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Proposed Fitzgibbon Chase – *"Areas B, C, E and G"*
253 Telegraph Road, Fitzgibbon

PRELIMINARY ENVIRONMENTAL NOISE IMPACT ASSESSMENT

Prepared for:

Fitzgibbon Chase

Date Prepared:

6th November, 2009

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PLANS AND DOCUMENTS
FOR PRE-DA APPROVAL

28 MAY 2013

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TABLE OF CONTENTS

1.INTRODUCTION **2**
2.SITE DESCRIPTION **2**
2.1 Site Location 2
2.2 Proposal 3
2.3 Acoustic Environment 3
3.EQUIPMENT **4**
4.METHODOLOGY **4**
4.1 Attended Train Noise Measurement Procedure 4
5.ENVIRONMENTAL NOISE CRITERIA **6**
5.1 Rail Noise Criteria – Queensland Transport 6
6.RESULTS AND ANALYSIS **7**
6.1 Rail Noise – Queensland Transport 7
6.1.1 Measured Noise Levels 7
6.1.2 Rail Volumes 7
6.1.3 Predicted Noise Levels 8
7.RECOMMENDATIONS AND DISCUSSION **12**
8.CONCLUSIONS **13**
9.APPENDICES **14**
APPENDIX A 14
Proposed Subdivision Layout 14
APPENDIX B 17
SoundPLAN Results – Noise Contour Maps 17
APPENDIX C 24
Recommended Acoustic Barrier 24
Area E: 24
Fitzgibbon Chase: 25

Table Index

Table 1: Measured Noise Levels from Passing Trains. 7
Table 2: Predicted Average$L_{Aeq,24hour}$ Noise Levels from Passing Trains. 11

Figure Index

Figure 1. Site Location (Not to Scale). 2
Figure 2. Rail Noise Monitoring Location. 5
Figure 3. Predicted L_{Amax} Noise Contours – Ground Floor (Not to Scale). 8
Figure 4. Predicted L_{Amax} Noise Contours – First Floor (Not to Scale). 9
Figure 5. Predicted L_{Amax} Noise Contours – Second Floor (Not to Scale). 9
Figure 6. Predicted L_{Amax} Noise Contours – Third Floor (Not to Scale). 10
Figure 7. Predicted L_{Amax} Noise Contours – Fourth Floor (Not to Scale). 10
Figure 8. Predicted L_{Amax} Noise Contours – Fifth Floor (Not to Scale). 11

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1. INTRODUCTION

The following report is in response to a request by Fitzgibbon Chase to conduct a preliminary noise assessment of Areas B, C, E and G of the proposed Fitzgibbon Chase development located at 253 Telegraph Road, Fitzgibbon. This report considers rail traffic and busway noise and provides preliminary advice for consideration by the ULDA.

In undertaking this assessment attended train and bus passby measurements were conducted, and through modelling, predictions of future noise impacts were produced. Based upon the predicted noise levels, recommendations regarding acoustic treatments were specified.

2. SITE DESCRIPTION

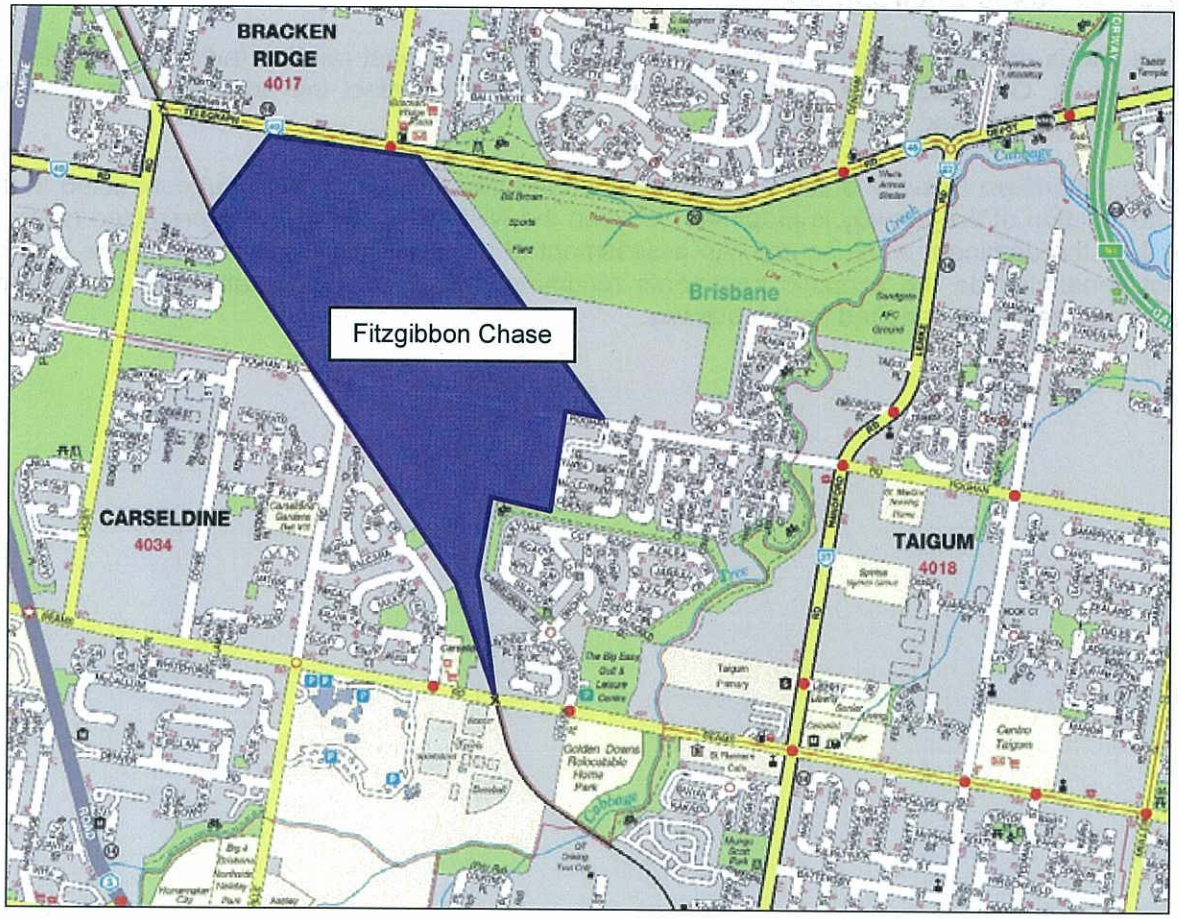
2.1 Site Location

The site is described by the following:

Lots 10 and 11 on SP223412,
253 Telegraph Road, Fitzgibbon.

Refer to Figure 1 for the site location.

Figure 1. Site Location (Not to Scale).



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A comprehensive site survey was conducted on the 14th of August, 2009. The survey identified the following:

- The *"North Coast Rail Line"* (NCRL) is located adjacent the western boundary separating the development from park land and a mixture of single and two storey residential dwellings.
- Currently, vacant land is located adjacent the northern boundary separating the site from Telegraph Road and a mixture of single and two storey residential dwellings. Note the vacant land forms part of the *"Fitzgibbon UDA"*.
- A mixture of single and two storey residential dwellings are located east of the development.
- The *"Northern Busway"* is proposed to be located on the western boundary separating the site from the NCRL.
- Carseldine train station and a mixture of single and two storey residential dwellings are located south separating the development from Beams Road, an autoparts recycling yard and *"QUT Carseldine"*.

2.2 Proposal

Fitzgibbon Chase shall be developed in several stages. This report will focus on Areas B, C, E and G comprising a mixture of residential, retail and commercial land uses.

The proposed subdivision layouts for areas B, C and G are not available. However, refer to **Appendix A** for the proposed subdivision layout of Area E.

2.3 Acoustic Environment

The site is primarily affected by rail noise from the North Coast rail line (adjacent the western site boundary). Other activities in the area that can potentially affect the acoustic amenity of the site include the proposed *"Northern Busway"*.

As the *Northern Busway* is still in planning, attended measurements were not conducted at the site. The location of the busway is proposed between the NCRL and the site, it is predicted railway noise will be the dominant noise source. An assessment of the activities associated with the busway was not conducted as the acoustic treatments recommended to attenuate rail noise are predicted to exceed treatments required for the busway.

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3. EQUIPMENT

The following equipment was used to record train passby noise levels at the site:

- RION NA-28 Sound Level Meter (SN# 01060055), and
- RION NA-74 Sound Calibrator (SN # 35073393).

The RION NA-28 sound level meter holds a current NATA Laboratory Certification, and was field calibrated before and after the monitoring session. No significant drift from the reference signal was recorded.

4. METHODOLOGY

4.1 Attended Train Noise Measurement Procedure

Attended noise measurements of train passes were conducted on the 14th and 17th of August, 2009. The RION NA-28 Sound Level Meter was positioned at two different locations as follows:

- Approximately 20metres from the nearest rail line with the microphone positioned 1.6metres above ground level (the microphone was approximately level with the rail tracks); and
- Approximately 11metres from the nearest rail line with the microphone positioned 2.2metres above ground level (the microphone was elevated approximately 0.3metres above the rail tracks).

Noise measurements were conducted as follows:

- "A" weighting;
- "Fast" response; and
- 5 minute statistical interval
- Statistics recorded: L_{Amax}, SEL\L_{AE}, L_{AEQ}

Note: the SEL or L_{AE} is the sound exposure level. A parameter closely related to L_{Aeq} for assessment of train events that have similar characteristics but are of different duration. The L_{AE} value contains the same amount of acoustic energy over a 'normalised' one second period as the actual noise event under consideration.

Based on the measured L_{AE} level, calculations are conducted utilising the number of trains per day to determine the $L_{Aeq,24hr}$ noise impact at the proposed residential receivers.

