

Our Reference: QA900-02F01 Permissible Change (r1)

16 December 2016

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**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

Approval no: DEV2012/284

Date: 22 June 2017



Residential Subdivision (Teviot Down Estate), Pub Lane, Greenbank - Permissible Change Application for Stages 1,2,4-9,11-15,17,20,21 and 24-29

1 Introduction

Renzo Tonin Ron Rumble have conducted an assessment and updated the noise model for the proposed Teviot Down residential subdivision at Pub Lane, Greenbank. The assessment was conducted to determine expected traffic and rail noise impacts on future residential lots, as a result of changes in lot layout and lot numbers and minor changes in proposed acoustic fence designs.

2 Background

In December 2012, our office prepared a traffic noise assessment for the residential subdivision on behalf of Teviot Downs Estate Pty Ltd, which was submitted to the Urban Land Development Authority (ULDA) as part of the development application (Our Ref: Q8999-01F01 (REV1) FINAL ACOUSTIC REPORT.DOC – *Residential Subdivision, Teviot Down Estate, Pub Lane, Greenbank, Noise Impact Assessment*, dated 19th December 2012). That study assessed the extent of road noise intrusion from Pub Lane and rail noise from the Brisbane to Sydney railway corridor onto the subdivision.

The report was approved by the ULDA on 31st January 2013.

3 Assessment of Road and Rail Noise Impacts

This assessment and the corresponding updated computer noise model have used the site layout and contour data provided by RPS on 6th December 2016 (Ref: 132965-03G *Overall Allotment Layout.dwg*). The methodologies and assumptions implemented in the December 2012 report have been adopted in this assessment.

The previously recommended 2.5m high fences adjacent to Pub Lane have been included in the model.

Note that the fences would need to achieve a minimum superficial density of 12kg/m² and a leakage of less than 1% of area, as stated in the original acoustic report.

The road noise contours with the 2.5m high acoustical fences in place are shown in the following figures:

Figure 2: QDC MP4.4 Noise Categories for lowset residences (Road) – with acoustic barriers (2.5m high)

Figure 3: QDC MP4.4 Noise Categories for highset residences (Road)– with acoustic barriers (2.5m high)

With the 2.5m high acoustical fences in place, the maximum road noise category is 2 at ground floor as seen in Figure 2. A maximum Noise Category 3 at upper floors is predicted as seen in Figure 3.

Rail noise contours at lowset and highset receivers are shown in the following figures:

Figure 4: QDC MP4.4 Noise Categories for lowset residences (Rail)

Figure 5: QDC MP4.4 Noise Categories for highset residences (Rail)

It can be seen in Figure 4 and Figure 5 that the maximum rail noise category is 1 at ground and upper floors.

The MP4.4 Code will require that the glazing, external walls, roof, floors and entry doors of the proposed dwellings achieve minimum R_w ratings based upon the relevant noise category. The R_w ratings are specified in Schedule 1 of the Code. An extract of Schedule 1 for noise categories of 1 to 3 are shown in Table 1.

Table 1: Minimum R_w rating for each relevant noise category

Noise Category	Minimum transport noise reduction (dBA) required for habitable rooms	Component of building's external envelope	Minimum R_w required
3	35	Glazing	38 (Total area of glazing for a habitable room is greater than 1.8m^2)
			35 (Total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	47
		Roof	41
		Floors	45
		Entry Doors	33
2	30	Glazing	35 (Total area of glazing for a habitable room is greater than 1.8m^2)
			32 (Total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	41
		Roof	38
		Floors	45
		Entry Doors	33
1	25	Glazing	27 (Total area of glazing for a habitable room is greater than 1.8m^2)
			24 (Total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	35
		Roof	35
		Entry Doors	28
0	No additional acoustic treatment required – standard building assessment provisions apply.		

The minimum R_w rating for each building component can be achieved by:

- Using the materials specified in Schedule 2 of the Code
<http://www.hpw.qld.gov.au/SiteCollectionDocuments/mp-4-4-buildings-in-transport-noise-corridors.pdf>; OR
- Using materials with manufacturer's specifications that, in combination, achieve the minimum R_w rating for the relevant building component and applicable Noise Category.

