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Report No. 12-316.R31

Capestone Stage 12B
Residential Development

Assessment and Control of
Road Traffic Noise Intrusion

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SUMMARY

Urbex has lodged an application with Moreton Bay Regional Council over land located on Capestone Boulevard, Mango Hill. The subject site is Lot 1394 of Stage 12B of the Capestone Estate. The application seeks approval for the development of 19 allotments for residential premises on the site.

The site adjoins Kinsellas Road East and is located in close proximity to Capestone Boulevard and Redcliffe Peninsula Rail Line (RPRL, formerly Moreton Bay Rail Link). Because of the proximity of the subject site to RPRL, Capestone Boulevard and Kinsellas Road East, Council will require that an assessment of the extent of noise intrusion from rail and road traffic onto the subject site be conducted.

Accordingly, Acoustics RB Pty Ltd was engaged by Urbex to conduct the required Rail Traffic Noise Assessment and Road Noise Assessment, and if necessary, to make recommendations for the control of any excessive road and/or rail noise intrusion. To address Council's requirements, two reports have been prepared: one to deal with rail noise intrusion and one to address road traffic noise intrusion. This report, Report No. 12-316.R31, deals with road noise intrusion. Report No. 12-316.R31 addresses the impact of road traffic noise intrusion.

From the results of this road noise assessment, it has been determined that:-

- The only road traffic noise issue of significance is the impact of road traffic noise intrusion from Capestone Boulevard and Kinsellas Road East.
- There will be no lots subjected to road traffic noise levels either exceeding 63dBA, but the dwellings on Lots 14-16 may be subjected to road traffic noise levels in the range 55-63dBA.
- A property note in accordance with in accordance with Clause (8)(c) of PSP6 will need to be placed on Council's property note system stating that the predicted road traffic noise levels on Lots 14-16 at the most exposed lower residential facade may be in the range 55-63dBA.
- Notwithstanding, for any dwelling facade exposed to noise levels in the range 55-63dBA, it is likely that there will be no requirement to upgrade the acoustical design of the lower level of the building.

A property note in accordance with Clause (8)(b) of LPSP6 will need to be placed on Council's property note system stating that, for Lots 14-16, the predicted road traffic noise levels on these lots will be in the range of 55-63dBA.

To maintain consistency with the approvals for earlier stages of Capestone, the suggested wording of the property note follows below.

Lot 14-16

PN…. Property Note - Capestone Boulevard - Traffic Noise Attenuation - (Building Design Standards)
The following property note shall be placed on Council's property note system for Lot 14-16 as identified in the approved acoustic assessment: "*The predicted long term traffic noise levels are expected to be in the range of 55-63dBA. To minimise intrusion of traffic noise into dwellings they should be designed to Categories 2 or 3 as defined in Australian Standard AS3671-1989. Where dwellings are elevated above ground or are of two storey design, they may have greater exposure to traffic noise. It is recommended that advice be sought from a person expert in dwelling design about ways to reduce traffic noise intrusion*."

General Note for Guidance re Dwelling Design:

The Construction Categories defined under Australian Standard AS3671-1989 are not the same as the Noise Categories defined under QDC MP 4.4. They should not be used interchangeably.

Furthermore, it is not appropriate to make reference to the schedules of QDC MP 4.4 to determine the extent of building upgrade that may be required to be incorporated into any dwelling to which the property notes apply. Doing so may lead to incorporating a higher degree of acoustical upgrade than this actually warranted. Rather, as indicated by the property notes, professional advice be sought from an appropriately qualified acoustical engineer to determine the actual extent of any upgrade required to be implemented into the design of the building.

Furthermore, to deal with Item 17.10 of *Changed Preliminary Approval No 2003/10335/MISC/1*, it is recommended that the following property note presented below be adopted.

	Property Note – North South Urban Arterial – Traffic Noise Attenuation
	The following property note shall be placed on Council's property note system for each of Lots 1-19 within the development: This lot is part of a development area located in the vicinity of the future North-South Urban Arterial Road and may be subject to traffic noise exposure exceeding recommended levels once the road is constructed. It is recommended that future lot owners seek advice from a person expert in dwelling design about ways to reduce traffic noise intrusion into the dwelling. To assist in this process, reference should be made to either: (i) Once the road is designated as a Transport Noise Corridor, the requirements under MP4.4 of the Queensland Development Code; or (ii) *AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction* in order to achieve the design sound levels, as specified in *AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors*, for a ten (10) year period following assessment. No assessment of road traffic noise impacts from the North South Urban Arterial has been undertaken as of the date of this advice due to uncertainties about when the road will be constructed, its design and the expected traffic volumes. A requirement to construct dwellings to a specific standard has therefore not been mandated by Council at this stage.

TABLE OF CONTENTS

Page

1.0 Introduction

Urbex has lodged an application with Moreton Bay Regional Council over land located on Capestone Boulevard, Mango Hill. The subject site is Lot 1394 of Stage 12B of the Capestone Estate. The application seeks approval for the development of 19 allotments for residential premises on the subject site.

Lot 1394 of Stage 12B is located at the southern extent of the previously-approved Stage 12 of Capestone Estate. The site adjoins Kinsella Road East and is located in close proximity to Capestone Boulevard and Redcliffe Peninsula Rail Line (RPRL, formerly Moreton Bay Rail Link).

