

APPENDIX W

Noise and Vibration Assessment—Railway Operations

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Executive Summary

Introduction

The Border to Gowrie (B2G) project (the Project) is one of the interconnecting projects that make up the Inland Rail Program. The Project connects the North Star to Border and Gowrie to Helidon project sections on the Inland Rail Program.

The Project is a 217.48 km section of new single track railway between the New South Wales / Queensland border and Gowrie, in Queensland. The Project is comprised of 7.0 km of standard gauge rail (1,435 mm) and 210.48 km of dual standard/narrow gauge rail (1,435 mm standard and 1,067 mm narrow). The new railway will be positioned within approximately 149.48 km of new rail corridor (greenfield) and approximately 68.00 km of existing rail corridor (brownfield), currently utilised by Queensland Rail's South Western Line and Millmerran Branch Line.

Proposed railway operations include 24 hour train movements on the Project alignment and the management of trains at five new crossing loops. The movement of rail freight on the Project is a source of noise and vibration that could impact sensitive receptors and the surrounding environment.

This report provides an assessment of potential noise and vibration levels from the proposed daily rail freight operations for the Project. The Department of Transport and Main Road (DTMR) *Interim Guideline Operational Railway Noise and Vibration* dated March 2019 (the 'Interim Guideline') is a statutory guideline under the Transport Act which applies to rail operations in Queensland. The Interim Guideline provides assessment criteria for noise and vibration impacts of rail operations and has therefore been used as the basis of this assessment. The requirements under the Terms of Reference set for the Environmental Impact Statement and subsequent request for information from the office of Coordinator General have been addressed in this report. Other Australian and international standards for noise and vibration have also been referenced in the assessment.

The assessment of noise and vibration from the construction of the Project and associated road traffic is detailed in the revised draft Environmental Impact Statement (EIS) Appendix V: Noise and Vibration Assessment – Construction and Road Traffic.

Railway Noise

The route alignment and design has considered potential noise and vibration impacts by minimising proximity to sensitive receptors where possible. Other mitigation methods include minimising level crossings, use of rail cuttings, avoiding steep gradients and use of continuously welded rail.

A detailed noise prediction model for the Project designs and the surrounding environment was developed to assess airborne noise from railway operations on the main line tracks, at level crossings and on crossing loops. The noise model covered an area 2 km either side of the alignment, which comprised a total area approximately 895 km² in size and 2,388 individual sensitive receptors.

The model adopted a database of noise emission levels from Australian Rail Track Corporation (ARTC) and NSW for the specific locomotives and wagons proposed on the Project. These locomotives proposed for Inland Rail differ from the existing fleet on the Queensland network. Noise modelling approaches were applied to account for the varying rail noise emissions along the alignment, including; the track gradients, train speeds and infrastructure such as loops and turnouts.



Noise levels for the proposed daily and maximum railway operations at Opening Year (2028) and the Design Year 2040 were predicted to achieve the airborne railway noise assessment criteria from the DTMR's Interim Guideline at the majority of the sensitive receptors.

The predicted noise levels were above the Interim Guideline criteria at 82 residential receptors for railway operations at the Opening Year 2028 and Design Year 2040 (i.e. same sensitive receptors trigger for both years). These exceedances were caused by the Single Event Maximum (SEM) parameter exceeding the Interim Guideline assessment criteria, with 60 of these receivers also triggering the L_{eq} threshold. The highest predicted railway noise level was 12 dBA above the relevant noise assessment criteria. There are also 15 non-residential sensitive receptors, including schools, post office, fire stations, etc. where noise levels are predicted to trigger SEM (for both years).

Potential sleep disturbance impacts have been assessed using a criterion of 55 dBA $L_{eq,night}$, which is based on the Australian Government's Department of Health publication, The Health Effects of Environmental Noise, 2018 ('enHEALTH 2018') as referenced in the Queensland Environmental Impact Statement guideline. Based on the year 2040 scenario, the results of the sleep disturbance assessment are that 169 dwellings are predicted to exceed the threshold, of which 82 dwellings are also predicted to exceed the Interim Guideline criteria. The modelling inputs and assumptions for night-time assessment will be further reviewed and assessed during detailed design development of mitigation measures where sleep-disturbance effects are predicted.

Measures to mitigate noise exceedances were considered by reviewing the predicted outcomes, potential mitigation options and their effectiveness to achieve the Interim Guideline, where reasonable and practicable to do so. It was determined that noise barriers were a reasonable and practicable mitigation measure to minimise noise effects for exceedances predicted at the towns of Kurrumbul, Yelarbon, Pampas Brookstead, Pittsworth, and Gowrie from an acoustic perspective. For isolated receptors however, at-property treatments are determined to be a more reasonable options for mitigation.

For the aforementioned townships, concept railway noise barriers have been reviewed in the assessment to assist Inland Rail in determining the reasonable and practicable measures to reduce and control railway noise within the more relatively populated townships. The analysis determined that noise barriers would assist in reducing noise levels and enable predicted noise levels to achieve the noise criteria at majority of sensitive receptors. The noise barriers however would have potential engineering, environmental and social constraints which will require detailed investigation, including further noise prediction modelling, during the detailed design and construction of the Project.

Applying the predicted noise levels and the location of the sensitive receptors outside of the townships; the reasonable and practicable measures adopted by Inland Rail to reduce railway noise impacts, beyond controlling railway noise at its source, are expected to be at-property controls such as architectural property treatments and upgrades to property fencing. Example at-property treatments are provided in this document.

Whether noise barriers or other alternative noise mitigation measures are required will ultimately be determined through the detailed design of the Project. Options to mitigate and manage potential noise and vibration levels, at identified sensitive receptor properties and land-uses, will be considered further during detailed design. This will include further railway noise modelling, analysis of engineering constraints, constructability issues and other potential and environmental matters (flooding implications and visual impacts as examples).

Consultation with noise-affected landowners will continue to occur during detailed design, and mitigation measures will be refined and installed during the construction of the Project. Verification of railway noise levels will be undertaken once Inland Rail operations commence on the Project.



Vibration from train movements

The daily train passbys on the Project can be a potential source of vibration and associated ground-borne noise. An assessment of ground-borne vibration was undertaken to identify where railway induced vibration and its effects may be a potential source of impact. The ground-borne vibration levels associated with train movements were assessed to achieve the relevant vibration criteria at all sensitive receptors.

There were three residential sensitive receptors within 50 m of the main line where the ground-borne noise criteria were forecast to be triggered without the inclusion of specific vibration mitigation measures. At these receptors the noise environment is expected to be dominated by the airborne railway noise, even for habitable areas that may not directly face the railway corridor. Therefore, no mitigation measures for these properties are considered required in this study based on the criteria established as guided by the Interim Guideline.

Nonetheless if the detailed design identifies any need for mitigation, the designers may need to investigate specific localised options to modify the trackform design by the use of resilient track fixings (such as under-sleeper pads or under-ballast mats) to reduce vibration energy at source.

Summary

Assuming the detailed design remains consistent with this assessment, the Project is predicted to comply with the objectives of the Interim Guideline for the management of noise and vibration from railway operations at the majority of sensitive receptors. Mitigation measures have been recommended to achieve the noise and vibration assessment criteria at the identified sensitive receptors, where reasonable and practicable.

Nonetheless, achieving the criteria does not preclude the potential for noise and vibration during train passbys to be perceptible at sensitive receptors in the context of the quiet rural areas along the Project alignment. Inland Rail shall continue to engage with the communities and stakeholders to discuss the predicted railway noise and vibration levels and measures to ameliorate potential impacts.

The operational railway noise and vibration levels will be verified through noise and vibration monitoring once the Project is operational. Inland Rail will also investigate additional reasonable and practicable mitigation measures where monitored operational noise and/or vibration levels at sensitive receptors are confirmed to be above adopted railway noise and vibration criteria despite the installation of the recommended mitigation measures during the design phase.

Recommendations

Based on the assessment outcomes, key recommendations for the management of railway noise and vibration are:

- Noise and vibration assessments should be updated through detailed design and construction to address any design changes. Moreover, the train volumes and schedule for night movements are also recommended to be further developed to update the night-time assessment.
- The noise management measures outlined in this report, including the concept barriers in towns, should be investigated in further detail, and any necessary revisions to noise and vibration mitigation measures required to comply with the Interim Guideline or sleep disturbance thresholds should be defined such that they are installed during construction of the Project where appropriate.



- Allow for the vibration mitigation measures modelled in this report including the ballasted track over bridge and viaducts to consider suitable resilient matting for ballast retention and vibration isolation.
- Further validate the noise and vibration prediction models and update predictions during the detailed design of the Project.
- Develop an Operational Noise and Vibration Management Plan as part of the Environmental Management Plan to adequately detail the operational management controls to minimise noise and vibration, including the requirements for validation and monitoring of operational rail noise and vibration.
- Validate the noise and vibration predictions post-construction via monitoring, and extrapolate the measured levels to 2040 design year to determine the need for any additional mitigation measures if necessary.



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Acronyms and Abbreviations

Term	Definition
ARTC	Australian Rail Track Corporation
AS	Australian Standard
B2G	Inland Rail – Border to Gowrie Project
BS	British Standard
CEMP	Construction Environmental Management Plan
Ch	Chainage (km)
dB	Decibel
dBA	A-weighted decibel (referenced 20 µPa)
dB L	Unweighted decibel
DES	Department of Environment and Science
DIN	Deutsches Institut für Normung (German Institute for Standardisation)
DTMR	Department of Transport and Main Roads
EIS	Environmental Impact Statement
G2H	Gowrie to Helidon project
HDPE	High Density Polyethylene
Hz	Hertz
ISO	International Standards Organisation
Kg	Kilograms
Km	Kilometres
Km/h	Kilometres per hour
Km ²	Square kilometres
LAeq	Equivalent continuous sound level
LAeq(24hour)	The equivalent continuous sound level for the 24-hour period.
LAeq(12hour)	The equivalent continuous sound level for the 12-hour daytime period of 6.00 am to 6.00 pm
LAeq(1hour)	The equivalent continuous sound level for the busiest 1-hour period.
LAeq(T)	The equivalent continuous sound level for a defined time period 'T'.
LAm _{ax}	The maximum sound level during the measurement or assessment period. The LAF _{max} or Fast is averaged over 0.125 of a second and the LAS _{max} or Slow is averaged over 1-second.
m	Metres
mm	Millimetres
mm/s	Millimetres per second
m/s	Metres per second
NS2B	North Start to Border project
NSW	New South Wales



Term	Definition
OEMP	Operational Environmental management Plan
ONVMP	Operational Noise and Vibration Management Plan
PPV	Peak Particle Velocity
QLD	Queensland
QR	Queensland Rail
SDPWO	<i>State Development and Public Works Organisation Act 1971</i>
SEL	Sound Exposure Level
VDV	Vibration Dose Value

Glossary of Project Terminology

Term	Definition
Active level crossing	Where the movement of vehicular or pedestrian traffic across a railway crossing is controlled using signs or devices such as flashing signals, gates or barriers (or combination of these). The device(s) are active prior to, and during, the passage of the train through the crossing.
Airborne noise	Sound (noise) which travels through the air and commonly describes noise experienced within the outdoor environment.
Ballast	Crushed rock and stone used to provide a foundation for railway track. It usually forms the bed on which railway sleepers are laid, transmits the load from the train movements to the formation and restrains the track from movement.
Bunching and stretching	Wagons can touch from coming together or make a noise when they stretch and pull apart.
Consist	The set of wagons or carriages that form the train.
Continuously welded rail	Continuously welded rail shall be constructed on Inland Rail, and due to there being fewer joints, trains can travel faster on continuously welded steel rails than on jointed rails. The continuously welded rail can reduce noise and vibration emissions from passing trains.
Crossing loop	A place on a single line railway where trains travelling in the opposite direction can pass each other.
Culvert	A structure that allows water to flow under a road, railway, track or similar obstruction.
Existing rail corridor	The corridor within existing rail infrastructure are located. The existing rail corridor is defined by ARTC to mean everywhere within 15 metres of the outermost rails; or within the boundary fence (where fences are provided) and are closer than 15 metres. If the property boundary is less than 15 metres, the corridor is defined as the property boundary or a permanent structure such as a fence, wall or level crossing separating the operating rail corridor from other land.
Formation	The earthworks/ material on which the ballast, sleepers and tracks are laid.
Ground-borne noise	Railway vibration in buildings at frequencies typically from about 30 Hz to about 200 Hz, can excite the floors and walls which then radiate a rumbling noise directly into the rooms. This ground-borne (or structure-borne) noise is managed where it occurs without the masking from the airborne rail noise.
Level crossing	A place where rail lines and a road cross at the same elevation.



Term	Definition
Low frequency noise	Noise containing energy in the low frequency range. For the purpose of this assessment, noise at frequencies up to 200 Hz is considered to be low frequency noise.
Passive level crossing	Where the movement of vehicular or pedestrian traffic across a railway crossing is controlled using signs or devices that are not activated by the approach or passage of a train, relying on the road user or pedestrian to detect the approach or presence of a train by direct observation.
Practicable	Relates to engineering considerations, what can practically be built (e.g. safety, access, site constraints).
Rail corridor	The corridor within which the rail tracks and associated infrastructure are located.
Rail dampers	Elements that are attached to the sides of the rails to improve the rail's ability to absorb and dissipate vibration energy that results from the rolling contact between the wheel and rail.
Rail pads	Rail pads are plastic or rubber mats that are inserted between the rails and the sleepers. Their purpose is to evenly distribute the load from passing trains onto the sleepers. They can also act to reduce noise and vibration emissions from passing trains.
Rating background level	The underlying level of noise present in an area once transient and short-term noise events are filtered out.
Reasonable	Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh adverse social, economic and environmental effects, including the cost of the measure.
Rollingstock	All rail vehicles operating on the rail lines.
Rolling noise	Noise emissions from the rolling of the wheels on the rail.
Sensitive receptors	Land uses detailed in railway noise and vibration guidelines which are sensitive to potential noise and vibration impacts, such as residential dwellings, schools and hospitals.
Track	The structure consisting of rails, fasteners, sleepers and ballast, which sits on the formation.
Turnout	A junction point where a rail vehicle can leave a given track for a branching or parallel track.



1.0 Introduction

1.1 Project overview

The Border to Gowrie (B2G) project (the Project) is a new railway infrastructure project providing a connection between the North Star to Border (NS2B) Inland Rail project and the Gowrie to Helidon (G2H) Inland Rail project.

The Project commences at Chainage (Ch) 30.60 km (North Star to New South Wales (NSW)/Queensland (QLD) Border (NS2B)) at the NSW/QLD border, the median point of the Macintyre River, approximately 18 km southeast of Goondiwindi. The Project runs northeast via Yelarbon, Inglewood, Millmerran, Pampas, Brookstead, Pittsworth, Southbrook and the Toowoomba Wellcamp Airport to Ch 208.2 km at Gowrie Junction, northwest of Toowoomba.

The Project is a 217.48 kilometres (km) section of new single track railway comprising 7.0 km of standard gauge rail (1,435 mm) and 210.48 km of dual standard/narrow gauge rail (1,435 mm standard and 1,067 mm narrow). The new railway will be positioned within approximately 149.48 km of new rail corridor (greenfield) and approximately 68.00 km of existing rail corridor (brownfield), currently utilised by Queensland Rail's (QR's) South Western Line and Millmerran Branch Line.

The Project design has been developed in response to environmental, engineering and social constraints. The design objectives were to minimise environmental impacts, minimise disturbance to existing infrastructure and utilities and meet the engineering design criteria. The key components of the Project include:

- Approximately 217.48 km of standard and dual gauge rail line with five crossing loops to accommodate for 1,800 m long trains.
- A series of bridges and viaducts are required so the route can traverse the local topography and cross waterways and other infrastructure.
- Rail crossings including level crossings, grade separations/road overbridges, occupational/private crossings, fauna crossing structures.
- Significant embankments and cuttings will be required along the length of the alignment.
- Ancillary works including road and public utility crossings and realignments, signage and fencing and provision of services within the corridor.
- Construction worksites, laydown areas and access roads.

The Project's anticipated timing of stages following the receipt of the Coordinator-General's evaluation report and *Environment Protection and Biodiversity Conservation Act* (1999) (EPBC Act) controlled action determination, are shown in **Table 1-1**. The commencement of Year 0 is marked by the receipt of the Coordinator-General's evaluation report and EPBC Act controlled action determination, and Year 1 marks the commencement of physical works in the Pre-construction Activities and Early Works stage.

Indicative construction and operation dates have been adopted to enable the Project to demonstrate conservative assessment of potential impacts and mitigation measures in response to draft Environmental Impact Statement (EIS) submissions from public notification in 2021 and subsequent requests for information from the Coordinator-General.

Construction schedules assumed for the purposes of EIS technical assessments have been based on information available at the time of assessment and are subject to change.



Table 1-1 Anticipated timing of the Project stages and activities

Year	Year 0				Year 1				Year 2				Year 3				Year 4				Year 5			
Duration (quarterly years)	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Detailed Design																								
Project Approvals and Corridor Acquisition																								
Pre-Construction Activities and Early Works																								
Construction Works																								
Commissioning																								
Operations																								

1.2 Relationship to other Inland Rail projects

The Project is one of the interconnecting projects that make up the Inland Rail Program. The Project connects directly to the NS2B project in the south and the G2H project in the northeast.

The Project is one of the missing links within the Inland Rail Program. As part of the broader Inland Rail Program, the Project provides a more direct route between Melbourne and Brisbane in comparison with the existing inland and coastal road and rail networks, and meets the Commonwealth Government's objective of providing a long-term rail solution for competitive freight movement.

1.3 Operational rail noise and vibration assessment report

The Project has been declared as a coordinated project for which an Environmental Impact Statement (EIS) is required under section 26 (1) (a) of the *State Development Public Works Organisation Act 1971*. This assessment report forms part of the Inland Rail – Border to Gowrie Project EIS to be provided to the office of Coordinator-General (OCG).

The Project is also a controlled action under the EPBC Act and requires approval from the Commonwealth Minister for the Department of Climate Change, Energy, the Environment and Water (previously the Department of Environment and Energy).

This report, prepared by SLR Consulting Australia Pty Ltd (SLR), details the assessment of potential noise and vibration emissions from the railway operations on the Project.

The baseline noise and vibration surveys and assessment of noise and vibration from non-operational railway aspects of the project, including construction and road traffic have been addressed in a separate technical report¹ as part of the EIS.

1.4 Terms of Reference requirements

This report has been prepared to support the EIS, specifically EIS Chapter 16: Noise and Vibration, and addresses:

- Sections 11.117 to 11.126 of the ToR.
- Additional information requirements as issued by the OCG.

¹ Inland Rail – Border to Gowrie project, Appendix V – Noise and Vibration Assessment – Construction and Road Traffic



A compliance check of this report against each of the relevant components of the ToR and additional OCG information requirements is presented in **Table 1-2**. Note that requirements in relation to construction of the project are addressed in Appendix V – Noise and Vibration Assessment – Construction and Report Traffic.

Table 1-2 Noise and Vibration Terms of Reference

Item	Requirement	Report Section
ToR – Existing Environment		
11.117	Describe the existing noise and vibration environment that may be affected by the project in the context of the environmental values.	Section 5.0
11.118	Describe and illustrate on maps at a suitable scale, the location of all sensitive noise and vibration receptors adjacent to all project components and estimate typical background noise and vibration levels based on surveys at representative sites.	Section 5.1 - Section 5.4
11.119	If the proposed project could adversely impact on the noise and vibration environment, undertake baseline monitoring at a selection of sensitive receptors potentially affected by the project. Describe the results of any baseline monitoring.	Section 5.4
ToR - Impact assessment		
11.120	Describe the characteristics of the noise and vibration sources that would be emitted when carrying out the activity (point source and general emissions). Describe noise and vibration emissions (including fugitive sources) that may occur during construction, commissioning and operation.	Section 6.2.1
11.121	Predict and map the impacts of the noise and vibration emissions from the construction and operation of the project on the environmental values of the receiving environment, including sensitive receptors. The assessment of impacts on noise and vibration should be in accordance with the following: (a) EPP (Noise) 2008, using recognised quality assured methods (b) Environmentally Relevant Activities - DES Application Requirements for ERAs with noise impacts (Guideline ESR/2015/1838) (c) Construction - The Department of Transport and Main Roads Transport Noise Management Code of Practice: Volume 2 - Construction Noise and Vibration dated March 2016 and gazetted on 29 July 2016 (d) Operational Noise – The Department of Transport and Main Roads Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 4 (October 2017) (Rail noise external criteria contained in Table 3 of the document) (refer to Appendix 1) (e) Operational Vibration – British Standard BS 6472-1:2008 Guide to evaluation of human exposure	Section 3.0, 6.0, 7.0 and 8.0 Also addressed in Appendix V – Noise and Vibration Assessment – Construction and Road Traffic.



Item	Requirement	Report Section
	to vibration in buildings – Vibration sources other than blasting. British Standards Institution, London (f) any additional railway noise and vibration guidance documents released by the State of Queensland.	
11.122	Discuss separately the key project components likely to present an impact on noise and vibration for the construction and operation phases of the project.	Section 7.0 and 8.0. Also addressed in Appendix V – Noise and Vibration Assessment – Construction and Road Traffic.
11.123	Taking into account the practices and procedures that would be used to avoid or minimise impacts, the impact prediction must address the: (a) activity's consistency with the objectives of documentation referenced in 11.122 (b) cumulative impact of the noise and vibration with other known emissions of noise associated with existing major projects and/or developments and those which are progressing through planning and approval processes that are publicly available (c) potential impacts of any low-frequency (<200 Hz) noise emissions.	Section 10.0 Section 15.0 Section 12.4
ToR - Mitigation measures		
11.124	Describe how the proposed project would be managed to be consistent with best practice environmental management for the activity. Where a government plan is relevant to the activity, or the site where the activity is proposed, describe the activity's consistency with that plan.	Section 17.1 and 17.2
11.125	Describe any expected exceedances of noise and vibration goals or criteria following the provision or application of mitigation measures and how any residual impacts would be addressed.	Section 10.0 , 11.0 and Section 17.4
11.126	Describe how the achievement of the objectives would be monitored and audited, and how corrective actions would be managed.	Section 17.7

1.5 Report limitations

The findings of this report are based on the current design and may change as the Project design progresses. Should the final design or conditions vary from the basis of this assessment, the noise and vibration levels and associated impacts may differ from the findings presented in this report and this report will need to be revised accordingly. The assumptions made regarding construction schedules are also considered suitably conservative and appropriate for the purposes of EIS impact assessment and any changes unlikely to alter the outcomes and conclusions presented in the EIS.

Preliminary mitigation measures for railway noise and vibration have been presented in this assessment based on the adopted assessment criteria, identified sensitive receptors and the predicted noise and vibration emissions associated with the proposed future railway operations of the Project to comply with the Interim Guideline requirements.



As the Project progresses through its detailed design and construction phases a final set of mitigation measures will be developed by Inland Rail. This is expected to require further assessment of railway noise and vibration and the monitoring of railway noise and vibration at the opening of the Project.



2.0 Border to Gowrie project description

2.1 Overview

The Project is a 217.48 km section of new dedicated single track, open access freight railway between the NSW/QLD border and Gowrie, in Queensland. The Project is comprised of 7 km of standard-gauge rail (1,435 millimetres (mm)) and 210.48 km of dual standard/narrow-gauge rail (1,435 mm standard and 1,067 mm narrow). The new railway will comprise approximately 149.48 km of new rail corridor (greenfield) and approximately 68.00 km of existing open access rail corridor (brownfield), that forms part of QR South Western Line and Millmerran Branch Line.

Brownfield corridor refers to locations where the Project is generally coincident with existing rail corridors. This does not mean that the railway is located wholly within the existing rail corridor. Corridor widening and/or curve easing is generally required to meet the requirements of the Inland Rail Basis of Design, resulting in some works outside the extent of the existing rail corridors.

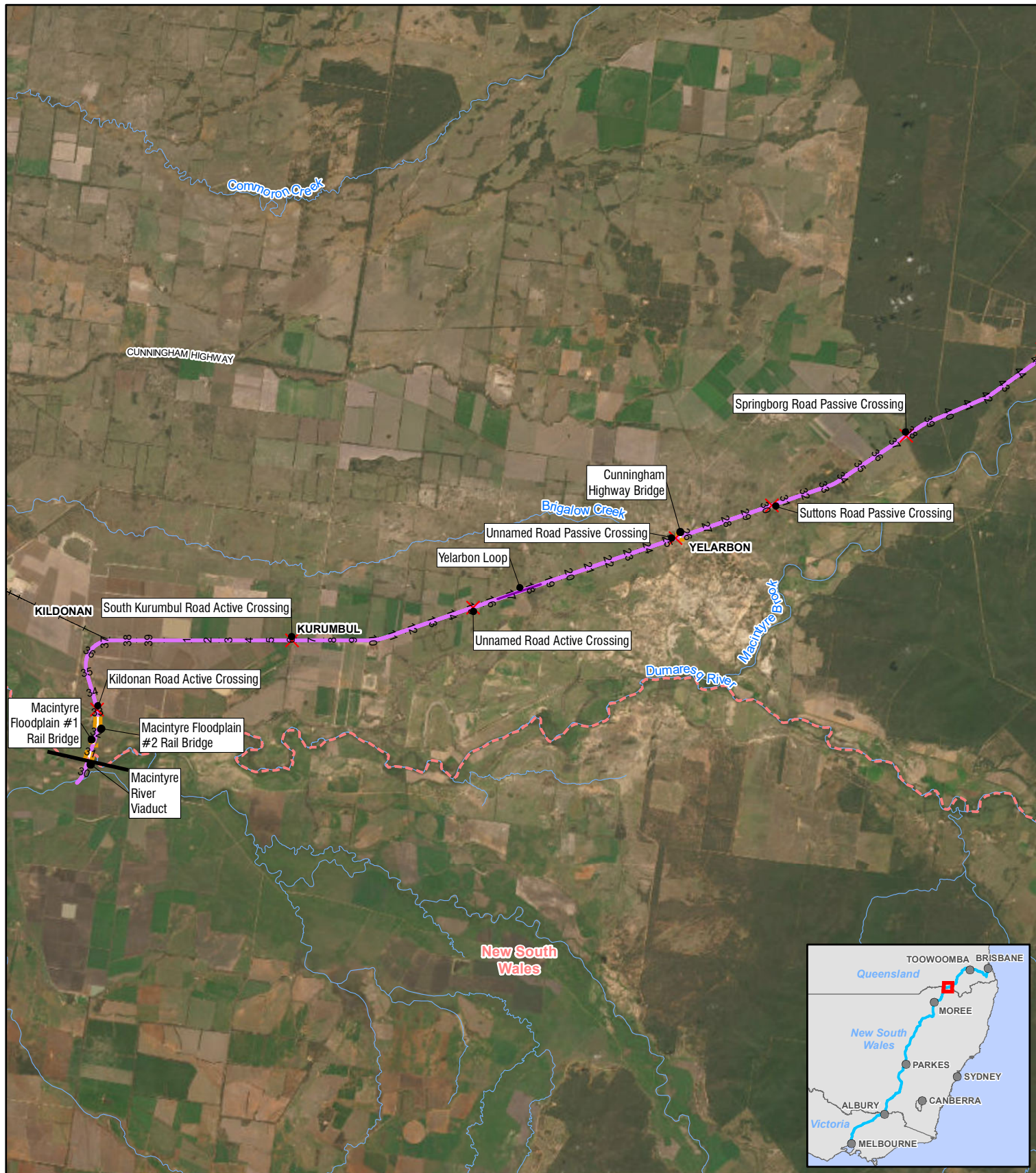
The design has been developed in response to environmental, engineering and social constraints. The design objective is to minimise environmental and social impacts, minimise disturbance to existing infrastructure and utilities, meet the engineering design criteria and realise Project benefits.

The key components of the Project are summarised in **Table 2-1**. The maps of the Project alignment along with the bridges and viaducts are presented in **Figure 2-1**.

Table 2-1 Key infrastructure for the Inland Rail – Border to Gowrie project

Key component	
Start and finish point	NSW/QLD border to Gowrie Junction in Queensland
Local government areas	Goondiwindi Regional Council and Toowoomba Regional Council
Length of alignment	217.48 km (149.48 km of new track and 68.00 km of upgraded track)
Track dimensions	30 metre (minimum) wide corridor; however, it is wider, as required, to accommodate the earthworks associated with large cuts and fills, drainage works, rail infrastructure, access roads and fencing.
Level crossings	29 public and multiple private level crossings with a mixture of active and passive crossings
New rail bridges and viaducts	37 of which 29 are rail bridges for crossing roads and waterways
Crossing loops	5 new loops up to 1,800 m in length (clearance point to clearance point) plus signalling overlap at Yelarbon, Inglewood, Kooroongarra, Yandilla and Broxburn.





BORDER TO GOWRIE

Overview of the Project

FIGURE 2-1 - Map 1 of 4

10 km

Coordinate System: GDA 1994 MGA Zone 56

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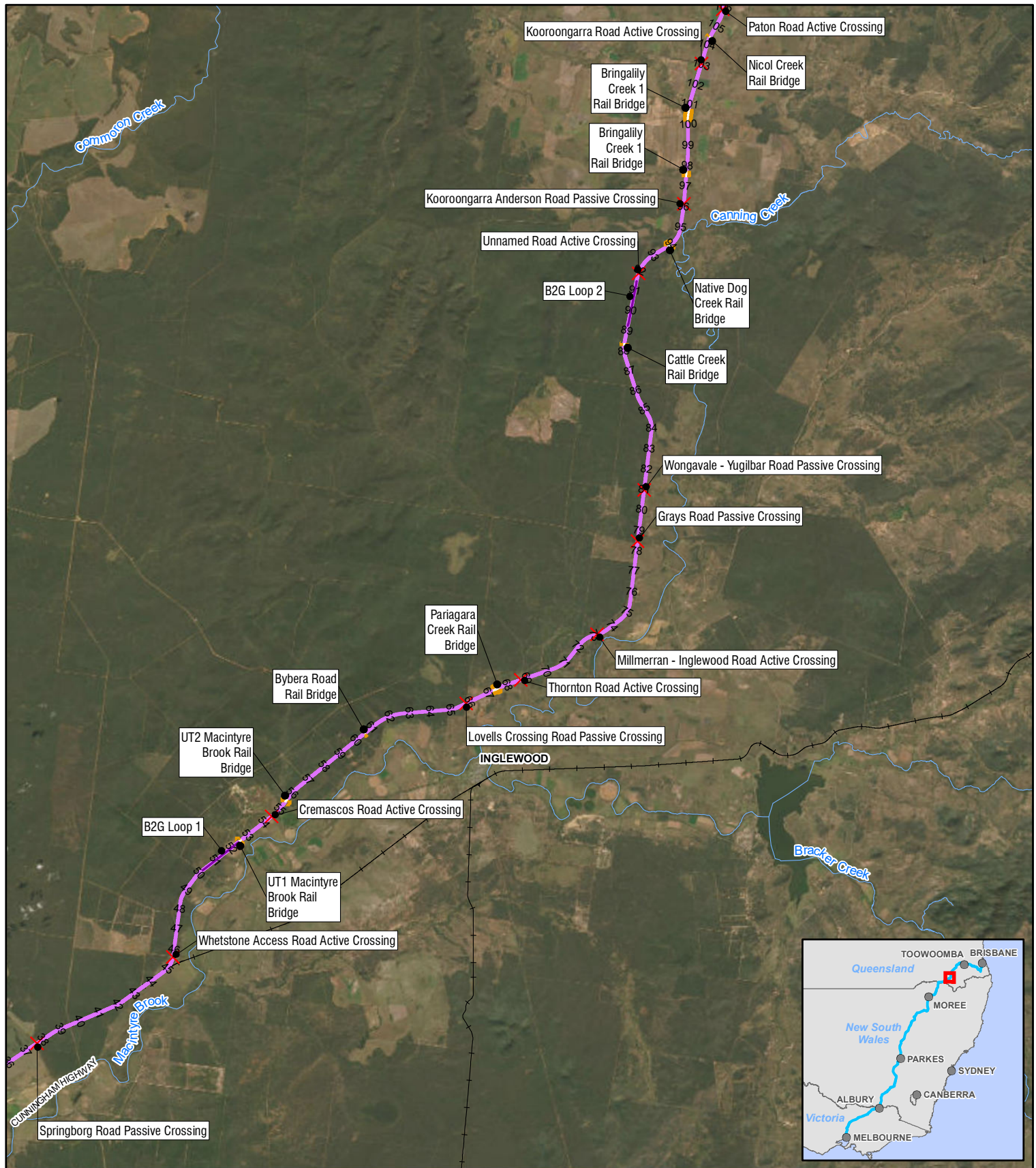
Paper: A4
Date: 23-Feb-2024
Author: JG

Scale: 1:250,000

- ✕ Level Crossings
- Project Extent
- Watercourses
- Existing Railway
- Crossing Loops
- Rail Alignment/Centreline
- Bridges and Viaducts
- - - State Boundaries

ARTC **InlandRail**

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE

Overview of the Project

FIGURE 2-1 - Map 2 of 4

10 km

Coordinate System: GDA 1994 MGA Zone 56

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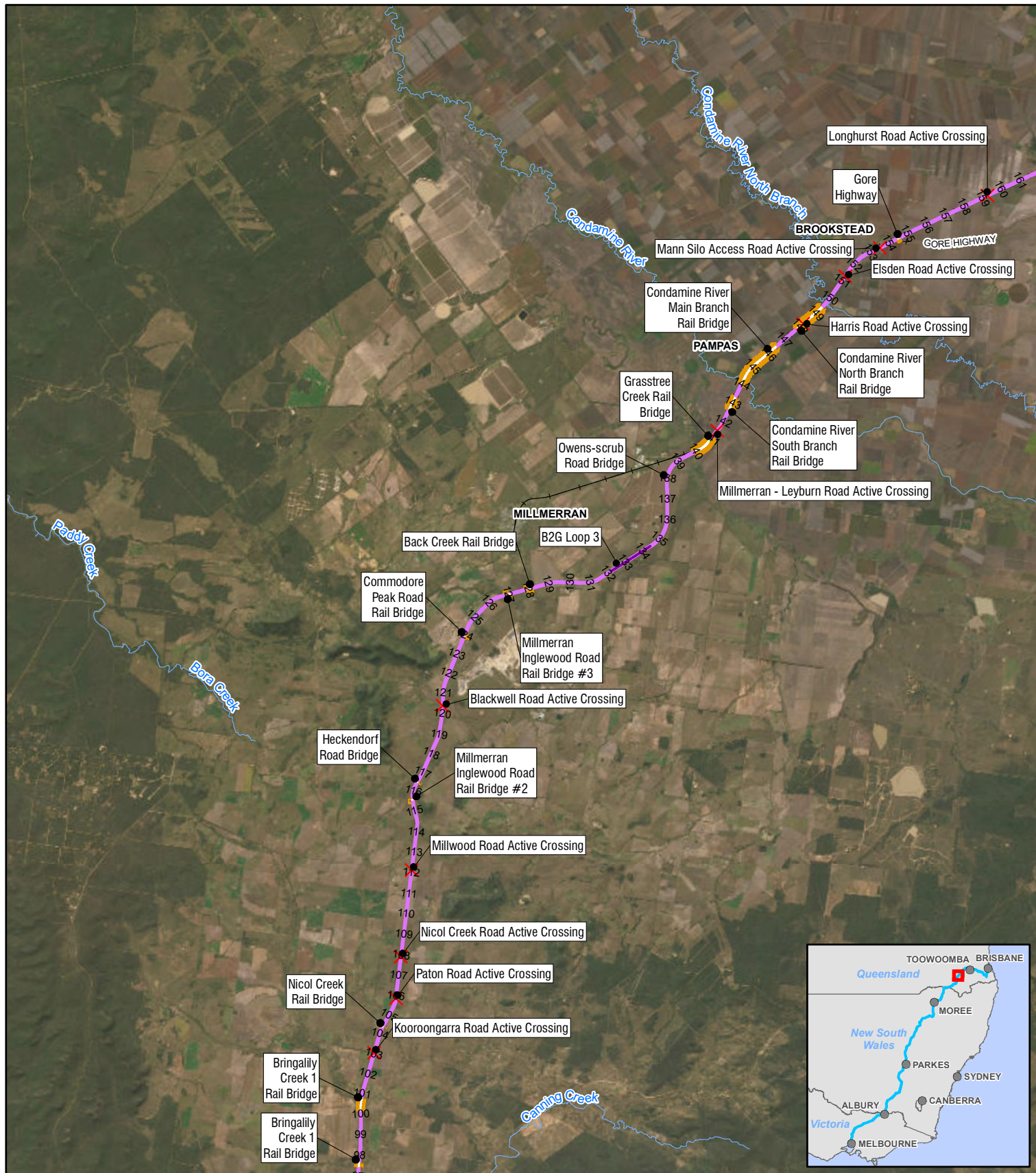
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Date: 23-Feb-2024
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- ✕ Level Crossings
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- - - State Boundaries

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BORDER TO GOWRIE

Overview of the Project

FIGURE 2-1 - Map 3 of 4

10 km

Coordinate System: GDA 1994 MGA Zone 56

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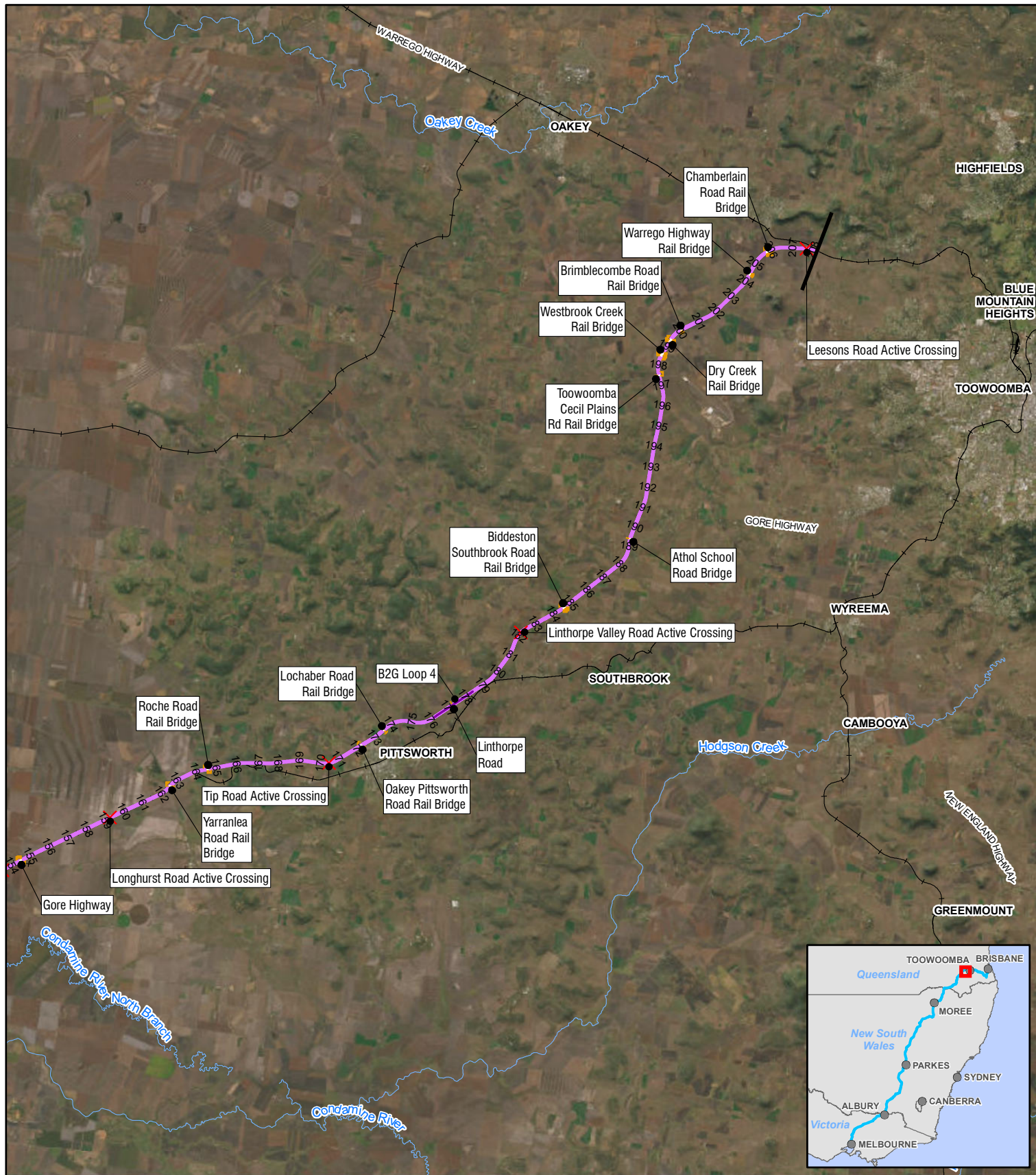
Paper: A4
Date: 23-Feb-2024
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Scale: 1:250,000

- ✕ Level Crossings
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- Bridges and Viaducts
- State Boundaries

ARTC **InlandRail**

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE

Overview of the Project

FIGURE 2-1 - Map 4 of 4

10 km

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
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- - - State Boundaries

ARTC **InlandRail**

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2.2 Rail bridges and viaducts

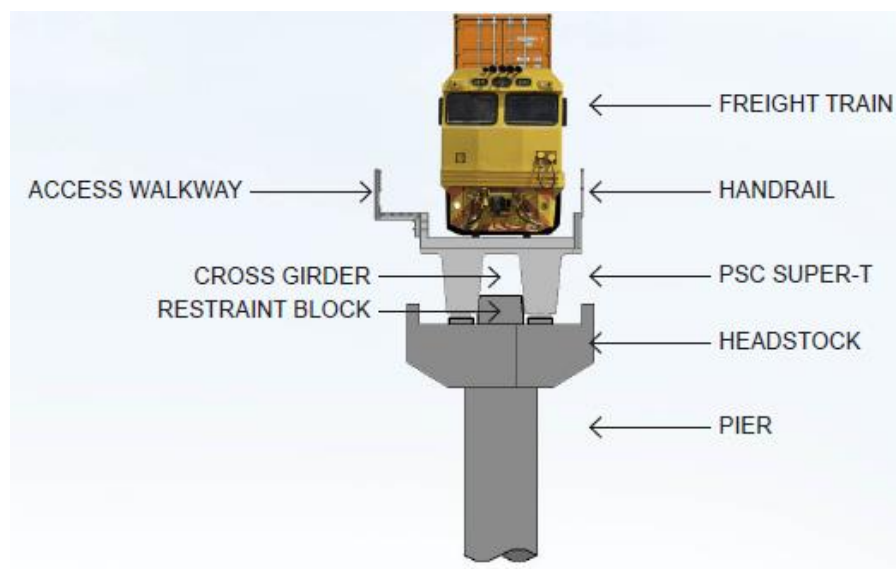
The Project requires 37 new bridge and viaduct structures of which 29 are for rail to cross over roads and waterways and 8 are to enable roads to cross over the rail corridor. The bridge and viaduct superstructures include the track system, walkways, guard rails and barriers as appropriate, and are typically founded on piles supporting in-situ reinforced concrete substructures.

Currently the designs indicate that the deck spans will typically be between 14 m and 46 m in length, noting that most bridges are made up of multiple spans. The sub-formation and ballast height will be approximately the same as the deck edge resulting in minimal screening of noise by the bridge structures.

Whilst minimal screening of direct airborne noise by the bridge structure may be expected, the use of ballast provides useful reduction of vibrational energy transfer into the structure which could generate structure-borne noise emissions that could cumulatively increase airborne noise emissions if direct fixed track bridge designs were alternatively used.

The bridges can be Super-T girders or pre-stressed concrete slab spans as illustrated in **Figure 2-2** and **Figure 2-3**.

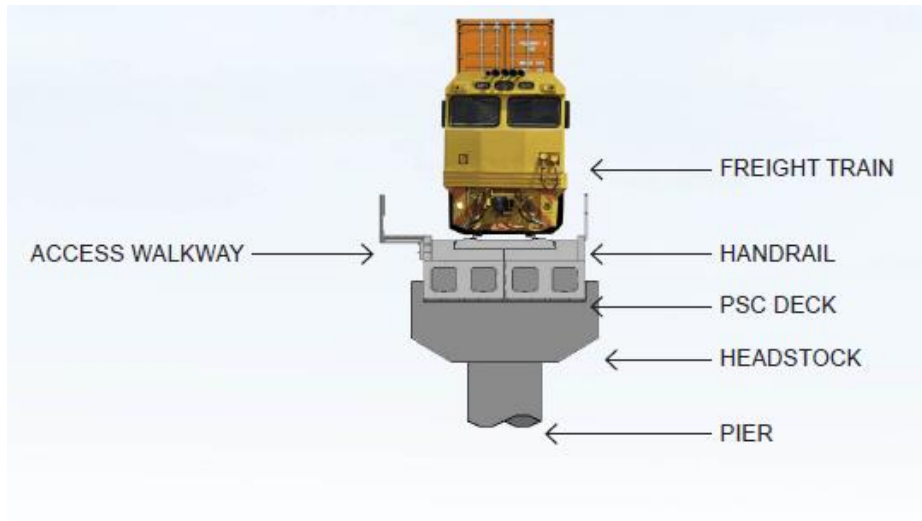
Figure 2-2 Typical pier with pre-stressed concrete Super-T girder



Note Not shown to scale.



Figure 2-3 Typical pier with pre-stressed concrete slab span



Note Not shown to scale.

The details of the bridges and viaducts are provided in **Table 2-2** and the location of the bridges and viaducts is presented in **Figure 2-1**.

Table 2-2 Bridges and viaducts on the Project

Bridge name	Bridge type	Crossing type	Chainage start (km)	Span (m)
Macintyre River Viaduct	Rail	Waterway	30.6 (NS2B)	535
Macintyre Floodplain #1 Rail Bridge	Rail	Waterway	31.4 (NS2B)	140
Macintyre Floodplain #2 Rail Bridge	Rail	Waterway	32.2 (NS2B)	546
Cunningham Highway Bridge	Road	Inland Rail	25.6	104
UT1 Macintyre Brook Rail Bridge	Rail	Waterway	52.4	207
UT2 Macintyre Brook Rail Bridge	Rail	Waterway	55.4	207
Bybera Road Rail Bridge	Rail	Road	60.5	75
Pariagara Creek Rail Bridge	Rail	Waterway	67.2	345
Cattle Creek Rail Bridge	Rail	Waterway	88.2	138
Native Dog Creek Rail Bridge	Rail	Waterway	93.8	184
Bringalily Creek 1 Rail Bridge	Rail	Waterway	97.4	299
Bringalily Creek 3 Rail Bridge	Rail	Waterway	100.1	621
Nicol Creek Rail Bridge	Rail	Water & road	104.3	92
Millmerran Inglewood Road Rail Bridge #2	Rail	Road	115.5	75
Heckendorf Road Bridge	Road	Inland Rail	116.4	59
Commodore Peak Road Rail Bridge	Rail	Road	123.9	75
Millmerran Inglewood Road Rail Bridge #3	Rail	Road	126.9	167



Bridge name	Bridge type	Crossing type	Chainage start (km)	Span (m)
Back Creek Rail Bridge	Rail	Waterway	127.9	230
Owens-scrub Road Bridge	Road	Inland Rail	129.8	72
Grasstree Creek Rail Bridge	Rail	Waterway	139.0	1,330
Condamine River South Branch Rail Bridge	Rail	Waterway	142.6	658
Condamine River Main Branch Rail Bridge	Rail	Condamine River	143.9	2,577
Condamine River North Branch Rail Bridge	Rail	Condamine River North Branch	149.1	1,568
Gore Highway	Road	Inland Rail	154.4	108
Yarranlea Road Rail Bridge	Rail	Road	162.5	69
Roche Road Rail Bridge	Rail	Road	164.5	121
Oakey Pittsworth Road Rail Bridge	Rail	Road	172.2	69
Lochaber Road Rail Bridge	Rail	Road	173.7	75
Linthorpe Road	Road	Inland Rail	177.1	66
Biddeston Southbrook Road Rail Bridge	Rail	Road	184.8	144
Athol School Road Bridge	Rail	Road	189.3	75
Toowoomba Cecil Plains Rd Rail Bridge	Rail	Road	197.3	92
Westbrook Creek Rail Bridge	Rail	Waterway	198.4	230
Dry Creek Rail Bridge	Rail	Waterway	199.1	184
Brimblecombe Road Rail Bridge	Rail	Road	199.9	75
Warrego Highway Rail Bridge	Rail	Road	204.3	132
Chamberlain Road Rail Bridge	Rail	Road	205.7	299

2.3 Rail design

The Project includes the establishment of 217.48 km of new single track railway, consisting of 7 km of standard gauge rail and 210.48 km of dual standard/narrow-gauge rail.

The 7 km of standard-gauge rail is a continuation of track from the NS2B project and extends from the NSW/QLD border to the connection point with the QR South Western Line at Kurumbul.

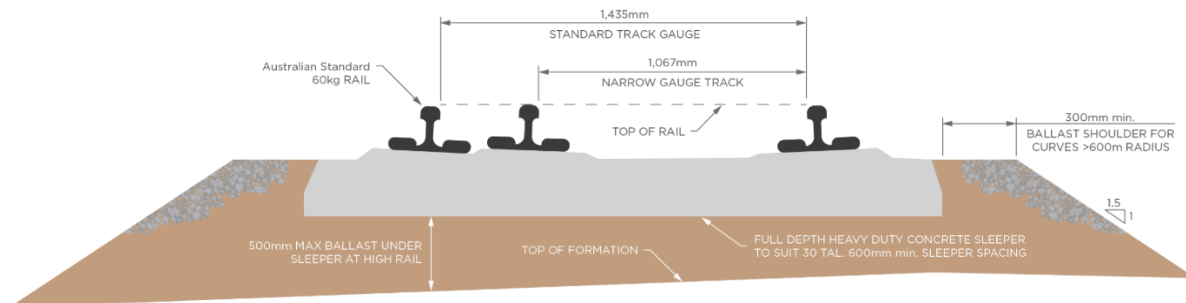
The remainder of railway for the Project will be a single-track, dual gauge railway line (standard (1,435 mm) and narrow (1,067 mm) gauge) and is proposed to facilitate the travel of trains in both directions within this section.

The mainline track structure is typically a ballasted track system consisting of continuously welded rail, resilient track fasteners, rail pads and concrete dual gauge full-depth sleepers at 600 mm centres and ballast between 250 mm and 500 mm in depth with minimum 300 mm shoulder width for lateral restraint.



A typical section for a dual gauge ballasted track is shown in **Figure 2-4**. Note that vertical alignments and related formations may slightly vary depending on the engineering constraints.

Figure 2-4 Indicative design for new track



2.4 Level crossings

Level crossings are typically applied to facilitate vehicle and pedestrian access where public and private roads interface with rail corridors. For safety purposes, the level crossings can require alarm bells at each crossing and a requirement for each train to sound its horns as it approaches the crossing. The Project involves 29 public and multiple private level crossings, which can be either passive or active, as defined below.

- Passive – have static warning signs (e.g. stop and give way signs) that are visible on approach. There are no mechanical aspects or light devices.
- Active – flashing lights and audible alarm bells with or without boom barriers for motorists, and automated gates for pedestrians. These devices are activated prior to and during the passage of a train through the levels crossing.
- The location of the public level crossings on the Project are summarised in **Table 2-3**.

Table 2-3 Public level crossings on the Project

Road name	Crossing Type
Kildonan Road	Active
South Kurumbul Road	Active
Unnamed Road (310-7-E-1)	Passive
Unnamed Road (310-10-P-1)	Passive
New Pedestrian Crossing (Yelarbon)	Active
Suttons Road	Passive
Springborg Road	Passive
Whetstone Access Road	Active
Cremascos Road	Active
Lovells Crossing Road	Active
Thornton Road	Active
Millmerran-Inglewood Road	Active
Grays Road	Passive



Road name	Crossing Type
Wongavale-Yugilbar Road	Passive
Unnamed Road (310-28-P3)	Active
Kooroongarra Anderson Road	Passive
Kooroongarra Road	Active
Paton Road	Active
Nicol Creek Road	Active
Millwood Road	Active
Blackwell Road	Active
Millmerran Leyburn Road	Active
Harris Road	Active
Elsden Road	Active
Mann Silo Road	Active
Longhurst Road	Active
Tip Road	Active
Linthorpe Valley Road	Active
Leesons Road	Active

2.5 Crossing loops

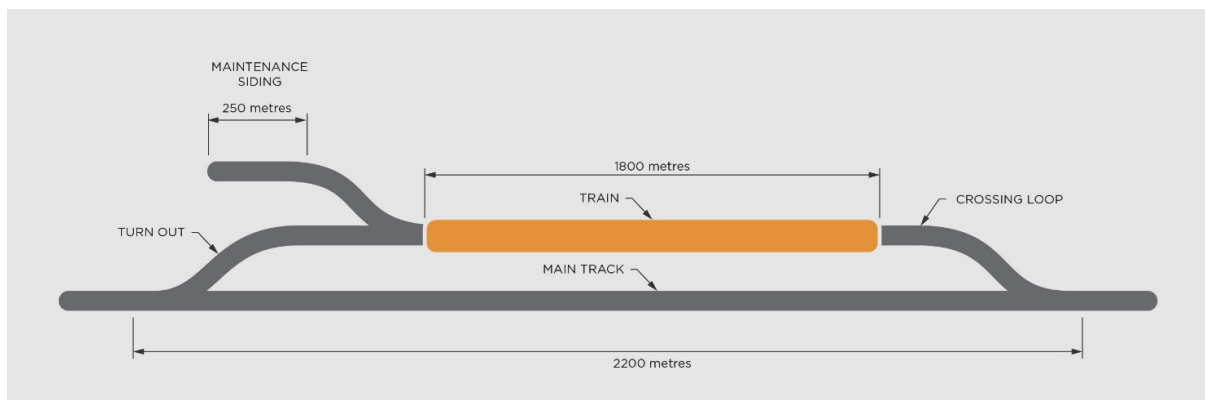
- Crossing loops enable a train to move from the main line track on to the loop and allow another train to pass through on the main line. The crossing loops are used to manage train movements on the network, such as trains travelling in the opposite direction or trains travelling at different speeds.
- The Project incorporates five new crossing loops, designed to accommodate an 1,800 m train length. Each crossing loop will be connected to the main line track at both ends so the crossing loops can be accessed by trains travelling in either direction.
- The loops would be new sections of track parallel to the existing track at an approximate 4.5 m spacing from the mainline track. Each loop shall incorporate a maintenance siding to enable maintenance of rollingstock without obstructing the track.
- The proposed location of the crossing loops are summarised in **Table 2-4** and the indicative design of the crossing loop and maintenance siding is shown in **Figure 2-5**.



Table 2-4 Crossing loop locations

Crossing loop	General location
Yelarbon ("Number 1")	Adjacent to Gibinbell station and Yelarbon Kurumbul Road. Ch 16.3 km to Ch 18.5 km
Inglewood ("Number 2")	North of McDougalls Road, west of the Cunningham Highway Ch 50.2 km to Ch 52.4 km
Kooroongarra ("Number 3")	Adjacent to Millmerran – Inglewood Road south of Kooroongarra Ch 89.2 km to Ch 91.4 km
Yandilla ("Number 4")	Adjacent to Lovells Road Ch 132.2 km to Ch 134.4 km
Broxburn ("Number 5")	North of the Gore Highway and Linthorpe Road Ch 176.1 km to Ch 178.4 km.

Figure 2-5 Indicative design for crossing loop and maintenance siding



2.6 Turnouts

A turnout is a point where a train can leave a given track for a branching or parallel track. The turnouts on the Project are expected at the locations below and each turnout on the Project alignment is detailed in **Table 2-5**.

- Connections between the Project and the South Western Line and Millmerran Branch Line;
- Cross overs to connect two parallel rail tracks; and
- Turnouts to each of the crossing loops and the maintenance siding at each loop.

Table 2-5 Location of turnouts on the Project

Turnout details	Chainage reference (km)
Connection to QR South Western Line	-2.27 (NS2B section)
Existing Kurumbull Loop	6.109
Existing Kurumbull Siding	6.191
Existing Kurumbull Loop	6.953
Number 1 Loop	16.323



Turnout details	Chainage reference (km)
Number 1 Siding	16.485
Number 1 Loop	18.523
Existing Yelarbon Loop	26.064
Existing Yelarbon Siding	26.324
Existing Yelarbon Siding	26.524
Existing Yelarbon Loop	27.002
Connection to South Western Line	44.497
Number 2 Loop	50.201
Number 2 Siding	51.045
Number 2 Loop	52.401
Number 3 Loop	89.216
Number 3 Siding	89.378
Number 3 Loop	91.415
Number 4 Loop	132.177
Number 4 Siding	134.220
Number 4 Loop	134.383
Connection to Millmerran Branch	139.237
Connection to Brookstead Siding	153.089
Connection to Millmerran Branch	165.732
Number 5 Loop	174.925
Number 5 Siding	176.963
Number 5 Loop	177.125



3.0 Environmental values and assessment criteria

The assessment of airborne noise, ground-borne noise and vibration from the Project has been undertaken consistent with ToR and general practice in Queensland with reference to the guidelines published under the *Transport Infrastructure Act 1994*.

Whilst the *Environment Protection Act 1994* and Environmental Protection (Noise) Policy 2019 (EPP (Noise)) apply for noise emissions in general, it states that noise from ordinary use/operations of rail transport infrastructure is not within scope of the EPP (Noise) being an activity listed in Schedule 1 of EP Act (and cross-referenced in Clause 7 (6)(a) of EPP (Noise), and hence are not considered in this assessment.

In 2019, the DTMR issued the Interim Guideline Operational Rail Noise and Vibration – Government Supported Transport Infrastructure² (Interim Guideline). The Interim Guideline is a published standard under the *Transport Infrastructure Act 1994*, and Inland Rail has adopted the Interim Guideline as the primary document to assess operational noise and vibration impacts on the Project.

This guideline aims to reduce the adverse environmental impacts of government supported transport infrastructure. For rolling stock noise and vibration emissions this requires reasonable and practicable measures to be implemented to prevent or minimise environmental harm and nuisance from operational activities. The guideline is specific to the assessment and management of railway noise and vibration from new rail infrastructure and upgrades to existing railway infrastructure.

The railway noise assessment criteria within the Interim Guideline are reproduced below in **Table 3-1**.

Table 3-1 DTMR Interim Guideline railway noise criteria

Type	Sensitive Land Use	Location at sensitive land use	External operational railway noise criteria		
			Single Event Maximum	LAeq(24hour)	LAeq(12hour)
New railway	Accommodation activities	All facades	≤ 82 dBA façade corrected	≤ 60 dBA façade corrected	-
	Educational establishments Childcare centres Health care services Hospitals Community uses Places of worship Offices	Outdoor spaces for passive recreation Outdoor education area Outdoor play area ¹	≤ 79 dBA free field	-	≤ 57 dBA free field

² Department of Transport and Main Roads, 2019. Interim Guideline, Operational Railway Noise and Vibration, Government Support Transport Infrastructure, dated March 2019.



Type	Sensitive Land Use	Location at sensitive land use	External operational railway noise criteria		
			Single Event Maximum	LAeq(24hour)	LAeq(12hour)
Upgrading existing railway or existing railway	Educational establishments	All facades	≤ 87 dBA façade corrected	≤ 65 dBA façade corrected	-
	Childcare centres Health care services Hospitals Community uses Places of worship Offices	Outdoor spaces for passive recreation Outdoor education area Outdoor play area ¹	≤ 84 dBA free field	-	≤ 62 dBA free field

Note 1 The facade corrected noise measurement / calculation / prediction height shall be 1.5 m above Finished Floor Level (FFL) or mid window height, whichever is the higher, for each storey of the building (1.0 m in front of the most exposed facade). Otherwise, the receptor heights shall be assumed at 1.8 m and 4.6 m above the building platform level for the ground and first floors respectively. A height of 0.5 m below the eaves' height is also acceptable. For free field criteria, the noise measurement / calculation / prediction height shall be 1.5 m above the ground level.

Note 2 For outdoor educational, outdoor play and passive recreational areas greater than 2,000 m², the criterion level is to be achieved for a minimum 2,000 m². For areas less than 2,000 m², the criterion shall be achieved for the whole area.

Note 3 Single Event Maximum (SEM) is the arithmetic average of the LAFmax from the highest 15 single events (i.e. rolling stock passby) during a Use Period within a 24-hour period.

Note that The Department of Transport and Main Roads (DTMR) Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 4 (October 2017) is not used in this assessment as this guideline is directed towards developers to consider noise emissions from railways for developments on land within the vicinity of the rail corridor, and not applied for new/upgraded rail projects (which are covered under the Interim Guideline).



3.1 Noise criteria for new and upgraded railway infrastructure

The Project will involve railway operations on new railway infrastructure and on sections of upgraded existing railway infrastructure for the Inland Rail tracks to be collated within existing rail corridors.

The Interim Guideline defines ‘Upgrading Existing Railway’ as situations where changes to infrastructure may result in ≥ 2 dB(A) for $L_{eq,24hr/12hr}$ or ≥ 3 dB(A) for SEM or above the ground-borne noise and vibration criteria (as detailed in **Section 3.2** and **Section 3.3**).

The railway noise management requirements from DTMR include specific noise criteria for new railways and the upgrade of existing railways.

Inland Rail has elected to assess and manage railway noise on the entire Project applying the noise criteria for new railways. The Project, for the purpose of operational railway noise, is being considered a greenfield railway infrastructure project and, to assess potential impacts, has adopted the most stringent railway noise criteria from the Interim Guideline. On this basis, an assessment or quantification of noise levels from existing railway operations on the Project alignment has not been undertaken.

The key aspects of the decision to assess the Project as new railway infrastructure are outlined below, including the benefits to the community of applying the noise criteria for new railways.

- The railway noise criteria for new railways are the most stringent criteria applicable under the DTMR guidelines to managing railway noise.
- All sensitive receptors will be assessed against the same noise criteria, irrespective of whether an individual receptor would currently experience noise from existing railway operations.
- As a result of the 2009-2011 floods in QLD, the Millmerran Line remains closed (red boarded) between Brookstead and Millmerran. There are currently no railway operations on this section (i.e. residences in this section have not been exposed to operational rail noise or vibration for over 10 years).
- The existing railway operations on the South Western Line and Millmerran Branch Line have a relatively small number of weekly train movements associated with seasonal agriculture. The operations equate to approximately one train per day and there would be periods throughout the year with no train movements over consecutive days.
- Rail noise levels at properties currently subject to rail noise will be dominated by future Inland Rail operations. Consequently, the railway noise levels with the Project will likely be dominated by the future new and additional rail freight operations facilitated by Inland Rail.
- Any requirement for noise management and mitigation will be determined by the future railway operations rather than the existing railway operations.



3.2 Ground-borne vibration guidelines

Railway vibration is generated by dynamic forces at the interface of the rail and train wheels. The resultant vibration from ground-level track can be transmitted into adjacent buildings via the intervening ground. If the levels of vibration are sufficiently high, then this vibration can be felt as tactile vibration by the occupants of nearby buildings.

People can perceive floor vibration at levels well below those likely to cause damage to buildings or their contents. Accordingly, the vibration criteria applied to manage potential impacts to human comfort at residences are usually the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents and structures, unless the structures are specially sensitive to vibration (see **Section 3.2.2**).

3.2.1 Ground-borne vibration criteria for sensitive receptors

For intermittent events such as train passby events, the vibration dose value (VDV) is applied to assess potential impacts to human comfort. The VDV provides a cumulative measure of the vibration levels associated with all railway operations in a daytime or night-time assessment period. The VDV considers the combined effects of the level of the ground-borne vibration and the duration of vibration generating events and, as such, is suited for the assessment of transient sources such as train passbys.

The Interim Guideline includes ground-borne vibration criteria for the management of vibration from railway operations and are reproduced in **Table 3-2**. The vibration dose values are based on the preferred values from BS 6472: 2008 - Guide to evaluation of human exposure to vibration in buildings - Vibration sources other than blasting.

Table 3-2 Ground-borne vibration criteria for sensitive receptors

Type of development	Sensitive receptors	Internal ground-borne vibration criteria	
		Use period ¹	Vibration dose value
New railway or upgrading existing railway	Accommodation activities	Daytime	$\leq 0.20 \text{ m/s}^{1.75}$
		Evening	
		Night-time	$\leq 0.13 \text{ m/s}^{1.75}$
	Educational establishments, childcare centres, health care services, hospitals, community uses, places of worship and offices	While in use	$\leq 0.40 \text{ m/s}^{1.75}$ (all areas) $\leq 0.10 \text{ m/s}^{1.75}$ (critical areas)

Note 1 Daytime 6.00 am to 6.00 pm, evening 6.00 pm to 10.00 pm and night-time 10.00 pm to 6.00 am.

The vibration criteria in **Table 3-2** are for sensitive receptors buildings, some scientific equipment (for example, electron microscopes and microelectronics manufacturing equipment) can require more stringent design goals than those applicable to human comfort. A review of the current buildings in the noise assessment study area did not identify that vibration sensitive scientific equipment would likely be in use at the sensitive receptors.

3.2.2 Ground-borne vibration criteria for heritage sites

Buildings which possess architectural, aesthetic, historic or cultural values may have certain sensitivities to vibration with respect to their long term preservation. In lieu of specific ground-borne vibration criteria for heritage sites in the Interim Guideline, a discussion of various standards relevant to vibration and its effects on buildings is provided in **Table 3-3** below.



Table 3-3 Referenced standards associated with cosmetic building damage risk

Reference	Notes
British Standard BS 5228.2 ³ British Standard BS 7385.2 ⁴	This standard notes that BS 7385-2 and BS ISO 4866:2010 provide guidance on vibration measurement, data analysis and reporting as well as building classification and guide values for building damage. BS 7385.2:1993 provides frequency dependent threshold levels which are judged to give a minimal risk of vibration-induced damage.
German Standard DIN 4150.3 ⁵	DIN 4150.3 prescribes levels as “safe limits”, up to which no damage due to vibration effects has been observed for the class of building. “Damage” is defined by DIN 4150.3 to include even minor non-structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls DIN 4150.3 also states that when vibration levels higher than the “safe limits” are present, it does not necessarily follow that damage will occur. Site specific criteria may be determined in conjunction with professional civil and/or structural engineering input based on the existing level of building condition and serviceability.

The Peak Particle Velocity (PPV) metric is applied as a measure of the maximum movement of the particles in the ground as a result of vibrations created from sources such as train passbys. It is commonly applied to evaluate the potential response of buildings and structures when exposed to vibration energy.

At the EIS stage, it is not possible to predict with reasonable certainty the dominant (or resonant) frequencies of vibration at each building during train passby events. Selecting the vibration criteria, irrespective of frequency, as essentially the lowest applicable value is an appropriately conservative assessment objective.

Based on **Table 3-3**, the guideline vibration values for the assessment of ground-borne vibration at heritage sites are presented in **Figure 3-1**. From this figure it can be seen that Line 3 of German Standard DIN 4150.3 is the lowest, most conservative vibration level, including where the vibration levels for Line 2 of British Standard BS 7385.2 are reduced by 50% where there is concern over continuous vibration generating ‘dynamic magnification’ resonance effects.

The German Standard DIN 4150.3 recommends a V_{PPV} objective of 3 mm/s at low frequencies increasing to around V_{PPV} 8 mm to 10 mm/s at frequencies above 50 Hz for sensitive structure with great intrinsic value (refer Line 3 DIN 4150.3).

The 3 mm/s vibration level has been adopted as the vibration objective to provide conservative assessment of potential impacts to heritage sites.

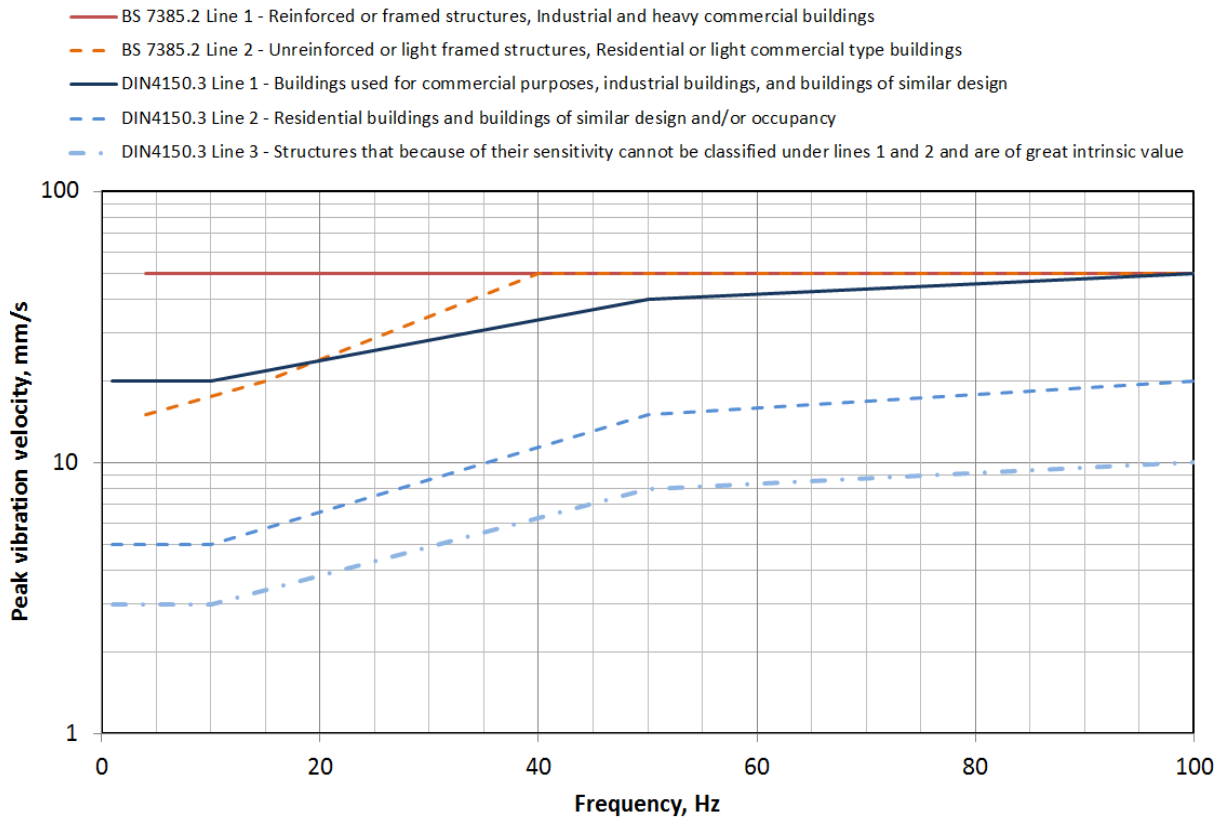
³ British Standard BS 5228.2-2009/2014-Code of practice for noise and vibration control on construction and open sites–Part 2: Vibration

⁴ British Standard, BS7385-2:1993 Evaluation and measurement for vibration in buildings

⁵ DIN 4150-3 2016 Structural Vibration Part 3 – Effects of vibration on structures



Figure 3-1 Guidance values for short term vibration



3.3 Ground-borne noise guidelines

The ground-borne vibration from train passbys can be sufficient to cause floors or walls of the structure to vibrate and this can result in an audible low frequency rumble inside buildings. This is termed as ground-borne noise or regenerated noise.

The ground-borne noise criteria listed in **Table 3-4** has been developed with reference to ground-borne noise assessment criteria from the Interim Guideline. Ground-borne noise criteria in buildings are primarily applicable at sensitive land uses where the level of ground-borne noise is likely to be greater than airborne noise (e.g. in buildings above rail tunnels where the airborne noise is masked by the tunnel).



Table 3-4 Ground-borne noise trigger levels

Type of development	Sensitive receptors	Internal ground-borne noise trigger levels	
		Use period ¹	SEM
New railway or upgrading existing railway	Accommodation activities	Daytime	≤ 40 dBA
		Evening/ night-time	≤ 35 dBA
	Educational establishments, Childcare centres Health care services and Hospitals	While in use	≤ 35 dBA ²
			≤ 40 dBA
			≤ 30 dBA
	Community uses (excluding a court of law) Places of worship and Offices		≤ 35 dBA
	Court of law (court rooms)		≤ 35 dBA ²
	Court of law (court reporting and transcript areas, Judges' chambers)		≤ 35 dBA ²

Note 1 Daytime 7.00 am to 6.00 pm, evening 6.00 pm to 10.00 pm and night-time 10.00 pm to 7.00 am.

4.0 Assessment methodology

The assessment of noise and vibration from the railway operations applied the following methodology.

- A desktop survey was undertaken to identify sensitive receptors within a 2 km radius of the Project alignment. An area greater than 840 km² (>84,000 hectares) was applied as the initial study area for railway noise and vibration.
- The 2 km study area was constrained to the limits of the Project extents. Railway noise and vibration levels at sensitive receptors outside the Project extents has been assessed on the corresponding NS2B as an approved project in NSW. Noise and vibration levels at sensitive receptors within the corresponding G2H project on Inland Rail is subject to ongoing assessment under the ongoing G2H project EIS.
- The applicable assessment criteria for airborne noise, ground-borne noise and ground-borne vibration were determined in accordance with the DTMR Interim Guideline.
- Noise and vibration assessment scenarios were determined for the proposed rail operations based on the EIS project description. The assessment scenarios were determined to be the Opening Year 2028 (for the commencement of rail operations) and Design Year 2040 (for the rail demand forecast for the year 2040).
- The principal sources of airborne noise, ground-borne noise and ground-borne vibration from the operation of rollingstock were identified and each source was assigned an appropriate emission level based on field measurements and/or available comprehensive databases.
- A detailed noise prediction model was developed for the calculation of airborne railway noise levels from rollingstock operations and associated sources of noise, including idling trains at crossing loops, and level crossings (assessed separately).



- The potential ground-borne vibration and ground-borne noise levels from rollingstock operations were calculated based on ground-borne vibration levels from comparable rail freight movements.
- The predicted airborne noise, ground-borne vibration and ground-borne noise levels were evaluated against the Interim Guideline assessment criteria with consideration to the project Terms of Reference (**Section 1.4**), sleep disturbance and low-frequency effects.
- The investigation of reasonable and practicable mitigation measures was triggered where the predicted levels were above the assessment criteria.
- The consideration of mitigation measures was in accordance with the Interim Guideline. Mitigation measures have been recommended as part of the overall strategy to minimise the potential noise and vibration impacts of the Project that are reasonable and practicable.
- The potential for residual impacts at sensitive land uses, after mitigation is implemented, was evaluated and recommendations were prepared for future noise and vibration assessment and monitoring works through the detailed design and upon commencement of operation for further validation.

5.0 Existing Environment

5.1 Sensitive receptors

The Interim Guideline identifies the receptors that can be potentially sensitive to noise and vibration from railway operations. The description of the various sensitive receptors referenced from the Interim Guideline is detailed in **Table 5-1**.

Table 5-1 Sensitive receptors

Sensitive receptors	Inclusions
Accommodation activities	Caretaker's accommodation, community residence, dual occupancy, dwelling house, dwelling unit, home-based business, multiple dwelling, nature-based tourism, non-resident workforce accommodation, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, rural workers' accommodation, short term accommodation and tourist park.
Education establishments	Primary and secondary schools, colleges, technical institutes, universities or other educational institutions.
Childcare centres	Crèches, early childhood centres, kindergartens and preschools.
Health care services	Medical centres, health clinics, surgeries and other medical institutions.
Hospitals	Hospitals
Community uses	Courts of law, art galleries, community halls, libraries and museums.
Places of worship	Churches, mosques, temples, synagogues, etc.
Offices	Offices
Mixed use	A mix of the uses listed above.
Protected area	An area identified under a conservation plan as a critical habitat or an area of major interest under the <i>Nature Conservation Act 1992</i> .
Public open spaces	A public park or gardens that is open to the public (whether or not on payment of a fee) for use other than for sport or organised entertainment (passive recreation only).



Source DTMR Interim Guideline, operational Railway Noise and Vibration, Government Supported Transport Infrastructure, March 2019.

To determine the sensitive receptors included in the assessment of railway noise and vibration, all buildings over 9 m² within the 2 km radius of the Project alignment were identified from a national geospatial dataset of buildings. Over 8,000 buildings were identified within the 2 km study area and each building was assigned a unique identification number for the purpose of the assessment.

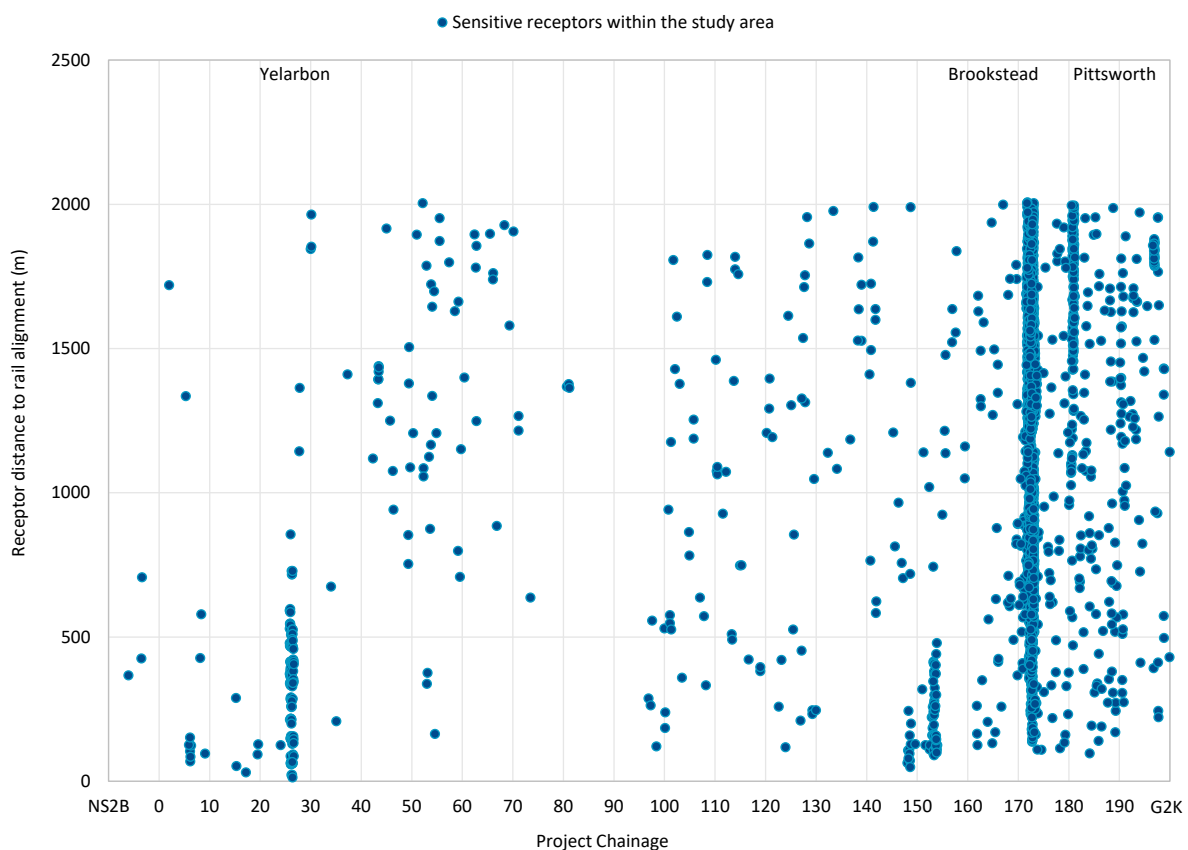
The buildings that were clearly identified from aerial imagery as non-sensitive, such as silos, sheds and warehouses were retained in the assessment as they could provide screening of rail noise levels at nearby sensitive receptors. Railway noise and vibration levels were not assessed at the non-sensitive buildings.

