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## **Vipac Engineers & Scientists**

### **Peet Limited**

## **Eden's Crossing Stages 1-3 and 6-8**

### **Noise Impact Assessment**

70Q-16-0182-TRP-540534-2

28 Jun 2017



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## 1 INTRODUCTION

Vipac Engineers & Scientists Ltd (Vipac) was commissioned by Peet to provide a traffic noise impact assessment for Eden's Crossing Stages 1-3 and 6-8, School Road Development, Redbank Plains. This traffic noise assessment includes the following:

- Description of the development;
- Discussion of the applicable noise criteria;
- Prediction of future traffic noise levels for the lots in the proposed development;
- Assessment of predicted traffic noise levels against applicable noise criteria;
- Discussion of noise barrier requirements; and
- Recommendations and conclusion.

## 2 DESCRIPTION OF THE DEVELOPMENT

A noise impact assessment had previously been completed by Vipac for Eden's Crossing Stages 1-3 and 6-8 on School Road, Redbank Plains, in the Vipac report 70Q-15-0350-TRP-519447-2, "Noise Impact Assessment", dated the 5<sup>th</sup> of February 2016 (then referred to as School Road Development Stage 6). This report assesses an updated layout and design levels for Stages 1-3 and 6-8. The proposed Stages 1-3 and 6-8 consist of 160 lots. The location of the development is shown in Figure 2-1.

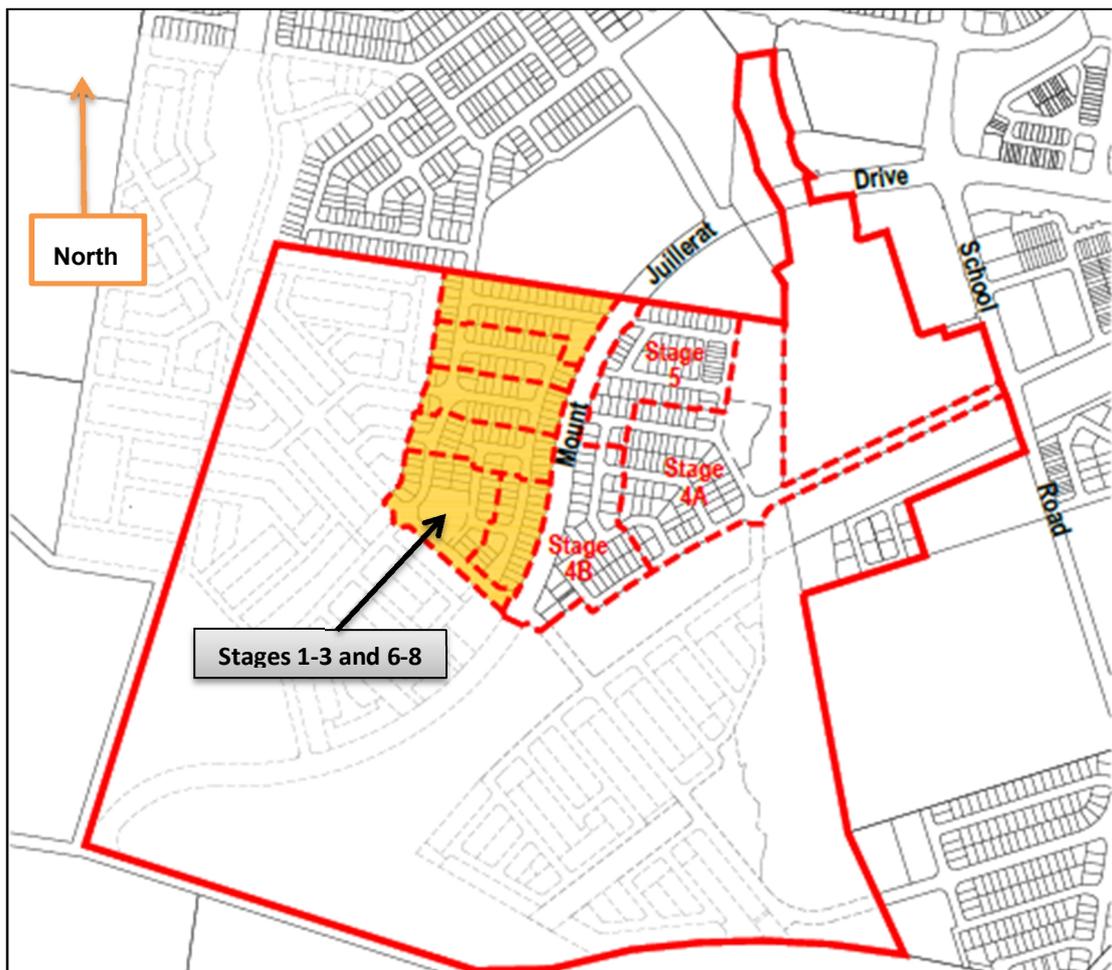


Figure 2-1: Eden's Crossing Stages 1-3 and 6-8 Site Location

### 3 NOISE CRITERIA

#### 3.1 STATE DEVELOPMENT ASSESSMENT PROVISIONS

The Department of State Development Infrastructure and Planning's "State Development Assessment Provisions" (SDAP) (commenced on 23 November 2015) have been adopted to assess traffic noise impacts on the development. Module 1 of the SDAP contains the noise limits in Table 3-1. The development has been assessed according to noise limits for residences in a transport corridor, due to its proximity to a proposed future sub-arterial road Mount Juillerat Drive running northeast to southwest through the development.

Table 3-1: SDAP Module 1 Noise Criteria

Performance Outcomes	Acceptable Outcomes
Accommodation activities near a state-controlled road or type 1 multimodal corridor	
<p>PO1 Development involving an accommodation activity achieves acceptable noise levels for residents and visitors by mitigating adverse impacts on the development from noise generated by a state-controlled road or a type 1 multi-modal corridor.</p>	<p>AO1.1 All facades of an accommodation activity exposed to noise from a state-controlled road or type 1 multi-modal corridor meet the following external noise criteria<sup>#</sup>:</p> <p>(1) <math>\leq 60</math> dB(A) <math>L_{10}</math> (18 hour) facade corrected (measured <math>L_{90}</math> (8 hour) free field between 10 pm and 6 am <math>\leq 40</math> dB(A))</p> <p>(2) <math>\leq 63</math> dB(A) <math>L_{10}</math> (18 hour) facade corrected (measured <math>L_{90}</math> (8 hour) free field between 10 pm and 6 am <math>&gt; 40</math> dB(A)).</p> <p>AND</p> <p>AO1.2 Every private open space in an accommodation activity exposed to noise from a state-controlled road or type 1 multi-modal corridor meets the following external noise criteria<sup>#</sup>:</p> <p>(1) <math>\leq 57</math> dB(A) <math>L_{10}</math> (18 hour) free field (measured <math>L_{90}</math> (18 hour) free field between 6 am and 12 midnight <math>\leq 45</math> dB(A))</p> <p>(2) <math>\leq 60</math> dB(A) <math>L_{10}</math> (18 hour) free field (measured <math>L_{90}</math> (18 hour) free field between 6 am and 12 midnight <math>&gt; 45</math> dB(A)).</p> <p>AND</p> <p>AO1.3 Every passive recreation area in an accommodation activity exposed to noise from a state-controlled road or type 1 multi-modal corridor meets the following external noise criteria<sup>#</sup>:</p> <p>(1) 63 dB(A) <math>L_{10}</math> (12 hour) free field (between 6 am and 6 pm).</p> <p>AND</p> <p>AO1.4 Every habitable room in an accommodation activity (other than a residential building) exposed to noise from a state-controlled road or type 1 multi-modal corridor meets the following internal noise criteria<sup>#</sup>:</p> <p>(1) <math>\leq 35</math> dB(A) <math>L_{eq}</math> (1 hour) (maximum hour over 24 hours).</p> <p>Note: Noise levels from state-controlled roads or type 1 multi-modal corridors are to be measured in accordance with AS1055.1–1997 Acoustics – Description and measurement of environmental noise.</p> <p><sup>#</sup>Editor's note: Habitable rooms of residential buildings located</p>

	within a transport noise corridor must comply with the Queensland Development Code MP4.4 Buildings in a transport noise corridor, Queensland Government, 2010. Transport noise corridors are mapped on the Department of Infrastructure, Local Government and Planning's State Planning Policy Interactive Mapping System.
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### 3.2 QUEENSLAND DEVELOPMENT CODE MP4.4

The Queensland Development Code MP4.4 document specifies external building construction requirements based on the external road traffic noise levels to achieve acceptable indoor noise levels. The road traffic noise level categories, as specified in Schedule 3 of MP4.4, are given in Table 3-2. The required building construction acoustic ratings for each noise category are also listed in Table 3-2.

