Our Reference: QA900-02F02 Teviot Downs-Balance Lots (r2)

23 January 2017

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL
Approval no: DEV2017/831
Date: 19 September 2017
Queensland Government

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Residential Subdivision (Teviot Down Estate), Pub Lane, Greenbank - Development Application for Stages 3,10,16,18,19,22,23 and 27 (Balance Lots)

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 for Stages 3,10,16,18,19,22,23 and 27 (Balance Lots). This report is required for the Development Application over these Balance Lots.

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.

In December 2016, our office prepared a report to address a permissible change application over Stages 1,2,4-9,11-15,17,20,21,24-26,28 and 29. That report was required as a result of changes in lot layout, lot numbers and minor changes in proposed acoustic fence designs along Pub Lane.

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/m^2 and a leakage of less than 1% of area, as stated in the original acoustic report.

3.1 Road Traffic Noise Results

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.

3.2 Rail Noise Results

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 2 at ground and upper floors.

As can be seen in these figures, no additional acoustic fences are proposed along the power line easement to the east.

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 RW 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.

3.3 Road and Rail Noise Consolidated Results

When designing the future dwelling onto a specific lot, the maximum noise category between rail and road should be considered. The noise contours for rail and road can be compared and the worse-case category determined. A summary of the worse-case categories for lowset and highset dwellings within Stages 3, 18, 19, 22 and 23 is presented in Table 2. Note that Stages 10, 16 and 27 are not considered noise affected from Pub Lane and the Brisbane-Sydney rail corridor.

Table 2: Summary of Noise categories – Stage 3, 18, 19, 22 and 23 – Consolidated Road and Rail

Lot No	QDC MP4.4 Noise Category	
	Lowset Dwelling	Highset Dwelling
1071	2	3
1072	1	2
1073	1	2
1074	1	1
1075	1	1
1076	0	1
1077	0	1
1078	0	0
1079	0	1
1080	0	1
1081-1084	1	2
1085	0	1
1086	0	1
1087	0	0
1088-1091	1	1
1092	1	2
1093	1	2
1094	1	3
1095	1	3
1096	1	2
1097	1	2

Lot No	QDC MP4.4 Noise Category	
	Lowset Dwelling	Highset Dwelling
1098-1141	1	1
1142	1	3
1143	1	3
1144	1	2
1145	1	2
1146-1171	2	2
1172-1180	1	2
1181-1235	1	1
1236-1244	1	2
1245	1	1
1246	1	1
1247	1	1
1248-1259	2	2
1260	1	2
1261-1268	1	1
1269	1	2
1270	1	2
1271	2	2
1272	2	2
1273-1286	1	1
1287-1302	2	2
1303-1339	1	1

