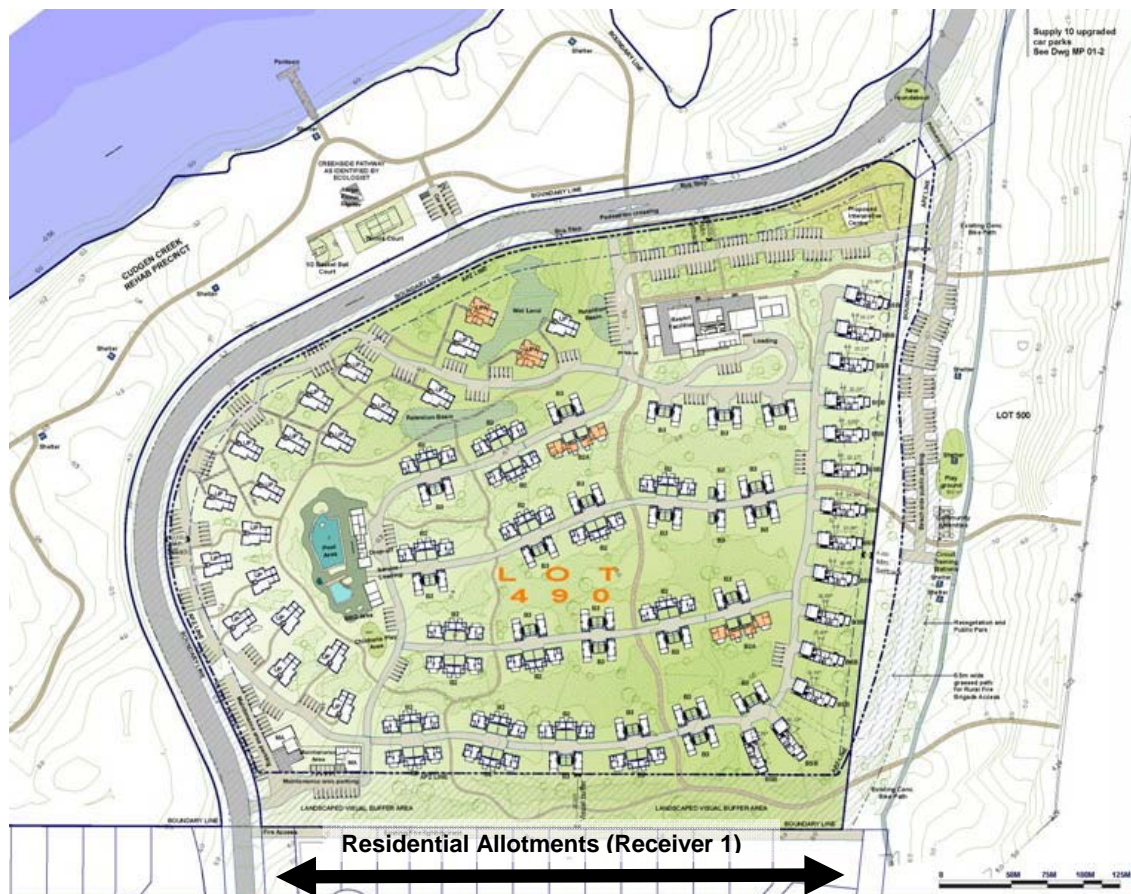
The overall maximum voice source levels for the development are dependent on the number of patrons/ visitors using the relevant areas.

7.2. Noise Levels At Offsite Receivers

7.2.1. Receiver Locations

Figure 2 below shows the nearest receiver locations. The nearest receivers are located on Cathedral Court to the immediate south, and include two storey dwellings, with ground level elevated above the subject site by approximately 1.5m. Bushland is located to the west and north of the site, and the ocean to the east of the site.

Figure 2: Receiver Location



7.2.2. Intrusiveness (Leq 15min)

$L_{eq(15min)}$ noise levels are based on the number and type of events occurring within the period. The number of peak hour passenger vehicle trips using the car spaces nearest to Receiver 1 is estimated to be 3 per 15-minute period. Waste collection is based on 1 vehicle in a 15 minute period, and voice upon a typical 5 minute conversation in any 15 minute period.

The predicted L_{eq} noise levels at the receiver locations, based on peak usage of the site, are as follows;

Table 5: Predicted Leq noise levels

Noise Source	Predicted Noise Level dB(A) $L_{eq 15min}$ at Receiver Location
Car door closures (12 events)	34
Car passbys (3 events)	35
Waste collection (1 event daily)	54
Voice at Maintenance and staff buildings (5min in any 15min period)	43
Voice at pool (continuous)	32
Truck in loading bay (1 continuous 15min period daily)	44
Truck reverse beeper (50% of a 5min period daily)	46
Alfresco Dining (continuous)	19
Band playing in function room (continuous)	38

7.2.3. Amenity (L_{eq} (time period))

L_{eq} noise levels are based on the number and type of events occurring within the day, evening, or night period. Waste collection and truck deliveries are based on 1 vehicle in any period (i.e. one collection during the daytime, evening, or night time).