We trust that the information provided is adequate for your purpose at this stage. If you require any further information, please do not hesitate to contact us.



VILLA GREEN PTY LTD
QA900-02F01 PERMISSIBLE CHANGE (R1)

RESIDENTIAL SUBDIVISION (TEVIOT DOWN ESTATE), PUB LANE,
GREENBANK
PERMISSIBLE CHANGE APPLICATION FOR STAGES 1,2,4-9,11-
15,17,20,21 AND 24-29

Figure 2: QDC MP4.4 Noise Categories for lowset residences (Road) – with acoustic barriers (2.5m high)

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Job QA900-01 - Residential Subdivision - Teviot Downs
Facade Corrected Noise Level (LA10 18hr)
Lowset Receiver Heights (1.8m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes

STAGE 1

STAGE 2

STAGE 3

LANE

60km/hr

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

60km/hr

PUB

Facade-Corrected L₁₀ 18hr Noise Level dB(A) and QDC MP4.4 Noise Categories

57.5 <	< 57.5 Noise Category 0
57.5 <=	< 62.5 Noise Category 1
62.5 <=	< 67.5 Noise Category 2
67.5 <=	< 72.5 Noise Category 3
72.5 <=	Noise Category 4

A3 Scale 1:1500

0 10 20 40 60 80 100 m

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Lowset Receiver Heights (1.8m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes