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

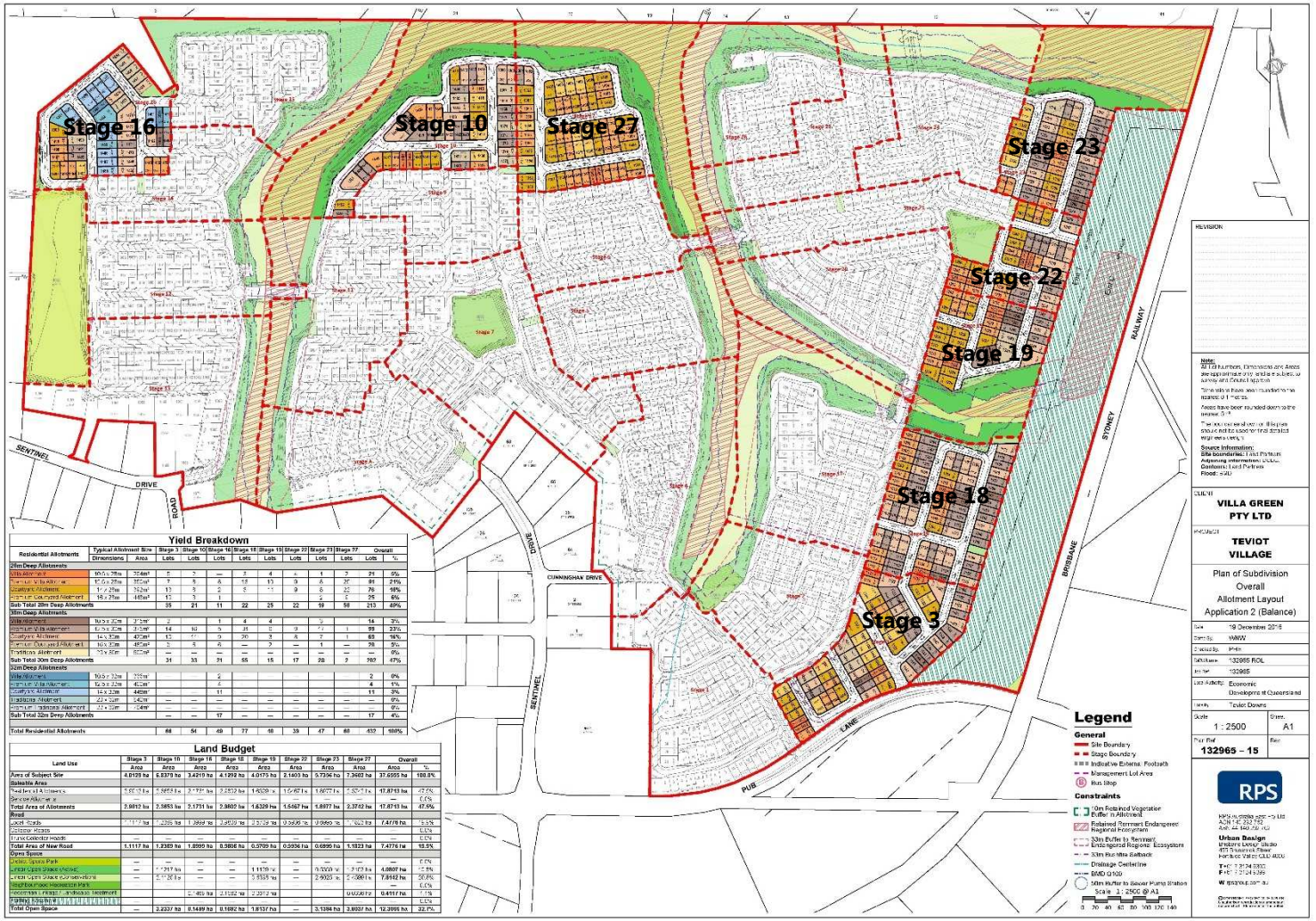

Figure 1: Site location

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

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Job QA900-02 - Residential Subdivision - Teviot Downs - Balance Lots
Facade Corrected Noise Levels ($L_{A10\ 18hr}$)
Lowset Receiver Heights (1.8m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes

STAGE 2
STAGE 3
STAGE 18

2.5m high acoustic fences

2.5m high acoustic fences

2.5m high acoustic fences

60km/hr

LANE

BRISBANE

N

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
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 QA900-02 - Residential Subdivision - Teviot Downs - Balance Lots
Facade Corrected Noise Levels ($L_{A10\ 18hr}$)
Highset Receiver Heights (4.6m) - QDC MP4.4
2.5m Noise Barriers
2025 Traffic Volumes

STAGE 2
STAGE 3
STAGE 18
9000
BRISBANE
LANE
60km/hr
N

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
0 10 20 40 60 80 100 m

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

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Job QA900-02 - Residential Subdivision - Teviot Downs - Balance Lots

Railway Noise Level Contours - Pub Lane Barriers Only (Lowset)

STAGE 26
STAGE 25
STAGE 24
STAGE 23
STAGE 22
STAGE 21
STAGE 20
STAGE 19
STAGE 18
STAGE 17
STAGE 2
STAGE 3

SYDNEY
BRISBANE
LANE

2.5m high acoustic fences

2.5m high acoustic fences

A3 Scale 1:3000

0 15 30 60 90 120 150 m

Noise level L_{max}
in dB(A)

		<	69.5	Noise Category 0
69.5 <=		<	74.5	Noise Category 1
74.5 <=		<	79.5	Noise Category 2
79.5 <=		<	84.5	Noise Category 3
84.5 <=				Noise Category 4

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

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Job QA900-02 - Residential Subdivision - Teviot Downs - Balance Lots

Railway Noise Level Contours - Pub Lane Barriers Only (Highset)

STAGE 26
STAGE 25
STAGE 24
STAGE 23
STAGE 22
STAGE 21
STAGE 20
STAGE 19
STAGE 18
STAGE 17
STAGE 2
STAGE 3

SYDNEY
BRISBANE
LANE

2.5m high acoustic fences

2.5m high acoustic fences

A3 Scale 1:3000

0 15 30 60 90 120 150 m

Noise level L_{max}
in dB(A)

		<	69.5	Noise Category 0
69.5 <=		<	74.5	Noise Category 1
74.5 <=		<	79.5	Noise Category 2
79.5 <=		<	84.5	Noise Category 3
84.5 <=				Noise Category 4

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 Leq 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
16.01.2017	Rev1	-	1	DR	DR	PJ
23.01.2017	Rev 2	-	2	DR	DR	PJ

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