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# Proposed Residential and Tourist Accommodation Development
# Corner Tweed Coast Road and Cypress Crescent
# Cabarita

# ROAD TRAFFIC NOISE REPORT

Prepared For: Tweed Coast Homes Pty Ltd

Date Prepared:

5 March 2010

TTMref: 33519 R03 Cypress Cresent Cabarita.doc

# Table of Contents

# Table Index



# Figure Index

# 1. INTRODUCTION

TTM Group have been engaged by Tweed Coast Homes Pty Ltd to conduct a road traffic noise assessment of a proposed residential and tourist accommodation development at the corner of Tweed Coast Road and Cypress Crescent, Cabarita.

This report is based on the following:

- Development plans by Pat Twohill Designs Pty Ltd (*project: 6005, dated 26/02/2010*).
- Site inspection, noise measurements, analysis and calculations by TTM.

The report includes the following:

- Description of the development site and proposal.
- Establishment of the existing road traffic noise environment at the site.
- The statement of assessment criteria relating to road traffic noise.
- Prediction of future traffic noise levels at the development.
- Details of any recommendations that should be incorporated into the development.

# 2. SITE DESCRIPTION

## 2.1. Site Location

The subject site is described by the following:

*Lots 1-3 DP29748*
*Lot 4 DP31209*
*Corner Tweed Coast Road and Cypress Crescent, Cabarita*

The site is bound by Cudgen Nature Reserve to the north, Tweed Coast Road to the west, Cypress Crescent to the south, and privately owned property to the east. For site location refer to Figure 1 below.

*Figure 1: Site and Noise Monitoring Location*


## 2.2. Proposal

The site is currently used as a caravan park. The plan of development is for a mixture of residential and tourist accommodation units. The development is planned to be 3 storeys in height with car parking at basement level.

Access to the basement ramp will be from Cypress Crescent. Communal outdoor facilities are proposed on the western part of the site.

This assessment has been based on the development plans shown in Appendix A.

## 2.3. Acoustic Environment

The subject site is primarily affected by road traffic noise from Tweed Coast Road which is controlled by the Tweed Shire Council. The road is currently a 2 lane bitumen paved carriageway with a posted speed limit of 50km/h.

TTM have been advised by the Engineering Services Department of Tweed Shire Council that Tweed Coast Road will be upgraded and duplicated within the next ten years. It is expected that following the completion of the road upgrade, the speed limit would be raised to 60 km/h.

# 3. METHODOLOGY

## 3.1. Measurement Equipment

The following equipment was used to record road traffic noise levels:

- ARL EL315 Environmental Noise Logger (SN # 15-203-512).
- Rion NC73 Acoustical Calibrator (SN # 10847023).

The ARL EL315 Environmental Noise Logger holds current NATA Laboratory Certification and was field calibrated before and after the monitoring sessions, with no significant drift from the reference signal recorded.

## 3.2. Unattended Noise Monitoring

Unattended noise monitoring was performed in order to establish the existing road traffic noise levels. The noise monitor was positioned at the subject site approximately 8m from the nearest lane of Tweed Coast Road. The microphone was in a free-field location, 1.4m above ground level, with an unobstructed line of sight to the road. For the noise monitoring location refer to Figure 1.

Noise monitoring was conducted between Thursday 13/08/2009 and Tuesday 25/08/2009.

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

- 'A'-weight.
- 'Fast' response.
- 15 minute statistical intervals.

The statistical interval was chosen to allow application of AS/NZS 2107:2000 '*Acoustics – Recommended Design Sound Level and Reverberation Times for Building Interiors*'.

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

Weather conditions during the survey were fine. The temperature ranged from 9˚C to 32˚C over the measurement period (Source: Bureau of Meteorology 2009).

# 4. NOISE CRITERIA

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

Development Type 2 from Table 1 *'Road traffic noise criteria for proposed road or residential land use developments'* states new residential developments affected by arterial traffic noise be assessed to the following levels:

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

# 5. MEASURED NOISE LEVELS

Table 1 below present the measured road traffic noise levels recorded on Friday 21/08/2009.