STAGE 1

STAGE 2

STAGE 3

80km/hr

60km/hr

60km/h

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

PUB

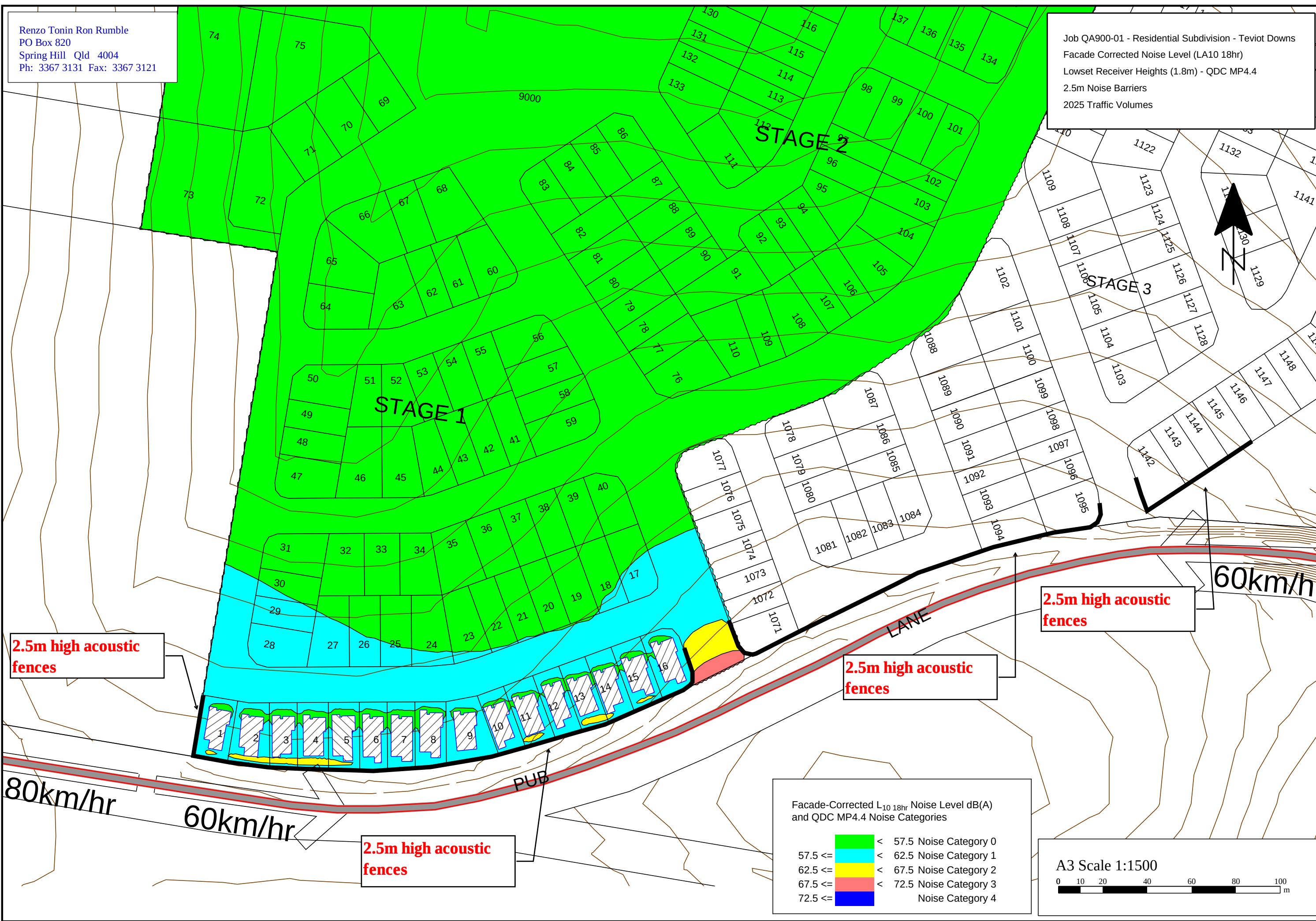
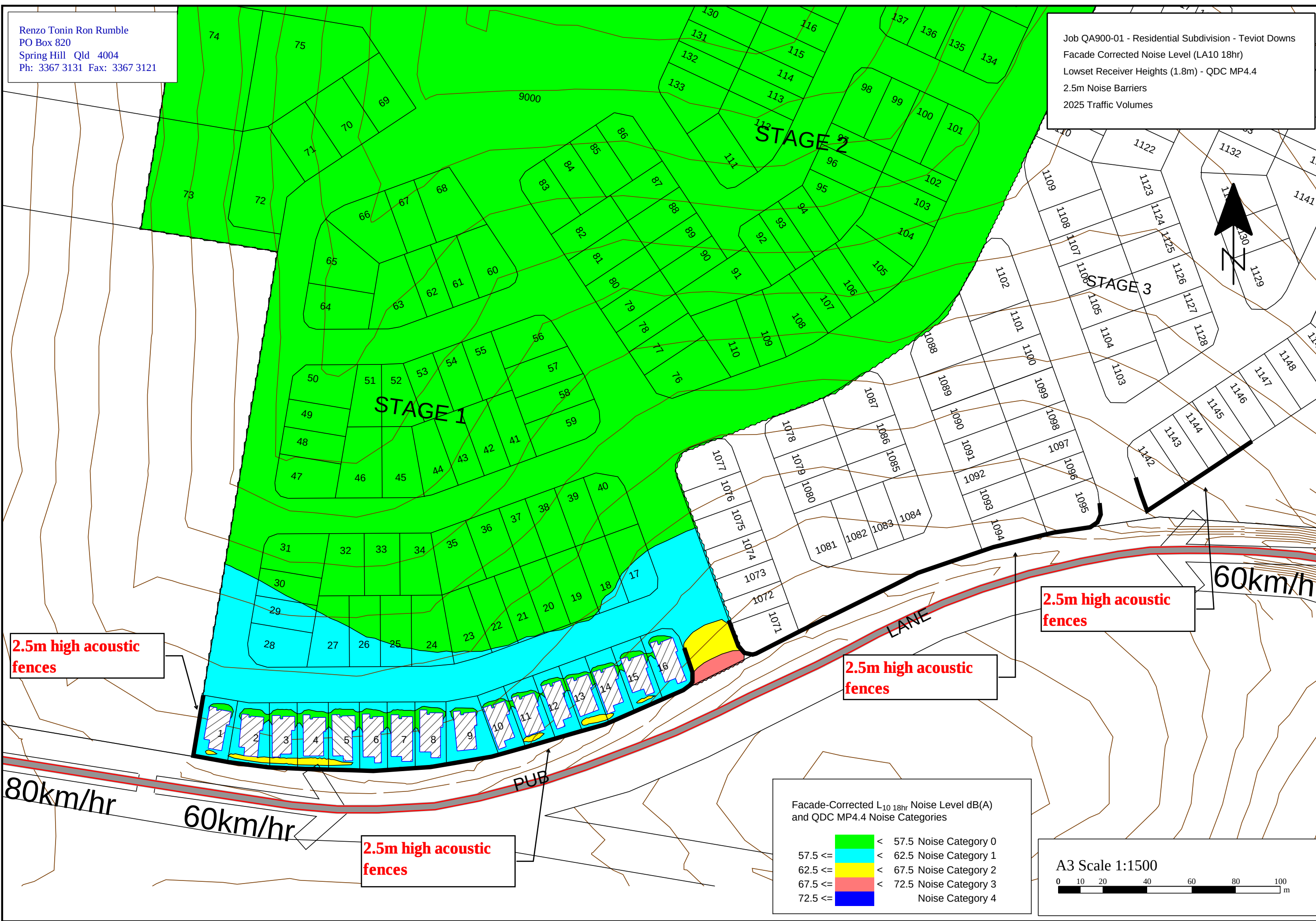
LANE

