



Jacobs SMEC Design Joint Venture

# Gateway Upgrade North

## Road and Rail Traffic Noise Assessment

### Design Report

GUN-3-SL-PNS-RP-200001

PNS-20

Revision: D

Document prepared by: Jacob SMEC Design Joint Venture (DJV)

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The following provides the record of authorisation and revisions made to this document.

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Released under RTI - DTMR

## DEFINITIONS

Reference	Meaning
The Client or the Principal	Department of Transport and Main Roads
Project or GUN	Gateway Upgrade North
ASS	Acid Sulphate Soil
BCC or Council	Brisbane City Council
CAD	Computer Aided Design
CoP	Transport Noise Management Code of Practice
D&C Deed or Deed	Project Design and Construct Deed
Design Consultant	An organisation preparing Design Documents for the project on behalf of Lendlease
DJV or JSDJV	Integrated design delivery team led by Jacobs SMEC Design Joint Venture
DEHP	Department of Environment and Heritage Planning
Design Documentation	Design deliverables prepared by DJV to specify the design.
Design Package	Collation of Design Documents for submission for an element or aspect of the Works at a particular Design Stage.
Design Stages	Defined stages in the development of the IFC design as follows:
- DCD	▪ Developed Concept Design (DCD);
- SDD	▪ Substantial Detailed Design (SDD);
- FDD	▪ Final Design (FDD); and
- IFC	▪ Issued for construction (IFC)
DMP	Design Management Plan
DNRM	Department of Natural Resources and Mines
EAR	Environmental Approval Report
EDR	Environmental Design Report
EMP(C)	Environmental Management Plan (Construction)
ESCP	Erosion and Sediment Control Plan
Head Contract	D&C Deed between DTMR and LLE
IDR	Inter-disciplinary Review
IFC	Issued for Construction
IV	Independent Verifier
IR	Independent Review
LLE	Lendlease Engineering Pty Limited, ABN 40 000 201 516
LRUD	Landscape, Revegetation and Urban Design
PSG	Project Steering Group
Principal Representative	Transurban Queensland (TQ)
QR	Queensland Rail
RFI	Request for Information
RPEQ	Registered Professional Engineer, Queensland
SID	Safety in Design
State	State of Queensland
SWTC	D&C Deed Exhibit A - Scope of Works and Technical Criteria
TQ	Transurban Queensland
Temporary Works	Works required for the purpose of constructing the WUC that do not form part of the permanent Works or in-service loading. Design for Temporary Works includes design for construction configurations whether or not the design results in additional works being specified.
TMR or DTMR	Department of Transport and Main Roads
VE	Value Engineering
WOL	Whole of Life
Works	Activities undertaken or required to be undertaken by the Contractor to complete the WUC including inter alia design, supply, load, deliver, haul, unload, construct, install, establish, disestablish, produce, manufacture, maintain, investigate, inspect, test, commission, modify, demolish, remove, spoil, dispose, train.

# 1 INTRODUCTION

## 1.1 Overview

The scope of this report is as required by the Department of Transport and Mains Road (DTMR) Project Deed Exhibit A for the Project Wide Road and Rail Traffic Noise Assessment. This report addresses:

- Scope of this report
- Compliance with D&C Deed and SWTC
- Relevant standards and guidelines
- Changes from Tender Design
- Design description and assumptions
- Design coordination, including:
  - integration with other design components
  - constructability
  - innovation and value improvements
  - safety in design
  - whole of life considerations
  - sustainability
  - environmental considerations.

## 1.2 Purpose

The purpose of this document is to present the Lendlease Developed Concept Design for Road and Rail Traffic Noise Assessment, as well as the design requirements detailed in the SWTC, for the whole of the project noise amelioration treatments.

Other related design elements are covered in the following reports:

- Changes from Tender Design
- Structural Design Report for structural design of noise barriers. The package has been compiled in collaboration with Lendlease.

## 1.3 Project design objectives

Project design objectives comprise:

- Safety - The design shall facilitate safe construction and operation of the facility such that no harm is done to workers or any other member of the community.
- Time and Cost - The design shall facilitate completion of construction and commissioning on time, within budget.
- Impact on Stakeholders - The design shall adopt innovation during delivery to minimise impacts of the Project on stakeholders, the environment, customers and the community and to reduce construction and commissioning timelines.
- Fit for Purpose and Value for Money - The design shall provide assets that are fit for purpose for their design life, affordable and are delivered through an optimal risk allocation between the parties, based on the purpose being that described in the SWTC and based on the minimum applicable standard.
- Maintain existing operations - The design shall identify and plan any works that will result in disruption to operations so as to minimise the impact of the construction activities.
- Sustainability – The design seeks to be leading in all areas of sustainable infrastructure design. The project is to be rated by ISCA which includes a rating for the design phase.
- Quality - Ensure the design is undertaken to appropriate standards to ensure serviceability, operational safety and maintenance efficiency.
- Procurement - Enable a procurement process that is fair for all tenderers and provides value for money; and within required timeframes.
- Relationships - Develop positive relationships between the parties founded on a clear understanding of the legal, contractual and commercial framework.

## 1.4 Project extent

The Gateway Upgrade North project includes:

- 11.3 km 6 lane motorway between GUP and Barrett Street northbound and Depot Road southbound with realignment of 6 curves between GUP and Nundah Creek, a mixture of depressed (Nudgee to Bicentennial Road) and concrete barrier separated median, new bridges over Nundah Creek and widened bridges over the Bicentennial Road interchange and Sandgate Road/Shorncliffe Railway line
- Reconfigured Nudgee Interchange including a new Nudgee Road bridge over the motorway, extended on and off-ramps including ramp metering provision and modifications to Nudgee Road including active provisions
- Minor modifications to the Bicentennial Road interchange consisting of extended on and off-ramps including ramp metering provisions
- Duplicated Deagon Deviation design based on Option 1B combining the southbound onramp from Braun Street and the Deagon Deviation, the latter with a new overpass, and onramp incorporating ramp metering provisions
- Closure of the Sandgate Road onramp and associated minor upgrades to Depot Road and Braun Street
- Signalisation of the Bracken Ridge Road southbound exit ramp terminal intersection
- Full ITS including VSL/LUMS gantries, VMS, CCTV and ramp metering
- A cycleway between Kedron Brook and Bracken Ridge joined by BCC network near Bicentennial Road.

The alignment of the Project and the study area extent is shown in **Figure 1**.



G:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 1.mxd


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Date:	04-Mar-2016
Drawn by:	N/R
Scale:	1:40,000
Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

- LEGEND**
-  Individual Map Extents
  -  Gateway Motorway
  -  Local Roads
  -  Suburb Boundaries


  
 Jacobs SMEC Design Joint Venture



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**Gateway Upgrade North**  
 Project Study Area and Figure Key

FIGURE 1

## 2 COMPLIANCE WITH D&C DEED AND SWTC

### 2.1 References

The project works and temporary works must meet the standards of DTMR, AUSTRROADS publications and relevant Australian Standards. If suitable Australian Standards do not exist for the design of any element of the project works or the temporary works, international standards may be used subject to the written approval of DTMR.

### 2.2 Project specific requirements

The project specific requirements are contained in the following documents:

- Department of Transport and Mains Road Contract Number METD-2797- Gateway Upgrade North Scope of Works and Technical Criteria (SWTC) Exhibit A and Appendices as specifically referenced in **Table 1** below.
- Reference documents as listed in SWTC Exhibit A, Appendix 16 'Reference Documents'. Specific referenced specifications and standards related to this package are listed below.

**Table 1 – Reference documents**

Reference	Clause(s)
SWTC Exhibit A Appendix 14 Design Information	14.6.2 Design Speeds 14.8 Noise Design 14.10 Pavement Design Criteria Attachment 14.A Traffic Data
SWTC Exhibit A Appendix 16 Reference Documents	As applicable
SWTC Exhibit A Appendix 19 Pavements	As applicable
SWTC Exhibit A Appendix 27 Environmental Requirements	As applicable
SWTC Exhibit A Appendix 30 Landscape, Revegetation and Urban Design	As applicable
SWTC Exhibit A Appendix 33 Technical Specifications	As applicable
DTMR Standard Specifications	MRTS15 – Noise Barriers
DTMR Standard Drawings	SD1608
DTMR Road Traffic Noise Management Code of Practice	As applicable

#### 2.2.1 Requirements of the SWTC

The following sub-sections outline the requirements of the *Clause 14.8 Noise Barriers and Noise Amelioration* of the SWTC.

#### 2.2.2 Clause 14.8.2 (a)

Noise barriers are to be constructed to comply with DTMR's *Road Transport Noise Management Code of Practice* (CoP). In summary, the requirement for noise attenuation is triggered where road traffic noise levels predicted for the design are above the levels in **Table 2** at noise-sensitive buildings and land use.

**Table 2 – Trigger Levels for Road Traffic Noise Barriers**

Categories	Criteria (dB)		
	Existing Residences <sup>1</sup>	Educational, Community and Health Buildings <sup>1</sup>	Outdoor Educational and Passive Recreational Areas (including Parks) <sup>2</sup>
New road – Access controlled	63 $L_{A10,18 \text{ hour}}$ , existing level >55 $L_{A10,18 \text{ hour}}$ 60 $L_{A10,18 \text{ hour}}$	58 $L_{A10,1 \text{ hour}}$	63 $L_{A10,12 \text{ hour}}$
Upgrading Existing Road	68 $L_{A10,18 \text{ hour}}$	65 $L_{A10,1 \text{ hour}}$	
Existing Road – No Roadworks			N/A
Exposure of Second Row of Buildings	65 $L_{A10,18 \text{ hour}}$	60 $L_{A10,1 \text{ hour}}$	

Note 1 Façade corrected noise level

Note 2 Free-field noise level.

The 18-hour period is defined as 6.00 am to 12.00 am, the 12-hour period is defined as 6.00 am to 6.00 pm and the 1-hour periods are considered to be the loudest one hour period during period of operation of the sensitive receptor (e.g. school operational hours may be defined as 8am to 4pm).

While not directly impacted but the proposed works, rail noise impacts have also been assessed. Queensland legislation does not contain noise levels or noise limits for railway activities. In the absence of legislative levels or limits, QR has outlined rail noise requirements within its SEMS.

One of the rail noise requirements in the SEMS is the achievement of target levels for all new infrastructure delivered by QR. The target levels are assessed at 1 m from in front of the most exposed part of an affected Noise Sensitive Place and quantified in dB. A Noise Sensitive Place includes residential dwellings. The target levels are defined as follows:

- 87 dB as a single event maximum sound level (SEM), defined as the arithmetic average of the 15 highest A-weighted maximum noise levels in the 24-hour period.
- $L_{Aeq, 24 \text{ hour}}$  65 dB as an average 24-hour energy level.

In assessing rail noise against the Planning Levels, the noise from klaxon warning horns is not included since they are a necessary safety measure. Clause 14.8.2 (b)

The two existing noise barriers on the western side of the motorway from Chainage (Ch) 10605 to Ch11310 (approximate) are to be replaced. The new noise barriers (i.e. NB 06 and NB 07 as detailed in **Section 5**), have been designed to comply with the CoP.

### 2.2.3 Clause 14.8.2 (c)

The design of the noise barriers to be consistent with SWTC Exhibit A Appendix 30 *Landscape, Revegetation and Urban Design* is outside of SLR's scope of works for the design of noise barriers. The Joint-Venture will confirm the status of the noise barrier design with regards to Appendix 30 elsewhere.

### 2.2.4 Clause 14.8.2 (d)

The design of the noise barriers includes measures for the safe and efficient inspection and maintenance of the noise barriers, as detailed in **Section 7**.

### 2.2.5 Clause 14.8.2 (e)

A construction date for road traffic noise barriers in **Section 5** will be determined in line with the wider project timeframe.

**2.2.6 Clause 14.8.2 (f)**

An overview strategy is detailed in **Section 11** for the noise monitoring and noise modelling of road traffic noise after Date of Opening Completion to confirm compliance with the requirements in the CoP.

**2.3 Departures from D&C Deed and SWTC**

Except where detailed below, all aspects of the design and its integration with other design elements fully comply with the requirements of the SWTC.

Non-compliances that have been identified as detailed in **Table 3**.

**Table 3 – Table of Permissible Non-Compliances**

Non-	Details
n/a	n/a

Since the previous design submission, non-compliances that have been identified and accepted are detailed in **Table 4**.

**Table 4 – Table of Identified and Accepted Non-Compliances**

Non-Compliance	Details
n/a	n/a

### 3 DETAILED DESIGN DESCRIPTION AND ASSUMPTIONS

#### 3.1 Overview

The tender design has been reviewed and developed to a final state of design. Key activities and inputs during the development to this phase of design development comprise:

- Review of revised SWTC including Appendix 52 “Permissible SWTC Technical Non-Compliances”
- Further optimisation of alignments and interchange layouts for constructability
- Development of construction staging and methodology and integrating with other disciplines particularly pavements, drainage, geotechnical and structures
- Safety in Design Workshop
- Project Design Group Meetings
- Design Leadership Meetings
- Documentation of the design.

For the purpose of design documentation and to integrate with construction planning, the works for the mainline, interchanges and ramps were divided into two areas (South and North).

- Southern Area
  - Northbound carriageway: MCN12 Ch. -110 to Ch. 5732.9016 (6697 to 12540)
  - Southbound carriageway: MCS12 Ch. -135 to Ch. 5741.577 (6651 to 12528)
- Northern Area
  - Northbound carriageway: MCN34 Ch. 5732.9016 to end (12540 to end)
  - Southbound carriageway: MCS34 Ch. 5741.577 to end (12528 to end)

Unless stated otherwise, all noise level calculations and predictions presented within this report are based on a location positioned 1 m in front of the most exposed building façade with a +2.5 dB building façade correction applied to all calculated or predicted noise levels.

#### 3.2 Noise modelling design software program

The design software that has been used to develop the tender design, and will be used to develop the detailed design is listed in **Table 5**.

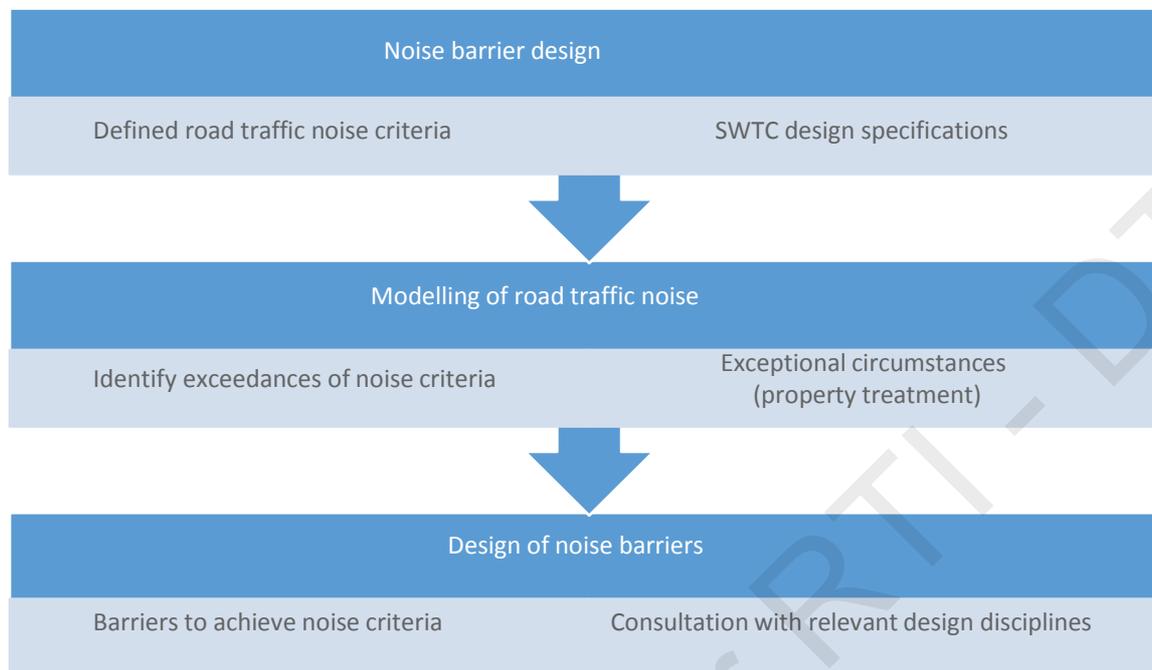
**Table 5 – Road and rail noise mitigation design software**

Element	Program name	Developer
Noise modelling and noise barrier design	SoundPLAN (Version 7.4)	SoundPLAN GmbH

## 4 DESIGN APPROACH

### 4.1 Overview

The design of noise barriers has been based on a detailed assessment of road traffic noise levels from the project. The design process is summarised in the following process:



### 4.2 Road traffic noise monitoring

Prior to the construction of the project, existing road traffic noise levels were monitored in 2015 at the noise-sensitive buildings and land-use in the vicinity to the Project extent. The road traffic noise monitoring was undertaken to determine:

- Road traffic noise levels prior to the construction and opening of the Project.
- Determining the road traffic noise criterion levels

The road traffic noise monitoring is detailed in the Gateway Upgrade North Noise and Vibration Monitoring Report (reference GUN-3-SL-PNS-RP-100003).

### 4.3 Road traffic noise modelling inputs

This section details the design inputs included in the road traffic noise prediction modelling and design of road traffic noise barriers.

Road traffic noise models for all assessed scenarios were created in the SoundPLAN (Version 7.4) noise propagation modelling software. SoundPLAN enables compilation of a sophisticated computer model comprising a 3-D ground map containing ground contours, the 3-D road design (including gradients) and building locations, traffic volumes, mix and speed, road pavement surface characteristics and noise barriers.

The *Calculation of Road Traffic Noise* (CoRTN) 1988 prediction technique was utilised within SoundPLAN to calculate and predict the relevant road traffic noise levels. These calculations account for the intervening topography, buildings and noise barriers. CoRTN is the recommended road traffic noise calculation and prediction technique in TMR's Code of Practice.

The building footprints were assigned a height based on the average eaves height of the building, with the number of storey's extrapolated between the difference in height between the building eaves height and the terrain below, using a notional value of 2.8 m for each storey.

The road traffic noise model inputs are provided in Table 6.

**Table 6 – Road noise model inputs**

Input	Element included in the noise model	Reference
Design	3D road strings for the 85% design of the road carriageways.	MCN12, MCN34, MCN5, MCS12, MCS34
Road traffic volume	18-hour road traffic volumes for the year 2018 and year 2028.	SW TC Appendix 14 – Attachment 14.A Refer Appendix B
Road traffic speed	Traffic speeds applied to the calculation of road traffic noise emissions.	SW TC Appendix 14 – 14.6.2
Road pavement surface	SMA and DGA road pavement surfaces.	PPV-01, SPV-10, NPV-10, GPV-10. Refer Figure 2, Figure 3 and Table 7
Existing road noise barriers	3D noise barriers	Refer Figure 9, Figure 10, Table 8
Ground terrain	Survey GIS data	
Noise-sensitive buildings and land-use	Survey GIS data and aerial data	Refer Figure 2, Figure 3 and Table 9

The road traffic volumes included in the noise prediction model are detailed in Appendix 14A of the SWTC and reproduced in **APPENDIX B** of this report.

The road traffic speeds, road pavements surfaces for the route alignment and the location of existing and proposed noise barriers are detailed in **Figure 2** and **Figure 3** in **APPENDIX B**.

The CoRTN calculation in the SoundPLAN road traffic noise model assigns road traffic noise adjustment factors relative to the performance of Dense Graded Asphalt (DGA), which has an adjustment factor of 0 dB. The Project includes DGA and Stone Mastic Asphalt (SMA) road pavement surfaces, with the corresponding noise emission adjustment factors detailed in **Table 7**.

**Table 7 – Road pavement surface correction factors**

Road pavement type	Road noise emission adjustment factor, dB
Dense Graded Asphalt (DGA)	0
Stone Mastic Asphalt (SMA)	-1

The existing road traffic noise barriers retained in the design, and included in the noise prediction model, are detailed in **Table 8** along with the barrier dimensions. Any additional or redesigned existing road traffic noise barriers are detailed in **Section 5**.

**Table 8 – Existing road traffic noise barriers**

Location of existing noise barrier	Chainage	Road noise barrier length and height
NB-01: West of Motorway – Property Developers Barrier built on the cadastral boundary.	3010 – 3380	Length 450 m and 2.4 m in height
NB-02: South/West of Motorway	8495 – 8950	Length 450 m and 3.0 m in height
NB-03: East of Motorway	8950 – 9560	Length 595 m and 3.0 m in height
NB-05: East of Motorway	9600 – 9910	Length 310 m and 2.7 m in height

Location of existing noise barrier	Chainage	Road noise barrier length and height
NB-06: West of Motorway	10120 – 10550	Length 420 m and 5.5 m in height
NB-07: West of Motorway	10605 – 10750	Length 75 m and 2.5 m in height
NB-08: West of Motorway	10810 – 11310	Length 500 m and 4.5 m in height
NB-09: South of Motorway	11605 – 11955	Length 345 m and 2.0 m in height
NB-10: North of Motorway	11705 – 11970	Length 270 m and 3.0 m in height

#### 4.4 Rail traffic noise modelling inputs

To calculate the noise level from passenger trains operating on the existing tracks a railway noise prediction model was developed with the SoundPLAN (Version 7.4) environmental noise modelling software. The noise model included the local terrain, buildings and rail tracks to develop a 3-dimensional representation of the project and the surrounding communities. The Nordic Rail Traffic Noise Prediction Method (Kilde 130) in-built to SoundPLAN was applied to calculate rail noise emission levels based on the number of trains and the train speed and length. SoundPLAN applies the rail noise emissions to predict rail noise levels at receptor buildings within the local environment.

Both SoundPLAN and the Kilde methodology are widely applied in Australia for the prediction of railway noise levels. The Kilde approach allows for the train noise emissions to be verified for QR rollingstock and the modelling predicts both  $L_{Aeq, 24 \text{ hour}}$  and the SEM as required by the Planning Levels.

The model predicts noise levels accounting for the complex interactions between the noise emitted from the wheel-rails of the train passby and the surrounding environment, including the local ground terrain, final earthworks for the design, the new/replaced rail security fences and the distance between the tracks and the receptors.

The motorway design, including the upgraded overpass over the rail line as part of the project, has been included in the noise prediction model. The property buildings for the noise sensitive receptors adjacent of the rail corridor were modelled to predict rail noise levels across the nearest façade facing the train lines. The Planning Levels apply at 0.5 m below the eaves. By modelling noise levels at the whole façade the assessment has been based on the highest predicted noise level.

Currently there are approximately 89 train movements in total per day on the existing rail alignment. The rail movements are approximately distributed 50:50 on the up rail track to Shorncliffe and the down rail track to Brisbane.

The rail noise prediction model applies source noise emissions for 6-car Suburban Multiple Unit (SMU) and Interurban Multiple Unit (IMU) passenger trains operating on the Gold Coast rail network. The reference noise levels in Table 9 have been developed by QR from extensive monitoring of noise levels from train passby events. Railway noise levels have been modelled at a height of 0.5 m above the top of rail height. The noise levels assume the train wheels and track are in good to fair condition.

**Table 9 – Train Noise Emission Levels**

Train Type	Reference Speed	Reference noise levels at 25 m, dBA	
		Sound Exposure Level	Single Event Maximum
SMU and IMU passenger trains	80 km/h	93	88

Note Sound Exposure Level is a measure of the total noise energy for a single train passby event.

SoundPLAN rail noise models include track corrections for existing rail infrastructure. As there are no sections of existing track with a radius under 500 m, bridges or parapets, no additional corrections were applied to the rail source lines within the study area.

## 4.5 Noise-sensitive buildings and land uses

Road traffic noise levels were predicted at the noise-sensitive buildings and land use presented in **Figure 3**. The majority of noise sensitive receptors are residential dwellings at the street adjacent to the alignment of the Motorway.

The non-residential noise sensitive receptors are:

- Evergreen Taoist Temple
- Sandgate Seventh Day Adventist Church
- St John Fisher College.

These receptors are detailed in **Table 10**. The noise criterion for these three locations is based on the maximum  $L_{A10, 1 \text{ hour}}$  noise level during hours of operation.

**Table 10 – Non-residential noise sensitive receptors**

Suburb	Location
Deagon	<p>Evergreen Taoist Temple, Depot Road (place of worship).</p> <p>The Evergreen Taoist Temple can be segregated into two primary areas. The first being residential, with housing offered to the south of the complex estate. Noise impacts to residential buildings within the estate have been considered in line with the remaining residences to the project, following the guidelines within TMR's Code of Practice.</p> <p>To the north of the estate is the church, with buildings providing administrative, catering and areas of worship. The church has a number of buildings that surround a central courtyard. The main entrance into the church is located to the north, with a covered open spaced flanked by small buildings for an office and souvenir kiosk. No buildings to the north of the courtyard are considered sensitive in addressing operational road traffic noise.</p> <p>Two storey buildings are located to the east and west of the central courtyard. To the east, the building holds a café / cafeteria area with toilets to the south. Again these rooms are not considered sensitive. Covered open spaces are located to the south of the courtyard with some walls and storage rooms to the east and west of this area. Whilst the storage buildings are not considered sensitive, the open central courtyard within the complex and undercover areas can be assessed against the outdoor passive recreation area criterion, presented in <b>Table 2</b>.</p> <p>The building to the west of the courtyard holds private rooms for functions and worship at the ground floor, with rooms for storage on the upper floor. The building to the west of the courtyard is considered sensitive to road traffic noise; however there are no openable windows fronting the motorway to these sensitive rooms.</p> <p>In summary, all sensitive buildings within the church have openable windows / doors that face into the internal courtyard. The majority of the church is open space, both within the internal courtyard and under covered buildings with open facades. As such, the <math>L_{A10, 12 \text{ hour}}</math> passive recreational criterion has been adopted for the church, to be assessed as a free field noise level at a location representative of 1 m from the external façade of all buildings within the church compound.</p>
Deagon	<p>Sandgate Seventh Day Adventist Church</p> <p>The church fronts an access road immediately adjacent to Depot Road, with the congregation area on the ground floor. The church is approximately 170 m away from the existing Gateway Motorway kerb, separated by nine dwellings. The <math>L_{A10, 1 \text{ hour}}</math> noise criterion for educational, community and health buildings is applicable to this church, assessed as a façade corrected noise level, 1 m from the building façade.</p>

Bracken Ridge	<p>Saint John Fisher College Administrative and classroom buildings dot the north of the Saint John Fisher College property boundary, with a large sporting field located to the east of the site.</p> <p>The <math>L_{A10, 1 \text{ hour}}</math> noise criterion for educational, community and health buildings is applicable to sensitive buildings within the school, assessed as a façade corrected noise level, 1m from the building façade. In addition, the <math>L_{A10, 12 \text{ hour}}</math> passive recreational criterion is applicable to the school grounds, to be assessed as a free field noise level across the open spaces.</p>
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The noise model predicts  $L_{A10,18 \text{ hour}}$  noise levels and a correction factor has been determined from measured data in order to correct the modelled  $L_{A10,18 \text{ hour}}$  road traffic noise level to a representative  $L_{A10,1 \text{ hour}}$  and  $L_{A10, 12 \text{ hour}}$  noise levels.

Measurements undertaken by SLR, ASK, AECOM and ARUP were used in order to determine the relevant correction factors.

To determine a correction for the  $L_{A10, 1 \text{ hour}}$  noise level, the  $L_{A10,18 \text{ hour}}$  and maximum  $L_{A10,1 \text{ hour}}$  (during hours of operation of any nearby educational, community or health facility) noise levels were compared for each measurement location near an educational, community or health building, as shown in **Table 11**.

**Table 11 – Noise level adjustment factor from  $L_{A10,18 \text{ hour}}$  to  $L_{A10,1 \text{ hour}}$**

Educational, Community and Health Building Area Measurements	Noise Level dBA		Difference dBA <sup>1</sup>
	$L_{A10,18 \text{ hour}}$	$L_{A10,1 \text{ hour}}$	
<b>SLR Measurements (November 2015)</b>			
Location 10 - 41 Depot Road (Taoist Church)	65.7	68.0	2.3
<b>ASK Measurements (May 2015)</b>			
Location 5 - 140 Nearra Street	59.1	61.8	2.7
Location 12 - 41 Depot Road (Taoist Church)	66.1	69.1	3.0
Location 13 - 25 Depot Road	65.3	68.1	2.8
<b>AECOM Measurements (2011)</b>			
Location 5 - 8 Schoolside Place	62.3	65.1	2.8
<b>ARUP Measurements (2010)</b>			
Location 5 - 140 Nearra Street	58.7	62.2	3.5
Location 12 - 41 Depot Rd (Taoist Church)	66.2	69.3	3.1
Location 13 - 25 Depot Road	65.1	68.2	3.1
Location 14 - St John Fisher Classroom 1	65.0	67.3	2.3
Location 15 - St John Fisher Classroom 2	65.5	69.0	3.5

Note 1: A positive difference indicates that the  $L_{A10,1 \text{ hour}}$  noise level is higher than the  $L_{A10,18 \text{ hour}}$  noise level

The average difference between the  $L_{A10,18 \text{ hour}}$  noise level and the  $L_{A10,1 \text{ hour}}$  noise level was 2.9 dBA with a standard deviation 0.4. This indicates that there is little variation in the differences between the two noise descriptors. It is therefore justifiable to use the average difference of 2.9 dBA as a standard correction factor to be added to the  $L_{A10,18 \text{ hour}}$  noise in order to calculate the  $L_{A10,1 \text{ hour}}$  noise level for these locations.

In order to determine a correction factor for the  $L_{A10,12 \text{ hour}}$  road traffic noise level, the  $L_{A10,18 \text{ hour}}$  and  $L_{A10,12 \text{ hour}}$  noise levels were compared for each of the measurement locations previously analysed in **Table 11**.

**Table 12** shows the difference between the  $L_{A10,18 \text{ hour}}$  and  $L_{A10,12 \text{ hour}}$  noise levels at each of these measurement locations.

**Table 12 – Noise level adjustment factor from  $L_{A10,18 \text{ hour}}$  to  $L_{A10,12 \text{ hour}}$**

Educational, Community and Health Building Area Measurements	Noise Level dBA		Difference dBA <sup>1</sup>
	$L_{A10,18 \text{ hour}}$	$L_{A10,12 \text{ hour}}$	
<b>SLR Measurements (November 2015)</b>			
Location 10 - 41 Depot Road	65.7	67.0	1.3
<b>ASK Measurements (May 2015)</b>			
Location 5 - 140 Nearra Street	59.1	60.2	1.1
Location 12 - 41 Depot Road	66.1	67.7	1.6
Location 13 - 25 Depot Road	65.3	66.7	1.4
<b>AECOM Measurements (2011)</b>			
Location 5 - 8 Schoolside Place	62.3	63.0	0.7
<b>ARUP Measurements (2010)</b>			
Location 5 - 140 Nearra Street	58.7	59.9	1.2
Location 12 - 41 Depot Road	66.2	67.7	1.5
Location 13 - 25 Depot Road	65.1	66.7	1.6
Location 14 - St John Fisher Classroom 1	65	66.3	1.3
Location 15 - St John Fisher Classroom 2	65.5	66.3	0.8

Note 1: A positive difference indicates that the  $L_{A10,12 \text{ hour}}$  noise level is higher than the  $L_{A10,18 \text{ hour}}$  noise level

The average difference between the  $L_{A10,18 \text{ hour}}$  noise level and the  $L_{A10,12 \text{ hour}}$  noise level was 1.2 dBA with a standard deviation of 0.3. This indicates that there is little variation in the differences between the two noise descriptors. It is therefore justifiable to use the average difference of 1.2 dBA as a standard correction factor to be added to the  $L_{A10,18 \text{ hour}}$  noise in order to represent the  $L_{A10,12 \text{ hour}}$  noise level for these locations.

#### 4.6 Noise model verification

Verification of the road traffic noise model ensures a high level of confidence in the accuracy of results for future road traffic noise levels.

In order to verify the results for future road traffic noise levels a model is created which represents the local environment and traffic volumes at the time field measurements were taken. This allows comparisons to be made between the calculated and measured values in order to verify the results from the model and give a high degree of confidence in the accuracy and precision of the model.

A detailed verification of the model is presented in **APPENDIX C**.

## 5 NOISE BARRIER DESIGN

To understand the road traffic noise levels for the project, three modelling scenarios have been assessed:

- Scenario 1: Pre-Existing (2013)
- Scenario 2: Proposed (2018) without the construction of new barriers. For this scenario, NB06 has been preserved as this noise barrier is a replacement of the existing noise wall.
- Scenario 3: Proposed (2028) without the construction of new barriers. For this scenario, NB06 has been preserved as this noise barrier is a replacement of the existing noise wall.
- Scenario 4: Proposed (2028) with the construction of all noise barriers listed in **Table 13**. Noise barriers have been designed, where required and practical, to achieve compliance with TMR's noise criteria in the Year 2028.

The road traffic noise levels for the above mentioned scenarios are tabulated and presented graphically in **APPENDIX D**. Rail noise levels have been assessed under Scenario 3. As there are no predicted noise levels from rail movements that exceed the criterion, rail noise levels have not been considered within the noise barrier design, Scenario 4.

Included within the figures in **APPENDIX D** are the road traffic noise barriers listed in **Table 13** below. More details for new / replaced barriers are discussed in **Sections 5.1 to 5.5**. These noise barriers have been designed to achieve as much as practical the road traffic noise criteria in **Table 2** for the 2028 road traffic volumes and composition. The road traffic noise barriers include the existing noise barriers to be retained by the Project, the existing noise barriers that will be replaced by the Project and the construction of new noise barriers.

**Table 13 – Road traffic noise barriers**

Location of noise barrier	Chainage	Status	Noise barrier length and height
NB-01: West of Motorway	3010 – 3380	Existing (Property Developers Barrier built on the cadastral boundary.)	Length 450 m and 2.4 m
NB-02: South/West of Motorway	8495 – 8950	Existing	Length 450 m and 3.0 m in height
NB-03: East of Motorway, south of Depot Road Bridge	8950 – 9560	Existing	Length 595 m and 3.0 m in height
NB-04: East of Motorway over Depot Road Bridge	9560 – 9895	New to Replace Existing	NB-04 and NB-05 is one combined barrier. Length 334 m and height ranging from 2.7 m to approximately 5 m in height
NB-05: East of Motorway north of Depot Road Bridge	9560 – 9820	New to Replace Existing	
NB-06: West of Motorway	10120 – 10550	Existing	Length 420 m and 5.5 m in height
NB-07: West of Motorway	10605 – 10750	New to Replace Existing	Length 160 m and 3.6 m in height, dropping to 2.4 m in height to the north.
NB-08: West of Motorway adjacent to Cloverbrook Place	10810 – 11310	Replace existing (like for like)	Length 500 m and 4.5 m in height
NB-09a: West / South of Motorway	11350 – 11650	New	Length 300 m and 6.0 m in height.
NB-09b: West / South of Motorway	11600 – 11980	New to Replace Existing	Length 345 m and 6.0 m in height.

NB-10a: Gateway Motorway southbound exit ramp to Bracken Ridge Road	11705 – 11950	New to Replace Existing	NB10a: Length 280 m and 2.4 m in height, rising to 3.0 m to the east.
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As discussed in **Section 6**, the design of the noise barriers was undertaken in consultation with the other design and construction teams and in accordance with the design requirements in **Section 2.2**.

### 5.1 NB-04 and NB-05

Noise barrier NB-04 / NB-05 is a continuous barrier. The barrier begins over Depot Road bridge at a height of approximately 2.7 m. As the barrier moves north, the top of barrier RL remains level as the ground falls away, until the barrier reaches an approximate height of 5.3 m, before stepping down to 3.0 m (min). In total NB04/05 is approximately 334 m in length.

### 5.2 NB-07

A new barrier is required to replace the existing noise barrier which is predicted to be insufficient in reducing the predicted 2028 road traffic noise levels to the dwelling west of the wall. The proposed barrier is approximately 100 m long at 3.6 m in height dropping down to 2.4 m as the barrier moves north for a further 60 m.

### 5.3 NB-08

The proposed barrier will be a like-for-like replacement of the existing noise barrier.

### 5.4 NB-09a and NB-09b

As detailed in **Table 3**, the footprints of two new noise barriers have been drafted – NB09a and NB09b. NB09a is approximately 300 m in length and has an return to connect with NB08 to limit road traffic noise intrusion into the school grounds. The barrier then continues north and wraps around the school grounds at a height of 6.0 m.

NB09b is elevated with the road pavement with a height of 6.0 m and an overall length of 345 m.

### 5.5 NB-10a

The proposed barrier NB10a will be a replacement of the existing noise barrier. The new barrier will be 280 m in length, with a minimum height of 2.4 m rising to 3.0 m, or a height that meets or exceeds the existing height, whichever is higher.

### 5.6 Rail Noise Impacts

QR's planning levels are achieved at all noise-sensitive receptors with the final design. Based on the predicted compliance to the planning levels noise mitigation measures are not required for rail noise as part of the GUN. The predicted rail noise levels can be found mapped and tabulated in **APPENDIX D**.

## 6 DESIGN DEVELOPMENT

The design involves the integration of requirements from all relevant design disciplines and is the subject of 'spatial fit' and other interface checks as each design package is developed. The design of road traffic noise barriers included consultation with the following design disciplines to achieve the best possible solutions for the Project.

- drainage and flooding
- structures and bridges
- pavements
- geotechnical
- intelligent transport systems (ITS)
- temporary traffic management (TTM)
- services
- environmental
- landscape, revegetation and urban design
- local roads.

### 6.1 Geometric and road works

The road geometry and road works have been considered in the development of the concept road traffic noise mitigation (noise barriers). Primarily the design speeds applicable to the modelling inputs have been determined in consultation with the road design team.

The horizontal alignment of the project within the project corridor was considered to confirm that there was adequate space for the noise barriers and integrated with the road furniture to optimise the design solution.

Further, noise barriers which limit horizontal sight distance (i.e. NB-09) were positioned in close consultation with the road design team to identify the road alignment changes required to avoid safety issues with the road users.

### 6.2 Structures and bridges

Structures and bridges have been consulted closely to determine the structural requirements and optimum form to provide an efficient and compliant design. Further discussions are required to coordinate the alignment and structural details of the noise barriers. Innovative material choices are also under discussion to utilise lightweight energy efficient panels in place of concrete panels, while still achieving the required design life and performance objectives.

### 6.3 Pavements

Pavements have been consulted to determine the existing and proposed pavement surfacing types for input into the model.

### 6.4 Geotechnical

Geotechnical will be consulted in the development of the noise barrier structural design and foundation requirements.

### 6.5 Intelligent transport systems

Placement of ITS and lighting infrastructure is critical for coordination of noise barriers and VLS and gantries. Further consultation is required to identify where non-standard mounting solutions are required to locate this infrastructure in conjunction with noise barriers.

## 6.6 Environmental

The key to successful environmental implementation and delivery is commitment from the project leadership and integration of the environmental team into all planning, delivery, and monitoring decision making processes. On the GUN project, the environmental team has responsibilities during design, approvals management and construction delivery.

The environmental team will continue to work with the noise team to minimise impact of the design on the environment. In particular, the detailed design minimises high risk activities such as working in watercourses and near sensitive areas, working in contaminated soils, erosion and sediment control.

Design requirements from the D&C Deed, SWTC and other environmental documents have been summarised in the Environmental Requirements Checklist. All Environmental requirements are to be summarised in the Environmental Design Report (EDR) (PEV-60).

The environmental constraints and sensitive areas, in addition to the corresponding environmental design criteria relevant to the road and rail traffic noise assessment are summarised in **Table 14** below.

**Table 14 – Environmental Design Criteria**

Environmental Element	Environmental Design Criteria
<p>Acid Sulfate Soils:</p> <p>In accordance with Brisbane City Council’s City Plan 2014 Mapping: Potential and Actual Acid Sulfate Soils Overlay, the site is located predominantly on land at or above 5m AHD. However ASRIS mapping depicts the area has having a high probably that ASS will occur in the area.</p>	<p>Minimise the extent of disturbance / excavation across the site.</p> <p>Where works involve the excavation of material below 5m AHD, there is an increased risk of exposing acid sulfate soils.</p> <p>The design of foundations at all other locations must consider acid sulfate soils and must: (i) facilitate the safe implementation of the Acid Sulfate Soils Management Plan where applicable; and (ii) ensure durability requirements for structures are met.</p> <p>Ensure that exposed ASS is treated in accordance with the Acid Sulfate Soils Management Plan.</p>
<p>Contaminated land:</p> <p>The proposed nose barriers are not located on land parcels listed on the Environmental Management Register or Contaminated Land Register.</p> <p>Searches of the Department of Defence UXO online mapping has indicated there are no locations that are potentially affected by UXOs.</p>	<p>Potential exists for previously unidentified contamination to be encountered during excavation/construction works. This is to be managed by the Contractor in accordance with the Environmental Management Plan (Construction).</p>
<p>Surface water – waterways and receiving water bodies:</p> <p>The proposed noise barriers do not directly impact watercourses. The sites traverse the catchments of Cabbage Tree Creek, Bald Hills Creek and the Deagon Wetlands.</p>	<p>The Contractor (CPESC/RPEQ) must prepare a temporary erosion and sediment control plan (ESCP), which must be progressively updated during construction.</p> <p>Ensure all design and construction takes into consideration the proximity to Deagon Wetlands, and creek catchment areas, the adjacent marine</p>

Environmental Element	Environmental Design Criteria
	<p>park and its tributaries.</p> <p>Implement measures to ensure compliance with all environmental standards as set out by legislation, permit conditions and approvals.</p>
<p>Terrestrial ecology and landscape and visual amenity:</p> <p>The site is not within a High Risk Area (Protected Plants Flora Survey Trigger Map) under the <i>Nature Conservation Act 1992</i>.</p> <p>The proposed noise barrier locations do not impact remnant vegetation under the <i>Vegetation Management Act 1999</i>. Essential habitat for the Wallum Froglet is mapped between CH10850-10700 on the eastern side of the Motorway.</p> <p>The entire site is mapped within the koala protection area and contains koala habitat.</p> <p>Minor vegetation clearing is likely to be required to enable replacement of existing and construction of new noise barriers.</p>	<p>Minimise the works footprint and clearing of remnant vegetation, including regrowth trees.</p> <p>Rehabilitate/revegetate all disturbed areas with suitable species.</p>
<p>Aquatic ecology:</p> <p>The proposed noise barriers do not directly impact watercourses. The sites traverse the catchments of Cabbage Tree Creek, Bald Hills Creek and the Deagon Wetlands.</p> <p>The site is also within 1km of a Matter of National Environmental Significance – Wetlands of International Importance (Ramsar) under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p>	<p>The Contractor (CPESC/RPEQ) must prepare a temporary erosion and sediment control plan (ESCP), which must be progressively updated during construction.</p>
<p>Noise and vibration, air quality and light (sensitive receptors):</p> <p>Refer to Figure 2a-2J for the location of nearby sensitive receptors.</p>	<p>Minimise disturbance to the greatest extent possible in proximity to sensitive receptors.</p> <p>Potential nuisance to sensitive receptors associated with construction will be managed during the construction phase in accordance with the Environmental Management Plan (Construction).</p> <p>Provide mitigation measures for predicted noise impacts that exceed criteria nominated in Table 2. Mitigation measures will include the installation of noise barriers as determined under this report.</p>
<p>Climate:</p>	<p>Climate impacts (including weather monitoring and warnings) must be assessed to address adverse weather conditions (e.g. storms, localised flooding, hail, frosts, extreme temperatures) which may</p>

Environmental Element	Environmental Design Criteria
	<p>impact the Contractor's Work, the Project Works or the Temporary Works and/or have adverse environmental impacts on the Contractor's Work, the Project Works or the Temporary Works.</p> <p>Future changes in climate conditions during the design life of this infrastructure are to be considered including 0.8m sea level rise but no increase in rainfall intensity. This is not expected to materially impact the design.</p>
<p>Cultural heritage – Indigenous:</p> <p>Some ground disturbance is expected to occur as a result of the proposed works.</p> <p>The noise barriers are not located within areas assessed to be of heritage significance.</p>	<p>For all ground disturbance activities, works are to be carried out in accordance with the Procedure for Management of Aboriginal Cultural Heritage and the Cultural Heritage Management Agreement between the State of Queensland, represented by the Department of Transport and Main Roads, and Maroochy Barambah dated 06 March, 2014.</p> <p>Works must also comply with the Cultural Heritage Duty of Care Guidelines at all times.</p> <p>Monitoring is required by a cultural heritage representative for all ground disturbance activities directly affected by the Project Works and which have not been subjected to previous significant ground disturbance.</p>
<p>Cultural Heritage – non-indigenous:</p> <p>There are no known non-indigenous cultural heritage values within or adjacent to the proposed noise barrier locations.</p>	<p>Potential exists for previously unidentified heritage values to be identified during excavation/construction works. This is to be managed by the Contractor in accordance with the Environmental Management Plan (Construction).</p>

Environmental Approvals:

A review of the legislative triggers associated with this package has identified a number of approvals that are likely to be required for the project as a whole. A Road Corridor Permit (0001592) has been sought and all aspects of the Project will be required to comply with the conditions of the permit.

It is TMR's position that the *Natural Assets Local Law 2003* (NALL) does not apply to the project works.

Outstanding Actions for Construction:

The following are the outstanding actions that need to be undertaken by the Lendlease Environment and Cultural Heritage Team for Construction:-

- Engage a fauna spotter-catcher for the duration of clearing.
- Extent of ground disturbance/excavation to be confirmed to ascertain potential impacts on heritage items.
- Ensure a cultural heritage representative is present for all ground disturbance activities directly affected by the Project Works and which have not been subjected to previous significant ground disturbance.
- Ensure all relevant management plans are prepared and implemented throughout construction, including the Environmental Management Plan (Construction).

## 6.7 Landscape, revegetation and urban design

The Noise Barriers have been designed so that they consider landscape revegetation and urban design (LRUD) treatments and components.

The noise barrier features comply with the environmental, civil and LRUD objectives, requirements and design criteria included in Exhibit E “*Environmental Assessment Report*”. The works allow for the integration of landscaping solutions through the adoption of contemporary noise barrier technology where possible.

Sensitive plantings will be identified in close proximity of the noise barriers to minimise maintenance and compromise the barrier with fallen branches.

## 6.8 Community

Locations of new and replacement of existing barriers has been carried out in consultation with adjacent land owners. Noise monitoring was carried out within private land and permission to enter was obtained for all properties. Refer to the Noise and Vibration Monitoring Report (GUN-3-SL-PNS-RP-100003) for details of the noise monitoring.

John Fisher College have been consulted with by TMR and have advised the DJV of their requirements and acceptance to allow resumption for the construction of the noise barrier to provide noise mitigation to the school.

Mercy Family Services have been consulted with by TMR and have advised that Building 24, the multi-story building, was confirmed as being Commercial/Administration. The building uses are confirmed as follows:

**Table 15 – Road traffic noise barriers**

Building	Use	Note
14	Residential - Apartment/Unit	Existing Air Con
15	Residential - Apartment/Unit	Existing Air Con
16	Residential - Apartment/Unit	Existing Air Con
17	Commercial/Admin	Not sensitive
18	Commercial/Admin	Not sensitive
19	Residential - Apartment/Unit	Existing Air Con
20	Laundry Store room	Not sensitive
21	Residential - Apartment/Unit	Existing Air Con
22	Store room	Not sensitive
23	Heritage Cottage - tbc	Unknown
24	Commercial/Admin	Multi Story/Not Sensitive
25	Convent/Commercial/Admin	Convent part of building closest to Queens Rd
26	Commercial/Admin	Not sensitive
27	Residential - Apartment/Unit	Existing Air Con
28	Residential - Apartment/Unit	Existing Air Con

## 7 SAFETY IN DESIGN

Safety is a Key Result Area (KRA) for the delivery of the project. Safety has been considered throughout the design process for the expected lifecycle of the project. The safety in design process included:

- identifying and assessing possible hazards and risks at safety in design workshops in accordance with AR1101 Design Management
- all designs studied to identify and assess work health and safety risks that may be present throughout the life cycle of the project
- design flow on risks identified and considered
- AR601A Project Safety Risk Register was consulted and updated.

Safety in design has been applied across both permanent and temporary works and to design changes. Examples of safety in design specifically relating to the geometric and road design are given in **Table 16**.