*Table 1: Measured Road Traffic Noise Levels*

| Road Traffic Noise Descriptor | Time Period | Measured Levels dB(A) |
|---|---|---|
| $L_{10,18hr}$ | 6am to midnight | 62 |
| $L_{eq,\ 15\ hour}$ | 7am to 10pm | 60 |
| $L_{eq,\ 9\ hour}$ | 10pm to 7am | 55 |

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

# 6. ANALYSIS AND RESULTS

## 6.1. Traffic Volumes

The existing traffic volumes for Tweed Coast Road were obtained from the Tweed Shire Council (correspondence dated 3/09/2009). Projected traffic volumes are based on an 8% compound increase per annum as advised by the Engineering Services Division of Council. The surveyed and projected traffic volumes are as follows:

| | |
|---|---|
| **Surveyed (2009) Traffic Volumes:** | 10,000 vehicles AADT |
| **Projected (2020) Traffic Volumes:** | 23,316 vehicles AADT |

## 6.2. Noise Model

### 6.2.1. Noise Modelling Parameters

Road traffic noise predictions were conducted using Pen3D, a CoRTN based model deemed acceptable under the Environmental Protection (Noise) Policy. The basis of the Pen3D Model is as follows, with results presented in Appendix C of this report.

| | |
|---|---|
| Segmentation Angle: | $1^{o}$ |
| Road Surface Type: | Impervious |
| Current Speed Limit: | 50 km/h |
| Future Speed Limit: | 60km/h |
| Noise Source Height above grade: | 0.5m |
| Floor Receiver Heights: | as per development plans |
| Façade Correction: | +2.5dB |

### 6.2.2. Noise Model Verification

To verify the road traffic noise prediction model, the predicted $L_{10,\ 18hr}$ traffic noise level at the monitoring location was calculated and compared to the measured noise level.

The predicted $L_{10,\ 18hr}$ existing noise level compared to the measured level is presented in Table 2. As the noise monitor was in a free-field position, the predicted noise level is also given as a free-field level.

*Table 2: Comparison of Measured and Predicted Traffic Noise Levels*

| **Measured $L_{A10,18hr}$** | **Predicted $L_{A10,18hr}$** | **Required Correction** |
|---|---|---|
| 61.9 | 62.8 | 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.

## 6.3. Predicted Noise Levels

Table 3 details the predicted year 2020 road traffic noise levels based on traffic growth and the development layout.

*Table 3: Predicted Road Traffic Noise Levels*

| **Assessment Location (most exposed location)** | | **Predicted SPL dB(A) in Year 2020 (Façade Corrected)** | | |
|---|---|---|---|---|
| **Unit** | **Façade** | $L_{10,\ 18\ hour}$ | **Day** $L_{eq\ 15hr}$ | **Night** $L_{eq\ 9hr}$ |
| 1 | West | 65 | 63 | 58 |
| 2 | North | 58 | 56 | 51 |
| 3 | North | 57 | 55 | 50 |
| 4 | North | 56 | 54 | 49 |
| 5 | West | 43 | 41 | 36 |
| 6 | West | 43 | 41 | 36 |
| 7 | South | 59 | 57 | 52 |
| 8 | West | 63 | 61 | 56 |
| 9 | West | 68 | 66 | 61 |
| 10 | North | 60 | 58 | 53 |
| 11 | North | 59 | 57 | 52 |
| 12 | North | 58 | 56 | 51 |
| 13 | West | 46 | 44 | 39 |
| 14 | West | 46 | 44 | 39 |
| 15 | South | 61 | 59 | 54 |
| 16 | West | 65 | 63 | 58 |
| 17 | West | 69 | 67 | 62 |
| 18 | North | 62 | 60 | 55 |
| 19 | North | 62 | 60 | 55 |
| 20 | North | 61 | 59 | 54 |
| 21 | West | 51 | 49 | 44 |
| 22 | West | 51 | 49 | 44 |
| 23 | South | 62 | 60 | 55 |
| 24 | West | 66 | 64 | 59 |

Future road traffic noise levels are predicted to be above the criteria at a number of units of the proposed development.

A suitable form of acoustic treatment would be as per Table 1 of the DEC's criteria for road traffic noise which states '*…building materials and construction should be chosen as to minimise noise impacts'*. Therefore, building façades should be designed in accordance with AS3671 to achieve the internal noise limits outlined in AS2107.

