



Enquiries: Blayne Magner
Direct Phone: 07 5433 2781
Our Ref: DA/36366/2018/V3RM
Your Ref:
Date: 7 January 2022

Orchard (Narangba) Developments Pty Ltd
C/- Peakurban Pty Ltd
PO Box 1344
BUDDINA QLD 4575

Dear Applicant,

Re: DEVELOPMENT APPROVAL
Planning Act 2016

Development Application No.:

Property Location:

Property Description:

DA/36366/2018/V3RM

275 Callaghan Road, Narangba

295 Burpengary Road, Narangba

Lot 2 RP 907550 & Lot 99 RP 907550

Please be advised that on 24 December 2021 the above development application was approved by Council's Delegate as the Assessment Manager in accordance with section 64 of the *Planning Act 2016* subject to conditions.

The following type of approval has been issued:

- Reconfiguring a Lot - Development Permit Subdivision (1 Lot into 32 Lots plus open space)

The development allowed by this approval must be carried out in accordance with the attached Decision package.

In addition to this approval you may also be required to obtain a water approval from Unity Water.

Attached is an extract from the *Planning Act 2016* which details your appeal rights and the appeal rights of any submitters, if applicable, regarding this decision.

Should you have any further queries in relation to this decision, please contact Blayne Magner as referenced above.

Yours faithfully



Blayne Magner
Principal Planner
Development Services

Enclosures: Attachment 1 - Decision Notice
Attachment 2 - Assessment Manager Conditions
Attachment 3 - Approved Plans/ Documents
Attachment 4 - Infrastructure Charges Notice
Attachment 5 - Appeal Rights

ATTACHMENT 1

Decision Notice

Decision Notice

Planning Act 2016, section 63

APPLICATION DETAILS

Application No:	DA/36366/2018/V3RM
Applicant:	Orchard (Narangba) Developments Pty Ltd
Street Address:	275 Callaghan Road, Narangba 295 Burpengary Road, Narangba
Real Property Description:	Lot 2 RP 907550 & Lot 99 RP907550
Planning Scheme:	Moreton Bay Regional Council Planning Scheme

APPROVAL DETAILS

Date of Decision: 24 December 2021

The development application was approved by Council OR Council's Delegate as the Assessment Manager in accordance with section 64 of the *Planning Act 2016* subject to conditions (refer Attachment 2).

APPROVAL TYPE	Development Permit	Preliminary Approval
Reconfiguring a Lot for Subdivision (1 Lot into 32 Lots plus open space)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

OTHER NECESSARY PERMITS

Listed below are other permit/s that are necessary to allow the development to be carried out:

- Operational Work - Roads work
- Operational Work - Stormwater
- Operational Work - Drainage work
- Operational Work - Earthworks
- Operational Work - Landscaping
- Operational Work - Electrical and Street Lighting

CURRENCY PERIOD OF APPROVAL

In accordance with section 85 of the *Planning Act 2016*, the currency period for each aspect of the development approval is as outlined below:

- Reconfiguring a Lot – 4 years from the date this approval starts to have effect.

INFRASTRUCTURE

Unless otherwise specified, all assessment manager conditions of this development approval relating to the provision of infrastructure are non-trunk infrastructure conditions under Chapter 4, section 145 of the *Planning Act 2016*.

Infrastructure Charges are applicable for this development approval.

ASSESSMENT MANAGER CONDITIONS

The conditions relevant to this development approval are listed in Attachment 2 of the Decision package.

APPROVED PLANS / DOCUMENTS

The approved plans and/or documents as listed below for this development approval are included in Attachment 3 of the Decision package.

Approved Plans and Documents			
Plan / Document Name	Reference Number	Prepared By	Dated
Plan of Subdivision	18-0147-PSI Issue D	PeakUrban	20.10.2021
Plan of Development	18-0147-PD1 Issue D	PeakUrban	20.10.2021
Pedestrian Pathway Plan	18-0147-PG2 Issue D	PeakUrban	20.10.2021
Noise Impact Assessment	ATP180519-R-NIA-03	ATP Consulting Engineers	July 2021
Concept Roadworks and Drainage Layout Plan	17-0112 P102 Rev 5	Peak Urban	10/09/2021

Plans and Documents to be Amended			
Plan / Document Name	Reference Number	Prepared By	Dated
Flooding and Stormwater Management Plan	17-0112FSMP01-V2	Peak Urban	Sept 2021

ASSESSMENT BENCHMARKS

The Assessment Benchmarks that applied to the development from the following Categorising Instruments include;

Categorising Instrument (*Planning Regulation 2017*)

State Planning Policy

- *State Planning Policy 2017*, Part E

Regional Plan

- *South East Queensland Regional Plan 2017 (ShapingSEQ)*

Local Categorising Instrument (*Moreton Bay Regional Council Planning Scheme*)

- Reconfiguring a Lot Code, Emerging Community Zone Code, Transition Precinct.

Local Categorising Instrument (Variation Approval)

Not applicable.

Local Categorising Instrument (Temporary Local Planning Instrument)

Not applicable.

REASONS FOR DECISION

Subject to development conditions being imposed (refer Attachment 2), the development can comply with the applicable Assessment Benchmarks against which the application was required to be assessed. For further details, refer to the Reasons for the Decision section of the Assessment Report which is available on Council's website (via *DA Tracker*) <https://www.moretonbay.qld.gov.au/Services/Building-Development/DA-Tracker> using the application number referenced in this Notice.

REFERRAL AGENCY CONDITIONS

There are no Referral Agencies applicable to this development approval.

APPEAL RIGHTS

Attachment 5 of the Decision package is an extract from the *Planning Act 2016* which details your appeal rights and the appeal rights of any submitters, if applicable, regarding this decision.

OTHER DETAILS


If you wish to obtain more information about Council's decision, please refer to the Assessment Report for the application on Council's (via *DA Tracker*) <https://www.moretonbay.qld.gov.au/Services/Building-Development/DA-Tracker> using the application number referenced in this Notice.


ATTACHMENT 2

Assessment Manager Conditions of Approval

CONDITION		TIMING
RECONFIGURING A LOT		
DEVELOPMENT PLANNING		
1	Approved Plans and/or Documents	
	Undertake development generally in accordance with the approved plans and/or documents. These plans and/or documents will form part of the approval, unless otherwise amended by conditions of this approval.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan) for each stage and to be maintained at all times.
2	Amended Plan - Stormwater Management	
	<p>Submit and have approved by Council, an amended Stormwater Management Plan (SMP) prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ). The SMP is to demonstrate that stormwater can be managed on/from the subject land in accordance with the MBRC Planning Scheme. The following specific amendments are to be included:</p> <ul style="list-style-type: none"> • Revise and update the SMP to reflect the latest staging; • Detail what infrastructure is to be delivered in which stage; • Detail temporary measures required (if any) as a result of the revised construction strategy. 	Prior to lodging an application for operational works.
3	Infrastructure Agreement	
	Comply with the 275 Callaghan Road, Infrastructure Agreement 2021 executed on 21 December 2021 between Moreton Bay Regional Council and Orchard (Narangba) Developments Pty Ltd, or as amended.	At all times.
4	Related Approvals	
	Demonstrate all conditions and requirements of Stage 1 of DA/2021/1519 have been fulfilled and the lots created.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
5	Entry Statement	
	<p>Establishment of any "Entry Statement" as a marketing strategy for the development must accord with the following, unless otherwise approved by Council:</p> <ul style="list-style-type: none"> (i) Located within a privately-owned allotment or on the boundary of a privately-owned allotment; (ii) Limited to one (1) entry statement per development; (iii) Constructed of durable, weather resistant materials; 	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).

CONDITION	TIMING
RECONFIGURING A LOT	
(iv) Positively contributes to the character of the surrounding area; and (v) Does not contain the logo of any developer or any other entity.	
6	
Landscaping for Reconfiguring a Lot	
A Carry out landscaping and associated earthworks, site preparation and other necessary works in accordance with the approved landscape plans, details and technical specifications of any proposed planting or landscape work (both soft and hard works) prepared in accordance with (B) below where such works will be on land under the control of Council, whether as a park, reserve or road reserve. Landscaping is to accord with Planning scheme policy - Integrated design Appendix D - Landscaping.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
B Unless an alternative design is approved in writing by Council or required under the recommendations of the approved noise impact assessment, provide a capped and stained timber screen fence that is 1.8 metres in height and constructed of treated timber along the full development frontage of Callaghan Road with associated landscaping to soften the visual appearance of the fence. An alternative fence design may be approved by Council as part of the submission for Operational Works - Landscaping approval.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
C Before commencing the operational work for the development obtain approval for the landscaping plans, details and technical specifications of any proposed planting or landscape work (both soft and hard works) from Council.	Prior to operational work for the development commencing on site
7	
Street Trees	
Provide street trees within the development in accordance with Planning scheme policy - Integrated design Appendix D - Landscaping. Specifically, the: <ol style="list-style-type: none"> 1. pot size is set out in section 4.2; and 2. number and species to be provided is set out in section 5.2. 	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
8	
Fencing of Public Boundaries	
Unless an alternative design is required under the recommendations of the approved noise impact assessment, provide semi-transparent fencing in the following locations: <ul style="list-style-type: none"> • along the northern boundary of Lot 210; • along the southern boundary of Lots 209 and 215; and • along the western boundary of Lots 208-215; 	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).

CONDITION	TIMING
RECONFIGURING A LOT	
<p>Fencing is to have a maximum height of 1.8 metres and a minimum 50% transparency for any part of the fence above 1.2m in height. An example is shown in the image below.</p> 	
9	Water and/or Sewerage
<p>A Submit to Council a Certificate of Completion or Provisional Certificate of Completion (for each stage where there are stages) for the development from the Northern SEQ Distributor–Retailer Authority (Unitywater) confirming:</p> <ul style="list-style-type: none"> (i) a reticulated water supply network connection is available to the land; and (ii) a sewerage network connection is available to the land; and (iii) all of the requirements of Unitywater have been satisfied. 	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).</p>
<p>B Provide a water supply and sewerage network connection to each proposed park at a location approved by the Council in writing having regard to planned or future improvements / embellishments likely to be made to the park (e.g. Water bubblers).</p>	
10	New Telecommunications Infrastructure
<p>A Provide Fibre-Ready telecommunications infrastructure (pit and pipe) throughout the development in accordance with the Communication Alliance specifications contained within Industry Guideline G645:2011 Fibre Ready Pit and Pipe Specifications for Real Estate Development Projects or in accordance with the NBN Co. specifications contained within</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).</p>

CONDITION	TIMING
RECONFIGURING A LOT	
<p>B Provide certification from a Registered Professional Engineer Queensland (RPEQ) electrical engineer that the works specified in (A) above have been installed and evidence that a telecommunications carrier licensed under the <i>Telecommunications Act 1997</i> has agreed to take ownership of the infrastructure.</p>	
<p>11 Electricity</p>	
<p>A Provide evidence (e.g. Certificate for Electricity Supply to Subdividers with Agreement Number or Certificate of Supply) demonstrating that an underground electricity supply network has or will be constructed within all new roads and along the frontage of each proposed lot.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).</p>
<p>B Provide an underground electricity supply connection to each proposed lot.</p>	
<p>C Provide an underground electricity supply connection to each proposed park at a location approved by the Council in writing having regard to planned or future improvements / embellishments likely to be made to the park (e.g. Lighting of the pedestrian paths through the park).</p>	
<p>D Ensure any PAD Mount transformer located immediately adjacent to proposed public use land / open space is painted with a mural on all sides that integrates the infrastructure into the location of being adjacent to the open space. Concepts for the mural are to align with the use of the adjoining land as open space or alternatively the environmental values of the area eg koalas or a previous use of the land. An example is shown in the image below;</p> 	
<p>E Submit certification from a licensed surveyor, Registered Professional Engineer of Queensland (RPEQ) or registered building surveyor that any electricity connections and</p>	

CONDITION	TIMING
RECONFIGURING A LOT	
12	Certify Lots are in Accordance with Approved Plan
Provide certification from a Licensed Surveyor that the lots to be created on the approved plan of subdivision are in accordance with the approved plan.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
13	Street Names
A	Submit requests for the names of new street/s in accordance with Council's Policy 11-2150-038 Allocation of Road Names and Street Address Numbers or as amended;
B	Obtain approval from Council for the names of new streets in accordance with (A) above;
C	Erect approved street name boards on all new roads in accordance (A) and (B); and
D	Mark all street names on the survey plans.
14	Payment of Rates
Pay all outstanding rates and charges applicable to the subject land.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
15	Dedicated Road Access
Provide dedicated constructed road access to the development. This condition has been imposed under section 145 of the Planning Act 2016.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan) and to be maintained at all times.
16	Remove /Demolition of Existing Buildings
Remove / demolish all existing buildings located on the site.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. survey plan).
17	Plan of Development
Development must comply with the approved Plan of Development unless otherwise approved in writing by Council.	To be maintained at all times.
18	Advice to Purchasers Regarding Plan of Development
A	Acknowledge in writing that potential purchasers will be advised of the approved Plan of Development and the
	Prior to submitting to the Council any request for approval of a plan of

CONDITION	TIMING
RECONFIGURING A LOT	
	subdivision (i.e. survey plan).
B	Provide potential purchasers with written notice of the approved Plan of Development and the requirement to comply with the approved Plan of Development.
19	Acoustic Attenuation Measures
A	Construct the acoustic barrier as specified in the Noise Impact Assessment prepared by ATP Consulting Engineers.
B	Provide certification from a suitably qualified person that the acoustic barrier has been constructed in accordance with the specifications of the Noise Impact Assessment prepared by ATP Consulting Engineers.
20	Fauna Management Plan
	<p>(a) Submit a Fauna Management Plan to reduce potential impacts on native fauna in accordance with the Environmental areas and corridors - Planning scheme policy. The plan must be prepared by a suitably qualified person and contain at least the following information:</p> <ul style="list-style-type: none"> (i) Procedures for dealing with fauna observed immediately prior to vegetation clearing; (ii) Procedures for dealing with fauna during vegetation clearing; (iii) Procedures for the treatment / removal of injured fauna from the site. <p>(b) Obtain approval from Council for the Fauna Management Plan in accordance with (a) above.</p> <p>(c) Carry out works in accordance with the approved Fauna Management Plan.</p>
21	Vegetation Management Plan
	<p>(a) Submit a Vegetation Management Plan prepared by a suitably qualified person and in accordance with the Environmental areas and corridors - Planning scheme policy. The plan must include scaled plans and supporting documentation that provides for the following:</p> <ul style="list-style-type: none"> i. Identification of trees to be removed during site works;

CONDITION	TIMING
RECONFIGURING A LOT	
<ul style="list-style-type: none"> ii. Control measures, maintenance procedures and monitoring programs; and iii. Weed control during construction; and iv. Weed control in landscape areas; and v. The rehabilitation of Lot 99 RP907550 in accordance with the requirements of the infrastructure agreement. <p>(b) Obtain approval from Council for the Vegetation Management Plan in accordance with (a) above.</p> <p>(c) Carry out works in accordance with the approved Vegetation Management Plan.</p>	<p>(b) Prior to works commencing on site.</p> <p>(c) Prior to lodging a request for Compliance Assessment of subdivision plans</p>
22	No Net Loss of Fauna Habitat
<p>A Development does not result in the net loss of fauna habitat. Where development does result in the loss of a Habitat Tree, development will provide replacement fauna nesting boxes at the following rate:</p> <ol style="list-style-type: none"> 1. One (1) nest box for every hollow removed; or 2. Where hollows have not yet formed in trees greater than 80cm in diameter at 1.3m in height, three (3) nest boxes are required for every habitat tree removed. 	<p>Prior to any vegetation clearing.</p>
<p>B Where development does result in the loss of a Habitat Tree, submit and obtain approval from Council for a nest box management plan with details of the proposed construction, installation methods and GPS location for each nest box for Council's records. The plan must be prepared in accordance with Council's Planning scheme policy - Environmental areas and corridors and by a suitably qualified person and include details of proposed maintenance and protocols for replacing fallen or broken nest boxes. Include any additional information that may be relevant such as:</p> <ol style="list-style-type: none"> 1. Exact number of habitat trees and number of hollows to be impacted, 2. Assessment of replacement hollows required as per 'No Net Loss of Fauna Habitat' condition requirements, 3. Assessment of target species, 4. Requirements for the target species, 5. Nest box types - design and sizes, 	<p>Prior to any vegetation clearing.</p>

CONDITION	TIMING
RECONFIGURING A LOT	
<p>6. Installation technique, 7. Proposed location of installed nest box including GPS location and owner's consent, 8. Installation timeframes which provide for installation prior to the commencement of clearing wherever possible, otherwise within seven (7) days of clearing; and 9. Monitoring and maintenance regime details, including protocols for replacing fallen or broken nest boxes.</p> <p>Nest boxes must be maintained for a minimum of 12 months post installation.</p>	
<p>C If nest box installation is proposed within a Council park, provide written confirmation from Council's Coordinator Parks and Recreation Planning that Council agrees to the installation of the nest boxes within Council park.</p> <p><i>Note: The agreement may require the payment of a maintenance bond refundable after the satisfactory completion of the 12 months maintenance period</i></p>	Prior to any vegetation clearing.
<p>D Provide a copy of written permission to enter Council Land from Council's Operations Technical Services team.</p>	Prior to any vegetation clearing.
23	Disposal of Cleared Vegetation
<p>Chip, shred or tub grind cleared native vegetation and spread as mulch outside of any areas identified to be maintained as low fuel loads in the approved Bushfire Management Plan or dispose of at an authorised waste facility.</p>	At all times during work being carried out on site
24	Stockpiles of Construction and Landscaping Materials
<p>Locate any stockpiles of construction and landscaping materials and other site debris clear of drainage lines and clear of any position from which it could be washed onto any footpath, nature strip, roadway or into any drain, wetland or watercourse.</p>	At all times during work being carried out on site
DEVELOPMENT ENGINEERING	
25	Replace Existing Council Infrastructure
<p>Replace existing Council infrastructure (including but not limited to street trees and footpaths) that is damaged as part of works carried out in association with the development to Council's standards.</p>	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
26	Alterations and Relocation of Existing Services

CONDITION	TIMING
RECONFIGURING A LOT	
<p>Ensure any alteration or relocation in connection with or arising from the development to any service, installation, plant, equipment or other item belonging to or under the control of an entity engaged in the provision of public utility services is to be carried out with the development and at no cost to Council unless agreed to in writing by the Council.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).</p>
27	Stormwater
<p>Carry out the development to ensure that adjoining properties, reserves and roads are protected from ponding or nuisance from stormwater as a result of any works undertaken.</p>	<p>To be maintained at all times.</p>
28	Stormwater Management
<p>A Submit and have approved by Council, a development application for operational works for stormwater infrastructure to service the development.</p> <p>Design drawings are to be prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ) and in accordance with the approved plans and documents of development and the MBRC Planning Scheme current at the time of the operational works application.</p>	<p>Prior to commencement of works associated with this condition.</p>
<p>B Construct stormwater infrastructure to service the development at no cost to Council and in accordance with the approved plans and documents of development.</p> <p>This condition has been imposed under section 145 of the <i>Planning Act 2016</i>.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).</p>
<p>C Provide registered easements in favour of Council over any drainage paths and drainage infrastructure within all new lot/s in accordance with the approved plans and documents of development.</p> <p>The easement documents must acknowledge the maintenance, repair and replacement responsibilities of the owner of this development site.</p> <p>Note: All easements are to be shown on plans submitted as part of operational works applications.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).</p>
29	New Council Roads
<p>A Submit and have approved by Council, a development application for operational works for the following:</p> <p>1. All new roads and associated works. The following classifications are to be applied:</p> <ul style="list-style-type: none"> • Road 1 - 16.5m wide Access Residential (1.2x10⁵ DESA) • Road 2 - 15.0m wide Modified Access Residential (1.2x10⁵ DESA) 	<p>Prior to commencement of works associated with this condition.</p>

CONDITION	TIMING
RECONFIGURING A LOT	
<p>2. Frontage works on Callaghan Road are to be in accordance with the associated Infrastructure Agreement.</p> <p>Design drawings are to be prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ) and in accordance with the approved plans and documents of development and the MBRC Planning Scheme current at the time of the operational works application.</p>	
<p>B Construct, at no cost to Council and in accordance with the approved plans and documents of development the following:</p> <ol style="list-style-type: none"> 1. All new roads and associated works 2. All frontage roads and associated works 3. All external roads and associated works. <p>This condition has been imposed under section 145 of the <i>Planning Act 2016</i>.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).</p>
<p>30 Pathways</p>	
<p>Construct, at no cost to Council reinforced concrete pathways in accordance with the approved pathway hierarchy plan.</p> <p>This condition has been imposed under section 145 of the <i>Planning Act 2016</i>.</p>	<p>Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).</p>
<p>31 Construction Management Plan</p>	
<p>A Submit and have approved by Council, a Construction Management Plan (CMP) prepared by the Principal Contractor. The CMP is to outline, in sufficient detail, the processes that will be employed to minimise impacts on the surrounding community during construction. These processes are to cover the following:</p> <ol style="list-style-type: none"> 1. Material delivery and storage locations 2. Waste locations and collection details 3. Construction office accommodation 4. Contractor / tradesman vehicle parking arrangements 5. Works that may make audible noise outside of 6:30am to 6:30pm any business day or Saturday. <p>The CMP may include a site layout drawing identifying these areas.</p> <p>The CMP needs to reflect any staging requirements.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Dewatering directly into Council's stormwater system (pipes or overland flow) without appropriate water quality treatment / improvement is not acceptable 2. Traffic control measures may need to be put in place for the duration of the construction works to control 	<p>Not less than two (2) weeks prior to commencement of works. To be maintained current at all times.</p>

CONDITION	TIMING	
RECONFIGURING A LOT		
	<p>contractor / tradesman vehicle parking arrangements, this should be documented within the CMP</p> <ol style="list-style-type: none"> 3. Materials unloading and loading must occur on-site unless prior written approval is given by Council. 4. All construction office accommodation and associated temporary buildings is to be contained within the site or on a nearby site. 	
B	<p>Implement the approved Construction Management Plan (CMP) and keep a copy of the approved CMP on site at all times during construction.</p>	At all times during construction of the development.
32	Earth Retaining Structures	
A	<p>Design all earth retaining structures within private land in accordance with Australian Standards, Building Code requirements and MBRC Planning scheme current the time of the operational works application and the following:</p> <ol style="list-style-type: none"> 1. The minimum design life (the period assumed in design for which a structure or structural element is required to perform its intended purpose without replacement or major structural repairs) for the earth retaining structure that is specified in Table 3.1 of Australian Standard AS4678; 2. Earth retaining structures within the land and around areas of cut on or near the boundaries of the site must be designed to allow for live and dead loads associated with the land/premise's current occupancy use; 3. Provide temporary safety fencing to all earth retaining structures over 1.0m in height. 4. Any retaining wall located along the Callaghan Road frontage a limited to a maximum height of 1.5m. 	Prior to commencement of works associated with this condition.
B	<p>Submit and have approved by Council, a development application for operational works for all earth retaining structures.</p> <p>Design drawing are to be prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ) and in accordance with the approved plans and documents of development and the MBRC Planning Scheme current at the time of the operational works application and they are to clearly show the location and overall configuration (fully dimensioned), design parameters and loads, materials and finishes of all earth retaining structures for the development.</p>	Prior to commencement of works associated with this condition.
C	<p>Construct all earth retaining structures within private land in accordance with Australian Standards, Building Code requirements and approved plans and documents of development.</p>	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).

CONDITION		TIMING
RECONFIGURING A LOT		
33	Existing Dams	
A	<p>Drain, desilt, remove embankments of existing dams and fill the dam to reinstate the ground levels generally as they existed prior to the dam being constructed and in accordance with the plans and documents of development.</p> <p>The dam area is to be made free draining and stabilized to prevent erosion. Any filling required to ensure the area is free draining is to be carried out in accordance with Level 1 supervision as detailed in AS3798.</p> <p>This condition has been imposed under section 145 of the <i>Planning Act 2016</i>.</p>	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
B	Provide certification from a suitable geotechnical testing authority that filling has been conducted in accordance with AS3798.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
34	Driveway Crossover	
	<p>Construct a driveway crossover to proposed Lots 208 and 207 in accordance with the approved plans and documents of development and MBRC Standard Drawing/s RS-049 & RS050.</p> <p>The width of the driveway crossover is to be a maximum of 40% of the frontage where the access is being obtain from, or 4.8m whichever is the lesser.</p>	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
35	Site Access Prohibited	
	<p>Ensure vehicular access directly from Callaghan Road to Lots 201 to 208 is prohibited for traffic management and safety reasons.</p> <p>Note: A property condition will be attached to the affected lots to advise land owners of this restriction.</p>	To be maintained at all times.
36	Minimum Flood Planning Level	
A	<p>Submit and have approved by Council, a development application for operational works for earthworks associated with pad / allotment fill to the Council adopted Flood Planning Level (FPL).</p> <p>Design drawing are to be prepared and certified by a suitably qualified Registered Professional Engineer Queensland (RPEQ) and in accordance with the approved plans and documents of development and the MBRC Planning Scheme current at the time of the operational works application.</p> <p>The FPL used for development can be obtained from the relevant section of the Flood Check Development Report available via Council's website: www.moretonbay.qld.gov.au.</p>	Prior to commencement of works associated with this condition.

CONDITION		TIMING
RECONFIGURING A LOT		
B	Construct the pad / allotment levels, at no cost to Council and in accordance with the approved plans and documents of development.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
C	Submit to Council As-Constructed drawings prepared by a Registered Surveyor, certifying that the development has been constructed in accordance this condition.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).
37	Existing Driveway Crossover	
	Remove completely all redundant driveway crossovers fronting the development site on Callaghan Road.	Prior to submitting to the Council any request for approval of a plan of subdivision (i.e. a survey plan).

ADVICES	
1	Aboriginal Cultural Heritage Act 2003
	<p>The <i>Aboriginal Cultural Heritage Act 2003</i> commenced in Queensland on April 16, 2004. The Act provides blanket protection of Aboriginal cultural heritage sites and places, including significant areas and objects, as well as archaeological remains. The Act also recognises that Aboriginal cultural heritage parties are key stakeholders in the assessment and management of Aboriginal cultural heritage.</p> <p>Under the Act, if a proposed activity involves disturbance of the ground surface, cultural heritage Duty of Care must be considered. This involves consideration of whether an activity is <i>likely</i> to harm Aboriginal cultural heritage. This may require involvement from the relevant Aboriginal cultural heritage party.</p> <p>Cultural heritage Duty of Care compliance ultimately lies with the person or entity conducting the activity, and penalty provisions apply for failing to fulfil this Duty of Care.</p> <p>Council strongly advises that before undertaking the land use activity, you refer to the <u>cultural heritage duty of care - Department of Aboriginal and Torres Strait Islander Partnerships (Queensland Government)</u> for further information regarding the responsibilities of the developer.</p>

PROPERTY NOTES	
1	DS01 Siting Requirements
	<p>The following property note will be attached to Council's database for all Lots:</p> <p><i>"A plan has been approved by Council for this lot identifying how and/or where development on this lot is to occur. Any development on this lot must be in accordance with the approved plan and associated conditions.</i></p> <p><i>Further details can be found in the development permit creating the lot or the development approval for the use, and the associated Council report (Delegated or</i></p>

	<i>Council Meeting) or approval letter. This information is available through the PD Online facility on Council's website www.moretonbay.qld.gov.au."</i>
2	DS07 Additional Development Requirements
	<p>The following property note will be attached to Council's database for All Lots:</p> <p><i>"Additional development requirements apply to this lot. Any development on this lot must be in accordance with the approved plan and associated conditions.</i></p> <p><i>Further details can be found in the development permit creating the lot or the development approval for the use, and the associated Council report (Delegated or Council Meeting) or approval letter. This information is available through the PD Online facility on Council's website www.moretonbay.qld.gov.au."</i></p>
3	Acoustic Advice
	<p>The following property note will be attached to Council's database for Lots 201-232:</p> <p><i>"It is required that any residential development on this lot be designed and constructed in accordance with the relevant acoustic design and construction standards, or the specific requirements approved in any acoustic report.</i></p> <p><i>Further details can be found in the development permit creating the lot or the development approval for the use, and the associated Council report (Delegated or Council Meeting) or approval letter. This information is available through the PD Online facility on Council's website www.moretonbay.qld.gov.au."</i></p>
4	DS05 Site Access Prohibited
	<p>The following property note will be attached to Council's database for Lots 201-208</p> <p><i>"Vehicular access to these lots directly from Callaghan Road is prohibited for traffic management and safety reasons.</i></p> <p><i>Further details can be found in the development permit creating the lot or the development approval for the use, and the associated Council report (Delegated or Council Meeting) or approval letter. This information is available through the PD Online facility on Council's website www.moretonbay.qld.gov.au."</i></p>

ATTACHMENT 3

Approved Plans / Documents



LEGEND

Site Boundary	
Local Park	
Road Resumption	
Proposed EMT	

YIELD SUMMARY

MBRC Lot Type	Lot Frontage	No. of Lots	%
Type A	7.5m	0	0.0%
Type B	>7.5m-10m	0	0.0%
Type C	>10m-12.5m	19	59.4%
Type D	>12.5m-18m	12	37.5%
Type E	>18.0m-32.0m	1	3.1%
Type F	32.0m+	0	0.0%
Total		32	100%

CLIENT
Orchard Property Group

PROJECT
Plan of Subdivision

275 Callaghan Road,
Narangba

Lot 2 on RP907550

AMENDMENTS:	DATE:
A Original	04.08.2021
B Amend Driveway	12.08.2021
C Re-orientate lots 19-22	08.09.2021
D Renummer	20.10.2021
E	
F	
G	
H	

DESIGNED: KS	DATE: 20.10.2021
DRAWN: KS	DATE: 20.10.2021
SCALE: 1:1,000 @ A3	1 of 1

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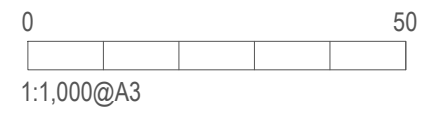
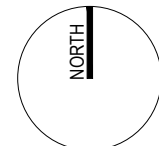
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DRAWING NUMBER:
18-0147-PS1

ISSUE:
D

24/12/2021





LEGEND

Site Boundary	
Local Park	
Road Resumption	
Proposed EMT	

LEGEND - Setbacks

Lots with a frontage 12.5m or less	
Mandatory Built to Boundary Wall (BTB)	
Mandatory Driveway Location	

CLIENT
Orchard Property Group

PROJECT
Plan of Development

275 Callaghan Road,
Narangba

Lot 2 on RP907550

AMENDMENTS:	DATE:
A Original	05.08.2021
B Amend Driveway + B2BW lot 9	12.08.2021
C Re-orientate lots 19-22	08.09.2021
D Renumber	20.10.2021

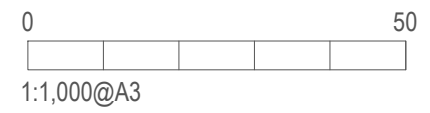
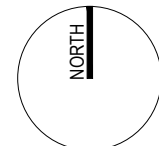
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LEGEND

Site Boundary	
Local Park	
Road Resumption	
Proposed EMT	
Pathway 1.5m	

CLIENT
Orchard Property Group

PROJECT
Pathway Hierarchy Plan

275 Callaghan Road,
Narangba

Lot 2 on RP907550

AMENDMENTS:	DATE:
A Original	05.08.2021
B Amend Driveway	12.08.2021
C Re-orientate lots 19-22	08.09.2021
D Renummer	20.10.2021
E	
F	
G	
H	

DESIGNED: KS	DATE: 20.10.2021
DRAWN: KS	DATE: 20.10.2021
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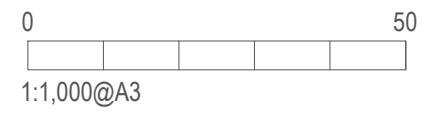
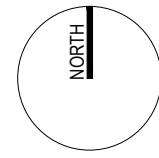
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Noise Impact Assessment

Reconfiguring of Lot (RoL) Application 275 Callaghan Road, Narangba

Orchard (Narangba) Developments Pty Ltd


Project No.: ATP180519

Project Name: 275 Callaghan Road

Document No.: ATP180519-R-NIA-03

July 2021

Document Control Record

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Signed:	
Date:	22 July 2021

Approved by:	Sasho Temelkoski RPEQ 13551
Position:	Managing Director
Signed:	
Date:	22 July 2021

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1	Issue 2	13 February 2019	Sasho Temelkoski
2	Issue 3	22 July 2021	Sasho Temelkoski

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Executive Summary

ATP Consulting Engineers (ATP) was engaged by Orchard (Narangba) Developments Pty Ltd to prepare an acoustic assessment (road and railway noise assessment) for the proposed residential development at 275 Callaghan Road in Narangba.

This report addresses the potential noise impacts on the proposed residential development from the road traffic on Callaghan Road and Burpengary Road as well as from the North Coast Rail Line railway corridor. This report is in support of a Reconfiguring of Lot (RoL) application for the residential development over Lot 2 on RP907550.

Issue 2 of this report was prepared in response to amendments to the development plan to avoid development on the flood affected area.

This is Issue 3 of this report in response to a modified development layout and based on the Council's requirement to re-calculate the predicted noise levels within a 10-year planning horizon for year 2032.

Based on the results of the noise impact assessment, the proposed residential Lots 1 to 32 are affected by minor levels of road traffic noise and moderate levels of railway noise. To protect the noise amenity at the proposed development it is recommended to construct a 1.8m high noise barrier along the western boundary of Lots 13, 14 and 15 and along the southern boundary of Lot 15, as per alignment presented in Figure 5.1 of this report.

The traffic and railway noise impacts have been evaluated to determine whether acoustic treatment is required to the future dwellings at Lots 1 to 32. Architectural treatment (acoustic design) to the building facades will be required at building approval stage to protect the internal noise amenity.

There are two options available for architectural treatment to the building facades, as follows:

- Option 1: Implementation of the 'acceptable forms of construction' specified in Queensland Development Code (QDC) Mandatory Part 4.4 (Buildings in a Transport Noise Corridor). The dwellings should be built to the Noise Categories specified in Table 5.1.
- Option 2: Floor plan specific acoustic design in accordance with AS3671-1989 to ensure compliance with the internal noise criteria in the habitable rooms.

Provided that the future dwellings to be constructed on the noise affected allotments are designed and constructed as per the requirements of QDC MP4.4, or based on floor plan specific acoustic design, the habitable rooms of the future dwellings will be protected from transport noise.

The road traffic and railway noise levels at the private open spaces complies with the relevant outdoor noise criteria. Therefore, no additional noise mitigation measures are required for the protection of the private open spaces at Lots 1 to 32.

Provided that the recommendations of this report are fully implemented in the detailed design and construction, the road traffic and railway noise emissions, within a 10-year planning horizon to year 2032, will not impose any further constraints on the establishment of the proposed development at 275 Callaghan Road in Narangba.

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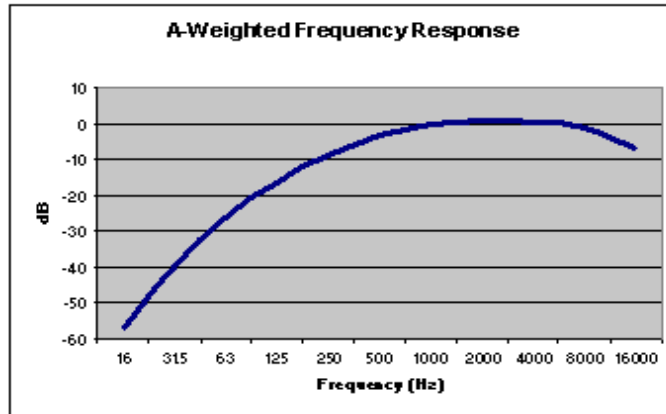
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- Appendix B – Site Photos
- Appendix C – Meteorological Data
- Appendix D – Noise Measurement Results
- Appendix E – Validation of CoRTN Traffic Noise Model
- Appendix F – Tabulated Traffic Noise Levels
- Appendix G – Traffic Noise Contours
- Appendix H – Validation of Nord 2000 Railway Noise Model
- Appendix I – Tabulated Railway Noise Levels
- Appendix J – Railway Noise Contours

Acoustics Glossary

A-weighting The A-weighting filter suppresses low frequency sounds and some of the higher frequency sounds to which the human ear is less sensitive. It is a correction to sound pressure levels to mimic the response of the human ear at low sound pressure levels. The A-weighted sound pressure level correlates well with the perceived loudness at low sound levels. The A-weighted sound pressure level is used extensively for general purpose noise measurements.



AADT Annual average daily traffic. The total traffic flow over a 24-hour period along a specific segment of road.

Broadband sound Sound distributed across the whole audible frequency range.

dB(A) The A-weighted sound pressure level.

Façade adjusted The noise level at 1m from a building façade is calculated by adding 2.5dB to the free-field noise level to account for sound reflected from the building façade. The external noise levels at the buildings façades are "façade-adjusted".

Fast time-weighting The Fast ("F") time-weighting is defined in AS 1259.1-1990. Instruments with F time weighting use a time constant of 125 milliseconds in their exponential averaging circuit.

Free-field Noise level without any reflected sound from buildings or other hard, reflective surfaces (except for the ground plane).

Hz (Hertz) Hertz is the standard measure of the frequency of oscillations in a wave motion. The frequency is most often measured in cycles per second (cps) or Hertz (Hz). Frequency of 1 Hz is one cycle per second.

Impulsive noise and impulsiveness adjustment Noise having a high peak of short duration or a sequence of such peaks. Impulsive noise is present if the difference in A-weighted maximum noise levels between fast response and impulse response is greater than 2dB. Impulsiveness adjustment (penalty) of up to 5dB should be applied to the component noise level.

$L_{Aeq,T}$ "Average-energy" sound level used in situations where sound varies over time. $L_{Aeq,T}$ is the A-weighted sound pressure level that has the same energy as the fluctuating sound over the time period T sec.

$L_{A01,T}$ Measure of the maximum sound level. $L_{A01,T}$ is a statistical parameter that is the A-weighted sound pressure level that is exceeded for 1% of the measurement time T.

