
MARSHALL DAY Acoustics

# 2-10 KAURI ROAD, WHENUAPAI
# AIRCRAFT NOISE PROVISIONS

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84 Symonds Street
PO Box 5811
Victoria Street West
Auckland 1142 New Zealand
T: +64 9 379 7822 F: +64 9 309 3540
www marsha day com

Project: **2 -10 KAURI ROAD WHENUAPAI SUBDIVISION**

Prepared for: **Neil Construction Limited**
**PO Box 8751**
**Symonds St**
**Auckland 1150**

Attention: **Trevor Canty**

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## 1.0 INTRODUCTION

Neil Construction Ltd (NCL) has asked Marshall Day Acoustics Ltd (MDA) to provide acoustic advice regarding a proposed mixed-used development near Whenuapai Airbase.

The proposal relates to sites addressed 150 – 152 Brigham Creek Road, 2 – 10 and 12 - 18 Kauri Road as shown in Figure 1. NCL proposes to subdivide the combined site to accommodate a residential area containing 273 residential lots and a smaller light industrial area. We have been asked by NCL to summarise the Whenuapai Airbase noise related planning standards that may apply to the proposed mixed-use development.

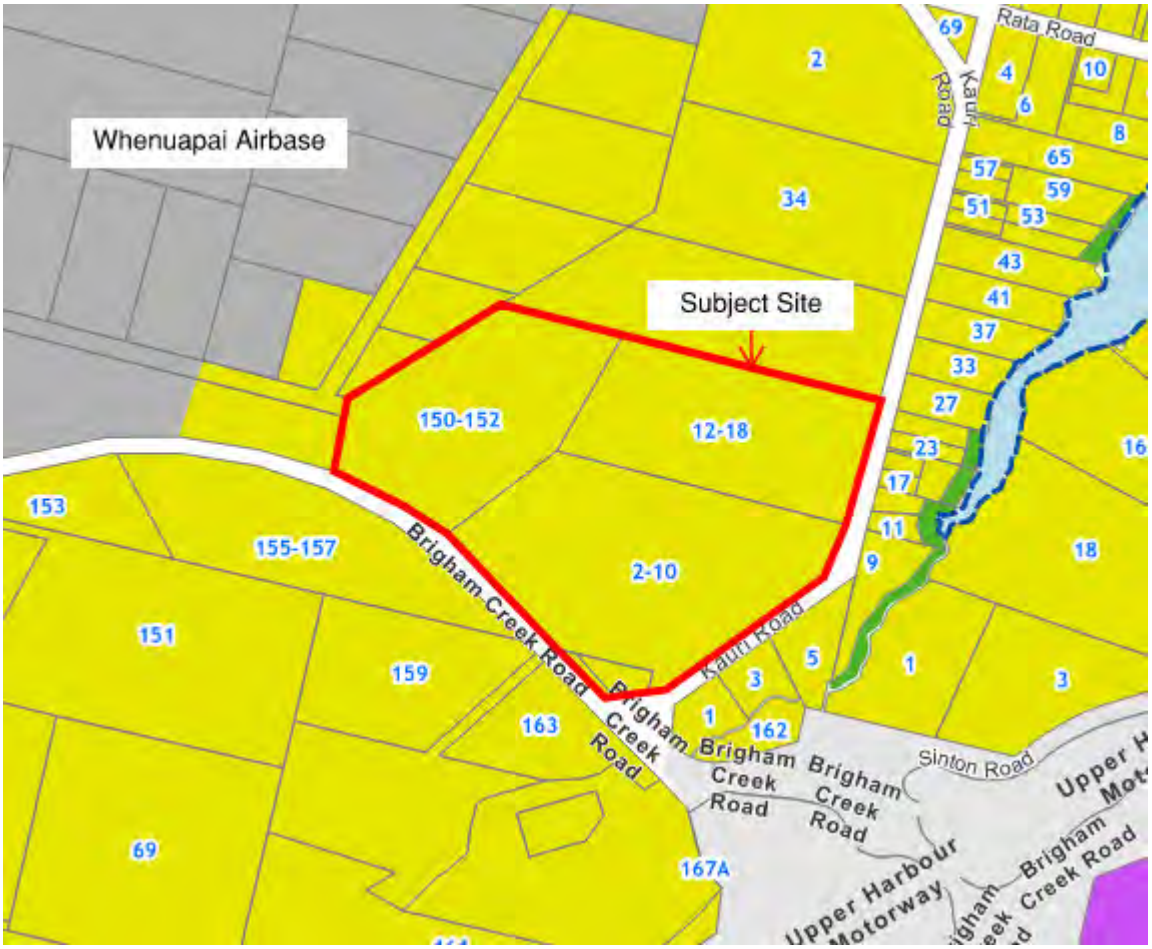
The subject site is not affected by the operative Whenuapai Airbase Aircraft Noise Overlay, however it is affected by the Whenuapai Airbase Engine Testing Noise Overlay (proposed under Variation 1 to Plan Change 5). Whilst this overlay has no statutory weight, NCL has opted to account for it and the related Plan Change 5 provisions for this subdivision application.