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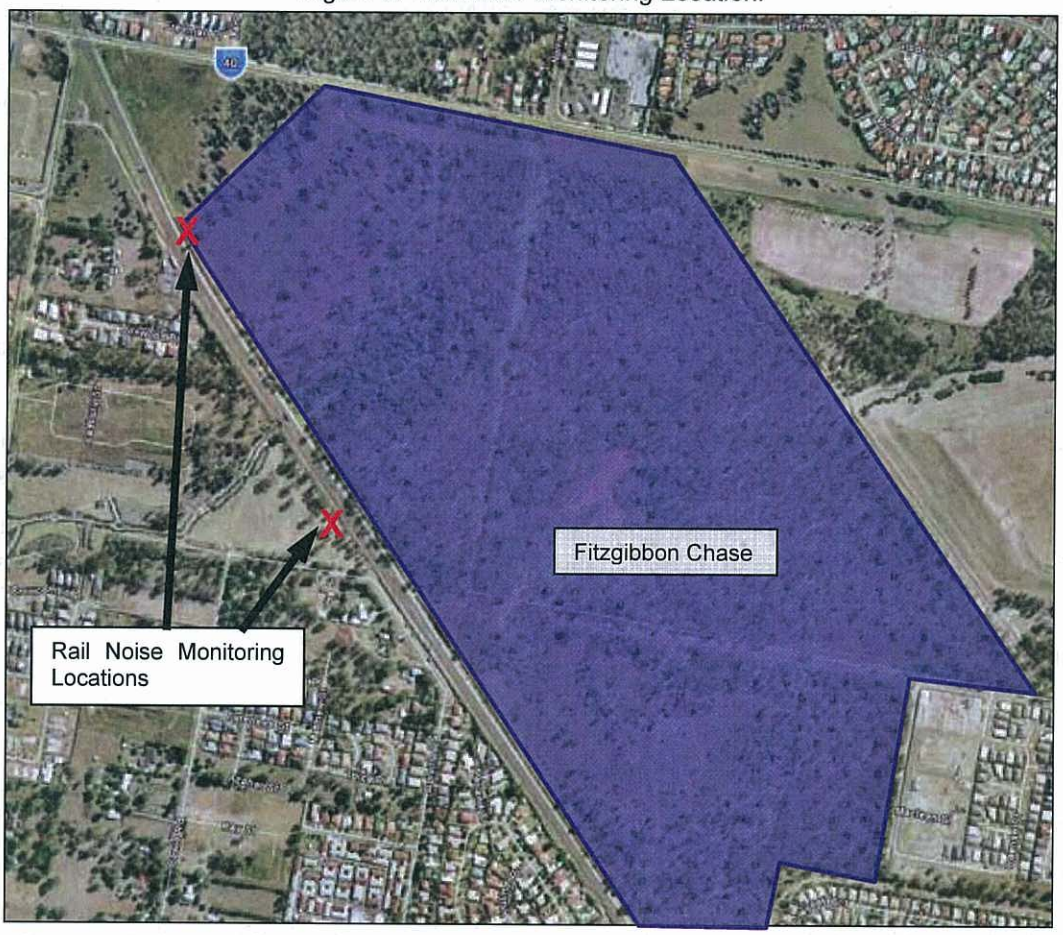
The measurements were conducted generally in accordance with Australian Standard AS 2377:2002 *'Acoustics – Methods for the Measurement of Railbound Vehicle Noise'*.

Refer to Figure 2 for the noise monitoring locations.

Figure 2. Rail Noise Monitoring Location.



Weather conditions on the 14th and 17th of August were generally fine, slightly overcast with light winds.

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5. ENVIRONMENTAL NOISE CRITERIA

The noise criteria applied to the site is generally in accordance with the *'Fitzgibbon Urban Development Area Development Scheme'* (July, 2009), where noise sensitive uses must comply with "best practice acoustic standards" and specifically the following:

- **Road Traffic Noise** for residential dwellings located adjacent roadways:
  - A maximum internal noise level of $L_{Aeq,\ 1hour}$ 35dB(A) between 10pm and 7am.
- **Rail Traffic Noise** for residential dwellings located within 100metres of a rail corridor (refer to **Appendix A** showing 100m separation line):
  - A maximum internal noise level of L_{Amax} 50dB(A) between 10pm and 7am.

In relation to rail noise, consideration should be placed on achieving a reasonable level at the outdoor recreation areas. To ensure best practice acoustic standards are achieved, it is recommended applying Queensland Transport's rail noise criteria as a guide presented in Section 5.1.

5.1 Rail Noise Criteria – Queensland Transport

The criteria typically applied by Queensland Transport to residential developments is detailed as follows:

- External design levels of $L_{Aeq,24hr}$ 65dB(A), assessed at outdoor recreation areas.
- L_{Amax} 87dB(A), assessed at outdoor recreation areas.
- Indoor design level for bedrooms and living areas of L_{Amax} 50dB(A) average maximum sound level between 10pm and 6am.

It is noted that the indoor design level is set out in Queensland Transport's 'Interest in Planning Schemes No.3'; and the external design levels are set out in the Environmental Protection (Noise) Policy 1997.

From time to time, passing trains will blow a horn to warn people of its presence. It should be noted however that Queensland Rails' "Code of Practice, Railway Noise Management" (December 1999), states the following in relation to noise impacts from horns and other safety devices:

8. "HORNS AND OTHER WARNING DEVICES"

Horns and sirens are used within QR as warning devices to protect the safety of both employees and the public. Unfortunately, noise from these devices may cause annoyance to some residents from time to time.

In general, public and employee safety must be satisfactorily protected and hence it is not appropriate to apply any particular noise criteria to these warning devices (including the QR nominated interim levels and the EPP Noise planning levels). Where specific complaints are received, however, responsible Managers will consider whether there is sufficient justification to change standing orders on the use of horns or to nominate alternative warning devices.

In considering what constitutes "sufficient justification", responsible Managers will have regard to any relevant QR Safety Management Systems.

QR shall ensure driver training will include appropriate use of horns and warning devices.

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6. RESULTS AND ANALYSIS

6.1 Rail Noise – Queensland Transport

6.1.1 Measured Noise Levels

Measurements of 14 trains passing the site were recorded on the 14th and 17th of August, 2009, and are presented in Table 1.

Table 1: Measured Noise Levels from Passing Trains.

Date/Time	Train Type	Direction of Travel	Separation Distance (m)	Maximum Noise Level L_{AMAX} dB(A)	Instantaneous Noise Level SEL dB(A)	Horn Sounded?
14th August, 2009	Passenger 6	N	30	77	82	Yes
	Passenger 6	S	25	84	87	No
	Passenger 6	S	25	77	82	No
	Passenger 6	N	30	75	81	Yes
	Passenger 6	S	25	82	86	No
	Passenger 6	S	25	88	90	No
	Passenger 6	N	30	75	81	Yes
	Passenger 6	S	25	86	82	Yes
	Passenger 6	N	30	95	90	No
17th August, 2009	Tilt Train 8	N	11	85	91	No
	Passenger 6	S	26	72	79	No
	Passenger 6	S	26	71	78	No
	2 Engine, 43 Cattle Wagons	S	26	91	97	No
	1 Engine 30Freight	S	26	80	88	Yes

An increase in rail traffic does not increase the maximum L_{Amax} noise levels; however it does increase the frequency of such occurrences and will increase the $L_{Aeq,24hour}$ noise level.

It was observed during the attended measurements that during certain train passbys the horn was utilised. Note as in accordance with the assessment requirements of Queensland Transport, all measurements containing horn noise were excluded from the analysis.

6.1.2 Rail Volumes

Rail timetables provided by Queensland Rail indicate there is an average of 150 trains (135 passenger and 15 freight) passing the site every day. We were advised by QR that all services are subject to alteration, addition and cancellation which may vary the number of actual trains passing on a daily basis.

During a phone conversation with QR, TTM Consulting was advised that due to confidentiality QR was unable to provide details of any future plans to duplicate the rail lines or of the ultimate rail traffic volumes.

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6.1.3 Predicted Noise Levels

The predicted maximum noise levels presented in Figures 3 – 8 are based on the following assumptions:

- In relation to the proposed lots natural surface levels were adopted as building pad levels were not provided at the time of the assessment (presented in **Appendix A** in "m AHD").
- The façade correction factor was not included in the modelling.
- 150 trains traverse the rail lines every day.
- The relative height above natural surface level for the ground floor is 1.8metres.
- The relative height of residential floors is 2.8metres.
- A 2.4metre high acoustic barrier along the full length of the western site boundary (adjacent the busway) as detailed in **Appendix C**.

Figures 3 – 8 present the modelled L_{Amax} levels of rail noise impacts at the site and assumes the construction of a 2.4metre high acoustic barrier.

Figure 3. Predicted L_{Amax} Noise Contours – Ground Floor (Not to Scale).