Facade-Corrected $L_{10\ 18hr}$ Noise Level dB(A) and QDC MP4.4 Noise Categories

57.5 <	57.5	Noise Category 0
57.5 <=	62.5	Noise Category 1
62.5 <=	67.5	Noise Category 2
67.5 <=	72.5	Noise Category 3
72.5 <=		Noise Category 4

A3 Scale 1:1500

0 10 20 40 60 80 100 m



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Facade Corrected Noise Level (LA10 18hr)
Lowset Receiver Heights (1.8m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes

STAGE 1

STAGE 2

STAGE 3

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

80km/hr

60km/hr

60km/h

LANE

PUB

Facade-Corrected L₁₀ 18hr Noise Level dB(A) and QDC MP4.4 Noise Categories

57.5 <	57.5	Noise Category 0
57.5 <=	62.5	Noise Category 1
62.5 <=	67.5	Noise Category 2
67.5 <=	72.5	Noise Category 3
72.5 <=		Noise Category 4

A3 Scale 1:1500

0 10 20 40 60 80 100 m

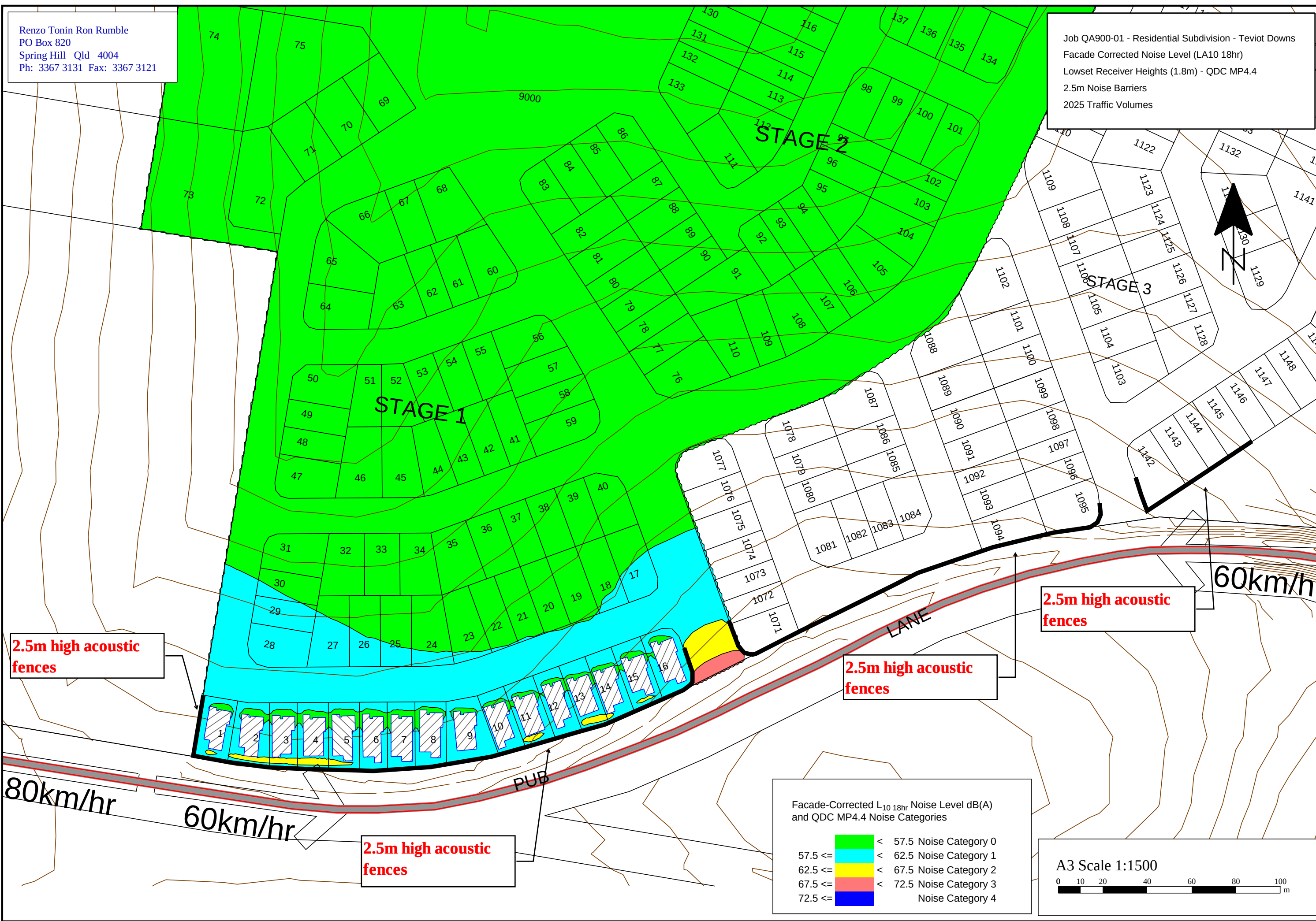
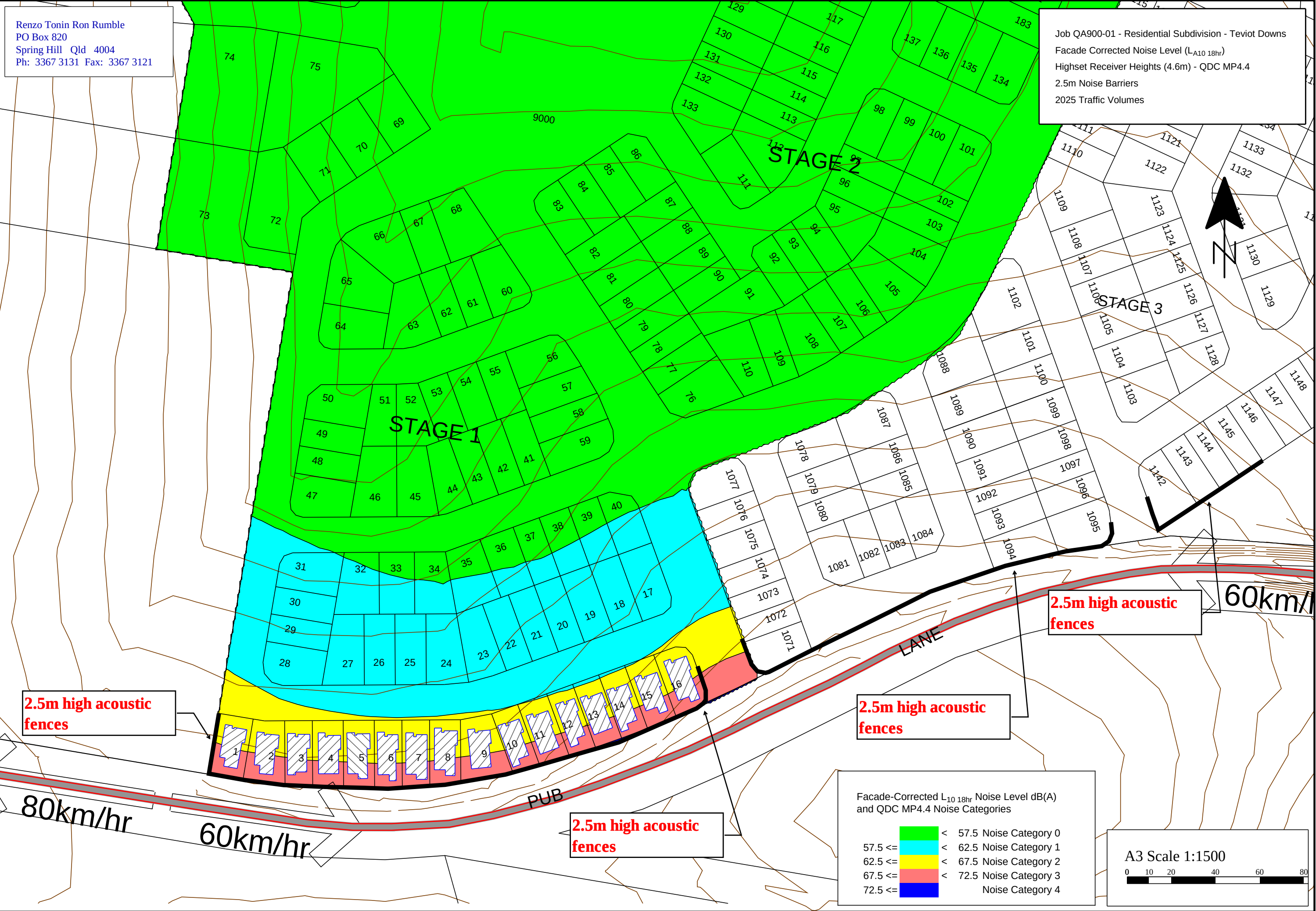