The predicted L_{eq} noise levels at the receiver locations over the day, evening, and night periods are shown in Table 6;

Table 6: Predicted Amenity L_{eq} noise levels

Noise Source	Predicted Noise Level dB(A) L_{eq} (T, period) at Receiver Location		
	L_{eq} (daytime)	L_{eq} (evening)	L_{eq} (night)
Car door closures (12 events per 15min)	33	22	22
Car passbys (3 events per 15min)	35	24	24
Waste collection (1 daily event)	38	42	38
Voice at Maintenance and staff buildings (33% of time)	42	38	35
Voice at pool (continuous during day and evening)	33	33	28
Truck in loading bay (15min period daily)	29	32	28
Truck reverse beeper (50% of 15min period)	31	34	30
Alfresco Dining (day and evening continuous, night until close of business)	<25	<25	<20
Band playing in function room (2 hours continuous)	36	36	31
TOTAL COMBINED NOISE	46	45	41

7.2.4. Summary

The bulk of onsite activity noise is predicted to comply with the intrusive, amenity, sleep arousal, criteria due to adequate separation distance. The resort facilities, interpretive centre, pool, BBQ and children playground would have adequate separation distance to the existing residents to the south.

8. ROAD TRAFFIC NOISE

8.1. Casuarina Way Traffic Volumes

8.1.1. Existing Flow

The existing traffic volumes for Casuarina Way were obtained from Tweed Shire Council (correspondence dated 3/09/2009). The year 2007 traffic count is as follows;

Surveyed (2007) Traffic Volume: 4,100 vehicles AADT, 5% heavy vehicles.

8.1.2. Future Flow

Future traffic volumes for Casuarina Way were obtained from the Masson Wilson Twiney traffic report (ref: 083725r02_TIA_Revision_2009_05_13, 13 May 2009). The predicted daily traffic volume, including generation by the development, is;

2022 Traffic Volume: 7,376 vehicles AADT, 5% heavy vehicles

A traffic survey conducted between Viking Street and Elliston Street was obtained in hourly periods and used to determine the hourly traffic volumes for use in the noise model.

Table 7: Hourly traffic - Casuarina Way

Time	Percentage % of Daily traffic
0:00 - 1:00	0.3
1:00 - 2:00	0.1
2:00 - 3:00	0.1
3:00 - 4:00	0.1
4:00 - 5:00	0.2
5:00 - 6:00	0.8
6:00 - 7:00	2.8
7:00 - 8:00	5.2
8:00 - 9:00	8.2
9:00 - 10:00	7.3
10:00 - 11:00	7.6
11:00 - 12:00	8.4
12:00 - 13:00	7.7
13:00 - 14:00	7.6
14:00 - 15:00	8.2
15:00 - 16:00	9.4
16:00 - 17:00	7.5
17:00 - 18:00	6.8
18:00 - 19:00	4.6
19:00 - 20:00	2.4
20:00 - 21:00	1.7
21:00 - 22:00	1.5
22:00 - 23:00	0.9
23:00 - 24:00	0.5

8.2. Measured Noise Levels

Table 8 below present the measured road traffic noise levels recorded on Wednesday 26 August 2009.

Table 8: Measured Road Traffic Noise Levels

Road Traffic Noise Descriptor	Time Period	Measured Levels dB(A)
L _{10,18hr}	6am to midnight	65
L _{eq, 15 hour}	7am to 10pm	64
L _{eq, 9 hour}	10pm to 7am	56

Graphical presentation of the measured road traffic noise levels is presented in Appendix B.

8.3. Noise Model Verification

Road traffic noise predictions were conducted using "TNoise", a CoRTN based model deemed acceptable under the Environmental Protection (Noise) Policy. To verify the road traffic noise prediction model, the L_{A10, (18hr)} traffic noise levels are typically calculated and compared to the measured noise levels.

The predicted L_{10, 18hr} existing noise level compared to the measured level is presented in Table 9. As the noise monitor was in a free-field position, the predicted noise level is also given as a free-field level.