Because of the proximity of the subject site to RPRL, Capestone Boulevard and Kinsellas Road East, Council will require that an assessment of the extent of noise intrusion from rail and road traffic onto the subject site be conducted.

Accordingly, Acoustics RB Pty Ltd was engaged by Urbex to conduct the required Rail Traffic Noise Assessment and Road Noise Assessment, and if necessary, to make recommendations for the control of any excessive road and/or rail noise intrusion.

To address Council's requirements, two reports have been prepared: one to deal with rail noise intrusion and one to address road traffic noise intrusion. This report, Report No. 12-316.R31, deals with road traffic noise intrusion. Report No. 12-316.R30 addresses the impact of rail noise intrusion.

2.0 Council Requirements

2.1 Historical

On 19 December 2006, Council (ie the former Pine Rivers Shire Council) issued a Negotiated Decision Notice under s3.5.17 of the Integrated Planning Act for preliminary approval for a material change of use over the entirety of the Capestone site. Negotiated Preliminary Approval No. 2003/10335/1 refers.

Conditions 11 and 37 of that Negotiated Preliminary Approval as well as Item 17.10 of *Changed Preliminary Approval No 2003/10335/MISC/1* each have relevance to the assessment and control of road and rail noise intrusion onto the subject site.

These conditions are reproduced below and overpage.

> ***11 Railway Traffic Noise***
>
> *The Developer shall provide a traffic noise report to ameliorate noise from the adjoining possible future railway as required by Council's Local Planning Policy LP 25. For the purposes of the policy, the possible rail corridor is a transport corridor controlled by the Queensland Department of Transport. The noise levels to be achieved shall be those specified for "New Corridors and Facilities" in the "QR Code of Practice for Railway Noise Management".*
>
> *The developer is not required by Council to construct any noise attenuation measures.*
>
> *Council's Subdivisions Engineer shall place appropriate worded property notes on all residential lots were the predicted noise level exceeds that were standard dwelling construction (would) be adequate to achieve the recommended design sound levels and the relevant Australian Standard. The property notes are intended to allow landowners to decide the type construction they may wish to build to limit possible future railway noise intrusion into the dwellings.*

37 Acoustic Report

The Acoustic Assessment prepared by Cardno MBK within the response entitled "Response to Information Request Flooding, Water Quality, Noise, Water Supply and Sewerage and Geotechnical Issues" received by Development Services date stamped 16 December 2004 is considered acceptable in principle. Further detailed Acoustical Impact reports will be required to be submitted by the applicant to the time of lodging future applications to obtain Development Permits over the site.

2.2 Changed Preliminary Approval No 2003/10335/MISC/1

Item 17.10 of Changed Preliminary Approval No 2003/10335/MISC/1 states:

Residential Development in the vicinity of the North South Arterial Road or the Public Transport Corridor is provided with an acceptable level of residential amenity particularly in relation to potential noise, air quality and visual impacts. At the time of submitting Code Assessable Material Change of Use applications for Development Permits to facilitate the creation of residential premises in the vicinity of the North South Arterial Road or the Public Transport Corridor the applicant shall demonstrate that measures have been incorporated into the layout or design to provide for an acceptable level of residential amenity particularly in relation to potential noise, air quality and visual impacts. Design solutions may include but are not limited to dense vegetated buffer areas, separation distances, topographic feature, internal local movement network components (local roads or pedestrian/cycle ways) and appropriately designed structures and buildings.

3.0 Existing Situation and Proposed Development

The location of the subject site is shown in Figure 1.

The real property description of the site is Lot 1394 on SP307899. The local authority is Moreton Bay Regional Council. As noted above, however, before amalgamation the site was previously located within the shire boundaries of the former Pine Rivers Shire.

In Figure 1, it can be seen that Lot 1394 of Stage 12B is located at the southern extent of the previously-approved Stage 12 of Capestone Estate.

The layout of the proposal new lots over Lot 1394 of Stage 12B is presented in Figure 2.

As is evident in Figure 1, Lot 1394 adjoins Kinsella Road East and is located in close proximity to Capestone Boulevard and Redcliffe Peninsula Rail Line (RPRL).

As shown in Figure 2, and as noted above, it is proposed to develop Lot 1394 of Stage 12B to accommodate 19 allotments for detached residences.

4.0 Requirements of Regulatory Authorities

4.1 Overview

As stated above in Section 2.1, Condition 11 *Railway Traffic Noise*, Council has made reference to the requirement to prepare a traffic noise report in accordance with "Council's Local Planning Policy LP 25 *Noise Attenuation on Residential Land*". As noted above, this report addresses the impact of road traffic noise intrusion onto the proposed new lots of Stage 12B. Report No. 12-316.R30 addresses the impact of rail noise intrusion. The application of Local Planning Policy LP 25 to the control of rail noise intrusion is dealt with in Report No. 12-316.R30.

As also stated above in Section 2.1, at Condition 37, Council requires that further detailed acoustical impact reports be prepared. Whilst not stated explicitly, Condition 37 applies to the assessment of rail noise intrusion and road traffic noise intrusion. Item 17.10 of Changed Preliminary Approval No 2003/10335/MISC/1 also requires that the impact of rail and/or road traffic noise intrusion be assessed.

Planning Policy LP 25 *Noise Attenuation on Residential Land* cited in Condition 11 deals specifically with the control of road traffic noise intrusion onto residential land. On 19 June 2006, however, Council adopted Planning Scheme Policy 6 *Traffic Noise Attenuation* (PSP6) as a replacement to LP 25. PSP6 commenced on 15 December 2006.