**Table 16 – Safety in Design risks and safeguards**

Description of potential risk	Potential safeguards
Undertaking maintenance of noise barriers in constrained locations and adjacent to live traffic	Design the noise barriers considering TMR's Maintenance Minimising Principles Guideline and allow sufficient access to barriers and using low/no maintenance materials and plantings in front
Noise barriers causing a permanent screen to share path users not in line with CPTED principles	Consider positioning noise barriers around shared path to maintain passive surveillance of the shared path
Security of properties during construction of the noise barrier	Construction to consider temporary fencing to properties during construction of the noise barrier.

## 8 WHOLE OF LIFE CONSIDERATIONS

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Whole of life costs have been considered in the tender design development, including:

- design life
- maintenance minimisation
- user costs
- operating costs.

Maintenance minimisation principles have been integrated throughout the design of the project, so that the ongoing maintenance of the designed elements will minimise lifecycle costs.

The design life for each asset on the project will meet the requirements of Clause 5.2 of the SWTC. The design life of the major asset items and asset sub-items which vary from the specified design life of the asset element which they form a part are also listed in *Volume III Asset Items and Sub-Items Specified Design Lives*.

### 8.1.1 Maintenance minimisation

The Maintenance Minimising Principles Guideline produced by the TMR Metropolitan District has been referred to during the design of transverse and longitudinal drainage. The following measures are proposed to assist in maintenance minimisation:

- Low maintenance planting in close proximity to noise barrier
- No large trees that would compromise the structural integrity of the noise barrier if fallen
- Allow sufficient access widths either side of noise barrier for maintenance access by foot or vehicle.

## 9 SUSTAINABILITY

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A key part of the design for the project is to ensure broader thinking and deliver high-performance assets that drive value. Sustainability is incorporated into the detailed design development and documented through the Sustainability Design checklist.

The Infrastructure Sustainability Council of Australia (ISCA) and broader implementation of sustainability initiatives will be managed as an integrated deliverable to the project, from design phase to completion, where key deliverables and milestones will be incorporated into the primary project program.

Key items of sustainable design outcomes for this package are:

- Minimising impact to surrounding wetlands.
- Increasing the health and wellbeing of the adjacent community
- Utilising predictive modelling to determine long term noise levels during operation
- Implementation of noise barriers to mitigate impacts to sensitive receptors and minimise exceedances of noise goals

**Table 17** provides a summary of design responses to relevant ISCA sustainability categories.

**Table 17 – Sustainability Design Checklist**

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
<b>Materials</b> (Mat-1)	<ul style="list-style-type: none"> <li>Monitoring and modelling of materials lifecycle impacts is undertaken using the Materials Calculator (or other suitable Lifecycle Assessment technique) across the infrastructure lifecycle.</li> <li>Monitoring and modelling demonstrates a reduction in materials lifecycle impacts compared to a reference footprint, as determined by the Materials Calculator.</li> </ul>	To minimise the impacts associated with the use of materials across the whole of life.	<ul style="list-style-type: none"> <li>Maximising the re-use of existing structures</li> <li>Consider the use on lightweight composite panel with better energy value</li> </ul>
<b>Discharges to Air, Land and Water</b>  <i>Water quality</i> (Dis-1)	<ul style="list-style-type: none"> <li>Baseline studies of existing receiving water environment have been carried out for the project.</li> <li>Predictions for receiving water quality impacts have been developed for construction and operation of the project.</li> <li>Measures to minimise adverse impacts to local receiving water quality during construction and operation have been identified and implemented.</li> <li>Monitoring of water discharges and receiving waters is undertaken at appropriate intervals and at times of discharge during construction and operation.</li> <li>Monitoring and modelling demonstrates no exceedances of water discharge or water quality goals.</li> <li>All stormwater leaving the site is treated or filtered in accordance with appropriate urban stormwater guidelines unless it occurs during:               <ul style="list-style-type: none"> <li>For construction of less than 1 year, a 6 hour 1 in 2 year storm event;</li> <li>For construction of greater than 1 year,</li> </ul> </li> </ul>	The design does not allow for untreated stormwater to leave the site. The design does not increase peak stormwater flows for rainfall events of up to a 1.5 year ARI event discharge.	<ul style="list-style-type: none"> <li>None identified for this package</li> </ul>

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
	<p>a 6 hour 1 in 5 year storm event.</p> <ul style="list-style-type: none"> <li>The infrastructure does not increase peak stormwater flows for rainfall events of up to a 1.5 year ARI event discharge.</li> </ul>		
Noise (Dis-2)	<ul style="list-style-type: none"> <li>Baseline studies of existing noise environment have been carried out for the project.</li> <li>Predictions for noise have been developed for construction and operation of the project.</li> <li>Measures to mitigate noise during construction and operation have been identified and implemented.</li> <li>Monitoring of noise is undertaken at appropriate intervals and in response to complaints during construction and operation.</li> <li>Monitoring and modelling demonstrates no recurring or major exceedances of noise goals.</li> </ul>	The design meets the noise criteria established for the project.	<ul style="list-style-type: none"> <li>Baseline monitoring of road and rail traffic noise has been undertaken and are documented in PNS-10.</li> <li>The results of the baseline monitoring have been utilised to model predicted noise levels for operation.</li> <li>Noise barriers are proposed, either to remain in situ, be replaced or new barriers installed as necessary to mitigate the predicted impacts identified in the modelling and achieve noise goals specified in the TMR Road Transport Noise Management Code of Practice.</li> <li>One minor exceedance of specified noise criteria for 2028 has been predicted at St John Fisher College. However, this is explained in Table 3 whereby to achieve the criteria, the noise wall would need to be over 7m high which exceeds the maximum height of 6m specified by TMR. This has been noted as a non-compliance. Figures showing predicted noise levels and locations of noise barriers are provided in Appendix B.</li> </ul>
Land Disturbance area (Lan-1)	<ul style="list-style-type: none"> <li>&gt;75% of the land used for the project is previously disturbed</li> </ul>	The design preferentially utilises disturbed areas over previously undisturbed areas.	<ul style="list-style-type: none"> <li>Maximising the re-use of existing structures and retaining the current footprint of noise barriers.</li> </ul>
Soils (Lan-2)	<ul style="list-style-type: none"> <li>Conservation of topsoils, subsoil, and conservation or use of on-site mineral resources has been considered.</li> <li>All subsoil and topsoil impacted by the construction works is separated and protected from degradation, erosion or mixing with fill or waste;</li> </ul>	Soils that can be reused on site (not ASS) are considered in the design.	<ul style="list-style-type: none"> <li>None identified for this package</li> </ul>

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
	<ul style="list-style-type: none"> <li>95% of all topsoil (by volume) retains its productivity and is beneficially re-used on or nearby to the project or asset.</li> </ul>		
<i>Contamination</i> (Lan-3)	<ul style="list-style-type: none"> <li>Site assessment follows the recommended approach in Schedule A 'Recommended general process for assessment of site contamination' of National Environment Protection (Assessment of Site Contamination) Measure 1999.</li> <li>Remediation options are identified and selected using a sustainability hierarchy</li> <li>The effectiveness and durability of the remedial solution, and maintenance and monitoring, have been considered over the lifetime of the infrastructure and beyond.</li> <li>Remediation appraisal and selection audited by qualified independent specialist.</li> </ul>	The most sustainable options for remediation of contaminated land are implemented.	<ul style="list-style-type: none"> <li>Consider minimising foundation requirements of noise barriers to reduce the ground disturbance.</li> <li>New or replacement noise barriers are not proposed in areas that have been identified as potentially contaminated.</li> </ul>
<i>Flooding</i> (Lan-4)	<ul style="list-style-type: none"> <li>The run-off, flood risk, and potential increased flood risk elsewhere as a result of the project have all been assessed over their expected working life, in line with the requirements of 'Flood plain management in Australia: best practice principles and guidelines' and appropriate flood resilience measures have been included in the design so that there is a significant decrease in flood risk.</li> </ul>	There is significant improvement in flood risk as a result of the project.	<ul style="list-style-type: none"> <li>Avoiding placement of noise barriers in locations that will impede the passage of water.</li> <li>Drainage slots will be incorporated in the design of the noise walls. Further assessment will be undertaken as the detailed design of the noise walls progresses.</li> </ul>
<b>Waste</b> (Was-1)	<ul style="list-style-type: none"> <li>Predictions for waste quantities and types have been developed for construction and operation.</li> <li>Measures to minimise waste during construction and operation have been identified and implemented. The measures must apply the waste hierarchy - avoidance, reduction, reuse and recycling.</li> <li>Tracking of all wastes is undertaken during</li> </ul>	Potential waste streams for construction and operation are considered as part of design phase and design responds to minimise and appropriate manage waste streams.	<ul style="list-style-type: none"> <li>Keep existing foundations in place and configure new footing to avoid them.</li> </ul>

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
	<p>construction and operation.</p> <ul style="list-style-type: none"> <li>Waste tracking and management has been externally audited.</li> <li>Waste handling and disposal/recycling all the way to final destination has been audited at appropriate intervals.</li> </ul>		
<b>Ecology</b> (Eco-1)	<ul style="list-style-type: none"> <li>Where the project, including land used for temporary works, includes, uses or potentially may impact, land that has been identified as ecologically sensitive, then an ecological management plan must be developed, exhibited and implemented that prioritises minimising ecological impacts, and is prepared by qualified ecological expert.</li> </ul>	To avoid impact to no-go areas, unless necessary. Consider other options that avoid direct impacts to these sensitive areas.	<ul style="list-style-type: none"> <li>Minimise clearing for the construction of the noise walls and retain along current alignment over disturbed areas only</li> </ul>
(Eco-2)	<ul style="list-style-type: none"> <li>No net change in ecological value of site based on the Ecology Calculator.</li> </ul>	To avoid impacts to undisturbed areas and identify opportunities to improve habitat quality and connectivity.	<ul style="list-style-type: none"> <li>Providing fauna access where required.</li> <li>Noise barriers will act in place of fauna fencing where required.</li> </ul>
(Eco-3)	<ul style="list-style-type: none"> <li>The existing degree of biodiversity values is enhanced by &gt;20% (offsetting allowed).</li> <li>A biodiversity management plan for the ecological value and biodiversity on the site has been developed and implemented.</li> </ul>	To avoid impacts to undisturbed areas and identify opportunities to improve habitat quality and connectivity.	<ul style="list-style-type: none"> <li>Providing fauna access where required.</li> <li>Noise barriers will act in place of fauna fencing where required.</li> </ul>
(Eco-4)	<ul style="list-style-type: none"> <li>There is a low or moderate degree of existing habitat connectivity identified.</li> <li>The existing degree of habitat connectivity is enhanced (with no offsetting).</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>There is a high degree of existing habitat connectivity identified.</li> <li>The existing degree of habitat connectivity is maintained (with no offsetting).</li> </ul>	To avoid impacts to undisturbed areas and identify opportunities to improve habitat connectivity.	<ul style="list-style-type: none"> <li>Providing fauna access where required.</li> <li>Noise barriers will act in place of fauna fencing where required.</li> </ul>
<b>Community Health, Well-</b>	<ul style="list-style-type: none"> <li>Stakeholder consultation is undertaken and relevant baseline studies have been referred</li> </ul>	To incorporate feedback from stakeholders on community	<ul style="list-style-type: none"> <li>Consultation has occurred with the adjacent community to understand the noise issues and</li> </ul>

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
<b>being and Safety</b> (Hea-1)	to, or undertaken, to identify priority community health and wellbeing issues. <ul style="list-style-type: none"> <li>• Community health and wellbeing indicators have been developed for one of the priority issues and adopted for design, construction and operation.</li> <li>• Measures to positively contribute to community health and wellbeing for one of the priority issues have been identified and implemented.</li> <li>• Monitoring of community health and wellbeing indicators is undertaken at appropriate intervals during construction and operation of the asset.</li> <li>• Community and key stakeholders have participated in identification of priority community health and wellbeing issues.</li> <li>• Community health and wellbeing indicators have been developed for two of the priority issues and adopted for design, construction and operation.</li> <li>• Measures to positively contribute to community health and wellbeing for two of the priority issues have been identified and implemented.</li> <li>• Monitoring of community health and wellbeing indicators is undertaken at appropriate intervals during construction and operation of the asset and demonstrates improvement of relevant indicators.</li> </ul>	health and wellbeing issues into the design.	requirements <ul style="list-style-type: none"> <li>• Baseline monitoring has been carried out to determine the current and predicted future road traffic noise levels and appropriate mitigation to reduce this where required to acceptable limits.</li> </ul>
(Hea-2)	<ul style="list-style-type: none"> <li>• The likelihood of crime has been reduced through implementing appropriate CPTED guidelines in design, construction and operation.</li> <li>• All tunnels or underpasses have end-to-end visibility.</li> </ul>	The design considers personal safety and reduces opportunities for crime to occur.	<ul style="list-style-type: none"> <li>• Placement of noise barriers around shared path is sensitive to maintaining passive surveillance</li> </ul>

Sustainability Category	Sustainability Criteria	Design Intent	Design Response
	<ul style="list-style-type: none"> <li>Temporary construction diversions and lighting are designed to meet CPTED guidance.</li> </ul>		
<b>Heritage</b> (Her-1)	<ul style="list-style-type: none"> <li>Baseline surveys of existing heritage have been carried out for the project.</li> <li>Community heritage values have been identified through consultation and integrated into surveys.</li> <li>Predictions for heritage impacts have been developed for construction and operation of the project.</li> <li>Measures to minimise adverse impacts to heritage during construction and operation have been identified and implemented.</li> <li>Community and key stakeholders have participated in the heritage surveys.</li> <li>Heritage values beyond those listed in government registers have been identified, considered and addressed.</li> <li>Signage and interpretative material describing heritage values is implemented and maintained.</li> <li>Partnerships with relevant stakeholders have been developed to utilise heritage places to promote local heritage values.</li> </ul>	To preserve and enhance non-indigenous and indigenous cultural heritage.	<ul style="list-style-type: none"> <li>Remain along current alignment over disturbed ground only.</li> <li>The noise barriers are not located within areas identified as being of heritage significance.</li> </ul>

## 10 FURTHER DESIGN DEVELOPMENT

### 10.1 Items for further development

Table 18 identifies the key noise mitigation design items to be finalised for next issue.

*Table 18 – Key areas for refinement and further development*

Design Element	Location	Description

### 10.2 Items for resolution

Table 19 identifies the key noise mitigation design items to be resolved.

*Table 19 – Items to be resolved prior to IFC submission*

Design Element	Location	Description	Method of Resolution	Action Owner
Noise wall	St John Fisher College	Acceptance of non-compliance	TMR to provide formal Minor Variation for permissible non-compliance	TMR

## 11 POST OPENING NOISE MONITORING AND MODELLING

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To confirm the noise design for the Project and in accordance with Clause 14.8.2 (f) of the SWTC; monitoring of road traffic noise will be undertaken after the date of Opening Completion.

At the time of the 100% design stage, a detailed noise monitoring methodology will be prepared that will be consistent with the requirements of DTMR's Code of Practice to:

- Quantify road traffic noise levels at noise-sensitive receptors.
- Enable assessment of road traffic noise levels to the Project Specific Requirements.
- Confirm the noise design achieves the Project Specific Requirements.
- Identify, if – required, additional noise mitigation measures.

## APPENDIX A DRAWING LIST

*Package PNS-20 - Drawing Transmittal*

DRAWING INDEX		
DRAWING NUMBER	DRAWING TITLE	REVISION
Nil.		

Released under RTI - DTMR

## APPENDIX B ROAD TRAFFIC DATA FOR NOISE DESIGN

Released under RTI - DTMR

## 14A.2 Forecast traffic for noise design

(a) Traffic forecasts at 2018 and 2028 for to be used in the noise modelling and design are shown in Table 14.A.2 below.

**Table 14.A.2 Forecast traffic volumes for noise design**

	Location	2018 18hr AWDT				2028 18hr AWDT			
		Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
Gateway Motorway & ramps - northbound	NB mid-block Bracken Ridge Rd-Bruce Hwy	36,150	4,000	2,310	42,450	43,630	5,590	2,920	52,150
	NB on ramp from Bracken Ridge Rd	5,680	460	140	6,270	6,860	640	170	7,670
	NB mid-block Bracken Ridge Rd between ramps	34,210	3,790	2,220	40,220	41,290	5,290	2,820	49,400
	NB off ramp to Bracken Ridge Rd	3,740	240	50	4,040	4,520	340	70	4,920
	NB mid-block Deagon Deviation-Bracken Ridge Rd	28,700	3,480	2,200	34,380	34,650	4,860	2,790	42,300
	NB to Deagon Deviation	13,810	1,290	310	15,410	16,660	1,810	400	18,870
	NB mid-block Depot Rd-Deagon Deviation	42,510	4,770	2,510	49,790	51,310	6,670	3,180	61,160
	NB on ramp from Depot Rd	8,950	480	330	9,760	10,810	670	420	11,900
	NB mid-block Depot Rd	33,560	4,290	2,180	40,030	40,500	5,990	2,770	49,270
	NB off ramp to Depot Rd	2,650	350	280	3,280	3,200	490	350	4,040
	NB mid-block Sandgate Rd-Depot Rd	36,210	4,640	2,460	43,310	43,700	6,480	3,120	53,310
	NB on ramp from Sandgate Rd	0	0	0	0	0	0	0	0
	NB mid-block Bicentennial Rd-Sandgate Rd	36,210	4,640	2,460	43,310	43,700	6,480	3,120	53,310
	NB on ramp from Bicentennial Rd	3,840	30	20	3,900	4,640	50	30	4,710
	NB mid-block Bicentennial Rd	32,370	4,600	2,440	39,410	39,070	6,430	3,100	48,600
	NB off ramp to Bicentennial Rd	2,290	70	20	2,380	2,770	100	20	2,880
	NB mid-block Nudgee Rd-Bicentennial Rd	34,660	4,670	2,460	41,790	41,830	6,530	3,120	51,480
	NB on ramp from Nudgee Rd	6,660	1,180	400	8,240	8,040	1,650	510	10,200
	NB mid-block Nudgee Rd	27,990	3,490	2,060	33,540	33,790	4,880	2,610	41,280
NB off ramp to Nudgee Rd	5,450	1,080	490	7,010	6,570	1,500	620	8,700	
NB mid-block Southern Cross Way-Nudgee Rd	33,440	4,570	2,550	40,560	40,370	6,380	3,230	49,980	
Gateway Motorway & ramps - southbound	SB mid-block Bruce Hwy-Bracken Ridge Rd	27,550	3,800	2,060	33,410	33,580	5,260	2,620	41,460
	SB off ramp to Bracken Ridge Rd	5,900	700	210	6,810	7,190	970	260	8,420
	SB Mid-block Bracken Ridge Rd-Deagon Deviation	21,650	3,100	1,860	26,610	26,390	4,280	2,360	33,030
	SB on ramp from Deagon Deviation	0	0	0	0	0	0	0	0

	Location	2018 18hr AWDT				2028 18hr AWDT			
		Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
	SB Mid-block Deagon Deviation-Depot Rd	32,210	4,100	2,230	38,530	39,260	5,670	2,820	47,750
	SB on ramp from Depot Rd	4,090	340	200	4,640	4,990	470	250	5,720
	SB Mid-block Depot Rd-Bicentennial Rd	36,380	4,440	2,400	43,220	44,340	6,140	3,050	53,530
	SB off ramp to Bicentennial Rd	800	90	10	900	980	130	10	1,120
	SB mid-block Bicentennial Rd	35,570	4,350	2,400	42,320	43,370	6,010	3,040	52,420
	SB on ramp from Bicentennial Rd	4,590	280	60	4,920	5,600	380	70	6,050
	SB mid-block Bicentennial Rd-Nudgee Rd	40,170	4,620	2,450	47,240	48,960	6,400	3,110	58,470
	SB off ramp to Nudgee Rd	4,110	620	60	4,790	5,010	860	80	5,940
	SB mid-block Nudgee Rd	36,060	4,000	2,390	42,450	43,950	5,540	3,030	52,520
	SB off ramp to Nudgee Rd	3,030	540	450	4,020	3,690	740	570	5,000
	SB mid-block Nudgee Rd-Southern Cross Way	39,110	4,540	2,840	46,490	47,680	6,280	3,600	57,560
Deagon Deviation & ramps - northbound	NB Deagon Deviation	13,570	1,530	230	15,330	16,380	2,140	290	18,810
	NB mid-block between ramps	9,320	1,030	190	10,540	11,250	1,440	240	12,920
	NB ramp to Bracken Ridge Rd	1,690	110	120	1,920	2,040	150	150	2,350
	NB ramp from Gateway Motorway	13,810	1,290	310	15,410	16,660	1,810	400	18,870
	NB mid-block Depot Rd-Bracken Ridge Rd	13,810	1,290	310	15,410	16,660	1,810	400	18,870
	NB mid-block Deagon Deviation @ Gateway	5,510	310	0	5,810	6,650	430	0	7,080
	NB ramp to Gateway Mwy	4,980	370	200	5,550	6,010	510	260	6,780
	NB mid-block Deagon Deviation dep Depot Rd	10,480	680	200	11,360	12,660	940	260	13,860
Deagon Deviation & ramps - southbound	SB Deagon Deviation	21,440	1,490	250	23,180	26,140	2,060	310	28,510
	SB off ramp to Bracken Ridge Rd	4,620	290	20	4,930	5,630	400	30	6,050
	SB mid-block between ramps	16,820	1,200	220	18,250	20,510	1,670	280	22,460
	SB on ramp from Bracken Ridge Rd	8,600	560	430	9,590	10,480	770	550	11,800
	SB mid-block Bracken Ridge Rd-Depot Rd	25,420	1,760	660	27,840	30,990	2,440	830	34,260
	SB ramp to Gateway Motorway	10,550	1,000	370	11,920	12,870	1,390	470	14,720
	SB mid-block Deagon Deviation @ Gateway	14,800	750	290	15,840	18,040	1,030	370	19,440
	SB mid-block Deagon Deviation appr Depot Rd	14,800	750	290	15,840	18,040	1,030	370	19,440
Bracken Ridge Road Westbound	WB Bracken Ridge Rd w of Gateway NB ramps	11,870	490	90	12,440	14,320	680	110	15,110
	WB Bracken Ridge Rd Bracken St-Gateway ramps	8,120	240	30	8,400	9,810	340	40	10,190

	Location	2018 18hr AWDT				2028 18hr AWDT			
		Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
	NB Bracken St	3,510	270	80	3,860	3,510	270	80	3,860
	SB Bracken St	2,470	200	150	2,820	2,990	280	190	3,450
	WB Bracken Ridge Rd Barfoot St-Bracken St	13,070	690	260	14,020	15,780	960	320	17,070
	SB ramp from Gateway Motorway	7,170	750	210	8,140	8,660	1,050	270	9,980
	WB Bracken Ridge Rd Deagon Ramps-Barfoot St	10,340	550	190	11,090	12,490	770	250	13,510
	NB ramp from Deagon Deviation	1,690	110	120	1,920	2,040	150	150	2,350
	WB Bracken Ridge Rd over Deagon Deviation	8,650	450	70	9,170	10,440	620	90	11,160
	WB Bracken Ridge Rd LT slip-SB ramp	8,650	450	70	9,170	10,440	620	90	11,160
	WB Bracken Ridge Rd SB ramp-LT slip	4,240	210	70	4,520	5,120	290	80	5,490
	WB Bracken Ridge Rd e of Deagon ramps	4,240	210	70	4,520	5,120	290	80	5,490
Bracken Ridge Road Eastbound	EB Bracken Ridge Rd w of Gateway NB ramps	11,640	610	340	12,600	14,190	850	430	15,470
	NB ramp to Gateway Motorway	4,670	430	130	5,230	5,700	590	170	6,450
	NB ramp from Gateway Motorway	3,080	230	50	3,360	3,750	310	60	4,130
	EB Bracken Ridge Rd Bracken St-Gateway ramps	10,380	540	310	11,230	12,650	750	400	13,790
	EB Bracken Ridge Rd Barfoot St-Bracken St	11,400	600	340	12,340	13,890	830	430	15,160
	NB Barfoot St	3,300	140	110	3,550	4,030	200	130	4,360
	SB Barfoot St	4,040	80	120	4,250	4,930	120	150	5,200
	EB Bracken Ridge Rd Deagon Ramps-Barfoot St	15,790	1,120	500	17,410	19,250	1,550	640	21,430
	NB ramp to Deagon Deviation	3,500	470	40	4,000	4,260	650	40	4,960
	EB Bracken Ridge Rd over Deagon Deviation	12,290	650	470	13,410	14,990	900	590	16,470
	LT slip Bracken Ridge Rd to Deagon Dev. SB ramp	8,210	500	420	9,130	10,010	690	530	11,230
	EB Bracken Ridge Rd LT slip-SB ramp	4,150	160	50	4,360	5,060	220	60	5,340
	SB ramp from Deagon Dev. (RT only)	4,020	280	20	4,320	4,900	380	30	5,310
	EB Bracken Ridge Rd SB ramp-LT slip	4,150	160	50	4,360	5,060	220	60	5,340
	LT slip from Deagon Dev. SB off ramp	600	10	0	610	730	10	0	740
EB Bracken Ridge Rd e of Deagon ramps	4,750	170	50	4,970	5,790	230	60	6,090	
Depot Road Westbound	WB Depot Rd w of NB Gateway ramps	13,850	470	290	14,610	16,720	660	370	17,750
	WB Depot Rd under Gateway Mwy	19,790	630	360	20,780	23,890	880	460	25,220
	NB Braun St	17,920	670	380	18,980	21,640	940	480	23,050

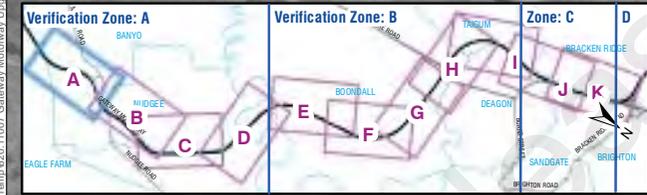
	Location	2018 18hr AWDT				2028 18hr AWDT			
		Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
	SB Braun St	21,820	910	570	23,300	26,330	1,270	730	28,330
	WB Board St e of Braun St	12,870	350	260	13,480	15,530	490	330	16,350
Depot Road Eastbound	EB Depot Rd w of NB Gateway ramps	11,390	440	290	12,120	13,890	600	360	14,860
	NB on ramp to Gateway Mwy	7,360	450	320	8,130	8,980	620	410	10,010
	NB off ramp from Gateway Mwy	2,180	320	270	2,780	2,660	450	350	3,450
	EB Depot Rd under Gateway Mwy	11,010	610	370	11,990	13,420	850	460	14,730
	NB Deagon Deviation	4,530	290	0	4,820	5,520	400	0	5,920
	SB Deagon Deviation	14,800	750	290	15,840	18,040	1,030	370	19,440
	EB Board St e of Braun St	8,190	250	160	8,600	9,980	340	210	10,530
Braun Street/Sandgate Road Northbound	NB Braun St Loftus-Depot	17,920	670	380	18,980	21,640	940	480	23,050
	EB Deagon S/C egress	840	10	10	870	1,020	20	20	1,050
	WB Deagon S/C access	750	10	0	760	900	20	10	920
	NB Braun St Nearra-Loftus	18,860	710	380	19,950	22,770	990	490	24,240
	EB Nearra St	870	20	0	890	1,050	20	0	1,080
	WB Nearra St	700	0	0	700	840	0	0	850
	NB Braun St Biarra St-Nearra St	18,680	690	380	19,760	22,550	970	490	24,010
	EB Biarra St	580	0	0	580	700	0	0	700
	WB Biarra St	260	0	0	260	320	0	0	320
	NB Braun St Burralong-Biarra	18,680	690	380	19,750	22,550	970	490	24,000
	EB Burralong St	320	0	0	320	380	0	0	380
	WB Burralong St	280	0	0	280	340	0	0	340
	NB Braun St under Gateway Mwy	18,490	690	380	19,570	22,320	970	490	23,770
	NB ramp to Gateway Mwy	0	0	0	0	0	0	0	0
NB Sandgate Rd s of ramp	16,730	690	380	17,800	20,190	970	490	21,640	
Braun Street/Sandgate Road Southbound	SB Braun St Loftus-Depot	17,940	850	560	19,350	21,870	1,170	710	23,760
	EB Loftus St	940	10	0	950	1,150	20	0	1,170
	WB Loftus St	1,790	20	0	1,810	2,180	30	0	2,210

	Location	2018 18hr AWDT				2028 18hr AWDT			
		Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
	SB Braun St Esther-Loftus	19,450	880	580	20,910	23,720	1,220	730	25,670
	EB Esther St	360	0	0	360	440	0	0	440
	WB Esther St	990	0	0	990	1,200	0	0	1,200
	SB Braun St Smith-Esther	20,080	880	580	21,540	24,480	1,220	730	26,430
	EB Smith St	310	0	0	310	370	0	0	370
	WB Smith St	560	0	0	560	690	0	0	690
	SB Braun St Musgrave-Smith	21,210	880	580	22,670	25,850	1,220	730	27,800
	EB Musgrave St	600	0	0	600	730	0	0	730
	WB Musgrave St	660	0	0	660	810	0	0	810
	SB Braun St under Gateway Mwy	21,150	880	580	22,600	25,780	1,220	730	27,730
	EB Holroyd St	280	0	0	280	340	0	0	340
	WB Holroyd St	1,450	0	0	1,450	1,770	0	0	1,770
	SB Sandgate Rd s of Holroyd St	20,470	890	580	21,930	24,950	1,230	730	26,910
Bicentennial Rd Northbound	NB Bicentennial Rd	9,420	330	80	9,830	11,370	460	100	11,940
Bicentennial Rd Southbound	SB Bicentennial Rd	2,690	160	30	2,870	3,270	220	30	3,520
Nudgee Road Northbound	NB Nudgee Rd n Golf Course access	2,110	180	140	2,430	2,540	250	180	2,970
	NB Nudgee Rd Gateway ramps-Golf course	2,110	180	140	2,430	2,540	250	180	2,970
	SB ramp from Gateway	4,990	670	60	5,720	6,030	930	80	7,040
	SB ramp to Gateway	3,680	580	460	4,720	4,450	800	580	5,830
	NB Nudgee Rd over Gateway Mwy	4,690	460	350	5,510	5,660	650	450	6,760
	SB Childs Rd	3,680	250	80	4,020	4,450	360	100	4,900
	NB Childs Rd	2,190	220	90	2,500	2,640	300	120	3,060
	NB Nudgee Rd ServiceCentre-Childs Rd	3,930	700	520	5,160	4,750	980	660	6,400
	NB Nudgee Rd offramp-onramp	2,760	600	390	3,750	3,330	840	490	4,670
	NB Nudgee Rd s of off ramp	5,570	600	470	6,640	6,720	840	600	8,150
Nudgee Road Southbound	SB Nudgee Rd n Golf Course access	1,210	480	290	1,970	1,470	660	370	2,500
	SB Golf Course access	140	0	0	140	180	0	0	180
	NB Gold Course access	200	0	0	200	240	0	0	240
	SB Nudgee Rd Gateway ramps-Golf course	1,170	480	290	1,940	1,430	660	370	2,460

Location	2018 18hr AWDT				2028 18hr AWDT			
	Car	Rigid	Artic	Total	Car	Rigid	Artic	Total
SB ramp to Gateway	3,030	540	450	4,020	3,690	740	570	5,000
SB Nudgee Rd over Gateway Mwy	4,340	600	110	5,040	5,290	830	140	6,250
SB Nudgee Rd ServiceCentre-Childs Rd	4,640	770	50	5,460	5,660	1,060	60	6,780
NB ramp to Gateway Mwy	5,480	1,100	390	6,970	6,680	1,520	500	8,700
Service Centre egress	1,550	120	140	1,810	1,890	160	170	2,230
SB Nudgee Rd offramp-onramp	2,570	270	30	2,860	3,130	370	30	3,540
Service Centre access	3,610	530	220	4,370	4,400	740	280	5,420
NB ramp from Gateway	4,480	1,000	480	5,960	5,460	1,390	610	7,450
SB Nudgee Rd s of off ramp	4,750	590	60	5,400	5,790	820	80	6,690



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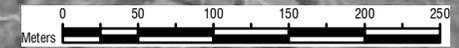
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 Date: 28-Jun-2016  
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 Projection: GDA 1994 MGA Zone 56

**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

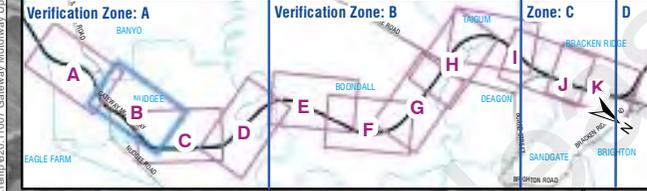
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier



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**Gateway Upgrade North**  
**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Nudgee Interchange South**  
 FIGURE 2A



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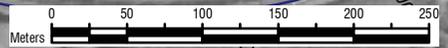
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 Projection: GDA 1994 MGA Zone 56

**LEGEND**  
**Noise Measurements**  
 ● AECOM - 2011  
 ● ARUP - 2009/2010  
 ● ASK - 2015  
 ● SLR - 2015/2016  
 — Existing Modelled Road Alignment  
 — Existing Noise Barrier

■ Building - Residential - Single Storey  
 ■ Building - Residential - Double Storey  
 ■ Building - Residential - Multi Level  
 ■ Building - Educational Community or Health  
 ■ Building - To Be Acquired  
 ■ Building - Not Sensitive  
 ■ Building - Residential - Outside of Study Area

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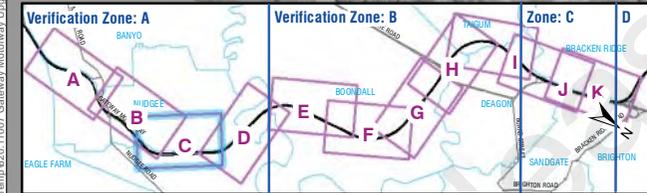
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**Gateway Upgrade North**  
**Building Types, No of Storeys & References, Measurement Sites, Verification Differences, Zones and Location of Existing Noise Barriers Nudgee Interchange North**  
 FIGURE 2B



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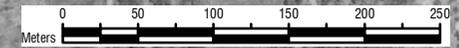
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**LEGEND**

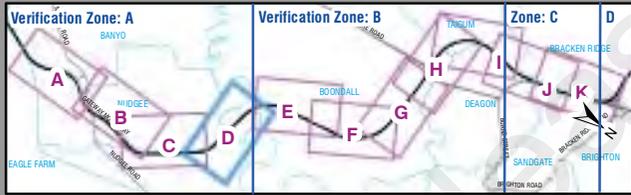
**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016
- Existing Modelled Road Alignment
- Existing Noise Barrier
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area

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**Gateway Upgrade North**  
**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Nudgee / Mercy Family Services**  
 FIGURE 2C



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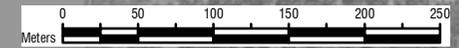
**LEGEND**

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- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

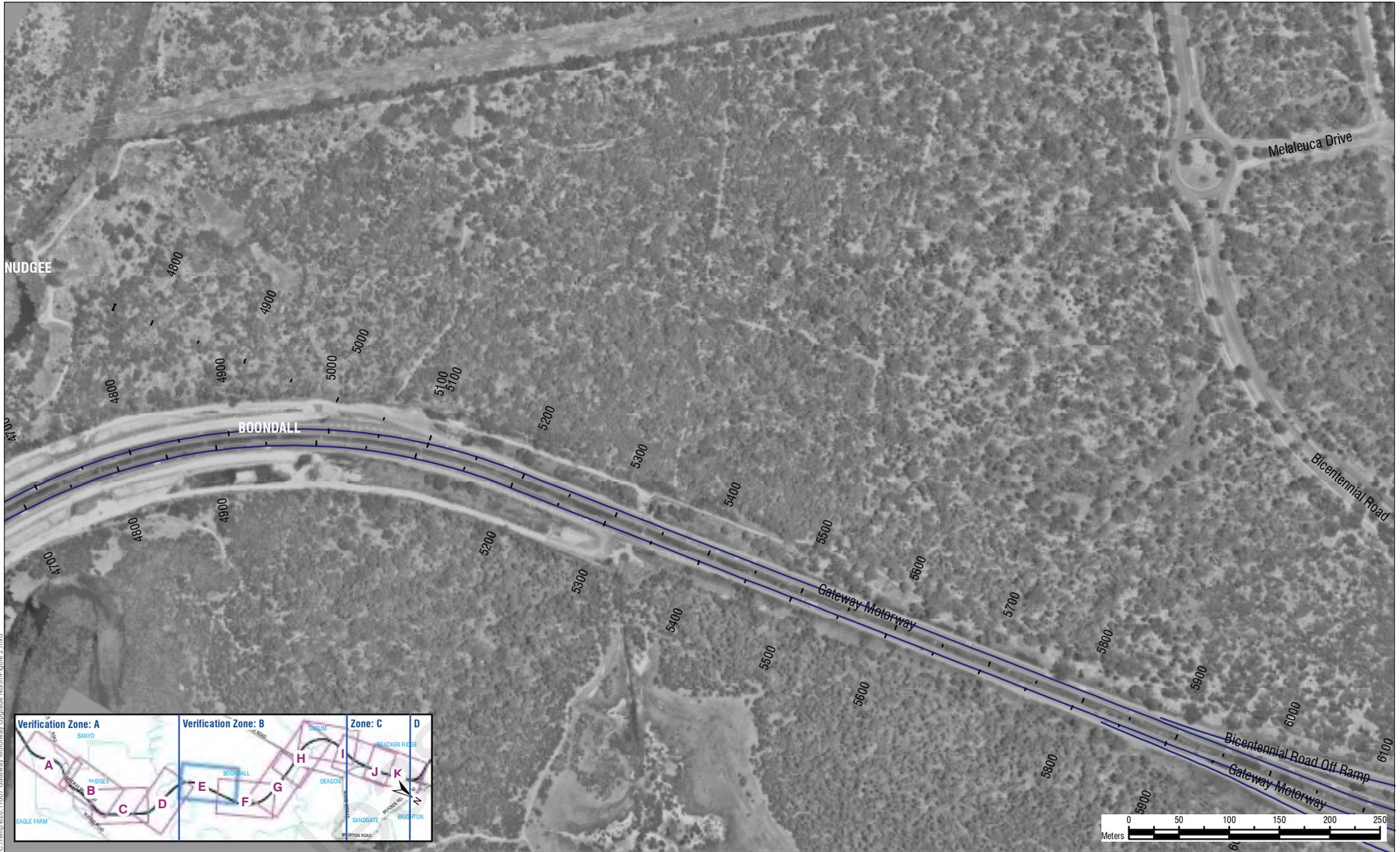
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- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area

Existing Modelled Road Alignment  
 Existing Noise Barrier

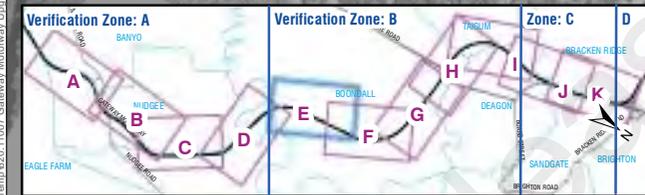


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**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Nundah Creek**  
 FIGURE 2D

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**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

- Existing Modelled Road Alignment
- Existing Noise Barrier

- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area



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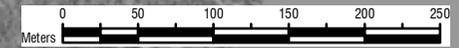
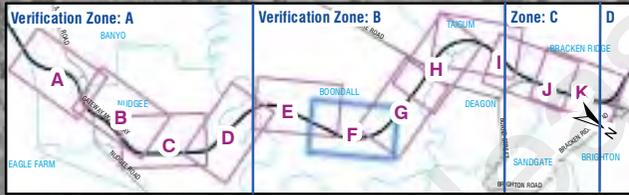
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**Gateway Upgrade North**  
**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Boondall Wetlands East**  
 FIGURE 2E



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**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

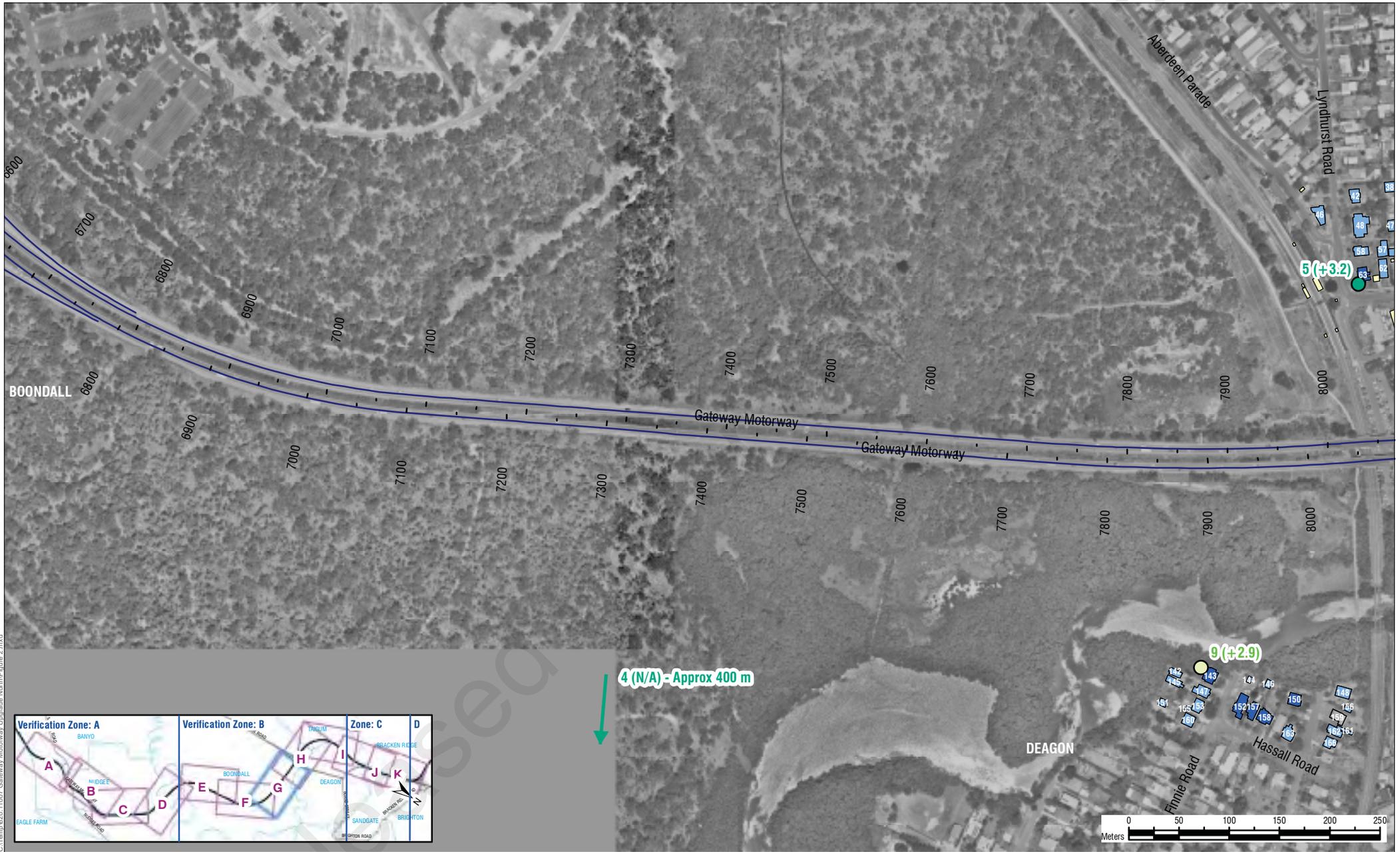
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area

Existing Modelled Road Alignment  
 Existing Noise Barrier

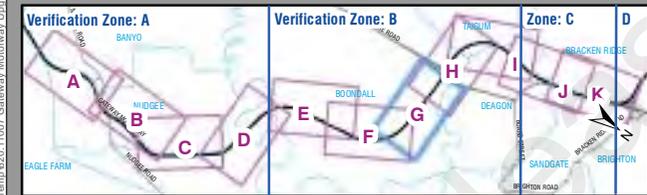
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**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Bicentennial Road Interchange**  
 FIGURE 2F



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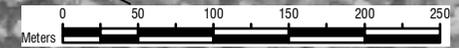
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**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

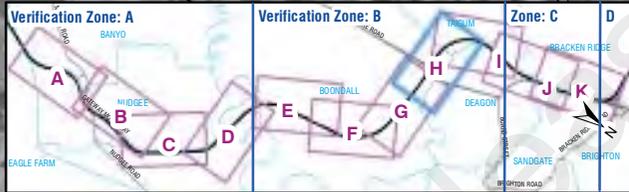
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier



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**Building Types, No of Storeys & References, Measurement Sites, Verification Differences, Zones and Location of Existing Noise Barriers Boondall Wetlands North**  
 FIGURE 2G



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**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016

- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

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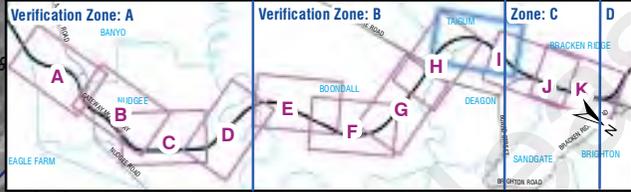
**Gateway Upgrade North**

**Building Types, No of Storeys & References,  
 Measurement Sites, Verification Differences,  
 Zones and Location of Existing Noise Barriers  
 Sandgate Road**

FIGURE 2H



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**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016
- Existing Modelled Road Alignment
- Existing Noise Barrier
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area

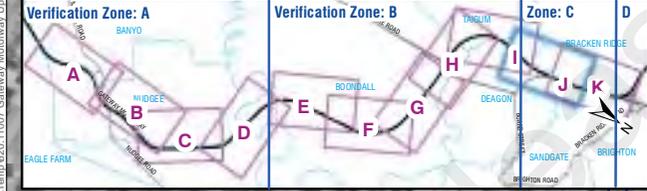
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**Gateway Upgrade North**  
**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Taigum / Deagon**  
 FIGURE 21



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 Drawn by: N/R  
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 Projection: GDA 1994 MGA Zone 56

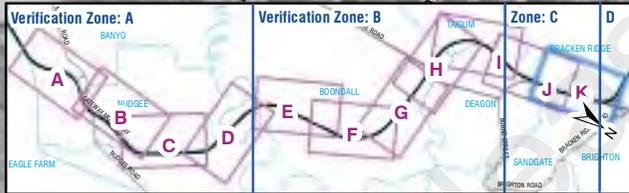
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- Noise Measurements**
- AECOM - 2011
  - ARUP - 2009/2010
  - ASK - 2015
  - SLR - 2015/2016
  - Existing Modelled Road Alignment
  - Existing Noise Barrier
- Building - Residential - Single Storey
  - Building - Residential - Double Storey
  - Building - Residential - Multi Level
  - Building - Educational Community or Health
  - Building - To Be Acquired
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area



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**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Depot Road Interchange**  
 FIGURE 2J



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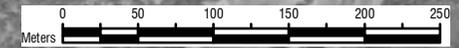
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 Projection: GDA 1994 MGA Zone 56

**LEGEND**

**Noise Measurements**

- AECOM - 2011
- ARUP - 2009/2010
- ASK - 2015
- SLR - 2015/2016
- Existing Modelled Road Alignment
- Existing Noise Barrier
- Building - Residential - Single Storey
- Building - Residential - Double Storey
- Building - Residential - Multi Level
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive
- Building - Residential - Outside of Study Area

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**Gateway Upgrade North**  
**Building Types, No of Storeys & References,**  
**Measurement Sites, Verification Differences,**  
**Zones and Location of Existing Noise Barriers**  
**Deagon Deviation**  
**FIGURE 2K**



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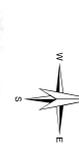
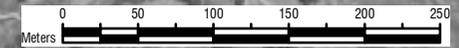
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 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- Proposed Road Source Line**
- SMA Pavement at 100 km/h
  - SMA Pavement at 90 km/h
  - DGA Pavement at 90 km/h
  - DGA Pavement at 80 km/h
  - DGA Pavement at 50/60 km/h
  - Proposed Crash Barrier
- Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted