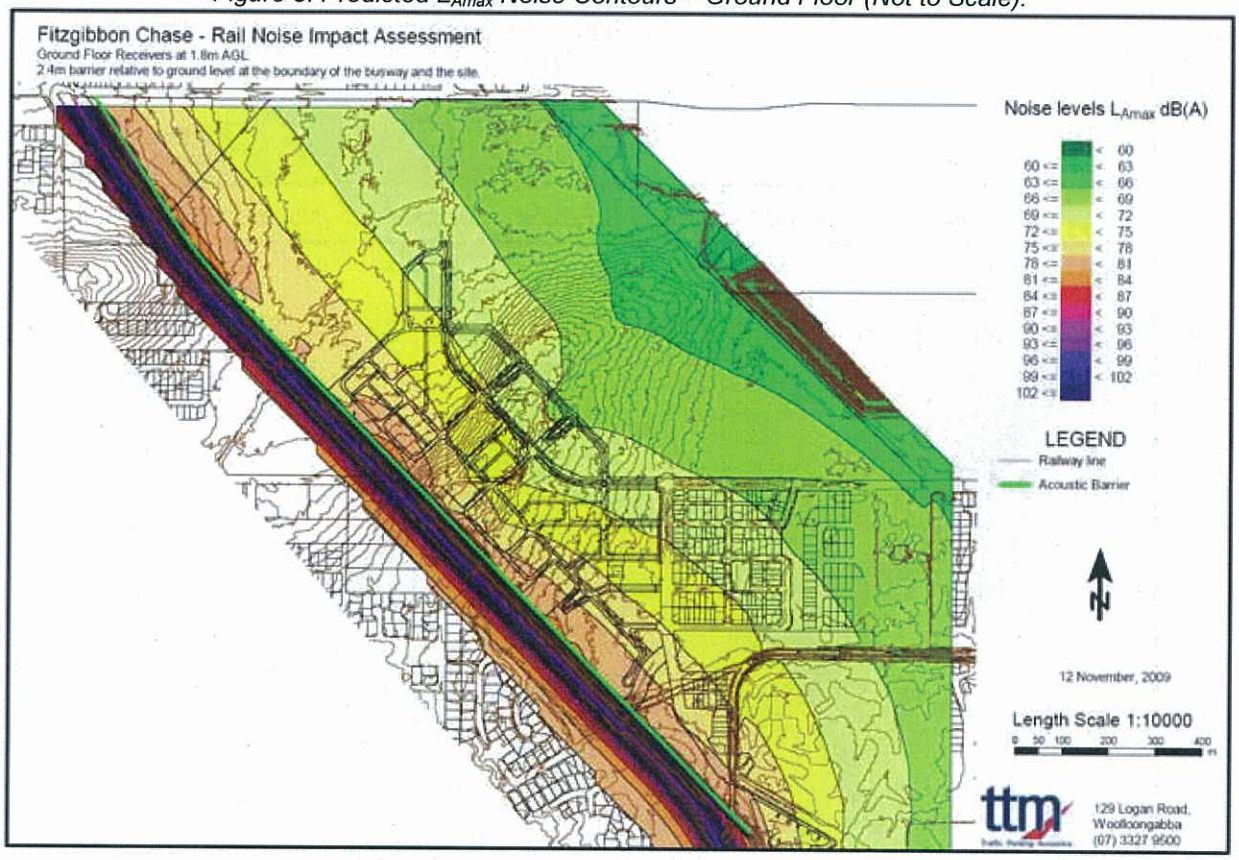

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Figure 4. Predicted L_{Amax} Noise Contours – First Floor (Not to Scale).

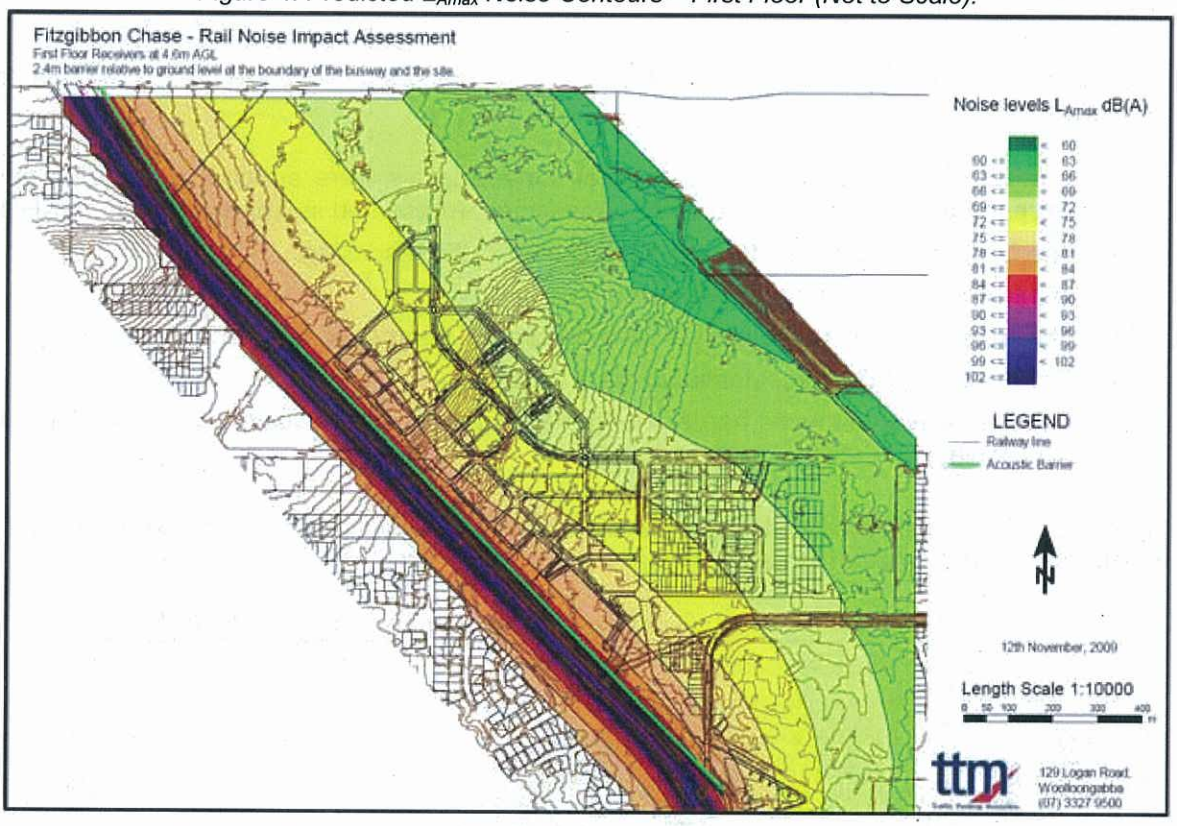

Figure 5. Predicted L_{Amax} Noise Contours – Second Floor (Not to Scale).

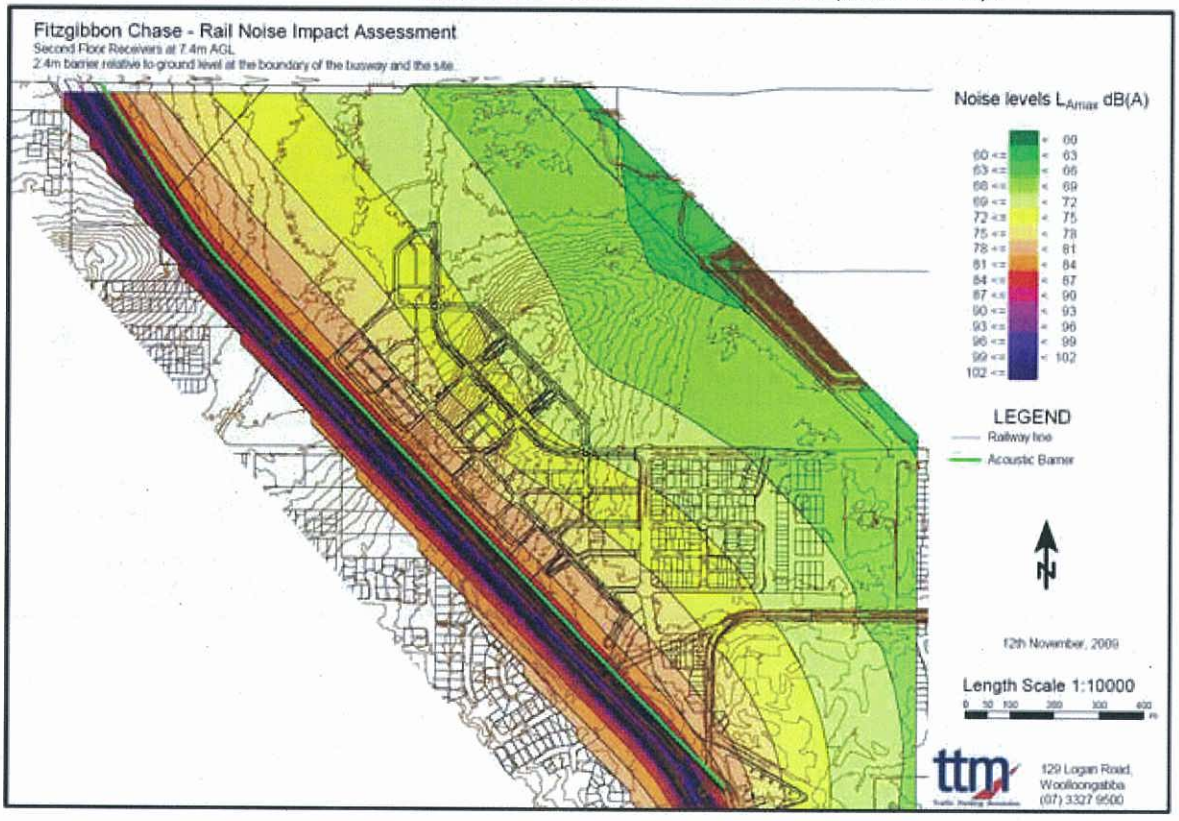

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Figure 6. Predicted L_{Amax} Noise Contours – Third Floor (Not to Scale).

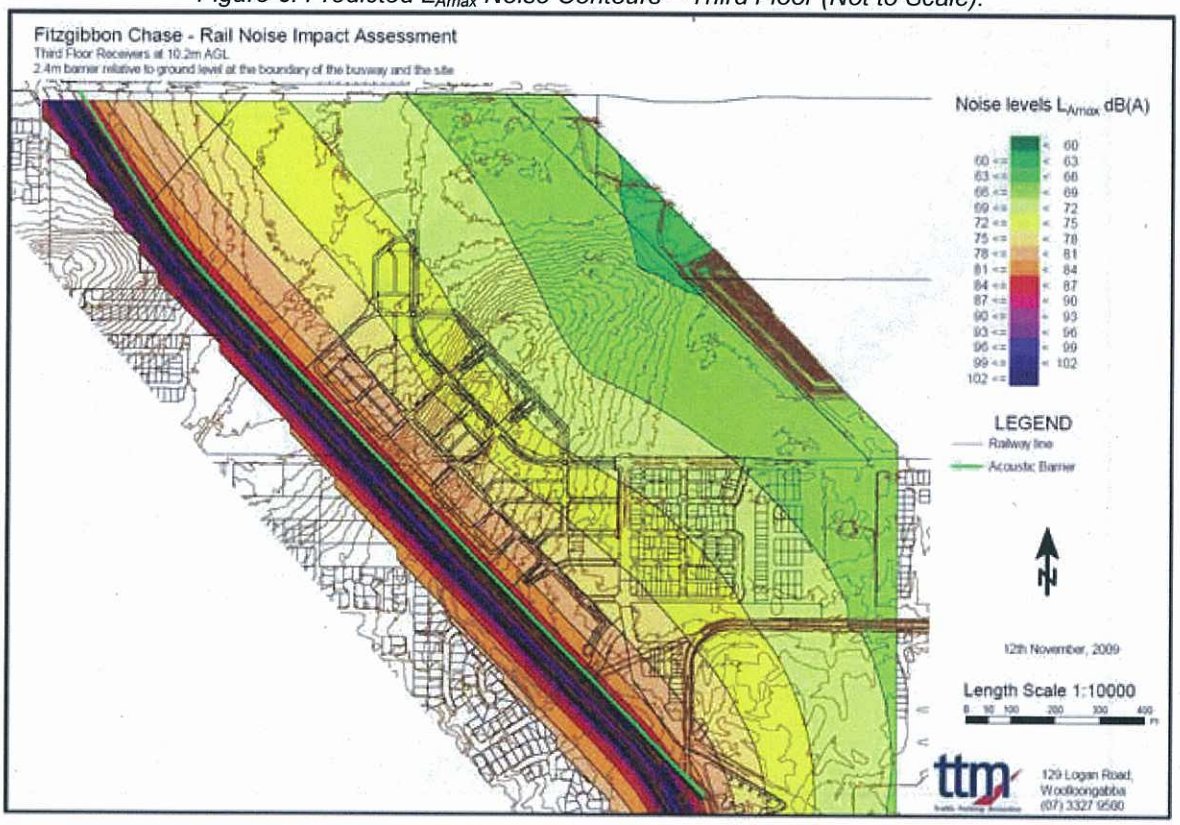

Figure 7. Predicted L_{Amax} Noise Contours – Fourth Floor (Not to Scale).