The stated objectives of PSP6 are:-

1.1 To provide information to registered proprietors of residential allotments about traffic noise levels. (Where noise levels may impact on domestic activities, property notes shall be placed on Council's property note system recommending types of dwelling construction to control the intrusion of noise into the dwelling and the need to maintain the integrity of fences installed for traffic noise reduction);

1.2 To identify residential lots which may be affected by significantly increased future traffic noise or noise levels which may be effectively ameliorated by traffic noise barriers;

1.3 To set out the general method of calculation for predicting traffic noise levels at the facade of dwellings in residential zones;

1.4 To define the format that a Traffic Noise Study shall be presented to encourage accurate interpretation by members of the public;

1.5 To identify existing and/or proposed Park which may be affected by significantly increased future traffic noise or noise levels which may be effectively ameliorated by traffic noise barriers; and

1.6 To define approved traffic noise amelioration measures required to be undertaken by the Applicant.

The policy applies to all residential development adjacent to State-controlled roads, transit/ transport corridors and various classes of Council-controlled roads.

It should be noted that, in the intervening period since the imposition of Conditions 11 and 37, Queensland Development Code (QDC) Mandatory Part (MP) 4.4 *Buildings in a Transport Noise Corridor* has been gazetted. This Code commenced on 1 September 2010. The current version of QDC MP 4.4 commenced on 17 August 2015, replacing the version gazetted in 2010. The provisions of the Code will now control the extent to which residences located on noise-affected lots within a Transport Noise Corridor (TNC) will need to be acoustically upgraded.

In addition, in November 2013 DTMR's Transport *Noise Management Code of Practice Volume 1 – Road Traffic Noise* commenced. This Code of Practice places specific requirements on the method of assessment of noise intrusion from road traffic on State-controlled roads. Limits for acceptable levels of transport noise intrusion are set under DTMR's *Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 2* dated May 2013.

Subsequently, in March 2019, DTMR issued *Interim Guideline – Operational Railway Noise and Vibration – Government Supported Transport Infrastructure*. The Interim Guideline re-states the limits for acceptable levels of noise intrusion from rail movements. It also provides guidance on the appropriate modelling and measurement methodologies to be used when assessing the impact of noise and/or vibration intrusion.

At the time of commencement of PSP6, ie December 2006, this policy quite correctly applied to land adjoining transit/transport corridors. For land adjoining State-controlled roads, the provisions of DTMR's *Code of Practice* would now apply to the assessment of road traffic noise intrusion at DA. The provisions of QDC MP 4.4 apply at BA to all residential development within a gazetted TNC.

Accordingly, because a local authority cannot impose a requirement which conflicts with the requirements of QDC MP 4.4 or seeks to alter or modify the application of a Queensland Development Code, the provisions of QDC MP 4.4 as they apply to any particular lot located within a TNC will override those of any particular code, guideline or policy generated by Council to the degree that any of this document/s seeks to impose acoustical design requirements which differ from those imposed under QDC MP 4.4.

In view of the above, PSP6 will have applicability to only those lots which are located outside a TNC associated with a State-controlled road. For lots located within a road TNC, assessment in accordance with DTMR's *Code of Practice* and QDC MP 4.4 would be appropriate.

Note:

> This distinction does not prevent QDC MP 4.4 being applied to lots located outside a TNC if there is an appropriate trigger and application mechanism to allow this to occur. It simply precludes the application of PSP6 to lots within the TNC.

Finally, and although not directly relevant to the development of Capestone, Council's SC 6.16 *Planning Scheme Policy – Noise* became effective on 1 February 2016, with the latest amendment taking effect from 29 January 2020. This Policy currently requires that assessment of noise intrusion from railways and major roads for development onto land subject to the current planning scheme be conducted in accordance with QDC MP 4.4.

4.2 Specific Requirements for Stage 12B

Under the provisions of Section 246Z of the *Building Act 1975*, Transport Noise Corridors (TNC's) have been designated along both sides of (i) Anzac Avenue and (ii) RPRL.

A graphical depiction of the TNCs associated with State-controlled roads and railways is available from the State Development, Manufacturing, Infrastructure and Planning (DSDMIP) State Planning Policy (SPP) Interactive Mapping System (IMS) website. It should be noted that while a TNC has been in place for Anzac Avenue since September 2010, it is only in more recent times that a TNC has been designated for RPRL. Furthermore, and importantly, it was only on 29 January 2020 after gazettal of an updated set of TNC's for the entire Rail Work of Queensland, that the State published QDC MP 4.4 the first set of noise category bands for any land adjoining RPRL.

An extract from the website showing the Anzac Avenue and RPRL TNC's in the vicinity of the subject site is presented in Figure 3. As is evident in this figure, while Stage 12B is situated wholly within the TNC associated with the Redcliffe Peninsula Rail Line, it lies well outside the Anzac Avenue TNC.

It should be noted that a TNC has not been declared for land adjoining either Capestone Boulevard or Kinsellas Road East.

Furthermore, a TNC has not yet been declared for land adjoining NSUA[1]. Notwithstanding this lack of a declaration, however, it would be reasonable to expect that, as work on the construction of the NSUA proceeds, a TNC will be gazetted at some future date. In this event, because the NSUA is an arterial road, it is expected that the width of the TNC would be set at the maximum permitted under Section 246Z of the *Building Act 1975*, ie 250m.