**JACOBS SMEC**  
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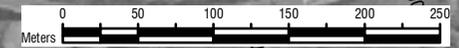
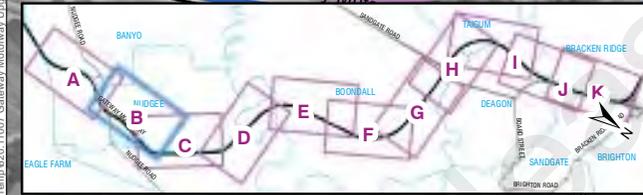
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**Gateway Upgrade North**  
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Nudgee Interchange South**  
 FIGURE 3A



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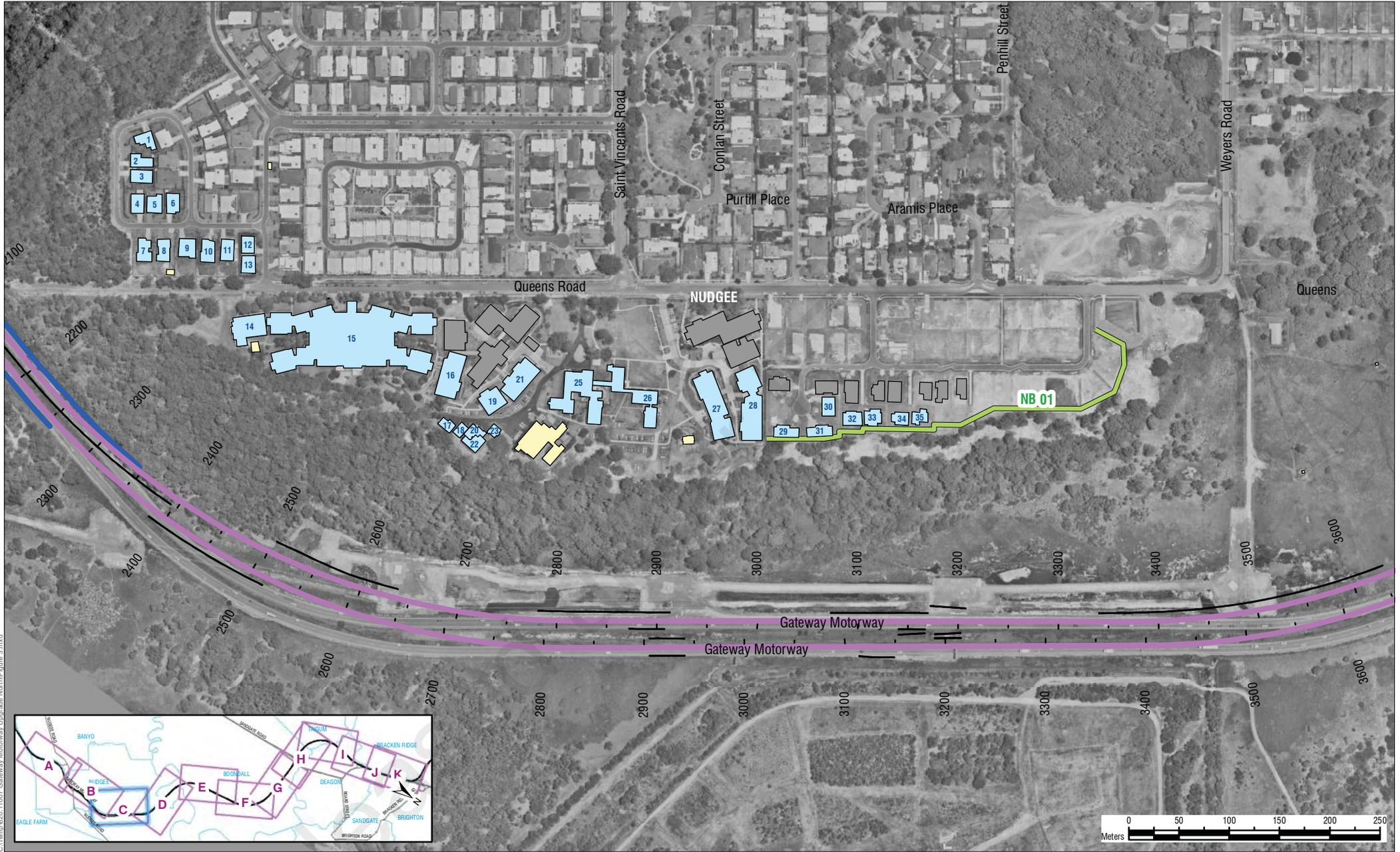
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Project No.: 620.11007.00200  
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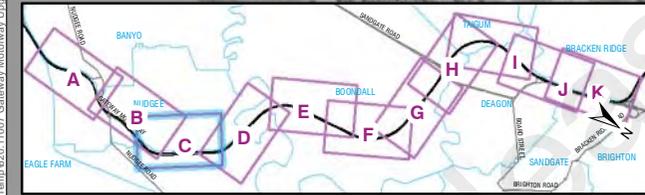
- LEGEND**
- Proposed Road Source Line
  - SMA Pavement at 100 km/h
  - SMA Pavement at 90 km/h
  - DGA Pavement at 90 km/h
  - DGA Pavement at 80 km/h
  - DGA Pavement at 50/60 km/h
  - Proposed Crash Barrier
  - Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted



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**Gateway Upgrade North**  
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Nudgee Interchange North**  
 FIGURE 3B



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

**Proposed Road Source Line**

- SMA Pavement at 100 km/h
- SMA Pavement at 90 km/h
- DGA Pavement at 90 km/h
- DGA Pavement at 80 km/h
- DGA Pavement at 50/60 km/h
- Proposed Crash Barrier

- Building - Residential
- Building - Educational Community or Health
- Building - Not Sensitive
- Building - Residential - Outside of Study Area
- New Noise Barrier
- Existing Noise Barrier - To be replaced
- Existing Noise Barrier - Not Impacted

**JACOBS** **SMEC**

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**Queensland Government**

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**Gateway Upgrade North**

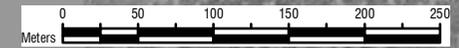
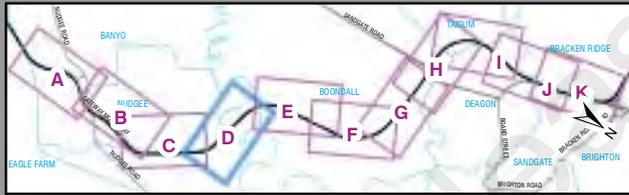
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers**

**Nudgee / Mercy Family Services**

FIGURE 3C



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Projection:	GDA 1994 MGA Zone 56

**LEGEND**

Proposed Road Source Line	Building - Residential
SMA Pavement at 100 km/h	Building - Educational Community or Health
SMA Pavement at 90 km/h	Building - Not Sensitive
DGA Pavement at 90 km/h	Building - Residential - Outside of Study Area
DGA Pavement at 80 km/h	New Noise Barrier
DGA Pavement at 50/60 km/h	Existing Noise Barrier- To be replaced
Proposed Crash Barrier	Existing Noise Barrier- Not Impacted

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**Gateway Upgrade North**

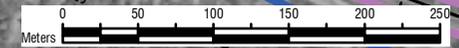
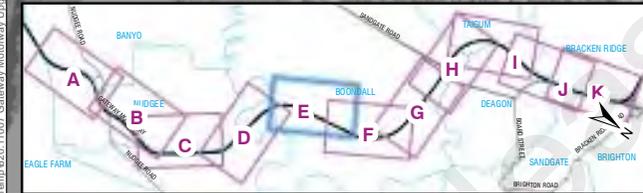
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers**

**Nundah Creek**

**FIGURE 3D**



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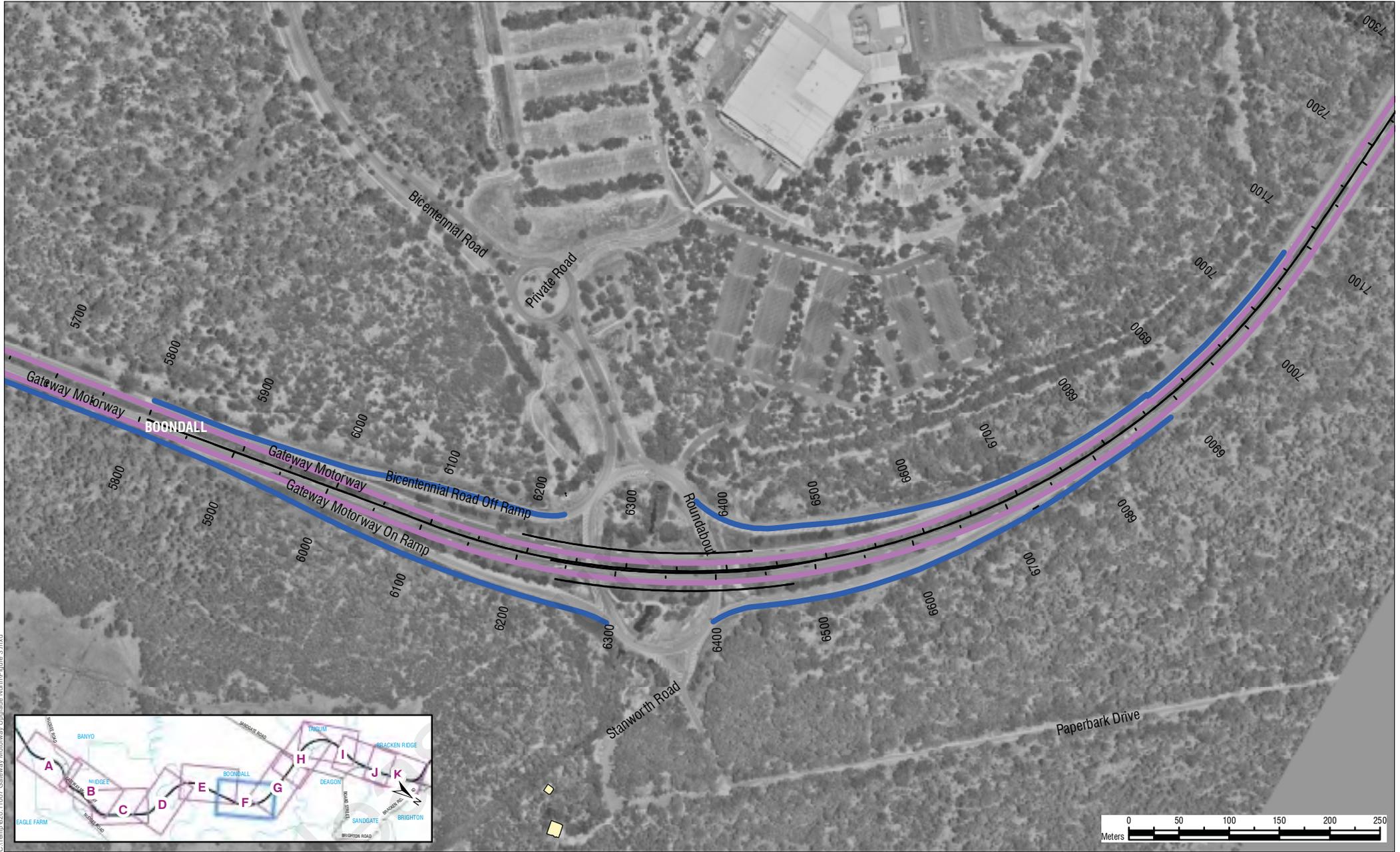
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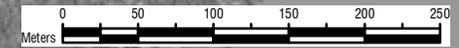
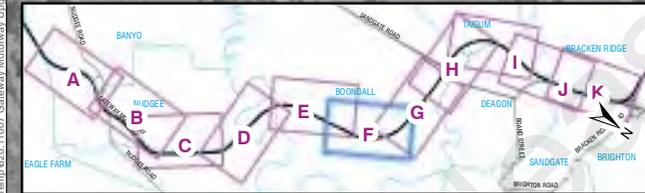
- LEGEND**
- Proposed Road Source Line
  - SMA Pavement at 100 km/h
  - SMA Pavement at 90 km/h
  - DGA Pavement at 90 km/h
  - DGA Pavement at 80 km/h
  - DGA Pavement at 50/60 km/h
  - Proposed Crash Barrier
  - Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted



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**Gateway Upgrade North**  
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Boondall Wetlands East**  
 FIGURE 3E



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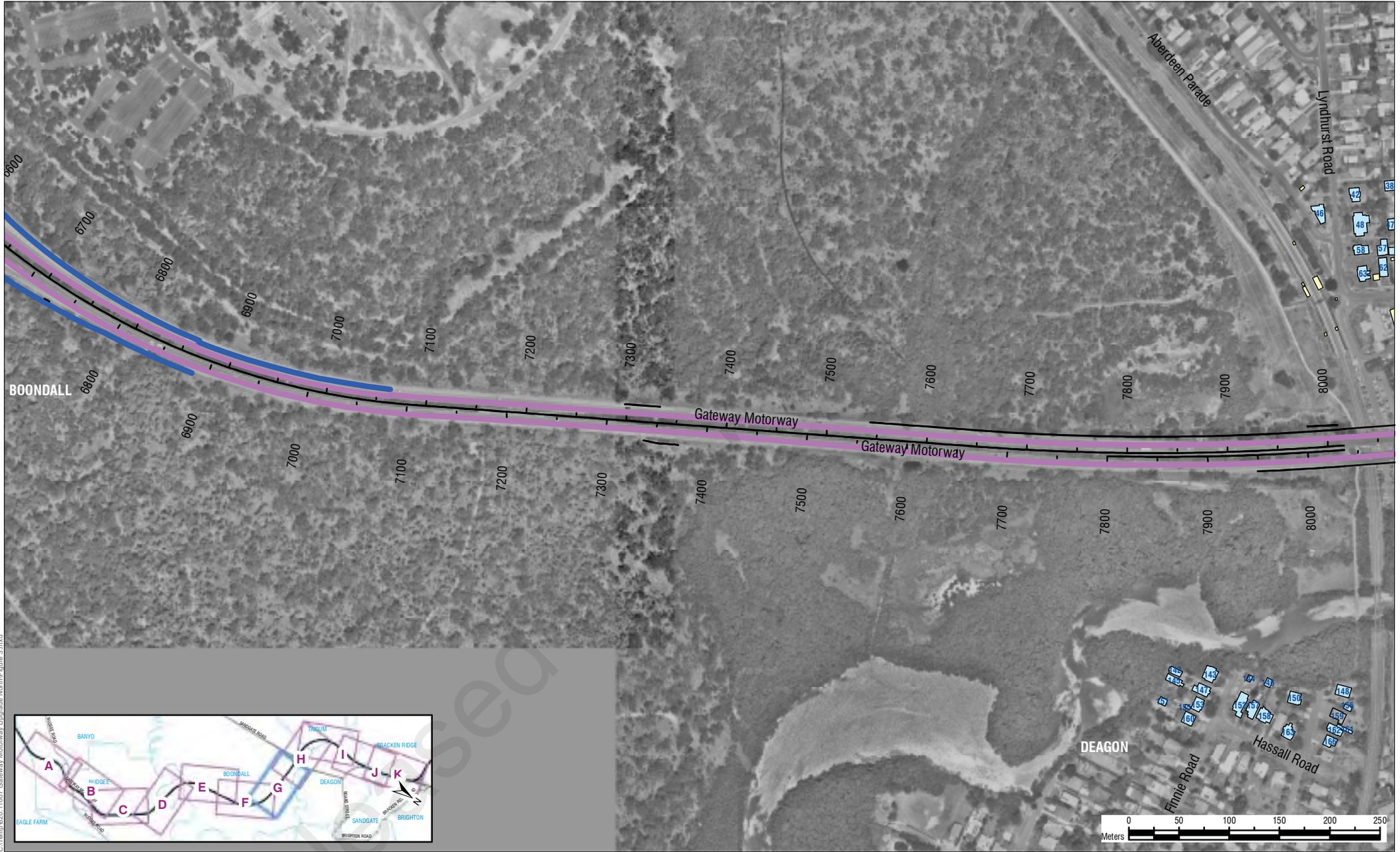
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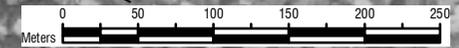
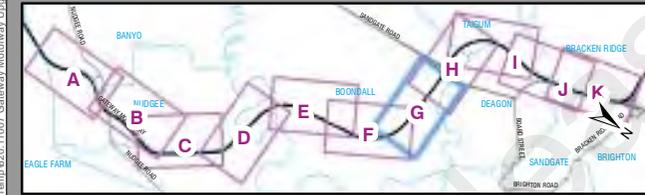
- LEGEND**
- Proposed Road Source Line
  - SMA Pavement at 100 km/h
  - SMA Pavement at 90 km/h
  - DGA Pavement at 90 km/h
  - DGA Pavement at 80 km/h
  - DGA Pavement at 50/60 km/h
  - Proposed Crash Barrier
  - Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted



JACOBS SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Bicentennial Road Interchange**  
 FIGURE 3F



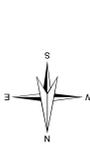
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- LEGEND**
- Proposed Road Source Line
    - SMA Pavement at 100 km/h
    - SMA Pavement at 90 km/h
    - DGA Pavement at 90 km/h
    - DGA Pavement at 80 km/h
    - DGA Pavement at 50/60 km/h
    - Proposed Crash Barrier
  - Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted



JACOBS SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Boondall Wetlands North**  
 FIGURE 3G



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- LEGEND**
- Proposed Road Source Line
    - SMA Pavement at 100 km/h
    - SMA Pavement at 90 km/h
    - DGA Pavement at 90 km/h
    - DGA Pavement at 80 km/h
    - DGA Pavement at 50/60 km/h
    - Proposed Crash Barrier
  - Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive
  - Building - Residential - Outside of Study Area
  - New Noise Barrier
  - Existing Noise Barrier - To be replaced
  - Existing Noise Barrier - Not Impacted



JACOBS SMEC Design Joint Venture  
**Gateway Upgrade North**  
 Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers  
 Sandgate Road  
 FIGURE 3H



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**LEGEND**

Proposed Road Source Line	Building - Residential
SMA Pavement at 100 km/h	Building - Educational Community or Health
SMA Pavement at 90 km/h	Building - Not Sensitive
DGA Pavement at 90 km/h	Building - Residential - Outside of Study Area
DGA Pavement at 80 km/h	New Noise Barrier
DGA Pavement at 50/60 km/h	Existing Noise Barrier - To be replaced
Proposed Crash Barrier	Existing Noise Barrier - Not Impacted

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**Gateway Upgrade North**

**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers**

**Taigum / Deagon**

FIGURE 3I



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**LEGEND**

Proposed Road Source Line	Building - Residential
SMA Pavement at 100 km/h	Building - Educational Community or Health
SMA Pavement at 90 km/h	Building - Not Sensitive
DGA Pavement at 90 km/h	Building - Residential - Outside of Study Area
DGA Pavement at 80 km/h	New Noise Barrier
DGA Pavement at 50/60 km/h	Existing Noise Barrier- To be replaced
Proposed Crash Barrier	Existing Noise Barrier- Not Impacted

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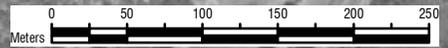
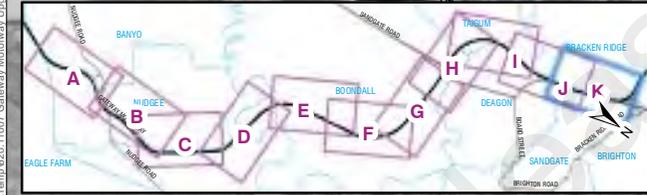
**Gateway Upgrade North**

**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers Depot Road Interchange**

FIGURE 3J



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Drawn by:	N/R
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**LEGEND**

Proposed Road Source Line	Building - Residential
SMA Pavement at 100 km/h	Building - Educational Community or Health
SMA Pavement at 90 km/h	Building - Not Sensitive
DGA Pavement at 90 km/h	Building - Residential - Outside of Study Area
DGA Pavement at 80 km/h	New Noise Barrier
DGA Pavement at 50/60 km/h	Existing Noise Barrier - To be replaced
Proposed Crash Barrier	Existing Noise Barrier - Not Impacted

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 Jacobs SMEC Design Joint Venture

**Queensland Government**

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**Gateway Upgrade North**

**Proposed Road Alignment, Pavement Types & Speeds, Building Types & Reference Numbers, Location of Existing & Proposed Noise Barriers, Deagon Deviation**

**FIGURE 3K**

## APPENDIX C NOISE MODEL VERIFICATION

In order to give the highest degree of confidence possible the verification of the model is separated into two traffic flow conditions. Firstly the model was run with relevant traffic volumes from 2010/2011 utilising measurements conducted by ARUP and AECOM. Secondly the model was rerun with existing traffic volumes and utilising the measurements conducted by SLR and ASK.

TMR considers a road traffic noise model to be verified when the average difference between the calculated and measured values are within  $\pm 2.0$  dBA. In order to aid the verification of the model, the measured noise levels at 28 monitoring locations were considered for the years 2010/2011, referenced from the following previous studies:

- Thirteen (13) measurements completed by AECOM, as detailed in “Gateway Motorway North Business Case Development, Road Traffic Noise Assessment” dated 25 September 2012.
- Fifteen measurements (15) completed by ARUP, as detailed in “Gateway Motorway Additional Northbound Lane, Noise Assessment Report” dated 25 September 2011.

Modelled road traffic noise levels for the 2010/2011 traffic conditions are shown in **Table 20**.

**Table 20 – 2010/2011 Model Verification**

Location of Measurement and Model Receiver	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>AECOM Measurements (2011)</b>			
Location 1 - 379 Bracken Ridge Road	60.6	62.9	2.3
Location 2 - 290 Bracken Ridge Road	69.1	69.7	0.6
Location 3 - 56 Rainwood Street	64.6	66.8	2.2
Location 4 - 215 Bracken Ridge Road	67.6	71.0	3.4
Location 5 - 8 Schoolside Place	62.3	66.5	4.2
Location 6 - 10 Cloverbrook Place	59.3	63.7	4.4
Location 7 - 6 Beresford Street	63.3	63.4	0.1
Location 8 - 63/21 Sean Street	62.5	63.3	0.8
Location 9 - 94 Finnie Road	63.5	66.4	2.9
Location 10 - 131 Queens Street	65.6	66.9	1.3
Location 11 - 131 Queens Street	59.4	61.9	2.5
Location 12 - 131 Queens Street	61.7	63.2	1.5
Location 13 - 379 Bracken Ridge Road	60.8	61.3	0.5
<b>ARUP Measurements (2010)</b>			
Location 1 - 57 Barrett Street	66.1	68.8	2.7

Location of Measurement and Model Receiver	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
Location 2 - 68/131 Quinlan Street	53.6	57.3	3.7
Location 3 17/131 Quinlan Street	61.4	63.9	2.5
Location 4 - 23 Calogero Drive	53.2	61.3	<b>8.1</b>
Location 5 - 140 Nearra Street	58.7	64.6	5.9
Location 6 - 122 Nearra Street	60.4	64.3	3.9
Location 7 - 47 Utalong Street	58.6	66.3	<b>7.7</b>
Location 8 - 10 Dorloo Street	63.9	65.7	1.8
Location 9 - 3 Egret Place	59.8	63.2	3.4
Location 10 - 16 Egret Place	65.3	67.9	2.6
Location 11 - 334 Muller Road	61.4	65.5	4.1
Location 12 - 41 Depot Road	66.2	66.9	0.7
Location 13 - 25 Depot Road	65.1	67.1	2.0
Location 14 - St John Fisher Class 1	65.0	65.6	0.6
Location 15 - St John Fisher Class 2	65.5	66.1	0.6

In the previous work conducted by AECOM the two sites with large prediction differences (i.e. large differences between the measured and calculated noise levels, highlighted in bold red text) were excluded based on the premise that there were “issues other than those normally associated with modelling involved”. With both of these discrepancies excluded from the data set, the average prediction differences for the AECOM and ARUP measurement locations were +2.1 dBA and +2.7 dBA, respectively.

The standard deviation of the modelled results was 1.4 dBA for the AECOM receivers and 1.6 dBA for the ARUP receivers. These results indicate that there is a close correlation between the measured and modelled levels.

These average prediction differences fall slightly outside the ideal tolerance of  $\pm 2.0$  dBA specified by TMR. This is likely due to the fact that traffic congestion is not considered in the model as the project aim is to alleviate congestion on the Gateway Motorway. Typically, congested traffic conditions lead to lower road traffic noise levels during the periods of congestion as a result of the decreased traffic speeds, so long as the traffic is not stationary for a significant portion of the hour. However, the noise model assumes that the traffic is travelling at the posted speed limit throughout the day. As such, it is likely that the calculated noise level will be slightly conservatively high when compared to the measured road traffic noise level on a congested road. As such, a slight relaxation of the standard  $\pm 2$  dBA tolerance may be justified and it can be said that the preliminary verification phase supports the accuracy of the model in terms of predicting future noise impacts from the Gateway Motorway.

Using the relevant traffic volumes from 2015, the road traffic noise levels from the model can also be verified against more recent measurement results. The existing (2015) road traffic noise model was used to calculate the L<sub>A10,18 hour</sub> noise levels at receiver locations representative of 29 measurement locations from the current and recent projects including:

- Thirteen (13) measurements completed by SLR on behalf of Jacob SMEC, as detailed in “Gateway Motorway Upgrade North, Noise and Vibration Monitoring Report” Section 5.0, dated 18 December 2015 – five measurements from this exercise were excluded due to their distance from the motorway.
- Fifteen (15) measurements completed by ASK, as detailed in “Gateway Additional Lane, Post Construction Noise Monitoring Assessment” Section 7.0, dated 20 May 2015.

Calculated results for the existing (2015) traffic conditions are shown below in **Table 21**.

**Table 21 – Existing (2015) Model Verification**

Location of Measurement and Model Receiver	LA10,18 hour Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 2 - 131 Queens Road	63.8	65.8	2.0
Location 5 - 9 Holroyd Street	60.9	64.1	3.2
Location 6 - 21/63 Sean Street	62.3	62.3	0.0
Location 7 - 16 Egret Place	62.5	66.0	3.5
Location 8 - 16 Starling Place	57.1	60.3	3.2
Location 9 - 502 Church Road	60.9	61.9	1.0
Location 10 - 41 Depot Road	65.9	65.8	-0.1
Location 13 - 10 Cloverbrook Place	60.5	63.5	3.0
Location 15 - 87 Playford Street	62.1	63.0	0.9
Location 16 - 343 Bracken Ridge Road	62.0	65.3	3.3
Location 17 - 69 Kyeema Crescent	61.1	65.1	4.0
Location 18 - 77 Kyeema Crescent	63.8	67.2	3.4
Location 20 - 35 Sirocco Place	64.5	67.2	2.7
<b>ASK Measurements (May 2015)</b>			
Location 1 - 57 Barrett Street	66.4	68.5	2.1
Location 2 - 68/131 Quinlan Street	57.0	61.9	4.9
Location 3 - 17/131 Quinlan Street	61.9	63.4	1.5
Location 4 - 23 Calogero Drive	59.2	60.4	1.2
Location 5 - 140 Nearra Street	59.1	64.2	5.1
Location 6 - 122 Nearra Street	58.9	63.4	4.5

Location of Measurement and Model Receiver	LA <sub>10,18</sub> hour Noise Level dBA		Difference dBA
	Measured	Calculated	
Location 7 - 49 Utalong Street	57.1	66.7	9.6
Location 8 - 10 Dorloo Street	63.5	65.6	2.1
Location 10 - 16 Egret Place	60.7	66.3	5.6
Location 11 - 343 Muller Road	60.8	64.5	3.7
Location 12 - 41 Depot Road	66.1	67.5	1.4
Location 13 - 25 Depot Road	65.3	67.3	2.0
Location 16 - 5 Egret Place	56.5	61.8	5.3
Location 17a - 4 Starling Place	55.7	61.1	5.4
Location 17b - 4 Starling Place	60.6	62.8	2.2

The results in **Table 17** show there is one location with large prediction differences.

The calculated road traffic noise level at the ASK measurement location 49 Utalong St was 9.6 dBA higher than the measured value. This location is located within 40 m of 47 Utalong St, one of the locations from the ARUP measurements which were omitted from the previous work conducted by AECOM. It is noted that the large prediction difference at 49 Utalong St is consistent with that calculated for its neighbour and, as such, it should also be omitted from this verification process.

With the site discussed above omitted from the results, the average prediction difference is 2.3 dBA for the SLR measurement locations and 3.4 dBA for the ASK measurement locations. These values fall outside of the  $\pm 2.0$  dBA tolerance set by TMR. As stated previously the slightly greater difference in values is most likely caused by traffic congestion and with the expected alleviation of congestion upon completion of the project, the model is still considered accurate for future road traffic noise level predictions.

The standard deviation of the modelled results was 1.4 dBA for the SLR receivers and 1.7 dBA for the ASK receivers. These results indicate that there is a close relationship between the measured and calculated road traffic noise levels, demonstrating the accuracy and precision of the model.

In order to draw the most accurate comparisons, all of the measurement locations were separated into five zones, designated A to E. These zones allow for more meaningful and accurate comparisons as the receivers within these zones share similar noise conditions.

The five zones have been defined as:

- Zone A - all of the measurement locations within the suburb of Nudgee.
- Zone B - all of the measurement locations within the suburb of Boondall and continuing north to Depot Rd, Deagon.
- Zone C - all of the measurement locations from the southern end of Bracken Ridge up to, but not including, St John Fisher College.
- Zone D - all of the measurement locations north of St John Fisher College to the northern end of Bracken Ridge.
- Zone E - all of the measurement locations in the suburb of Bald Hills.

Results for both the existing (2015) and 2010/2011 traffic conditions are tabulated below for the valid measurements within each zone. The standard deviation of the prediction differences is given in order to indicate the precision of the model. Average differences between the calculated and measured noise levels are also included so that the accuracy of the model can be analysed.

### Zone A

**Table 22 – Zone A 2015 Verification**

Zone A 2015 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 2 - 131 Queens Road	63.8	65.8	2.0
<b>ASK Measurements (May 2015)</b>			
Nil	-	-	-
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
0.0	2.0		

**Table 23 – Zone A 2010/2011 Verification**

Zone A 2010/2011 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>AECOM Measurements (2011)</b>			
Location 10 - 131 Queens Street	65.6	66.9	1.3
Location 11- 131 Queens Street	59.4	61.9	2.5
Location 12 - 131 Queens Street	61.7	63.2	1.5
<b>ARUP Measurements (2010)</b>			
Nil	-	-	-
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
0.5	1.8		

The model slightly over predicts the noise levels with the average difference being +2.0 dBA with current traffic conditions and +1.8 dBA for 2010/2011 traffic conditions. Both of these average differences fall within the ±2.0 dBA tolerance recommended by TMR.

### Zone B

**Table 24 – Zone B 2015 Verification**

Zone B 2015 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 5 - 9 Holroyd Street	60.9	64.1	3.2
Location 6 - 21/63 Sean Street	62.3	62.3	0.0
Location 7 - 16 Egret Place	62.5	66.0	3.5
Location 8 - 16 Starling Place	57.1	60.3	3.2
Location 9 - 502 Church Road	60.9	61.9	1.0
Location 10 - 41 Depot Road	65.9	65.8	-0.1

<b>ASK Measurements (May 2015)</b>			
Location 5 - 140 Nearra Street	59.1	64.2	5.1
Location 6 - 122 Nearra Street	58.9	63.4	4.5
Location 8 - 10 Dorloo Street	63.5	65.6	2.1
Location 10 - 16 Egret Place	60.7	66.3	5.6
Location 11 - 343 Muller Road	60.8	64.5	3.7
Location 12 - 41 Depot Road	66.1	67.5	1.4
Location 13 - 25 Depot Road	65.3	67.3	2.0
Location 16 - 5 Egret Place	56.5	61.8	5.3
Location 17a - 4 Starling Place	55.7	61.1	5.4
Location 17b - 4 Starling Place	60.6	62.8	2.2
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.9	3.0		

**Table 25 – Zone B 2010/2011 Verification**

<b>Zone B 2010/2011 Measurements</b>	<b>LA<sub>10,18</sub> hour Noise Level dBA</b>		<b>Difference dBA</b>
	<b>Measured</b>	<b>Calculated</b>	
<b>AECOM Measurements (2011)</b>			
Location 8 - 63/21 Sean Street	62.5	63.3	0.8
Location 9 - 94 Finnie Road	63.5	66.4	2.9
<b>ARUP Measurements (2010)</b>			
Location 5 - 140 Nearra Street	58.7	64.6	5.9
Location 6 - 122 Nearra Street	60.4	64.3	3.9
Location 8 - 10 Dorloo Street	63.9	65.7	1.8
Location 9 - 3 Egret Place	59.8	63.2	3.4
Location 10 - 16 Egret Place	65.3	67.9	2.6
Location 11 - 334 Muller Road	61.4	65.5	4.1
Location 12 - 41 Depot Road	66.2	66.9	0.7
Location 13 - 25 Depot Road	65.1	67.1	2.0
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.6	2.8		

For Zone B, a comparison between the standard deviations for the current and previous traffic conditions are 1.9 and 1.6, respectively. This indicates that there is a high degree of consistency across both the 2010/2011 and 2015 measurements within this zone with minimum variation in prediction difference across this group of receivers.

The model slightly over predicts the noise levels with the average prediction differences being +3.0 dBA with current traffic conditions and +2.8 dBA for 2010/2011 traffic conditions. Both of these average differences fall outside of the usual  $\pm 2.0$  dBA tolerance required by TMR. As stated previously, the slightly greater prediction differences are most likely due to traffic congestion and, as the purpose of the

project is to alleviate this congestion, the model is deemed to be sufficiently accurate for future road traffic noise level predictions in Zone B.

### Zone C

**Table 26 – Zone C 2015 Verification**

Zone C 2015 Measurements	LA10,18 hour Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 13 - 10 Cloverbrook Place	60.5	63.5	3.0
<b>ASK Measurements (May 2015)</b>			
Location 1 - 57 Barrett Street	66.4	68.5	2.1
Location 2 - 68/131 Quinlan Street	57.0	61.9	4.9
Location 3 - 17/131 Quinlan Street	61.9	63.4	1.5
Location 4 - 23 Calogero Drive	59.2	60.4	1.2
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.5	2.5		

**Table 27 – Zone C 2010/2011 Verification**

Zone C 2010/2011 Measurements	LA10,18 hour Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>AECOM Measurements (2011)</b>			
Location 5 - 8 Schoolside Place	62.3	66.5	4.2
Location 6 - 10 Cloverbrook Place	59.3	63.7	4.4
Location 7 - 6 Beresford Street	63.3	63.4	0.1
<b>ARUP Measurements (2010)</b>			
Location 1 - 57 Barrett Street	66.1	68.8	2.7
Location 2 - 68/131 Quinlan Street	53.6	57.3	3.7
Location 3 17/131 Quinlan Street	61.4	63.9	2.5
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.6	2.9		

For Zone C, a comparison between the standard deviations for the current and previous traffic conditions are 1.5 and 1.6, respectively. This indicates that there is a high degree of consistency within this zone of the model as there is little variation in prediction difference between these receivers with similar road traffic noise conditions.

The model slightly over predicts the noise levels with the average difference being +2.54 dBA with current traffic conditions and +2.9 dBA for 2010/2011 traffic conditions. Both of these average differences fall outside of the usual  $\pm 2.0$  dBA tolerance required by TMR. As stated previously, the slightly greater prediction differences are most likely due to traffic congestion and, as the purpose of the project is to alleviate this congestion, the model is deemed to be sufficiently accurate for future road traffic noise level predictions in Zone C.

**Zone D**

**Table 28 – Zone D 2015 Verification**

Zone D 2015 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 15 - 87 Playford Street	62.1	63.0	0.9
Location 16 - 343 Bracken Ridge Road	62.0	65.3	3.3
<b>ASK Measurements (May 2015)</b>			
Nil	-	-	-
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.6	2.1		

**Table 29 – Zone D 2010/2011 Verification**

Zone D 2010/2011 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>AECOM Measurements (2011)</b>			
Location 1 - 379 Bracken Ridge Road	60.6	62.9	2.3
Location 2 - 290 Bracken Ridge Road	69.1	69.7	0.6
Location 3 - 56 Rainwood Street	64.6	66.8	2.2
Location 4 - 215 Bracken Ridge Road	67.6	71.0	3.4
<b>ARUP Measurements (2010)</b>			
Location 14 - St John Fisher Class 1	65	65.6	0.6
Location 15 - St John Fisher Class 2	65.5	66.1	0.6
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
1.2	1.6		

For Zone D, a comparison between the standard deviations for the current and previous traffic conditions are 1.6 and 1.2, respectively. This indicates that there is a high degree of consistency within this zone of the model as there is little variation in the prediction differences between these receivers with similar road traffic noise conditions.

The model slightly over predicts the noise levels with the average difference being +2.1 dBA with current traffic conditions and +1.6 dBA for 2010/2011 traffic conditions. The average difference for the 2010/2011 traffic conditions falls within the usual  $\pm 2.0$  dBA tolerance required by TMR, however the average difference for the existing 2015 traffic conditions falls slightly outside of the  $\pm 2.0$  dBA range.

As stated previously, the slightly greater prediction differences are most likely due to traffic congestion and, as the purpose of the project is to alleviate this congestion, the model is deemed to be sufficiently accurate for future road traffic noise level predictions in Zone D.

**Zone E**

**Table 30 – Zone E 2015 Verification**

Zone E 2015 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>SLR Measurements (November 2015)</b>			
Location 17 - 69 Kyeema Crescent	61.1	65.1	4.0
Location 18 - 77 Kyeema Crescent	64.1	67.2	3.1
Location 20 - 35 Sirocco Place	64.5	67.2	2.7
<b>ASK Measurements (May 2015)</b>			
Nil	-	-	-
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
0.64	3.4		

**Table 31 – Zone E 2010/2011 Verification**

Zone E 2010/2011 Measurements	L <sub>A10,18 hour</sub> Noise Level dBA		Difference dBA
	Measured	Calculated	
<b>AECOM Measurements (2011)</b>			
Nil	-	-	-
<b>ARUP Measurements (2010)</b>			
Nil	-	-	-
<b>Standard Deviation</b>	<b>Average Difference dBA</b>		
N/A	N/A		

The model slightly over predicts the noise levels with the average difference being +3.4 dBA with current traffic conditions. This average difference falls outside the usual  $\pm 2.0$  dBA tolerance required by TMR. As stated previously, the slightly greater prediction differences are most likely due to traffic congestion and, as the purpose of the project is to alleviate this congestion, the model is deemed to be sufficiently accurate for future road traffic noise level predictions in Zone E.

**Summary**

Overall the noise model has an average prediction difference of 2.6 dBA using all historical noise measurements. This result suggests the model is conservative in over predicting the road traffic noise levels; an outcome that is comparable to the verification result formally provided by AECOM (i.e. 2.4 dBA using measurements from AECOM and ARUP only). This agreement with historical studies further supports the accuracy of the model.

With the information presented it can be confidently stated that the SoundPLAN model for the Gateway Motorway is adequate, with sufficient accuracy and precision. This is evident through all of the data presented in this Appendix and thus no verification correction is needed.

## APPENDIX D ROAD TRAFFIC NOISE LEVELS

### Residential

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 L <sub>A10,18 hour</sub>	Scenario 2 - Proposed 2018 Road - No Barriers L <sub>A10,18 hour</sub>	Scenario 3 - Proposed 2028 Road - No Barriers L <sub>A10,18 hour</sub>	Scenario 3 - Proposed 2028 Rail - No Barriers L <sub>Aeq,24 hour</sub>	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers L <sub>A10,18 hour</sub>
1	19 Morgan Circuit Nudgee QLD	3.5	1	61	62	63	0	0	63
2	17 Morgan Circuit Nudgee QLD	3.5	1	62	63	64	0	0	64
3	15 Morgan Circuit Nudgee QLD	3.5	1	62	63	64	0	0	64
4	13 Morgan Circuit Nudgee QLD	3.5	1	63	64	65	0	0	65
5	11 Morgan Circuit Nudgee QLD	3.5	1	60	61	62	0	0	62
6	9 Morgan Circuit Nudgee QLD	3.5	1	60	61	62	0	0	62
7	24 Morgan Circuit Nudgee QLD	3.5	1	64	65	66	0	0	66
8	20 Morgan Circuit Nudgee QLD	3.5	1	61	62	63	0	0	63
9	16 Morgan Circuit Nudgee QLD	3.5	1	61	62	63	0	0	63
10	12 Morgan Circuit Nudgee QLD	3.5	1	60	61	62	0	0	62
11	8 Morgan Circuit Nudgee QLD	3.5	1	59	60	61	0	0	61
12	4 Morgan Circuit Nudgee QLD	3.5	1	58	59	60	0	0	60
13	2 Cotham Street Nudgee QLD	3.5	1	60	61	62	0	0	62
14	131 Queens Road Nudgee QLD	3	1	63	65	66	0	0	66
15	131 Queens Road Nudgee QLD	2.97	1	65	66	67	0	0	67
16	131 Queens Road Nudgee QLD	3.5	1	62	63	64	0	0	64
17	131 Queens Road Nudgee QLD	3.5	1	65	67	68	0	0	68
18	131 Queens Road Nudgee QLD	2.9	1	65	67	68	0	0	68
19	131 Queens Road Nudgee QLD	3.5	1	59	61	61	0	0	61
20	131 Queens Road Nudgee QLD	2.61	1	65	67	68	0	0	68
21	131 Queens Road Nudgee QLD	3.5	1	58	60	60	0	0	60
22	131 Queens Road Nudgee QLD	3.5	1	65	67	68	0	0	68

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
23	131 Queens Road Nudgee QLD	2.87	1	64	66	67	0	0	67
25	131 Queens Road Nudgee QLD	6.69	1	63	65	66	0	0	66
26	131 Queens Road Nudgee QLD	3.27	1	63	64	65	0	0	65
27	131 Queens Road Nudgee QLD	3.5	1	65	66	67	0	0	67
28	131 Queens Road Nudgee QLD	3.5	1	65	66	67	0	0	67
29	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
30	131 Queens Road Nudgee QLD	3.5	1	61	62	63	0	0	63
31	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
32	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
33	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
34	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
35	131 Queens Road Nudgee QLD	3.5	1	63	64	65	0	0	65
36	35/63 Sean Street Boondall QLD	5	1	63	62	63	37	57	63
36	35/63 Sean Street Boondall QLD	5	2	64	63	64	37	57	64
37	15/63 Sean Street Boondall QLD	5	1	63	62	63	39	61	63
37	15/63 Sean Street Boondall QLD	5	2	64	63	64	39	61	64
38	2507A Sandgate Road Boondall QLD	2.35	1	65	61	62	42	65	62
39	16/63 Sean Street Boondall QLD	5	1	63	62	63	39	61	63
39	16/63 Sean Street Boondall QLD	5	2	64	63	64	39	61	64
40	18/63 Sean Street Boondall QLD	5	1	63	63	63	38	60	63
40	18/63 Sean Street Boondall QLD	5	2	64	63	64	38	60	64
41	20/63 Sean Street Boondall QLD	5	1	63	63	63	38	60	63
41	20/63 Sean Street Boondall QLD	5	2	64	63	64	38	60	64
42	21 Lyndhurst Road Boondall QLD	4.6	1	63	62	63	48	71	63
43	22/63 Sean Street Boondall QLD	5	1	63	63	64	37	59	63
43	22/63 Sean Street Boondall QLD	5	2	64	64	64	37	59	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
44	2509 Sandgate Road Boondall QLD	2.51	1	65	61	62	43	65	62
45	2511 Sandgate Road Boondall QLD	3.21	1	65	62	63	43	66	63
46	9 Aberdeen Parade Boondall QLD	2.61	1	64	63	64	51	76	64
47	2513 Sandgate Road Boondall QLD	2.74	1	62	62	63	44	66	63
48	17 Lyndhurst Road Boondall QLD	3.34	1	62	62	63	47	71	63
49	326 Muller Road Taigum QLD	2.63	1	62	62	62	34	56	62
50	3 Hillgrove Street Taigum QLD	2.73	1	60	60	61	34	56	61
51	5 Hillgrove Street Taigum QLD	3.16	1	59	60	61	31	52	61
52	7 Hillgrove Street Taigum QLD	2.99	1	60	61	61	32	52	61
53	2515 Sandgate Road Boondall QLD	3.84	1	65	61	62	47	68	62
53	2515 Sandgate Road Boondall QLD	3.84	2	68	64	65	47	68	65
54	1 Poplar Place Taigum QLD	2.59	1	60	61	62	33	53	62
55	3 Poplar Place Taigum QLD	2.55	1	61	61	62	32	52	62
56	2517 Sandgate Road Boondall QLD	3.23	1	66	62	63	45	66	63
57	5 Lyndhurst Road Boondall QLD	2.42	1	63	63	63	46	69	63
58	5 Lyndhurst Road Boondall QLD	3.41	1	63	63	64	50	72	64
59	2517 Sandgate Road Boondall QLD	2.88	1	63	63	64	46	68	64
60	332 Muller Road Taigum QLD	3.37	1	62	62	62	33	55	62
61	2521 Sandgate Road Boondall QLD	2.94	1	67	64	65	46	68	65
62	7 Holroyd Street Boondall QLD	2.54	1	66	64	64	47	70	64
63	9 Holroyd Street Boondall QLD	3.66	1	66	64	65	52	75	65
63	9 Holroyd Street Boondall QLD	3.66	2	67	65	66	52	75	66
64	334 Muller Road Taigum QLD	4.48	1	64	63	64	34	55	64
64	334 Muller Road Taigum QLD	4.48	2	65	65	66	34	55	65
65	334 Muller Road Taigum QLD	2.93	1	64	64	64	34	54	64
66	350 Muller Road Taigum QLD	3.31	1	63	64	65	32	54	65

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
67	38 Longbill Place Taigum QLD	4.23	1	62	64	64	34	54	63
68	36 Longbill Place Taigum QLD	4.7	1	62	63	63	34	55	62
69	13 Egret Place Taigum QLD	3	1	63	64	65	33	54	64
70	34 Longbill Place Taigum QLD	2.46	1	60	61	62	33	55	61
71	32 Longbill Place Taigum QLD	2.51	1	60	61	62	35	56	60
72	9 Egret Place Taigum QLD	3	1	63	64	65	33	55	64
73	28 Longbill Place Taigum QLD	3.89	1	61	62	63	35	57	62
74	7 Egret Place Taigum QLD	3	1	64	64	65	34	55	63
75	30 Longbill Place Taigum QLD	2.46	1	60	61	61	35	56	60
76	5 Egret Place Taigum QLD	3	1	63	64	65	34	55	63
77	3 Egret Place Taigum QLD	3	1	63	64	64	34	54	63
78	49 Sanderling Street Taigum QLD	3	1	61	62	63	33	54	61
79	48 Sanderling Street Taigum QLD	3	1	63	63	64	34	56	63
80	25 Sanderling Street Taigum QLD	2.63	1	62	63	63	33	54	62
81	350 Muller Road Taigum QLD	3	1	67	67	68	32	54	66
82	29 Sanderling Street Taigum QLD	2.6	1	62	63	64	34	56	62
83	23 Sanderling Street Taigum QLD	2.96	1	62	63	64	34	55	62
84	47 Sanderling Street Taigum QLD	3	1	62	63	63	33	54	62
85	21 Sanderling Street Taigum QLD	2.56	1	62	63	63	34	55	62
86	20 Egret Place Taigum QLD	3	1	69	71	71	33	54	67
87	19 Sanderling Street Taigum QLD	2.58	1	61	62	63	35	56	62
88	17 Sanderling Street Taigum QLD	2.41	1	61	62	63	34	55	62
89	15 Sanderling Street Taigum QLD	2.55	1	61	62	63	33	55	61
90	18 Egret Place Taigum QLD	3	1	70	71	72	33	54	67
91	13 Sanderling Street Taigum QLD	2.49	1	61	62	62	32	53	61
92	45 Sanderling Street Taigum QLD	3	1	63	63	64	33	55	62