We have considered the implications of the PC5 Var1 Engine Testing Noise Overlay and related provisions on the proposed mixed-use development and suggested consent conditions that would give effect to the PC5 Var 1 provisions.

## 2.0 PROPOSED DEVELOPMENT

The subject site and surrounds are zoned Future Urban in the AUP and will eventually be rezoned. Whenuapai Airbase is located north-west of the site, separated by a golf course.

**Figure 1: Location of proposed mixed-use development**



NCL proposes to subdivide the combined site creating a light industrial area adjacent to the golf course and a residential area on the balance of the site as shown in Figure 2. The subdivision layouts for the light industrial and residential areas are included in Appendix B and Appendix C respectively. The location of the light industrial area has been driven by the Whenuapai Airbase engine testing noise contours developed for PC5 Var1 which are included as Appendix D. We discuss the impact of these contours on the proposal further in Section 4.0.

**Figure 2: Extent of proposed light industrial and residential areas**


## 3.0 NOISE PLANNING STANDARDS

The subject site is zoned *Future Urban Zone* in the AUP indicating it will eventually be rezoned. NCL proposes to apply the AUP **Business – Light Industry Zone** provisions to the light industrial area and the AUP **Residential – Mixed Housing Urban Zone** provisions to the residential area. Therefore, activities within those areas shall comply with the noise limits set out in relevant sections in Chapter E25 of the AUP. If appropriate, these could be reproduced as conditions of consent.

In addition to the activity noise limits, acoustic insulation standards apply to noise sensitive activities located in areas affected by noise from Whenuapai Airbase. The Whenuapai Airbase Aircraft Noise Overlay does not extend over the subject site. However, we note that substantial acoustic monitoring and reporting was undertaken as part of (recently withdrawn) Plan Change 5 and Variation 1 to Plan Change 5. The Whenuapai Airbase Engine Testing Noise Overlay (proposed under Variation 1) provides updated noise contours reflective of the current acoustic situation. These contours[1] do extend over the entire subject site (refer Appendix D). Whilst this has no statutory weight, the information provides the latest engine testing noise contours updated by the Minister of Defence and NCL has opted to account for this in this application.

[1] Engine testing contours presented in Tonkin and Taylor report "*Whenuapai Airbase – Engine Testing Noise Contours Plan Change 5*" dated March 2021.