Table 9: Comparison of Measured and Predicted Traffic Noise Levels

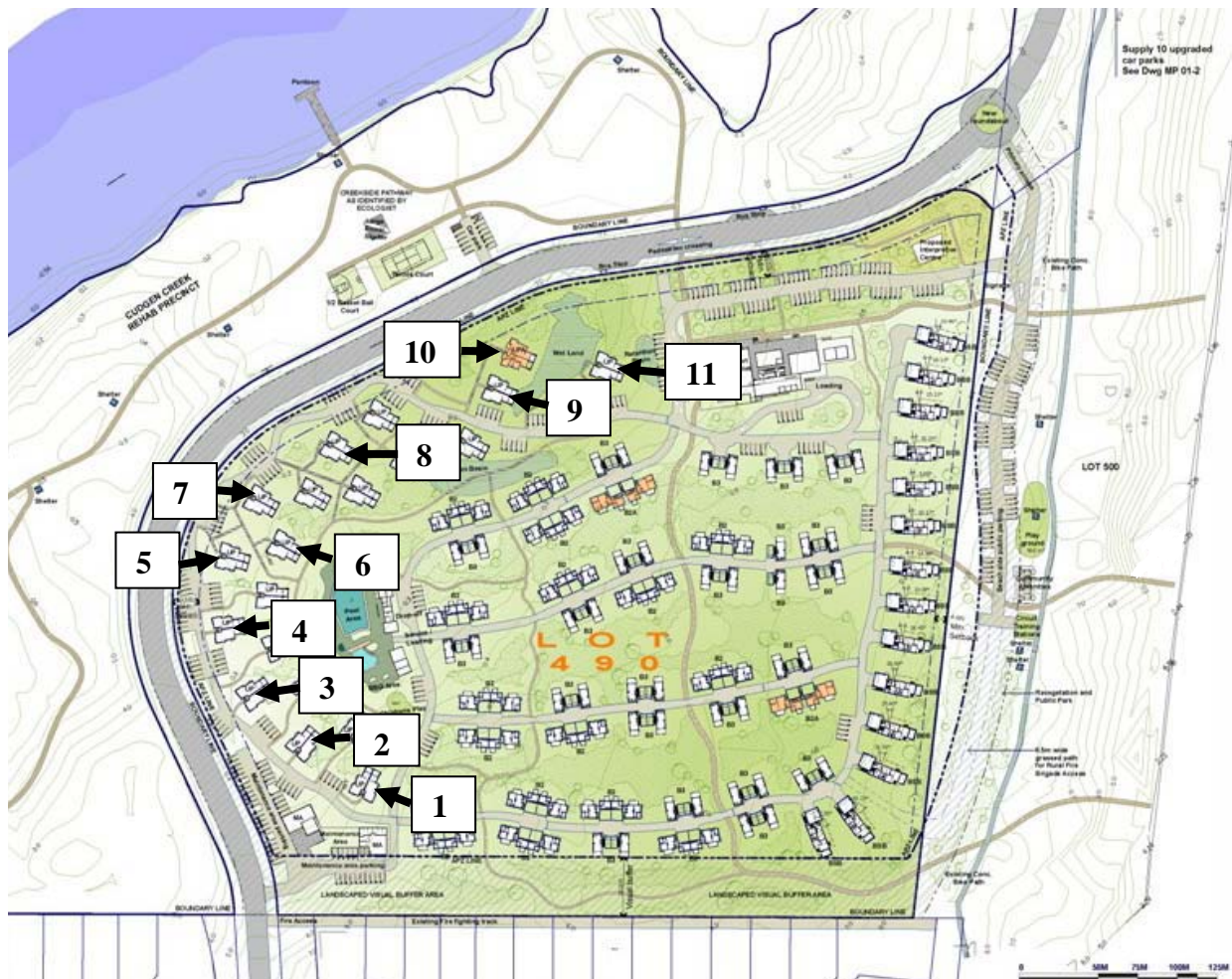
Measured L _{A10,18hr}	Predicted L _{A10,18hr}	Required Correction
65.4	65.5	0

As the modelled levels are within the allowable tolerance of 2 dB (A) of the measured levels, no correction is required to the model. It should be noted that CoRTN calculation methodology tends to over-predict.

8.4. Building Numbering

Figure 3 below details the nominal building numbering used in this assessment.

Figure 3: Nominal Building Numbering



8.5. Predicted Noise Levels

Based on the projected traffic volumes and the proposed development layout, the model predicts year 2022 road traffic noise levels as outlined in Table 10 below.

Table 10: Predicted road traffic noise levels

Building No.	Floor Level	Predicted Noise Level - dB(A)	
		L _{eq} , (15h)	L _{eq} , (9h)
1	Ground	56	48
	First	58	50
2	Ground	59	51
	First	61	53
3	Ground	60	52
	First	62	54
4	Ground	60	52
	First	62	54
5	Ground	60	52
	First	62	54
6	Ground	56	48
	First	58	50
7	Ground	59	51
	First	61	53
8	Ground	60	52
	First	62	54
9	Ground	56	48
	First	58	50
10	Ground	60	52
	First	62	54
11	Ground	56	48
	First	58	50

Noise levels are predicted to be above the criteria for both living and bedrooms of Buildings 2-5, 7, 8 and 10. For Buildings 1, 6, 9, and 11, noise levels are predicted to be above the criteria at living areas.

Therefore, acoustic treatment would be required in order to minimise noise intrusion.

9. RECOMMENDATIONS

9.1. Management Principles

- Deliveries to the main building should be limited to between 7am and 10pm to minimise noise impacts.
- Deliveries to other areas should be limited to between 7am and 6pm.
- Waste collection should be limited to between 7am and 6pm to minimise noise impacts.

Incorporating the above management principles is predicted to result in the amenity noise levels listed in Table 11;

Table 11: Predicted noise levels after the incorporation of management principles

Noise Source	Predicted Noise Level dB(A) Leq (T, period) at Receiver Location		
	L _{eq} (daytime)	L _{eq} (evening)	L _{eq} (night)
Car door closures (12 events per 15min)	33	22	22
Car passbys (3 events per 15min)	35	24	24
Waste collection (1 daily event)	38	-	-
Voice at maintenance and staff buildings (33% of time)	42	-	-
Truck in loading bay (15min period daily)	31	32	28
Truck reverse beeper (50% of 15min period)	33	34	30
Voice at pool (continuous during day and evening)	33	33	28
Alfresco Dining (day and evening continuous, night until close of business)	25	25	20
Band playing in function room (2 hours continuous)	36	36	31
TOTAL COMBINED NOISE	46	40/38*	36

*40dB(A) if deliveries occur on the same evening as a band in the function room. 38dB(A) if deliveries take place without function room noise.