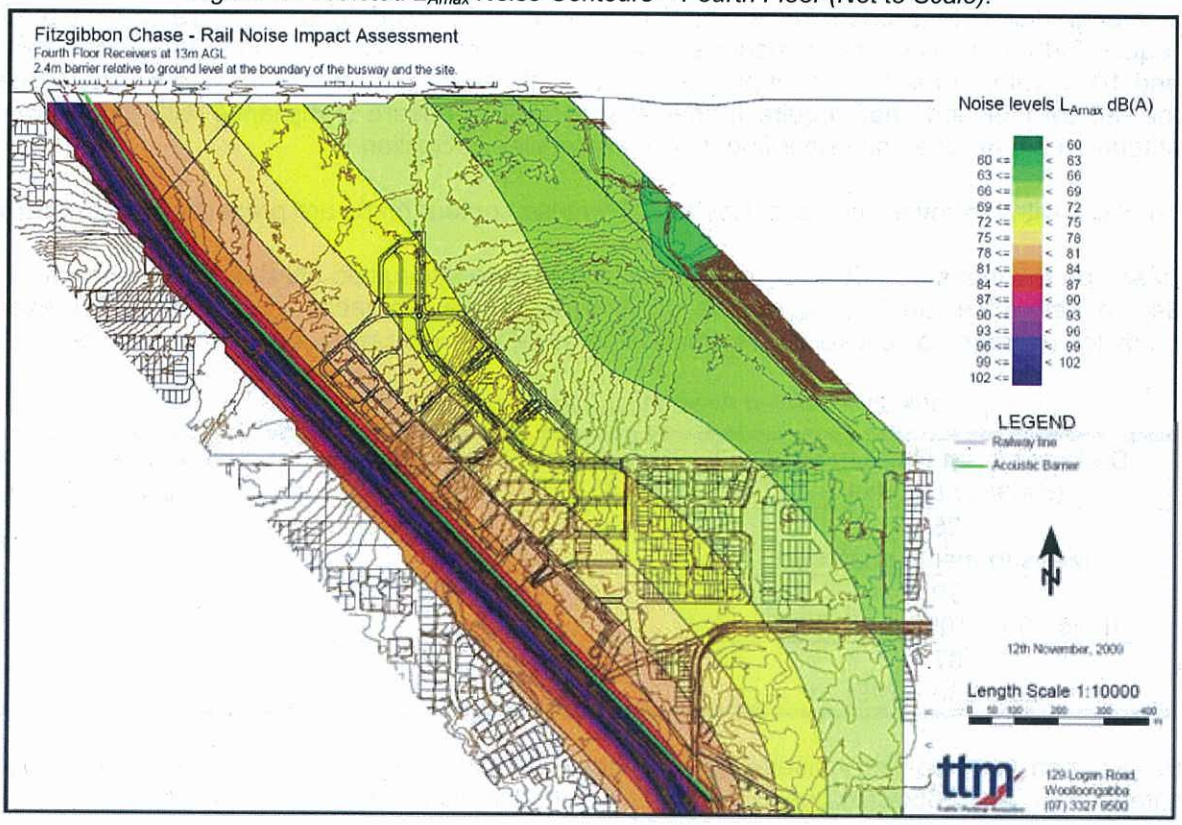

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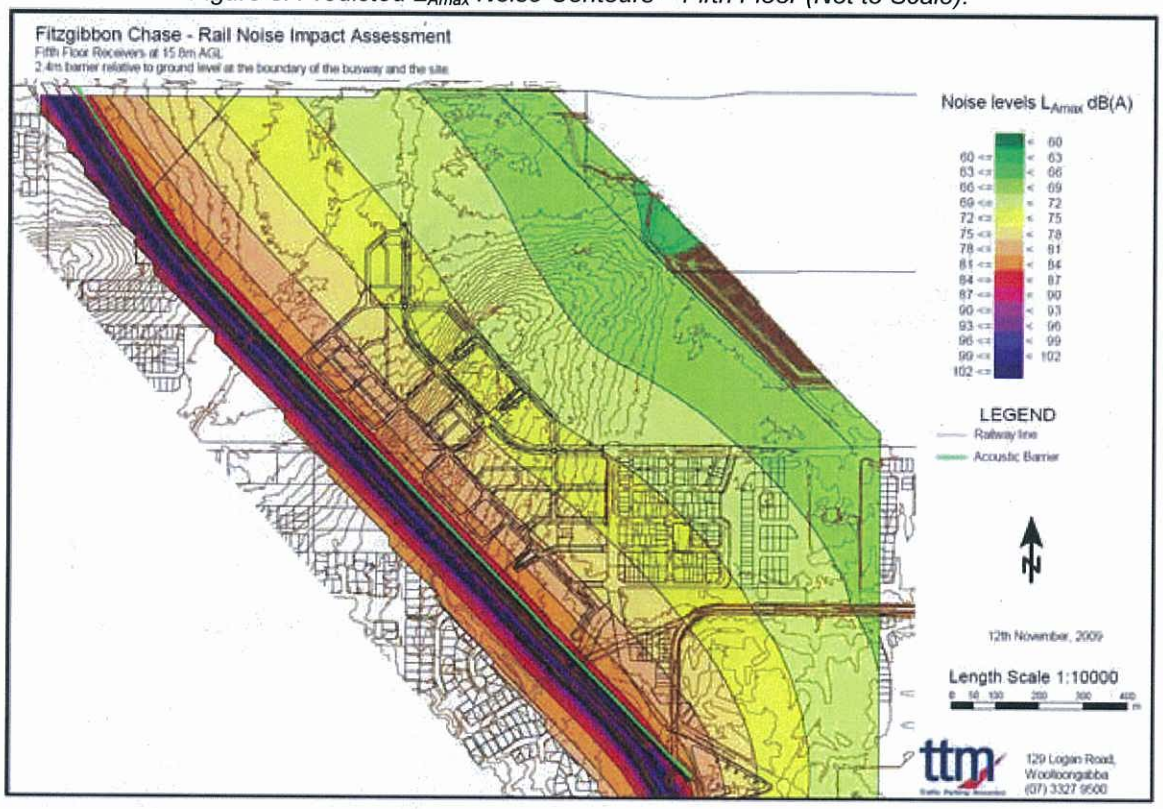
Figure 8. Predicted L_{Amax} Noise Contours – Fifth Floor (Not to Scale).



Based upon the modelled noise levels, the upper floor levels of lots 1001, 1003 and 1004 within Area E are predicted to exceed the external criteria of L_{Amax} 87dB(A) (outdoor recreation areas) and require further acoustic assessment as detailed in Section 7. Lots 179 – 198, 229 – 259, 1001, 1003 and 1004 (within Area E) and all proposed lots within areas B, C and G located within 100metres of the rail corridor and shall require further assessment to ensure compliance with the internal noise criteria on the ground and upper floor levels as detailed in Section 7.

To assist with the review process, SoundPLAN noise contour maps are presented in **Appendix B**.

Based on the measured SEL/L_{AE} level, calculations were conducted utilising the number of trains per day to determine the $L_{Aeq,24hour}$ noise impacts at private recreation areas. Table 2 presents the predicted average noise level at the ground floor level with increasing separation distance.

Table 2: Predicted Average$L_{Aeq,24hour}$ Noise Levels from Passing Trains.

Distance from Rail Line (m) (Relative Location)	**Average Noise Level dB(A) $L_{Aeq,24hr}$ (Free field)**	**Criteria dB(A) $L_{Aeq,24hour}$**	**Complies Yes/No**
25 (Measurement Location)	65	65	Yes
30 (Lots 1001, 1003 and 1004)	63		Yes
67 (Lots 236 – 249)	58		Yes

Based upon the modelled noise levels, all private recreation areas are predicted to comply with the criteria of $L_{Aeq,24hour}$ 65dB(A) due to increased separation distance from the rail line.

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7. RECOMMENDATIONS AND DISCUSSION

Compliance is predicted with the ULDA assessment criteria on the condition the following treatments are implemented:

Area E:

- Construction of a 2.4metre high acoustic barrier along the site boundary as detailed in **Appendix C**.
  - Care should be taken to ensure the barriers are free of gaps or holes.
  - The acoustic barriers shall be constructed to the designated height above natural ground level at the eastern site boundary.
  - The recommended barriers may be constructed using one of the following materials (but not limited to) 19mm thick timber palings fence with 40% overlap, 9mm fibre cement or masonry.
  - Note the modelling has assumed the barrier is constructed the full length of the western boundary.
- Communal recreation areas located on lots 1001, 1003 and 1004 are predicted to exceed the criteria and require further acoustic assessment once their locations are finalised.
  - As a guide we recommend communal recreation areas are located at ground level on the eastern side of any building to maximise screening from the rail line.
- To ensure compliance with the internal criteria of L_{Amax} 50dB(A) lots 179 – 198, 229 – 259, 1001, 1003 and 1004 (located within 100metres of rail corridor) will require further acoustic assessment once detailed floor plans and elevations are available. Refer to **Appendix A** showing 100m separation line.