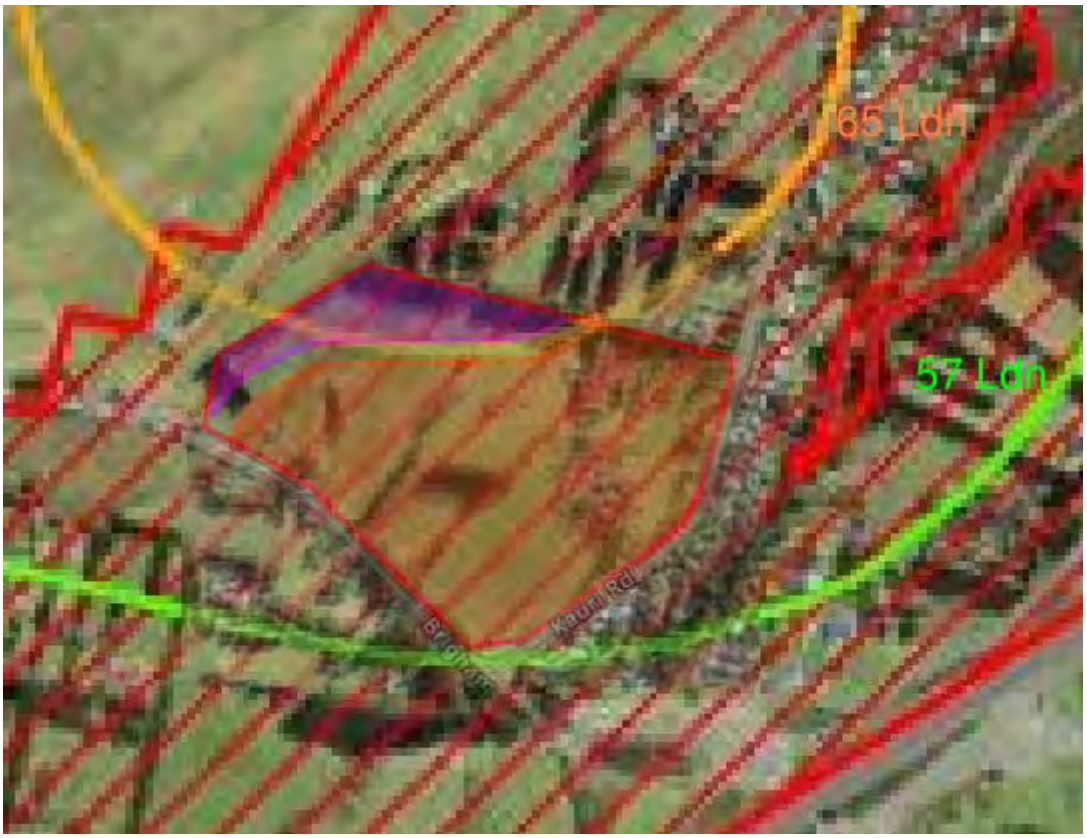
Section 3.1 summarises the PC5 Var1 provisions and Sections 4.0 and 5.0 describe how these impact the proposed light industrial and residential subdivision.

## 3.1 Plan Change 5 Whenuapai Airbase Engine Testing Noise Contours

Plan Change 5 was withdrawn on 16 June 2022 hence these provisions are not operative. Nonetheless NCL has opted to account for the PC5 Var1 provisions in this application and will seek consent conditions that reflect the relevant PC5 Var1 acoustic performance standards.

The proposed engine testing noise contours from PC5 Var1 are shown in Appendix D. Figure 3 below shows an indicative overlay of the engine testing noise contours and the proposed sub-division. We do not have a digital copy of the engine testing noise contours at this stage therefore Figure 3 is indicative only.

**Figure 3: Overlay of proposed subdivision and engine testing noise contours**



The proposed provisions relating to the engine testing noise contours in PC5 Var1 set out the following restrictions:

- New activities sensitive to aircraft noise within the 65 dB $L_{dn}$ noise boundary would be prohibited;
- New activities sensitive to aircraft noise between the 57 and 65 dB $L_{dn}$ contour, would be subject to an acoustic insulation and ventilation standard, and activities that do not meet this standard would be non-complying.

The acoustic and ventilation requirements are as follows:

*I616.6.10 Development within the aircraft engine testing noise boundaries*

1. *Between the 57 dB $L_{dn}$ and 65 dB $L_{dn}$ noise boundaries as shown on Whenuapai 3 Precinct Plan 3, new activities sensitive to noise and alterations and additions to existing buildings accommodating activities sensitive to aircraft noise must provide sound attenuation and related ventilation and/or air conditioning measures:*
    a. *To ensure the internal noise environment of habitable rooms does not exceed a maximum noise level of 40 dB $L_{dn}$;*
    b. *That are certified to the council's satisfaction as being able to meet the Standard I616.6.10(1)(a) by a person suitably qualified and experienced in acoustics prior to its construction; and*
    c. *So that the related ventilation and/or air conditioning system(s) satisfies the requirements of New Zealand Building Code Rule G4 with all external doors of the building and all windows of the habitable rooms closed.*

In Section 5.0 of this report, we provide some indicative constructions that would achieve the above performance standard for typical new dwellings.

## 4.0 IMPACT OF ENGINE TESTING NOISE CONTOURS ON LIGHT INDUSTRY ACTIVITIES

The extent of light industrial area has been driven by the location of the 65 dB $L_{dn}$ engine testing noise contour since residential development would be prohibited in this area.

The Business – Light Industry Zone largely provides for non-noise sensitive activities however it does provide for a small number of activities sensitive to aircraft noise (as defined in AUP Chapter J). The PC5 Var1 provisions would prohibit these activities inside the 65 dB $L_{dn}$ engine testing noise contour however this is not operative. To ensure this restriction applies in the proposed sub-division, a condition of consent prohibiting activities sensitive to aircraft noise inside the light industrial area could be imposed.