Therefore the predicted noise levels are capable of complying with the amenity criteria of 47 dB(A) day, 38 dB(A) evening and 36 dB(A) night.

9.2. Plant Noise

Detailed plant selections are not available at this stage. Consequently it is not possible to carry out detailed examination of any measures that may be required to achieve compliance with the noise targets. Plant and equipment may require acoustic treatment to prevent noise emissions from adversely impacting the receiver. This may include selecting the quietest plant possible, or treating the plant equipment with enclosures, barriers, duct lining and silencers, etc if required to comply with the assessment criteria.

Experience with similar projects indicates that it is possible to achieve the criteria with appropriate acoustic treatment. This treatment would be determined at the Building Approval/Construction Certificate stage.

9.3. Construction Noise

A construction noise management plan in accordance with the NSW Department of Environment and Climate Change "New South Wales Construction Noise Guideline" (draft, August 2008) may be submitted prior to construction and certification.

9.4. Road Traffic Noise

To maintain consistency with existing residential and commercial development to the south of the subject site, it is preferable to achieve compliance where possible without traffic noise barriers.

Building treatments for road traffic noise are determined by using the calculation methods detailed in Australian Standard AS3671:1989 'Road Traffic Noise Intrusion – Building Siting and Construction'. Building components are to be tightly fitting and acoustically sealed (no gaps or holes) to maintain the acoustic performance of the building. The assessment of road traffic noise is based on $L_{eq (15hr)}$ for noise to living areas (day and evening) and $L_{eq (9hr)}$ for noise to bedrooms (night).

Buildings and rooms that are not listed in the recommendations below do not require any additional acoustic treatment.

9.4.1. Recommended Roof and Ceiling Construction

Based on the proposed building floor plans, as a guide we recommend applying ceiling/roof treatments such as those listed in Table 12.

Table 12: Recommended ceiling/roof treatment

Buildings	Required Ceiling/Roof Treatment	Insulation	Rw
1-11	Pitched metal roof over sloping 10m plasterboard (i.e. raking ceiling), 150mm cavity	-	35-40

9.4.2. Recommended External Wall Construction

Standard construction of dwellings is acceptable at ground floor level. Upper floor levels of buildings 1-11 may be of brick or lightweight construction and be similar to those detailed in Table 13 below.

Table 13: Typical wall treatment

Typical Wall Treatment	Insulation	Min Rw
Conventional masonry or brick veneer	-	40-45
OR		
EPS building system consisting of 40mm Expanded Polystyrene cladding with 8mm render externally, 70mm studs and 10mm plasterboard internally	-	35
OR		
Minimum 7.5mm fibre cement external cladding, 70mm studs, 10mm plasterboard internal	-	35
OR		
Linea Weatherboard Cladding externally, with 70mm studs and 10mm plasterboard internal	-	35
OR		
Hebel FAÇADE wall system. 75mm Hebel power panel, on 92mm studs, with 10mm plasterboard inside	-	45

9.4.3. Recommended Glazing Treatments

Based on the proposed building floor plans, we recommend the glazing treatments listed in Table 14 to the proposed buildings.

The affected external façade windows and doors would need to be closed to achieve the internal noise criteria; therefore all rooms specified with glazing treatments below would require the provision of alternative ventilation to comply with BCA requirements. The design and installation of alternative systems should not reduce the acoustic performance of the building.

Table 14: Recommended minimum glazing treatment

Buildings	Floor Level	Room	Component	Glazing Thickness	Acoustic Seals	R_w
2, 3, 4, 5, 7, 8, and 10	All	Bedrooms	Glazing	4mm Float	No	22
2, 3, 4, 5, 7, 8, and 10	All	Living	Glazing	4mm Float	Yes	27
1, 6, 9 and 11	All	Living	Glazing	4mm Float	No	22

Other buildings and rooms that are not listed in the above table do not require any additional acoustic treatment.

9.4.4. Alternative Ventilation

To achieve the required internal noise levels in noise affected habitable rooms, doors and/or windows would need to be closed. Therefore, provision of alternative ventilation in accordance with BCA requirements should be included in these rooms.

The affected units/rooms would be those habitable spaces listed in Table 14 above. The plant should not reduce the acoustic performance of the building.

10. CONCLUSION

Based on the predicted noise levels generated by the proposed development, recommendations have been provided. Noise from activities such as waste collection may exceed the criteria at the nearest receiver, and as such are recommended to be limited to the day period to reduce the potential for sleep disturbance to guests at the resort. The bulk of on-site activity would comply at off site receivers due to adequate separation distance.

Traffic noise generated by Casuarina Way would be moderate based on the predicted traffic volumes, particularly during the night period. Rooms exposed to predicted traffic noise levels above the criteria have been prescribed with acoustic treatments to achieve the internal noise limits in AS/NZS 2107:2000 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

Mechanical plant requirements for the buildings are not known at this point. Preliminary calculations indicate air conditioning equipment would comply with the assessment criteria during the night period providing that suitable locations are selected. Increasing the separation distance between plant and receivers could reduce the potential for acoustic treatments. Acoustic treatments should be determined at the Building Approval/Construction Certificate stage, or when mechanical services plans are available.