# 7. RECOMMENDATIONS

The results of the analysis predict that noise levels in the year 2020 would exceed the criteria at a number of building facades. Noise affected facades would require further acoustic treatment to achieve the internal noise levels as outlined in AS 2107:2000.

## 7.1. Building Treatment

### 7.1.1. Glazing

We recommend the glazing treatments detailed in Table 4 below. The thickness of glass should not be reduced regardless of its $R_W$ rating. The installed glass may be equal or thicker to the specified glass only. Glazing specified with acoustic seals requires Schlegel Q-Lon, Raven, Lorient, or equivalent product. Mohair seals will not be accepted.

Rooms specified with glazing treatments will require the provision of alternative ventilation such as air-conditioning so that windows and doors can be closed in order to exclude noise.

Units/rooms that are not listed in Table 4 below do not require any special glazing treatment i.e. can be standard glazing.

*Table 4: Recommended Glazing Treatments*

| Unit | Room | Glazing Thickness | Acoustic Seals | Min $R_W$ |
|---|---|---|---|---|
| 1 | Living | 4mm float | No | 22 |
| | Study | 4mm float | No | 22 |
| | Bedroom 1 | 4mm float | No | 22 |
| | Bedroom 2 | 4mm float | No | 22 |
| 2 | Living | 4mm float | No | 22 |
| | Bedroom 1 | 4mm float | No | 22 |
| 7 | Bedroom 2 | 4mm float | No | 22 |
| | Bedroom 3 | 4mm float | No | 22 |
| 8 | Living | 4mm float | No | 22 |
| | Bedroom 2 | 4mm float | No | 22 |
| 9 | Living | 4mm float | No | 22 |
| | Study | 4mm float | Yes | 27 |
| | Bedroom 1 | 4mm float | Yes | 27 |
| | Bedroom 2 | 4mm float | No | 22 |
| 10 | Living | 4mm float | No | 22 |
| | Bedroom 1 | 4mm float | No | 22 |
| 15 | Bedroom 2 | 4mm float | No | 22 |
| | Bedroom 3 | 4mm float | No | 22 |
| 16 | Living | 4mm float | Yes | 27 |
| | Bedroom 2 | 4mm float | Yes | 27 |
| 17 | Living | 4mm float | Yes | 27 |
| | Study | 6mm float | Yes | 29 |
| | Bedroom 1 | 4mm float | Yes | 27 |
| | Bedroom 2 | 4mm float | Yes | 27 |
| 18 | Living | 4mm float | No | 22 |
| | Bedroom 1 | 4mm float | No | 22 |

| Unit | Room | Glazing Thickness | Acoustic Seals | Min $R_w$ |
|---|---|---|---|---|
| 23 | Bedroom 2 | 4mm float | No | 22 |
| | Bedroom 3 | 4mm float | No | 22 |
| 24 | Living | 4mm float | Yes | 27 |
| | Bedroom 2 | 4mm float | Yes | 27 |

### 7.1.2. Wall Construction

Standard construction of the building is acceptable. Any lightweight construction should be similar to those detailed in Table 5 below.

*Table 5: 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 and10mm plasterboard internal | - | 35 |
| OR | | |
| Hebel FAÇADE wall system. 75mm Hebel power panel, on 92mm studs, with 10mm plasterboard inside | - | 45 |

### 7.1.3. Ceiling/Roof Construction

The proposed section of concrete deck roof would achieve the required $R_W$ rating without the need for additional treatment.

The sheet metal roof should include a system capable of achieving an $R_W40$ rating or higher. The typical ceiling/roof construction is detailed in Table 6 below.

*Table 6: Recommended Ceiling/Roof Construction*

| Ceiling/Roof Treatment | Insulation | Min Rw |
|---|---|---|
| Pitched sheet metal roof over 10mm thick plasterboard ceiling | Minimum 50mm glasswool batts or Tontine TSB-4 polyester insulation | 40 |

### 7.1.4. 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. This could include air-conditioning, borrowed ventilation, mechanically assisted ventilation or other suitable methods.

Units / rooms that require the provision of ventilation include those listed in Table 4. The plant should not reduce the acoustic performance of the building.