Table 3-2: MP4.4 Road Traffic Noise Category Levels and Required Building Construction Acoustic Ratings

Free-field Noise Category	Level of Traffic Noise $L_{A10(18hr)}$ (façade corrected)	Required Acoustic Ratings ( $R_w$ )			
		Glazing and Frames		External Walls	Ceiling and Roofs
		Room Façade Glazing Area $\geq$ 1.8m <sup>2</sup>	Room Façade Glazing < 1.8m <sup>2</sup>		
Category 4	$\geq 73$ dB(A)	$R_w$ 43	$R_w$ 43	$R_w$ 52	$R_w$ 45
Category 3	68-72 dB(A)	$R_w$ 38	$R_w$ 35	$R_w$ 47	$R_w$ 41
Category 2	63-67 dB(A)	$R_w$ 35	$R_w$ 32	$R_w$ 41	$R_w$ 38
Category 1	58-62 dB(A)	$R_w$ 27	$R_w$ 24	$R_w$ 35	$R_w$ 35
Category 0	$\leq 57$ dB(A)	None	None	None	None

### 3.3 CRITERIA USED IN THIS ASSESSMENT

The noise limits have been adopted for Stages 1-3 and 6-8 where the background noise level is above 45 dB(A)  $L_{90, 8hr}$ . The development stages are near the future Mount Juillerat Drive, which will be a major road, and future background noise levels are expected to be above 45 dB(A)  $L_{90, 8hr}$ .

As a result, the relevant criteria from Table 3-1 for this development are:

- Noise at the external façade of a residence:  $\leq 63$  dB(A)  $L_{10, 18hr}$  façade corrected;
- Noise inside private open space on Lots:  $\leq 60$  dB(A)  $L_{10, 18hr}$  free field;
- Noise at recreational areas (park):  $\leq 63$  dB(A)  $L_{10, 12hr}$  free-field; and
- Development Code MP4.4 for habitable rooms of residential buildings.

## 4 NOISE IMPACT ASSESSMENT

Noise impact assessment has been conducted using the SoundPlan noise modelling software. The following are discussed in this section:

- Modelling methodology and assumptions;
- Traffic data;
- Scenarios modelled;
- Predicted road traffic noise levels; and
- Noise barrier specifications.

### 4.1 TRAFFIC NOISE MODELLING METHODOLOGY

Traffic noise calculations were carried out using SoundPLAN noise modelling software. The data and assumptions used in traffic noise modelling are presented in Table 4-1.

Table 4-1: Data and Assumptions Used in Traffic Noise Modelling

Parameter	Data
Future Residence Receiver Heights	Ground Floor: 1.8m above ground level as obtained from terrain data (façade corrected) Ground Floor: 1.5m above ground level as obtained from terrain data (private open space) First Floor: 4.6m above ground level as obtained from terrain data (assuming height of floors as 2.8m)
Terrain Data	Stage 1-3 and 6-8 terrain data from Peet, "PETSWL6 3D DESIGN CONTOUR & MESH 060916.dwg", received 06/09/2016 Surrounding terrain contours and Centenary Highway contours as used for previous stages of Eden's Crossing/ School Road development
Lot Layout	Stage 1-3 and 6-8 from Peet, "132030-Edens Stg1-7 ROL-RevA.dwg", received 15/09/2016 Base Lots from Peet, "Base Lots.dwg", received 15/09/2016 Disclosure Plan for Proposed Lot 425 from Peet, "Disclosure Plans Lot425", received 27/06/2017
Calculation Method	UK's Calculation of Road Traffic Noise (CoRTN)
Rail Noise	A future rail line is proposed, adjacent to the southern boundary of Stage 4 of the development. The rail line would link up with an existing rail line at Springfield Station. At this stage, there are no details available for this rail line, including when it will be constructed, or if the project will indeed go ahead. Due to the uncertainty surrounding the proposed rail line, rail noise has not been assessed in this report
Road Surface	Dense Graded Asphalt was modelled as the road surface for all roads. <ul style="list-style-type: none"> <li>A correction of -1.7 dB(A) has been applied for façade corrected receivers for Queensland conditions (Department of Transport and Main Roads, Transport Noise Management Code of Practice 2013); and</li> <li>A correction of -0.7 dB(A) has been applied for free field locations for Queensland conditions (Department of Transport and Main Roads, Transport Noise Management Code of Practice 2013).</li> </ul>

The above data has been incorporated into the existing SoundPLAN noise model and future traffic noise levels predicted. The traffic volumes adopted for this assessment are presented in Table 4-2.

Table 4-2: Traffic Data Used in Traffic Noise Modelling

Road	Scenario	Year	AADT	18hr Traffic Volumes	%CV*	Speed	Growth Rate	Data Source
						(km/h)		
The Centenary Mwy	Traffic Count	2015	5,675	5,334	11.35%	100	3%	TTM
	Ultimate	2027	7,627	7,169	11.35%	100	-	TTM
Mount Juillerat Dve	Ultimate	2027	15,000	14,100	5.0%	70	-	TTM

\* Future %CVs were assumed to be the same as current %CVs

## 4.1 PREDICTED TRAFFIC NOISE LEVELS

### 4.1.1 PREDICTED FAÇADE CORRECTED TRAFFIC NOISE LEVELS WITH NO NOISE MITIGATION

The predicted traffic noise levels are tabulated in Appendix A. Noise modelling results show future traffic noise levels for lots in the development will range between  $L_{A10,18hr}$  50 dB(A) and 68 dB(A) (façade corrected) for the ground floor and  $L_{A10,18hr}$  52 dB(A) and 69 dB(A) (façade corrected) for the first floor. Traffic noise for a number of lots adjacent to Mount Juillerat Drive is predicted to exceed the noise criteria on the ground floor and the first floor. Lots predicted to exceed the indoor noise limit are shown in Table 4-3.

Table 4-3 Lots Predicted to Exceed the External Noise Limit Criteria

Noise Limit	Lots Exceeding Noise Limits	Floor
$L_{A10,18hr}$ 63 dB(A) – Façade corrected	425-426, 493-521	Ground
	425-426, 476, 493-521	First

### 4.1.2 PREDICTED PRIVATE OPEN SPACE NOISE LEVELS WITH NO NOISE MITIGATION

The predicted noise results show future free field traffic noise levels for the lots in the development will range between  $L_{A10,18hr}$  48 dB(A) and 68 dB(A) for private open space. Predicted traffic noise levels are shown in Appendix B. Without a noise barrier, the lots that exceed the private open space noise criteria are tabulated in Table 4-4.

Table 4-4 Lots Predicted to Exceed the Outdoor Noise Limit Criteria

Noise Limit	Lots Exceeding Noise Limits	Floor
$L_{A10,18hr}$ 60 dB(A) – Free-field	425-426, 493-521	Ground

### 4.1.3 PREDICTED TRAFFIC NOISE AT PASSIVE RECREATION AREA

The location of the passive recreation area (park) for this development is shown in Figure 2-1, the closest point of which is located approximately 100m west of Mount Juillerat Drive.

The following adjustment factor was assumed to calculate the predicted  $L_{10(12hr)}$  noise descriptor from the predicted  $L_{A10(18hr)}$  noise levels, based on noise measurements conducted for the original Vipac noise assessment for the development:

- 0.8 dB(A)

The predicted  $L_{A10(12hr)}$  noise level at the recreational park, including the above adjustment is shown below in Table 4-5.

Table 4-5 Predicted Traffic Noise Levels at the Passive Recreation Area

Location of Residences	Predicted Traffic Noise Level	Noise Limit, Free Field	Compliance
	$L_{A10, 12hr}$ dB(A)	$L_{A10, 12hr}$ dB(A)	
Park (Passive Recreation Area)	51	63	Yes

Traffic noise level at the park is predicted to comply with noise limit. Noise maps showing free field levels are shown in Appendix C.