Under these circumstances, the entirety of Lot 1394 of Stage 12B is likely to be included in the future TNC associated with NSUA.

It should be noted that this same issue had relevance to development over Stages 4, 5, 16 and 17 of Capestone. To deal with Item 17.10 of *Changed Preliminary Approval No 2003/10335/MISC/1* as it applied to these earlier stages, Council imposed the property note presented below.

	Property Note – North South Urban Arterial – Traffic Noise Attenuation
	The following property note shall be placed on Council's property note system for all lots within the development: This lot is part of a development area located in the vicinity of the future North-South Urban Arterial Road and may be subject to traffic noise exposure exceeding recommended levels once the road is constructed. It is recommended that future lot owners seek advice from a person expert in dwelling design about ways to reduce traffic noise intrusion into the dwelling. To assist in this process, reference should be made to either: (iii) Once the road is designated as a Transport Noise Corridor, the requirements under MP4.4 of the Queensland Development Code; or (iv) *AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction* in order to achieve the design sound levels, as specified in *AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors*, for a ten (10) year period following assessment. No assessment of road traffic noise impacts from the North South Urban Arterial has been undertaken as of the date of this advice due to uncertainties about when the road will be constructed, its design and the expected traffic volumes. A requirement to construct dwellings to a specific standard has therefore not been mandated by Council at this stage.

To maintain consistency with the assessment conducted for the earlier stages of Capestone, and given that there has been no change to the resolution of the uncertainties surrounding the date of construction of the road, it is considered appropriate to deal with the impact of road traffic noise intrusion from the NSUA in generally the same manner. This matter is discussed further at Section 8.0.

Having regard to the discussion presented above, the only road traffic noise issue of significance is the impact of road traffic noise intrusion from Capestone Boulevard and Kinsellas Road East. Because the site lies outside Anzac Avenue TNC and a TNC has not been declared for land adjoining Capestone Boulevard, Kinsellas Road East, or as yet, the future NSUA, it is appropriate to use the methodologies and provisions of PSP6 to assess the extent of road traffic noise intrusion onto the new lots of Stage 12B.

This impact of road traffic noise intrusion onto the site has been assessed accordingly. The results are presented in Section 6.0 following.

[1] On advice from Council provided on 26 May 2020, it is understood that NSUA will be a State-controlled road. At this point, however, the timing of completion of the design of the road and construction of the road is unknown. In these circumstances, and in the absence of a TNC for the road, Council has advised that the same approach as adopted for Stages 4, 5, 16 and 17 be applied again for Stage 12B.

4.3 Planning Scheme Policy PSP6 Traffic Noise Attenuation

As stated at Clause (4)(a) of PSP6, the intention of the planning scheme policy is to reduce road traffic noise levels so that they do not exceed 63dBA $L_{10(18hour)}$[2] at residential dwellings. In addition, Council considers that $L_{10(18hour)}$ road traffic noise levels less than 55dBA are generally acceptable and do not warrant any specific attention being paid to the construction of dwellings subjected to noise of this level.

For lots subjected to road traffic noise levels of 55dBA or greater, Council requires that property notes be placed on Council's property note system alerting potential purchasers to the adverse impact of road traffic noise on the individual properties.

Two property notes have been developed.

For lots subjected to road traffic noise levels in the range 55-63dBA, the specific property note is as follows (ref. Clause (8)(b)):-

> *The predicted long term traffic noise levels are expected to be in the range of 55-63dBA. To minimise intrusion of traffic noise into dwellings, they should be designed to Categories 2 or 3 as defined in Australian Standard AS3671-1989. Where dwellings are elevated above ground or are two storey design they may have greater exposure to traffic noise. It is recommended that advice be sought from a person expert in dwelling design about ways to reduce traffic noise intrusion.*

For lots subjected to road traffic noise levels exceeding 63dBA, the specific property note is as follows (ref. Clause (8)(c)):-

> *The predicted long term traffic noise levels are expected to be exceed 63dBA. To minimise intrusion of traffic noise into dwellings they should be designed to Categories 3 or 4 as defined in Australian Standard AS3671-1989. Where dwellings are elevated above ground or are two storey design they may have greater exposure to traffic noise. It is recommended that advice be sought from a person expert in dwelling design about ways to reduce traffic noise intrusion.*

General Note for Guidance re Dwelling Design:

The Construction Categories defined under Australian Standard AS3671-1989 are <u>not</u> the same as the Noise Categories defined under QDC MP 4.4. They should <u>not</u> be used interchangeably.

Furthermore, it is not appropriate to make reference to the schedules of QDC MP 4.4 to determine the extent of building upgrade that may be required to be incorporated into any dwelling to which the property notes apply. Doing so may lead to incorporating a higher degree of acoustical upgrade than this actually warranted. Rather, as indicated by the property notes, professional advice be sought from an appropriately qualified acoustical engineer to determine the actual extent of any upgrade required to be implemented into the design of the building.

[2] $L_{10(18hour)}$ is defined by Pine Rivers Shire Council in LP25, UK DoE in *Calculation of Road Traffic Noise* (CRTN '88) and by DTMR in the *Road Traffic Noise Management: Code of Practice* as the arithmetic mean of each of the eighteen hourly $L_{10,1hr}$ levels between 6:00am and 12:00 midnight on an average weekday where $L_{10,1hr}$ is the noise level measured in dBA that is exceeded for 10% of the specific one hour period. While this terminology is not in strict accordance with the recommendations of Standards Australia because it does not identify the A-weighting requirement, it is adopted here to maintain consistency with common practice and with the terminology of LP25, PSP6, CRTN '88 and DTMR's *Code of Practice*.