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
93	16 Egret Place Taigum QLD	3	1	71	72	73	34	55	67
94	14 Egret Place Taigum QLD	3	1	70	71	72	33	55	66
95	6 Egret Place Taigum QLD	3	1	68	69	69	34	56	65
96	31 Sanderling Street Taigum QLD	2.44	1	63	63	64	35	57	62
97	4 Egret Place Taigum QLD	3	1	65	65	66	34	56	65
98	2 Egret Place Taigum QLD	3	1	63	64	65	34	56	63
99	43 Sanderling Street Taigum QLD	3	1	64	65	65	34	55	63
100	33 Sanderling Street Taigum QLD	2.59	1	63	64	65	35	55	63
101	20 Sanderling Street Taigum QLD	2.46	1	62	63	64	33	54	62
102	18 Sanderling Street Taigum QLD	2.78	1	62	63	64	33	54	62
103	42 Sanderling Street Taigum QLD	3	1	67	68	69	35	57	65
104	10 Egret Place Taigum QLD	3	1	71	72	73	37	59	67
105	16 Sanderling Street Taigum QLD	2.67	1	62	63	63	33	56	62
106	14 Sanderling Street Taigum QLD	2.74	1	61	62	63	32	54	62
107	35 Sanderling Street Taigum QLD	2.69	1	64	64	65	33	55	63
108	12 Sanderling Street Taigum QLD	2.49	1	61	63	63	32	54	62
109	22 Sanderling Street Taigum QLD	2.5	1	63	64	65	33	55	63
110	10 Sanderling Street Taigum QLD	2.74	1	61	62	62	32	55	62
111	8 Sanderling Street Taigum QLD	2.51	1	61	62	63	32	54	62
112	6 Sanderling Street Taigum QLD	2.68	1	61	62	63	32	53	62
113	39 Sanderling Street Taigum QLD	3	1	67	67	68	35	57	65
114	40 Sanderling Street Taigum QLD	3	1	70	71	72	36	58	67
115	37 Sanderling Street Taigum QLD	2.71	1	65	66	67	35	57	64
116	13 Starling Place Taigum QLD	2.64	1	63	63	64	33	55	63
117	24 Sanderling Street Taigum QLD	2.55	1	64	65	66	34	55	64
118	11 Starling Place Taigum QLD	2.65	1	63	64	65	33	55	63

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
119	9 Starling Place Taigum QLD	2.93	1	63	64	64	32	54	63
120	15 Starling Place Taigum QLD	2.62	1	64	65	65	34	56	64
121	7 Starling Place Taigum QLD	2.72	1	62	63	64	32	54	62
122	5 Starling Place Taigum QLD	2.47	1	62	63	64	32	55	63
123	3 Starling Place Taigum QLD	2.59	1	63	63	63	32	54	63
124	38 Sanderling Street Taigum QLD	3	1	75	76	76	36	58	68
125	1 Starling Place Taigum QLD	2.52	1	63	63	63	30	52	63
126	32 Sanderling Street Taigum QLD	2.53	1	70	71	72	35	57	67
127	20 Starling Place Taigum QLD	2.57	1	64	65	66	34	56	64
128	30 Sanderling Street Taigum QLD	2.58	1	70	71	72	34	56	66
129	36 Sanderling Street Taigum QLD	3	1	74	76	77	35	56	68
130	28 Sanderling Street Taigum QLD	2.56	1	68	69	69	35	57	66
131	26 Sanderling Street Taigum QLD	2.72	1	67	68	69	35	57	66
132	18 Starling Place Taigum QLD	2.66	1	67	67	68	34	56	65
133	16 Starling Place Taigum QLD	2.51	1	65	65	66	33	55	64
134	14 Starling Place Taigum QLD	2.59	1	65	65	66	33	55	65
135	12 Starling Place Taigum QLD	2.58	1	64	64	65	33	56	64
136	10 Starling Place Taigum QLD	2.89	1	64	64	65	32	55	64
137	6 Starling Place Taigum QLD	2.56	1	64	63	64	31	53	63
138	8 Starling Place Taigum QLD	2.55	1	64	64	65	30	53	64
139	4 Starling Place Taigum QLD	2.55	1	64	63	64	31	52	63
140	25 Corella Crescent Taigum QLD	2.92	1	63	63	64	30	52	63
141	455 Church Road Taigum QLD	2.91	1	66	66	66	32	55	65
142	92 Finnie Road Deagon QLD	2.5	1	66	65	66	42	66	66
143	94 Finnie Road Deagon QLD	6.43	1	66	65	66	46	70	66
143	94 Finnie Road Deagon QLD	6.43	2	66	65	62	46	70	62

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
144	91 Finnie Road Deagon QLD	2.59	1	66	65	65	47	70	65
145	92 Finnie Road Deagon QLD	2.43	1	65	64	65	41	65	65
146	23 Hassall Road Deagon QLD	3.38	1	65	64	65	47	71	65
147	92 Finnie Road Deagon QLD	2.94	1	64	63	64	43	67	64
148	119 Blackwood Road Deagon QLD	3.06	1	65	64	65	56	81	65
149	45 Utalong Street Deagon QLD	4.73	1	67	66	67	38	60	67
150	118 Blackwood Road Deagon QLD	4.74	1	65	64	65	51	75	65
150	118 Blackwood Road Deagon QLD	4.74	2	65	65	65	51	75	65
151	88 Finnie Road Deagon QLD	3.61	1	65	64	65	38	61	65
152	91 Finnie Road Deagon QLD	3.67	1	64	63	64	46	70	64
152	91 Finnie Road Deagon QLD	3.67	2	65	64	65	46	70	65
153	90 Finnie Road Deagon QLD	3.21	1	63	62	63	43	67	63
154	43 Utalong Street Deagon QLD	5.38	1	66	65	66	37	59	66
154	43 Utalong Street Deagon QLD	5.38	2	67	67	67	37	59	67
155	90 Finnie Road Deagon QLD	2.54	1	63	63	64	38	60	64
156	119 Blackwood Road Deagon QLD	2.51	1	63	63	63	56	81	63
157	23 Hassall Road Deagon QLD	4.72	1	64	63	64	48	71	64
157	23 Hassall Road Deagon QLD	4.72	2	65	64	65	48	71	65
158	21 Hassall Road Deagon QLD	3.96	1	63	63	63	48	71	63
158	21 Hassall Road Deagon QLD	3.96	2	64	64	65	48	71	65
159	115 Blackwood Road Deagon QLD	2.81	1	63	63	64	55	79	64
160	88 Finnie Road Deagon QLD	3.3	1	62	62	63	40	64	63
161	113 Blackwood Road Deagon QLD	2.28	1	61	62	62	56	81	62
162	113 Blackwood Road Deagon QLD	3.11	1	61	61	62	51	75	62
163	112 Blackwood Road Deagon QLD	2.79	1	62	62	63	48	71	63
164	94A Buralong Street Deagon QLD	5	1	66	65	66	33	56	66

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
164	94A Buralong Street Deagon QLD	5	2	67	66	67	33	56	67
165	94 Buralong Street Deagon QLD	5	1	65	65	65	33	56	65
165	94 Buralong Street Deagon QLD	5	2	65	65	65	33	56	65
166	111 Blackwood Road Deagon QLD	3.4	1	60	60	61	50	74	61
167	99 Buralong Street Deagon QLD	3.36	1	66	65	66	29	50	66
168	502 Church Road Taigum QLD	2.32	1	65	64	65	0	0	64
169	10 Dorloo Street Deagon QLD	2.61	1	65	66	66	35	57	66
170	98 Nearra Street Deagon QLD	6.36	1	63	63	64	34	56	64
170	98 Nearra Street Deagon QLD	6.36	2	63	64	65	34	56	65
171	8 Dorloo Street Deagon QLD	4.76	1	64	65	66	36	58	66
171	8 Dorloo Street Deagon QLD	4.76	2	65	66	67	36	58	67
172	11 Dorloo Street Deagon QLD	2.85	1	65	66	67	34	56	67
173	100 Nearra Street Deagon QLD	5.49	1	63	63	64	34	56	64
173	100 Nearra Street Deagon QLD	5.49	2	64	65	65	34	56	65
174	6 Dorloo Street Deagon QLD	4.19	1	63	63	64	37	59	64
174	6 Dorloo Street Deagon QLD	4.19	2	65	66	67	37	59	66
175	102 Nearra Street Deagon QLD	3.89	1	63	63	64	36	58	64
175	102 Nearra Street Deagon QLD	3.89	2	64	65	66	36	58	65
176	4 Dorloo Street Deagon QLD	3.47	1	63	63	64	34	57	64
176	4 Dorloo Street Deagon QLD	3.47	2	64	66	66	34	57	66
177	9 Dorloo Street Deagon QLD	4.85	1	63	66	67	34	56	67
177	9 Dorloo Street Deagon QLD	4.85	2	66	68	68	34	56	68
178	7 Dorloo Street Deagon QLD	4.26	1	63	64	65	36	57	65
178	7 Dorloo Street Deagon QLD	4.26	2	65	67	68	36	57	67
179	104 Nearra Street Deagon QLD	3.28	1	63	63	64	34	56	64
179	104 Nearra Street Deagon QLD	3.28	2	64	65	66	34	56	65

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
180	5 Dorloo Street Deagon QLD	4.97	1	61	63	64	36	57	63
180	5 Dorloo Street Deagon QLD	4.97	2	64	66	67	36	57	66
181	2 Dorloo Street Deagon QLD	3.2	1	63	64	64	35	57	64
181	2 Dorloo Street Deagon QLD	3.2	2	64	65	66	35	57	66
182	3 Dorloo Street Deagon QLD	5.1	1	60	63	64	36	59	63
182	3 Dorloo Street Deagon QLD	5.1	2	63	65	66	36	59	66
183	1 Dorloo Street Deagon QLD	3.33	1	62	63	64	36	59	64
183	1 Dorloo Street Deagon QLD	3.33	2	64	65	66	36	59	66
184	112 Nearra Street Deagon QLD	4.93	1	61	63	63	35	58	63
184	112 Nearra Street Deagon QLD	4.93	2	63	65	66	35	58	65
185	114 Nearra Street Deagon QLD	4.65	1	61	63	64	36	59	64
185	114 Nearra Street Deagon QLD	4.65	2	63	65	66	36	59	66
186	116 Nearra Street Deagon QLD	3.02	1	61	63	64	34	57	64
187	139 Nearra Street Deagon QLD	5.21	1	60	62	62	34	56	62
187	139 Nearra Street Deagon QLD	5.21	2	62	64	65	34	56	64
188	118 Nearra Street Deagon QLD	4.88	1	61	63	64	36	58	64
188	118 Nearra Street Deagon QLD	4.88	2	63	65	66	36	58	66
189	120 Nearra Street Deagon QLD	4.99	1	62	63	64	34	56	64
189	120 Nearra Street Deagon QLD	4.99	2	63	65	66	34	56	66
190	105 Nearra Street Deagon QLD	4.18	1	61	62	63	35	57	63
190	105 Nearra Street Deagon QLD	4.18	2	62	65	65	35	57	65
191	137 Nearra Street Deagon QLD	4.2	1	59	61	62	35	57	62
191	137 Nearra Street Deagon QLD	4.2	2	62	64	65	35	57	64
192	122 Nearra Street Deagon QLD	5.05	1	62	64	65	34	56	64
192	122 Nearra Street Deagon QLD	5.05	2	63	65	66	34	56	66
193	107 Nearra Street Deagon QLD	3.19	1	61	63	64	37	59	63

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
193	107 Nearra Street Deagon QLD	3.19	2	63	65	66	37	59	65
194	135 Nearra Street Deagon QLD	3.14	1	60	62	62	33	56	62
195	124 Nearra Street Deagon QLD	4.74	1	62	64	65	36	57	65
195	124 Nearra Street Deagon QLD	4.74	2	63	66	66	36	57	66
196	109 Nearra Street Deagon QLD	4.73	1	61	63	64	36	58	63
196	109 Nearra Street Deagon QLD	4.73	2	62	65	65	36	58	65
197	133 Nearra Street Deagon QLD	4.87	1	60	61	62	35	57	62
197	133 Nearra Street Deagon QLD	4.87	2	62	64	65	35	57	64
198	111 Nearra Street Deagon QLD	3.29	1	61	63	64	36	58	63
198	111 Nearra Street Deagon QLD	3.29	2	62	65	66	36	58	65
199	131 Nearra Street Deagon QLD	4.75	1	60	62	62	37	59	62
199	131 Nearra Street Deagon QLD	4.75	2	62	64	65	37	59	64
200	129 Nearra Street Deagon QLD	3.4	1	60	62	63	35	57	62
200	129 Nearra Street Deagon QLD	3.4	2	62	64	65	35	57	64
201	113 Nearra Street Deagon QLD	4.08	1	61	63	64	36	58	63
201	113 Nearra Street Deagon QLD	4.08	2	62	65	66	36	58	65
202	127 Nearra Street Deagon QLD	4.5	1	60	62	63	36	58	62
202	127 Nearra Street Deagon QLD	4.5	2	61	64	65	36	58	64
203	115 Nearra Street Deagon QLD	5.06	1	61	63	64	34	56	63
203	115 Nearra Street Deagon QLD	5.06	2	62	65	65	34	56	64
204	125 Nearra Street Deagon QLD	4.71	1	60	61	62	34	56	62
204	125 Nearra Street Deagon QLD	4.71	2	61	64	65	34	56	64
205	136 Nearra Street Deagon QLD	4.94	1	62	64	65	31	53	64
205	136 Nearra Street Deagon QLD	4.94	2	63	66	67	31	53	66
206	117 Nearra Street Deagon QLD	3.01	1	61	64	64	35	57	63
206	117 Nearra Street Deagon QLD	3.01	2	62	65	66	35	57	65

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
207	119 Nearra Street Deagon QLD	4.46	1	60	62	62	35	57	61
207	119 Nearra Street Deagon QLD	4.46	2	62	65	66	35	57	64
208	70 Depot Road Deagon QLD	4.66	1	66	66	66	0	0	66
209	121 Nearra Street Deagon QLD	4.68	1	59	61	62	35	58	61
209	121 Nearra Street Deagon QLD	4.68	2	62	64	65	35	58	64
210	138 Nearra Street Deagon QLD	3.38	1	63	65	66	30	52	65
210	138 Nearra Street Deagon QLD	3.38	2	64	67	68	30	52	66
211	140 Nearra Street Deagon QLD	4.86	1	62	65	66	30	53	65
211	140 Nearra Street Deagon QLD	4.86	2	64	68	68	30	53	66
212	144 Nearra Street Deagon QLD	4.04	1	60	62	63	33	55	62
212	144 Nearra Street Deagon QLD	4.04	2	63	66	67	33	55	65
213	142 Nearra Street Deagon QLD	4.03	1	62	64	65	32	53	63
213	142 Nearra Street Deagon QLD	4.03	2	63	67	68	32	53	65
214	146 Nearra Street Deagon QLD	3.72	1	60	63	63	33	55	62
214	146 Nearra Street Deagon QLD	3.72	2	62	65	66	33	55	64
215	148 Nearra Street Deagon QLD	4.76	1	59	62	63	34	56	61
215	148 Nearra Street Deagon QLD	4.76	2	62	65	66	34	56	64
216	150 Nearra Street Deagon QLD	4.86	1	59	61	62	33	54	61
216	150 Nearra Street Deagon QLD	4.86	2	61	64	65	33	54	63
217	152 Nearra Street Deagon QLD	3.71	1	59	62	62	34	57	61
217	152 Nearra Street Deagon QLD	3.71	2	61	64	65	34	57	63
218	26 Depot Road Deagon QLD	3.89	1	64	70	71	26	49	66
218	26 Depot Road Deagon QLD	3.89	2	66	71	71	26	49	67
219	24 Depot Road Deagon QLD	4.36	1	63	69	70	25	48	65
219	24 Depot Road Deagon QLD	4.36	2	65	70	71	25	48	67
220	22 Depot Road Deagon QLD	4.71	1	63	68	69	30	52	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
220	22 Depot Road Deagon QLD	4.71	2	65	69	70	30	52	66
221	20 Depot Road Deagon QLD	5	1	62	67	68	30	53	63
221	20 Depot Road Deagon QLD	5	2	64	68	69	30	53	66
222	16 Depot Road Deagon QLD	2.58	1	61	65	66	27	49	63
223	18 Depot Road Deagon QLD	4.12	1	61	66	67	32	54	63
223	18 Depot Road Deagon QLD	4.12	2	63	67	68	32	54	65
224	14 Depot Road Deagon QLD	3	1	61	65	65	30	52	63
225	12 Depot Road Deagon QLD	4.7	1	60	64	64	30	53	61
225	12 Depot Road Deagon QLD	4.7	2	62	65	66	30	53	64
226	10 Depot Road Deagon QLD	2.95	1	59	61	62	33	56	61
226	10 Depot Road Deagon QLD	2.95	2	61	65	65	33	56	64
227	4 Depot Road Deagon QLD	4.96	1	61	62	63	33	56	62
227	4 Depot Road Deagon QLD	4.96	2	62	64	65	33	56	63
228	2 Depot Road Deagon QLD	5.06	1	60	62	63	31	55	61
228	2 Depot Road Deagon QLD	5.06	2	62	64	64	31	55	63
229	1/41 Depot Road Deagon QLD	7.08	1	65	70	71	0	0	65
229	1/41 Depot Road Deagon QLD	7.08	2	67	73	74	0	0	67
230	1/41 Depot Road Deagon QLD	6.82	1	61	66	67	31	53	62
230	1/41 Depot Road Deagon QLD	6.82	2	63	67	68	31	53	64
231	1/41 Depot Road Deagon QLD	7.16	1	65	70	71	0	0	65
231	1/41 Depot Road Deagon QLD	7.16	2	67	73	74	0	0	63
232	1/41 Depot Road Deagon QLD	7.18	1	65	70	71	0	0	65
232	1/41 Depot Road Deagon QLD	7.18	2	67	73	74	0	0	64
233	3 Desmond Avenue Deagon QLD	2.35	1	57	60	61	29	52	61
234	1 Desmond Avenue Deagon QLD	2.99	1	57	61	62	30	52	61
235	2 Desmond Avenue Deagon QLD	3.2	1	59	63	65	29	51	65

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
236	4 Desmond Avenue Deagon QLD	3.16	1	59	64	65	29	51	65
237	1/15 Ibis Avenue Deagon QLD	5.42	1	54	56	57	31	53	56
237	1/15 Ibis Avenue Deagon QLD	5.42	2	56	59	60	31	53	59
238	158 Board Street Deagon QLD	2.83	1	59	64	65	29	51	65
239	156 Board Street Deagon QLD	3.18	1	59	63	65	30	52	65
240	11 Ibis Avenue Deagon QLD	4.52	1	54	56	57	30	53	56
240	11 Ibis Avenue Deagon QLD	4.52	2	56	59	59	30	53	59
241	154 Board Street Deagon QLD	3.28	1	59	63	64	29	52	64
241	154 Board Street Deagon QLD	3.28	2	59	64	65	29	52	65
242	152 Board Street Deagon QLD	4.76	1	59	63	64	31	53	63
242	152 Board Street Deagon QLD	4.76	2	59	64	65	31	53	65
243	9 Ibis Avenue Deagon QLD	4.89	1	54	56	57	31	54	56
243	9 Ibis Avenue Deagon QLD	4.89	2	56	58	59	31	54	59
244	150 Board Street Deagon QLD	4.51	1	58	63	63	31	53	63
244	150 Board Street Deagon QLD	4.51	2	59	63	64	31	53	64
245	1/148 Board Street Deagon QLD	2.91	1	58	62	63	29	52	63
246	7 Ibis Avenue Deagon QLD	2.98	1	55	57	58	30	52	58
247	1/148 Board Street Deagon QLD	2.29	1	57	62	63	29	51	62
248	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
249	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
250	12 Carl Place Bracken Ridge QLD	2.6	1	64	65	66	0	0	66
251	10 Carl Place Bracken Ridge QLD	2.66	1	64	65	66	0	0	66
252	8 Carl Place Bracken Ridge QLD	2.75	1	63	64	65	0	0	65
253	6 Carl Place Bracken Ridge QLD	2.42	1	63	64	65	0	0	65
254	4 Carl Place Bracken Ridge QLD	2.46	1	62	63	64	0	0	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
255	11 Calogero Drive Bracken Ridge QLD	2.48	1	62	63	64	0	0	64
256	140/131 Quinlan Street Bracken Ridge QLD	3	1	65	66	67	0	0	67
257	140/131 Quinlan Street Bracken Ridge QLD	3.5	1	64	65	66	0	0	66
258	21 Calogero Drive Bracken Ridge QLD	2.64	1	63	64	65	0	0	65
259	19 Calogero Drive Bracken Ridge QLD	2.6	1	62	63	64	0	0	64
260	23 Calogero Drive Bracken Ridge QLD	2.67	1	63	64	65	0	0	65
261	17 Calogero Drive Bracken Ridge QLD	2.56	1	61	62	63	0	0	63
262	15 Calogero Drive Bracken Ridge QLD	2.45	1	61	62	63	0	0	63
263	13 Calogero Drive Bracken Ridge QLD	2.6	1	61	62	63	0	0	63
264	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
265	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
266	18 Calogero Drive Bracken Ridge QLD	2.56	1	63	65	66	0	0	66
267	24 Calogero Drive Bracken Ridge QLD	3	1	64	65	66	0	0	66
268	22 Calogero Drive Bracken Ridge QLD	3	1	64	65	66	0	0	66
269	18 Calogero Drive Bracken Ridge QLD	5.23	1	64	65	66	0	0	66
270	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
271	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
272	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	64	65	0	0	65
273	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
274	140/131 Quinlan Street Bracken Ridge QLD	3	1	60	62	62	0	0	62
275	140/131 Quinlan Street Bracken Ridge QLD	3	1	59	61	62	0	0	62
276	140/131 Quinlan Street Bracken Ridge QLD	2.86	1	60	62	62	0	0	62

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
277	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
278	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
279	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
280	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
281	140/131 Quinlan Street Bracken Ridge QLD	3	1	60	62	63	0	0	63
282	140/131 Quinlan Street Bracken Ridge QLD	3	1	60	61	62	0	0	62
283	140/131 Quinlan Street Bracken Ridge QLD	2.61	1	60	62	63	0	0	62
284	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
285	140/131 Quinlan Street Bracken Ridge QLD	2.62	1	62	63	64	0	0	64
286	140/131 Quinlan Street Bracken Ridge QLD	2.6	1	61	63	63	0	0	63
287	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
288	140/131 Quinlan Street Bracken Ridge QLD	2.24	1	62	64	64	0	0	64
289	140/131 Quinlan Street Bracken Ridge QLD	2.54	1	62	63	64	0	0	64
290	140/131 Quinlan Street Bracken Ridge QLD	2.37	1	61	62	63	0	0	63
291	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
292	140/131 Quinlan Street Bracken Ridge QLD	2.51	1	61	62	63	0	0	63
293	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
294	140/131 Quinlan Street Bracken Ridge QLD	2.63	1	63	64	65	0	0	65
295	140/131 Quinlan Street Bracken Ridge QLD	2.57	1	61	63	64	0	0	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
296	140/131 Quinlan Street Bracken Ridge QLD	2.58	1	61	63	64	0	0	63
297	140/131 Quinlan Street Bracken Ridge QLD	2.41	1	61	63	63	0	0	63
298	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
299	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
300	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
301	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
302	140/131 Quinlan Street Bracken Ridge QLD	3	1	60	61	62	0	0	62
303	140/131 Quinlan Street Bracken Ridge QLD	2.56	1	61	62	63	0	0	63
304	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
305	140/131 Quinlan Street Bracken Ridge QLD	3.39	1	61	63	64	0	0	63
306	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
307	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
308	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
309	140/131 Quinlan Street Bracken Ridge QLD	2.33	1	61	62	63	0	0	63
310	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
311	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
312	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
313	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
314	140/131 Quinlan Street Bracken Ridge QLD	3.89	1	62	63	64	0	0	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
315	140/131 Quinlan Street Bracken Ridge QLD	2.64	1	61	62	63	0	0	63
316	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
317	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
318	140/131 Quinlan Street Bracken Ridge QLD	2.59	1	61	63	63	0	0	63
319	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	64
320	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	63	0	0	63
321	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
322	140/131 Quinlan Street Bracken Ridge QLD	2.62	1	61	62	63	0	0	63
323	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
324	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
325	140/131 Quinlan Street Bracken Ridge QLD	2.65	1	62	63	63	0	0	63
326	140/131 Quinlan Street Bracken Ridge QLD	3	1	62	63	64	0	0	63
327	140/131 Quinlan Street Bracken Ridge QLD	3	1	61	62	63	0	0	63
328	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	64	65	0	0	65
329	132 Quinlan Street Bracken Ridge QLD	4.58	1	62	63	64	0	0	64
330	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	66
331	140/131 Quinlan Street Bracken Ridge QLD	3	1	63	64	65	0	0	65
332	140/131 Quinlan Street Bracken Ridge QLD	3	1	67	68	68	0	0	67
333	140/131 Quinlan Street Bracken Ridge QLD	3	1	66	66	67	0	0	66

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
334	140/131 Quinlan Street Bracken Ridge QLD	3	1	64	65	66	0	0	65
335	57 Barrett Street Bracken Ridge QLD	2.54	1	69	71	72	0	0	68
336	181 Quinlan Street Bracken Ridge QLD	3.22	1	68	69	70	0	0	68
337	67 Barrett Street Bracken Ridge QLD	3.09	1	62	63	64	0	0	64
338	152 Quinlan Street Bracken Ridge QLD	3.58	1	66	66	67	0	0	66
339	60 Woodcroft Street Bracken Ridge QLD	2.73	1	66	66	67	0	0	67
340	1 Beresford Circuit Bracken Ridge QLD	2.66	1	66	67	68	0	0	67
341	2 Beresford Circuit Bracken Ridge QLD	2.45	1	66	67	67	0	0	67
342	6 Beresford Circuit Bracken Ridge QLD	2.55	1	65	65	66	0	0	66
343	8 Beresford Circuit Bracken Ridge QLD	2.48	1	62	63	64	0	0	64
344	10 Beresford Circuit Bracken Ridge QLD	2.48	1	63	64	64	0	0	64
345	12 Beresford Circuit Bracken Ridge QLD	2.47	1	62	63	64	0	0	63
346	4 Beresford Circuit Bracken Ridge QLD	2.74	1	64	65	66	0	0	66
347	3 Beresford Circuit Bracken Ridge QLD	2.43	1	65	66	67	0	0	67
348	14 Beresford Circuit Bracken Ridge QLD	2.59	1	62	63	63	0	0	63
349	16 Beresford Circuit Bracken Ridge QLD	2.56	1	61	62	63	0	0	63
350	18 Beresford Circuit Bracken Ridge QLD	2.53	1	61	62	62	0	0	62
351	20 Beresford Circuit Bracken Ridge QLD	2.44	1	61	62	63	0	0	62
352	22 Beresford Circuit Bracken Ridge QLD	2.46	1	60	61	62	0	0	62
353	5 Beresford Circuit Bracken Ridge QLD	2.34	1	66	66	67	0	0	67
354	7 Beresford Circuit Bracken Ridge QLD	2.46	1	65	66	67	0	0	67
355	17 Beresford Circuit Bracken Ridge QLD	2.35	1	62	63	64	0	0	64
356	15 Beresford Circuit Bracken Ridge QLD	2.69	1	63	64	65	0	0	65
357	2 Cloverbrook Place Bracken Ridge QLD	2.49	1	65	66	66	0	0	66
358	19 Beresford Circuit Bracken Ridge QLD	2.53	1	61	62	63	0	0	63

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
359	1 Cloverbrook Place Bracken Ridge QLD	2.36	1	65	66	67	0	0	66
360	88 Beresford Circuit Bracken Ridge QLD	2.43	1	60	61	62	0	0	62
361	3 Fieldstone Close Bracken Ridge QLD	2.69	1	62	63	63	0	0	63
362	4 Fieldstone Close Bracken Ridge QLD	2.54	1	62	63	64	0	0	63
363	3 Cloverbrook Place Bracken Ridge QLD	2.59	1	64	65	66	0	0	66
364	5 Fieldstone Close Bracken Ridge QLD	2.72	1	62	63	64	0	0	64
365	4 Cloverbrook Place Bracken Ridge QLD	2.73	1	65	66	66	0	0	66
366	86 Beresford Circuit Bracken Ridge QLD	2.58	1	61	62	63	0	0	62
367	5 Fieldstone Close Bracken Ridge QLD	2.87	1	62	63	64	0	0	64
368	73 Beresford Circuit Bracken Ridge QLD	2.38	1	61	62	63	0	0	62
369	5 Cloverbrook Place Bracken Ridge QLD	2.35	1	65	65	66	0	0	66
370	6 Fieldstone Close Bracken Ridge QLD	2.7	1	62	63	64	0	0	64
371	6 Cloverbrook Place Bracken Ridge QLD	2.76	1	65	66	67	0	0	66
372	84 Beresford Circuit Bracken Ridge QLD	2.45	1	60	61	62	0	0	62
373	7 Fieldstone Close Bracken Ridge QLD	2.67	1	63	64	64	0	0	64
374	7 Cloverbrook Place Bracken Ridge QLD	2.36	1	65	66	66	0	0	66
375	71 Beresford Circuit Bracken Ridge QLD	2.33	1	61	62	63	0	0	62
376	8 Fieldstone Close Bracken Ridge QLD	2.5	1	62	63	64	0	0	64
377	8 Cloverbrook Place Bracken Ridge QLD	2.5	1	65	66	67	0	0	66
378	82 Beresford Circuit Bracken Ridge QLD	2.52	1	61	62	62	0	0	62
379	9 Cloverbrook Place Bracken Ridge QLD	2.39	1	65	66	67	0	0	66
380	69 Beresford Circuit Bracken Ridge QLD	2.46	1	62	62	63	0	0	63
381	9 Fieldstone Close Bracken Ridge QLD	2.48	1	63	64	65	0	0	64

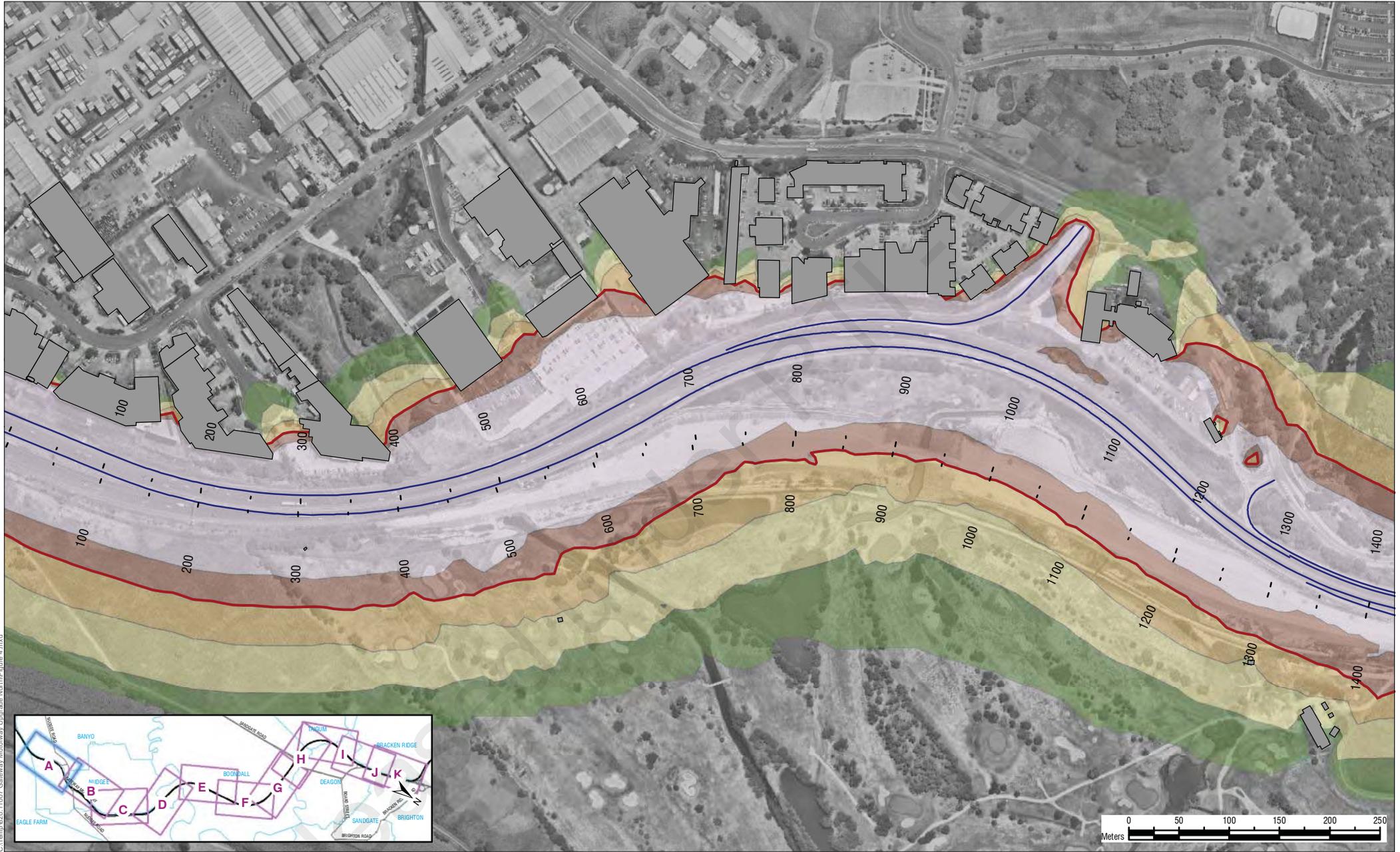
Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
382	80 Beresford Circuit Bracken Ridge QLD	2.46	1	61	62	62	0	0	62
383	11 Cloverbrook Place Bracken Ridge QLD	2.52	1	64	65	66	0	0	66
384	10 Cloverbrook Place Bracken Ridge QLD	2.4	1	64	65	66	0	0	66
385	9 Fieldstone Close Bracken Ridge QLD	2.49	1	62	63	64	0	0	64
386	67 Beresford Circuit Bracken Ridge QLD	2.26	1	62	63	63	0	0	63
387	10 Fieldstone Close Bracken Ridge QLD	2.44	1	62	63	64	0	0	63
388	13 Cloverbrook Place Bracken Ridge QLD	2.67	1	65	66	67	0	0	67
389	78 Beresford Circuit Bracken Ridge QLD	2.49	1	62	63	63	0	0	63
390	12 Fieldstone Close Bracken Ridge QLD	2.49	1	62	63	64	0	0	64
391	65 Beresford Circuit Bracken Ridge QLD	2.62	1	62	63	64	0	0	63
392	11 Fieldstone Close Bracken Ridge QLD	2.71	1	63	64	64	0	0	64
393	13 Fieldstone Close Bracken Ridge QLD	2.42	1	63	64	65	0	0	64
394	15 Cloverbrook Place Bracken Ridge QLD	2.43	1	65	65	66	0	0	66
395	12 Cloverbrook Place Bracken Ridge QLD	2.59	1	64	65	65	0	0	65
396	63 Beresford Circuit Bracken Ridge QLD	2.28	1	62	63	64	0	0	64
397	14 Cloverbrook Place Bracken Ridge QLD	2.53	1	64	65	66	0	0	66
398	76 Beresford Circuit Bracken Ridge QLD	2.36	1	62	63	64	0	0	63
399	17 Cloverbrook Place Bracken Ridge QLD	2.38	1	65	66	66	0	0	66
400	3 Greening Place Bracken Ridge QLD	2.37	1	63	63	64	0	0	63
401	61 Beresford Circuit Bracken Ridge QLD	2.37	1	63	63	64	0	0	63
402	5 Greening Place Bracken Ridge QLD	2.27	1	63	64	65	0	0	64
403	19 Cloverbrook Place Bracken Ridge QLD	2.76	1	66	66	67	0	0	67
404	7 Greening Place Bracken Ridge QLD	2.37	1	63	64	65	0	0	64

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
405	9 Greening Place Bracken Ridge QLD	2.35	1	64	65	65	0	0	65
406	11 Greening Place Bracken Ridge QLD	2.55	1	65	66	66	0	0	66
407	39 Beresford Circuit Bracken Ridge QLD	2.8	1	61	62	63	0	0	62
408	13 Greening Place Bracken Ridge QLD	2.59	1	66	66	67	0	0	67
409	59 Beresford Circuit Bracken Ridge QLD	2.48	1	63	63	64	0	0	64
410	41 Beresford Circuit Bracken Ridge QLD	2.97	1	61	62	63	0	0	62
411	59 Beresford Circuit Bracken Ridge QLD	2.19	1	61	61	62	0	0	62
412	72 Beresford Circuit Bracken Ridge QLD	2.48	1	62	63	63	0	0	63
413	57 Beresford Circuit Bracken Ridge QLD	2.54	1	63	64	64	0	0	64
414	15 Greening Place Bracken Ridge QLD	2.66	1	65	65	66	0	0	66
415	4 Greening Place Bracken Ridge QLD	2.41	1	63	64	65	0	0	64
416	43 Beresford Circuit Bracken Ridge QLD	2.77	1	62	62	63	0	0	62
417	6 Greening Place Bracken Ridge QLD	2.46	1	64	64	65	0	0	64
418	16 Greening Place Bracken Ridge QLD	2.37	1	65	65	66	0	0	66
419	70 Beresford Circuit Bracken Ridge QLD	2.48	1	63	64	64	0	0	64
420	8 Greening Place Bracken Ridge QLD	2.52	1	64	64	65	0	0	65
421	55 Beresford Circuit Bracken Ridge QLD	2.41	1	63	64	65	0	0	64
422	10 Greening Place Bracken Ridge QLD	2.48	1	65	66	66	0	0	66
423	14 Greening Place Bracken Ridge QLD	2.54	1	66	65	66	0	0	66
424	45 Beresford Circuit Bracken Ridge QLD	2.49	1	63	63	64	0	0	63
425	47 Beresford Circuit Bracken Ridge QLD	2.49	1	63	64	65	0	0	63
426	53 Beresford Circuit Bracken Ridge QLD	2.48	1	63	64	65	0	0	64
427	68 Beresford Circuit Bracken Ridge QLD	2.57	1	64	64	65	0	0	64
428	3 Schoolside Place Bracken Ridge QLD	2.59	1	64	64	65	0	0	64
429	12 Greening Place Bracken Ridge QLD	2.58	1	66	66	66	0	0	66
430	5 Schoolside Place Bracken Ridge QLD	2.39	1	64	65	65	0	0	65

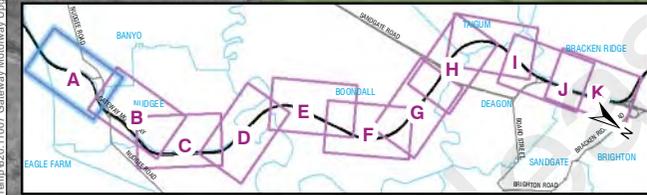
Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels (Façade Corrected)					
				Scenario 1 - Road Pre-Existing 2013 LA10,18 hour	Scenario 2 - Proposed 2018 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Road - No Barriers LA10,18 hour	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq,24 hour	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event LMax	Scenario 4 - Proposed 2028 Road - With Barriers LA10,18 hour
431	7 Schoolside Place Bracken Ridge QLD	2.37	1	65	65	66	0	0	66
432	9 Schoolside Place Bracken Ridge QLD	2.47	1	66	66	67	0	0	66
433	11 Schoolside Place Bracken Ridge QLD	2.47	1	66	66	66	0	0	66
434	13 Schoolside Place Bracken Ridge QLD	2.43	1	65	65	66	0	0	66
435	64 Beresford Circuit Bracken Ridge QLD	2.47	1	65	65	66	0	0	65
436	2 Schoolside Place Bracken Ridge QLD	2.44	1	65	65	66	0	0	65
437	60 Beresford Circuit Bracken Ridge QLD	2.48	1	64	65	66	0	0	64
438	56 Beresford Circuit Bracken Ridge QLD	2.73	1	63	64	65	0	0	64
439	58 Beresford Circuit Bracken Ridge QLD	2.67	1	64	65	65	0	0	64
440	54 Beresford Circuit Bracken Ridge QLD	2.75	1	63	64	65	0	0	63
441	4 Schoolside Place Bracken Ridge QLD	2.52	1	65	66	67	0	0	65
442	6 Schoolside Place Bracken Ridge QLD	2.69	1	65	66	67	0	0	65
443	15 Schoolside Place Bracken Ridge QLD	2.63	1	66	65	66	0	0	66
444	8 Schoolside Place Bracken Ridge QLD	2.74	1	67	67	68	0	0	67
445	17 Schoolside Place Bracken Ridge QLD	2.64	1	66	65	66	0	0	66
446	19 Schoolside Place Bracken Ridge QLD	2.48	1	65	65	66	0	0	66
447	21 Schoolside Place Bracken Ridge QLD	2.71	1	65	65	66	0	0	65
448	23 Schoolside Place Bracken Ridge QLD	2.69	1	67	67	68	0	0	66

Education, Community and Health

Ref	Address	Building Height (m)	Building Storey	Calculated and Predicted Road and Rail Traffic Noise Levels					
				Scenario 1 - Road Pre-Existing 2013 LA10 (1h)	Scenario 2 - Proposed 2018 Road - No Barriers LA10 (1h)	Scenario 3 - Proposed 2028 Road - No Barriers LA10 (1h)	Scenario 3 - Proposed 2028 Rail - No Barriers LAeq (24h)	Scenario 3 - Proposed 2028 Rail - No Barriers Single Event L <sub>Amax</sub>	Scenario 4 - Proposed 2028 Road - With Barriers LA10 (1h)
700	8 Depot Road Deagon QLD	3.43	1	63	65	66	36	58	65
701	8 Depot Road Deagon QLD	2.36	1	63	66	67	36	58	65
706	27 John Fisher Drive Bracken Ridge QLD	2.93	1	66	66	68	N/A	N/A	65
707	27 John Fisher Drive Bracken Ridge QLD	3.88	1	66	65	68	N/A	N/A	65
708	27 John Fisher Drive Bracken Ridge QLD	3.23	1	65	66	69	N/A	N/A	64
709	27 John Fisher Drive Bracken Ridge QLD	2.82	1	65	66	67	N/A	N/A	64
710	27 John Fisher Drive Bracken Ridge QLD	2.96	1	67	67	69	N/A	N/A	66
711	27 John Fisher Drive Bracken Ridge QLD	3.33	1	66	68	70	N/A	N/A	64
712	27 John Fisher Drive Bracken Ridge QLD	3.29	1	67	68	70	N/A	N/A	66
713	27 John Fisher Drive Bracken Ridge QLD	2.70	1	66	68	69	N/A	N/A	65
714	27 John Fisher Drive Bracken Ridge QLD	2.70	1	69	69	72	N/A	N/A	66
715	27 John Fisher Drive Bracken Ridge QLD	2.92	1	68	69	72	N/A	N/A	65
716	27 John Fisher Drive Bracken Ridge QLD	2.75	1	68	69	74	N/A	N/A	65
717	27 John Fisher Drive Bracken Ridge QLD	3.57	1	69	70	75	N/A	N/A	65
718	27 John Fisher Drive Bracken Ridge QLD	3.11	1	69	70	72	N/A	N/A	66
719	27 John Fisher Drive Bracken Ridge QLD	2.56	1	71	72	77	N/A	N/A	67



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**SLR**  
 Level 2, 15 ASTOR TERRACE  
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Project No.: 620.11007.00200  
 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

**Calculated  $L_{A10}$  (18h) Noise Level**

- 64 dBA or Below
- 65 to 66 dBA
- 67 to 68 dBA
- 69 to 70 dBA
- Above 70 dBA
- 68 dBA Noise Contour

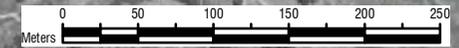
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive / Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

**Notes:**

1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

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 Jacobs SMEC Design Joint Venture

**Queensland Government**

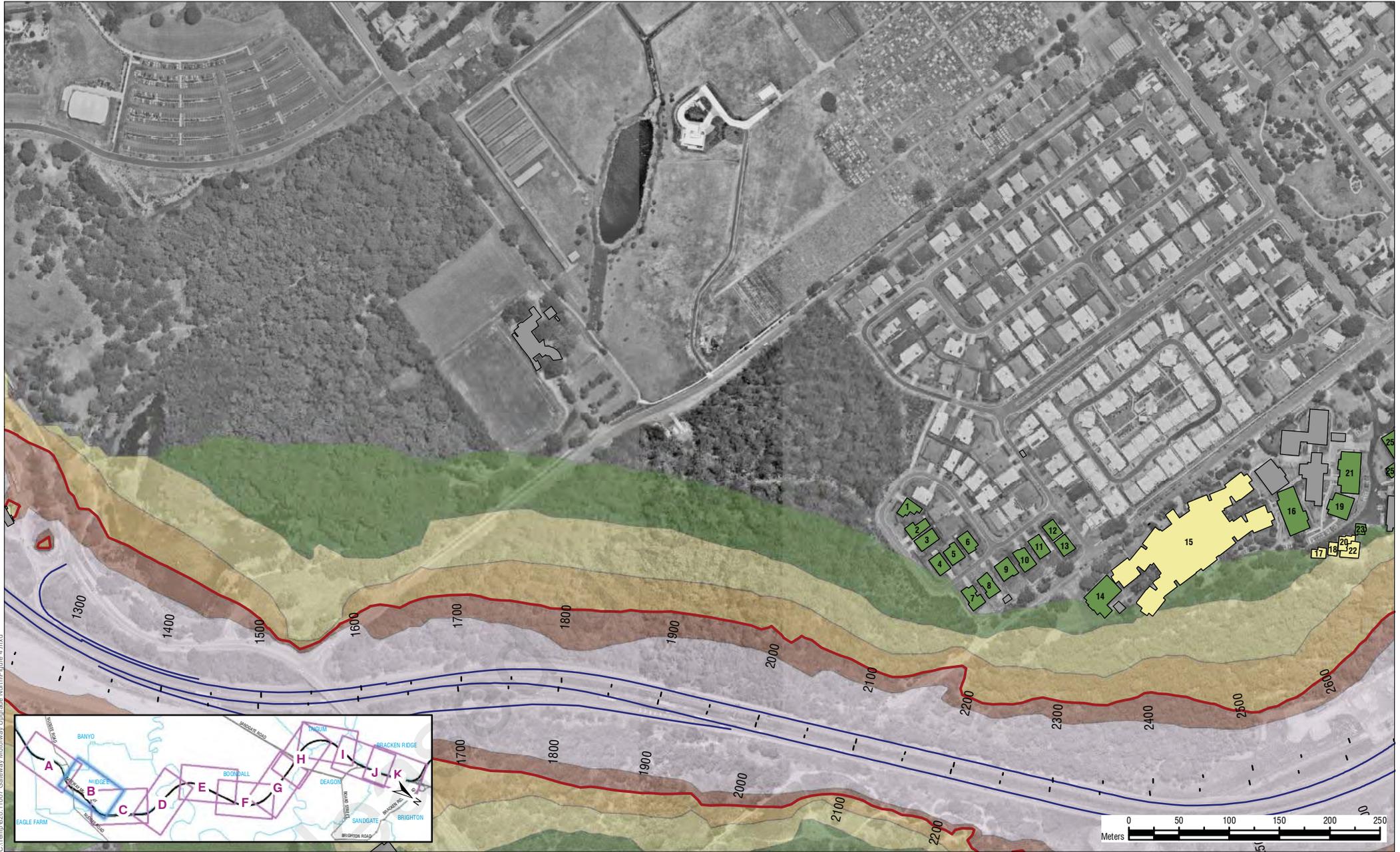


Jacobs SMEC Design Joint Venture

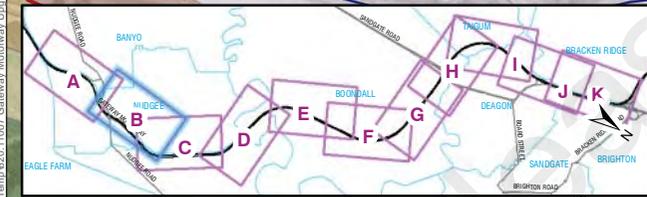
**Gateway Upgrade North**

**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers Nudgee Interchange South**

FIGURE 4A - Scenario 1



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**SLR**  
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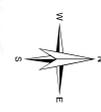
Project No.: 620.11007.00200  
 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<b>Calculated <math>L_{A10}</math> (1.8m) Noise Level</b>	Building - Educational Community or Health
64 dBA or Below	Building - To Be Acquired
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Existing Modelled Road Alignment
69 to 70 dBA	Existing Noise Barrier
Above 70 dBA	
68 dBA Noise Contour	

**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture

Queensland Government

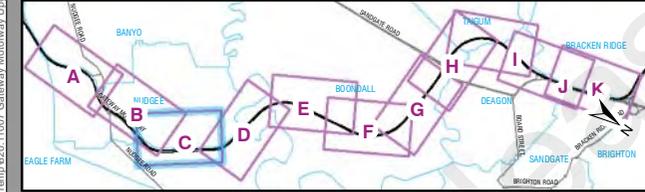


Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers Nudgee Interchange North**  
 FIGURE 4B - Scenario 1

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.