## 5 NOISE BARRIER REQUIREMENTS

The exceedances of the 63 dB(A) façade noise limit and 60 dB(A) private open space noise limit at the proposed subdivision are caused by traffic noise from Mount Juillerat Drive. 2m high traffic noise barriers would be required to be constructed on the eastern boundary of the subdivision on lots 425, 493-521 (shown in Figure 5-1) to reduce the traffic noise levels at the ground floor and private open spaces to comply with noise limits.

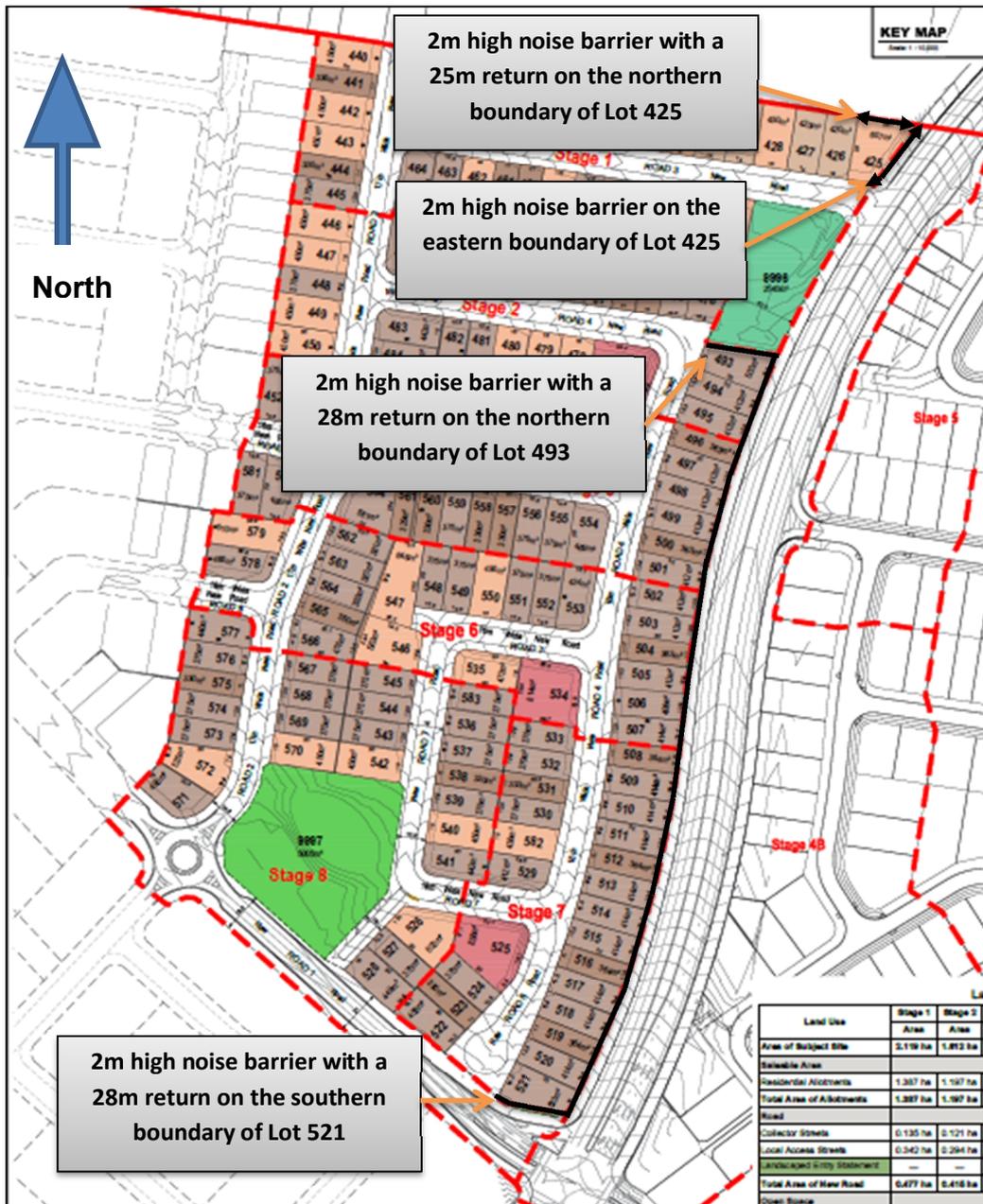


Figure 5-1: Noise Barriers for Lots Adjacent to Mount Juillerat Drive

### 5.1 PREDICTED FAÇADE CORRECTED TRAFFIC NOISE LEVELS WITH NOISE BARRIERS

The predicted results in Appendix A show future traffic noise levels for lots in the development will range between  $L_{A10,18hr}$  49 dB(A) and 63 dB(A) (façade corrected) for the ground floor and  $L_{A10,18hr}$  50 dB(A) and

70 dB(A) (facade corrected) for the first floor with noise mitigation. As a result, all ground floor traffic noise levels will comply with the noise criteria in Table 3-1. Lots that are predicted to exceed the criteria on the first floor are summarised in Table 5-1 below:

Table 5-1: Lots Predicted to Exceed the Indoor Noise Criteria with Noise Mitigation

Noise Limit	Lots Exceeding Noise Limits	Floor
L <sub>A10,18hr</sub> 63 dB(A) – Façade corrected	425-426, 493-521	First

### 5.1.1 PREDICTED PRIVATE OPEN SPACE NOISE LEVELS WITH NOISE BARRIERS

The predicted noise results in Appendix B show future traffic noise levels for the lots in the development will range between L<sub>A10,18hr</sub> 47 dB(A) and 60 dB(A) for the ground level. Consequently, all private open space traffic noise levels will comply with the noise criteria in Table 3-1.

## 6 BUILDING CONSTRUCTION ACOUSTIC REQUIREMENTS

The lots in the proposed development fall into MP4.4 Traffic Noise Categories 0 to 1 for the ground floor and 0 to 3 for the first floor. Consequently, building construction should be designed to achieve the ratings specified in the MP4.4 document, as presented in Table 3-2. Glazing, external wall, ceiling/roof and ventilation requirements are specified in Sections 6.1.1 to 6.1.4.

### 6.1.1 GLAZING REQUIREMENTS

Glazing requirements were determined to achieve acceptable indoor road traffic noise levels, as per MP4.4. Glazing requirements are specified in Table 6-1.

Table 6-1: Required Glazing Ratings for Future Residences

Floor	Lots	Minimum Required Glazing and Frames Acoustic Rating (R <sub>w</sub> )	
		Room Façade Glazing Area ≥ 1.8m <sup>2</sup>	Room Façade Glazing Area <1.8m <sup>2</sup>
Ground	425-429, 453, 475-476, 493-521	27	24
First	428-430, 453-455, 474-477, 492, 523	27	24
	426-427	35	32
	425, 493-521	38	35

Typical R<sub>w</sub> values for different glazing thicknesses are presented in Table 6-2.

Table 6-2: Typical R<sub>w</sub> Values for Different Glazing Thicknesses

R <sub>w</sub>	Glazing Thickness
20	3 mm
25	4.5/5 mm
31	6.38/6.76mm laminate
35	10.38 mm laminate
40	Double glazed (>75mm cavity)

It is required that the R<sub>w</sub> performance ratings of the glazing systems (windows and frames) be certified by the supplier prior to installation. Glazing and frame certificates will be required for building certification. Where glazing system requirements are considered high, the design or glazed surface area can be reduced to minimise the acoustic rating required. **In addition, once the building design has been finalised, a site specific report based on AS3671 requirements can be conducted which could potentially reduce the glazing requirements.**

### 6.1.2 EXTERNAL WALL REQUIREMENTS

The external wall construction options shown in Table 6-3 are example forms of construction to achieve acceptable indoor traffic noise levels. Alternative external wall constructions that achieve the specified acoustic ratings may be adopted.