Of the buildings identified, 2,388 receptors were identified as being potential noise and vibration sensitive receptors within the 2 km study area. The distribution of these sensitive receptors along the Project railway alignment is presented in **Figure 5-1**. The majority of the sensitive receptors are within 50 m to 1,500 m of the Project alignment and concentrated around townships.

The individual sensitive receptors are detailed in the route maps provided in **Appendix A**.

Available Development Applications from the past six years were reviewed to identify any approved unbuilt sensitive receptor developments within the study area. The review included the Goondiwindi Regional Council and Toowoomba Regional Council areas along with the Queensland Coordinator-General Coordinated Projects and Economic Development Queensland development projects. See **Section 8.3** for further details.

Figure 5-1 Distribution of sensitive receptors along the project alignment



Note Some receptors are in the same location and the markers in the above figure may represent more than one receptor.



5.2 Sensitive receptors other than residences

Land use information from the EIS and the geospatial surveys was referenced to identify buildings and land uses that could be sensitive receptors other than individual residential properties. The number of buildings for each type of receptor is provided in **Table 5-2**. These types of receptors were identified in accordance with the requirements of the Interim Guideline, and are also shown in **Appendix A**.

Table 5-2 Non-residential sensitive receptors

Receptor types	Number of receptors within study area
Educational buildings	37
Child care centres	1
Community uses	21
Places of worship	9
Offices	43
Public open spaces	17
TOTAL	128

The protected areas for habitat consist of flying fox camps near Pittsworth and Toowoomba (as identified by the National Flying-Fox Monitoring Viewer from the Australian government *Department of Climate Change, Energy, the Environment and Water*) and koala habitat areas near Toowoomba (as identified in the Queensland Nature Conservation Plan).

5.3 Heritage sites

Referencing the cultural heritage assessment for the Project, the non-indigenous sites in

Table 5-3 Non-residential sensitive receptors

Site ID	Site name	Site description	Proximity to the Project
B2G-19-H01	Kurumbul Station	Timber stump remains of previous buildings	30 m
B2G-19-H02	Gibinbell Shearing Complex	Iron clad sheds, potentially constructed from repurposed material	25 m
B2G-19-H03	Gibinbell Siding	Only an earth bank remains of the station.	10 m
B2G-19-H04	Yelarbon & District Soldiers Memorial Hall	Chamferboard clad building with corrugated iron roof.	60 m
B2G-19-H05	Anzac Memorial Garden	Small Park with two stone/ granite block statues	60 m
B2G-19-H06	Cancer Charity Tree	Commemorative tree on sandstone block	17 m
B2G-19-H07	Church (former)	Chamferboard clad building with corrugated iron roof.	67 m
B2G-19-H08	Yelarbon Mill 1	Timber framed buildings in disrepair.	90 m
B2G-19-H09	Yelarbon Mill 2	Open sided iron roofed shed structure.	90 m



Site ID	Site name	Site description	Proximity to the Project
B2G-19-H10	Petrol Station	Disused chamferboard clad building	58 m
B2G-19-H11	Yelarbon Railway Complex	No original station buildings remain, large corrugated iron shed and series of grain silos	12 m
B2G-19-H12	Tree Trunk	Large felled tree, possibly used as a sign	100 m
B2G-19-H13	Whetstone Siding	All station buildings removed, and earthen loading bank remains.	450 m
B2G-19-H14	Homestead Complex	Weatherboard clad residence	SLR ID 254828, 110 m
B2G-19-H15	Homestead Complex	Weatherboard clad property from the later colonial period, not obviously occupied.	108 m
B2G-19-H16	Structure	Small weatherboard building, not occupied.	45 m
B2G-19-H17	Sheds	Two weatherboard & corrugated iron sheds	93 m
B2G-19-H18	Lookout	Lookout and rest area	370 m
B2G-19-H19	Outbuildings	Weatherboard clad outbuildings, associated homestead was removed	78 m
B2G-19-H20	Grass Tree Creek Bridge	Low timber girder rail bridge	Within the rail corridor
B2G-19-H21	Yandilla Station	Large corrugated iron shed and series of grain silos with a weighbridge	15 m
B2G-19-H22	Protest Public Art	Shipping container with public art	60 m
B2G-19-H23	Condamine River Bridge	Timber girder rail bridge with precast concrete abutments	Within rail corridor
B2G-19-H24	Pampas Station	Large metal grain handling shed with weighbridge	6 m
B2G-19-H25	Pampas Memorial Hall	Chamferboard clad hall on low timber stumps, still in use	75 m
B2G-19-H26	Sheds adjacent to Millmerran Branch Line	Dilapidated timber frame sheds	Within B2G rail corridor
B2G-19-H27	Condamine River Bridge 2	Timber girder rail bridge with precast concrete abutments	Within the rail corridor
B2G-19-H28	Brookstead Station	Complex of grain silos	53 m
B2G-19-H29	Brookstead Station Building (relocated)	Small weatherboard clad timber building on low stumps.	120 m
B2G-19-H32	Murlaggan Station	All station elements removed	Within the rail corridor
B2G-19-H33	Homestead Complex	Occupied weatherboard colonial dwelling & ruins of timber structures	78 m



Site ID	Site name	Site description	Proximity to the Project
B2G-19-H34	Archaeological Site	Site of former buildings, assumed outbuildings, site is extensively ploughed	Within B2G rail corridor
B2G-21-H2	Yelarbon Cemetery	Public cemetery administered by Goondiwindi Regional Council adjacent to the Cunningham Highway	851 m
B2G-21-H3	Avonlea homestead complex	Homestead complex including a house and at least two outbuildings (likely sheds)	86 m
B2G-21-H4	Multiple structures	Multiple structures including a house, garden and at least four other structures (likely sheds and other farm infrastructure)	65 m
B2G-21-H9	Brookstead Hotel	Brookstead Hotel including reception, bar and accommodation dating to the early 20 th century	154 m
B2G-21-H10	House and windmill complex	House and windmill complex including a house and at least two other structures (likely sheds)	332 m
B2G-21-H12	Shed	Shed	66 m
B2G-21-H13	Green Hills Hotel Complex	Green Hills Hotel complex including the grave of Maria Tibbs, artefact scatter, cottage, house and timber posts	Within B2G corridor (canopy/shed)
B2G-21-H14	Fairvale homestead complex	Fairvale homestead complex including a house and at least four sheds. The house likely dates to the late colonial period.	198 m

5.4 Existing noise environment

A baseline environmental noise survey was undertaken in 2018 to quantify and characterise the noise environment surrounding the Project alignment. The noise survey was conducted by the Future Freight Joint Venture to support the assessment of noise from the construction of the Project. Additional monitoring at four schools was conducted in 2023. A summary of the survey is provided below with the noise monitoring survey detailed in the revised draft EIS Appendix V: Noise and Vibration Assessment – Construction and Road Traffic.

Existing noise levels were monitored at 15 locations selected to be representative of the nearest communities to the Project. The monitoring surveys were principally to define the daily environmental noise levels.

The Rating Background Levels (RBL) determined from the monitoring survey are summarised in **Table 5-4** and confirm that the existing noise levels are generally low, typically below 40 dBA during the daytime and evening and below 35 dBA during the night-time.

The RBLs are characteristic of the steady-state rural noise environments where the main sources of noise are local road traffic, residential activities and natural sources, such as windblown vegetation and bird song.



Table 5-4 Existing environmental noise levels

Monitoring location	Rating background levels, dBA		
	Daytime	Evening	Night-time
B2G_01, Kurumbul	30	34	28
B2G_02, Yelarbon	36	35	25
B2G_03, Yelarbon	41	40	24
B2G_04, Yelarbon	32	34	23
B2G_05, Inglewood	31	33	23
B2G_06, Brookstead	39	38	29
B2G_07, Pittsworth	35	40	27
B2G_08, Pittsworth	37	37	25
B2G_09, Southbrook	40	37	30
B2G_010, Athol	35	36	29
B2G_011, Gowrie	35	31	26
SC01, Yelarbon State School	36	37	35
SC02, Brookstead State School	36	38	42
SC03 Pittsworth State High School	37	40	38
SC04 Soothbrook Central State School	40	43	38

Note Daytime is 7.00 am to 6.00 pm, evening is 6.00 pm to 10.00 pm and night-time is 10.00 pm to 7.00 am.

Source Inland Rail: Border to Gowrie, Appendix V –Noise and Vibration Assessment – Construction and Road Traffic.



6.0 Railway noise modelling

6.1 Prediction of railway noise

The noise emissions from the railway operations on the Project were calculated using the SoundPLAN (version 8.2) noise prediction modelling software.

The noise prediction model included a detailed terrain model to develop a 3-dimensional (3D) representation of the Project and the 2 km study area. The terrain datasets comprised 3D data of the existing ground and the Project designs to recreate in detail the rail and road civil earthworks and infrastructure and the surrounding environment. The resultant terrain model represented the future environment with the Project.

The vertical and horizontal designs for the Project were digitised in the model, including; cuttings, embankments, and the track formation (earthworks and track ballast). The elevated structures for the bridges and viaducts were modelled at the height above ground level consistent with the Project designs. The base of the elevated structures was digitised to represent the concrete spans that form each bridge and viaduct with the rail track (inclusive of ballast) modelled on top of the spans.

The buildings for the sensitive receptors and non-sensitive structures were set to the mean ground height. Building heights were determined from the referenced geospatial database, where the building height was not reported a 5 m building height was adopted as being representative of the single storey residences that are common in rural areas.

The Interim Guideline recommends noise levels are calculated at a height of 1.5 m or 1.8 m above the finished, floor level of the ground floor. Alternatively, 0.5 m below the eave height is also acceptable under the Interim Guideline.

Receiver heights have been modelled at 0.5 m below eave height consistent with the Interim Guideline recommendations. For a small portion of sensitive receptors (isolated rural dwellings) with no eave heights available, receptor heights have been determined to be 1.8 m above the terrain level for ground floor, and 4.6 m above terrain level for first floor (if applicable).

All external railway noise predictions were adjusted by +2.5 dBA to determine the façade corrected noise level, as required by the Interim Guideline.

The immediate area 600 m either side of the rail corridor was modelled with a ground absorption coefficient of zero (0 – 100% reflective) to be representative of a hard, reflective ground surface. Further than 600 m from the rail corridor a ground absorption coefficient of one (1 – 100% absorptive) was adopted to be representative of the rural environment beyond the rail corridor, except for the area verified to be a built environment (where hard ground effects were applied).

To calculate noise emissions from the operation of rollingstock, the model applied the Nordic Rail Traffic Noise Prediction Method (Kilde 130) methodology⁶. Both the SoundPLAN modelling software and the Nordic prediction methodology are widely applied in Australia and accepted under the Interim Guideline. The adoption of this rail prediction methodology is expected to provide a conservative prediction of noise levels across the study area.

⁶ M. Ringheim, 1984, *Kilde Report 130 – Background Material for the Nordic Rail Traffic Noise Prediction Method*.



To confirm the suitability of the noise modelling inputs on the QLD sections of the Inland Rail program, a survey of existing railway noise levels was undertaken in 2019 at discrete track side locations on the West Moreton System. Details of the monitored railway noise levels and the noise model verification are provided in **Appendix B**.

6.2 Daily railway operations

The strategic business case for Inland Rail is based on the projected movement of goods and materials (tonnage) on the Project. The train movements are derived from the tonnage predictions and directly linked to the expected future demand for freight services.

The predicted tonnage, and resultant train operations, account for the demand of inter-capital, intermodal, and regional agricultural freight, the effects of climate change, the economic and industrial demands of the future road freight, coal process and exchange rates.

Accounting for the variability of these factors, the daily train movements on the Project are described as Typical and Peak operations. The Interim Guideline requires noise and vibration to be assessed based on the 'typical worst-case (e.g., typical maximum operating conditions)', for Inland Rail this is the Peak daily train services, which account for the maximum forecast operations including the seasonal agricultural services.

The adopted Peak train numbers are the best available information at the time of assessment and considered representative of typical worst case operating conditions.

The train movements on the Project were provided by Inland Rail for the assessment of operational railway noise for the Opening Year 2028 and the Design Year 2040. Consideration of the Design Year 2040 scenario satisfies the Interim Guideline requirement for assessing a 10-year horizon of train operations.

The daily train movements associated with the Project are detailed in **Table 6-1** below and are based on the following principles:

- The train movements are the total daily movements in both directions for the 24-hour period and are rounded to integers to assess a complete train pass by. The total movements are equally distributed to determine the northbound and southbound daily train movements, based on rail forecasts of train departure times.
- When assessing to a 12-hour period, for example outdoor spaces, the specific number of trains are assumed the same distribution of rail traffic between the 24-hour period and 12-hour period based on forecast departure times.
- The noise assessment only considers whole trains, so the train movements are rounded to the nearest integer.

Table 6-1 Daily train movements on the Project (total for both directions)

Train service	Train movements-Opening Year 2028	Train movements-Design Year 2040
MB Express (Bromelton)	1	2
MB Express (Acacia Ridge)	1	2
MB Superfreighter (Bromelton)	5	6
MB Superfreighter (Acacia Ridge)	1	1
GB Superfreighter (Bromelton)	2	3
GB Superfreighter (Acacia Ridge)	1	2
Narrabri – Port of Brisbane Grain	2	3



Train service	Train movements-Opening Year 2028	Train movements-Design Year 2040
Yelarbon – Port of Brisbane Grain	2	3
Narrabri – Port of Brisbane Export	1	2
Yelarbon – Port of Brisbane Cotton	1	1
TOTAL	17	25

6.2.1 Night-time railway operations

The Interim Guideline mandates that the assessment of noise and vibration from rolling stock operations on the Project be based on a 24-hour period. However, a separate assessment of night-time noise impacts has been undertaken to inform sleep disturbance effects (see **Section 10.0**) that requires considering noise levels over the 8-hour period between 10:00 PM and 6:00 AM. To provide this assessment, it is necessary to estimate the number of likely train movements during the night-time period.

At the EIS stage, it is too early in the development of the B2G project to know with certainty how daily railway operations will unfold. While the number of trains operating in a day will not exceed the peak train movements defined in **Table 6-1**, the distribution of train movements over a 24-hour period may vary depending on several factors:

- Activities at the main freight terminals at the Port of Brisbane and Port of Melbourne.
- Demand for freight services, as trains are typically not deployed until they have a minimum volume of freight to be economically viable.
- Availability of rolling stock, such as when locomotives are undergoing routine maintenance.
- Train operations elsewhere on the Inland Rail network that may influence travel times for other services.
- Trains stopping to allow train crossing movements.
- Refuelling and crew changes.

To estimate the number of potential train services during the night-time, Inland Rail reviewed the anticipated operations on the B2G alignment. The bi-directional track on B2G allows trains to travel in both directions on the same track, which was identified as a primary constraint on the number of train services per hour.

The operation (occupancy) of the track is determined by the safe operation of the main line track and the crossing loops. There were four operational scenarios:

- A northbound train following another northbound train.
- A southbound train following another southbound train.
- A northbound train entering a crossing loop to let a southbound train pass on the main track.
- A southbound train entering a crossing loop to let a northbound train pass on the main track.

Inland Rail's analysis identified that a typical minimum 30-minute spacing between two trains is required to achieve safe operations for the above scenarios. This minimum time is based on the travel time of the train and the time needed to access the crossing loop.

In theory, this could result in a total of 16 train movements within the 8-hour night-time period (a theoretical slot for 2 trains per hour). However, this would represent more than 90% of



daily movements occurring at night (in 2028) and 65% of daily train movements occurring at night (in 2040), which Inland Rail do not forecast to occur on this corridor.

Given that trains are traveling from different departure locations, including over 1,000 km away in Melbourne, it is unreasonable to assume that Inland Rail could accommodate and manage the network operation of two freight trains every hour for eight consecutive hours during the night time period.

Furthermore, if some hours have two train movements, there will be other hours without train services. This is because not all hours in a day would be needed to accommodate the peak daily traffic of 25 train movements.

Therefore, it is deemed reasonable at the time of the EIS to base the assessment of night-time noise on the following assumptions:

- There would be at least one train movement in every hour of the night-time period, with no allowance made for hours without train operations.
- The night-time train movements allow for one train per hour for eight consecutive hours.
- In this scenario, approximately 32% of daily train movements would occur during the night-time.
- The train types are proportionally distributed to operate at night due to the lack of more detailed scheduling information at this EIS Stage. The considered train volumes for the 2040 scenario are presented in **Table 6-2**, which are derived from the peak weekly volumes.

Table 6-2 Night-time train movements

Train service	24-hour Train movements- Opening Year 2040	Night-time Train movements- Design Year 2040
MB Express	4	1
GB Superfreighter	12	4
Narrabri – Port of Brisbane Export	2	1
Narrabri – Port of Brisbane Grain	3	1
Yelarbon – Port of Brisbane Grain	3	1
Yelarbon – Port of Brisbane Cotton	1	0
TOTAL	25	8

Refer to **Section 11.2** for further discussion on train types.

6.3 Operational railway noise model inputs

6.3.1 Track gradient and locomotive notch settings

To control the speed of the trains, the locomotives have a series of throttle controls, known as notches. Most locomotives have up to eight notches and follow the operational principles below. The notch setting of a locomotive is related to the noise emission, with higher notch settings generally causing higher noise levels.

- When operating on relatively flat or moderate gradients the locomotive would generally be operated at a medium notch setting (notch settings 3, 4 or 5).



- On downhill gradient track trains are often in low notch setting or can use dynamic braking where the traction motors that drive each locomotive axle are used to slow the train. Dynamic braking can be a source of additional noise as the radiator cooling fans are used to dissipate heat energy from resistor banks on the locomotive.
- For uphill gradients the load is increased which requires high notch settings (notch setting 6, 7 or 8). Often on uphill sections the train can be operating at lower speeds but at a higher notch setting.

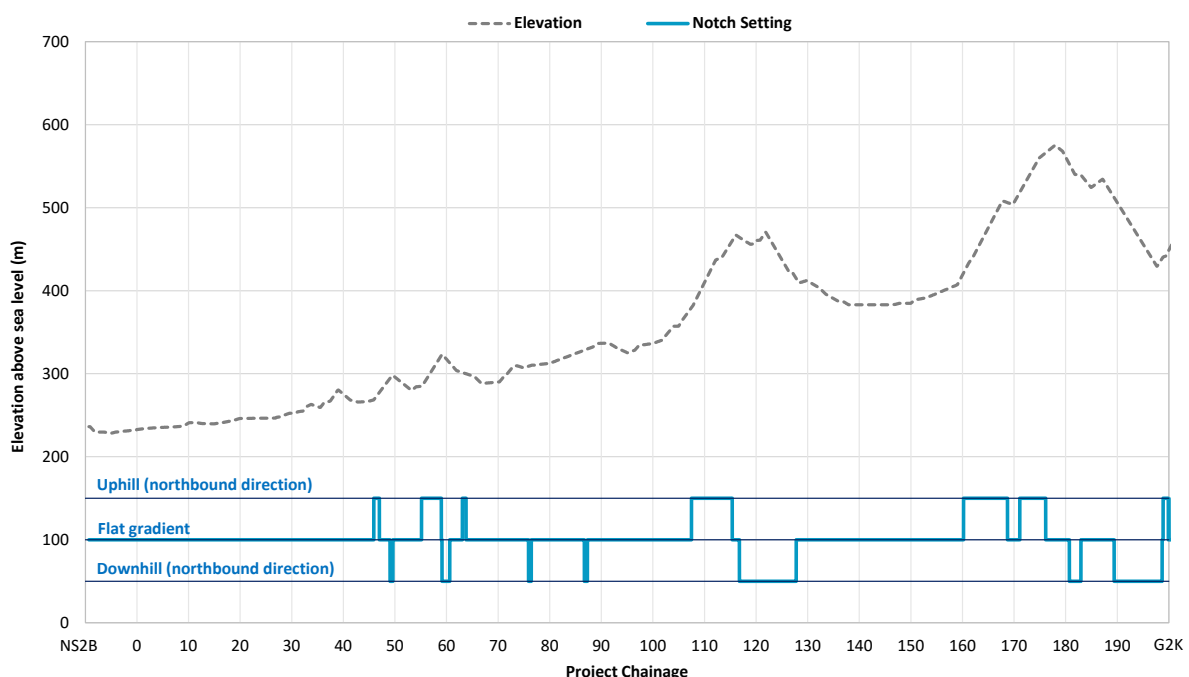
For the purpose of assessment, a gradient of 1 in 100 or steeper was applied to identify areas where uphill and downhill sections may require a high notch setting or dynamic braking. This approach is considered conservative as the design gradient for the project is 1 in 80 and hence the corrections for higher notch will apply on gradients on the project steeper than 1 in 100. Also, the corrections for dynamic braking are also assumed to be applicable at similar downhill gradients for modelling purposes.

In practice, the selection of notch settings and dynamic braking will be determined by the driver and the 1 in 100 gradient was adopted to provide a conservative allowance for such events. The track elevation for the Project and the notch settings and dynamic braking applied in the assessment of airborne noise are shown in **Figure 6-1**.

In addition to the gradients, locomotives starting and accelerating from crossing loops are also expected to use high notch settings to generate sufficient thrust whilst getting on to the main lines. In order to account for this behaviour, higher notch settings are used for the locomotives accelerating from crossing loops.

During train movements on gradients, there may be a potential for rolling stock to also have bunching and stretching noise. These are considered in the assessment based on the levels presented in **Table 6-10**. However, the bunching and stretching noise is not predicted to contribute to overall noise levels as the rolling and locomotive noise levels are observed to be significantly higher (as evident from noise levels presented in **Table 6-4**) for trains travelling at posted speeds.

Figure 6-1 Track elevation and locomotive notch setting



6.3.2 Train speeds

As the project design has not yet progressed to the position of assigning signposted speeds, the noise modelling applied speed profiles for each train type based on worst-case operational train speeds. The following are assumed conservatively in assigning modelling speeds:

- All trains are modelled at no less than their maximum potential line speed for non-stopping services travelling along the mainline. This includes a consistent 115 km/h for the interstate and super-freighter services and all other services such as grain and cotton trains at the safe maximum and permitted speed granted for freight rail transport operators services, which is a consistent 80km/hr unloaded and 60km/hr loaded.
- No allowance is made for trains to slow due to track features such as terrain/gradient or curvature. Not allowing for reductions in speed due to train performance over terrain/gradient or curvature on the main line adds further conservatism to the modelled speed profiles and associated noise level predictions.
- Trains stopping at crossing loops (roughly one in four trains) are modelled at 45 km/h which is the posted speed at crossing loops.

The train speed profiles adopted in the noise modelling are presented in **Figure 6-2** (northbound) and **Figure 6-3** (southbound). The acute changes in train speed are associated with entry to and exit from the crossing loop.

Figure 6-2 Operational track speed profiles, Border to Gowrie direction

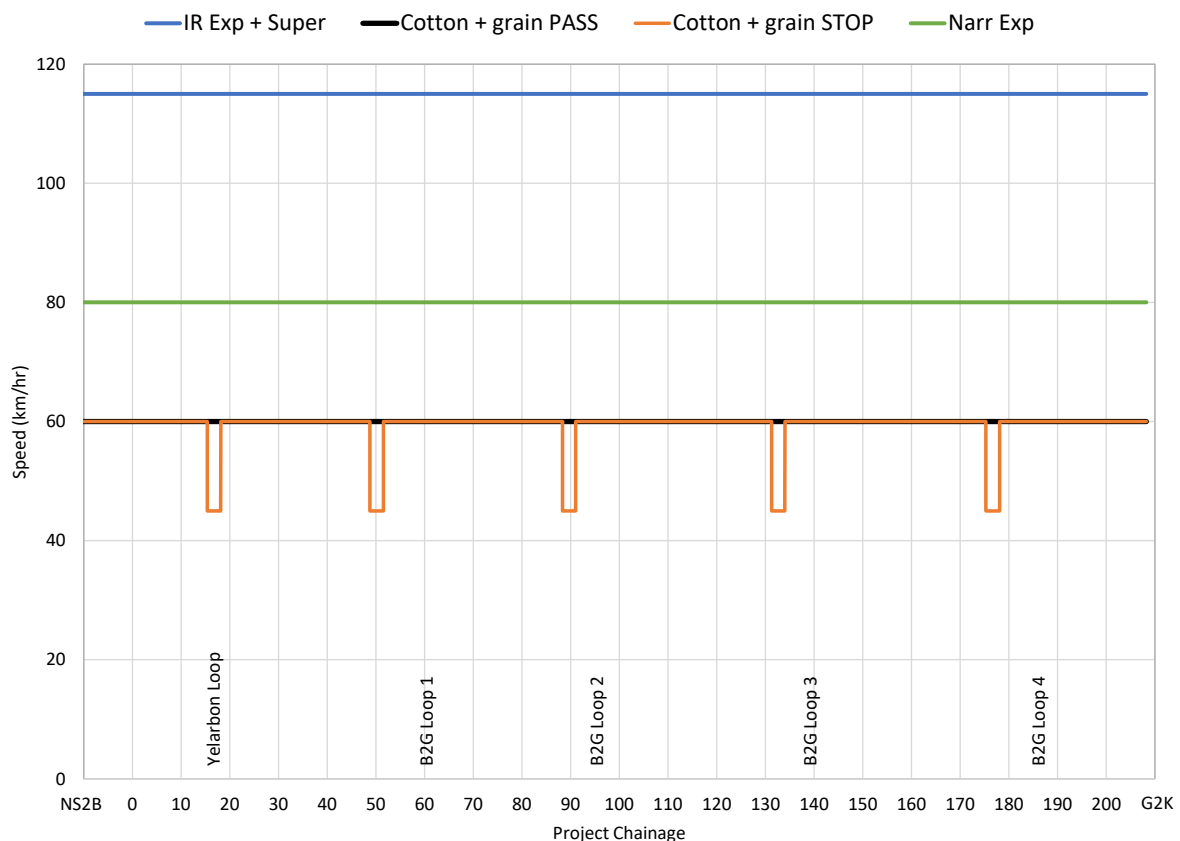
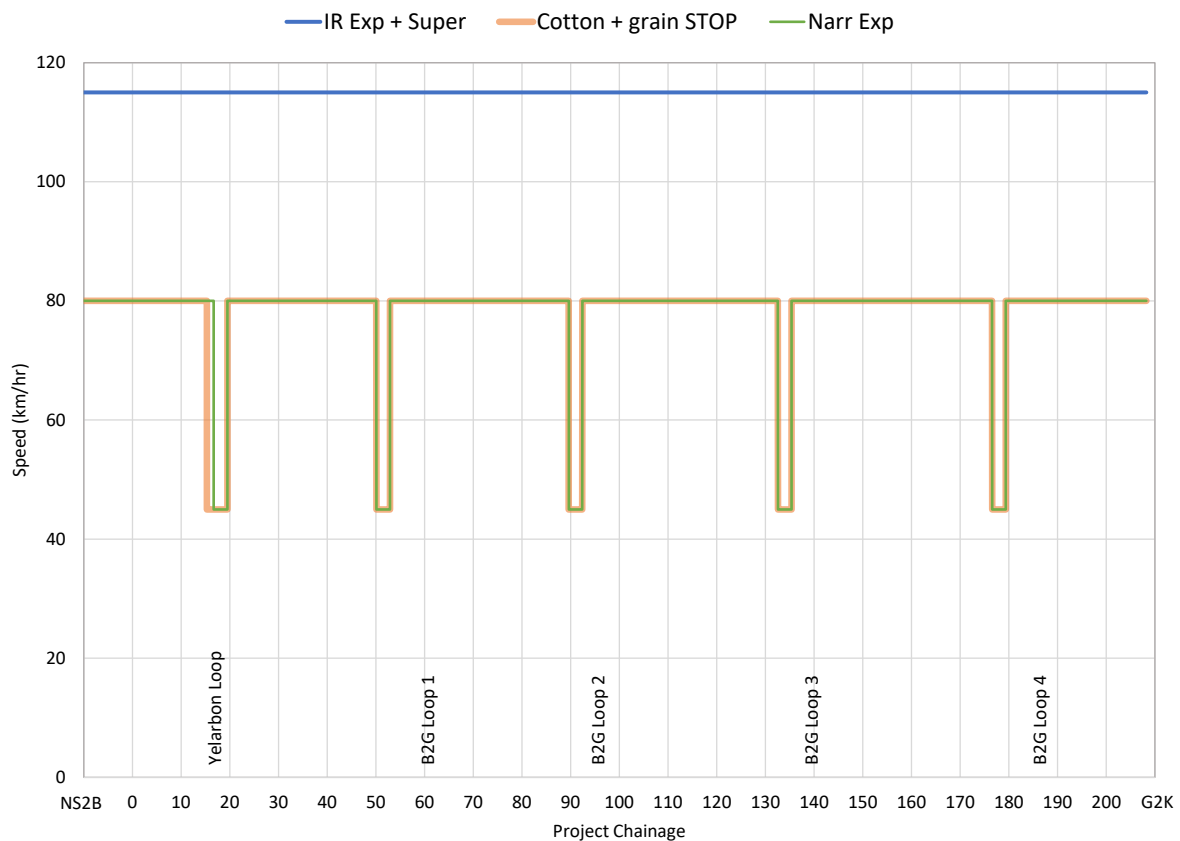


Figure 6-3 Operational track speed profiles, Gowrie to Border direction



6.3.3 Train lengths and locomotive classes

The length of each train type and the number of locomotives for the future railway operations with the Project is shown in **Figure 6-3**.

Table 6-3 Train lengths and classes on the Project

Train service	No. locomotives	Total locomotive length	Length of wagons	Total train length
Inland Rail Express (NR class)	3	66 m	1,680 m	1,746 m
Inland Rail Superfreighter (SCT class)	2	44 m	1,700 m	1,744 m
Toowoomba Export Container freight (82 class)	2	44 m	600 m	644 m
Narrabri Export Containers (82 class)	2	44 m	580 m	624 m
Queensland grain, Narrabri to Fisherman Island (PR22L class)	3	54 m	800 m	854 m
Queensland grain, Yelarbon to Fisherman Island (PR22L class)	3	54 m	560 m	614 m
Queensland cotton (PR22L class)	3	54 m	800 m	854 m

6.3.4 Source noise levels

Modelling of noise from railway operations requires defined source noise emission levels for the various classes of locomotives and rail wagons proposed to operate on the Project. For



railway infrastructure projects in Queensland, the rollingstock noise emissions are often referenced from a noise emission database maintained by QR. The database is specific to rollingstock operating on existing rail networks in Queensland and does not provide the noise emission data for all the rollingstock proposed for the Project and the Inland Rail program. Moreover, the QR database does not provide the SEM metric for use in accordance with the Interim Guideline.

The Transport for NSW (TfNSW) Asset Standards Authority (ASA) Stage III Rail Noise Database was referenced by this assessment to provide a source noise emission inventory for the locomotive classes proposed for Inland Rail. The TfNSW database defines reference noise levels for Australian rollingstock for use in commercial noise modelling software packages to conduct airborne noise predictions under a range of operating scenarios.

The database contains over 840 measurements of freight and passenger rail sources, including rail freight proposed on the Project. The noise levels were measured and analysed in line with procedures outlined in specific railway noise standards; International Standard ISO 3095⁷ and Australian Standard AS 2377⁸.

As part of the assessment, the rail source noise emission levels derived from the TfNSW ASA database were validated against the ARTC Pollution Reduction Programme Rail Noise Study, which was prepared by ARTC to evaluate locomotive noise as part of ARTC's pollution reduction program. The levels and individual measurements were compared between the databases and the highest / conservative emission levels were adopted where applicable. The levels determined from available data for the proposed rollingstock are found to be comparable with the sound exposure levels quoted in the QR database for 'current generation' locomotives which is considered appropriate for this Project.

The Inland Rail Program is introducing the PR22L class locomotives on to the rail network. The referenced source levels for the PR22L class locomotive were determined from additional measurement of train passby noise where the locomotive class currently operates in Australia.

6.3.4.1 Sound Exposure Levels

The following principles were applied when determining the Sound Exposure Levels (SELs) for rollingstock:

- The SEL noise emission levels are derived for each locomotive and set of wagons i.e. per unit.
- The noise levels for freight wagons account for a variety of wagon classes. The freight wagon reference noise levels are representative of typical wagon operations, and do not include a correction for increased noise levels that can result from unique operational influences (curves, stopping/starting) or significant defects (such as major wheel flats or bearing failures). Corrections for track features are applied separately in accordance with the Interim Guideline.
- Locomotive engine noise is determined from the required power output (notch setting) and the rolling (wheel-rail) noise emissions for the train is a function of the train speed.
- The SEL noise level for an individual locomotive or consist of wagons is the logarithmic average of the referenced noise emissions levels.

⁷ International Standards, 2013. ISO 3095 Railway applications – Acoustics – Measurement of noise emitted by railbound vehicles.

⁸ Australian Standards, 2002. AS 2377 Acoustics – Methods for the measurement of railbound vehicle noise.



- The source noise levels assume the track is in good condition and that the running surface of the rail head is free of defects and wheel tread condition is also assumed to be in good to fair condition.

Locomotive noise emissions are modelled at 4 m above top of track, and the wagon noise emissions have been modelled at 0.5 m above top of track in accordance with the Interim Guideline.

The source noise emission levels for each rollingstock category are detailed in **Table 6-4**. Inspection of the source noise emission levels in **Table 6-4** indicates that the adopted noise emission levels for the noise modelling are generally higher (more conservative) than the QR database.

The train movements on B2G would be dominated by Inland Rail Express and Superfreighter trains that use the NR and SCT class respectively (**Table 6-1** and **Table 6-3**), and hence the overall noise emissions will be controlled by these locomotives and trains (and not the existing local locomotives).

Table 6-4 Source rail noise emission levels - SEL

Rollingstock category	Rail source elevation	Train class	Reference length	Gradient	SEL (dBA)
Diesel electric locomotives	4.0 m above the top of rail	NR	22 m	Flat	85
				Downhill	84
				Uphill	90
		GT46C ¹	21 m	Flat	84
				Downhill	84
				Uphill	89
		82	22 m	Flat	83
				Downhill	84
				Uphill	88
		PR22L	18 m	Flat	84
				Downhill	84
				Uphill	89
Wagons (all consist)	0.5 m above top of rail	Wagons	1,000 m	n/a	100

Note 1: GT46C ACe model locomotive encompasses SCT, LDP, TT, WH, GWA, and SSR class designations.

6.3.4.2 Single Event Maximum

The Single Event Maximum (SEM) from trains is determined in the Interim Guideline as follows:

- If the number of single events due to train passing is greater than or equal to 15 over a given 24-hour period, the SEM is the arithmetic average of maximum levels of the highest 15 events, or
- If the number of single events due to train passing is less than 15 over a given 24-hour period, the SEM is the arithmetic average of maximum levels of all the events.

On the B2G project, the train movements for the Opening Year 2028 and Design Year 2040 are more than 15 trains per 24-hour period. As per approach (1), the SEM is the arithmetic average of the highest 15 maximum (L_{max}) noise events.



The SEM is generally a metric determined from measured noise levels from individual rolling stock operations over a 24-hour period. There is no published database of SEM values for noise modelling, and the Interim Guideline does not provide guidance for determining the SEM for predictive modelling purposes.

Accordingly, an approach has been developed to derive SEM values from maximum noise emissions in the Transport for NSW Asset Standards Authority rolling stock noise emission and ARTC databases. The analysis has also been supplemented by rolling stock noise measurements undertaken by SLR for the Inland Rail project. The methodology adopted is provided in **Appendix F**.

The determined SEM values for modelling (with relevant factor of safety) for modelling are presented in **Table 6-5**. Note that these SEM values are applied for both the Opening Year 2028 and Design Year 2040 scenarios, since there are more than 15 trains assumed in both scenarios, with the SEM being the average of the loudest 15 trains.

Whilst the locomotive SEM is predominantly dependent on the gradient and the sections where trains accelerate at crossing loops (where an uphill/downhill correction is applied to account for high notch setting or braking), the wagon SEM propagation is dependent on the wagon speed as per the modelling algorithm. Since the IR express and super-freighters have the maximum line speeds and are the longest trains (see **Section 6.3.2**), their speed profiles and lengths were conservatively utilised to estimate the wagon SEM at each sensitive receptor. The wagon and locomotive SEMs were calculated separately for each receptor and the maximum of the two was determined to be the resultant SEM for comparison against the established SEM criteria.

Table 6-5 Source rail noise emission levels - SEM

Source	Height	SEM (Flat gradient)	Reference Speed	Gradient adjustment
Locomotives	4 m above top of rail	89	Not speed dependent	+4 (uphill)
		89	n/a	+2 (downhill)
Wagons	0.5 m above top of rail	86	80 km/h	0 (none required)

6.3.5 Kilde source level correction factors

Kilde 130 source correction factors have been calculated for the source levels presented in **Sections 6.3.4** above. These factors, at the Kilde reference speed of 80 km/h, are presented in **Table 6-6** below as requested in the Interim Guideline. The Kilde correction factors are at the reference distance of 100 metres for the SEL sources and 10 metres for the SEM sources.

Table 6-6 Kilde source level correction factors

Source	ΔL_{type} (dBA)	ΔL_1 (dBA)	ΔL_2 (dBA)
Wheel-rail (locomotives and wagons)	-7.4	89.5	0
Locomotive exhaust: NR class ¹	-5.2	92.5	0
Locomotive exhaust: 82 class ¹	-7.5	92.5	0
Locomotive exhaust: PR22L class ¹	-4.2	92.5	0

Note 1: ΔL_1 source level based on notch setting rather than vehicle speed (see **Sections 6.3.4.1** and **6.3.4.2**)



6.3.6 Consideration of double-stack container freight

The Project will operate some trains with containers on wagons in a double-stacked configuration. Concerns were raised by stakeholders and the community that double stacking the containers could lead to significantly different wagon noise emissions. The potential noise emission levels from double-stacked containers were investigated as part of this assessment and the key outcomes are outlined below.

International Standard ISO 3095 provides general guidance on the difference in noise level resulting from changes in axle loads and notes that an approximate doubling of axle loads (increased weight) may result in a reduction in noise levels of around 1 dB in L_{Aeq} terms. A variance in noise emission of 1 dB is negligible in the context of other factors which can affect rolling noise and vibration emission levels, such as wheel and track condition, speed and unsprung mass.

To support the assessment of noise on the Project, a noise and vibration monitoring survey was undertaken to investigate the potential influence of single and double stacked containers on noise and vibration emissions from freight trains. The details of the survey are provided in **Appendix C** and the survey determined the following:

- Consistent with ISO 3095, individual wagons with double-stacked containers have L_{Aeq} noise levels approximately 1 to 2 dB less than the individual wagons with single-stacked containers.
- Overall train passby noise levels are not significantly reduced by wagons with double-stacked containers given the minimal change in rolling noise emissions from the wagons.
- The loading of individual trains can substantially vary both in terms of the number of wagons with single-stacked and double-stacked containers but also the weight of each container on the train will vary from empty to fully loaded (a typical range of 3 to 30 tonnes).
- The overall passby noise levels, particularly L_{Amax}/SEM noise levels, are more influenced by factors other than the configurations of the containers on individual wagons.

On the basis of the above, correction factors to account for the potential configuration of containers on the wagons were not applied to the source noise emission levels in **Table 6-4** and **Table 6-5**.

6.3.7 Track feature corrections

Impact noise from rail discontinuities such as turnouts, expansion joints or rail defects can increase noise levels from trains and are heard as impulsive noise as each train wheel passes over the discontinuity. Noise modelling correction factors were applied at each turnout to account for potential impact noise during the train passbys.

The elevated structures on the Project are proposed to be ballasted concrete bridges and viaducts. Railway noise level corrections have been applied consistent with the Interim Guideline requirements and are shown in **Table 6-7** for the features that are present on this Project.

The Project does not include tight radius curved track (<500 m), accordingly the noise modelling did not apply noise emission correction factors for curving noise emissions.



Table 6-7 Noise model rail infrastructure corrections

infrastructure feature	type	source correction, dBA
Level crossing	Level crossing, a 10 m section of track for each crossing.	+5
Turnout	Switches, a 10 m section of track for each crossing.	+6
Bridges	Concrete bridges and viaducts with parapets	+1
	Concrete bridges and viaducts without parapets	+3.5

Note 1: the Interim Guideline does not include ballasted concrete bridges, which are modelled with a 0 dBA source correction. The +1dB correction for concrete bridges with parapets has been conservatively applied in the noise model.

6.3.8 Level crossings

Noise associated with train horns and warning devices are excluded from the noise assessment under the Interim Guideline due to the safety obligations associated with such noise sources. Whilst these sources are not assessed under the DTMR requirements, the noise levels from train horns and level crossings have been considered separately to quantify their effects and inform design development to minimise noise.

The study assumed all active level crossings included noise sources during each train passby for the crossing alarm bells and approaching train horns. The passive level crossings only included the train horns as noise sources.

At each active level crossing the noise sources included a single alarm bell and two train horn source emissions, one located 100 m either side of the crossing to account for trains approaching from either direction. A source height of 2.0 m above ground level for the crossing alarm bells and 4.0 m above ground level was applied for the train horns.

The Nordic railway noise prediction methodology is limited to the rollingstock noise emissions. To calculate noise levels from the level crossing alarm bells and train horns at sensitive land uses, the International Standard ISO 9613-2⁹ method for calculating the outdoor noise propagation was applied.

The ISO method calculates noise levels with default meteorological conditions favourable for downwind propagation of noise or under a moderate ground-based temperature inversion.

The noise modelling applied the source noise levels for alarm bells and train horn detailed in **Table 6-8**. The noise levels were referenced from SLR's measurement of train horn and alarm bell events on existing freight corridors.

⁹ International Standards, 1996. ISO 9613-2:1996, Acoustics – attenuation of sound during propagation outdoors – Part 2: General method of calculation.



Table 6-8 Level crossing and train horn source emission levels

Source	Noise emission level (LAeq) at 15 m, dBA										
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz	Overall
Alarm bell	26	29	43	34	42	65	70	57	35	21	71
Train horn	38	52	68	81	93	98	95	92	82	62	101
Source	Noise emission level (LAeq) at 15 m, dBA										
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz	Overall
Alarm bell ¹	31	35	48	46	57	68	73	60	45	33	74
Train horn ²	43	57	73	86	98	103	100	97	87	67	106

Note 1 LAeq noise level is for an alarm bell event 20-seconds in duration prior to the noise of the train becoming the dominant noise contribution and masking the alarm bell noise contribution.

Note 2 LAeq noise level for a train horn event 2-seconds in duration.

6.3.9 Train movements within the crossing loops

For the purpose of assessment, it has been assumed that approximately one in four trains per daytime or night-time period would access the crossing loops and each train could be held at the crossing loop for up to 15 minutes. To assess potential typical noise emissions from the crossing loops it was assumed that a train stops at all the crossing loops. In practice, a train would only be held on an individual crossing loop when necessary to facilitate a train moving in the other direction, an activity that typically takes less than 10 minutes.

The details of the loop operations used in the noise prediction modelling are shown in **Table 6-9**.

Table 6-9 Proposed crossing loop occupancy

Assessment scenario	Number of trains accessing the loop per period in 24 hours	Total hours occupancy time per period
Opening Year 2028	4	1
Design Year 2040	6	1.5

At a crossing loop the train will come to a complete stop from the main line track and idle until the train is signalled to return to the main line track. The assessment of airborne noise considered the noise emissions from the train locomotive engines idling whilst the train has stopped as well as short-lived noise events such as wagon braking/bunching and stretching, which results in contact noise as the wagons come together. The acceleration of the trains heading back on to the main line are also considered in the form of the increased locomotive notch settings and the SEM source level is based on the worst-case assumption of one in four trains stopping at the crossing loops.

For the purpose of assessing typical worst-case noise levels, the noise modelling included the faster and longer Inland Rail Express and Inland Rail Superfreighter on the main line track with the other general freight types held on the crossing loops.

The noise emission for an individual locomotive at idle was modelled as 70 dBA at a distance of 15 m from source. Because the idling of locomotive engines is a steady-state



continuous noise emission, the emission level was referenced for the L_{Aeq} and L_{Amax}^{10} noise metrics. Acknowledging that trains can access each crossing loop from either direction, the noise modelling considered idling locomotives at both extents of each crossing loop.

The source noise emission levels for rolling noise, including potential wagon bunching and braking, were referenced from noise measurements of the existing coal and freight train movements in QLD. The noise emission level was applied as a contribution to the L_{Amax} level as the short-lived nature of bunching and braking noise (1 to 2 seconds per event) would not be sufficient to influence the overall daily L_{Aeq} noise levels. It should be noted that the stopping and idling of trains at passing loops while generating noise of differing character to the passing trains is a less significant noise source than trains passing at higher speed.

The noise prediction modelling for the crossing loops applied the ISO prediction methodology and each idling locomotive and bunching noise event was modelled as individual point noise sources. The bunching and braking sources were modelled as a combined point source at any position along the passing loop to anticipate the potential for such events along the length of the train.

The noise sources for the idling trains and wagons bunching referenced the source noise emission levels detailed in **Table 6-10**.

Table 6-10 Crossing loop source emission levels

Source	Noise emission level (L_{Aeq}) at 15 m, dBA										
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz	Overall
Idling train (L_{eq} , L_{max})	47	52	47	47	57	58	69	46	39	21	70
Bunching/braking (L_{max})	51	63	71	62	53	56	53	52	48	40	72

7.0 Airborne railway noise levels – Opening Year 2028

7.1 Overview

The predicted railway noise levels at all the identified sensitive receptors for 2028 are detailed in **Appendix D**. The railway noise levels are provided as tabulated façade corrected noise level predictions at individual dwellings and maps of railway noise contours for the Project alignment. The assessment of L_{eq} and SEM railway noise levels is discussed in the following sections.

The railway noise levels are the combined noise levels from train passbys on the main tracks and train operations on the crossing loops. The predicted noise levels have been assessed against the adopted railway noise criteria to evaluate the potential noise impact of the Project and identify where noise mitigation options would need to be investigated.

¹⁰ Reference to L_{Amax} is used here in lieu of SEM as the crossing loops involve discrete events such as idling and braking/bunching events. However, these levels are compared with the SEM of pass-bys on the main line for the purposes of the assessment.



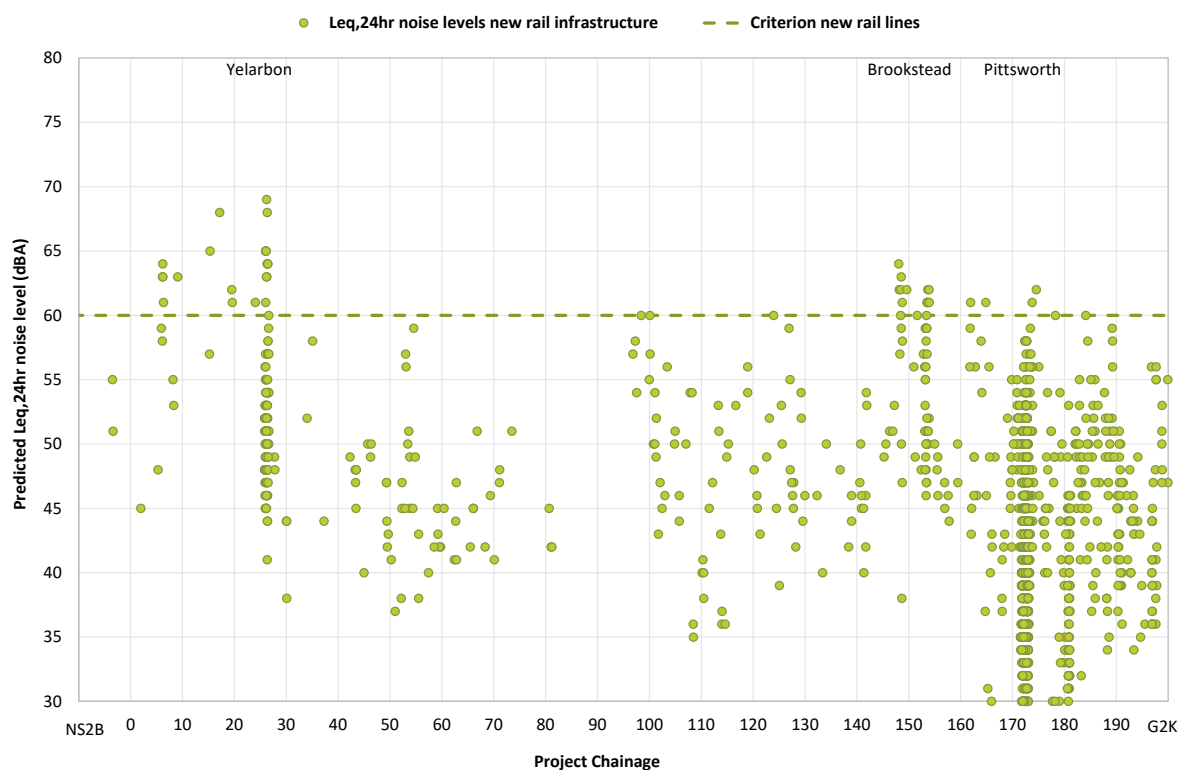
7.2 Railway noise levels at residential receptors

7.2.1 Daily railway noise levels

The distribution of predicted $L_{Aeq}(24\text{hour})$ railway noise levels over the Project alignment at the residential receptors are summarised in **Figure 7-1**.

The predicted railway noise levels achieve the $L_{Aeq}(24\text{hour})$ 60 dBA noise criterion at the majority of sensitive receptors adjacent to the section of new rail corridor. There are 42 residential receptors predicted to exceed the $L_{Aeq}(24\text{hour})$ threshold, with exceedances between 1 and 9 dB above criteria. Majority of these exceedances are at, or near, the town of Yelarbon and Brookstead.

Figure 7-1 Predicted $L_{eq}(24\text{h})$ railway noise levels (2028 scenario)



Note Some receptors are in the same location and the markers in the above scatter plot represent more than one receptor.

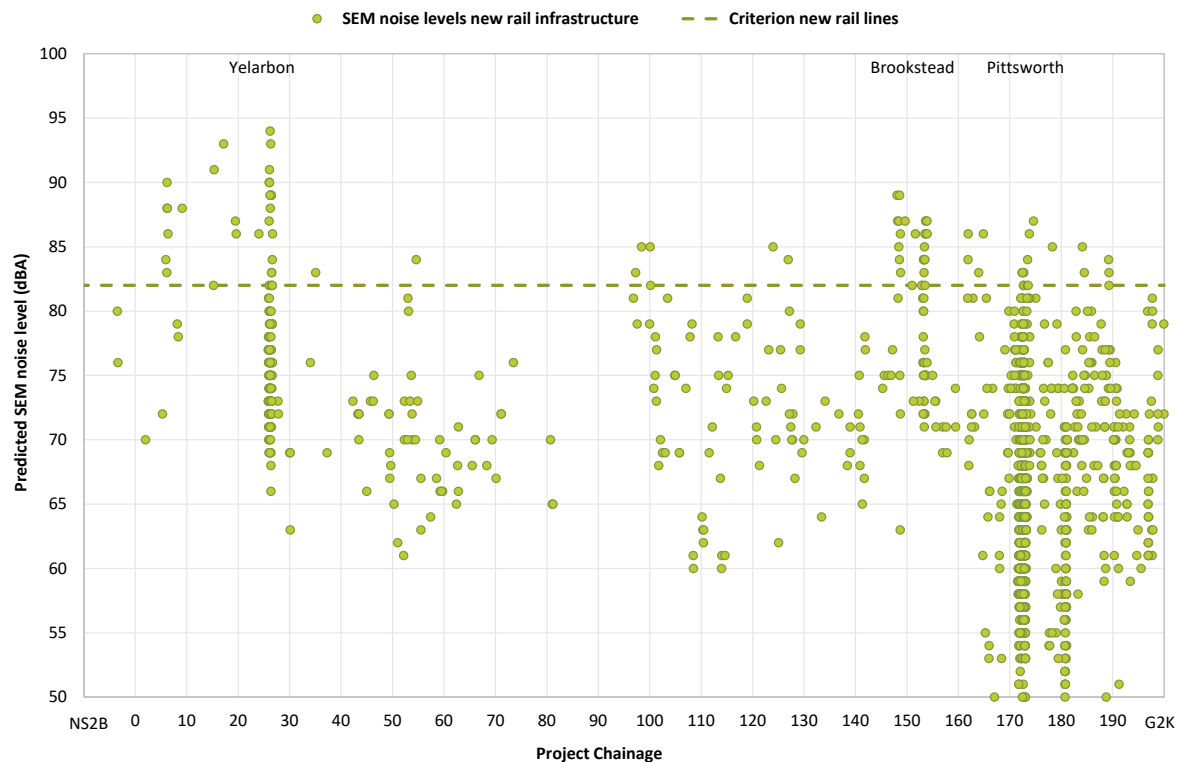
7.2.2 Single Event Maximums

The SEM levels were predicted as described in **Section 6.3.4.2**. The distribution of predicted SEM railway noise levels over the Project alignment at the residential receptors are summarised in **Figure 7-2**.

The predicted railway noise levels achieve the SEM 82 dBA noise criterion at the majority of the residential receptors adjacent to the sections of new rail corridor. The predicted noise levels are between 1 – 12 dBA above the SEM noise criterion at 82 residential receptors. These exceeded receptors include the exceeded receptors noted for the $L_{Aeq}(24\text{hour})$ parameter. Whilst majority of these exceedances are at, or near, the towns of Yelarbon, Pittsworth and Brookstead, isolated residences are also predicted to exceed the threshold along the project alignment.



Figure 7-2 Predicted SEM pass-by railway noise levels (2028 scenario)



Note Some receptors are in the same location and the markers in the above scatter plot represent more than one receptor.

8.0 Airborne railway noise levels – Design Year 2040

8.1 Overview

The predicted $L_{Aeq}(24\text{hour})$ and SEM noise levels for the Design Year 2040 scenario are detailed in **Appendix E**. The railway noise levels are provided as tabulated façade corrected noise level predictions at individual sensitive receptors and maps of railway noise contours for the Project alignment. The assessment of $L_{Aeq}(24\text{hour})$ and SEM railway noise levels is discussed in the following sections.

8.2 Railway noise levels at residential receptors

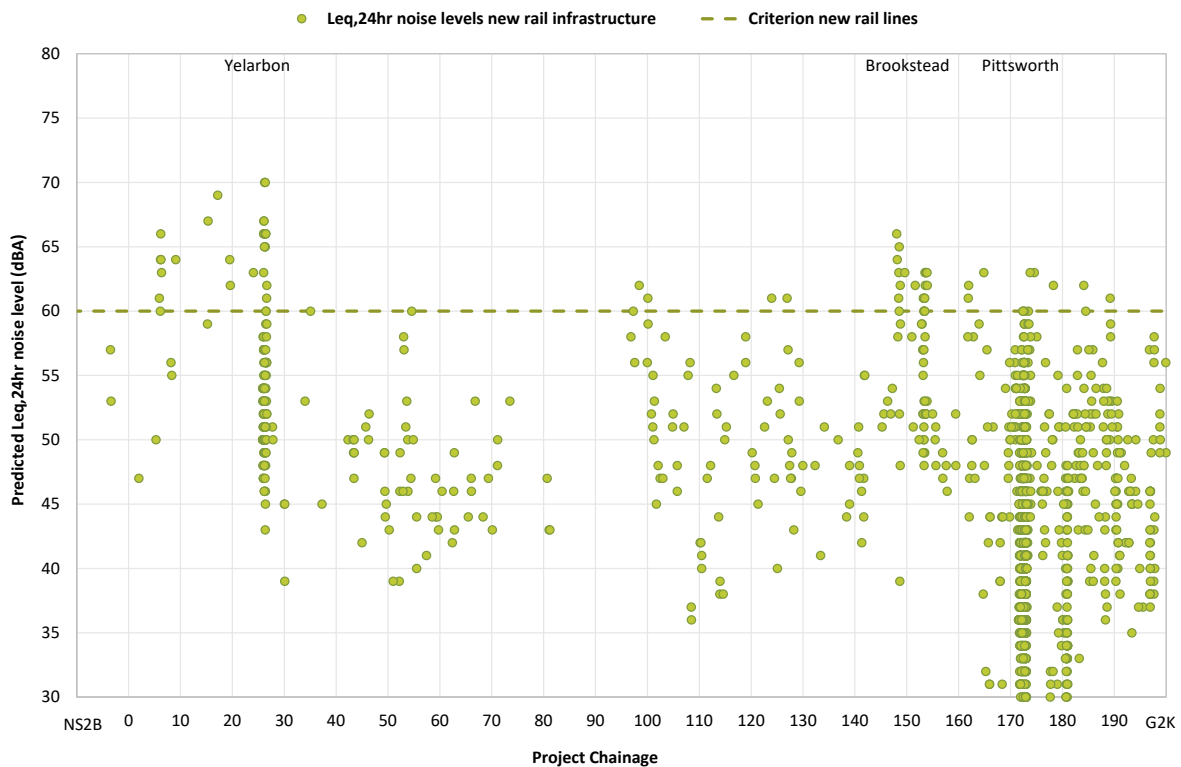
8.2.1 Daily railway noise levels

The distribution of predicted $L_{Aeq}(24\text{hour})$ railway noise levels over the Project alignment at the residential receptors are summarised in **Figure 8-1**.

The predicted daily railway noise levels achieve the $L_{Aeq}(24\text{hour})$ 60 dBA noise criterion at the majority of sensitive receptors adjacent to the sections of new rail corridor. The predicted daytime $L_{Aeq}(24\text{hour})$ railway noise levels are between 1 – 10 dBA above the noise criterion at 60 sensitive receptors. These exceedances are predominantly located at, or near, the towns of Yelarbon, Brookstead and Pittsworth.



Figure 8-1 Predicted Leq(24h) railway noise levels (Design Year 2040 scenario)



Note Some receptors are in the same location and the markers in the above scatter plot represent more than one receptor.

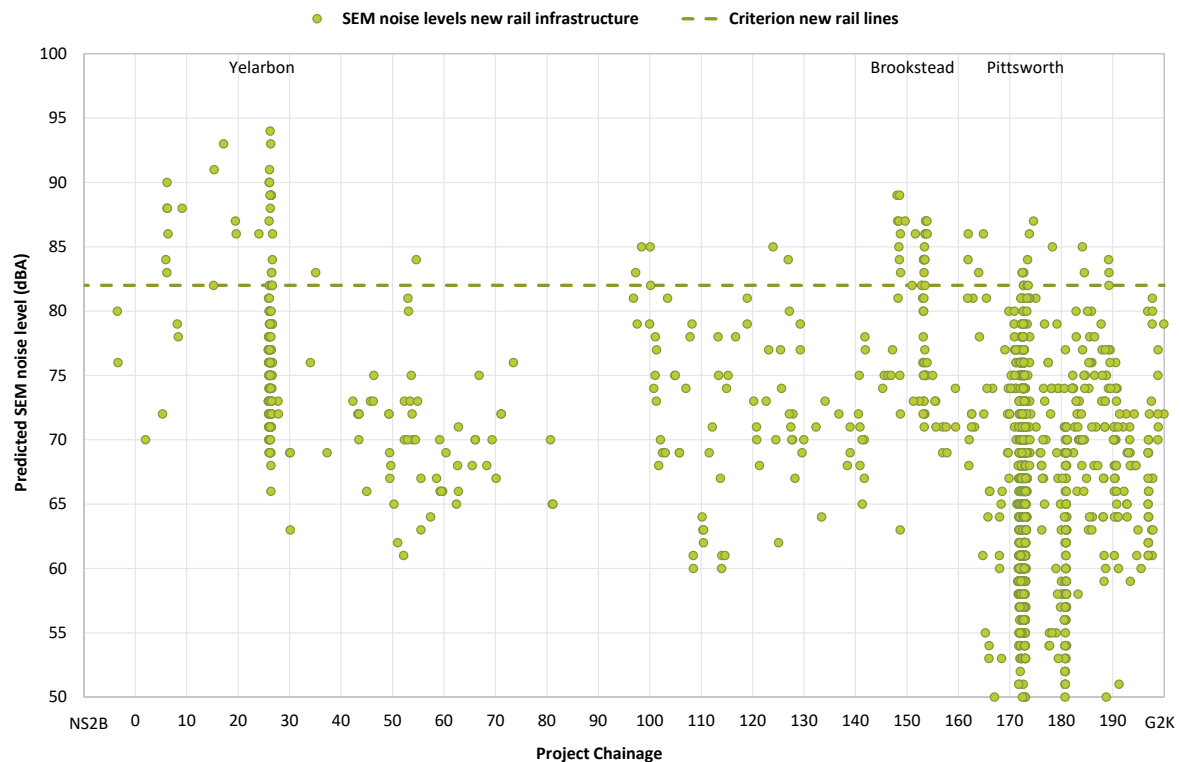
8.2.2 Single Event Maximums

The SEM levels were predicted as described in **Section 6.3.4.2**. The distribution of predicted SEM railway noise levels over the Project alignment at the residential receptors are summarised in **Figure 8-2**.

The predicted railway noise levels achieve the SEM 82 dBA noise criterion at the majority of the residential receptors adjacent to the sections of new rail corridor. As per the 2028 scenario, the predicted noise levels are between 1 – 12 dBA above the SEM noise criterion at 82 residential receptors. These exceeded receptors include the exceeded receptors noted for the LAeq(24hour) parameter. Whilst majority of these exceedances are at, or near, the towns of Yelarbon, Pittsworth and Brookstead, isolated residences are also predicted to exceed the threshold along the project alignment.



Figure 8-2 Predicted SEM pass-by railway noise levels (Design Year 2040 scenario)



Note Some receptors are in the same location and the markers in the above scatter plot represent more than one receptor.

8.3 Future approved sensitive developments

Future sensitive developments have been assessed based on properties with approved Development Application plans, using data received on 25 August 2022. The approved future developments within the study area are presented in **Table 8-1**. The results of the analysis indicate that there are no future noise-sensitive developments that are expected to exceed the Interim Guideline threshold for new railways.

Table 8-1 Future approved developments

Lotplan	Description	Predicted noise level- LAeq, 24h	Predicted noise level- SEM
14SP127017	Concrete batch plant in Kurumbul	N/A ¹	N/A ¹
54SP169191	Cattle feedlot in Kurumbul	N/A ¹	N/A ¹
1SP327036	Petrol station in Yelarbon	N/A ¹	N/A ¹
3Y56918	Transport depot in Yelarbon	N/A ¹	N/A ¹
2SP318369	Dwelling at 48 Burrell Street Yelarbon	47-52 dBA	75-80 dBA
2Y5699	Yelarbon Police Station	50-55 dBA	75-80 dBA
1SP214649	Quarry adjacent to Bringalily State Forest	N/A ¹	N/A ¹
93DY180	Dwelling at Lot 93 Blackwell Road, Clontarf	50-55 dBA	70-75 dBA
10SP342301	Rural worker's accommodation at 787 Lindenmayer Road, Yandilla	50-55 dBA	75-80 dBA
4RP907313	Warehouse in Brookstead	N/A ¹	N/A ¹



Lotplan	Description	Predicted noise level- LAeq, 24h	Predicted noise level- SEM
2RP7475	Solar farm in Yarranlea	N/A ¹	N/A ¹
1AG4028	Trailer manufacturer in Pittsworth	N/A ¹	N/A ¹
4SP243179	Dwelling at 4 Railway Street Pittsworth	40-45 dBA	65-70 dBA
408P2101	St Stephens Primary School Pittsworth	35-40 dBA	60-65 dBA
8RP161366	Dwelling at 10 Forest Street Pittsworth	40-45 dBA	60-65 dBA
3RP155699	Dwelling at 34 Evans Street Pittsworth	35-40 dBA	60-65 dBA
8RP161366	Dwelling at 4 Forest Street Pittsworth	35-40 dBA	60-65 dBA
1ST113265	Industrial use at 8 Mallard Road Pittsworth	N/A ¹	N/A ¹
11RP158383	Industrial use at 1 Grevillea Street Pittsworth	N/A ¹	N/A ¹
1RP52439	Dwelling at 11 Edward Street Pittsworth	40-45 dBA	65-70 dBA
1RP60667	Dwelling at 43 Murray Street Pittsworth	35-40 dBA	65-70 dBA
1RP66724	Industrial use at 154 Yandilla Street Pittsworth	41-46 dBA	70-75 dBA
1RP94198	Dwelling at 3 Copp Street Pittsworth	40-45 dBA	60-65 dBA
2RP130032	Community use at 16 Pioneer Way Pittsworth	40-45 dBA	70-75 dBA
2RP84839	Commercial use at 46 Short Street Pittsworth	35-40 dBA	55-60 dBA
2RP880145	Industrial use at 32 Grevillea Street Pittsworth	N/A ¹	N/A ¹
3RP30791	Dwelling at 27 Hill Street Pittsworth	35-40 dBA	55-60 dBA
3RP74079	Dwelling at 22 Evans Street Pittsworth	35-40 dBA	55-60 dBA
4RP158383	Industrial use at 35 Grevillea Street Pittsworth	N/A ¹	N/A ¹
712P2104	Dwelling at 69 Hume Street Pittsworth	35-40 dBA	60-65 dBA
8SP230423	Dwelling at 14 Forest Street Pittsworth	40-45 dBA	60-65 dBA
10RP212401	Industrial use in Southbrook	N/A ¹	N/A ¹
2AG1900	Industrial use in Southbrook	N/A ¹	N/A ¹
86RP212401	Industrial use in Southbrook	N/A ¹	N/A ¹
3AG3669	Roadside billboard in Gowrie Mountain	N/A ¹	N/A ¹
2SP308326	Service station in Kingsthorpe	N/A ¹	N/A ¹
186SP260885	Gowrie Little Plain fire brigade	45-50 dBA	65-70 dBA
1SP303040	Kingsthorpe Medical	<30 dBA	65-70 dBA
39SP171019	Dwelling at 30 Katherine Crescent Kingsthorpe	40-45 dBA	65-70 dBA
51RP204786	Dwelling at 2 Georgina Court Kingsthorpe	<30 dBA	65-70 dBA
45AG3955	Mount Kingsthorpe Reserve	42-<30 dBA	70-75 dBA

Note 1: Not a noise-sensitive receptor.



9.0 Airborne railway noise levels at non-residential receptors

The railway noise levels were predicted at the buildings and property identified as being non-residential noise sensitive receptors, for example, places of worship, offices, schools and passive recreational facilities (such as public parks).

The predicted external and internal railway noise levels at the non-residential sensitive receptors are detailed in **Appendix D** for the Opening Year 2028 scenario and in **Appendix E** for the Design Year 2040 scenario. Free-field noise contours for outdoor receptors are presented in **Appendix H**.

Figure 9-1 Predicted $L_{eq}(24h)$ railway noise levels (Design Year 2040 scenario) – non-residential receptors

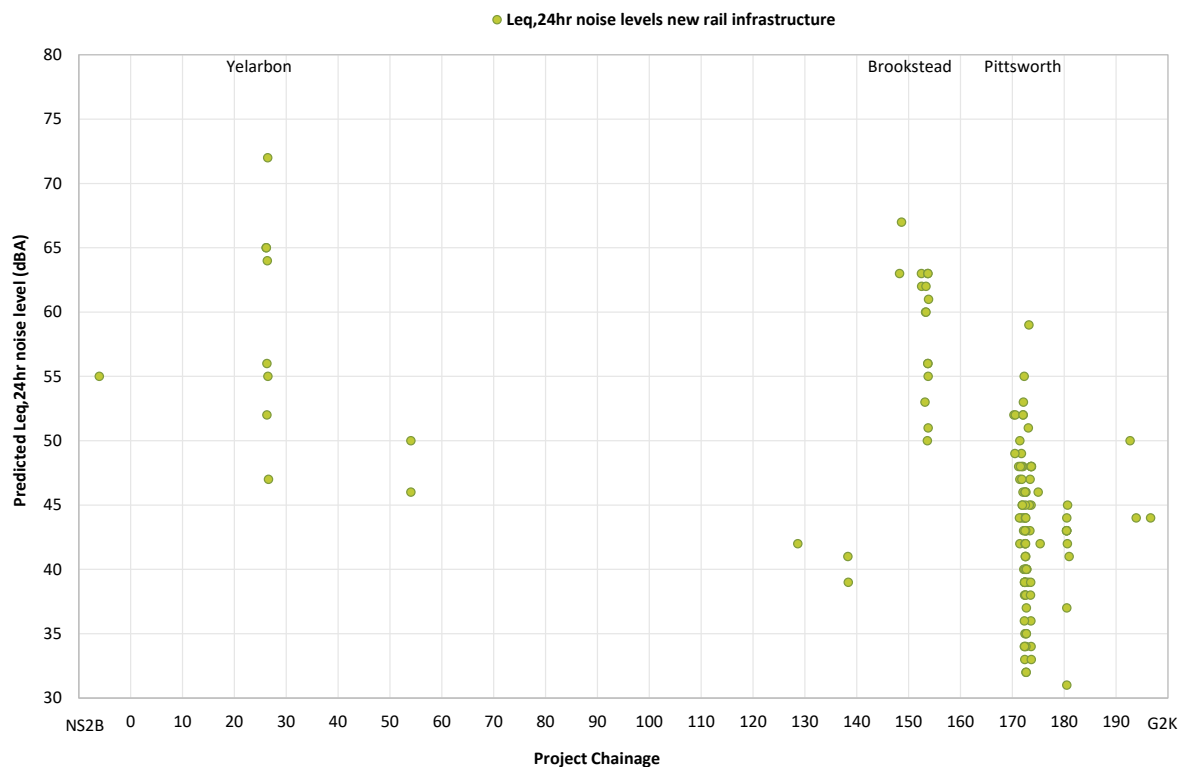
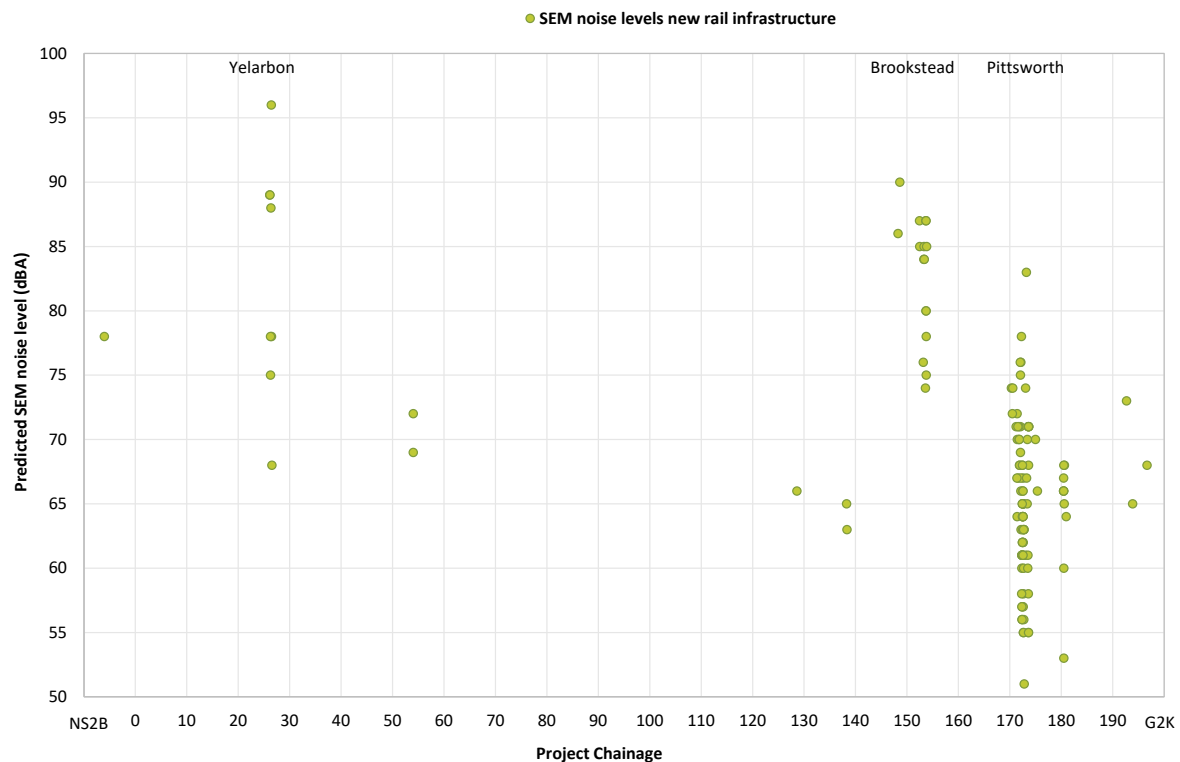


Figure 9-2 Predicted SEM railway noise levels (Design Year 2040 scenario) – non-residential receptors



Out of the non-residential receptor results provided above, 15 receptor locations are predicted to be above the established criteria. The non-residential receptors predicted to exceed the criteria are:

- Yelarbon Scouts Hall
- Yelarbon Post Office
- Yelarbon Fire Station
- Pampas Memorial Hall
- Pampas Rural Fire Shed
- Brookstead Park (free-field receptor and building ID 261544)
- Brookstead Post Office
- Brookstead State School: two buildings (ID 261749 and 261795) and the sports fields (ID 2008488)
- Assembly of God, Pittsworth
- Two buildings with office usage in Brookstead (ID 261287 and 261321)
- One building with office usage in Yelarbon (ID 254619)

The predicted noise levels for these receptors are presented in **Table 10-2**, and the location of these receptors are shown in **Figure 10-1**. The exceedances are driven by the SEM parameter, with exceedances generally between 1 – 8 dB above criteria. The office at Yelarbon however has an exceedance of up to 14 dB due to its proximity to the rail line. The Brookstead State School is predicted to exceed the criteria by 3 dB for L_{eq} , and up to 5 dB for SEM.



Mitigation for the receptors in Yelarbon and Brookstead would be provided by the concept noise barriers discussed in **Section 17.4** below.

Note that the predicted levels for Brookstead Park are provided on the park boundary closest to the rail line. This is due to the fact that the park sitting areas and canopies are closer to the rail line. Taking into account the Interim Guideline's requirement for outdoor areas larger than 2000 m², predicted noise levels at the northernmost 2000 m² of the park are higher than 79 dBA SEM (free field), therefore the park is considered to exceed the DTMR criteria.

10.0 Receptors triggering the Interim Guideline criteria

Where predicted railway noise levels at sensitive receptors are above the Interim Guideline criteria, Inland Rail will investigate reasonable and practicable measures to reduce noise levels, and mitigate potential impacts in accordance with the Interim Guideline.

The review of noise mitigation is triggered at 82 residential receptors for the Design Year 2040 scenario. Out of these 82 residences, 60 residences trigger the LAeq criteria as well. Additionally, there are 15 non-residential receptors where predicted noise levels are above the assessment criteria.

The sensitive residential receptors where the Design Year 2040 noise levels were predicted above the criteria are detailed in **Table 10-1**, with the individual criteria triggers highlighted in bold in the table. The predicted noise levels include both trains on the main line and crossing loops. Non-residential sensitive receptor buildings where noise levels were predicted above the criteria are detailed in **Table 10-2**.

The location of the sensitive receptors, including the non-residential sensitive receptors, where noise levels trigger the assessment criteria are presented in **Figure 10-1**.