Building treatments shall be determined by using the calculation methods detailed in Australian Standard *AS3671:1989 'Road Traffic Noise Intrusion – Building Siting and Construction'*, to ensure compliance with the ULDA and Queensland Transport's internal noise criteria of L_{Amax} 50dB(A), once building floor plans and elevations are finalised.

Areas B, C and G:

A preliminary assessment of the acoustic treatments required for Areas B, C and G was conducted. Compliance with the ULDA assessment criteria is predicted provided the following recommendations are implemented:

- Construction of a 2.4metre high acoustic barrier along the site boundary as detailed in **Appendix C**.
  - Care should be taken to ensure the barriers are free of gaps or holes.
  - The acoustic barriers shall be constructed to the designated height above natural ground level at the eastern site boundary.
  - The recommended barriers may be constructed using one of the following materials (but not limited to) 19mm thick timber palings fence with 40% overlap, 9mm fibre cement or masonry.
  - Note the modelling has assumed the barrier is constructed the full length of the western boundary.
- All lots located within 100metres of the rail corridor require further acoustic assessment once building floor plans and elevations are finalised.

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8. CONCLUSIONS

A preliminary environmental noise impact assessment was conducted of Areas B, C, E and G of the proposed Fitzgibbon Chase Development located at 253 Telegraph Road, Fitzgibbon. On the condition the recommendations presented in Section 7 are implemented, the development can be designed to comply with the relevant ULDA and Queensland Transport assessment criteria.

If you should have any further questions, please do not hesitate to contact us.

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9. APPENDICES

APPENDIX A

Proposed Subdivision Layout

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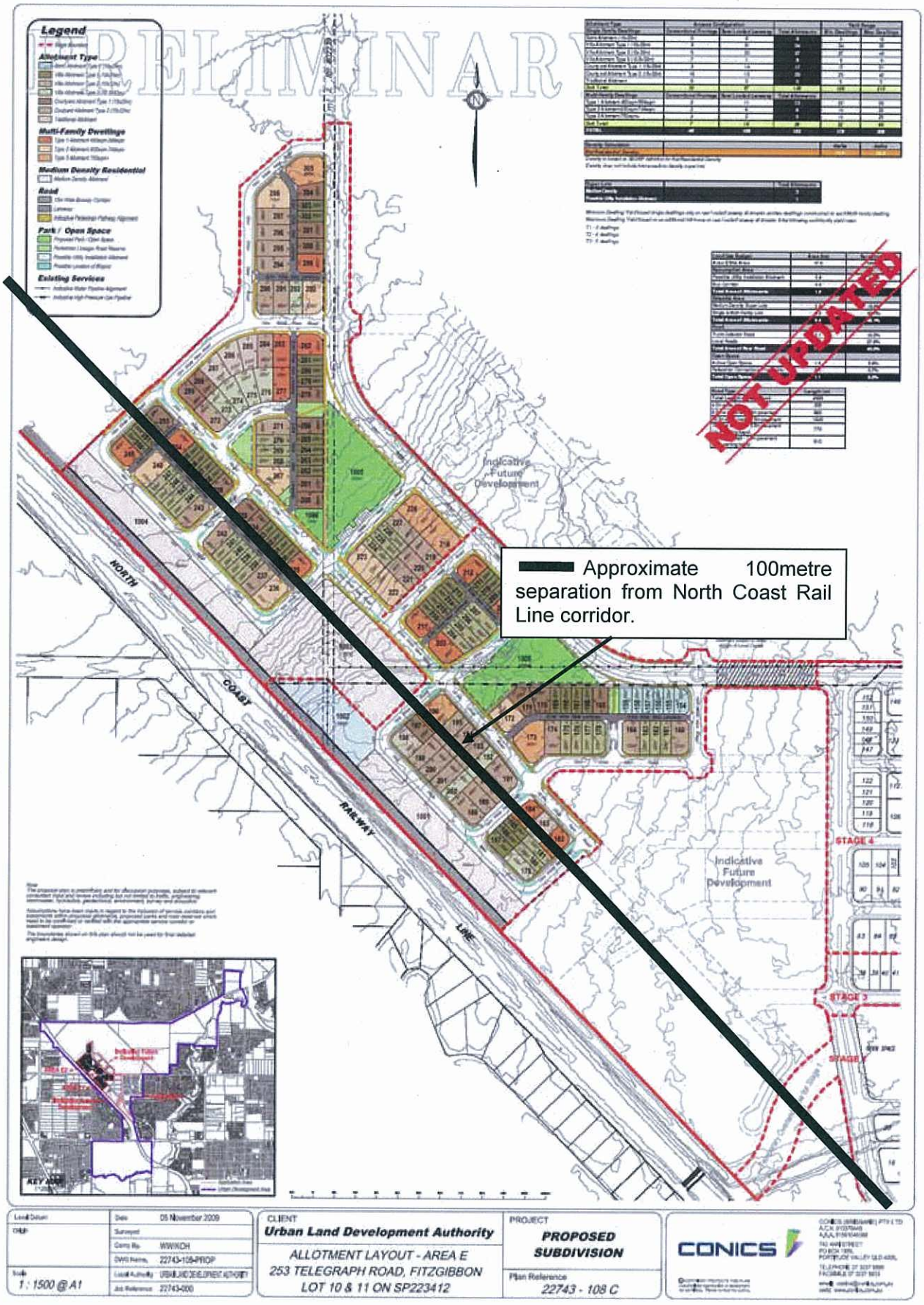

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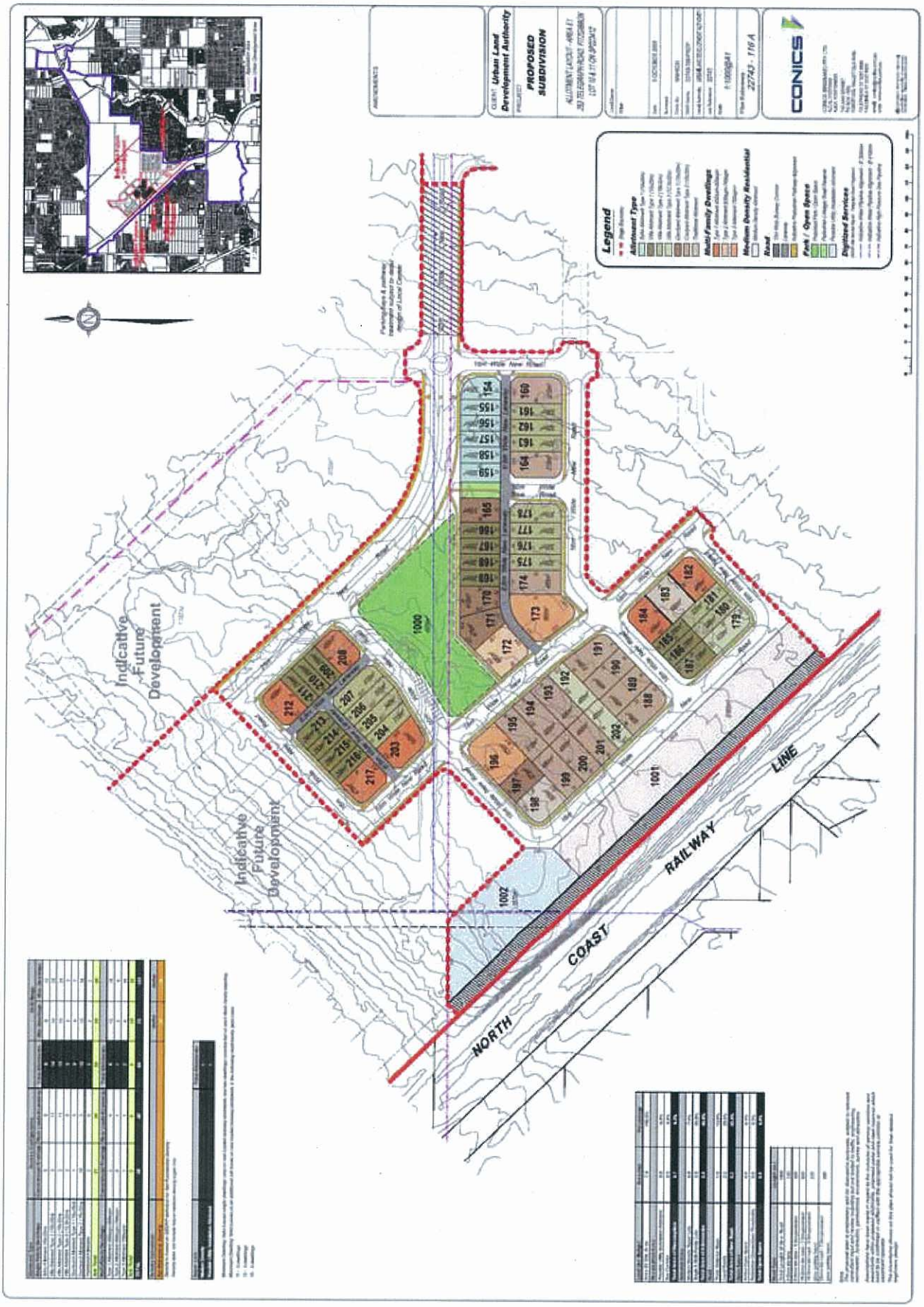