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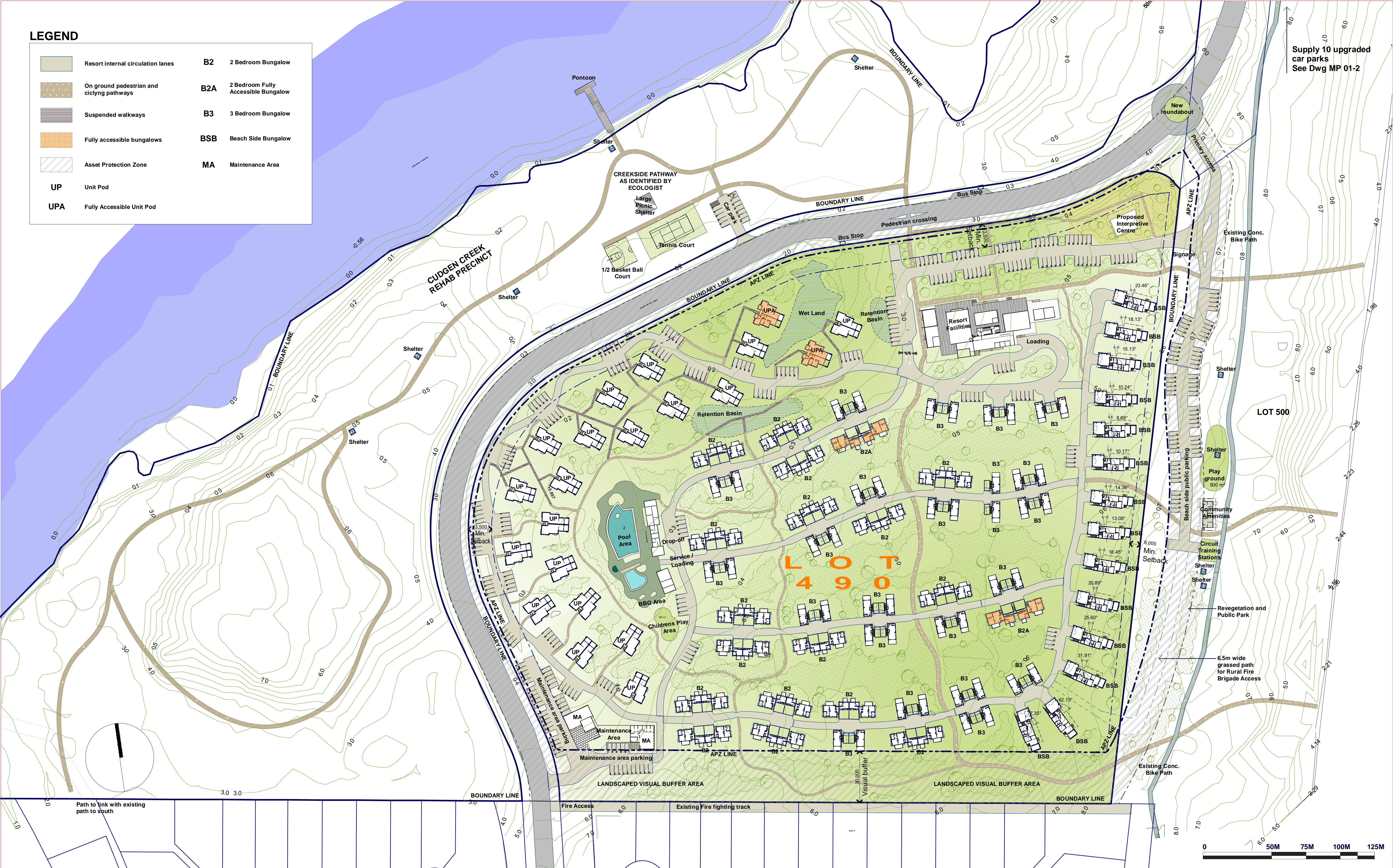
11. APPENDICES

11.1. Appendix A - Development Proposal

LEGEND

- Resort internal circulation lanes
- On ground pedestrian and cycling pathways
- Suspended walkways
- Fully accessible bungalows
- Asset Protection Zone
- UP Unit Pod
- UPA Fully Accessible Unit Pod

- B2 2 Bedroom Bungalow
- B2A 2 Bedroom Fully Accessible Bungalow
- B3 3 Bedroom Bungalow
- BSB Beach Side Bungalow
- MA Maintenance Area



Supply 10 upgraded car parks
See Dwg MP 01-2

AMENDMENTS

REV.	DATE:	DESCRIPTION:	ISSUED BY:
A	02.04.09	NSW DEPT OF PLANNING - DA	NK
B	25.08.09	RE LOCATE PONTOON	TK
C	07.10.09	ADJ. MAIN ROAD TO TRAFFIC ENG. REQ	TK
D	16.10.09	ADJ. ROAD TO MAINTENANCE AREA	TK
E	15.03.10	MP - UPDATE	PL

C COPYRIGHT

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NOTES:

Verify all dimensions on site before the commencement of any new construction work, alterations or shop drawings - take measured dimensions in preference to any scaled dimensions

Comply to the following or any other relevant codes:

- Building Code of Australia
- Local Authorities Rules and Guidelines
- covenants manual
- Apply all applicable AUSTRALIAN STANDARDS where relevant, including:
- Termite Barrier AS 3660.1
- Access and Mobility Codes AS 1428.1 & 1428.2