Table 10-1 Residential receptors triggering the investigation of noise mitigation

Receptor	Design Year 2040 noise level (dBA)		Receptor	Design Year 2040 noise level (dBA)	
	LAeq (24h)	SEM		LAeq (24h)	SEM
254161	64	88	260213	65	89
254164	64	88	260528	63	87
254168	66	90	261084	62	86
254170	64	88	261368	60	84
254179	63	86	261386	61	85
254181	61	84	261493	61	84
254250	67	91	261638	60	83
254271	69	93	261665	60	84
254276	62	86	261686	63	86
254347	63	86	261687	60	84
254551	63	87	261703	61	84
254558	66	90	261720	62	86
254559	66	90	261729	63	87
254562	67	91	261739	63	87
254565	67	90	261908	63	87
254576	65	88	261969	62	86
254578	60	83	315138	60	84



Receptor	Design Year 2040 noise level (dBA)		Receptor	Design Year 2040 noise level (dBA)	
	L _{Aeq} (24h)	SEM		L _{Aeq} (24h)	SEM
254589	65	89	315139	63	87
254595	66	89	315262	61	84
254598	66	89	315319	61	85
254601	61	84	315421	65	88
254603	66	89	319045	60	83
254609	70	94	319101	61	84
254612	65	89	319103	59	83
254614	70	93	319121	63	87
254628	60	83	319150	62	85
254635	62	86	319166	59	83
254661	60	83	319191	62	86
254828	60	84	319193	61	84
255333	60	83	319485	63	86
255346	62	85	319848	62	85
255350	61	85	320557	59	83
256019	61	85	320889	60	83
256166	61	84	321184	60	84
260058	66	89	321458	60	83
260067	64	87	321618	60	83
260119	60	84	322552	63	87
260150	59	83	323854	63	86
260169	61	85	324270	64	87
260170	62	86	324333	60	83
260189	63	87	2008224	60	83

Table 10-2 Non-residential sensitive receptors triggering the investigation of noise mitigation

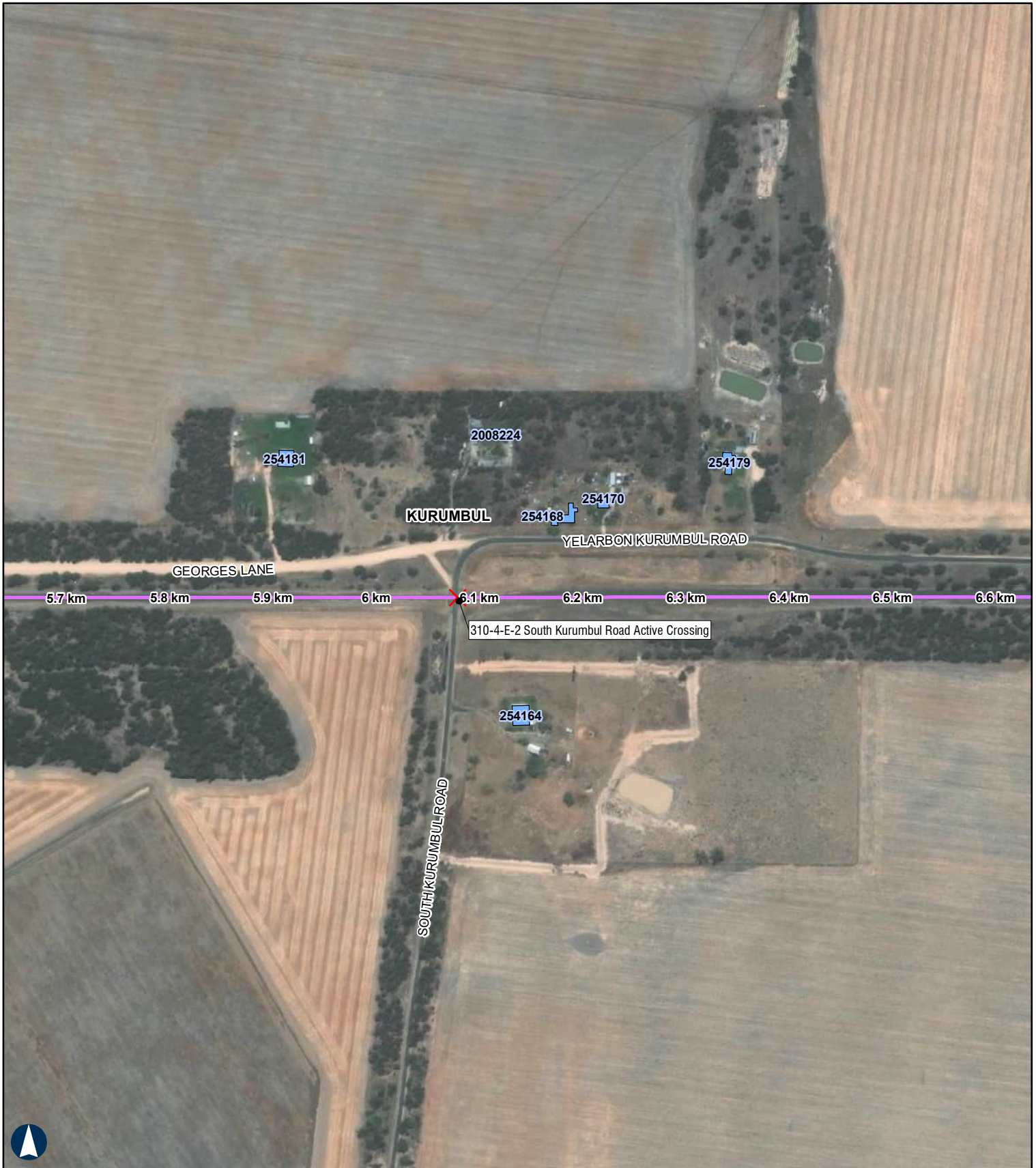
Receptor	Sensitive receptor description	Design Year 2040 noise level (dBA)	
		L _{Aeq} (24h)	SEM
254564	Yelarbon Scouts Hall	65	89
254574	Yelarbon Post Office	65	89
254592	Yelarbon Fire Station	64	88
254619	office at Lot 21, Railway Parade, Yelarbon	72	96
260123	Pampas Memorial Hall	63	86
260154	Pampas Rural Fire Shed	67	90
261287	office (Brookstead)	63	87
261321	office (Brookstead)	62	85
261544	Brookstead Park	60	84
261639	Brookstead Post Office	60	84



Receptor	Sensitive receptor description	Design Year 2040 noise level (dBA)	
		LAeq (24h)	SEM
261749	Brookstead State School	63	87
261795	Brookstead State School	63	87
322790	Pittsworth and District Assembly of God	59	83
2008446	Brookstead Park ¹	62	85
2008488	Brookstead State School: sports fields ¹	61	85

Note 1: Outdoor receptor assessed using free-field LAeq,12h and free-field SEM noise levels, as per the DTMR Interim Guideline.





BORDER TO GOWRIE

Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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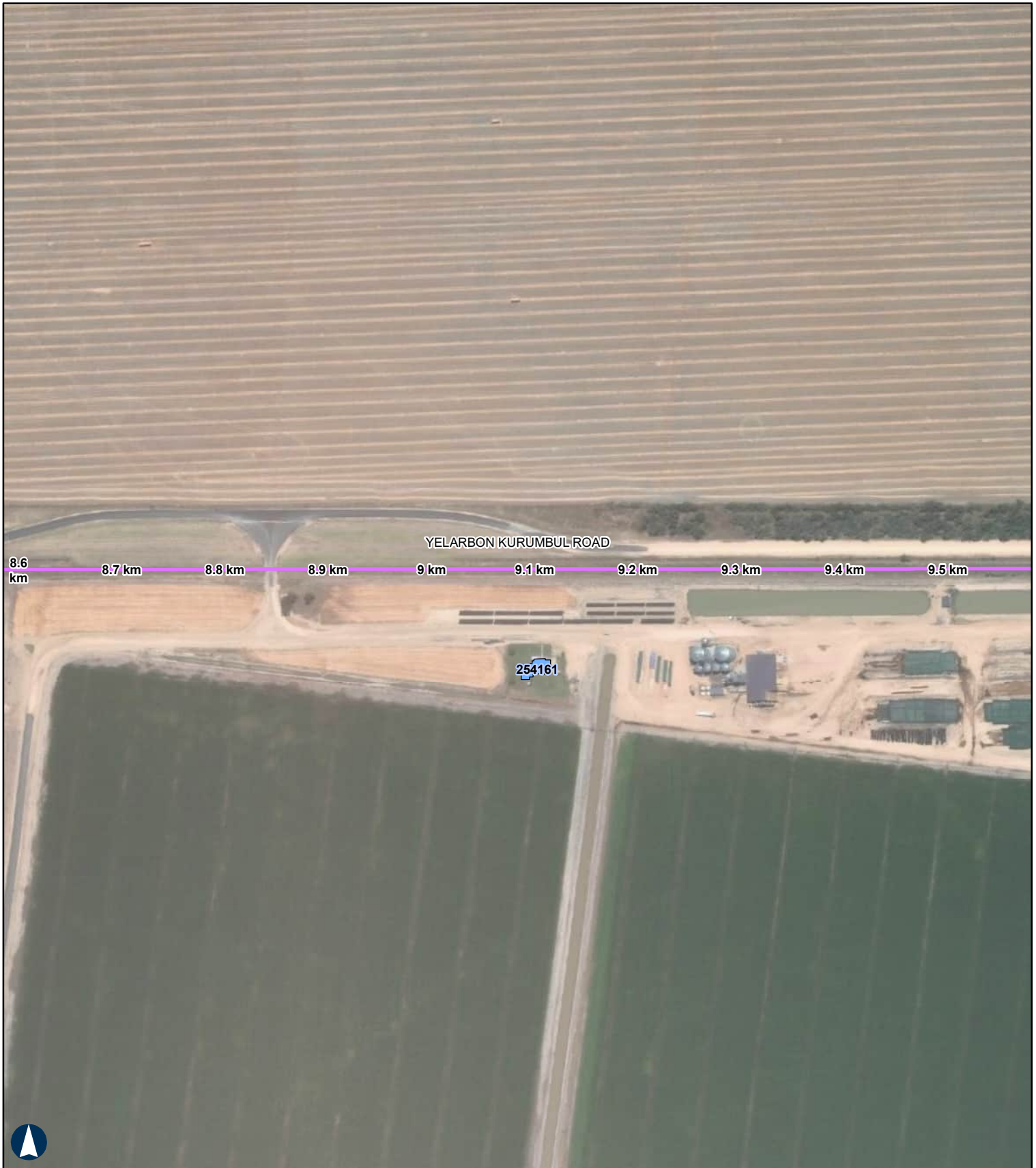
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- X Level Crossings
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- Sensitive receptors triggering a review of mitigation (Residential)
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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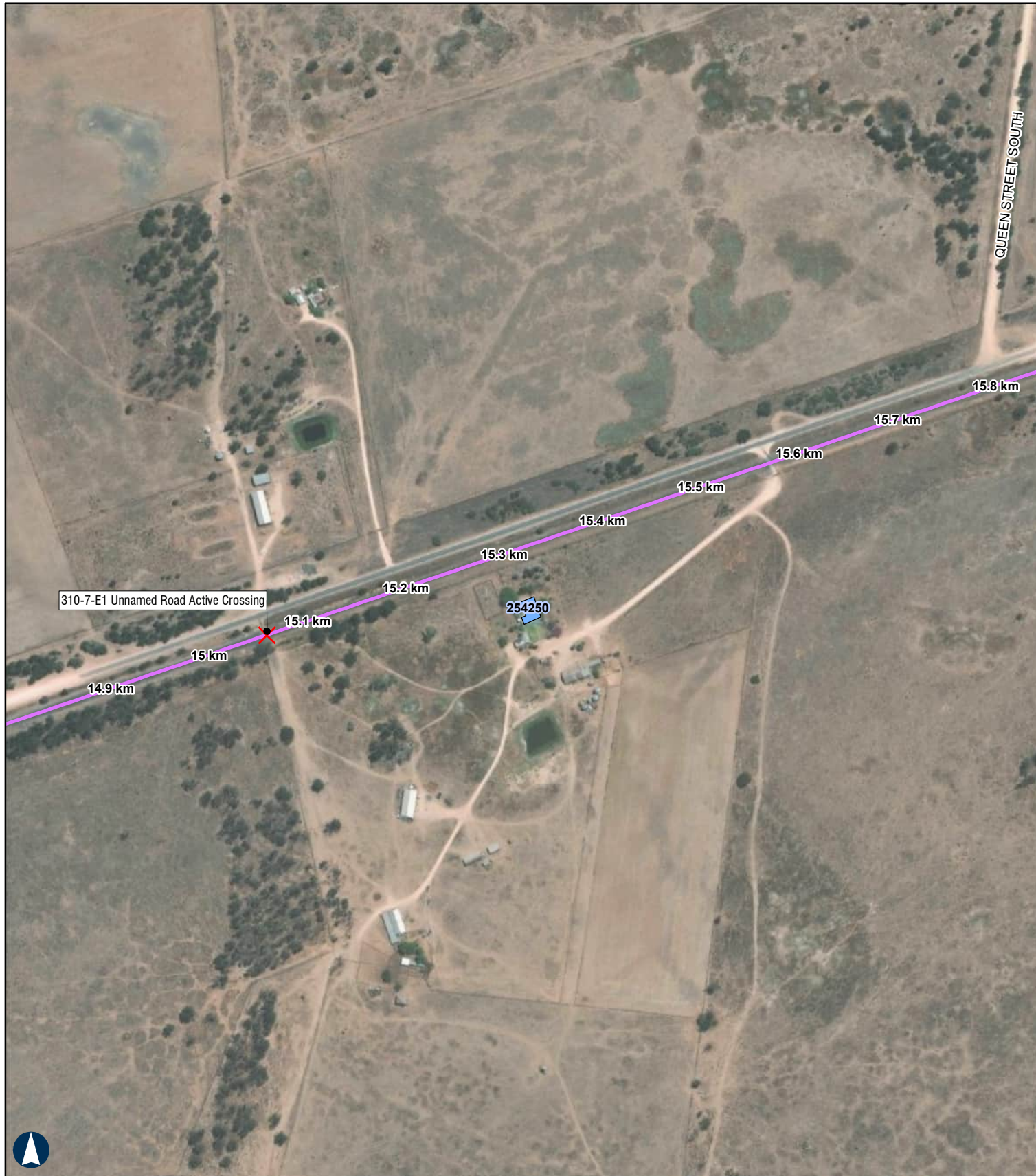
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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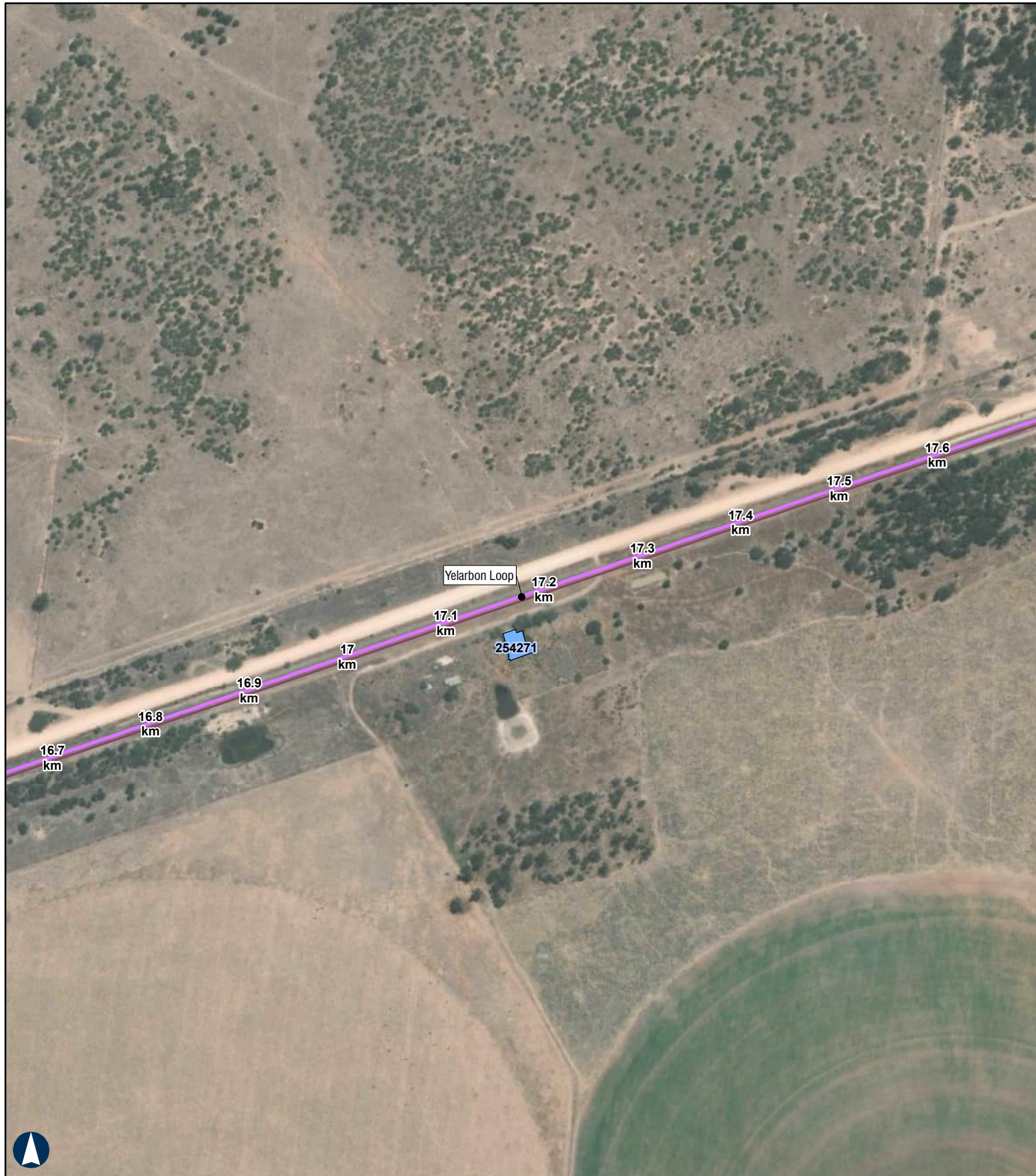
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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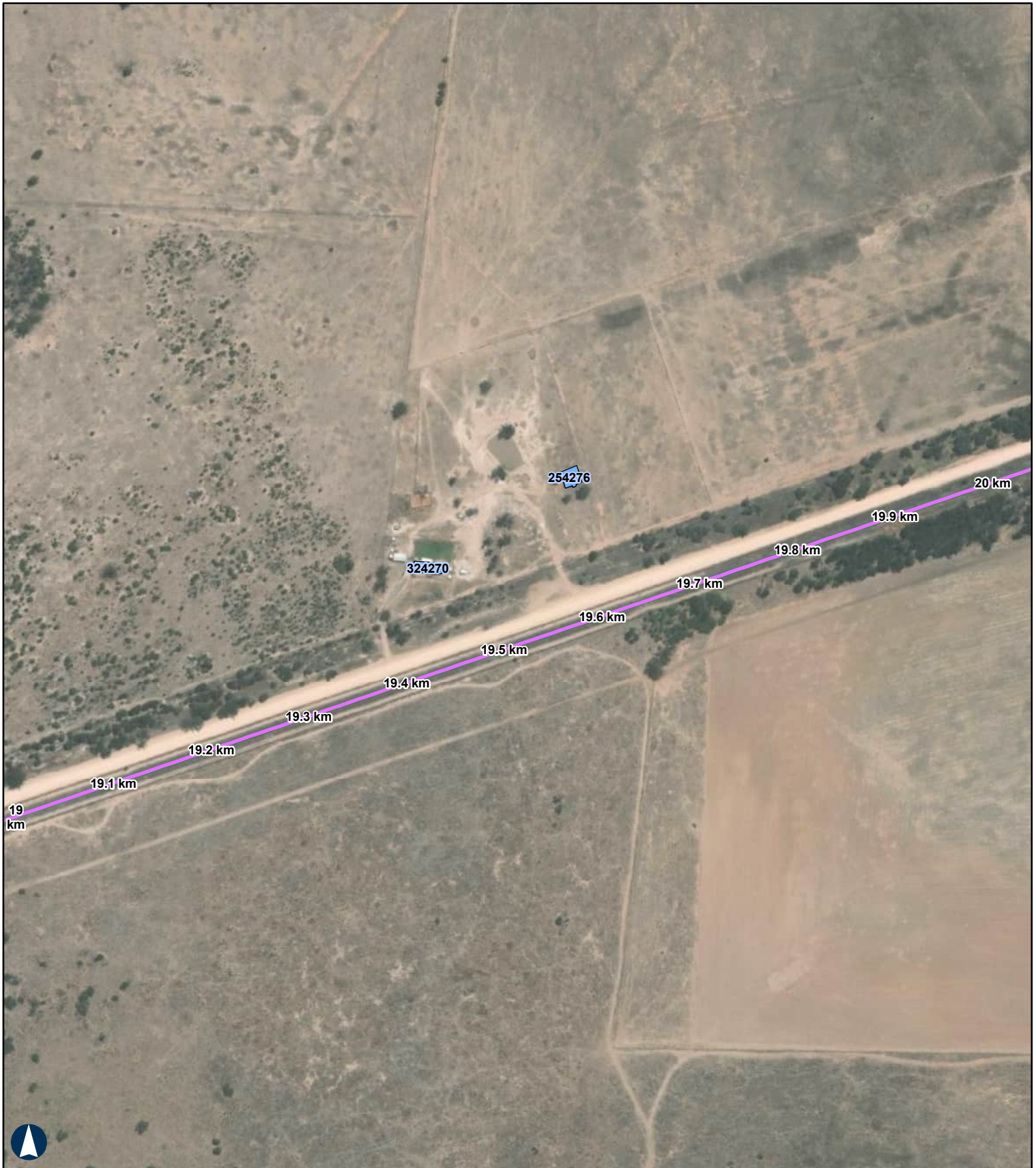
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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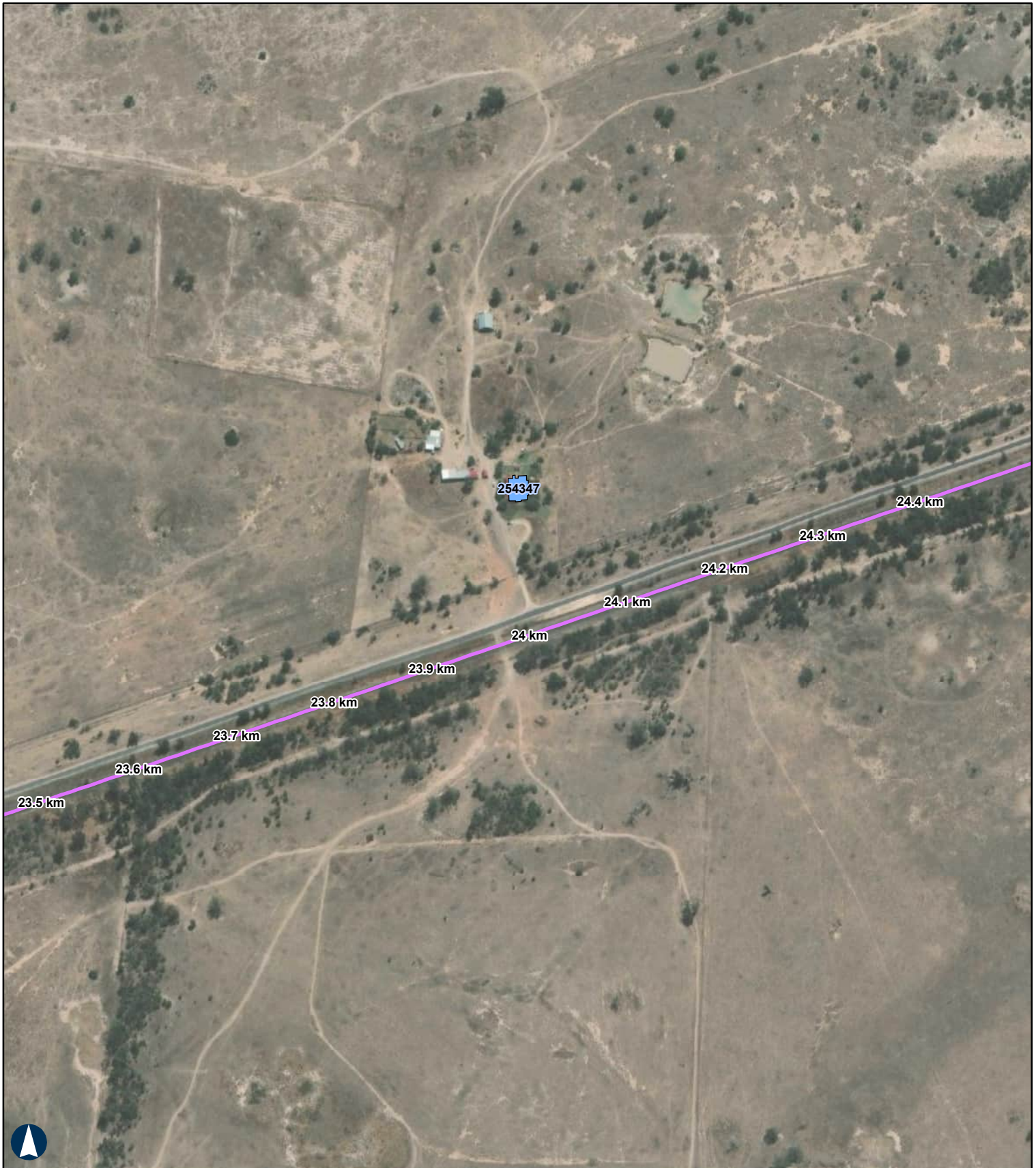
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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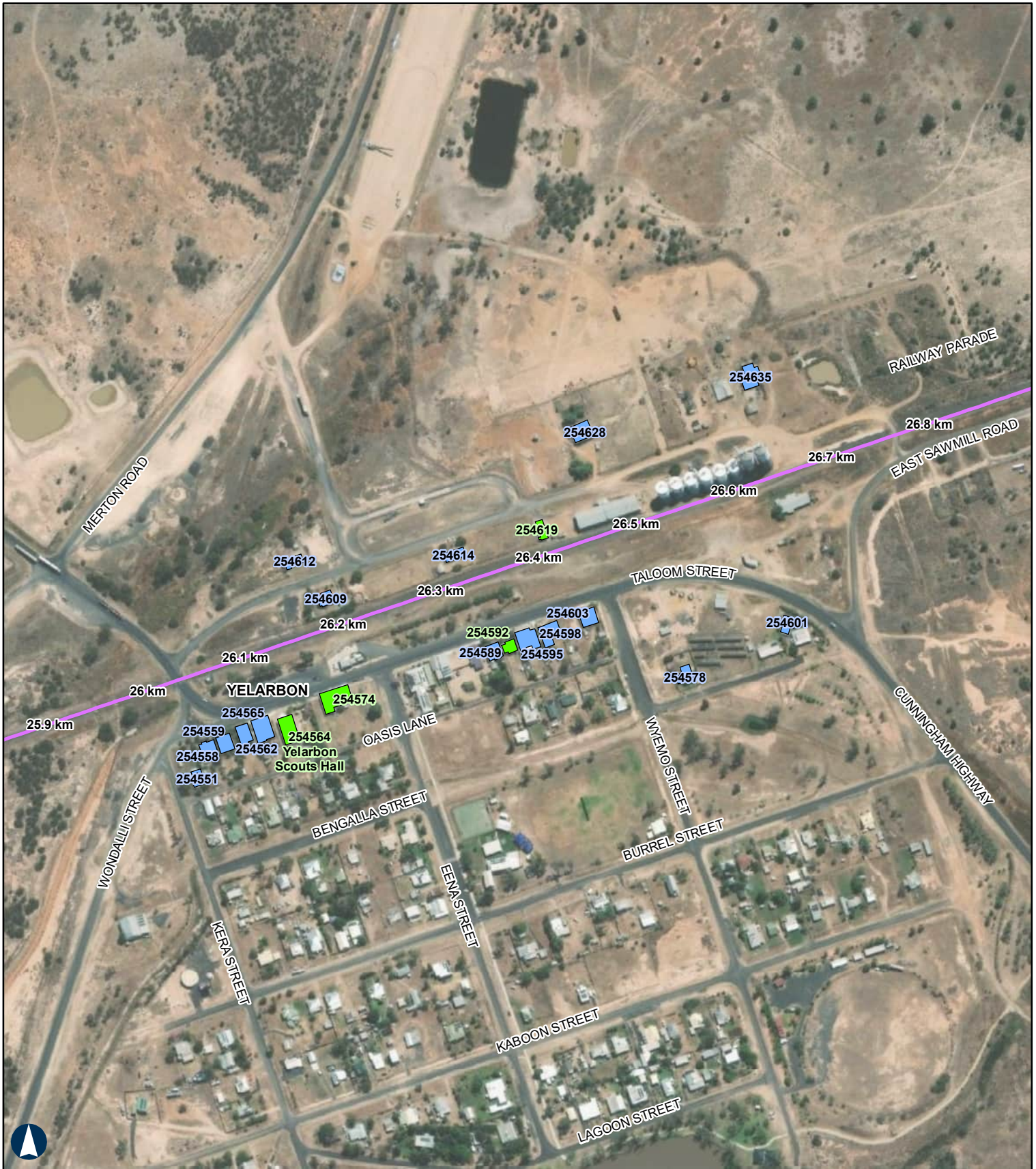
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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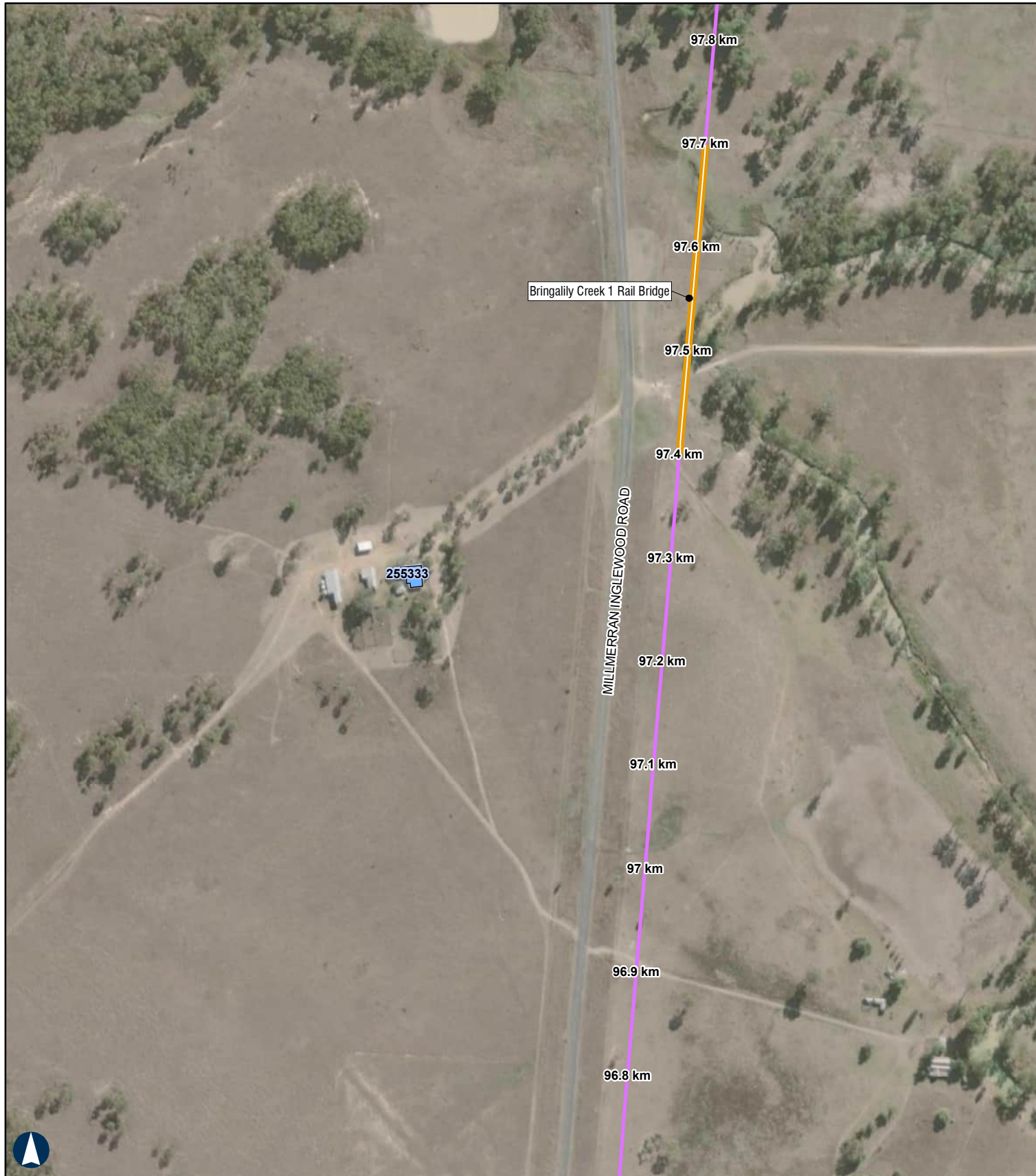
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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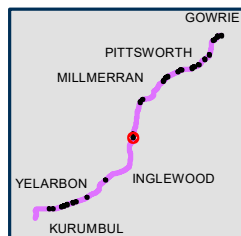
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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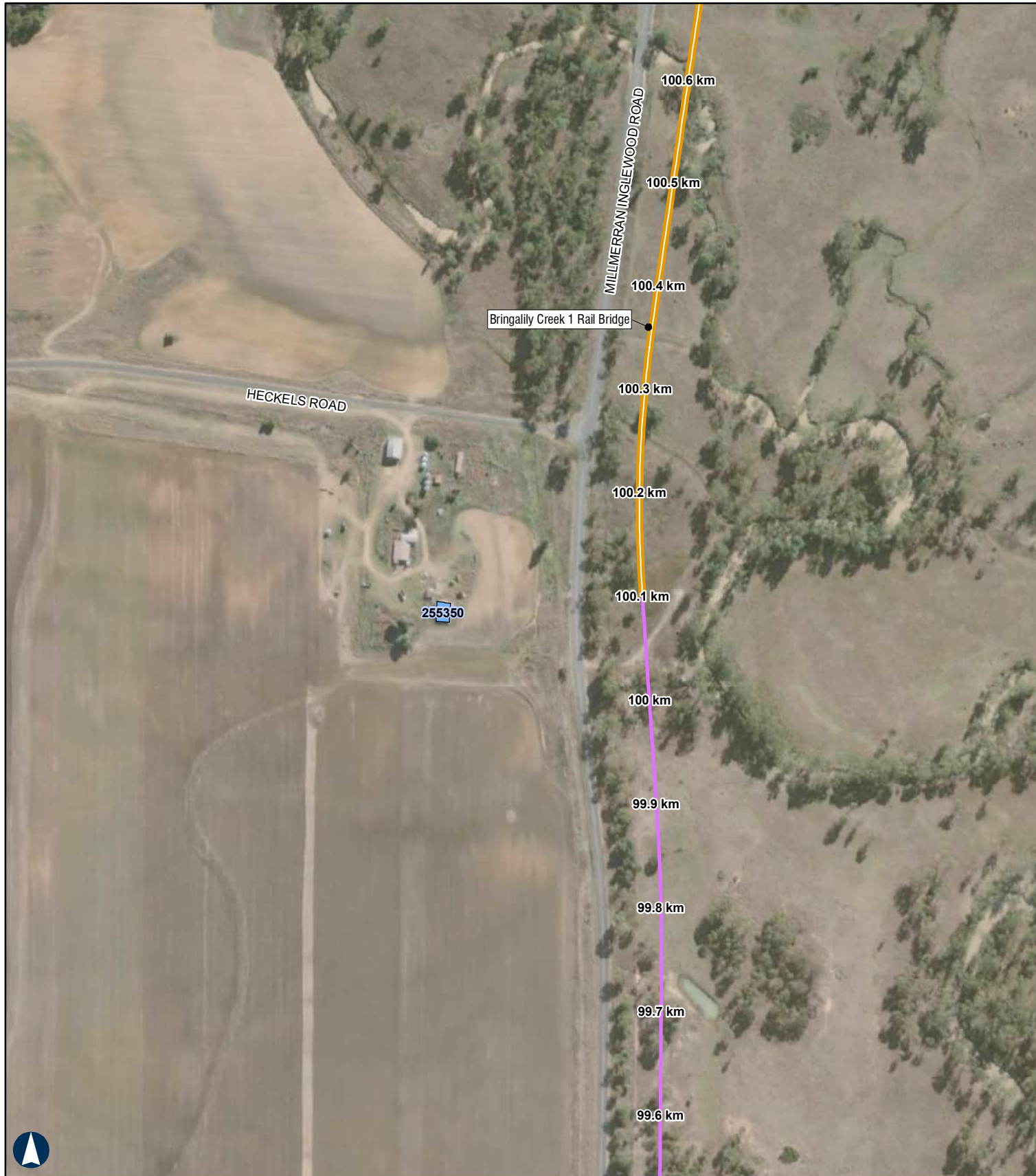
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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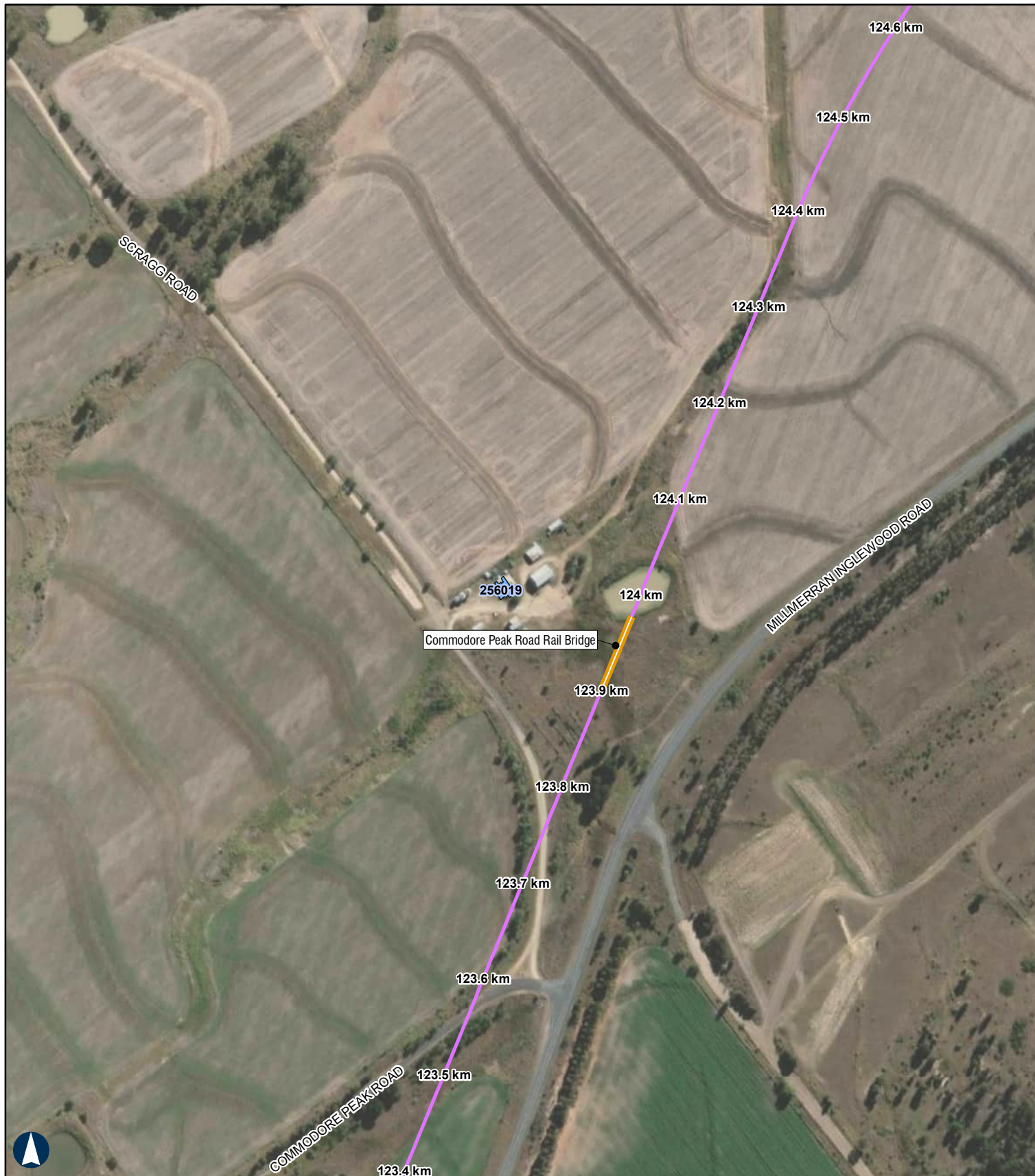
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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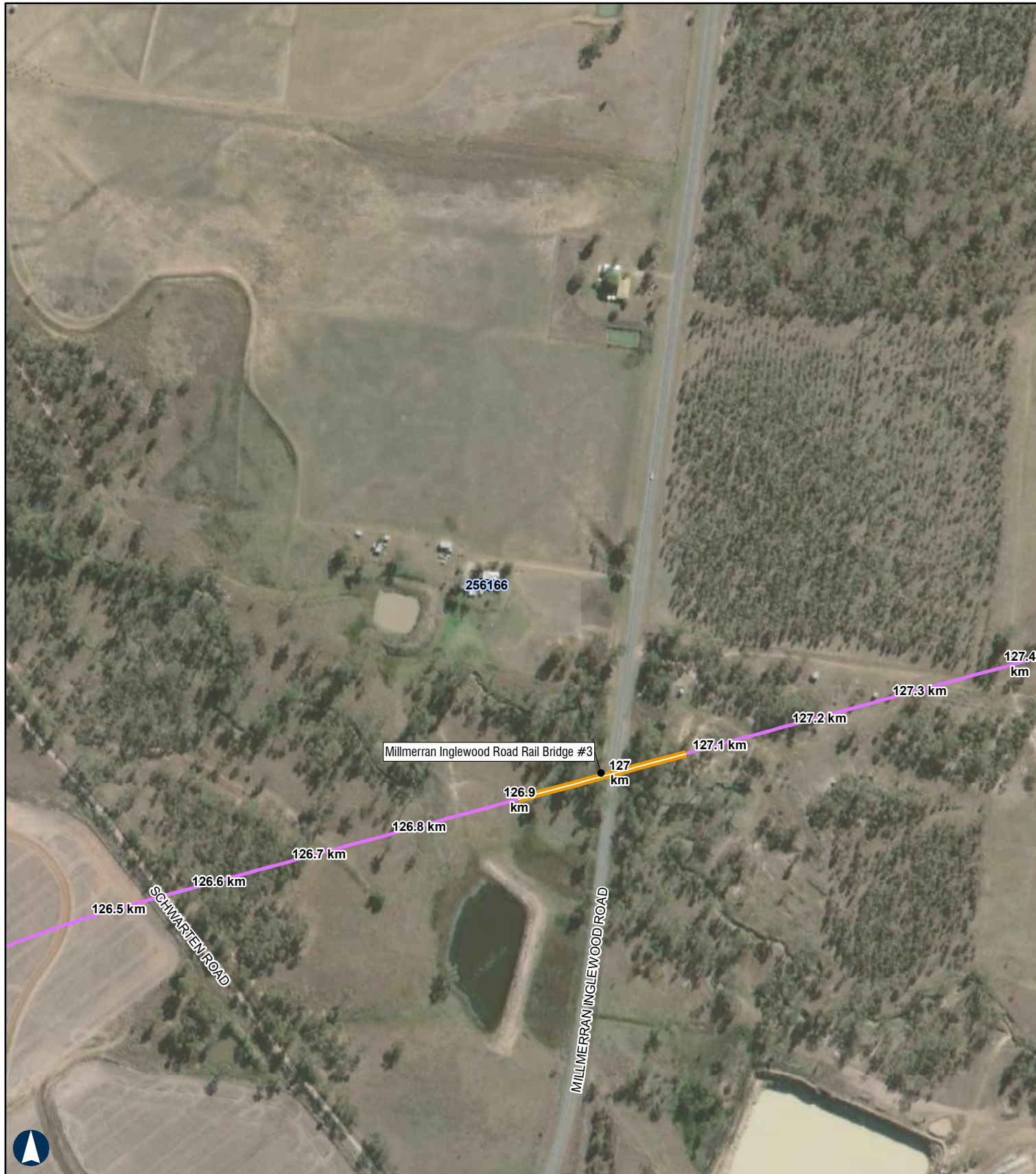
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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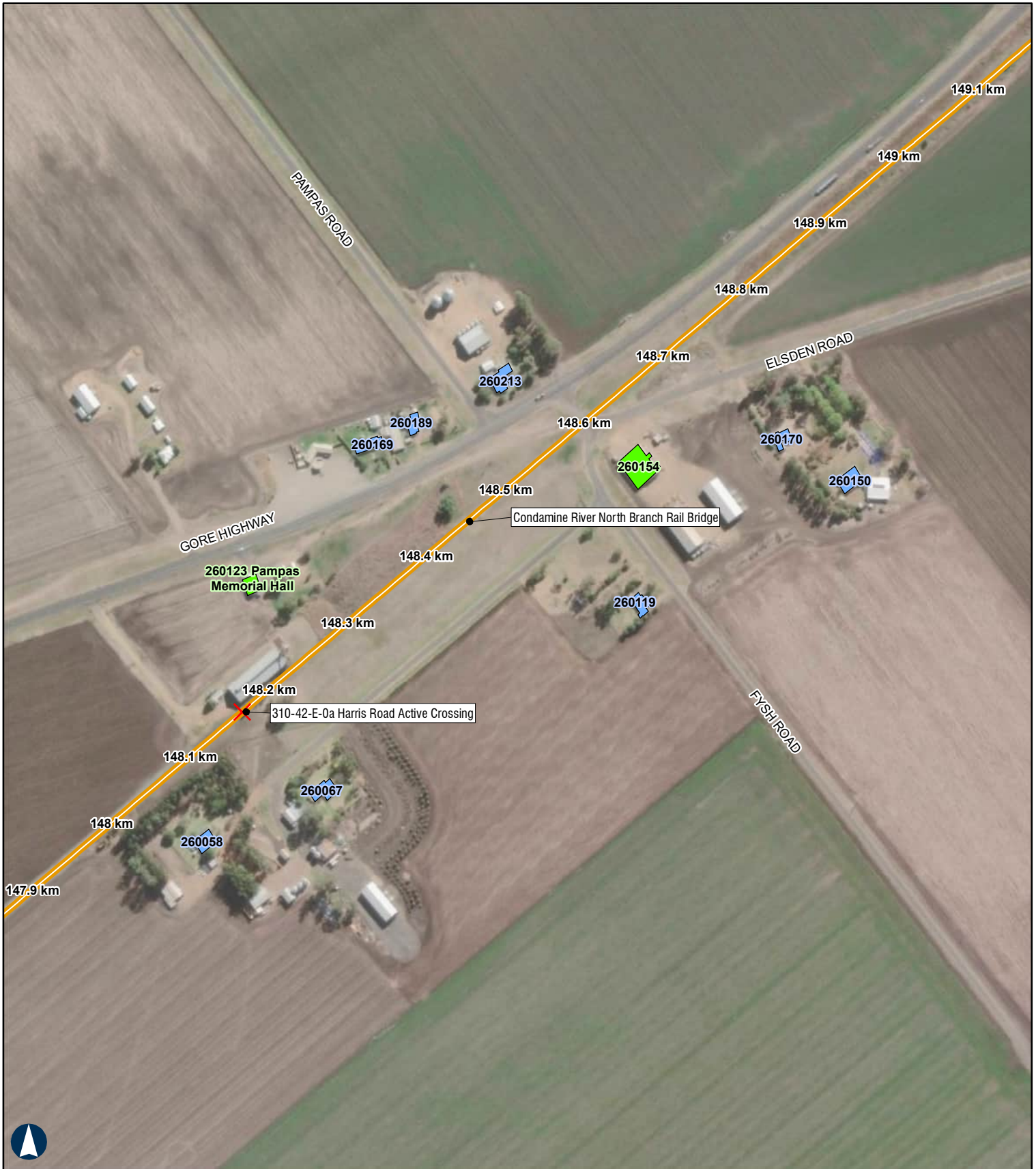
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- ✗ Level Crossings
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- Crossing Loops
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- Sensitive receptors triggering a review of mitigation (Residential)
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

Mapsheet 15 of 32

100 m

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- X Level Crossings
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- ◆ Sensitive receptors triggering a review of mitigation (Residential)
- ◆ Sensitive receptors triggering a review of mitigation (Non-residential)



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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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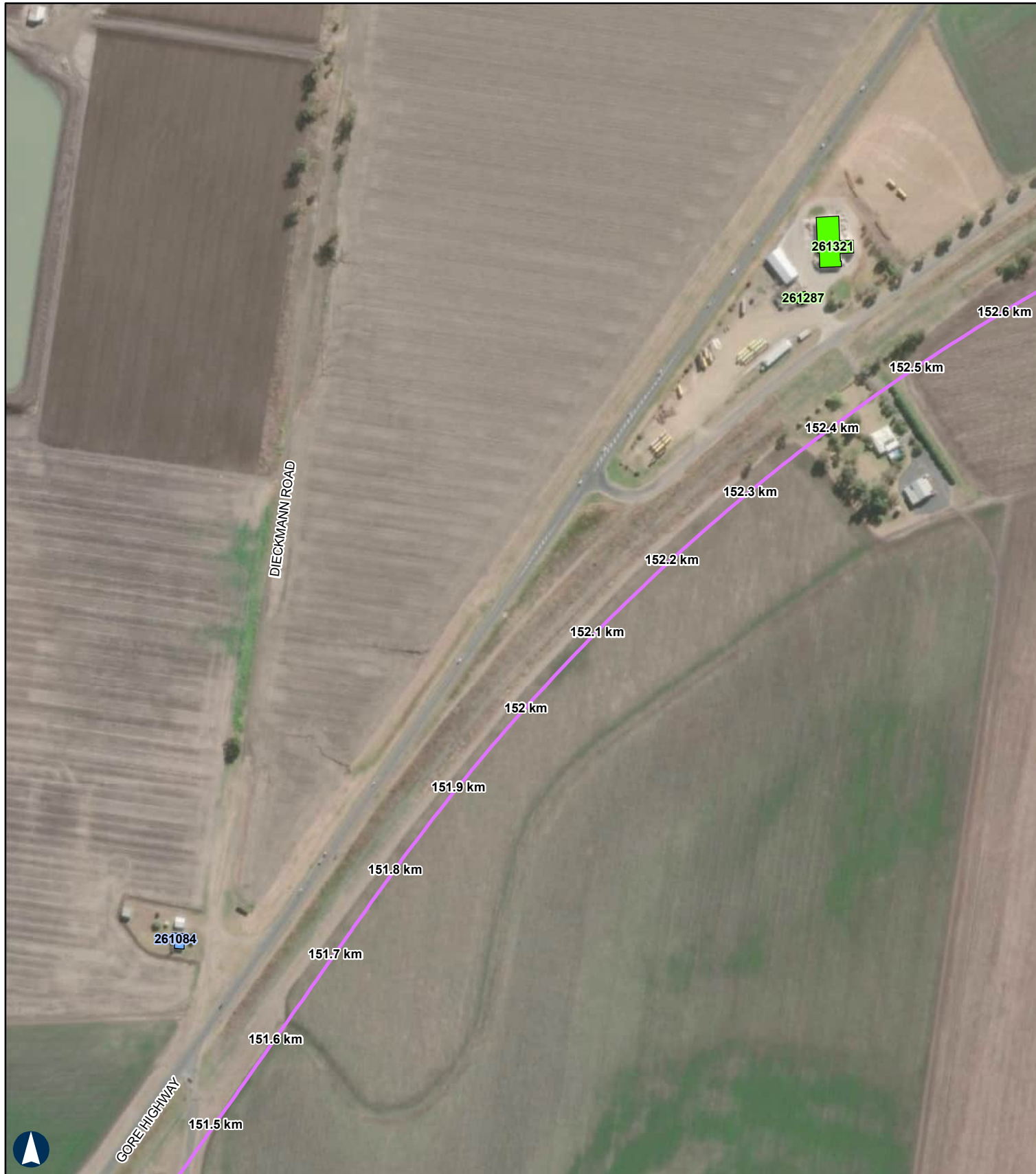
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

Mapsheet 17 of 32

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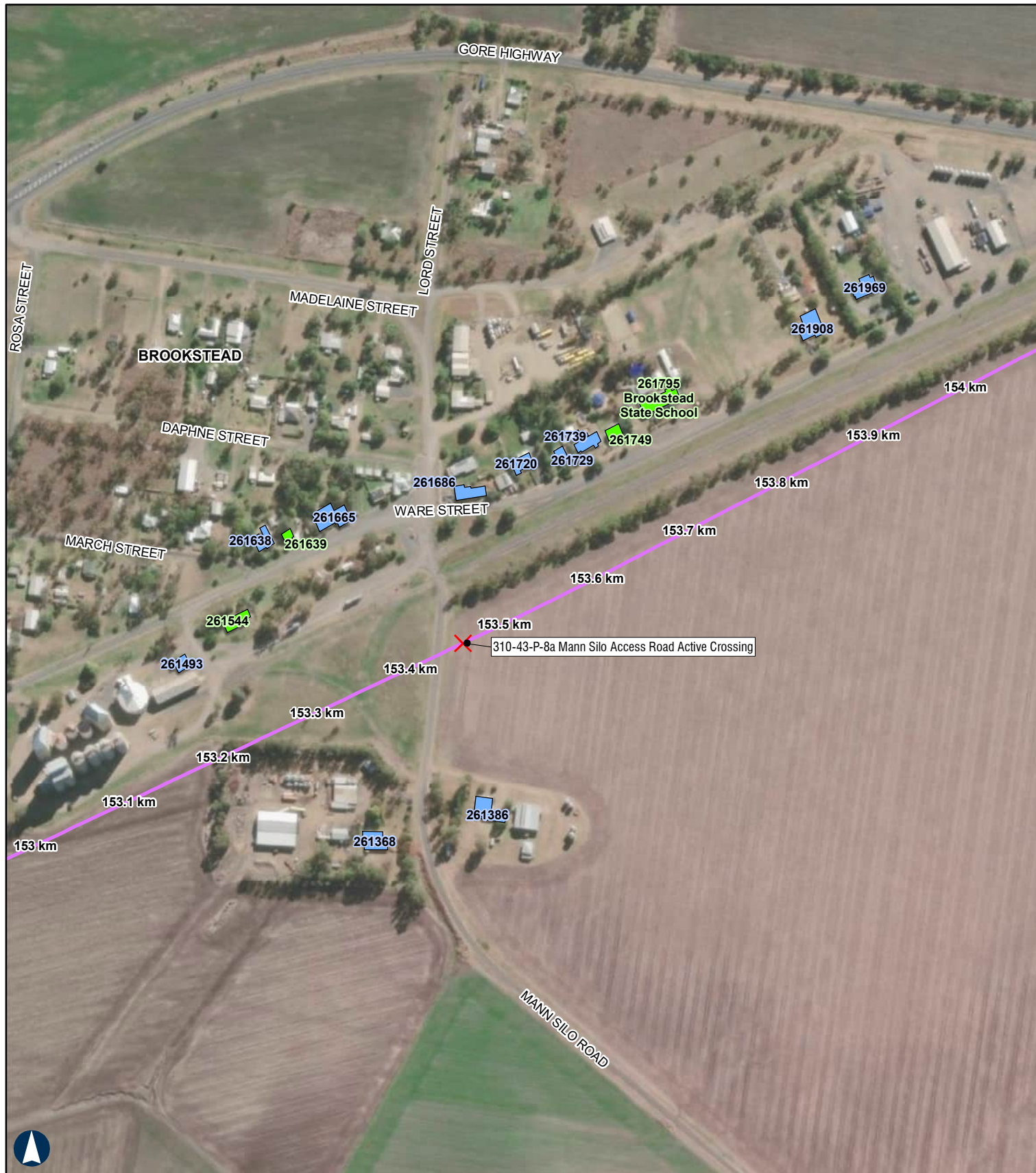
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Date: 17-Oct-2024
Author: JG

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- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Sensitive receptors triggering a review of mitigation (Residential)
- Sensitive receptors triggering a review of mitigation (Non-residential)



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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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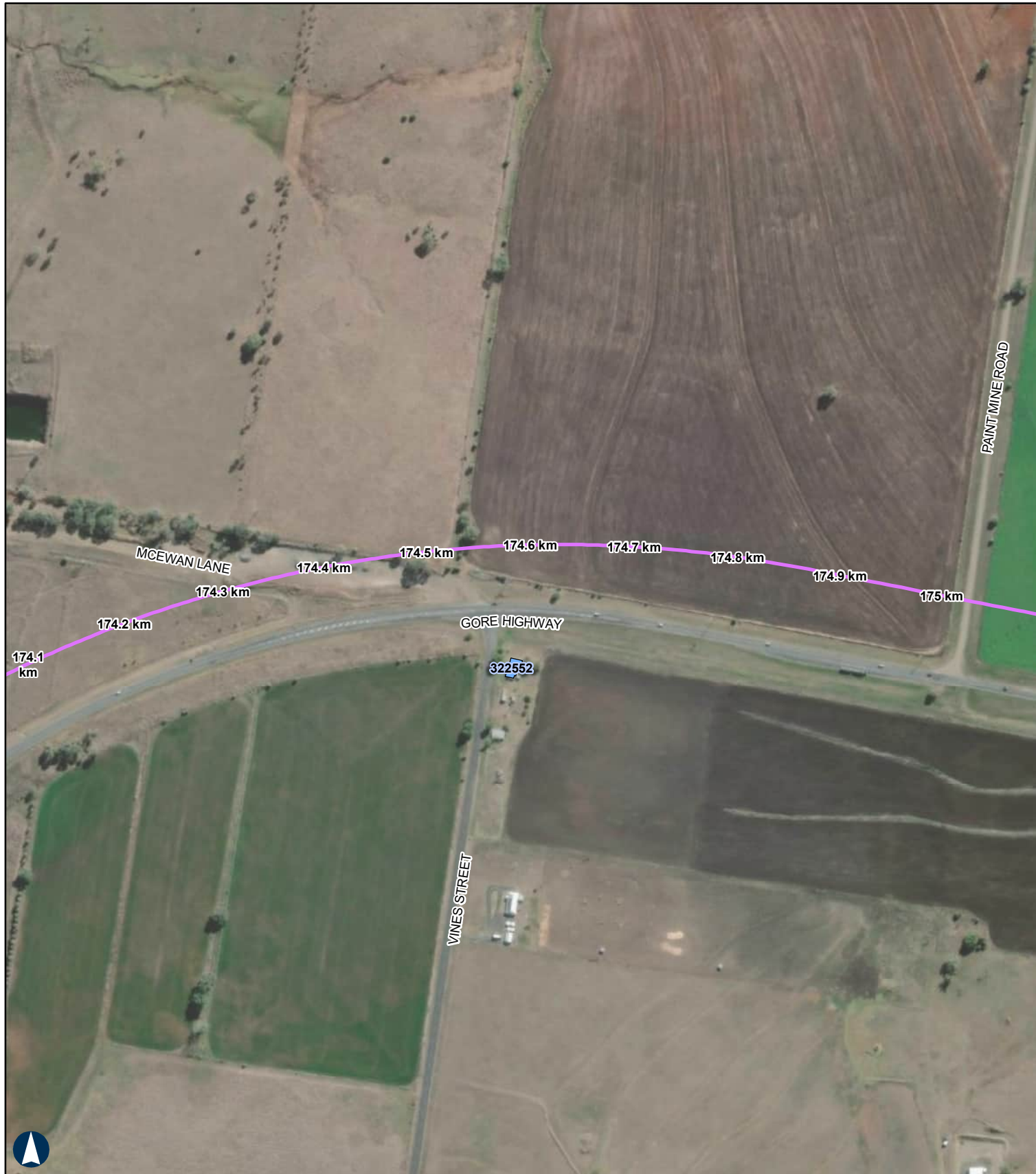
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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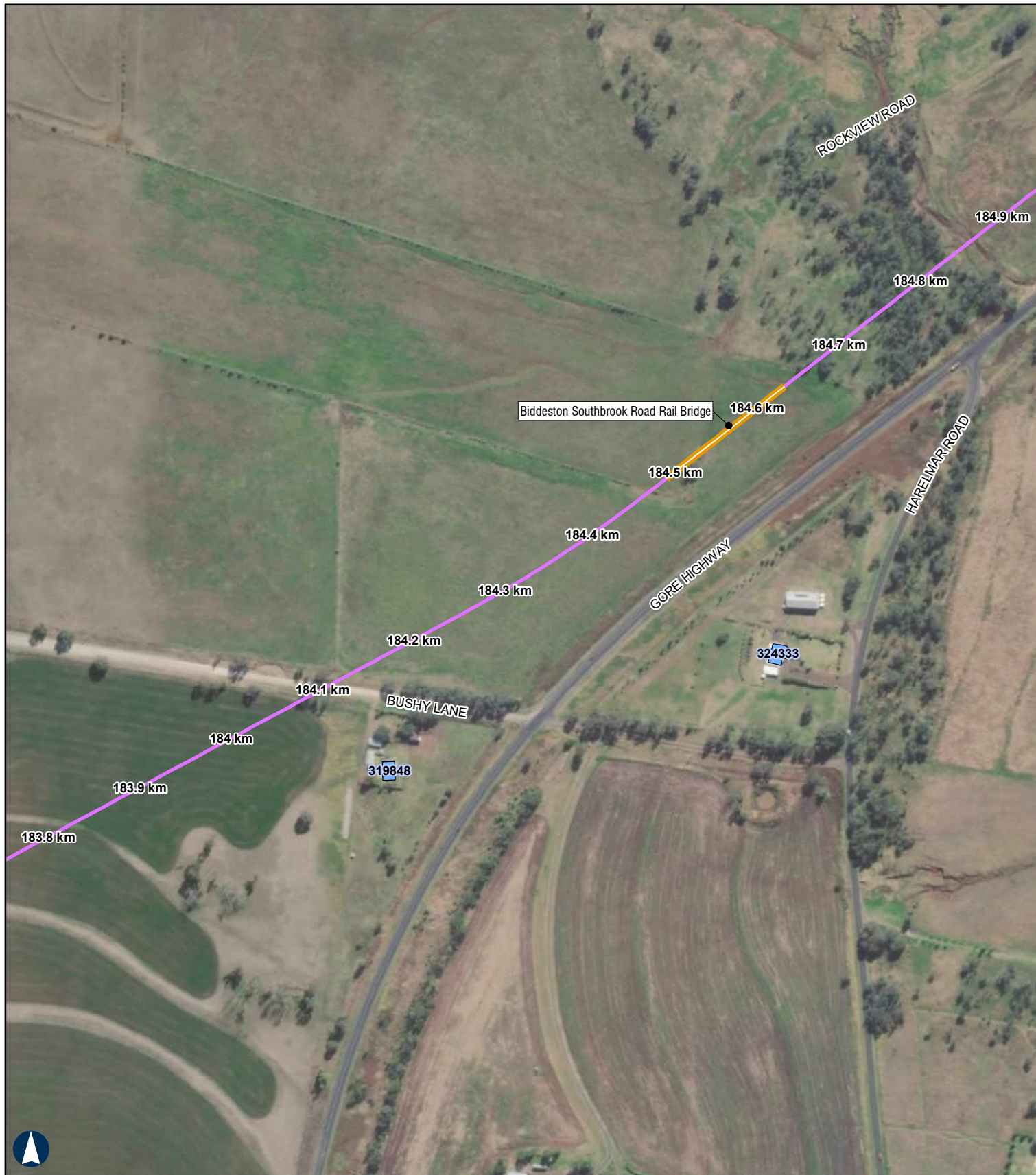
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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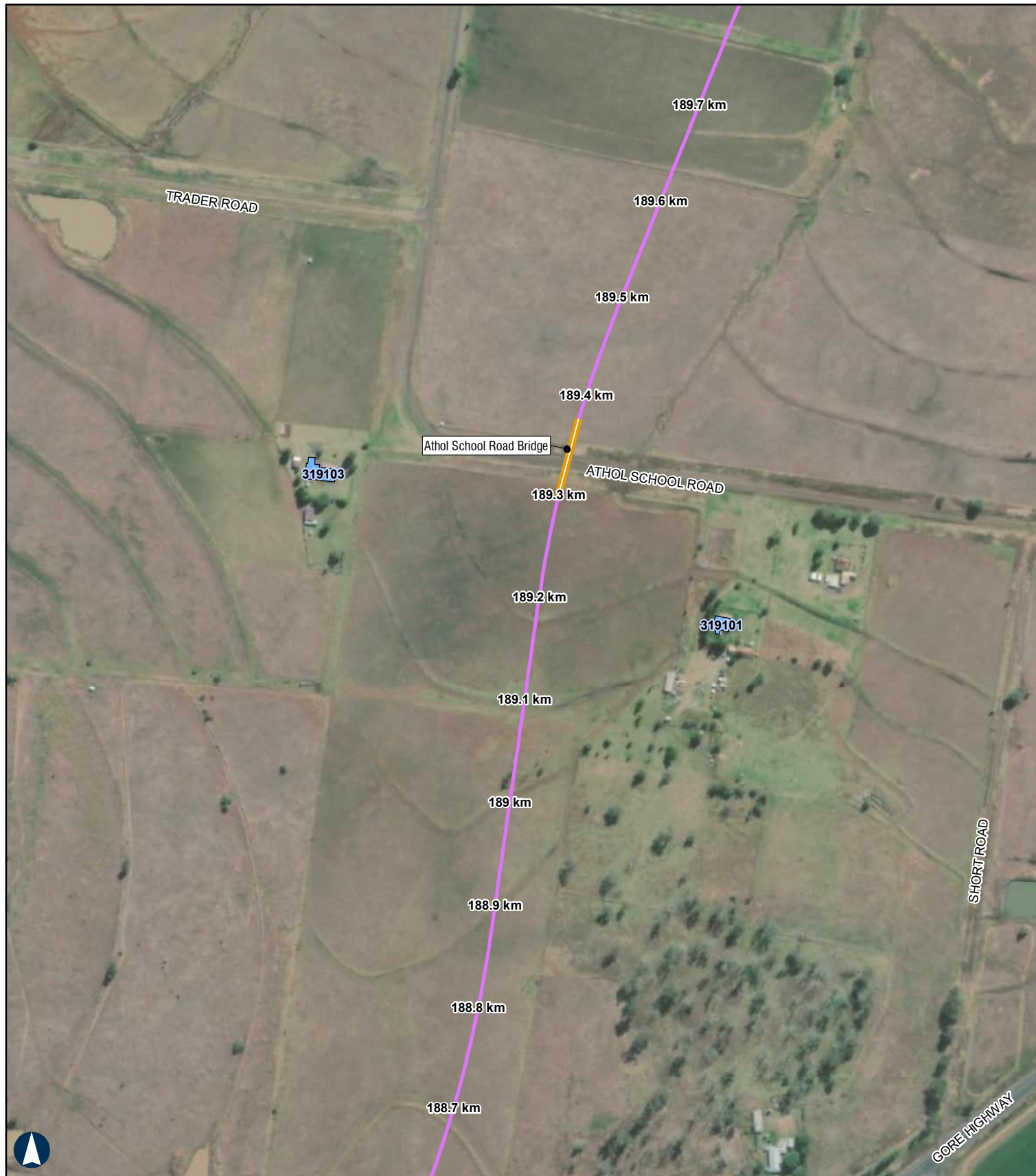
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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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Figure 10-1: Sensitive Receptors Triggering the Investigation of Noise Mitigation

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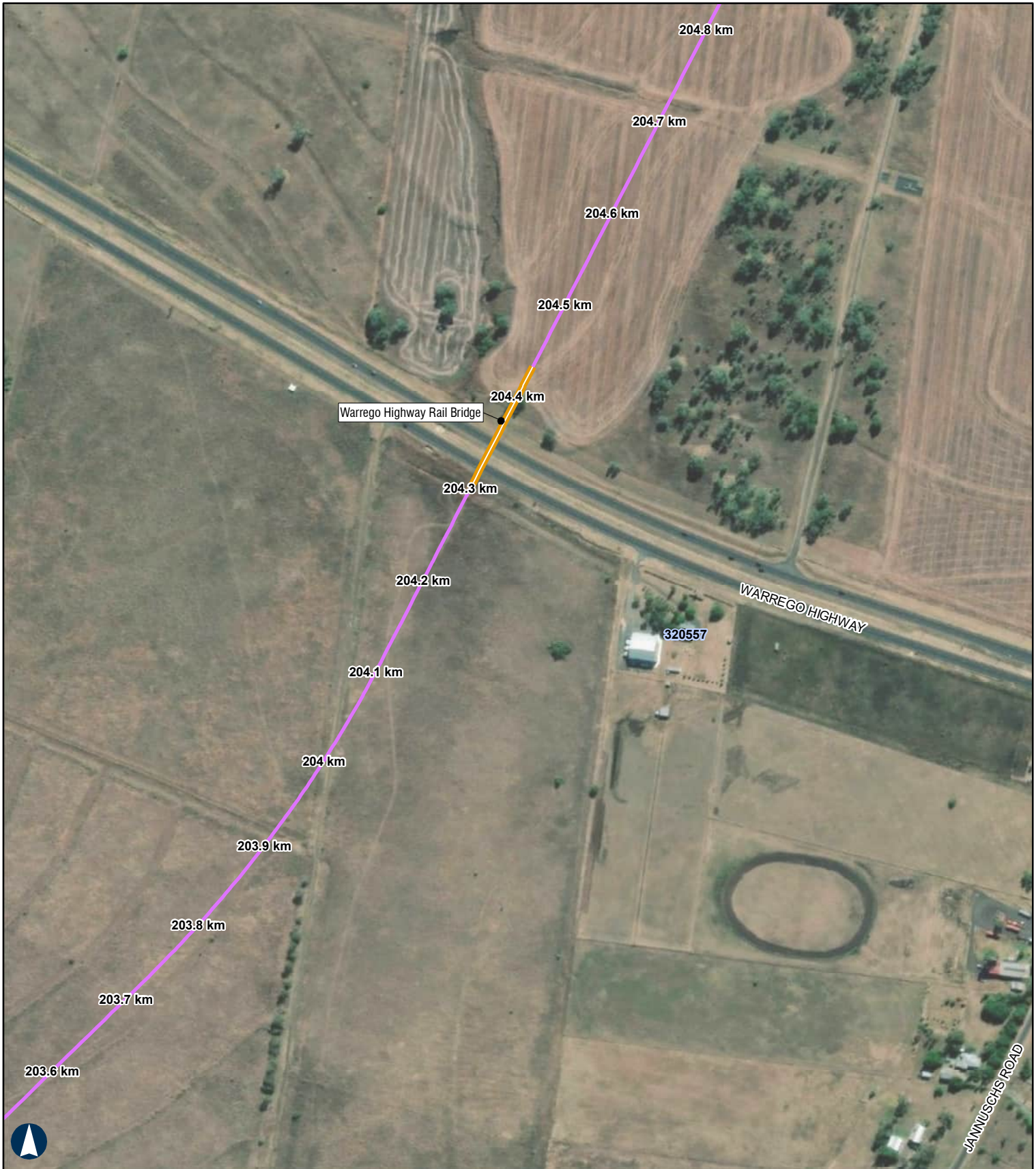
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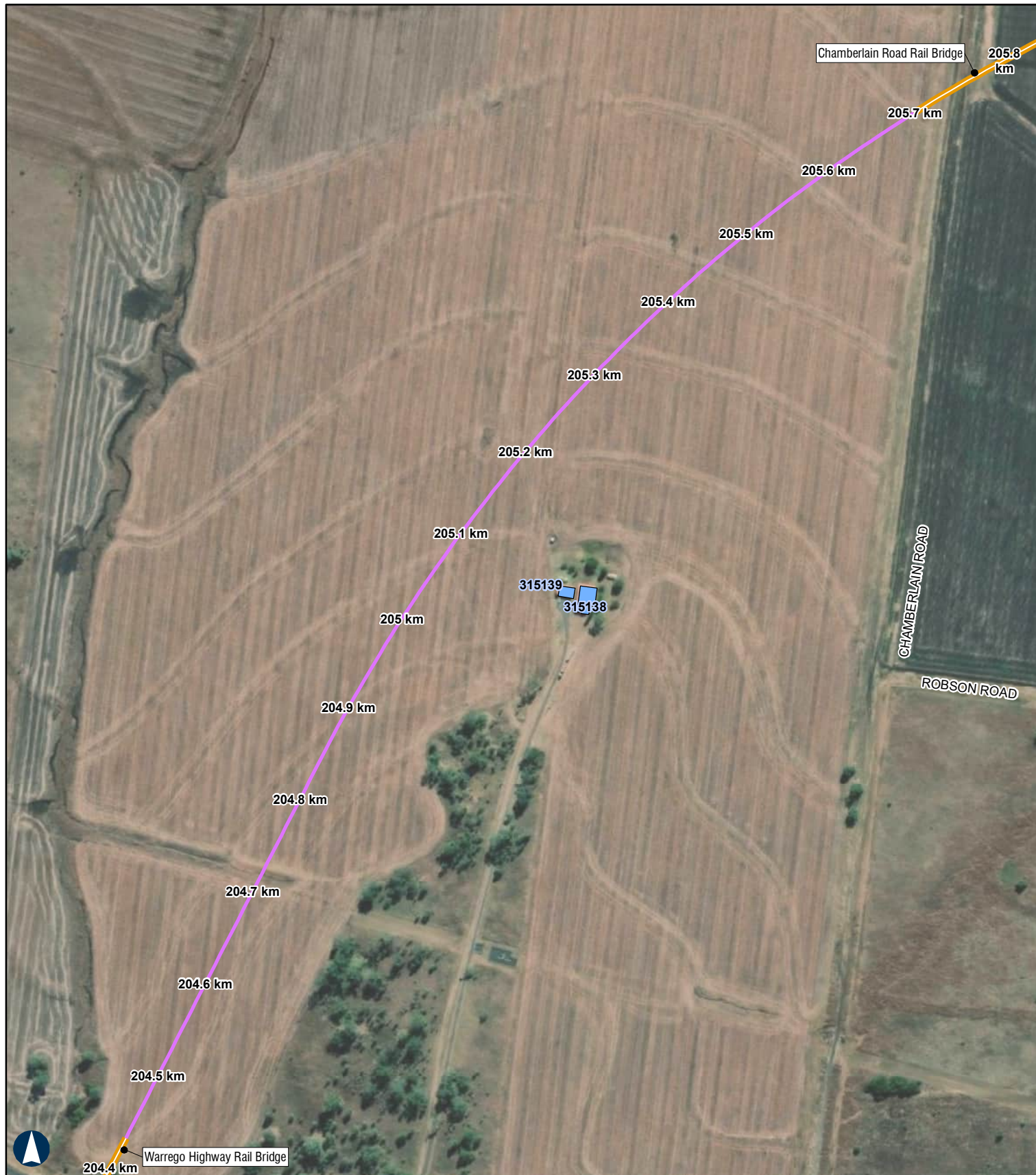
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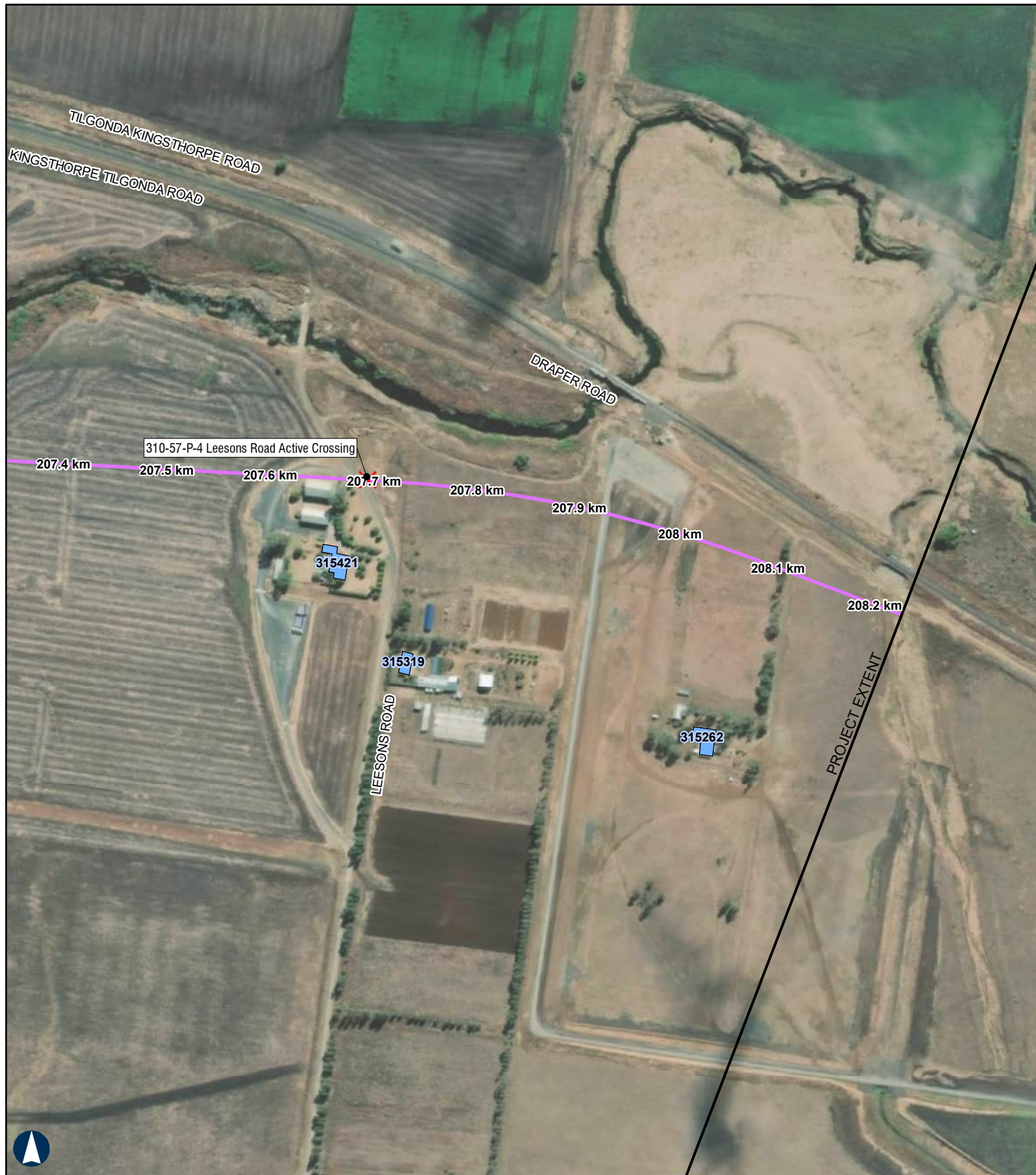
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11.0 Sleep disturbance Assessment

11.1 Assessment guideline

The sleep disturbance assessment has been based on the Queensland *Noise and Vibration EIS Information Guide* (DES, 2024), which references the Australian Government's Department of Health publication, *The Health Effects of Environmental Noise*, 2018 ('enHEALTH 2018').

The enHEALTH 2018 publication includes review of international evidence on the influence of environmental noise on sleep, cardiovascular disease and cognitive outcomes. It is based on over 200 research papers, publications and policies from January 1994 to March 2014. The findings of the enHEALTH publication include the following:

- During the night-time, an evidence based limit of 55 dB(A) at the facade using the $L_{eq,night}$, or similar metric and eight-hour night-time period is suggested.
- During the day-time, an evidence based limit of 60 dB(A) outside measured using the $L_{eq,day}$, or similar metric and a 16 hour day-time period is suggested.

The more onerous of the two above limits is the limit for the night-time period. Therefore, a trigger level of 55 dBA $L_{eq,night}$ has been used for the assessment of sleep disturbance. Note that the enHEALTH guideline thresholds are external limits at the façade of the building.

Compliance with the enHEALTH threshold does not preclude the potential for sleep disturbance in some individuals. Inland Rail recognise that lower thresholds for sleep disturbance have been proposed in Europe (44dBA $L_{eq,night}$) (World Health Organization, 2018). The 44 dBA night-time level as an evidence-based threshold is not strongly supported in the enHEALTH guideline as it only accounts for about 3% probability of being highly sleep disturbed based on the research literature reviewed. Comparatively, the 55 dBA threshold has about 10% probability of being highly sleep disturbed. The enHEALTH publication has considered these aspects in developing the 55 dBA threshold for Australian conditions.

It is important to note that the night-time threshold of 55 dBA is a lower, and more stringent, noise level criterion than the requirements of the Interim Guideline. Furthermore, the application of a 55 dBA $L_{eq,night}$ noise level criterion is deemed more stringent than any noise management threshold that has been implemented on rail projects in Queensland.

11.2 Predicted noise levels

The sleep disturbance modelling is based on the following methodology and assumptions:

- Train movements as described in **Section 6.2.1**.
- In addition to the noise from train movements, noise from level crossing alarms and train horns (which are not covered by the Interim Guideline noise criteria) has been included in the sleep disturbance assessment.
- The predicted noise levels do not include the potential mitigation measures identified in this report (presented in **Section 17.4**), therefore actual noise levels would be lower where mitigation is provided.

The predicted $L_{eq,night}$ noise levels are shown in **Appendix D** and **Appendix E**. Based on the worst-case year 2040 scenario, the results of the sleep disturbance assessment are as follows:

- 169 dwellings are predicted to exceed the trigger level. The highest predicted excess is 14 dB and the average excess is 3 dB.



- 82 of these 169 dwellings are also predicted to exceed the DTMR Interim Guideline criteria.