5.0 Methodology

The prediction of road traffic noise intrusion onto the site has been conducted using the CRTN '88[3] algorithms as applied by the SoundPLAN[4] computer program.

As noted in Section 1.0, the subject site is at the southern extent of the previously-approved Stage 12 of Capestone Estate. The site adjoins Kinsella Road East and is located in close proximity to Capestone Boulevard. To maintain consistency with the road traffic noise assessment conducted over the earlier stages, the same noise model has been updated and extended to include the proposed development over Lot 1394 of Stage 12B.

It should be noted that while the subject site does not adjoin Anzac Avenue, earlier Stage 1 did. Consequently, to ensure consistency of determination of road traffic noise impact conducted previously, Anzac Avenue has been retained in the noise model for the subject site.

The design assumptions regarding the future road traffic volumes, vehicle mix and road speed for each of the roads in the immediate vicinity of Stage 12B, ie Capestone Boulevard, Mango Hill Boulevard and Kinsellas Road East, were provided earlier by Pekol Traffic & Transport when the road traffic noise assessments were conducted for Stages 4 and 7.

The road traffic data is presented below:-

Capestone Boulevard at Stage 12

- 10 year traffic volume: 8620 vpd AADT
- Percentage heavy vehicles: 3%
- Vehicle speed: 50 km/h
- Road surface: Dense graded asphaltic concrete

Mango Hill Boulevard

- 10 year traffic volume: 8100 vpd AADT
- Percentage heavy vehicles: 3%
- Vehicle speed: 50 km/h
- Road surface: Dense graded asphaltic concrete

Kinsellas Road East (North of roundabout)

- 10 year traffic volume: 5320 vpd AADT
- Percentage heavy vehicles: 3%
- Vehicle speed: 60 km/h
- Road surface: Dense graded asphaltic concrete

[3] *Calculation of Road Traffic Noise*, UK DoE, HMSO, 1988. This is the method endorsed by Queensland Department of Transport and Main Roads, DEHP, Moreton Bay Regional Council, Brisbane City Council and various other local authorities.

[4] SoundPLAN is an integrated software package for noise and air pollution evaluation developed in Germany by Braunstein + Berndt GmbH. It has been configured to predict the extent of (i) road traffic noise intrusion by application of the CRTN '88 algorithms and (ii) industrial noise emission using the CONCAWE algorithms. It is in use in more than 43 countries and has had widespread application throughout Australia. It is endorsed Queensland Department of Transport and Main Roads, DEHP, MBRC, Brisbane City Council and various other local authorities and most other State environmental authorities.

Kinsellas Road East (South of roundabout)

- 10 year traffic volume: 560 vpd AADT
- Percentage heavy vehicles: 3%
- Vehicle speed: 60 km/h
- Road surface: Dense graded asphaltic concrete

The assumptions regarding development over the subject site and receptor locations for assessment of road traffic noise intrusion are presented below:-

- Shielding effects: Lots 1-7: 15m x 10m rectangular lowset dwellings at standard setbacks[5] positioned to suit the current layout
- Receiver location: 1.6m above ground level, 1m from facade (Ref. PSP 6 Clause 2(b)(ii)(E))
- Receiver facade location: At most exposed facade

Topographical contours and separation distances as well as the vertical and horizontal alignment of Capestone Boulevard, Mango Hill Boulevard and Kinsellas Road East were determined from the CAD files prepared by the Project Civil Engineers.

The calculations also took account of the various site-specific variables and parameter settings which influence the level of road traffic noise emission onto the site.

These included:-

- Site topography
- Distance from road
- Shielding provided by boundary noise barriers
- Shielding provided by jersey kerb noise barriers
- Reflection from any opposite facades
- Road gradient and road surface
- Vertical alignment of road
- Angle of view to road
- Receptor height

[5] To simulate the effect of shielding by residences across the site, PSP6 permits the "construction" of rectangular 15m x 10m lowset residences situated at minimum boundary setbacks on lots across the development. (Ref. Clause (2)(b)(ii)(C).)

6.0 Predicted Future Road Traffic Noise Levels

6.1 Road Traffic Noise Levels on Residential Allotments

As required by PSP6, a series of road traffic noise predictions has been conducted at each of the new lots, the reference location for determination of the noise levels was at the centre of the most exposed facade of the residential building having regard in each case to the expected placement of the residence on the lot. The results are presented in Table 1 below. All values have been rounded to the nearest whole decibel.

Lot No	Calculated $L_{10(18hour)}$ Noise Level, dBA	Lot No	Calculated $L_{10(18hour)}$ Noise Level, dBA	Lot No	Calculated $L_{10(18hour)}$ Noise Level, dBA
1	<55	8	<55	15	57
2	<55	9	<55	16	<55
3	<55	10	<55	17	<55
4	<55	11	<55	18	<55
5	<55	12	<55	19	<55
6	<55	13	<55		
7	<55	14	55		

Table 1 - Calculated $L_{10(18hour)}$ Noise Level at Reference Locations on the Most Exposed Facades
(All values include the effect of facade reflection)

From the results presented in Table 1, it can be seen that the noise levels at the most exposed facades of the 15m x 10m rectangular lowset dwellings which have been "constructed" for this purpose are expected to be in the range 55-63dBA for Lots 14 and 15, while at each of the other residences on the remaining 17 lots, the level of noise exposure will expected to be less than 55dBA $L_{10(18hour)}$ in each case.