## 5.0 IMPACT OF ENGINE TESTING NOISE CONTOURS ON RESIDENTIAL ACTIVITIES

Figure 3 shows the residential lots would be located between the 57 and 65 dB $L_{dn}$ engine testing noise contours. Acoustic insulation standards would apply under the PC5 Var1 provisions (refer Section 3.1.

The acoustic insulation standard I616.6.10 requires buildings to be designed to ensure an internal noise environment in habitable rooms of not greater than 40 dB $L_{dn}$ based on the outdoor aircraft noise defined at the site by the aircraft and engine testing noise boundaries.

Chapter J of AUP defines habitable rooms as follows:

> *Habitable room*
>
> *Any room in a building used for a residential nesting table activity and in a care centre or healthcare facility with an overnight stay facility, excluding laundry, bathroom, toilet or any room used solely as an entrance hall, passageway, garage, or other space of a specialised nature occupied neither frequently nor for extended periods.*

For proposed residential sites within the PC5 Var1 engine testing boundaries, the outdoor noise levels range from 57 to 65 dB $L_{dn}$. To achieve an indoor level of 40 dB $L_{dn}$ a noise reduction of 17 to 25 dB would be required.

We have calculated the sound insulation performance for a generic top floor corner bedroom of standard lightweight building construction exposed to aircraft engine testing noise. Our calculations show the internal criterion of 40 dB $L_{dn}$ can be achieved without additional acoustic insulation treatment.

The standard building construction used in our calculations is listed in Table 1. Other acoustically equivalent or superior constructions would also be suitable.

**Table 1: Typical standard facade construction**

| Façade Element | Suitable Construction Details (or approved acoustically equivalent) |
|---|---|
| Glazing: | 6 mm standard glass/12 mm air gap/6 mm standard glass |
| Wall: | Weatherboard on 45 x 90mm timber studs, with 10mm standard plasterboard and sound absorptive material[1] in the cavity. |
| Roof: | Pitched roof with corrugate longrun roofing (minimum 0.55mm thick) on timber with a ceiling lining of one layer of 10mm standard plasterboard and sound absorptive material[1] in the cavity. |

1) Sound absorptive material such as R2.4 Pink Batts, Autex Greenstuff or approved equivalent.

This information is indicative only as compliance for a given dwelling would depend on the location within the noise contours and the geometry and specific construction of the habitable spaces. Therefore, each building design would need to be assessed individually. Also, ventilation measures would be required under standard I616.6.10.

## 6.0 NOISE CONDITIONS

To give effect to the PC5 Var1 provisions relating to engine testing noise, the following consent conditions for the proposed sub-division could be imposed.

For the proposed light industrial development, a condition prohibiting activities sensitive to aircraft noise would give effect to the PC5 Var1 provisions inside the 65 dB $L_{dn}$ engine testing noise contour.

For the proposed residential development, the PC5 Var1 acoustic insulation requirements could be simplified to apply the maximum insulation standard across the whole residential area. The PC5 Var1 provisions require 40 dB $L_{dn}$ in habitable rooms of dwellings based on the outdoor engine testing noise contour (between 57 and 65 dB $L_{dn}$). The maximum insulation standard is 40 dB $L_{dn}$ indoors based on 65 dB $L_{dn}$ outdoors. Therefore, a single consent condition could require all habitable rooms in the residential area be designed to achieve 40 dB $L_{dn}$ indoors based on 65 dB $L_{dn}$ outdoors using the following spectrum.

**Table 2: Engine Testing Outdoor Design Level in Octave Bands**

| Octave Band Centre Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **dBA** |
| 66 | 67 | 67 | 64 | 59 | 54 | 52 | 65 |