L_{A10,T}	L _{A10,T} is a statistical parameter that is the A-weighted sound pressure level that is exceeded for 10% of the measurement time T. Used as a traffic noise descriptor in Queensland.
L_{A10,18hr}	The arithmetic average of the 18 individual L _{A10,1hr} values between 6:00am and 12:00am (midnight). It is a derived descriptor which is used as a main traffic noise descriptor in the Calculation of Road Traffic Noise (CoRTN) procedure developed by the UK Department of Environment, Welsh Office, HMSO, 1988.
L_{A90,T}	Background sound level. L _{A90,T} is a statistical parameter that is the A-weighted sound pressure level that is exceeded for 90% of the measurement time T.
Noise	Unwanted sound.
Octave bands and 1/3 octave bands	<p>A range of frequencies whose upper frequency limit is twice that of its lower frequency limit. In acoustics, the audible spectrum (20Hz to 20kHz) is divided into 10 parts (octaves) with centre frequencies of 31.5Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.</p> <p>For more detailed frequency analysis, octave bands are further divided into more discrete bands. For examples, 1/3 octaves bands are where each octave band is divided into three parts.</p> <p>IEC 61260:1995, <i>Electroacoustics — Octave-band and fractional-octave band filters</i></p>
Rating background level (RBL)	The overall single-figure background level representing each assessment period (e.g. standard hours, non-standard hours). The RBL is the background noise level for each work period using the tenth percentile method of measured L _{A90,15-minute} .
Sound power	The sound energy radiated per unit time by a sound source in all directions, measured in Watts (W).
Sound Power Level, L_w (SWL)	The sound power level in decibels (dB) is 10 times the base 10 logarithm of the ratio of the sound power in W to the reference sound power of 1 x 10 ⁻¹² W (hearing threshold).
Sound pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals (Pa).
Sound Pressure Level, L_p (SPL)	The sound power level in decibels (dB) is 20 times the base 10 logarithm of the ratio of the sound pressure in Pa to the reference sound pressure of 2 x 10 ⁻⁵ Pa (hearing threshold).
Tonal noise, tonality and tonality adjustment	Tonal noise is characterised by one or more distinct frequency components (“tones”) that emerge audibly from the total sound. In accordance with the <i>NSW EPA Noise Policy For Industry (2017)</i> , tonal noise is assessed with one-third octave band analysis using the “objective method for assessing the audibility of tones in noise – simplified method” (ISO 1996.2:2007 – Annex D). Tonal noise is penalised by the addition of up to 5dB to the component noise level.
Weighted Sound Reduction Index (R_w)	A single-number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies.

1. Introduction

1.1 Project Background

ATP Consulting Engineers (ATP) was engaged by Orchard (Narangba) Developments Pty Ltd to prepare an acoustic assessment (road and railway noise assessment) for the proposed residential development at 275 Callaghan Road in Narangba.

This report addresses the potential noise impacts on the proposed residential development from road traffic on Callaghan Road and Burpengary Road as well as from the North Coast Rail Line railway corridor. This report is in support of a Reconfiguring of Lot (RoL) application for the residential development over Lot 2 on RP907550.

Issue 2 of this report was prepared in response to amendments to the development plan to avoid development on the flood affected area.

This is Issue 3 of this report in response to a modified development layout and based on the Council's requirement to re-calculate the predicted noise levels within a 10-year planning horizon to year 2032.

1.2 Study Objectives

Study objectives are as follows:

Traffic Noise Impact Assessment

- Monitoring of the traffic noise levels at the site over a 7-day period.
- Development of a 3D traffic noise propagation model using SoundPLAN software applying the CoRTN procedure for calculating road traffic noise.
- Calculation of the traffic noise levels ($L_{10,18hr}$), within a 10-year planning horizon (year 2032), at the facades and private open spaces of the proposed dwellings to be established at the development.
- Assessment of the traffic noise levels against the relevant criteria specified in the *Planning Scheme Policy – Noise* from the Moreton Bay Regional Council.

Railway Noise Impact Assessment

- Monitoring of the railway noise levels at the site over a 7-day period.
- Based on the noise monitoring results, determine the single event maximum (SEM) L_{max} and $L_{eq,24hr}$ railway noise levels for the purposes of validating the railway noise calculation model.
- Development of a 3D railway noise propagation model using SoundPLAN software applying the Nord 2000 prediction method for railway noise.
- Calculation of the railway noise levels at the façades and private open spaces of the proposed dwellings.

- Assessment of the railway noise levels against the relevant criteria from the SDAP State Code 2.

Based on the results of the road traffic and the railway noise assessments, this report will recommend construction requirements for the future dwellings (Noise Categories from QDC MP4.4).

1.3 Description of Development

The development site in Narangba is a reconfiguration of Lot 2 on RP907550, within the Moreton Bay Regional Council local government area. The proposed subdivision will yield 32 allotments. The total area of the site is 20,000m².

The location of the development is presented in Figure 1.1.



Figure 1.1 Site Location

2. Existing Noise Amenity

2.1 Noise Measurement Locations

Noise measurements were carried out at the subject site to obtain information about the existing traffic and railway noise levels.

Seven (7) days of noise monitoring has been carried out at two locations at the development site:

- **Location 1** – Representation of the noise levels from Burpengary Road and in close proximity to North Coast Line.
- **Location 2** – Representation of the noise levels from Callaghan and Burpengary Roads and at distance from North Coast Line.
- **Locations 2 & 3** – Attended noise measurements to verify the noise logger measurements and to obtain further information about the noise levels adjacent to the railway line.
- **Location 4** – Representation of the noise levels at 275 Callaghan Road to gather site specific measurements from Callaghan and Burpengary Roads and at distance from North Coast Line.

Location 1 and Location 2 noise measurements were carried out between 3 and 11 May 2018 using noise loggers to record traffic and railway noise continuously 24 hours a day.

Location 4 measurements were carried out between 26 May and 1 June 2018 using a noise logger to record traffic and railway noise continuously 24 hours a day.

The noise measurement locations (noise logging and attended noise measurements) are presented in Figure 2.1 and site photos are presented in Appendix B.



Figure 2.1 Noise Measurement Location

2.2 Instruments Used

The noise measurements were carried out using the following instruments:

- Environmental Noise Logger – ARL Ngara (serial no. 87811D and 8780d4);
- Sound Level Meter – 2 x SVAN 977 & 1 x SVAN 949 (serial no. 45740, 45785 and 9704); and
- Sound Level Calibrator – NC 74.

The noise measurement instruments conform to ASIEC61672.1-2004 and the measurements were undertaken in accordance with AS1055-1997 and AS2702-1984. A calibration drift of <0.1 dB(A) was observed between the pre and post measurement calibrations of the instrument.

2.3 Meteorological Conditions

The rainfall data¹ for the noise measurement period is presented in Appendix C. Rainfall has occurred on 8, 28 and 29 May 2018. Noise data recorded during periods of rainfall has been excluded from the assessment.

2.4 Noise Measurement Results

2.4.1 Traffic Noise Measurements

The results of the noise measurements at Location 1 are presented in Table 2.1 and in Appendix D.

Table 2.1 Noise Measurement Results – Location 1

Date	Traffic noise levels		Background noise levels	
	L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
3 May 2018 (Thu)	-	64	-	36
4 May 2018 (Fri)	61	64	46	35
5 May 2018 (Sat)	60	63	46	39
6 May 2018 (Sun)	59	63	44	37
7 May 2018 (Mon)	58	62	44	39
8 May 2018 (Tue)	62	65	46	37
9 May 2018 (Wed)	62	65	45	37
10 May 2018 (Thu)	61	65	47	33
Arithmetic Mean	61	64	46	36
Weekdays Only	61	64	46	36

The measurements at Location 2 have been impacted by background noise from construction activities at the Amity development to the east. These extraneous noise sources were removed from the measurement results. The adjusted results of the noise measurements at Location 2 are presented in Table 2.2 and Appendix D.

Table 2.2 Noise Measurement Results – Location 2

Date	Traffic noise levels		Background noise levels	
	L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
3 May 2018 (Thu)	-	60	-	31
4 May 2018 (Fri)	50	55	40	30

¹ Observation from Bureau of Meteorology Redcliffe station (station ID 040958)

Date	Traffic noise levels		Background noise levels	
	L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
5 May 2018 (Sat)	47	52	39	30
6 May 2018 (Sun)	47	52	38	30
7 May 2018 (Mon)	46	49	38	34
8 May 2018 (Tue)	50	55	42	33
9 May 2018 (Wed)	52	58	42	32
10 May 2018 (Thu)	53	60	43	27
Arithmetic Mean	49	55	40	31
Weekdays Only	50	56	41	31

The measurements at Location 4 have been impacted by background noise from construction activities at the Amity development to the east. These extraneous noise sources were removed from the measurement results. The adjusted results of the noise measurements at Location 4 are presented in Table 2.3 and Appendix D.

Table 2.3 Noise Measurement Results – Location 4

Date	Traffic noise levels		Background noise levels	
	L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
26 May 2018 (Sat)	-	52	-	29
27 May 2018 (Sun)	49	54	38	30
28 May 2018 (Mon)	50	55	40	37
29 May 2018 (Tue)	51	56	40	31
30 May 2018 (Wed)	52	56	40	25
31 May 2018 (Thu)	53	57	40	29
Arithmetic Mean	51	55	39	30
Weekdays Only	52	56	40	27

2.4.2 Attended Railway Noise Measurements

Attended railway noise measurements were taken on 3 May 2018 (Thursday) and 11 May 2018 (Friday) to determine L_{max} noise levels associated with different train variants. The results of the attended railway noise measurements are presented in Table 2.4.

Table 2.4 Railway Noise Measurements – Attended Measurements

Date	Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)		
			Location 1	Location 2	Location 3
3/05/2018	10:46 AM	Passenger	77.9	-	86.4
3/05/2018	10:48 AM	Passenger	77.8	-	83.7
3/05/2018	11:12 AM	Freight	78.6	-	84.7
3/05/2018	11:16 AM	Passenger	82.4	-	90.3
3/05/2018	11:18 AM	Passenger	77.7	-	84.1
3/05/2018	11:37 AM	Passenger	77.5	-	83.3
3/05/2018	11:46 AM	Passenger	76.9	65.5	86.2
3/05/2018	11:50 AM	Passenger	77.3	65.5	88.1
3/05/2018	11:58 AM	Passenger	79.8	66.0	85.2
3/05/2018	12:16 PM	Passenger	75.5	65.3	83.0
3/05/2018	12:17 PM	Passenger	79.4	66.5	84.9
11/05/2018	9:50 AM	Passenger	83.4	72.2	89.6
11/05/2018	10:07 AM	Passenger	78.7	70.1	86.0
11/05/2018	10:14 AM	Passenger	81.3	70.4	89.0
11/05/2018	10:16 AM	Passenger	77.2	67.2	85.9
Average			79	68	86

All measurements are free-field

2.4.3 Unattended Railway Noise Measurements

Full 24 hours of noise data has been analysed in detail to determine the L_{max} (SEM) and L_{eq,24hr} railway noise levels at the proposed development site.

The period considered was 12:00am midnight on 4 May 2018 (Friday) to 12:00am midnight on 5 May 2018 (Saturday) for Location 1 and 2. Location 4 comprises of the period from 12:00am midnight on 31 May 2018 (Thursday) to 12:00am midnight on 1 June 2018 (Friday).

Noise levels were measured simultaneously at Location 1 and 2, and additional measurements were taken at Location 4. The A-weighted sound pressure levels recorded at Location 1, 2 and 4 are presented in Appendix D.

The individual train pass-by noise levels and the Single Event Maximum (SEM) noise level is presented below. The L_{Aeq,24hr} noise level was calculated by integrating the noise levels for all train pass-bys over a 24 hour period. The results are presented in Table 2.5 and Table 2.6.

Table 2.5 Single Event Maximum (SEM) and L_{eq,24hr} – Location 1 & 2

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)	
		Location 1	Location 2
12:15 AM	Passenger	78.8	66.7
12:29 AM	Passenger	72.0	60.5
1:05 AM	Freight	82.9	71.2
1:41 AM	Freight	89.7	76.1

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)	
		Location 1	Location 2
1:47 AM	Freight	72.6	64.6
2:52 AM	Passenger	73.3	63.5
2:56 AM	Freight	75.2	66.4
3:18 AM	Freight	76.6	65.1
4:05 AM	Freight	81.8	68.9
4:16 AM	Passenger	78.9	65.7
4:24 AM	Passenger	76.0	63.1
4:46 AM	Passenger	73.9	61.5
5:15 AM	Passenger	80.7	68.8
5:16 AM	Passenger	75.0	63.5
5:39 AM	Passenger	75.3	63.4
5:46 AM	Passenger	81.4	71.7
5:58 AM	Passenger	82.9	69.4
6:08 AM	Passenger	72.8	61.9
6:16 AM	Passenger	77.7	66.3
6:16 AM	Passenger	80.8	66.0
6:34 AM	Passenger	75.8	65.5
6:45 AM	Passenger	82.7	78.2
6:48 AM	Passenger	82.0	69.5
6:58 AM	Passenger	77.7	66.6
7:03 AM	Freight	76.8	67.3
7:10 AM	Passenger	80.9	69.9
7:16 AM	Passenger	79.4	67.2
7:28 AM	Passenger	75.2	64.1
7:33 AM	Passenger	79.4	70.8
7:40 AM	Passenger	76.5	65.9
7:46 AM	Passenger	74.8	65.0
7:47 AM	Passenger	78.5	66.2
8:07 AM	Passenger	81.0	70.0
8:16 AM	Passenger	75.2	65.9
8:17 AM	Passenger	78.5	66.5
8:22 AM	Freight	76.6	64.3
8:31 AM	Passenger	76.2	68.3
8:47 AM	Passenger	77.0	63.9
8:59 AM	Freight	78.0	68.4
9:15 AM	Passenger	76.7	66.5
9:19 AM	Passenger	70.4	60.9
9:46 AM	Passenger	74.5	65.1
9:47 AM	Passenger	76.4	64.4
10:10 AM	Passenger	79.5	67.2
10:15 AM	Passenger	76.9	66.3

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)	
		Location 1	Location 2
10:16 AM	Passenger	82.3	68.6
10:28 AM	Freight	77.8	67.5
10:41 AM	Freight	83.5	70.1
10:45 AM	Passenger	78.3	64.8
10:46 AM	Passenger	81.5	72.5
11:12 AM	Freight	78.2	67.1
11:15 AM	Passenger	75.9	64.7
11:16 AM	Passenger	79.8	67.8
11:34 AM	Passenger	75.1	63.3
11:45 AM	Passenger	74.7	66.4
11:45 AM	Passenger	74.0	65.9
12:15 PM	Passenger	77.6	66.3
12:19 PM	Passenger	76.0	64.1
12:46 PM	Passenger	79.8	68.2
12:53 PM	Passenger	76.6	65.0
1:46 PM	Passenger	78.6	59.0
2:11 PM	Passenger	75.9	66.7
2:16 PM	Passenger	75.4	59.2
2:17 PM	Passenger	81.0	68.4
2:45 PM	Passenger	76.3	62.3
2:45 PM	Passenger	73.3	65.1
3:16 PM	Passenger	80.8	64.1
3:16 PM	Passenger	76.2	57.8
3:46 PM	Passenger	75.3	65.3
3:47 PM	Passenger	76.1	63.3
3:52 PM	Passenger	76.1	62.0
4:00 PM	Passenger	76.3	65.6
4:11 PM	Passenger	75.8	64.8
4:13 PM	Passenger	77.9	67.6
4:17 PM	Passenger	75.3	64.4
4:20 PM	Passenger	77.4	67.0
4:30 PM	Passenger	79.7	68.1
4:41 PM	Passenger	75.6	65.1
4:46 PM	Passenger	74.5	64.7
4:55 PM	Passenger	78.1	64.3
5:01 PM	Passenger	78.1	64.9
5:06 PM	Passenger	75.9	63.5
5:18 PM	Passenger	81.0	69.2
5:24 PM	Passenger	75.2	63.0
5:30 PM	Passenger	78.6	65.5
5:33 PM	Freight	75.0	63.8

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)	
		Location 1	Location 2
5:47 PM	Passenger	76.3	63.4
5:47 PM	Passenger	74.5	64.4
5:50 PM	Passenger	74.7	63.1
6:01 PM	Passenger	81.0	67.9
6:07 PM	Passenger	78.3	66.0
6:14 PM	Passenger	78.9	65.8
6:15 PM	Passenger	76.6	64.4
6:35 PM	Passenger	76.2	64.1
6:35 PM	Passenger	79.8	68.0
6:43 PM	Passenger	78.5	66.6
6:45 PM	Passenger	79.3	68.1
7:01 PM	Passenger	84.2	68.0
7:16 PM	Passenger	80.1	67.0
7:45 PM	Passenger	76.3	65.8
7:50 PM	Passenger	78.6	65.7
7:58 PM	Passenger	83.2	71.0
8:02 PM	Passenger	71.2	59.1
8:10 PM	Freight	76.8	67.9
8:16 PM	Passenger	74.4	63.4
8:16 PM	Passenger	76.7	63.7
8:27 PM	Freight	74.7	66.0
8:45 PM	Passenger	77.6	65.7
8:46 PM	Passenger	74.4	60.6
9:07 PM	Freight	82.9	71.9
9:16 PM	Passenger	74.2	64.4
9:16 PM	Passenger	78.9	67.7
9:46 PM	Passenger	78.6	65.6
9:46 PM	Passenger	72.5	61.7
9:55 PM	Freight	83.0	73.0
10:16 PM	Passenger	78.2	63.9
10:18 PM	Passenger	73.2	63.0
10:45 PM	Passenger	75.4	62.5
10:46 PM	Passenger	78.7	66.6
11:15 PM	Passenger	75.6	63.7
11:29 PM	Passenger	81.0	68.9
11:45 PM	Passenger	76.0	63.4
11:46 PM	Passenger	79.3	66.3
11:54 PM	Freight	80.1	68.4
11:59 PM	Passenger	78.3	70.5
Single Event Maximum (SEM), dB(A) (Average of the 15 loudest trains)		83 dB(A)	72 dB(A)

Time of train pass-by	Type of train	Railway noise level, L_{max} dB(A)	
		Location 1	Location 2
Total number of seconds of train pass-by in 24hr period		5465	5465
$L_{eq,T}$ train pass-by (T = 5465 sec, trains only and no gaps)		70 dB(A)	60 dB(A)
$L_{eq,24hr}$ train pass-by (T = 24hr)		58 dB(A)	48 dB(A)

Table 2.6 Single Event Maximum (SEM) and $L_{eq,24hr}$ – Location 4

Time of train pass-by	Type of train	Railway noise level, L_{max} dB(A)
		Location 4
12:16 AM	Commuter	68.7
1:02 AM	Freight	68.9
1:10 AM	Freight	67.8
3:09 AM	Freight	68.0
3:16 AM	Freight	68.3
4:16 AM	Commuter	65.7
4:24 AM	Commuter	67.4
4:42 AM	Freight	69.9
4:47 AM	Commuter	64.0
5:16 AM	Commuter	68.7
5:17 AM	Commuter	72.6
5:41 AM	Commuter	64.8
5:45 AM	Commuter	68.6
5:59 AM	Commuter	66.6
6:08 AM	Commuter	67.8
6:16 AM	Commuter	67.7
6:18 AM	Commuter	65.3
6:34 AM	Commuter	66.0
6:46 AM	Commuter	67.8
6:48 AM	Commuter	71.8
6:59 AM	Commuter	72.6
7:03 AM	Commuter	69.5
7:10 AM	Commuter	72.0
7:15 AM	Commuter	68.3
7:17 AM	Commuter	72.2
7:23 AM	Commuter	64.0
7:28 AM	Commuter	67.1
7:34 AM	Commuter	72.8
7:40 AM	Commuter	71.6
7:46 AM	Commuter	66.3
7:47 AM	Commuter	71.0
7:58 AM	Commuter	68.4

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)
		Location 4
8:14 AM	Commuter	74.2
8:16 AM	Commuter	67.7
8:20 AM	Commuter	75.7
8:31 AM	Commuter	68.8
8:47 AM	Commuter	67.6
8:48 AM	Commuter	72.2
8:52 AM	Commuter	65.3
9:02 AM	Commuter	68.9
9:17 AM	Commuter	71.0
9:19 AM	Commuter	68.3
9:35 AM	Freight	64.2
9:46 AM	Commuter	72.5
9:51 AM	Freight	66.3
10:10 AM	Commuter	69.7
10:17 AM	Commuter	70.0
10:18 AM	Commuter	68.9
10:46 AM	Commuter	69.4
10:48 AM	Commuter	70.8
10:56 AM	Commuter	67.8
11:17 AM	Commuter	64.3
11:18 AM	Commuter	75.4
11:25 AM	Freight	72.6
11:36 AM	Commuter	69.6
11:49 AM	Commuter	68.6
11:51 AM	Commuter	74.5
11:55 AM	Commuter	67.5
12:15 PM	Commuter	71.5
12:17 PM	Commuter	75.0
12:45 PM	Commuter	69.0
12:46 PM	Commuter	76.0
1:15 PM	Commuter	65.3
1:17 PM	Commuter	73.6
1:47 PM	Commuter	72.4
1:47 PM	Commuter	72.6
2:07 PM	Commuter	69.0
2:16 PM	Commuter	70.7
2:17 PM	Commuter	69.9
2:45 PM	Commuter	67.0
2:46 PM	Commuter	68.8
3:17 PM	Commuter	67.8
3:18 PM	Commuter	68.6

Time of train pass-by	Type of train	Railway noise level, L _{max} dB(A)
		Location 4
3:43 PM	Commuter	73.6
3:46 PM	Commuter	73.2
3:49 PM	Commuter	69.2
4:04 PM	Commuter	69.0
4:10 PM	Commuter	72.7
4:13 PM	Commuter	70.0
4:19 PM	Commuter	67.9
4:32 PM	Commuter	70.7
4:41 PM	Commuter	68.6
4:46 PM	Commuter	68.2
4:50 PM	Commuter	72.9
5:02 PM	Commuter	70.1
5:08 PM	Commuter	67.5
5:16 PM	Commuter	72.7
5:20 PM	Commuter	69.7
5:26 PM	Commuter	69.6
5:32 PM	Freight	72.4
5:36 PM	Commuter	73.2
5:43 PM	Commuter	71.2
5:49 PM	Commuter	69.2
5:50 PM	Commuter	70.6
6:03 PM	Commuter	72.4
6:08 PM	Commuter	67.3
6:14 PM	Commuter	69.5
6:16 PM	Commuter	71.0
6:18 PM	Commuter	65.5
6:27 PM	Freight	71.0
6:32 PM	Commuter	70.1
6:36 PM	Commuter	71.8
6:44 PM	Commuter	67.4
6:47 PM	Commuter	70.0
7:02 PM	Commuter	70.2
7:15 PM	Commuter	69.8
7:18 PM	Commuter	64.6
7:46 PM	Commuter	68.4
7:46 PM	Commuter	69.3
8:04 PM	Commuter	65.9
8:17 PM	Commuter	69.8
8:19 PM	Commuter	68.6
8:26 PM	Freight	68.8
8:45 PM	Commuter	70.6

Time of train pass-by	Type of train	Railway noise level, L_{max} dB(A)
		Location 4
8:46 PM	Commuter	63.3
8:54 PM	Freight	74.1
8:55 PM	Freight	67.6
9:15 PM	Commuter	69.8
9:17 PM	Commuter	69.0
9:28 PM	Freight	74.4
9:46 PM	Commuter	69.2
9:46 PM	Commuter	67.2
10:16 PM	Commuter	72.3
10:20 PM	Commuter	66.7
10:39 PM	Commuter	63.1
10:46 PM	Commuter	69.6
10:47 PM	Commuter	68.0
10:52 PM	Freight	72.4
11:15 PM	Commuter	69.7
11:16 PM	Commuter	66.7
11:21 PM	Freight	58.1
11:45 PM	Commuter	72.9
11:50 PM	Commuter	69.7
Single Event Maximum (SEM), dB(A) (Average of the 15 loudest trains)		74 dB(A)
Total number of seconds of train pass-by in 24hr period		5497
$L_{eq,T}$ train pass-by (T = 5465 sec, trains only and no gaps)		63 dB(A)
$L_{eq,24hr}$ train pass-by (T = 24hr)		51 dB(A)

3. Road Traffic Noise Impact Assessment

3.1 Road Traffic Noise Criteria

The proposed development is located adjacent to Burpengary Road and Callaghan Road. Under the Moreton Bay Planning Scheme, Burpengary Road is designated as an arterial road and Callaghan Road is designated as a sub-arterial road.

Traffic noise impacts on the proposed development need to be assessed in accordance with the *Planning Scheme Policy – Noise*.

The external traffic noise levels at the proposed development will be assessed using the following documents:

- Queensland Development Code (QDC) Mandatory Part 4.4 (*Buildings in a transport noise corridor*). The proposed dwellings must be built to comply with QDC MP4.4, which specifies the acoustic requirements for building construction based on the traffic noise levels predicted at the external facades. This assessment will identify the QDC MP4.4 noise category applicable to each dwelling at the proposed development.
- In addition, the assessment is to address the requirement for each dwelling to have a private open space that meets the criteria specified in the Department of Transport and Main Roads (TMR) *Development Affected by Environmental Emissions from Transport Policy, Version 4* (October 2017).

The applicable criteria from the QDC MP 4.4 and the TMR Policy are presented in Table 3.1.

Table 3.1 External Noise Criteria for New Residential Development

Development type	Location within Development	Environmental Criteria		
		Measurement	Range	Category
Residential	Building facades	L _{10,18hr} at 1m from the façade of the proposed building dB(A)	≥73	QDC MP4.4 Category 4
			68 - 72	QDC MP4.4 Category 3
			63 - 67	QDC MP4.4 Category 2
			58 - 62	QDC MP4.4 Category 1
	Private open spaces of accommodation activities ²	≤57dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and midnight ≤ 45dB(A))		
			≤60dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and midnight > 45dB(A))	

² "Accommodation activity" includes caretaker's accommodation, community residence, dual occupancy, dwelling house, dwelling unit, multiple dwelling, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, short-term accommodation and tourist park

The noise criteria for accommodation activities depends on the background noise levels at the development. The existing background noise levels between 6am and midnight are lower than 45dB(A) $L_{90,18hr}$. Therefore, the external noise criterion for private open spaces is:

- Private open spaces (free-field): $\leq 57\text{dB(A)} L_{10,18hr}$.

3.2 Queensland Development Code (QDC) MP4.4

Acoustic treatments to buildings are specified in *Mandatory Part 4.4 (Buildings in a Transport Noise Corridor)* of the *Queensland Development Code, 2015*. There are five road traffic noise categories and corresponding acceptable form of construction, as presented in Table 3.2.

Table 3.2 QDC MP4.4 Road Traffic Noise Categories

Noise Category	Level of transport noise* $L_{A10,18hr}$ for State-controlled and designated local government roads
Category 4	$\geq 73 \text{ dB(A)}$
Category 3	68 – 72 dB(A)
Category 2	63 – 67 dB(A)
Category 1	58 – 62 dB(A)
Category 0	$\leq 57 \text{ dB(A)}$

*Measured at 1m from building facade

QDC MP4.4 specifies acceptable forms of construction for the external walls, windows and roof/ceilings.

The noise categories applicable to the proposed development will be determined in this report.

As an alternative to the deemed-to-comply construction specifications from QDC MP4.4, the buildings can be constructed as per the advice of a qualified acoustical engineer. At building approval stage, detailed acoustic design specifications, in accordance with AS3671-1989, can be provided for the construction of the external walls, windows and roof/ceilings.

3.3 Traffic Noise Calculation Methodology

Traffic noise levels at the proposed development, within a planning horizon of 10 years (year 2032), were calculated using SoundPLAN noise propagation modelling software.

SoundPLAN calculates traffic noise as per the procedure specified in the UK Department of Transport Welsh Office *Method of Calculation of Road Traffic Noise (CoRTN)*. This traffic noise calculation procedure is widely adopted in Australia.

The assumptions and data used in development of the traffic noise propagation model are presented in Table 3.3.

Table 3.3 Data and Assumptions – Traffic Noise Model

Terrain	<ul style="list-style-type: none"> Department of Natural Resources and Mines Airborne Laser Scanning (LiDAR) 1 metre data was used to determine the elevation of the development relative to the surrounds. Ground surface absorption factor of 0 was applied to all paved surfaces and 1 for all grassed areas.
Buildings	<ul style="list-style-type: none"> The proposed dwellings were included in the model along with the existing neighbouring buildings.
Road Traffic	<ul style="list-style-type: none"> Traffic volumes for Callaghan Road and Burpengary Road were sourced from RMA Engineers Traffic Engineering Report (Rev 1) dated 25 May 2016. Future traffic volumes were calculated based on 5% annual traffic growth. Burpengary Road and Callaghan Road have one lane in the either direction as they pass the development site. Speed limit on Callaghan Road is 70 km/h. Speed limit on Burpengary Road is 80 km/h. Pavement surface type on Callaghan Road and Burpengary Road is dense graded asphalt. The CoRTN procedure requires traffic volume data input for 18 hours. Traffic volume for 18-hour period (6:00am to midnight) was considered as 94% of the 24 hour AADT.
Receivers	<ul style="list-style-type: none"> Building Facades: Receivers were attached to the facades of the proposed buildings. Receivers are placed at a height of 1.5m above each floor level. SoundPLAN adds +2.5dB(A) to the calculated noise levels when the receivers are attached to the buildings, thus the tabulated traffic noise levels are façade adjusted. Private Open Spaces: Receiver was placed at 1.5m above ground level at the private outdoor areas of each of the proposed dwellings. 5m grid spacing was used for calculation of the noise contour maps.
Noise Mitigation Measures	<ul style="list-style-type: none"> 1.8m High Noise Barrier Fence along the western boundary of Lots 13, 14 and 15 and along the southern boundary of Lot 15.

3.4 Road Traffic Data

Traffic flow data, as considered in the SoundPLAN model, is presented in Table 3.4.

Table 3.4 Traffic Flow Data

Road	Traffic Volumes			Heavy Vehicles (%)
	2016 AADT	2021 AADT	2032 AADT (10 year planning horizon)	
Callaghan Road	670	855.1	1463	4%
Burpengary Road	4,560	5,820	9,954	4%

Notes:

1. AADT – Average Annual Daily Traffic.
2. Traffic data for Callaghan Road and Burpengary Road were obtained from RMA Engineers Traffic Engineering Report (Rev 1) dated 25 May 2016. 2021 and 2032 traffic flow is calculated based on 5% annual traffic growth.

3.5 Road Traffic Noise Model Validation

The noise data collected during the monitoring period (as presented in Table 2.1 to Table 2.3) was used to validate the accuracy of the SoundPLAN model prior to undertaking calculations of the future road traffic noise levels within a 10-year planning horizon.

The results of the SoundPLAN model validation are presented in Table 3.5 and in Appendix E.

Table 3.5 SoundPLAN Validation Results

Receiver	L _{10,18hr} dB(A)		Difference dB(A)	Validation Factor
	Measured*	Calculated*		
Location 1	61	62	+1	0
Location 2	50	49	-1	0
Location 4	52	51	-1	0

*Free field

The free field calculated road traffic noise level is within the acceptable tolerance of ± 2 dB(A), thus there is no need for the addition of a validation factor to the road traffic noise levels within the planning horizon (year 2032). Excerpt from the 3D SoundPLAN noise propagation model is presented in Figure 3.1.

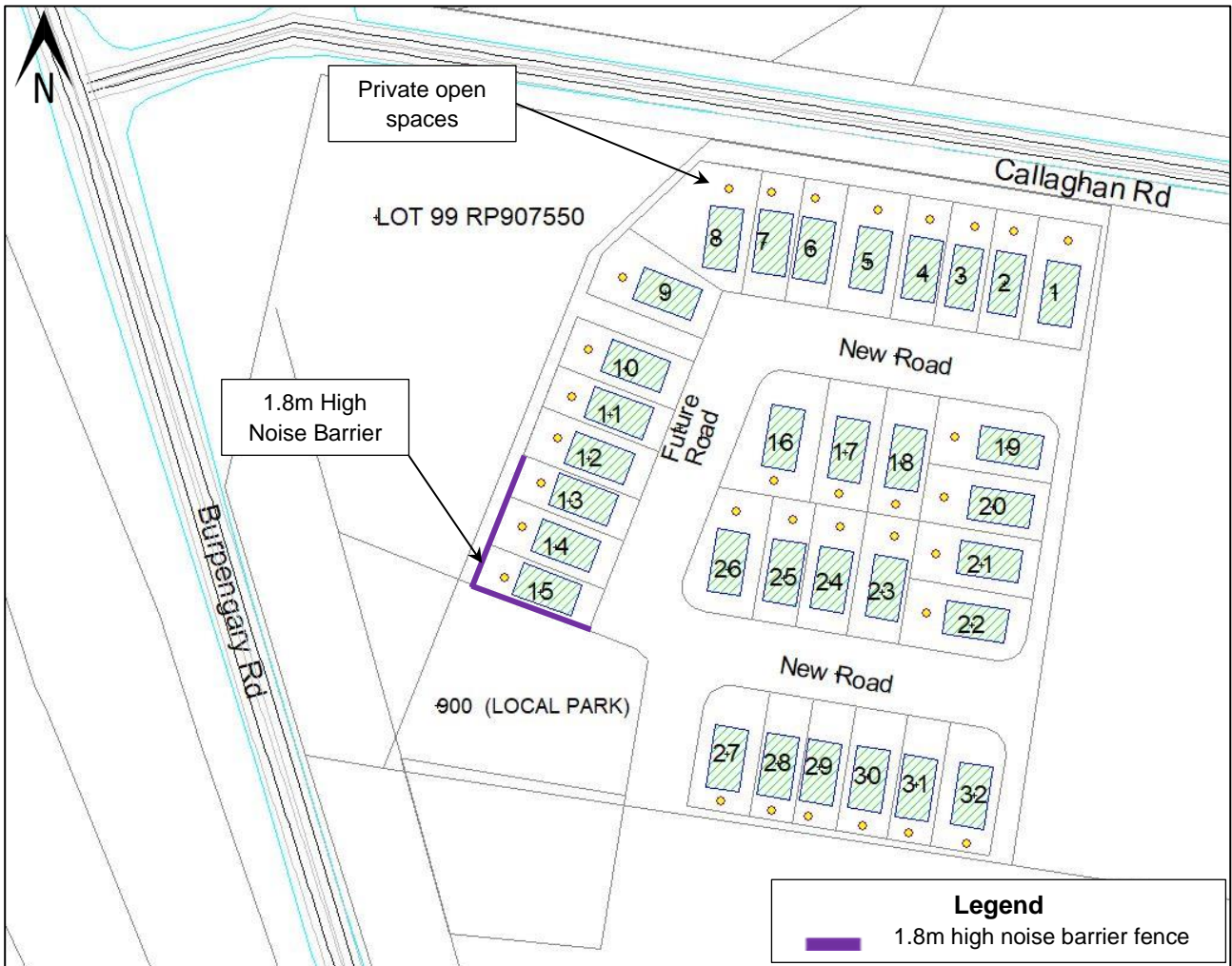


Figure 3.1 3D Traffic Noise Model - SoundPLAN Excerpt

3.6 Traffic Noise Calculation Results

3.6.1 External Facades

The calculated road traffic noise levels for each facade within a 10-year planning horizon are presented in Table 3.6.

Table 3.6 Traffic Noise Levels at Facades

Lot No.	Floor	Façade	Traffic Noise Level L _{10,18hr} dB(A)*	Noise Category QDC MP4.4
Lot 1	F 1	N	60	Noise Category 1
Lot 2	F 1	N	60	Noise Category 1
Lot 3	F 1	N	60	Noise Category 1
Lot 4	F 1	N	60	Noise Category 1
Lot 5	F 1	N	60	Noise Category 1
Lot 6	F 1	N	60	Noise Category 1

Lot No.	Floor	Façade	Traffic Noise Level L _{10,18hr} dB(A)*	Noise Category QDC MP4.4
Lot 7	F 1	N	60	Noise Category 1
Lot 8	F 1	N	61	Noise Category 1
Lot 8	F 1	W	59	Noise Category 1
Lot 9	F 1	N	58	Noise Category 1
Lot 9	F 1	W	59	Noise Category 1
Lot 10	F 1	N	58	Noise Category 1
Lot 10	F 1	W	59	Noise Category 1
Lot 11	F 1	N	58	Noise Category 1
Lot 11	GF	W	58	Noise Category 1
Lot 11	F 1	W	59	Noise Category 1
Lot 11	F 1	S	58	Noise Category 1
Lot 12	F 1	N	58	Noise Category 1
Lot 12	GF	W	58	Noise Category 1
Lot 12	F 1	W	60	Noise Category 1
Lot 12	F 1	S	58	Noise Category 1
Lot 13	F 1	N	58	Noise Category 1
Lot 13	GF	W	58	Noise Category 1
Lot 13	F 1	W	60	Noise Category 1
Lot 13	F 1	S	58	Noise Category 1
Lot 14	F 1	E	58	Noise Category 1
Lot 14	F 1	N	59	Noise Category 1
Lot 14	GF	W	58	Noise Category 1
Lot 14	F 1	W	61	Noise Category 1
Lot 14	F 1	S	59	Noise Category 1
Lot 15	F 1	E	58	Noise Category 1
Lot 15	F 1	N	59	Noise Category 1
Lot 15	GF	W	59	Noise Category 1
Lot 15	F 1	W	62	Noise Category 1
Lot 15	GF	S	58	Noise Category 1
Lot 15	F 1	S	61	Noise Category 1
Lot 27	F 1	N	58	Noise Category 1
Lot 27	F 1	W	58	Noise Category 1
Lot 27	F 1	S	58	Noise Category 1
All other allotments	-	-	<57	Noise Category 0

*façade adjusted

3.6.2 Private Open Spaces

The calculated road traffic noise levels at the private open spaces are presented in Table 3.7.

Table 3.7 Traffic Noise Levels at Private Open Spaces

Lot No.	Floor	Private Open Space	Traffic Noise Level L _{10,18hr} dB(A)*	Compliance with ≤57dB(A) L _{10,18hr} criterion for accommodation activities?
POS_Lot 1	GF	Backyard	56	Yes
POS_Lot 2	GF	Backyard	56	Yes
POS_Lot 3	GF	Backyard	56	Yes
POS_Lot 4	GF	Backyard	56	Yes
POS_Lot 5	GF	Backyard	56	Yes
POS_Lot 6	GF	Backyard	56	Yes
POS_Lot 7	GF	Backyard	57	Yes
POS_Lot 8	GF	Backyard	57	Yes
POS_Lot 9	GF	Backyard	55	Yes
POS_Lot 10	GF	Backyard	55	Yes
POS_Lot 11	GF	Backyard	56	Yes
POS_Lot 12	GF	Backyard	56	Yes
POS_Lot 13	GF	Backyard	55	Yes
POS_Lot 14	GF	Backyard	55	Yes
POS_Lot 15	GF	Backyard	56	Yes
POS_Lot 16	GF	Backyard	48	Yes
POS_Lot 17	GF	Backyard	47	Yes
POS_Lot 18	GF	Backyard	47	Yes
POS_Lot 19	GF	Backyard	48	Yes
POS_Lot 20	GF	Backyard	47	Yes
POS_Lot 21	GF	Backyard	48	Yes
POS_Lot 22	GF	Backyard	47	Yes
POS_Lot 23	GF	Backyard	48	Yes
POS_Lot 24	GF	Backyard	47	Yes
POS_Lot 25	GF	Backyard	47	Yes
POS_Lot 26	GF	Backyard	47	Yes
POS_Lot 27	GF	Backyard	53	Yes
POS_Lot 28	GF	Backyard	51	Yes
POS_Lot 29	GF	Backyard	50	Yes
POS_Lot 30	GF	Backyard	49	Yes
POS_Lot 31	GF	Backyard	48	Yes
POS_Lot 32	GF	Backyard	49	Yes

*free field

Full tabulated results of the calculated traffic noise levels are presented in Appendix F.