Table 6-3: Required External Wall Construction Specifications for Future Residences

Floor	Required Acoustic Rating (R <sub>w</sub> )	Lots	Construction options to achieve the required rating	
Ground	35	425-429, 453, 475-476, 493-521	External Wall – Brick	Single leaf of brick masonry (minimum 110mm)
				70mm timber studs at 600 mm centres
			External Wall – Lightweight	1 X 10mm plasterboard
				Fibre cement cladding (minimum 6.5mm)
First	35	428-430, 453-455, 474-477, 492, 523	External Wall – Brick	70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
			External Wall – Lightweight	Fibre cement cladding (minimum 6.5mm)
				70mm timber studs at 600 mm centres
	41	426-427	External Wall – Brick	1 X 10mm plasterboard
				Brick veneer (minimum 70mm)
			External Wall – Lightweight	70mm timber studs at 600 mm centres
				1 X 10mm acoustic rated plasterboard
	47	425, 493-521	External Wall – Brick	Brick veneer (minimum 70mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
				R2.5 Batts insulation

### 6.1.3 CEILING/ROOF REQUIREMENTS

The ceiling/roof construction specifications Table 6-4 are example forms of construction to achieve acceptable indoor traffic noise levels. Alternative ceiling/roof constructions that achieve the specified acoustic rating may be adopted.

Table 6-4: Required Ceiling / Roof Construction Specifications for Future Residences

Floor		Required Acoustic Rating (R <sub>w</sub> )	Construction to achieve the required rating
First	425, 493-521	41	Concrete tiles / sheet metal
			10mm acoustic rated plasterboard
			R3.0 Batts insulation

### 6.1.4 VENTILATION REQUIREMENTS

Acceptable indoor noise levels according to MP4.4 can be achieved: however, for the habitable rooms of future residences on Lots where the MP4.4 traffic noise categories are 1 or greater, doors and windows must be closed. Alternative ventilation may include air-conditioning, borrowed ventilation, mechanical assisted ventilation or other suitable methods.

## 7 CONCLUSION AND RECOMMENDATIONS

Vipac Engineers & Scientists Ltd (Vipac) has completed a traffic noise impact assessment for the proposed Eden's Crossing Stages 1-3 and 6-8, School Road Development, Redbank Plains

Traffic noise levels have been predicted to exceed the State Development Assessment Noise Provisions (SDAP) Module 1 noise limits at some of the lots within the proposed development. The following noise mitigation measures are recommended:

- Construction of 2m high noise barriers adjacent to Mount Juillerat Drive, as presented in Figure 5-1. Barriers should be constructed in accordance with Main Roads Technical Specification MRTS 15, "Noise Fences". Barriers should have no gaps between palings, or between palings and posts and ground. A minimum surface density of 12.5kg/m<sup>2</sup> should be used;
- Selection of glazing as presented in Table 6-1;
- Construction of external walls as presented in Table 6-3;
- Construction of ceilings and roofs as presented in Table 6-4; and
- Lots 425 to 427 will house a sales office initially, and as a result noise barriers along the boundary of Lot 425 will not be required during this period. However, noise barriers as shown in Figure 5-1 are to be constructed prior to converting the sales office on Lots 425 to 427 into residences in order to comply with noise limits.

For habitable rooms of future residences on Lots where the MP4.4 Traffic Noise Category is 1 or greater, doors and windows must be closed to achieve acceptable indoor noise levels. Under these conditions, alternative ventilation will be required in affected rooms. Alternative ventilation may include air-conditioning, borrowed ventilation, mechanically assisted ventilation or other suitable methods.

## Appendix A PREDICTED TRAFFIC NOISE LEVELS AND CONSTRUCTION CATEGORIES

Table A-1: Predicted Façade Corrected Traffic Noise Levels and Construction Categories

Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		L <sub>A10,18hr</sub> Façade Corrected		No Barrier	With Barriers
425	Ground	67	62	2	1
	First	68	68	3	3
426	Ground	64	61	2	1
	First	65	64	2	2
427	Ground	62	61	1	1
	First	63	63	2	2
428	Ground	60	59	1	1
	First	62	61	1	1
429	Ground	59	58	1	1
	First	60	59	1	1
430	Ground	57	57	0	0
	First	59	58	1	1
431	Ground	57	56	0	0
	First	58	57	1	0
432	Ground	55	55	0	0
	First	57	56	0	0
433	Ground	55	54	0	0
	First	56	55	0	0
434	Ground	54	53	0	0
	First	56	55	0	0
435	Ground	53	53	0	0
	First	55	54	0	0
436	Ground	53	52	0	0
	First	54	53	0	0
437	Ground	52	52	0	0
	First	54	53	0	0
438	Ground	52	51	0	0
	First	53	52	0	0
439	Ground	52	51	0	0
	First	53	52	0	0
440	Ground	50	49	0	0
	First	52	50	0	0
441	Ground	50	49	0	0
	First	52	50	0	0
442	Ground	50	49	0	0
	First	52	50	0	0
443	Ground	50	50	0	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr	Façade Corrected	No Barrier	With Barriers
	First	52	51	0	0
444	Ground	50	50	0	0
	First	52	51	0	0
445	Ground	50	50	0	0
	First	52	51	0	0
446	Ground	50	50	0	0
	First	52	51	0	0
447	Ground	51	50	0	0
	First	52	51	0	0
448	Ground	51	50	0	0
	First	52	51	0	0
449	Ground	51	50	0	0
	First	52	51	0	0
450	Ground	51	50	0	0
	First	52	51	0	0
451	Ground	51	50	0	0
	First	53	51	0	0
452	Ground	50	49	0	0
	First	52	50	0	0
453	Ground	60	59	1	1
	First	62	61	1	1
454	Ground	58	57	1	0
	First	61	59	1	1
455	Ground	57	56	0	0
	First	59	58	1	1
456	Ground	56	55	0	0
	First	58	57	1	0
457	Ground	55	54	0	0
	First	57	56	0	0
458	Ground	55	53	0	0
	First	57	55	0	0
459	Ground	54	53	0	0
	First	56	54	0	0
460	Ground	53	52	0	0
	First	55	54	0	0
461	Ground	53	52	0	0
	First	55	53	0	0
462	Ground	52	51	0	0
	First	54	53	0	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr	Façade Corrected	No Barrier	With Barriers
463	Ground	52	51	0	0
	First	54	52	0	0
464	Ground	52	51	0	0
	First	53	52	0	0
465	Ground	53	51	0	0
	First	54	52	0	0
466	Ground	53	52	0	0
	First	54	53	0	0
467	Ground	53	52	0	0
	First	55	53	0	0
468	Ground	54	52	0	0
	First	55	54	0	0
469	Ground	54	53	0	0
	First	56	54	0	0
470	Ground	55	53	0	0
	First	57	55	0	0
471	Ground	56	54	0	0
	First	57	56	0	0
472	Ground	57	55	0	0
	First	58	57	1	0
472	Ground	57	56	0	0
	First	59	57	1	0
474	Ground	58	57	1	0
	First	60	59	1	1
475	Ground	60	58	1	1
	First	61	60	1	1
476	Ground	62	61	1	1
	First	64	62	2	1
477	Ground	59	57	1	0
	First	60	58	1	1
478	Ground	56	55	0	0
	First	58	56	1	0
479	Ground	55	54	0	0
	First	57	55	0	0
480	Ground	55	53	0	0
	First	57	54	0	0
481	Ground	54	52	0	0
	First	56	54	0	0
482	Ground	54	52	0	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr Façade Corrected		No Barrier	With Barriers
	First	55	53	0	0
483	Ground	53	51	0	0
	First	54	52	0	0
484	Ground	53	51	0	0
	First	54	52	0	0
485	Ground	53	51	0	0
	First	54	52	0	0
486	Ground	53	52	0	0
	First	55	52	0	0
487	Ground	54	52	0	0
	First	56	54	0	0
488	Ground	55	53	0	0
	First	56	54	0	0
489	Ground	56	54	0	0
	First	57	55	0	0
490	Ground	56	54	0	0
	First	58	56	1	0
491	Ground	57	55	0	0
	First	59	57	1	0
492	Ground	59	55	1	0
	First	61	58	1	1
493	Ground	67	62	2	1
	First	69	69	3	3
494	Ground	67	61	2	1
	First	69	68	3	3
495	Ground	67	61	2	1
	First	69	69	3	3
496	Ground	68	61	3	1
	First	69	69	3	3
497	Ground	68	61	3	1
	First	69	68	3	3
498	Ground	67	61	2	1
	First	69	68	3	3
499	Ground	68	61	3	1
	First	69	68	3	3
500	Ground	68	61	3	1
	First	69	68	3	3
501	Ground	67	60	2	1
	First	69	68	3	3