Larger Scale Drawings Take Precedence to smaller scale

Kingscliff Resort
DEVELOPMENT



LEIGHTON PROPERTIES

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CLIENT. LEIGHTON PROPERTIES

JOB THE KINGSCLIFF RESORT

LOCATION CASUARINA WAY KINGSCLIFF 2487

PROPERTY DESCRIPTION

JOB No. 1040

DATE. OCT 09

SCALE. 1:1000 @A1
50% @A3

DRAWN. NK

CHECKED JMA Architects

DRAWING SET MASTER PLAN
DRAWING TITLE SITE PLAN

DRAWING No: 1040 MP-01-3

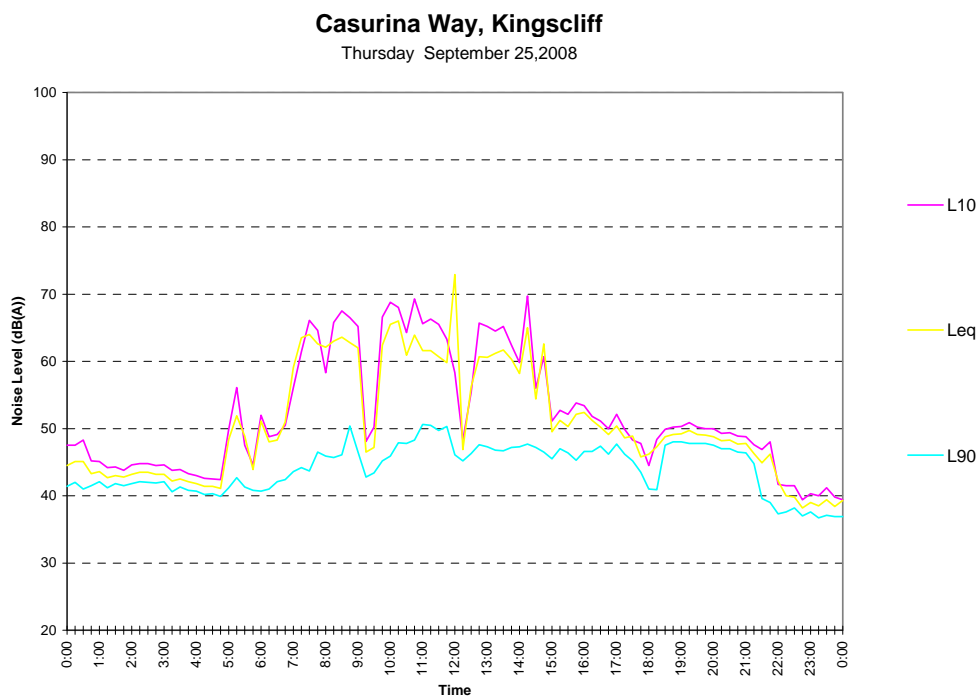
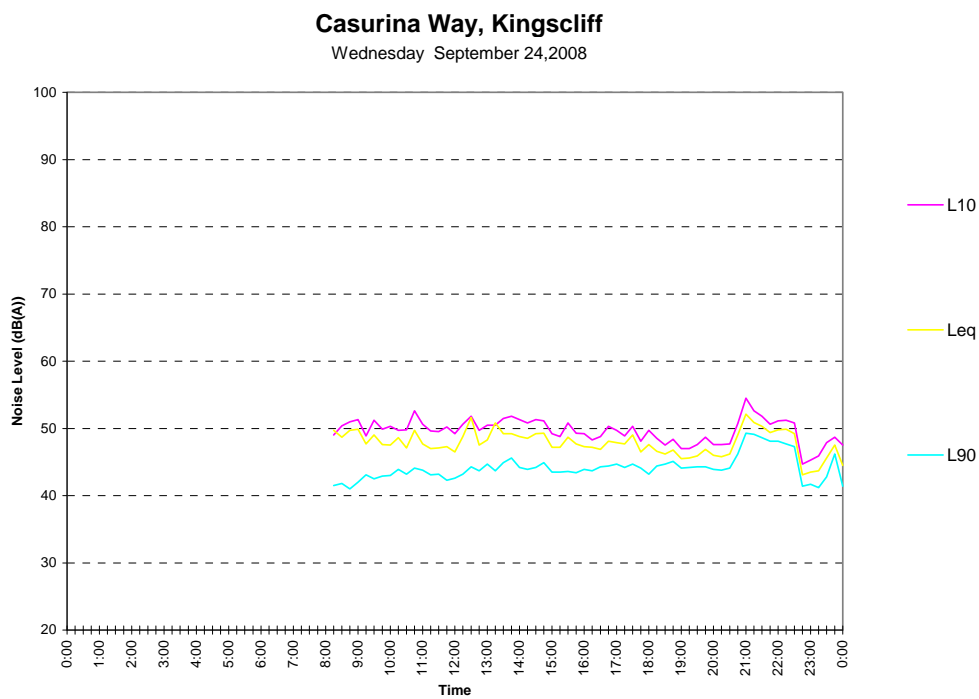
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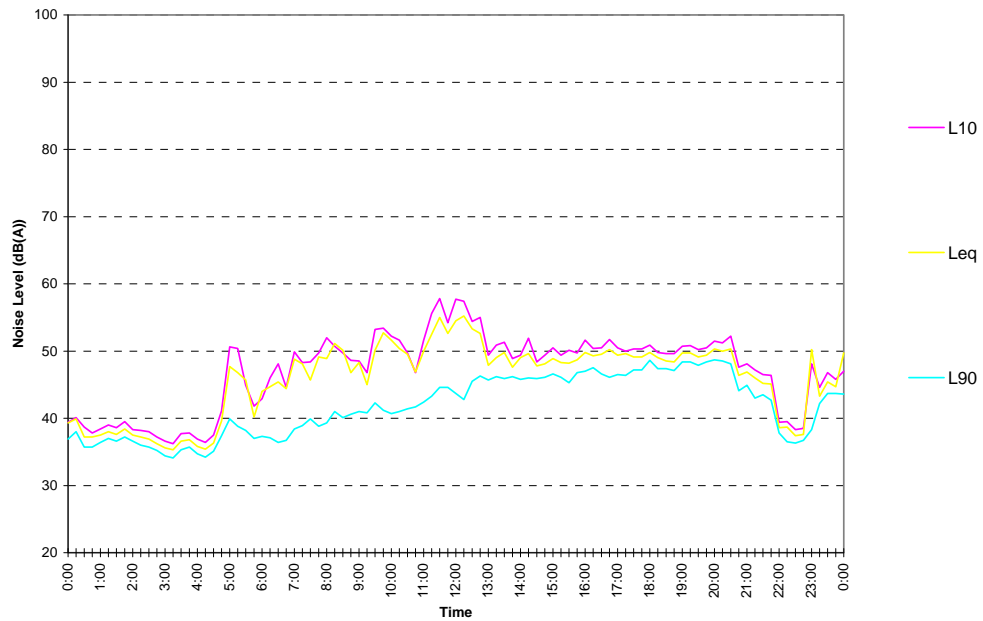
11.2. Appendix B - Noise Measurement Charts