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APPENDIX B

SoundPLAN Results – Noise Contour Maps

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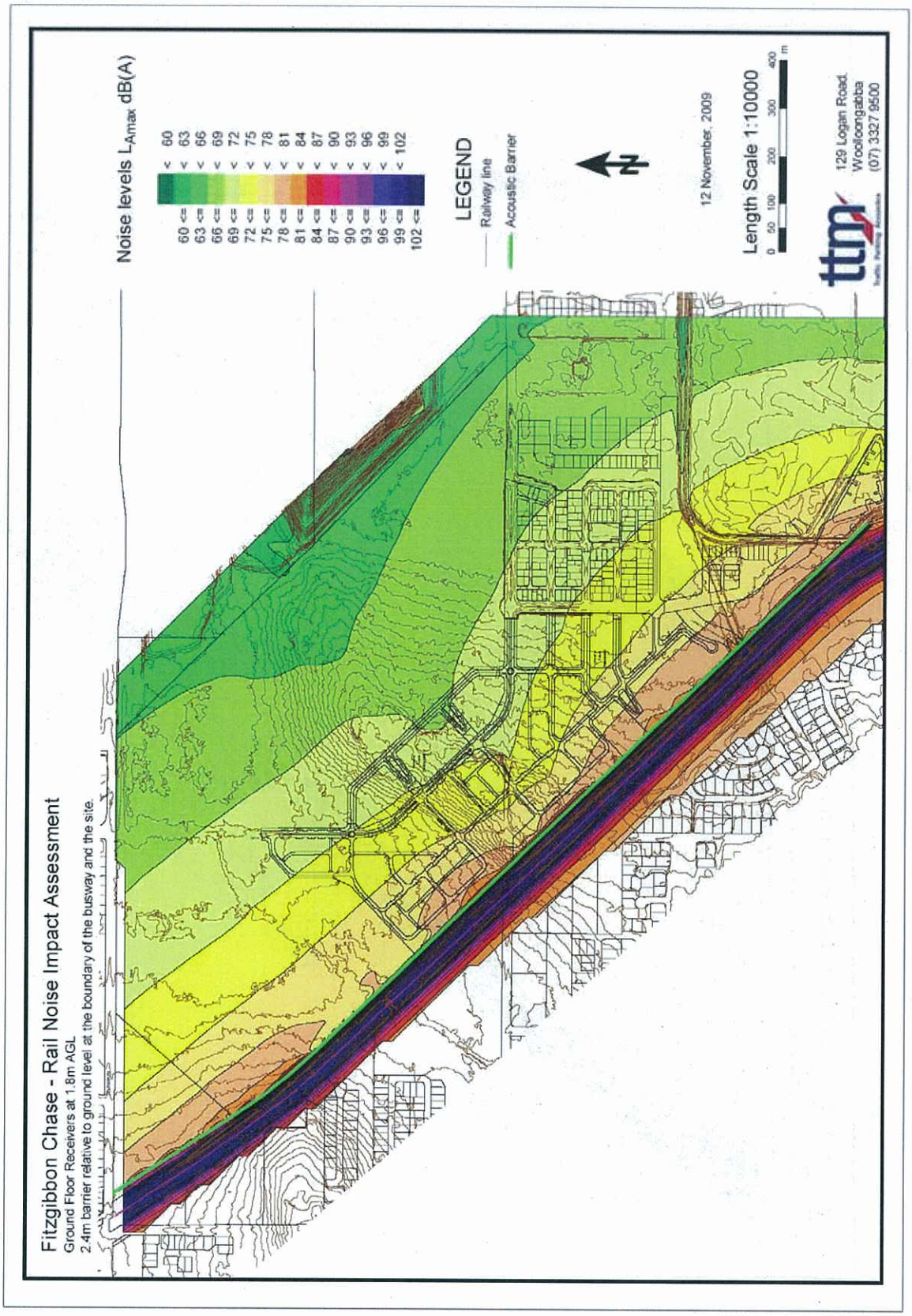

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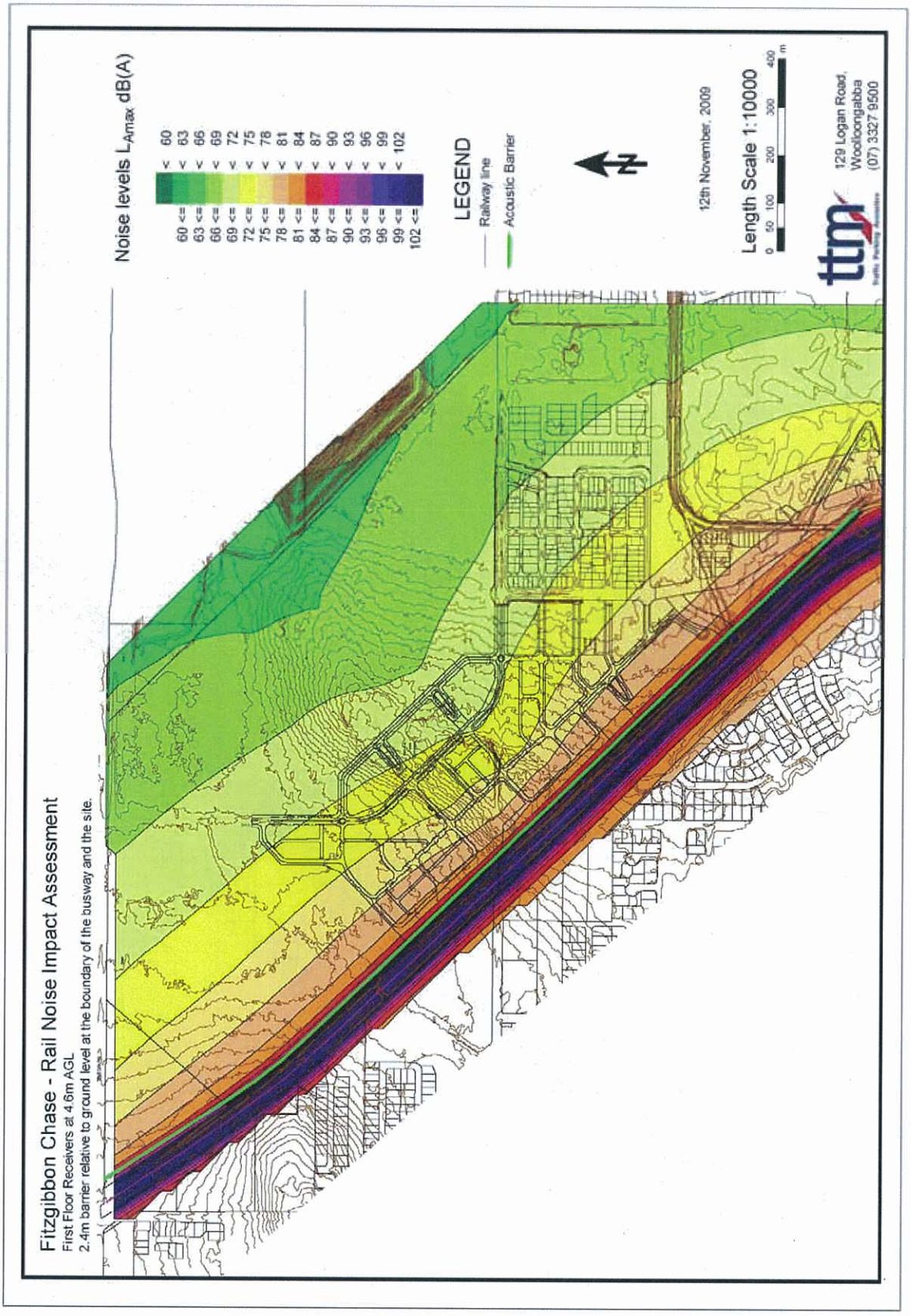

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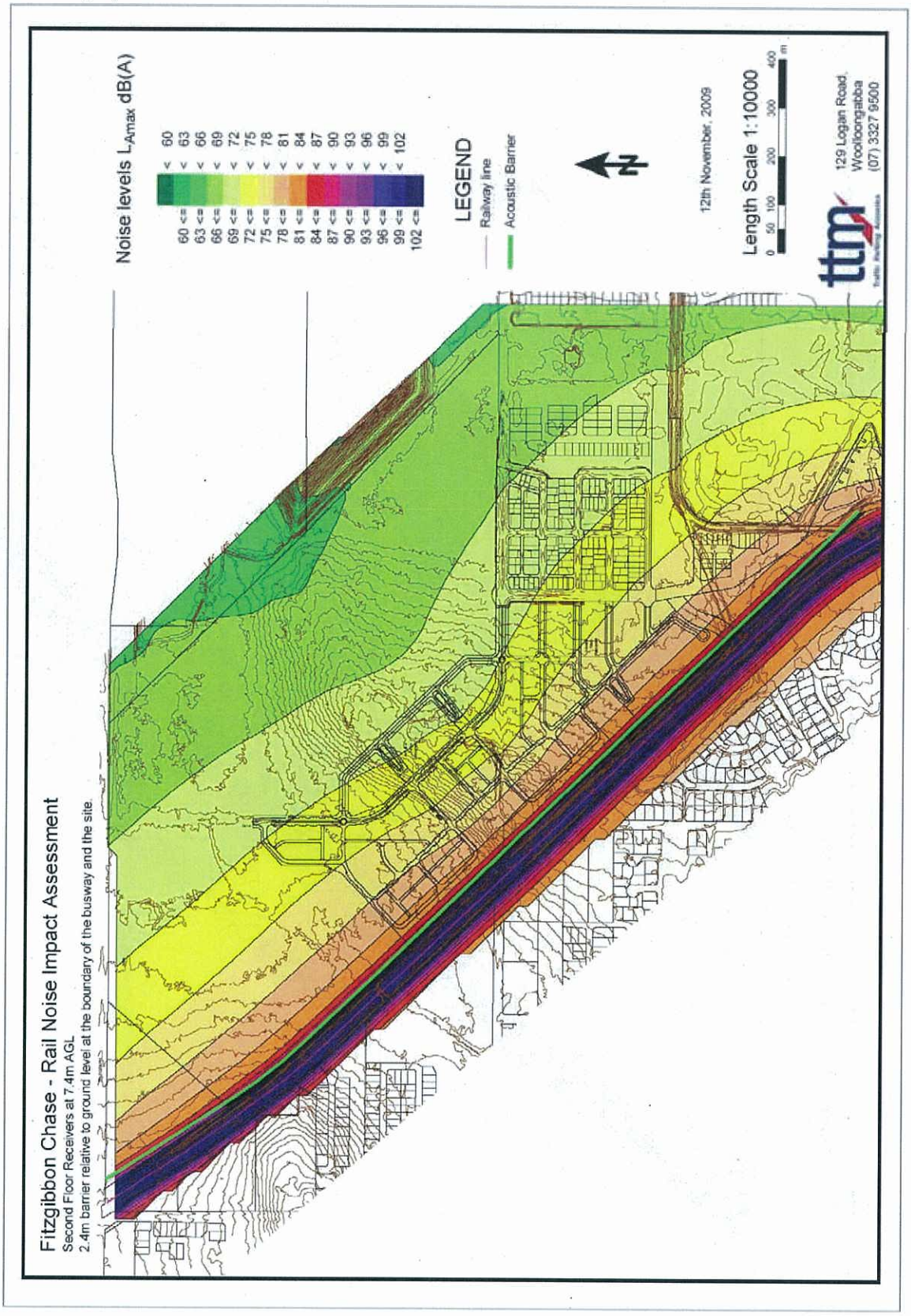