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr	Façade Corrected	No Barrier	With Barriers
502	Ground	68	61	3	1
	First	69	68	3	3
503	Ground	68	60	3	1
	First	69	68	3	3
504	Ground	68	61	3	1
	First	69	68	3	3
505	Ground	68	61	3	1
	First	69	68	3	3
506	Ground	67	61	2	1
	First	69	68	3	3
507	Ground	67	60	2	1
	First	68	68	3	3
508	Ground	68	61	3	1
	First	69	68	3	3
509	Ground	68	61	3	1
	First	69	68	3	3
510	Ground	67	61	2	1
	First	69	68	3	3
511	Ground	67	61	2	1
	First	69	68	3	3
512	Ground	68	61	3	1
	First	69	68	3	3
513	Ground	68	61	3	1
	First	69	68	3	3
514	Ground	67	61	2	1
	First	69	68	3	3
515	Ground	67	62	2	1
	First	69	68	3	3
516	Ground	67	62	2	1
	First	69	68	3	3
517	Ground	67	61	2	1
	First	69	68	3	3
518	Ground	67	62	2	1
	First	69	68	3	3
519	Ground	67	62	2	1
	First	69	68	3	3
520	Ground	67	62	2	1
	First	69	68	3	3
521	Ground	67	62	2	1



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr	Façade Corrected	No Barrier	With Barriers
	First	68	68	3	3
522	Ground	58	55	1	0
	First	59	57	1	0
523	Ground	58	56	1	0
	First	60	58	1	1
524	Ground	58	56	1	0
	First	60	57	1	0
525	Ground	59	56	1	0
	First	61	58	1	1
526	Ground	56	54	0	0
	First	58	55	1	0
527	Ground	56	54	0	0
	First	58	55	1	0
528	Ground	55	53	0	0
	First	57	55	0	0
529	Ground	59	55	1	0
	First	61	57	1	0
530	Ground	59	55	1	0
	First	61	57	1	0
531	Ground	59	55	1	0
	First	61	57	1	0
532	Ground	59	55	1	0
	First	61	57	1	0
533	Ground	59	55	1	0
	First	61	57	1	0
534	Ground	59	55	1	0
	First	61	57	1	0
535	Ground	56	53	0	0
	First	58	54	1	0
536	Ground	56	53	0	0
	First	58	54	1	0
537	Ground	56	53	0	0
	First	58	54	1	0
538	Ground	56	53	0	0
	First	58	55	1	0
539	Ground	56	53	0	0
	First	58	55	1	0
540	Ground	57	54	0	0
	First	58	55	1	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr Façade Corrected		No Barrier	With Barriers
541	Ground	56	54	0	0
	First	58	55	1	0
542	Ground	54	52	0	0
	First	56	53	0	0
543	Ground	54	52	0	0
	First	56	53	0	0
544	Ground	54	52	0	0
	First	56	53	0	0
545	Ground	54	51	0	0
	First	56	53	0	0
546	Ground	53	51	0	0
	First	55	53	0	0
547	Ground	54	52	0	0
	First	55	53	0	0
548	Ground	55	52	0	0
	First	56	53	0	0
549	Ground	55	52	0	0
	First	57	54	0	0
550	Ground	56	53	0	0
	First	58	54	1	0
551	Ground	57	53	0	0
	First	58	55	1	0
552	Ground	58	54	1	0
	First	60	56	1	0
553	Ground	59	55	1	0
	First	61	57	1	0
554	Ground	59	55	1	0
	First	61	57	1	0
555	Ground	57	54	0	0
	First	59	56	1	0
556	Ground	56	54	0	0
	First	58	55	1	0
557	Ground	56	53	0	0
	First	58	55	1	0
558	Ground	55	53	0	0
	First	57	54	0	0
559	Ground	55	53	0	0
	First	57	54	0	0
560	Ground	54	52	0	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr Façade Corrected		No Barrier	With Barriers
	First	56	54	0	0
561	Ground	54	52	0	0
	First	56	53	0	0
562	Ground	53	51	0	0
	First	54	52	0	0
563	Ground	53	51	0	0
	First	54	52	0	0
564	Ground	53	51	0	0
	First	54	52	0	0
565	Ground	53	51	0	0
	First	54	52	0	0
566	Ground	52	51	0	0
	First	54	52	0	0
567	Ground	52	51	0	0
	First	54	52	0	0
568	Ground	52	51	0	0
	First	54	52	0	0
569	Ground	52	51	0	0
	First	54	52	0	0
570	Ground	53	51	0	0
	First	54	52	0	0
571	Ground	51	50	0	0
	First	52	50	0	0
572	Ground	51	50	0	0
	First	53	51	0	0
573	Ground	51	50	0	0
	First	52	50	0	0
574	Ground	51	50	0	0
	First	53	51	0	0
575	Ground	51	50	0	0
	First	52	51	0	0
576	Ground	51	50	0	0
	First	53	51	0	0
577	Ground	51	50	0	0
	First	52	50	0	0
578	Ground	51	50	0	0
	First	53	51	0	0
579	Ground	51	50	0	0
	First	53	51	0	0



Lot No	Floor	No Barrier	With Barriers	QDC MP4.4 Categories	
		LA10,18hr Façade Corrected		No Barrier	With Barriers
580	Ground	51	50	0	0
	First	53	51	0	0
581	Ground	50	49	0	0
	First	52	50	0	0
582	Ground	59	55	1	0
	First	61	57	1	0
583	Ground	56	53	0	0
	First	58	54	1	0
584	Ground	53	51	0	0
	First	53	51	0	0



## Appendix B PREDICTED FREE-FIELD TRAFFIC NOISE LEVELS

Table B-1: Predicted Free-field Traffic Noise Levels for Private Open Spaces

Lot No	No Barrier	With Barriers
	LA10,18hr (dB(A))	
425	65	60
426	62	59
427	60	59
428	58	57
429	57	56
430	56	55
431	55	54
432	54	53
433	53	52
434	53	52
435	52	51
436	51	50
437	51	50
438	51	50
439	50	49
440	49	48
441	49	48
442	48	48
443	48	48
444	49	48
445	49	48
446	49	48
447	49	48
448	49	48
449	49	48
450	49	48
451	49	48
452	49	47
453	58	57
454	57	56
455	56	54
456	55	53
457	54	53
458	53	52
459	52	51
460	52	51
461	51	50



Lot No	No Barrier	With Barriers
	L <sub>A10,18hr</sub> (dB(A))	
462	51	50
463	51	49
464	50	49
465	51	49
466	51	50
467	52	50
468	52	51
469	53	51
470	53	52
471	54	52
472	55	53
472	56	54
474	57	55
475	58	56
476	60	59
477	57	55
478	55	53
479	54	52
480	53	51
481	52	50
482	52	50
483	51	49
484	51	49
485	51	49
486	51	49
487	53	50
488	53	51
489	54	51
490	54	52
491	56	53
492	57	53
493	66	60
494	66	59
495	66	59
496	67	59
497	67	59
498	67	59
499	67	58
500	67	58



Lot No	No Barrier	With Barriers
	L <sub>A10,18hr</sub> (dB(A))	
501	67	58
502	67	58
503	67	58
504	67	58
505	67	59
506	67	58
507	66	58
508	67	59
509	67	59
510	67	59
511	67	59
512	68	60
513	67	59
514	67	60
515	67	60
516	67	60
517	66	60
518	67	60
519	66	60
520	66	60
521	66	60
522	56	54
523	56	54
524	57	54
525	58	54
526	54	51
527	54	51
528	54	51
529	57	53
530	57	53
531	57	53
532	57	52
533	57	52
534	57	52
535	54	50
536	55	51
537	55	51
538	55	51
539	55	51



Lot No	No Barrier	With Barriers
	L <sub>A10,18hr</sub> (dB(A))	
540	55	51
541	55	51
542	52	49
543	52	49
544	52	49
545	52	49
546	52	49
547	52	50
548	53	50
549	53	50
550	54	51
551	55	51
552	56	52
553	57	52
554	57	52
555	55	52
556	55	51
557	54	51
558	53	51
559	53	51
560	53	50
561	53	50
562	51	49
563	51	49
564	51	49
565	51	49
566	51	49
567	51	49
568	51	49
569	51	49
570	51	49
571	49	47
572	49	47
573	49	47
574	49	47
575	49	47
576	49	47
577	49	47
578	49	47