Figure 3: QDC MP4.4 Noise Categories for highset residences (Road)– with acoustic barriers (2.5m high)

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Job QA900-01 - Residential Subdivision - Teviot Downs
Facade Corrected Noise Level (L_{A10 18hr})
Highset Receiver Heights (4.6m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes



2.5m high acoustic
fences

2.5m high acoustic
fences

2.5m high acoustic
fences

2.5m high acoustic
fences

Facade-Corrected L_{10 18hr} Noise Level dB(A)
and QDC MP4.4 Noise Categories

< 57.5	Noise Category 0
57.5 <=	< 62.5 Noise Category 1
62.5 <=	< 67.5 Noise Category 2
67.5 <=	< 72.5 Noise Category 3
72.5 <=	Noise Category 4

A3 Scale 1:1500



Figure 4: QDC MP4.4 Noise Categories for lowset residences (Rail)

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Job QA900-01 - Residential Subdivision - Teviot Downs
Railway Noise Level Contours - No Barriers (Lowset)

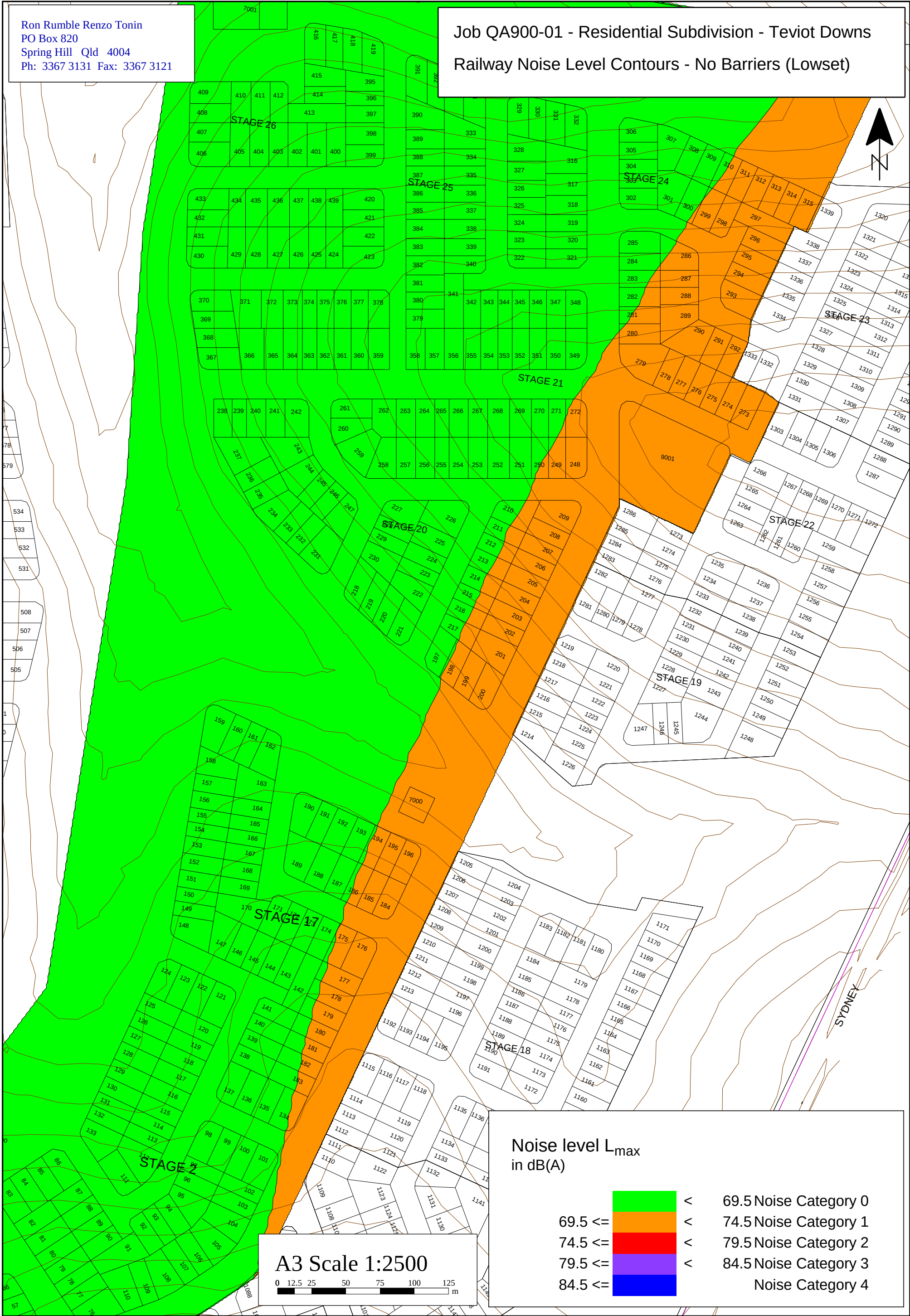
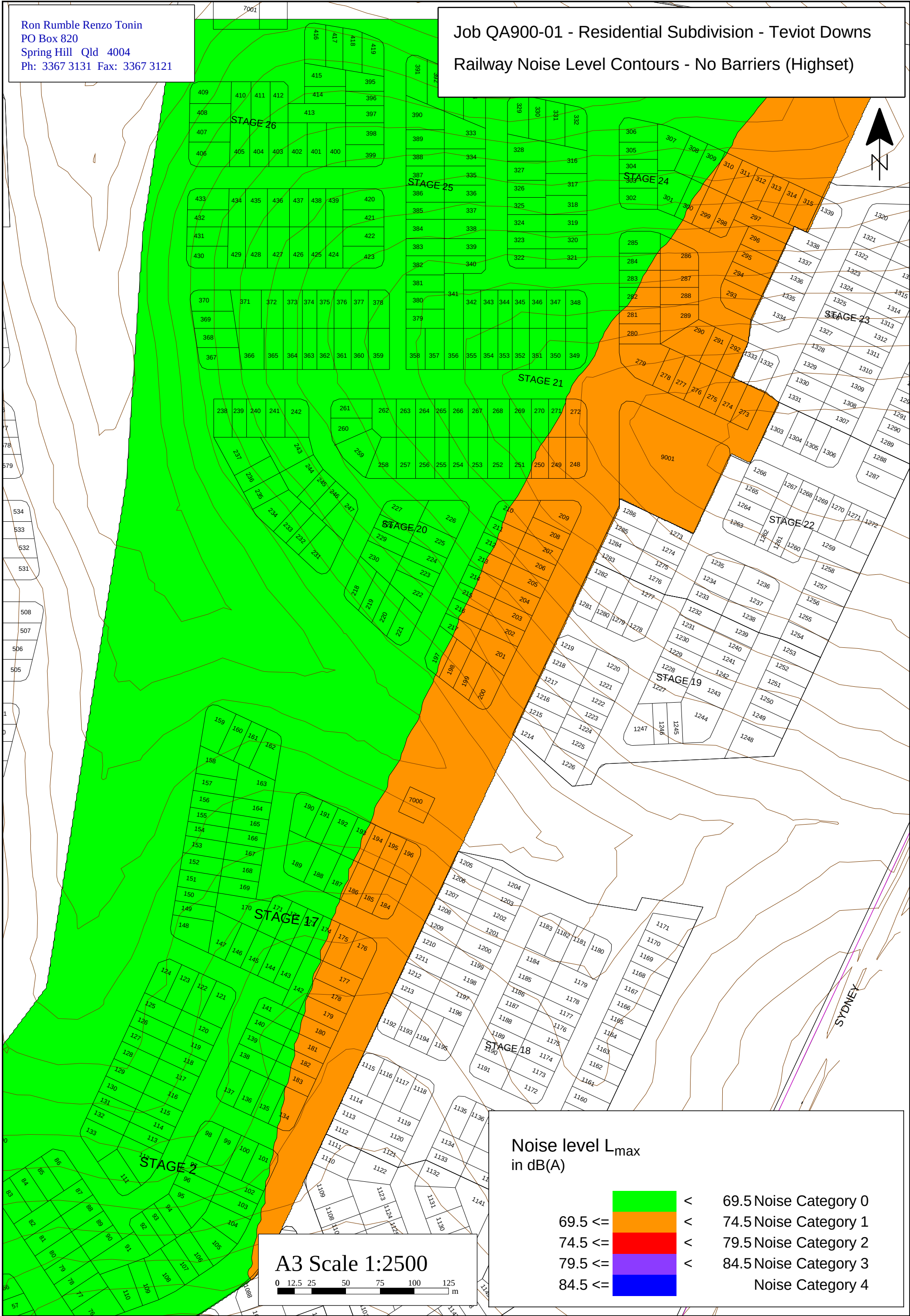


Figure 5: QDC MP4.4 Noise Categories for highset residences (Rail)

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Job QA900-01 - Residential Subdivision - Teviot Downs
Railway Noise Level Contours - No Barriers (Highset)



APPENDIX A Glossary of Terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment Period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L _{Max}	The maximum sound pressure level measured over a given period.
L _{Min}	The minimum sound pressure level measured over a given period.
L ₁	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L ₁₀	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

L ₉₀	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L _{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain L _{eq} sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

Document Control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
09.12.2016	Rev 0	-	0	DR	DR	PJ
16.12.2016	Final	-	1	DR	DR	PJ

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