The L_{eq} exceedances are observed to be predominantly dominated by rolling noise at modelled posted speeds, with influences from locomotive noise as well.

The sensitive receptors where the Design Year 2040 noise levels exceed the sleep disturbance trigger level are presented in **Table 11-1**. Sleep disturbance effects are not applicable to non-residential receptors, and hence only the residential receptors are presented in the table.

Table 11-1 Residential sensitive receptors exceeding the sleep disturbance trigger level

Receptor	Leq,night (dBA)	Receptor	Leq,night (dBA)	Receptor	Leq,night (dBA)
254161	64	255349	56	319154	58
254164	65	255350	61	319166	59
254168	67	255357	59	319191	62
254170	65	255433	58	319193	61
254179	63	255514	56	319200	58
254181	61	255776	58	319226	56
254188	57	255777	56	319294	57
254193	56	256019	61	319297	57
254250	67	256166	61	319452	57
254255	59	256192	56	319465	57
254271	69	256213	57	319481	57
254276	63	257028	56	319485	63
254347	63	260058	66	319605	58
254476	58	260067	64	319652	56
254502	57	260119	61	319733	57
254516	56	260150	59	319848	62
254526	56	260165	59	320376	56
254529	56	260169	61	320557	59
254531	56	260170	62	320581	58
254534	58	260189	63	320889	60
254535	56	260213	65	320890	56
254536	57	260528	63	321184	60
254537	56	260930	58	321381	58
254539	57	261084	62	321457	59
254540	56	261368	61	321458	60
254546	57	261386	62	321618	60
254549	57	261452	59	322047	58
254550	56	261465	59	322391	56
254551	63	261493	61	322429	58
254558	66	261535	57	322494	58
254559	66	261572	57	322529	56
254562	67	261638	60	322552	63



Receptor	Leq,night (dBA)	Receptor	Leq,night (dBA)	Receptor	Leq,night (dBA)
254565	67	261649	58	322625	56
254571	59	261661	57	322665	57
254573	57	261665	61	323406	57
254576	65	261686	63	323416	56
254578	60	261687	61	323449	56
254587	58	261703	61	323525	57
254589	65	261717	58	323569	57
254594	59	261720	63	323605	56
254595	66	261729	63	323678	59
254598	66	261739	63	323720	59
254601	61	261908	63	323722	56
254603	66	261969	62	323796	59
254609	70	315138	60	323804	59
254612	65	315139	63	323819	56
254614	70	315262	61	323854	63
254628	60	315319	61	323868	56
254635	62	315421	65	324270	64
254661	60	319019	57	324333	60
254787	58	319045	60	2008224	60
254790	57	319101	61	2008318	57
254828	60	319103	59	2008319	57
255318	58	319104	58	2008340	56
255333	60	319121	63	2008347	56
255336	56	319138	57		
255346	62	319150	62		

The daily numbers are derived from peak weekly volumes, and hence incorporate a certain level of conservatism in the assessment. It is however worth noting that the predicted levels are sensitive to the train types that might traverse at night.

Section 6.2.1 details the assumption of up to eight train movements during the night (and rationale behind the number of train movements at night). Within these eight movements, there are five Inland Rail Express and Superfreighters which are the worst-case movements considering their length (about 1800 m) and posted speeds (115 km/hr) and hence dominate the predicted noise levels.

If these trains were to run during the day and were replaced by cotton or grain trains at night, the night-time noise levels may reduce, resulting in lesser receptors exceeding the night-time threshold. Similarly, if all of the night-time trains comprise of worst-case Express or Superfreighter trains, the predicted noise levels may further increase, resulting in an increase in the number of receptors exceeding threshold. However at this EIS Stage, there is no further certainty on daily scheduling of trains.

Moreover, the actual freight train speeds typically are less than the posted speeds for large sections of freight corridor. For example, trains travelling at 80% of the posted speed are typically 2 dB quieter than the same trains travelling at posted speed.



Inland Rail is committed to assessing the sleep disturbance effects carefully based on future realistic worst-case conditions as the project progresses into detailed design, with consideration to the following aspects:

- Detailed train timetables as they are developed,
- Actual operating conditions of trains (speeds, notches, loads, etc. at various sections),
- Knowledge of the construction of the individual buildings and use of windows (note that sleep disturbance is an internal noise effect, and the probability of semi-open windows, closed windows etc. should be accounted for to assess impacts case-by-case),
- Updated noise prediction modelling conducted during detailed design,
- Any design changes as they occur during further project development, and
- Any further on-site validation and measurements as required.

Based on a review of the locations of receptors tabulated in **Table 11-1**, majority of the exceedances are observed to be in towns. These receptors would benefit from any noise barriers being implemented (such as the concept barriers shown in **Section 17.4**). Outside of these towns and/or barrier locations presented in this assessment, the remaining receptors are observed to be isolated, even if the predicted levels were to be exceeded (by 2-3 dB for a theoretical worst-case scenario). Therefore, mitigation to these receptors would be limited to property treatments, subject to further investigation as described above.





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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 1 of 47

100 m

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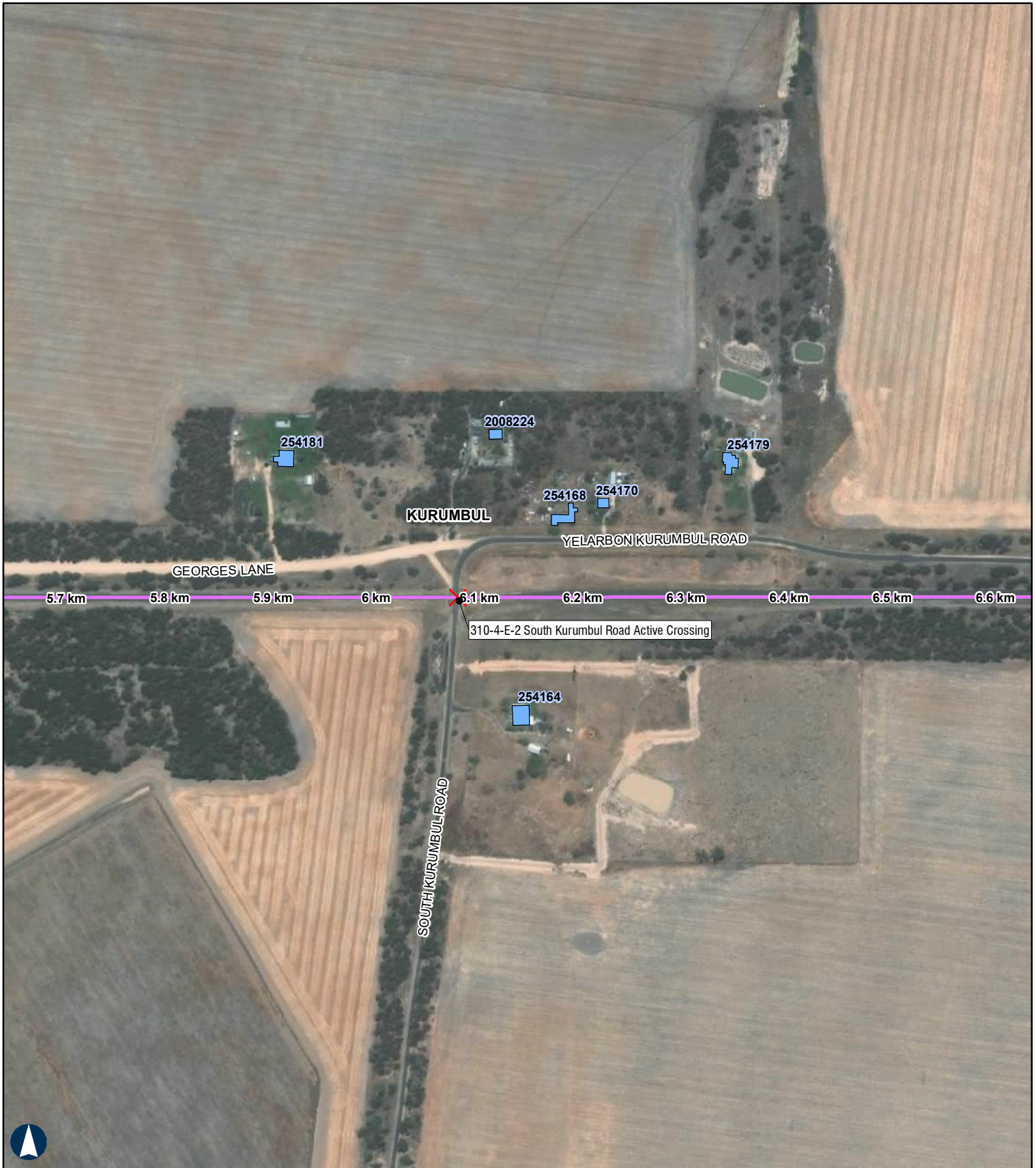


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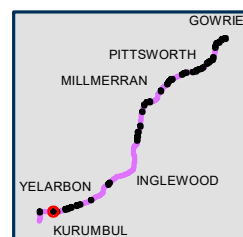
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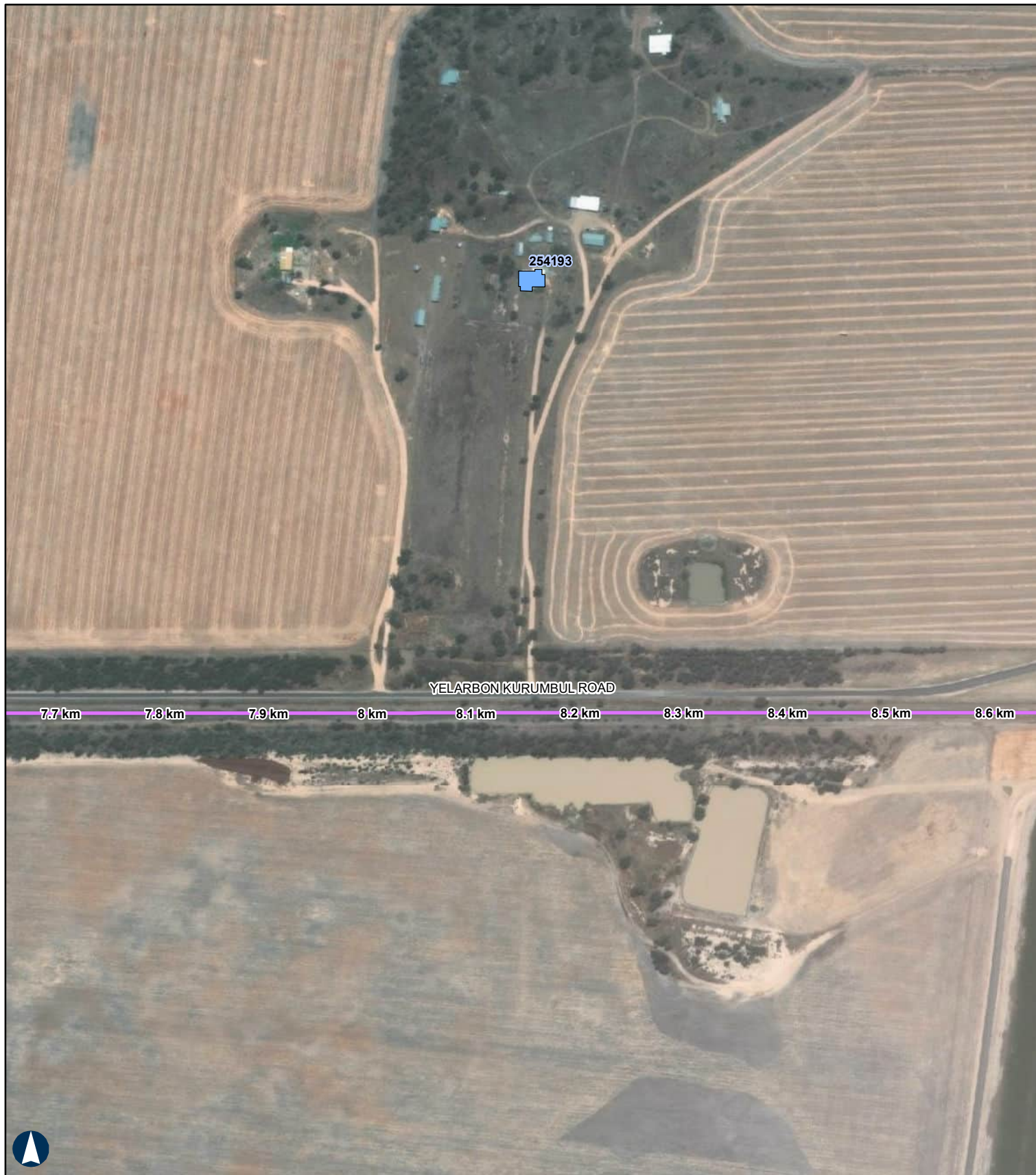
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- Sleep Disturbance Triggers



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Author: JG
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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

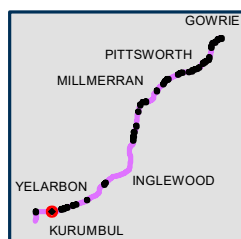
Mapsheet 3 of 47

100 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Sleep Disturbance Triggers

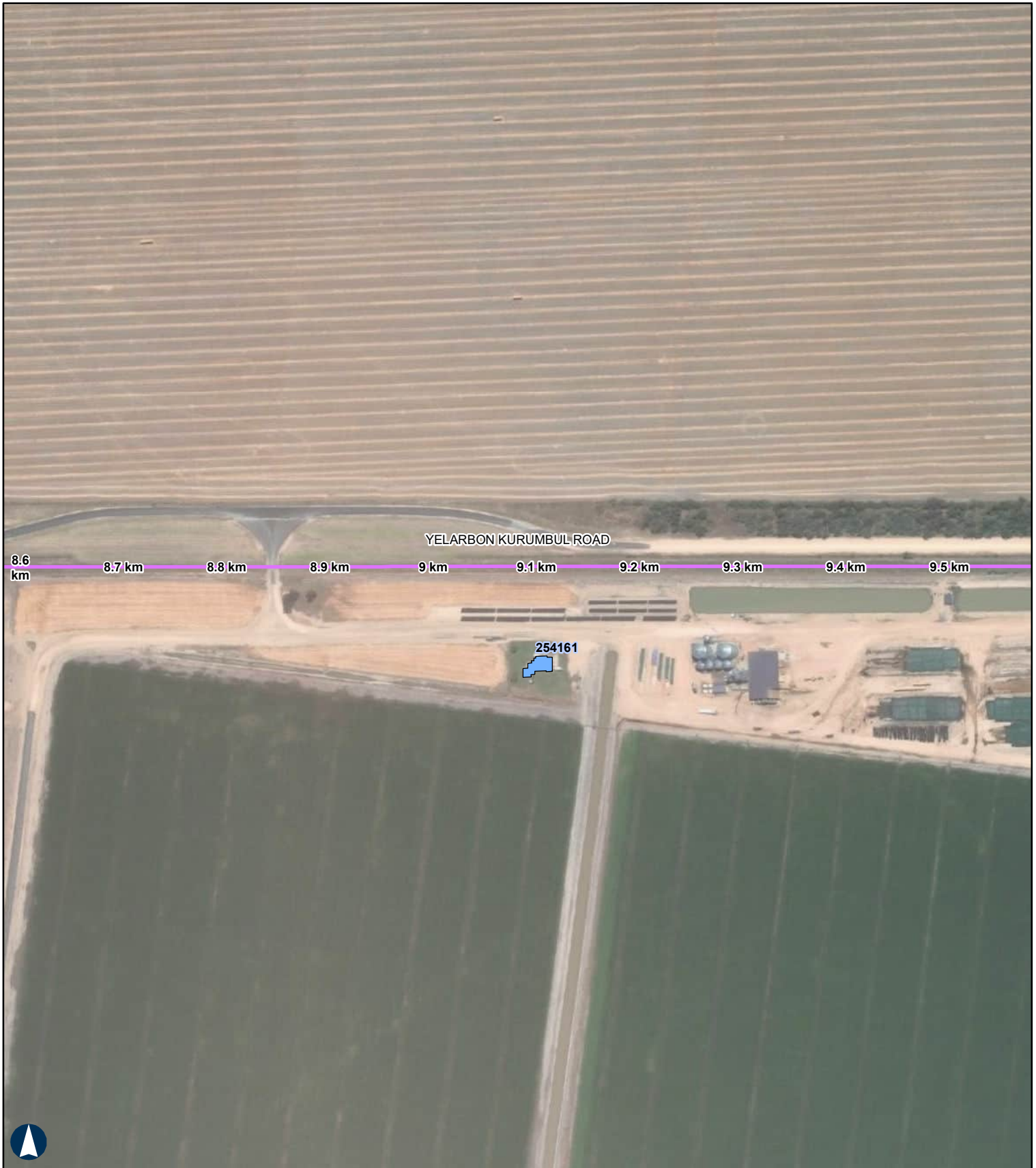


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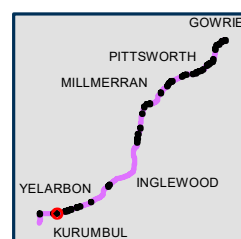
Mapsheet 4 of 47

100 m

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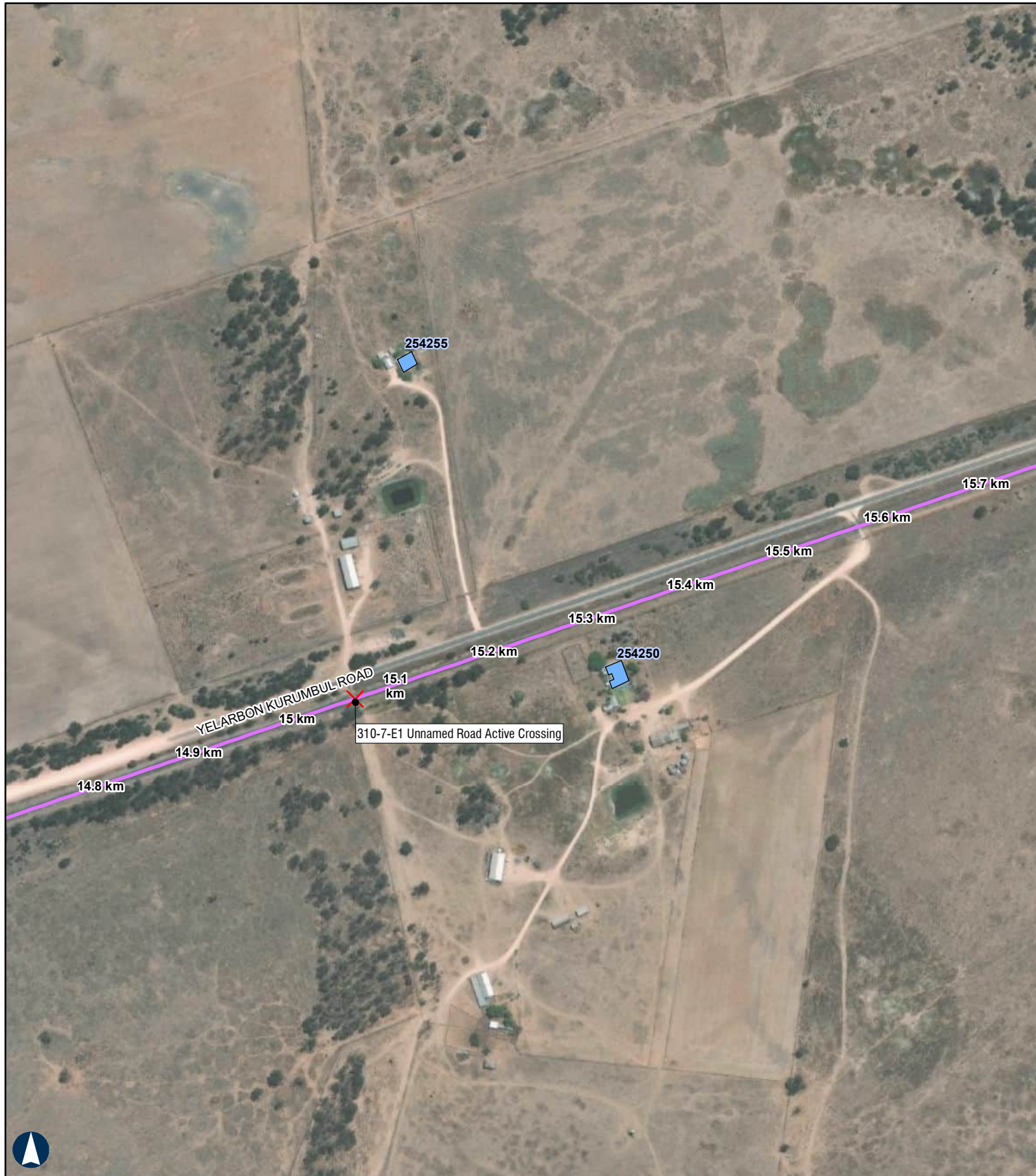
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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 6 of 47

100 m

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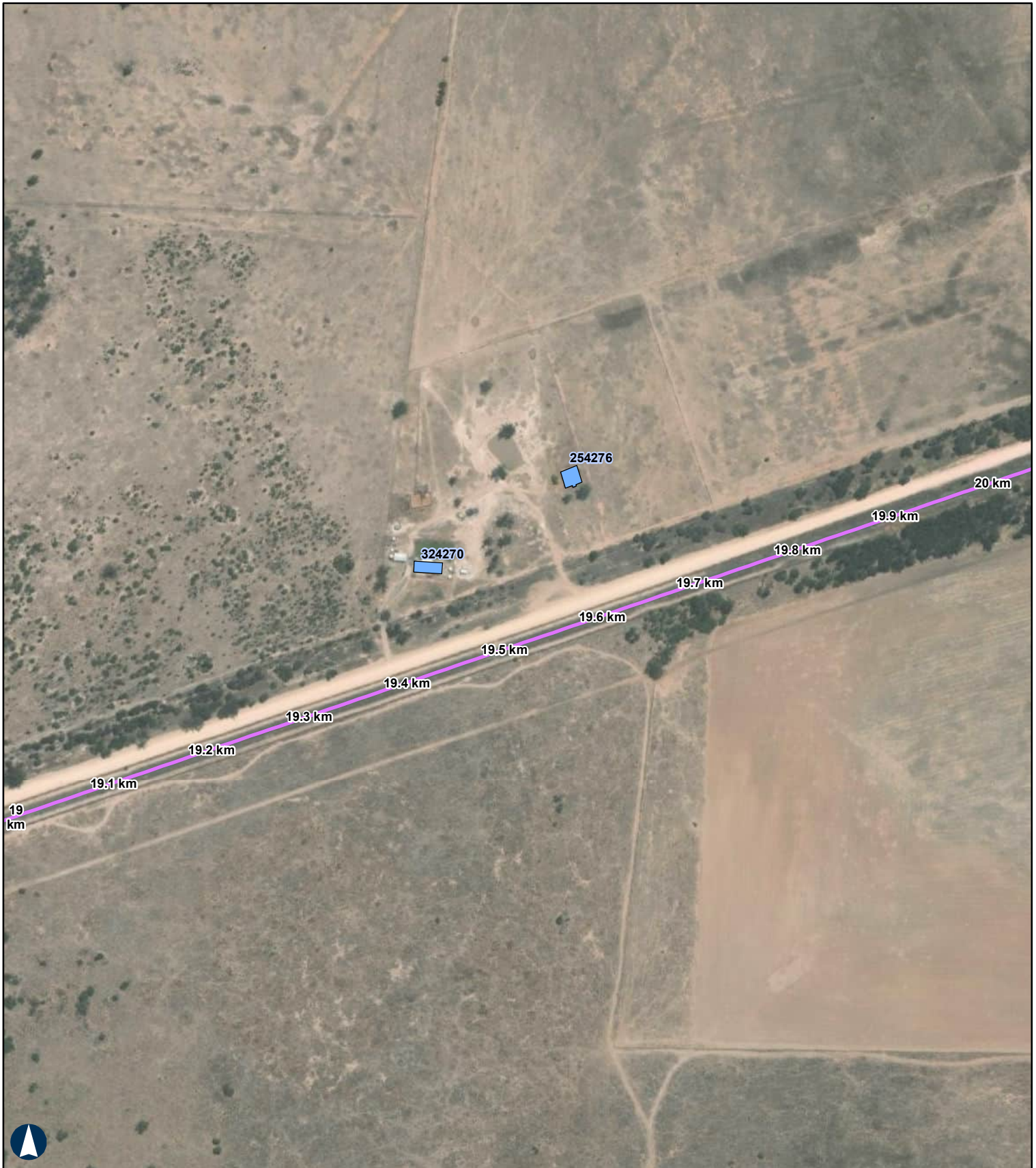
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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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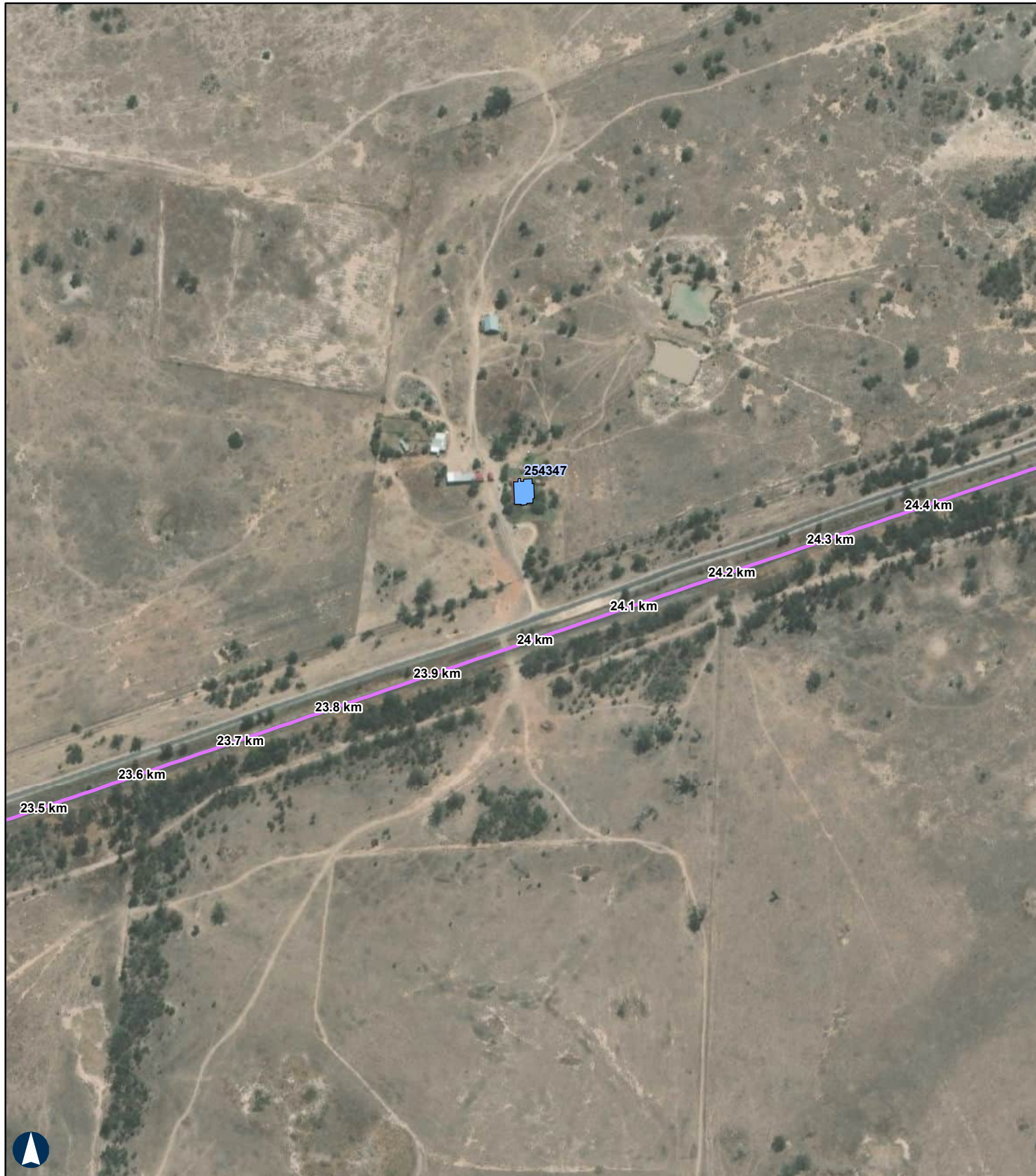


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 8 of 47

100 m

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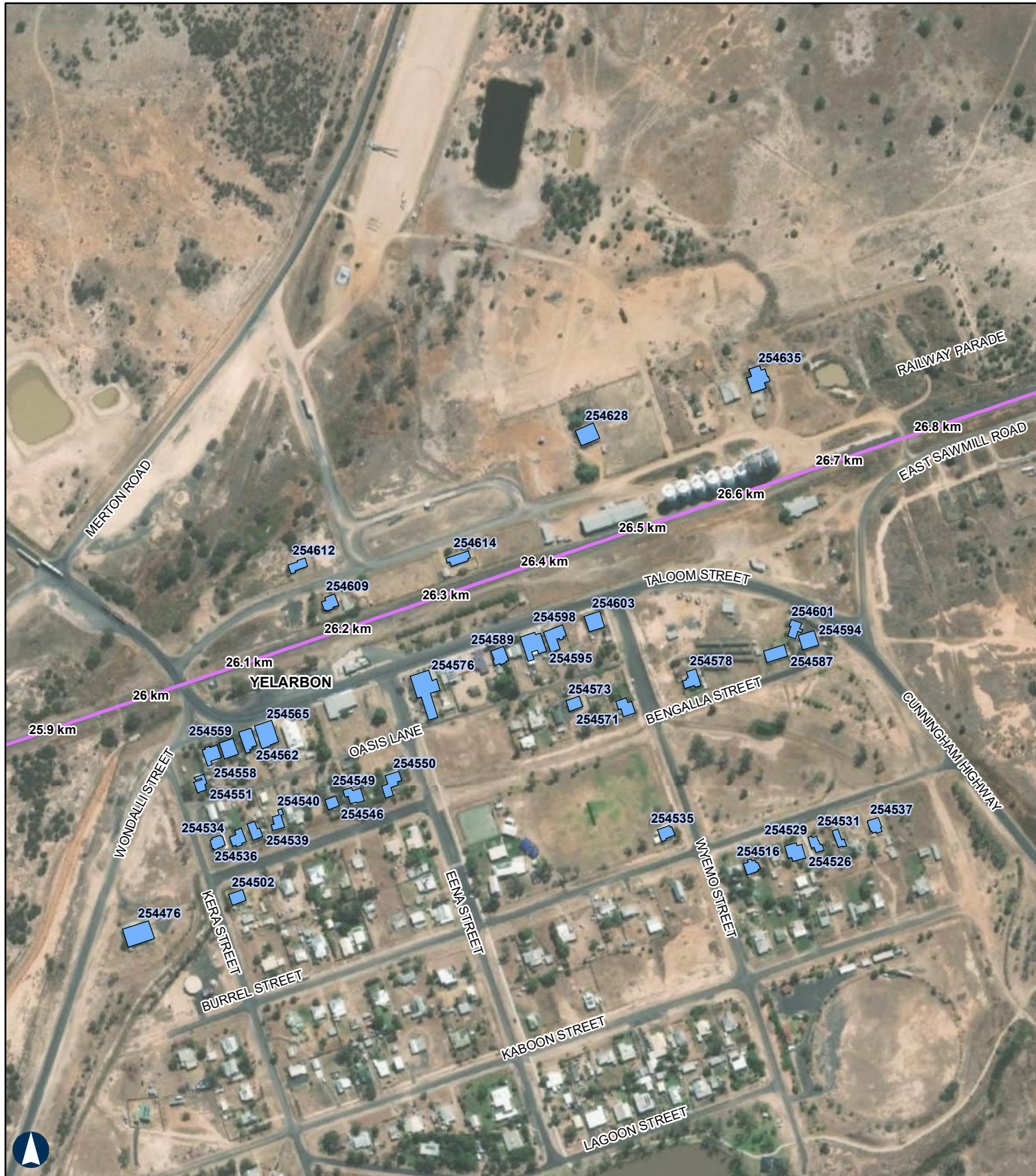


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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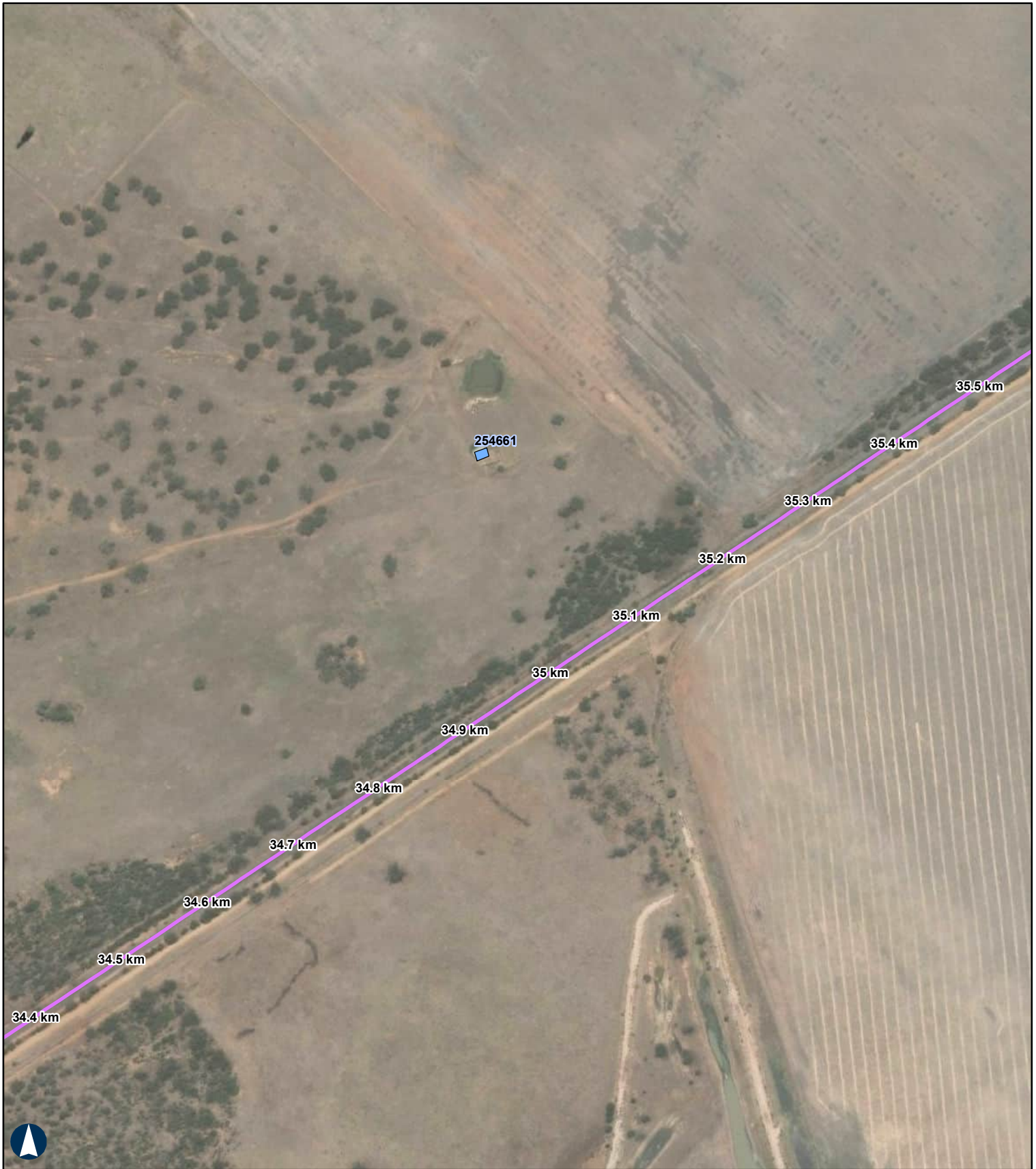


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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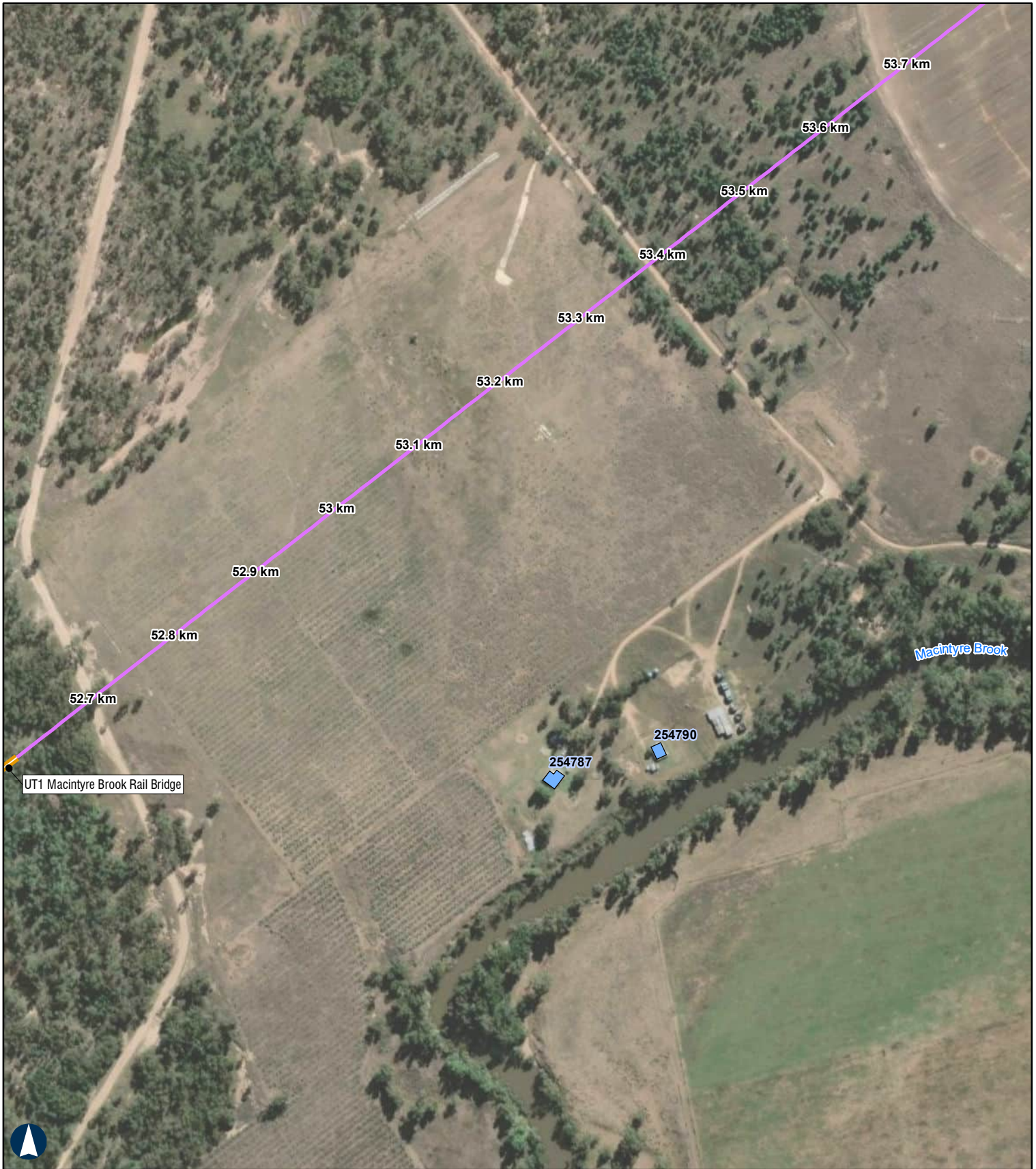


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

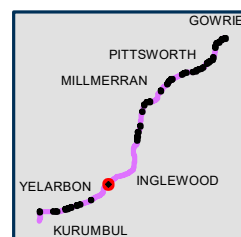
Mapsheet 11 of 47

100 m

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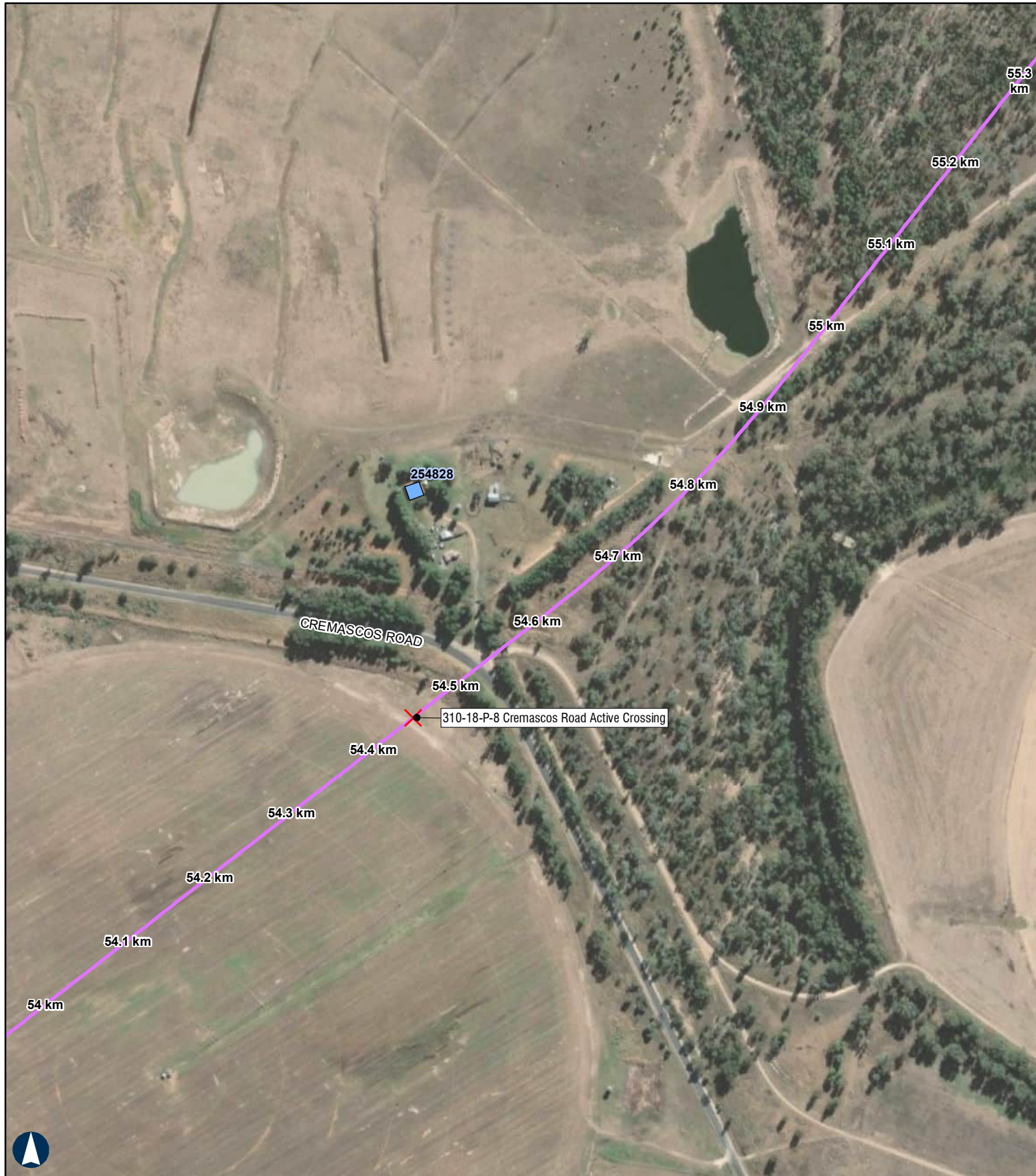


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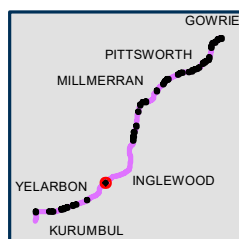
Mapsheet 12 of 47

100 m

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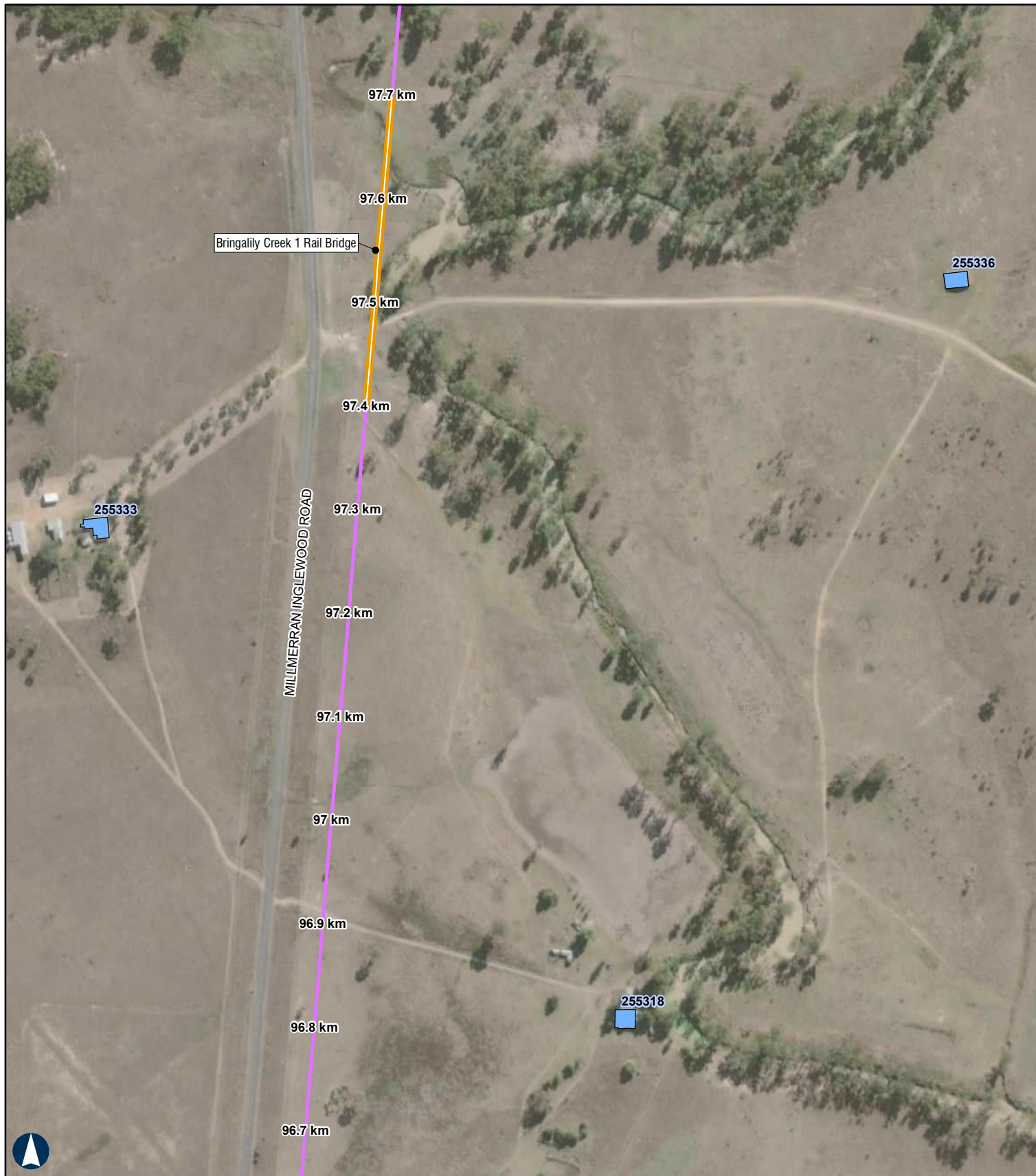
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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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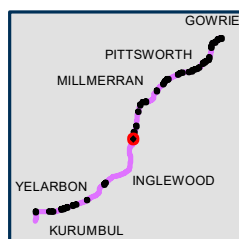
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100 m

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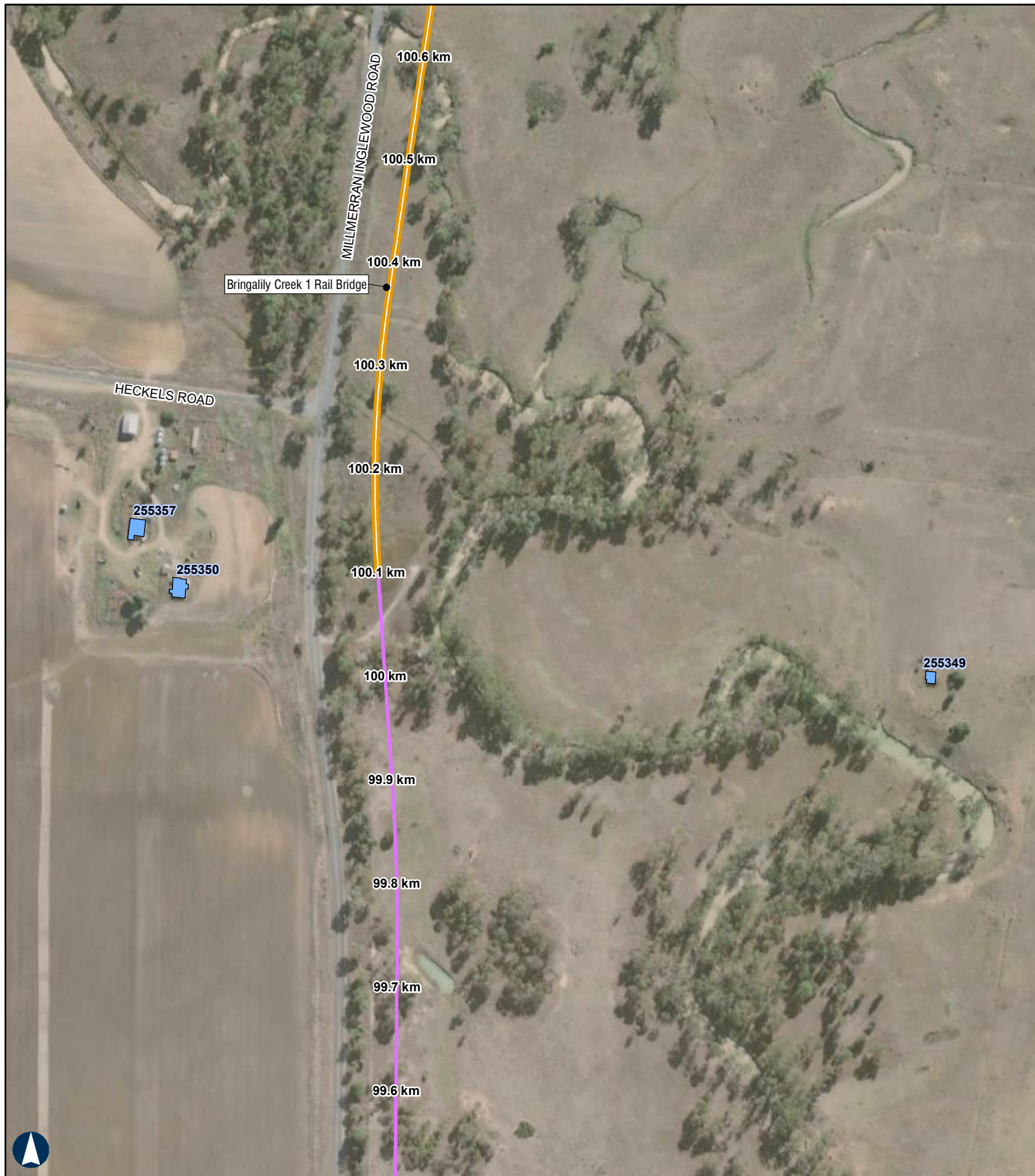


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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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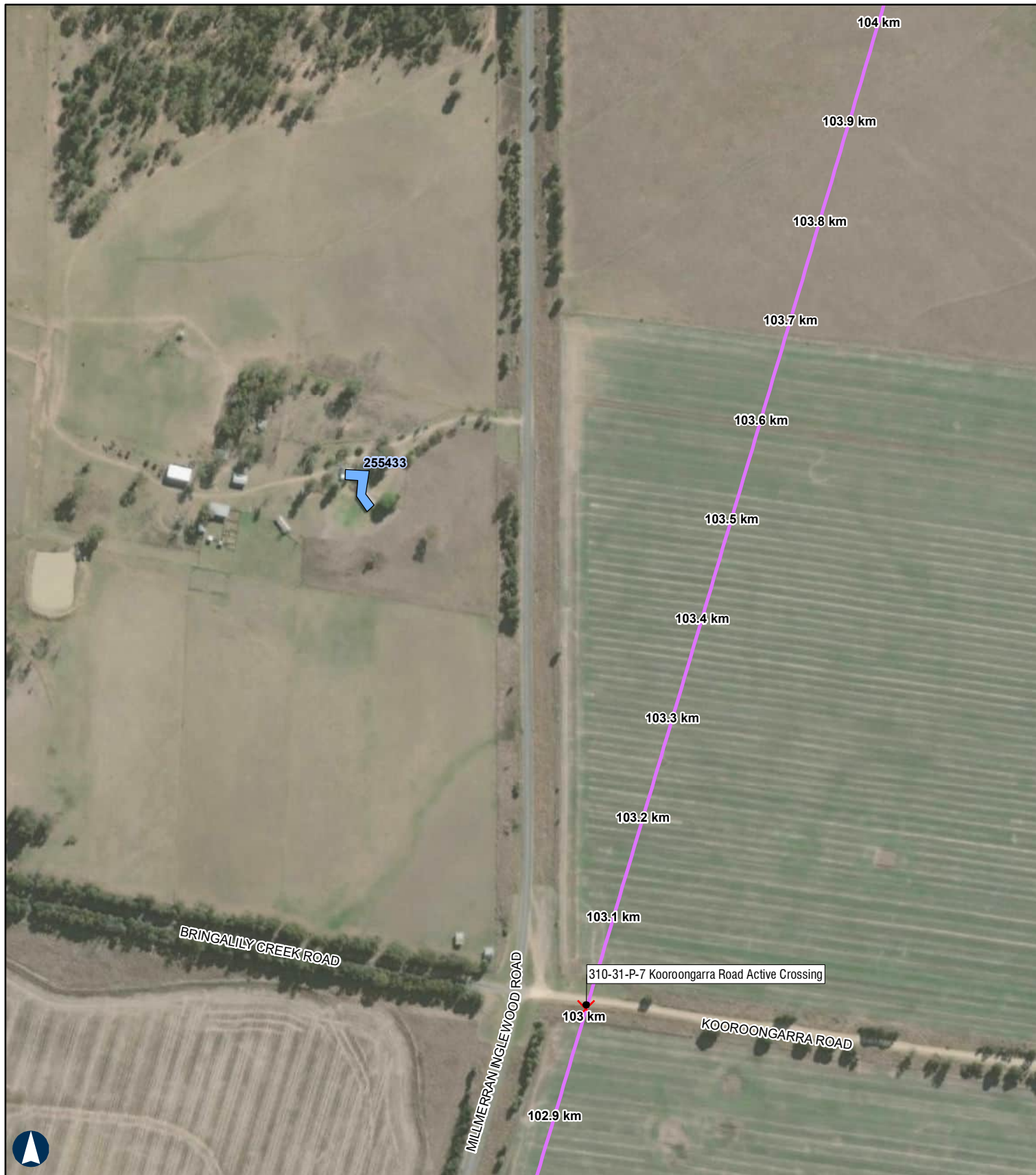
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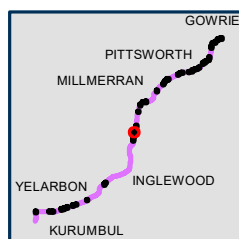
Mapsheets 16 of 47

100 m

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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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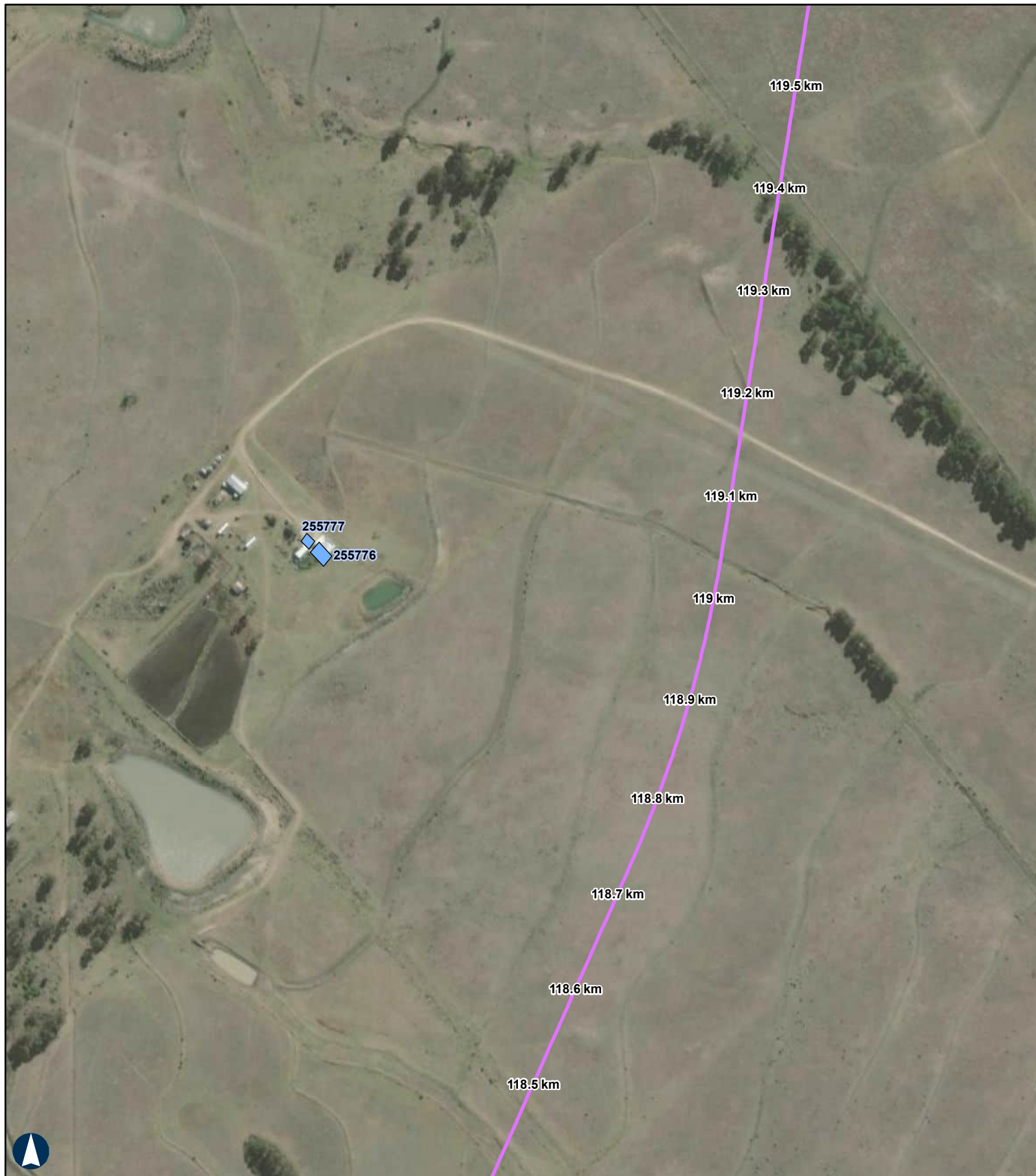
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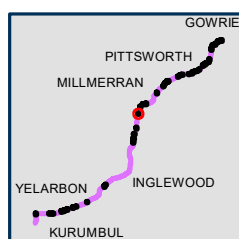
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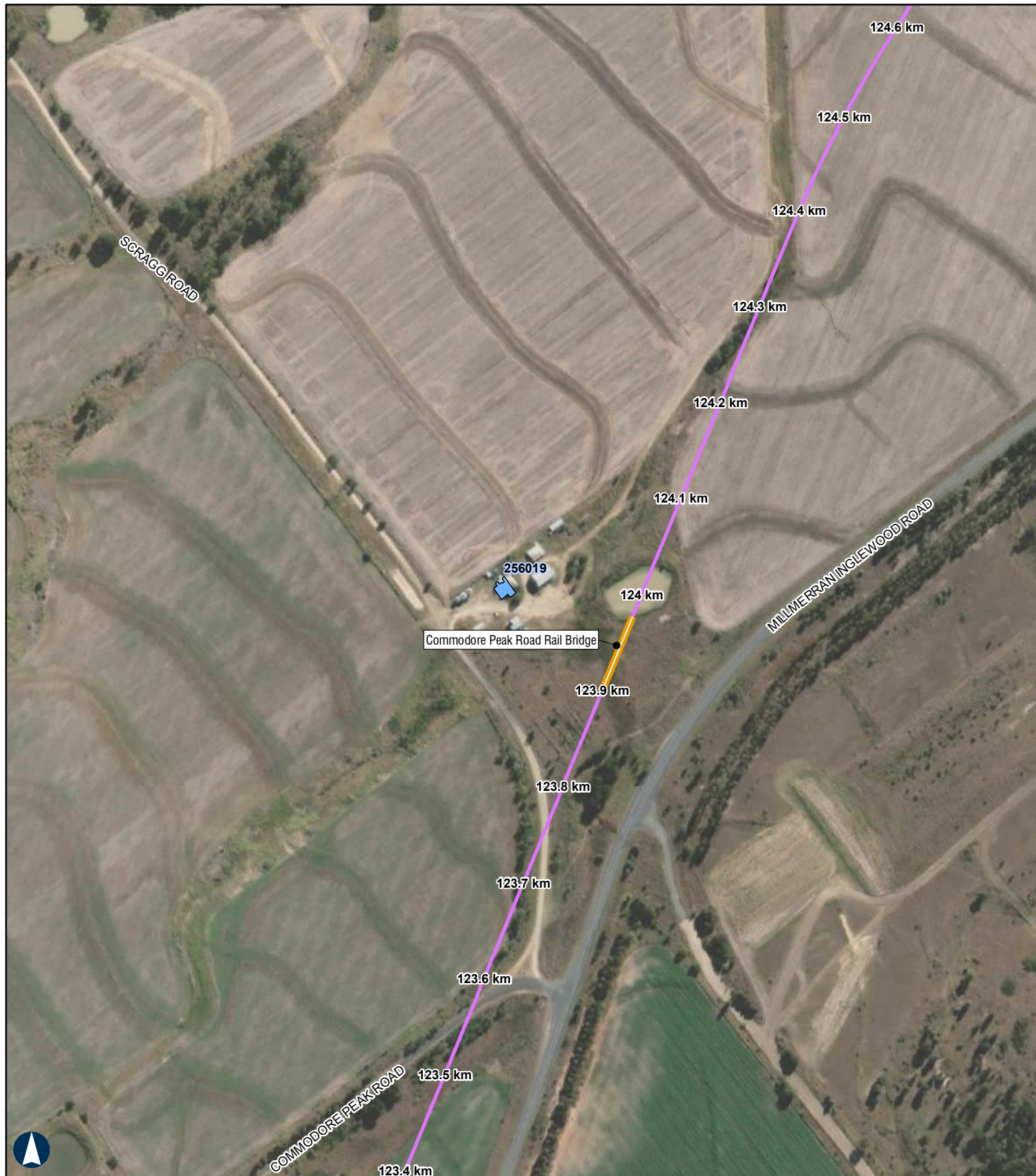


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 19 of 47

100 m

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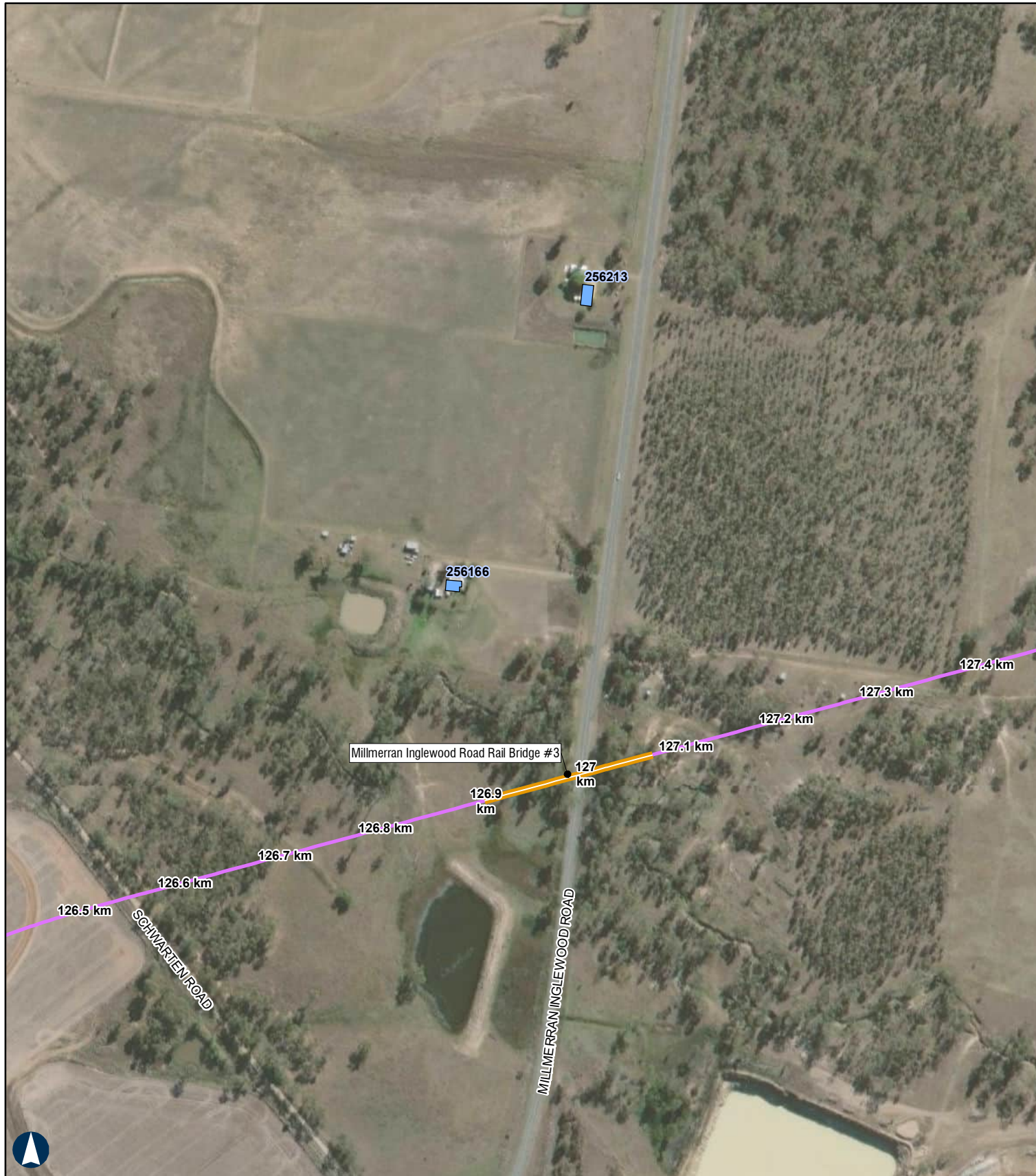


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 20 of 47

100 m

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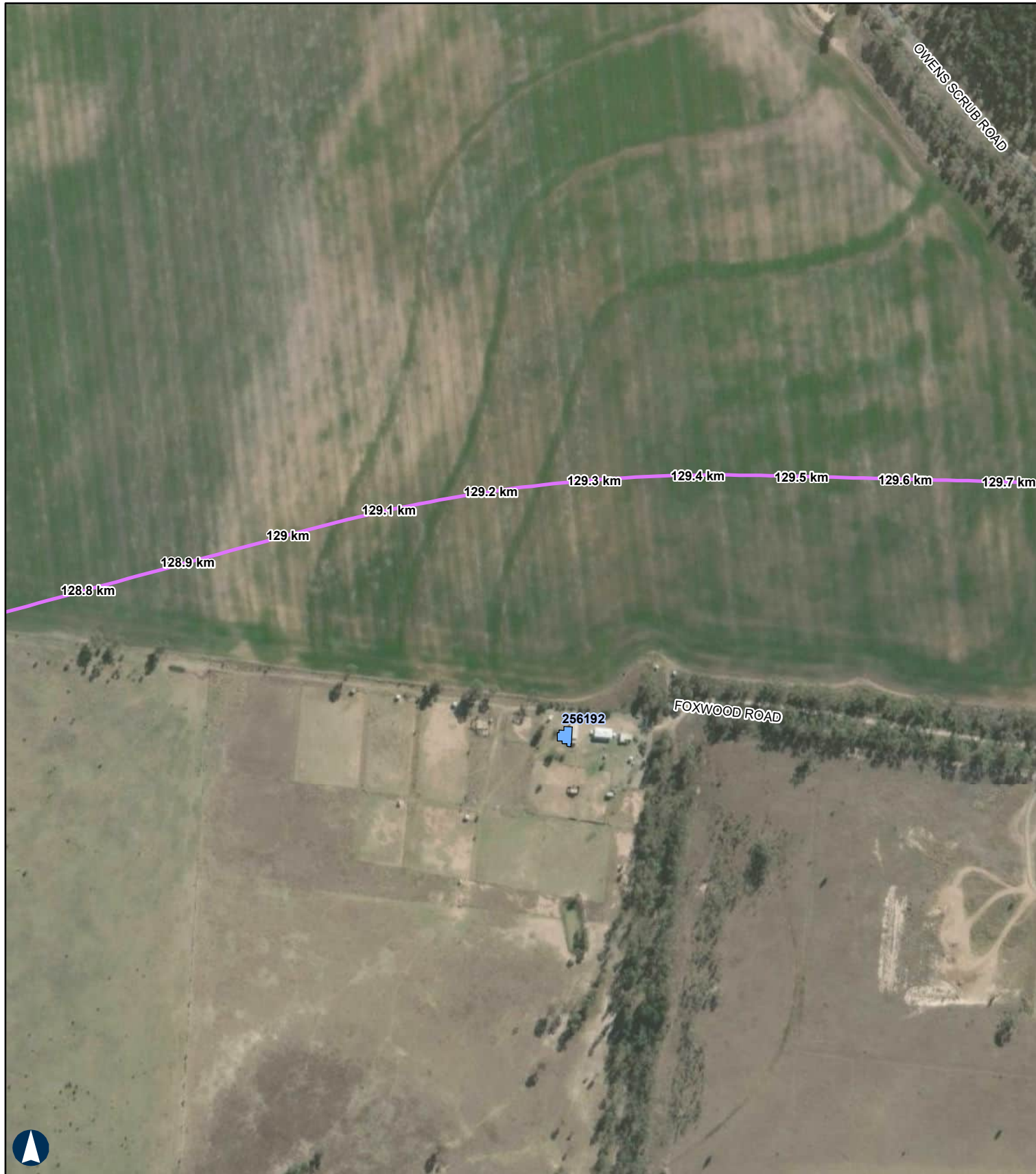


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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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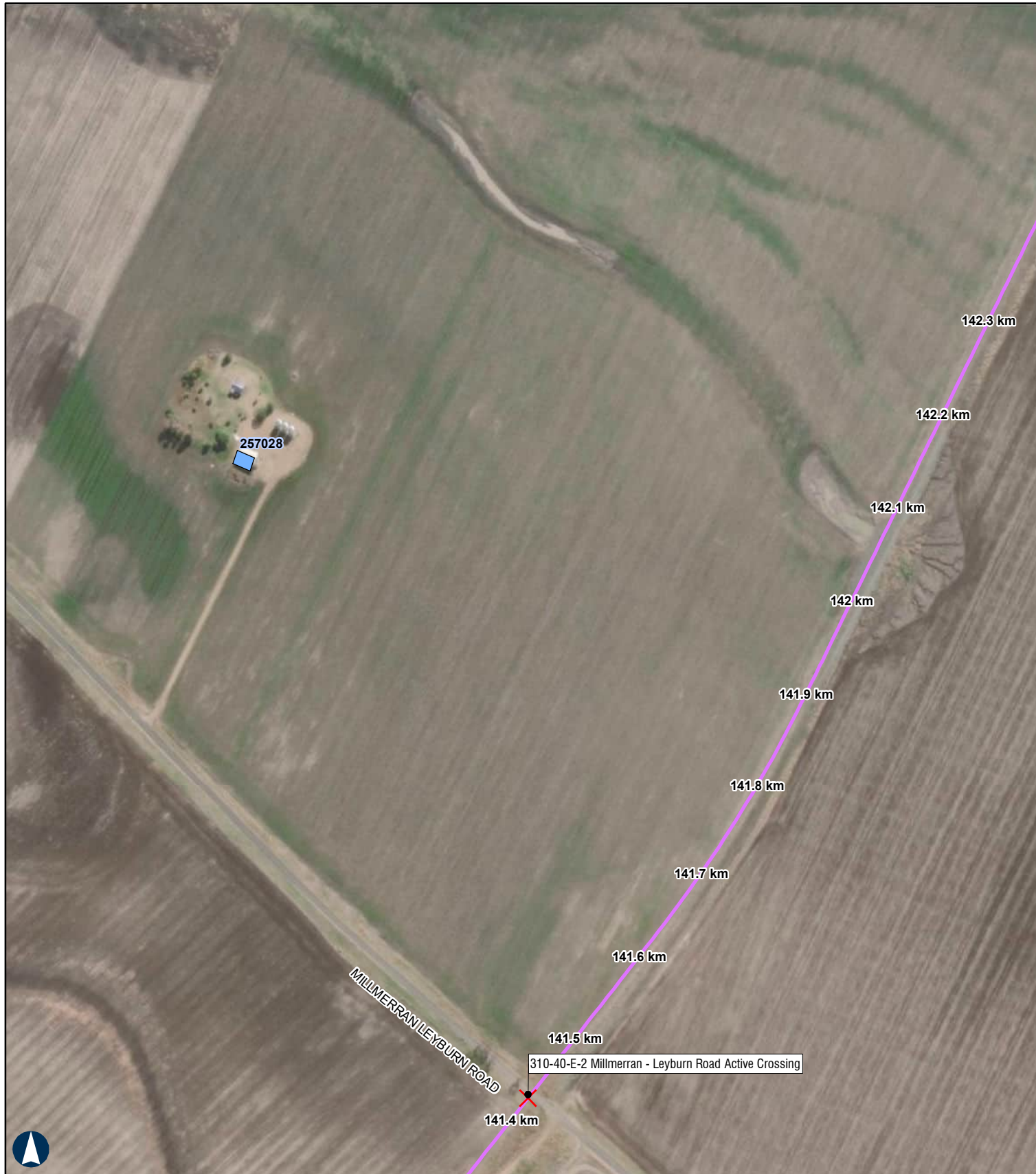
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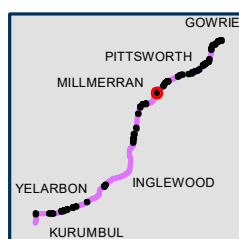
Mapsheet 22 of 47

100 m

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- X Level Crossings
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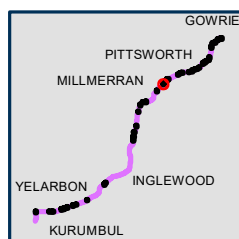
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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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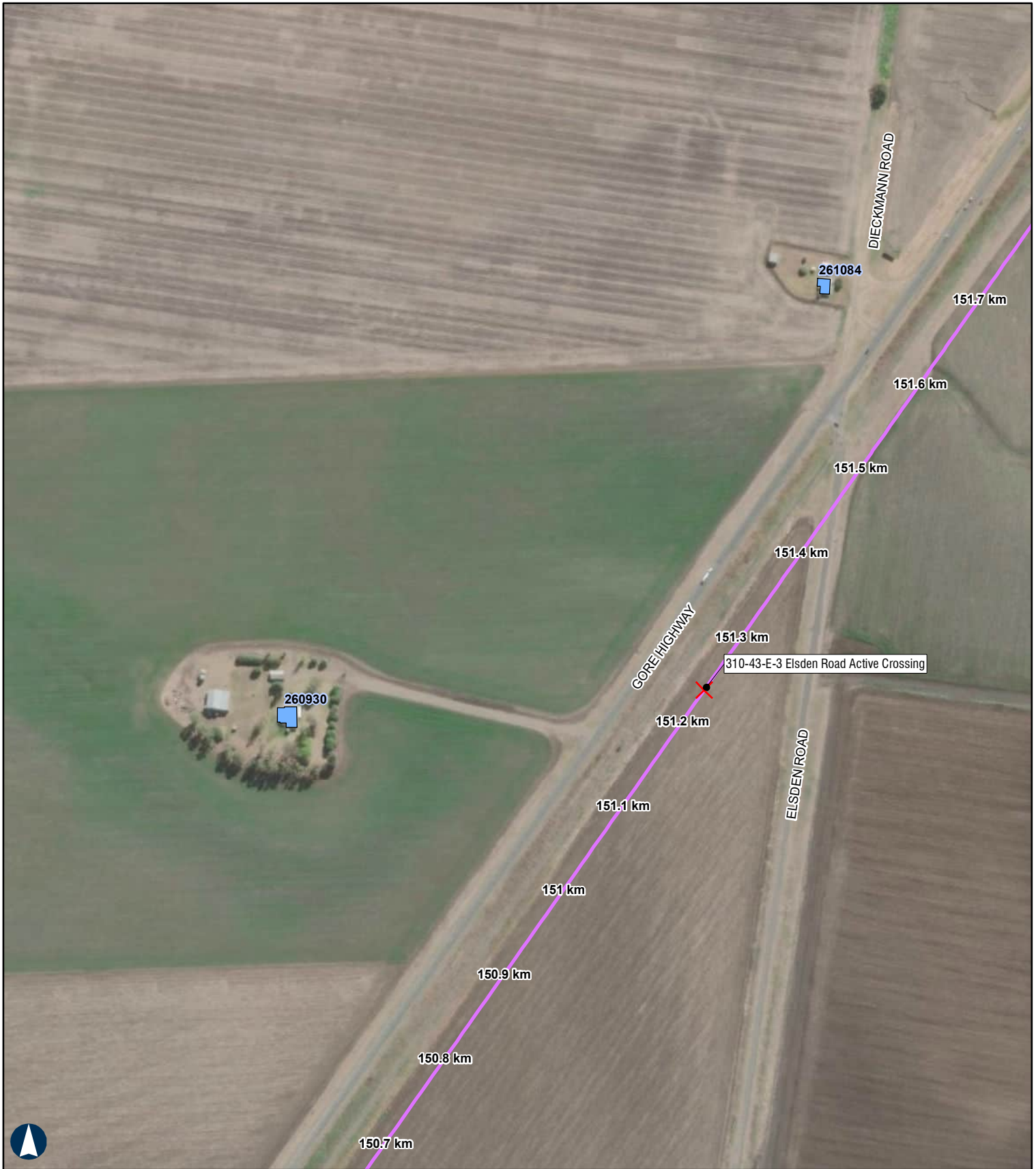


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Author: JG

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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 25 of 47