Noise contour maps showing the propagation of traffic noise across the development site are presented in Appendix G.

4. Railway Noise Impact Assessment

4.1 External Noise Criteria

Residential buildings located in a railway noise corridor should comply with the external noise criteria presented in the Department of Infrastructure, Local Government and Planning (DILGP), *State Development Assessment Provisions (SDAP) version 2.2 (March 2018), State Code 2: Development in a railway environment*, as presented in Table 4.1.

Table 4.1 External Railway Noise Criteria

Transport infrastructure	Development type	Location within Development	Environmental Criteria
State-controlled Railway	Accommodation activity near a railway (with 15 or more passing trains per day)	All facades	≤ 65 dB(A) $L_{eq,24hr}$ façade corrected
			≤ 87 dB(A) (single event maximum sound pressure level) façade corrected
		Private open spaces	≤ 62 dB(A) $L_{eq,24hr}$ free field
			≤ 84 dB(A) (single event maximum sound pressure level) free field

4.2 Internal Noise Criteria

According to State Code 2, the buildings must be designed and constructed to ensure that the internal noise levels in the habitable rooms comply with the criteria presented in Table 4.2.

Table 4.2 Internal Railway Noise Criteria

Transport infrastructure	Development type	Location within Building	Environmental Criteria
State-controlled Railway	Accommodation activity near a railway (with 15 or more passing trains per day)	Habitable rooms all times	≤ 45 dB(A) single event maximum sound pressure level (railway)

4.3 Queensland Development Code (QDC) MP4.4

In Queensland, residential buildings located in a transport noise corridor should be constructed in accordance with the deemed-to-comply construction specifications in QDC MP4.4 (*Buildings in a transport noise corridor*). QDC MP4.4 specifies acceptable forms of construction for the external walls, windows and roof/ceiling.

The construction requirements are ranked according to the Noise Category, where Category 0 is the lowest noise category and Category 4 is the highest noise category.

The QDC noise categories are presented in Table 4.3.

Table 4.3 QDC Noise Categories

Noise Category	Single event maximum noise (L_{Amax}) for railway land*
Category 4	≥ 85 dB(A)
Category 3	80 – 84 dB(A)
Category 2	75 – 79 dB(A)
Category 1	70 – 74 dB(A)
Category 0	≤ 69 dB(A)

*Measured at 1m from building facade

As an alternative to the deemed-to-comply construction specifications from QDC MP4.4, the buildings can be constructed as per the advice of a qualified acoustic engineer. The engineer can carry out floor plan specific acoustic design in accordance with AS3671-1989 and provide an acoustic report specifying the acceptable forms of construction for the external walls, windows and roof/ceilings.

4.4 Railway Noise Modelling

Railway noise levels at the development site were calculated using SoundPLAN noise propagation modelling software and the Nord 2000 railway noise prediction method. The Nordic prediction method is the preferred method for this assessment because it is one of the few calculation methods that is able to predict both L_{max} and $L_{eq,24hr}$ noise levels which are the railway noise assessment criteria used in Queensland.

The noise modelling was undertaken for three different scenarios:

- **Validation.** Check of the results of the calculation method against the noise levels measured on site.
- **Current assessment.** Based on current railway traffic, assess the noise levels at the building facades and private open spaces within the development.
- **10-year planning horizon.** Based on projected increase in railway traffic within a 10-year planning horizon, assess the noise levels at the building facades and private open spaces within the development.

4.5 Modelling Assumptions

The assumptions and data used in the development of the railway noise propagation model are presented in Table 4.4.

Table 4.4 Data and Assumptions – Railway Noise Model

Terrain	<ul style="list-style-type: none"> Department of Natural Resources and Mines Airborne Laser Scanning (LiDAR) 1 metre data was used to determine the elevation of the development relative to the surrounds. Ground surface absorption factor of 0 was applied to all paved surfaces and 1 for all grassed areas.
Buildings	<ul style="list-style-type: none"> The proposed dwellings were included in the model along with the existing neighbouring buildings.
Railway noise modelling parameters	<ul style="list-style-type: none"> Train type = Electric passenger train Speed = 100km/h Length = 148m (six car unit) Current railway traffic: Number of trains 6am to 10pm = 98. Number of trains 10pm to 6am = 27. (Includes in service and not in service trains). Future railway traffic: Worst case scenario of the doubling of railway traffic along North Coast Line will be considered. Doubling of the railway traffic would lead to +3dB increase in the $L_{eq,24hr}$ noise levels, which will be considered in the 10 year planning horizon assessment. Number of trains 6am to 10pm = 196. Number of trains 10pm to 6am = 54. (Includes in service and not in service trains). It will be assumed that the L_{max} noise levels associated with individual train pass-by will not increase in the future, therefore there is no change to the L_{max} (SEM) noise level.
Receivers	<ul style="list-style-type: none"> Building Facades: Receivers were attached to the facades of each house at the proposed development. Receivers are placed at a height of 1.5m above each floor level. SoundPLAN adds +2.5dB(A) to the calculated noise levels when the receivers are attached to the buildings, thus the tabulated railway noise levels are façade adjusted. Private Open Spaces: Receiver was placed at 1.5m above ground level within the backyard areas on the ground floor. These noise levels are free field. 5m grid spacing was used for calculation of noise contour maps.
Noise Mitigation Measures	<ul style="list-style-type: none"> 1.8m High Noise Barrier Fence along the western boundary of Lots 13, 14 and 15 and along the southern boundary of Lot 15.

4.6 Railway Noise Model Validation

The noise data collected during the monitoring period (as presented in Table 2.5 and Table 2.6) was used to validate the accuracy of the SoundPLAN model.

The results of the SoundPLAN model validation are presented in Table 4.5 and in Appendix H.

Table 4.5 SoundPLAN Validation Results

Measurement Location	Measured* L_{max} (SEM) dB(A)	Calculated* L_{max} (SEM) dB(A)	Difference dB(A)	Measured* $L_{eq,24hr}$ dB(A)	Calculated* $L_{eq,24hr}$ dB(A)	Difference dB(A)
Location 1	83	85	+2	58	59	+1
Location 2	72	72	0	48	49	+1
Location 4	74	74	0	51	51	0

*Free field

The results of the SoundPLAN model are in good agreement with the measured noise levels.

4.7 Railway Noise Assessment

Railway noise levels (in terms of L_{max} (SEM) and $L_{eq,24hr}$) have been calculated at the facades and private open spaces of all proposed allotments at 275 Callaghan Road.

Overview of the SoundPLAN model is presented in Figure 4.1.

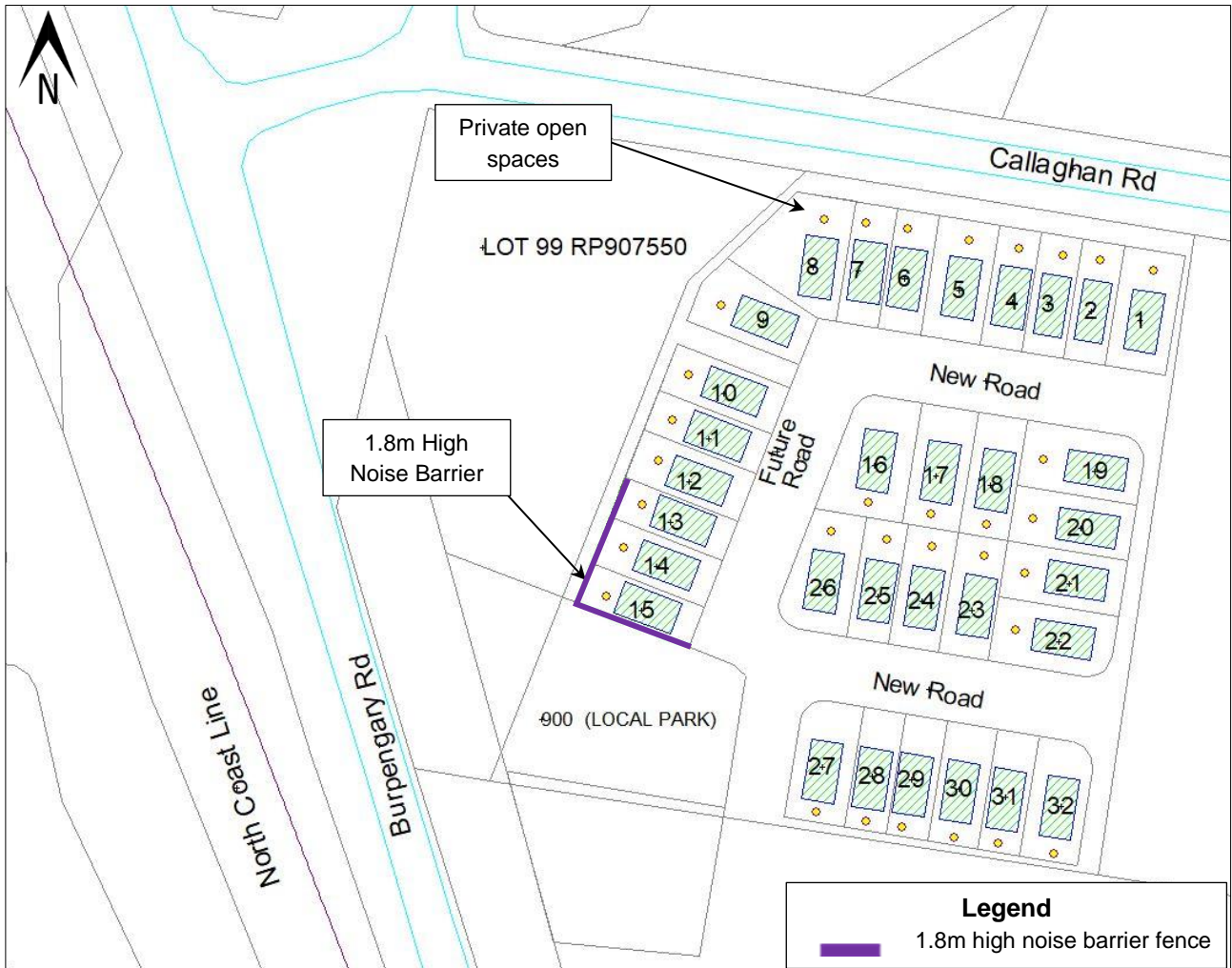


Figure 4.1 3D Railway Noise Model - SoundPLAN Excerpt

The model considers private open spaces at the backyards of each dwelling, as represented by the yellow dots in Figure 4.1.

4.8 Calculated Railway Noise Levels

4.8.1 External Facades

The calculated railway noise levels at the external facades of the proposed dwellings are presented in Table 4.6.

Table 4.6 Railway Noise Levels at Facades

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 1	GF	S	72	Yes	Noise Category 1	48	Yes	51	Yes
Lot 1	F 1	E	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 1	F 1	N	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 1	F 1	S	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 1	F 1	W	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 2	GF	S	73	Yes	Noise Category 1	48	Yes	51	Yes
Lot 2	F 1	E	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 2	F 1	N	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 2	F 1	S	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 2	F 1	W	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 3	GF	S	74	Yes	Noise Category 1	49	Yes	52	Yes
Lot 3	F 1	E	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 3	F 1	N	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 3	F 1	S	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 3	F 1	W	72	Yes	Noise Category 1	50	Yes	53	Yes
Lot 4	GF	S	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 4	F 1	E	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 4	F 1	N	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 4	F 1	S	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 4	F 1	W	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 5	GF	S	71	Yes	Noise Category 1	49	Yes	52	Yes
Lot 5	F 1	E	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 5	F 1	N	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 5	F 1	S	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 5	F 1	W	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 6	GF	S	70	Yes	Noise Category 1	49	Yes	52	Yes
Lot 6	F 1	E	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 6	F 1	N	74	Yes	Noise Category 1	52	Yes	55	Yes
Lot 6	F 1	S	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 6	F 1	W	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 7	F 1	E	73	Yes	Noise Category 1	52	Yes	55	Yes
Lot 7	F 1	N	74	Yes	Noise Category 1	52	Yes	55	Yes

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 7	F 1	S	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 7	F 1	W	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 8	GF	W	74	Yes	Noise Category 1	47	Yes	50	Yes
Lot 8	F 1	E	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 8	F 1	N	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 8	F 1	S	71	Yes	Noise Category 1	51	Yes	54	Yes
Lot 8	F 1	W	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 9	GF	S	76	Yes	Noise Category 2	51	Yes	54	Yes
Lot 9	GF	W	76	Yes	Noise Category 1	51	Yes	54	Yes
Lot 9	F 1	E	74	Yes	Noise Category 2	53	Yes	56	Yes
Lot 9	F 1	N	76	Yes	Noise Category 2	53	Yes	56	Yes
Lot 9	F 1	S	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 9	F 1	W	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 10	GF	E	72	Yes	Noise Category 1	49	Yes	52	Yes
Lot 10	GF	S	78	Yes	Noise Category 1	49	Yes	52	Yes
Lot 10	GF	W	78	Yes	Noise Category 2	52	Yes	55	Yes
Lot 10	F 1	E	76	Yes	Noise Category 2	54	Yes	57	Yes
Lot 10	F 1	N	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 10	F 1	S	72	Yes	Noise Category 2	53	Yes	56	Yes
Lot 10	F 1	W	76	Yes	Noise Category 2	53	Yes	56	Yes
Lot 11	GF	E	70	Yes	Noise Category 1	49	Yes	52	Yes
Lot 11	GF	N	77	Yes	Noise Category 1	49	Yes	52	Yes
Lot 11	GF	S	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 11	GF	W	78	Yes	Noise Category 2	52	Yes	55	Yes
Lot 11	F 1	E	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 11	F 1	N	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 11	F 1	S	71	Yes	Noise Category 2	53	Yes	56	Yes
Lot 11	F 1	W	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 12	GF	E	71	Yes	Noise Category 1	49	Yes	52	Yes
Lot 12	GF	N	78	Yes	Noise Category 1	49	Yes	52	Yes
Lot 12	GF	S	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 12	GF	W	79	Yes	Noise Category 2	53	Yes	56	Yes
Lot 12	F 1	E	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 12	F 1	N	78	Yes	Noise Category 2	55	Yes	58	Yes
Lot 12	F 1	S	73	Yes	Noise Category 2	54	Yes	57	Yes
Lot 12	F 1	W	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 13	GF	E	71	Yes	Noise Category 1	48	Yes	51	Yes
Lot 13	GF	N	79	Yes	Noise Category 1	48	Yes	51	Yes
Lot 13	GF	S	74	Yes	Noise Category 1	49	Yes	52	Yes

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 13	GF	W	79	Yes	Noise Category 2	53	Yes	56	Yes
Lot 13	F 1	E	77	Yes	Noise Category 2	55	Yes	58	Yes
Lot 13	F 1	N	78	Yes	Noise Category 2	55	Yes	58	Yes
Lot 13	F 1	S	74	Yes	Noise Category 2	54	Yes	57	Yes
Lot 13	F 1	W	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 14	GF	E	70	Yes	Noise Category 1	48	Yes	51	Yes
Lot 14	GF	N	80	Yes	Noise Category 2	50	Yes	53	Yes
Lot 14	GF	S	75	Yes	Noise Category 1	49	Yes	52	Yes
Lot 14	GF	W	80	Yes	Noise Category 2	53	Yes	56	Yes
Lot 14	F 1	E	78	Yes	Noise Category 3	55	Yes	58	Yes
Lot 14	F 1	N	78	Yes	Noise Category 3	56	Yes	59	Yes
Lot 14	F 1	S	73	Yes	Noise Category 2	54	Yes	57	Yes
Lot 14	F 1	W	78	Yes	Noise Category 2	54	Yes	57	Yes
Lot 15	GF	N	80	Yes	Noise Category 1	49	Yes	52	Yes
Lot 15	GF	S	72	Yes	Noise Category 2	54	Yes	57	Yes
Lot 15	GF	W	80	Yes	Noise Category 2	53	Yes	56	Yes
Lot 15	F 1	E	78	Yes	Noise Category 3	56	Yes	59	Yes
Lot 15	F 1	N	78	Yes	Noise Category 3	56	Yes	59	Yes
Lot 15	F 1	S	79	Yes	Noise Category 2	54	Yes	57	Yes
Lot 15	F 1	W	78	Yes	Noise Category 2	54	Yes	57	Yes
Lot 16	GF	S	77	Yes	Noise Category 1	48	Yes	51	Yes
Lot 16	GF	W	78	Yes	Noise Category 1	49	Yes	52	Yes
Lot 16	F 1	E	71	Yes	Noise Category 2	54	Yes	57	Yes
Lot 16	F 1	N	76	Yes	Noise Category 2	54	Yes	57	Yes
Lot 16	F 1	S	70	Yes	Noise Category 2	53	Yes	56	Yes
Lot 16	F 1	W	75	Yes	Noise Category 2	54	Yes	57	Yes
Lot 17	GF	E	70	Yes	Noise Category 1	45	Yes	48	Yes
Lot 17	GF	S	77	Yes	Noise Category 1	50	Yes	53	Yes
Lot 17	GF	W	77	Yes	Noise Category 1	50	Yes	53	Yes
Lot 17	F 1	E	72	Yes	Noise Category 2	54	Yes	57	Yes
Lot 17	F 1	N	76	Yes	Noise Category 2	53	Yes	56	Yes
Lot 17	F 1	S	74	Yes	Noise Category 2	52	Yes	55	Yes
Lot 17	F 1	W	75	Yes	Noise Category 2	53	Yes	56	Yes
Lot 18	GF	S	75	Yes	Noise Category 1	50	Yes	53	Yes
Lot 18	F 1	E	74	Yes	Noise Category 2	52	Yes	55	Yes
Lot 18	F 1	N	75	Yes	Noise Category 1	51	Yes	54	Yes
Lot 18	F 1	S	74	Yes	Noise Category 1	52	Yes	55	Yes
Lot 18	F 1	W	74	Yes	Noise Category 2	51	Yes	54	Yes
Lot 19	GF	S	73	Yes	Noise Category 1	45	Yes	48	Yes

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 19	GF	W	70	Yes	Noise Category 1	47	Yes	50	Yes
Lot 19	F 1	E	74	Yes	Noise Category 1	49	Yes	52	Yes
Lot 19	F 1	N	70	Yes	Noise Category 1	50	Yes	53	Yes
Lot 19	F 1	S	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 19	F 1	W	72	Yes	Noise Category 1	50	Yes	53	Yes
Lot 20	GF	W	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 20	F 1	E	72	Yes	Noise Category 1	50	Yes	53	Yes
Lot 20	F 1	N	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 20	F 1	S	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 20	F 1	W	73	Yes	Noise Category 1	50	Yes	53	Yes
Lot 21	GF	W	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 21	F 1	E	71	Yes	Noise Category 1	50	Yes	53	Yes
Lot 21	F 1	N	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 21	F 1	S	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 21	F 1	W	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 22	GF	S	74	Yes	Noise Category 1	47	Yes	50	Yes
Lot 22	GF	W	73	Yes	Noise Category 1	49	Yes	52	Yes
Lot 22	F 1	E	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 22	F 1	N	71	Yes	Noise Category 1	51	Yes	54	Yes
Lot 22	F 1	S	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 22	F 1	W	73	Yes	Noise Category 1	51	Yes	54	Yes
Lot 23	GF	E	70	Yes	Noise Category 1	45	Yes	48	Yes
Lot 23	GF	S	75	Yes	Noise Category 1	50	Yes	53	Yes
Lot 23	F 1	E	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 23	F 1	N	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 23	F 1	S	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 23	F 1	W	74	Yes	Noise Category 2	52	Yes	55	Yes
Lot 24	GF	S	77	Yes	Noise Category 2	50	Yes	53	Yes
Lot 24	GF	W	77	Yes	Noise Category 1	46	Yes	49	Yes
Lot 24	F 1	E	70	Yes	Noise Category 2	54	Yes	57	Yes
Lot 24	F 1	N	76	Yes	Noise Category 2	54	Yes	57	Yes
Lot 24	F 1	S	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 24	F 1	W	75	Yes	Noise Category 2	53	Yes	56	Yes
Lot 25	GF	E	70	Yes	Noise Category 1	46	Yes	49	Yes
Lot 25	GF	S	78	Yes	Noise Category 2	51	Yes	54	Yes
Lot 25	GF	W	79	Yes	Noise Category 1	49	Yes	52	Yes
Lot 25	F 1	E	71	Yes	Noise Category 2	55	Yes	58	Yes
Lot 25	F 1	N	77	Yes	Noise Category 2	55	Yes	58	Yes
Lot 25	F 1	S	76	Yes	Noise Category 2	53	Yes	56	Yes

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 25	F 1	W	76	Yes	Noise Category 2	54	Yes	57	Yes
Lot 26	GF	E	71	Yes	Noise Category 1	47	Yes	50	Yes
Lot 26	GF	S	79	Yes	Noise Category 2	51	Yes	54	Yes
Lot 26	GF	W	80	Yes	Noise Category 1	51	Yes	54	Yes
Lot 26	F 1	E	74	Yes	Noise Category 2	56	Yes	59	Yes
Lot 26	F 1	N	78	Yes	Noise Category 3	55	Yes	58	Yes
Lot 26	F 1	S	75	Yes	Noise Category 2	54	Yes	57	Yes
Lot 26	F 1	W	76	Yes	Noise Category 2	55	Yes	58	Yes
Lot 27	GF	E	79	Yes	Noise Category 1	47	Yes	50	Yes
Lot 27	GF	S	77	Yes	Noise Category 2	51	Yes	54	Yes
Lot 27	GF	W	78	Yes	Noise Category 2	53	Yes	56	Yes
Lot 27	F 1	E	77	Yes	Noise Category 2	55	Yes	58	Yes
Lot 27	F 1	N	77	Yes	Noise Category 2	55	Yes	58	Yes
Lot 27	F 1	S	71	Yes	Noise Category 2	53	Yes	56	Yes
Lot 27	F 1	W	79	Yes	Noise Category 2	54	Yes	57	Yes
Lot 28	GF	S	78	Yes	Noise Category 2	51	Yes	54	Yes
Lot 28	F 1	E	77	Yes	Noise Category 2	55	Yes	58	Yes
Lot 28	F 1	N	76	Yes	Noise Category 2	54	Yes	57	Yes
Lot 28	F 1	S	75	Yes	Noise Category 2	53	Yes	56	Yes
Lot 28	F 1	W	78	Yes	Noise Category 2	54	Yes	57	Yes
Lot 29	GF	S	77	Yes	Noise Category 2	50	Yes	53	Yes
Lot 29	F 1	E	77	Yes	Noise Category 2	54	Yes	57	Yes
Lot 29	F 1	N	75	Yes	Noise Category 2	54	Yes	57	Yes
Lot 29	F 1	S	75	Yes	Noise Category 2	53	Yes	56	Yes
Lot 29	F 1	W	76	Yes	Noise Category 2	53	Yes	56	Yes
Lot 30	GF	S	77	Yes	Noise Category 1	49	Yes	52	Yes
Lot 30	F 1	E	75	Yes	Noise Category 2	53	Yes	56	Yes
Lot 30	F 1	N	74	Yes	Noise Category 2	53	Yes	56	Yes
Lot 30	F 1	S	74	Yes	Noise Category 1	52	Yes	55	Yes
Lot 30	F 1	W	75	Yes	Noise Category 2	52	Yes	55	Yes
Lot 31	GF	E	77	Yes	Noise Category 1	46	Yes	49	Yes
Lot 31	GF	S	76	Yes	Noise Category 1	48	Yes	51	Yes
Lot 31	F 1	E	73	Yes	Noise Category 2	53	Yes	56	Yes
Lot 31	F 1	N	74	Yes	Noise Category 2	53	Yes	56	Yes
Lot 31	F 1	S	70	Yes	Noise Category 1	52	Yes	55	Yes
Lot 31	F 1	W	76	Yes	Noise Category 2	53	Yes	56	Yes
Lot 32	GF	S	73	Yes	Noise Category 1	48	Yes	51	Yes
Lot 32	F 1	E	74	Yes	Noise Category 1	50	Yes	53	Yes
Lot 32	F 1	N	73	Yes	Noise Category 1	51	Yes	54	Yes

Lot No.	Floor	Facade	L _{max} (SEM) Assessment		QDC MP4.4 Noise Category	L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
			L _{max} (SEM) dB(A)	Compliance with noise criterion of 87dB(A) L _{max} (SEM)		L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 65dB(A) L _{eq,24hr}
Lot 32	F 1	S	74	Yes	Noise Category 1	51	Yes	54	Yes
Lot 32	F 1	W	74	Yes	Noise Category 1	51	Yes	54	Yes
All other allotments			Complies with criterion Noise Category 0 is applicable, i.e. no acoustic requirements			Complies with criterion		Complies with criterion	

NOTE: All noise levels are facade adjusted

4.8.2 Private Open Spaces

The calculated railway noise levels at the private open spaces of the proposed dwellings are presented in Table 4.7.

Table 4.7 Railway Noise Levels at Private Open Spaces

Lot No.	Floor	L _{max} (SEM) Assessment		L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
		L _{max} (SEM) dB(A)	Compliance with noise criterion of 84dB(A) L _{max} (SEM)	L _{eq,24hr} dB(A)	Compliance with noise criterion of 62dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 62dB(A) L _{eq,24hr}
Lot 1	GF	64	Yes	42	Yes	45	Yes
Lot 2	GF	64	Yes	43	Yes	46	Yes
Lot 3	GF	63	Yes	42	Yes	45	Yes
Lot 4	GF	66	Yes	43	Yes	46	Yes
Lot 5	GF	67	Yes	44	Yes	47	Yes
Lot 6	GF	67	Yes	45	Yes	48	Yes
Lot 7	GF	68	Yes	46	Yes	49	Yes
Lot 8	GF	73	Yes	48	Yes	51	Yes
Lot 9	GF	76	Yes	52	Yes	55	Yes
Lot 10	GF	77	Yes	53	Yes	56	Yes
Lot 11	GF	78	Yes	54	Yes	57	Yes
Lot 12	GF	79	Yes	55	Yes	58	Yes
Lot 13	GF	80	Yes	55	Yes	58	Yes
Lot 14	GF	80	Yes	55	Yes	58	Yes
Lot 15	GF	79	Yes	55	Yes	58	Yes
Lot 16	GF	73	Yes	50	Yes	53	Yes
Lot 17	GF	75	Yes	51	Yes	54	Yes
Lot 18	GF	74	Yes	51	Yes	54	Yes
Lot 19	GF	71	Yes	48	Yes	51	Yes
Lot 20	GF	74	Yes	51	Yes	54	Yes
Lot 21	GF	72	Yes	50	Yes	53	Yes
Lot 22	GF	74	Yes	50	Yes	53	Yes
Lot 23	GF	73	Yes	51	Yes	54	Yes
Lot 24	GF	74	Yes	51	Yes	54	Yes
Lot 25	GF	73	Yes	51	Yes	54	Yes

Lot No.	Floor	L _{max} (SEM) Assessment		L _{eq,24hr} Assessment – Current Railway Traffic		L _{eq,24hr} Assessment – Future Railway Traffic	
		L _{max} (SEM) dB(A)	Compliance with noise criterion of 84dB(A) L _{max} (SEM)	L _{eq,24hr} dB(A)	Compliance with noise criterion of 62dB(A) L _{eq,24hr}	L _{eq,24hr} dB(A)	Compliance with noise criterion of 62dB(A) L _{eq,24hr}
Lot 26	GF	74	Yes	50	Yes	53	Yes
Lot 27	GF	77	Yes	53	Yes	56	Yes
Lot 28	GF	77	Yes	53	Yes	56	Yes
Lot 29	GF	76	Yes	52	Yes	55	Yes
Lot 30	GF	75	Yes	51	Yes	54	Yes
Lot 31	GF	73	Yes	49	Yes	52	Yes
Lot 32	GF	73	Yes	50	Yes	53	Yes

NOTE: All noise levels are free field

Full tabulated results of the calculated railway noise levels are presented in Appendix I.

Noise contour maps showing the propagation of railway noise across the development site are presented in Appendix J.

5. Discussion and Recommendations

The residential development at 275 Callaghan Road is located in the transport noise corridor of the North Coast line. Site specific noise measurements and detailed traffic and railway noise propagation modelling were carried out to assess noise impact from the current road and rail traffic and the future traffic up to a 10-year planning horizon (year 2032).

To protect the noise amenity at the proposed development it is recommended to construct a 1.8m high noise barrier fence as per alignment presented in Figure 5.1.

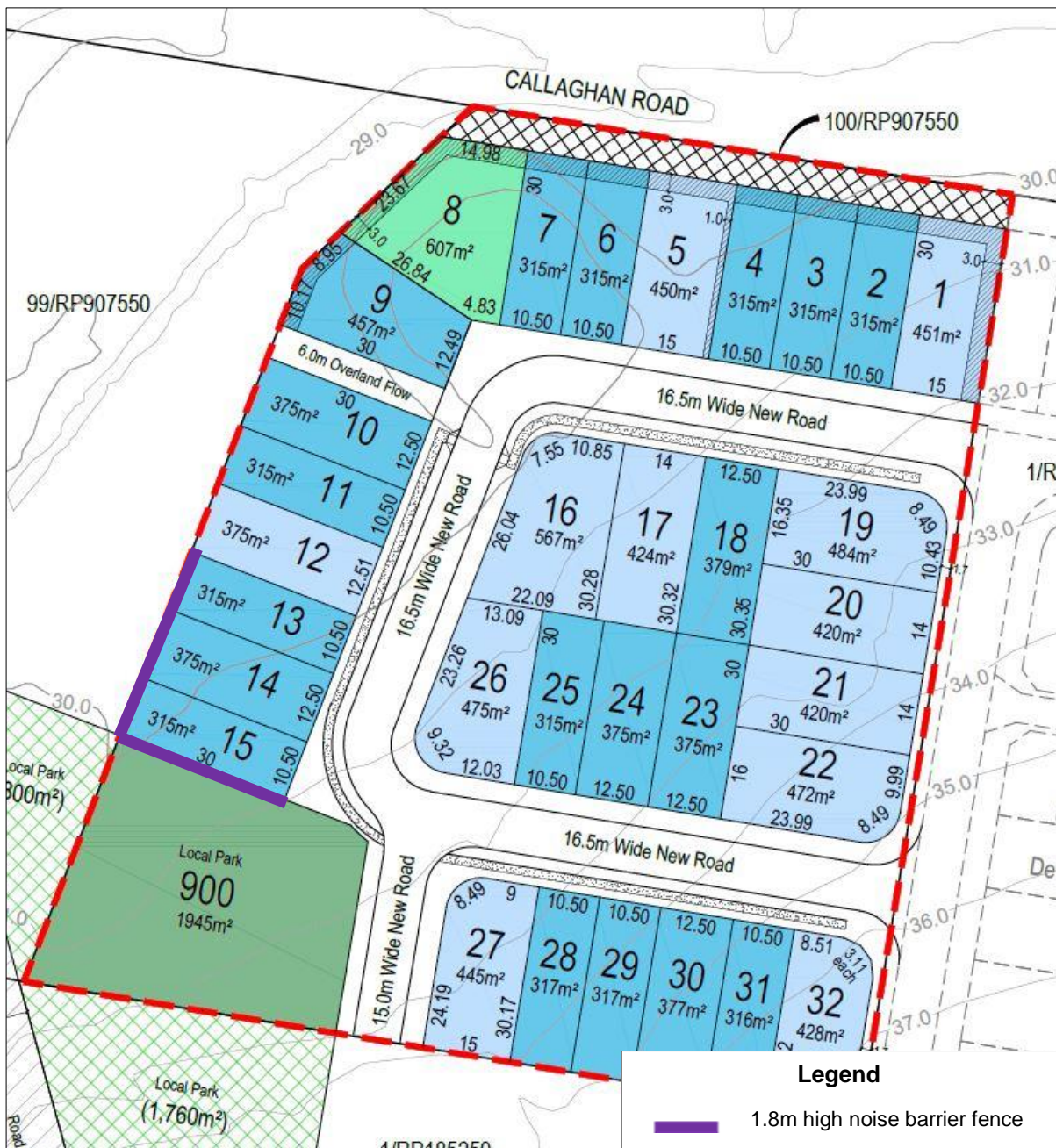


Figure 5.1 Recommended Noise Barrier Fence

Since the noise barrier will be located in a state-controlled railway noise corridor, the noise barrier must be built to comply with:

- Department of Transport and Main Roads (TMR) Technical Specification *Transport and Main Roads Specifications MRTS15 Noise Fences*, dated July 2017.
- TMR *Road Traffic Noise Management: Code of Practice*, Chapter 7: Integrated Noise Barrier Design.
- Queensland Rail, Civil Engineering Technical Requirement – CIVIL-SR-014 Design of noise barriers adjacent to railways, 2011.

The acoustic panels used in the construction of the noise barrier must achieve a weighted sound reduction index (R_w) of a least 25 in accordance with AS/NZS ISO 717.1. Suitable materials include timber, plywood, concrete, compressed fibre cement, sandwich panels, steel, aluminium and transparent materials. There shall be no gaps in the noise barrier. The construction of the noise barrier must be durable and long lasting as per the TMR and Queensland Rail requirements.

The noise barrier must also be built to meet the performance outcomes of the Moreton Bay Planning Scheme, including *Planning scheme policy – Integrated design – Appendix D*.

5.1 Road Traffic Noise Impact

The modelling results of the TNIA indicate that there will be minor road traffic noise impact on the development. However, with the proposed 1.8m high noise barrier the relevant noise criteria will be achieved at the private open spaces at all allotments.

The traffic noise levels on the western façade of the future dwellings at Lots 11 to 15, the southern façade of Lot 15 and the upper floors of the future dwellings on Lots 1 to 15 and Lots 27 exceed the traffic noise criteria and the future dwellings will require minor architectural treatment to the facades as per the QDCMP4.4 noise categories presented in Table 5.1.

5.2 Railway Noise Impact

The railway noise propagation modelling results indicate that there will be moderate railway noise impact on the development. However, with the proposed 1.8m high noise barrier the relevant noise criteria will be achieved at the facades and private open spaces at all allotments.

The highest railway noise levels at the facades of the buildings at Lots 1 to 32 are as follows:

- **L_{max} , current and future railway traffic:** 79dB(A) $L_{max(SEM)}$ (Noise Category 2) on the ground floor and 80dB(A) $L_{max(SEM)}$ (Noise Category 3) on the upper floor;
- **$L_{eq,24hr}$, current railway traffic:** 54dB(A) $L_{eq,24hr}$ on the ground floor and 56dB(A) $L_{eq,24hr}$ on the upper floor;
- **$L_{eq,24hr}$, future railway traffic:** 57dB(A) $L_{eq,24hr}$ on the ground floor and 59dB(A) $L_{eq,24hr}$ on the upper floor. This is a conservative estimate based on doubling of the number of trains using the North Coast Line.

The noise levels comply with the external noise criteria of $\leq 87\text{dB(A)}$ $L_{\text{max (SEM)}}$ and $\leq 65\text{dB(A)}$ $L_{\text{eq,24hr}}$ at the building facades of all allotments.

However, there is some residual railway noise at the development. Minor architectural treatment is required to some allotments (as per Table 5.1) to ensure compliance with the internal noise criteria of $\leq 45\text{dB(A)}$ $L_{\text{max (SEM)}}$ in the habitable rooms.

The highest calculated railway noise levels at the private open spaces are as follows:

- **L_{max} , current and future railway traffic:** 80dB(A) $L_{\text{max (SEM)}}$;
- **$L_{\text{eq,24hr}}$, current railway traffic:** 55dB(A) $L_{\text{eq,24hr}}$;
- **$L_{\text{eq,24hr}}$, future railway traffic:** 58dB(A) $L_{\text{eq,24hr}}$.

The noise levels comply with the external noise criteria of $\leq 84\text{dB(A)}$ $L_{\text{max (SEM)}}$ and $\leq 62\text{dB(A)}$ $L_{\text{eq,24hr}}$ free field at all allotments. No additional noise mitigation measures are required for the protection of the private open spaces.

5.3 Recommendations

The traffic and railway noise impacts have been evaluated to determine whether acoustic treatment is required to the future dwellings at Lots 1 to 32. Considering traffic and railway noise impact, the corresponding QDC MP4.4 Noise Categories at each allotment are presented in Table 5.1.