6.2 Road Traffic Noise Contours

PSP6 also requires that the 55dBA and 63dBA $L_{10(18hour)}$ noise level contours be predicted for road traffic noise emission onto the subject site. This requirement applies only to lower level facades. Council does not require that the assessment of noise intrusion to the upper level/s of any future highset/multi-storey residences be assessed at this time. (Ref. PSP6 Clause 2(b)(ii)(E).)

These contours (ie for lower level facades) are used to determine the extent to which road traffic noise intrudes onto individual lots throughout the development. The resultant contours are shown in Figure 4 (noise level contours at 2dBA intervals) and Figure 4A (55dBA and 63dBA contours, after rounding). These noise contours show the likely extent of road traffic noise intrusion onto the site in more detail.

In Figure 4A, it can be seen that the 63dBA contour does not intrude onto any lots within the site. It can also be seen that the 55dBA contour (after rounding) intrudes onto Lots 14-16[6] only. The remaining 16 lots are subjected to noise levels that are less than 55dBA in every case.

[6] On Lot 16, the intrusion of road traffic noise is shown to occur at the rear of the lot only. For all practical purposes, it would be expected that the residence to be constructed on this lot would be situated outside the line of the 55dBA contour. Notwithstanding, because (i) the extent of intrusion onto Lot 16 will be a function of the actual degree of shielding provided by the residence constructed on Lot 15 which, itself, will be a function of the placement of the residence on Lot 15 and (ii) the degree of noise exposure at the residence on Lot 16 will depend upon the placement of the residence on the lot, prudently, Lot 16 should be included in the list of lots exposed to noise levels in the range 55-63 dBA.

It should be noted that for any dwelling facade exposed to noise levels in the range 55-63dBA there is almost invariably no requirement to upgrade the acoustical design of the building. Simply closing the windows is normally sufficient to achieve acceptable acoustical conditions internally.

In view of the results presented above, property notes will need to be applied to Council's property note system for Lots 14-16 only, but no property notes will be required to be applied to the remaining 16 lots.

For Lots 14-16, a property note in accordance with Clause (8)(c) of PSP6 will need to be placed on Council's property note system stating that it has been determined that the predicted road traffic noise level at the most exposed facade of the dwellings on this lot are likely to be in the range 55-63dBA. In this case, the property note recommends that the affected dwellings be designed in accordance with AS 3671-1989.

7.0 Conclusions

From the results of the assessment presented above, the following conclusions can be drawn:-

- The only road traffic noise issue of significance is the impact of road traffic noise intrusion from Capestone Boulevard and Kinsellas Road East.
- There will be no lots subjected to road traffic noise levels either exceeding 63dBA, but the dwellings on Lots 14-16 may be subjected to road traffic noise levels in the range 55-63dBA.
- A property note in accordance with in accordance with Clause (8)(c) of PSP6 will need to be placed on Council's property note system stating that the predicted road traffic noise levels on Lots 14-16 at the most exposed lower residential facade may be in the range 55-63dBA.
- Notwithstanding, for any dwelling facade exposed to noise levels in the range 55-63dBA, it is likely that there will be no requirement to upgrade the acoustical design of the lower level of the building.

8.0 Recommendations

A property note in accordance with Clause (8)(b) of LPSP6 will need to be placed on Council's property note system stating that, for Lots 14-16, the predicted road traffic noise levels on these lots will be in the range of 55-63dBA.

To maintain consistency with the approvals for earlier stages of Capestone, the suggested wording of the property note follows below.

Lot 14-16

PN…. Property Note - Capestone Boulevard - Traffic Noise Attenuation - (Building Design Standards)
The following property note shall be placed on Council's property note system for Lot 14-16 as identified in the approved acoustic assessment: "*The predicted long term traffic noise levels are expected to be in the range of 55-63dBA. To minimise intrusion of traffic noise into dwellings they should be designed to Categories 2 or 3 as defined in Australian Standard AS3671-1989. Where dwellings are elevated above ground or are of two storey design, they may have greater exposure to traffic noise. It is recommended that advice be sought from a person expert in dwelling design about ways to reduce traffic noise intrusion*."

General Note for Guidance re Dwelling Design:

The Construction Categories defined under Australian Standard AS3671-1989 are not the same as the Noise Categories defined under QDC MP 4.4. They should not be used interchangeably.

Furthermore, it is not appropriate to make reference to the schedules of QDC MP 4.4 to determine the extent of building upgrade that may be required to be incorporated into any dwelling to which the property notes apply. Doing so may lead to incorporating a higher degree of acoustical upgrade than this actually warranted. Rather, as indicated by the property notes, professional advice be sought from an appropriately qualified acoustical engineer to determine the actual extent of any upgrade required to be implemented into the design of the building.

Furthermore, to deal with Item 17.10 of *Changed Preliminary Approval No 2003/10335/MISC/1*, it is recommended that the following property note presented below be adopted.