# 8. CONCLUSION

TTM Group has conducted a road traffic noise assessment for the proposed residential and tourist accommodation development at the corner of Tweed Coast Road and Cypress Crescent, Cabarita.

Based on advice provided by Council, Tweed Coast Road will experience high growth over the next ten years and will be subsequently upgraded to a four lane carriageway. Given the projected traffic volumes, road traffic noise is predicted to be above the criteria at the northern, southern and western facades of the development.

Based on the incorporation of recommendations detailed in Section 7, the development is capable of complying with the noise criteria outlined in Section 4.

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

Report Compiled by:
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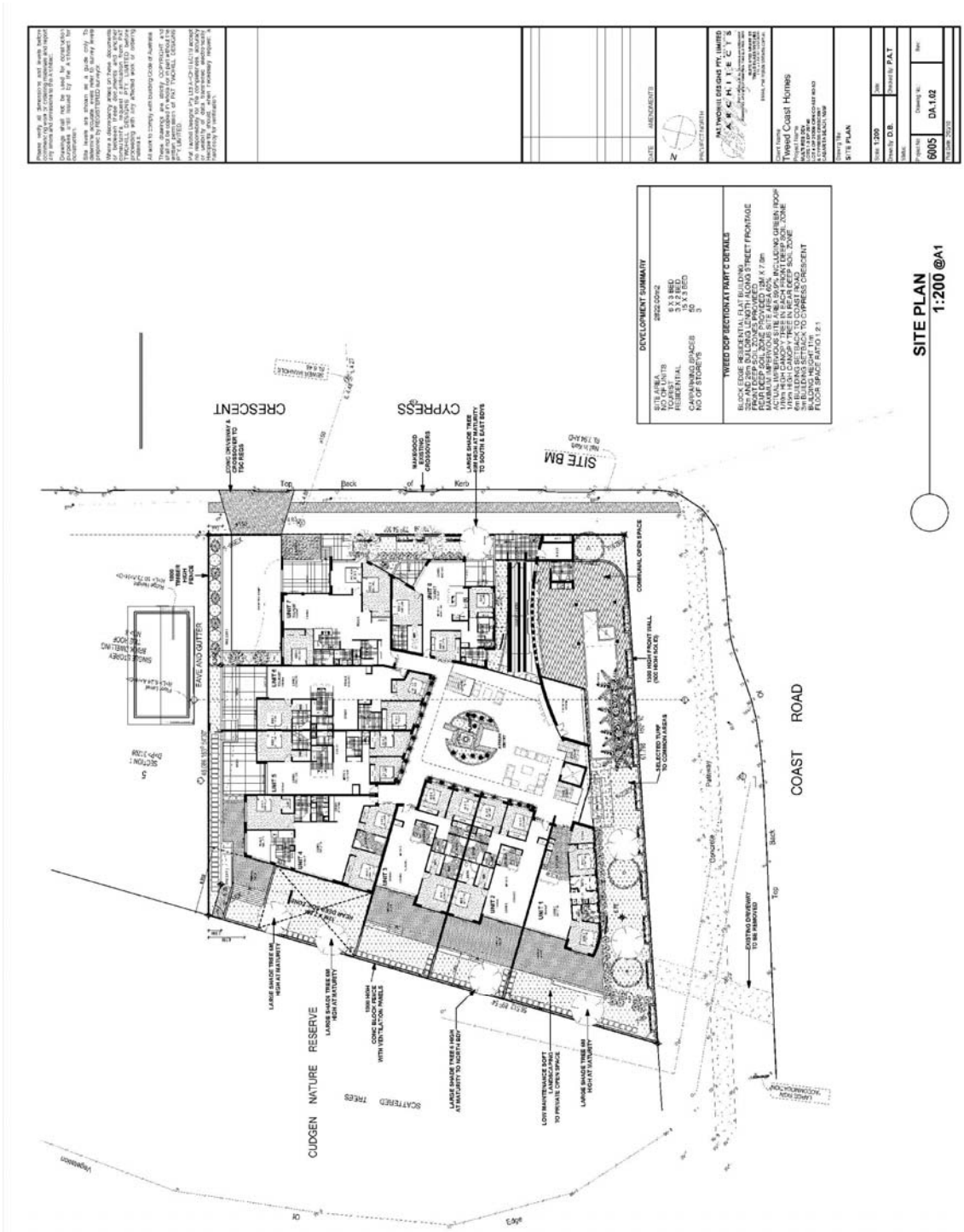
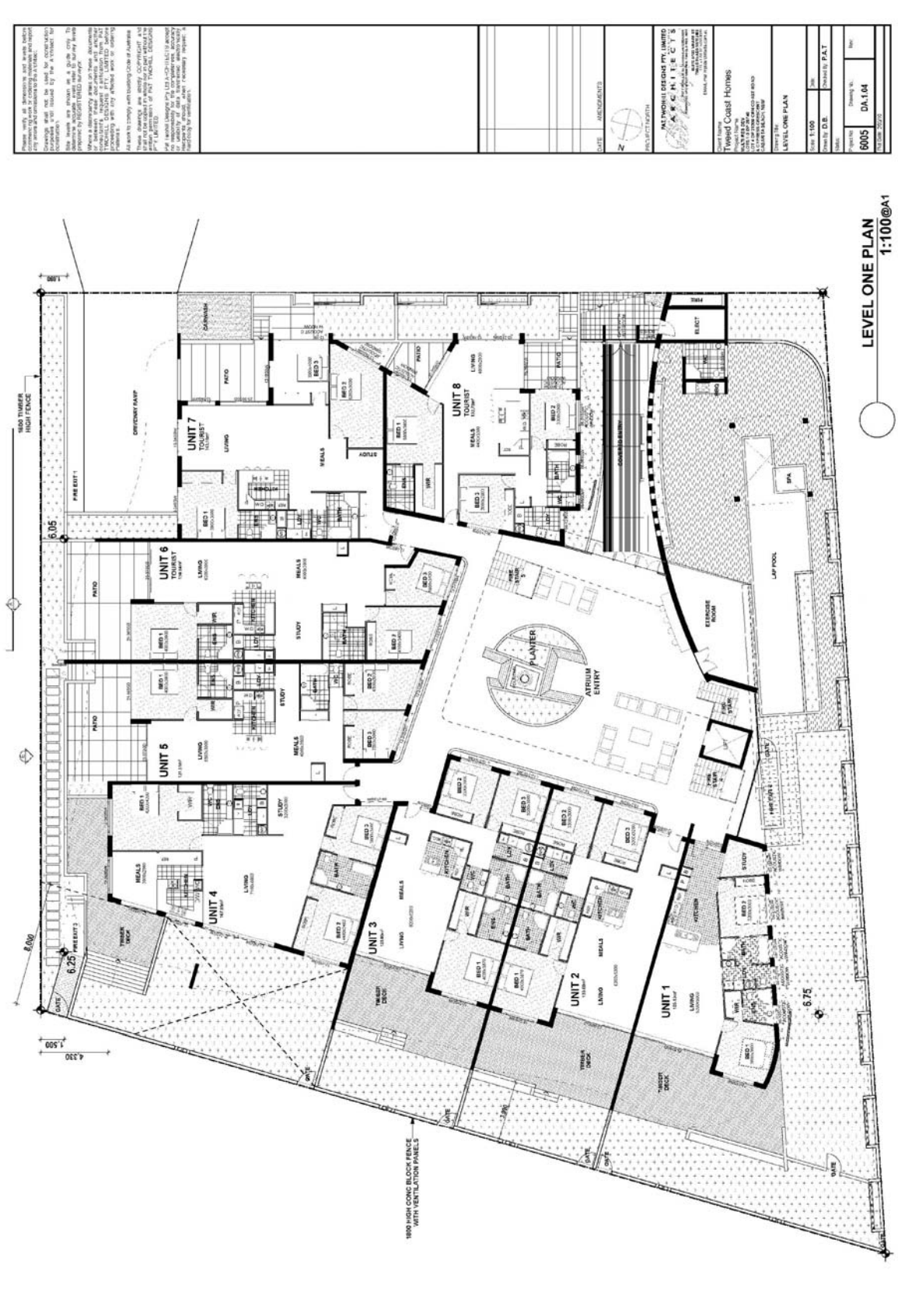
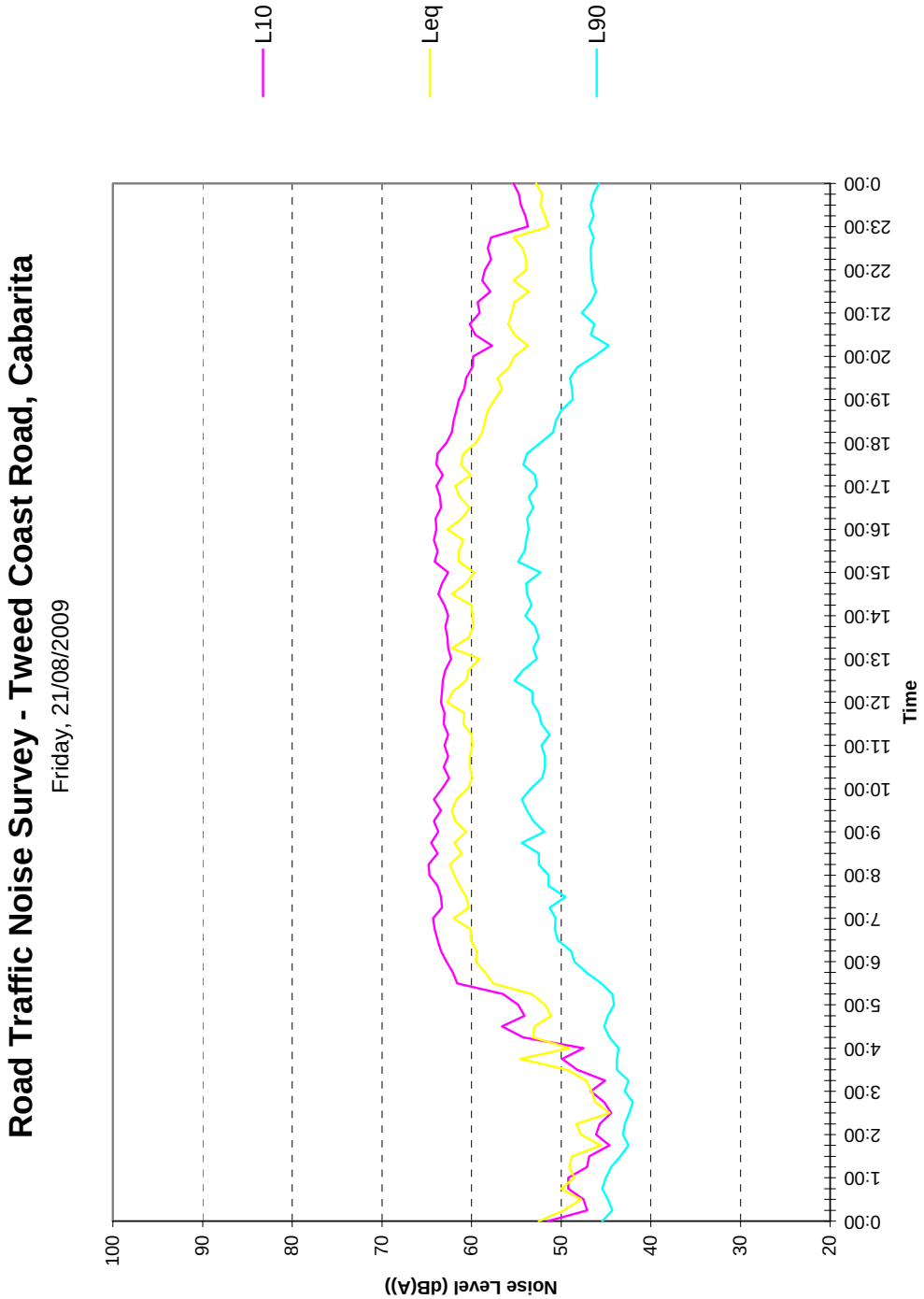
# 9. APPENDICES