Table 5.1 Calculated Facade Noise Levels and QDC MP4.4 Noise Categories

Lot No.	Facade	Ground Floor			Upper Floor		
		Traffic noise level $L_{10,18\text{hr}}$ dB(A)	Railway noise level L_{max} dB(A)	Noise Category QDC MP4.4	Traffic noise level $L_{10,18\text{hr}}$ dB(A)	Railway noise level L_{max} dB(A)	Noise Category QDC MP4.4
Lot 1	E	53	55	Category 0	56	73	Category 1
Lot 1	N	57	54	Category 0	60	72	Category 1
Lot 1	S	47	72	Category 1	53	72	Category 1
Lot 1	W	50	66	Category 0	55	72	Category 1
Lot 2	E	49	68	Category 0	55	73	Category 1
Lot 2	N	57	55	Category 0	60	73	Category 1
Lot 2	S	48	73	Category 1	53	73	Category 1
Lot 2	W	49	64	Category 0	55	73	Category 1
Lot 3	E	47	63	Category 0	55	74	Category 1
Lot 3	N	57	56	Category 0	60	74	Category 1
Lot 3	S	48	72	Category 1	54	72	Category 1
Lot 3	W	48	64	Category 0	55	73	Category 1
Lot 4	E	47	64	Category 0	55	74	Category 1
Lot 4	N	57	57	Category 0	60	74	Category 1
Lot 4	S	49	72	Category 1	54	73	Category 1
Lot 4	W	50	66	Category 0	56	74	Category 1
Lot 5	E	48	68	Category 0	56	74	Category 1

Lot No.	Facade	Ground Floor			Upper Floor		
		Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4	Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4
Lot 5	N	57	57	Category 0	60	74	Category 1
Lot 5	S	50	71	Category 1	55	73	Category 1
Lot 5	W	51	66	Category 0	56	73	Category 1
Lot 6	E	48	68	Category 0	56	74	Category 1
Lot 6	N	57	57	Category 0	60	74	Category 1
Lot 6	S	50	70	Category 1	55	74	Category 1
Lot 6	W	49	62	Category 0	56	73	Category 1
Lot 7	E	47	63	Category 0	56	74	Category 1
Lot 7	N	57	57	Category 0	60	74	Category 1
Lot 7	S	50	68	Category 0	55	73	Category 1
Lot 7	W	51	64	Category 0	57	73	Category 1
Lot 8	E	48	66	Category 0	57	75	Category 2
Lot 8	N	57	57	Category 0	61	75	Category 2
Lot 8	S	50	67	Category 0	56	74	Category 1
Lot 8	W	56	71	Category 1	59	74	Category 1
Lot 9	E	48	69	Category 0	56	76	Category 2
Lot 9	N	53	59	Category 0	58	76	Category 2
Lot 9	S	53	75	Category 2	57	75	Category 2
Lot 9	W	57	74	Category 1	59	76	Category 2
Lot 10	E	49	72	Category 1	56	78	Category 2
Lot 10	N	53	66	Category 0	58	78	Category 2
Lot 10	S	52	72	Category 1	57	76	Category 2
Lot 10	W	57	76	Category 2	59	77	Category 2
Lot 11	E	49	70	Category 1	57	77	Category 2
Lot 11	N	52	73	Category 1	58	78	Category 2
Lot 11	S	52	71	Category 1	58	77	Category 2
Lot 11	W	58	77	Category 2	59	77	Category 2
Lot 12	E	49	71	Category 1	57	78	Category 2
Lot 12	N	53	73	Category 1	58	79	Category 2
Lot 12	S	51	73	Category 1	58	77	Category 2
Lot 12	W	58	77	Category 2	60	78	Category 2
Lot 13	E	50	71	Category 1	57	79	Category 2
Lot 13	N	52	74	Category 1	58	79	Category 2
Lot 13	S	51	74	Category 1	58	77	Category 2
Lot 13	W	58	77	Category 2	60	78	Category 2
Lot 14	E	50	70	Category 1	58	80	Category 3
Lot 14	N	53	75	Category 2	59	80	Category 3
Lot 14	S	51	73	Category 1	59	78	Category 2
Lot 14	W	58	78	Category 2	61	78	Category 2
Lot 15	E	50	68	Category 0	58	80	Category 3

Lot No.	Facade	Ground Floor			Upper Floor		
		Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4	Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4
Lot 15	N	52	72	Category 1	59	80	Category 3
Lot 15	S	58	79	Category 2	61	78	Category 2
Lot 15	W	59	78	Category 2	62	78	Category 2
Lot 16	E	43	68	Category 0	54	77	Category 2
Lot 16	N	50	67	Category 0	54	78	Category 2
Lot 16	S	49	70	Category 1	54	75	Category 2
Lot 16	W	52	71	Category 1	54	76	Category 2
Lot 17	E	43	70	Category 1	54	77	Category 2
Lot 17	N	50	69	Category 0	55	77	Category 2
Lot 17	S	48	74	Category 1	55	75	Category 2
Lot 17	W	50	72	Category 1	55	76	Category 2
Lot 18	E	44	69	Category 0	54	75	Category 2
Lot 18	N	50	68	Category 0	55	74	Category 1
Lot 18	S	48	74	Category 1	55	74	Category 1
Lot 18	W	49	69	Category 0	55	75	Category 2
Lot 19	E	48	55	Category 0	54	72	Category 1
Lot 19	N	51	68	Category 0	54	73	Category 1
Lot 19	S	46	70	Category 1	53	73	Category 1
Lot 19	W	50	70	Category 1	54	74	Category 1
Lot 20	E	47	55	Category 0	54	73	Category 1
Lot 20	N	48	65	Category 0	54	73	Category 1
Lot 20	S	46	68	Category 0	54	73	Category 1
Lot 20	W	50	72	Category 1	55	73	Category 1
Lot 21	E	46	55	Category 0	54	73	Category 1
Lot 21	N	48	65	Category 0	54	73	Category 1
Lot 21	S	46	69	Category 0	54	74	Category 1
Lot 21	W	51	71	Category 1	55	74	Category 1
Lot 22	E	45	56	Category 0	54	73	Category 1
Lot 22	N	48	67	Category 0	54	74	Category 1
Lot 22	S	50	71	Category 1	54	74	Category 1
Lot 22	W	50	73	Category 1	55	74	Category 1
Lot 23	E	43	70	Category 1	55	75	Category 2
Lot 23	N	49	69	Category 0	55	75	Category 2
Lot 23	S	51	74	Category 1	55	74	Category 1
Lot 23	W	49	69	Category 0	56	75	Category 2
Lot 24	E	43	68	Category 0	55	77	Category 2
Lot 24	N	49	69	Category 0	55	77	Category 2
Lot 24	S	52	75	Category 2	56	75	Category 2
Lot 24	W	49	70	Category 1	56	76	Category 2
Lot 25	E	43	70	Category 1	55	78	Category 2

Lot No.	Facade	Ground Floor			Upper Floor		
		Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4	Traffic noise level L _{10,18hr} dB(A)	Railway noise level L _{max} dB(A)	Noise Category QDC MP4.4
Lot 25	N	48	68	Category 0	55	79	Category 2
Lot 25	S	52	76	Category 2	56	76	Category 2
Lot 25	W	51	71	Category 1	56	77	Category 2
Lot 26	E	44	71	Category 1	55	79	Category 2
Lot 26	N	47	69	Category 0	55	80	Category 3
Lot 26	S	53	75	Category 2	56	76	Category 2
Lot 26	W	53	74	Category 1	56	78	Category 2
Lot 27	E	45	71	Category 1	57	79	Category 2
Lot 27	N	51	66	Category 0	58	79	Category 2
Lot 27	S	54	77	Category 2	58	77	Category 2
Lot 27	W	56	77	Category 2	58	78	Category 2
Lot 28	E	44	67	Category 0	56	78	Category 2
Lot 28	N	51	65	Category 0	57	78	Category 2
Lot 28	S	53	76	Category 2	57	75	Category 2
Lot 28	W	50	69	Category 0	57	77	Category 2
Lot 29	E	43	69	Category 0	55	76	Category 2
Lot 29	N	51	63	Category 0	56	77	Category 2
Lot 29	S	52	75	Category 2	56	75	Category 2
Lot 29	W	48	66	Category 0	57	77	Category 2
Lot 30	E	43	67	Category 0	55	75	Category 2
Lot 30	N	50	64	Category 0	56	77	Category 2
Lot 30	S	51	74	Category 1	55	74	Category 1
Lot 30	W	48	67	Category 0	55	75	Category 2
Lot 31	E	43	70	Category 1	54	76	Category 2
Lot 31	N	50	66	Category 0	55	77	Category 2
Lot 31	S	51	73	Category 1	54	74	Category 1
Lot 31	W	48	67	Category 0	54	76	Category 2
Lot 32	E	44	55	Category 0	54	74	Category 1
Lot 32	N	50	63	Category 0	55	73	Category 1
Lot 32	S	51	73	Category 1	55	74	Category 1
Lot 32	W	50	69	Category 0	55	74	Category 1

There are two options available for architectural treatment to the building facades as follows:

- **Option 1:** Implementation of the 'acceptable forms of construction' specified in Queensland Development Code (QDC) Mandatory Part 4.4 (*Buildings in a Transport Noise Corridor*). The dwellings should be built to the Noise Categories specified in Table 5.1.
- **Option 2:** Floor plan specific acoustic design, in accordance with AS3671-1989 to ensure compliance with the internal noise criteria in the habitable rooms.

6. Conclusions

Based on the results of noise impact assessment for the residential development at 275 Callaghan Road in Narangba, the following is concluded:

- The proposed residential Lots 1 to 32 are affected by minor levels of road traffic noise and moderate levels of railway noise.
- To protect the noise amenity at the proposed development it is recommended to construct a 1.8m high noise barrier fence along the western boundary of Lots 13, 14 and 15 and along the southern boundary of Lot 15, as per alignment presented in Figure 5.1.
- The traffic and railway noise impacts have been evaluated to determine whether acoustic treatment is required to the future dwellings at Lots 1 to 32. Considering traffic and railway noise impact, the corresponding QDC MP4.4 Noise Categories at each allotment are presented in Table 5.1.
- Architectural treatment (acoustic design) to the building facades will be required at building approval stage to protect the internal noise amenity. There are two options available for architectural treatment to the building facades, as follows:
 - **Option 1:** Implementation of the 'acceptable forms of construction' specified in Queensland Development Code (QDC) Mandatory Part 4.4 (*Buildings in a Transport Noise Corridor*). The dwellings should be built to the Noise Categories specified in Table 5.1.
 - **Option 2:** Floor plan specific acoustic design in accordance with AS3671-1989 to ensure compliance with the internal noise criteria in the habitable rooms.
- Provided that the future dwellings to be constructed on the noise affected allotments are designed and constructed as per the requirements of QDC MP4.4, or based on floor plan specific acoustic design, the habitable rooms of the future dwellings will be protected from transport noise.
- The road traffic and railway noise levels at the private open spaces comply with the relevant outdoor noise criteria. Therefore, no additional noise mitigation measures are required for the protection of the private open spaces at Lots 1 to 32.

Provided that the recommendations of this report are fully implemented in the detailed design and construction, the road traffic and railway noise emissions, within a 10-year planning horizon to year 2032, will not impose any further constraints on the establishment of the proposed development at 275 Callaghan Road in Narangba.

7. References

- Australian Standard AS 1055-2018 (*Acoustics - Description and Measurement of Environmental Noise*)
- Australian Standard AS/NZS 2107:2016 (*Acoustics – Recommended design sound levels and reverberation times for building interiors*)
- Australian Standard AS2377-2002 (*Methods for the Measurement of Railbound Vehicle Noise*)
- Australian Standard AS2702-1984 (*Acoustics – Methods for the measurement of road traffic noise*)
- Australian Standard AS 3671:1989 (*Acoustics – Road Traffic Noise Intrusion – Building sitting and construction*)
- Australian Standard ASIEC61672.1-2004 (*Electroacoustics - Sound level meters – Specifications*)
- Department of State Development Infrastructure and Planning, March 2018, *State Development Assessment Provisions (Version 2.2), State Code 1: Development in a state-controlled road environment*
- Department of State Development Infrastructure and Planning, March 2018, *State Development Assessment Provisions (Version 2.2), State Code 2: Development in a railway environment*
- Department of Transport and Main Roads, 2013, *Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure (Version 4)*
- Department of Transport and Main Roads, 2013, *Transport Noise Management Code of Practice: Volume 1 – Road Traffic Noise*
- Moreton Bay Regional Council, 2017, *Planning Scheme Policy - Noise*
- Queensland Development Code (QDC), 2015, *Mandatory Part 4.4 (Buildings in a Transport Noise Corridor)*

8. Appendices

Appendix A – Proposed Development Layout

Appendix B – Site Photos

Appendix C – Meteorological Data

Appendix D – Noise Measurement Results

Appendix E – Validation of CoRTN Traffic Noise Model

Appendix F – Tabulated Traffic Noise Levels

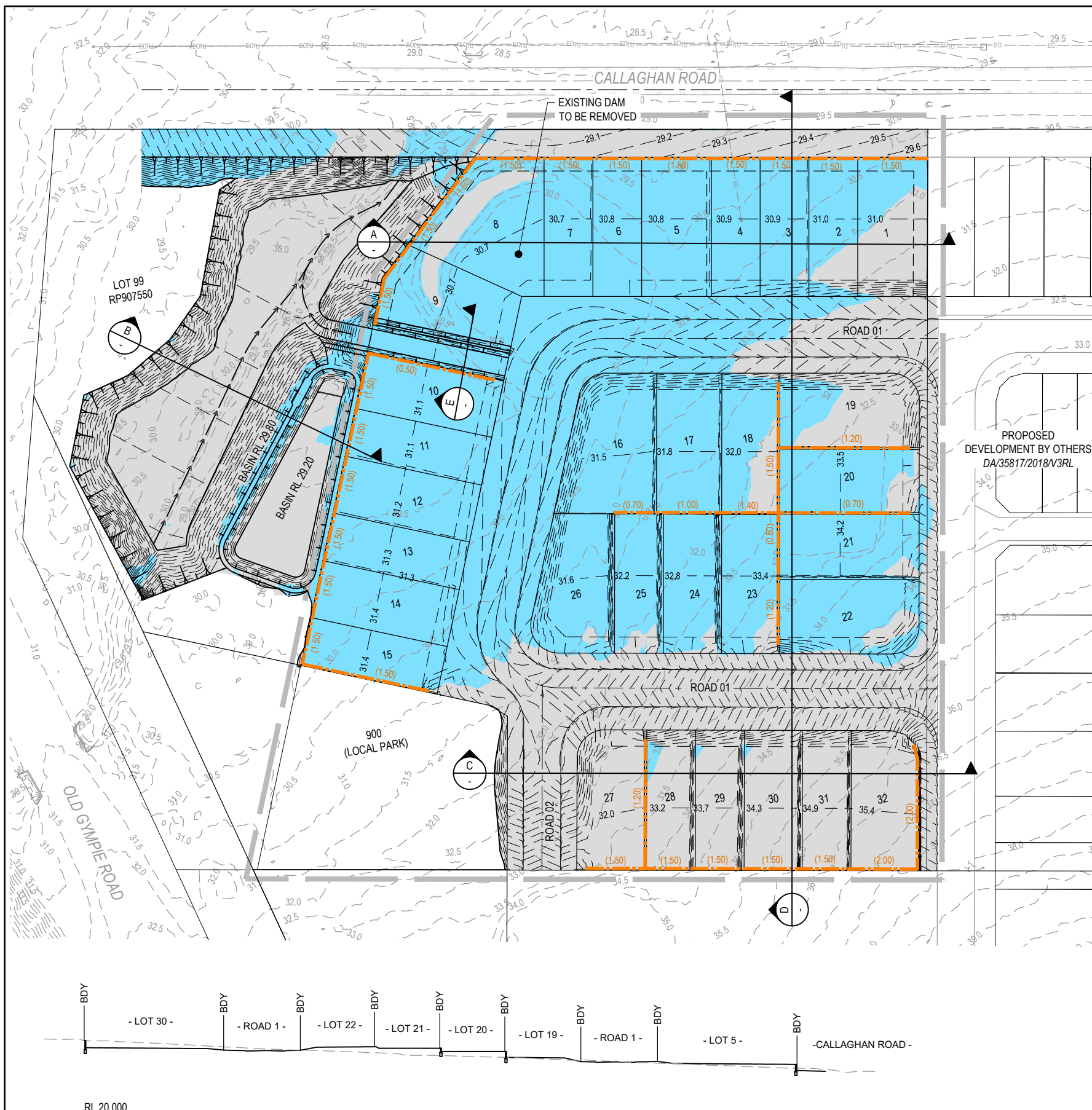
Appendix G – Traffic Noise Contours

Appendix H – Validation of Nord 2000 Railway Noise Model

Appendix I – Tabulated Railway Noise Levels

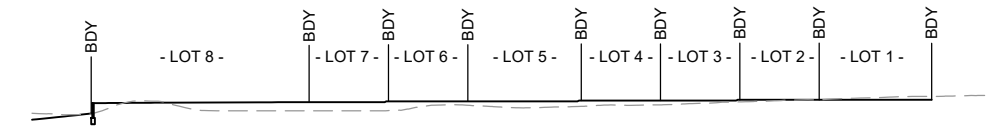
Appendix J – Railway Noise Contours

Appendix A – Proposed Development Layout

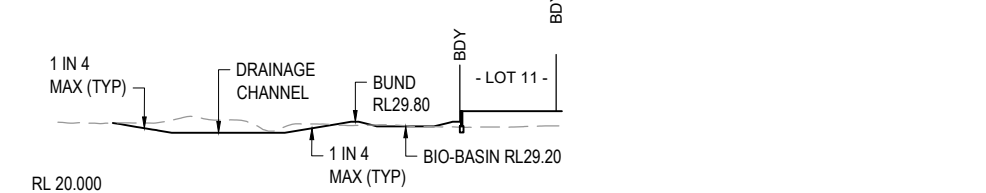


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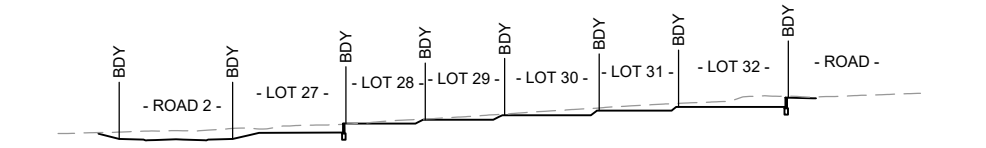
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	PROPOSED SURFACE CONTOUR
	EXISTING SURFACE CONTOUR
	PROPOSED CONCRETE SLEEPER RETAINING WALL 2.0m MAX HEIGHT (AVERAGE WALL HEIGHT SHOWN IN BRACKETS)
	PROPOSED AREA OF CUT
	PROPOSED AREA OF FILL



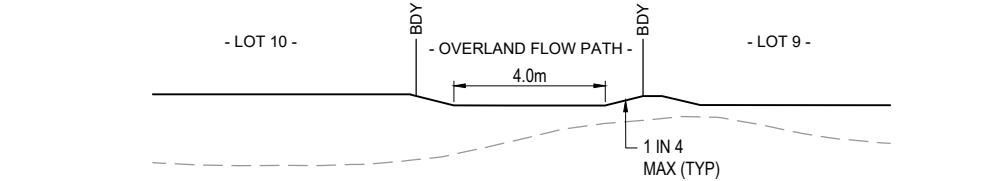
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SCALE 1:1000 (A3)



RL 20.000
SECTION B
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SCALE 1:1000 (A3)



RL 20.000
SECTION C
SCALE 1:500 (A1)
SCALE 1:1000 (A3)



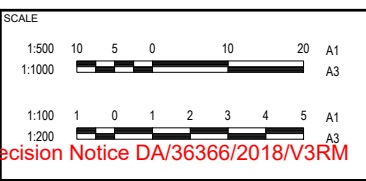
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SECTION D
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SCALE 1:200 (A3)

RL 20.000
SECTION D
SCALE 1:500 (A1)
SCALE 1:1000 (A3)

PRELIMINARY - NOT FOR CONSTRUCTION

REV	DATE	DESIGN	DRAWN	ORIGINAL ISSUE	REVISION DETAILS
1	12.05.18	JV	CL	ADDED FOOTPATH, AMENDED DRIVEWAY/ZERO LOT LOCATIONS	
2	26.06.18	JV	CL	GENERAL LAYOUT AMENDMENT	
3	19.02.19	JV	CS	UPDATED LAYOUT	
4	27.02.19	JV	CS	LAYOUT AND OVERALL EARTHWORKS AMENDED	
5	15.09.21	RD	RD		

FOR DEVELOPMENT APPLICATION NOT FOR CONSTRUCTION	STATUS
DESIGN APPROVED ANDREW NIGO	RPEQ 12329
FOR AND ON BEHALF OF PEAKURBAN PTY LTD	



CLIENT
ORCHARD (NARANGBA) DEVELOPMENTS PTY LTD.

ASSOCIATED CONSULTANT
VERIS
PHONE: (07) 3666 4700

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

CALLAGHAN ROAD
NARANGBA

DRAWING TITLE CONCEPT BULK EARTHWORKS LEVELS LAYOUT PLAN		
PROJECT No. 17-0112	DRAWING No. 24/12/2021 P101	REVISION 5



Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

DRAFT FOR DISCUSSION
PURPOSES ONLY



LEGEND

Site Boundary	
Possible Local Park	
Possible Local Park	
Proposed Stormwater Management Area	
Road Resumption	
Proposed EMT	

YIELD SUMMARY

MBRC Lot Type	Lot Frontage	No. of Lots	%
Type A	7.5m	0	0.0%
Type B	>7.5m-10m	0	0.0%
Type C	>10m-12.5m	19	59.4%
Type D	>12.5m-18m	12	37.5%
Type E	>18.0m-32.0m	1	3.1%
Type F	32.0m+	0	0.0%
Total		32	100%

CLIENT
Orchard Property Group

PROJECT
CONCEPT SKETCH PLAN

275 Callaghan Road,
Narangba

Lot 2 on RP907550

AMENDMENTS:	DATE:
A Original	03.03.2021
B Amend lots/basin/overland flow path	04.06.2021
C	
D	
E	
F	
G	
H	

DESIGNED: KS	DATE: 04.06.2021
DRAWN: KS	DATE: 04.06.2021
SCALE: 1:1,000 @ A3	1 of 1

IMPORTANT NOTES:
This note is an integral part of this plan. This plan may not be reproduced without this note.

This plan was prepared for discussion purposes only and is conceptual only. This plan should not be used for any other purposes.

This plan remains subject to, but not limited to, authority approval, detail design and final survey.

The total number of lots shown on this plan is approximate only.

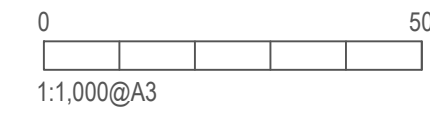
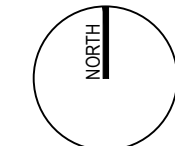
No relevance should be placed on the information on this plan for any financial dealings involving the land.

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ISO 14001
AS/NZS 4801
GLOBAL CERTIFICATION PTY LTD



DRAWING NUMBER: 18-0147-SK2	ISSUE: B
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Appendix B – Site Photos



Photo 1: Noise monitoring location 1 (3 May 2018)



Photo 2: Noise monitoring location 2 (3 May 2018)



Photo 3: Attended railway noise measurements (3 May 2018)



Photo 4: Attended railway noise measurement – Freight train (3 May 2018)



Photo 5: Noise monitoring location 4 (26 May 2018)



Photo 6: Noise monitoring location 4 (26 May 2018)

Appendix C – Meteorological Data

Redcliffe, Queensland

May 2018 Daily Weather Observations

Most observations from Talobilla Park, but wind from Redcliffe Jetty.



Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C																		
1	Tu	15.3	24.3	0			SE	46	14:27	21.2	57		SSW	17	1024.0	23.2	55		SSE	35	1021.8
2	We	17.0	25.2	0			SSE	35	01:53	21.5	66		SSW	19	1023.2	23.3	57		SSE	28	1019.7
3	Th	16.6	26.1	0			SSW	22	05:01	22.4	64		S	17	1021.5	23.9	59		E	11	1018.2
4	Fr	17.1	26.4	0			NE	30	15:18	22.6	67		W	9	1021.0	24.8	61		NE	22	1017.3
5	Sa	18.2	25.8	0			SSE	57	17:21	23.5	67		S	17	1023.6	24.0	59		SSE	43	1022.8
6	Su	16.5	25.2	0			SSE	50	14:14	21.6	56		SSW	24	1027.4	23.5	53		SSE	41	1024.5
7	Mo	18.2	24.4	0			SE	39	00:01	23.5	56		SE	30	1024.6	22.9	63		SE	30	1020.9
8	Tu	18.3	22.8	24.2			SE	41	14:12	20.2	92		S	17	1021.4	20.4	85		SSE	28	1018.7
9	We	17.8	26.3	3.4			SSW	31	02:57	21.1	72		SW	15	1019.7	24.5	60		ENE	11	1015.9
10	Th	15.0	27.4	0			NNW	33	23:21	20.8	74		SSE	9	1018.3	26.9	33		NNE	13	1012.9
11	Fr	16.7	22.8	0			WSW	50	09:17	18.9	39		WSW	28	1015.1	22.1	24		W	22	1012.7
12	Sa	11.5	22.1	0						16.0	40		WNW	15	1016.0	21.8	29		W	19	1012.2
13	Su	12.2	23.5	0						17.6	51		W	15	1018.0	23.2	34		SE	11	1015.1
14	Mo	11.5	23.6	0						19.5	52		S	11	1020.8	21.4	49		E	11	1017.6
15	Tu	13.1	23.4	0						19.0	57		SSW	17	1021.0	21.5	48		E	15	1018.6
16	We	12.9	23.0	0						18.8	61		SSW	20	1023.4	21.5	48		SE	30	1021.0
17	Th	14.0	22.3	0						19.2	59		S	20	1023.9	20.4	68		SSE	33	1021.4
18	Fr	15.1	22.6	0.2			SSW	24	06:39	19.7	62		SSW	13	1022.7	21.4	59		ENE	9	1019.4
19	Sa	12.0	23.1	0						17.9	69		S	11	1022.1	21.8	42		ESE	9	1019.5
20	Su	12.1	25.3	0						19.1	68		E	6	1021.7	24.8	26		NNW	17	1017.6
21	Mo	10.5	23.6	0						17.9	45		SW	13	1021.4	22.3	42		E	6	1018.3
22	Tu	11.4	24.3	0						18.0	41		W	11	1021.5	23.5	33		ENE	15	1016.9
23	We	12.3	23.9	0						19.7	50		SW	15	1022.7	22.0	56		SE	31	1021.2
24	Th	14.2	23.3	0			S	26	09:56	19.3	67		SSW	15	1023.9	21.5	57		SE	19	1020.3
25	Fr	15.0	22.9	0			SSE	50	19:16	19.4	65		SSW	17	1024.2	21.8	60		SE	22	1022.3
26	Sa	15.9	22.8	0			SSE	52	21:51	19.6	57		SSW	22	1027.1	19.1	71		S	33	1025.0
27	Su	15.2	21.4	0.2			SE	41	10:22	19.2	67		S	28	1026.5	20.9	68		S	19	1023.4
28	Mo	15.3	22.1	8.8			SE	41	16:04	17.7	83		SSW	20	1024.6	19.1	77		SSE	31	1021.8
29	Tu	15.7	22.3	13.6			SSE	35	00:02	17.8	84		SW	17	1022.2	20.4	65		E	6	1019.0
30	We	13.1	24.5	0			WSW	37	22:05	17.8	79		SSW	6	1020.1	23.2	60		NE	15	1015.7
31	Th	10.1	21.2	0						13.7	46		W	17	1021.1	20.9	26		W	15	1017.2
Statistics for May 2018																					
Mean		14.5	23.8							19.5	61			16	1022.1	22.3	52			20	1019.0
Lowest		10.1	21.2							13.7	39		#	6	1015.1	19.1	24		E	6	1012.2
Highest		18.3	27.4	24.2			SSE	57		23.5	92		SE	30	1027.4	26.9	85		SSE	43	1025.0
Total				50.4																	

Observations were drawn from Redcliffe (station 040958)

This Automatic Weather Station (AWS) is located in Talobilla Park, and sources its wind measurements from an anemometer on Redcliffe jetty.

IDCJDW4099.201805 Prepared at 13:02 UTC on 2 Jun 2018
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Users of this product are deemed to have read the information and accepted the conditions described in the [notice at 2021](http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf)
<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Appendix D – Noise Measurement Results

**Unattended Noise Measurements
Location 1**



Traffic Noise Levels

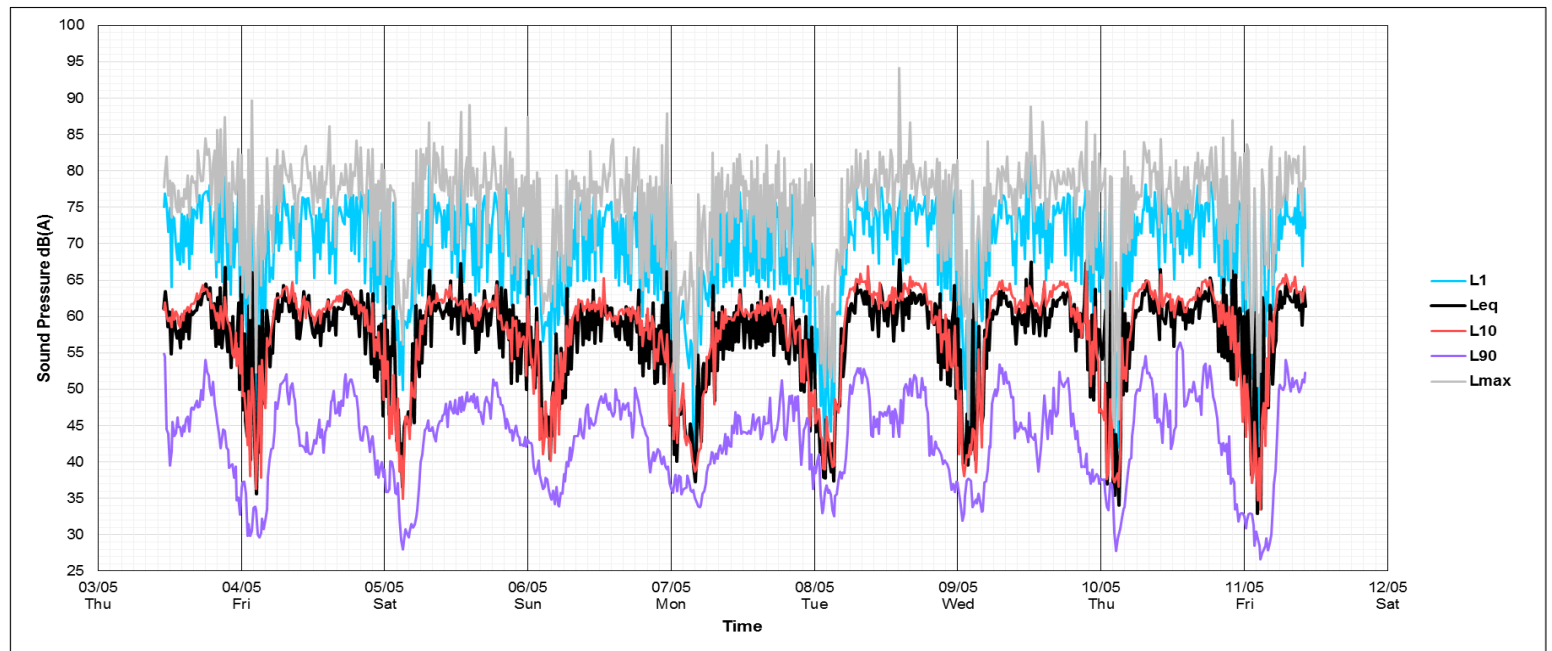
Logger Location 1 - 305 Burpengary Road
17m from property boundary with Burpengary Road

ARL Environmental Noise Logger
 Logger Serial Number 8780d4
 Measurement Title 20180503_103546
 Measurement started at 03/05/2018 - 10:35:48
 Measurement stopped at 11/05/2018 - 10:28:28
 Frequency Weighting A
 Time Averaging Fast
 Statistical Interval 15 min
 Pre-measurement Ref. 94.0
 Post-measurement Ref. 94.0
 Engineering Units dB SPL

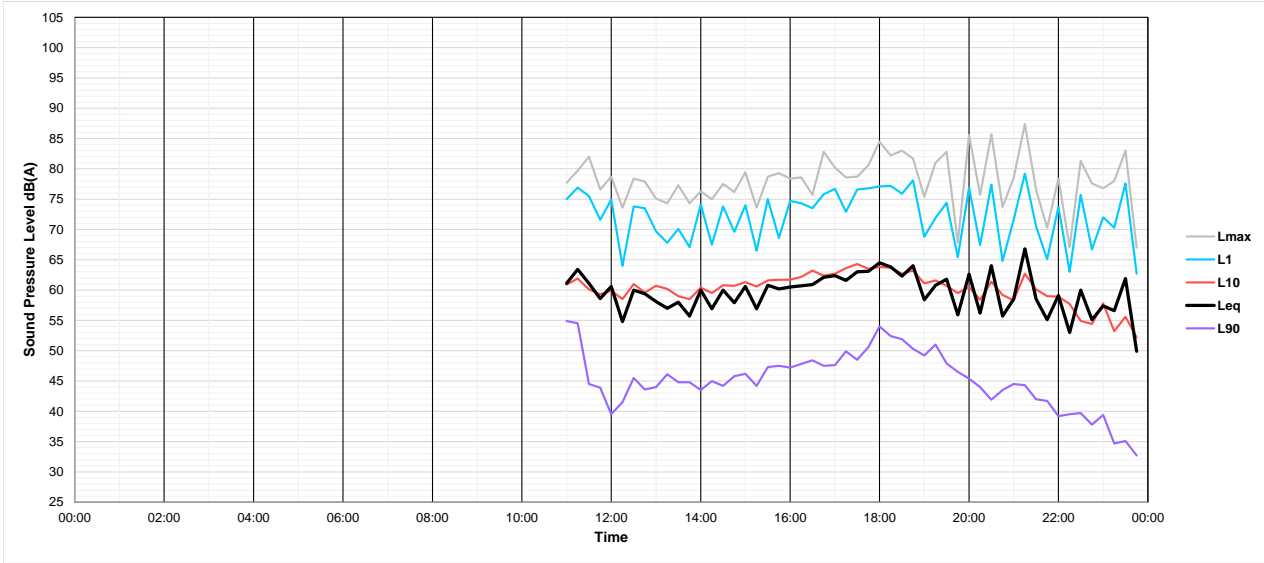
Note

- No noise data available
- Rainfall recorded on this day

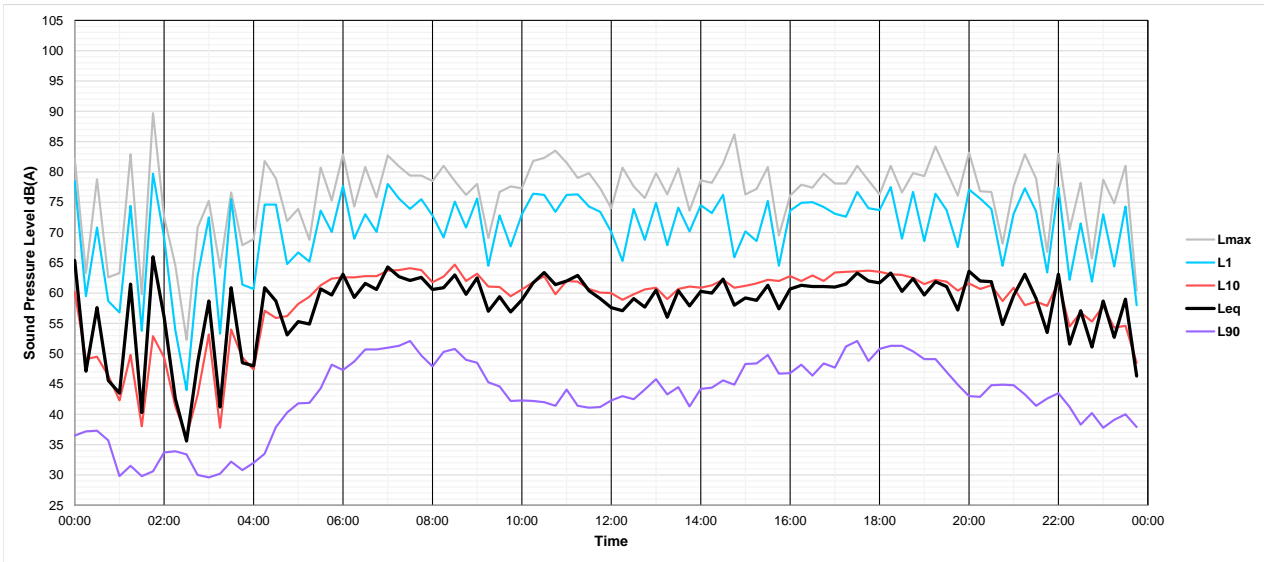
Date	Day	L _{A10,T}			L _{Aeq,T}		L _{A90,T}	
		18hr day 6am-12am	1hr max 6am-12am	Time for 1hr max	18hr day 6am-12am	8hr night 10pm-6am	18hr day 6am-12am	8hr night 10pm-6am
3/05/2018	Thursday	—	64	17:45	—	54	—	36
4/05/2018	Friday	61	64	7:45	60	51	46	35
5/05/2018	Saturday	60	63	11:45	60	52	46	39
6/05/2018	Sunday	59	63	12:45	58	49	44	37
7/05/2018	Monday	58	62	16:45	57	49	44	39
8/05/2018	Tuesday	62	65	7:45	61	52	46	37
9/05/2018	Wednesday	62	65	17:45	60	53	45	37
10/05/2018	Thursday	61	65	17:45	60	53	47	33
Average		61	64		59	52	46	36
Average (weekdays only)		61	64		60	52	46	36