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**SLR**  
 Level 2, 15 ASTOR TERRACE  
 SPRING HILL  
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 www.slrconsulting.com

Project No.: 620.11007.00200  
 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

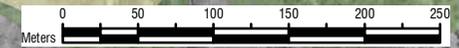
**Calculated  $L_{A10}$  (18h) Noise Level**

- 64 dBa or Below
- 65 to 66 dBa
- 67 to 68 dBa
- 69 to 70 dBa
- Above 70 dBa
- 68 dBa Noise Contour

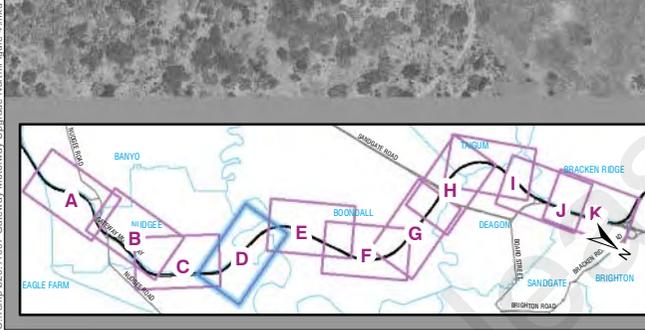
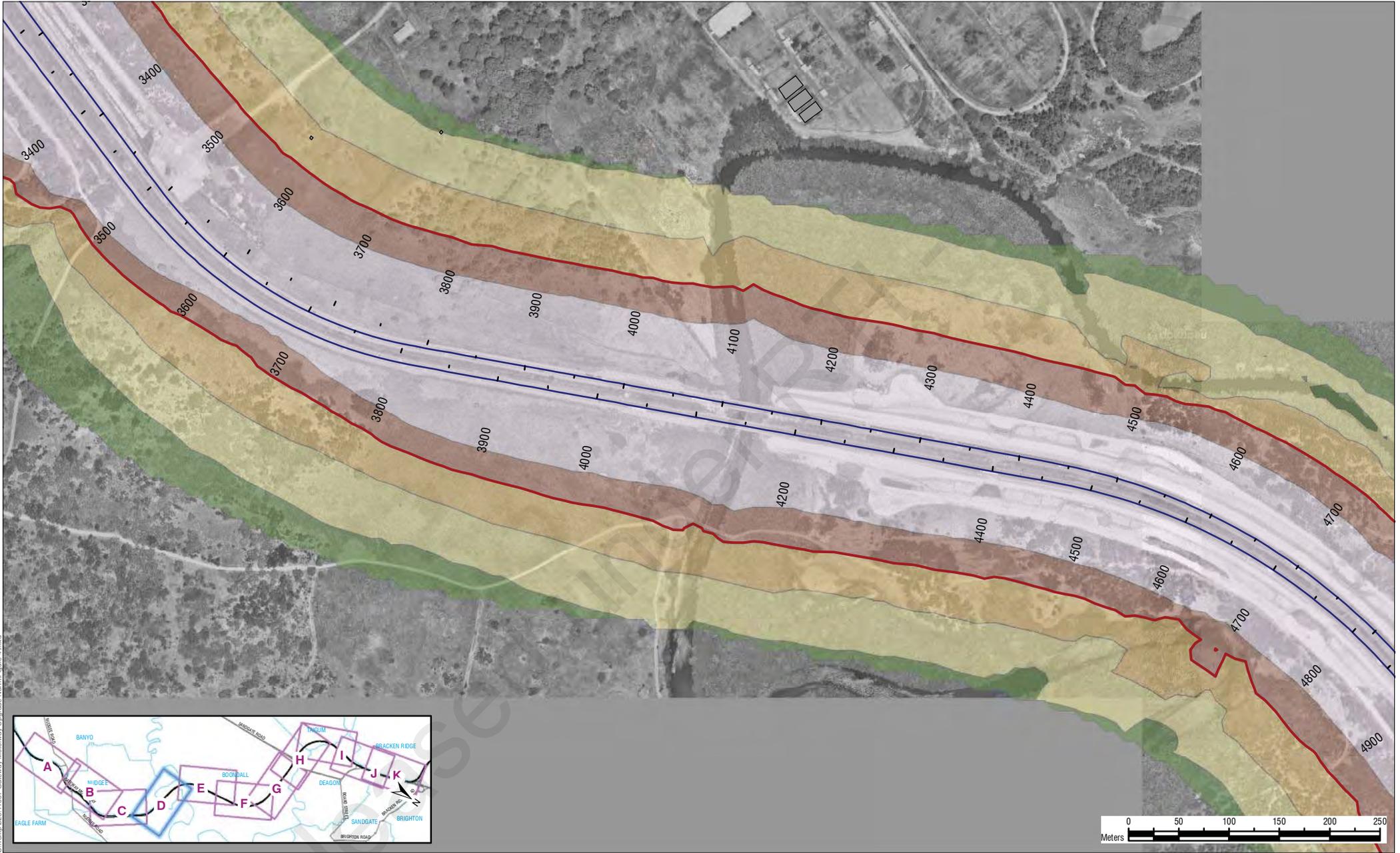
- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive / Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013)**  
**Noise Levels (Facade Corrected), Existing**  
**Mwy Alignment and Existing Noise Barriers**  
**Nudgee / Mercy Family Services**  
 FIGURE 4C - Scenario 1



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**LEGEND**  
**Calculated  $L_{A10(18h)}$  Noise Level**  
 64 dBA or Below  
 65 to 66 dBA  
 67 to 68 dBA  
 69 to 70 dBA  
 Above 70 dBA  
 68 dBA Noise Contour

Building - Educational Community or Health  
 Building - To Be Acquired  
 Building - Not Sensitive / Outside of Study Area  
 Existing Modelled Road Alignment  
 Existing Noise Barrier

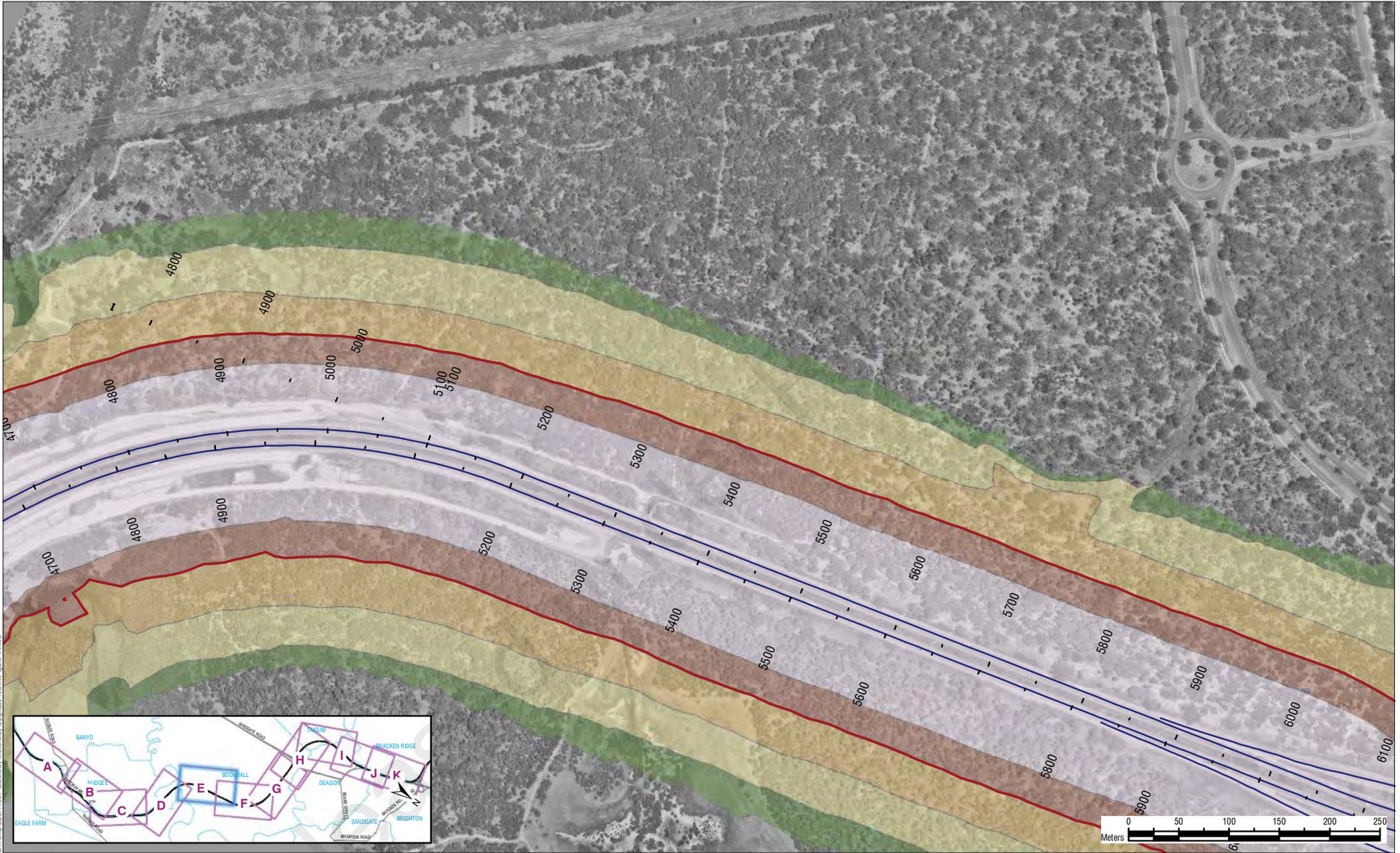
**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture

**Queensland Government**

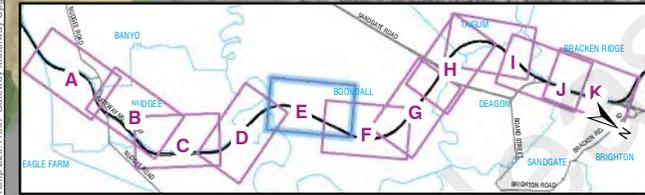
Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers**  
**Nundah Creek**  
 FIGURE 4D - Scenario 1

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Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.



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**LEGEND**

**Calculated  $L_{A10}$  (18h) Noise Level**

- 64 dBA or Below
- 65 to 66 dBA
- 67 to 68 dBA
- 69 to 70 dBA
- Above 70 dBA
- 68 dBA Noise Contour

- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive / Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

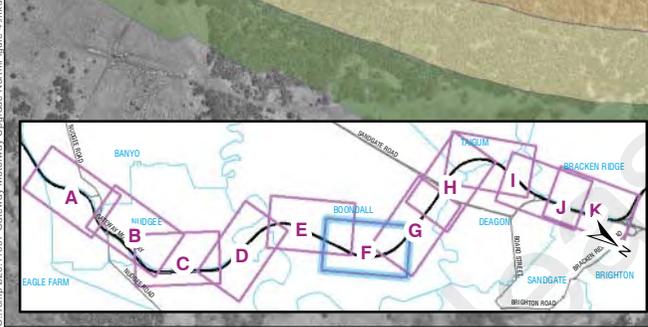
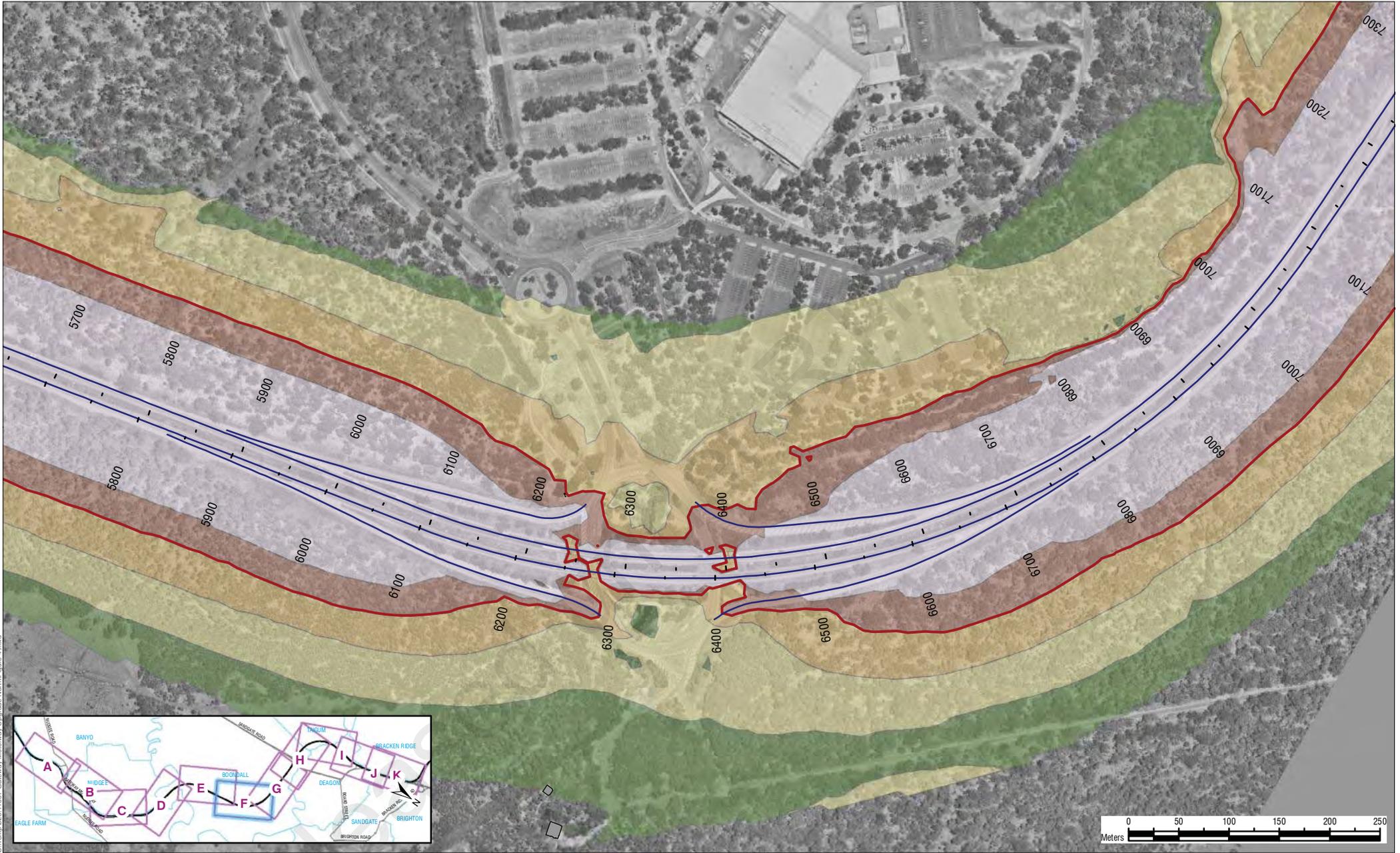
Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers**  
**Boondall Wetlands East**  
 FIGURE 4E - Scenario 1



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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

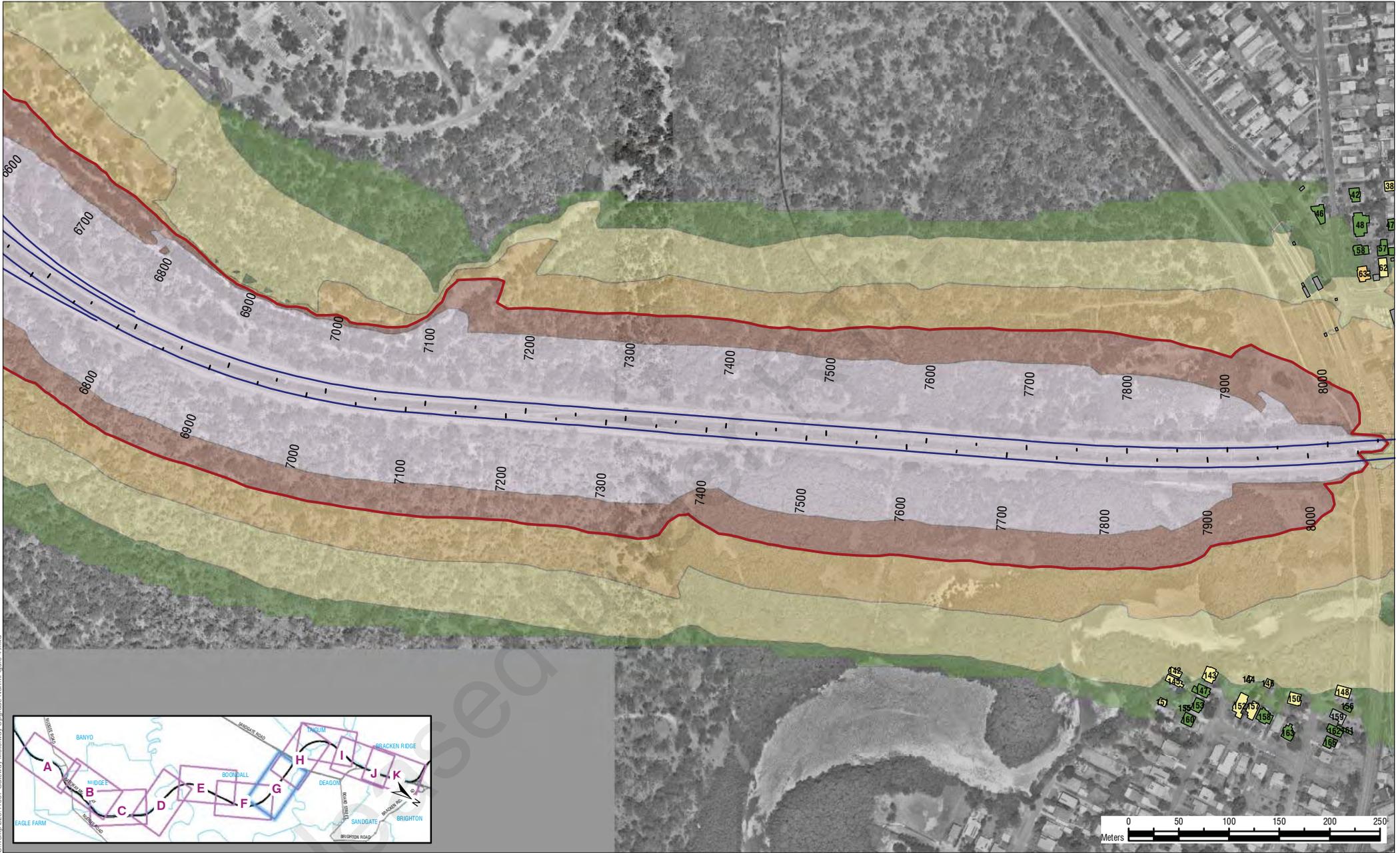
**LEGEND**  
**Calculated  $L_{A10(1.8m)}$  Noise Level**  
 64 dBA or Below  
 65 to 66 dBA  
 67 to 68 dBA  
 69 to 70 dBA  
 Above 70 dBA  
 68 dBA Noise Contour

Building - Educational Community or Health  
 Building - To Be Acquired  
 Building - Not Sensitive / Outside of Study Area  
 Existing Modelled Road Alignment  
 Existing Noise Barrier

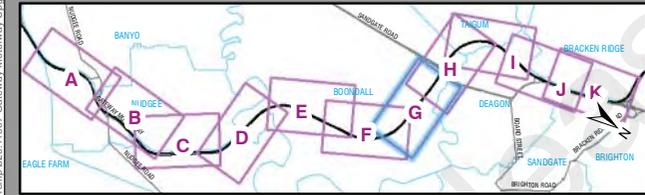
Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013)**  
**Noise Levels (Facade Corrected), Existing**  
**Mwy Alignment and Existing Noise Barriers**  
**Bicentennial Road Interchange**  
 FIGURE 4F - Scenario 1



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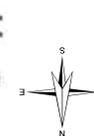
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 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

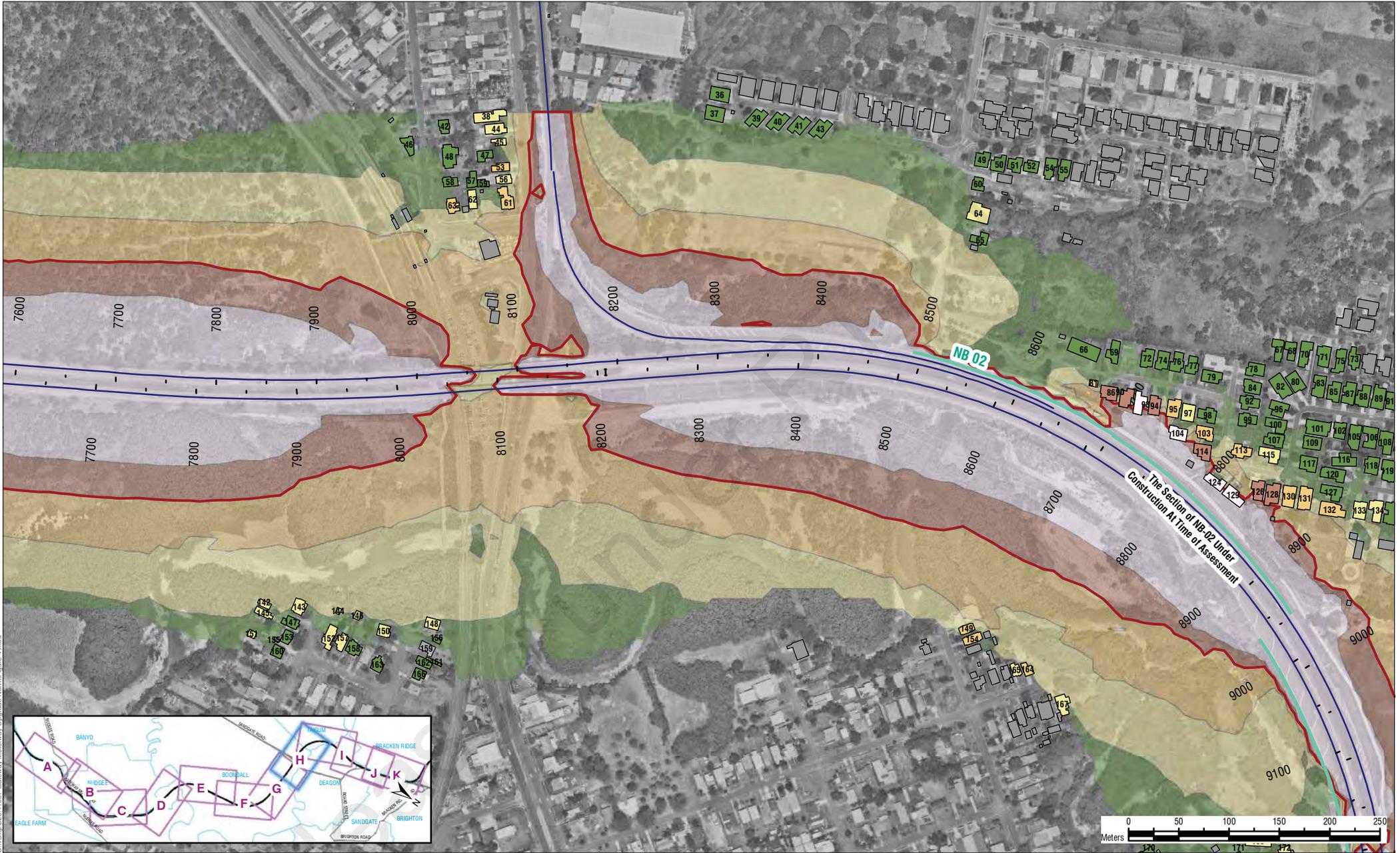
- Calculated  $L_{A10}(18h)$  Noise Level**
- 64 dBA or Below
  - 65 to 66 dBA
  - 67 to 68 dBA
  - 69 to 70 dBA
  - Above 70 dBA
  - 68 dBA Noise Contour
- Building - Educational Community or Health  
 Building - To Be Acquired  
 Building - Not Sensitive / Outside of Study Area  
 Existing Modelled Road Alignment  
 Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

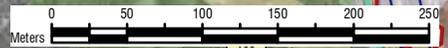
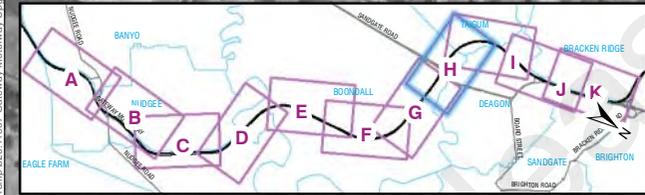
**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers Boondall Wetlands North**  
 FIGURE 4G - Scenario 1



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**LEGEND**

- Calculated  $L_{A10}$  (1.8m) Noise Level**
- 64 dBA or Below
  - 65 to 66 dBA
  - 67 to 68 dBA
  - 69 to 70 dBA
  - Above 70 dBA
  - 68 dBA Noise Contour
- Building - Educational Community or Health**
- Building - To Be Acquired**
- Building - Not Sensitive / Outside of Study Area**
- Existing Modelled Road Alignment**
- Existing Noise Barrier**
- Notes:**
- Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.
  - All noise levels are facade corrected.

**JACOBS** **SMEC**  
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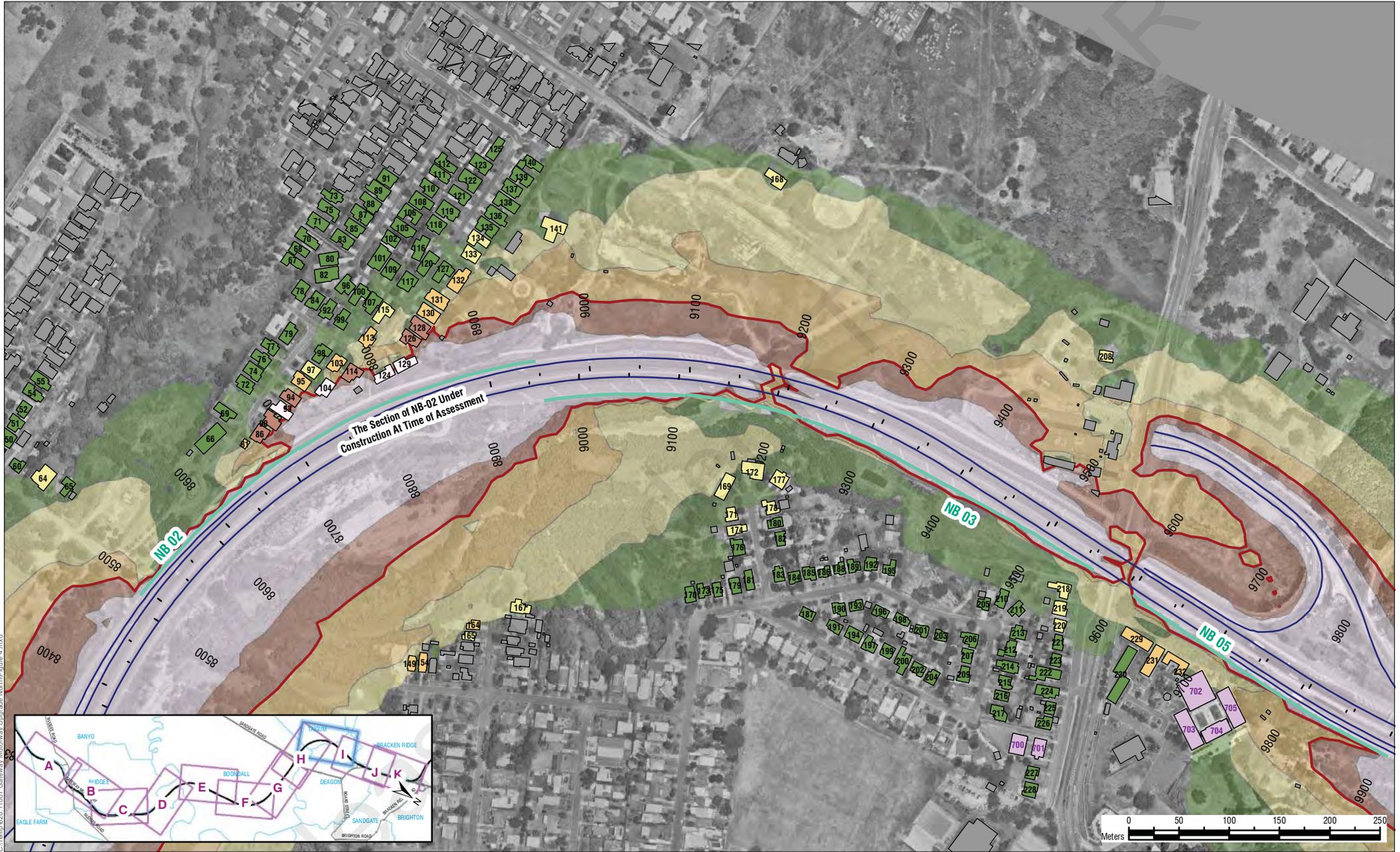
Jacobs SMEC Design Joint Venture

**Gateway Upgrade North**

**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers**

**Sandgate Road**

**FIGURE 4H - Scenario 1**



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**LEGEND**

**Calculated  $L_{A10(18h)}$  Noise Level**

- 64 dBA or Below
- 65 to 66 dBA
- 67 to 68 dBA
- 69 to 70 dBA
- Above 70 dBA
- 68 dBA Noise Contour

- Building - Educational Community or Health
- Building - To Be Acquired
- Building - Not Sensitive / Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**

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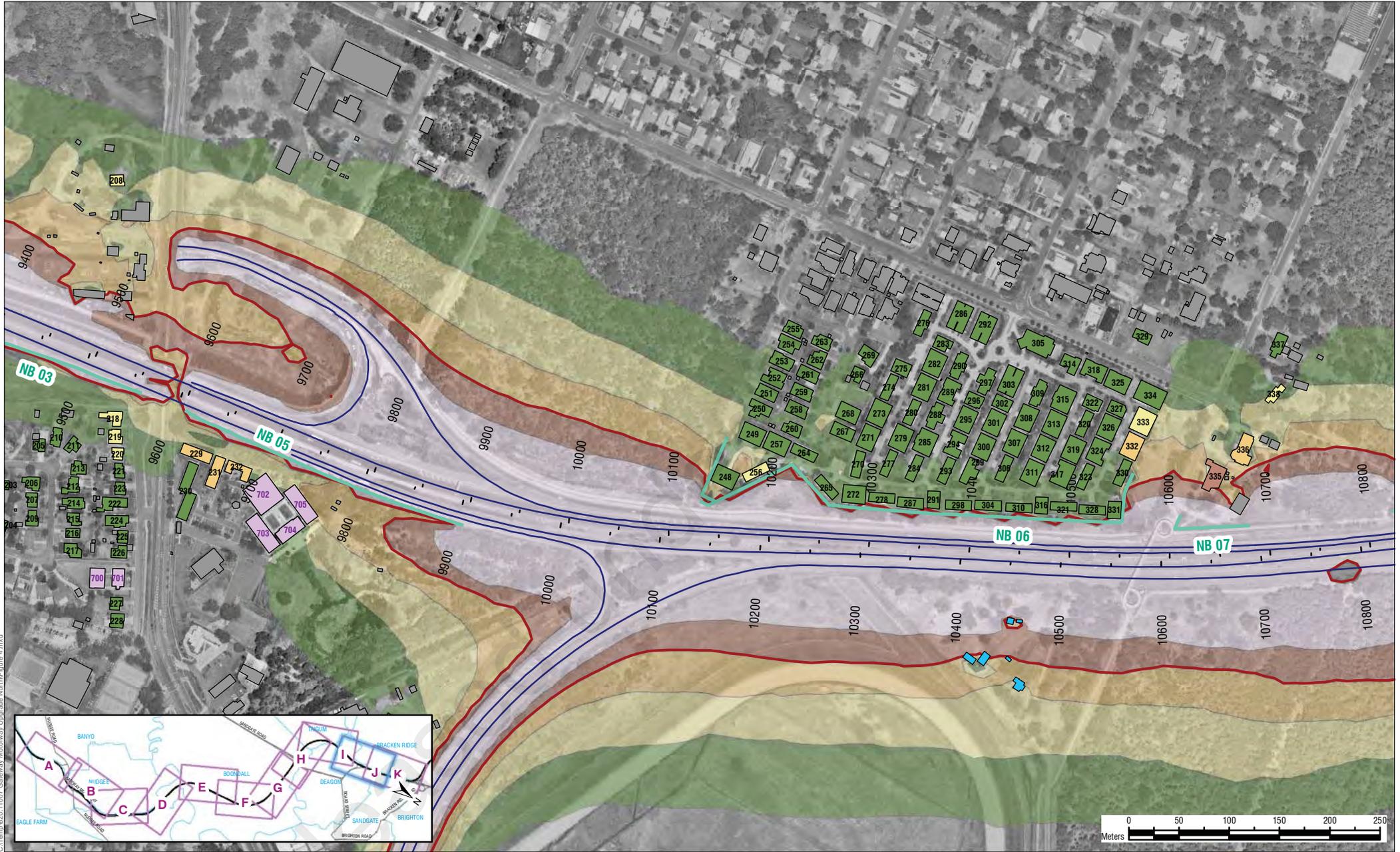
JACOBS SMEC Design Joint Venture

**Gateway Upgrade North**

**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers**

**Taigum / Deagon**

**FIGURE 4I - Scenario 1**



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**LEGEND**

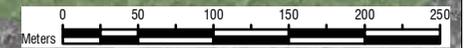
**Calculated  $L_{A10}$  (18h) Noise Level**

64 dBA or Below
65 to 66 dBA
67 to 68 dBA
69 to 70 dBA
Above 70 dBA
68 dBA Noise Contour

Building - Educational Community or Health
Building - To Be Acquired
Building - Not Sensitive / Outside of Study Area
Existing Modelled Road Alignment
Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

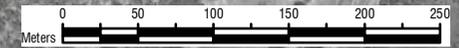
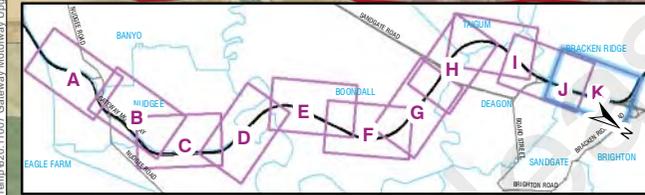
**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers Depot Road Interchange**  
 FIGURE 4J - Scenario 1



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**LEGEND**  
**Calculated  $L_{A10}$  (1.8m) Noise Level**  
 64 dBA or Below  
 65 to 66 dBA  
 67 to 68 dBA  
 69 to 70 dBA  
 Above 70 dBA  
 68 dBA Noise Contour

Building - Educational Community or Health  
 Building - To Be Acquired  
 Building - Not Sensitive / Outside of Study Area  
 Existing Modelled Road Alignment  
 Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Residential Pre-Existing (2013) Noise Levels (Facade Corrected), Existing Mwy Alignment and Existing Noise Barriers**  
**Degaon Deviation**  
 FIGURE 4K - Scenario 1

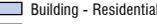
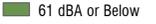
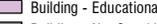
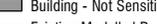
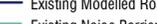
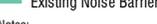
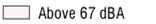
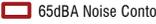


C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 5A.mxd


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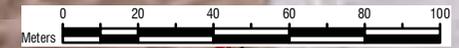
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 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- |   |   |
|---|---|
| <b>Calculated <math>L_{Aeq(1hr)}</math> Noise Level</b>   |  Building - Residential                           |
|  61 dBA or Below     |  Building - Educational Community or Health       |
|  62 to 63 dBA        |  Building - Not Sensitive / Outside of Study Area |
|  64 to 65 dBA        |  Existing Modelled Road Alignment                 |
|  66 to 67 dBA        |  Existing Noise Barrier                           |
|  Above 67 dBA        |   |
|  65dBA Noise Contour |   |

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the ground floor only.  
 2. All noise levels are facade corrected.

  
 Jacobs SMEC Design Joint Venture  

Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Community (Buildings) Pre-Existing (2013) Facade Corrected Noise Levels, Existing Motorway Alignment and Existing Noise Barriers**  
**Seventh Day Adventist Church**  
 FIGURE 5A - Scenario 1



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 5B.mxd

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**LEGEND**

**Calculated  $L_{p10}(12h)$  Noise Level**

- 58 to 59 dBA
- 60 to 61 dBA
- 62 to 63 dBA
- 64 to 65 dBA
- Above 65 dBA
- 63dBA Noise Contour

- Building - Educational Community or Health
- Building - Residential
- Building - Not Sensitive / Outside of Study Area
- Existing Modelled Road Alignment
- Existing Noise Barrier

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All noise levels are free-field.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

**Queensland Government**



Jacobs SMEC Design Joint Venture

**Gateway Upgrade North**

**Calculated Passive Recreational (Outdoor) Pre-Existing (2013) Free Field Noise Levels, Existing Motorway Alignment and Existing Noise Barriers Evergreen Taoist Church**

FIGURE 5B - Scenario 1



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 5C.mxd

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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- Calculated  $L_{A10(1h)}$  Noise Level**
- 61 dBA or Below
  - 62 to 63 dBA
  - 64 to 65 dBA
  - 66 to 67 dBA
  - Above 67 dBA
  - 65dBA Noise Contour
- Building - Residential**
- Building - Not Sensitive / Outside of Study Area**
- Existing Modelled Road Alignment**
- Existing Noise Barrier**

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture

**Gateway Upgrade North**

**Calculated Educational (Buildings) Pre-Existing (2013) Facade Corrected Noise Levels, Existing Motorway Alignment and Existing Noise Barriers St John Fisher College**

FIGURE 5C - Scenario 1



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 5D.mxd


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 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

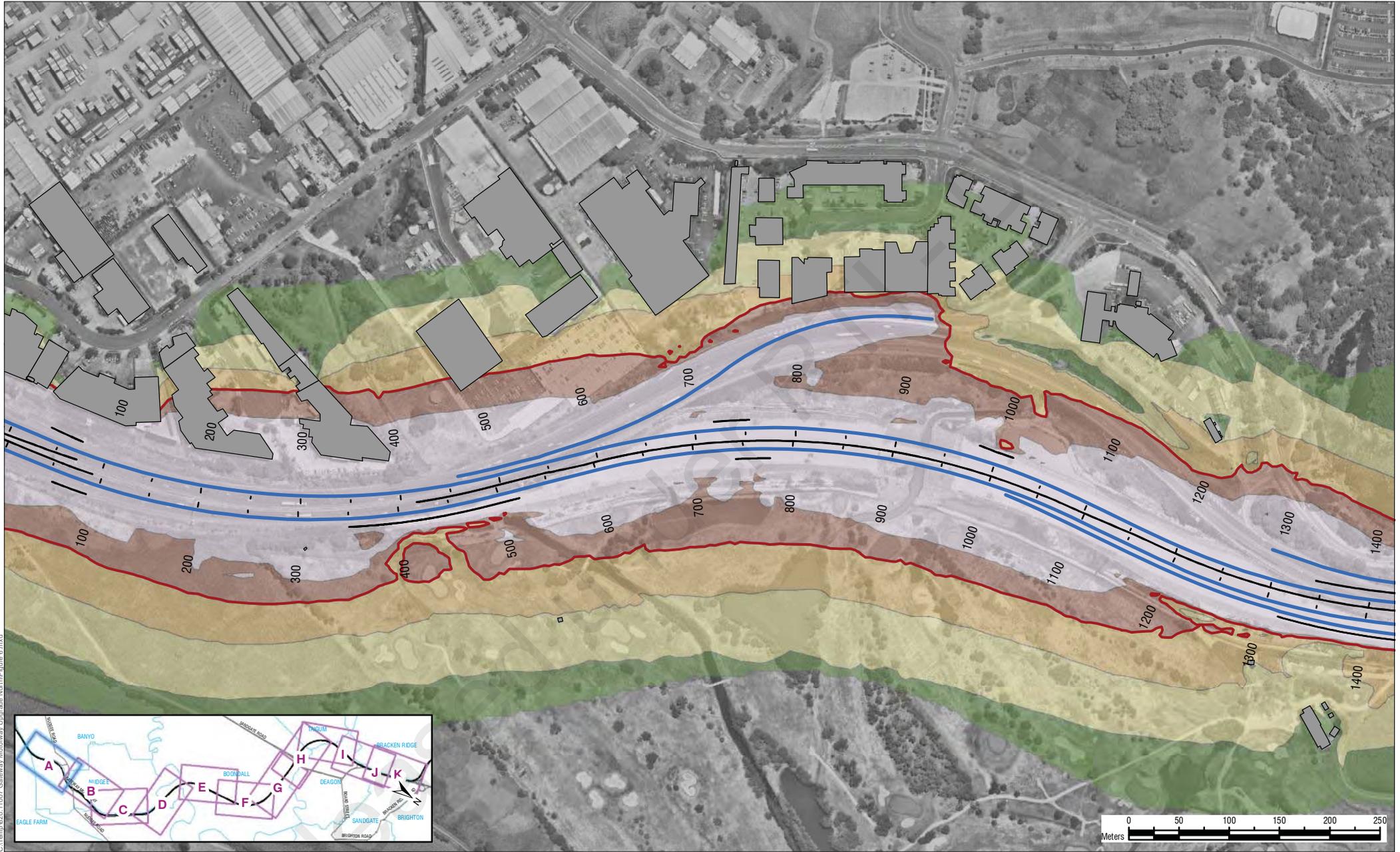
**LEGEND**

- Calculated  $L_{A10(12h)}$  Noise Level**
- 58 to 59 dBA
  - 60 to 61 dBA
  - 62 to 63 dBA
  - 64 to 65 dBA
  - Above 65 dBA
  - 63dBA Noise Contour
-  Building - Educational Community or Health  
 Building - Residential  
 Building - Not Sensitive / Outside of Study Area  
 Existing Modelled Road Alignment  
 Existing Noise Barrier
- Notes:**  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All noise levels are free-field.


  
 Jacobs SMEC Design Joint Venture  




Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Calculated Educational (Outdoor) Pre-Existing (2013) Free Field Noise Levels, Existing Motorway Alignment and Existing Noise Barriers St John Fisher College**  
 FIGURE 5D - Scenario 1



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 6.mxd

<p>Level 2, 15 ASTOR TERRACE SPRING HILL QUEENSLAND 4004 AUSTRALIA T: 61 7 3858 4800 F: 61 7 3858 4801 www.slrconsulting.com</p>	Project No.:	620.11007.00200
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	Drawn by:	N/R
	Scale:	1:5,000
	Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56	

**LEGEND**

64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	Existing Noise Barrier- To be replaced
68dB Noise Contour	Existing Noise Barrier- Not Impacted

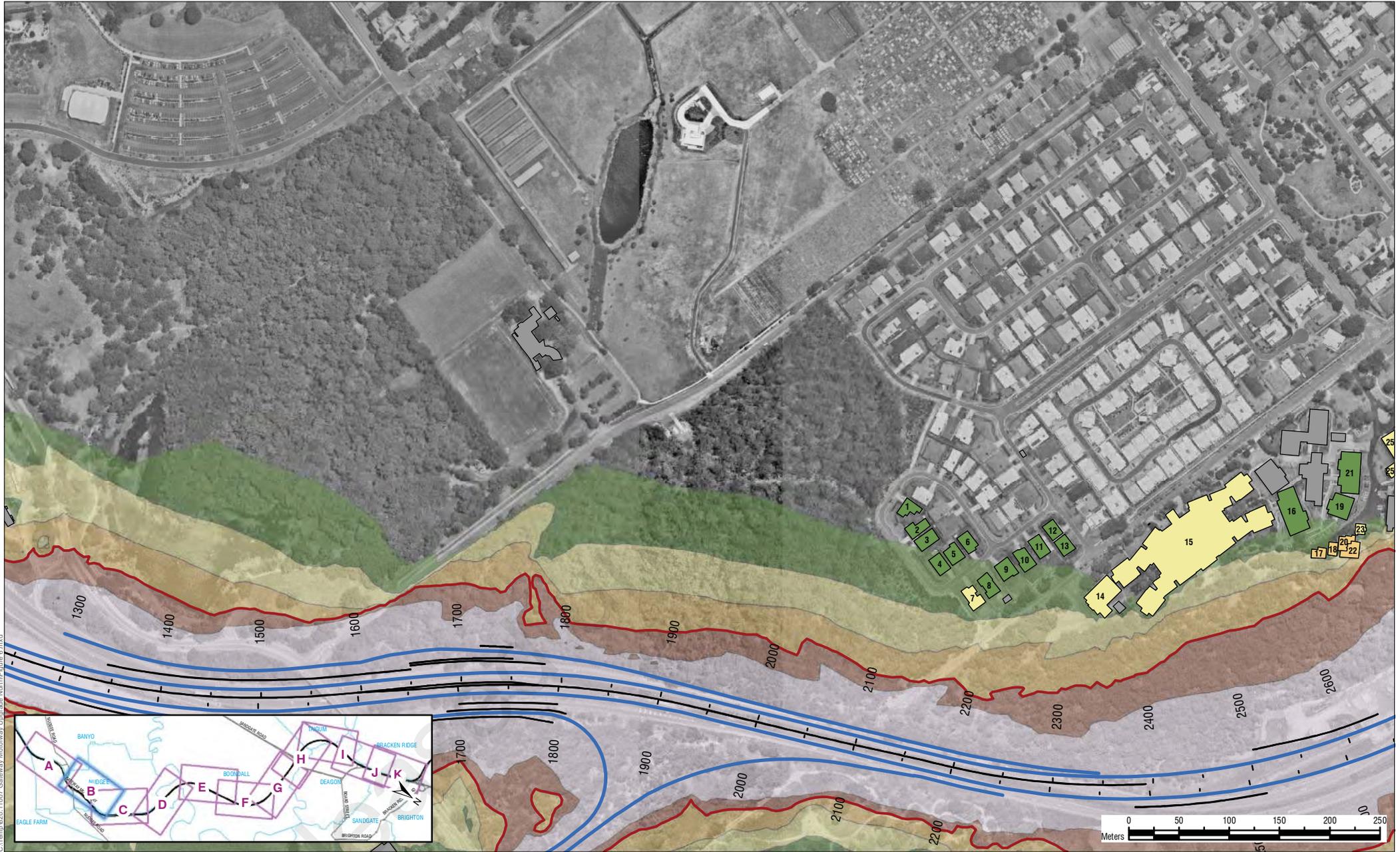
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
2. All noise levels are 27th percentile.