## 9.1. Appendix A - Development Plans





## 9.2. Appendix B - Noise Monitoring Graph



## 9.3. Appendix C - Pen3D Noise Modelling Results

# POINT CALCULATIONS

Pen3D2000 V1.9.8
Project Code:33519
Project Description:Tweed Coast Rd
File:H:\Project\Acoustics\33500 - 33599\33519 Tweed Coast Rd and Cypress Cr Cabarita RTN\33519 Pen3D\33519 M01 Existing.PEN

File Description: Noise Logger Verification

Thursday 03 Sep, 2009 at 10:49:34

## CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

| Receptor | X Posn (m) | Y Posn (m) | Height (m) | L10(18hour) (dB(A)) |
|---|---|---|---|---|
| Logger | -7.9 | 43.3 | 1.3 | 62.8 (free-field) |

# POINT CALCULATIONS

Pen3D2000 V1.9.8
Project Code: 33519
Project Description:Tweed Coast Rd
File:H:\Project\Acoustics\33500 - 33599\33519 Tweed Coast Rd and Cypress Cr Cabarita RTN\33519 Pen3D\33519 M02 Future.PEN

File Description: Future Year 2020 Noise Levels

Friday 04 Sep, 2009 at 16:53:54

## CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

| Receptor | X Posn (m) | Y Posn (m) | Height (m) | L10(18hour) (dB(A)) |
|---|---|---|---|---|
| Unit 1 - west | 3.1 | 40.5 | 1.8 | 65.2 |
| Unit 1 - north | 6.7 | 50.6 | 1.8 | 60.5 |
| Unit 2 - north | 16.7 | 46.5 | 1.8 | 58.0 |
| Unit 3 - North | 25.3 | 45.0 | 1.8 | 57.3 |
| Unit 4 - North | 39.3 | 41.1 | 1.8 | 55.8 |
| Unit 5 - east | 44.7 | 27.5 | 1.8 | 39.3 |
| Unit 6 - East | 44.6 | 20.0 | 1.8 | 39.3 |
| Unit 7 - South | 32.3 | 2.8 | 1.8 | 58.8 |
| Unit 8 - west | 15.4 | 8.8 | 1.8 | 63.1 |
| Unit 5/6 - west | 24.9 | 22.8 | 1.8 | 42.7 |
| Unit 3 - south | 20.2 | 30.5 | 1.8 | 51.4 |
| Unit 2 - south | 11.7 | 32.9 | 1.8 | 55.6 |
| Unit 9 - west | 3.1 | 40.5 | 4.8 | 68.0 |
| Unit 9 - north | 6.7 | 50.6 | 4.8 | 63.2 |
| Unit 10 - north | 16.7 | 46.5 | 4.8 | 60.4 |
| Unit 11 - North | 25.3 | 45.0 | 4.8 | 59.4 |
| Unit 12 - North | 39.3 | 41.1 | 4.8 | 57.7 |
| Unit 13 - east | 44.7 | 27.5 | 4.8 | 42.1 |
| Unit 14 - East | 44.6 | 20.0 | 4.8 | 42.1 |
| Unit 15 - South | 32.3 | 2.8 | 4.8 | 60.9 |
| Unit 16 - west | 15.4 | 8.8 | 4.8 | 65.3 |
| Unit 13/14 - west | 24.9 | 22.8 | 4.8 | 45.9 |
| Unit 11 - south | 20.2 | 30.5 | 4.8 | 53.5 |
| Unit 10 - south | 11.7 | 32.9 | 4.8 | 57.9 |
| Unit 17 - west | 3.1 | 40.5 | 7.8 | 69.0 |
| Unit 17 - north | 6.7 | 50.6 | 7.8 | 64.3 |
| Unit 18 - north | 16.7 | 46.5 | 7.8 | 61.5 |
| Unit 19 - North | 25.3 | 45.0 | 7.8 | 60.5 |
| Unit 19+ - North | 39.3 | 41.1 | 7.8 | 58.7 |
| Unit 20 - east | 44.7 | 27.5 | 7.8 | 46.8 |
| Unit 21 - East | 44.6 | 20.0 | 7.8 | 46.8 |
| Unit 22 - South | 32.3 | 2.8 | 7.8 | 61.9 |
| Unit 23 - west | 15.4 | 8.8 | 7.8 | 66.4 |
| Unit 20/21 - west | 24.9 | 22.8 | 7.8 | 50.8 |
| Unit 19 - south | 20.2 | 30.5 | 7.8 | 55.3 |
| Unit 18 - south | 11.7 | 32.9 | 7.8 | 59.3 |