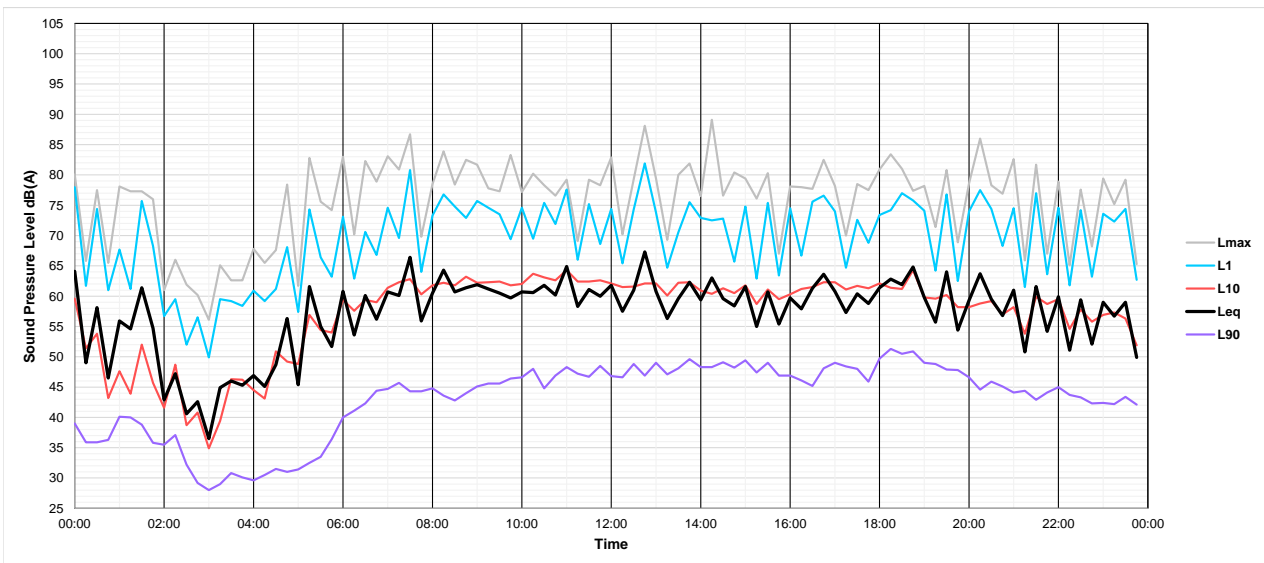
Location 1
Thursday 3 May 2018



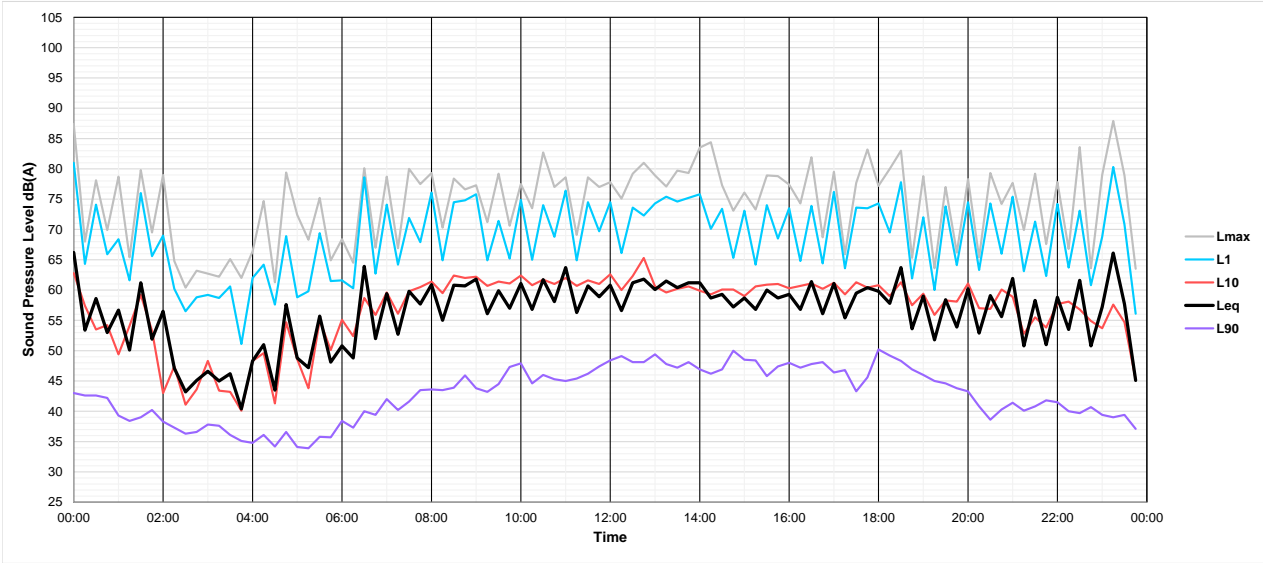
Location 1
Friday 4 May 2018



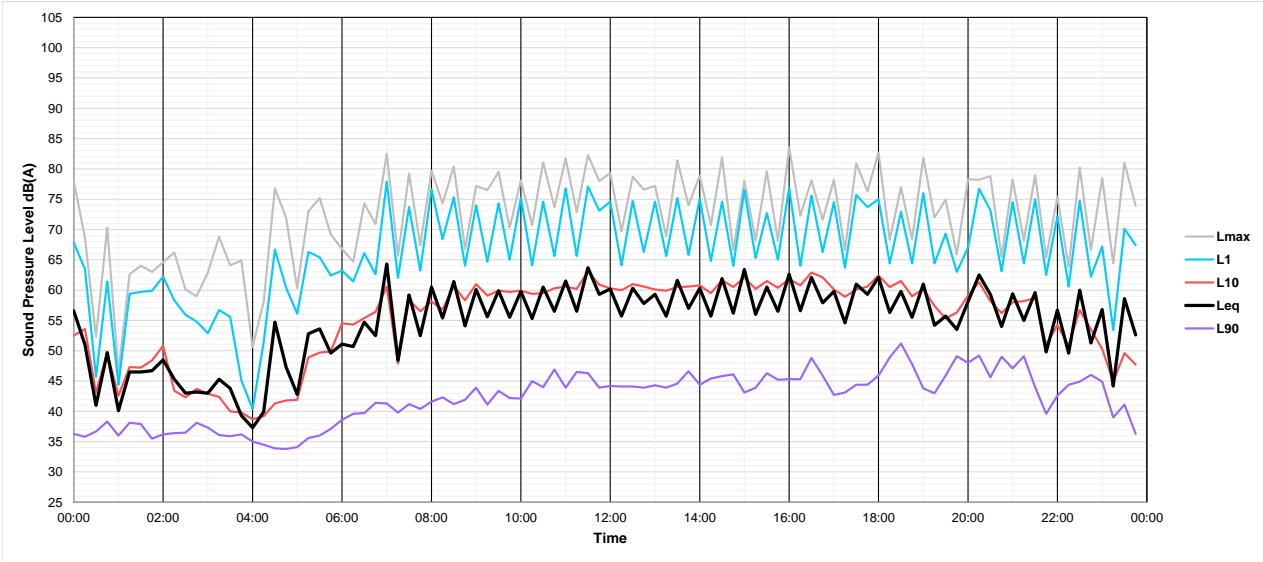
Location 1
Saturday 5 May 2018



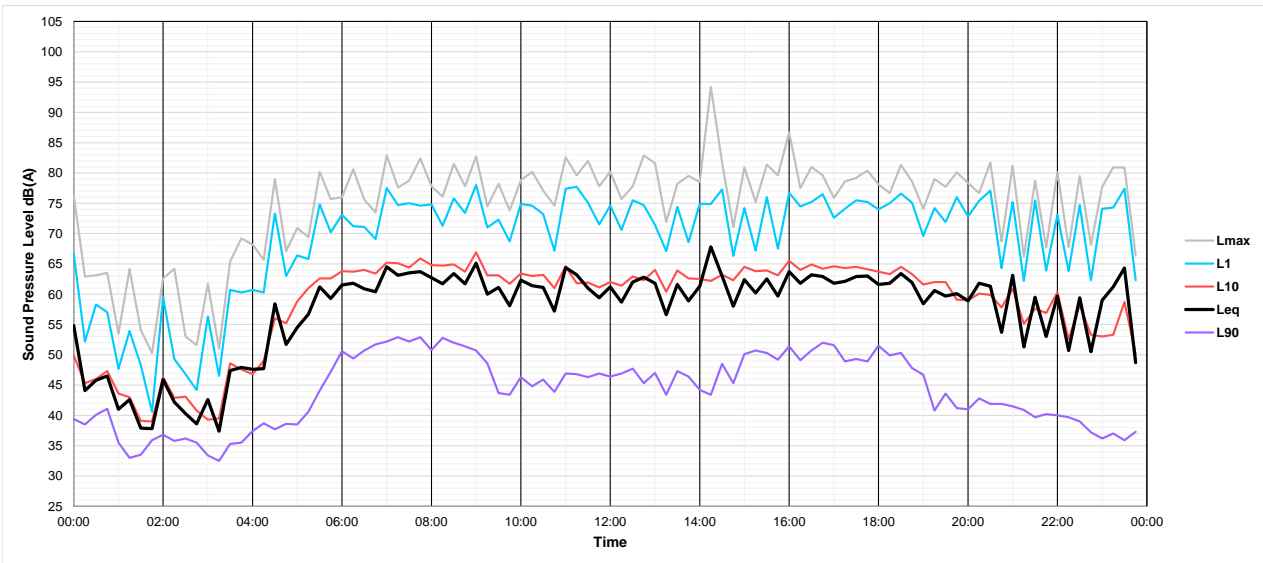
Location 1
Sunday 6 May 2018



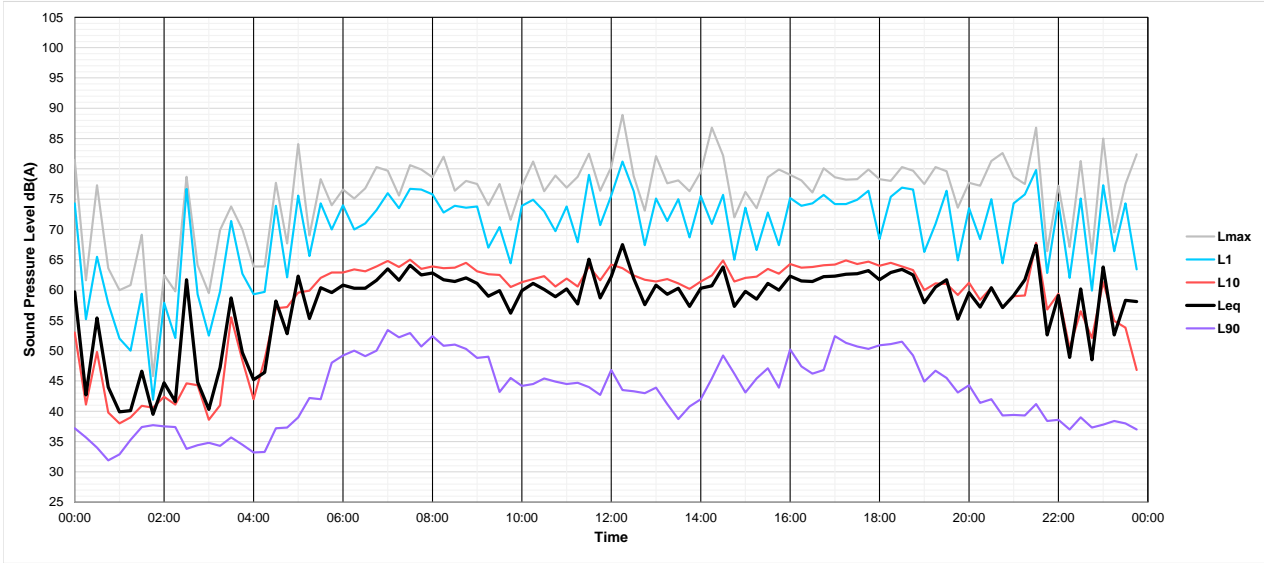
Location 1
Monday 7 May 2018



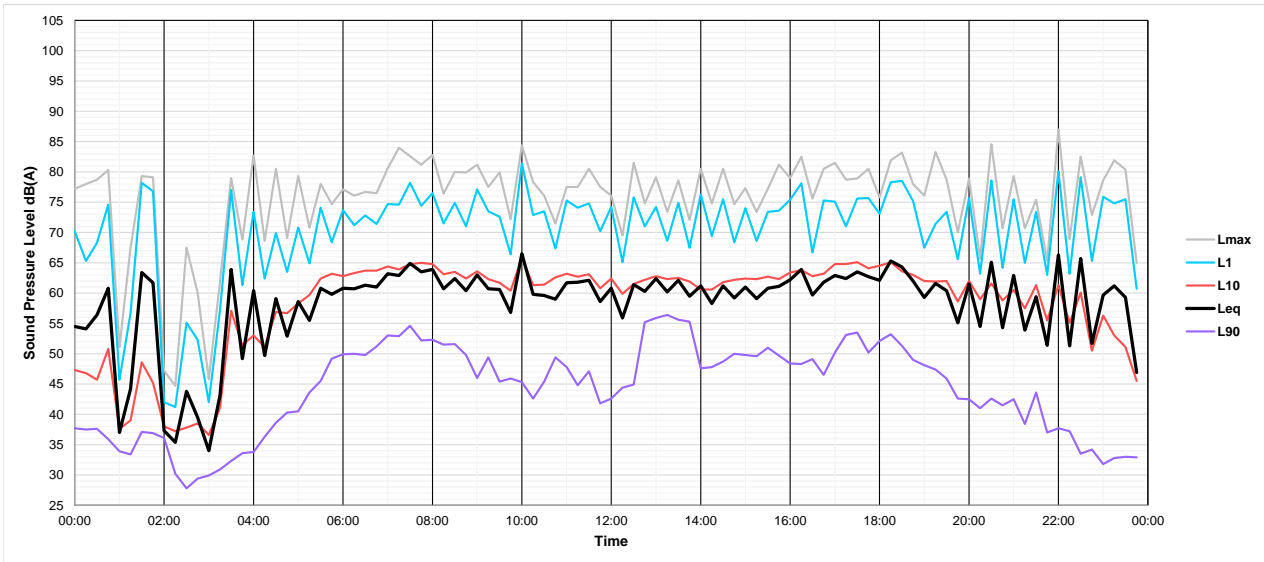
Location 1
Tuesday 8 May 2018



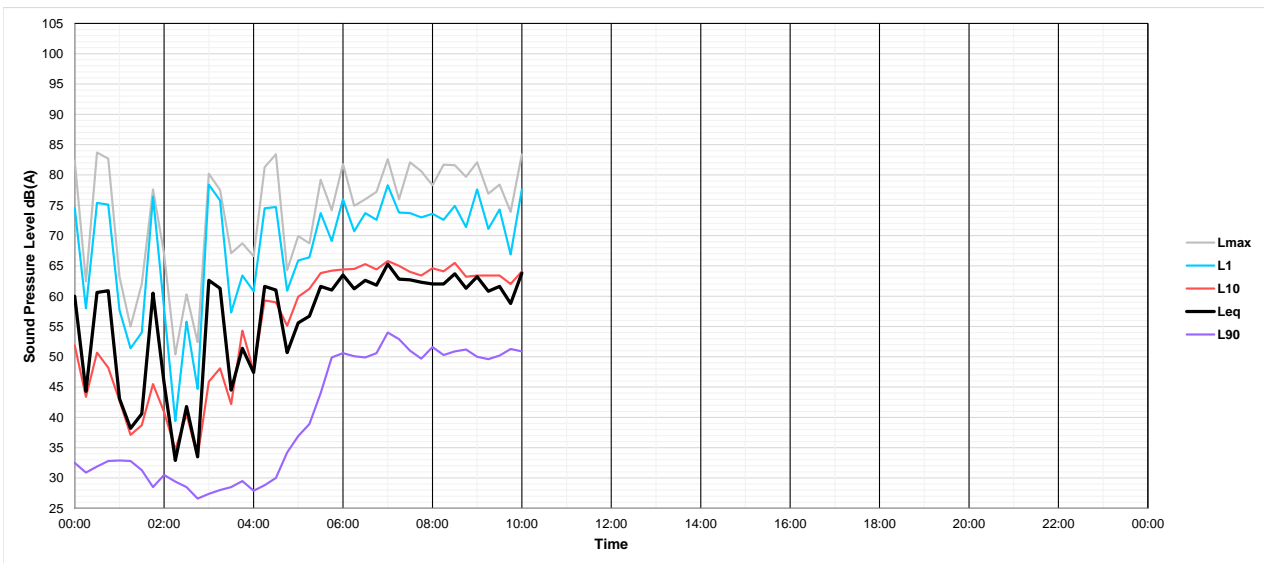
Location 1
Wednesday 9 May 2018



Location 1
Thursday 10 May 2018



Location 1
Friday 11 May 2018



**Unattended Noise Measurements
Location 2**



Traffic Noise Levels

**Logger Location 2 - western boundary of
265 Callaghan Road
113m south of Callaghan Road
175m east of Burpengary Road**

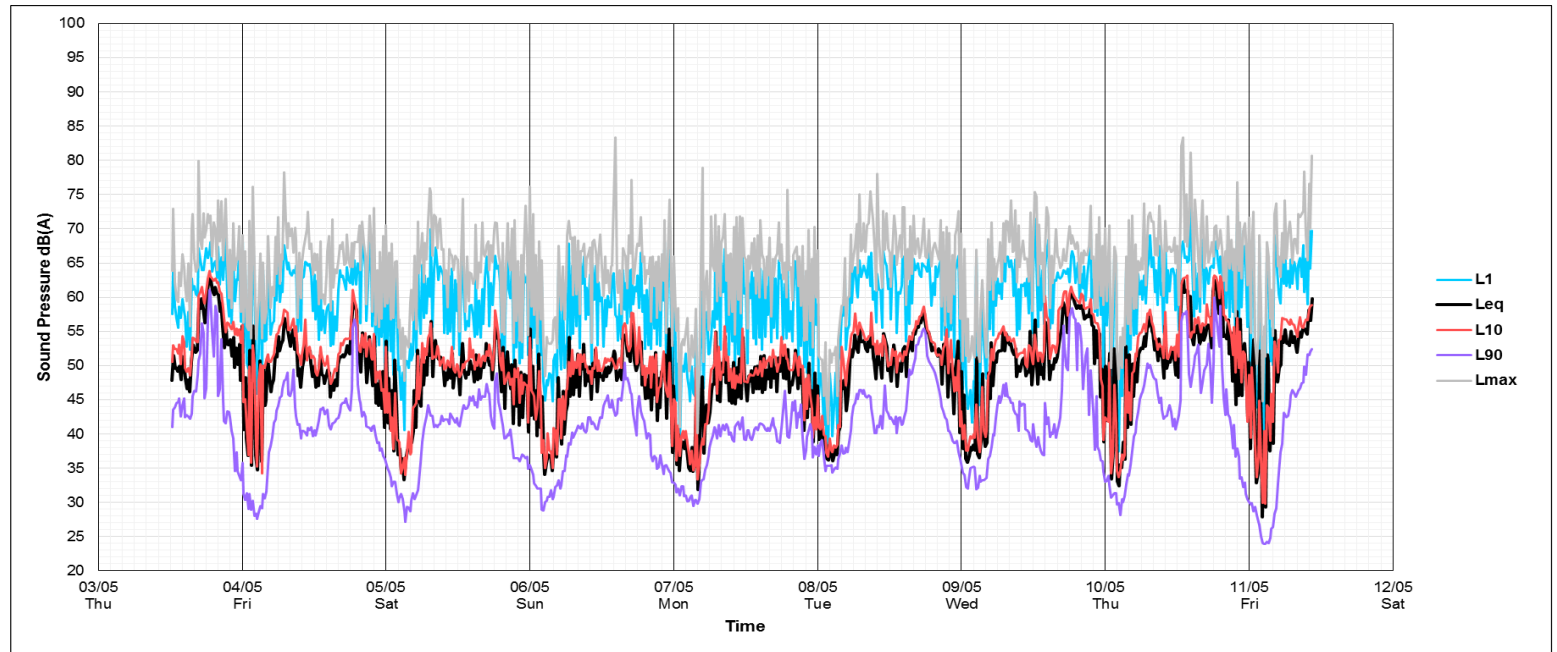
ARL Environmental Noise Logger

Logger Serial Number 87811D
Measurement Title 20180503_115417
Measurement started at 03/05/2018 - 11:54:18
Measurement stopped at 11/05/2018 - 10:42:52
Frequency Weighting A
Time Averaging Fast
Statistical Interval 15 min
Pre-measurement Ref. 94.0
Post-measurement Ref. 93.9
Engineering Units dB SPL

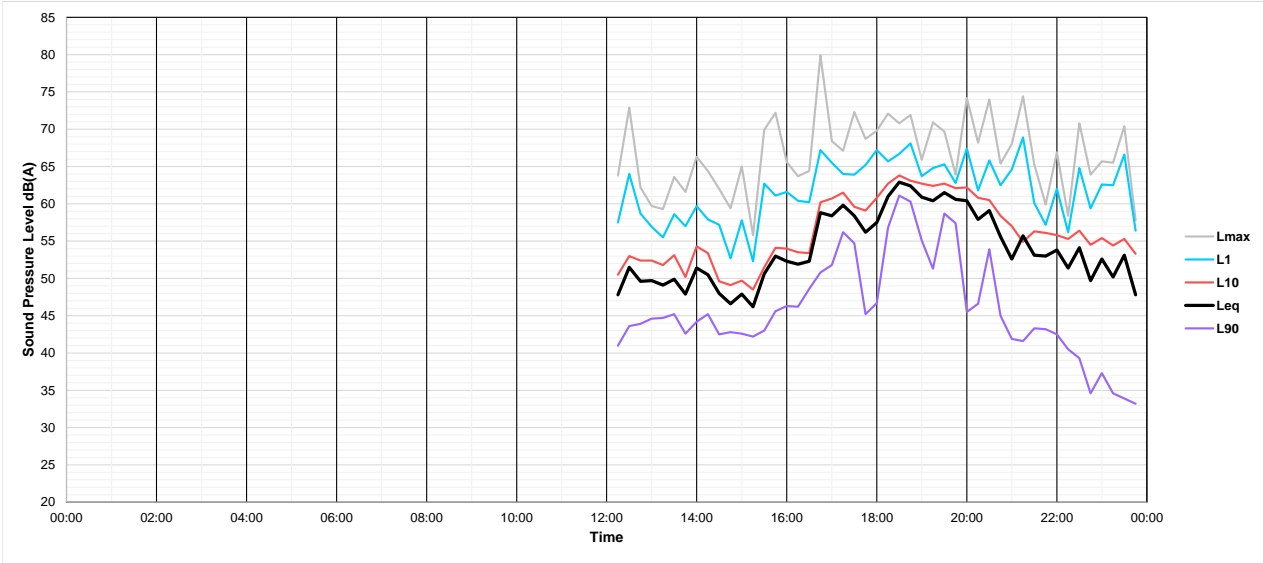
Note

- No noise data available
- Rainfall recorded on this day

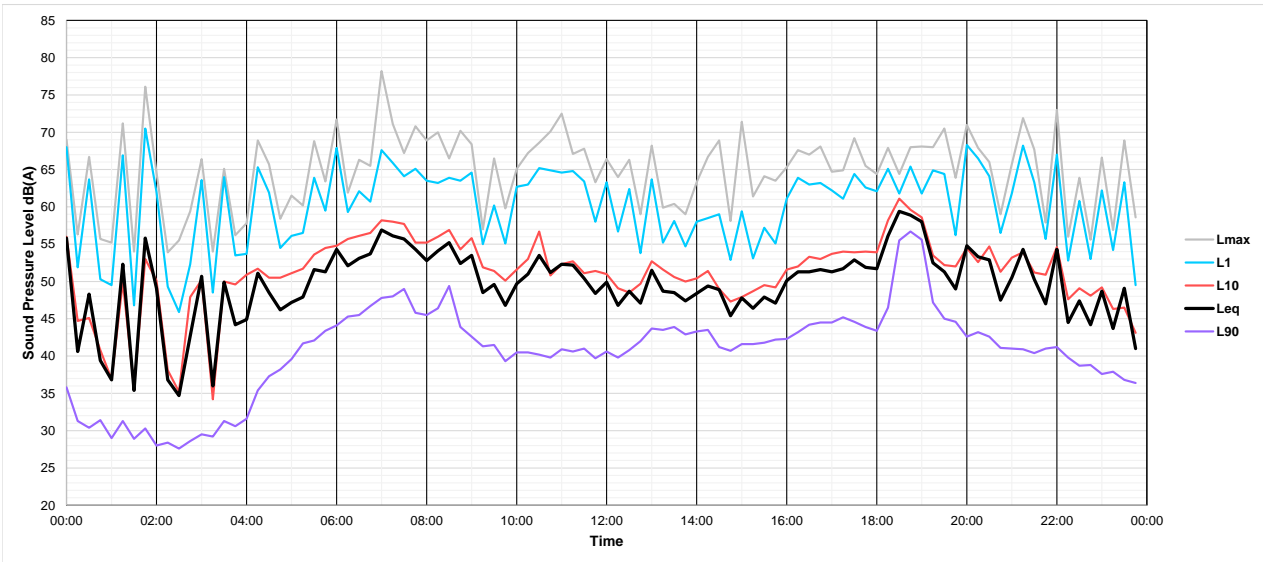
Date	Day	L _{A10,T}			L _{Aeq,T}		L _{A90,T}	
		18hr day 6am-12am	1hr max 6am-12am	Time for 1hr max	18hr day 6am-12am	8hr night 10pm-6am	18hr day 6am-12am	8hr night 10pm-6am
3/05/2018	Thursday	—	60	18:45	—	44	—	31
4/05/2018	Friday	50	55	18:45	48	40	40	30
5/05/2018	Saturday	47	52	18:45	46	40	39	30
6/05/2018	Sunday	47	52	17:45	46	38	38	30
7/05/2018	Monday	46	49	18:45	45	40	38	34
8/05/2018	Tuesday	50	55	17:45	49	41	42	33
9/05/2018	Wednesday	52	58	18:45	50	43	42	32
10/05/2018	Thursday	53	60	13:45	51	43	43	27
Average		49	55		48	41	40	31
Average (weekdays only)		50	56		49	42	41	31



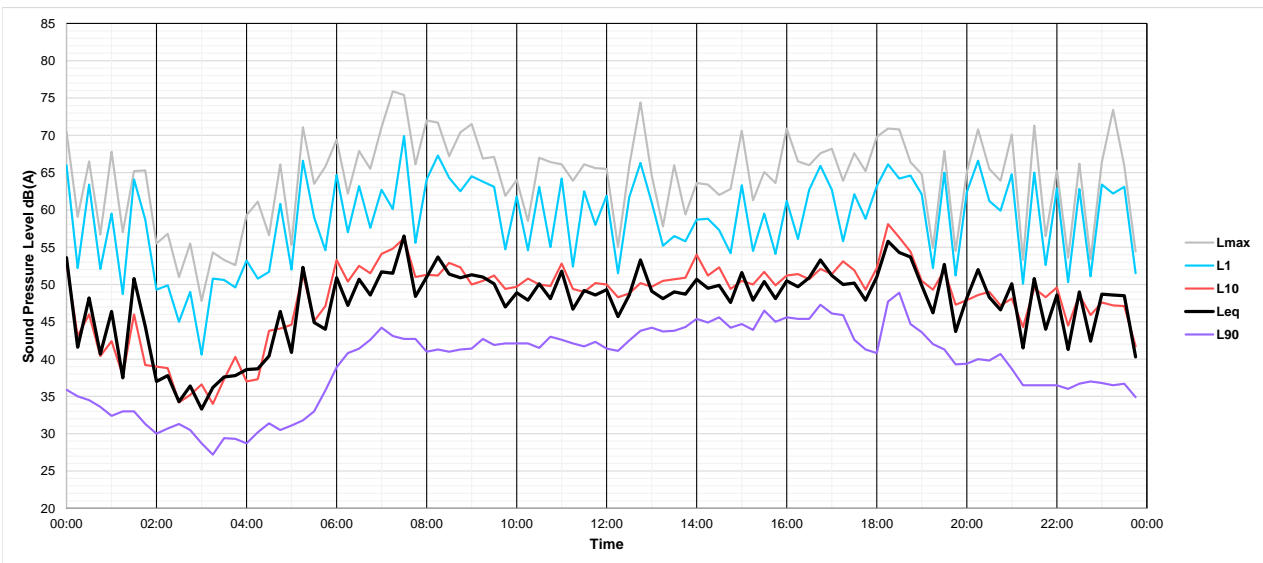
Location 2
Thursday 3 May 2018



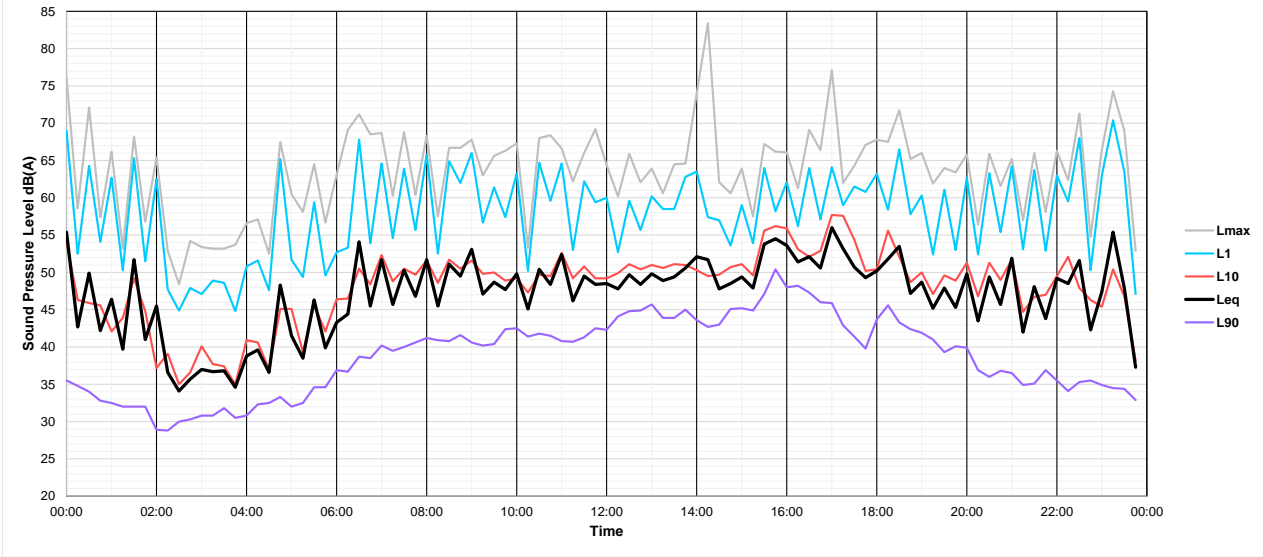
Location 2
Friday 4 May 2018



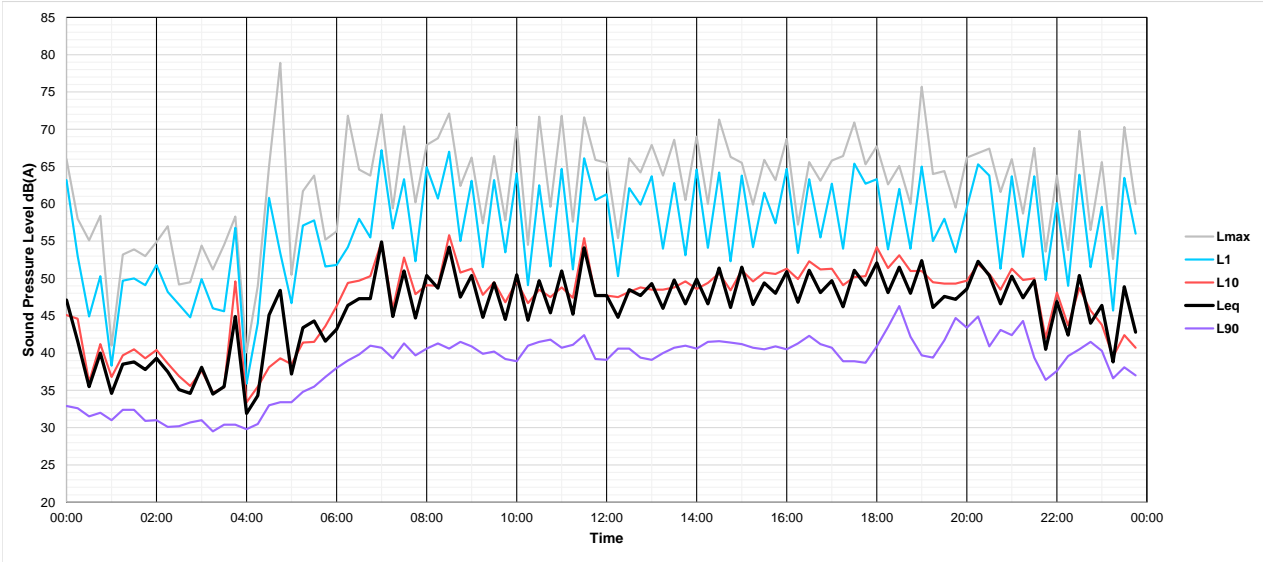
Location 2
Saturday 5 May 2018



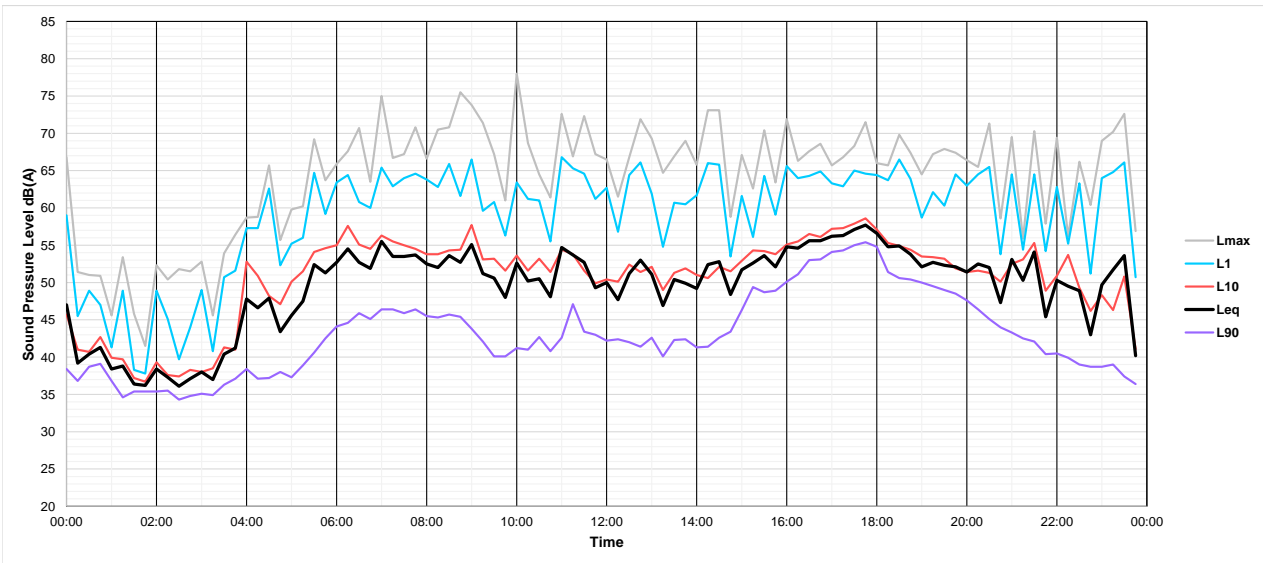
Location 2
Sunday 6 May 2018



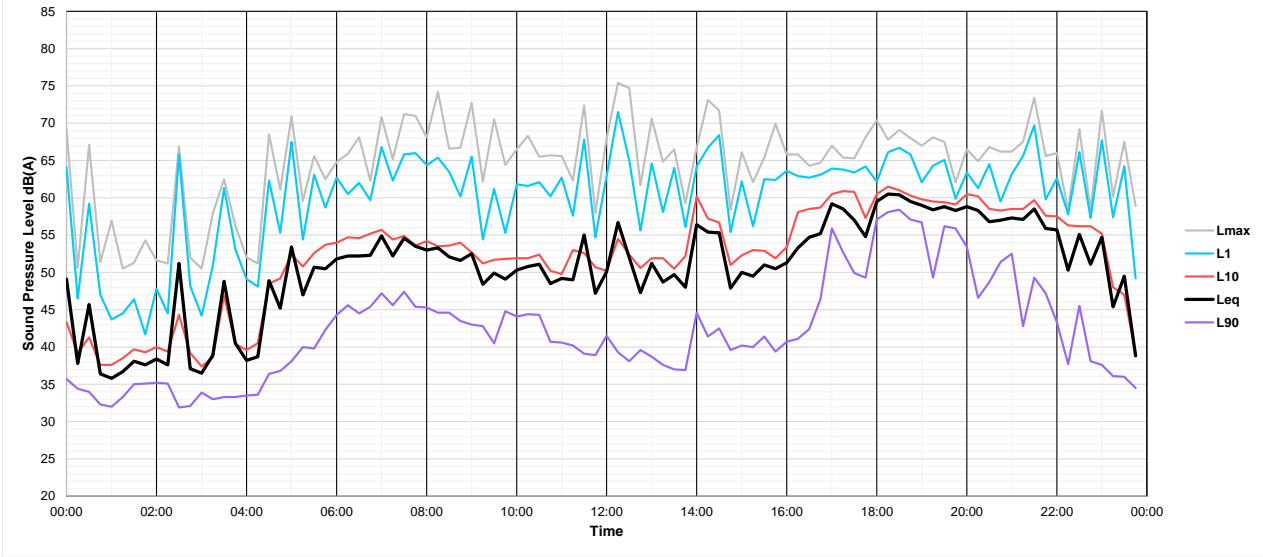
Location 2
Monday 7 May 2018



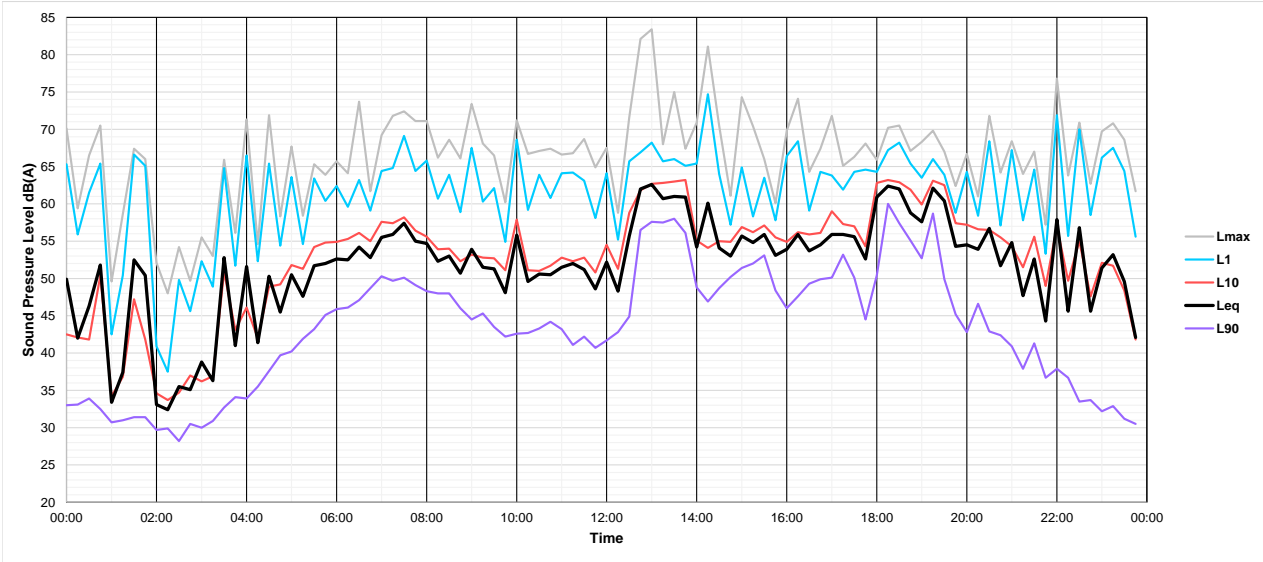
Location 2
Tuesday 8 May 2018



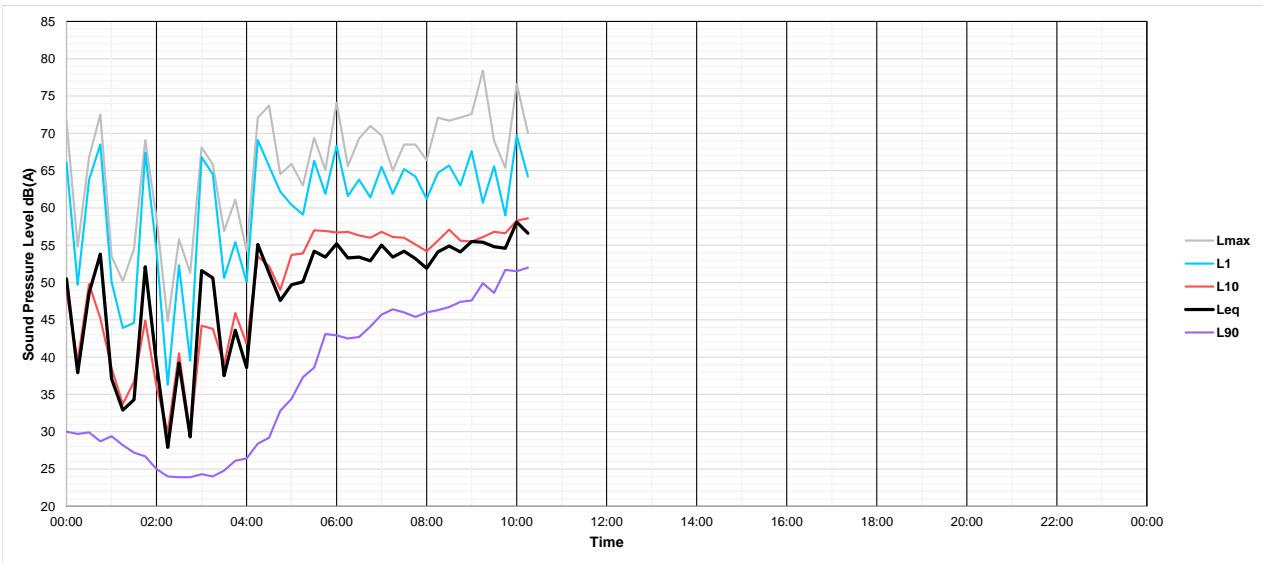
Location 2
Wednesday 9 May 2018



Location 2
Thursday 10 May 2018



Location 2
Friday 11 May 2018



**Unattended Noise Measurements
Location 4**



Traffic Noise Levels

**Logger Location 3 - 275 Callaghan Road,
Narangba
70m south of Callaghan Road
140m east of Burpengary Road**

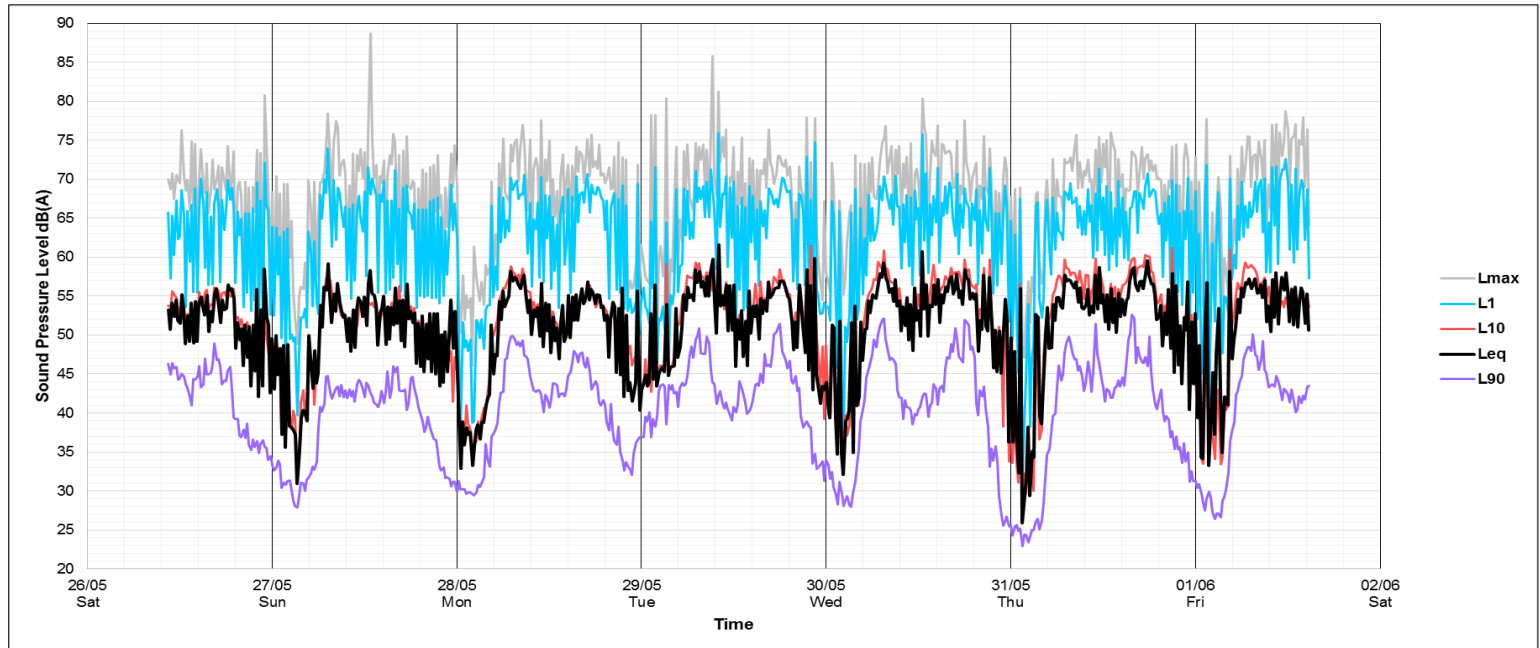
ARL Environmental Noise Logger

Logger Serial Number 87811D
 Measurement Title 20180526_100203
 Measurement started at 26/05/2018 - 10:02:05
 Measurement stopped at 01/06/2018 - 14:47:44
 Frequency Weighting A
 Time Averaging Fast
 Statistical Interval 15 min
 Pre-measurement Ref. 94.0
 Post-measurement Ref. 94.0
 Engineering Units dB SPL