Lot No	No Barrier	With Barriers
	L <sub>A10,18hr</sub> (dB(A))	
579	49	47
580	49	47
581	48	47
582	57	53
583	53	49
584	51	50
Park	51	49



## Appendix C NOISE CONTOUR MAPS

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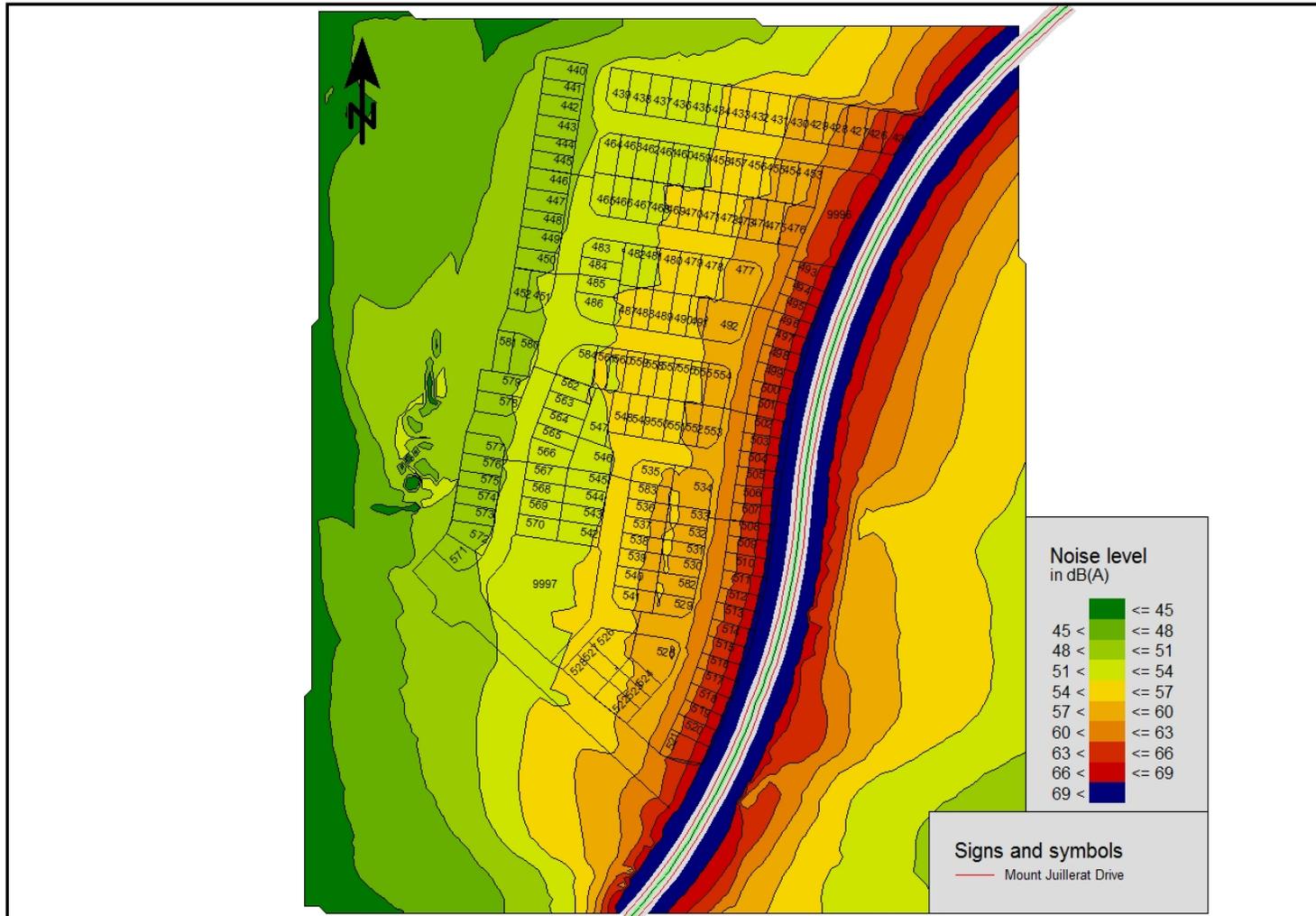


Figure C-1: Predicted Façade Adjusted LA10 (18hr) Road Traffic Noise Levels at the Ground Floor of Lots with No Noise Mitigation on Mt Juillerat Drive

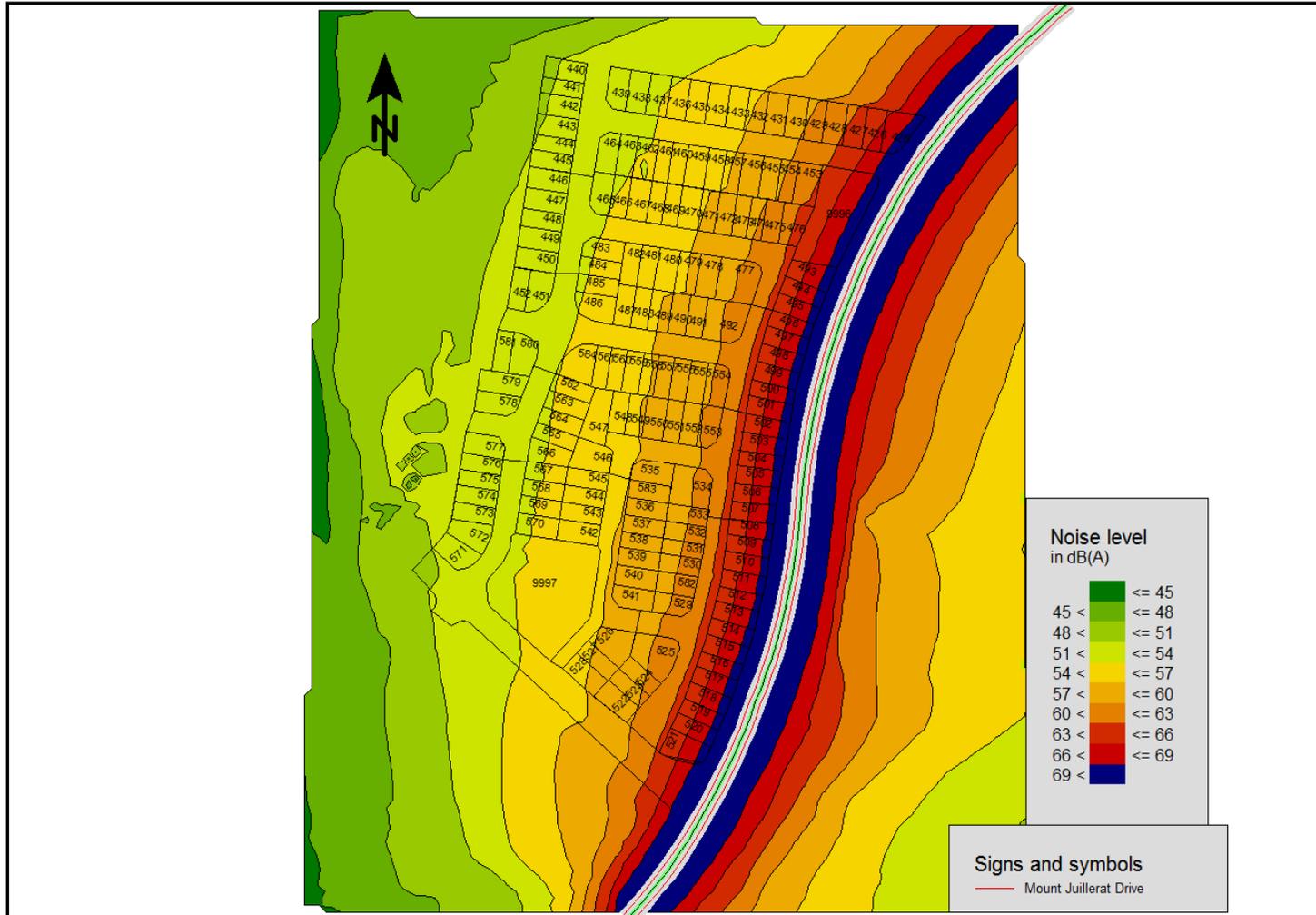


Figure C-2: Predicted Façade Adjusted LA10 (18hr) Road Traffic Noise Levels at the First Floor of Lots with No Noise Mitigation on Mt Juillerat Drive