11.2.1. Ambient Background Noise



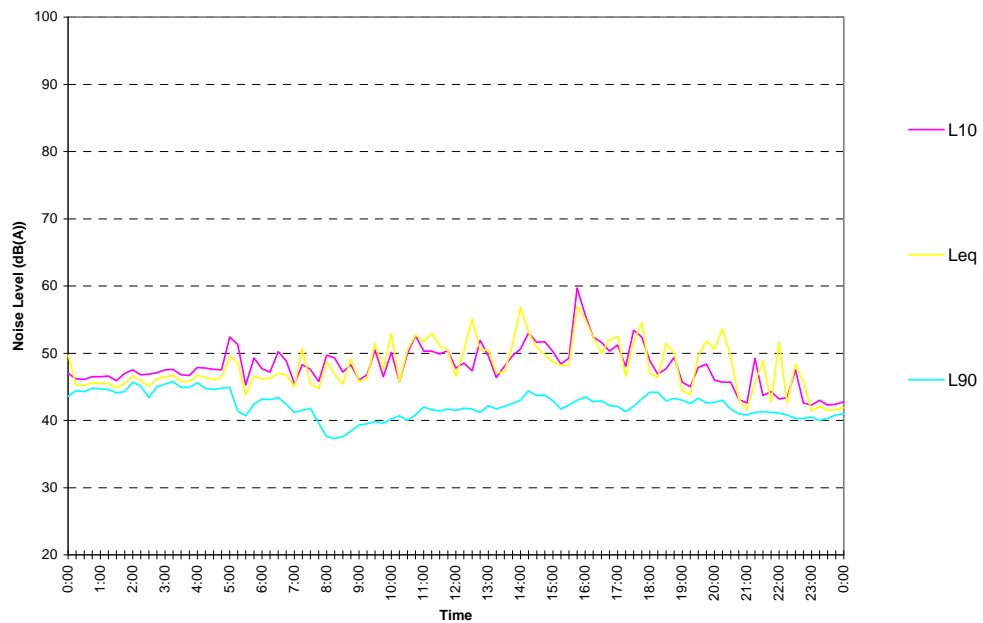
Casurina Way, Kingscliff

Friday September 26, 2008



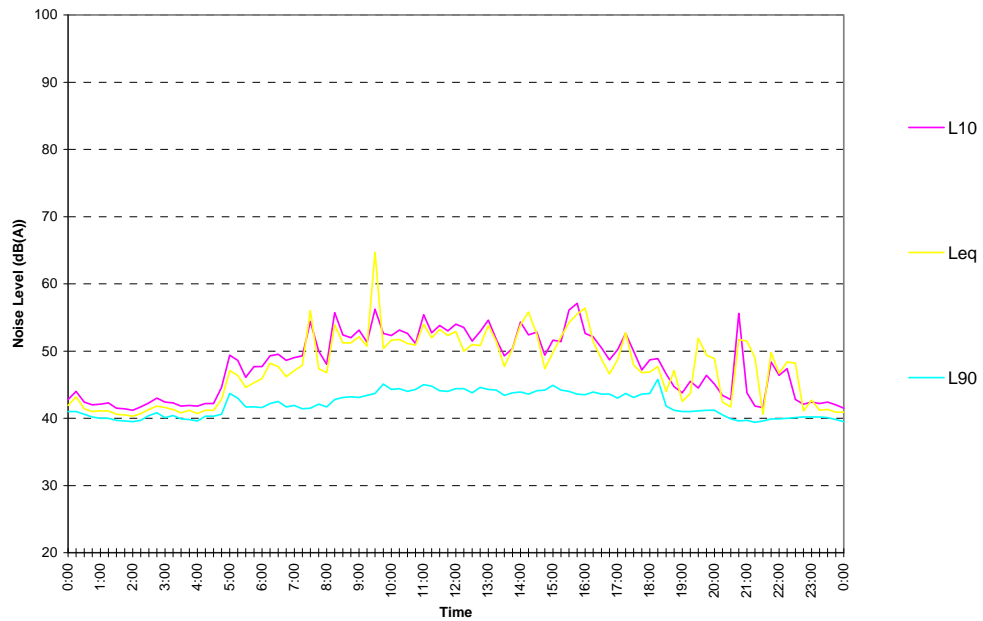
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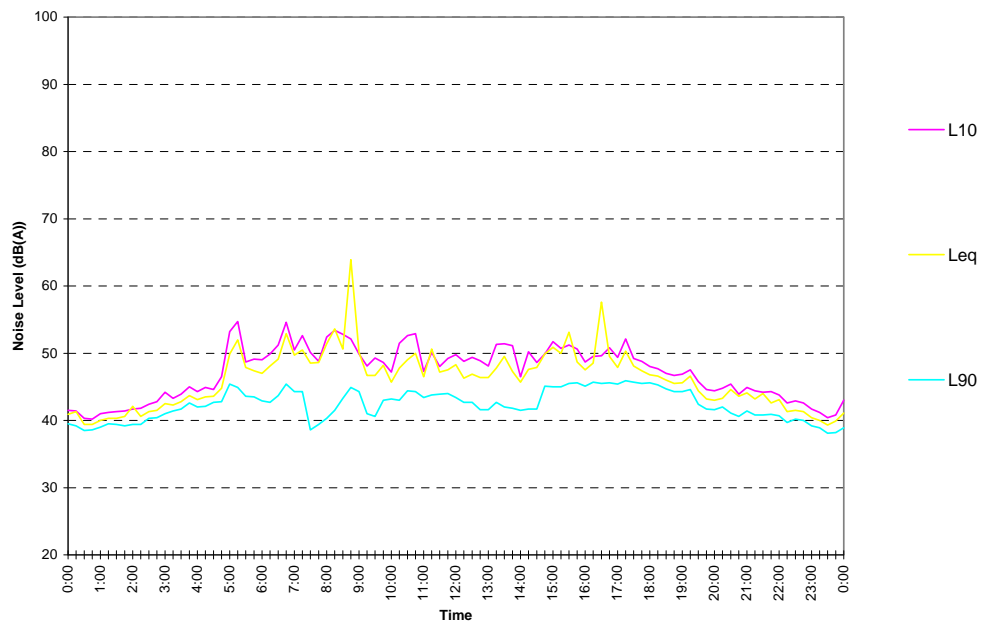