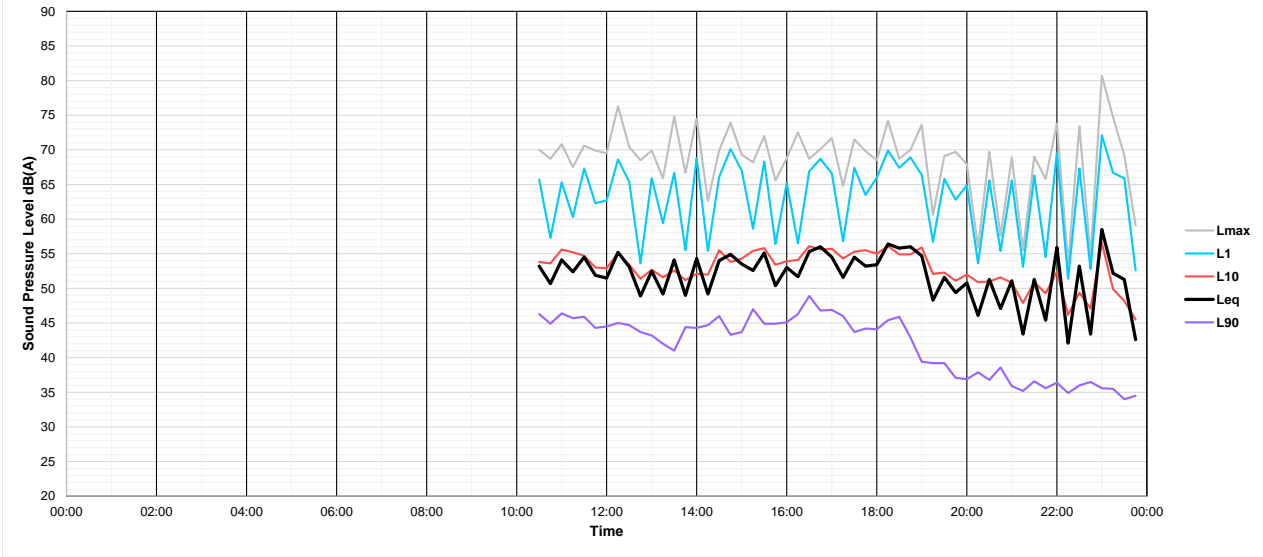
Note

- No noise data available
- Rainfall recorded on this day

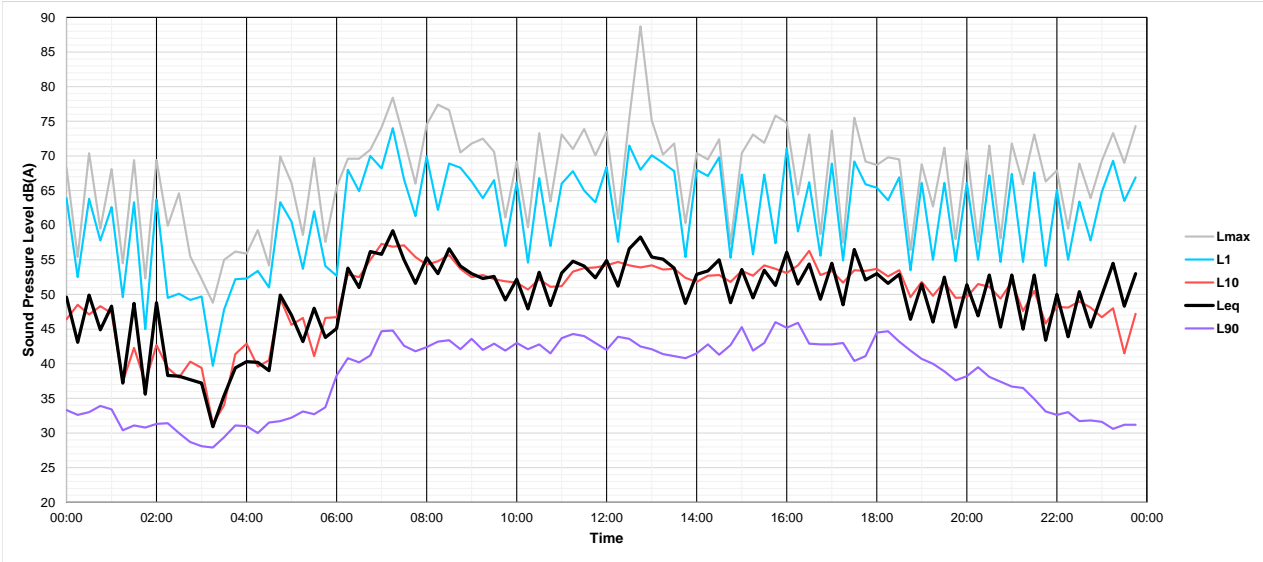
Date	Day	L _{A10,T}			L _{Aeq,T}		L _{A90,T}	
		18hr day 6am-12am	1hr max 6am-12am	Time for 1hr max	18hr day 6am-12am	8hr night 10pm-6am	18hr day 6am-12am	8hr night 10pm-6am
26/05/2018	Saturday	-	52	18:45	-	41	-	29
27/05/2018	Sunday	49	54	7:45	49	40	38	30
28/05/2018	Monday	50	55	7:45	49	44	40	37
29/05/2018	Tuesday	51	56	7:45	50	42	40	31
30/05/2018	Wednesday	52	56	7:45	51	41	40	25
31/05/2018	Thursday	53	57	17:45	51	43	40	29
Average		51	55		50	42	39	30
Average - weekdays, fine weather		52	56		51	42	40	27



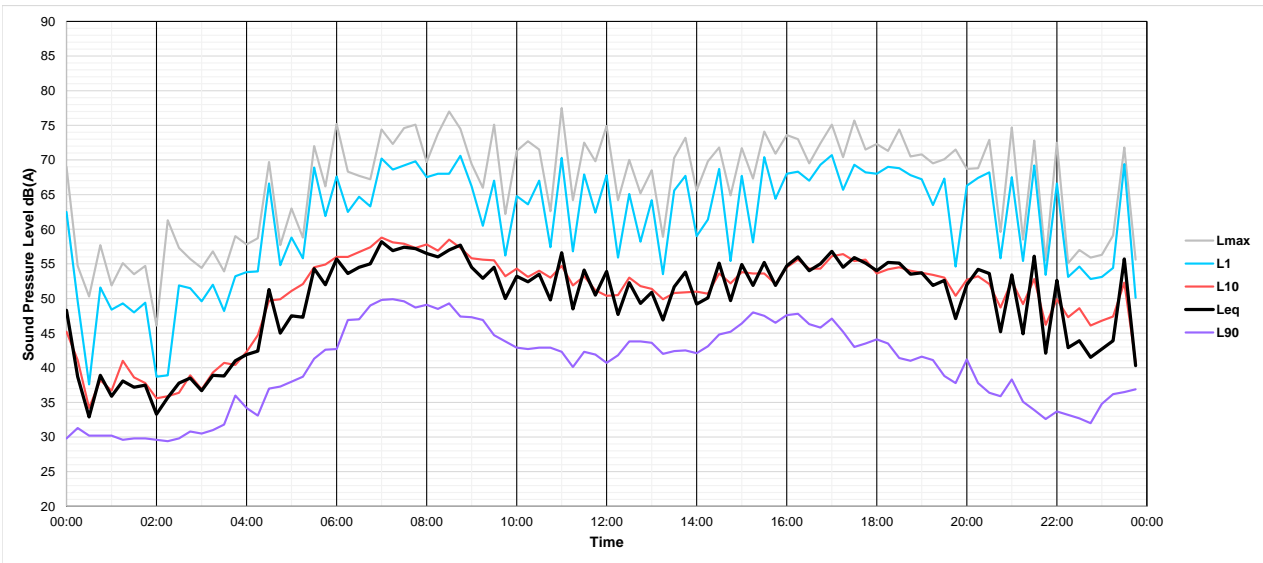
Location 4
Saturday 26 May 2018



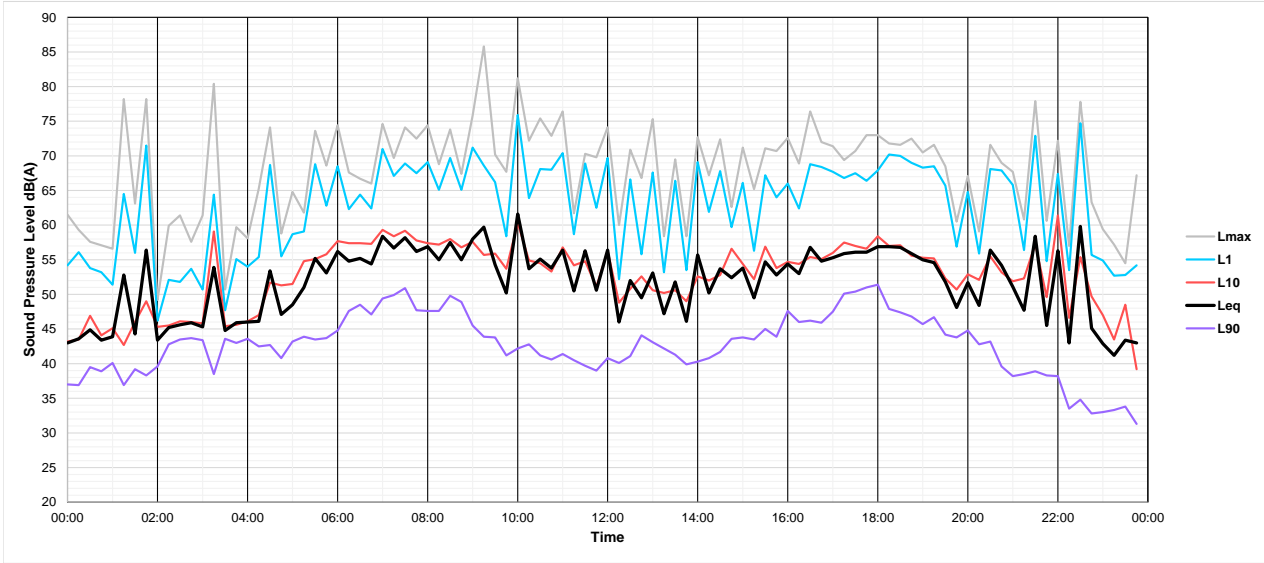
Location 4
Sunday 27 May 2018



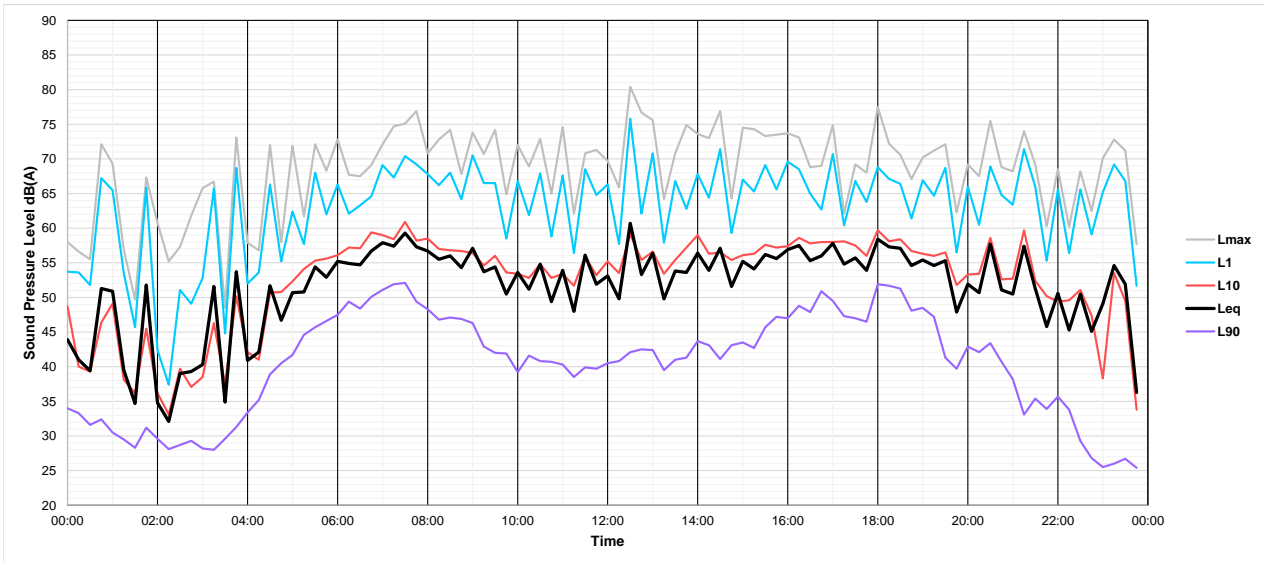
Location 4
Monday 28 May 2018



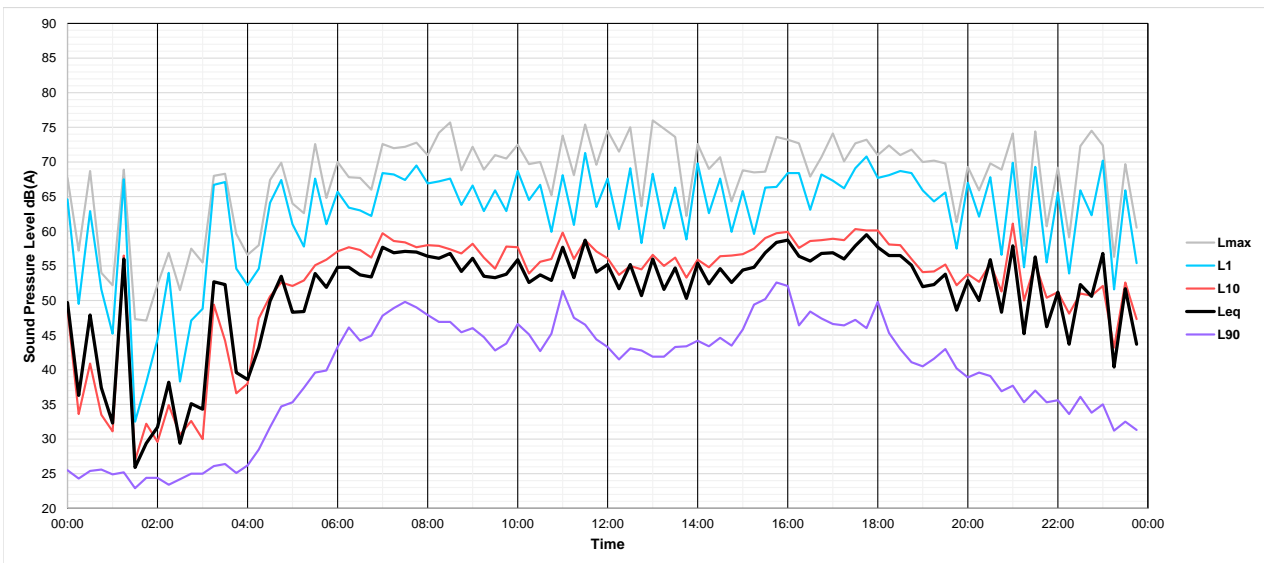
Location 4
Tuesday 29 May 2018

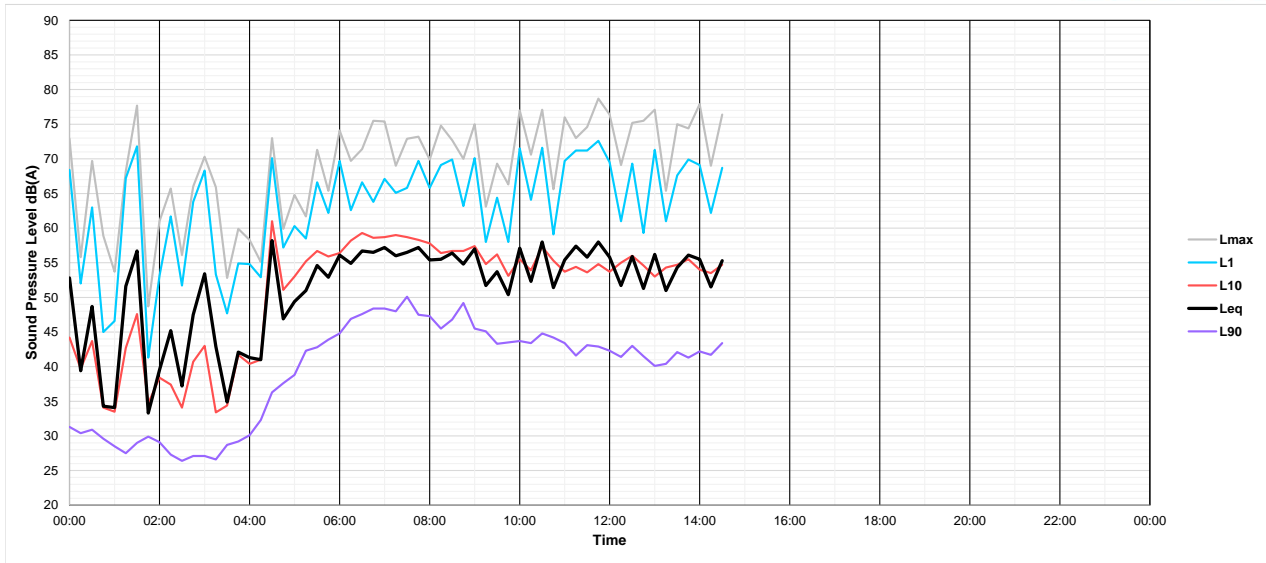


Location 4
Wednesday 30 May 2018



Location 4
Thursday 31 May 2018






Appendix E – Validation of CoRTN Traffic Noise Model

275 Callaghan Rd, Narangba
Calculated Traffic Noise Levels
RTNA Validation 2018

Receiver	Location	L10(18h) dB(A)
Location 1	GF	62
Location 2	GF	49
Location 4	GF	51

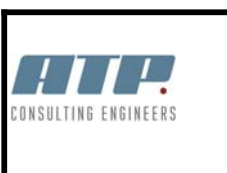
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	ATP Consulting	1
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Appendix F – Tabulated Traffic Noise Levels

275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032


Receiver	Floor	Facade	L10(18h) dB(A)
Lot 1	GF	S	47
Lot 1	F 1	S	53
Lot 1	GF	E	53
Lot 1	F 1	E	56
Lot 1	GF	N	57
Lot 1	F 1	N	60
Lot 1	GF	W	50
Lot 1	F 1	W	55
Lot 2	GF	E	49
Lot 2	F 1	E	55
Lot 2	GF	N	57
Lot 2	F 1	N	60
Lot 2	GF	W	49
Lot 2	F 1	W	55
Lot 2	GF	S	48
Lot 2	F 1	S	53
Lot 3	GF	E	47
Lot 3	F 1	E	55
Lot 3	GF	N	57
Lot 3	F 1	N	60
Lot 3	GF	W	48
Lot 3	F 1	W	55
Lot 3	GF	S	48
Lot 3	F 1	S	54
Lot 4	GF	S	49
Lot 4	F 1	S	54
Lot 4	GF	E	47
Lot 4	F 1	E	55
Lot 4	GF	N	57
Lot 4	F 1	N	60
Lot 4	GF	W	50
Lot 4	F 1	W	56
Lot 5	GF	S	50
Lot 5	F 1	S	55
Lot 5	GF	E	48
Lot 5	F 1	E	56
Lot 5	GF	N	57
Lot 5	F 1	N	60
Lot 5	GF	W	51
Lot 5	F 1	W	56
Lot 6	GF	S	50



ATP Consulting Engineers


275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
Lot 6	F 1	S	55
Lot 6	GF	E	48
Lot 6	F 1	E	56
Lot 6	GF	N	57
Lot 6	F 1	N	60
Lot 6	GF	W	49
Lot 6	F 1	W	56
Lot 7	GF	S	50
Lot 7	F 1	S	55
Lot 7	GF	E	47
Lot 7	F 1	E	56
Lot 7	GF	N	57
Lot 7	F 1	N	60
Lot 7	GF	W	51
Lot 7	F 1	W	57
Lot 8	GF	S	50
Lot 8	F 1	S	56
Lot 8	GF	E	48
Lot 8	F 1	E	57
Lot 8	GF	N	57
Lot 8	F 1	N	61
Lot 8	GF	W	56
Lot 8	F 1	W	59
Lot 9	GF	E	48
Lot 9	F 1	E	56
Lot 9	GF	N	53
Lot 9	F 1	N	58
Lot 9	GF	W	57
Lot 9	F 1	W	59
Lot 9	GF	S	53
Lot 9	F 1	S	57
Lot 10	GF	E	49
Lot 10	F 1	E	56
Lot 10	GF	N	53
Lot 10	F 1	N	58
Lot 10	GF	W	57
Lot 10	F 1	W	59
Lot 10	GF	S	52
Lot 10	F 1	S	57
Lot 11	GF	E	49
Lot 11	F 1	E	57

	ATP Consulting Engineers	2
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
Lot 11	GF	N	52
Lot 11	F 1	N	58
Lot 11	GF	W	58
Lot 11	F 1	W	59
Lot 11	GF	S	52
Lot 11	F 1	S	58
Lot 12	GF	E	49
Lot 12	F 1	E	57
Lot 12	GF	N	53
Lot 12	F 1	N	58
Lot 12	GF	W	58
Lot 12	F 1	W	60
Lot 12	GF	S	51
Lot 12	F 1	S	58
Lot 13	GF	E	50
Lot 13	F 1	E	57
Lot 13	GF	N	52
Lot 13	F 1	N	58
Lot 13	GF	W	58
Lot 13	F 1	W	60
Lot 13	GF	S	51
Lot 13	F 1	S	58
Lot 14	GF	E	50
Lot 14	F 1	E	58
Lot 14	GF	N	53
Lot 14	F 1	N	59
Lot 14	GF	W	58
Lot 14	F 1	W	61
Lot 14	GF	S	51
Lot 14	F 1	S	59
Lot 15	GF	E	50
Lot 15	F 1	E	58
Lot 15	GF	N	52
Lot 15	F 1	N	59
Lot 15	GF	W	59
Lot 15	F 1	W	62
Lot 15	GF	S	58
Lot 15	F 1	S	61
Lot 16	GF	E	43
Lot 16	F 1	E	54
Lot 16	GF	N	50

	ATP Consulting Engineers	3
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
Lot 16	F 1	N	54
Lot 16	GF	W	52
Lot 16	F 1	W	54
Lot 16	GF	S	49
Lot 16	F 1	S	54
Lot 17	GF	E	43
Lot 17	F 1	E	54
Lot 17	GF	N	50
Lot 17	F 1	N	55
Lot 17	GF	W	50
Lot 17	F 1	W	55
Lot 17	GF	S	48
Lot 17	F 1	S	55
Lot 18	GF	E	44
Lot 18	F 1	E	54
Lot 18	GF	N	50
Lot 18	F 1	N	55
Lot 18	GF	W	49
Lot 18	F 1	W	55
Lot 18	GF	S	48
Lot 18	F 1	S	55
Lot 19	GF	N	51
Lot 19	F 1	N	54
Lot 19	GF	W	50
Lot 19	F 1	W	54
Lot 19	GF	S	46
Lot 19	F 1	S	53
Lot 19	GF	E	48
Lot 19	F 1	E	54
Lot 20	GF	N	48
Lot 20	F 1	N	54
Lot 20	GF	W	50
Lot 20	F 1	W	55
Lot 20	GF	S	46
Lot 20	F 1	S	54
Lot 20	GF	E	47
Lot 20	F 1	E	54
Lot 21	GF	N	48
Lot 21	F 1	N	54
Lot 21	GF	W	51
Lot 21	F 1	W	55

	ATP Consulting Engineers	4
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
Lot 21	GF	S	46
Lot 21	F 1	S	54
Lot 21	GF	E	46
Lot 21	F 1	E	54
Lot 22	GF	N	48
Lot 22	F 1	N	54
Lot 22	GF	W	50
Lot 22	F 1	W	55
Lot 22	GF	S	50
Lot 22	F 1	S	54
Lot 22	GF	E	45
Lot 22	F 1	E	54
Lot 23	GF	E	43
Lot 23	F 1	E	55
Lot 23	GF	N	49
Lot 23	F 1	N	55
Lot 23	GF	W	49
Lot 23	F 1	W	56
Lot 23	GF	S	51
Lot 23	F 1	S	55
Lot 24	GF	E	43
Lot 24	F 1	E	55
Lot 24	GF	N	49
Lot 24	F 1	N	55
Lot 24	GF	W	49
Lot 24	F 1	W	56
Lot 24	GF	S	52
Lot 24	F 1	S	56
Lot 25	GF	E	43
Lot 25	F 1	E	55
Lot 25	GF	N	48
Lot 25	F 1	N	55
Lot 25	GF	W	51
Lot 25	F 1	W	56
Lot 25	GF	S	52
Lot 25	F 1	S	56
Lot 26	GF	E	44
Lot 26	F 1	E	55
Lot 26	GF	N	47
Lot 26	F 1	N	55
Lot 26	GF	W	53

	ATP Consulting Engineers	5
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
Lot 26	F 1	W	56
Lot 26	GF	S	53
Lot 26	F 1	S	56
Lot 27	GF	N	51
Lot 27	F 1	N	58
Lot 27	GF	W	56
Lot 27	F 1	W	58
Lot 27	GF	S	54
Lot 27	F 1	S	58
Lot 27	GF	E	45
Lot 27	F 1	E	57
Lot 28	GF	N	51
Lot 28	F 1	N	57
Lot 28	GF	W	50
Lot 28	F 1	W	57
Lot 28	GF	S	53
Lot 28	F 1	S	57
Lot 28	GF	E	44
Lot 28	F 1	E	56
Lot 29	GF	N	51
Lot 29	F 1	N	56
Lot 29	GF	W	48
Lot 29	F 1	W	57
Lot 29	GF	S	52
Lot 29	F 1	S	56
Lot 29	GF	E	43
Lot 29	F 1	E	55
Lot 30	GF	N	50
Lot 30	F 1	N	56
Lot 30	GF	W	48
Lot 30	F 1	W	55
Lot 30	GF	S	51
Lot 30	F 1	S	55
Lot 30	GF	E	43
Lot 30	F 1	E	55
Lot 31	GF	N	50
Lot 31	F 1	N	55
Lot 31	GF	W	48
Lot 31	F 1	W	54
Lot 31	GF	S	51
Lot 31	F 1	S	54

	ATP Consulting Engineers	6
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
 RTNA 2032


Receiver	Floor	Facade	L10(18h) dB(A)
Lot 31	GF	E	43
Lot 31	F 1	E	54
Lot 32	GF	N	50
Lot 32	F 1	N	55
Lot 32	GF	W	50
Lot 32	F 1	W	55
Lot 32	GF	S	51
Lot 32	F 1	S	55
Lot 32	GF	E	44
Lot 32	F 1	E	54
POS_Lot 1	GF		56
POS_Lot 2	GF		56
POS_Lot 3	GF		56
POS_Lot 4	GF		56
POS_Lot 5	GF		56
POS_Lot 6	GF		56
POS_Lot 7	GF		57
POS_Lot 8	GF		57
POS_Lot 9	GF		55
POS_Lot 10	GF		55
POS_Lot 11	GF		56
POS_Lot 12	GF		56
POS_Lot 13	GF		55
POS_Lot 14	GF		55
POS_Lot 15	GF		56
POS_Lot 16	GF		48
POS_Lot 17	GF		47
POS_Lot 18	GF		47
POS_Lot 19	GF		48
POS_Lot 20	GF		47
POS_Lot 21	GF		48
POS_Lot 22	GF		47
POS_Lot 23	GF		48
POS_Lot 24	GF		47
POS_Lot 25	GF		47
POS_Lot 26	GF		47
POS_Lot 27	GF		53
POS_Lot 28	GF		51
POS_Lot 29	GF		50
POS_Lot 30	GF		49

	ATP Consulting Engineers	7
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275 Callaghan Rd, Narangba
Calculated Facade Traffic Noise Levels
RTNA 2032

Receiver	Floor	Facade	L10(18h) dB(A)
POS_Lot 31	GF		48
POS_Lot 32	GF		49

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	ATP Consulting Engineers	8
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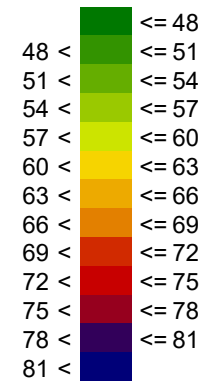
Appendix G – Traffic Noise Contours

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Traffic Noise Modelling
Year 2032**

Ground Floor (1.8m AGL)

Traffic noise level
Facade-adjusted
Adjusted for Queensland Conditions¹
L_{10,18hr} dB(A)



Legend

- Lot line
- Paved surface
- Proposed development
- Road surface
- 1.8m noise barrier fence

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

¹ As per procedure of TMR Code of Practice Volume 1



LOT 99 RP907550

Callaghan Rd

New Road

Future Road

Burpengary Rd

900 (LOCAL PARK)

New Road

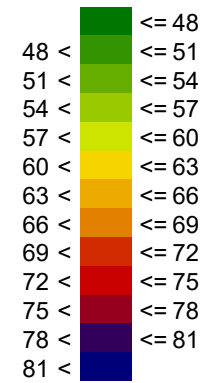
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Traffic Noise Modelling
Year 2032**

First Floor (4.6m AGL)

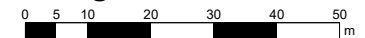
Traffic noise level
Facade-adjusted
Adjusted for Queensland Conditions¹
L_{10,18hr} dB(A)



Legend

- Lot line
- Paved surface
- Proposed development
- Road surface
- 1.8m noise barrier fence

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

¹ As per procedure of TMR Code of Practice Volume 1

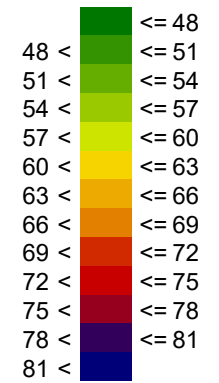


**Proposed Residential Development
275 Callaghan Road, Narangba**

**Traffic Noise Modelling
Year 2032**

Ground Floor (1.5m AGL)

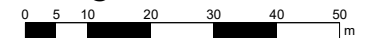
Traffic noise level
Free field
Adjusted for Queensland Conditions¹
L_{10,18hr} dB(A)



Legend

- Lot line
- ▭ Paved surface
- * Point receiver
- ▭ Proposed development
- ▭ Road surface
- ▬ 1.8m noise barrer fence

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

¹ As per procedure of TMR Code of Practice Volume 1



**Proposed Residential Development
275 Callaghan Road, Narangba**

**Traffic Noise Modelling
Year 2032**

Ground Floor (1.8m AGL)

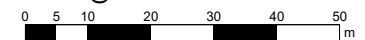
QDC MP4.4 Noise Category
Facade-adjusted
Adjusted for Queensland Conditions¹



Legend

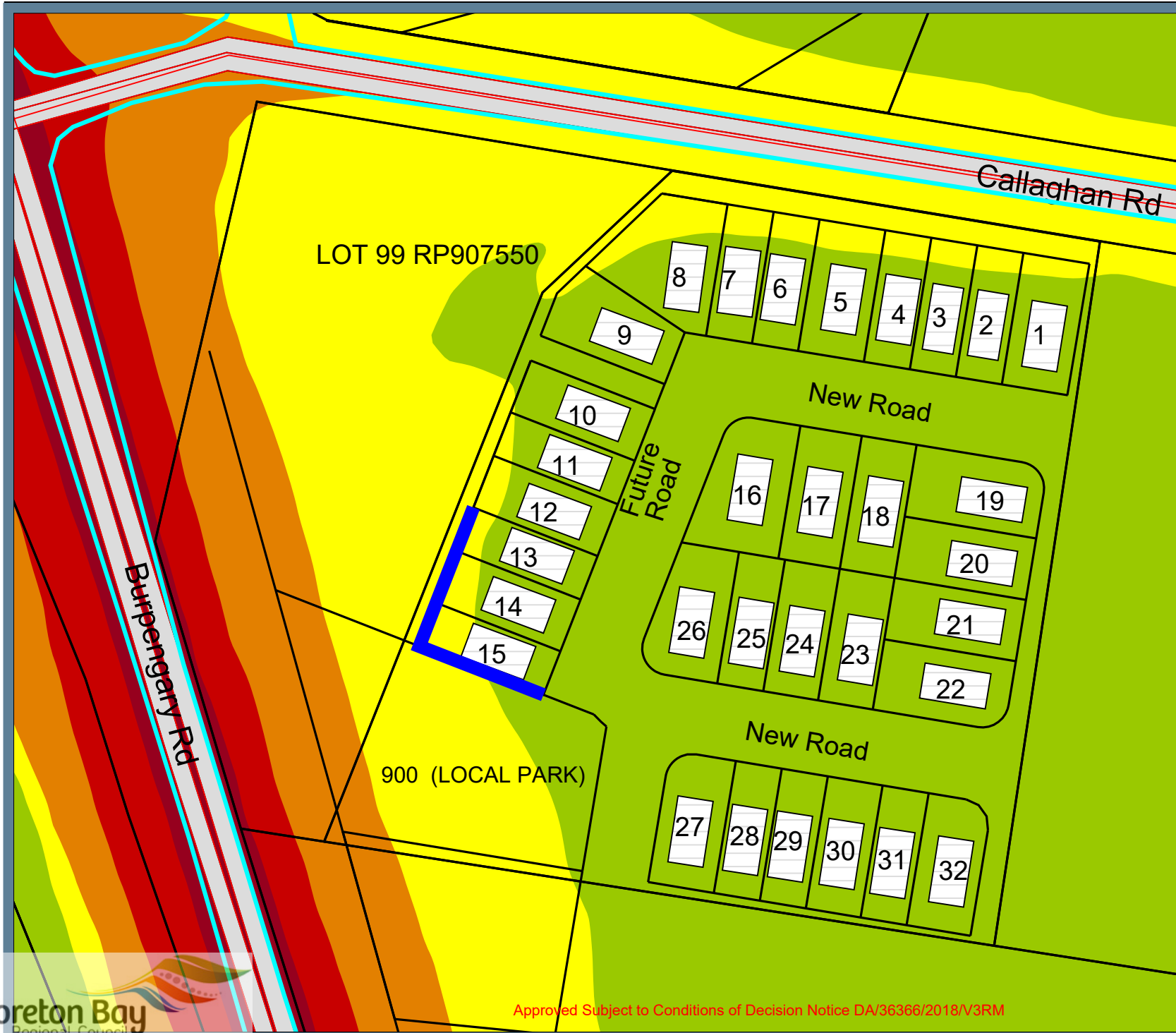
- Lot line
- ▭ Paved surface
- ▭ Proposed development
- ▭ Road surface
- ▬ 1.8m noise barrier fence