28 Jun 2017

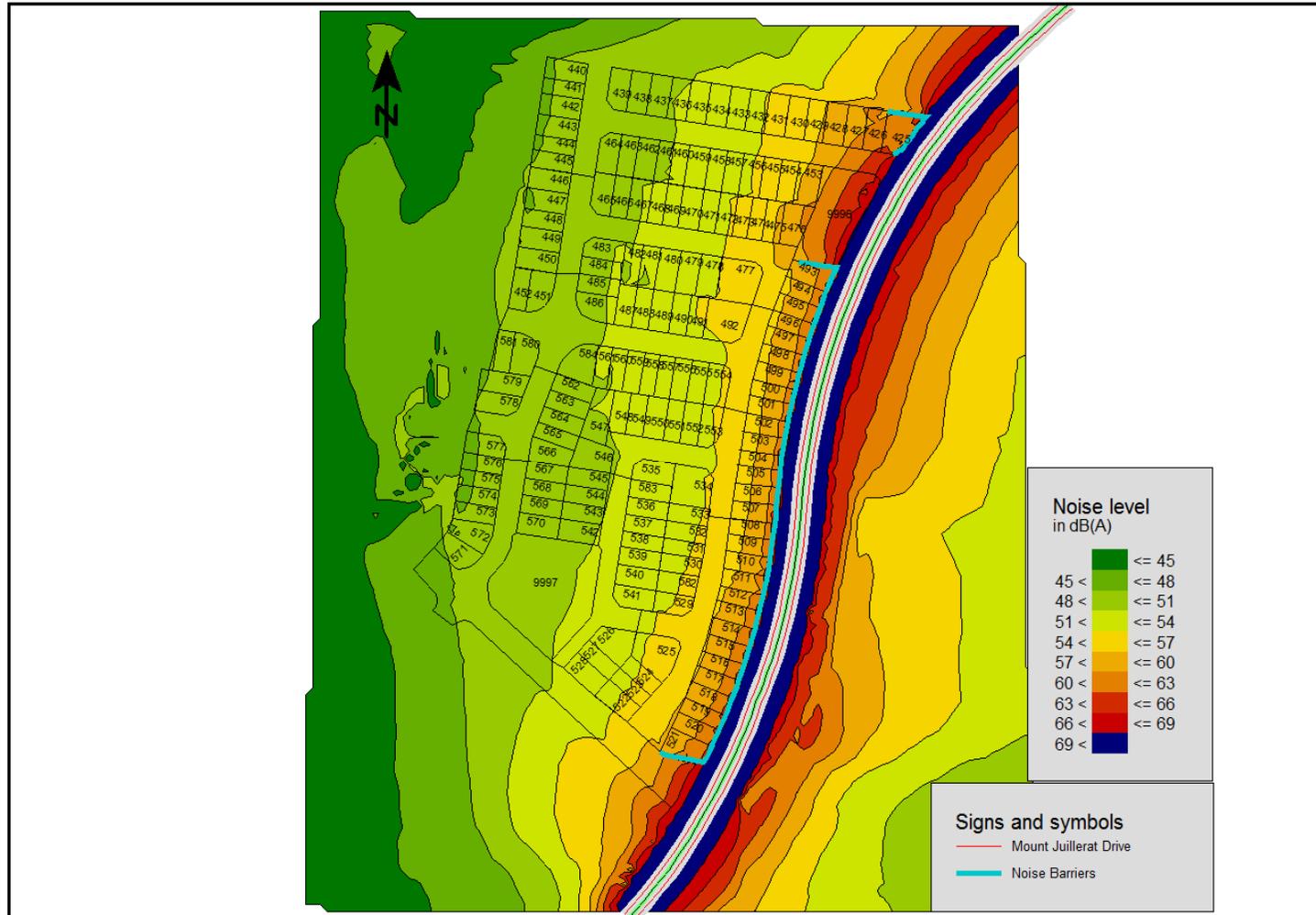


Figure C-3: Predicted Façade Adjusted LA10 (18hr) Road Traffic Noise Levels at the Ground Floor of Lots with Noise Barriers on Mt Juillerat Drive

28 Jun 2017

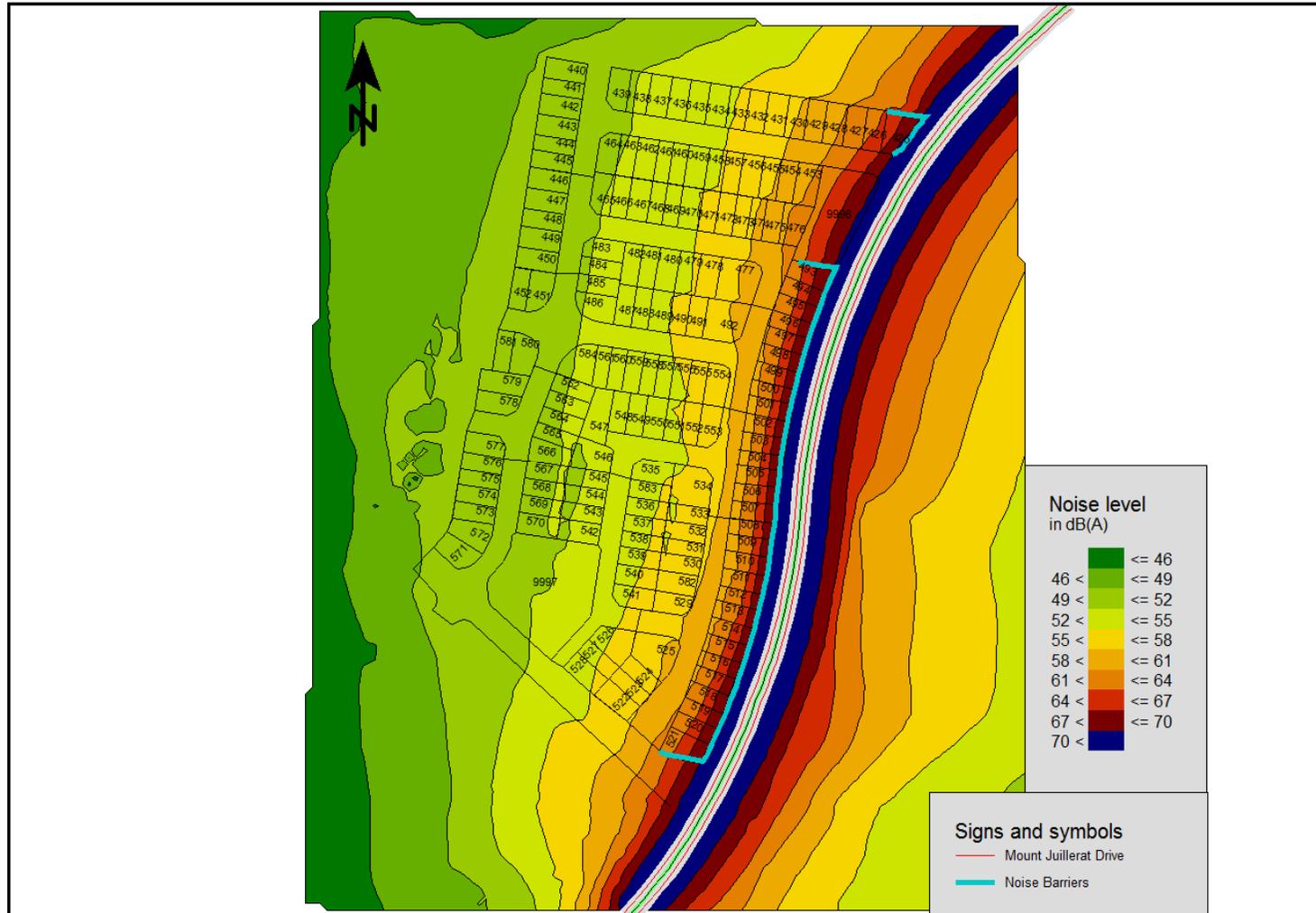


Figure C-4: Predicted Façade Adjusted LA10 (18hr) Road Traffic Noise Levels at the First Floor of Lots with Noise Barriers on Mt Juillerat Drive