Casurina Way, Kingscliff

Sunday September 28, 2008



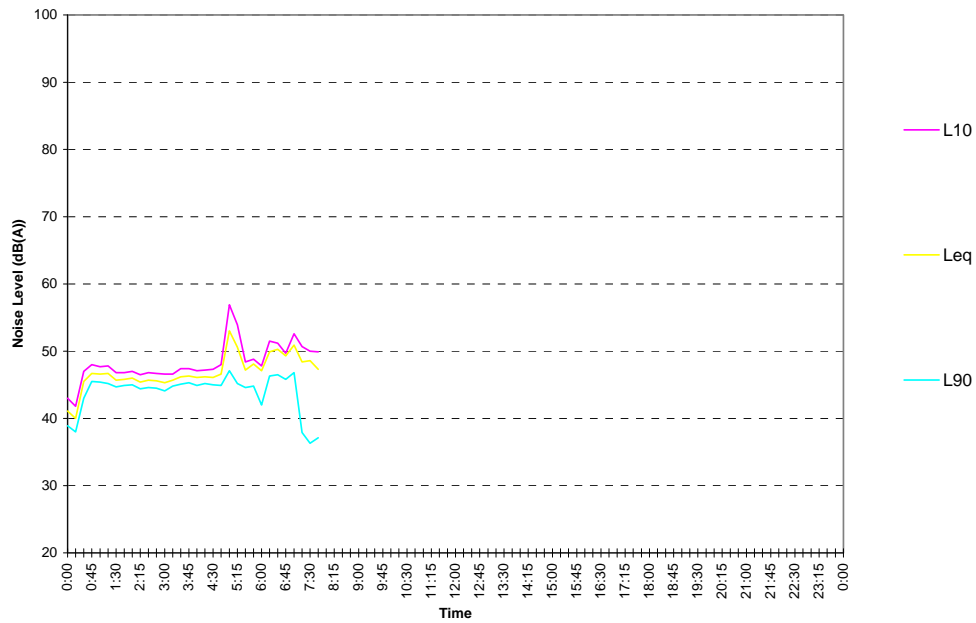
Casurina Way, Kingscliff

Monday September 29, 2008



Casurina Way, Kingscliff

Tuesday September 30, 2008



11.2.2. Road Traffic Noise