100 m

Coordinate System: GDA 1994 MGA Zone 56

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- X Level Crossings
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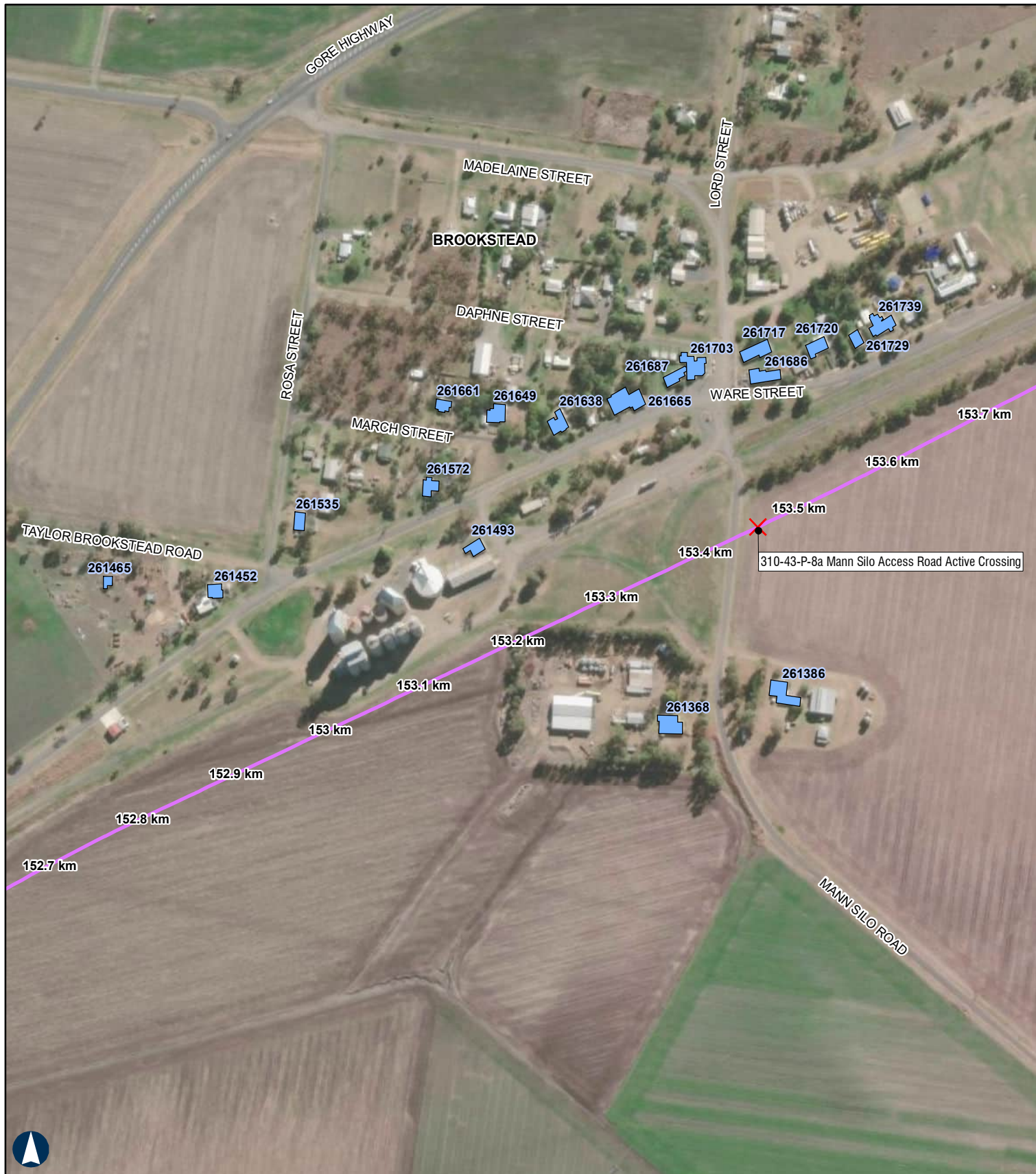


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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 26 of 47

100 m

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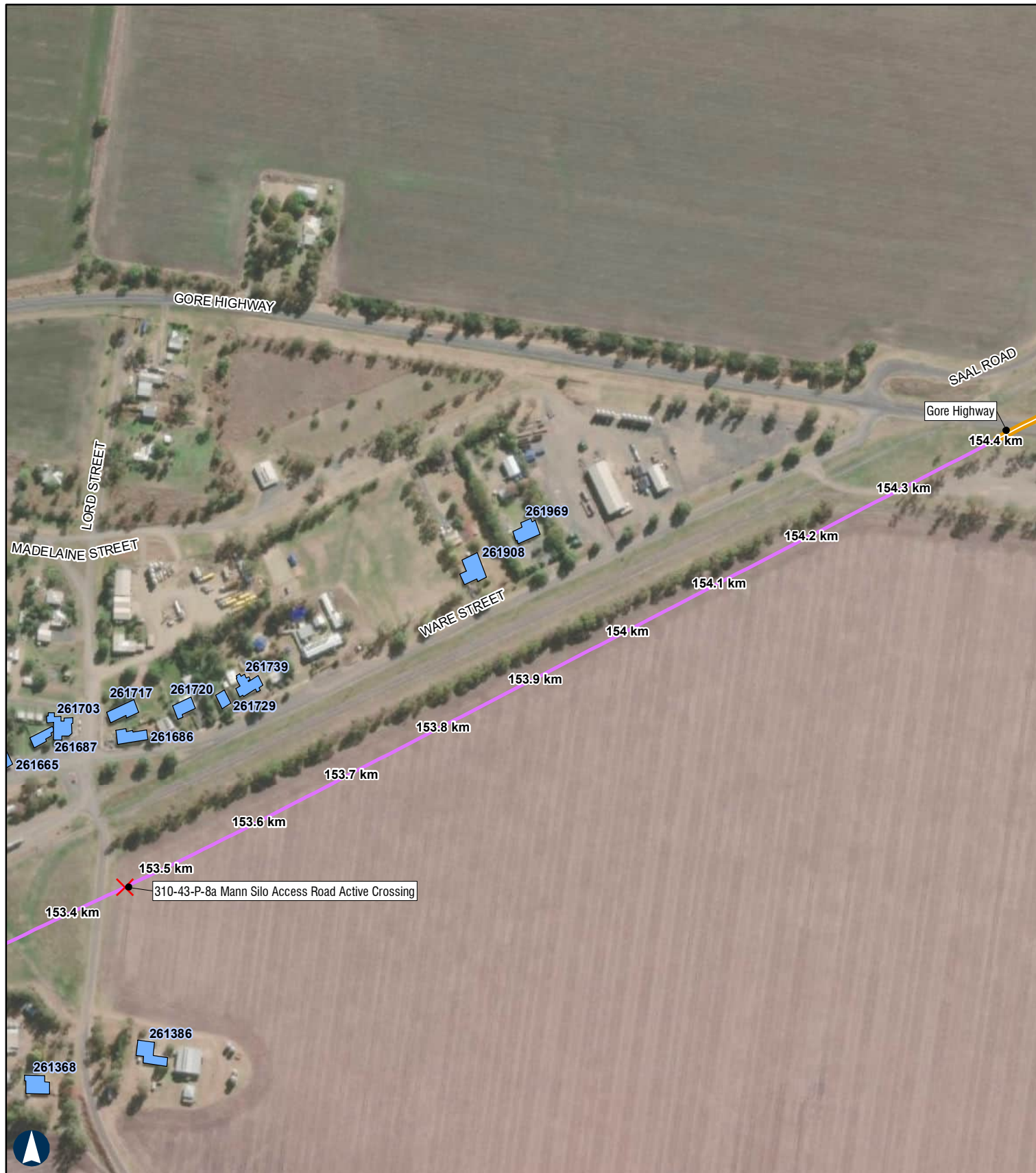
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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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100 m

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BORDER TO GOWRIE

Figure 11-1: Location of Predicted Sleep Disturbance Triggers

Mapsheet 28 of 47

100 m

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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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Figure 11-1: Location of Predicted Sleep Disturbance Triggers

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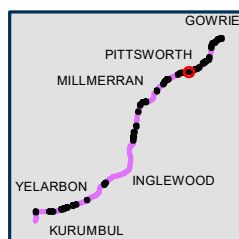
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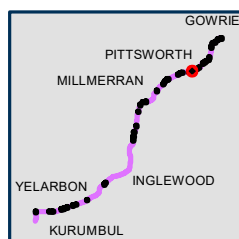
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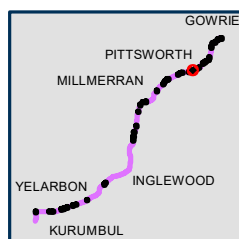
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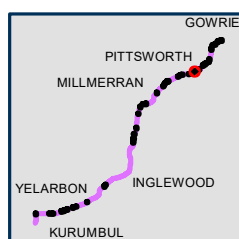
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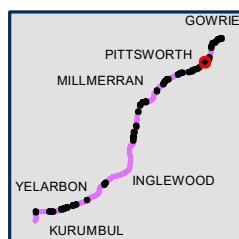
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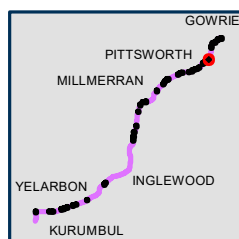
Mapsheet 40 of 47

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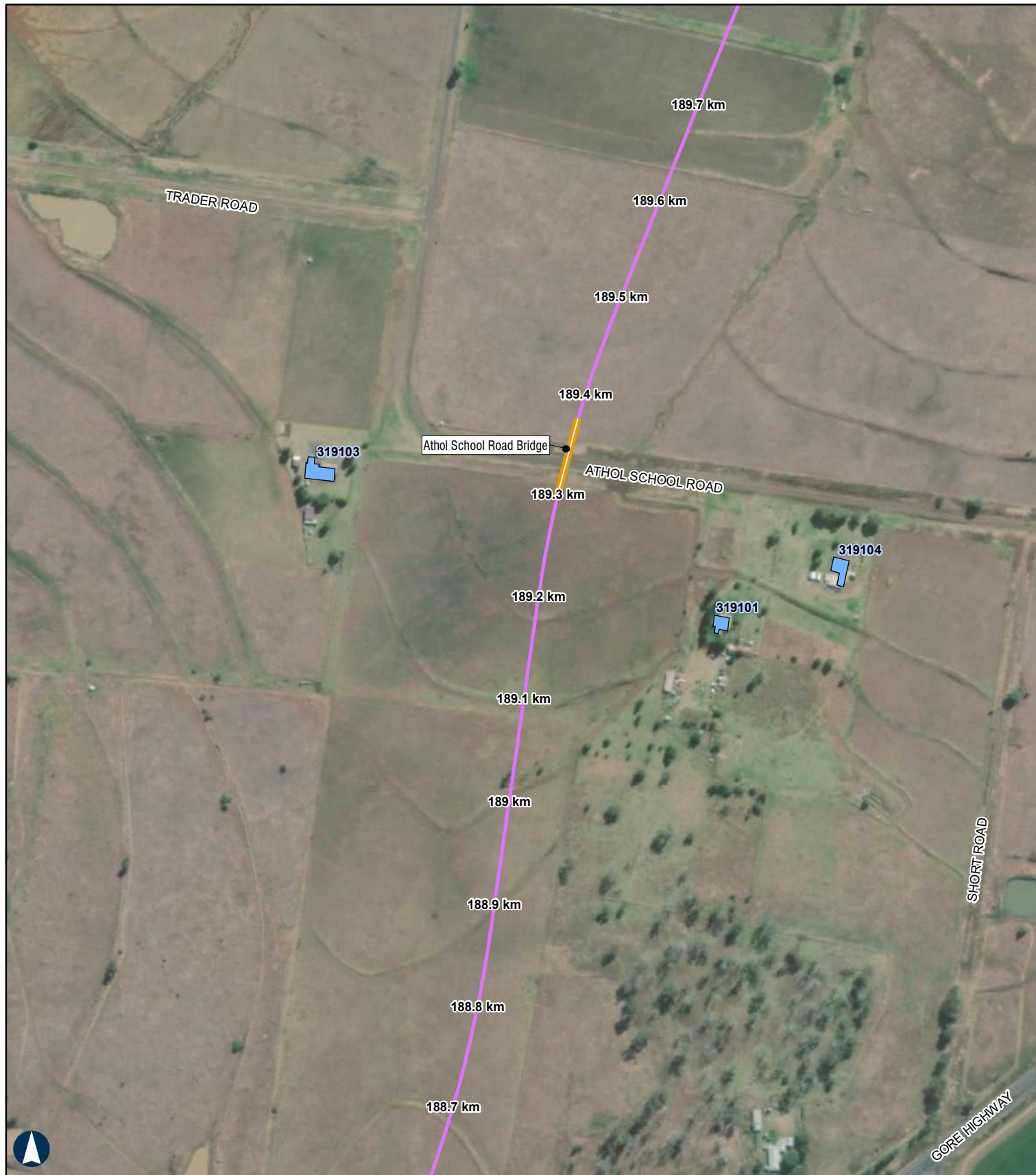


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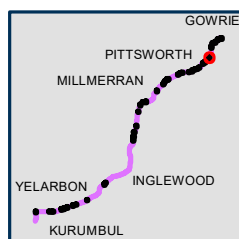
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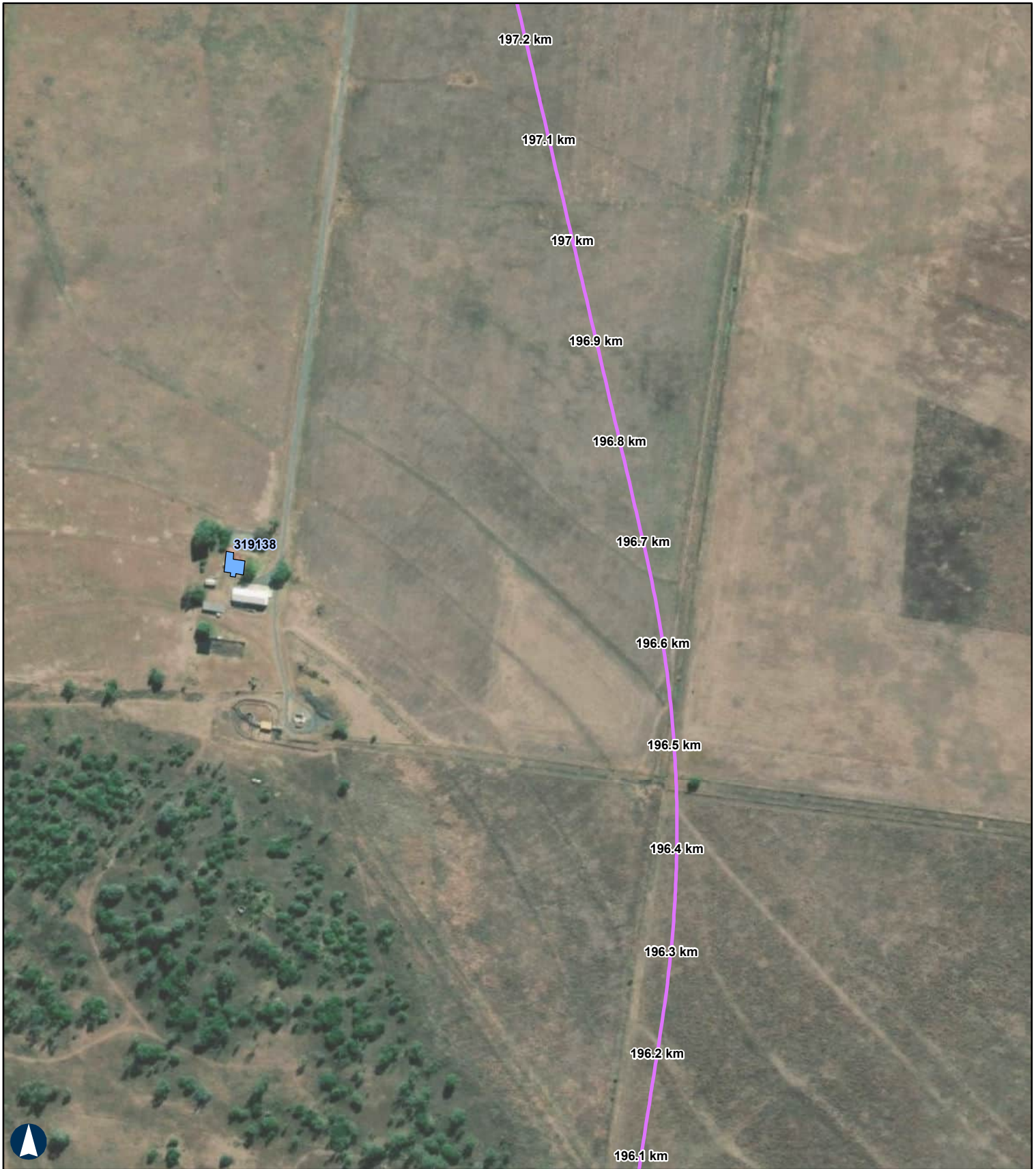


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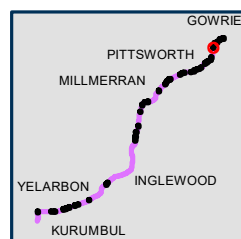
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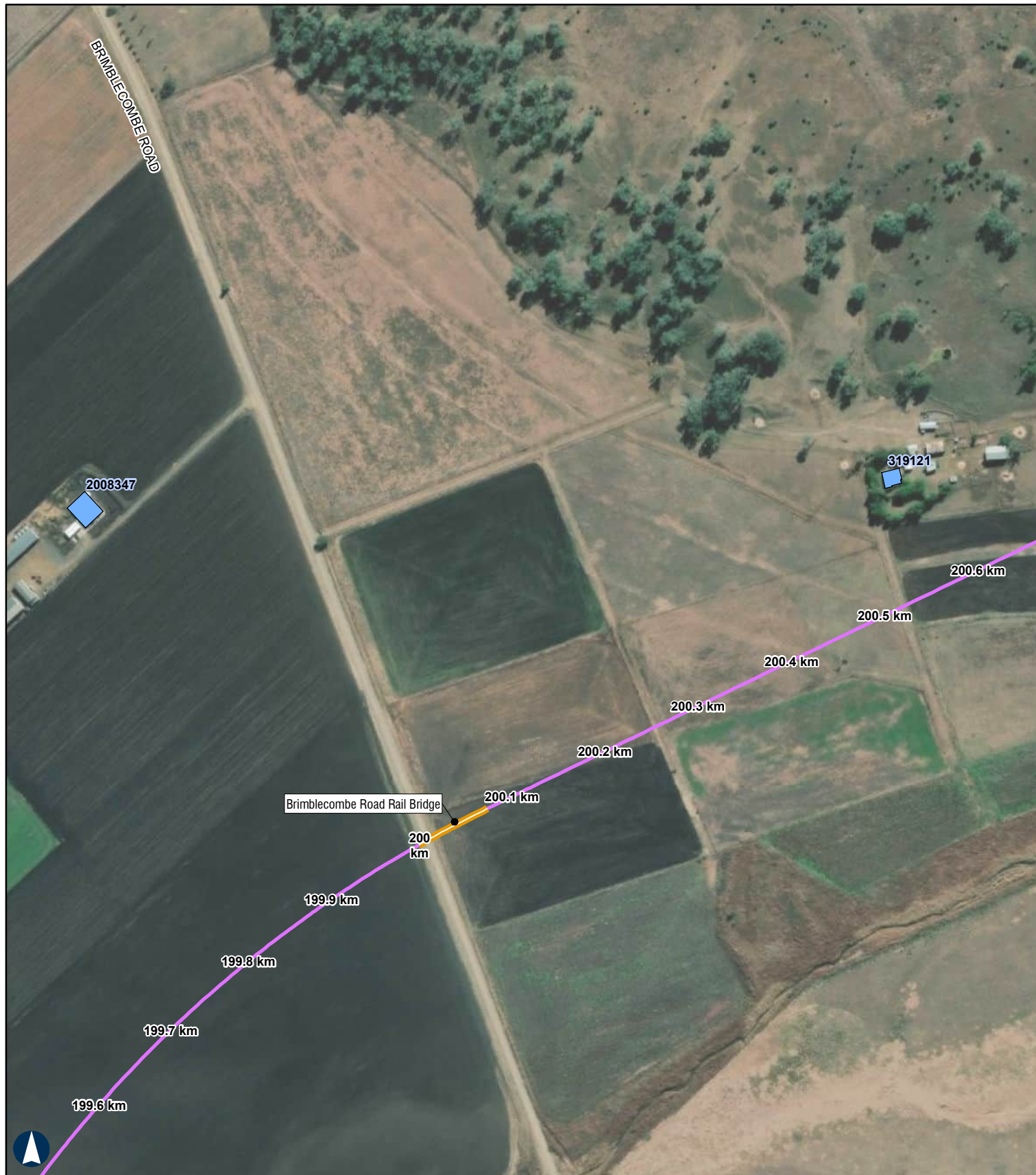
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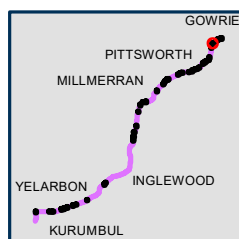
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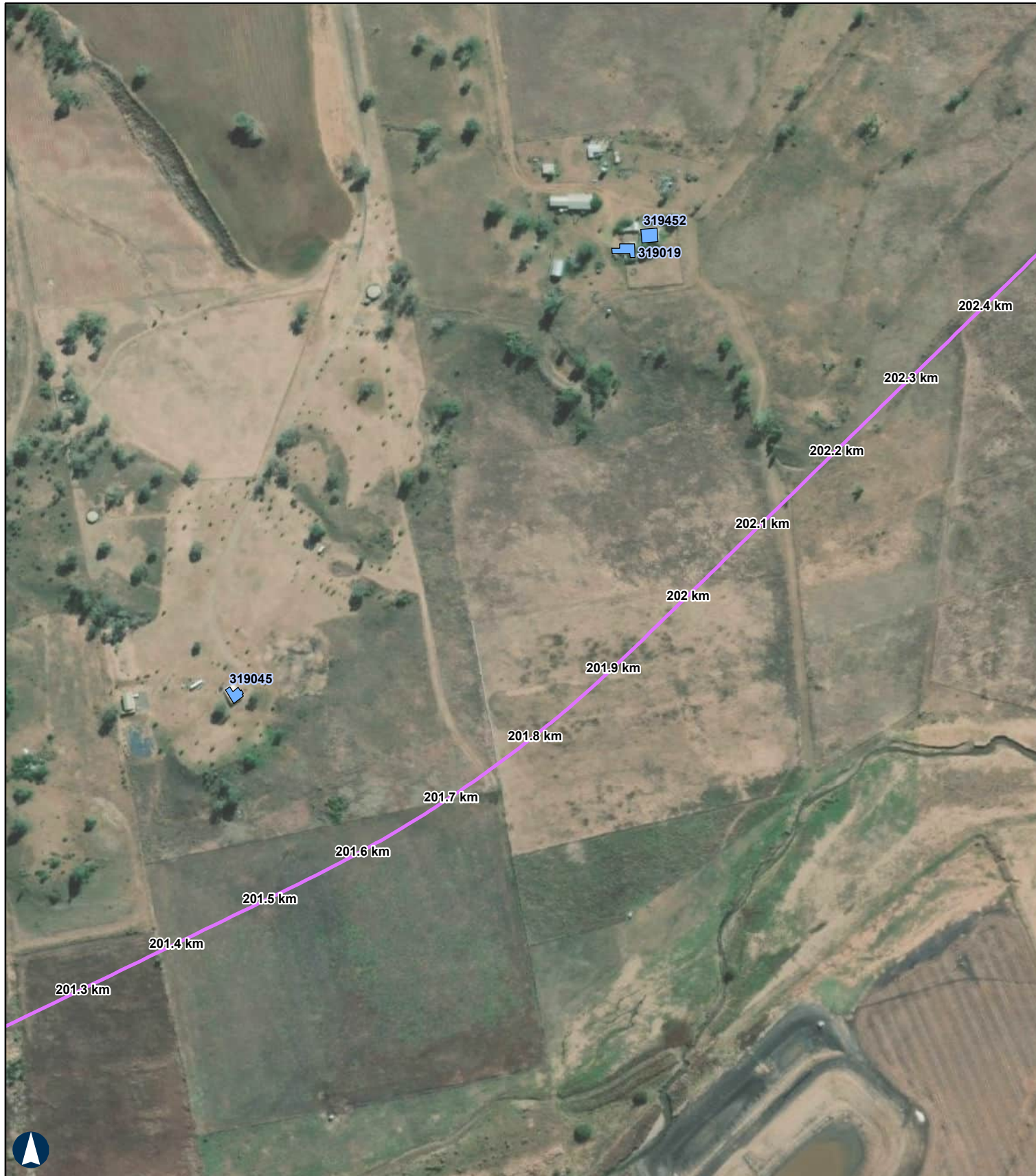


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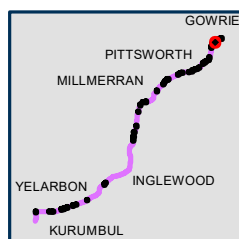
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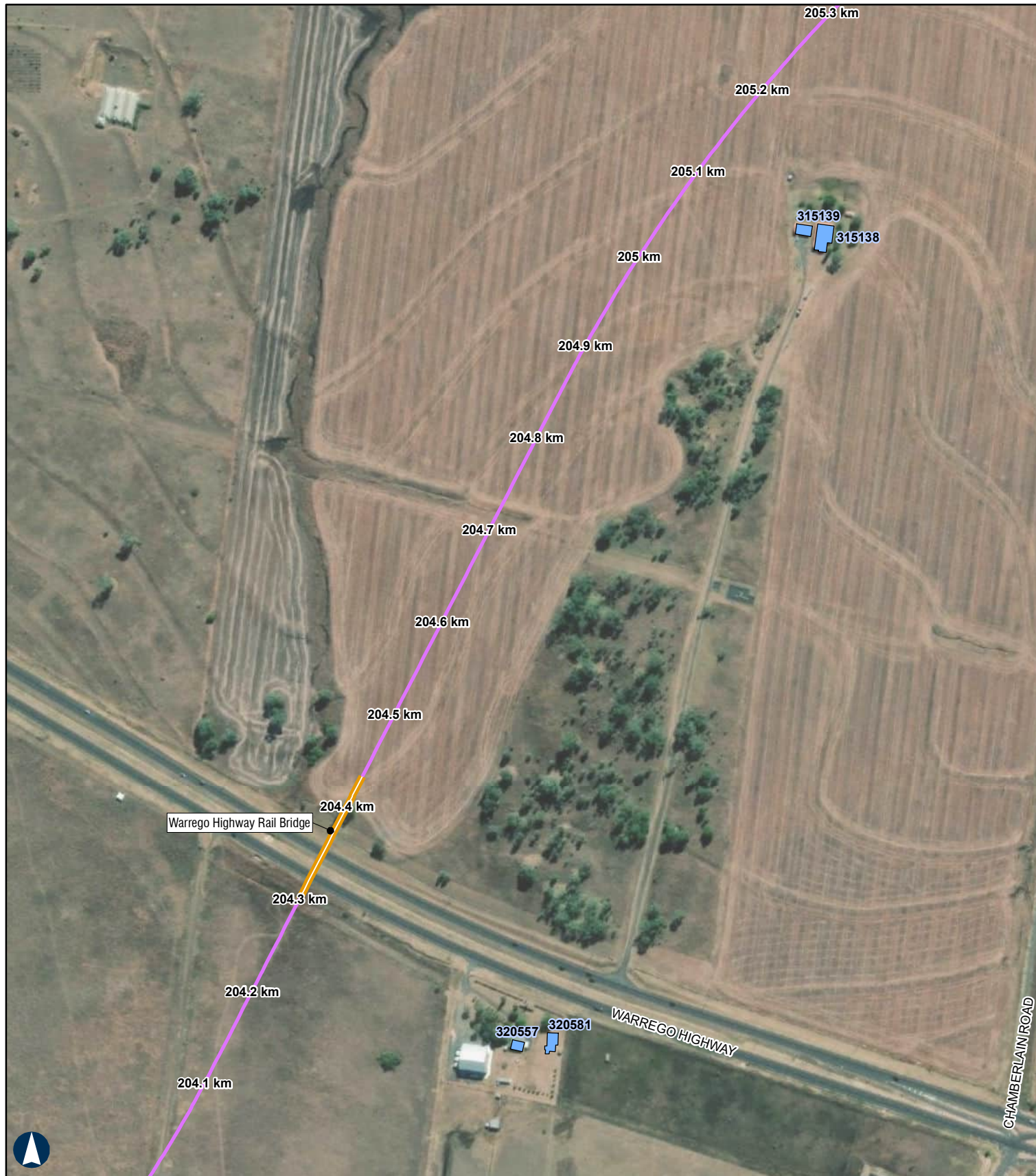


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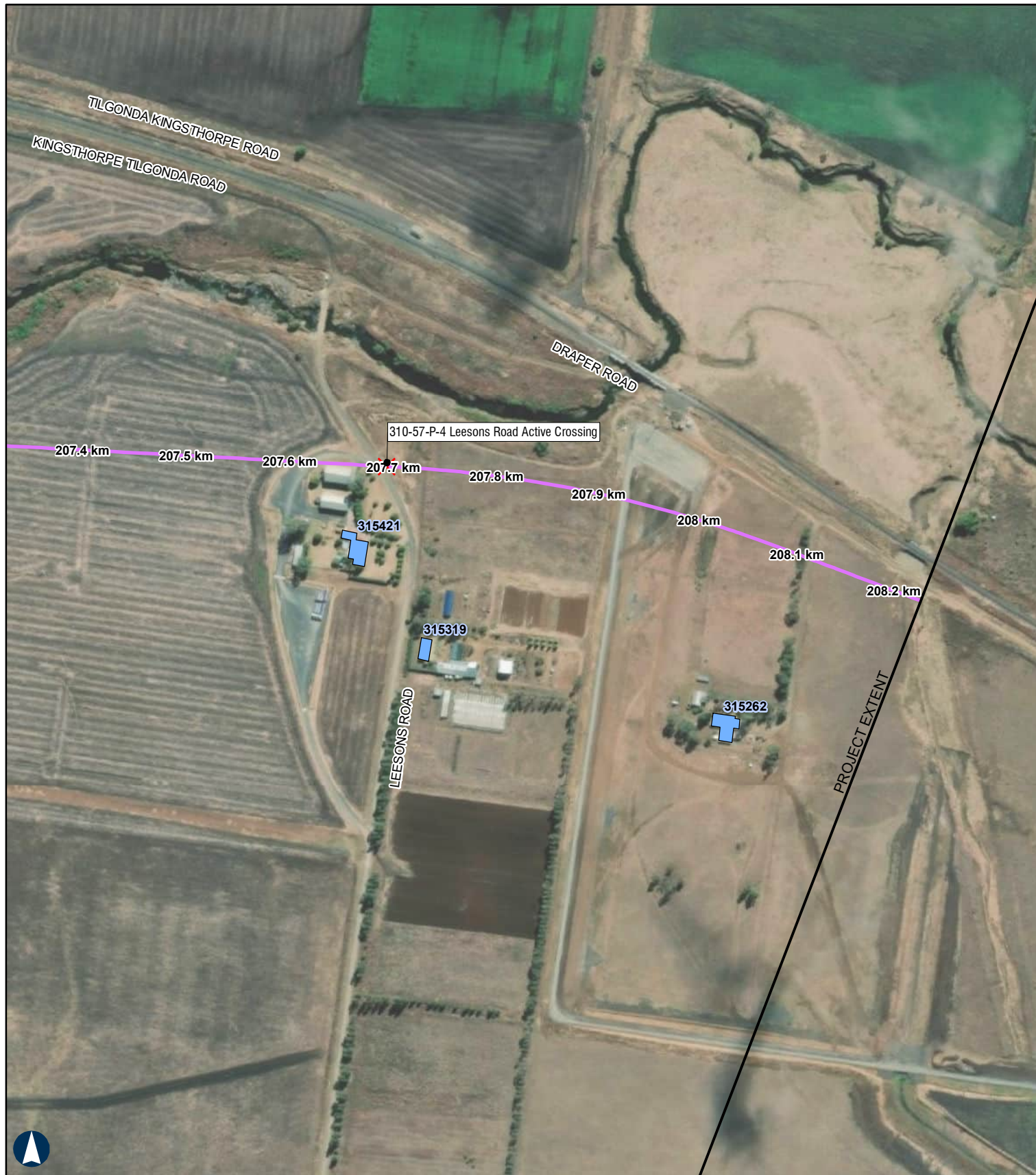


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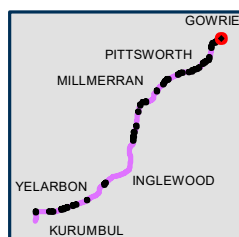
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12.0 Other considerations

12.1 Trains accessing the crossing loops

A review of the predicted noise levels at the sensitive receptors determined the noise level contribution from the crossing loops at the highest predicted receptor was up to $L_{Aeq}(24\text{hour})$ 40 dBA and SEM of 67 dBA (for reference, the predicted noise levels from mainline rail movements at this receptor are $L_{Aeq}(24\text{hour})$ 67 dBA and SEM 91 dBA).

The predicted noise levels from the crossing loops were within the established criteria and are significantly lower than the railway noise levels from the daily train passby events on the main line (4.5 m from the crossing loop), and hence the combined crossing loop and main line noise do not increase the daily predicted noise levels and SEM at the sensitive receptors to cause any additional exceedances.

12.2 Operation of the level crossings

The predicted railway noise levels were modelled separately to quantify their effects, as noise from level crossings is not assessed under the Interim Guideline. In most cases, whilst the level crossings are a potential source of noise in the local environment, the predicted noise level at the sensitive receptors was primarily influenced by the train passbys on the main line track.

$L_{eq}(24\text{hour})$ noise levels from crossings were predicted to be up to 58 dBA at the sensitive receptors, and L_{Amax} noise levels were predicted to be up to 96 dBA. At 29 residential receptors, it is noted that the L_{Amax} from level crossing associated train horns were predicted to be greater than the train pass-by SEMs, and also greater than 82 dBA. Out of these 29 receptors, 20 receptors were predicted to be already exceeding the Interim Guideline SEM criteria of 82 dBA purely from the train movements, and hence any mitigation provided for Interim Guideline exceedances may also assist in minimising noise from the crossings.

The level crossings where the L_{Amax} from train horns is predicted to be greater than 82 dBA are:

- South Kurumbul Road (310-4-E-2)
- Unnamed Road (310-5-E-1)
- Unnamed Road (310-7-E-1)
- Unnamed Road (310-8-E-2A)
- Private Crossing (310-E-1)
- Harris Road (310-42-E-0)
- Main Silo Road (310-43-E-8)
- Lessons Road (310-57-P-4)

Whilst the L_{Amax} levels are predicted to be higher than the SEM from the rail and locomotive noise at certain receptors, these noise levels are not assessable against the Interim Guideline criteria as noise from safety warning devices are excluded from compliance with airborne noise criteria. However, it is recommended that Inland Rail investigate reasonable and practicable mitigation measures to minimise noise from level crossings as discussed in **Section 15.1**.



12.3 Consideration of local weather on railway noise

The regional weather conditions have the potential to influence the propagation of noise within the local environment. Downwind from a noise source the wind conditions can enhance the propagation of noise and equally being upwind of a noise source, the wind conditions act to suppress noise propagation. Worst case noise enhancing wind conditions for ground level noise sources are typically associated with light 2 - 4m/s source to receiver wind conditions with noise enhancing effects becoming less apparent at higher wind speeds.

Temperature inversion conditions occur where the temperature of a layer of air in the atmosphere increases with height, rather than the typical conditions where air temperature decreases with height. This causes a layer of cool, still air being trapped below the warmer air. Temperature inversion conditions generally occur during the early morning and night-time periods during the winter months where little or no vertical air movement of the cool air layer can result in a refraction of sound waves and potentially enhance the propagation of noise.

The analysis of meteorological conditions presented in the B2G Air Quality Assessment identified noise enhancing weather conditions which are likely to occur and include easterly and north-easterly winds during the warmer months specifically spring and summer. Temperature inversion conditions were also identified during the winter months.

The Interim Guideline requires the prediction of railway noise to be undertaken using the Kilde 130 modelling methodology. This algorithm does not allow for assessment of varying weather conditions in the prediction of train noise, however Kilde 130 provides a conservative prediction which is typically greater than more recently developed modelling methodologies which allow for modelling of weather effects¹¹.

A comparison of noise enhancing weather effects modelled using the NORD 2000 modelling methodology and Kilde 130 is provided in **Appendix G**. In summary, the results predicted using the Interim Guideline recommended Kilde 130 methodology are expected to predict noise levels equivalent or greater than would be expected during noise enhancing conditions.

12.4 Characteristics of railway noise

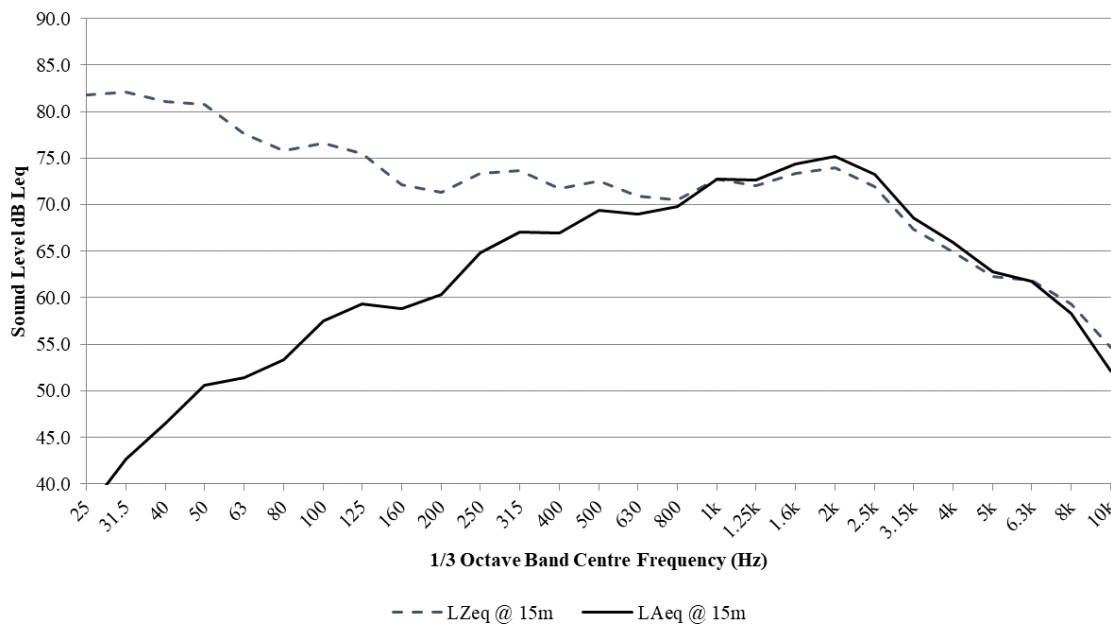
The perception of noise from railway operations can be influenced by the characteristics of the noise from the train passbys and rail operation at the crossing loops. An example noise spectrum for a freight train passby event is detailed in **Figure 12-1**. The noise spectrum is based on the measurement of noise levels from an intermodal freight train of 1.5km in length travelling at 100km/hr with two NR class locomotives.

The train passby spectra shown in **Figure 12-1** includes contribution of noise in the low frequency range below 200Hz as shown in the unweighted (dBZ) spectrum measured at 15 m from the rail line.

¹¹ De Lisle S and Burgemeister K, *Comparison of Kilde and NORD 2000 Rail Noise Prediction Methodologies*, Inter-Noise (2014).



Figure 12-1 Noise emission spectra for rail freight



Note Noise spectra based on the measured Leq noise levels during train passby at 15 m from the rail centreline.

These results can be considered a reasonable approximation of the future Superfreighter and Inland Rail Express trains which are the most common (16 of 25) trains per day travelling at the highest speeds along the proposed B2G alignment.

A review of frequency spectrum (including below 200Hz) at receptor distances between 50 m and 2000 m from the alignment predicted using the NORD 2000 modelling methodology and is provided in **Appendix G**. The results indicate that noise levels at receptors would include a component of low frequency noise.

Other general characteristics of railway noise are summarised below and are usually specific to individual items of rollingstock and track features:

- Bunching or stretching can occur when the couplings on a train are subject to sudden changes in force during acceleration and deceleration, this can cause short-lived 'squeaks' and 'bangs'. Events of this nature may have subjective impulsive noise emission characteristics, although not necessarily quantified as impulsive noise at nearest sensitive receptors. Noise events from bunching or stretching have been modelled at the crossing loops and inclined gradients proposed on the Project.
- Short-lived 'booming' noise with potential low frequency characteristics can be caused by empty containers and wagons resonating.
- Curving noise, such as wheel-squeal, can result in prominent tonal noise emissions. The Project designs do not include tight-radius curves (radius ≤ 500 m) and the noise modelling did not apply noise emission correction factors for potentially curving noise emissions.
- The condition of the track can be a primary influence on the rolling noise from the locomotives and the wagons. Features such as corrugation (deformation of the track) increase the roughness of the rails which can cause increased noise levels on both straight track and curves. The Project will be newly constructed rail that shall be specifically designed for freight rail operations and subject to periodic maintenance.



- Features such as jointed track can increase rolling noise. The track for Inland Rail will be continuously welded rail which reduces the likelihood of ‘clickety-clack’ sounds from the wheel-rail interface.

13.0 Assessment of ground-borne vibration

13.1 Approach

To inform the assessment of potential ground-borne vibration from the railway operations, guidance was referenced from International Standard ISO 14837¹² on the typical assessment requirements for new rail systems, including definitions of:

- **Scoping Model** at the very earliest stages.
- **Environmental Assessment Model** during planning process and preliminary design.
- **Detailed Design Model** to finalise extent and form of mitigation for construction.

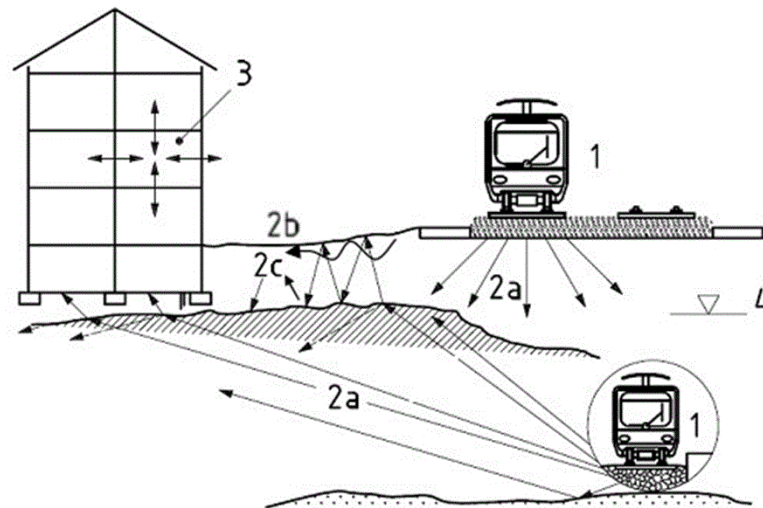
For this assessment, a combined Scoping Model and an Environmental Assessment Model was adopted. In accordance with the ISO standard, modelling for ground-borne noise and ground-borne vibration considers key parameters that are critical in determining the likely range levels of ground-borne noise and vibration and the benefits (or otherwise) of different design and mitigation options.

An overview of the modelling approach is illustrated in **Figure 13-1**. The approach considers the source vibration levels, the vibration propagation between the surrounding environment and nearby building foundations, and the propagation of vibration within the building elements.

¹² ISO 14837-1 2005 “Mechanical vibration - Ground-borne noise and vibration arising from rail systems - Part 1: General guidance



Figure 13-1 Example of rail vibration source, propagation and receptor system



Key

- 1 source
- 2 propagation:
 - 2 a body waves (compression, shear)
 - 2 b surface waves (e.g. Rayleigh, Love)
 - 2 c interface waves (e.g. Stoneley)
- 3 receiver (vibration, re-radiated noise)
- 4 water table

NOTE The components of the system comprising source, propagation and receiver are interdependent.

The modelling has been carried out using a combination of theoretical and empirical relationships to determine the attenuation and/or amplification of ground-borne vibration levels with assumptions that include:

- Single frequency overall values versus distance;
- No adjustment for buildings of substantially greater mass or size than those used to inform published data (conservative); and
- a crest factor¹³ of 4.

A crest factor of 4 is sourced from Federal Transit Administration (FTA-US) Transit Noise and Vibration Impact Assessment Manual, 2018. This crest factor, as suggested in the FTA manual, is also consistent with SLR's general observations from rail vibration measurements.

Previous measurement and assessment of ground-borne vibration from existing rail freight corridors indicates that potential for ground-borne vibration impacts would be limited to sensitive receptors located within 100 m of the proposed rails. Forecast levels at properties beyond this distance are routinely expected to be within assessment criteria and the integrity of building structures is unlikely to be compromised by passing trains.

The calculation of ground-borne vibration from above ground rail operations refrained from applying estimated adjustments, such as loss of vibration energy as it is transferred to buildings (coupling loss), where adjustments could infer there would be no risk of impacts

¹³ Ratio of peak to root mean square (RMS) velocity level.



from ground-borne vibration outside of the rail corridor. This approach is considered conservative and represents a worst-case condition.

13.2 Source vibration levels

The Project alignment is primarily a greenfield rail corridor with no existing comparable rail freight operations or speeds as that proposed. Consequently, it is not possible to measure local vibration levels directly and a model is used to estimate results at each location.

To determine a reference ground vibration level, detailed measurement surveys were completed on existing rail corridors between Wagga Wagga and Albury in NSW, Euroa and Wallan in Victoria and Gowrie and Helidon in Queensland. The locations are associated with the Inland Rail Program in NSW and Victoria where there are comparable existing rail freight operations, with single-stacked freight wagons, on ballasted track form, and in Queensland where there are coal trains on the West Moreton system. The rail corridor in these regions is mainly used for rail freight and had an average of 20 or more freight train movements per day operating at 60 km/h to 80 km/h (excluding Queensland locations where there were lesser number trains per day). Ground-borne vibration levels were measured at-grade (ground level) at distances of 15 m to 50 m from the outer rail line.

The acceleration time traces of train movements were referenced to calculate the W_b -weighted VDV_s at 15 m from the outer rail varied at all sites from 0.01 m/s^{1.75} to 0.04 m/s^{1.75} for each train passby event. The variation is representative of differences in rollingstock, wheel conditions and consists. The adopted VDV (W_b weighted) of 0.04 m/s^{1.75} at a setback of 15 m for a single train passby was based on the maximum measured and weighted VDV_s. The assessment assumes that each train is a worst-case vibration generating event and is therefore conservative.

The change in VDV for a single train passby event with distance from the track is shown in **Figure 13-2**. The figure presents the monitored vibration levels at the four sites and the adopted relationship between rail vibration and distance from the outer rail. The figure shows the reduction of VDV with increasing distance from the track based on geometric spreading of the vibration energy only (ignoring site specific dampening). The results obtained using this process had similar vibration spectra and relationships between overall levels and distance from the rail track.

The modelled vibration spectrum in **Figure 13-3** is provided as one-third octave bands based on the logarithmic averages of the measurement in order to bias sites with the highest ground-borne vibration levels during train passby events. As ground-borne vibration propagates away from the track, the amplitude of the vibration wave attenuates with increasing distance. The reference vibration spectrum was adjusted to account for this reduction in amplitude.



Figure 13-2 Logarithmic relationship between VDV and distance

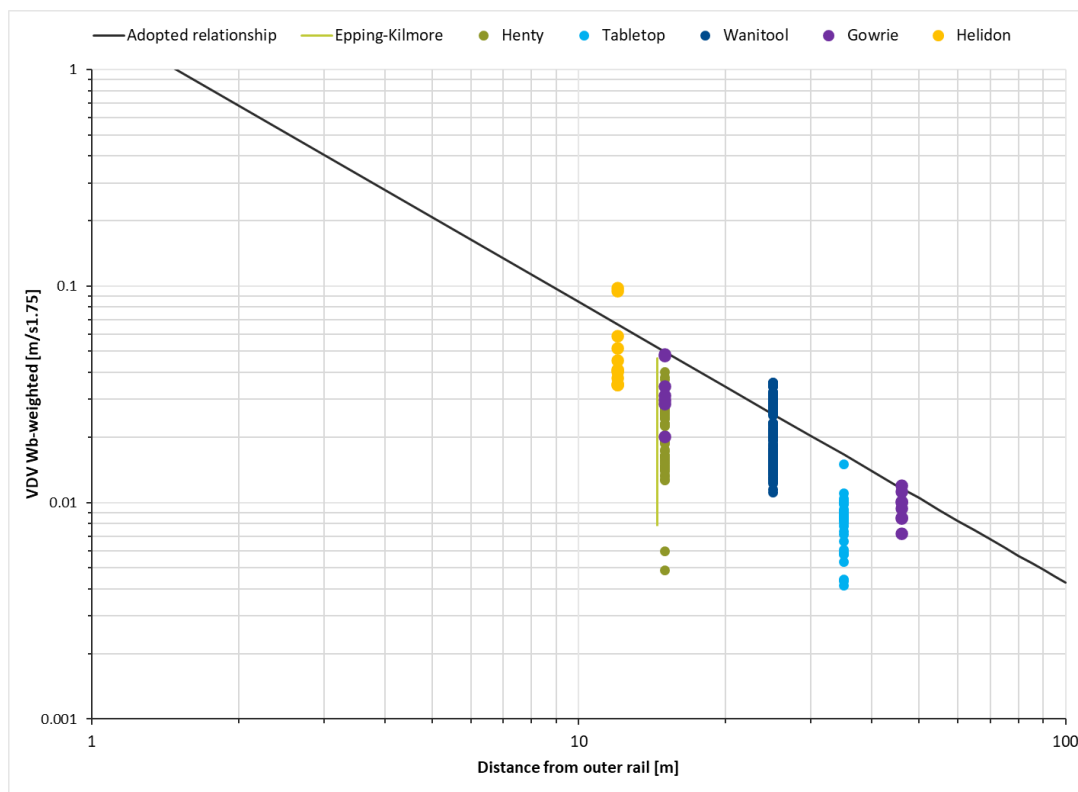
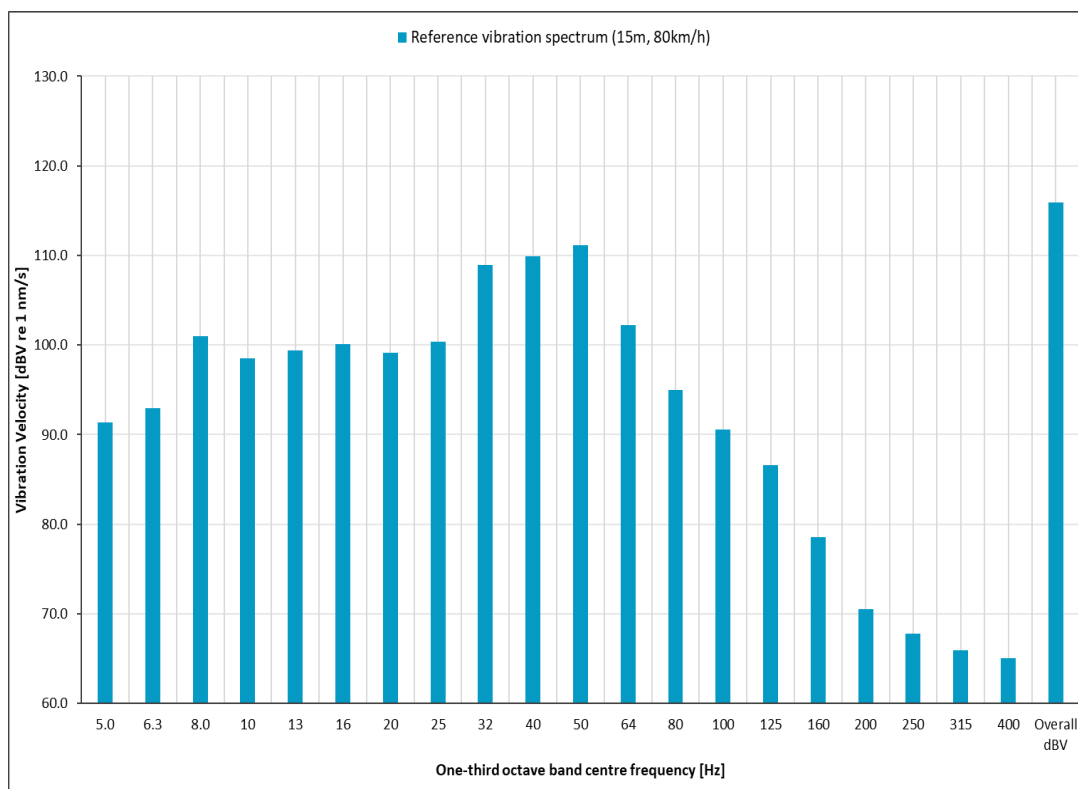


Figure 13-3 Vibration velocity spectrum at 15 m from the outer rail



13.3 Ground-borne vibration from ground-level train passbys

The effects of vibration in buildings can be divided into two broad categories which are considered further in the following sections.

- Where the occupants or users of the building are inconvenienced or possibly disturbed either from tactile vibration or audible noise generated from the building vibration ('comfort risk'); and
- Where the building contents or internal linings may be noticeably affected or where the integrity of the building or the structure itself may be prejudiced ('cosmetic damage risk').

13.3.1 Residential and other occupied buildings

The VDV results were predicted based on the forecast Opening Year 2028 and Design Year 2040 daily train movements, and the forecast train speeds. The number of trains for day, evening and night have been equally distributed based on the 24-hour train volumes. VDV levels for trains at 115 km/h were applied (by proportionally increasing the reference levels at 80 km/h using a 20 x log relationship) to determine the minimum off-set distance from the outer rail of the Project where the ground-borne vibration criteria would be expected to be achieved.

Predicted off-set distances to achieve the daytime and night-time rail vibration criteria are shown in **Table 13-1**.

Table 13-1 Screening assessment of ground-borne vibration levels

	Estimated off-set to meet vibration criteria, subject to detailed review			Receptors within the off-set distance
	Daytime (0.2 m/s ^{1.75})	Evening (0.2 m/s ^{1.75})	Night-time (0.13 m/s ^{1.75})	
Opening Year 2028	9 m (9 trains)	8 m (3 trains)	12 m (6 trains)	None
Design Year 2040	10 m (13 trains)	8 m (4 trains)	12 m (8 trains)	None

Note The estimated off-set distances are based on the VDV reference, actual vibration levels at individual receptors can vary from the calculated levels due to the rail infrastructure and geological conditions.

VDV levels calculated applying the W_b -weighted vibration levels as per the 2008 version of BS 6472.

Based on the highest estimated off-set distance for the night-time railway operations for the Design Year 2040 scenario, an estimated off-set distance of 12 m from the outer rail would be required to achieve ground-borne vibration criteria.

A review of the Project alignment identified that all sensitive receptors, excluding those expected to be acquired by the Project, would be outside of the 12 m off-set distance from the outer rail of the Inland Rail track. On this basis, the railway operations on the Project rail tracks would achieve the ground-borne vibration assessment criteria at all sensitive receptors. The closest receptor (ID 254609) is found to be 22 m from the rail corridor. The predicted VDV for night-time based on the aforementioned assumptions is 0.06 m/s^{1.75}, which is predicted to be below the more stringent night-time target.

Where ground-borne vibrations from railway operations are within the assessment criteria, there can still be potential for rail operations to generate perceptible levels of ground-borne vibration at sensitive receptors. The ground-borne vibration levels would achieve the criteria for managing vibration disturbance, consequently the less stringent vibration criteria for managing risk of cosmetic damage to buildings would also be achieved, aside from the heritage sites which are assessed separately in **Section 13.3.2**.



The assessment also considered potential vibration impacts on a weighbridge located approximately 100m from the rail line between Goondiwindi and Toowoomba. A heavy vehicle weighbridge is designed to operate with heavy vehicles manoeuvring adjacent to it and to withstand the dynamic loads of heavy vehicles driving onto the weighbridge. The operation of weighbridges is also not adversely impacted by running diesel engines. In comparison, vibration levels from railway operations at 100 m away from the weighbridge would be significantly less than those associated with truck movement and running diesel engines and is therefore not expected to adversely impact operation of the weighbridge.

13.3.2 Heritage sites

The assessment has considered the potential for ground-borne vibration from railway operations to impact sites along the Project alignment that were identified as possessing historical or cultural values in the Non-Indigenous Cultural Heritage Survey report undertaken for the EIS¹⁴.

As this study is not informed as to the structural condition of each heritage site, SLR has considered that heritage structures are structurally sound, on the understanding that the Project will require:

- Condition surveys of heritage buildings and structures in the vicinity of the alignment and any excavations would be carried out prior to final design.
- Where ground-borne vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and vibration monitoring would be carried out to confirm vibration levels remain below appropriate limits for that structure.
- For heritage items, any detailed assessment would determine any specific sensitivities in consultation with relevant specialists to ensure risks are adequately managed.
- If a heritage building or structure is found to be structurally unsound (following inspection), a more conservative cosmetic damage objective (for example 2.5 mm/s peak component particle velocity for long term vibration from DIN 4150.3) would be considered.

Based on the reference ground-borne vibration velocity for a freight train passby (**Figure 13-3**), the PPV levels are predicted to comply with applicable heritage vibration criteria at distances greater than 20 m from the nearest rail. Allowance for local factors such as turnouts, where a localised increase of PPV by 10 dBV (a factor of 3.2) is also applied. Within this distance it is to be acknowledged that:

- Depending on location, some assets may already be exposed to similar vibration levels, as the Project shall be collocating within an existing corridor that is used by freight trains; and,
- Ground-borne vibration levels may still be within the guidelines given the conservative assumptions and the dominant frequencies of rail vibration.
- A review of identified sites of potential heritage significance has been undertaken based on the identified 20 m offset from the nearest rail required for compliance in **Table 13-2**. The review has not identified any potential vibration impacts from railway induced ground-borne vibration on the assumption that structures in close proximity to rail line will be modified, or assessed in further detail if retained.

¹⁴ Appendix Z of EIS – Non-indigenous Cultural Heritage Survey Report.



Table 13-2 Review of potential ground-borne vibration impacts at heritage sites

Site ID ¹	Site name	Site description	Proximity to the Project	Predicted PPV	Assessment
B2G-19-H01	Kurumbul Station	Timber stump remains of previous buildings	30 m	2 mm/s	No impacts
B2G-19-H02	Gibinbell Shearing Complex	Iron clad sheds	25 m	2.6 mm/s	No impacts
B2G-19-H03	Gibinbell Siding	All station buildings removed, and earth bank remains.	10 m	11.5 mm/s	No impacts, note ²
B2G-19-H04	Yelarbon & District Soldiers Memorial Hall	Chamferboard clad building with corrugated iron roof.	60 m	0.7 mm/s	No impacts
B2G-19-H05	Anzac Memorial Garden	Small Park with two stone and granite block status	60 m	0.7 mm/s	No impacts
B2G-19-H06	Cancer Charity Tree	Commemorative tree on sandstone block	17 m	4.8 mm/s	No impacts – subject structure is a tree
B2G-19-H07	Church (former)	Chamferboard clad building with corrugated iron roof.	67 m	0.6 mm/s	No impacts
B2G-19-H08	Yelarbon Mill 1	Timber framed buildings in disrepair.	90 m	0.4 mm/s	No impacts
B2G-19-H09	Yelarbon Mill 2	Open sided iron roofed shed.	90 m	0.4 mm/s	No impacts
B2G-19-H10	Petrol Station	Disused chamferboard clad building	58 m	0.7 mm/s	No impacts
B2G-19-H11	Yelarbon Railway Complex	Large corrugated iron shed and series of grain silos	12 m	8.8 mm/s	No impacts, note ¹ . Dominant energy anticipated to be at 50 Hz and above.
B2G-19-H12	Tree Trunk	Large felled tree, possibly a sign	100 m	0.3 mm/s	No impacts
B2G-19-H13	Whetstone Siding	All station buildings removed, and earthen loading bank remains.	450 m	<0.1 mm/s	No impacts
B2G-19-H14	Homestead Complex	Weatherboard clad residence	SLR ID 254828, 110 m	0.3 mm/s	No impacts
B2G-19-H15	Homestead Complex	Weatherboard clad property, not obviously occupied.	108 m	0.3 mm/s	No impacts



Site ID ¹	Site name	Site description	Proximity to the Project	Predicted PPV	Assessment
B2G-19-H16	Structure	Small weatherboard building, not obviously occupied.	45 m	1.1 mm/s	No impacts
B2G-19-H17	Sheds	Two weatherboard & corrugated iron sheds	93 m	0.3 mm/s	No impacts
B2G-19-H18	Lookout	Lookout and rest area	370 m	<0.1 mm/s	No impacts
B2G-19-H19	Outbuildings	Weatherboard clad outbuildings, associated homestead was removed	78 m	0.4 mm/s	No impacts
B2G-19-H20	Grass Tree Creek Bridge	Low timber girder rail bridge	Within the rail corridor	> 12 mm/s	No impacts, note ¹
B2G-19-H21	Yandilla Station	Large corrugated iron shed and grain silos with a weighbridge	15 m	6.2 mm/s	No impacts, note ¹ . Dominant energy anticipated to be at 50 Hz and above.
B2G-19-H22	Protest Public Art	Shipping container with public art	60 m	0.7 mm/s	No impacts
B2G-19-H23	Condamine River Bridge	Timber girder rail bridge with precast concrete abutments	Within rail corridor	> 12 mm/s	No impacts, note ¹
B2G-19-H24	Pampas Station	Large metal grain handling shed with weighbridge	6 m	> 12 mm/s	No impacts, note ¹ . Dominant energy anticipated to be at 50 Hz and above.
B2G-19-H25	Pampas Memorial Hall	Chamferboard clad hall on low timber stumps, still in use	75 m	0.5 mm/s	No impacts
B2G-19-H26	Sheds adjacent to Millmerran Branch Line	Dilapidated timber frame sheds	Within B2G rail corridor	> 12 mm/s	No impacts, note ¹ . Dominant energy anticipated to be at 50 Hz and above.
B2G-19-H27	Condamine River Bridge 2	Timber girder rail bridge with precast concrete abutments	Within the rail corridor	> 12 mm/s	No impacts, note ¹
B2G-19-H28	Brookstead Station	Complex of grain silos	53 m	0.8 mm/s	No impacts
B2G-19-H29	Brookstead Station Building (relocated)	Small weatherboard clad timber	120 m	0.2 mm/s	No impacts



Site ID ¹	Site name	Site description	Proximity to the Project	Predicted PPV	Assessment
		building on low stumps.			
B2G-19-H30	Cecilvale Station	All station elements removed	Within the rail corridor	> 12 mm/s	No impacts, note ²
B2G-19-H31	Yarranlea Station	Existing grain silos and shed	45 m	1.1 mm/s	No impacts
B2G-19-H32	Murlaggan Station	All station elements removed	Within the rail corridor	> 12 mm/s	No impacts, note ²
B2G-19-H33	Homestead Complex	Occupied weatherboard colonial dwelling & ruins of timber structures	78 m	0.4 mm/s	No impacts
B2G-19-H34	Archaeological Site	Site of former buildings, site is extensively ploughed	Within B2G rail corridor	> 12 mm/s	No impacts, note ²
B2G-21-H2	Yelarbon Cemetery	Public cemetery administered by Goondiwindi Regional Council adjacent to the Cunningham Highway	851 m	<0.1 mm/s	No impacts
B2G-21-H3	Avonlea homestead complex	Homestead complex including a house and at least two outbuildings (likely sheds)	86 m	0.4 mm/s	No impacts
B2G-21-H4	Multiple structures	Multiple structures including a house, garden and at least four other structures (likely sheds and other farm infrastructure)	65 m	0.6 mm/s	No impacts
B2G-21-H9	Brookstead Hotel	Brookstead Hotel including reception, bar and accommodation dating to the early 20 th century	154 m	0.1 mm/s	No impacts
B2G-21-H10	House and windmill complex	House and windmill complex including a house and at least two other	332 m	<0.1 mm/s	No impacts



Site ID ¹	Site name	Site description	Proximity to the Project	Predicted PPV	Assessment
		structures (likely sheds)			
B2G-21-H12	Shed	Shed	66 m	0.6 mm/s	No impacts
B2G-21-H13	Green Hills Hotel Complex	Green Hills Hotel complex including the grave of Maria Tibbs, artefact scatter, cottage, house and timber posts	3 m (canopy/shed)	> 12 mm/s	No impacts ¹
B2G-21-H14	Fairvale homestead complex	Fairvale homestead complex including a house and at least four sheds. The house likely dates to the late colonial period.	198 m	0.1 mm/s	No impacts

Note 1 Review in detail if the structures are to be retained with the Project 'as is' i.e. not modified.

Note 2 No impacts anticipated on the understanding there were no observed structures or artefacts.

14.0 Assessment of ground-borne noise

The following modelling method were used in the assessment of ground-borne noise:

- The ground-borne vibration model and the referenced source rail vibration levels were applied to assess the potential ground-borne noise from railway operations at the ground-level track.
- The building types and construction details of the sensitive receptors are not known and could have substantial variations in rural areas. To conservatively estimate the ground-borne noise levels at sensitive receptors, the calculations applied the following key assumptions:
- No coupling loss between the ground and the receptor building structures to account for loss of energy as vibration enters the building footings.
- No floor amplification effects or floor-to-floor losses within the receptor structures.
- Use of a vibration to sound pressure (noise) conversion factor of -32 dB¹⁵.
- Application of a 0.05 per metre damping loss estimated from the rail vibration measures described in **Section 11.0**.
- The above assumption for coupling loss and amplification factor are considered appropriate at this stage of the assessment. For example, the FTA manual¹⁶ recommends a building coupling loss of -5 dB to wood frame houses, but also recommends a -2 dB for floor-to-floor loss and +6 dB for floor amplification / resonance which generally cancel out. As such, the assumptions are deemed appropriate going by generic adjustments from industry best practice. However, further detailed review of

¹⁵ Acoustics and Noise Consultants, Guideline "Measurement & Assessment of Groundborne Noise & Vibration", 2nd Edition 2012.

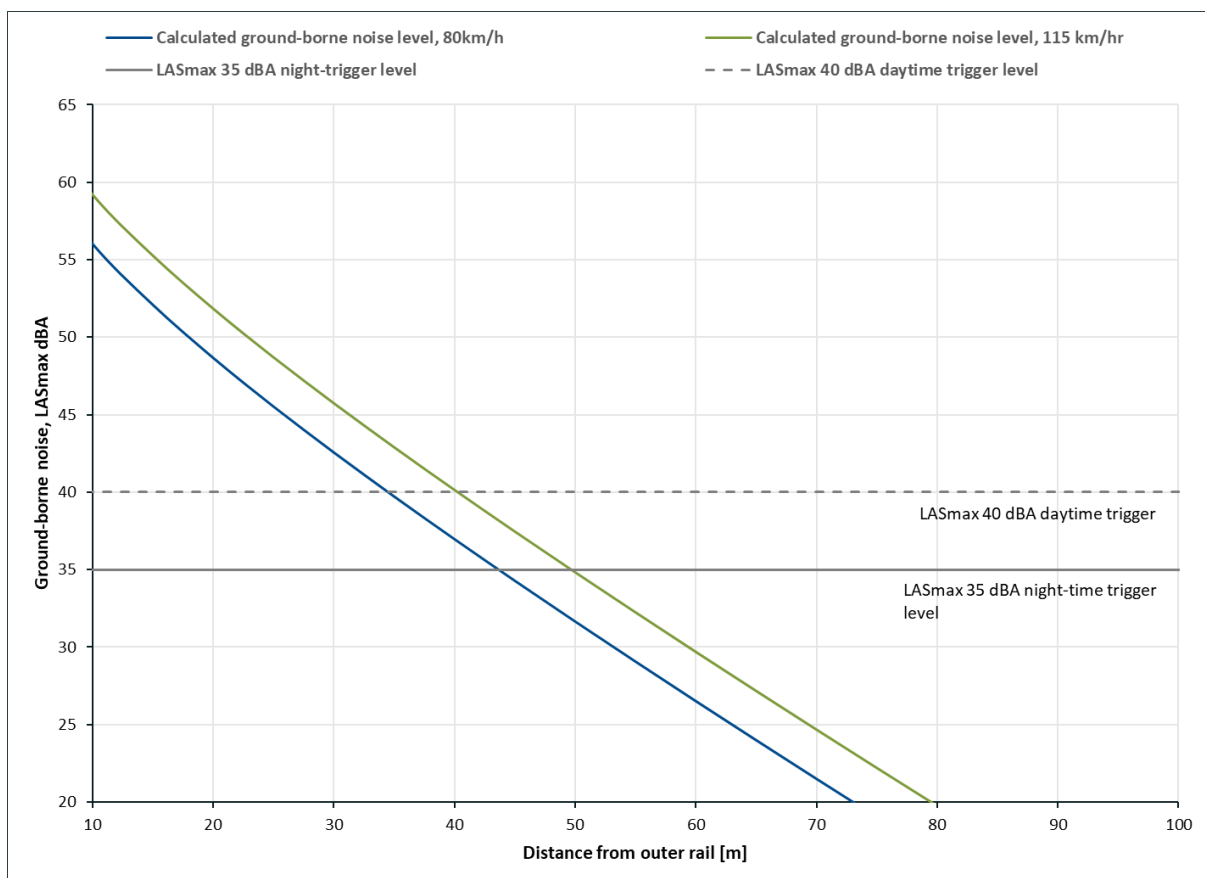
¹⁶ Ratio of peak to root mean square (RMS) velocity level – sourced from Federal Transit Administration (FTA-US) Transit Noise and Vibration Impact Assessment Manual, 2018.



coupling losses and amplification factors are recommended to be undertaken during detailed design where required.

- The calculated ground-borne noise (GBN) levels in decibels, at increasing distance from the outer rail, of the Project is detailed in **Figure 14-1**. The ground-borne noise levels are presented for a train speed of up to 115 km/h. As mentioned in **Section 3.3**, whilst the criteria in the Interim Guideline are based on an SEM parameter, predictions have been conservatively based on the 95th percentile LAS_{max}. This approach is considered conservative as the LAS_{max} level will always remain higher (and hence more stringent) than the SEM parameter. Moreover, the SEM defined in the Interim Guideline has to be adopted for day and night periods – the distribution of trains and locomotive classes across the time periods are currently not available, and as such the use of LAS_{max} is provides a conservative assessment.

Figure 14-1 Calculated ground-borne noise levels from train passby



- The calculated ground-borne noise levels identified that, at a distance of greater than 50 m from the outer rail, the SEM 40 dBA daytime and SEM 35 dBA night-time ground-borne noise assessment criteria would be achieved.
- There were three sensitive residential receptors (IDs 254271, 254609, 254614) and one office (at Yelarbon, ID 254619) identified to be within 50 m of the outer rail of the Project alignment. At these buildings facade noise levels are predicted as follows:
 - Most exposed facades 93-96 dBA SEM
 - Least exposed facade 76-82 dBA SEM
- When considering the predicted noise levels in the context of best-case transmission loss into a dwelling (modern dwelling designed and constructed for high acoustic



performance) even the rooms on the least exposed facade would still be impacted by airborne noise levels significantly higher than GBN. At the 50 m off-set distance, the outdoor noise environment would be dominated by the airborne noise which would likely mask the potential ground-borne noise content at the nearest habitable rooms facing the rail corridor.

- If noise barriers are introduced to minimise airborne noise levels at the sensitive receivers within 50 m, the airborne noise levels may reduce further by 5–10 dB. In such scenarios, whilst airborne noise may still dominate the rooms not facing the corridor, the ground-borne noise levels may be audible and influence the overall noise levels in certain circumstances. Whilst such circumstances are not observed in this assessment, they shall be taken into consideration if they are observed during detailed design.
- Whilst ground-borne noise levels at all other sensitive receptors were calculated to be within the assessment criteria, there can still be a risk of ground-borne noise impacts at sensitive receptors located beyond 50 metres of the railway. Consequently, the assessment outcomes are proposed to be reviewed during the detailed design phase to verify any future requirements to mitigate ground-borne noise.

15.0 Cumulative impacts

A qualitative assessment of the potential for cumulative noise and vibration impacts during the operational phase of the Project has been completed as part of this assessment. Significant existing or approved future projects having potential to interact with the Project were reviewed from publicly available information sources. For the purposes of noise and vibration, projects that directly interface with the Project and will have temporary overlap in construction have the potential to result in cumulative impacts are detailed in **Table 15-1**.

A summary of the findings, including brief descriptions of the assessed projects, the nature of potential cumulative noise and vibration impact, impact significance, and potential mitigation measures is presented in **Table 15-2**. The qualitative impact significance assessment approach is further described in *Chapter 4: Assessment Methodology* of the revised draft EIS.

Cumulative impacts from adjacent sections of Inland Rail including G2H and NS2B are already captured in the assessment of airborne railway noise levels in this technical report by including the contribution of the trains approaching from these adjacent sections. The Project directly links to the south with the adjoining NS2B project section and links directly to the G2H project section to the north. At the sensitive receptors within the B2G project area, the primary source of rail noise will be the Inland Rail trains as they travel on the B2G alignment.

The adjacent sections to the Project are in the process of design development and will be assessed for potential noise impacts as the design develops. Rail noise from the trains travelling along the adjacent NS2B and G2H project sections will occur further from the sensitive receptors on the B2G study area. Consequently, adjacent rail operations are not expected to result in a cumulative increase in daily railway noise levels and SEM at the sensitive receptors within the Project study area since the relative contribution from the adjacent project sections are not anticipated to be sufficient to influence the overall noise predictions for receptors near the ends of the Project section.



Table 15-1 Projects considered

Projects	Location	Description	Operation dates
InterLinkSQ	13 km west of Toowoomba The northern limit of the Project is situated adjacent to the InterLinkSQ site	A 200 hectare transport, logistics and business hub. Located on the narrow-gauge regional rail network and interstate network. Located at the junction of the Gore, Warrego, and New England highways.	Assumed operations would coincide with the Project.
Commodore Mine and Millmerran Power Station	Domville, Queensland The Project is aligned adjacent to potential future coal reserves for the mine	The Commodore Mine is an open cut coal mine which provides coal for the 850 MW Millmerran Power Station. The Millmerran Power Station is a coal-fired power station that supplies enough electricity to power approximately 1.1 million homes.	Subject to annual maintenance shutdown and continual pit expansion. Also potential for coal reserves to be accessed beyond the current footprint
Asterion Medicinal Cannabis Facility	Wellcamp, Queensland Located adjacent the eastern construction footprint boundary of the Project. The facility will be located between the Project and the Toowoomba Wellcamp Airport	A high-tech medicinal cannabis cultivation, research, and manufacturing facility. The project involves construction of a 40 hectare glasshouse to produce 20,000 plants per day at full capacity. Medicinal grade cannabis grown at the facility will be manufactured into a range of medicinal products, including single patient packs, cannabis oils, gels, salts, and related products, destined solely for the medicinal market. The facility will be powered by renewable energy.	No information on construction timeline is available



Table 15-2 Qualitative assessment of potential cumulative noise and vibration impacts

Project	Potential cumulative impact	Aspect	Relevance factor	Sum of relevance factors	Impact significance	Comments and management measures
InterLinkSQ	Increased noise and vibration levels at sensitive receptors—operation	Probability of the impact	Low (1)	5	Low	The potential for cumulative impacts from noise and vibration from Interlink SQ and the Project is considered to be low. Potential cumulative impacts will be managed through inspection and maintenance of the Inland Rail network, including noise attenuation measures within the rail corridor, in accordance with ARTC's network procedures. Operation of the InterLinkSQ facility would also be required to meet operational noise criteria which are separate to the rail operations criteria. This would manage potential cumulative impacts.
		Duration of the impact	Low (1)			
		Magnitude/intensity of the impact	Low (1)			
		Sensitivity of the receiving environment	Medium (2)			
Asterion Medicinal Cannabis Facility	Increased noise and vibration levels at sensitive receptors—operation	Probability of the impact	Low (1)	5	Low	The potential for cumulative impacts from noise and vibration is considered to be low, therefore specific mitigation measures to address cumulative impacts are not warranted. The potential for the Project to contribute to such impacts is considered to be appropriately managed through inspection and maintenance of the Inland Rail network in accordance with ARTC's network procedures.
		Duration of the impact	Low (1)			
		Magnitude/intensity of the impact	Low (1)			
		Sensitivity of the receiving environment	Medium (2)			
Commodore Mine and Millmerran Power Station	Increased noise and vibration levels at sensitive receptors—operation	Probability of the impact	Low (1)	5	Low	The potential for cumulative impacts from noise and vibration is considered to be low, therefore specific mitigation measures to address cumulative impacts are not warranted. The potential for the Project to contribute to such impacts is considered to be appropriately managed through inspection and maintenance of the Inland Rail network in accordance with ARTC's network procedures.
		Duration of the impact	Low (1)			
		Magnitude/intensity of the impact	Low (1)			
		Sensitivity of the receiving environment	Medium (2)			



15.1 Cumulative road traffic and railway noise

The rail alignment of the Project, in places, intersect and be alongside the existing road network and the future new and upgraded roads proposed within the Project.

While the policies and guidelines referenced in this assessment do not specify criteria or management objectives for combined road and railway transport noise, an overview assessment of potential cumulative transport noise has been undertaken. DTMR's Development Affected by Environmental Emissions from Transport Policy, Version 4 (October 2017), assess cumulative impacts from road and rail for new developments using the following criteria which can be considered to assist in quantifying and assessing cumulative impacts from the project (noting that the policy is intended for developers developing sensitive uses adjacent to transport corridors, and not directly applicable for this Project).

Table 15-3 Primary (external) Noise Criteria for new sensitive developments

State transport corridor	Development type	Location within development	Environmental criteria
Railway or Multi-modal corridor which includes a railway	Accommodation activities, Educational establishments Child care centres, Health care services Hospitals Community uses Places of worship Offices	All facades	≤ 65 dB(A) L_{eq} (24hr) ¹ , L_{eq} (12hr) ² and L_{eq} (1hr) ³ façade corrected
			≤ 87 dB(A) (single event maximum sound pressure level) façade corrected
		Outdoor spaces for passive recreation	≤ 65 dB(A) L_{eq} (24hr) ¹ , L_{eq} (12hr) ² and L_{eq} (1hr) ³ façade corrected
			≤ 62 dB(A) L_{eq} (24hr) free field ≤ 84 dB(A) (single event maximum sound pressure level) free field

Table note:

The L_{eq} descriptor applies for a 24hr period (1) at accommodations sites, 12hr period (2) educational sites and 1hr period (3) healthcare and community sites. Refer Table 3 Development Affected by Environmental Emissions from Transport Policy Version 4 (October 2017).