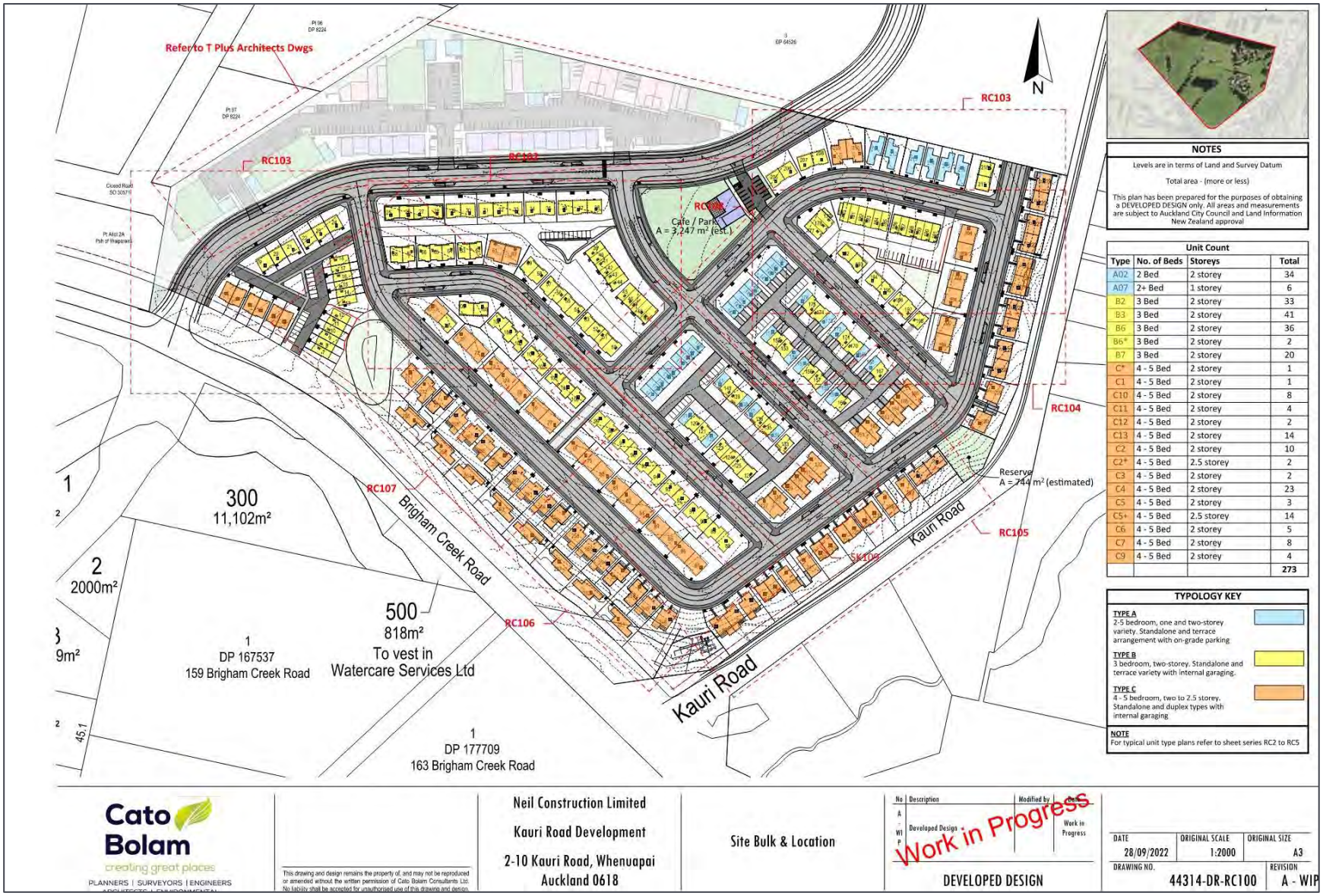
A condition that replicates the PC5 Var 1 ventilation standards should also be added if technically appropriate. MDA does not have the expertise to advise on the technical suitability or practicability of the ventilation measures.

## APPENDIX A GLOSSARY OF TERMINOLOGY

| | |
|---|---|
| **A-weighting** | The process by which noise levels are corrected to account for the non-linear frequency response of the human ear. |
| **dB** | Decibel<br>The unit of sound level.<br>Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 mPa i.e. dB = 20 x log(P/Pr) |
| **Ldn** | The A-weighted day night noise level which is calculated from the 24 hour LAeq with a 10 dB penalty applied to the night-time (2200-0700 hours) LAeq. Ldn is a measure of the cumulative noise exposure over time. |
| **LAeq(t)** | The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.<br>The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am. |
| **LAmax** | The A-weighted maximum noise level. The highest noise level which occurs during the measurement period. |
| **Noise** | A sound that is unwanted by, or distracting to, the receiver. |

## APPENDIX B PROPOSED LIGHT INDUSTRIAL SUBDIVISION PLAN

## APPENDIX C PROPOSED RESIDENTIAL SUBDIVISION PLAN



## APPENDIX D TONKIN + TAYLOR ENGINE TESTING NOISE CONTOURS