**JACOBS SMEC**  
Jacobs SMEC Design Joint Venture

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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Nudgee Interchange South**

FIGURE 6A - Scenario 2



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 6.mxd

**SLR**

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**LEGEND**

<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey; border:1px solid black;"></span> Predicted $L_{10}(18h)$ Noise Level	<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey; border:1px solid black;"></span> Building - Educational Community or Health
<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen; border:1px solid black;"></span> 64 dBA or Below	<span style="display:inline-block; width:10px; height:10px; background-color:grey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> 65 to 66 dBA	<span style="display:inline-block; width:10px; height:10px; background-color:blue; border:1px solid black;"></span> Proposed Road Source Line
<span style="display:inline-block; width:10px; height:10px; background-color:orange; border:1px solid black;"></span> 67 to 68 dBA	<span style="display:inline-block; width:10px; height:10px; background-color:black; border:1px solid black;"></span> Proposed Crash Barrier
<span style="display:inline-block; width:10px; height:10px; background-color:lightorange; border:1px solid black;"></span> 69 to 70 dBA	<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:10px; height:10px; background-color:lightyellow; border:1px solid black;"></span> Above 70 dBA	<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen; border:1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:10px; height:10px; border:2px solid red;"></span> 68dB Noise Contour	

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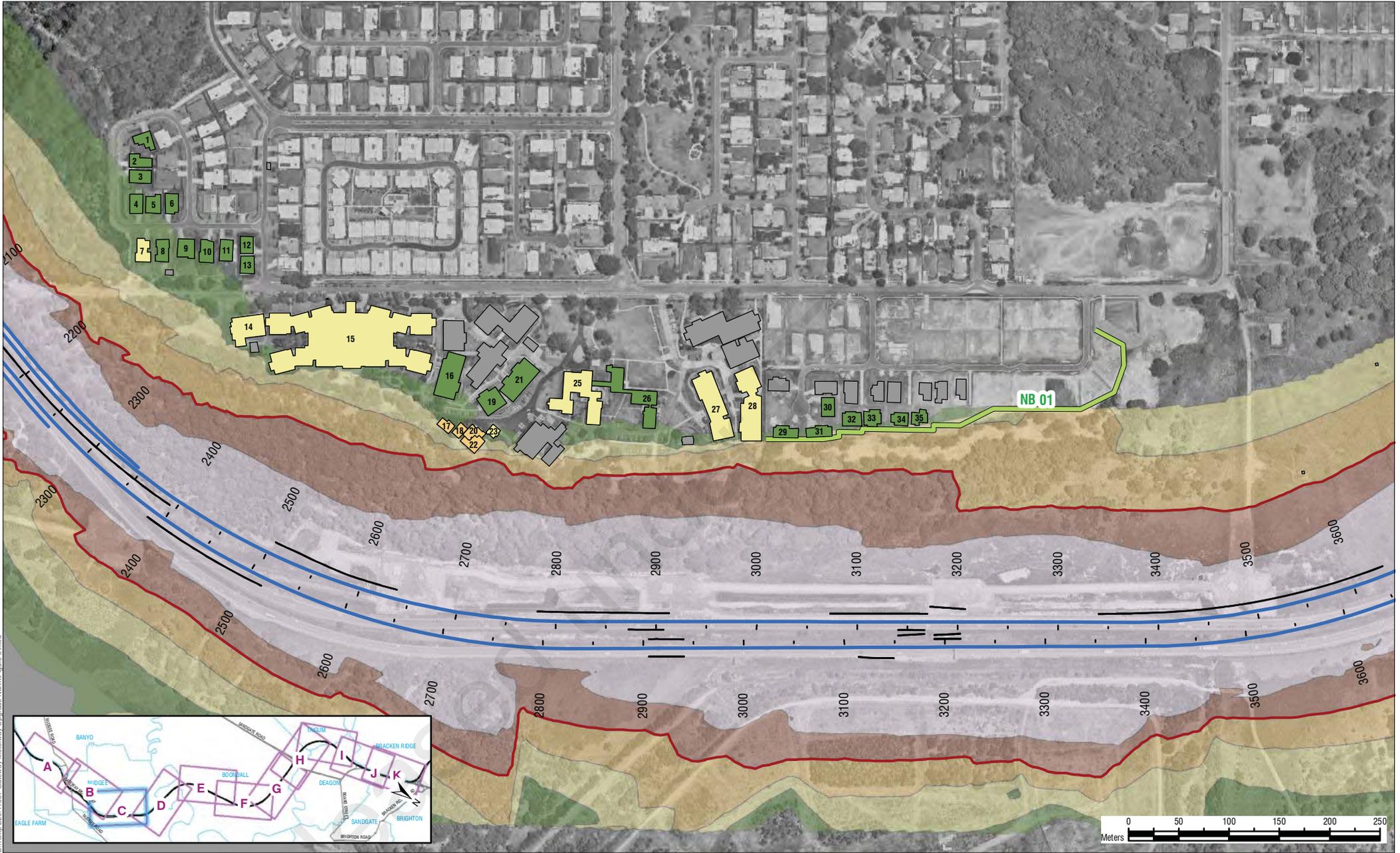


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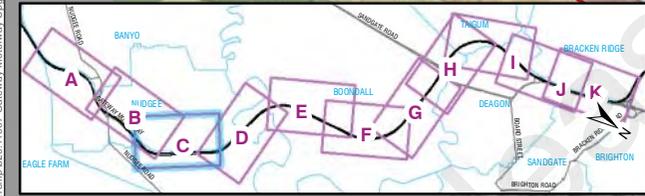
**Gateway Upgrade North**

**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Nudgee Interchange North**

FIGURE 6B - Scenario 2



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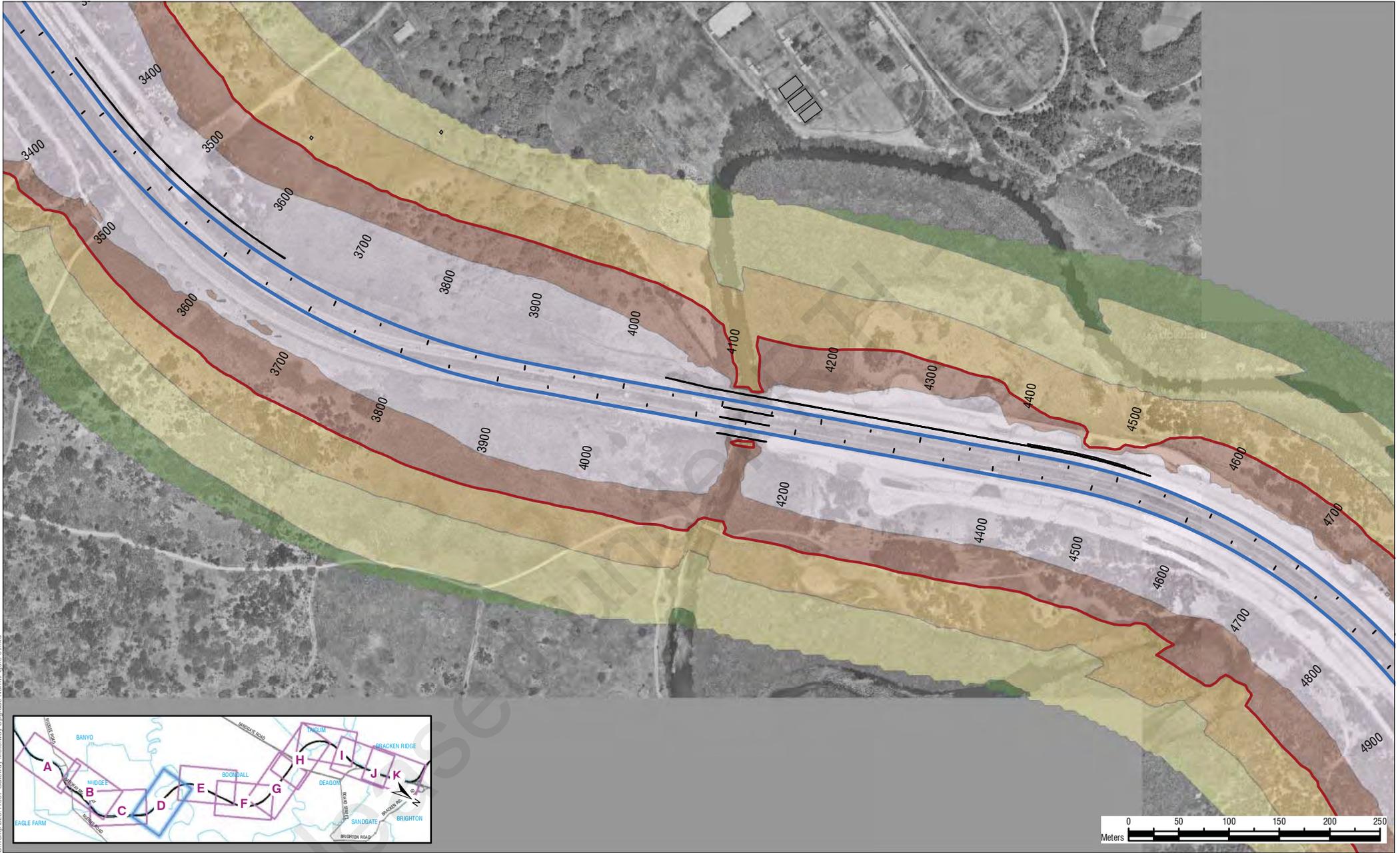
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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

LEGEND	
Predicted L <sub>A10</sub> (18h) Noise Level	
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	Existing Noise Barrier- To be replaced
68dB Noise Contour	Existing Noise Barrier- Not Impacted

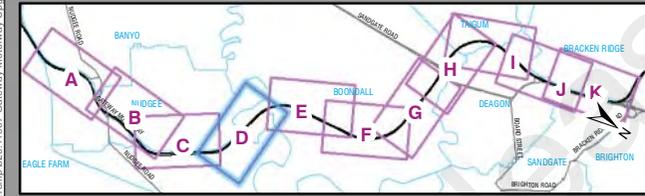
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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers**  
 Nudgee / Mercy Family Services  
 FIGURE 6C - Scenario 2



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:grey; border:1px solid black;"></span> Predicted L <sub>10</sub> (18h) Noise Level	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Educational Community or Health
<span style="display:inline-block; width:15px; height:15px; background-color:darkgreen; border:1px solid black;"></span> 64 dBA or Below	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:15px; height:15px; background-color:yellowgreen; border:1px solid black;"></span> 65 to 66 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span> Proposed Road Source Line
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> 67 to 68 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:black; border:1px solid black;"></span> Proposed Crash Barrier
<span style="display:inline-block; width:15px; height:15px; background-color:lightcoral; border:1px solid black;"></span> 69 to 70 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Above 70 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:15px; height:15px; border:2px solid red;"></span> 68dB Noise Contour	

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All buildings are assumed to be 1.8m high.

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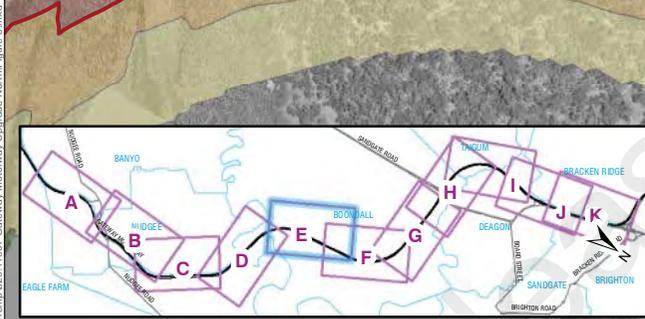
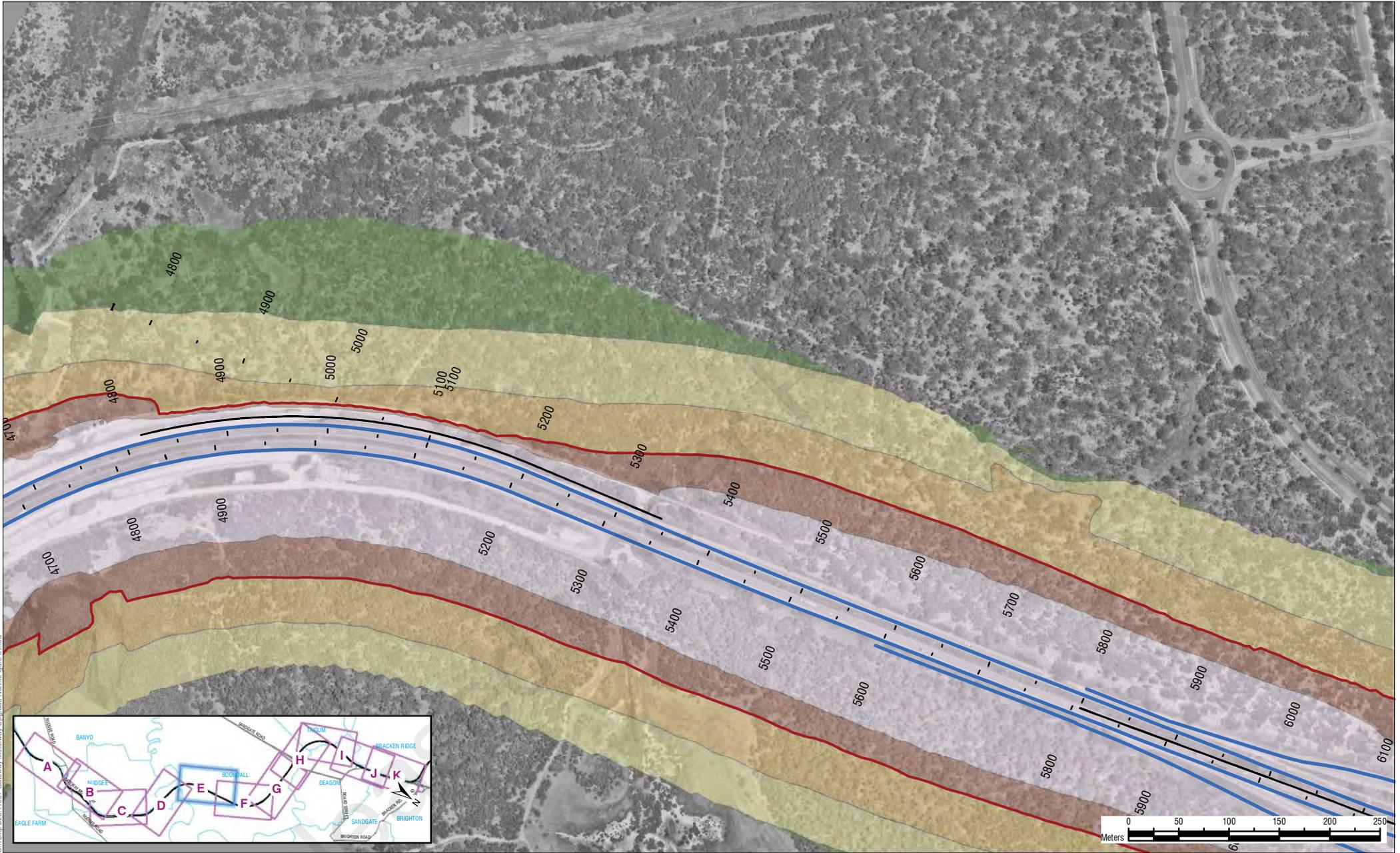


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**Gateway Upgrade North**

**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Nundah Creek**

FIGURE 6D - Scenario 2



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LEGEND	
<b>Predicted L<sub>10</sub>(18h) Noise Level</b>	Building - Educational Community or Health
64 dBA or Below	Building - Not Sensitive / Outside of Study Area
65 to 66 dBA	Proposed Road Source Line
67 to 68 dBA	Proposed Crash Barrier
69 to 70 dBA	Existing Noise Barrier- To be replaced
Above 70 dBA	Existing Noise Barrier- Not Impacted
68dB Noise Contour	

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the worst case scenario.

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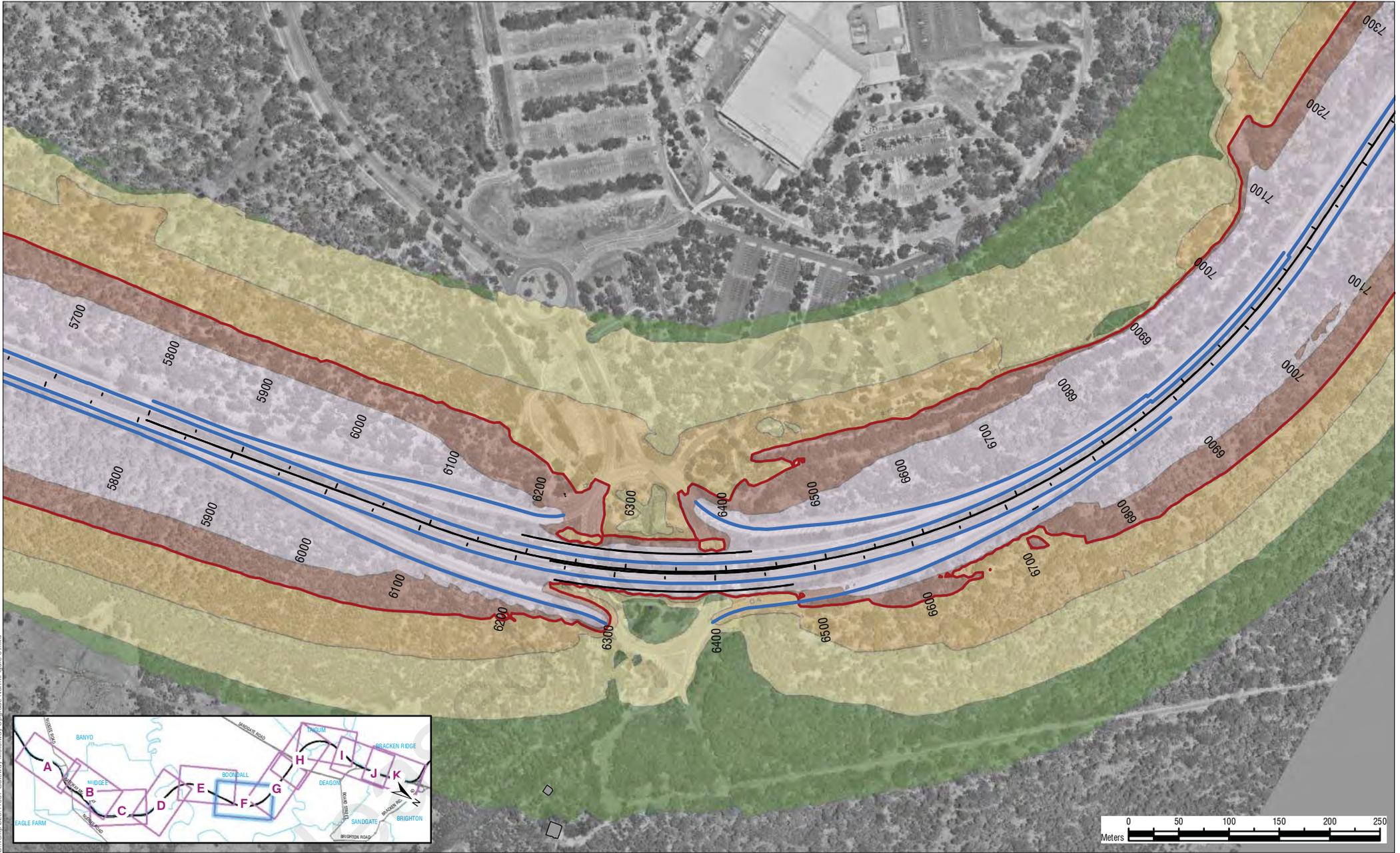
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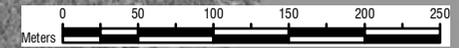
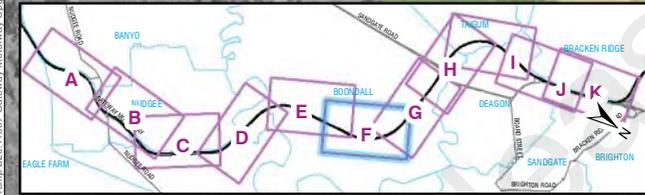
**Gateway Upgrade North**

**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Boondall Wetlands East**

**FIGURE 6E - Scenario 2**



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LEGEND	
Predicted L <sub>10</sub> (18h) Noise Level	
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	Existing Noise Barrier- To be replaced
68dB Noise Contour	Existing Noise Barrier- Not Impacted

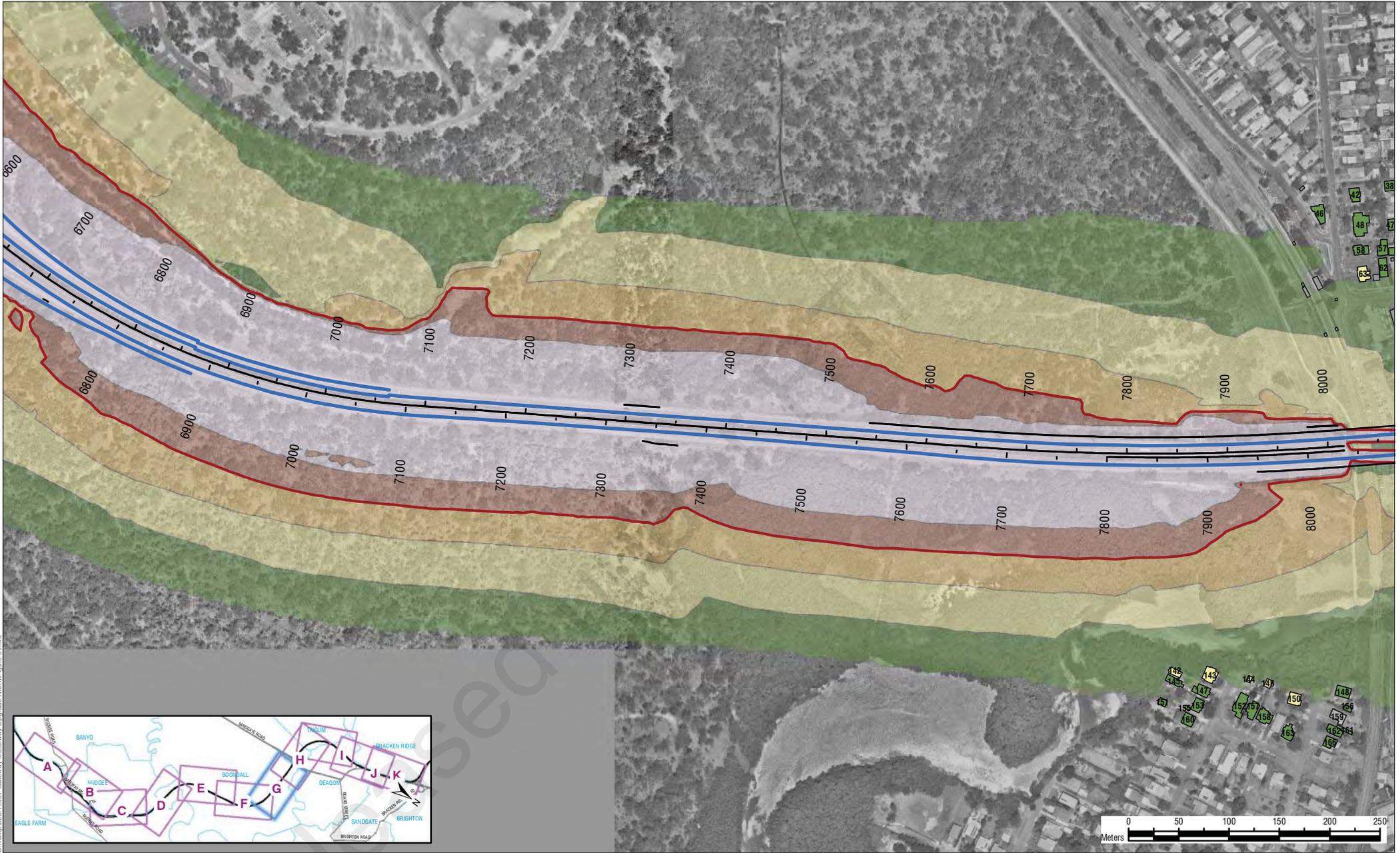
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are predicted at 27°C.

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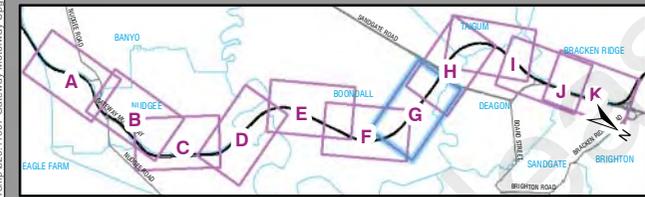
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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Bicentennial Road Interchange**  
 FIGURE 6F - Scenario 2



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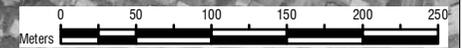
**SLR**  
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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

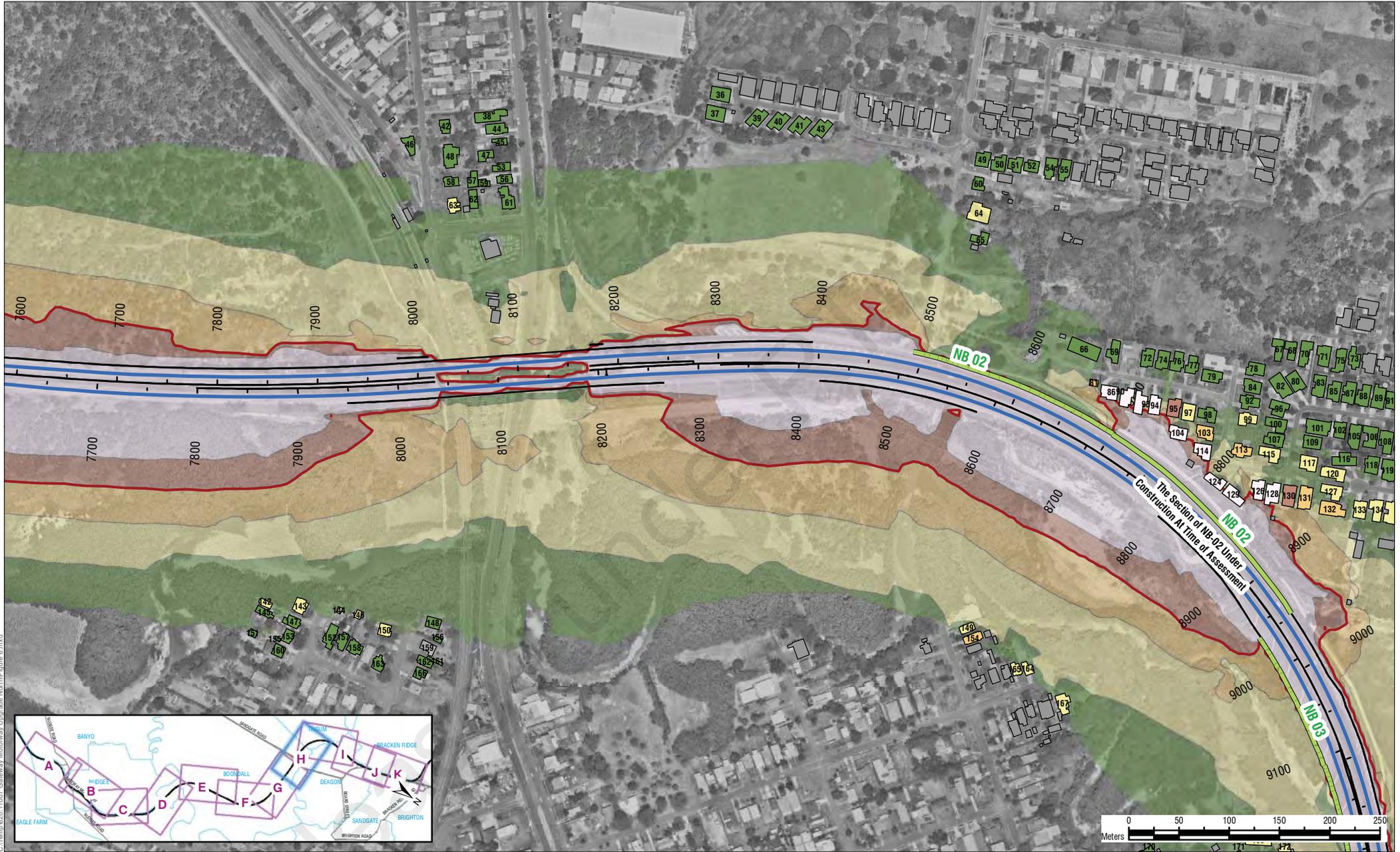
**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | Existing Noise Barrier- To be replaced           |
| Above 70 dBA                                     | Existing Noise Barrier- Not Impacted             |
| 68dB Noise Contour                               |  |

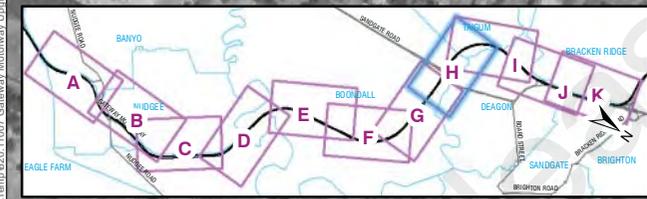
Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the lowest facade, regardless of storey.  
 2. All noise levels are predicted for the worst case scenario.



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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Boondall Wetlands North**  
 FIGURE 6G - Scenario 2



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; border: 1px solid black;"></span> Building - Educational Community or Health	<span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; border: 1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Predicted L <sub>10</sub> (18h) Noise Level 64 dBA or Below	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 65 to 66 dBA
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 67 to 68 dBA	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 69 to 70 dBA
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Above 70 dBA	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 68dB Noise Contour
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Existing Noise Barrier - To be replaced	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Existing Noise Barrier - Not Impacted

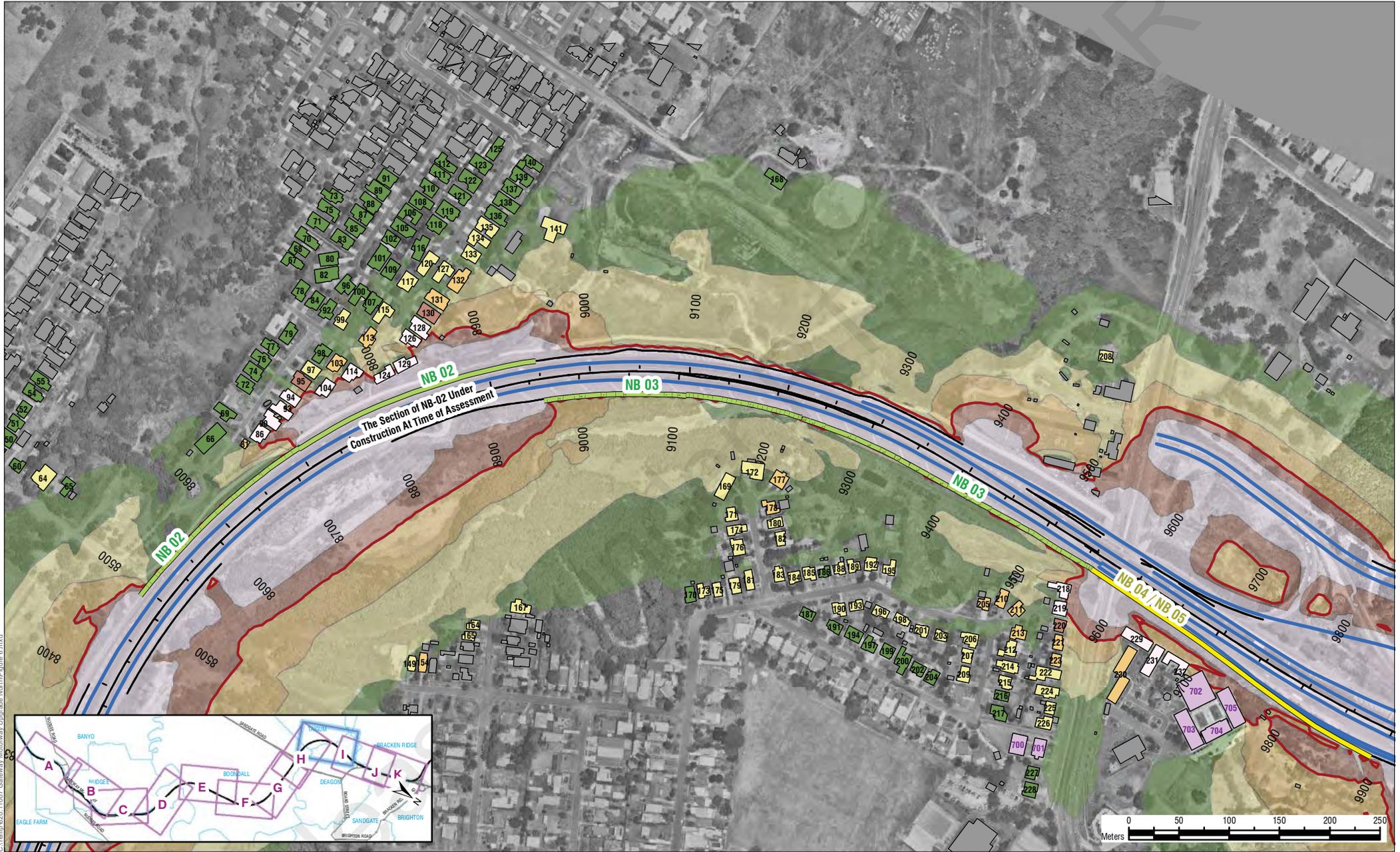
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of story.  
 2. All noise levels are at 27°C.

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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Sandgate Road**  
 FIGURE 6H - Scenario 2



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**LEGEND**

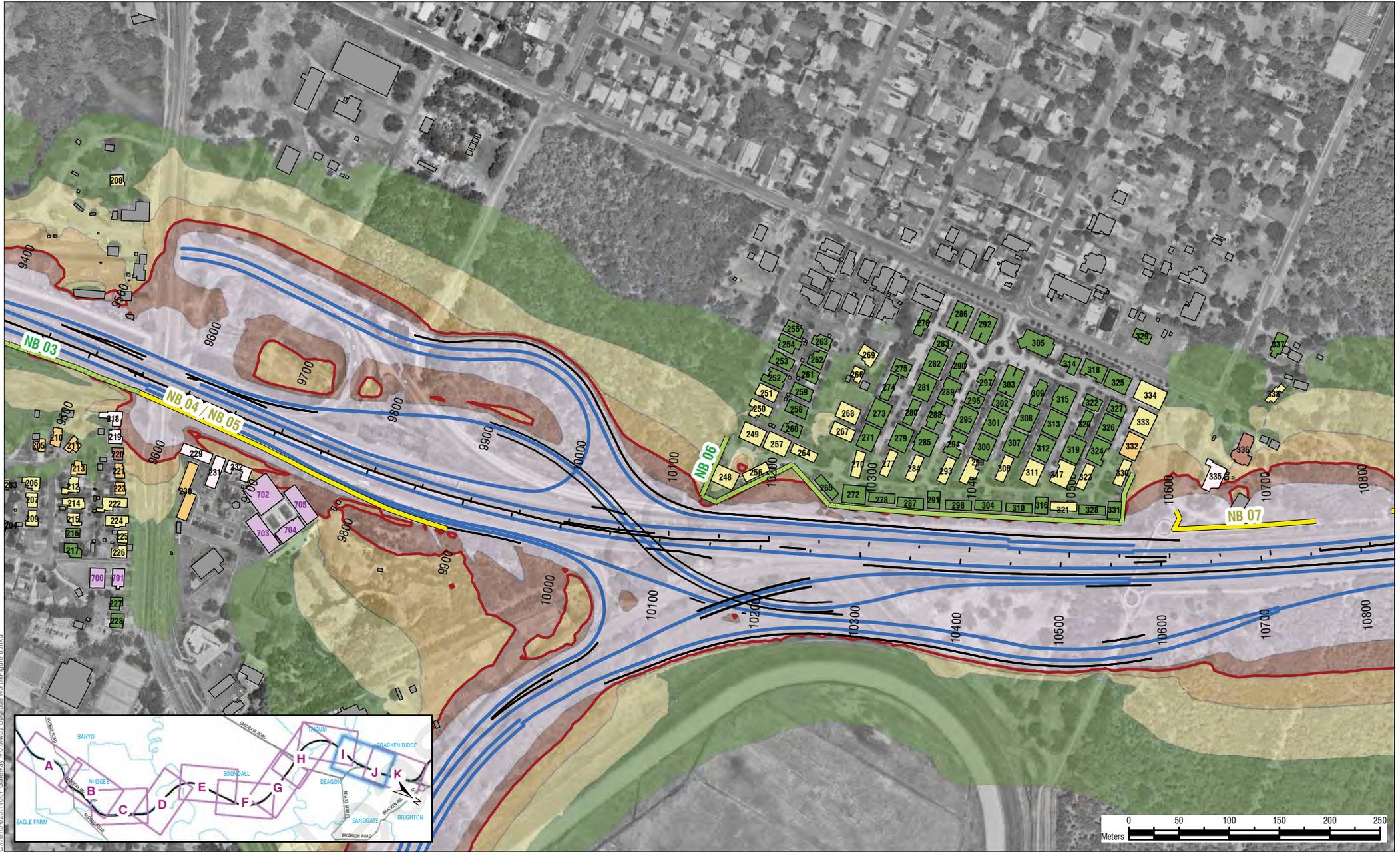
- Predicted L<sub>10</sub>(18h) Noise Level**
- 64 dBA or Below
  - 65 to 66 dBA
  - 67 to 68 dBA
  - 69 to 70 dBA
  - Above 70 dBA
  - 68dB Noise Contour
- Building - Educational Community or Health  
 Building - Not Sensitive / Outside of Study Area  
 Proposed Road Source Line  
 Proposed Crash Barrier  
 Existing Noise Barrier- To be replaced  
 Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All predicted noise levels are based on a 2018 traffic volume.



0 50 100 150 200 250  
 Meters

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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Taigum / Deagon**  
 FIGURE 6I - Scenario 2



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**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | Existing Noise Barrier- To be replaced           |
| Above 70 dBA                                     | Existing Noise Barrier- Not Impacted             |
| 68dB Noise Contour                               |  |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are 27th percentile.

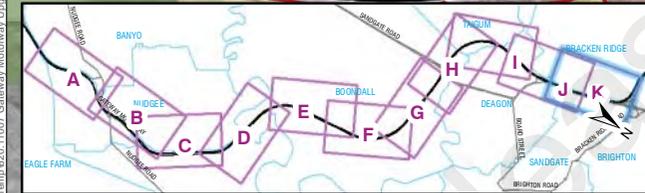
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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Depot Road Interchange**  
 FIGURE 6J - Scenario 2



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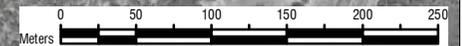
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 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- Predicted L<sub>10</sub>(18h) Noise Level**
- 64 dB or Below
  - 65 to 66 dB
  - 67 to 68 dB
  - 69 to 70 dB
  - Above 70 dB
  - 68dB Noise Contour
- Building - Educational Community or Health
  - Building - Not Sensitive / Outside of Study Area
  - Proposed Road Source Line
  - Proposed Crash Barrier
  - Existing Noise Barrier- To be replaced
  - Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are based on a 70% correction factor.

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**Gateway Upgrade North**  
**Predicted Residential (2018) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Degaon Deviation**  
 FIGURE 6K - Scenario 2



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Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

**LEGEND**

- Predicted L<sub>10</sub>(1h) Noise Level**
- 61 dBA or Below
  - 62 to 63 dBA
  - 64 to 65 dBA
  - 66 to 67 dBA
  - Above 67 dBA
  - 65dB Noise Contour
- Building - Residential
  - Building - Educational Community or Health
  - Building - Not Sensitive / Outside of Study Area
  - Proposed Road Source Line
  - Proposed Crash Barrier
  - Existing Noise Barrier - Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise contours are based on the current scenario.

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**Gateway Upgrade North**

**Community (Buildings) Predicted 2018 Facade Corrected Noise Levels, Proposed Motorway Alignment and Preserved Noise Barriers Seventh Day Adventist Church**

FIGURE 7A - Scenario 2



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 7B.mxd

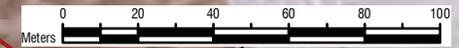
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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(12h) Noise Level</b> | Building - Residential                           |
| 58 to 59 dBA                                     | Building - Not Sensitive / Outside of Study Area |
| 60 to 61 dBA                                     | Proposed Road Source Line                        |
| 62 to 63 dBA                                     | Proposed Crash Barrier                           |
| 64 to 65 dBA                                     | Existing Noise Barrier - Not Impacted            |
| Above 65 dBA                                     |  |
| 63dB Noise Contour                               |  |
- Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All noise levels are free-field.

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**Gateway Upgrade North**  
**Passive Recreational (Outdoor) Predicted 2018**  
**Free Field Noise Levels, Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Evergreen Taoist Church**  
 FIGURE 7B - Scenario 2



G:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 7C.mxd


 Level 2, 15 ASTOR TERRACE  
 SPRING HILL  
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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

**Predicted L<sub>10</sub> (1h) Noise Level**

- 61 dBA or Below
- 62 to 63 dBA
- 64 to 65 dBA
- 66 to 67 dBA
- Above 67 dBA
- 65dB Noise Contour

- Building - Residential
- Building - Not Sensitive / Outside of Study Area
- Proposed Road Source Line
- Proposed Crash Barrier
- Existing Noise Barrier - To be replaced
- Existing Noise Barrier - Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are in dB(A) unless otherwise stated.

  
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Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted 2018 Facade Corrected Noise Levels**  
**(Educational - Buildings), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**St John Fisher College**  
 FIGURE 7C - Scenario 2



G:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 7D.mxd


 Level 2, 15 ASTOR TERRACE  
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Project No.: 620.11007.00200  
 Date: 29-Jun-2016  
 Drawn by: N/R  
 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- |   |  |
|---|--|
| <b>Predicted L<sub>A10</sub>(12h) Noise Level</b> | Building - Residential                           |
| 58 to 59 dBA                                      | Building - Educational Community or Health       |
| 60 to 61 dBA                                      | Building - Not Sensitive / Outside of Study Area |
| 62 to 63 dBA                                      | Proposed Road Source Line                        |
| 64 to 65 dBA                                      | Proposed Crash Barrier                           |
| Above 65 dBA                                      | Existing Noise Barrier - To be replaced          |
| 63dBA Noise Contour                               | Existing Noise Barrier - Not Impacted            |

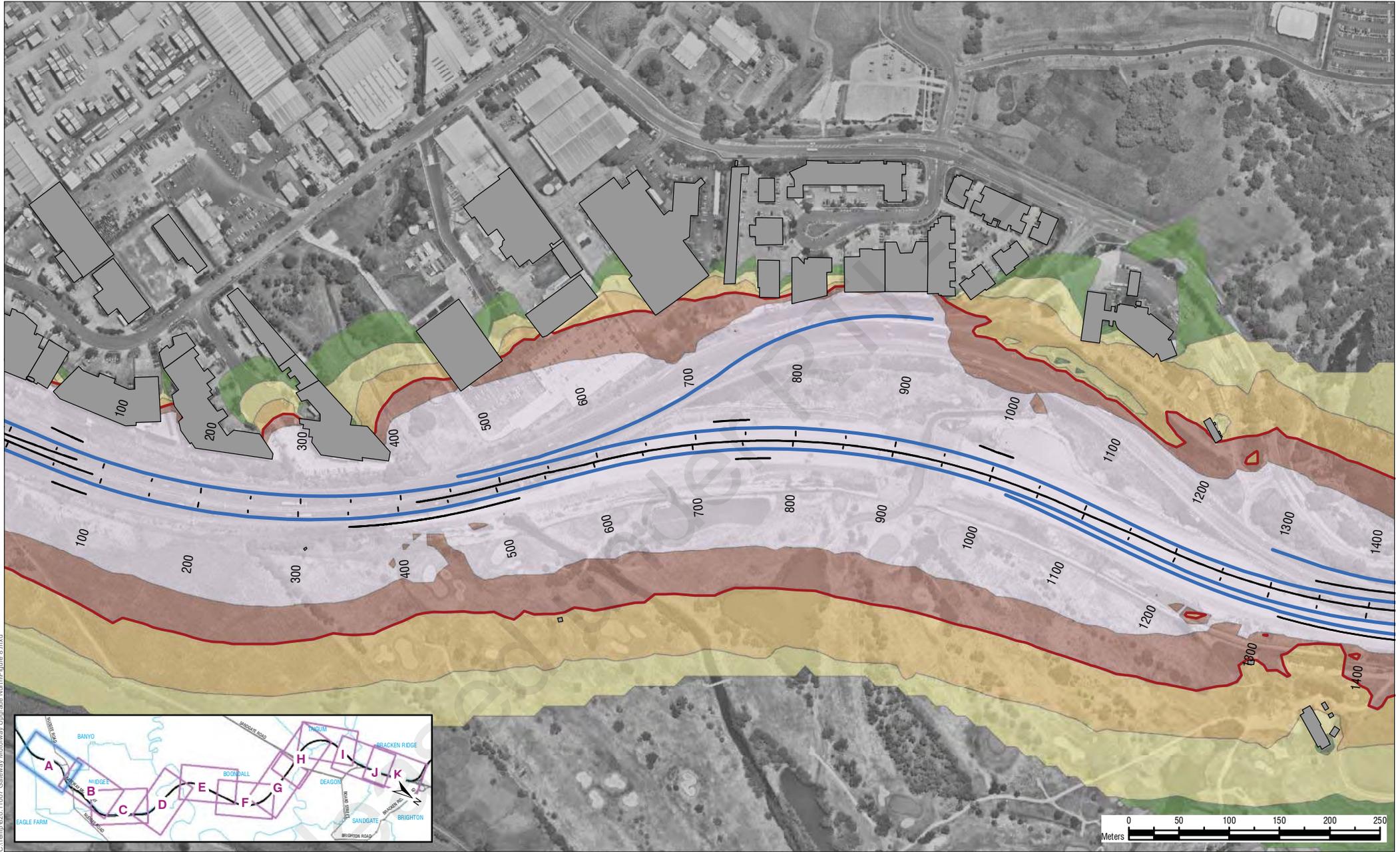
Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All noise levels are free-field.

  
 Jacobs SMEC Design Joint Venture

  
 Queensland Government



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted 2018 Free Field Noise Levels (Educational - Outdoor), Proposed Motorway Alignment and Preserved Noise Barriers**  
**St John Fisher College**  
 FIGURE 7D - Scenario 2



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 8.mxd

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**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:grey; border:1px solid black;"></span> Predicted $L_{10}(18h)$ Noise Level	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Educational Community or Health
<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> 64 dBA or Below	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> 65 to 66 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span> Proposed Road Source Line
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> 67 to 68 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:black; border:1px solid black;"></span> Proposed Crash Barrier
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> 69 to 70 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Above 70 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:green; border:1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:15px; height:15px; border:2px solid red;"></span> 68dB Noise Contour	

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are 20% cumulative.