	Property Note – North South Urban Arterial – Traffic Noise Attenuation
	The following property note shall be placed on Council's property note system for each of Lots 1-19 within the development: This lot is part of a development area located in the vicinity of the future North-South Urban Arterial Road and may be subject to traffic noise exposure exceeding recommended levels once the road is constructed. It is recommended that future lot owners seek advice from a person expert in dwelling design about ways to reduce traffic noise intrusion into the dwelling. To assist in this process, reference should be made to either: (v) Once the road is designated as a Transport Noise Corridor, the requirements under MP4.4 of the Queensland Development Code; or (vi) *AS 3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction* in order to achieve the design sound levels, as specified in *AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors*, for a ten (10) year period following assessment. No assessment of road traffic noise impacts from the North South Urban Arterial has been undertaken as of the date of this advice due to uncertainties about when the road will be constructed, its design and the expected traffic volumes. A requirement to construct dwellings to a specific standard has therefore not been mandated by Council at this stage.

Report prepared by:

Russell Brown,
Director
RPEQ 2799

Figure 1 – Site Location

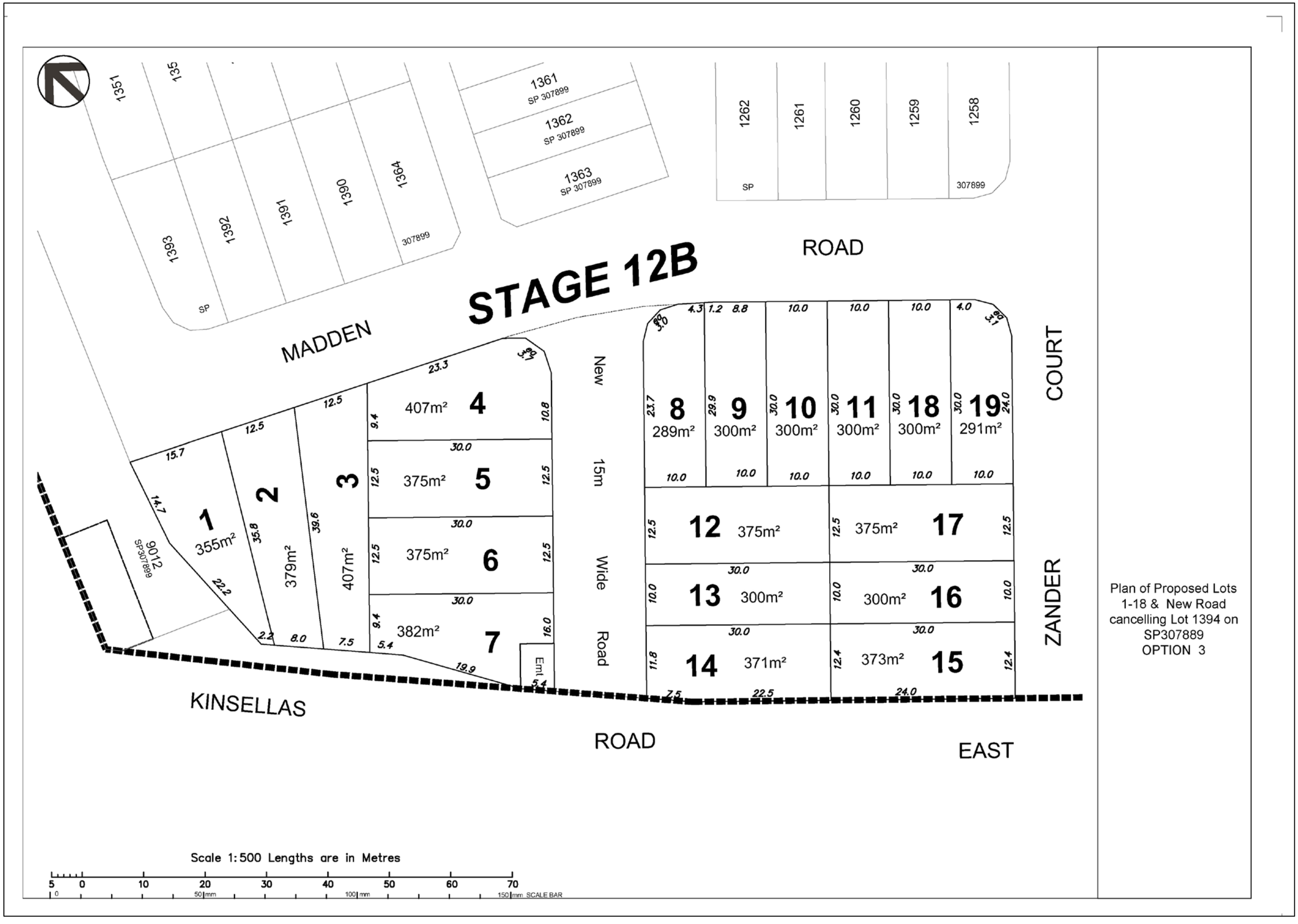

Figure 2 – Lot Layout

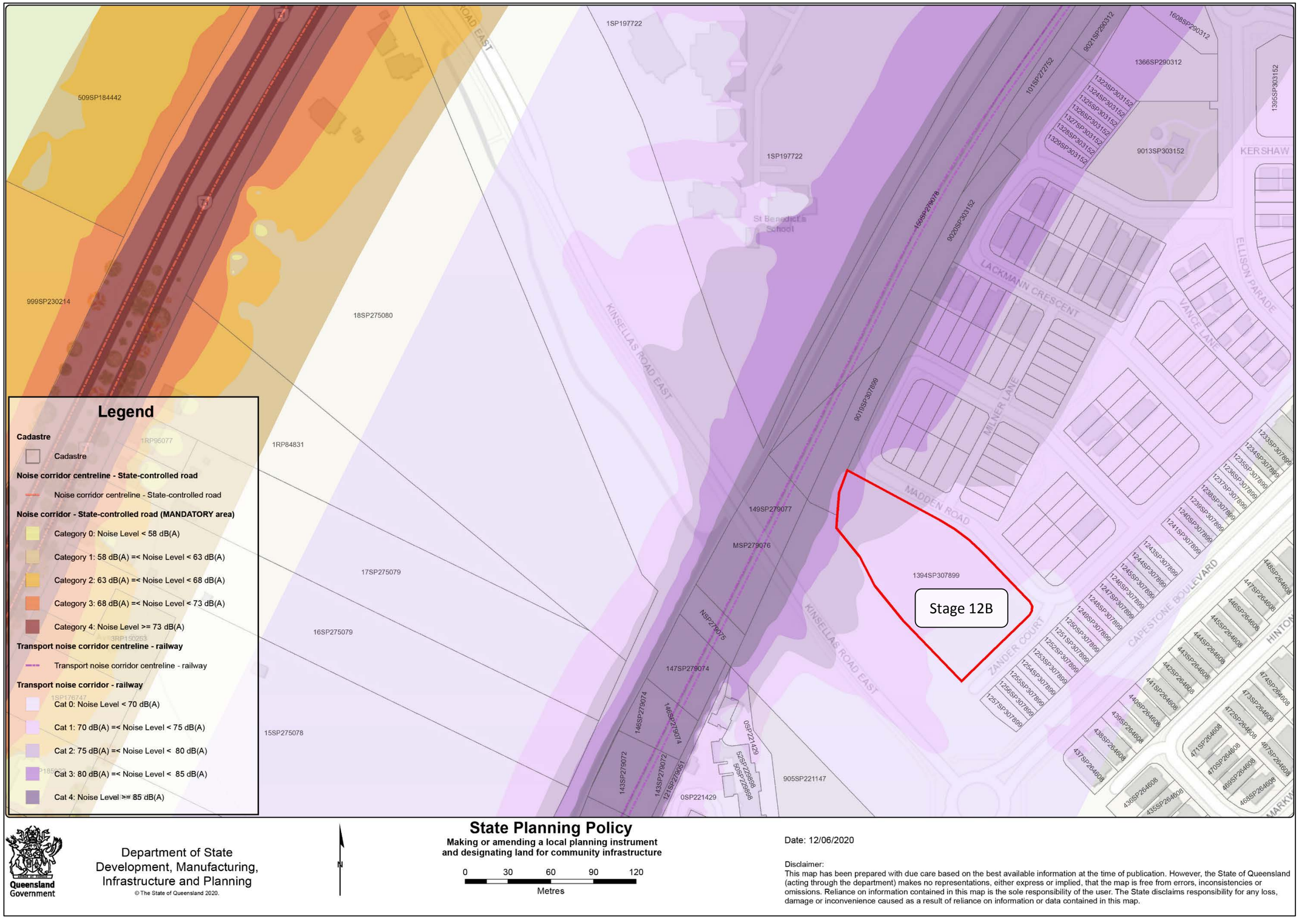

Figure 3 – Anzac Avenue and RPRL Transport Noise Corridors (TNC's) Relative to Stage 12B