28 Jun 2017

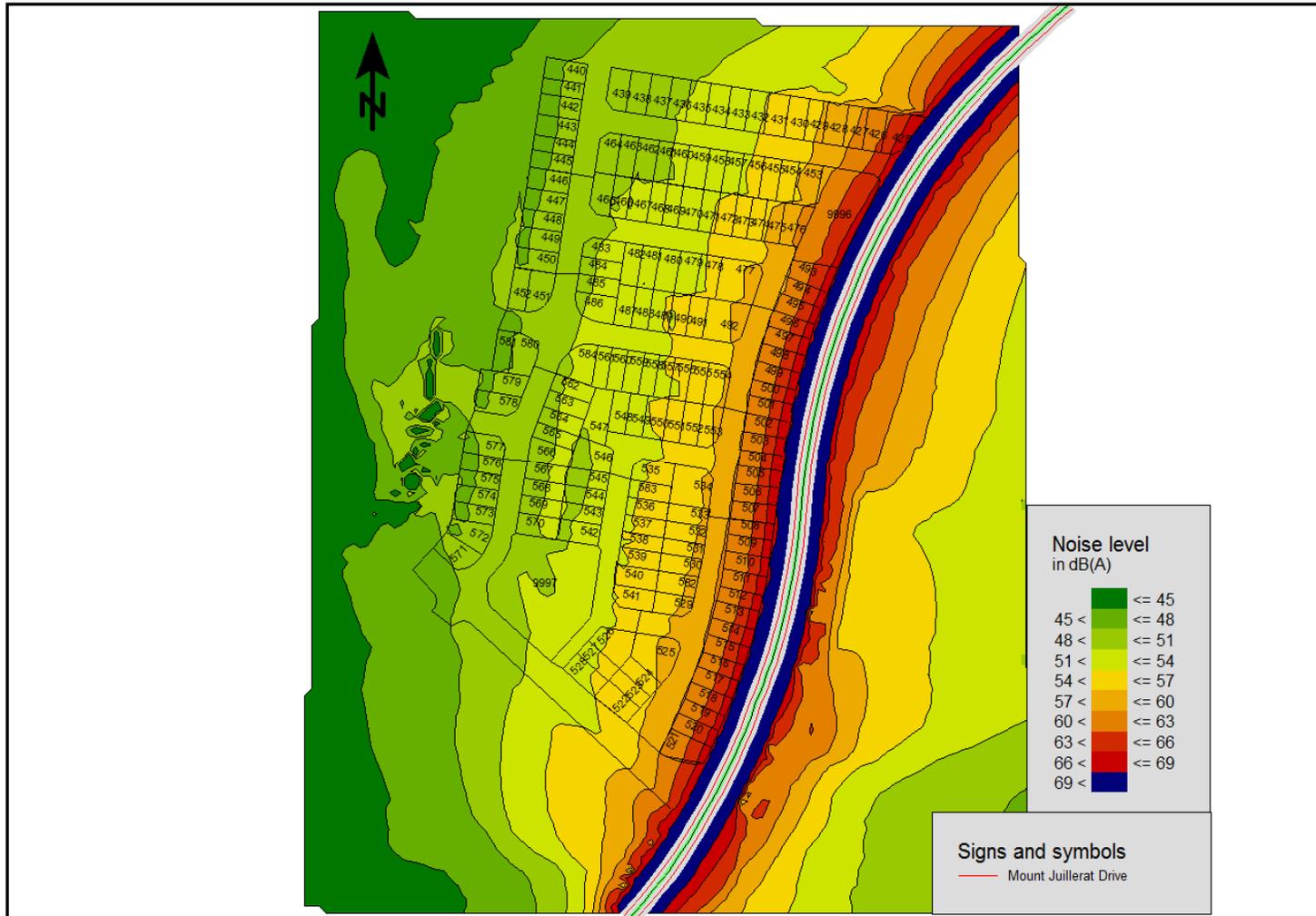


Figure C-5: Predicted Free Field LA10 (18hr) Road Traffic Noise Levels at Private Open Spaces of Lots with No Noise Mitigation on Mt Juillerat Drive

28 Jun 2017

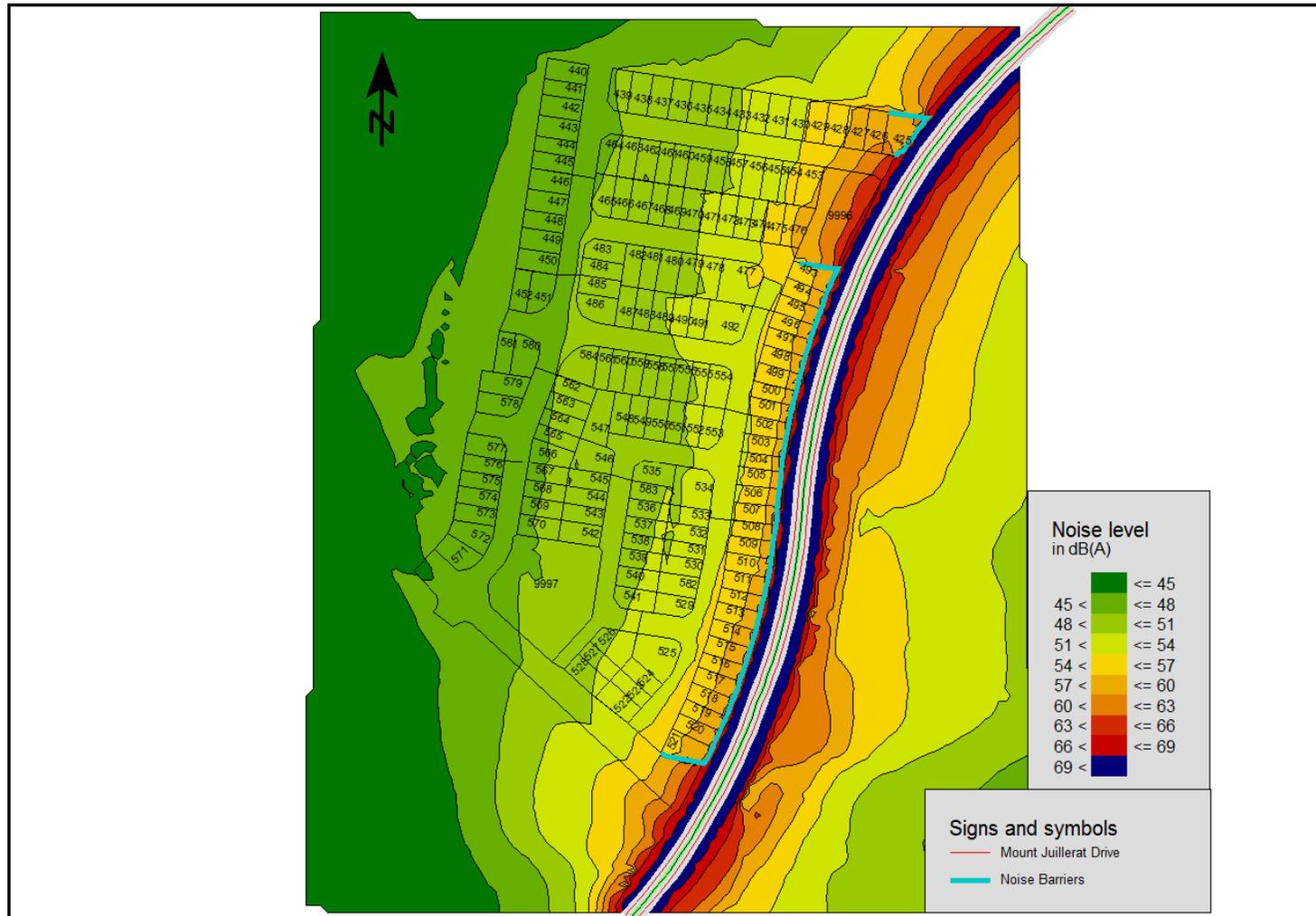


Figure C-6: Predicted Free Field LA10 (18hr) Road Traffic Noise Levels at Private Open Spaces of Lots with Noise Barriers on Mt Juillerat Drive

28 Jun 2017