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 Jacobs SMEC Design Joint Venture

**Queensland Government**

Jacobs SMEC Design Joint Venture

**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Nudgee Interchange South**

FIGURE 8A - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 8.mxd

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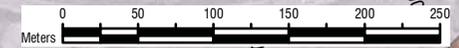
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 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey;"></span>	Building - Educational Community or Health
<span style="display:inline-block; width:10px; height:10px; background-color:grey;"></span>	Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:10px; height:10px; background-color:yellow;"></span>	Proposed Road Source Line
<span style="display:inline-block; width:10px; height:10px; border-bottom:2px solid blue;"></span>	Proposed Crash Barrier
<span style="display:inline-block; width:10px; height:10px; background-color:orange;"></span>	Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen;"></span>	Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey;"></span>	Above 70 dBA
<span style="display:inline-block; width:10px; height:10px; border:2px solid red;"></span>	68dB Noise Contour

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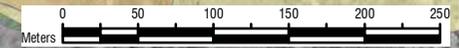
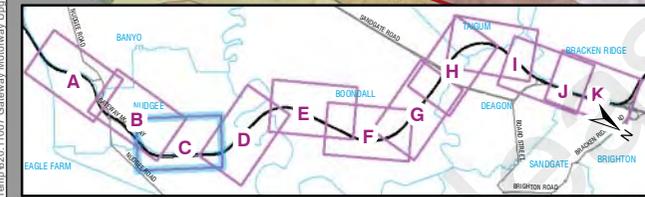
**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Nudgee Interchange North**  
 FIGURE 8B - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 8.mxd



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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

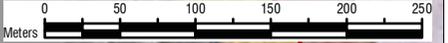
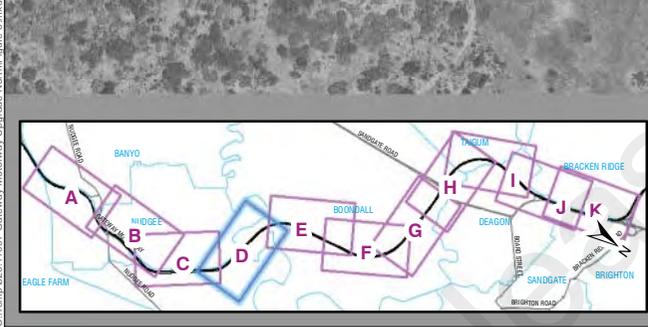
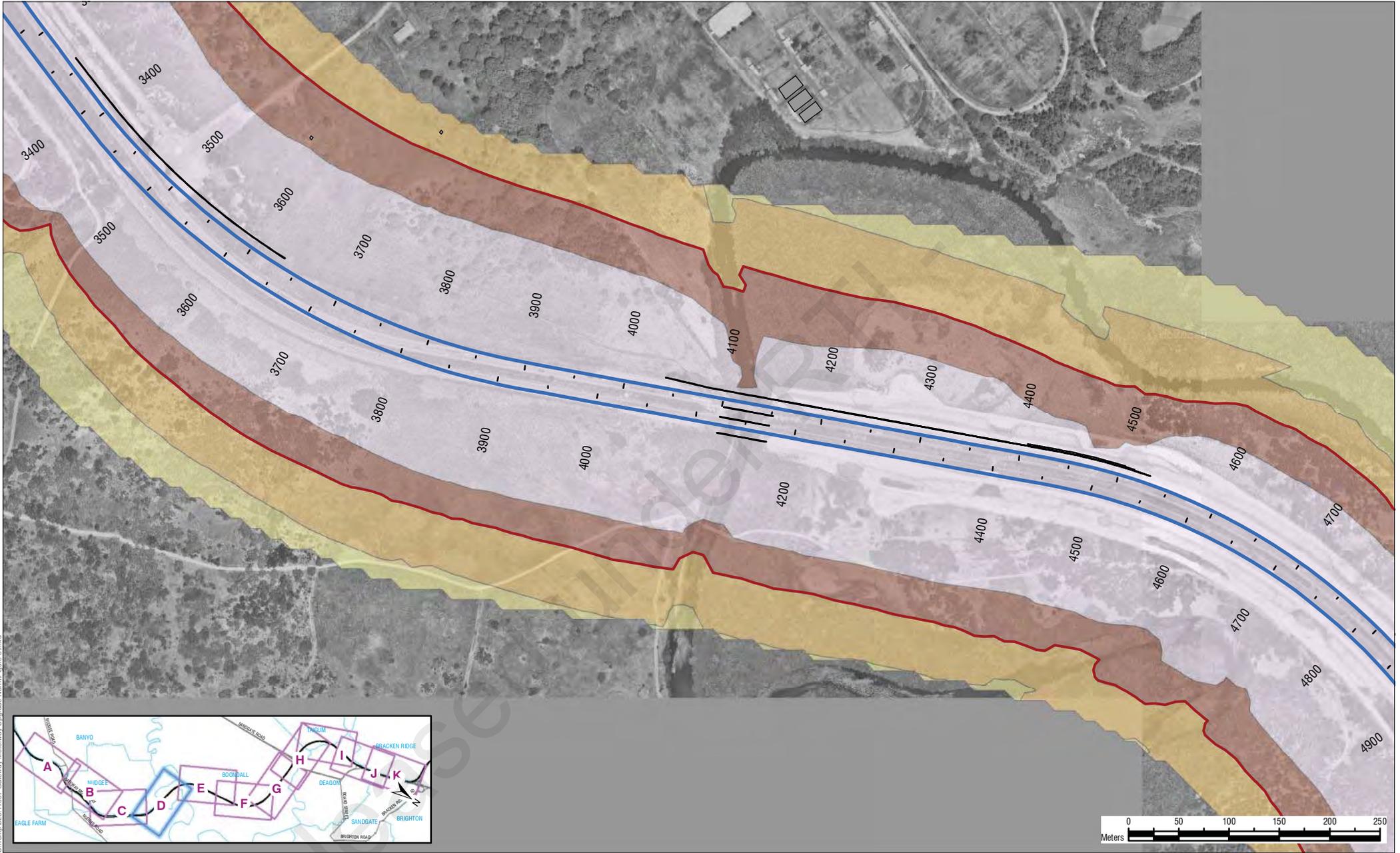
<b>Predicted L<sub>10</sub>(18h) Noise Level</b>	Building - Educational Community or Health
64 dBA or Below	Building - Not Sensitive / Outside of Study Area
65 to 66 dBA	Proposed Road Source Line
67 to 68 dBA	Proposed Crash Barrier
69 to 70 dBA	Existing Noise Barrier- To be replaced
Above 70 dBA	Existing Noise Barrier- Not Impacted
68dB Noise Contour	

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the worst case scenario.

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**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers**  
 Nudgee / Mercy Family Services  
 FIGURE 8C - Scenario 3



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**LEGEND**

Predicted L <sub>10</sub> (18h) Noise Level	Symbol
64 dBA or Below	Lightest green shaded area
65 to 66 dBA	Light green shaded area
67 to 68 dBA	Yellow-green shaded area
69 to 70 dBA	Yellow shaded area
Above 70 dBA	Orange shaded area
68dB Noise Contour	Red dashed line

Building - Educational Community or Health	Light purple shaded area
Building - Not Sensitive / Outside of Study Area	Dark purple shaded area
Proposed Road Source Line	Blue dashed line
Proposed Crash Barrier	Black dashed line
Existing Noise Barrier- To be replaced	Yellow dashed line
Existing Noise Barrier- Not Impacted	Green dashed line

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the year 2028.

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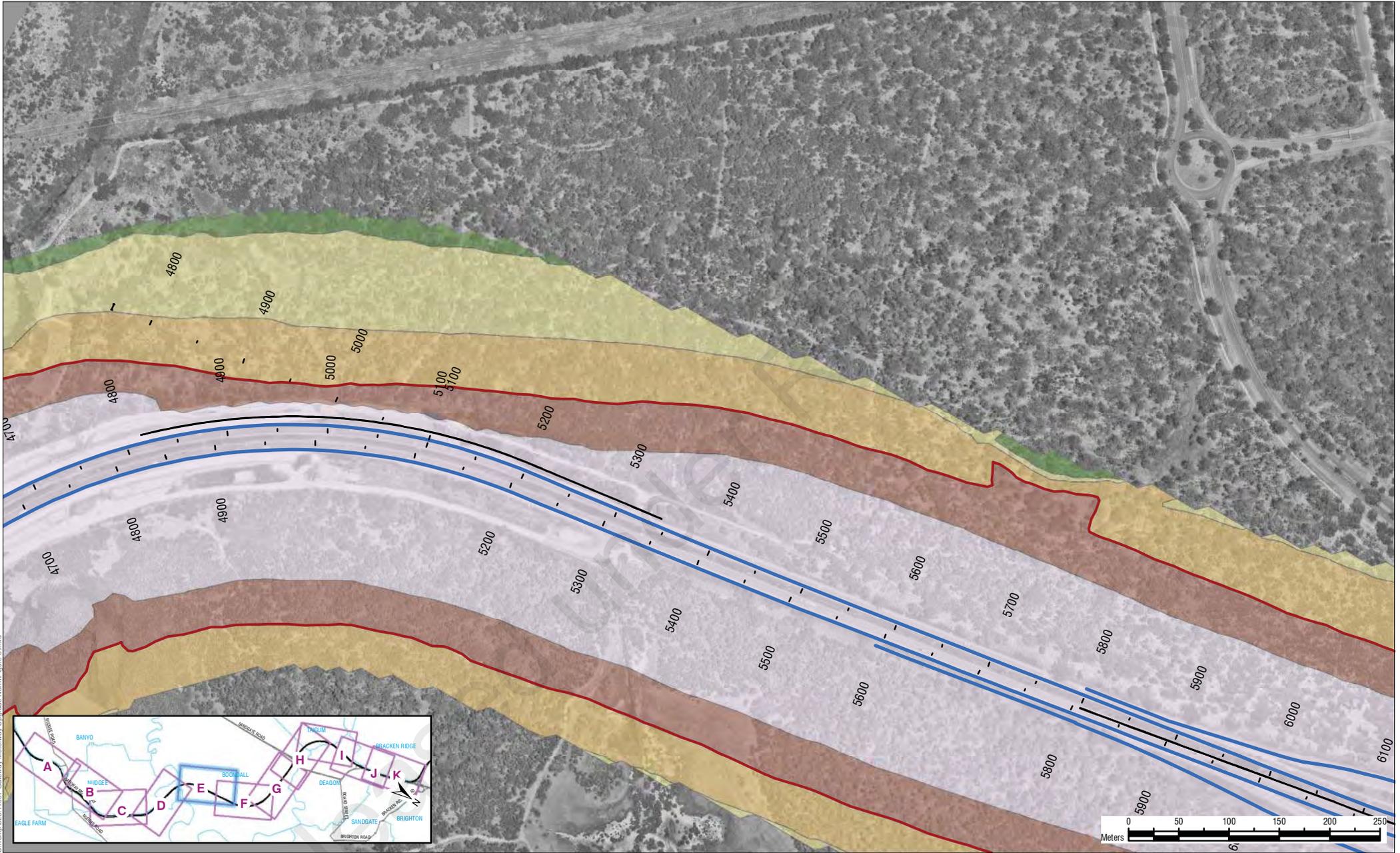


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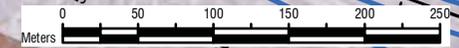
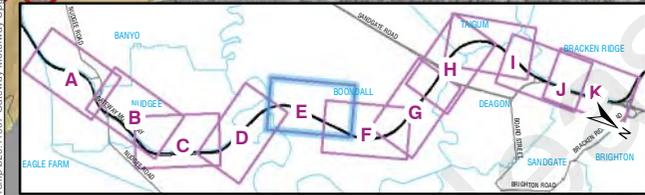
**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Nundah Creek**

FIGURE 8D - Scenario 3



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Educational Community or Health	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span> Predicted L <sub>10(18h)</sub> Noise Level	<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span> 64 dB(A) or Below
<span style="display:inline-block; width:15px; height:15px; background-color:orange;"></span> 65 to 66 dB(A)	<span style="display:inline-block; width:15px; height:15px; background-color:orange;"></span> 67 to 68 dB(A)
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue;"></span> 69 to 70 dB(A)	<span style="display:inline-block; width:15px; height:15px; background-color:lightblue;"></span> Above 70 dB(A)
<span style="display:inline-block; width:15px; height:15px; border:2px solid red;"></span> 68dB Noise Contour	

**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture

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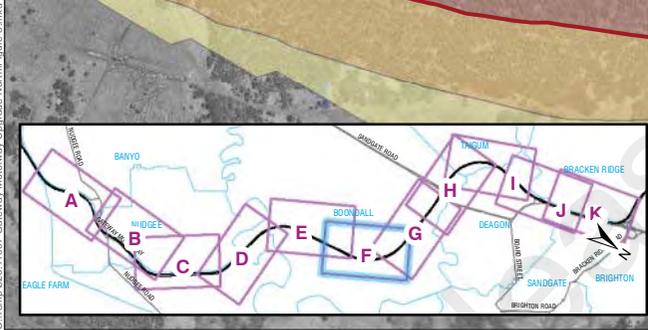
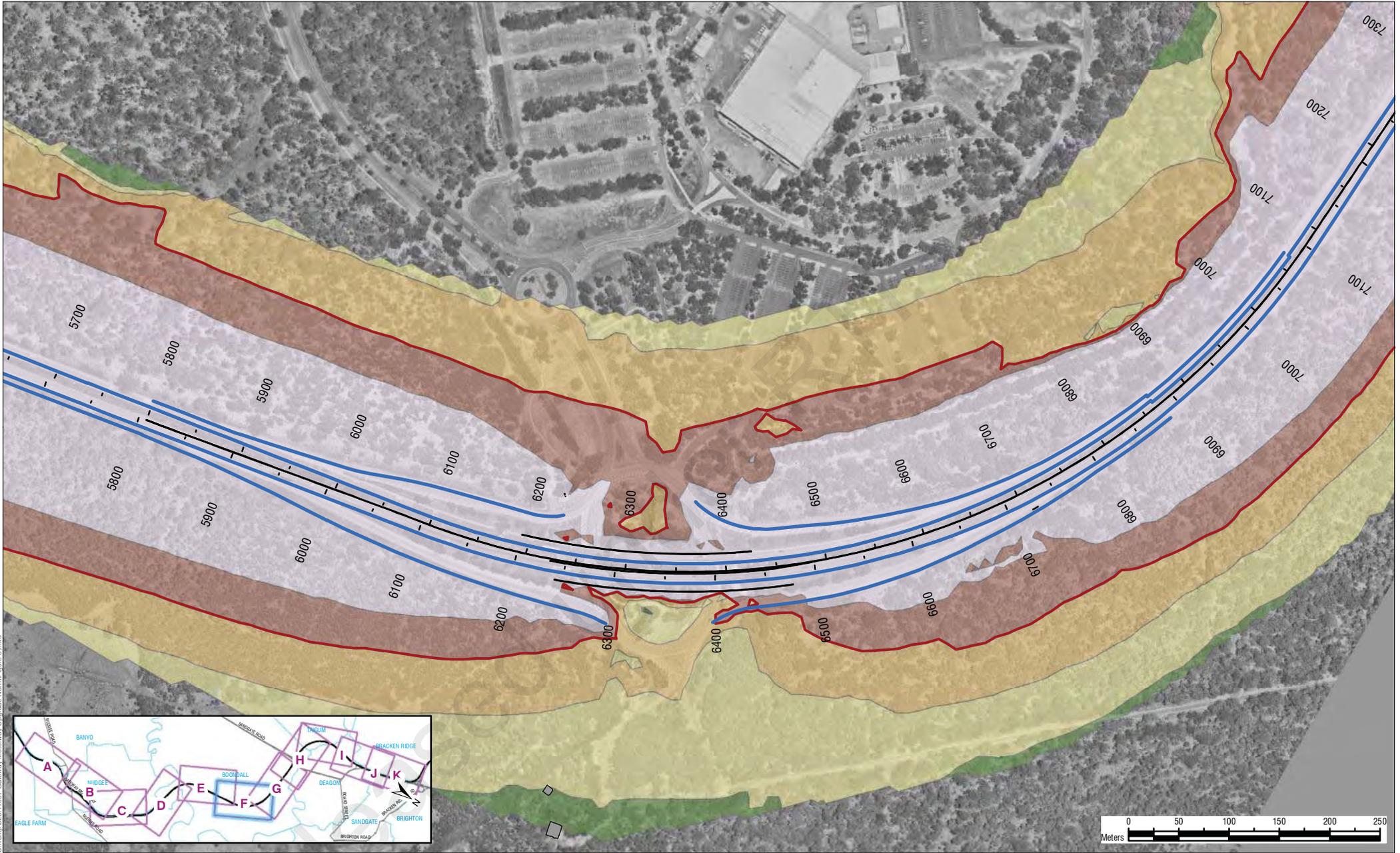


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**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Boondall Wetlands East**

FIGURE 8E - Scenario 3



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 Drawn by: [Redacted]  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

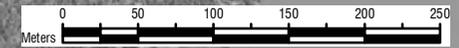
**LEGEND**

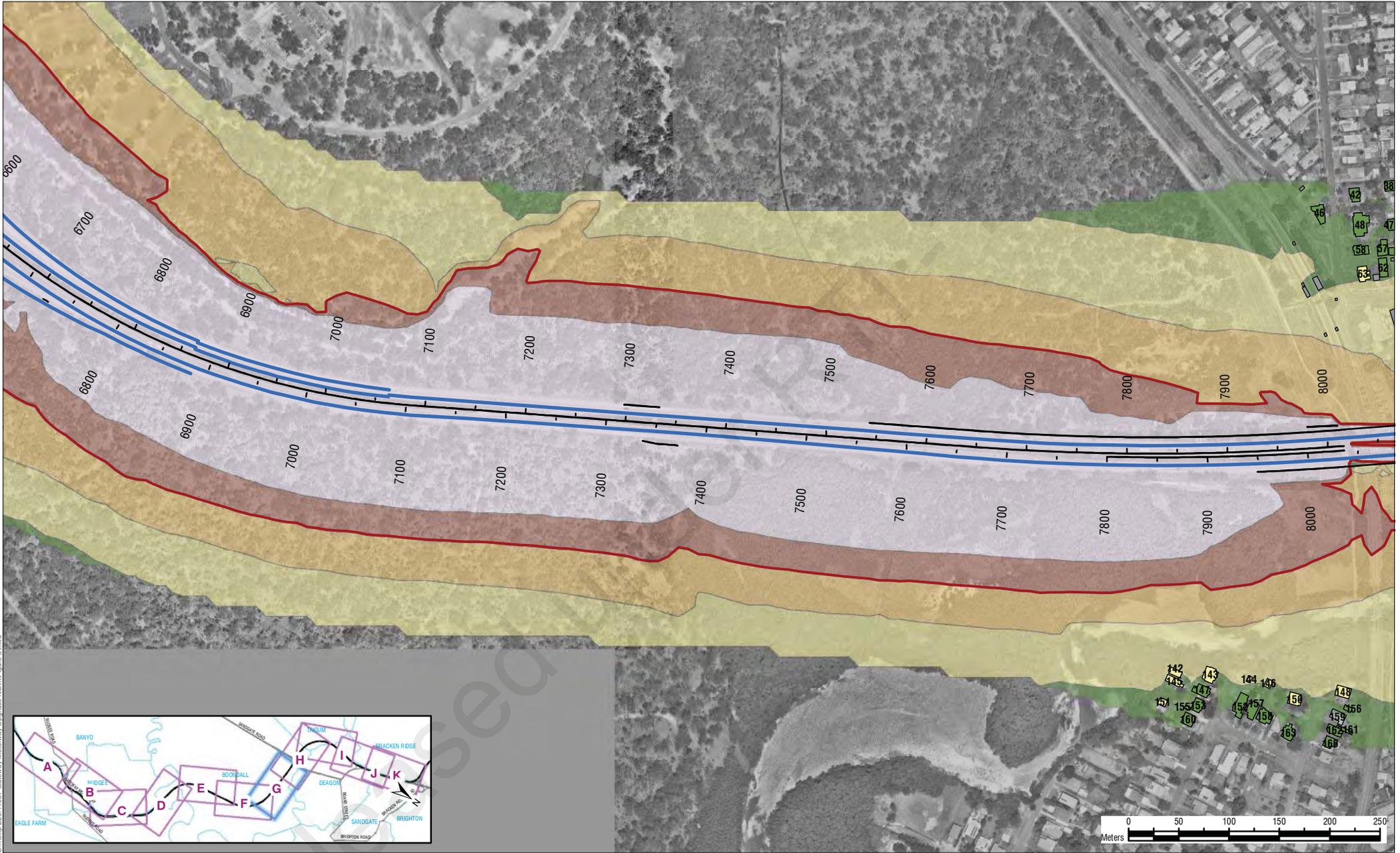
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	Existing Noise Barrier- To be replaced
68dB Noise Contour	Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the worst case scenario.

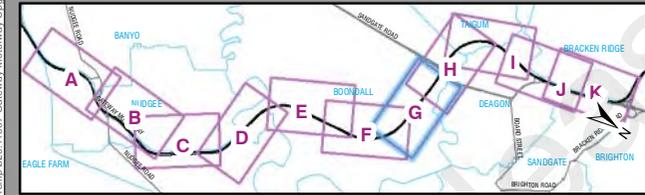
**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture

Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Bicentennial Road Interchange**  
 FIGURE 8F - Scenario 3





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 Projection: GDA 1994 MGA Zone 56

**LEGEND**  
**Predicted L<sub>10</sub>(18h) Noise Level**  
 64 dBA or Below  
 65 to 66 dBA  
 67 to 68 dBA  
 69 to 70 dBA  
 Above 70 dBA  
 68dB Noise Contour

Building - Educational Community or Health  
 Building - Not Sensitive / Outside of Study Area  
 Proposed Road Source Line  
 Proposed Crash Barrier  
 Existing Noise Barrier- To be replaced  
 Existing Noise Barrier- Not Impacted

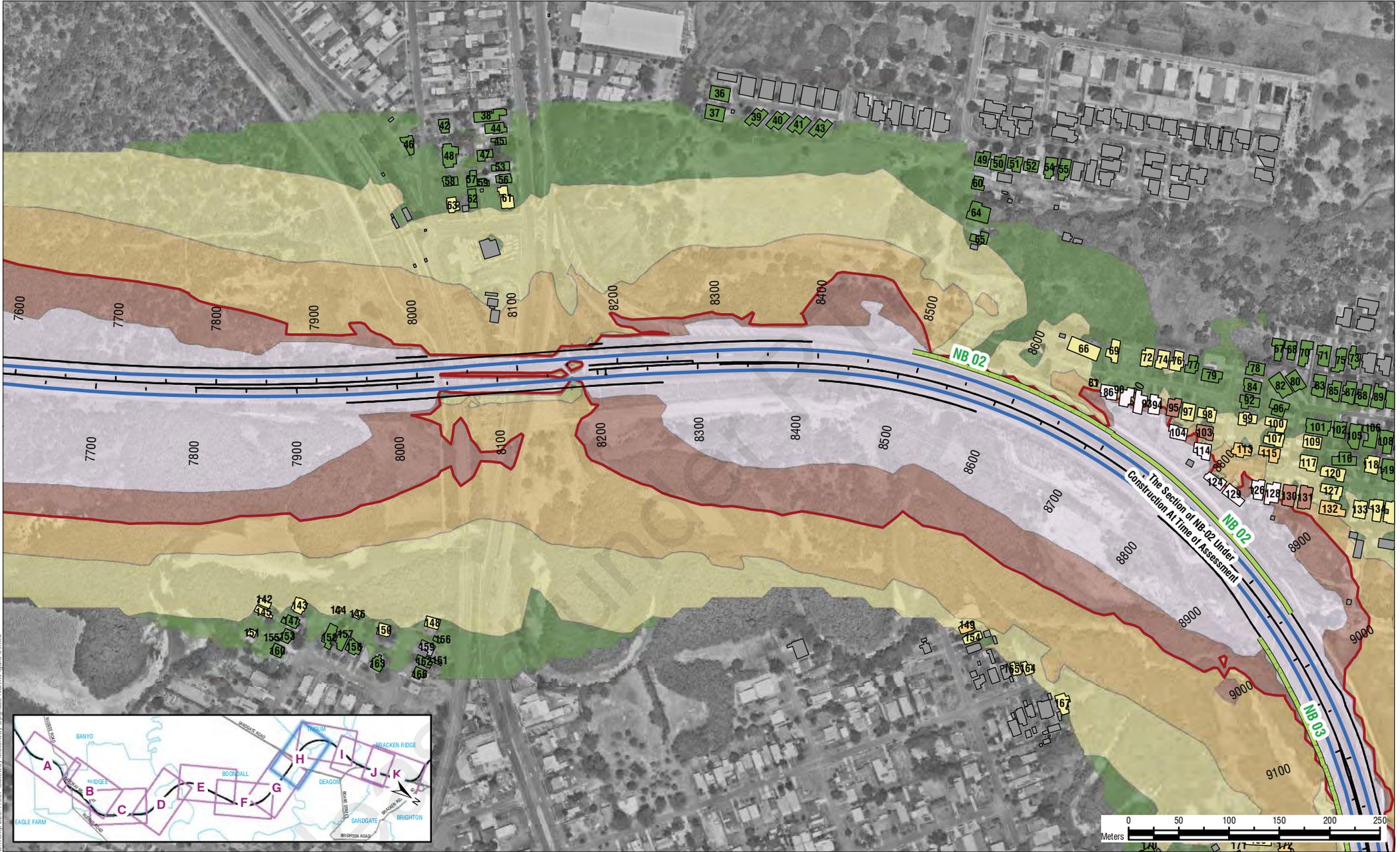
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the worst case scenario.

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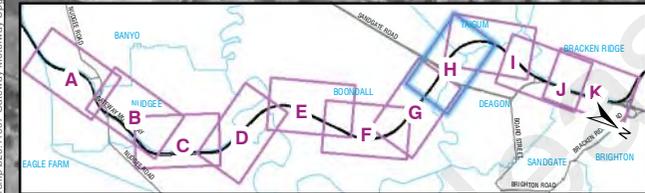


0 50 100 150 200 250  
 Meters

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**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Boondall Wetlands North**  
 FIGURE 8G - Scenario 3



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 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

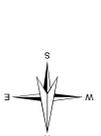
**LEGEND**

<span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; border: 1px solid black;"></span> Building - Educational Community or Health	<span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; border: 1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Predicted L <sub>10</sub> (18h) Noise Level 64 dBA or Below	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 65 to 66 dBA
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 67 to 68 dBA	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 69 to 70 dBA
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Above 70 dBA	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> 68dB Noise Contour
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Existing Noise Barrier- To be replaced	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Proposed Road Source Line	<span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; border: 1px solid black;"></span> Proposed Crash Barrier

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 3. All buildings are assumed to be 2.7m wide.

**JACOBS** **SMEC**  
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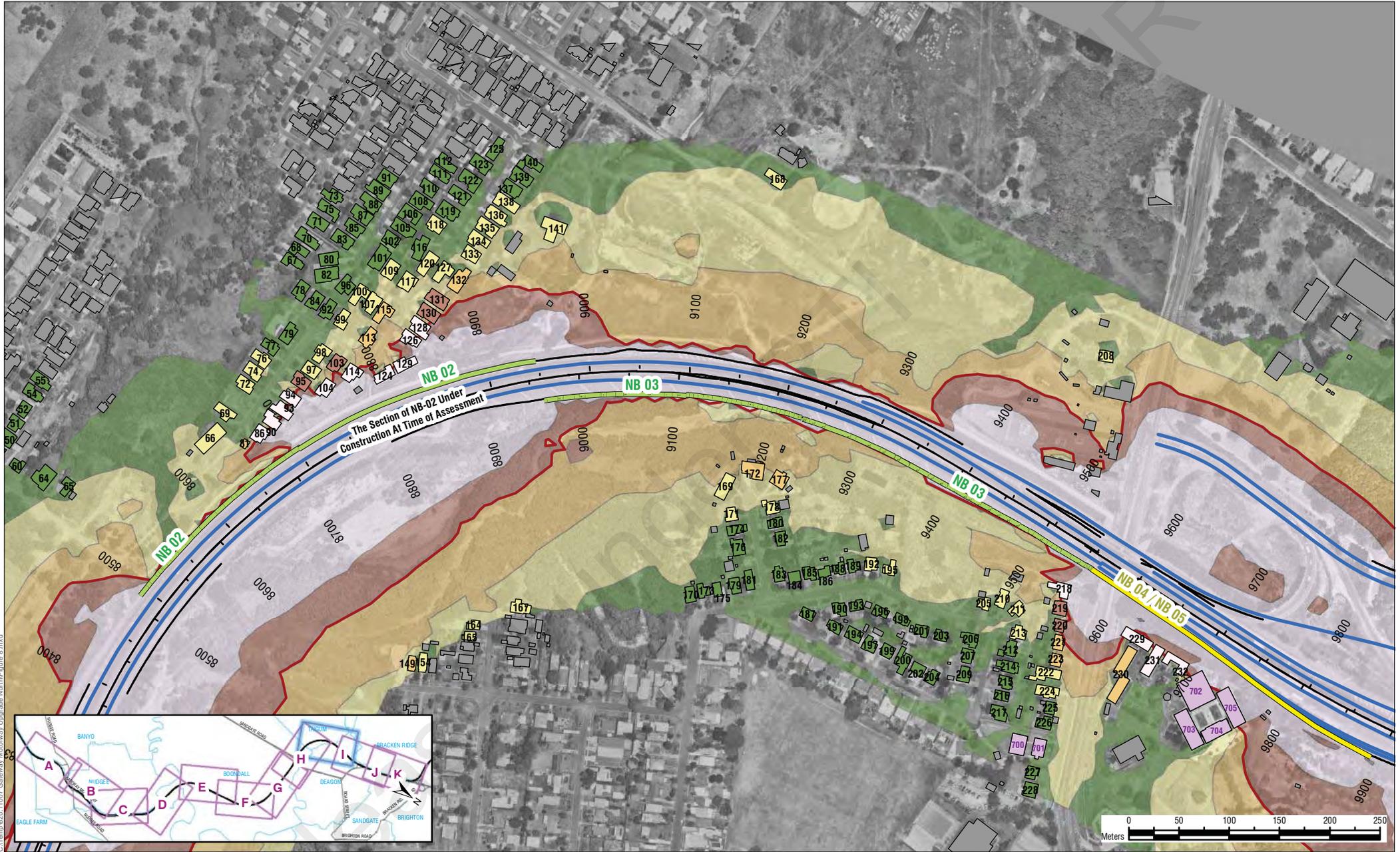


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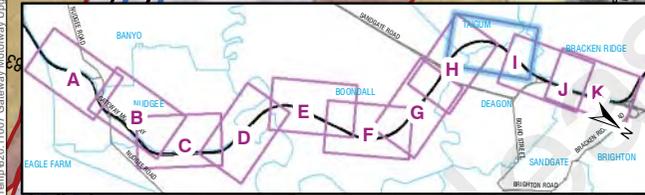
**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Sandgate Road**

FIGURE 8H - Scenario 3



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**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | Existing Noise Barrier- To be replaced           |
| Above 70 dBA                                     | Existing Noise Barrier- Not Impacted             |
| 68dB Noise Contour                               |  |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for a 2028 scenario.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



0 50 100 150 200 250  
 Meters

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**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Taigum / Deagon**  
 FIGURE 8I - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 8.mxd

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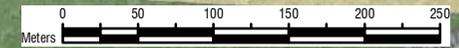
Project No.:	620.11007.00200
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Scale:	1:5,000
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Projection:	GDA 1994 MGA Zone 56

**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dB(A) or Below                                | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dB(A)                                   | Proposed Road Source Line                        |
| 67 to 68 dB(A)                                   | Proposed Crash Barrier                           |
| 69 to 70 dB(A)                                   | Existing Noise Barrier- To be replaced           |
| Above 70 dB(A)                                   | Existing Noise Barrier- Not Impacted             |
| 68dB Noise Contour                               |  |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are predicted for the year 2028.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Depot Road Interchange**  
 FIGURE 8J - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 8.mxd

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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:grey; border:1px solid black;"></span> Building - Educational Community or Health	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> Predicted L <sub>10</sub> (18h) Noise Level	<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> 64 dB(A) or Below
<span style="display:inline-block; width:15px; height:15px; background-color:lightyellow; border:1px solid black;"></span> 65 to 66 dB(A)	<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> 67 to 68 dB(A)
<span style="display:inline-block; width:15px; height:15px; background-color:lightorange; border:1px solid black;"></span> 69 to 70 dB(A)	<span style="display:inline-block; width:15px; height:15px; background-color:lightred; border:1px solid black;"></span> Above 70 dB(A)
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Proposed Road Source Line	<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> Proposed Crash Barrier	<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> 68dB Noise Contour	

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**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Motorway Alignment and Preserved Noise Barriers Degaon Deviation**

FIGURE 8K - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 9A.mxd


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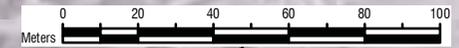
Project No.: 620.11007.00200  
 Date: 15-Aug-2016  
 Drawn by: N/R  
 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- |   |  |
|---|--|
| <b>Predicted L<sub>10</sub>(1h) Noise Level</b> | Building - Residential                           |
| 61 dBA or Below                                 | Building - Educational Community or Health       |
| 62 to 63 dBA                                    | Building - Not Sensitive / Outside of Study Area |
| 64 to 65 dBA                                    | Proposed Road Source Line                        |
| 66 to 67 dBA                                    | Proposed Crash Barrier                           |
| Above 67 dBA                                    | Existing Noise Barrier- Not Impacted             |
| 65dB Noise Contour                              |  |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise contours are based on current conditions.


  
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**Gateway Upgrade North**  
**Community (Buildings) Predicted 2028 Facade Corrected Noise Levels, Proposed Motorway Alignment and Preserved Noise Barriers Seventh Day Adventist Church**  
 FIGURE 9A - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 9B.mxd


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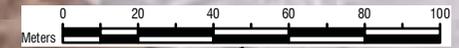
Project No.: 620.11007.00200  
 Date: 15-Aug-2016  
 Drawn by: N/R  
 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10(12h)</sub> Noise Level</b> | Building - Residential                           |
| 58 to 59 dBA                                     | Building - Educational Community or Health       |
| 60 to 61 dBA                                     | Building - Not Sensitive / Outside of Study Area |
| 62 to 63 dBA                                     | Proposed Road Source Line                        |
| 64 to 65 dBA                                     | Proposed Crash Barrier                           |
| Above 65 dBA                                     | Existing Noise Barrier- Not Impacted             |
| 63dBA Noise Contour                              |  |

Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All buildings are assumed to be 1.8m high.

  
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**Gateway Upgrade North**  
**Passive Recreational (Outdoor) Predicted 2028**  
**Free Field Noise Levels, Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**Evergreen Taoist Church**  
 FIGURE 9B - Scenario 3



G:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 9C.mxd


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 Projection: GDA 1994 MGA Zone 56

**LEGEND**

- Predicted L<sub>10</sub>(1h) Noise Level**
- 61 dBA or Below
  - 62 to 63 dBA
  - 64 to 65 dBA
  - 66 to 67 dBA
  - Above 67 dBA
  - 65dB Noise Contour
- Building - Residential  
 Building - Not Sensitive / Outside of Study Area  
 Proposed Road Source Line  
 Proposed Crash Barrier  
 Existing Noise Barrier- To be replaced  
 Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are in dB(A) unless otherwise stated.

  
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**Gateway Upgrade North**  
**Predicted 2028 Facade Corrected Noise Levels**  
**(Educational - Buildings), Proposed Motorway**  
**Alignment and Preserved Noise Barriers**  
**St John Fisher College**  
 FIGURE 9C - Scenario 3



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 9D.mxd


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**LEGEND**

<b>Predicted L<sub>A10</sub> (12h) Noise Level</b>	Building - Residential
58 to 59 dBA	Building - Educational Community or Health
60 to 61 dBA	Building - Not Sensitive / Outside of Study Area
62 to 63 dBA	Proposed Road Source Line
64 to 65 dBA	Proposed Crash Barrier
Above 65 dBA	Existing Noise Barrier - To be replaced
63dBA Noise Contour	Existing Noise Barrier - Not Impacted

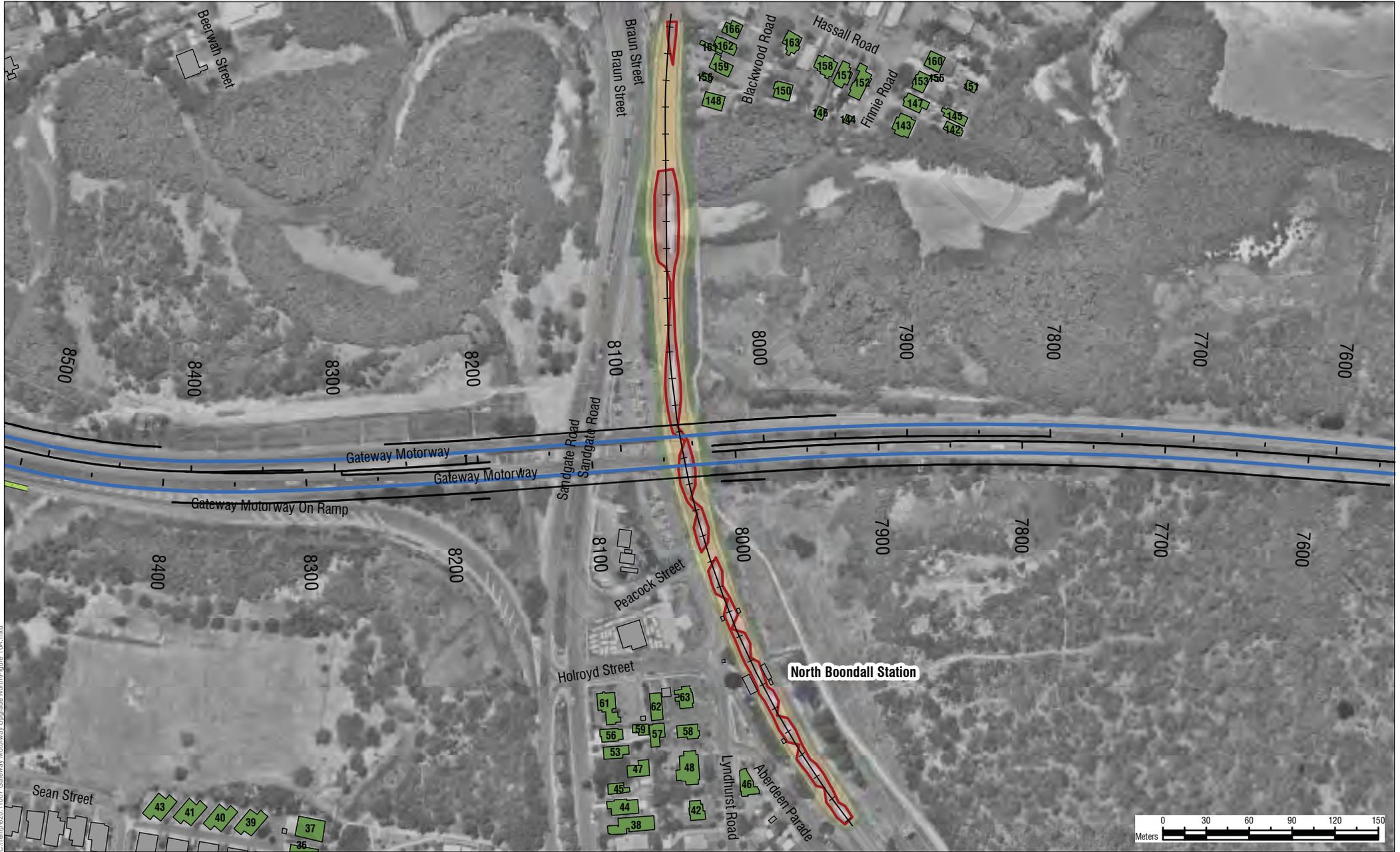

  
 Jacobs SMEC Design Joint Venture


 Queensland Government



Notes:  
 1. Noise contours represent noise levels at 1.8m above ground level.  
 2. All noise levels are free-field.

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**Gateway Upgrade North**  
**Predicted 2028 Free Field Noise Levels (Educational - Outdoor), Proposed Motorway Alignment and Preserved Noise Barriers**  
**St John Fisher College**  
 FIGURE 9D - Scenario 3



G:\Temp\620.11007 Gateway Motorway Upgrade North\Figure\_10A.mxd

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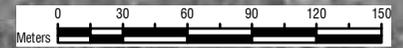
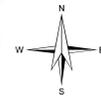
**LEGEND**

- Predicted  $L_{Aeq}(24h)$  Noise Level**
- 61 dBA or Below
  - 62 to 63 dBA
  - 64 to 65 dBA
  - 66 to 67 dBA
  - Above 67 dBA
  - 65dBA Noise Contour
- Building - Educational Community or Health  
 Building - Not Sensitive / Outside of Study Area  
 Proposed Road Source Line  
 Proposed Crash Barrier  
 Existing Noise Barrier- To be replaced  
 Existing Noise Barrier- Not Impacted  
 Railway

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All predicted noise levels are based on the worst case scenario.

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**Gateway Upgrade North**

**Predicted Residential Facade Corrected Noise Levels (Rail - 2018/2028), Proposed Motorway Alignment and Preserved Noise Barriers Sandgate Bridge / Shorncliffe Rail Overpass**

FIGURE 10A - Scenarios 2, 3 & 4



G:\Term 620.11007 Gateway Motorway Upgrade North\Figure 10B.mxd

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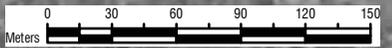
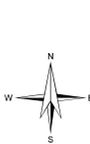
**LEGEND**

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<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFD700; border: 1px solid black;"></span> 84 to 85 dBA	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFA500; border: 1px solid black;"></span> 86 to 87 dBA	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF8C00; border: 1px solid black;"></span> 88 to 89 dBA	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF69B4; border: 1px solid black;"></span> Building - Not Sensitive / Outside of Study Area	<span style="display: inline-block; width: 15px; height: 10px; background-color: #0000FF; border: 1px solid black;"></span> Proposed Road Source Line
<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF69B4; border: 1px solid black;"></span> Above 89 dBA	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF0000; border: 1px solid black;"></span> 87dBA Noise Contour	<span style="display: inline-block; width: 15px; height: 10px; background-color: #000000; border: 1px solid black;"></span> Existing Noise Barrier - To be replaced	<span style="display: inline-block; width: 15px; height: 10px; background-color: #000000; border: 1px solid black;"></span> Existing Noise Barrier - Not Impacted	<span style="display: inline-block; width: 15px; height: 10px; background-color: #000000; border: 1px solid black;"></span> Proposed Crash Barrier
<span style="display: inline-block; width: 15px; height: 10px; background-color: #000000; border: 1px solid black;"></span> Railway				

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are based on the proposed rail alignment.

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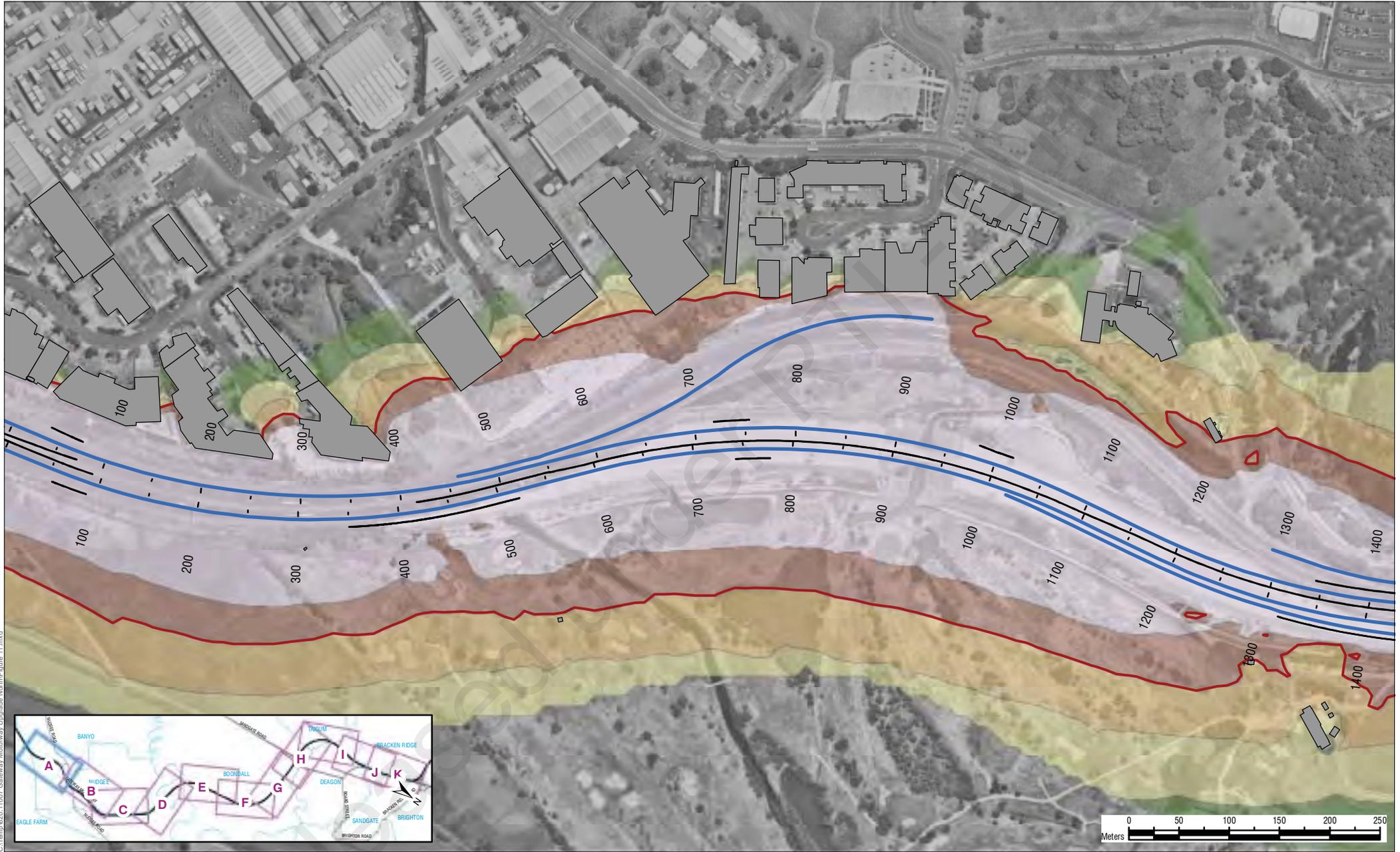


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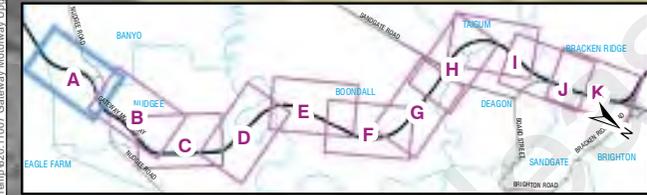
**Gateway Upgrade North**

**Predicted Residential Facade Corrected Noise Levels (Rail - 2018/2028), Proposed Motorway Alignment and Preserved Noise Barriers Sandgate Bridge / Shorncliffe Rail Overpass**

FIGURE 10B - Scenarios 2, 3 & 4



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 11.mxd



**SLR**

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**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | New Noise Barrier                                |
| Above 70 dBA                                     | Existing Noise Barrier- To be replaced           |
|  | Existing Noise Barrier- Not Impacted             |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**JACOBS** **SMEC**

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**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Nudgee Interchange South**

FIGURE 11A - Scenario 4



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure\_11.mxd

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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

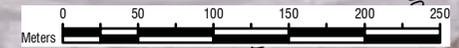
**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | New Noise Barrier                                |
| Above 70 dBA                                     | Existing Noise Barrier- To be replaced           |
|  | Existing Noise Barrier- Not Impacted             |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

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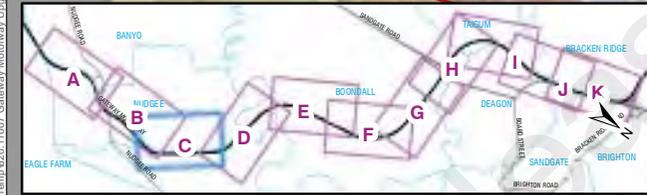
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Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Mwy Alignment**  
**and Existing / Proposed Noise Barriers**  
**Nudgee Interchange North**  
 FIGURE 11B - Scenario 4



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**LEGEND**

Predicted L <sub>10</sub> (18h) Noise Level	Symbol
64 dBA or Below	Shaded Building
65 to 66 dBA	Yellow Shaded Building
67 to 68 dBA	Orange Shaded Building
69 to 70 dBA	Red Shaded Building
Above 70 dBA	White Building
Building - Educational Community or Health	Grey Building
Building - Not Sensitive / Outside of Study Area	Light Grey Building
Proposed Road Source Line	Blue Line
Proposed Crash Barrier	Black Dashed Line
New Noise Barrier	Green Line
Existing Noise Barrier - To be replaced	Yellow Line
Existing Noise Barrier - Not Impacted	Green Line

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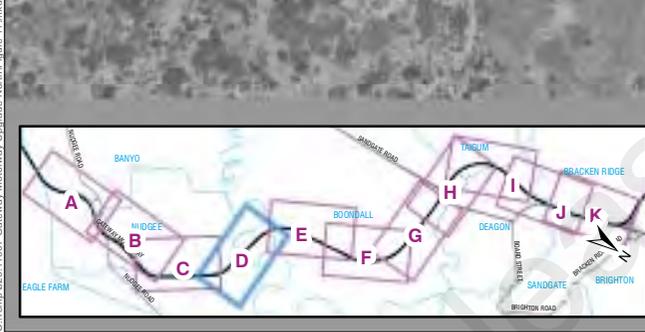
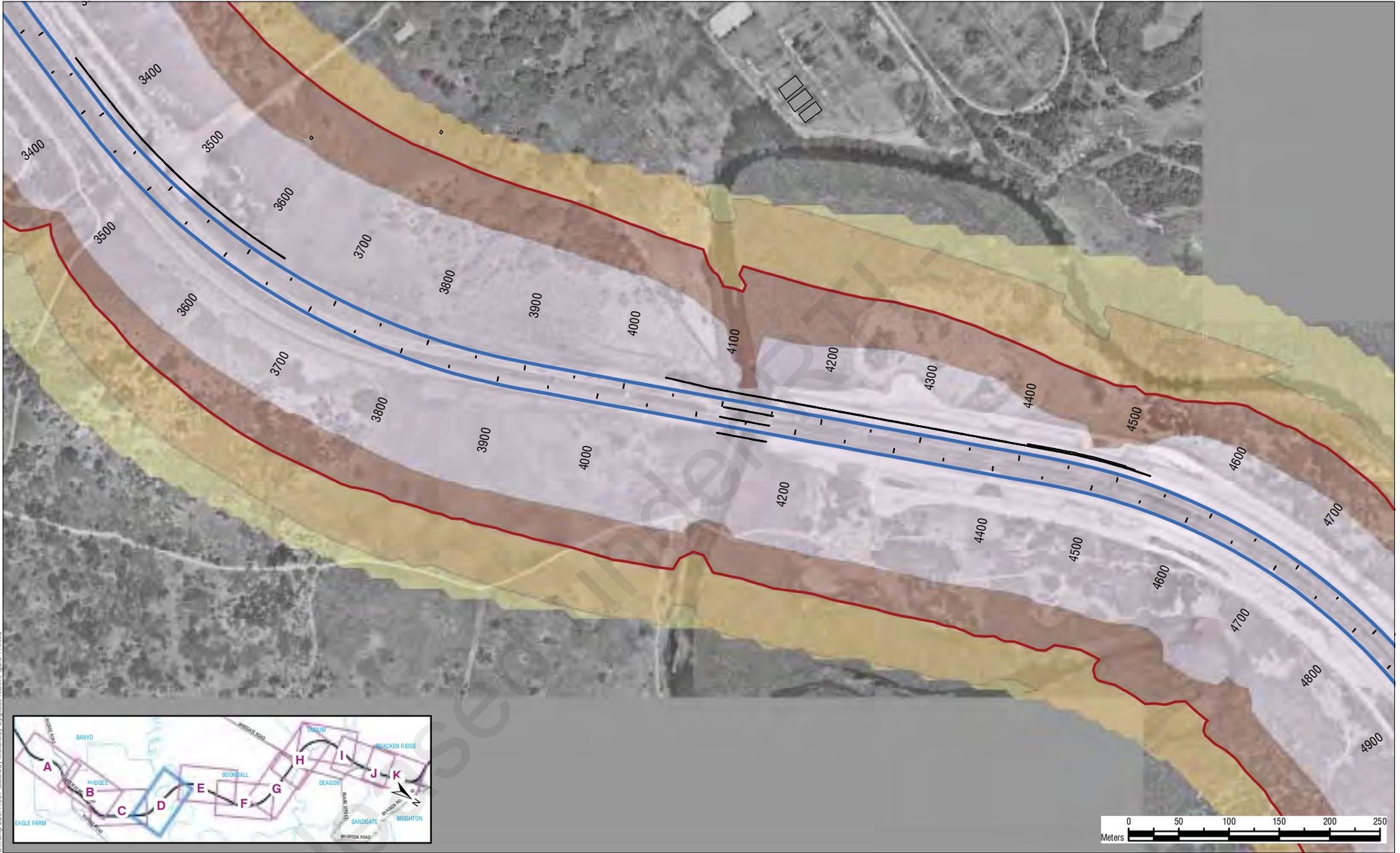
**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers**

**Nudgee / Mercy Family Services**

FIGURE 11C - Scenario 4

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.