The assessment criteria for road noise emissions and the Interim Guideline use differing noise metrics. Road noise assessments use the upper 10 percentile noise level over 18 hours, $L_{A10,18h}$ criteria, whereas the Interim Guideline uses an equivalent average noise level over 24 hours, $L_{Aeq,24h}$ criteria. The conversion factor from Table 2 of *Austroads Research Report AP-R277/05 Modelling, Measuring and Mitigating Road Traffic Noise* to convert $L_{A10,18h}$ noise levels to $L_{Aeq,24h}$ noise levels, such that $L_{Aeq} = L_{A10} - 3dB$ could be applied as an approximation.

A comparison of predicted noise levels at receptors from both upgraded and new roads converted to a $L_{Aeq,24h}$ noise level and rail noise levels described with the $L_{Aeq,24h}$ and SEM descriptors is presented in **Appendix J**. The road noise modelling details are further outlined in Appendix V of the EIS.

The results identified the following:

- In general terms, cumulative transport noise levels would generally be expected only where road traffic or railway noise is within 10 dBA of each other (where the same noise metric is applied to quantify both sources of transport noise).



- At the majority of sensitive receptors close to both the road network and railway alignment to potentially experience cumulative transport noise, railway noise levels are expected to be the dominant noise contribution (during train passby).
- Most receptors that trigger the road noise criteria for road upgrades were also identified as triggering the rail noise criteria and would require investigation of reasonable and practicable mitigation for rail noise. The exception being two receptors in Brookstead impacted by upgrades to the Gore Highway and trigger road noise criteria but are over 400m from the rail line. Road noise is the dominant source (greater than 10dB louder than rail noise) and these receptors will also benefit from the rail noise barrier in Brookstead and would be managed for road noise impacts in accordance with the road noise code of practice.
- No additional receptors were identified where combined noise levels from upgraded roads and new rail would result in noise levels increasing above $L_{Aeq,24h}$ 65 dBA which were not already identified as triggering the SEM rail noise criteria.
- At receivers that exceed the rail noise criteria (which is more stringent than the cumulative criteria) they will be provided with mitigation for rail noise, which would also assist in controlling cumulative road and rail noise.
- Potential cumulative impacts would be further reviewed at detailed design stage.

16.0 Impacts on Intensive Animal Operations

The construction and operation of the Project will generate noise and vibration that could potentially impact intensive animal operations. Inland Rail engaged The Australian Centre for Rail Innovation (ACRI) to undertake a literature review of studies that directly or indirectly addressed domestic livestock species, and noise, vibration or other impacts of rail operation applicable to the freight rail context.

Based on this literature review, ACRI made the following recommendations regarding noise impacts on animals:

- Avian exposure to freight rail noise more than 100 dB L_{Amax} should be avoided or mitigated to reduce the potential for stress and harm from a physiological and behavioural perspective.
- Extent of avian exposure to high level operational noise ≥ 90 dB L_{Amax} proximal to the Inland Rail should be estimated or modelled to allow for measures that reduce or avoid exposure.
- Mammalian livestock exposure to freight rail noise in the range of 90 – 110 dB L_{Amax} should be minimised to avoid aversive behavioural responses.
- Frequency and duration of mammalian livestock exposure to high level freight rail noise ≥ 100 dB L_{Amax} proximal to Inland Rail project sites should be estimated or modelled to allow for measures that reduce or avoid noise exposure.

The predicted noise levels (L_{Amax}) for the railway operations at the design year 2040 indicate that the 90 dB L_{Amax} noise levels occur very close to the rail alignment. Noise levels at all farm buildings, sheds and feedlots within intensive livestock properties are less than 90 dB L_{Amax} .

Several construction scenarios have been modelled as part of the construction noise assessment (Appendix V: Noise and Vibration – Construction and Road Traffic), and for the purposes of assessing construction impacts to intensive animal operations, earthworks scenario: cut and fill has been selected as the most noise intensive scenario occurring



throughout the Project alignment, noting that construction activities are temporary. The predicted noise levels for earthworks indicate that the 90 dB L_{Amax} noise level is largely confined to the construction area. The modelled noise levels further indicate that noise levels during construction at intensive livestock facilities such as farm buildings, sheds or feedlots visible from aerial imagery, are less than 90 dB L_{Amax} . Based on this, construction activities are not expected to significantly impact intensive animal operations.

In order to provide a conservative estimate of the potential impacts of vibration on intensive livestock facilities, the human vibration limits for railway operations (accommodation activities) and construction (human comfort,) have been applied.

The assessment determined that the vibration criteria would be achieved where receptors are greater than 12 m from the closest rail (based on the most stringent limit for the night-time period). The assessment found that there were no sensitive receptors triggering the ground-borne vibration criteria from railway operations.

For intensive animal operations, considering that structures such as farm buildings, sheds or feedlots visible from aerial imagery, are located at distances significantly farther away than the estimated off-set distance of 12 m, it is anticipated that ground borne vibration impacts to livestock are not likely to be expected in these locations.

Ground vibration impacts for the construction phase were assessed as part of Appendix V: Noise and Vibration – Construction and Road Traffic Impact. During construction, it is standard practice to maintain adequate separation distance or 'safe' working distance where possible and/or monitor vibration levels at sensitive receptor locations during vibration intensive construction works.

The safe working distances provide a simple and conservative guide to site personnel to manage the likelihood of vibration impacts to sensitive receptors including livestock.

Appendix K provides a detailed summary of the ACRI research and discussion on the noise and vibration impacts to intensive animal operations from construction and operation of the Project, identification of potential impacts and mitigation measures.



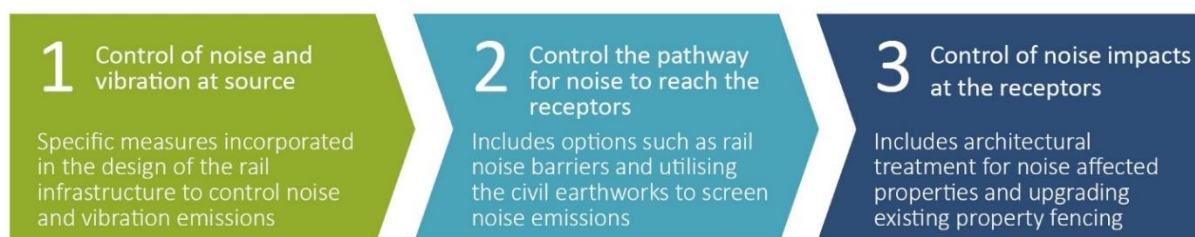
17.0 Recommendations

17.1 Reasonable and practicable mitigation measures

In alignment with the Interim Guideline, the Project will investigate and implement reasonable and practicable measures to prevent or minimise environmental harm and nuisance from operational activities. The noise and vibration criteria from the Interim Guideline serve as the threshold for implementing these measures. This report reviews concept mitigations to demonstrate it is feasible to comply with the Interim Guideline limits and to manage aspects not covered by the guideline, such as sleep disturbance.

The investigation of noise and vibration mitigation for the Project follows a hierarchy of control options, as summarised in **Figure 17-1**.

Figure 17-1 Hierarchy of noise and vibration mitigation measures



The Project is applying the following strategy as the basis for identifying the reasonable and practicable noise mitigation measures at the time of the EIS. The terms ‘reasonable’ and ‘practicable’, with respect to noise mitigation, are outlined below in **Table 17-1**.

Table 17-1 Evaluation of reasonable and practicable for noise mitigation

Term	Description	
Practicable	The noise mitigation should be a conventional and available noise mitigation approach. Ideally the option is consistent with industry best practice and does not introduce novel or untried technology. The mitigation should be practical to build with consideration to the constructability, engineering, maintenance and reliability of the option.	
Reasonable	When determining if mitigation is reasonable, the following factors should be considered:	
	Safety	The mitigation should not adversely impact the safety of the public or the safety of implications of rail operations within the rail corridor. For example, pedestrians should be able to audibly and visually detect trains at pedestrian crossings.
	Noise impacts	The effect of the noise mitigation to change aspects such as the overall noise levels, the amenity of the ambient noise environment and how frequently the rail noise levels could trigger mitigation are all considered.
	Noise mitigation benefits	The noise reduction performance achieved by the mitigation is reviewed, along with the perceptible change in noise level that could be experienced.
	Community views	The views of landowners and the community should be consulted and options that have the support from the receptors exceeding criteria should be considered.
	State government requirements	Consider any State specific requirements for what constitutes reasonable or practicable.



Term	Description	
	Cost	The costs should be reasonable in context of the overall project cost and spending on other similarly affected residents. The cost should consider the overall project costs including on-going maintenance. Any residual costs to the community, such as running air-conditioning, should also be reviewed.

17.2 Noise and vibration mitigation options

The rail design incorporates aspects that would inherently minimise noise emissions. These include the selection of route alignment, continuously welded rail, minimising rail curves and avoidance of steep gradient as far as reasonably possible. In this regard, it is deemed that the base case alignment already has certain level of mitigation in place. The following sections detail further reasonable and feasible mitigation measures based on the predicted results.

A review of potential reasonable and practicable mitigation options to reduce and control noise and/ or vibration levels, and related impacts at sensitive receptors, is discussed below in **Table 17-2**.

The options demonstrate the range of mitigation measures that can be implemented on the Project. The final decision on mitigation measures will be determined during the detailed design and construction of the Project. This is expected to include further noise and vibration prediction modelling to verify the outcomes of this assessment.

The mitigation measures are specific to the sources of noise and vibration, for example wheel-rail (rolling) noise, locomotive noise emissions or potential ground-borne noise from train passbys. The detailed design may determine a combination of options would be implemented to provide the reasonable and practicable control of the noise and vibration, targeted to achieving the assessment criteria and minimising potential impacts.

Table 17-2 Review of potential noise mitigation measures

Noise source	Aspect	Commentary
Rolling noise	Noise walls or barriers at the rail corridor boundary	Rail noise barriers can be an effective noise mitigation option to control the noise emissions from both the wheel-rail interface and from the locomotives. Appropriately designed noise walls and barriers can typically reduce the overall noise levels by 7 - 15 dBA, where the line of sight between the sensitive receptor and the source(s) is fully impeded by the barrier structure. The project considers noise walls or barriers where the mitigation can effectively control noise at sensitive land uses and receptor buildings, and where the cost of mitigation is reasonable relative to the noise benefit provided in terms of noise reduction, combined with number of impacted receptors mitigated. See Section 17.2.1 for further details.
	Low height noise barriers	In situations where the primary noise source is from the wheel-rail interface, low height barriers (for example ≤ 2 m in height) can be constructed close to the outer rail track. Such barriers can achieve similar noise reductions to noise walls or barriers at the rail corridor boundary. Typically, this mitigation option only suits single tracks and where only the rolling noise (dominant Leq metric) needs to be controlled. Given the overall noise levels from rail freight are a combination of rolling noise and locomotive noise (dominant SEM metric)



Noise source	Aspect	Commentary
		emissions the low height noise barriers would have a negligible influence on the compliance to the noise criteria.
	Earth mounds at the rail corridor boundary	Earth mounds at the rail corridor boundary can be an alternative to or complement noise walls and barriers. The earth mounds can mitigate noise by impeding the direct line of sight between the noise source and receptor. To reduce noise levels between 5 dBA to 10 dBA, earth mounds would need to be a comparable height and length to potential rail noise walls or barriers. The required height of noise walls or barriers can be achieved where the structure is constructed on an earth mound base. This approach provides the required screening of noise and can reduce the associated costs of the noise wall or barrier. When reviewing the practical application of earth mounds, the following should be considered: • The construction of earth bunds can be constrained by the available space between the rail corridor and neighbouring infrastructure. • Earth mounds require considerably more space than the footprint of a rail noise barrier. A 2 m height earth mound could require an 8 m wide base. • Earth mounds could provide a benefit to control perceptible rail noise impacts. Reductions in noise levels by at least 3 dBA could result in a perceptible improvement to the loudness of train passby events. • Whilst earth mounds may not achieve specific noise reduction performance as can be achieved with noise walls or barriers, they can assist in reducing the overall noise levels to be closer to the assessment criteria. • In addition to the potential constraints associated with noise walls and barriers, the earth mound would also need to meet environmental, safety and design requirements. • The implications to water through flow and flooding will need careful consideration to ensure the earth mounding does not adversely impede the movement of surface water. • The required extent and height of the earth mounds to achieve reduction in noise levels may exceed the availability of re-usable spoil material.
	Rail dampers	Rail dampers may provide localised benefit for the control of rolling noise where the contribution from the rail is a primary factor. International experience suggests a reduction in rolling noise of 3 dBA could be achieved and there is limited evidence that suggests rail dampers can provide some benefit in controlling curving noise. The effectiveness of rail dampers may be limited by the stiffness of the ballasted track and concrete sleepers, the forces exerted by the heavy rail freight and the long-term durability and maintenance of such measures. Sections of generally straight track that are not highly susceptible to prominent or regular wear and would be most suited for the consideration of rail dampers.



Noise source	Aspect	Commentary
	Maintaining defective rollingstock	Defects with the wagons, such as wheel flats or misaligned axles/ bogies, can cause discrete and potentially annoying high noise events. The Inland Rail Border to Gowrie project includes provision of Wayside Monitoring Systems across the rail network to identify individual rollingstock and the specific sources of noise for the targeted mitigation of railway noise. The Wayside Monitoring Systems include: • Wheel impact and load detector, bearing acoustic monitoring (RailBAM) and Squeal acoustic detector (RailSQAD), • Angle of attack, hunting detector and wheel profile monitoring. A similar monitoring program could be implemented to identify sources of high noise events. Once identified, defective rollingstock can be temporarily removed from service and defects repaired to address factors contributing to higher noise levels or discrete annoying noise characteristics. It is likely the overall reduction to LAeq and SEM noise levels would be minor but would assist in managing noise events that could cause disturbance.
Level crossing bells and horns (to consider impacts above the minimum Interim Guideline requirement)	Safety requirements	The operation of devices such as train horns and level crossing alarms are exempt from compliance to airborne noise criteria due to public safety obligations. The following mitigation options are proposed as part of Inland Rail's commitment to managing noise impacts.
	Wayside horns	A wayside horn is an automated audible warning located at the level crossing. Instead of the train sounding its horn on approach to a level crossing the wayside horn automatically sounds to provide a targeted audible noise event for vehicles and pedestrians at the level crossing. The objectives are to remove the need for the train to sound its horn adjacent to sensitive receptors and to implement a horn event that has a noise emission level and sound directivity focused to the users of the level crossing. It is expected that respite from train horns could reduce L_{Amax} noise levels by more than 10 dBA at sensitive receptors and provide a notable improvement in loudness and potential risk for annoyance, particularly where there can be more two train horn events every hour with the Inland Rail project.
	Soft tone alarm bells	The design of level crossing alarm (warning) bells will be required to confirm to specific design standards. Typically, loud tone alarm bells are to operate at L_{Amax} noise levels between 85 dBA to 105 dBA at 3 m. A soft tone bell design, which has a lower L_{Amax} noise emission level between 75 dBA to 85 dBA at 3 m can be applied, where practicable, to reduce maximum noise levels from the alarm bells by approximately 10 dBA. The LAeq noise level would have a more marginal improvement as the noise environment surrounding level crossings is primarily influenced by the train passby events.



Noise source	Aspect	Commentary
	Silencing level crossing bells	Where environmental or local situations warrant a reduction in audible warning sound levels, and a risk assessment involving the relevant authorities and human factors provides for safe mitigation, then suppression of audible warning may be considered, especially during night periods when background noise levels may be low. At night (for example, between the hours of 22:00 and 06:00), silencing road warning bells may be considered (subject to a risk review) if: - the road crossing is provided with booms and dedicated pedestrian audible warning devices are switched on in lieu of the road warning bells during the nominated time. - an assessment has determined a low likelihood of pedestrians using the road crossing during the nominated time. In such cases, pedestrian audible warning devices may not to be silenced.
Property controls	At-property architectural treatment	Where external rail noise levels are predicted to exceed the assessment criteria and other mitigation measures (such as noise barriers) are not feasible, a potential option is to mitigate the intrusion of rail noise within the affected property. The provision of at-property treatment would depend on a number of factors and is expected to only apply to habitable rooms or acoustically significant rooms/uses of sensitive buildings. Typically, measures such as upgraded acoustic glazing, acoustic window and door seals and acoustic insulation for the roof are considered to mitigate noise intrusion. The provision of upgrades to ventilation, such as fresh air ventilation (acoustic ducting) or air-conditioning will allow windows to be kept closed as a mitigation option whilst maintaining air flow. Appropriately designed measures, where windows are closed, can mitigate the intrusion of noise by more than 10 dBA. However, these measures can be more effective to control the intrusion of rolling noise as it is more broadband in nature and often does not have prominent tonal or low frequency components. All consideration of architectural property treatment would be subject to the individual property. Suitability will be confirmed prior to the implementation of noise control treatments.
	Property construction	In rural locations, the age and construction of residential properties can influence the practical implementation of modern architectural treatments. The review of architectural treatments will require further review of eligible properties and advice from suitably qualified professionals.
	Consideration of low frequency noise content	Noise which is considered to have low frequency and/or tonal content can be increasingly annoying. Where the control of low frequency noise is required at properties, the architectural acoustic treatments would need to consider the control of low frequency noise intrusion. The approach applied would need to achieve an overall improvement to the internal rail noise levels and potential characteristics that could cause annoyance. The control of low frequency noise within a property is challenging and care needs to be taken to manage residual impacts such as the architectural treatments controlling the mid and high frequencies which may cause the low frequency noise to become more perceptible.
	At-property fence upgrades	Existing fencing at the boundary of individual receptors can be upgraded by replacing part or all of the existing fencing with an



Noise source	Aspect	Commentary
		'acoustic' fence design. Compared to standard residential property fencing, an acoustic fence, such as aerated concrete (solid masonry), has an improved acoustic transmission loss performance. Whilst the noise reduction performance will be specific to individual properties, upgrades to existing property fencing are likely to be suitable only where noise reductions of less than 10 dBA are required. The potential for upgrading existing property fencing can be limited by the line of sight between the railway and the receptor, the available land and the requirements of local Councils and regulatory authorities with respect to the height and materials permitted for property boundary fencing. Agreement between the landowner and Inland Rail would be required for Inland Rail to undertake works on private property.
	Property relocation	In rural locations, individual residential property can be located on large land holdings where the location of services allows (i.e. electricity, sewer, water). It may be possible to relocate the residential property within the same land so that it is further from the rail corridor and noise levels would be lower. The relocation of property would be assessed on a case by case basis and ensure there would be a notable improvement to the noise environment at the relocation site. As a general rule, where the distance between the dwelling and the rail line is doubled the rail noise levels can 3 dBA less.
	Negotiated agreements	The implementation of at-property treatments and other measures to private property would likely be subject to the agreement of commercial and legal terms between Inland Rail and the property owner.

17.2.1 Noise barrier mitigation principles

The review of noise mitigation options, including noise barriers, considered the following principles:

- Noise mitigation must sufficiently reduce railway noise levels to meet the airborne noise criteria from the Interim Guideline at nearby noise-affected sensitive receptors. Upon achieving Interim Guideline criteria, further improvements for mitigation shall be considered to minimise night-time noise levels to achieve the sleep disturbance thresholds (55 dBA Leq, 8hr).
- Noise barriers must effectively control railway noise and minimise the need for additional noise mitigation outside of the railway corridor.
- Noise barrier structures adjacent to all passive and active level crossings must not impede the ability of:
 - Road users and pedestrians to have a clear line of sight to approaching trains.
 - Train operators to have a clear line of sight to approaching road vehicles and pedestrians.
 - The gaps between railway noise barrier structures for passive level crossings, active level crossings, and stock crossings should not compromise the noise reduction performance for the majority of nearby sensitive receptors.
- Noise mitigation structures would not be provided adjacent to land designated as not being a noise sensitive area.
- Noise barriers within the railway corridor should not increase road traffic noise exposure by reflecting road traffic noise towards nearby sensitive receptors.



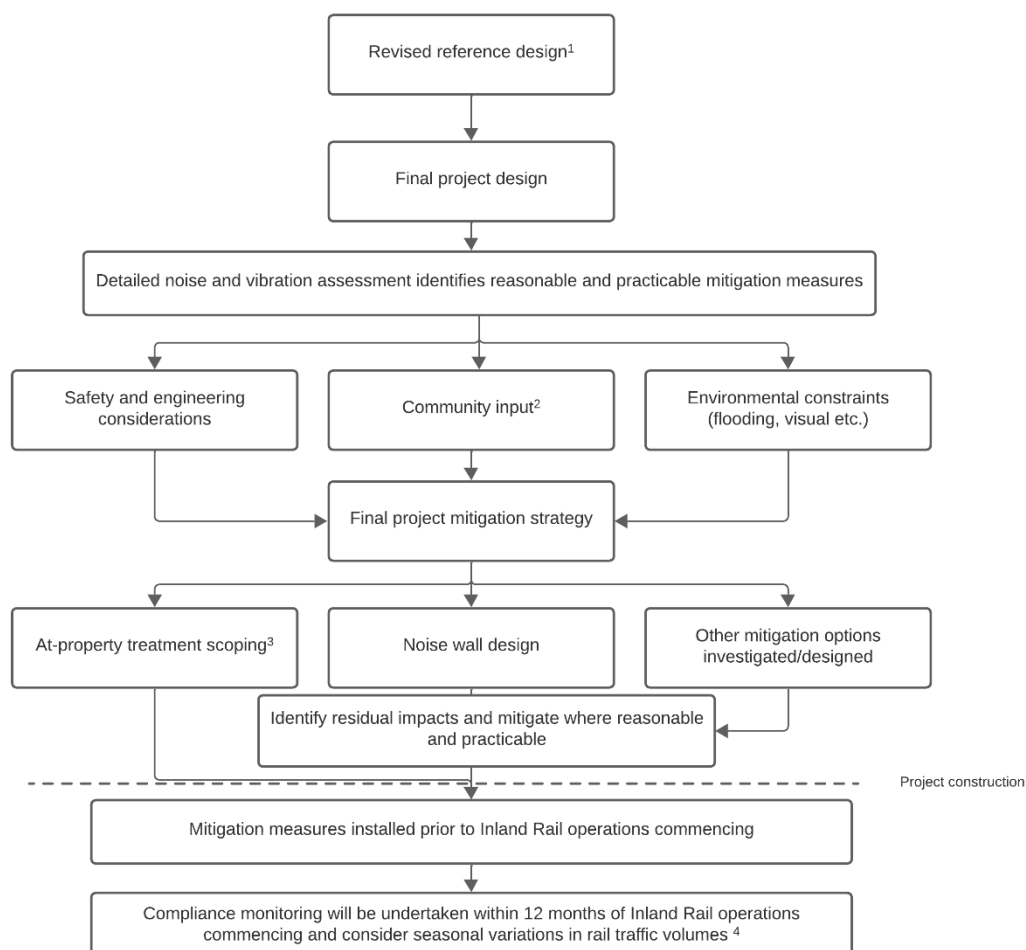
- Noise mitigation should be located to enhance Crime Prevention Through Environmental Design (CPTED). For example, noise barriers would not be installed in locations that could compromise the ability of people to make safe choices about where to be and how to respond to potential threats.
- Environmental factors will influence the feasibility of noise mitigation, including the potential for structures to worsen flooding conditions, create negative visual impacts, affect heritage and cultural contexts, and introduce ecological impacts such as preventing fauna crossings.
- In areas where sensitive receptors are present on both sides of the railway corridor, noise mitigation should not create physical barriers that hinder community access or negatively impact social connectivity and sense of place. Community consultation must occur and the local community's preference must be factored into the decision making process.
- Noise barriers are generally only considered where groups of triggered sensitive receptors are apparent on the same side of the track.
- For isolated sensitive receptors, such as single dwellings, noise barriers would generally not be considered a reasonable and practicable mitigation option. Noise barriers are unlikely to be cost-effective for a single property due to the extensive coverage required to screen a wide angle of view to the railway corridor. The noise mitigation for isolated sensitive receptors are discussed further in **Section 17.5**.
- The location of existing services and Public Utility Plant that would limit the installation of noise barriers would be considered. Relocation of services can be a significant undertaking.
- Whole of life cost and total benefits achieved are also key factors adopted in the final selection, design and implementation of any proposed mitigation option.

17.2.2 Mitigation refinement

The process for identifying and establishing mitigation is outlined in **Figure 17-2**. Note that all mitigation measures developed during detailed design, including the exceedances predicted for design year (2040), should be installed during the construction phase of the Project, prior to line opening.



Figure 17-2 Noise mitigation process flowchart



1 – Includes conceptual mitigation measures.

2 – Where noise barriers are proposed consultation will be undertaken with relevant councils and community.

3 – At-property treatments to be applied according to **Table 17-16**.

4 – Additional mitigation will be installed where operational monitoring indicates exceedances of the relevant criteria.

17.3 Review of results to determine noise mitigation

The airborne noise assessment identified railway noise levels triggered the Interim Guideline review of noise mitigation at 82 residential receptors for rail operations at both Opening Year 2028 and Design Year 2040.

A review of the noise mitigation triggers, based on the margin the rail noise levels are above the criteria, is provided in **Table 17-3**.

Table 17-3 Summary of residential triggers

Assessment criteria margin	Residences triggering the Interim Guideline criteria	
Opening Year 2028		
	Leq	SEM
1 dBA to 3 dBA	28	38
>3 dBA to 5 dBA	11	23



Assessment criteria margin	Residences triggering the Interim Guideline criteria	
>5 dBA to 10 dBA	3	18
>10 dBA	0	3
Total receptors triggering noise–mitigation - project opening	42	82 (including Leq triggers)
Design Year 2040		
1 dBA to 3 dBA	37	38
>3 dBA to 5 dBA	10	23
>5 dBA to 10 dBA	13	18
>10 dBA	0	3
Total receptors triggering noise–mitigation - design year	60 (including the 42 receptors triggering in 2028)	82 (including the Leq triggers and 85 receptors triggering in 2028)

A review of the location of these sensitive receptors determined in the order of half of properties were isolated properties dispersed along both sides of the Project alignment. Elsewhere, the residential receptors were located at the townships of Kurrumbul, Yelarbon, Pampas, Brookstead, Pittsworth and Gowrie.

At these townships the sensitive receptors are grouped together, located adjacent to the railway corridor and are predicted to exceed the Interim Guideline criteria. On this basis, a review of concept noise barriers has been undertaken, as detailed in **Section 17.4**.

For the other sensitive receptors where the assessment criteria are predicted to be triggered, the reasonable and practicable noise mitigation options are expected to be:

- at-source noise control measures to reduce the emission of railway noise; and/or,
- at-property treatments to the buildings triggering the assessment criteria to control rail noise within the internal environment of the building; and/or,
- at-property upgrades to any existing property boundary fencing to improve screening of rail noise levels.

In addition to receptors exceeding the Interim Guideline criteria, receptors exceeding night-time thresholds will also similarly be considered for at-property treatments, subject to further review as detailed in **Section 11.2**.

During the detailed design phase, the sensitive receptors that exceed the noise criteria shall be surveyed to exclude rooms and buildings that are not noise sensitive from the consideration of at-property treatments, such as storage areas, bathrooms, hallways and corridors. The surveys would need to investigate the construction and condition of the existing property facades and assign appropriate mitigation measures based on **Table 17-16** and homeowner preferences.

In addition, there are 15 non-residential receptors where predicted noise levels were above the noise assessment criteria. The surveys of sensitive receptors will need to include the non-residential receptors to confirm the building use and occupancy and the noise attenuation performance of the existing facades. The sensitive receptors at Yelarbon such as the Scouts Hall, Post Office and Fire Station would benefit from noise barriers described in the following sections. Similarly, the Brookstead school buildings, sporting fields, post office and park are also expected to benefit from the provision of noise barriers (by achieving compliance with criteria subject to the final design of the barriers). Other triggered non-residential sensitive receptors will have to be inspected for their usage and façade performances to determine suitable at-property treatments during detailed design.



Note that the two buildings within Brookstead State School will also have to be investigated further during detailed design and ensure that the mitigation design also considers the Design standards for Department of Education, Training and Employment facilities.

In addition to the above, when determining the magnitude of noise to mitigate, consideration should also be provided to cumulative noise that arise from rail and the road upgrade subject to the mitigation being reasonable and feasible (as discussed in **Section 15.1**). **Appendix J** provides the cumulative rail and road noise levels as a guidance which will be reviewed further during detailed design.

17.4 Review of noise barrier options

17.4.1 Overview

At the towns of Kurrumbul, Yelarbon, Pampas, Brookstead and Pittsworth the railway noise levels at nearby sensitive receptors are typically above the noise trigger levels, the receptors are within 200 m of the rail corridor and in groups on the same side of the track. The assessment has reviewed potential noise barrier designs at these towns to determine recommended reasonable and practicable noise mitigation for the Project. In addition, barrier option is also considered at Gowrie, as detailed in the sections below. These barrier locations are considered to be the only locations along the project alignment where barriers may be beneficial, subject to further detailed design review and broader environmental considerations.

Noise barrier is recommended as a reasonable and practicable noise mitigation in this assessment, and Inland Rail will determine the barrier's further implications during the detailed design and construction of the Project. Note that all of the environmental, engineering and design aspects of these barriers listed in **Section 17.2.1** have not been considering in this assessment. As such, the barriers are meant to be treated as concept barriers from an acoustic perspective only.

The key assumptions referenced as part of the review and modelling of the noise barrier options in this report are:

- The predicted noise levels for the worst-case Design Year 2040 scenario were applied as the basis for the mitigation assessment and reported in this section.
- The predicted L_{Aeq} and SEM railway noise levels at sensitive receptors are a combination of the noise from both the wheel-rail interface (rolling noise) and the locomotive exhausts.
- The number of receptors triggering the noise criteria is greater for the SEM compared to the $Leq(24hours)$ parameter (which has a bearing on the source height and a barrier design response).
- The intention of the barrier height is to maximise compliance with the Interim Guideline criteria and at the same time support mitigation of impacts not wholly addressed by the requirements of the Interim Guideline. Whilst the noise barriers maximise compliance against Interim Guideline, reductions to night-time Leq are also expected to be achieved.
- All noise barriers would need to be solid structures constructed from material such as autoclaved aerated concrete or pre-cast concrete. A combination of a rail noise barrier, retaining wall and/or earth mound structure may be feasible to ensure the barrier structure effectively impedes the direct line of sight (noise pathway) between the rail corridor and the sensitive receptors.
- An acoustically absorptive design for the noise barrier surface may be required to ensure reflected sound does not limit the noise reduction performance of the barrier. The barrier has been modelled with standard reflection properties, but absorptive layer on either face



of the barrier may be considered if exceedances to the receivers on the opposite side are identified during detailed design.

17.4.2 Concept noise barrier mitigation at Kurumbul

At the Kurumbul township, five residences are located to the north of the railway and one residence is located at south of the railway. The predicted unmitigated noise levels for Design Year 2040 were above the assessment criteria at these receptors.

Concept noise barriers were modelled to the north of the railway, with a gap of 50 m for South Kurumbul Road to provide line of sight at the crossing. The total length of the barrier is 870 m and a barrier height of 6 m above ground level was assessed.

The noise barrier is shown in **Figure 17-3** along with the individual sensitive receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the number of additional receptors achieving the noise criteria with the noise barrier mitigation and residual receptors where noise levels remained above the criteria are summarised in **Table 17-4**.

Table 17-4 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (4 triggers)	0 (5 triggers)
With barriers	3 (1 residual triggers)	4 (1 residual triggers)

The predicted noise reductions for each considered barrier height are detailed in **Table 17-5**. The table presents the number of receptors within each noise reduction category.

Table 17-5 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 6m barrier	Predicted reduction	Without barrier	With 6m barrier	Predicted reduction
254170	65	57	8	88	80	8
254179	63	57	6	86	79	7
254168	67	61	6	90	83	7
254181	61	55	6	84	77	7
2008224	60	58	2	83	81	2

The review of the noise barrier performance identified that the concept noise barrier is expected to result in compliance with Interim Guideline at all of the nearby sensitive receptors except for ID 254168 (due to the receptor being prone to the gap in the barrier to allow for South Kurumbul Road crossing), where the residual exceedance of SEM against the criteria is 1 dB.





BORDER TO GOWRIE

Noise Barrier - Kurumbul

Figure 17-3

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 18-Oct-2024

Author: JG

- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Noise Barrier
- Sensitive Receptors (Residential)
- Sensitive Receptors (Non-Residential)



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17.4.3 Concept noise barrier mitigation at Yelarbon

At Yelarbon, the Cunningham Highway will be realigned which would assist with a rail noise barrier to be investigated parallel to the nearest sensitive receptors. The predicted unmitigated noise levels for Design Year 2040 identified 18 sensitive receptors (14 residential, a scout hall, an office building, a post office and a fire station) located to the north and south of the railway line where noise levels were above the assessment criteria. Therefore, noise barrier options have been investigated to mitigate noise to the receptors on both sides of the corridor.

To the south of the railway, a 230 m long barrier was assessed to the west of Wondalli Street and a 710 m long barrier was assessed to the east of Wondalli Street. To the north of the railway, a 360 m long barrier was assessed between Wondalli Street and the art silos. These noise barriers were assessed using a height of 6 metres.

The noise barrier is shown in **Figure 17-4** along with the receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the additional receptors achieving the noise criteria and the residual receptors where noise levels remained above the criteria are summarised in **Table 17-6**.

Table 17-6 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (17 triggers)	0 (18 triggers)
With barriers	11 (6 residual triggers)	11 (7 residual triggers)

The predicted noise levels with and without noise barriers are detailed in **Table 17-7**.

Table 17-7 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 6m barrier	Predicted reduction	Without barrier	With 6m barrier	Predicted reduction
254551	63	61	2	86	84	2
254558	66	64	2	90	88	2
254559	66	64	2	90	88	2
254562	67	63	4	90	87	3
254564	65	59	6	89	83	6
254565	67	62	5	90	85	5
254574	65	57	8	89	80	9
254576	65	56	9	88	79	9
254578	60	54	6	83	77	6
254589	65	54	11	89	77	12
254592	64	53	11	88	76	12
254595	66	56	10	89	78	11
254598	65	55	10	89	77	12
254603	66	55	11	89	78	11
254614	70	56	14	93	79	14
254609	70	59	11	94	82	12
254612	65	59	6	88	82	6
254619	65	63	2	88	86	2



The review of the noise barrier performance identified that the concept noise barriers are predicted to result in compliance at 11 of the 18 triggered properties behind the barriers. Residual exceedances are predicted at one commercial property (to the north of the railway line), at a Scout Hall (to the south) and five residences (to the south). These are attributed to the length limitations of the barriers and gaps due to the presence of the crossing in the area.

There are two residential receivers within 50 m from the rail corridor on the northern side (ID 245609 and ID 254614) where GBN is predicted to be above criteria. With the modelled barriers, the airborne SEM level at the facades facing away from the corridor are predicted to be as low as 74 dB SEM. Assuming a 20 dB façade loss, the resultant internal airborne SEM are still predicted to be the dominant source compared to the internal GBN SEM. The GBN predictions are however recommended to be further reviewed at these properties if barrier designs are progressed at this location.





BORDER TO GOWRIE

Noise Barrier - Yelarbon

Figure 17-4

100 m

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- Sensitive Receptors (Residential)
- Sensitive Receptors (Non-Residential)



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17.4.4 Concept noise barrier mitigation at Pampas

At the Pampas township, the sensitive receptors include three receptors to the north of the railway (near Pampas Road) and four receptors to the south of the railway (near Pysh Road, which is getting realigned at the intersection of Pampas Pit Road). The predicted unmitigated noise levels for Design Year 2040 were above the assessment criteria at these receptors. A noise barrier is not considered practical for the Pampas Memorial Hall or the two residences at the south of the town, due to the proposed realignment of Elsdon Road.

Concept noise barriers were modelled on both sides of the railway. For the barrier to the north of the railway, the length of the barrier is 540 m and a height of 4 m above ground level was assessed. For the barrier to the south of the railway, the length of the barrier is 580 m and a height of 6 m above ground level was assessed.

The noise barriers are shown in **Figure 17-5** along with the individual sensitive receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the number of additional receptors achieving the noise criteria with the noise barrier mitigation and residual receptors where noise levels remained above the criteria are summarised in **Table 17-8**.

Table 17-8 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (5 triggers)	0 (7 triggers)
With barriers	5 (0 residual triggers)	7 (0 residual triggers)

The predicted noise reductions for each considered barrier height are detailed in **Table 17-9**. The table presents the number of receptors within each noise reduction category.

Table 17-9 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With barrier	Predicted reduction	Without barrier	With barrier	Predicted reduction
260119	60	56	4	84	79	5
260150	59	56	3	83	79	4
260154	67	57	10	90	80	10
260169	62	56	6	85	79	6
260170	62	58	4	86	80	6
260189	63	57	6	87	81	6
260213	65	59	6	89	82	7

The review of the noise barrier performance identified that the concept noise barriers are expected to result in compliance at all of the nearby sensitive receptors with Interim Guideline criteria.

The Leq results show residual exceedance with sleep disturbance thresholds (55 dB LAeq,8hr) by 1 – 4 dBA. The barrier design should be further reviewed and optimised during detailed design to also further minimise any sleep disturbance effects where reasonable and practicable.





BORDER TO GOWRIE

Noise Barrier - Pampas

Figure 17-5

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

- Rail Alignment/ Centreline
- Crossing Loops
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- Noise Barrier
- Sensitive Receptors (Residential)
- Sensitive Receptors (Non-Residential)



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17.4.5 Concept noise barrier mitigation at Brookstead

The sensitive receptors at Brookstead are to the north-west of the alignment with the nearest receptors approximately 110 m from the main line track. The predicted unmitigated noise levels for Design Year 2040 identified 15 sensitive receptors (eleven residential, two community and two buildings within the Brookstead State School) where noise levels were above the assessment criteria.

The noise levels are influenced by the train passbys on the main line and noise sources associated with the active level crossing proposed for Mann Silo Road. A potential noise barrier would need to stop with appropriate clearance either side of Mann Silo Road to maintain road access and meet relevant railway safety and access requirements.

Any openings or gaps within the noise barrier structure would not fully obstruct the line of sight between the nearby receptors and the railway line, which can result in little or no screening of noise emissions at nearby sensitive receptors. Note that the need for a break in the noise barrier associated with the realignment of the Brookstead Scrubby Road has been allowed for in this assessment (see **Figure 17-6**).

A concept noise barrier was modelled to the north of the railway. The noise barrier alignment was considered in two sections due to the location of the proposed Mann Silo Road realignment. In total, the concept noise barrier is approximately 1,500 m in length and a barrier height of 4 metres above ground level was assessed.

The noise barrier is shown in **Figure 17-6** along with the individual sensitive receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the number of additional receptors achieving the noise criteria with the noise barrier mitigation and residual receptors where noise levels remained above the criteria are summarised in **Table 17-10**.

Table 17-10 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (11 triggers)	0 (15 triggers)
With barriers	11 (0 residual triggers)	15 (0 residual triggers)

The predicted noise levels with and without noise barriers are detailed in **Table 17-11**.

Table 17-11 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 4m barrier	Predicted reduction	Without barrier	With 4m barrier	Predicted reduction
261493	61	56	5	84	78	6
261638	60	56	4	83	78	5
261639	61	56	5	84	78	6
261665	60	56	4	84	79	5
261686	63	58	5	86	79	7
261687	61	56	5	84	78	6
261703	61	57	4	84	78	6
261720	63	57	6	86	78	8
261729	63	57	6	87	78	9
261739	63	57	6	87	78	9
261749	63	57	6	87	78	9



Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 4m barrier	Predicted reduction	Without barrier	With 4m barrier	Predicted reduction
261795	63	56	7	86	78	8
261908	63	56	7	87	79	8
261969	62	55	7	86	78	8
2008446	65	60	5	88	81	7

The review of the noise barrier performance identified that the concept noise barrier is expected to result in compliance with Interim Guideline criteria at all of the nearby sensitive receptors. Note that the most of the residual noise levels are also predicted to be within 2 dB of the night-time sleep disturbance threshold (55 dB $L_{Aeq,8hr}$). The barrier heights are therefore recommended to be further evaluated during detailed design to assess the ability to further reduce the L_{eq} levels if necessary.





BORDER TO GOWRIE

Noise Barrier - Brookstead

Figure 17-6

100 m

Coordinate System: GDA 1994 MGA Zone 56

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- Noise Barrier
- Sensitive Receptors (Residential)
- Sensitive Receptors (Non-Residential)



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17.4.6 Concept noise barrier mitigation at Pittsworth

At Pittsworth the alignment, in a west to east direction, comes from elevated track on a bridge crossing the new road alignment, onto a newly constructed embankment and down into a cutting that is adjacent to the nearest sensitive receptors, and back up on the embankment again. The triggered receptors consist of two individual dwellings, the Pittsworth District Assembly of God and two buildings at the Pittsworth Motor Inn.

A concept noise barrier was modelled to the north of the railway, between Oakey Pittsworth Road and Lochaber Road. This barrier is 1,120 m in length and a barrier height of 4 m above ground level was assessed.

The noise barrier is shown in **Figure 17-7** along with the individual sensitive receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the number of additional receptors achieving the noise criteria with the noise barrier mitigation and residual receptors where noise levels remained above the criteria are summarised in **Table 17-12**.

Table 17-12 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (0 triggers)	0 (5 triggers)
With barriers	0 (0 residual triggers)	5 (0 residual triggers)

The predicted noise reductions for each considered barrier height are detailed in **Table 17-13**. The table presents the number of receptors within each noise reduction category.

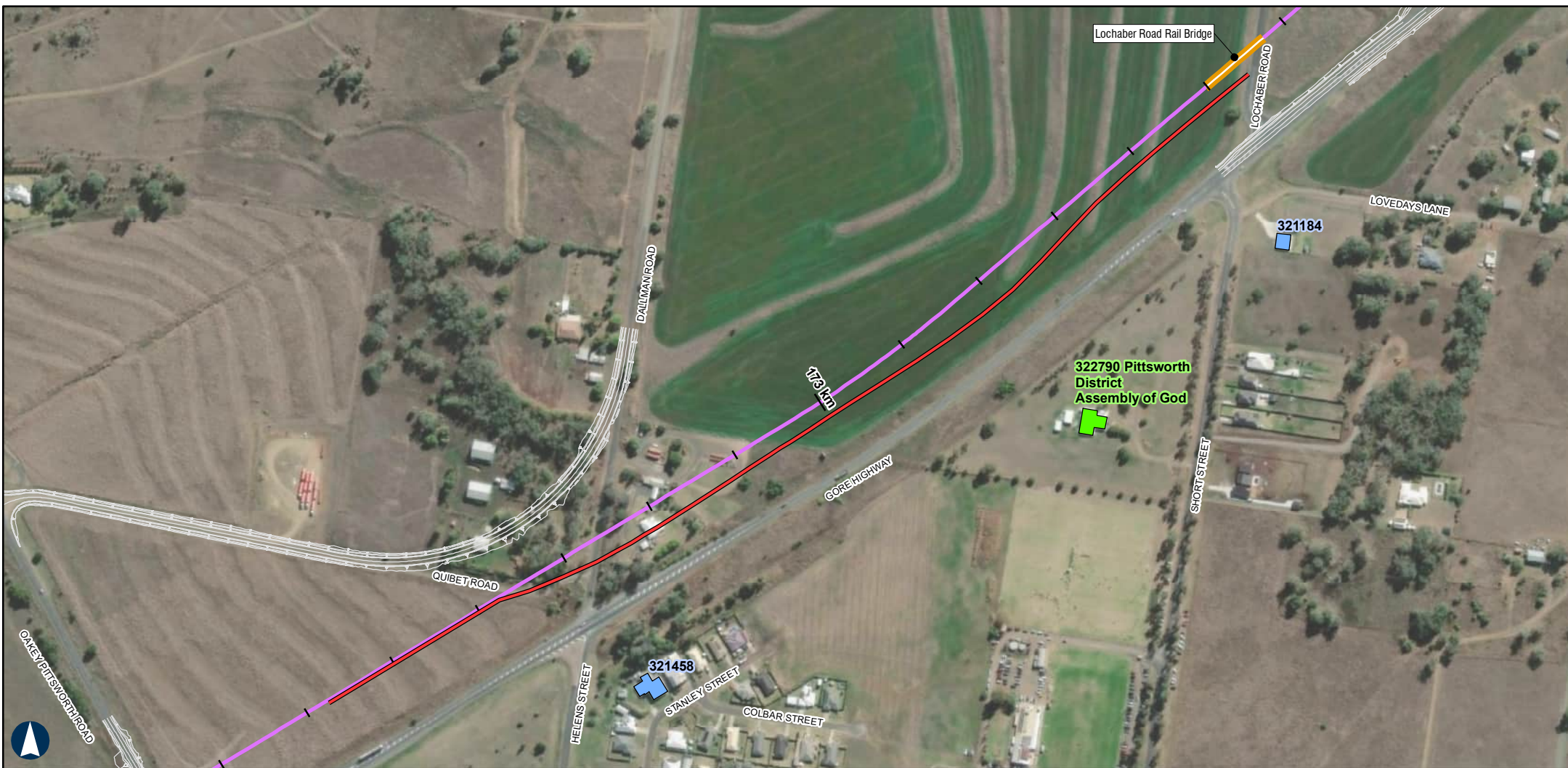
Table 17-13 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 4m barrier	Predicted reduction	Without barrier	With 4m barrier	Predicted reduction
320889	59	58	1	83	81	2
321618	60	58	2	83	81	2
321458	60	55	5	83	79	4
322790	59	54	5	83	78	5
321184	60	55	5	84	79	5

The review of the noise barrier performance identified that the concept noise barrier is expected to result in compliance with Interim Guideline criteria at all of the nearby sensitive receptors.

The Leq results show residual exceedance with sleep disturbance thresholds (55 dB LAeq,8hr) by up to 3 dBA. The barrier design should be further reviewed and optimised during detailed design to also further minimise any sleep disturbance effects where reasonable and practicable.





BORDER TO GOWRIE

Noise Barrier - Pittsworth

Figure 17-7

100 m

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Date: 18-Oct-2024

Author: JG

- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Noise Barrier
- + Sensitive Receptors (Residential)
- + Sensitive Receptors (Non-Residential)



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17.4.7 Concept noise barrier mitigation at Gowrie

The sensitive receptors at Gowrie are to the south of the alignment with the triggered receptors being located 60 m to 170 m from the railway. The predicted unmitigated noise levels for Design Year 2040 identified three residential receptors where noise levels were above the assessment criteria. At the receptor to the west of Leeson's Road (ID 315421), a noise barrier was deemed not practical, due to the proposed road realignment.

A concept noise barrier was modelled for the two residences east of Leeson's Road. This barrier is 610 m in length and a barrier height of 4 m above ground level was assessed.

The noise barrier is shown in **Figure 17-8** along with the individual sensitive receptors where noise levels are above the assessment criteria. For the predicted Design Year 2040 noise levels, the number of additional receptors achieving the noise criteria with the noise barrier mitigation and residual receptors where noise levels remained above the criteria are summarised in **Table 17-14**.

Table 17-14 Sensitive receptors triggering noise criteria

Scenario	Receptors mitigated to below the LAeq criterion	Receptors mitigated to below the SEM criteria
Without barriers	0 (2 triggers)	0 (2 triggers)
With barriers	2 (0 residual triggers)	2 (0 residual triggers)

The predicted noise reductions for each considered barrier height are detailed in **Table 17-15**. The table presents the number of receptors within each noise reduction category.

Table 17-15 Noise levels at sensitive receptors

Receptor ID	Leq noise level			SEM noise level		
	Without barrier	With 4m barrier	Predicted reduction	Without barrier	With 4m barrier	Predicted reduction
315319	61	59	2	85	82	3
315262	61	57	4	84	80	4

The review of the noise barrier performance identified that the concept noise barrier is expected to result in compliance with Interim Guideline criteria at two of the three sensitive receptors in the area.

The Leq results show residual exceedance with sleep disturbance thresholds (55 dB LAeq,8hr) by 2 – 4 dBA. The barrier design should be further reviewed and optimised during detailed design to also further minimise any sleep disturbance effects where reasonable and practicable.





BORDER TO GOWRIE

Noise Barrier - Gowrie

Figure 17-8

100 m

Coordinate System: GDA 1994 MGA Zone 56

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- Rail Alignment/ Centreline
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- Sensitive Receptors (Residential)
- Sensitive Receptors (Non-Residential)



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17.4.8 Summary of the concept noise barrier mitigations

In summary, the review of concept noise barrier mitigation options concluded:

- Yelarbon: Barriers to the north and south of the railway with heights of 6 m were investigated. These barriers are predicted to result in compliance with Interim Guideline at 11 of the 18 triggered properties behind the barriers. Residual excesses are predicted at one commercial property (to the north of the railway line), at a Scout Hall (to the south) and five residences (to the south).
- Brookstead: Barriers to the north of the railway with heights of 4 m were investigated. These barriers are expected to result in compliance at all of the nearby sensitive receptors.
- Pittsworth: A barrier to the north of the railway with a height of 4 m was investigated. This barrier is expected to result in compliance at all of the nearby sensitive receptors.
- Gowrie: A barrier to the south of the railway with a height of 4 m was investigated. This barrier is expected to result in compliance at two of the three sensitive receptors in the area.
- Kurumbul: Barriers to the north of the railway with heights of 6 m were investigated. These barriers are expected to result in compliance at all of the nearby sensitive receptors except for ID 254168 (due to the gap in the barrier for South Kurumbul Road).
- Pampas: A barrier to the north of the railway with a height of 4 m was investigated, along with a barrier to the south with a height of 6 m. These barriers are expected to result in compliance at all of the nearby sensitive receptors.

In reviewing these barriers during detailed design by considering other environmental and engineering factors, night-time sleep disturbance effects should also be considered subject to further modelling.

17.5 Property Treatment

The application of at-property treatments will be on a case-by-case basis where the railway noise criteria (Interim Guideline and sleep disturbance thresholds, subject to further review) are not met, following the implementation of all other reasonable and practicable noise attenuation measures (such as noise barriers). This includes all triggered receptors outside the locations where noise barriers and other physical mitigation measures would be installed. Additionally, at-property treatments will be considered for any residual triggers where noise levels remain above the limits, even with noise barriers in place.

At-property treatments would be applied for varying levels of noise exceedance at sensitive receptors and may consist of a combination of measures. The following table (**Table 17-16**) provides example property treatments that could be implemented based on the predicted or measured railway noise levels. Any Queenslander-type houses will be reviewed on a case-by-case basis depending on their build quality, year (current thermal provisions), materials,



etc. and mitigation will be developed accordingly in the context of the level of mitigation required so far as reasonable and practicable.

Table 17-16 Example at-property treatment packages

Scenario	Predicted Noise Level ³	Example Treatment Package ¹
All	Does not exceed criterion/threshold levels	No treatment required.
New Railway Projects	Exceeds criterion/threshold by up to 5 dBA	• A ventilation system (air con, evaporative or mechanical) that meets building code of Australia requirements with the windows and doors shut⁵ • Upgrading windows with 10.38mm laminate glazing and acoustic rated seals • External solid core doors with surface mounted moulds minimum 40mm and provide acoustic rated seals • Fill minor gaps in eaves/external façade • Ceiling fans Other treatments may include: • Upgrades to existing property boundary fencing² • Vegetation⁴
	Exceeds criterion/threshold by more than 5 dBA	• A ventilation system (air con, evaporative or mechanical) that meets building code of Australia requirements with the windows and doors shut⁵ • Upgrading windows with 10.38mm laminate glazing and acoustic rated seals • External solid core doors with surface mounted moulds minimum 40mm and provide acoustic rated seals • Fill minor gaps in eaves/external façade • Appropriately treating the sub-floor • Sealing of wall vents, underfloor below the bearers and eaves • Upgrade façade constructions where applicable. This may include wall insulation (e.g. R2.7 90mm thick) and re-sheeting of lightweight wall construction • Ceiling insulation (e.g. R4.0 215mm thick) • Ceiling fans Other treatments may include: • Upgrades to existing property boundary fencing² • Vegetation⁴

1 – for habitable rooms (i.e. not garages, laundries, bathrooms) where the external façade is exposed to noise levels above the criteria.

2 – this may be the only treatment applied to buildings that are unsafe or in a state of disrepair

3 – based on Design Year 2040 predictions (absolute noise levels) – LAeq , SEM or night-time LAeq (subject to further review).

4 – seedlings or plants to provide a visual barrier. Sparse vegetation provides no acoustic benefit

5 – where any existing systems are more than 5 years old

17.6 Mitigation for low frequency noise

Low frequency energy content exists in overall noise emissions from road and rail noise corridors, especially when the traffic consists of diesel-powered vehicles. In the context of freight rail, low frequency noise (below 200 Hz) is typically emitted from locomotive exhaust. However, the overall noise emissions within the same passby also have energy content in the mid and high frequency range driven by locomotive casing, wagons, wheel and rail radiations, which are more sensitive to human ears. In this regard, it must be acknowledged



that low frequency content in overall noise is generally a common feature in freight train noise levels and are prevalent in all freight and multimodal corridors in Queensland. Moreover, low-frequency noise levels are short-term and intermittent in nature as they are only prominent for short period at a time when the train would passby, and is not a constant feature from the rail corridor.

It is however acknowledged that when low frequency noise content is excessive in magnitude and also dominant in an unbalanced spectrum, there may be a potential to cause annoyance to the community. **Appendix H** presents the A-weighted noise levels and C-weighted noise levels to better appreciate the overall magnitude and dominance of low frequency effects.

There are no statutory limits for low frequency noise emissions from trains. Generally, the 'C minus A' weighted level of at least 15 dB is considered as a threshold to establish low frequency noise prominence¹⁷. In addition to evaluating low-frequency prominence, an absolute night-time external maximum of L_{Ceq} of 55-60 dB is suggested in a research review¹⁸. Based on the review of results presented in **Table H.2**, it is evident that low frequency noise is more prominent at distances of 250 m and beyond, but the overall L_{Ceq} levels are not estimated to be significantly high. Where noise barriers may be considered, low frequency noise may be prominent from much shorter offset distances (within 50 m). However, the presence of barriers is also found to reduce the overall A-weighted and C-weighted noise levels. In this regard, concept noise barriers presented in **Section 17.4** would assist in minimising overall noise emissions and provide broader noise benefits.

Irrespective of the predicted low frequency effects and their evaluation benchmarks, reasonable and feasible mitigation options for low frequency noise can be considered. However, the following limitations are noted in reducing low frequency dominance:

- Noise barriers are generally an effective path control to minimise noise emissions from rail corridors. However, noise barriers provide greater attenuation at higher frequencies and minimal attenuation to lower frequencies, thereby making the resultant low frequency noise more prominent.
- At-property treatments (as discussed in **Section 17.5**) are general best industry practice. Façade constructions typically do not offer significant reductions at lower frequencies, especially below 50 Hz. Subject to the external and internal lining, and associated framing, there may also be mass-air-mass resonances at lower frequencies making it challenging to attenuate low-frequency noise and making the resultant spectrum potentially unbalanced.

Considering the above, locomotive source control is regarded as the most effective way to minimise low frequency noise in the form of bespoke exhaust silencers and engine noise control. However, this would require all rail operators to undertake locomotive redesign and upgrade programs to minimise low frequency noise.

Inland Rail are unable to mandate such requirements to rail operators. However, all new locomotives that enter the Project section from NSW are subjected to locomotive noise limits under the rail operators' NSW Environmental Protection Licences (EPLs). These EPLs mandate both A-weighted and linear (Z-weighted) noise limits for all idling and throttling conditions for new locomotives in order to minimise low-frequency dominance at the source. This would inherently result in minimising low-frequency dominance in the B2G corridor, including the crossing loops and gradients (as the movements are dominated by trains that travel from/to NSW). Inland Rail would also support such mandates to rail operators in

¹⁷ NSW Noise Policy for Industry, 2018

¹⁸ N. Broner, A Simple Outdoor Criterion for Assessment of Low Frequency Noise Emission, Acoustics Australia 39, 1-7, April 2011.



Queensland if they were implemented by DTMR/DES on new locomotive noise levels to progressively minimise low frequency noise emissions on rail corridors in Queensland.

17.7 Mitigation for ground-borne vibration and ground-borne noise

Based on the proximity of the sensitive receptors to the rail corridor, the assessment has identified that the potential ground-borne vibration and ground-borne noise levels would comply with the Interim Guideline criteria at all sensitive receptors.

Notwithstanding, if there are potential ground-borne noise impacts confirmed during detailed design, a range of vibration control measures, such as rail pads, could be investigated to dampen the vibration energy at source and reduce the potential for vibration induced impacts at nearby sensitive receptors.

The assessment of potential vibration induced impacts to non-Indigenous cultural heritage items identified the following should be subject to a structural survey where the property and structures are determined to be within 20 m of the outer rail. The majority of these sites are within the existing railway corridor and in some cases may be resumed during the construction of the Project.

- Yelarbon Railway Complex
- Grass Tree Creek Bridge
- Yandilla Station
- Condamine River Bridge
- Pampas Station
- Sheds opposite the Millmerran Branch Line
- Condamine Rail Bridge 2
- Green Hills complex shed.

It is recommended that further assessment is undertaken during detailed design phase to verify these assessment outcomes. This can be supplemented by additional ground-borne vibration and ground-borne noise assessment and analysis for existing railway operations on other sections of the Inland Rail program.

In the event the detailed assessment or verified (measured) ground-borne noise levels triggers an investigation of mitigation measures for ground-borne noise, options for mitigation include the use of more resilient track support pads, under-sleeper pads and under ballast matting. The effectiveness of measures such as rail pads and rail dampers may be significantly limited by the stiffness of the track and concrete sleepers, the forces exerted by the passage of heavy rail freight and the long-term durability and maintenance of such measures. Final noise mitigation options will need to be evaluated and confirmed having regard to cost, performance and effectiveness. The assessment however recommends the resilient matting for retention of ballast on bridge and viaduct structures are retained.

17.8 Operational Noise and Vibration Management Plan

The management of noise and vibration during project operations will be administered by an Operational Noise and Vibration Management Plan (ONVMP) as a component of the Operations Environmental Management Plan (EMP). The ONVMP will define the processes, responsibilities and confirm the noise and vibration mitigation measures that would be implemented during the operational phase of the Project. The ONVMP will provide the



structured approach to the management of noise and vibration issues with the objective of supporting delivery of the project in a manner that maintains human health and wellbeing by ensuring a suitable acoustic environment. The ONVMP will be developed by the Proponent (ARTC) and consistent with Conditions of approval and all relevant laws, prior to the commencement of relevant Project works.

The ONVMP will present updated results of the noise and vibration impact assessment based on the confirmed final Project design and verify the findings of this assessment. The plan will demonstrate the management of noise and vibration from the operation of the Project consistent with the requirements of Interim guidelines and other applicable legislative and Project requirements. Requirements of monitoring during project operations will be provided (as described in **Section 17.9**) to inform the management of potential impacts and confirm the application of reasonable and practicable noise and vibration management measures. The performance of the Project operations will be monitored and managed in accordance with the ONVMP, with periodic reporting as appropriate.

17.9 Validation of noise and vibration levels during operation

A programme of noise and vibration monitoring is recommended to be undertaken within twelve months of the commencement of Inland Rail operations on the Project. The validation programme will be detailed in the ONVMP. The purpose of the monitoring surveys shall be to:

- Quantify the rail noise and vibration levels from the daily rail operations and determine the $L_{Aeq, 24hr}$, $L_{Aeq, 8hr}$ and SEM rail noise levels at the most affected sensitive receptors.
- Assess the Project's compliance with any relevant conditions of approval relating to noise and vibration emissions from the operation of the Project.
- Provide an assessment of the effectiveness of any noise and vibration management and mitigation measures implemented on the Project.
- Identify, if required, further noise and vibration mitigation measures to meet the Interim Guideline thresholds and relevant conditions of approval.
- The recommendations below have been developed to assist the preparation of a noise and vibration monitoring plan:
- Noise and vibration monitoring shall be undertaken in accordance with the requirements of the Interim Guideline.
- Provide a monitoring strategy consistent with the requirements of relevant acoustic standards and guidelines for monitoring environmental and transport noise and vibration.
- Plan and schedule the monitoring surveys with consideration to:
 - The rail movements during each daytime and night-time period. The survey period shall include the days during which the highest number of train movements would be expected and cover a period of consecutive days to be representative of typical operations. Monitoring should ideally be undertaken during seasonal peaks where there are more train movements. If that is not feasible, the measured levels must be adjusted to account for possible additional train traffic during seasonal variations.
 - Future traffic growth. Measured levels should also be mathematically extrapolated using relevant prediction algorithms to account for the future design year traffic flows, and further modelling may be carried out to support this extrapolation.
 - At locations free from localised buildings and structures (other than noise barriers) that may screen or reflect noise.



- The condition of the rails and other rail infrastructure.
- Weather conditions during the monitoring periods.
- Monitoring should be conducted at the sensitive receptors with the potential for the highest received noise and vibration levels from rail operations.
- Where feasible, noise levels should be assessed 1 m in front of the most affected building façade. Where noise levels are monitored in the free-field a +2.5 dBA correction should be considered to adjust the free-field level for a noise level at the building façade.
- Should monitoring be required within a property, the noise monitoring would be conducted at the centre of the habitable room that is most exposed to noise from rail operations.
- Vibration shall be monitored in the three axes representing horizontal, vertical and axial direction of displacement (movement). Vibration shall be monitored as the Peak Particle Velocity (mm/s) and vibration acceleration (m/s^2).
- If required, reference the monitored noise levels to update the predicted rail noise levels and re-assess rail noise and vibration levels at the sensitive receptors aligning the Project.
- If the noise and/or vibration levels are above the applicable criteria at any sensitive receptors, allowing for any monitoring and compliance tolerances, the key sources of rail noise and contributing factors (e.g. rail defects, excessive rail roughness levels, turnouts, locomotive engine exhausts) shall be identified to inform the investigation of reasonable and practicable mitigation measures.

The results of the monitoring surveys are to be applied, as required, to revise and update the rail noise and vibration predictions for the rail operations with suitable validation of inputs and model. In this regard, the validated noise and vibration levels can be applied to continually refine the conservatism and uncertainty in the predictions and support the selection of reasonable and practicable mitigation measures.

18.0 Residual impacts

The rail noise and vibration assessment criteria implemented by DTMR are designed to manage aspects such as environmental harm and nuisance. The intent of the criteria is to identify where reasonable and practicable noise mitigations should be implemented to manage the potential for impacts consistent with best practice for environmental management.

The criteria do not require noise from railway operations, including where noise mitigation is implemented, to be inaudible at sensitive receptors. The potential for annoyance or disturbance from rail noise is subjective and can remain a potential impact even where noise mitigation is implemented, and noise levels are well within the noise criteria.

The reasonable and practicable noise mitigation for the Project is expected to be at-property treatments for sensitive receptors outside the towns of Kurrumbul, Yelarbon, Pampas, Brookstead, Pittsworth, and Gowrie where physical mitigation such as barriers are not expected to be reasonable and practicable. The at-property treatment could include upgrading existing glazing and/or the provision of ventilation system to manage the intrusion of rail noise and maintain internal (indoor) noise amenity within habitable rooms. These treatments do not address the source emission of rollingstock noise or the external (outdoor) rail noise levels within the environment surrounding the rail corridor.

On this basis, the rail noise levels can remain above the external rail noise assessment criteria, and be perceptible, at the sensitive receptors with the implementation of at-property



noise mitigation measures. Notwithstanding, the at-property treatments would be implemented to reduce internal railway noise levels to achieve improvements to the indoor acoustic environment of habitable rooms.

In lieu of the known building construction of the sensitive receptors and the acoustic performance specification of individual at-property treatments, the noise reduction performance is not able to be exactly quantified at this stage. As per recommendations for upgrade works listed in **Table 17-16**, two packages of upgrade works have been listed depending on the level of exceedances predicted. These upgrade works are based on good industry practices and is anticipated to achieve a significant improvement to the noise reduction performance of the building fabric which would be clearly perceivable.

Rail noise barriers have been investigated to control rail noise at sensitive receptors within Kurrumbul, Yelarbon, Pampas, Brookstead, Pittsworth, and Gowrie. The assessment of noise levels with concept noise barriers has identified that, depending on the final extent and height of the noise barriers, the Interim Guideline criteria may be fully achieved at most of the receptors located adjacent to the noise barriers, and also minimise night-time noise levels.

If the established criteria are not met, including with the implementation of reasonable and practicable mitigation measures, the Project will explore additional measures to manage residual noise and vibration impacts. The management of these residual impacts will often be determined by the specific circumstances at individual receptors and is expected to primarily involve at-property treatments to minimise noise intrusion and maintain amenity.

The potential for receptors to exceed the sleep disturbance thresholds will be further investigated in detailed design, and where noise levels are predicted to exceed the established threshold, mitigation in the form of noise barrier upgrades (at the identified locations) and/or at-property treatments will be considered on a case-by-case basis.

The assessment has identified the ground-borne noise and vibration assessment criteria in accordance with the Interim Guideline would be achieved at all of the sensitive receptors. There is potential for ground-borne noise and vibration to be perceptible even where the assessment criteria are achieved at sensitive receptors. However, disturbance or annoyance impacts would not necessarily be experienced based on the relatively low levels of ground-borne noise and vibration predicted at the sensitive receptors.



19.0 Conclusion

The railway operations on the Project have the potential to be a source of airborne noise, ground-borne noise and ground-borne vibration within the environment surrounding the Project. This report has undertaken a conservative assessment of future rail operations and identified where the predicted levels of noise and vibration from the railway operations would achieve assessment criteria and where the levels trigger an investigation of reasonable and practicable mitigation options.

Based on the assessment of potential rail noise levels at 2,388 sensitive receptors, the Interim Guideline noise criteria are achieved at the majority of the sensitive receptors. There are 97 sensitive receptors (82 residential receptors and 15 non-residential receptors) where noise levels trigger a review of mitigation.

Potential sleep disturbance impacts have been assessed using a criterion of 55 dBA Leq,night, which is based on the Australian Government's Department of Health publication, The Health Effects of Environmental Noise, 2018 ('enHEALTH 2018'). Based on the year 2040 scenario, the results of the sleep disturbance assessment are that 169 dwellings are predicted to exceed the threshold, of which 82 dwellings are also predicted to exceed the Interim Guideline criteria. The modelling inputs and assumptions for night-time assessment will be further reviewed and assessed during detailed design including mitigation measures where sleep-disturbance effects are predicted.

The location of the sensitive receptors, the predicted noise levels at each receptor and the principles of Inland Rail's management of noise on the Inland Rail program were reviewed to identify the appropriate noise mitigation options. In addition to source noise controls implemented in the design and construction of the Project, the reasonable and practicable noise mitigation is expected to include noise barriers for the towns of Kurrumbul, Yelarbon, Pampas, Brookstead, Pittsworth, and Gowrie and at-property treatment for all other sensitive receptors.

At-property mitigations can include architectural treatments to control railway noise within the building and upgrades to property fencing. Whether at-property controls or other alternative mitigation options are required will ultimately be determined through the detailed design of the Project. This will include consultation with the property owners, further railway noise modelling and analysis of engineering and environmental constraints. All mitigation measures required based on 2040 design year operations will be in place prior to the commencement of railway operations on the Project. Verification of noise levels once railway operations commence will identify any additional exceedances of the assessment criteria.

Rail noise barriers are recommended as reasonable and practicable measure to control rail noise at sensitive receptors within Kurrumbul, Yelarbon, pampas, Brookstead, Pittsworth, and Gowrie. The assessment of noise levels with concept noise barriers has identified that, depending on the final extent and height of the noise barriers, the Interim Guideline criteria may be fully achieved at majority of the receivers adjacent to the barriers. At-property treatments are recommended to sensitive receptors that do not achieve the Interim Guideline requirements or sleep disturbance night-time thresholds where the Project has implemented rail noise barriers, and this would be determined by Inland Rail subject to further optimisation of the barriers during the detailed design and construction of the Project.

The assessment of ground-borne noise and vibration from railway operations determined that predicted levels would achieve the criteria for ground-borne noise and ground-borne vibration at all sensitive receptors. The assessment recommends the resilient matting for retention of ballast on bridge and viaduct structures are retained. Further detailed investigation should be undertaken at detailed design to verify the outcomes of this



assessment and, if required, the application of additional measures to mitigate ground-borne vibration.

Where the Project achieves the noise and vibration criteria there can still be potential for noise and vibration from railway operations to be audible/ perceptible within the environment.

The airborne noise, ground-borne noise and ground-borne vibration levels will continue to be assessed during the detailed design and construction of the Project.

Where the detailed design remains consistent with this assessment and, allowing for the implementation of recommended noise and vibration mitigation measures, the Project is expected to achieve the objectives set out in the Terms of Reference and DTMR Interim Guideline for the management of railway noise and vibration.



APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix A Adopted sensitive receptors

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT



BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 1 of 63

500 m

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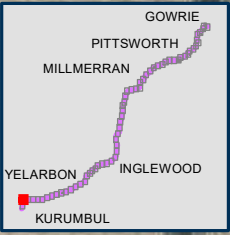
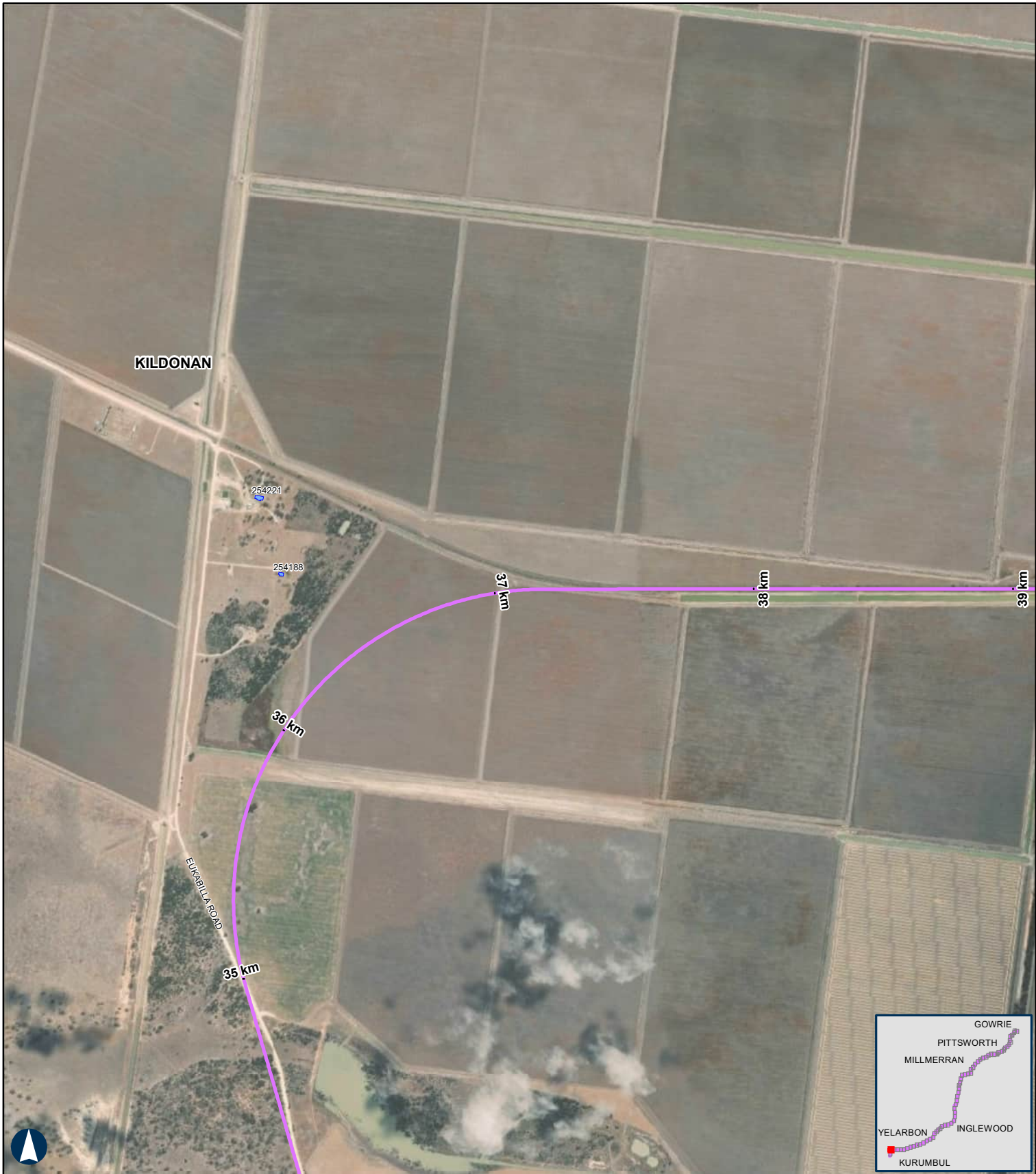
- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

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Sensitive Receptor Type

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Sensitive Receptors

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Author: JG

✗ Level Crossings

— Project Extent

— Crossing Loops

== Bridges and Viaducts

— Rail Alignment/ Centreline

 Koala Habitat Area

Sensitive Receptor Type

 Residential

 Educational

 Community

Commercial

 Parkland

☐ Future Developments

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Sensitive Receptors

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✗ Level Crossings

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

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Sensitive Receptor Type

■ Residential

■ Educational

■ Community

■ Commercial

■ Parkland

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Sensitive Receptors

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- ✗ Level Crossings
- Project Extent
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- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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Sensitive Receptors

APPENDIX A - Map 6 of 63

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- ✗ Level Crossings
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- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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Sensitive Receptors

APPENDIX A - Map 7 of 63

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- ▨ Koala Habitat Area

- Sensitive Receptor Type**
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Sensitive Receptors

APPENDIX A - Map 8 of 63

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- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
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Sensitive Receptors

APPENDIX A - Map 9 of 63

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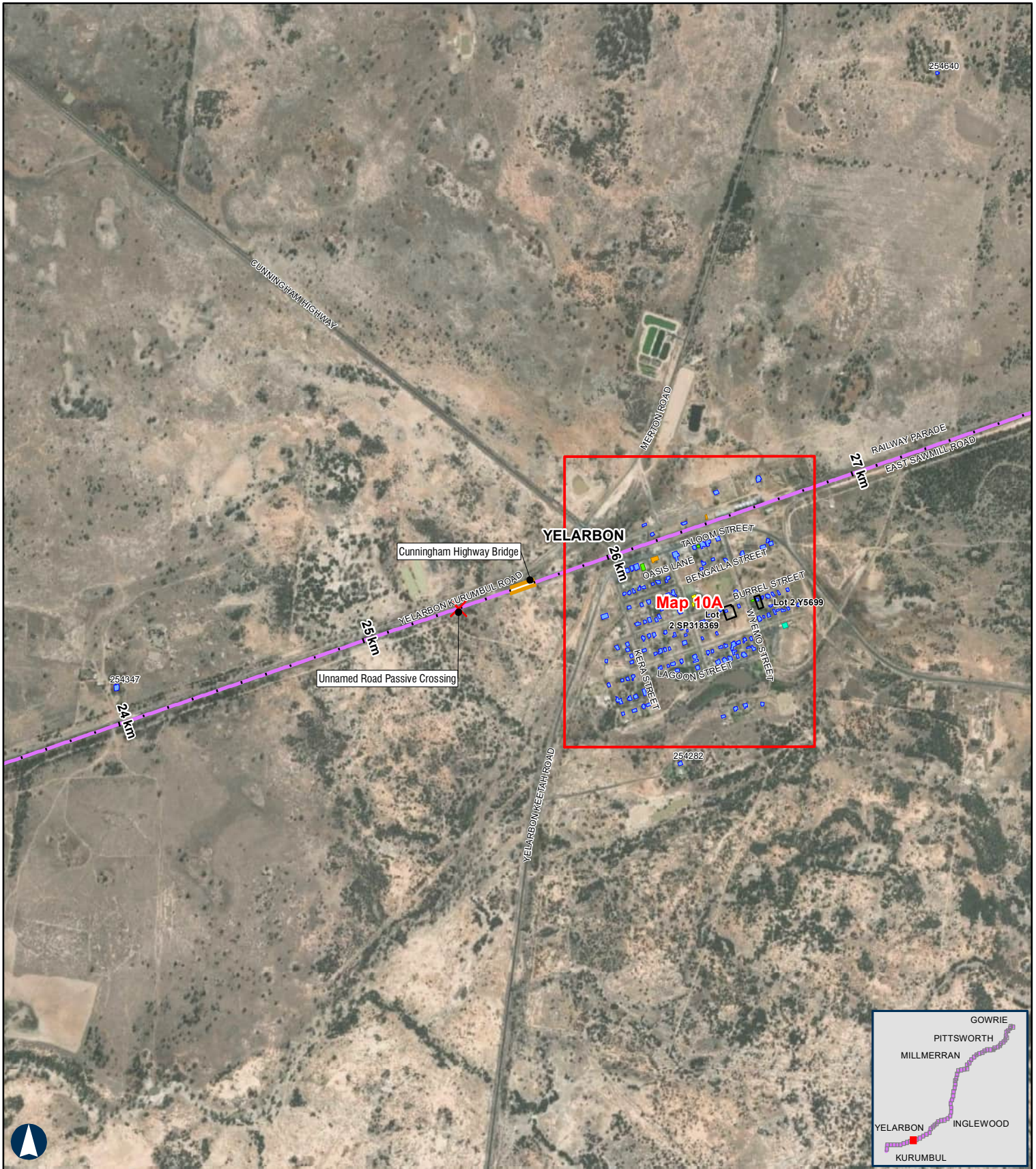
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Sensitive Receptor Type

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Sensitive Receptors

APPENDIX A - Map 10 of 63

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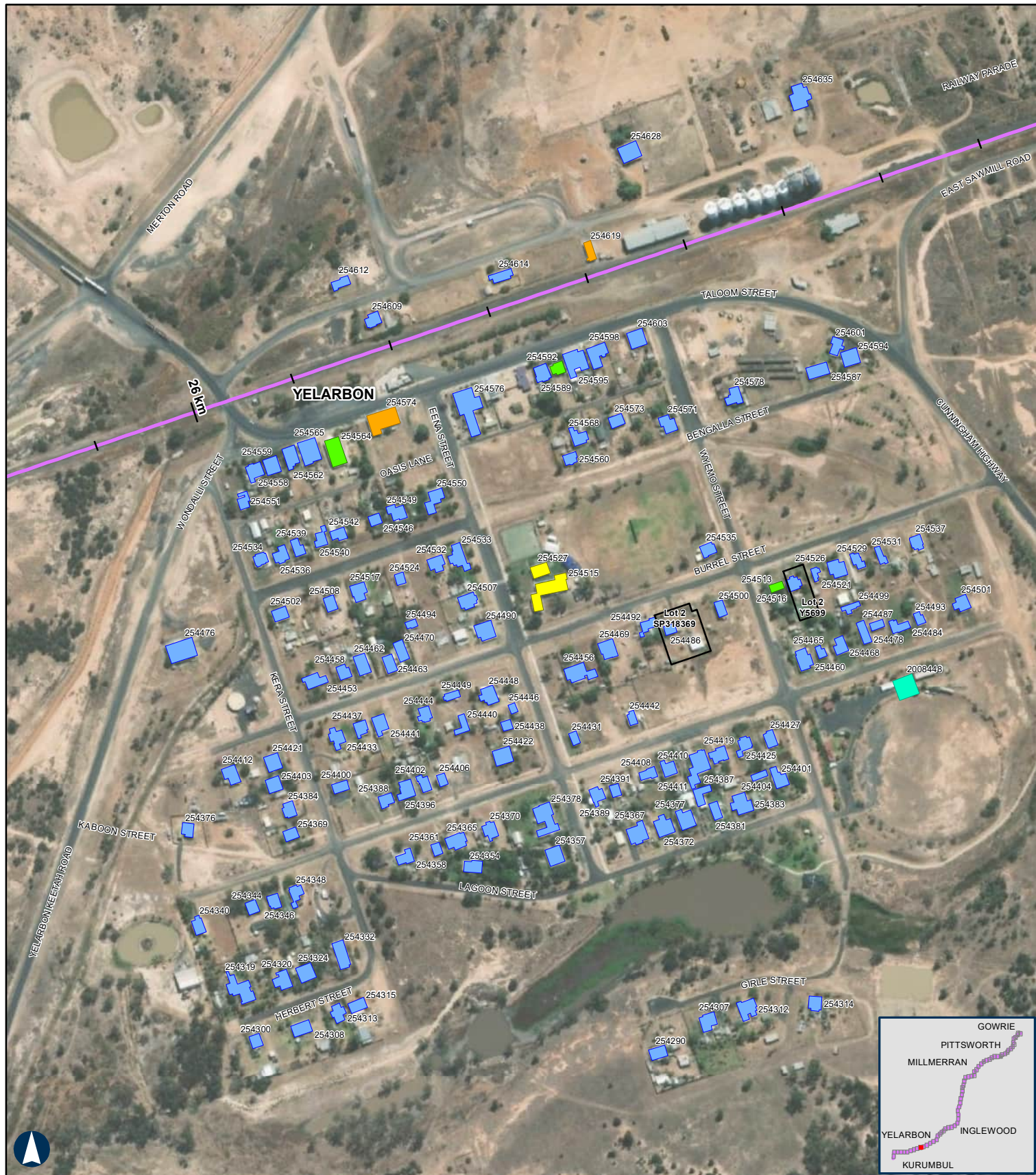
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- Bridges and Viaducts
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- ▨ Koala Habitat Area

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 10A of 63

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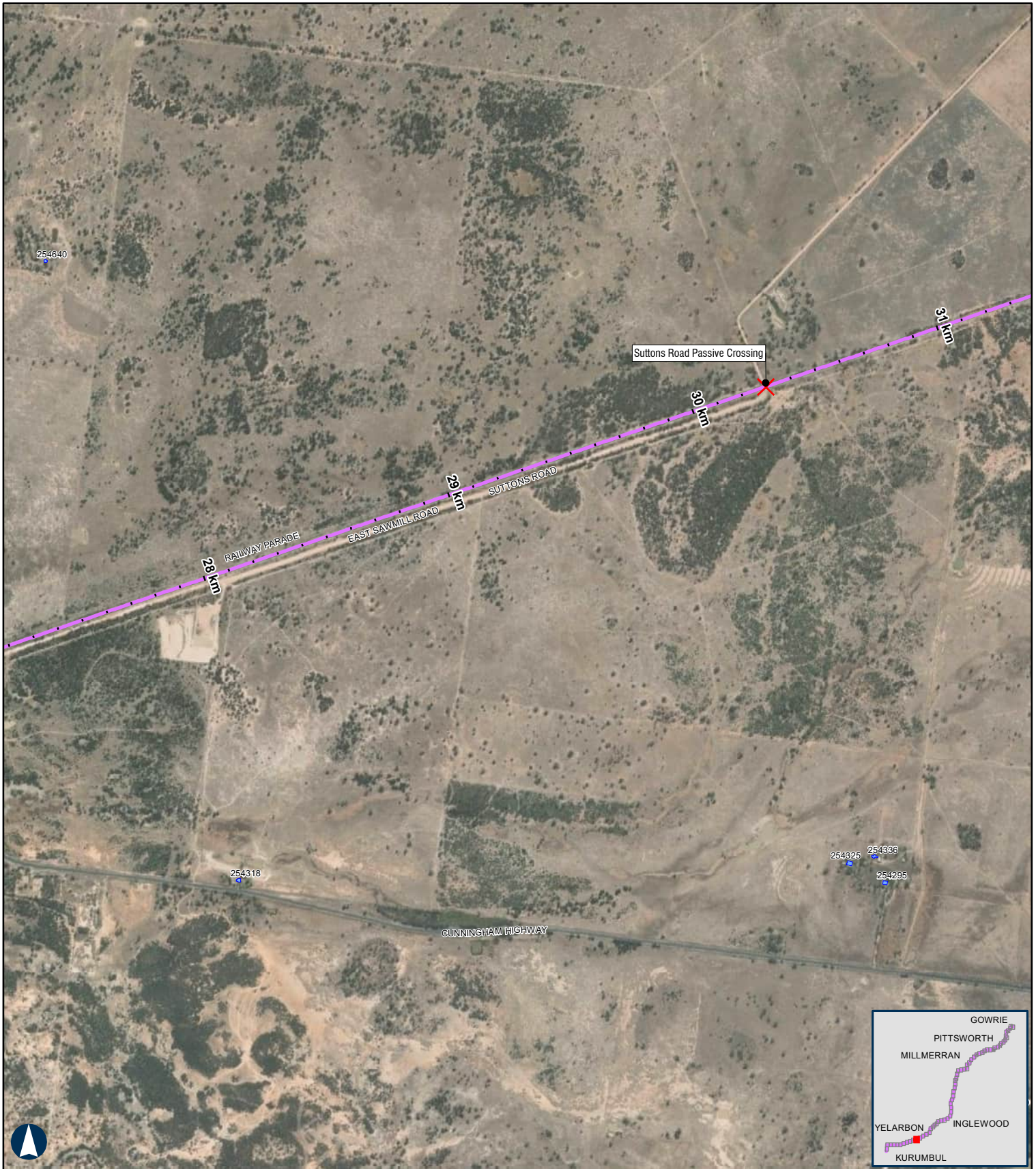
- ✗ Level Crossings
- Project Extent
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Sensitive Receptor Type

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Sensitive Receptors

APPENDIX A - Map 11 of 63

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- ✕ Level Crossings
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- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 12 of 63

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- ▨ Koala Habitat Area

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Sensitive Receptors

APPENDIX A - Map 13 of 63

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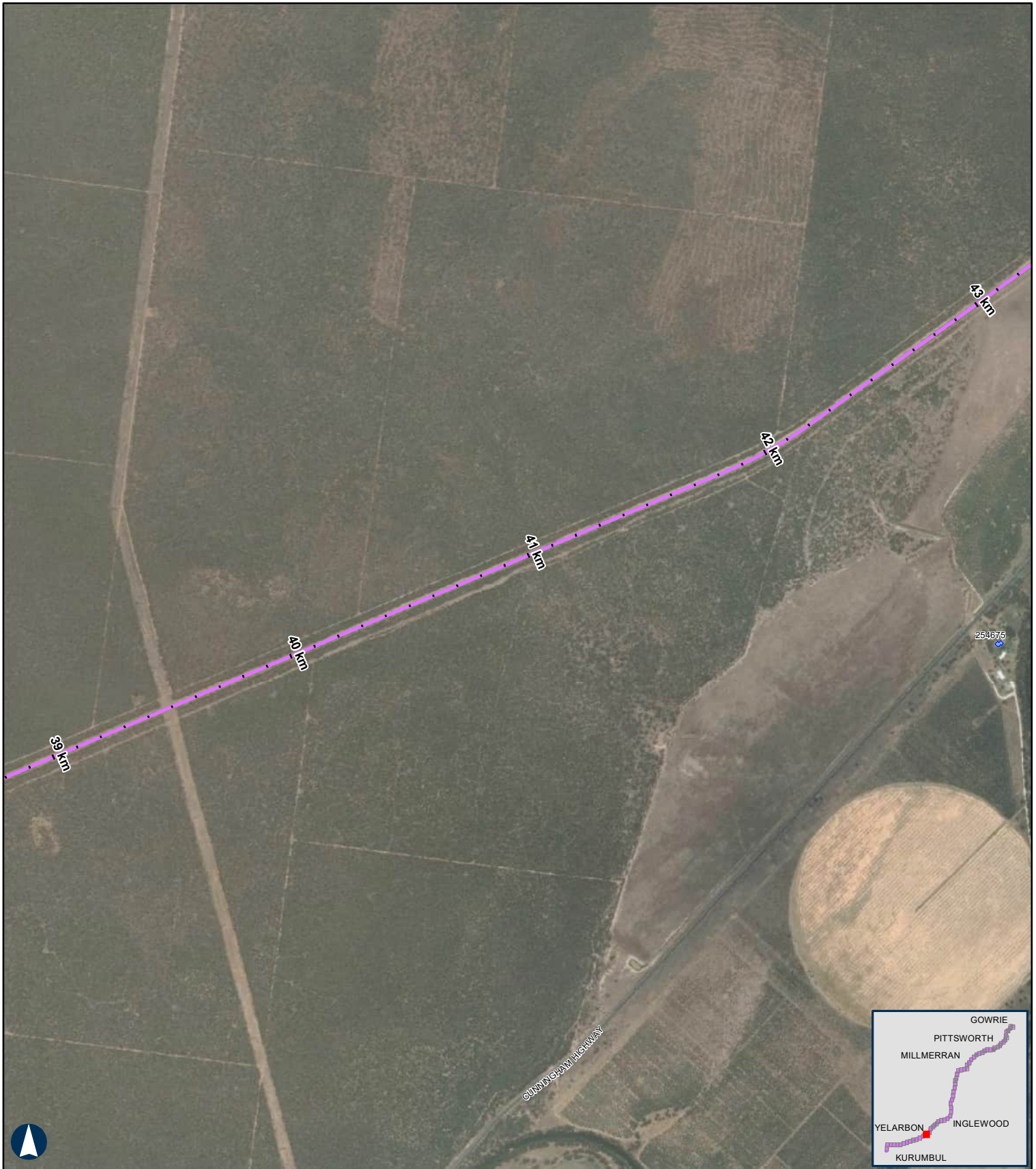
- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 14 of 63

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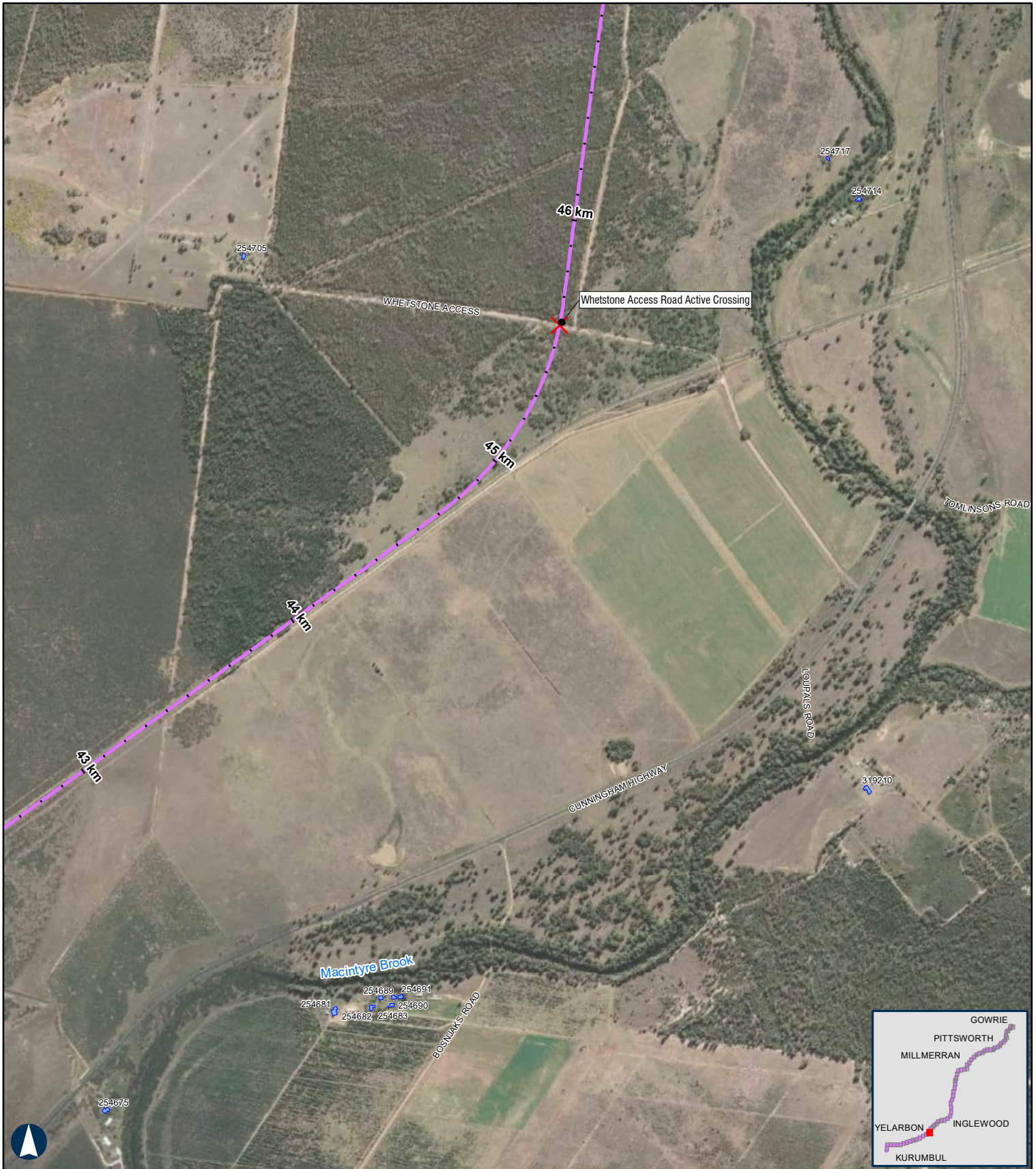
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 15 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A3
Date: 07-Nov-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

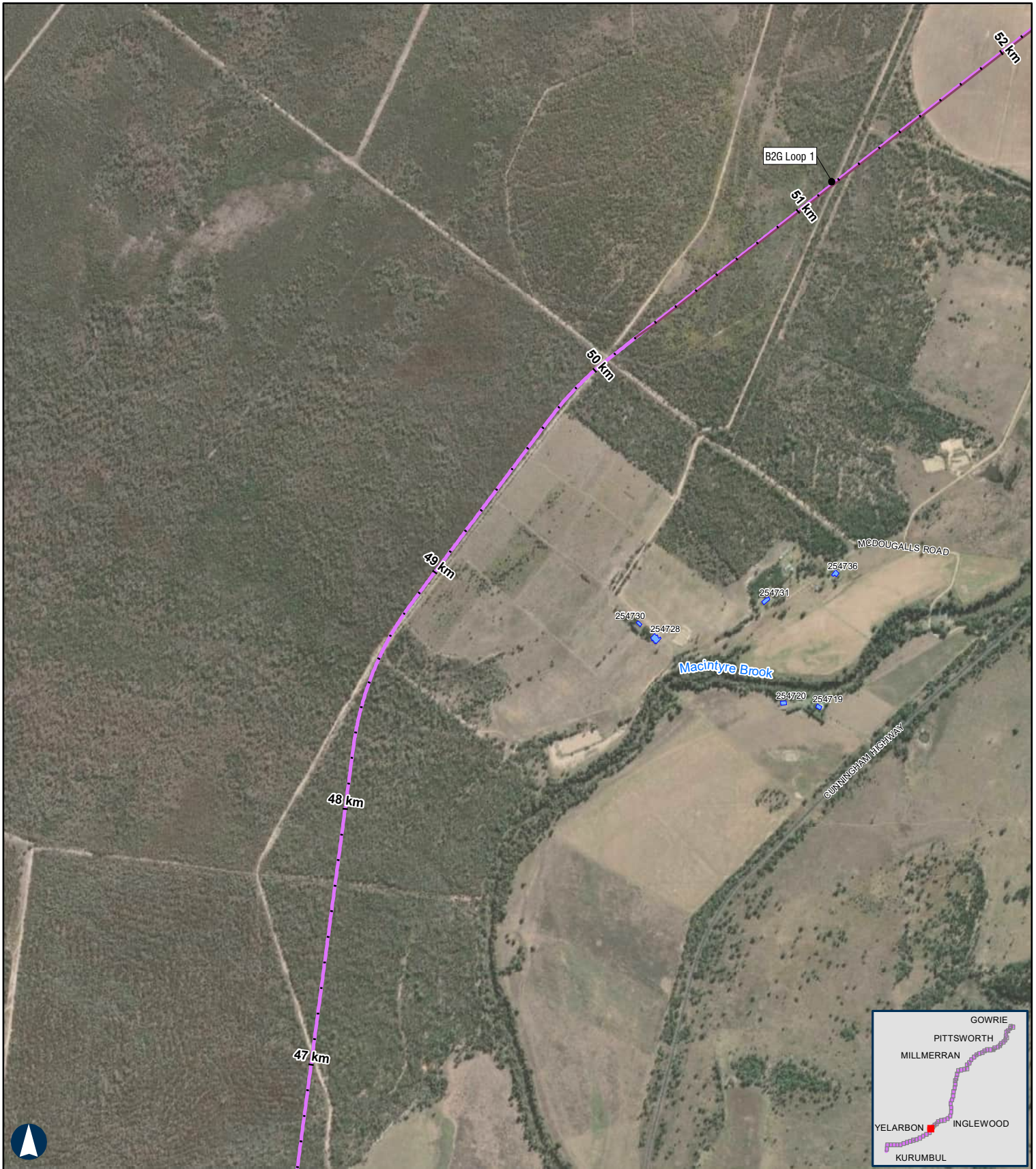
Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
- ▢ Community
- ▢ Commercial
- ▢ Parkland
- ▢ Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 16 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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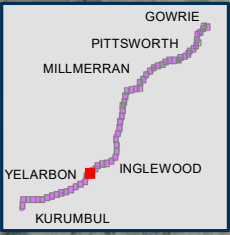
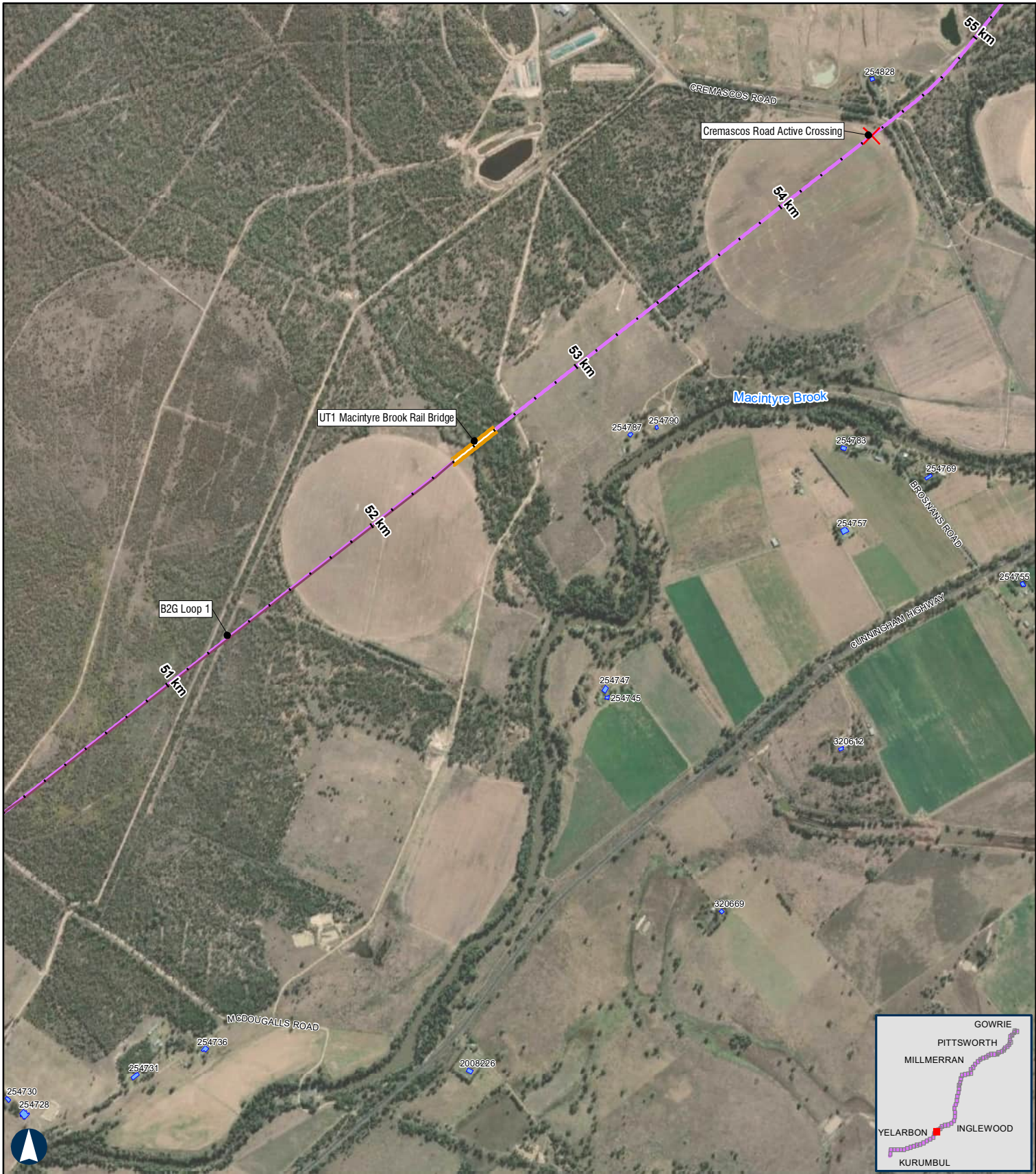
- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

500 m

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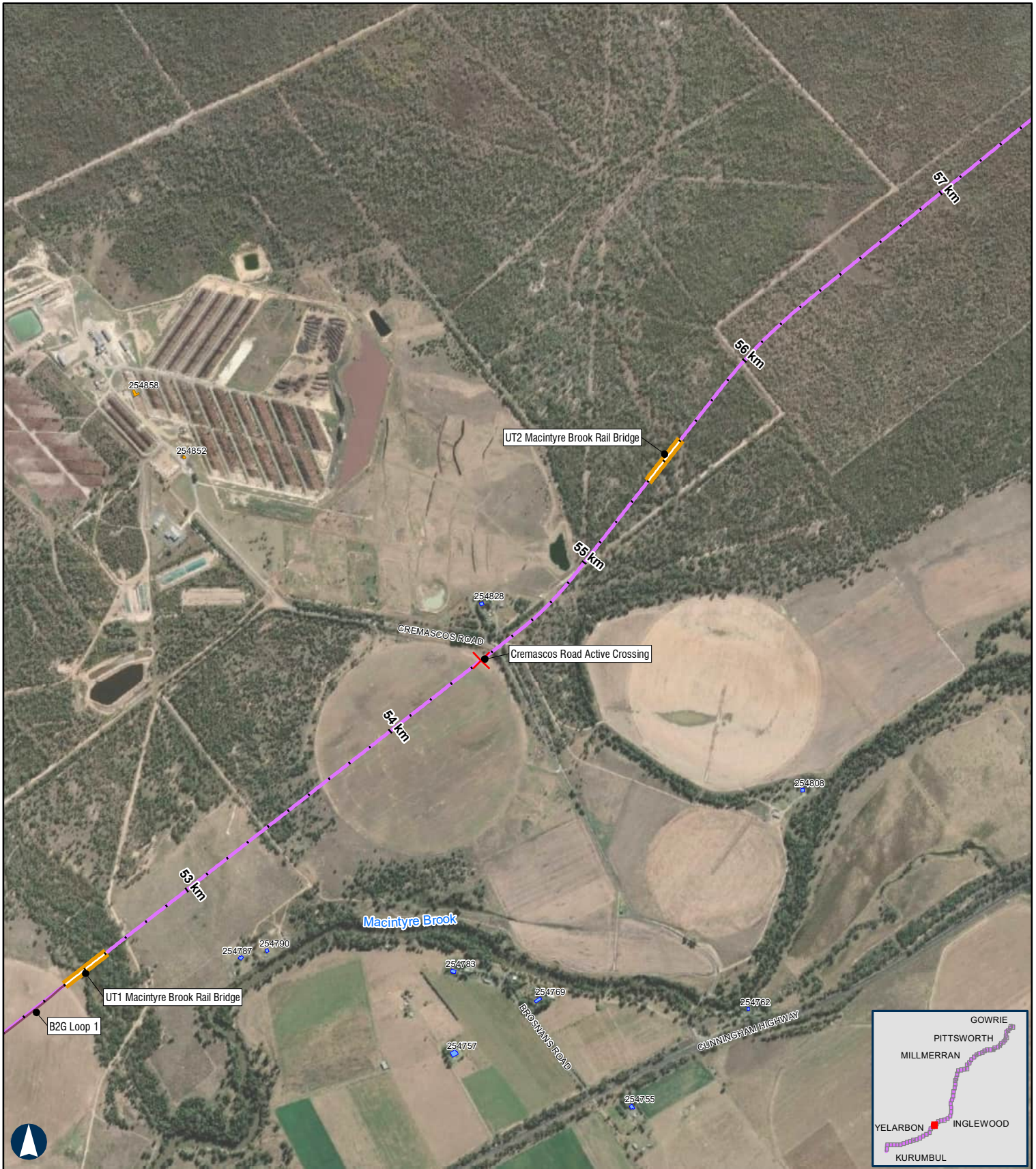
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 18 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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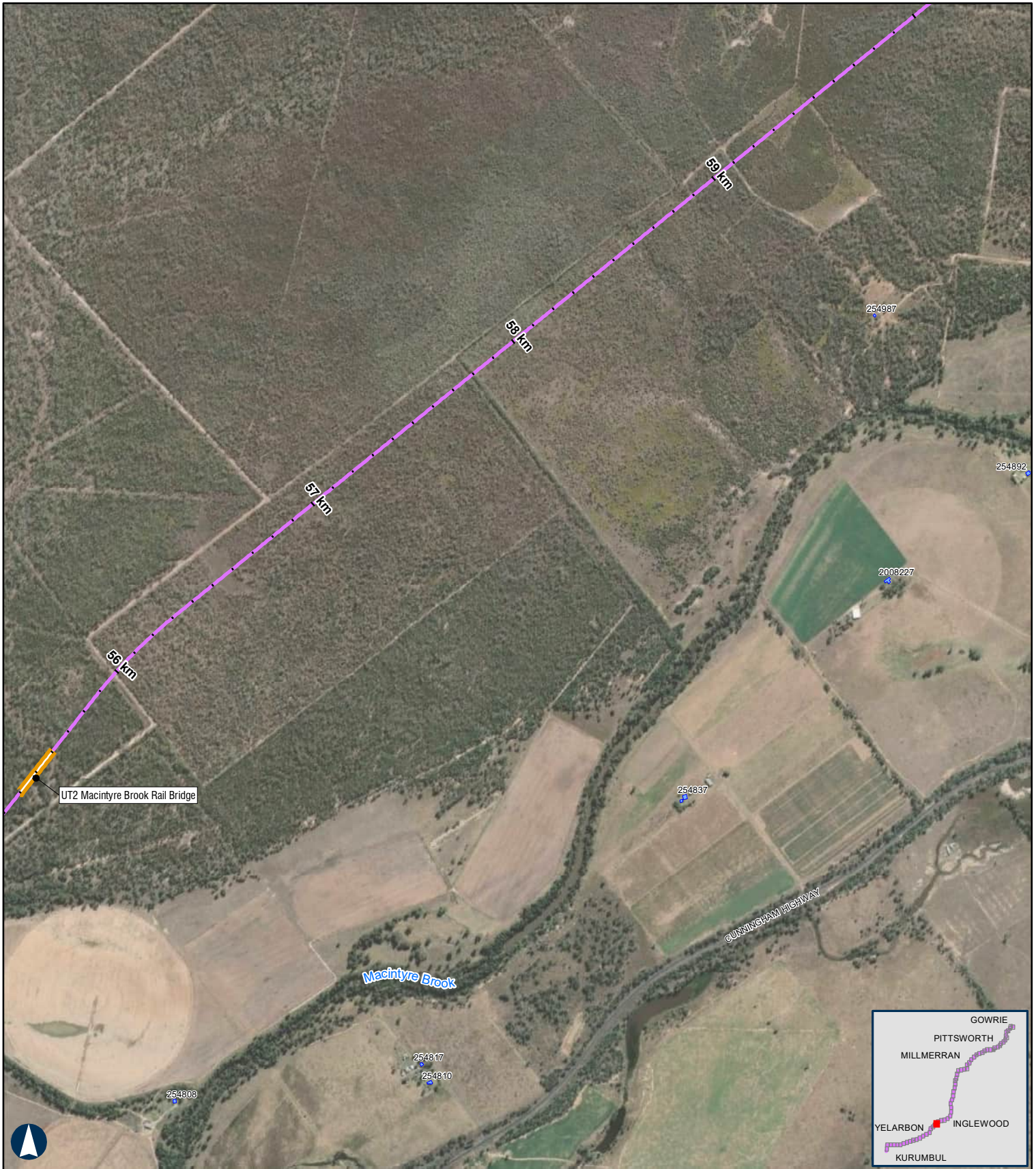
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 19 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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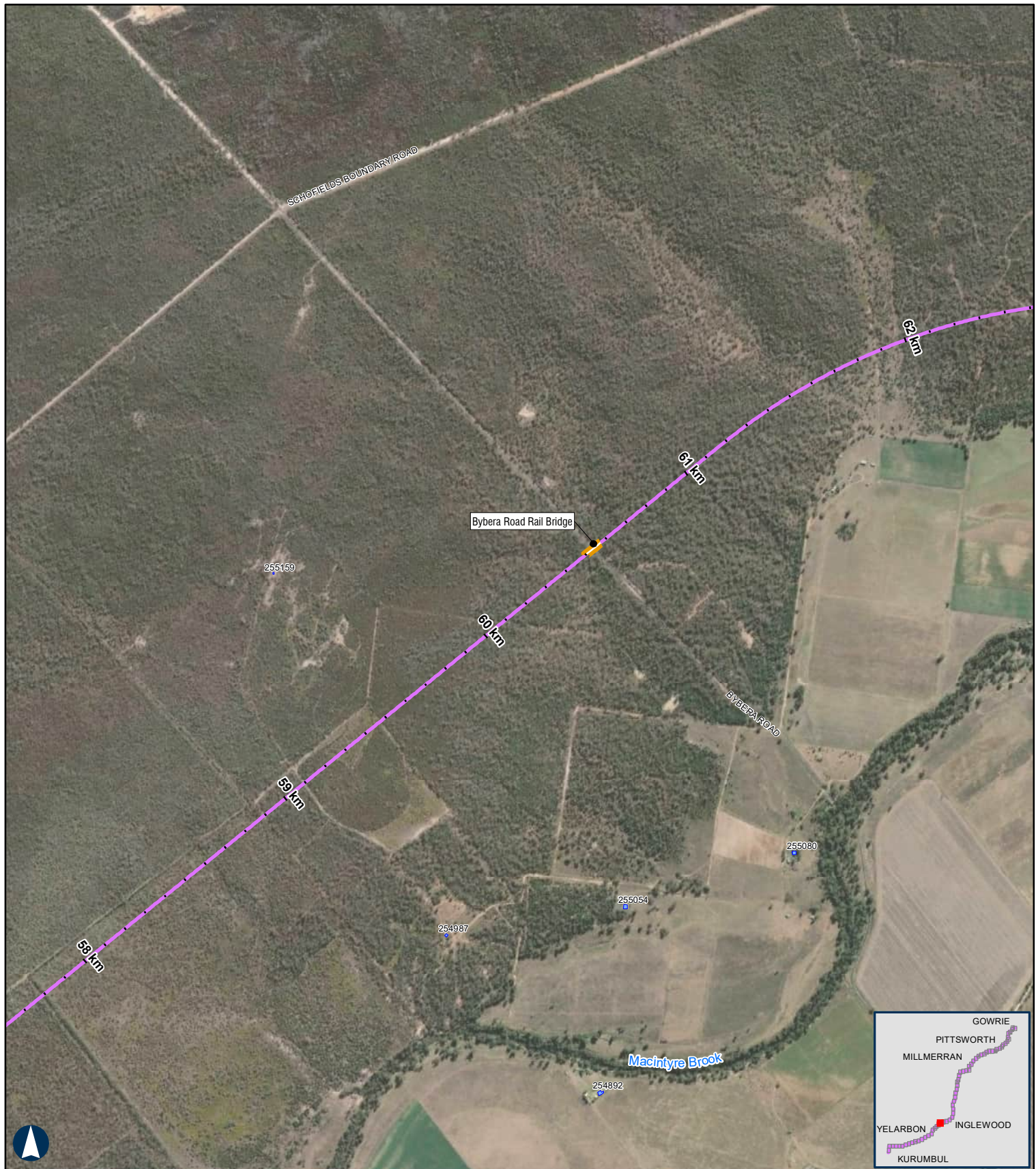
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 20 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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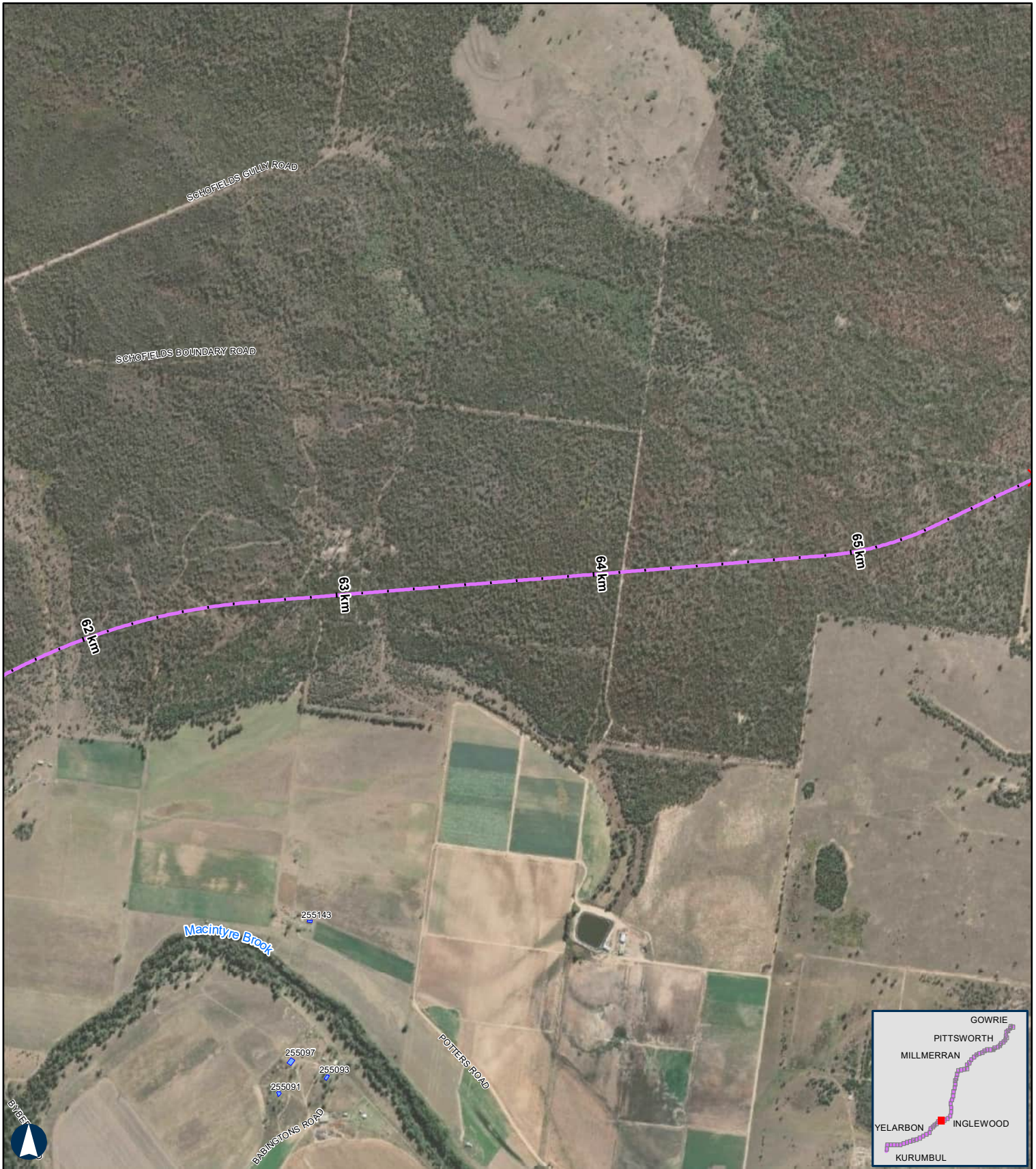
- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 21 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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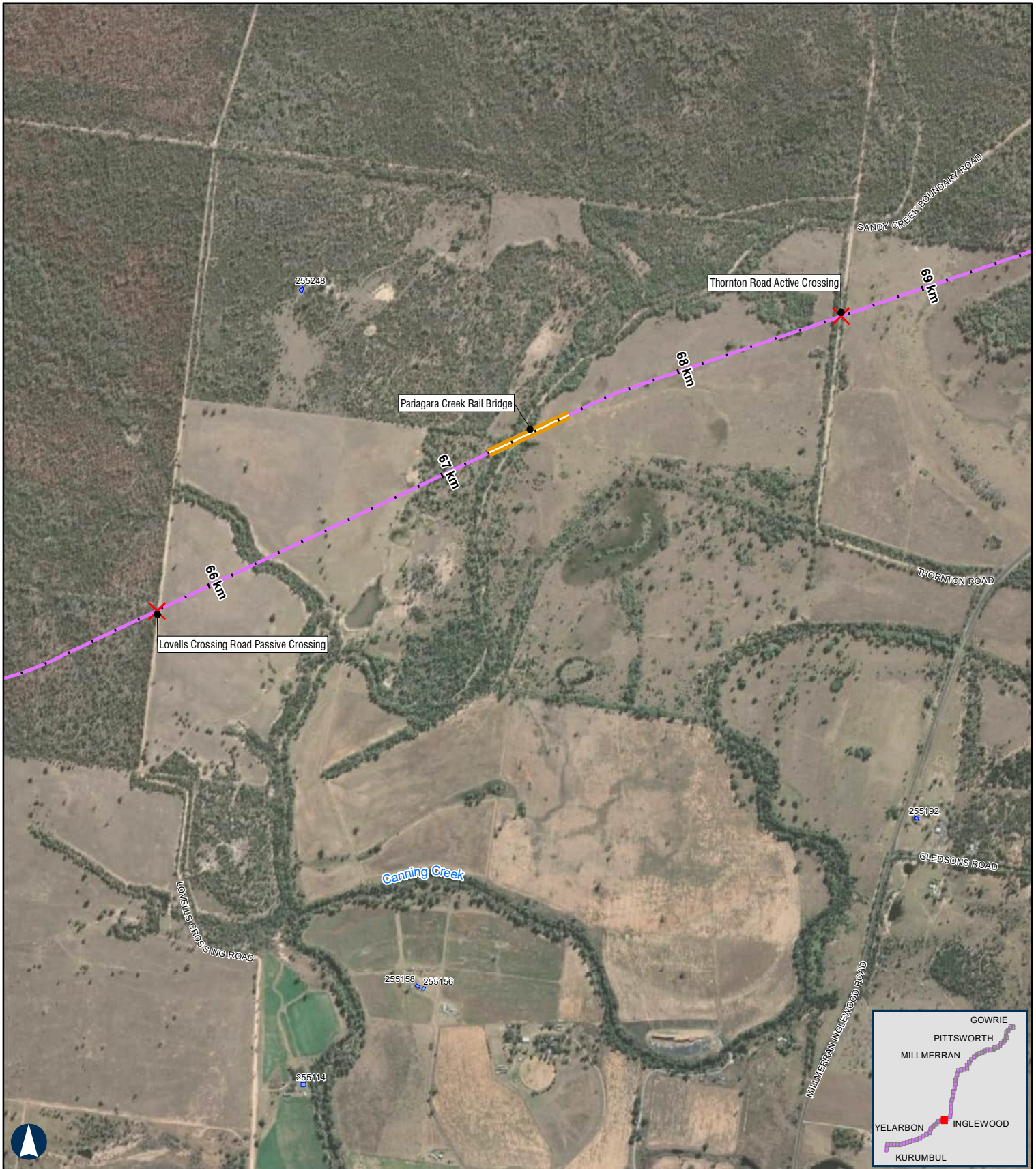
- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 22 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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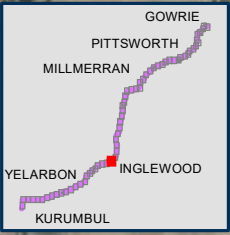
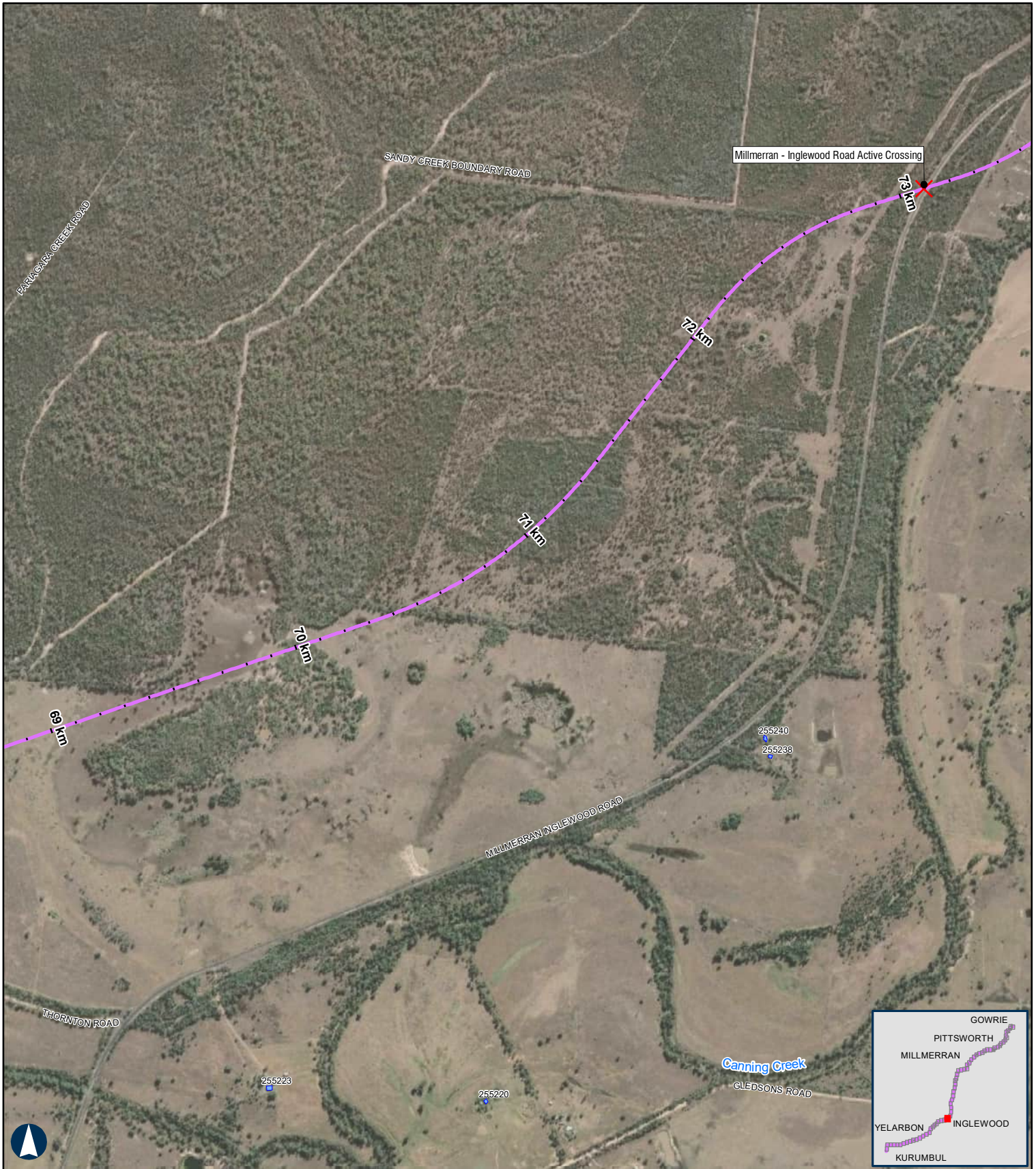
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 23 of 63

500 m

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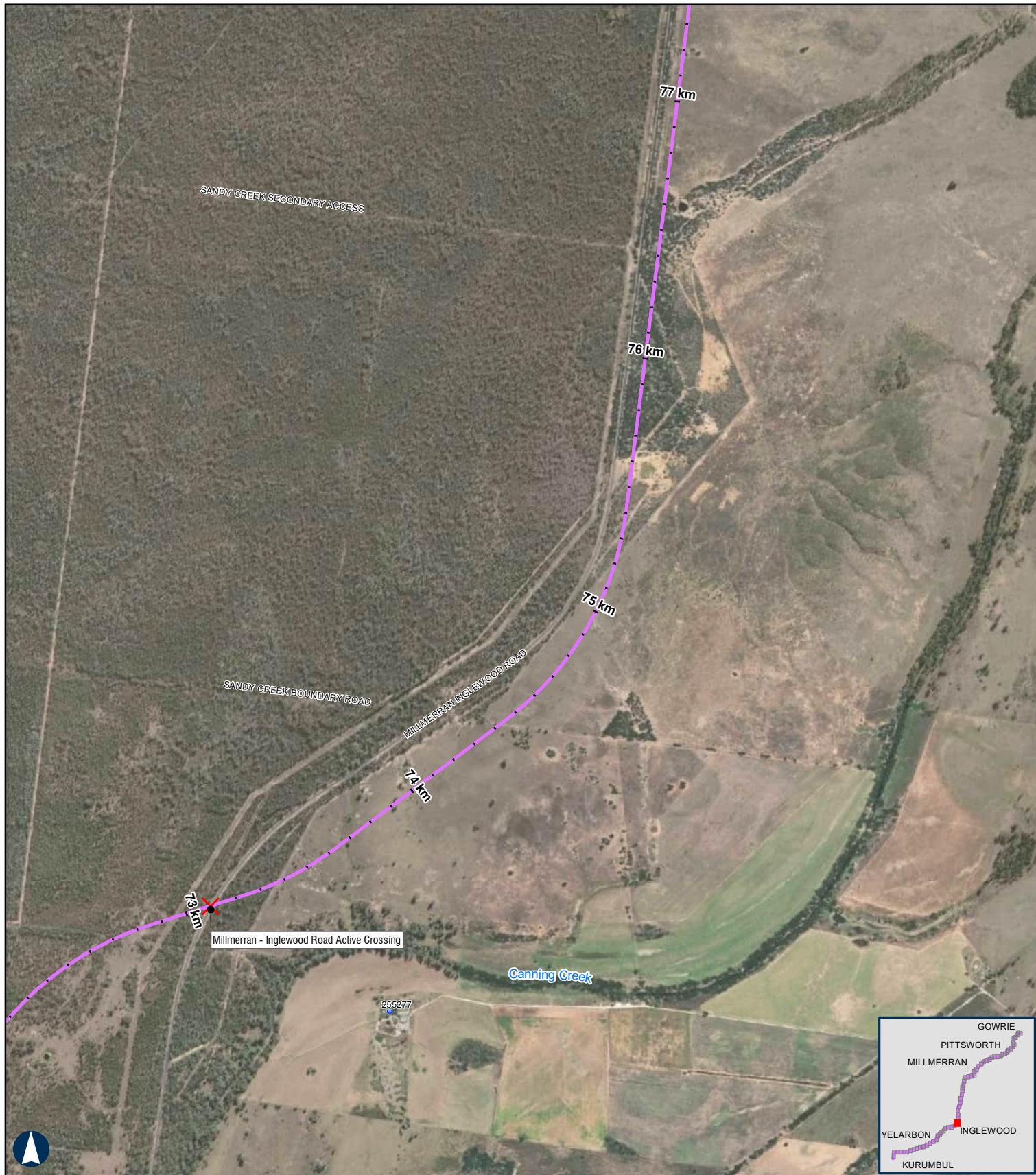
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
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- Commercial
- Parkland
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 24 of 63

500 m

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- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 25 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
- ▢ Community
- ▢ Commercial
- ▢ Parkland
- ▢ Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 26 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 27 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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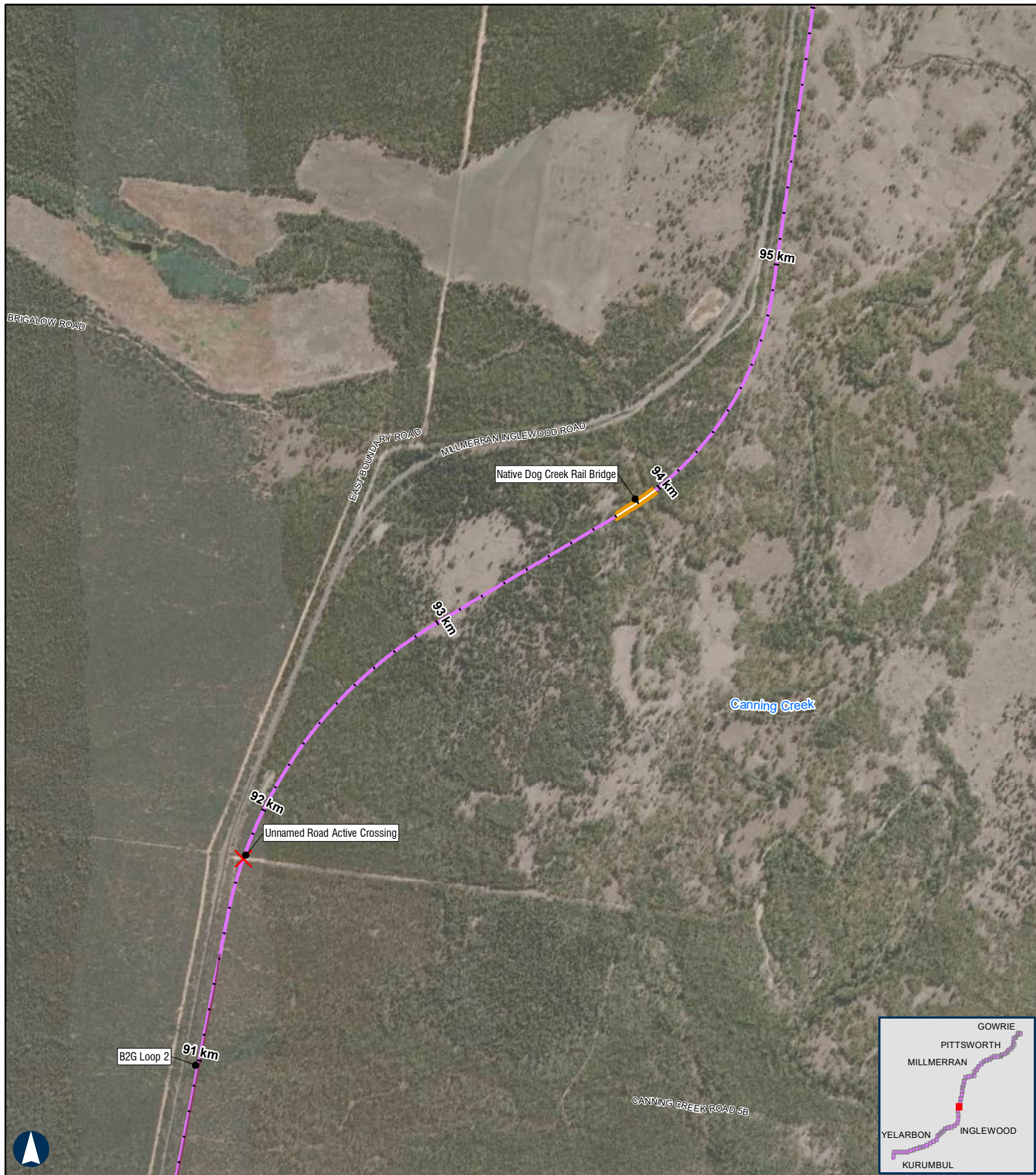
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 28 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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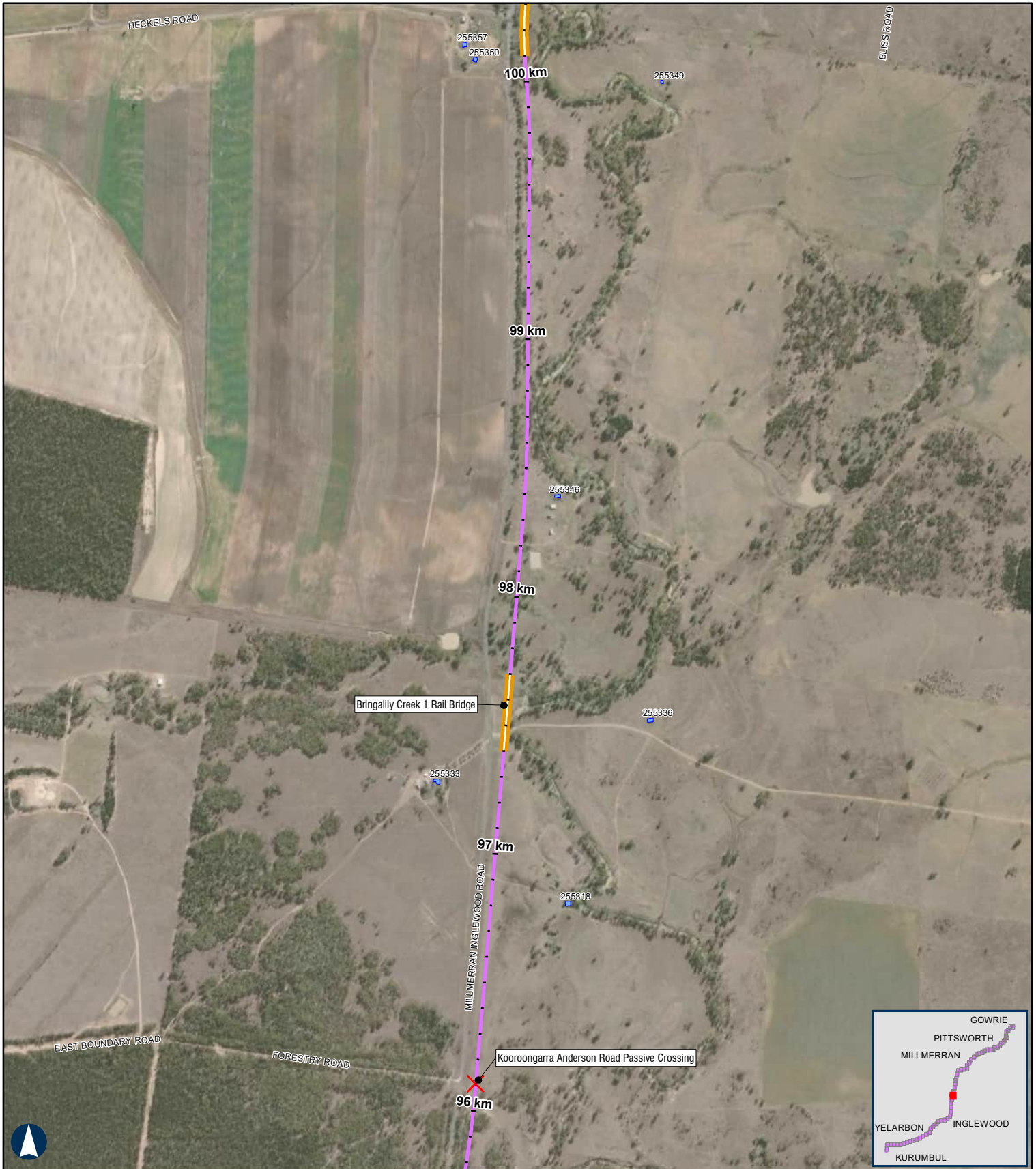
- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 29 of 63

500 m

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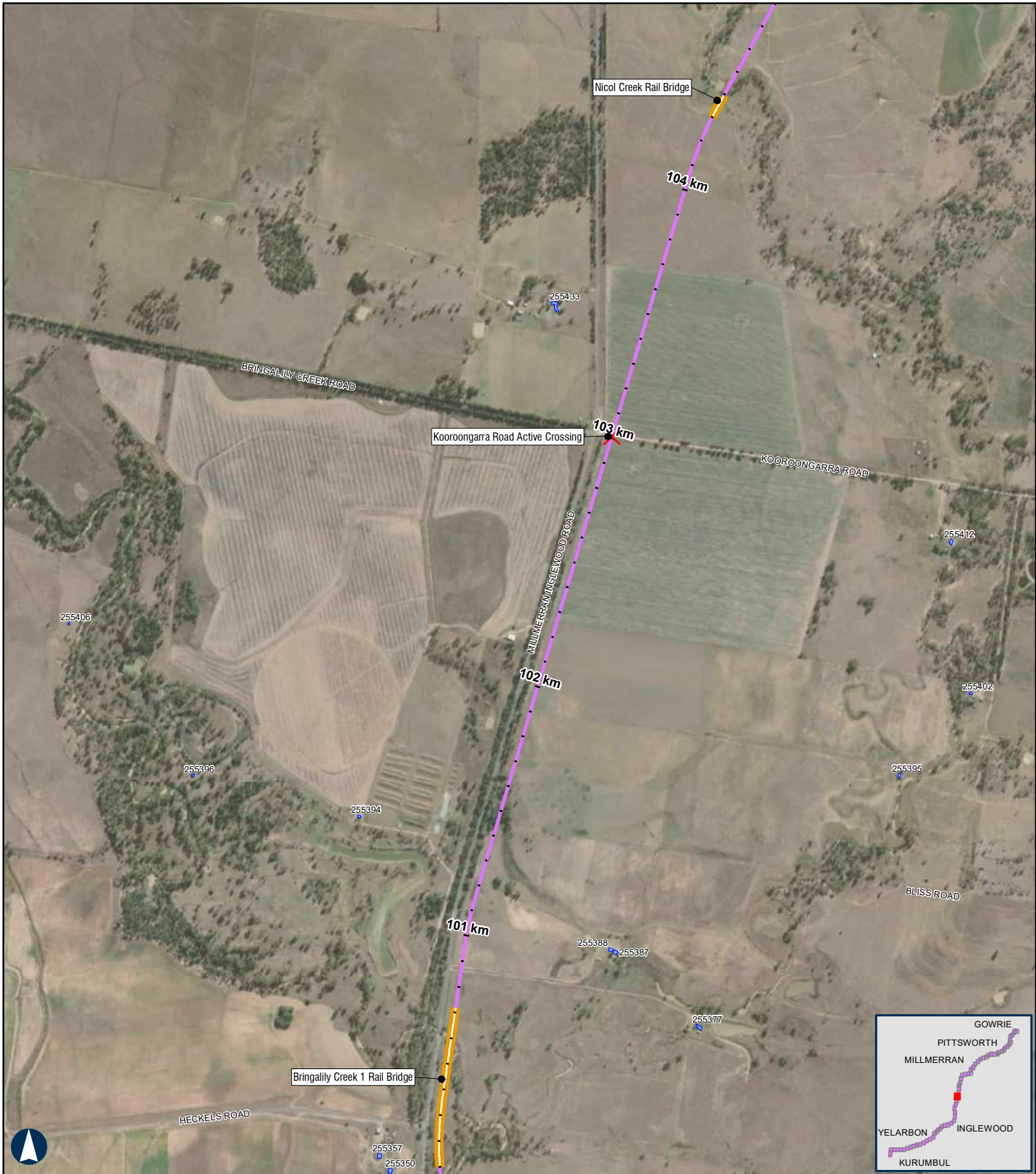
- ✗ Level Crossings
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- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 30 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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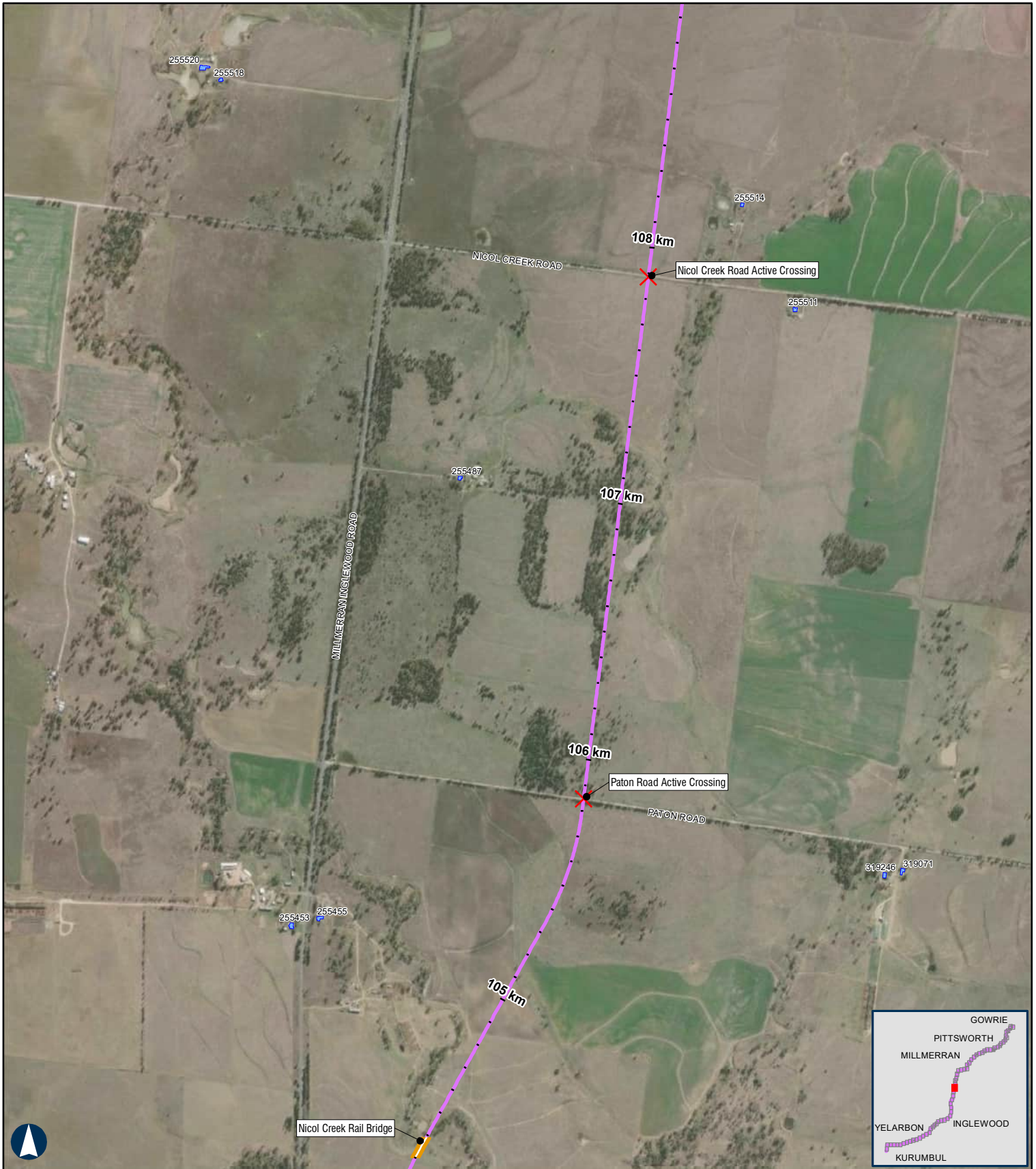
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- Parkland
- Future Developments

ARTC InlandRail

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 31 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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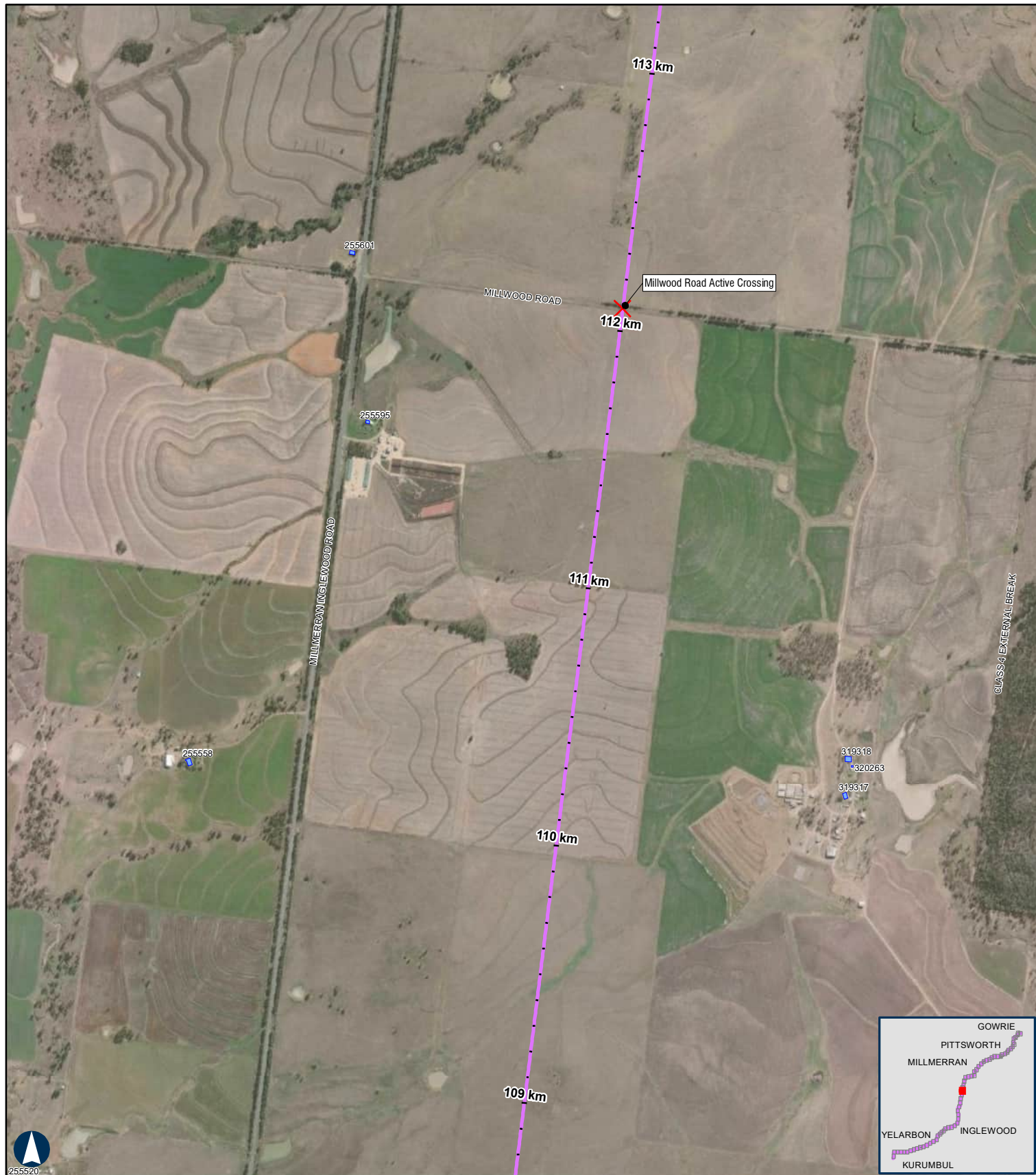
- ✗ Level Crossings
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- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 32 of 63

500 m

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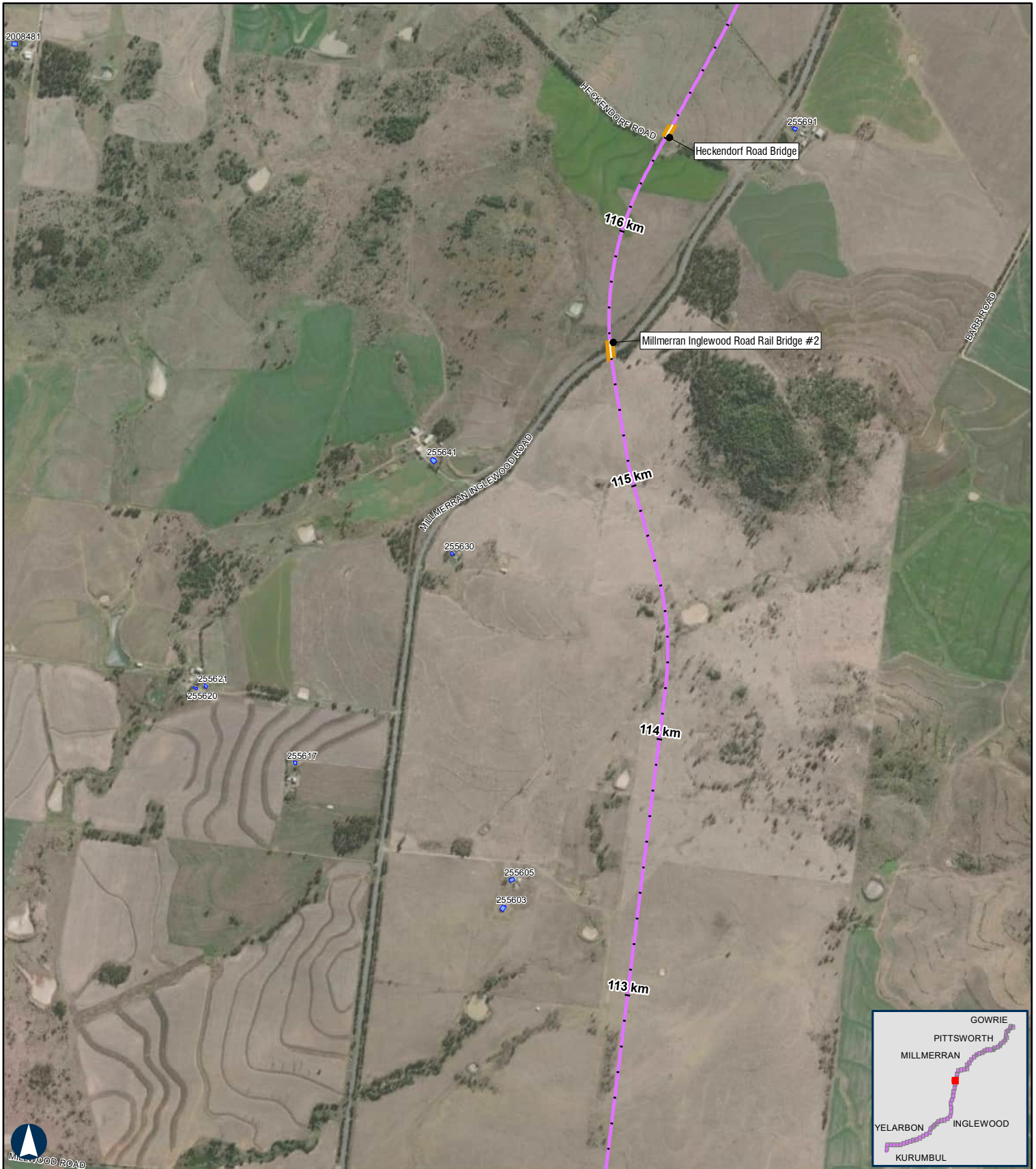
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
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Sensitive Receptor Type

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- ▢ Parkland
- ▢ Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 33 of 63

500 m

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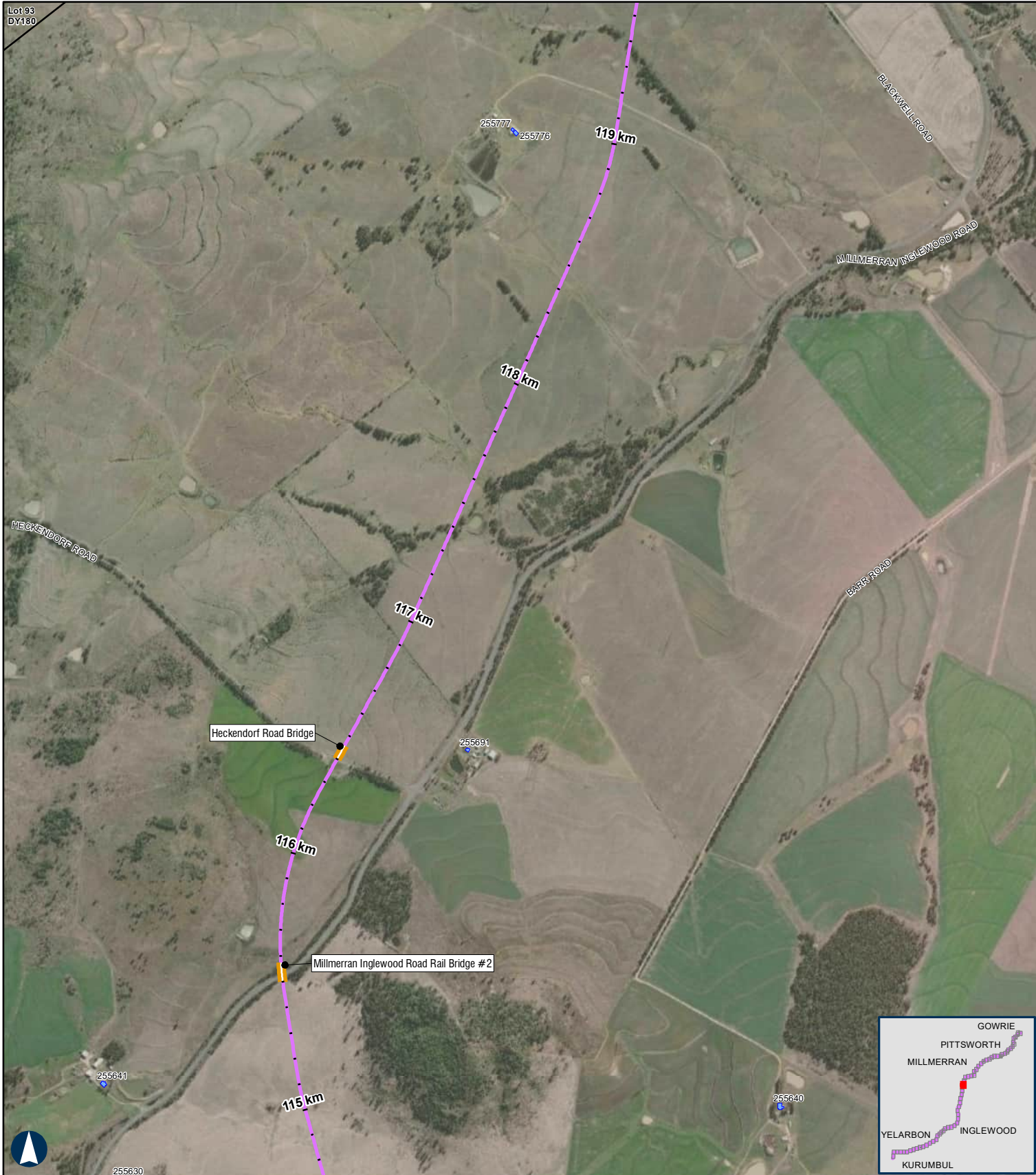
- ✗ Level Crossings
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 34 of 63

500 m

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- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- ▨ Educational
- ▨ Community
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- ▨ Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 35 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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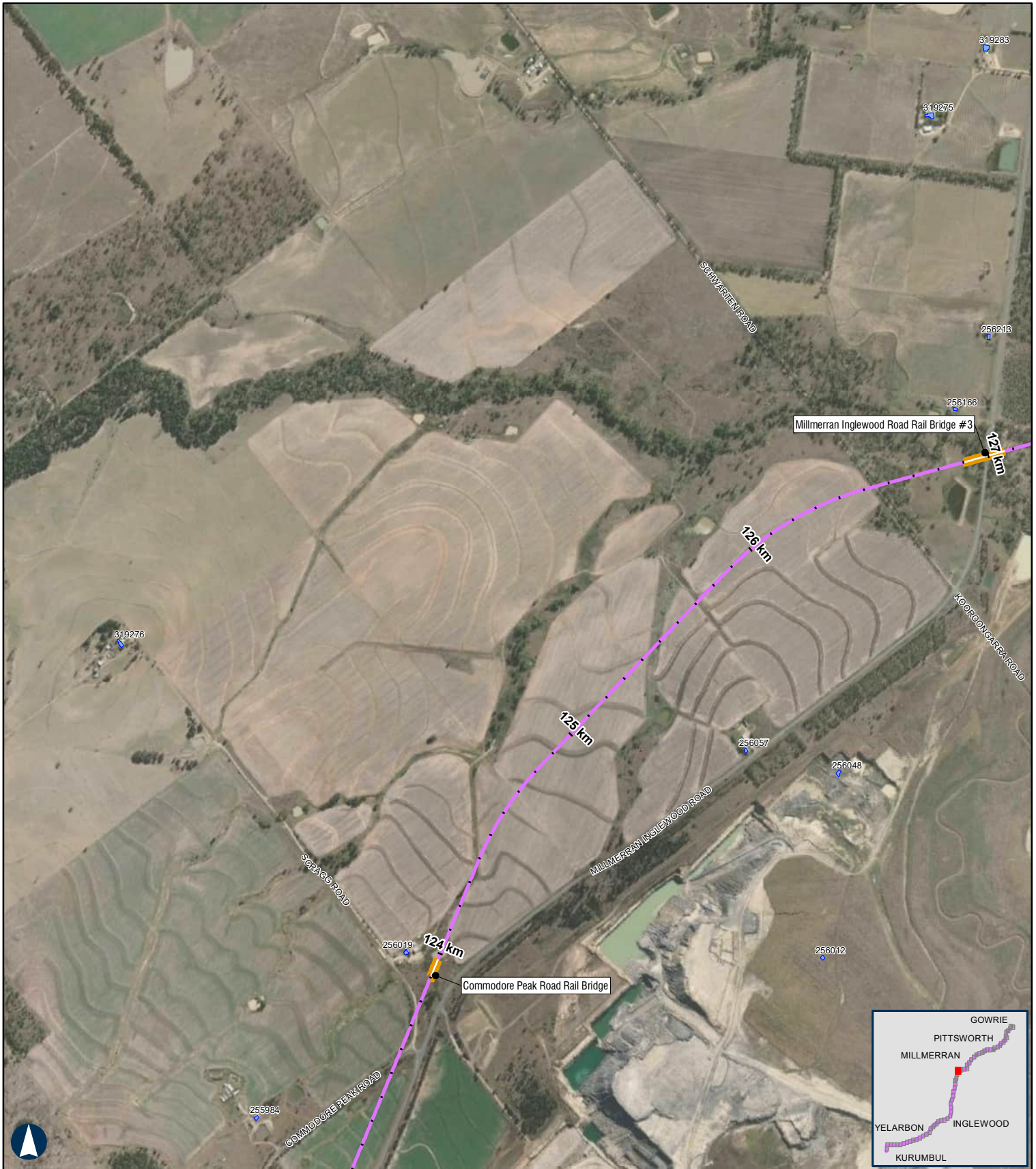
- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
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Sensitive Receptor Type