Figures 4 and 5

Acoustics RB Pty Ltd

Report No 12-316.R31 Figure 4

Facade-Corrected $L_{10(18hour)}$ Noise Levels

Road Traffic Noise

Ground Floor Level Facades
Receiver Height = 1.6m Above Finished Ground Level

N

STAGE 12B

KINSELLAS ROAD EAST

CAPESTONE BOULEVARD

149 SP279077

1353 SP307899
1354 SP307899
1355 SP307899
1357 SP307899
1358 SP307899
1359 SP307899
1360 SP307899
1361 SP307899
1362 SP307899
1363 SP307899
1364 SP307899
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1250 SP307899
1251 SP307899
1252 SP307899
1253 SP307899
1254 SP307899
1255 SP307899
1256 SP307899
1257 SP307899
439 SP264608

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Facade-Corrected $L_{10(18hour)}$ Noise Level (dBA)

	<= 45
45 <	<= 47
47 <	<= 49
49 <	<= 51
51 <	<= 53
53 <	<= 55
55 <	<= 57
57 <	<= 59
59 <	<= 61
61 <	<= 63
63 <	<= 65
65 <	<= 67
67 <	<= 69
69 <	<= 71
71 <	<= 73
73 <	

A3 Scale 1:750

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No 12-316.R31 Figure 4A

55dBA and 63dBA Facade-Corrected $L_{10(18hour)}$ Noise Levels after Rounding

Road Traffic Noise

Ground Floor Level Facades
Receiver Height = 1.6m Above Finished Ground Level

N

STAGE 12B

KINSELLAS ROAD EAST

CAPESTONE BOULEVARD

149 SP279077

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

1353 SP307899
1354 SP307899
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1254 SP307899
1255 SP307899
1256 SP307899
1257 SP307899
439 SP264608

A3 Scale 1:750

0 5 10 20 30 40 50 60 70 80 90 100 m

Facade-Corrected $L_{10(18hour)}$ Noise Level (dBA)

<= 55.5
55.5 < <= 63.5
63.5 <