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 Scale: 1:5,000  
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 Projection: GDA 1994 MGA Zone 56

LEGEND	
<b>Predicted L<sub>10</sub>(18h) Noise Level</b>	Building - Educational Community or Health
64 dBA or Below	Building - Not Sensitive / Outside of Study Area
65 to 66 dBA	Proposed Road Source Line
67 to 68 dBA	Proposed Crash Barrier
69 to 70 dBA	New Noise Barrier
Above 70 dBA	Existing Noise Barrier- To be replaced
68dB Noise Contour	Existing Noise Barrier- Not Impacted

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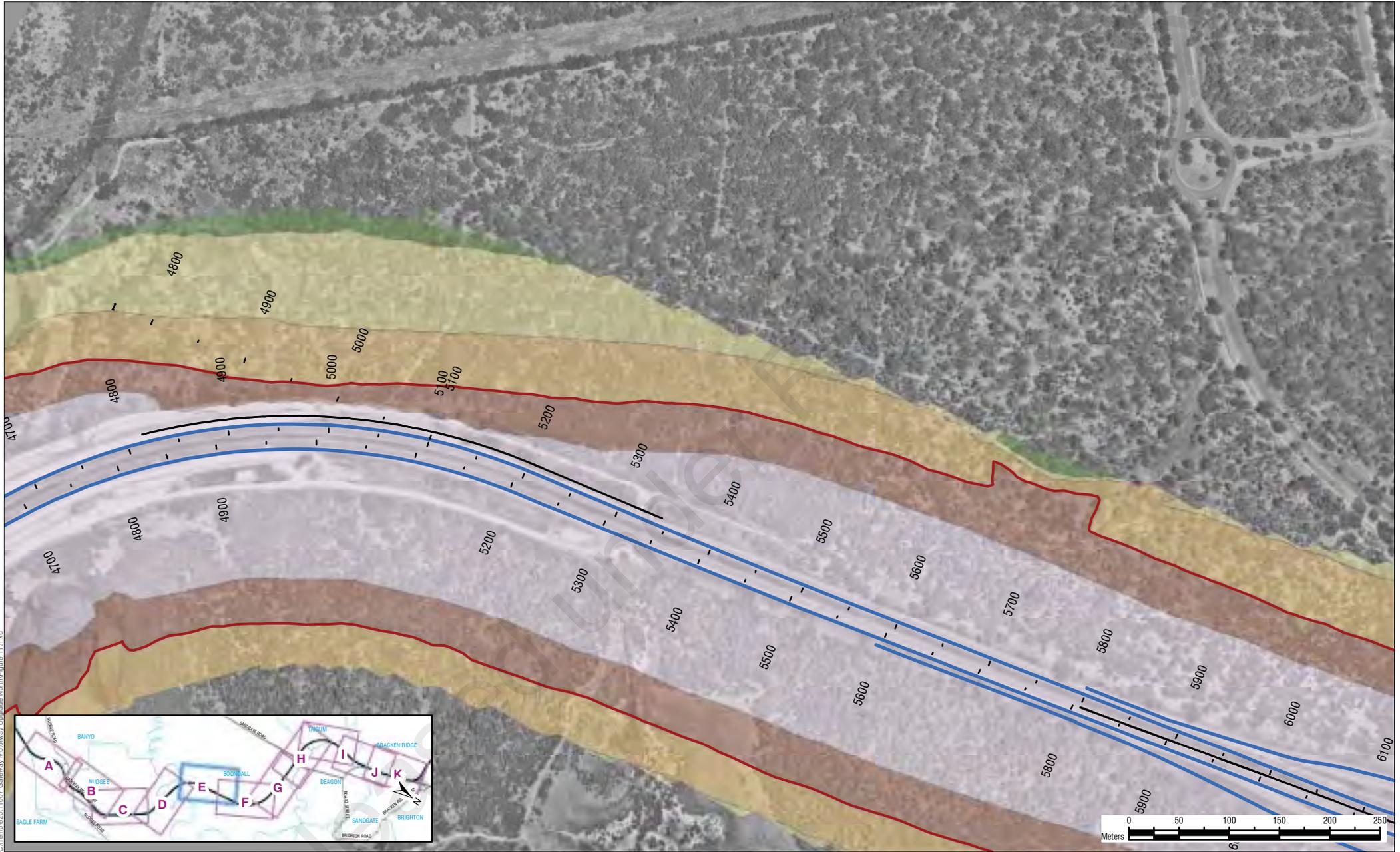
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

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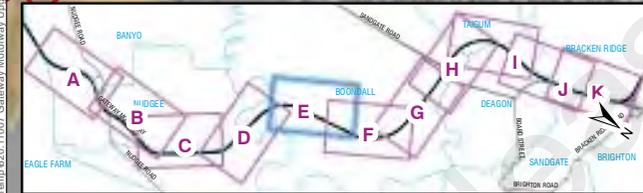
**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Nundah Creek**

FIGURE 11D - Scenario 4



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**LEGEND**

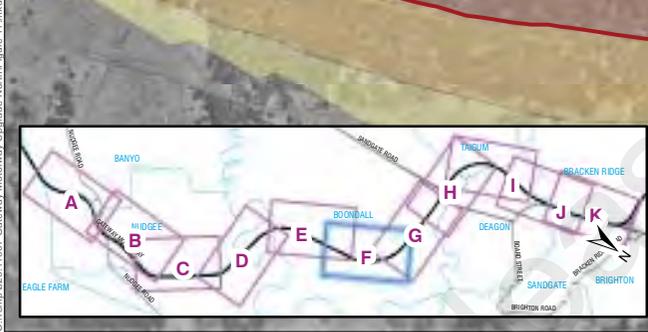
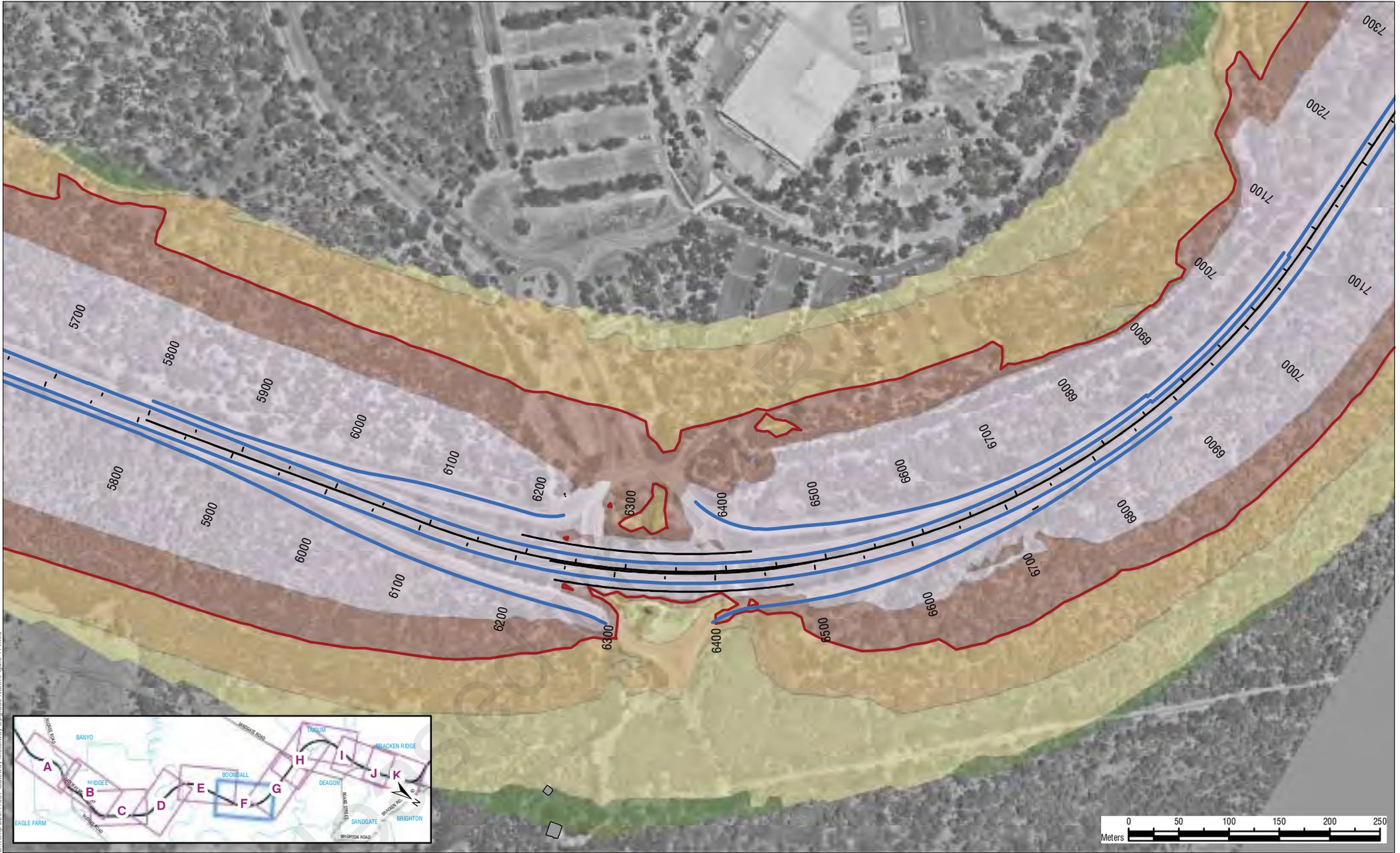
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	New Noise Barrier
68dB Noise Contour	Existing Noise Barrier- To be replaced
	Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Mwy Alignment**  
**and Existing / Proposed Noise Barriers**  
**Boondall Wetlands East**  
 FIGURE 11E - Scenario 4



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 Projection: GDA 1994 MGA Zone 56

LEGEND	
Predicted L <sub>A10</sub> (18h) Noise Level	
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	New Noise Barrier
68dB Noise Contour	Existing Noise Barrier- To be replaced
	Existing Noise Barrier- Not Impacted

**JACOBS SMEC**  
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Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.



Jacobs SMEC Design Joint Venture

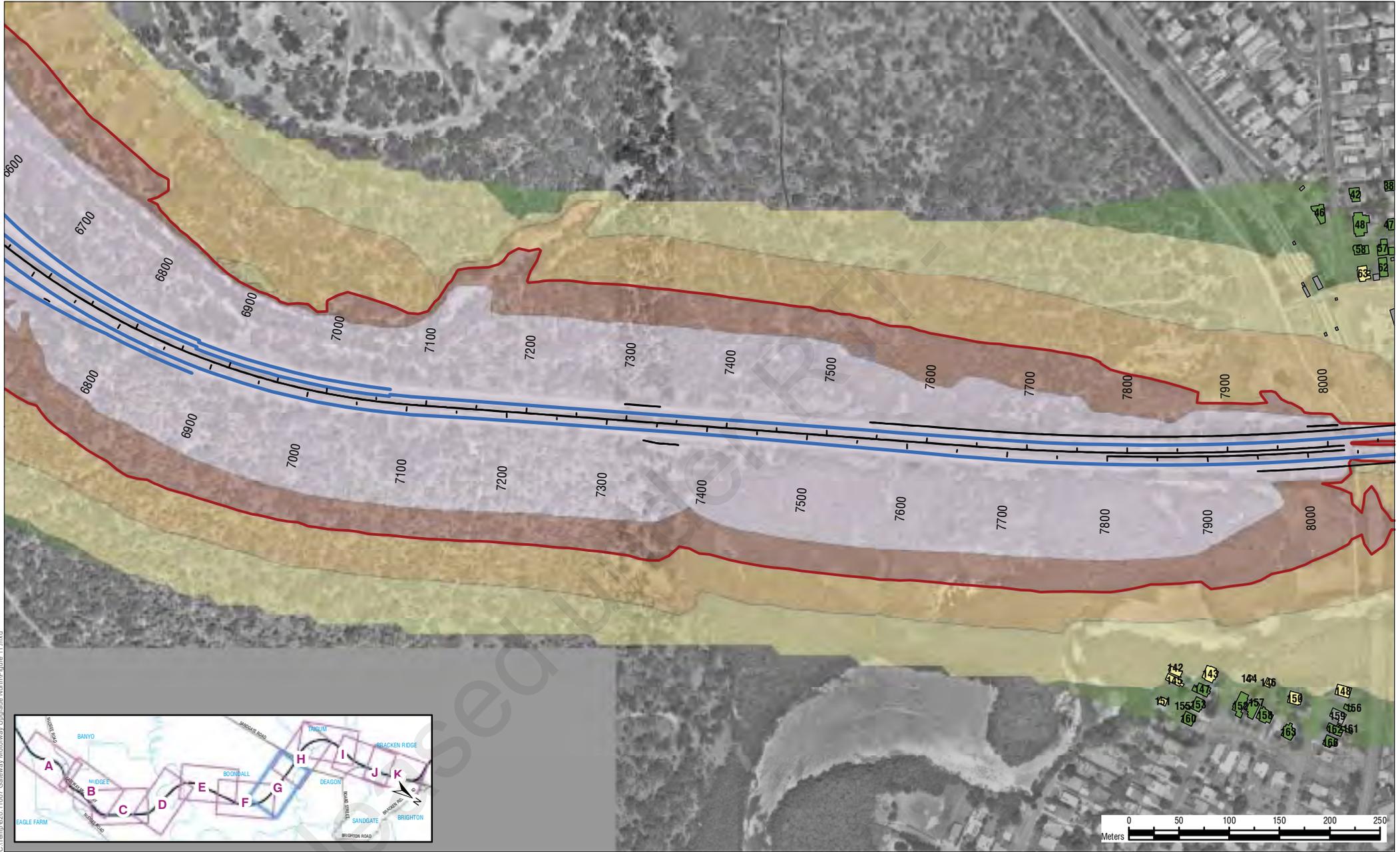
**Gateway Upgrade North**

**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers**

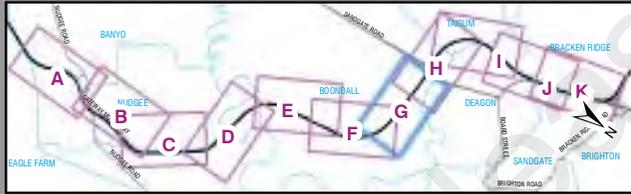
**Bicentennial Road Interchange**

FIGURE 11F - Scenario 4

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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

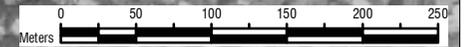
**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(18h) Noise Level</b> | Building - Educational Community or Health       |
| 64 dBA or Below                                  | Building - Not Sensitive / Outside of Study Area |
| 65 to 66 dBA                                     | Proposed Road Source Line                        |
| 67 to 68 dBA                                     | Proposed Crash Barrier                           |
| 69 to 70 dBA                                     | New Noise Barrier                                |
| Above 70 dBA                                     | Existing Noise Barrier- To be replaced           |
| 68dB Noise Contour                               | Existing Noise Barrier- Not Impacted             |

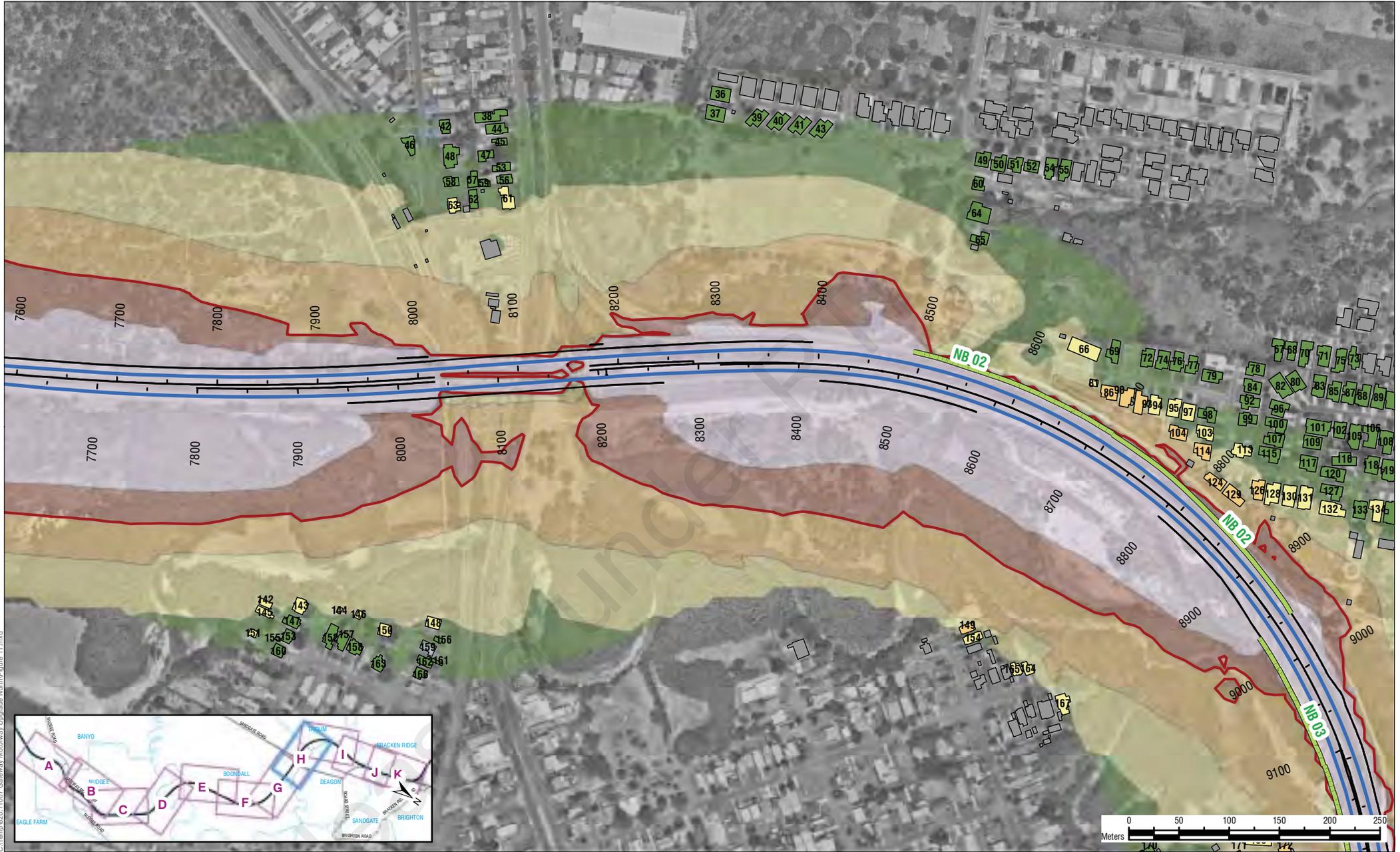
Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

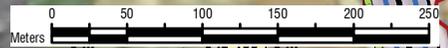
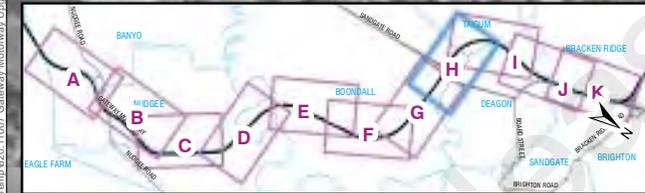
**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Boondall Wetlands North**  
 FIGURE 11G - Scenario 4



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

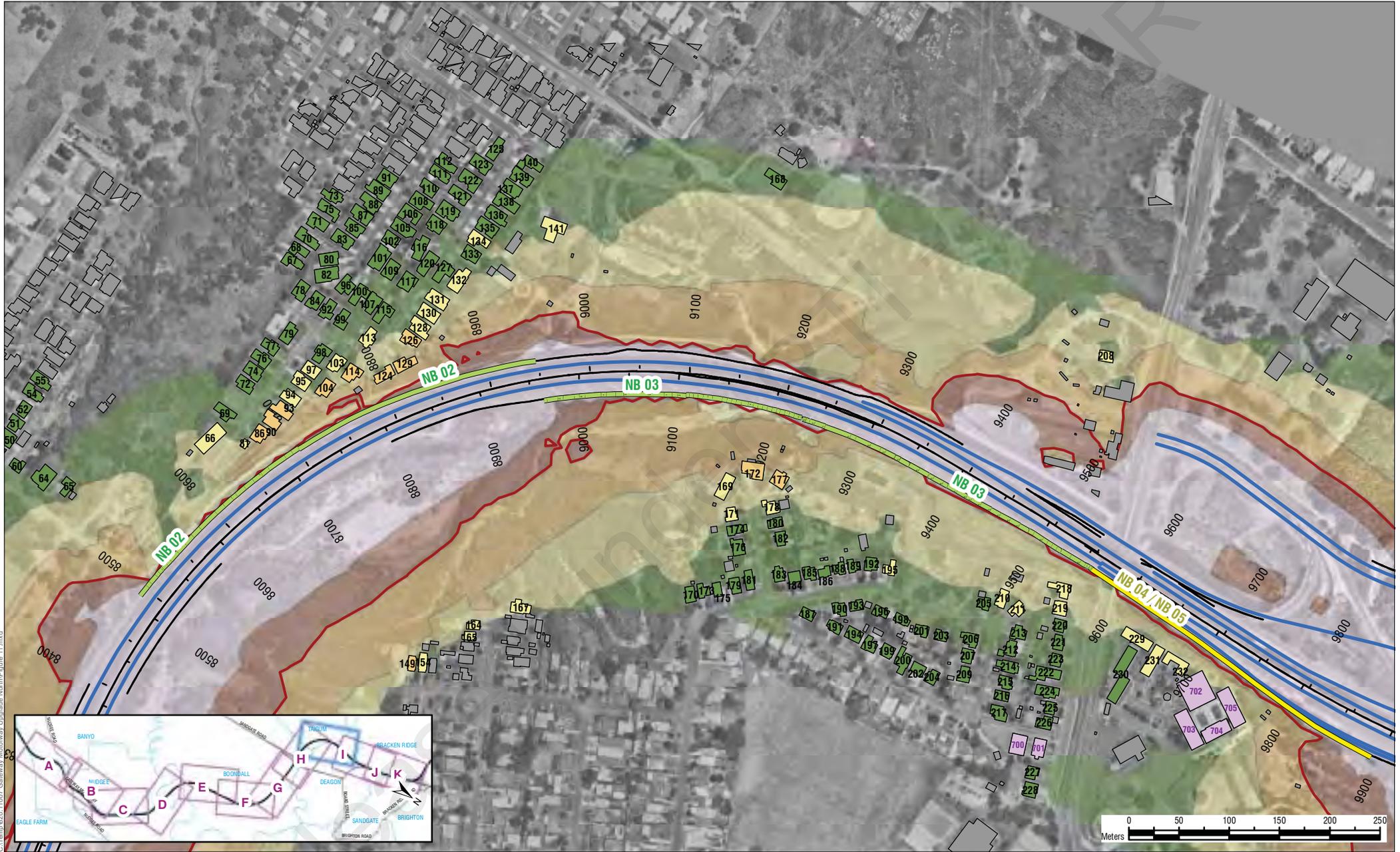
LEGEND	
Predicted L <sub>410</sub> (18h) Noise Level	
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	New Noise Barrier
68dB Noise Contour	Existing Noise Barrier- To be replaced
	Existing Noise Barrier- Not Impacted

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

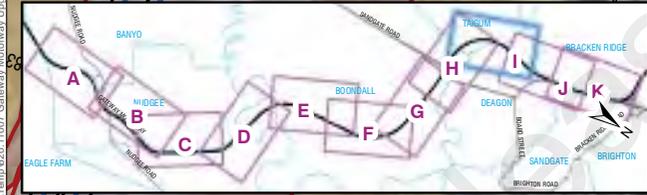


Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Sandgate Road**  
 FIGURE 11H - Scenario 4



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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

LEGEND	
Predicted L <sub>A10(18h)</sub> Noise Level	
64 dBA or Below	Building - Educational Community or Health
65 to 66 dBA	Building - Not Sensitive / Outside of Study Area
67 to 68 dBA	Proposed Road Source Line
69 to 70 dBA	Proposed Crash Barrier
Above 70 dBA	New Noise Barrier
68dB Noise Contour	Existing Noise Barrier- To be replaced
	Existing Noise Barrier- Not Impacted

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Taigum / Deagon**  
 FIGURE 111 - Scenario 4



C:\Temp\620-11007 Gateway Motorway Upgrade North\Figure 11.mxd

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 Date: 19-Oct-2016  
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 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey;"></span> Building - Educational Community or Health	<span style="display:inline-block; width:15px; height:15px; background-color:grey;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen;"></span> Predicted L <sub>10</sub> (18h) Noise Level 64 dBA or Below	<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span> 65 to 66 dBA
<span style="display:inline-block; width:15px; height:15px; background-color:orange;"></span> 67 to 68 dBA	<span style="display:inline-block; width:15px; height:15px; background-color:red;"></span> 69 to 70 dBA
<span style="display:inline-block; width:15px; height:15px; background-color:white;"></span> Above 70 dBA	<span style="display:inline-block; width:15px; height:15px; border:2px solid red;"></span> 68dB Noise Contour
<span style="display:inline-block; width:15px; height:15px; border-bottom:2px solid blue;"></span> Proposed Road Source Line	<span style="display:inline-block; width:15px; height:15px; border-bottom:2px solid black;"></span> Proposed Crash Barrier
<span style="display:inline-block; width:15px; height:15px; border-bottom:2px solid yellow;"></span> New Noise Barrier	<span style="display:inline-block; width:15px; height:15px; border-bottom:2px solid orange;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:15px; height:15px; border-bottom:2px solid green;"></span> Existing Noise Barrier- Not Impacted	

**JACOBS SMEC**  
 Jacobs SMEC Design Joint Venture

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels (Facade Corrected), Proposed Mwy Alignment and Existing / Proposed Noise Barriers Depot Road Interchange**  
 FIGURE 11J - Scenario 4



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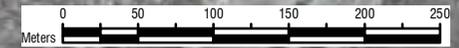
Project No.: 620.11007.00200  
 Date: 19-Oct-2016  
 Drawn by: N/R  
 Scale: 1:5,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

**LEGEND**

<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey; border:1px solid black;"></span> Building - Educational Community or Health	<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey; border:1px solid black;"></span> Building - Not Sensitive / Outside of Study Area
<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> Predicted L <sub>10</sub> (18h) Noise Level	<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> Proposed Road Source Line
<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen; border:1px solid black;"></span> 64 dB(A) or Below	<span style="display:inline-block; width:10px; height:10px; background-color:blue; border:1px solid black;"></span> Proposed Crash Barrier
<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen; border:1px solid black;"></span> 65 to 66 dB(A)	<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> New Noise Barrier
<span style="display:inline-block; width:10px; height:10px; background-color:orange; border:1px solid black;"></span> 67 to 68 dB(A)	<span style="display:inline-block; width:10px; height:10px; background-color:yellow; border:1px solid black;"></span> Existing Noise Barrier- To be replaced
<span style="display:inline-block; width:10px; height:10px; background-color:orange; border:1px solid black;"></span> 69 to 70 dB(A)	<span style="display:inline-block; width:10px; height:10px; background-color:lightgreen; border:1px solid black;"></span> Existing Noise Barrier- Not Impacted
<span style="display:inline-block; width:10px; height:10px; background-color:orange; border:1px solid black;"></span> Above 70 dB(A)	
<span style="display:inline-block; width:10px; height:10px; background-color:orange; border:1px solid black;"></span> 68dB Noise Contour	

**JACOBS** **SMEC**  
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Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Predicted Residential (2028) Noise Levels**  
**(Facade Corrected), Proposed Mwy Alignment**  
**and Existing / Proposed Noise Barriers**  
**Degaon Deviation**  
 FIGURE 11K - Scenario 4



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 12A.mxd

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 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

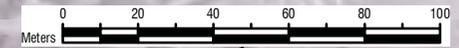
**LEGEND**

- |  |  |
|--|--|
| <b>Predicted L<sub>10</sub>(<sub>1h</sub>) Noise Level</b> | Building - Residential                           |
| 61 dBA or Below  | Building - Educational Community or Health       |
| 62 to 63 dBA   | Building - Not Sensitive / Outside of Study Area |
| 64 to 65 dBA   | Proposed Road Source Line                        |
| 66 to 67 dBA   | Proposed Crash Barrier                           |
| Above 67 dBA   | New Noise Barrier                                |
| 65dBA Noise Contour  | Existing Noise Barrier - To be replaced          |
|  | Existing Noise Barrier - Not Impacted            |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Community (Buildings) Predicted 2028 Facade Corrected Noise Levels, Proposed Mwy Algnmnt Location of Existing & Proposed Noise Barriers Seventh Day Adventist Church**  
 FIGURE 12A - Scenario 4



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 12B.mxd


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 Drawn by: N/R  
 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

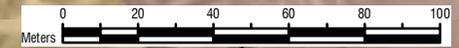
**LEGEND**

- |   |  |
|---|--|
| <b>Predicted L<sub>A10(125)</sub> Noise Level</b> | Building - Residential                           |
| 59 dBA or Below                                   | Building - Educational Community or Health       |
| 60 to 61 dBA                                      | Building - Not Sensitive / Outside of Study Area |
| 62 to 63 dBA                                      | Proposed Road Source Line                        |
| 64 to 65 dBA                                      | Proposed Crash Barrier                           |
| Above 65 dBA                                      | New Noise Barrier                                |
| 63dBA Noise Contour                               | Existing Noise Barrier- To be replaced           |
|   | Existing Noise Barrier- Not Impacted             |

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

  
 Jacobs SMEC Design Joint Venture





Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Passive Recreational (Outdoor) Predicted 2028**  
**Free Field Noise Levels, Proposed Mwy Algnmnt**  
**Location of Existing & Proposed Noise Barriers**  
**Evergreen Taoist Church**  
 FIGURE 12B - Scenario 4



C:\Temp\620.11007 Gateway Motorway Upgrade North\Figure 12C.mxd

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Project No.:	620.11007.00200
Date:	15-Aug-2016
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Scale:	1:2,000
Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

**LEGEND**

**Predicted L<sub>10</sub> (1h) Noise Level**

Green	61 dBA or Below
Light Green	62 to 63 dBA
Yellow	64 to 65 dBA
Orange	66 to 67 dBA
Red	Above 67 dBA
Red outline	65dBA Noise Contour

Blue outline	Building - Residential
Grey outline	Building - Not Sensitive / Outside of Study Area
Blue line	Proposed Road Source Line
Black line	Proposed Crash Barrier
Yellow line	New Noise Barrier
Orange line	Existing Noise Barrier- To be replaced
Green line	Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level. Shaded buildings represent noise levels at the loudest facade, regardless of storey. 2. All noise levels are facade corrected.

**JACOBS** **SMEC**  
 Jacobs SMEC Design Joint Venture

**Queensland Government**



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Community (Buildings) Predicted 2028 Facade Corrected Noise Levels, Proposed Mwy Algnmnt Location of Existing & Proposed Noise Barriers**  
**St John Fisher College**  
 FIGURE 12C - Scenario 4



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Project No.: 620.11007.00200  
 Date: 15-Aug-2016  
 Drawn by: N/R  
 Scale: 1:2,000  
 Sheet Size: A4  
 Projection: GDA 1994 MGA Zone 56

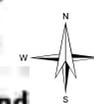
**LEGEND**

<b>Predicted L<sub>A10</sub> (12h) Noise Level</b>	Building - Residential
58 to 59 dBA	Building - Educational Community or Health
60 to 61 dBA	Building - Not Sensitive / Outside of Study Area
62 to 63 dBA	Proposed Road Source Line
64 to 65 dBA	Proposed Crash Barrier
Above 65 dBA	New Noise Barrier
63dB Noise Contour	Existing Noise Barrier- To be replaced
	Existing Noise Barrier- Not Impacted

Notes: 1. Noise contours represent noise levels at 1.8m above ground level.  
 Shaded buildings represent noise levels at the loudest facade, regardless of storey.  
 2. All noise levels are facade corrected.

  
 Jacobs SMEC Design Joint Venture

  
 Queensland Government



Jacobs SMEC Design Joint Venture  
**Gateway Upgrade North**  
**Passive Recreational (Outdoor) Predicted 2028**  
**Free Field Noise Levels, Proposed Mwy Algnmnt**  
**Location of Existing & Proposed Noise Barriers**  
**St John Fisher College**  
 FIGURE 12D - Scenario 4

## APPENDIX E TMR and IV Comments

Released under RTI - DTMR

## Gateway Upgrade North Project Independent Verification Record

### Documentation details

<b>Design package name:</b>	Road and Rail Traffic Noise Assessment	<b>Design delivery phase:</b>	FDD Final Detailed Design	
<b>Package/Deliverable no.</b>	PNS-20	<b>Package owner designer:</b>	JSDJV	
<b>Nominated verifier:</b>	N/R	<b>Date submitted:</b>	16/05/2016	<b>Verification due date:</b> 26/05/2016

Verification Record of findings – comment summary, designer response and verifier close out								
Item No.	Date/ Revision	Drawing/ section/ reference	Verifier comment	SWTC Reference	Category	Designer response	Verifier close-out	
							Status	Date
1.	2705/2015	Appendix B	Appendix Road Traffic Data is missing		3 Deficient	Rail criteria, modelling inputs, methodology and outcomes have been expanded within the report.		
2.	27/05/2015	General	Leq and Lmax rail criteria are not provided and their compliance or non-compliance for Scenario 2 are not discussed		3 Deficient			
3.	27/05/2015	General	2018 predictions are not provided or discussed.		3 Deficient		2018 scenario will be added to the reporting.	
4.					0			
5.					0			
6.					0			
7.					0			
8.					0			
9.					0			
10.					0			
11.					0			
12.					0			
13.					0			

#### Category legend:

- 1 – Minor Issue - does not require a detailed from the designer.
- 2 – Moderate Issue - requires response from the designer
- 3 – Deficiency - significant design issue to be addressed prior to signoff

Verification Record of findings – comment summary, designer response and verifier close out								
Item No.	Date/ Revision	Drawing/ section/ reference	Verifier comment	SWTC Reference	Category	Designer response	Verifier close-out	
							Status	Date
<b>Verification Assessment Category</b> (Verifier to tick appropriate outcome)						<b>Sign-off</b> Verifier to sign when verification is complete (see*)		
1			Reviewed without comments			Verified by:	N/R	
2			Reviewed with general comments. Proceed to the next activity/phase taking into consideration the comments below			Date completed	27/05/2016	
3			Reviewed with comments that must be addressed before the next activity/phase – see Verification Record to close out comments			Signature	N/R	

Verification Checklist Summary (Verifier to check box key items considered relevant. Detailed issues to be summarised above.)					
Methods, references and/or systems are appropriate	<input checked="" type="checkbox"/>	Output complies with 3rd party reqmts (BCC, ENERGEX)	<input type="checkbox"/>	<del>3d model consistent with 2d drawings</del>	<input type="checkbox"/>
Output complies with SWTC requirements	<input checked="" type="checkbox"/>	Safe Design issues have been considered & actioned	<input type="checkbox"/>	<del>Specific Verification Brief attached</del>	<input type="checkbox"/>
Output complies with relevant standards and codes	<input checked="" type="checkbox"/>	Interfaces on multi-discipline elements have been coordinated	<input type="checkbox"/>	<del>Design Package must be fully resubmitted</del>	<input type="checkbox"/>
Output complies with local and statutory requirements	<input checked="" type="checkbox"/>	Project Technical Risk Register reviewed and updated	<input type="checkbox"/>	Other issues.....	<input type="checkbox"/>
Output is consistent with other project activities	<input checked="" type="checkbox"/>	<del>Design Package partially reviewed as noted</del>	<input type="checkbox"/>	Other issues.....	<input type="checkbox"/>

Outstanding items – for incorporation/closeout at next phase (use corresponding Item No. from schedule above)			
Item No.	Details of further action required to close	Verifier close-out	
		Status	Date

\*Designer responses are closed and initialled by verifier (in the case of RED items)

**Category legend:**

- 1 – Minor Issue - does not require a detailed from the designer.
- 2 – Moderate Issue - requires response from the designer
- 3 – Deficiency - significant design issue to be addressed prior to signoff

e	FDD
	GUN-3-LL-PNS-LE-000017
	DTMR-DR-000388

Clause Ref.	Reviewer	DTMR Comments	Contractor's Response	Further DTMR Response	Further Contractor's Response	Further Cor
	MK & SP	TMR Comment "Inconsistent or missing street type abbreviations in tables" Contractor response "Abbreviations will be corrected" TMR Further response Inconsistent or missing street type abbreviations in tables. Table 18, pg C2 (Quinlan)	Missed abbreviations amended in the report	Response accepted to be included in the IFC submission.		
	MK & SP	TMR Comment "Very little information provided on rail model prediction methodology - provide details" Contractor response "Additional rail information will be provided." TMR Further response Provide details of rail information. Confirm what this is being assessed against and update report	Rail criteria, modelling inputs, methodology and outcomes have been expanded within the report	Please provide extract to close out this comment.		
	MK & SP	TMR Comment "Map/s showing Zones, suburbs, monitoring locations and differences highly desirable" Contractor response "All monitoring locations will be included. We will look to include a map of zones and differences if easily achieved." TMR Further response Provide maps showing the monitoring locations in the zones/suburbs, table 19-28	Maps now present the differences in calculated and predicted noise level. In addition, Zone breaks have been added to the Key map in the bottom left hand corner.	Response accepted to be included in the IFC submission.		
	MK & SP	TMR Comment "Should indicate whether façade-corrected or free field" Contractor response "Clarification will be made." TMR Further response Where has clarification been made to indicated façade-corrected or free field for tables.	Refer notes in the maps that outline if noise maps are free field or façade corrected. This has now been added to the title too.	Include a note in the tables within the assessment to indicate if free field or façade in the IFC submission. This comment does not refer to the maps.	<b>Updated Response 16/08/2016:</b> Noted. Will be included in IFC.	
4.4.1 of Practice.	SM	TMR Comment "A full table of predicted noise levels for the year 2018 and 2028 with and without noise barriers was to be included as per DCD comments. 2018 data is not included. Please include" Contractor response "A table will be added. " TMR Further response This is a requirement under the code to tabulate predicted noise levels for all noise sensitive receptors for the assessment year, the year of road opening/completion and 10 year horizon following assessment year or road opening/completion.	2018 Scenario has now been incorporated into the report.	Please provide extract to close out this comment.		
	DA	TMR Comment "NB-09 to be 6.0m to comply with code of practice." Contractor response "Noted and will be revised in FDD issue. Note that 6m height is proposed to be applied to NB-09a only and height reduced where additional height has no impact on noise criteria. This is to be for noise wall along the boundary only. " TMR Further response Both NB09a and NB09b require to be 6 m to comply with the code of practice.	Noise barrier NB-09a and NB-09b are now 6m for full length in the modelling and reporting.	Response accepted to be included in the IFC submission.		

SP	<p>TMR Comment Provide verification details of the current road traffic noise assessment model for the Mercy Family Services. Requirement to comply with CoP."</p> <p>Contractor response "Full verification against all historical measurements has been completed and details will be provided in the upcoming revision. "</p> <p>DTMR Response "Note further investigations required at Mercy Family Services before non-compliance is considered. "</p> <p>TMR Further response Requirement to comply with CoP for Mercy Family Services. Is a noise barrier required and how high/long.</p>	<p>criterion. Dwellings remaining over criterion (up to 1 dBA over) already have air conditioning therefore no further treatments are considered necessary under the CoP. Refer to email of 22nd June 2016 from N/R</p>		<p>meets the 68 dBA criteria and is compliant.</p> <p>Note that the model over predicts the 2011 road traffic noise level by 2.0 dBA above the measured noise level at this location. It is a multi-story building with direct line of sight to the motorway not protected by vegetation hence the over-prediction of only 2.0 dBA compared to the other building with protection from vegetation.</p> <p>However, the exact use of the building is not confirmed and if building 24 was considered educational / medical or community, it would be assessed against the LA10 (1h) noise descriptor of which the 2028 noise level would be 74 dBA (again at top floor) – some 9 dBA ( or 6 dBA on ground floor) above the 65 dBA criterion for these sensitive rooms.</p> <p>Therefore in the case of residential it is compliant on Ground floor. In the case of community/health, it is 6 dBA over on ground floor putting it in the bracket of requiring air-conditioning under exceptional circumstances (3-9 dBA over). However, from site inspection, this building is noted to have airconditioning already. Historically, it is known for some TMR projects, if a sensitive receptor already has in-building treatments that meet what would be provided under exception circumstances (i.e. if a building already has airconditioning or mechanical ventilation) then there has been no further consideration. Therefore, the provision of a barrier may not be considered cost effective or effective for a multi-story building given that they have in building treatments already.</p> <p>In this regard, a permissible non-compliance has been submitted to TMR for consideration.</p>	is no longer any non-compl
SP	<p>TMR Comment "How high does NB04-05 need to be in order to be compliant. "</p> <p>Contractor response "The barrier would need to be in excess of 6m in height (i.e. higher than the permitted height within the COP). The church facades do not have openable windows. Rather there are pathways through the perimeter buildings to an open space inside. This is a unique scenario, where the existing noise levels already exceed the limits within the COP. An option may be to investigate the church layout further and perhaps agree upon a Status-Quo limit, i.e. not try and reach a target that's more stringent than the current noise environment, but not to make it worse? "</p> <p>TMR Further response Note further investigation to the temple layout should be undertaken to better model the impact on the temple.</p> <p>TMR Further response Requirement to comply with CoP for Evergreen Taoist Church</p>	<p>Site inspection flags that no sensitive rooms have windows that open to a façade with noise levels that exceed criterion. However, site inspection indicates that the northern and southern buildings within the church compound are predominantly wall less - i.e. open spaces. Revised criterion to achieve passive recreational criterion, assessed as a free field noise level, at 1m from the external facade of all modelled buildings. Revised barrier design with a max height of 5.5m allows predicted noise levels to meet this criterion. Refer to Aconex email of 30th June 2016 from N/R</p>	<p>Response accepted. Update assessment as per discussions at meeting held on 13/07/2016</p>	<p><b>Updated Response 16/08/2016:</b> Following the site visit it is understood that air-conditioning is not possible in the building as the building is considered an option space as it allows permanently open facades with open roofs and walls. Therefore, we have amended our assessment to apply a free field criteria rather than a facade criteria. As such, the noise levels achieved in the model are reduced by -4.2db (-2.5db from facade to free field and -1.7db for change from 1hr to 12hr criteria). However, the noise criteria also lowers by 2db thereby needing to achieve 63.4db for conformance. In this regard, a revised barrier height has been designed and modelled to achieve compliance. This is described as a barrier starting at 14.46mRL (2.7m height) and continuing with the top level at 14.46m RL until a maximum height of 5.3m just beyond the norther extent of the buildings. The barrier then steps down in 200mm increments to a constant top level of 11.26mRL (3.0m min height). The barrier then steps down on the end panels to terminate at ~Ch 9880 (MCS12). This provides the required mitigation for compliant noise attenuation for the above criteria. Therefore, no non-conformance is required.</p>	
SP	<p>TMR Comment How high will the noise barrier have to be to reduce the noise levels at the St John Fisher College? Further investigations required before non-compliance is considered."</p> <p>Contractor response "The barrier would need to be in excess of 6m in height (i.e. higher than the permitted height within the COP). "</p> <p>TMR Further response "Note further investigations required."</p> <p>TMR Further response Requirement to comply with CoP for St John Fisher (i.e 6m barrier at the highest)</p>	<p>Both noise barriers for the college have been increased to the maximum height of 6m for the entire length.</p>	<p>Response accepted to be included in the IFC submission.</p>		
SP	<p>TMR Comment "Community consultation has not occurred for new and replacement of existing barriers. Update."</p> <p>Contractor response "Consultation has occurred with St John Fisher College. It is acknowledged that this is not broad consultation and this will be updated to reflect.. "</p> <p>TMR Further response "Response accepted subject to review of upcoming revision."</p> <p>TMR Further response Community consultation has not occurred for some barriers. Action that TMR need to undertake consultation.</p>	<p>Both noise barriers for the college have been increased to the maximum height of 6m for the entire length.</p>	<p>Closed. Action for TMR to undertake consultation.</p>		

		TMR Further response "Response accepted subject to review of upcoming revision." TMR Further response Figures referred to 2013, now refer to 2015. If model was verified in 2015, shouldn't it all be 2015?			
MK		TMR Comment "Residential buildings not on legend. Too many decimal places in noise contour range in caption." Contractor response "Change will be made." TMR Further response "OK" TMR Further response Residential buildings not on legend for 4B	Figure 4B (now 5B) concentrates on education, community and health buildings and has a notional value for residential. This is consistent for maps for the churches and schools.	Response accepted to be included in the IFC submission.	
SP		Provide further clarification that this noise barrier is inside SOM property. As it could be interpreted that it is on the property boundary.	Additional information added within these tables.	Response accepted to be included in the IFC submission.	
SP		Statement made about - following post construction measurements. All decisions regarding noise treatments are to be made prior to construction of the road, unless post-construction monitoring indicates non compliance for barriers installed.	Sentence remains for SJFC, where the conservative model indicates noise levels will exceed criterion, with the maximum noise barrier height, and existing in-building treatments are unlikely.	Response accepted to be included in the IFC submission.	
SP		Should NB04 and NB05 be labelled an upgrade to material if they are already existing?	Label changed	Response accepted to be included in the IFC submission.	
SP		Ecological survey and extent to ground disturbance for impacts on groundwater to be addressed.	This will be assessed in detail in noise wall package.	Closed	
SP		Reference is made to sensitive plantings - confirm what this means or consider rewording to screen planting in front of noise barriers or refer to the landscape package.	To be reworded to: "Specific plantings in close proximity to the noise wall will be nominated to minimise maintenance and compromise the barrier with fallen branches."	Response accepted to be included in the IFC submission.	
SP		Missing Appendix please provide.	this will be provided as per previous issue - was accidentally left out.	Response accepted to be included in the IFC submission.	
SP		Bold noise levels to highlight levels that are exceeding criteria, as has been done in prior revisions	Change made.	Response accepted to be included in the IFC submission.	

The Contractor acknowledges DTMR has not carried out any proof calculations or risk analysis. The Contractor must meet its obligations and responsibilities for the purposes of design development this sheet is to be used, maintained and added to through all design stages of each individual submission.