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

¹ As per procedure of TMR Code of Practice Volume 1



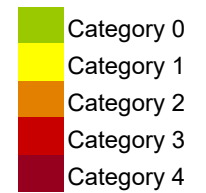
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Traffic Noise Modelling
Year 2032**

First Floor (4.6m AGL)

QDC MP4.4 Noise Category
Facade-adjusted
Adjusted for Queensland Conditions¹



Legend

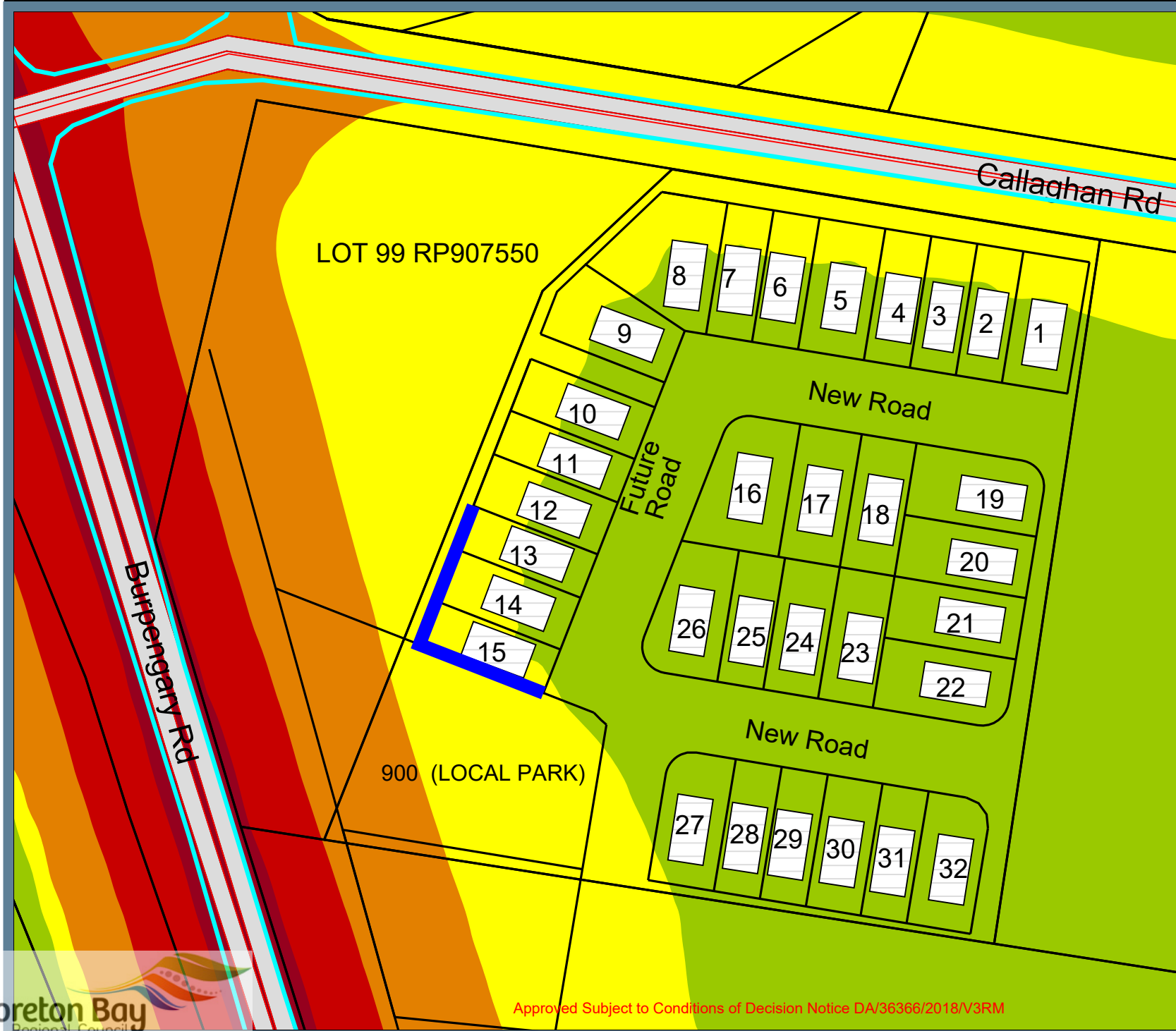
- Lot line
- Paved surface
- Proposed development
- Road surface
- 1.8m noise barrier fence

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

¹ As per procedure of TMR Code of Practice Volume 1




Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

Appendix H – Validation of Nord 2000 Railway Noise Model

275 Callaghan Rd, Narangba
Railway Noise Validation 2018

Receiver	Leq,24hr dB(A)	Lmax dB(A)
Location 1	59	85
Location 2	49	72
Location 4	51	74

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	ATP Consulting Engineers	1
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Appendix I – Tabulated Railway Noise Levels

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

Receiver	Floor	Facade	Leq,24hr	Lmax
			dB(A)	dB(A)
Lot 1	GF	S	48	72
Lot 1	F 1	S	49	72
Lot 1	GF	E	32	55
Lot 1	F 1	E	49	73
Lot 1	GF	N	35	54
Lot 1	F 1	N	49	72
Lot 1	GF	W	43	66
Lot 1	F 1	W	49	72
Lot 2	GF	E	43	68
Lot 2	F 1	E	50	73
Lot 2	GF	N	36	55
Lot 2	F 1	N	50	73
Lot 2	GF	W	41	64
Lot 2	F 1	W	50	73
Lot 2	GF	S	48	73
Lot 2	F 1	S	49	73
Lot 3	GF	E	42	63
Lot 3	F 1	E	51	74
Lot 3	GF	N	35	56
Lot 3	F 1	N	50	74
Lot 3	GF	W	42	64
Lot 3	F 1	W	50	73
Lot 3	GF	S	49	72
Lot 3	F 1	S	49	72
Lot 4	GF	S	49	72
Lot 4	F 1	S	50	73
Lot 4	GF	E	43	64
Lot 4	F 1	E	51	74
Lot 4	GF	N	36	57
Lot 4	F 1	N	51	74
Lot 4	GF	W	45	66
Lot 4	F 1	W	50	74
Lot 5	GF	S	49	71
Lot 5	F 1	S	50	73
Lot 5	GF	E	44	68
Lot 5	F 1	E	51	74
Lot 5	GF	N	37	57
Lot 5	F 1	N	51	74
Lot 5	GF	W	46	66
Lot 5	F 1	W	50	73
Lot 6	GF	S	49	70
Lot 6	F 1	S	51	74
Lot 6	GF	E	44	68
Lot 6	F 1	E	51	74
Lot 6	GF	N	37	57
Lot 6	F 1	N	52	74
Lot 6	GF	W	43	62
Lot 6	F 1	W	51	73
Lot 7	GF	S	49	68
Lot 7	F 1	S	51	73
Lot 7	GF	E	42	63

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

Receiver	Floor	Facade	Leq,24hr	Lmax
			dB(A)	dB(A)
Lot 7	F 1	E	52	74
Lot 7	GF	N	38	57
Lot 7	F 1	N	52	74
Lot 7	GF	W	45	64
Lot 7	F 1	W	51	73
Lot 8	GF	S	47	67
Lot 8	F 1	S	51	74
Lot 8	GF	E	44	66
Lot 8	F 1	E	52	75
Lot 8	GF	N	38	57
Lot 8	F 1	N	52	75
Lot 8	GF	W	47	71
Lot 8	F 1	W	51	74
Lot 9	GF	E	48	69
Lot 9	F 1	E	53	76
Lot 9	GF	N	37	59
Lot 9	F 1	N	53	76
Lot 9	GF	W	51	74
Lot 9	F 1	W	52	76
Lot 9	GF	S	51	75
Lot 9	F 1	S	52	75
Lot 10	GF	E	49	72
Lot 10	F 1	E	54	78
Lot 10	GF	N	45	66
Lot 10	F 1	N	54	78
Lot 10	GF	W	52	76
Lot 10	F 1	W	53	77
Lot 10	GF	S	49	72
Lot 10	F 1	S	53	76
Lot 11	GF	E	49	70
Lot 11	F 1	E	54	77
Lot 11	GF	N	49	73
Lot 11	F 1	N	54	78
Lot 11	GF	W	52	77
Lot 11	F 1	W	54	77
Lot 11	GF	S	49	71
Lot 11	F 1	S	53	77
Lot 12	GF	E	49	71
Lot 12	F 1	E	54	78
Lot 12	GF	N	49	73
Lot 12	F 1	N	55	79
Lot 12	GF	W	53	77
Lot 12	F 1	W	54	78
Lot 12	GF	S	49	73
Lot 12	F 1	S	54	77
Lot 13	GF	E	48	71
Lot 13	F 1	E	55	79
Lot 13	GF	N	48	74
Lot 13	F 1	N	55	79
Lot 13	GF	W	53	77
Lot 13	F 1	W	54	78

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

Receiver	Floor	Facade	Leq,24hr	Lmax
			dB(A)	dB(A)
Lot 13	GF	S	49	74
Lot 13	F 1	S	54	77
Lot 14	GF	E	48	70
Lot 14	F 1	E	55	80
Lot 14	GF	N	50	75
Lot 14	F 1	N	56	80
Lot 14	GF	W	53	78
Lot 14	F 1	W	54	78
Lot 14	GF	S	49	73
Lot 14	F 1	S	54	78
Lot 15	GF	E	48	68
Lot 15	F 1	E	56	80
Lot 15	GF	N	49	72
Lot 15	F 1	N	56	80
Lot 15	GF	W	53	78
Lot 15	F 1	W	54	78
Lot 15	GF	S	54	79
Lot 15	F 1	S	54	78
Lot 16	GF	E	45	68
Lot 16	F 1	E	54	77
Lot 16	GF	N	45	67
Lot 16	F 1	N	54	78
Lot 16	GF	W	49	71
Lot 16	F 1	W	54	76
Lot 16	GF	S	48	70
Lot 16	F 1	S	53	75
Lot 17	GF	E	45	70
Lot 17	F 1	E	54	77
Lot 17	GF	N	46	69
Lot 17	F 1	N	53	77
Lot 17	GF	W	50	72
Lot 17	F 1	W	53	76
Lot 17	GF	S	50	74
Lot 17	F 1	S	52	75
Lot 18	GF	E	45	69
Lot 18	F 1	E	52	75
Lot 18	GF	N	46	68
Lot 18	F 1	N	51	74
Lot 18	GF	W	48	69
Lot 18	F 1	W	51	75
Lot 18	GF	S	50	74
Lot 18	F 1	S	52	74
Lot 19	GF	N	44	68
Lot 19	F 1	N	50	73
Lot 19	GF	W	47	70
Lot 19	F 1	W	50	74
Lot 19	GF	S	45	70
Lot 19	F 1	S	49	73
Lot 19	GF	E	31	55
Lot 19	F 1	E	49	72

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

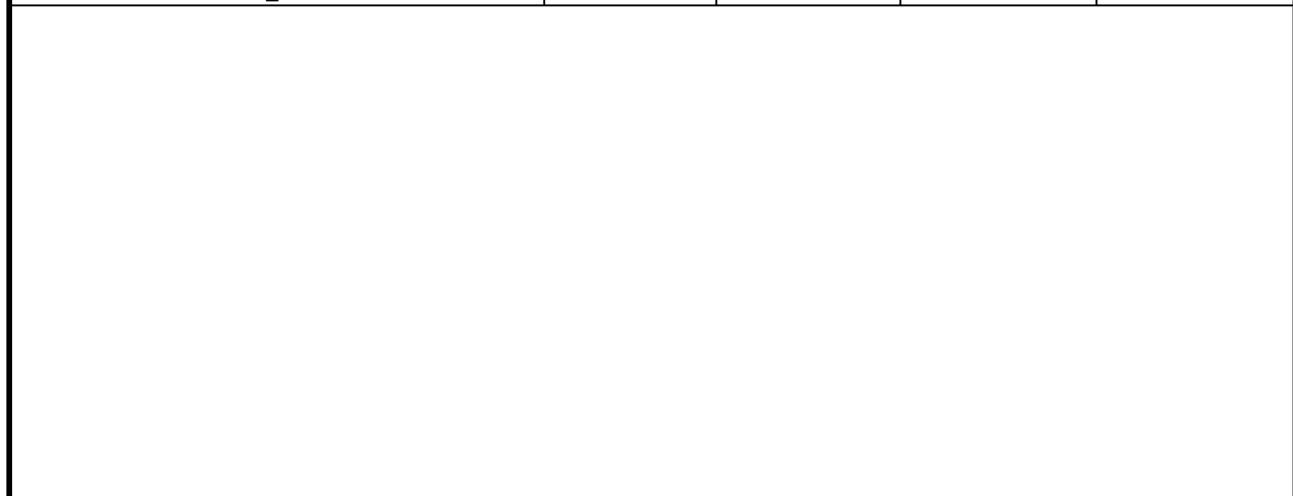
Receiver	Floor	Facade	Leq,24hr	Lmax
			dB(A)	dB(A)
Lot 20	GF	N	43	65
Lot 20	F 1	N	50	73
Lot 20	GF	W	49	72
Lot 20	F 1	W	50	73
Lot 20	GF	S	46	68
Lot 20	F 1	S	50	73
Lot 20	GF	E	32	55
Lot 20	F 1	E	50	73
Lot 21	GF	N	44	65
Lot 21	F 1	N	50	73
Lot 21	GF	W	49	71
Lot 21	F 1	W	51	74
Lot 21	GF	S	44	69
Lot 21	F 1	S	50	74
Lot 21	GF	E	32	55
Lot 21	F 1	E	50	73
Lot 22	GF	N	43	67
Lot 22	F 1	N	51	74
Lot 22	GF	W	49	73
Lot 22	F 1	W	51	74
Lot 22	GF	S	47	71
Lot 22	F 1	S	51	74
Lot 22	GF	E	33	56
Lot 22	F 1	E	51	73
Lot 23	GF	E	45	70
Lot 23	F 1	E	52	75
Lot 23	GF	N	47	69
Lot 23	F 1	N	52	75
Lot 23	GF	W	48	69
Lot 23	F 1	W	52	75
Lot 23	GF	S	50	74
Lot 23	F 1	S	51	74
Lot 24	GF	E	45	68
Lot 24	F 1	E	54	77
Lot 24	GF	N	48	69
Lot 24	F 1	N	54	77
Lot 24	GF	W	46	70
Lot 24	F 1	W	53	76
Lot 24	GF	S	50	75
Lot 24	F 1	S	52	75
Lot 25	GF	E	46	70
Lot 25	F 1	E	55	78
Lot 25	GF	N	48	68
Lot 25	F 1	N	55	79
Lot 25	GF	W	49	71
Lot 25	F 1	W	54	77
Lot 25	GF	S	51	76
Lot 25	F 1	S	53	76
Lot 26	GF	E	47	71
Lot 26	F 1	E	56	79
Lot 26	GF	N	46	69

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

Receiver	Floor	Facade	Leq,24hr	Lmax
			dB(A)	dB(A)
Lot 26	F 1	N	55	80
Lot 26	GF	W	51	74
Lot 26	F 1	W	55	78
Lot 26	GF	S	51	75
Lot 26	F 1	S	54	76
Lot 27	GF	N	47	66
Lot 27	F 1	N	55	79
Lot 27	GF	W	53	77
Lot 27	F 1	W	54	78
Lot 27	GF	S	51	77
Lot 27	F 1	S	53	77
Lot 27	GF	E	47	71
Lot 27	F 1	E	55	79
Lot 28	GF	N	47	65
Lot 28	F 1	N	54	78
Lot 28	GF	W	47	69
Lot 28	F 1	W	54	77
Lot 28	GF	S	51	76
Lot 28	F 1	S	53	75
Lot 28	GF	E	43	67
Lot 28	F 1	E	55	78
Lot 29	GF	N	47	63
Lot 29	F 1	N	54	77
Lot 29	GF	W	44	66
Lot 29	F 1	W	53	77
Lot 29	GF	S	50	75
Lot 29	F 1	S	53	75
Lot 29	GF	E	45	69
Lot 29	F 1	E	54	76
Lot 30	GF	N	46	64
Lot 30	F 1	N	53	77
Lot 30	GF	W	44	67
Lot 30	F 1	W	52	75
Lot 30	GF	S	49	74
Lot 30	F 1	S	52	74
Lot 30	GF	E	44	67
Lot 30	F 1	E	53	75
Lot 31	GF	N	46	66
Lot 31	F 1	N	53	77
Lot 31	GF	W	44	67
Lot 31	F 1	W	53	76
Lot 31	GF	S	48	73
Lot 31	F 1	S	52	74
Lot 31	GF	E	46	70
Lot 31	F 1	E	53	76
Lot 32	GF	N	45	63
Lot 32	F 1	N	51	73
Lot 32	GF	W	47	69
Lot 32	F 1	W	51	74
Lot 32	GF	S	48	73
Lot 32	F 1	S	51	74

275 Callaghan Rd, Narangba
Assessed Receiver Levels - Current Railway Traffic

Receiver	Floor	Facade	Leq,24hr dB(A)	Lmax dB(A)
Lot 32	GF	E	32	55
Lot 32	F 1	E	50	74
POS_Lot 1	GF		42	64
POS_Lot 2	GF		43	64
POS_Lot 3	GF		42	63
POS_Lot 4	GF		43	66
POS_Lot 5	GF		44	67
POS_Lot 6	GF		45	67
POS_Lot 7	GF		46	68
POS_Lot 8	GF		48	73
POS_Lot 9	GF		52	76
POS_Lot 10	GF		53	77
POS_Lot 11	GF		54	78
POS_Lot 12	GF		55	79
POS_Lot 13	GF		55	80
POS_Lot 14	GF		55	80
POS_Lot 15	GF		55	79
POS_Lot 16	GF		50	73
POS_Lot 17	GF		51	75
POS_Lot 18	GF		51	74
POS_Lot 19	GF		48	71
POS_Lot 20	GF		51	74
POS_Lot 21	GF		50	72
POS_Lot 22	GF		50	74
POS_Lot 23	GF		51	73
POS_Lot 24	GF		51	74
POS_Lot 25	GF		51	73
POS_Lot 26	GF		50	74
POS_Lot 27	GF		53	77
POS_Lot 28	GF		53	77
POS_Lot 29	GF		52	76
POS_Lot 30	GF		51	75
POS_Lot 31	GF		49	73
POS_Lot 32	GF		50	73



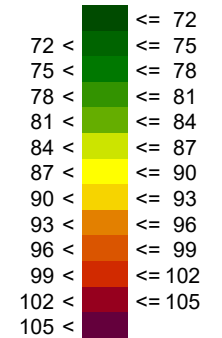
Appendix J – Railway Noise Contours

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**Ground Floor
(1.8m AGL)**

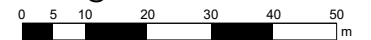
Railway noise level
Facade adjusted
 $L_{max}(SEM)$ dB(A)



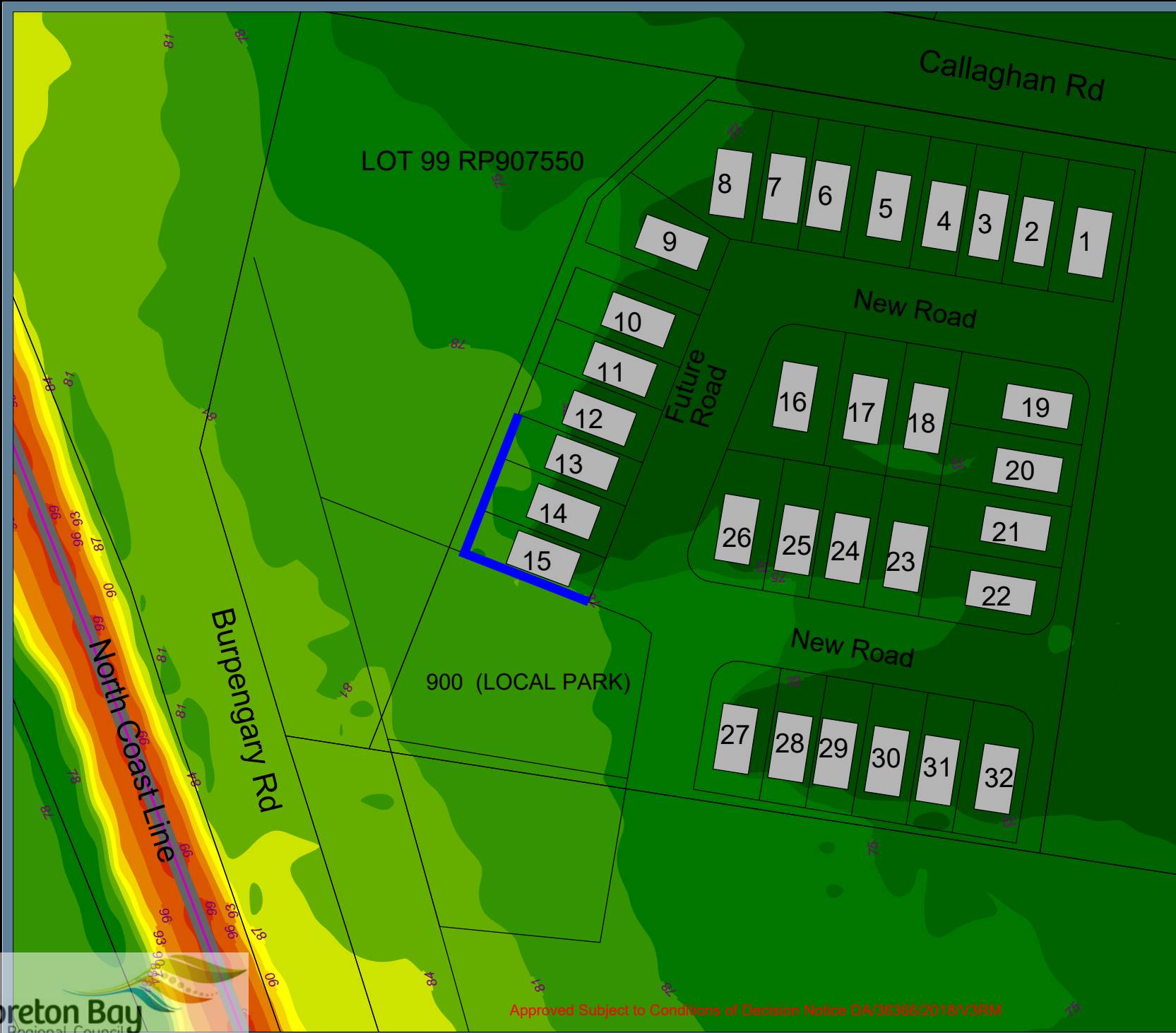
Legend

- Lot boundary
- Proposed development
- Railway noise emission line
- 1.8m high noise barrier fence
- Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021 8.2



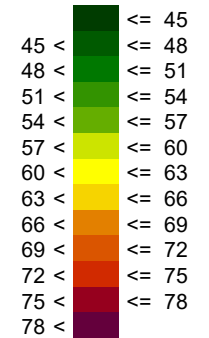
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**Ground Floor
(1.8m AGL)**

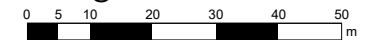
Railway noise level
Facade adjusted
 $L_{eq(24hr)}$ dB(A)



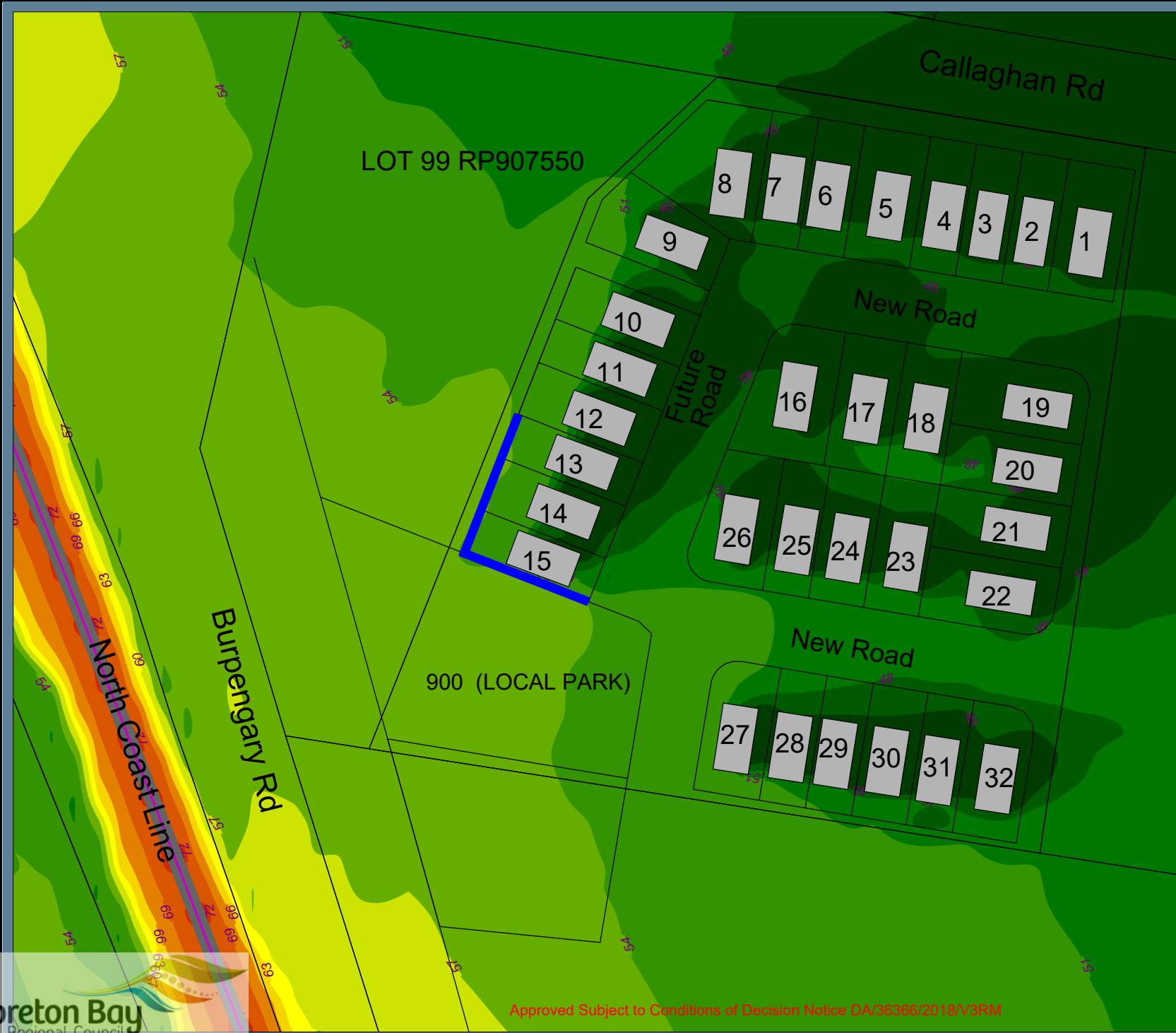
Legend

- Lot boundary
- Proposed development
- Railway noise emission line
- 1.8m high noise barrier fence
- Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021
EN 8.2



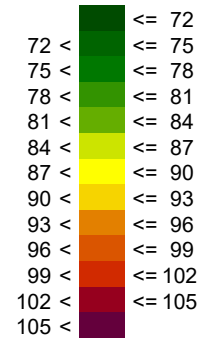
Approved Subject to Conditions of Decision Notice DA/36386/2018/v3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**First Floor
(4.6m AGL)**

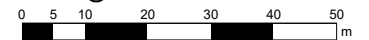
Railway noise level
Facade adjusted
 $L_{max}(SEM)$ dB(A)



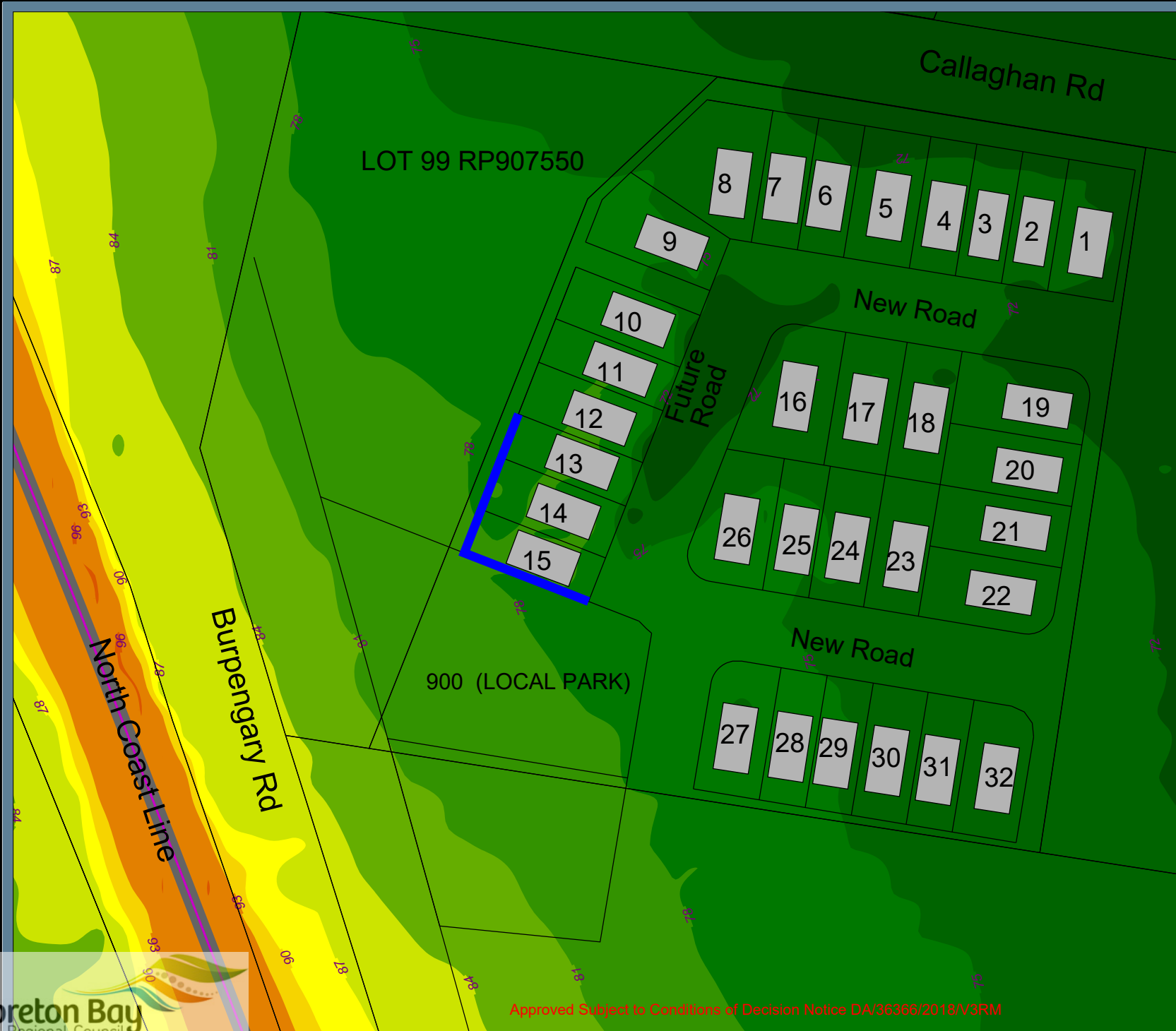
Legend

- Lot boundary
- Proposed development
- Railway noise emission line
- 1.8m high noise barrier fence
- Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021 8.2



LOT 99 RP907550

900 (LOCAL PARK)

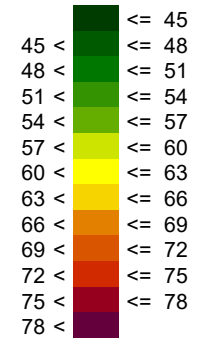
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**






**Railway Noise Modelling
Year 2032**

**First Floor
(4.6m AGL)**

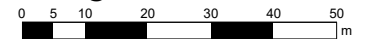
Railway noise level
Facade adjusted
 $L_{eq(24hr)}$ dB(A)



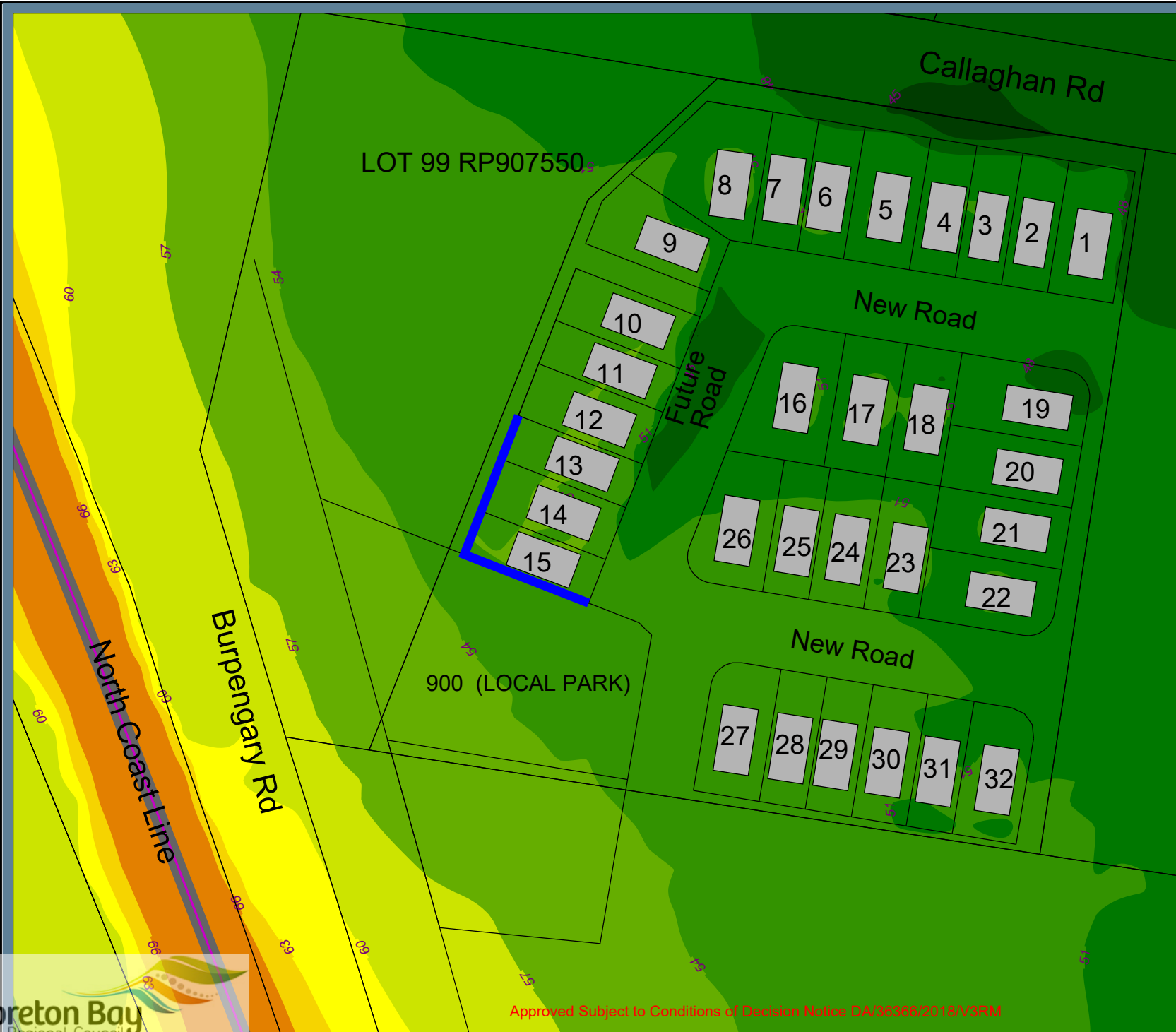
Legend

-  Lot boundary
-  Proposed development
-  Railway noise emission line
-  1.8m high noise barrier fence
-  Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021 8.2



LOT 99 RP907550

900 (LOCAL PARK)

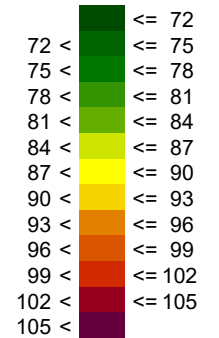
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**







**Railway Noise Modelling
Year 2032**

**Ground Floor
(1.5m AGL)**

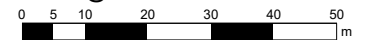
Railway noise level
Free field
 $L_{max}(SEM)dB(A)$



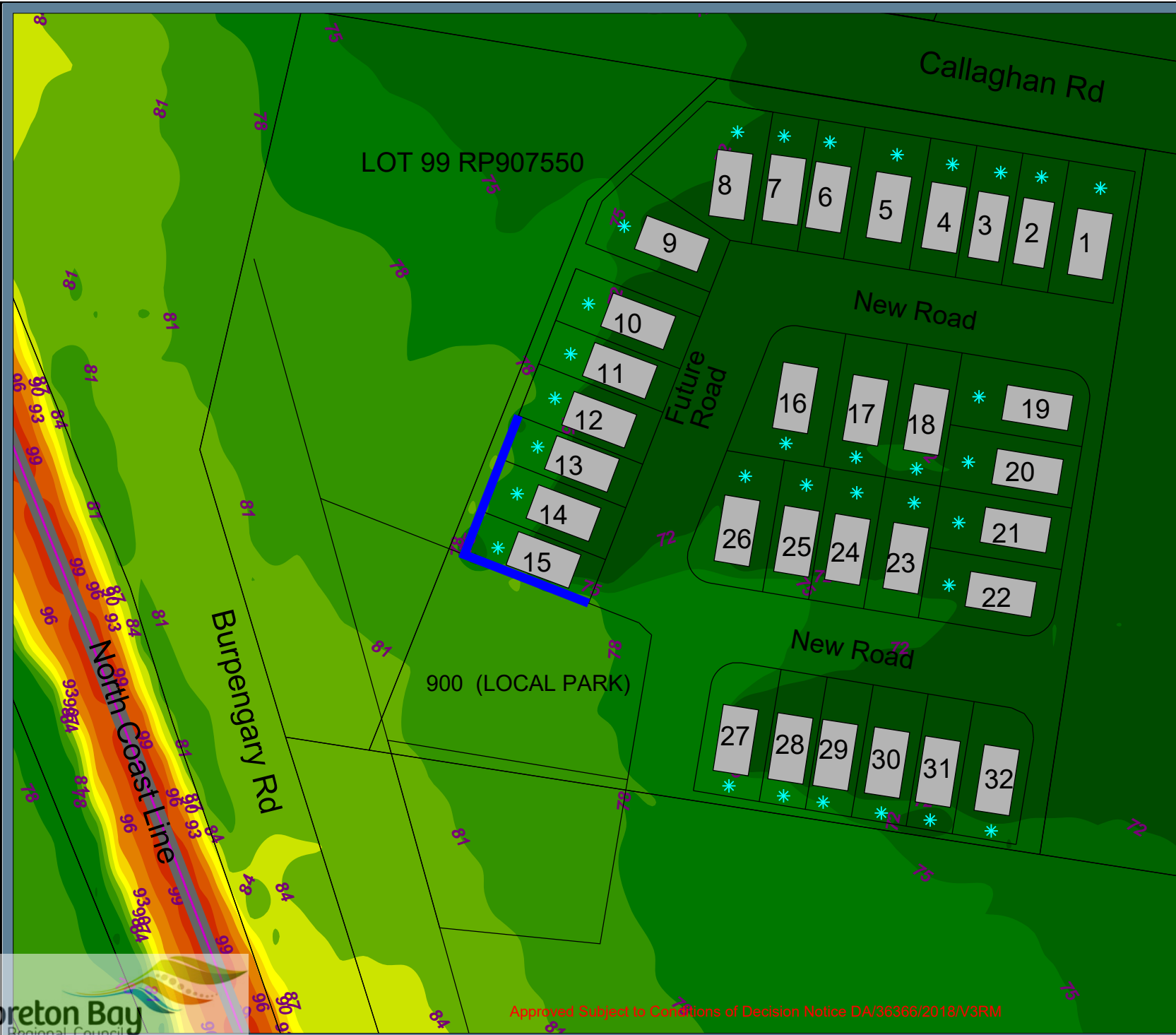
Legend

-  Lot boundary
-  Proposed development
-  Point receiver
-  Railway noise emission line
-  1.8m high noise barrier fence
-  Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021 8.2