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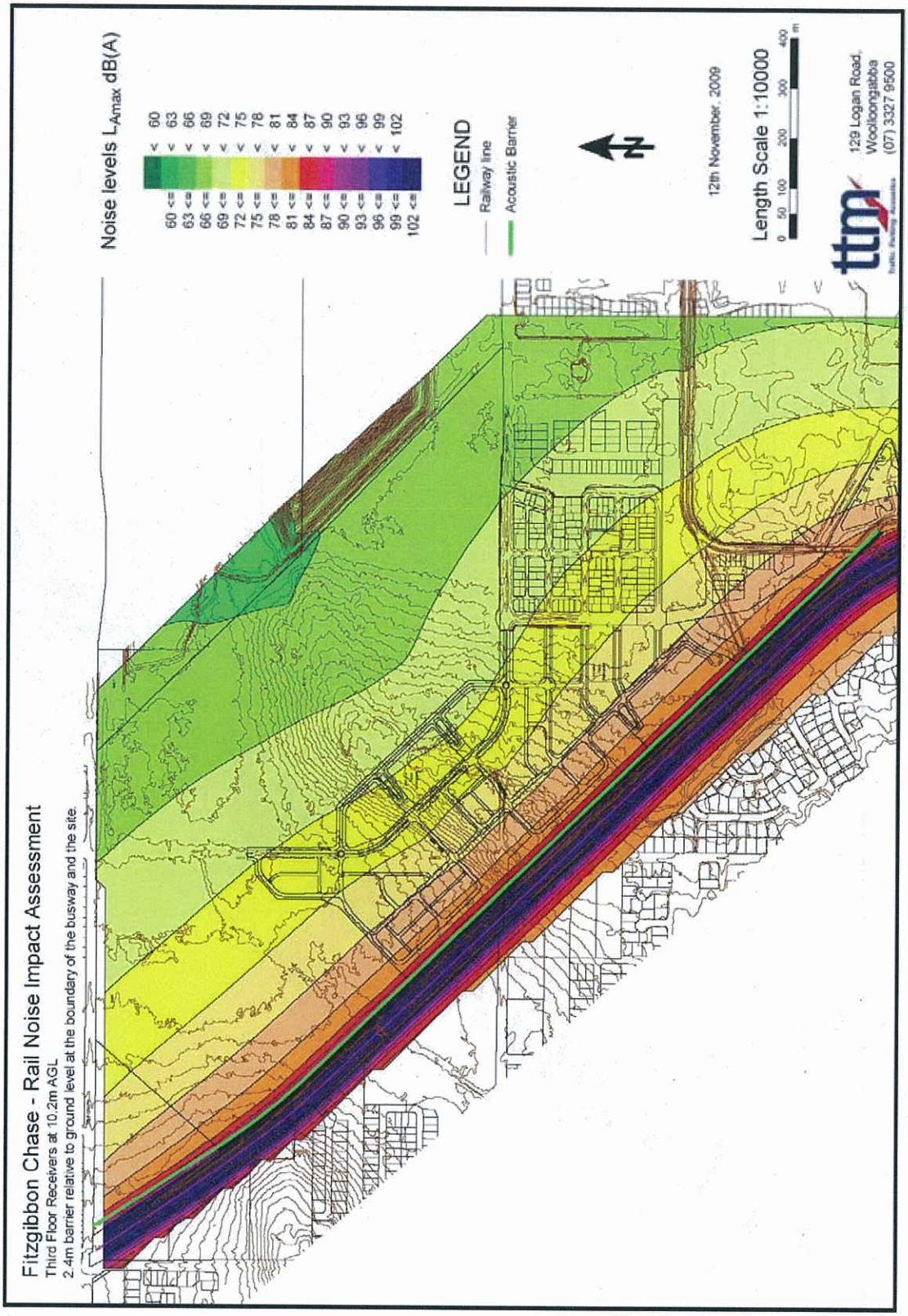

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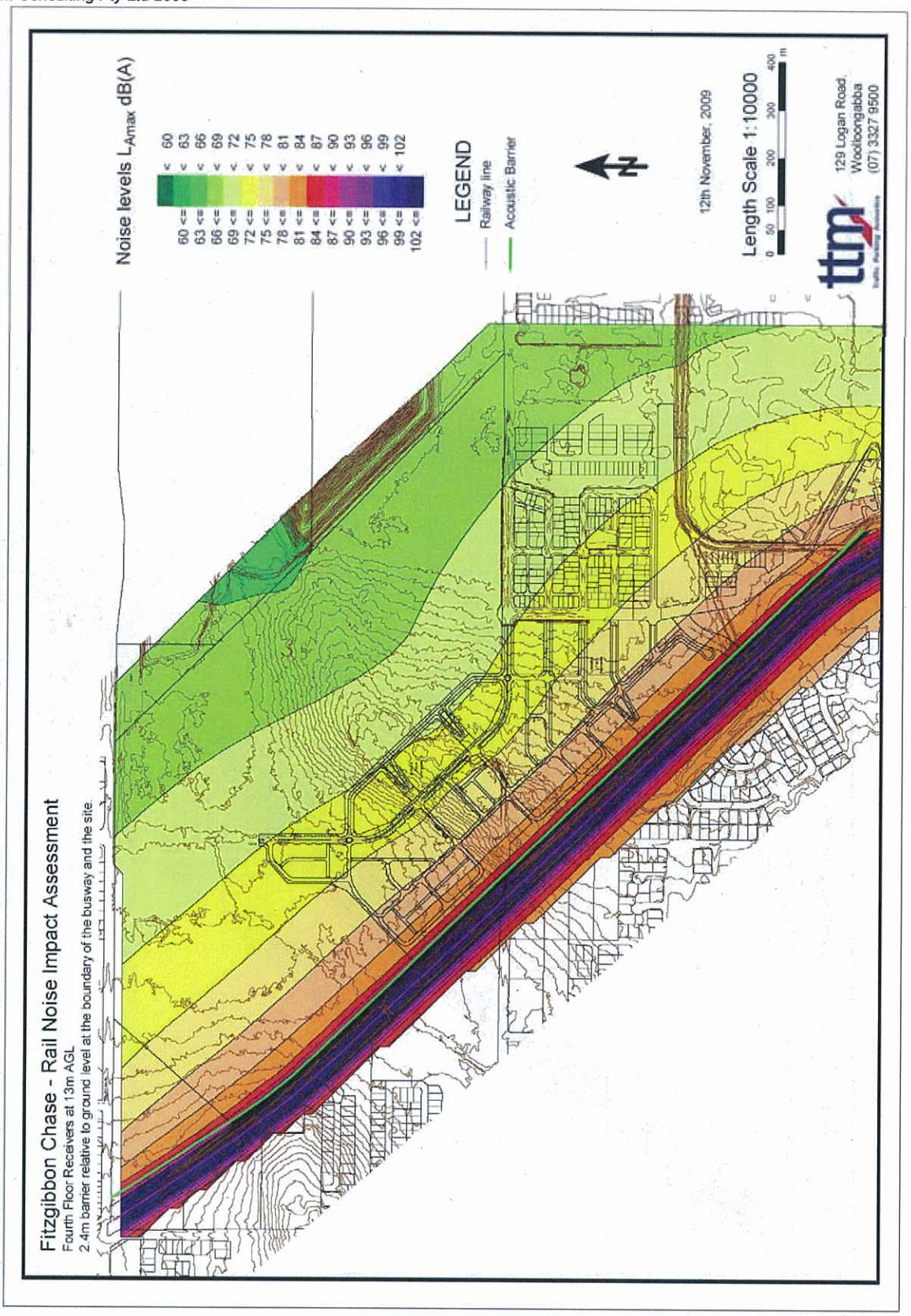

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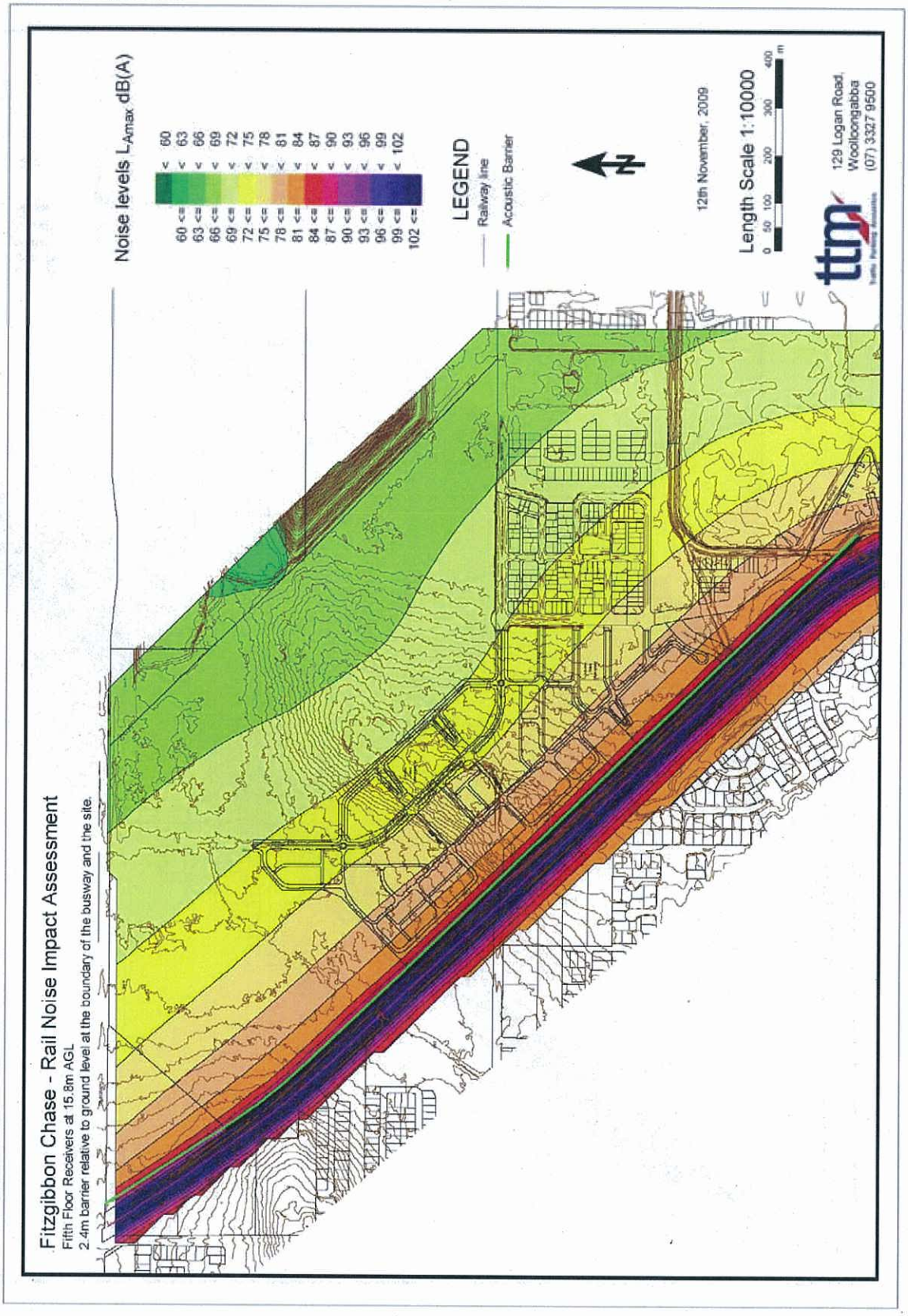