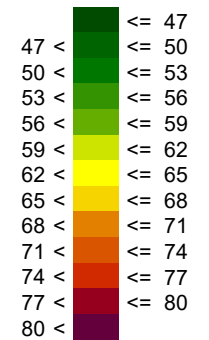
Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**Ground Floor
(1.5m AGL)**

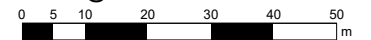
Railway noise level
Free-field
 $L_{eq}(24hr)dB(A)$



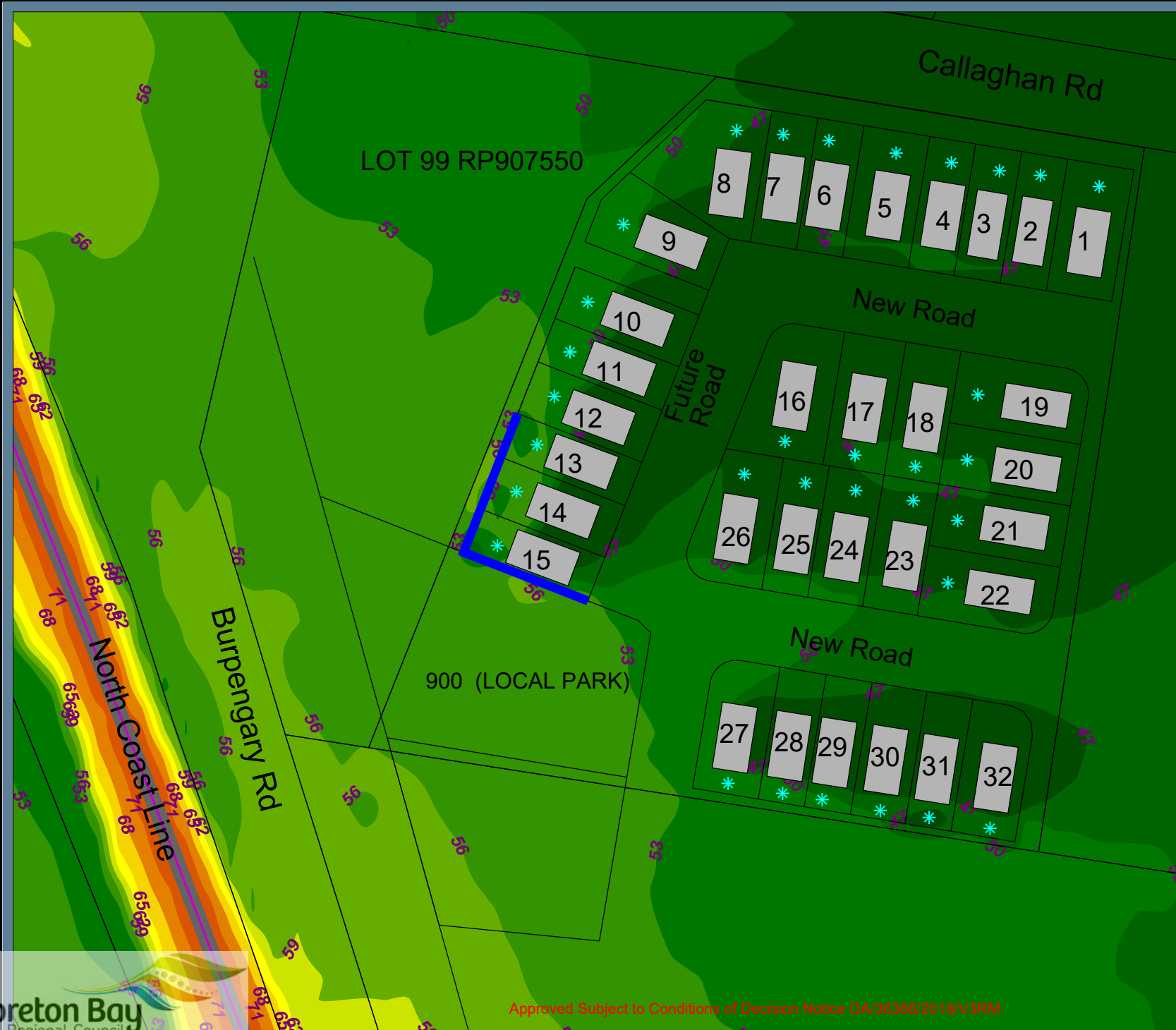
Legend

- Lot boundary
- ▭ Proposed development
- * Point receiver
- Railway noise emission line
- ▬ 1.8m high noise barrier fence
- ▭ Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed: 24/08/2021 8.2



Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**Ground Floor
(1.8m AGL)**

QDC MP4.4 Noise Category
Facade adjusted



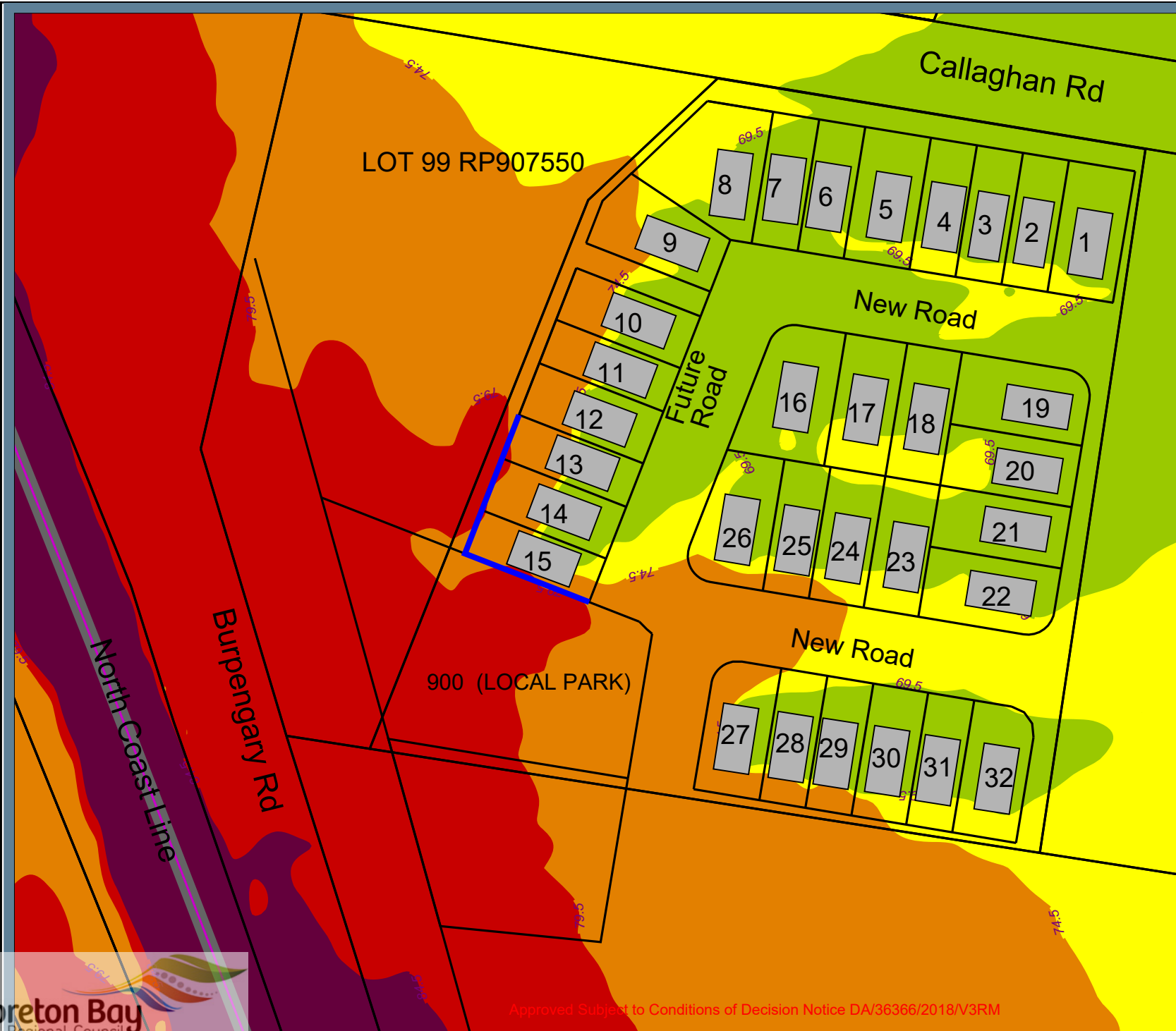
Legend

- Lot boundary
- ▭ Proposed development
- Railway noise emission line
- ▬ 1.8m high noise barrier fence
- ▬ Surface

SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021



Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM

**Proposed Residential Development
275 Callaghan Road, Narangba**

**Railway Noise Modelling
Year 2032**

**First Floor
(4.6m AGL)**

QDC MP4.4 Noise Category
Facade adjusted



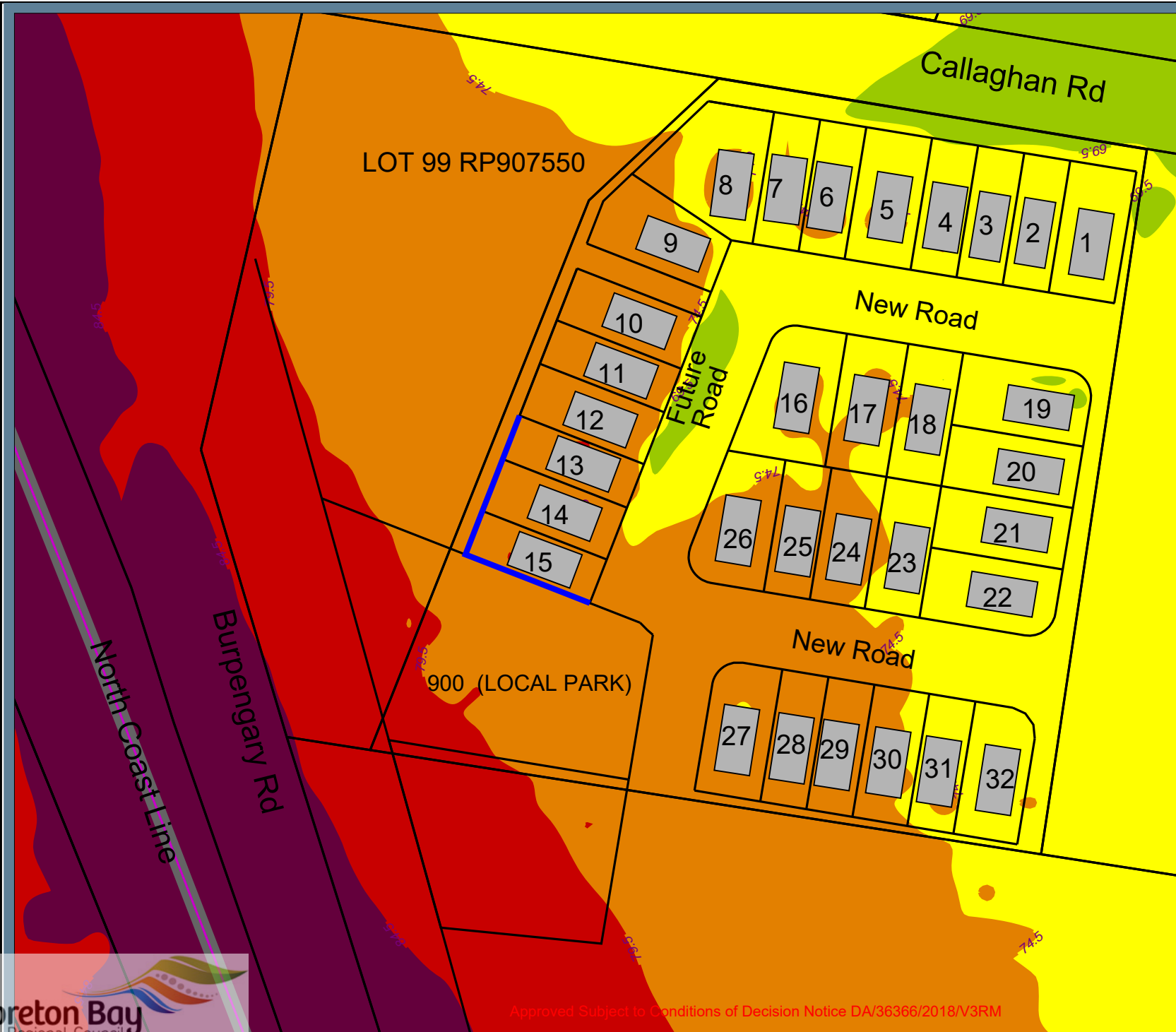
Legend

- Lot boundary
- Proposed development
- Railway noise emission line
- 1.8m high noise barrier fence
- Surface

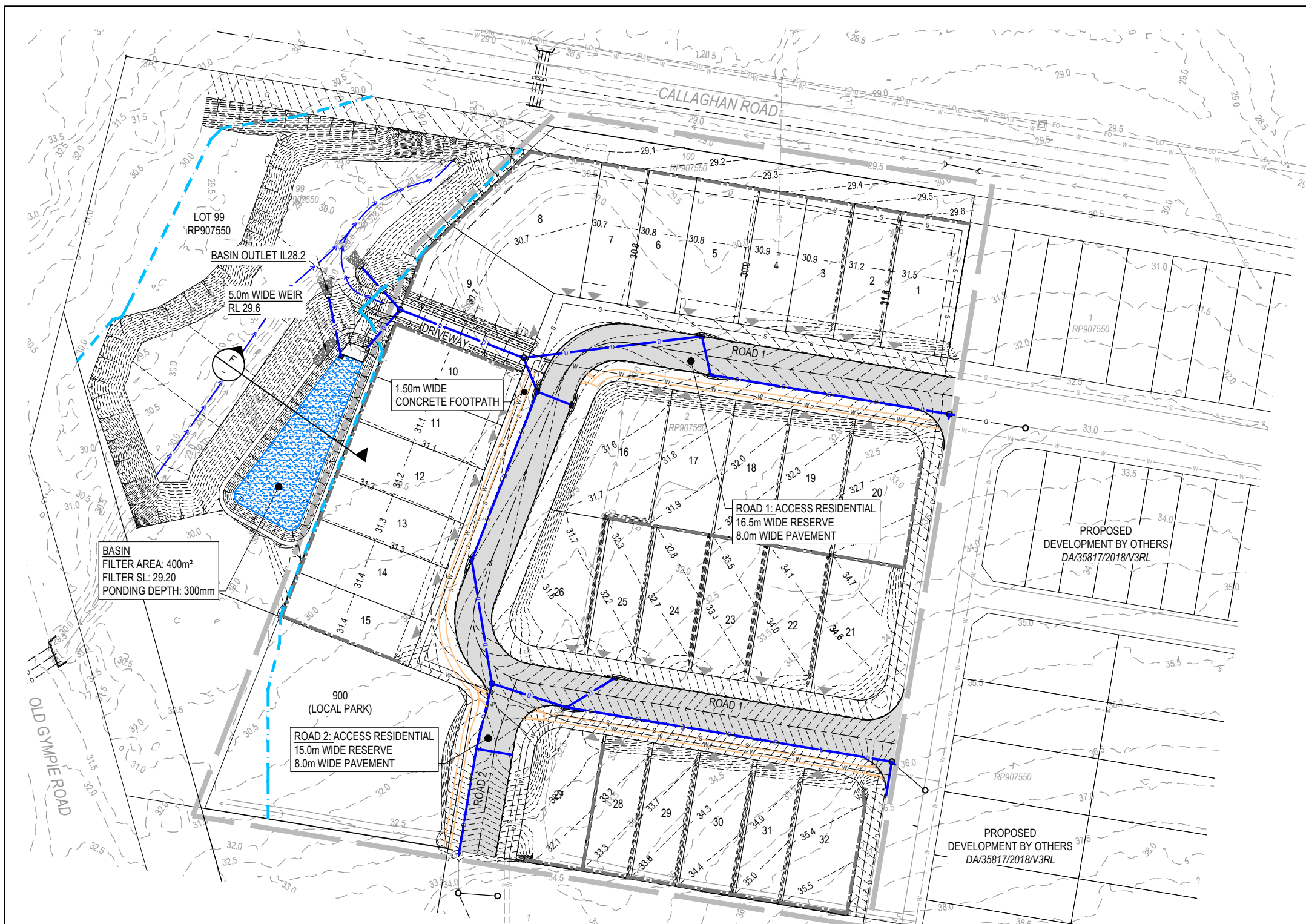
SCALE @ A4 1:1200



Grid Spacing: 5m
Project Engineer: Bojan Todorovski
Created: 22/07/2021
Processed with SoundPLAN 8.2
24/12/2021

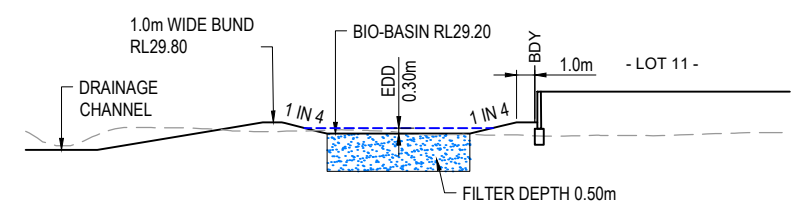
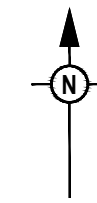


Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM



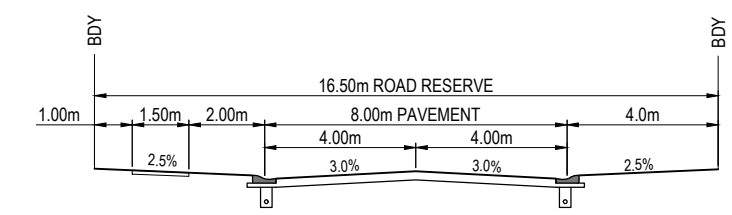
LEGEND

- PROPOSED AREA OF WORKS
- Q100 (DEVELOPED)
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB INVERT LINE
- PROPOSED FOOTPATH
- EXISTING KERB INVERT LINE
- EXISTING EDGE OF BITUMEN
- PROPOSED NEW ROAD PAVEMENT
- PROPOSED DRIVEWAY
- INDICATIVE DRIVEWAY LOCATION
- EXISTING SURFACE CONTOUR
- PROPOSED STORMWATER DRAINAGE PIPE
- EXISTING STORMWATER DRAINAGE PIPE
- PROPOSED BIO RETENTION FILTER MEDIA
- PROPOSED RETAINING WALL
- PROPOSED SEWERAGE MAIN
- EXISTING SEWERAGE MAIN
- PROPOSED WATER MAIN
- EXISTING WATER MAIN
- EXISTING ELECTRICAL CABLE O/H
- EXISTING TELECOMMUNICATION CABLE U/G



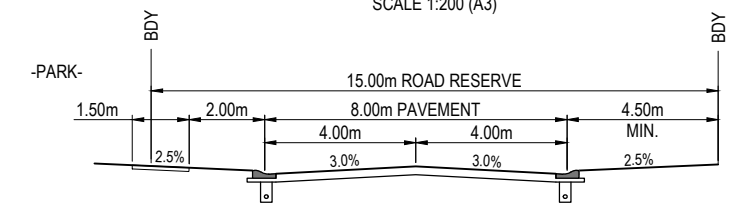
RL 21.000

SECTION F
SCALE 1:200 (A1)
SCALE 1:400 (A3)



TYPICAL ROAD CROSS SECTION - ROAD 1

SCALE 1:100 (A1)
SCALE 1:200 (A3)



TYPICAL ROAD CROSS SECTION - ROAD 2

SCALE 1:100 (A1)
SCALE 1:200 (A3)

REV	DATE	DESIGN	DRAWN	REVISION DETAILS
1	12.08.18	JV	CL	ORIGINAL ISSUE
2	26.08.18	JV	CL	ADDED FOOTPATH, AMENDED DRIVEWAY/ZERO LOT LOCATIONS, UPDATED SECTION
3	19.02.19	JV	CS	GENERAL LAYOUT AMENDMENT
4	27.02.19	JV	CS	UPDATED LAYOUT
5	10.09.21	RD	RD	LAYOUT AMENDED

DRAWN	STATUS
	FOR DEVELOPMENT APPLICATION NOT FOR CONSTRUCTION
DESIGN	APPROVED ANDREW NGO RPEQ 12329

PEAKURBAN
DEVELOPMENT ENGINEERS • ADVISORS

SCALE
1:500 10 5 0 10 20 A1
1:1000

CLIENT
**ORCHARD (NARANGBA)
DEVELOPMENTS PTY LTD.**

ASSOCIATED CONSULTANT
VERIS
PHONE: (07) 3666 4700

PROJECT NAME
**PROPOSED RESIDENTIAL
DEVELOPMENT**

CALLAGHAN ROAD
NARANGBA

DRAWING TITLE
**CONCEPT ROADWORKS AND
DRAINAGE
LAYOUT PLAN**

PROJECT No. 17-0112 24/12/2021
DRAWING No. P102
REVISION 5

Approved Subject to Conditions of Decision Notice DA/36366/2018/V3RM



ATTACHMENT 4

Infrastructure Charges Notice

Infrastructure Charges Notice



Original Notice (s119 Planning Act 2016)

ABN 92 967 232 136

Moreton Bay Regional Council
Caboolture Office, 2 Hasking Street, Caboolture Qld 4510
PO Box 159, CABOOLTURE QLD 4510

Approval No:	DA/36366/2018/V3RM	Applicant:	Orchard (Narangba) Developments Pty Ltd
Approval Description:	Reconfiguring a Lot - Development Permit for Subdivision (1 into 32 lots plus park)	Stage:	1
Based On:	2020/21 financial year	Applicant Address:	PO Box 9094 GCME QLD 9726
Version of Charges Resolution:	Ver 8 - 14 August 2018	Owner:	Moreton Bay Regional Council Narangba View Pty Ltd
Proportional Split (MBRC/UW):	20/21 financial year Adopted 60/40	Owner Address:	295 Burpengary Road NARANGBA QLD 4504 275 Callaghan Road NARANGBA QLD 4504
Total Levied Charges:	\$0.00	Date Charges Payable:	Reconfiguring a Lot component of the development approval - in accordance with section 122(1)(a) of the Planning Act 2016. Material Change of Use component of the development approval - in accordance with section 122(1)(c) of the Planning Act 2016. There has been no alternative agreement about payment or provision of infrastructure instead of payment.
		The Total Levied Charge is calculated as the Total Charge less any Offset available as identified below in an Infrastructure Agreement or a condition of the development approval. Where the Offset exceeds the Total Charge and a refund is available, the Total Levied Charge is zero and any refund is addressed in the Refund section of this Infrastructure Charges Notice.	

Property Details

Property Address	Real Property Description
295 Burpengary Road NARANGBA QLD 4504 275 Callaghan Road NARANGBA QLD 4504	Lot 99 RP 907550 Lot 1 RP 907550

Charge Details

Description	Existing Demand (Credit)	Proposed Demand	Unit of Demand	Demand Factor	Charge Rate per Unit of Demand	Total Charge
RESIDENTIAL						
Residential Use - 3 or more bedroom dwelling						
1 into 32 Lots	1	32	Dwelling	1	\$18,406.59	\$507,604.29
SUB TOTAL						\$507,604.29
TOTAL GST						\$0.00
GRAND TOTAL						\$507,604.29

Infrastructure Charges Notice

Original Notice (s119 Planning Act 2016)

Moreton Bay Regional Council
Caboolture Office, 2 Hasking Street, Caboolture Qld 4510
PO Box 159, CABOOLTURE QLD 4510

Infrastructure Agreement Offset Details

IA Number (Council Ref)	DA/36366/2018/v3rm
Description	275 Callaghan Road Narangba Infrastructure Agreement 2021
Agreement Date	21 December 2021

Infrastructure ID Number	Infrastructure Item Description	Delivery Status ¹	Original Agreed Value of Item ²	Previous Value of Item Used ³	New Value of Item Used ⁴	Value of Item left Available ⁵
Schedule 2	Items 1.4-1.5, 2.1.2-2.1.4 and 2.2.1	Future	\$507,604.29 plus indexation	\$0.00	\$507,604.29 plus indexation	\$0.00

Development Condition Offset Details

Condition and DA Number	Infrastructure Item Description	Delivery Status ¹	Original Agreed Value of Item ²	Previous Value of Item Used ³	New Value of Item Used ⁴	Value of Item left Available ⁵

Offset and Refund Details

In accordance with s121(1)(f) of the *Planning Act 2016*, any offset or refund applicable is listed below and will be refunded in accordance with the terms listed in an infrastructure agreement, or if there is no infrastructure agreement, in accordance with the Council's Infrastructure Charges Resolution Implementation Policy in effect at the date when the refund is payable and the Infrastructure Item has been Delivered⁶ to Council.

Infrastructure Item	Condition Number	Value of the Infrastructure Item Used as Offset in this ICN	Value of Offset available for Refund or transfer to other development ⁷

Original Notice (s119 Planning Act 2016)

Moreton Bay Regional Council
Caboolture Office, 2 Hasking Street, Caboolture Qld 4510
PO Box 159, CABOOLTURE QLD 4510

Notes

1. Where an Infrastructure Item has not been delivered, the value of the Infrastructure Item as an offset has been deducted from the charge on an expectation that the Infrastructure Item will be delivered concurrently with, or before, payment of the Levied Charge is due as payable to Council. AVAILABLE means the item has been delivered at the date of issue of this Infrastructure Charges Notice whereas FUTURE means the item has not yet been delivered at the date of issue of this Infrastructure Charges Notice.
2. Represents the amount of the Original Agreed Value of the Infrastructure Item.
3. Represents the amount of the Original Agreed Value of the Infrastructure Item used in another Infrastructure Charges Notice (e.g. an earlier stage of the development).
4. Represents the amount of the Original Agreed Value of the Infrastructure Item used in this Infrastructure Charges Notice to determine the Total Levied Charge.
5. Represents the amount of the Original Agreed Value of the Infrastructure Item remaining after the issuing of this Infrastructure Charges Notice. In respect to the Notes above, where provided for in an Infrastructure Agreement or the Council's Infrastructure Charges Resolution, the value of the infrastructure has been indexed to the date of issue of this Infrastructure Charges Notice.
6. Delivered is taken to be:
 - (a) for land, the date when the land is transferred to Council in fee simple or dedicated as a reserve (e.g. road reserve), and/or
 - (b) for works, the date when the works are accepted by Council in writing and in full as being 'On Maintenance', unless agreed to otherwise by Council in writing.
7. Where an Infrastructure Item has not been Delivered, the value of any refund is not available until the Infrastructure Item has been delivered to Council and has been confirmed by the Council as exceeding any Offset available and is in accordance with the Council's Infrastructure Charges Resolution Implementation Policy.

DECISION NOTICE

Council resolved to approve the development application as stated at the beginning of this notice over premises located at the property/s mentioned in this notice and gave a decision notice to the Applicant.

The Council having regard to the relevant sections of its current Charges Resolution is of the view that an adopted charge applies to providing trunk infrastructure for the development.

Accordingly, the Council has resolved to give this infrastructure charges notice to you in accordance with section 119 of the *Planning Act 2016*. The infrastructure charges notice contains the mandatory information in accordance with section 121 of the *Planning Act 2016*.

SUBMISSIONS REGARDING THIS NOTICE The recipient of an Infrastructure Charges Notice may make a submission about the charges notice within the relevant appeal period (20 days from receipt of the charges notice) in accordance with Chapter 4 Part 2 Subdivision 5 of the *Planning Act 2016*.

APPEALS ABOUT AN INFRASTRUCTURE CHARGES NOTICE The recipient of an Infrastructure Charges Notice may appeal to the court about the decision to give the notice in accordance with Chapter 6 Part 1 of the *Planning Act 2016*.

TO WHOM THE CHARGE MUST BE PAID

Payment of the Charge must be made payable to MORETON BAY REGIONAL COUNCIL via Customer Service or Development Services, PO Box 159, Caboolture Qld 4510

The Infrastructure Charge has been calculated in accordance with the charges stated in Council's Infrastructure Charges Resolution. This notice will be escalated to time of payment to the extent permitted under legislation in force at that time.

Infrastructure Charges Notice

Original Notice (s119 Planning Act 2016)

Moreton Bay Regional Council
Caboolture Office, 2 Hasking Street, Caboolture Qld 4510
PO Box 159, CABOOLTURE QLD 4510

PAYMENT DUE BY:

In accordance with sections 121(1)(d) and 122 of the *Planning Act 2016* - extract as follows:

A levied charge is payable:

(a) if the charge applies for reconfiguring a lot - when the local government that levied the charge approves a plan for the reconfiguration that, under the Land Title Act, is required to be given to the local government for approval;

or

(b) if the charge applies for building work - when the final inspection certificate for the building work, or the certificate of classification for the building, is given under the Building Act;

or

(c) if the charge applies for material change of use - when the change happens;

or

(d) if the charge is for other development - on the day stated in the infrastructure charges notice under which the charge is levied.

Notice is hereby given that the abovementioned infrastructure charges levied by Moreton Bay Regional Council in compliance with the *Planning Act 2016*, Chapter 6 on land described for the period described, and such charges are DUE AND PAYABLE BY THE TIME STIPULATED IN THIS NOTICE. These charges plus any arrears and interest thereon may be recovered by legal process without further notice if unpaid after the time stipulated in this notice.

Infrastructure Charges Notice IMPORTANT INFORMATION

PAYMENT

This notice is due and payable by the due time shown. Cheques, money orders or postal notes should be made payable to MORETON BAY REGIONAL COUNCIL and crossed "Not Negotiable". Change cannot be given on cheque payments. Property owners will be liable for any dishonour fees.

OVERSEAS PAYEES

Please forward your infrastructure charges payment by way of a bank draft for the required amount in Australian dollars.

GOODS AND SERVICES TAX

GST is not applicable to the Infrastructure Charges contained in this Notice.

INFRASTRUCTURE CHARGE IS SUBJECT TO PRICE VARIATION

In accordance with section 121(e) of the *Planning Act 2016*, the Levied Charge in this notice will be escalated to time of payment to the extent permitted under legislation and the Council's Infrastructure Charges Resolution in force at that time.

Where indexation is applicable, an online spreadsheet calculator is available to assist with making the calculation

<https://www.moretonbay.qld.gov.au/Services/Building-Development/infrastructure-Charges>

Council takes no responsibility for the accuracy of the calculator.

PLEASE CONTACT DEVELOPMENT SERVICES BEFORE MAKING PAYMENT.

INFRASTRUCTURE CHARGE ENQUIRIES

Enquiries regarding this infrastructure charge notice should be directed to MORETON BAY REGIONAL COUNCIL, Development Services, Caboolture Office, during office hours, Monday to Friday on phone (07) 3205 0555.

Infrastructure Charges Notice



ABN 92 967 232 136

Original Notice (s119 Planning Act 2016)

Moreton Bay Regional Council
Caboolture Office, 2 Hasking Street, Caboolture Qld 4510
PO Box 159, CABOOLTURE QLD 4510

METHODS OF PAYMENT

PAYMENT BY MAIL

Confirm the current Infrastructure Charge applicable and obtain an updated payment notice from Council's Development Services.

Mail this updated payment notice immediately with your payment to: MORETON BAY REGIONAL COUNCIL, PO Box 159, Caboolture Qld 4510

NOTE: Cheques must be made payable to MORETON BAY REGIONAL COUNCIL

PAYMENT AT COUNCIL OFFICES

Confirm the current Infrastructure Charge applicable and obtain an updated payment notice from Council's Website.

Present this updated payment notice with your payment to Moreton Bay Regional Council at the Customer Service Counters.

NOTE: Cheques must be made payable to MORETON BAY REGIONAL COUNCIL

PAYMENT MADE BY CREDIT CARD

Credit Cards accepted: Mastercard or Visa

ATTACHMENT 5

Appeal Rights

Chapter 6 Dispute resolution

Part 1 Appeal rights

229 Appeals to tribunal or P&E Court

- (1) Schedule 1 states—
 - (a) matters that may be appealed to—
 - (i) either a tribunal or the P&E Court; or
 - (ii) only a tribunal; or
 - (iii) only the P&E Court; and
 - (b) the person—
 - (i) who may appeal a matter (the *appellant*); and
 - (ii) who is a respondent in an appeal of the matter; and
 - (iii) who is a co-respondent in an appeal of the matter; and
 - (iv) who may elect to be a co-respondent in an appeal of the matter.
- (2) An appellant may start an appeal within the appeal period.
- (3) The *appeal period* is—
 - (a) for an appeal by a building advisory agency—10 business days after a decision notice for the decision is given to the agency; or
 - (b) for an appeal against a deemed refusal—at any time after the deemed refusal happens; or
 - (c) for an appeal against a decision of the Minister, under chapter 7, part 4, to register premises or to renew the registration of premises—20 business days after a notice is published under section 269(3)(a) or (4); or

- (d) for an appeal against an infrastructure charges notice—20 business days after the infrastructure charges notice is given to the person; or
- (e) for an appeal about a deemed approval of a development application for which a decision notice has not been given—30 business days after the applicant gives the deemed approval notice to the assessment manager; or
- (f) for an appeal relating to the *Plumbing and Drainage Act 2018*—
 - (i) for an appeal against an enforcement notice given because of a belief mentioned in the *Plumbing and Drainage Act 2018*, section 143(2)(a)(i), (b) or (c)—5 business days after the day the notice is given; or
 - (ii) for an appeal against a decision of a local government or an inspector to give an action notice under the *Plumbing and Drainage Act 2018*—5 business days after the notice is given; or
 - (iii) otherwise—20 business days after the day the notice is given; or
- (g) for any other appeal—20 business days after a notice of the decision for the matter, including an enforcement notice, is given to the person.

Note—

See the P&E Court Act for the court's power to extend the appeal period.

- (4) Each respondent and co-respondent for an appeal may be heard in the appeal.
- (5) If an appeal is only about a referral agency's response, the assessment manager may apply to the tribunal or P&E Court to withdraw from the appeal.
- (6) To remove any doubt, it is declared that an appeal against an infrastructure charges notice must not be about—
 - (a) the adopted charge itself; or

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- (b) for a decision about an offset or refund—
 - (i) the establishment cost of trunk infrastructure identified in a LGIP; or
 - (ii) the cost of infrastructure decided using the method included in the local government's charges resolution.

230 Notice of appeal

- (1) An appellant starts an appeal by lodging, with the registrar of the tribunal or P&E Court, a notice of appeal that—
 - (a) is in the approved form; and
 - (b) succinctly states the grounds of the appeal.
- (2) The notice of appeal must be accompanied by the required fee.
- (3) The appellant or, for an appeal to a tribunal, the registrar, must, within the service period, give a copy of the notice of appeal to—
 - (a) the respondent for the appeal; and
 - (b) each co-respondent for the appeal; and
 - (c) for an appeal about a development application under schedule 1, section 1, table 1, item 1—each principal submitter for the application whose submission has not been withdrawn; and
 - (d) for an appeal about a change application under schedule 1, section 1, table 1, item 2—each principal submitter for the application whose submission has not been withdrawn; and
 - (e) each person who may elect to be a co-respondent for the appeal other than an eligible submitter for a development application or change application the subject of the appeal; and
 - (f) for an appeal to the P&E Court—the chief executive; and

- (g) for an appeal to a tribunal under another Act—any other person who the registrar considers appropriate.
- (4) The *service period* is—
 - (a) if a submitter or advice agency started the appeal in the P&E Court—2 business days after the appeal is started; or
 - (b) otherwise—10 business days after the appeal is started.
- (5) A notice of appeal given to a person who may elect to be a co-respondent must state the effect of subsection (6).
- (6) A person elects to be a co-respondent to an appeal by filing a notice of election in the approved form—
 - (a) if a copy of the notice of appeal is given to the person—within 10 business days after the copy is given to the person; or
 - (b) otherwise—within 15 business days after the notice of appeal is lodged with the registrar of the tribunal or the P&E Court.
- (7) Despite any other Act or rules of court to the contrary, a copy of a notice of appeal may be given to the chief executive by emailing the copy to the chief executive at the email address stated on the department’s website for this purpose.

231 Non-appealable decisions and matters

- (1) Subject to this chapter, section 316(2), schedule 1 and the P&E Court Act, unless the Supreme Court decides a decision or other matter under this Act is affected by jurisdictional error, the decision or matter is non-appealable.
- (2) The *Judicial Review Act 1991*, part 5 applies to the decision or matter to the extent it is affected by jurisdictional error.
- (3) A person who, but for subsection (1) could have made an application under the *Judicial Review Act 1991* in relation to the decision or matter, may apply under part 4 of that Act for a statement of reasons in relation to the decision or matter.

(4) In this section—

decision includes—

- (a) conduct engaged in for the purpose of making a decision; and
- (b) other conduct that relates to the making of a decision; and
- (c) the making of a decision or the failure to make a decision; and
- (d) a purported decision; and
- (e) a deemed refusal.

non-appealable, for a decision or matter, means the decision or matter—

- (a) is final and conclusive; and
- (b) may not be challenged, appealed against, reviewed, quashed, set aside or called into question in any other way under the *Judicial Review Act 1991* or otherwise, whether by the Supreme Court, another court, any tribunal or another entity; and
- (c) is not subject to any declaratory, injunctive or other order of the Supreme Court, another court, any tribunal or another entity on any ground.

232 Rules of the P&E Court

- (1) A person who is appealing to the P&E Court must comply with the rules of the court that apply to the appeal.
- (2) However, the P&E Court may hear and decide an appeal even if the person has not complied with rules of the P&E Court.