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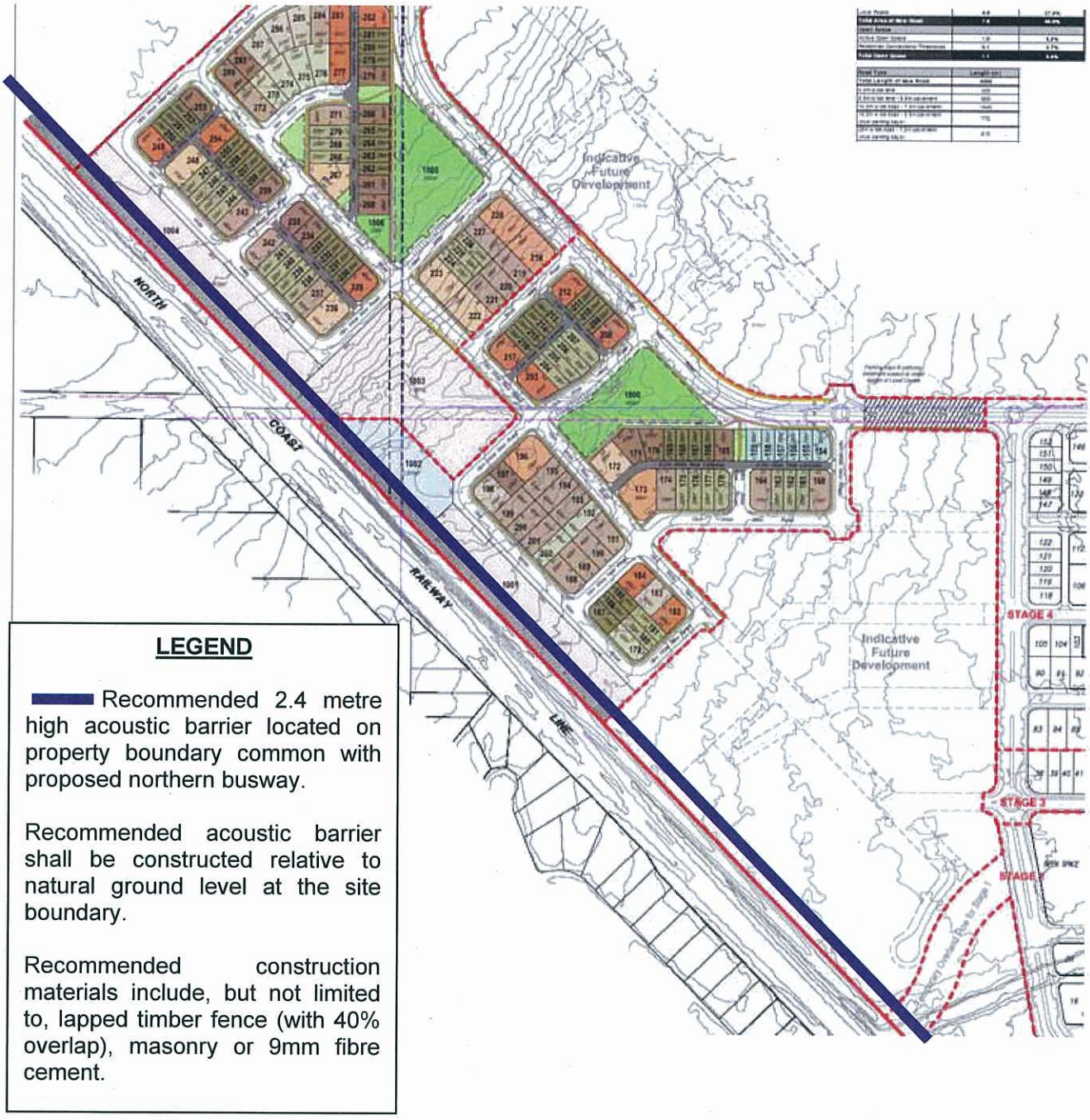
APPENDIX C

Recommended Acoustic Barrier

Area E:



LEGEND

Recommended 2.4 metre high acoustic barrier located on property boundary common with proposed northern busway.

Recommended acoustic barrier shall be constructed relative to natural ground level at the site boundary.

Recommended construction materials include, but not limited to, lapped timber fence (with 40% overlap), masonry or 9mm fibre cement.

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Fitzgibbon Chase:

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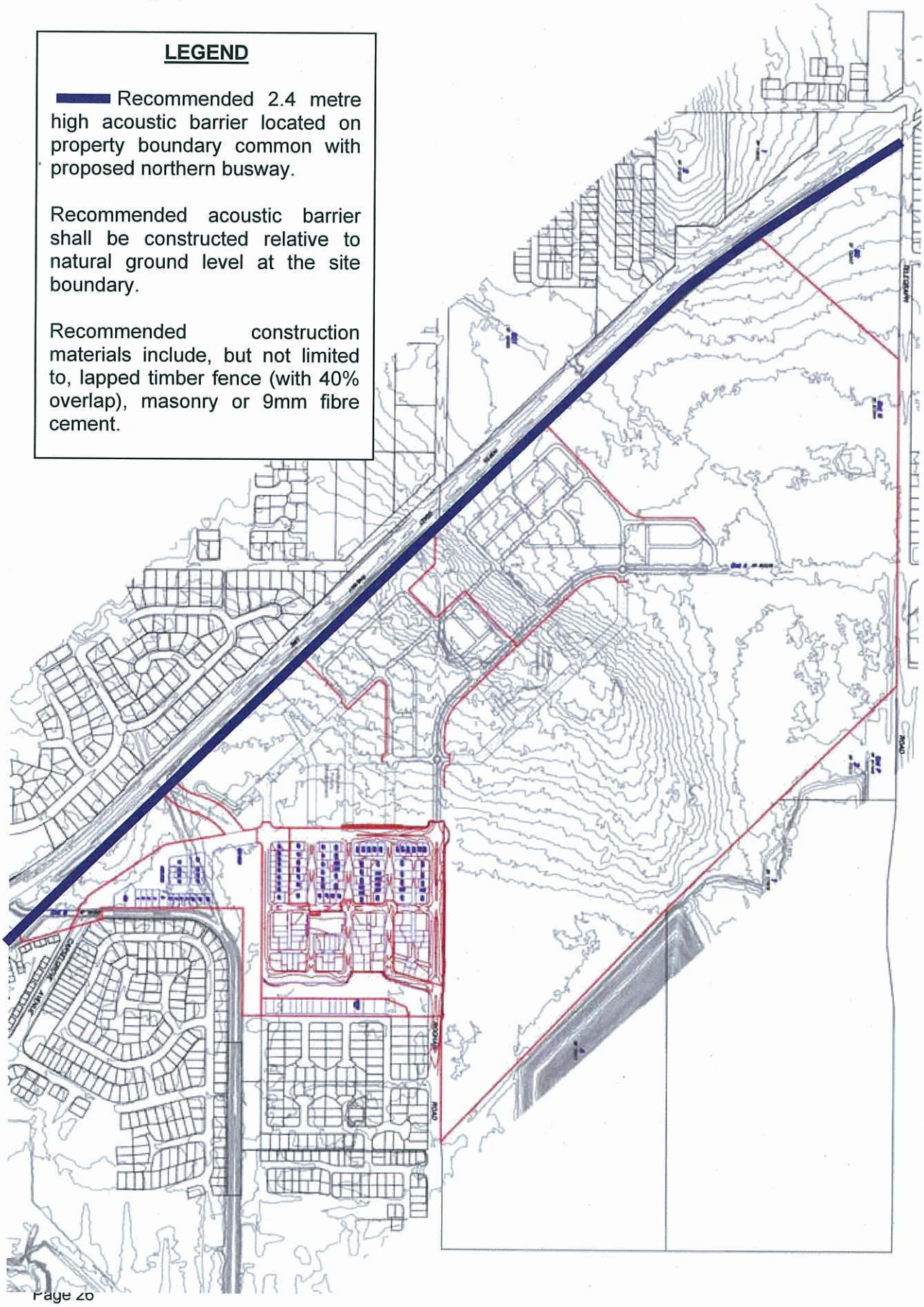
LEGEND

Recommended 2.4 metre high acoustic barrier located on property boundary common with proposed northern busway.

Recommended acoustic barrier shall be constructed relative to natural ground level at the site boundary.

Recommended construction materials include, but not limited to, lapped timber fence (with 40% overlap), masonry or 9mm fibre cement.