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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 36 of 63

500 m

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Date: 07-Nov-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC InlandRail

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 37 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 07-Nov-2024
Author: JG

Scale: 1:20,000

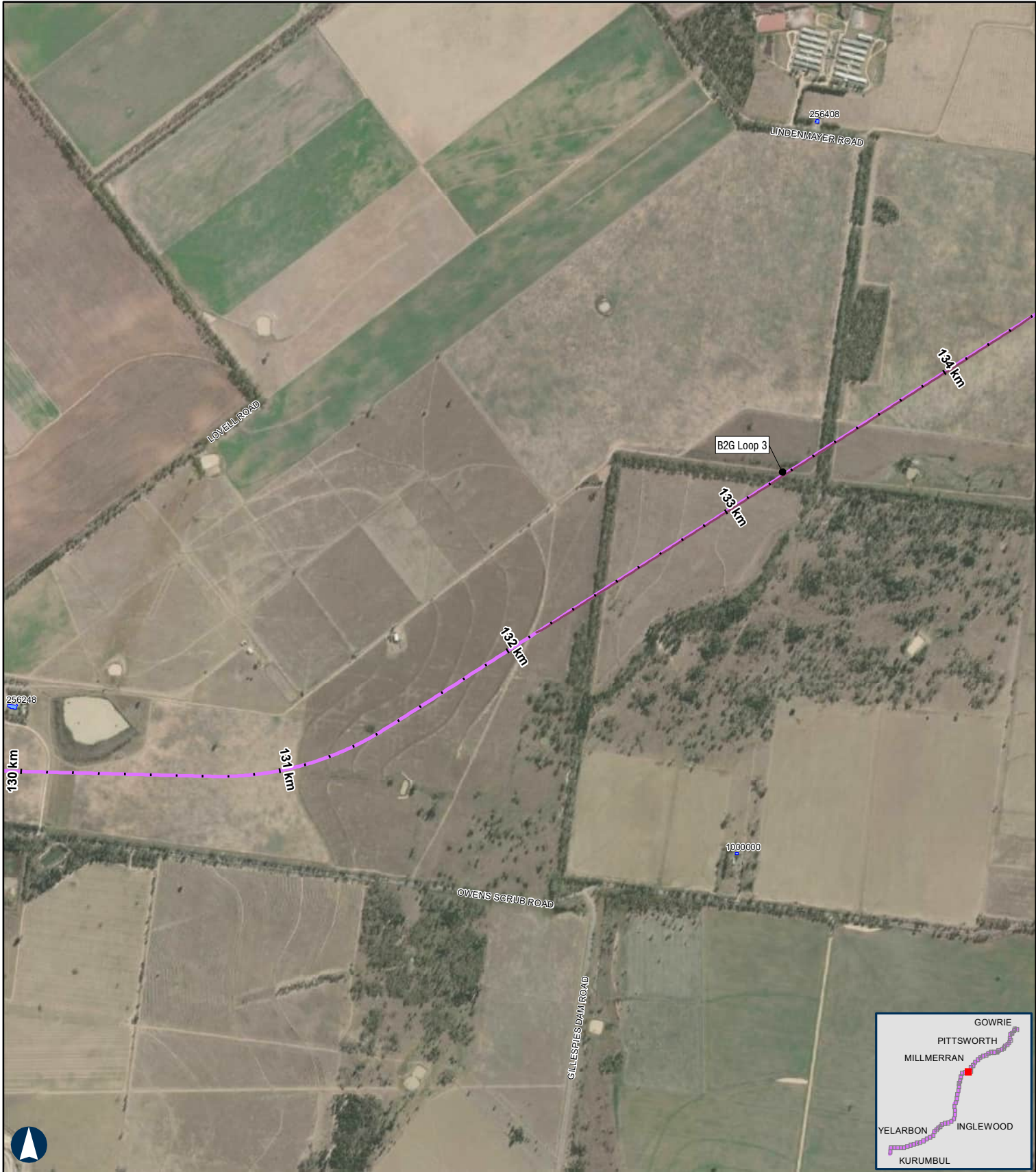
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
- ▢ Community
- ▢ Commercial
- ▢ Parkland
- ▢ Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 38 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 07-Nov-2024
Author: JG

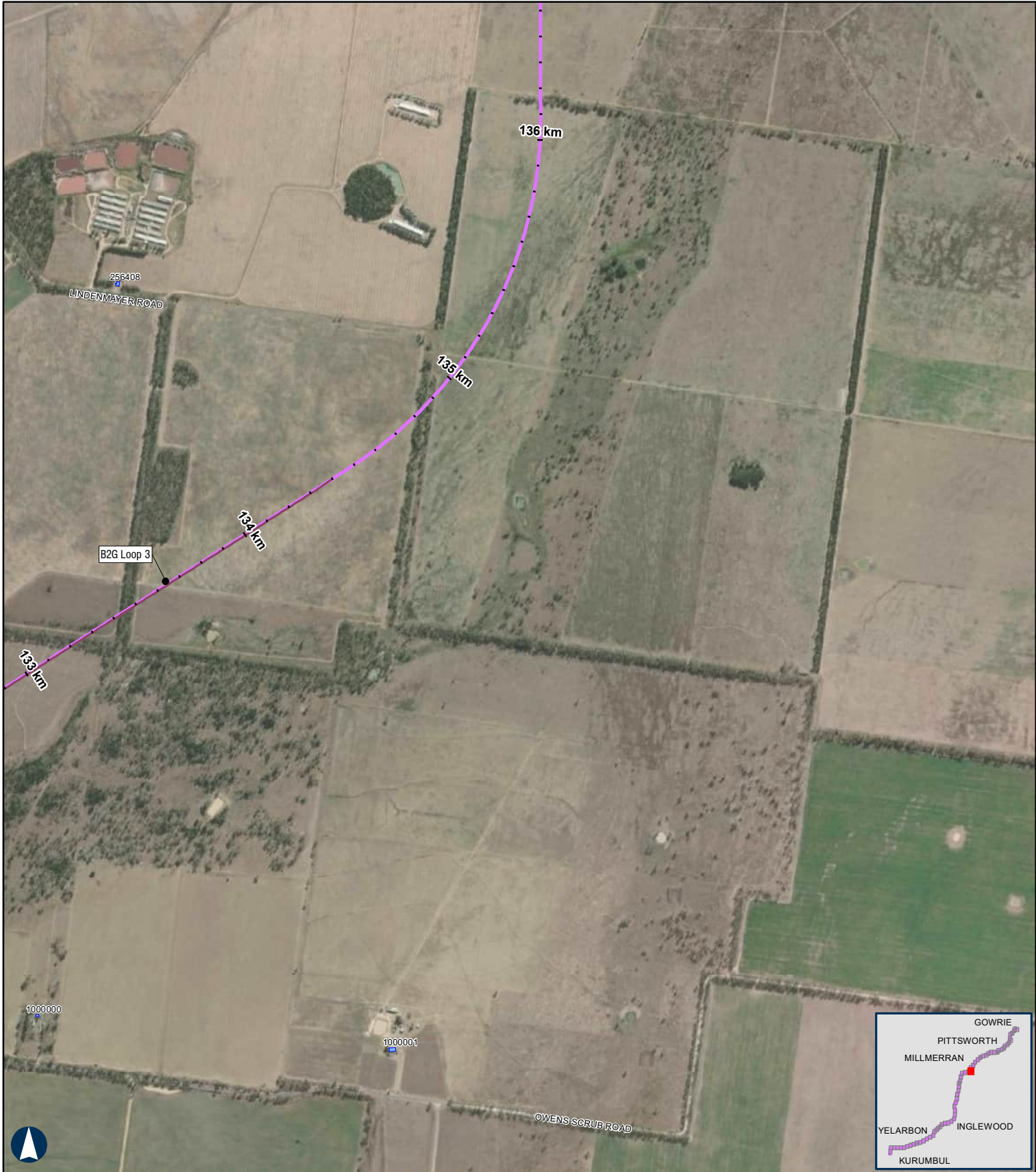
Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

- Sensitive Receptor Type
- Residential
 - Educational
 - Community
 - Commercial
 - Parkland
 - Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 39 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

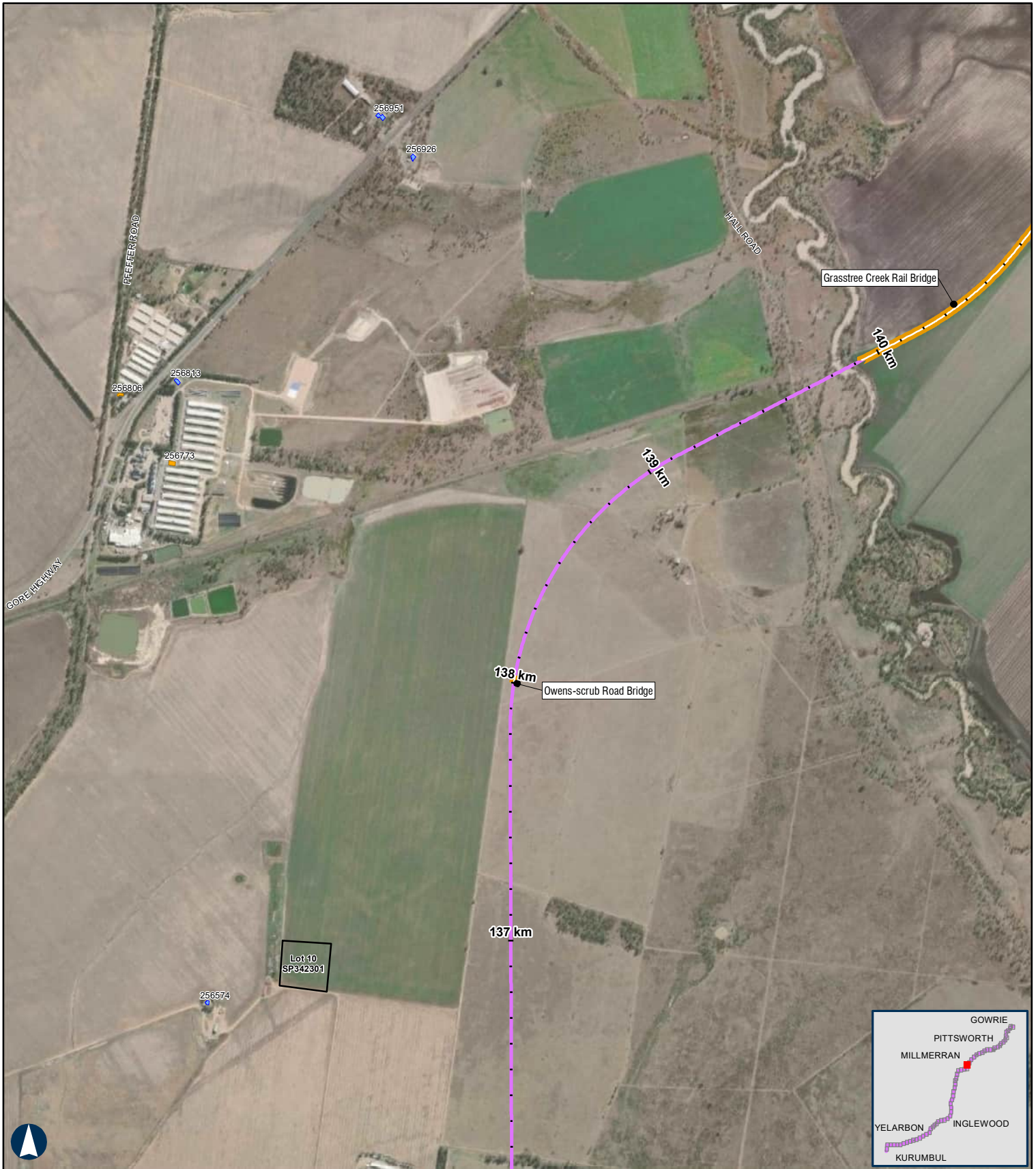
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 40 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
- ▢ Community
- ▢ Commercial
- ▢ Parkland
- ▢ Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 41 of 63

500 m

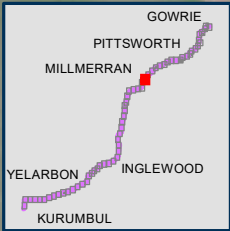
Coordinate System: GDA 1994 MGA Zone 56

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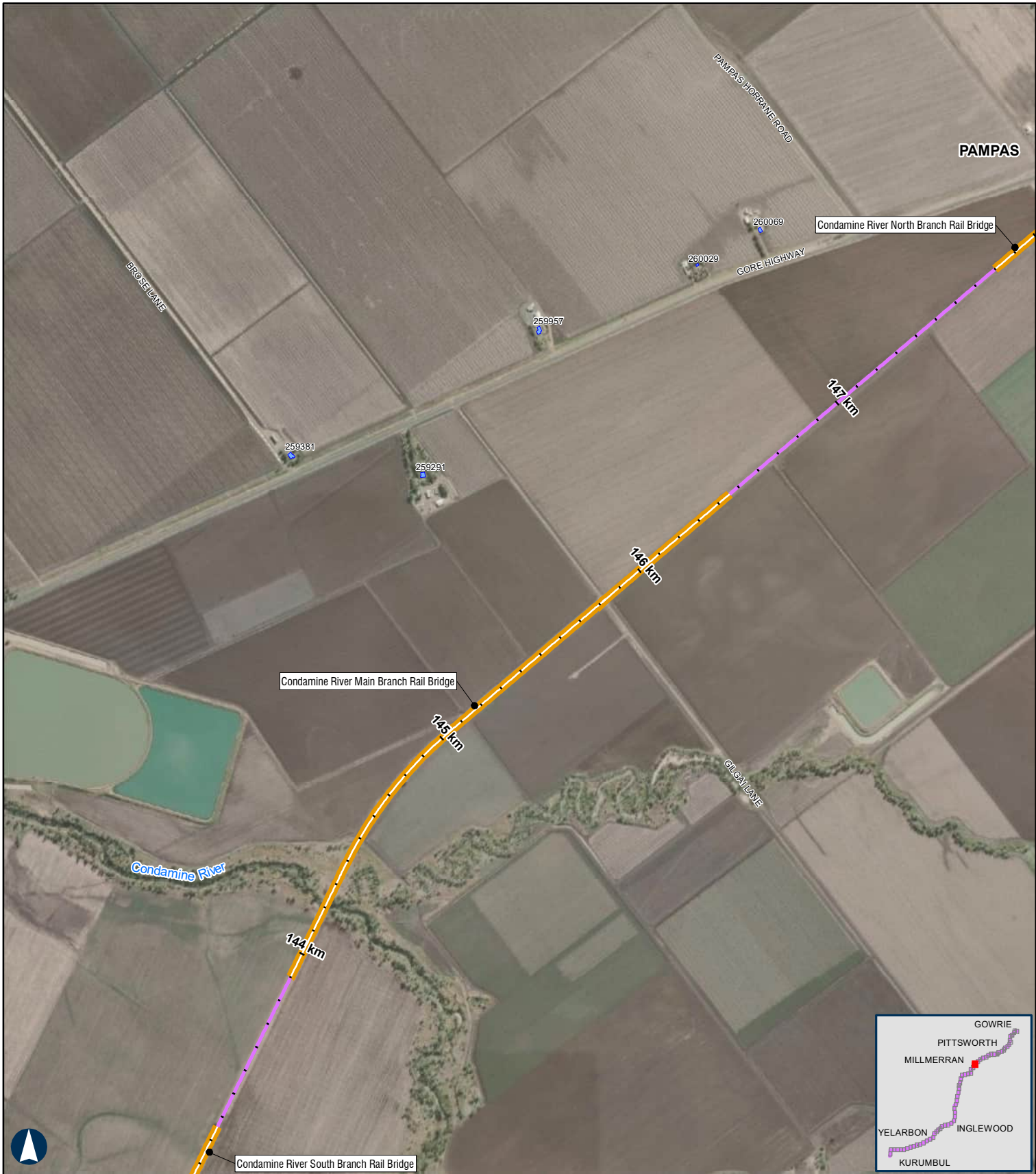
Paper: A3
Date: 07-Nov-2024
Author: JG
Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Educational
 - Community
 - Commercial
 - Parkland
 - Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 42 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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 Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Educational
 - Community
 - Commercial
 - Parkland
 - Future Developments

ARTC

InlandRail

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 43 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

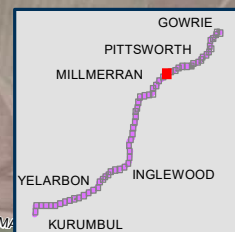
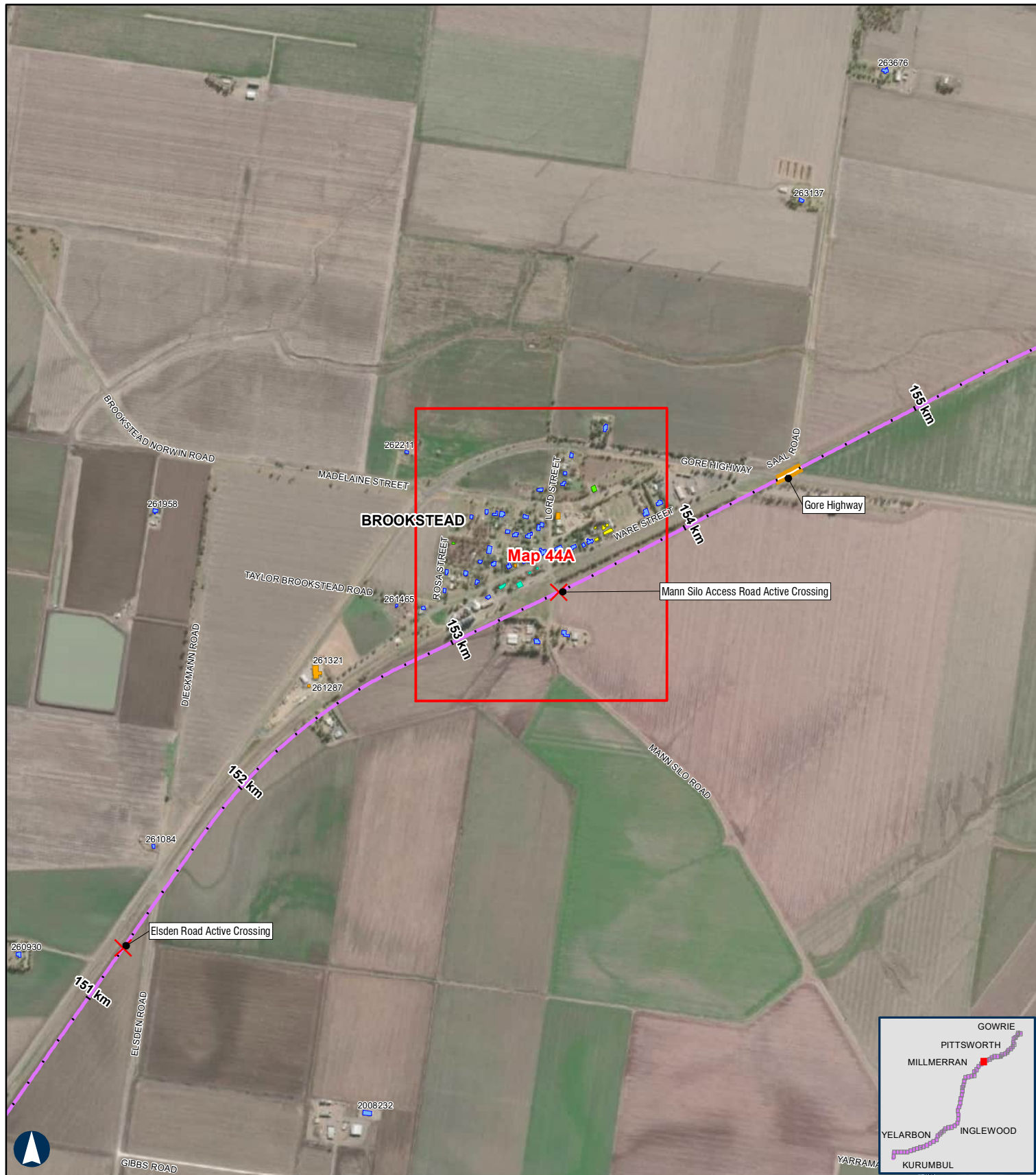
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 44 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

✗ Level Crossings

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Koala Habitat Area

Sensitive Receptor Type

Residential

Educational

Community

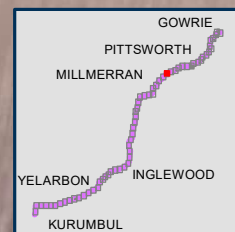
Commercial

Parkland

Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 44A of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:5,000

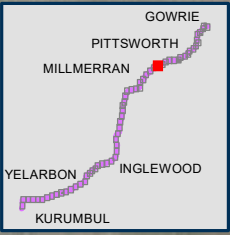
- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 45 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

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- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 46 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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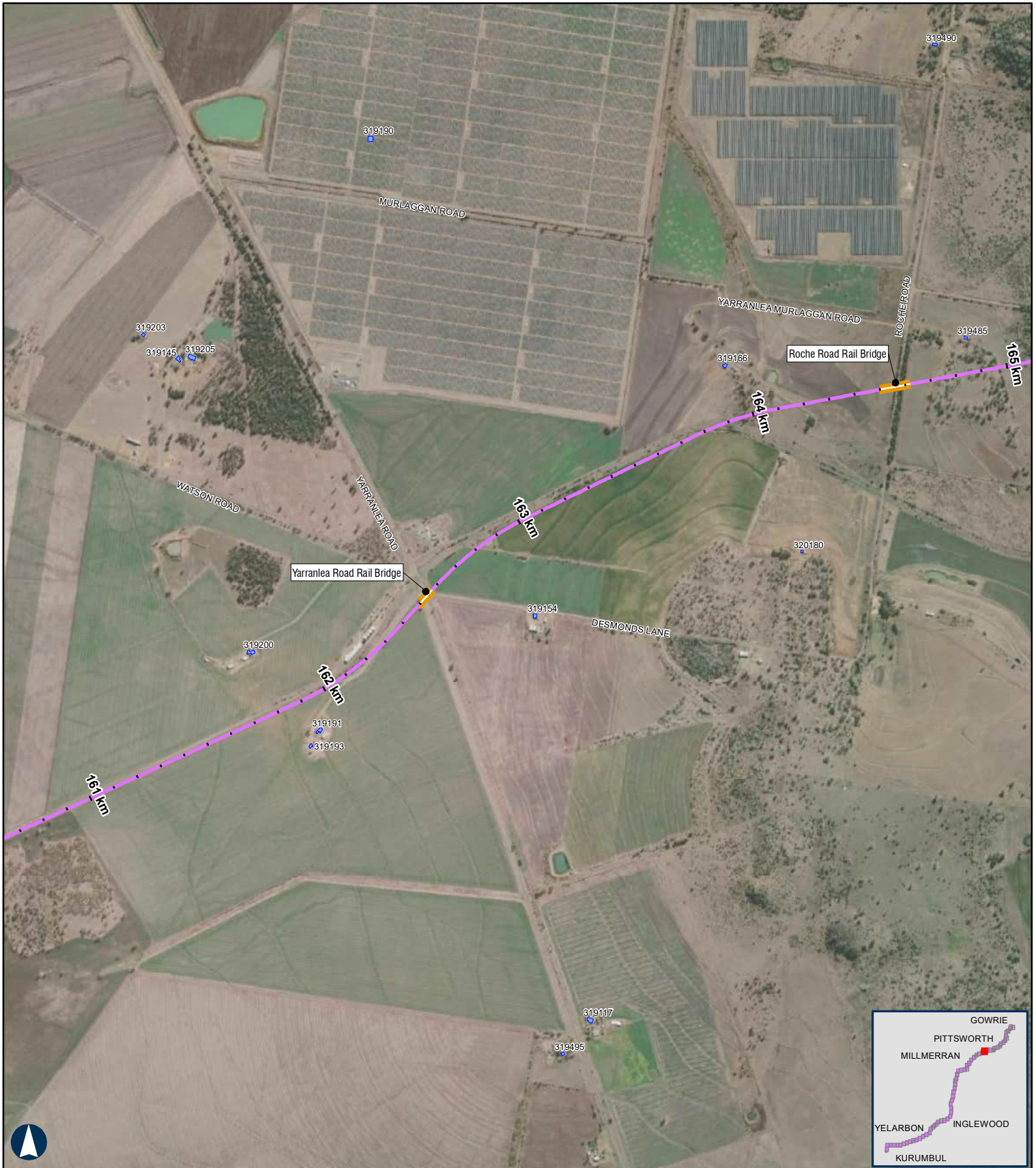
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 47 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 48 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

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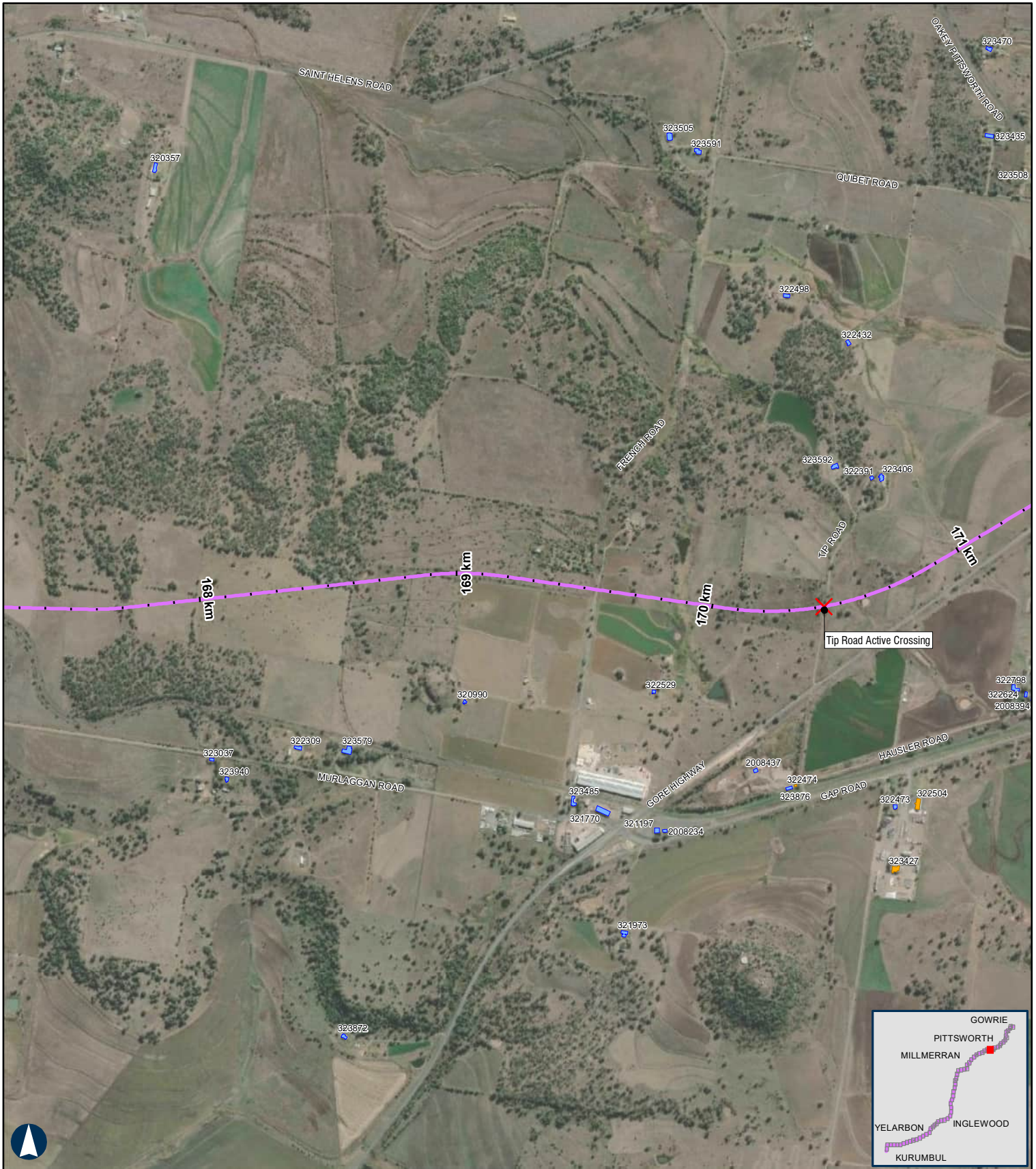
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 49 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

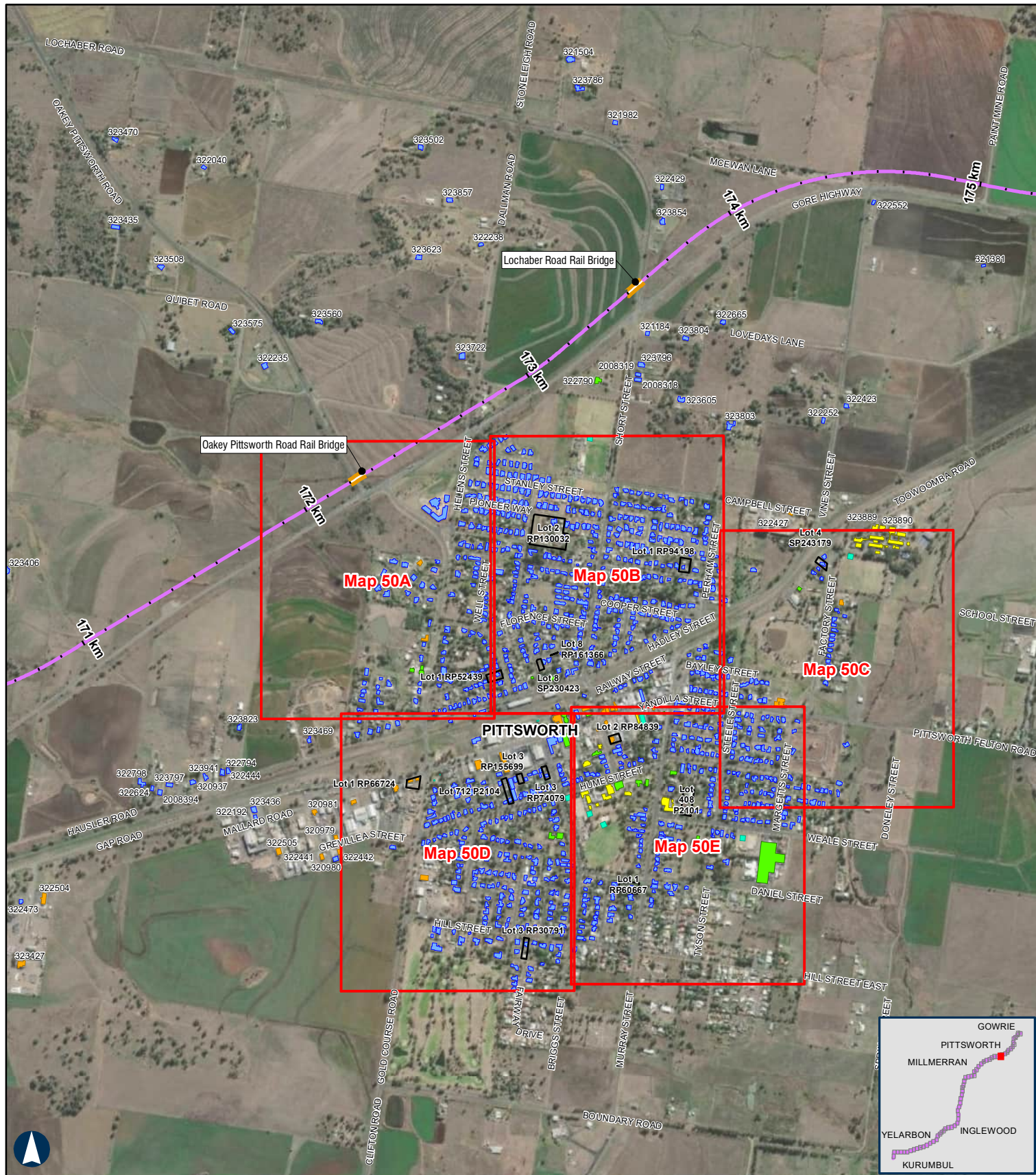
- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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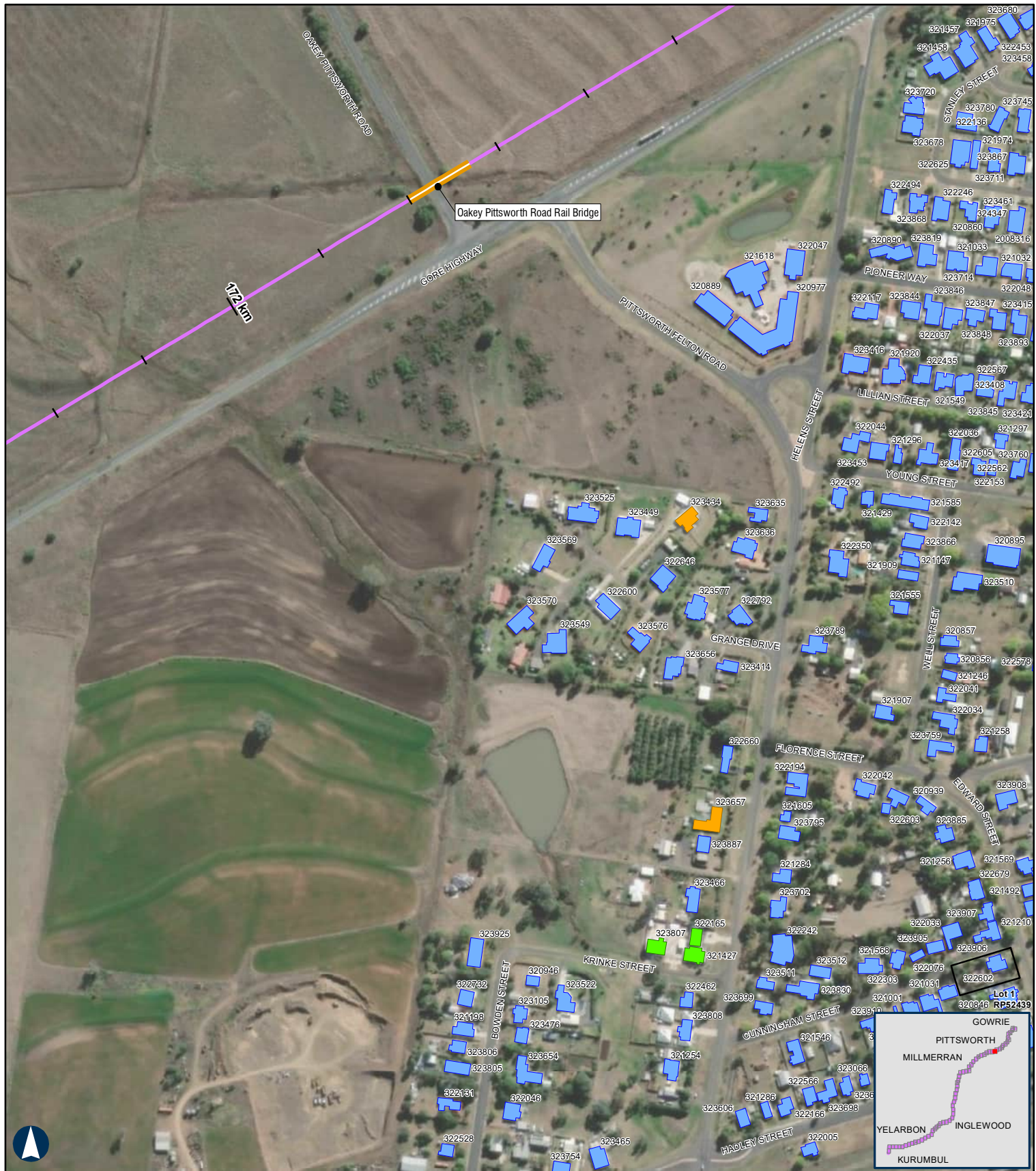
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50A of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A3
Date: 07-Nov-2024
Author: JG

Scale: 1:5,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
- ▢ Community
- ▢ Commercial
- ▢ Parkland
- ▢ Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50B of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A3
Date: 07-Nov-2024
Author: JG

Scale: 1:5,000

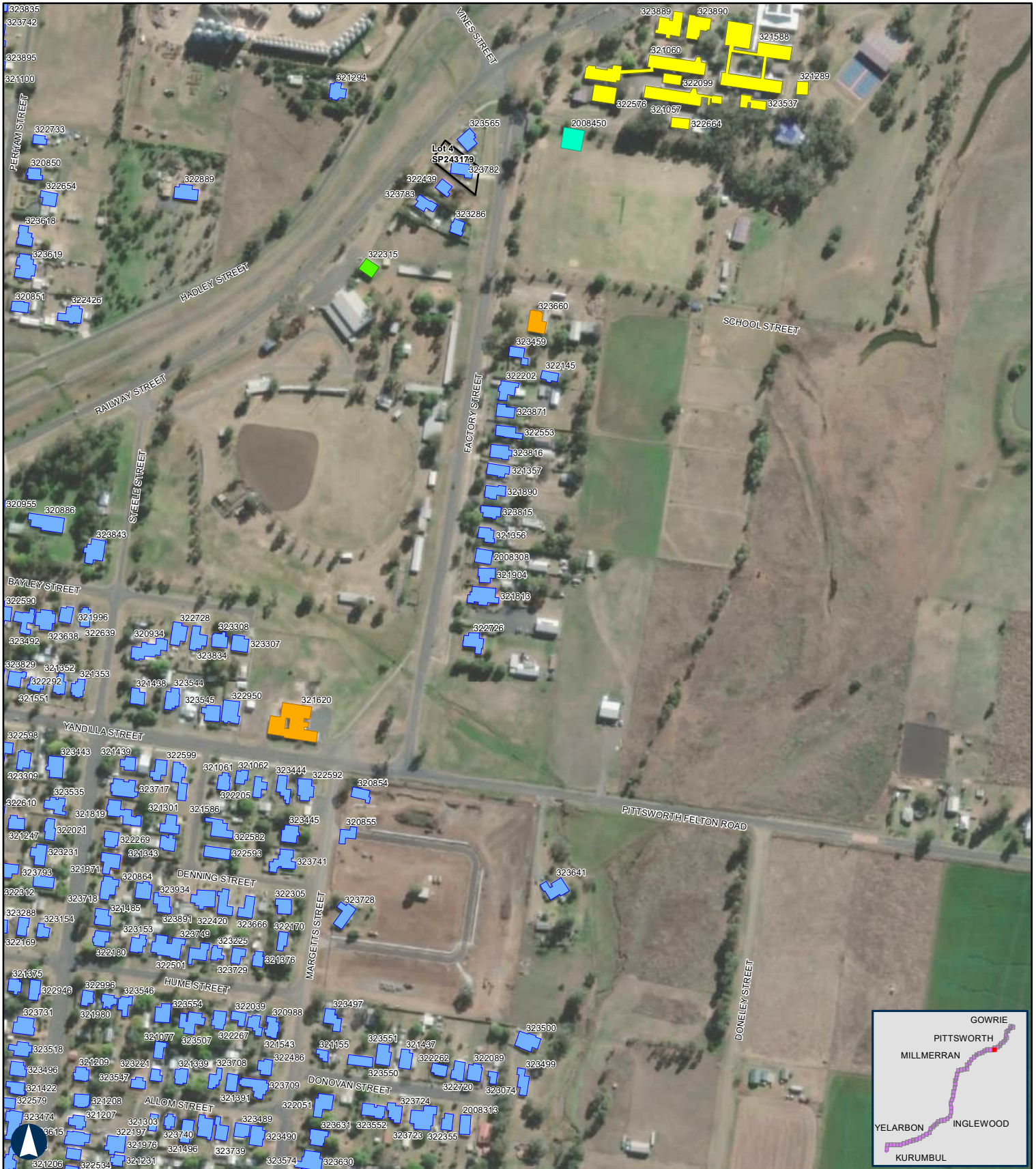
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50C of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 07-Nov-2024
Author: JG

Scale: 1:5,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50D of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:5,000

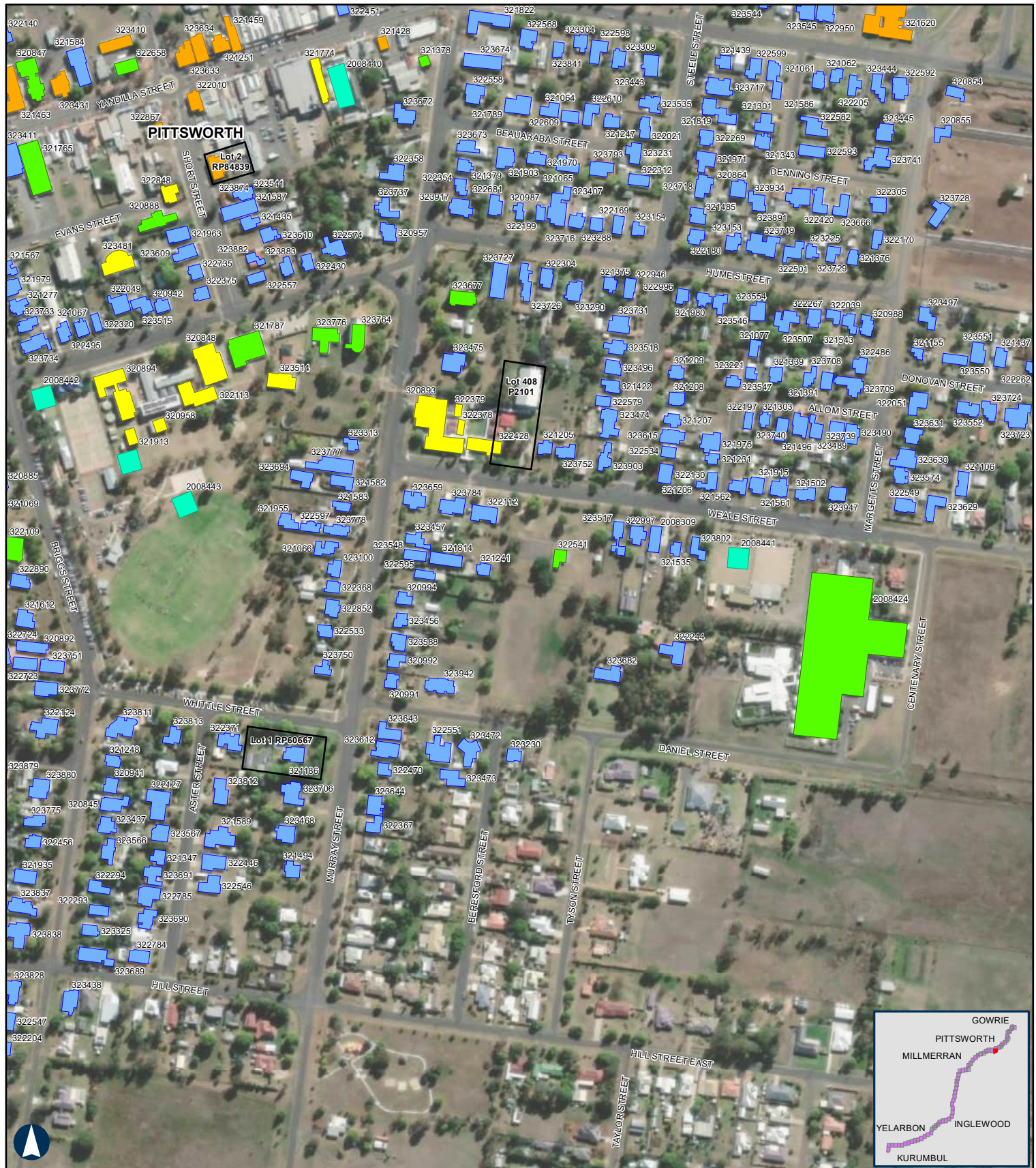
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC *InlandRail*

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 50E of 63

125 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:5,000

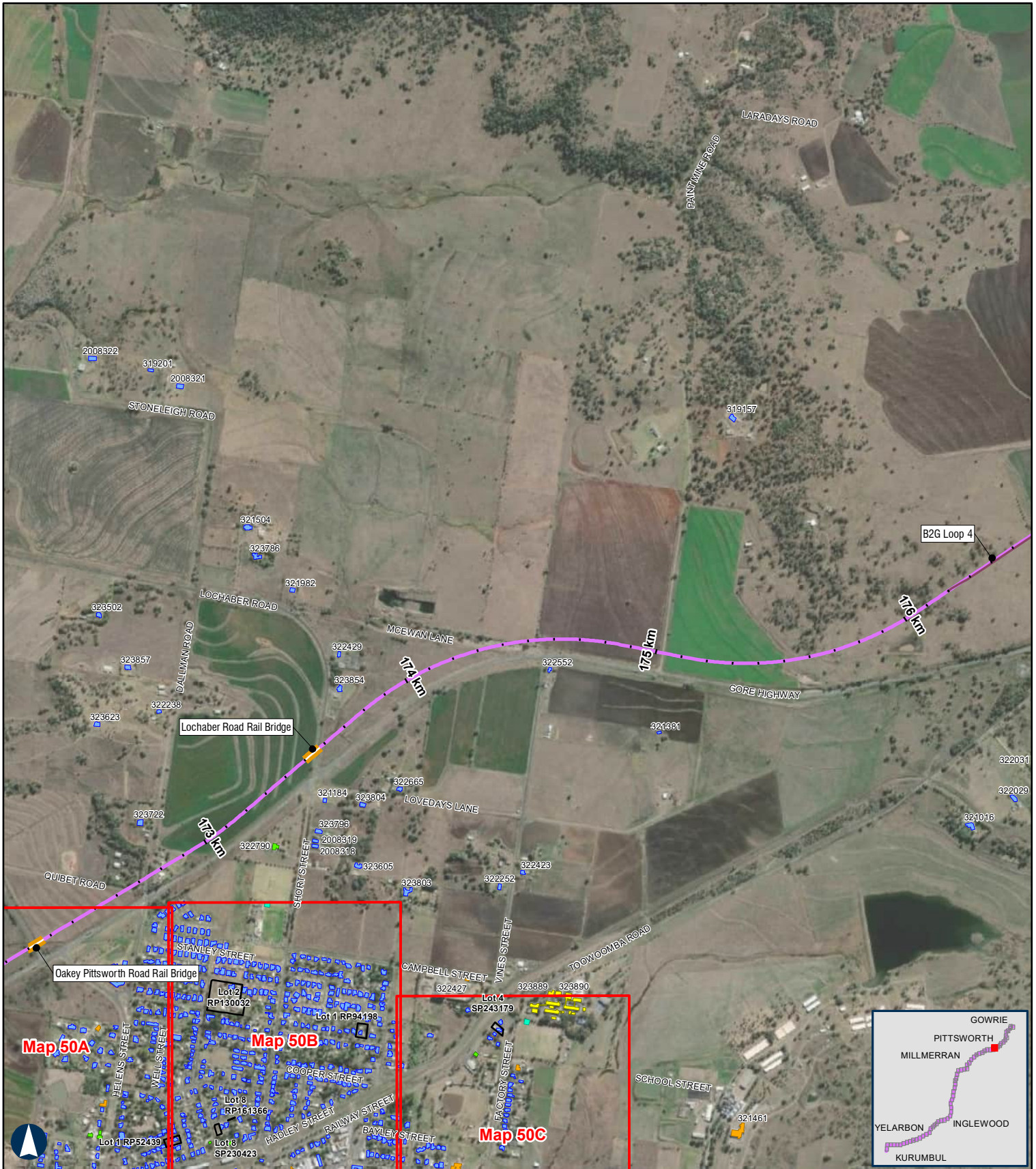
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 51 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A3
Date: 07-Nov-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▨ Residential
- ▨ Educational
- ▨ Community
- ▨ Commercial
- ▨ Parkland
- ▨ Future Developments

ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 52 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

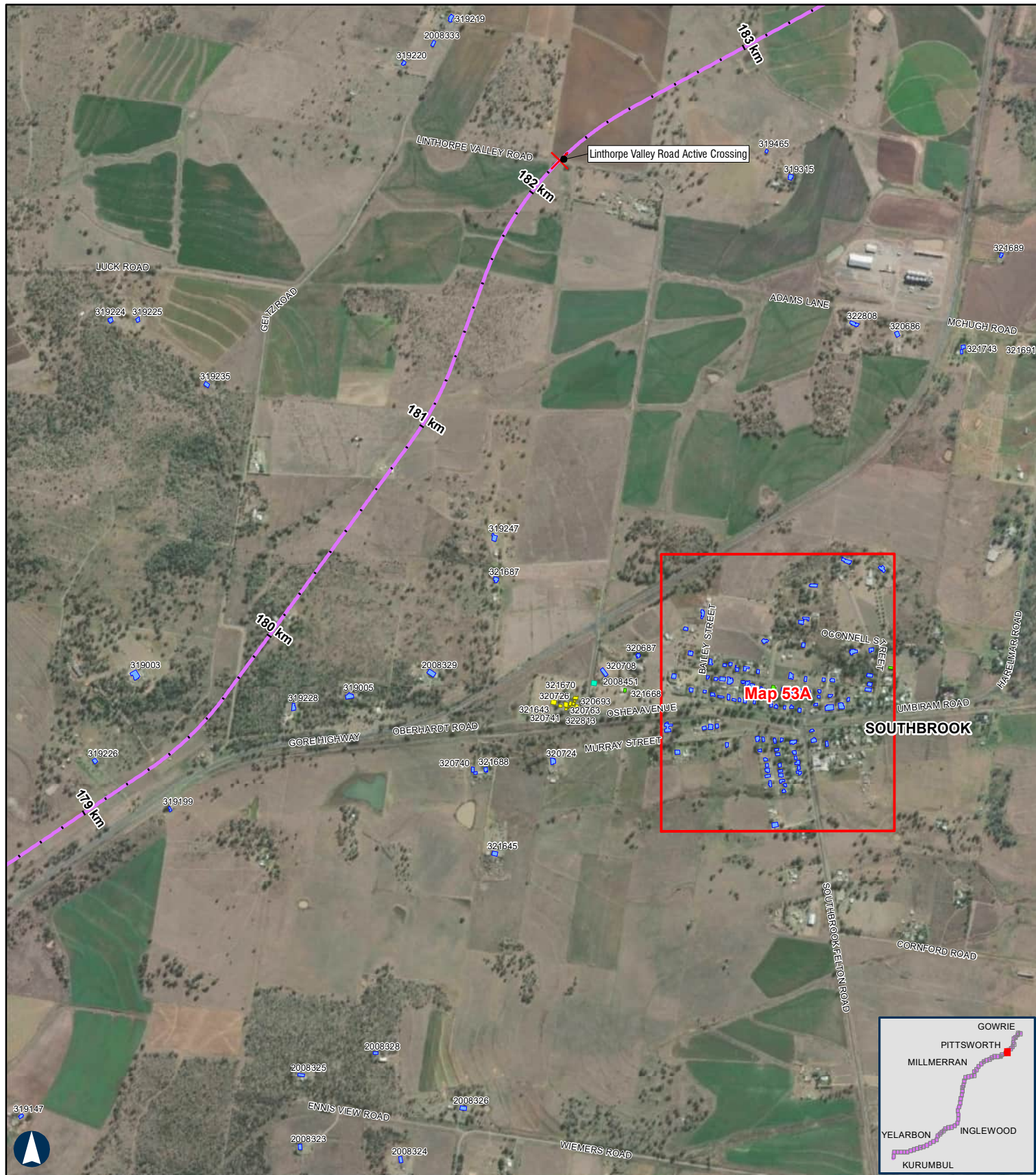
Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments



ARTC **InlandRail**

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 53 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A3
Date: 07-Nov-2024
Author: JG

Scale: 1:20,000

✗ Level Crossings

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

▨ Koala Habitat Area

Sensitive Receptor Type

▢ Residential

▢ Educational

▢ Community

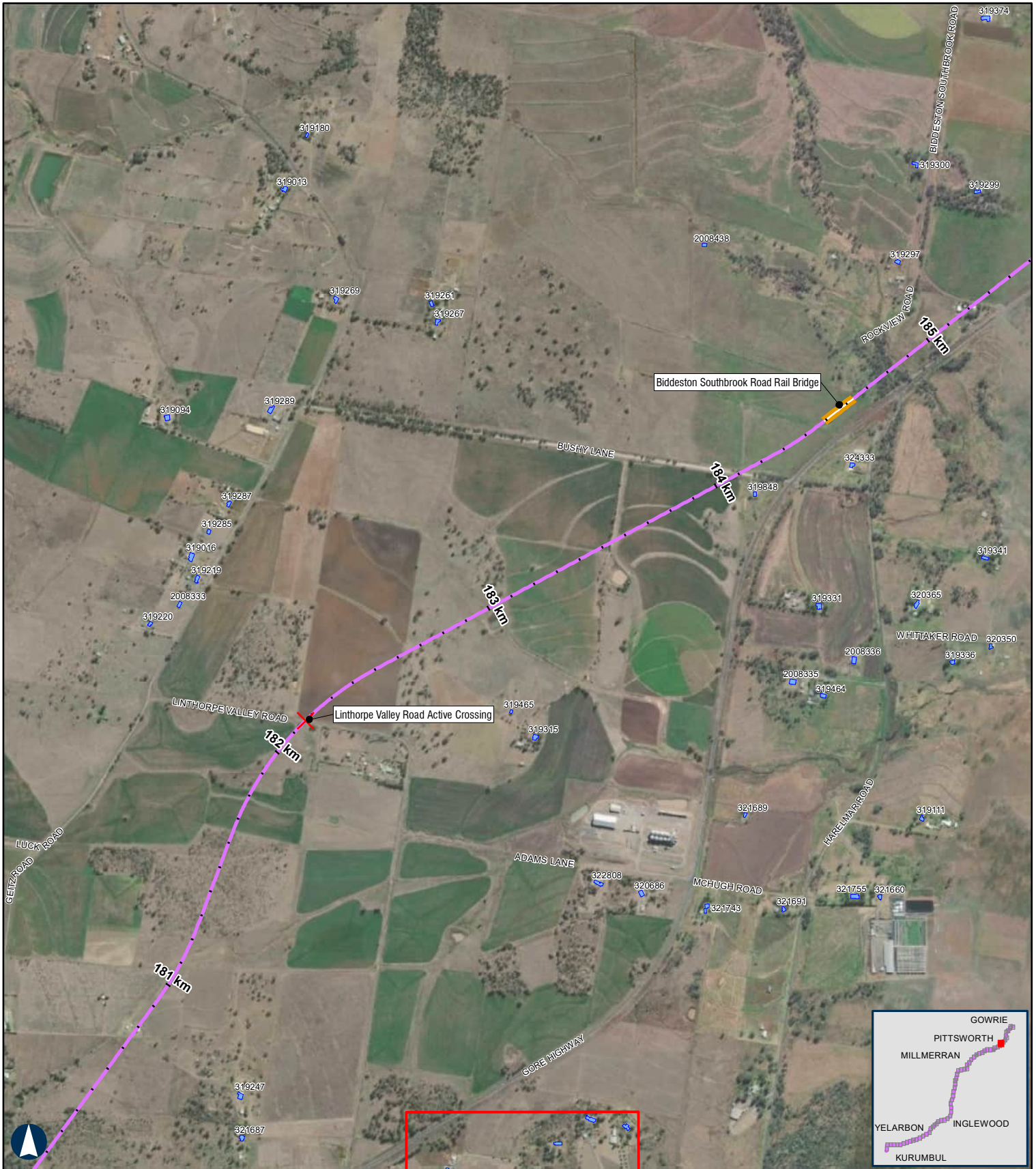
▢ Commercial

▢ Parkland

▢ Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 54 of 63

500 m

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✗ Level Crossings

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Koala Habitat Area

Sensitive Receptor Type

Residential

Educational

Community

Commercial

Parkland

Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 55 of 63

500 m

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- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Educational
- Community
- Commercial
- Parkland
- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 56 of 63

500 m

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Scale: 1:20,000

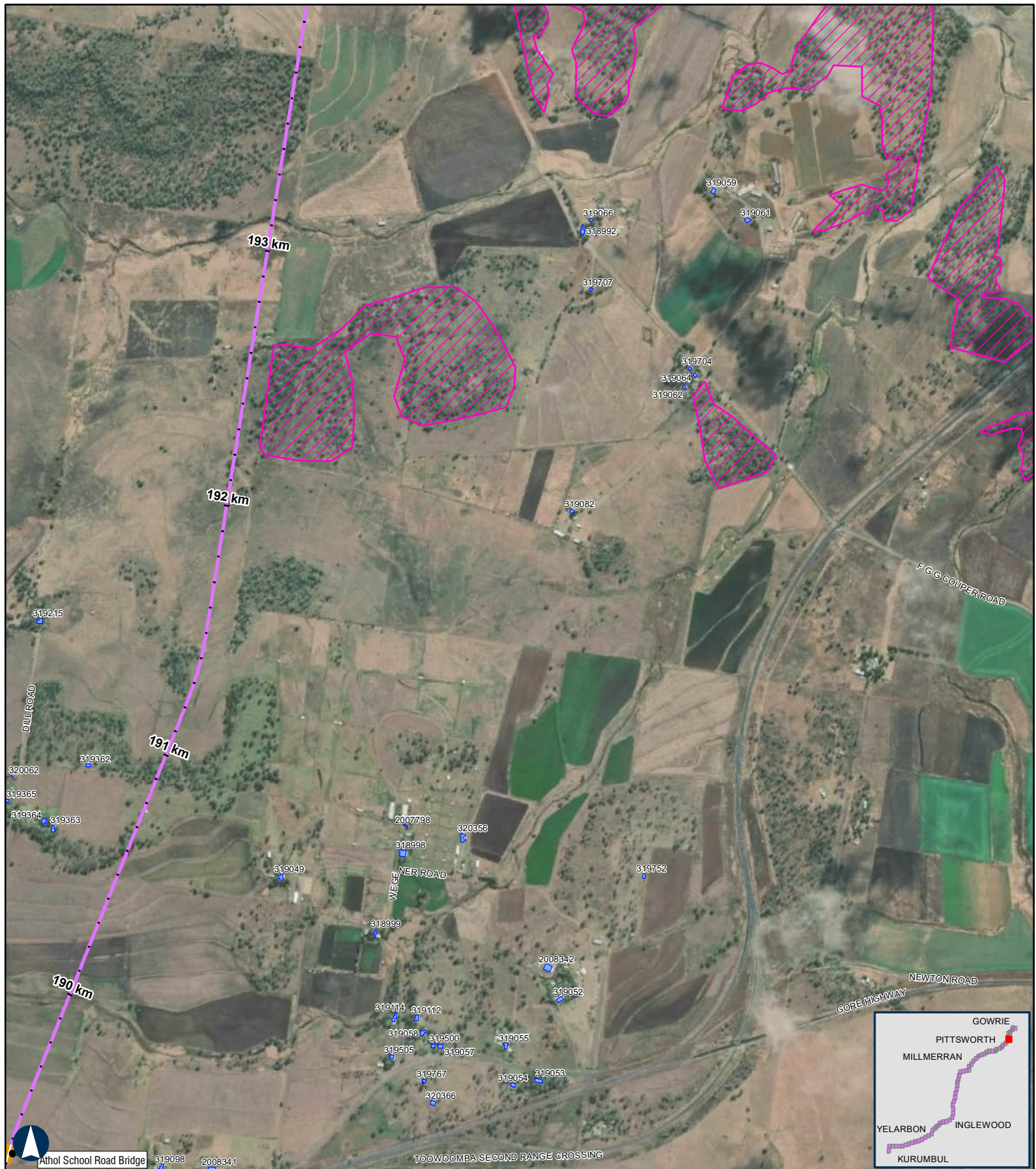
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- Community
- Commercial
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- Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 57 of 63

500 m

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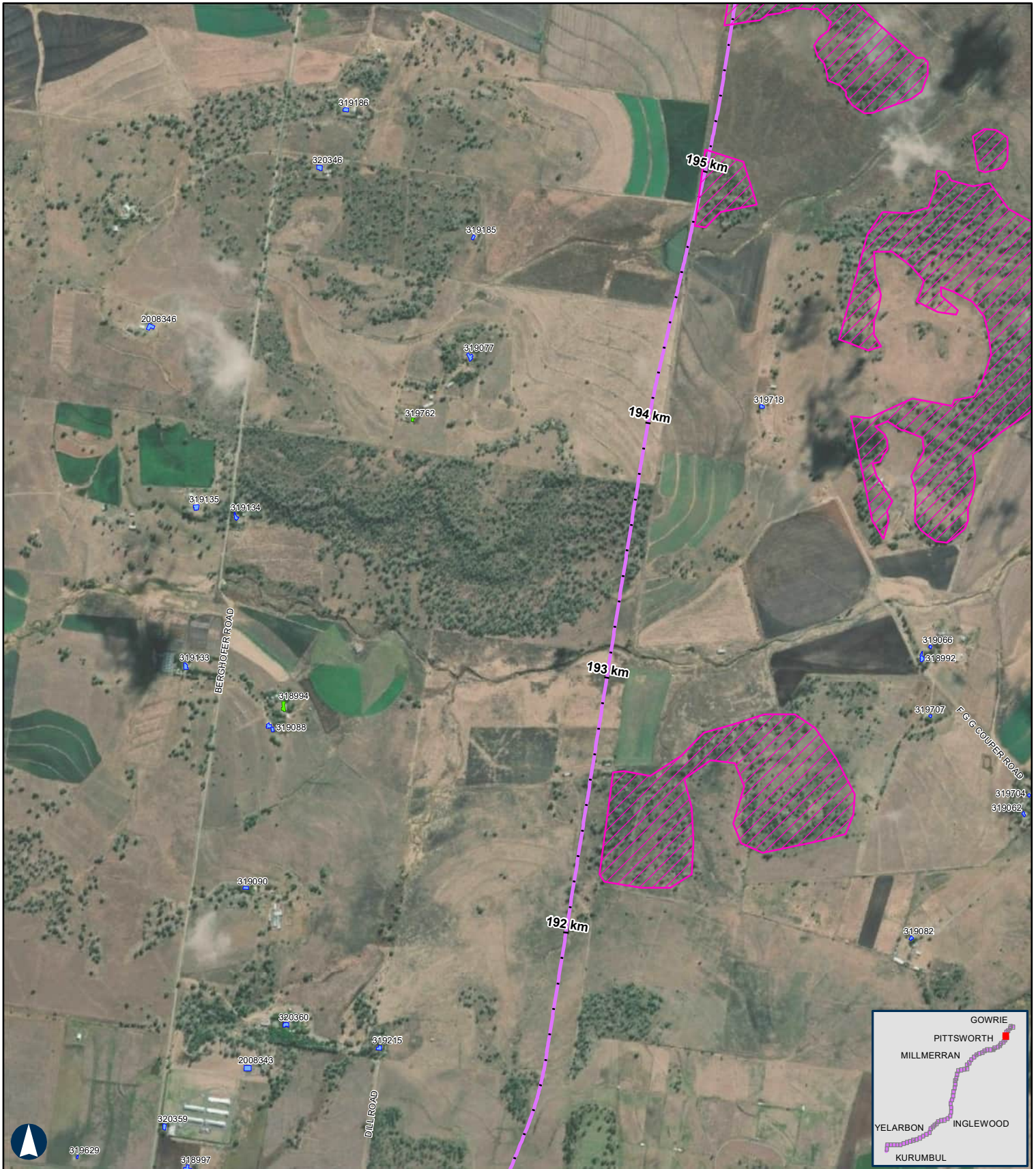
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 58 of 63

500 m

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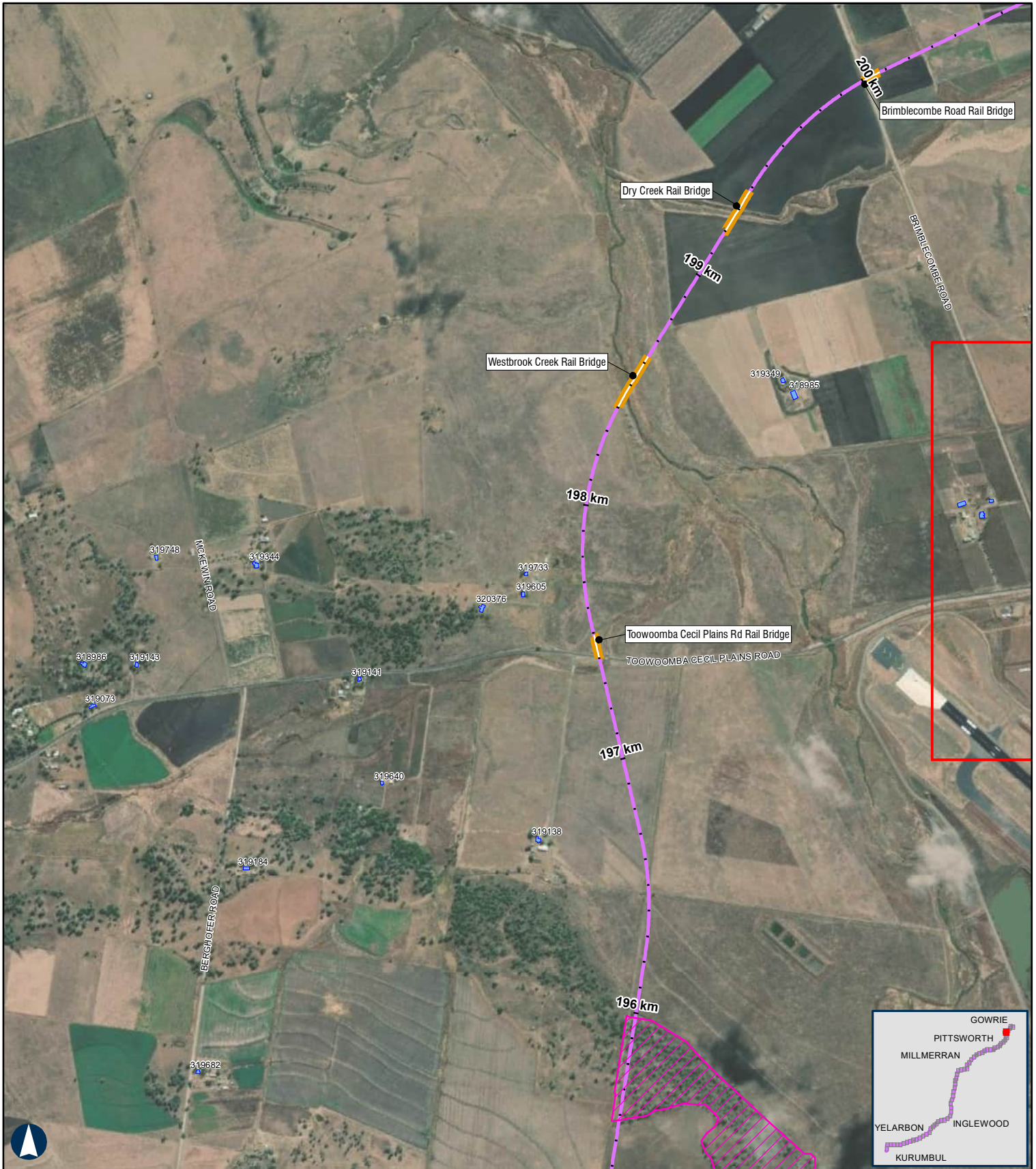
- ✗ Level Crossings
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- Rail Alignment/ Centreline
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Sensitive Receptor Type

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 59 of 63

500 m

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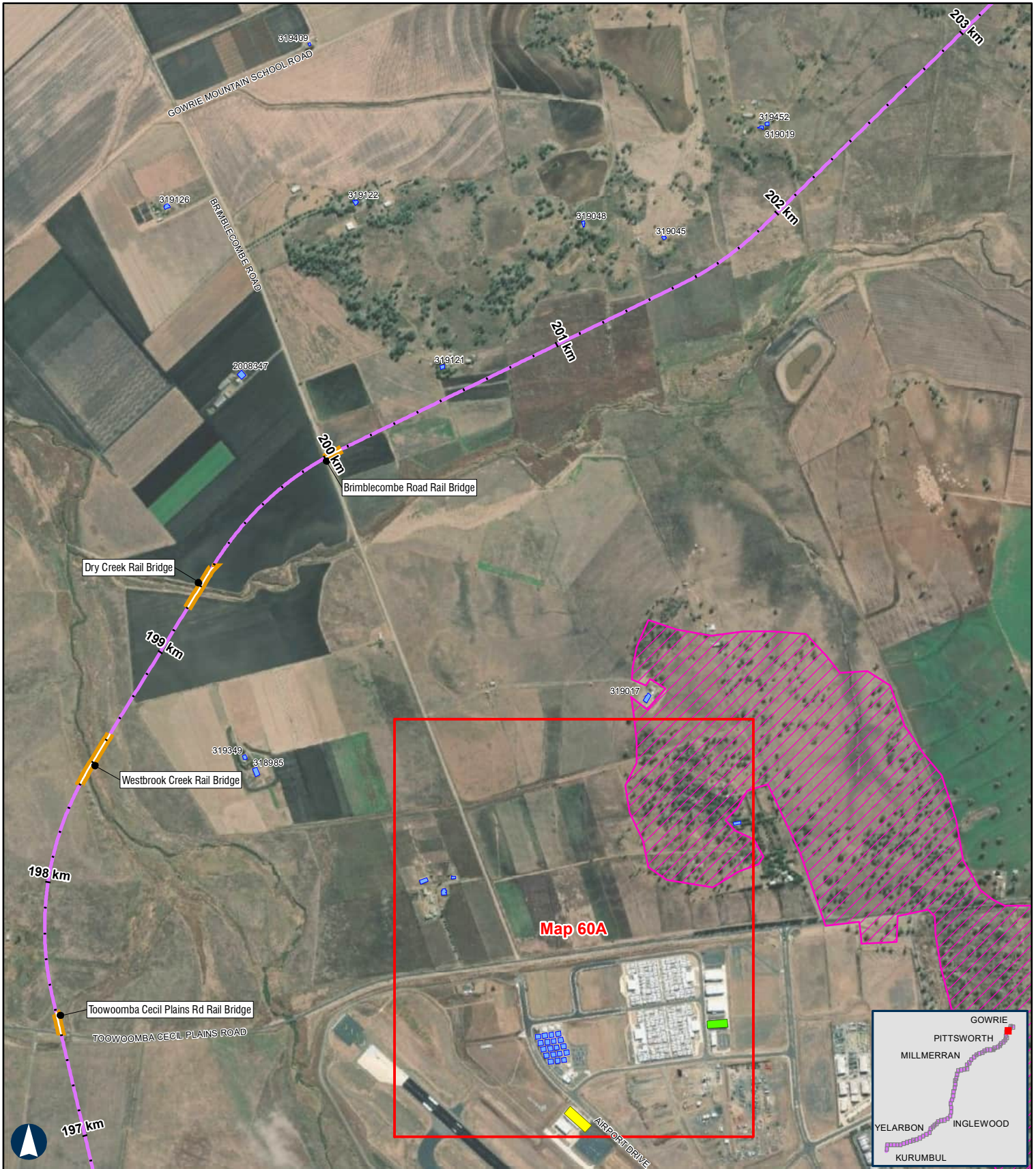
Scale: 1:20,000

- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 60 of 63

500 m

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Author: JG

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- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

- ▢ Residential
- ▢ Educational
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- ▢ Commercial
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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 60A of 63

200 m

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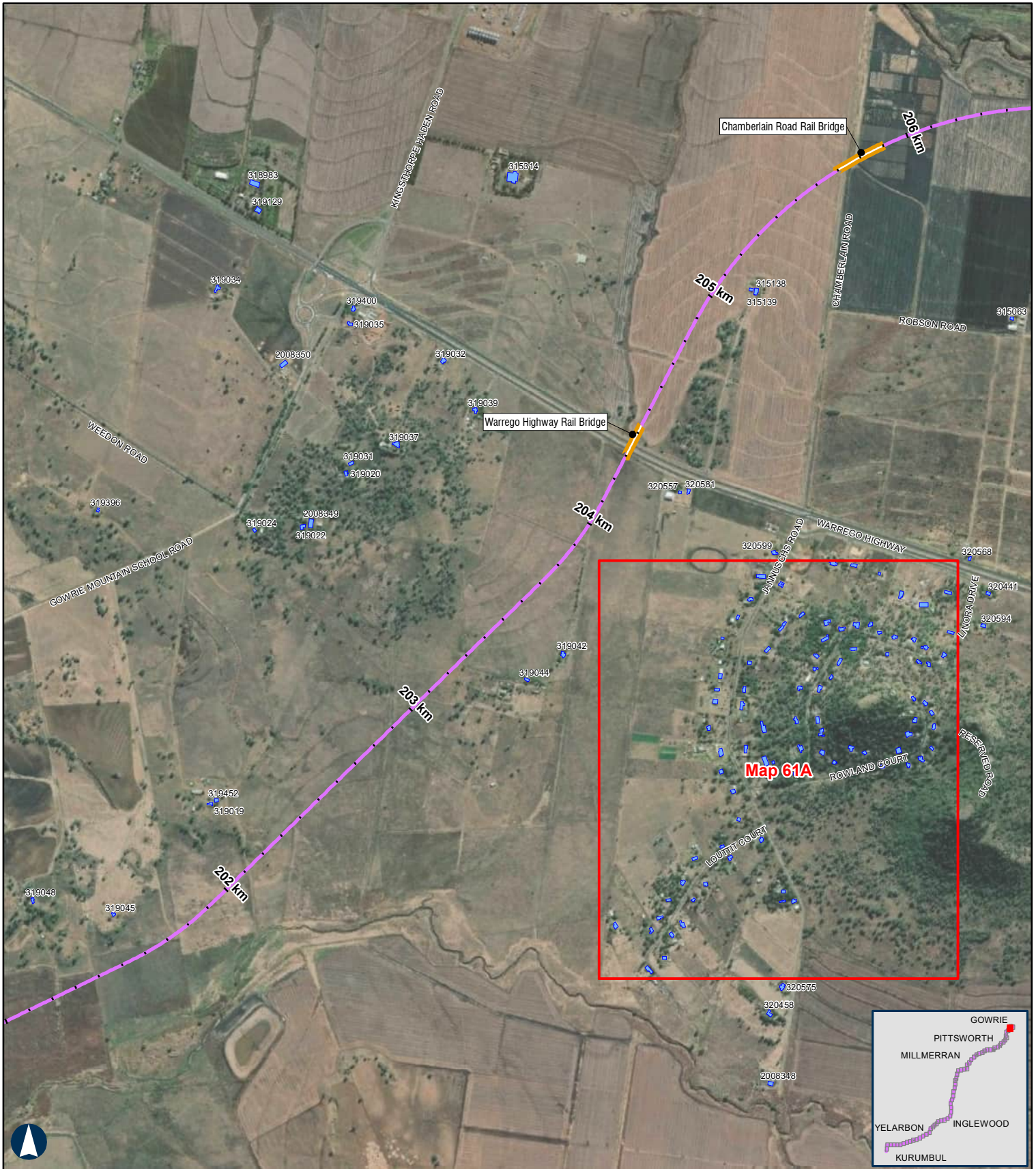
- ✕ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 61 of 63

500 m

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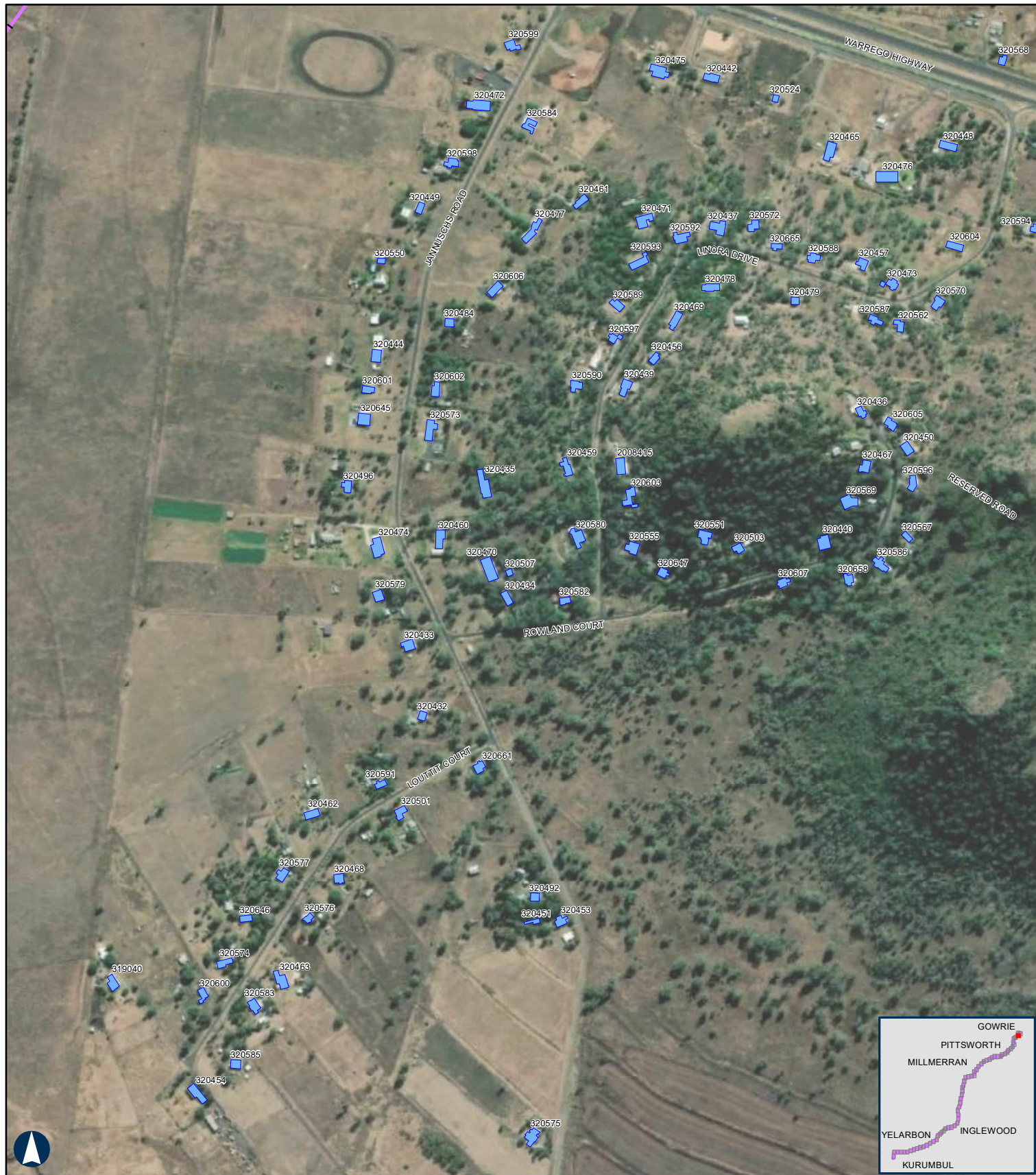
- ✗ Level Crossings
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BORDER TO GOWRIE

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APPENDIX A - Map 61A of 63

200 m

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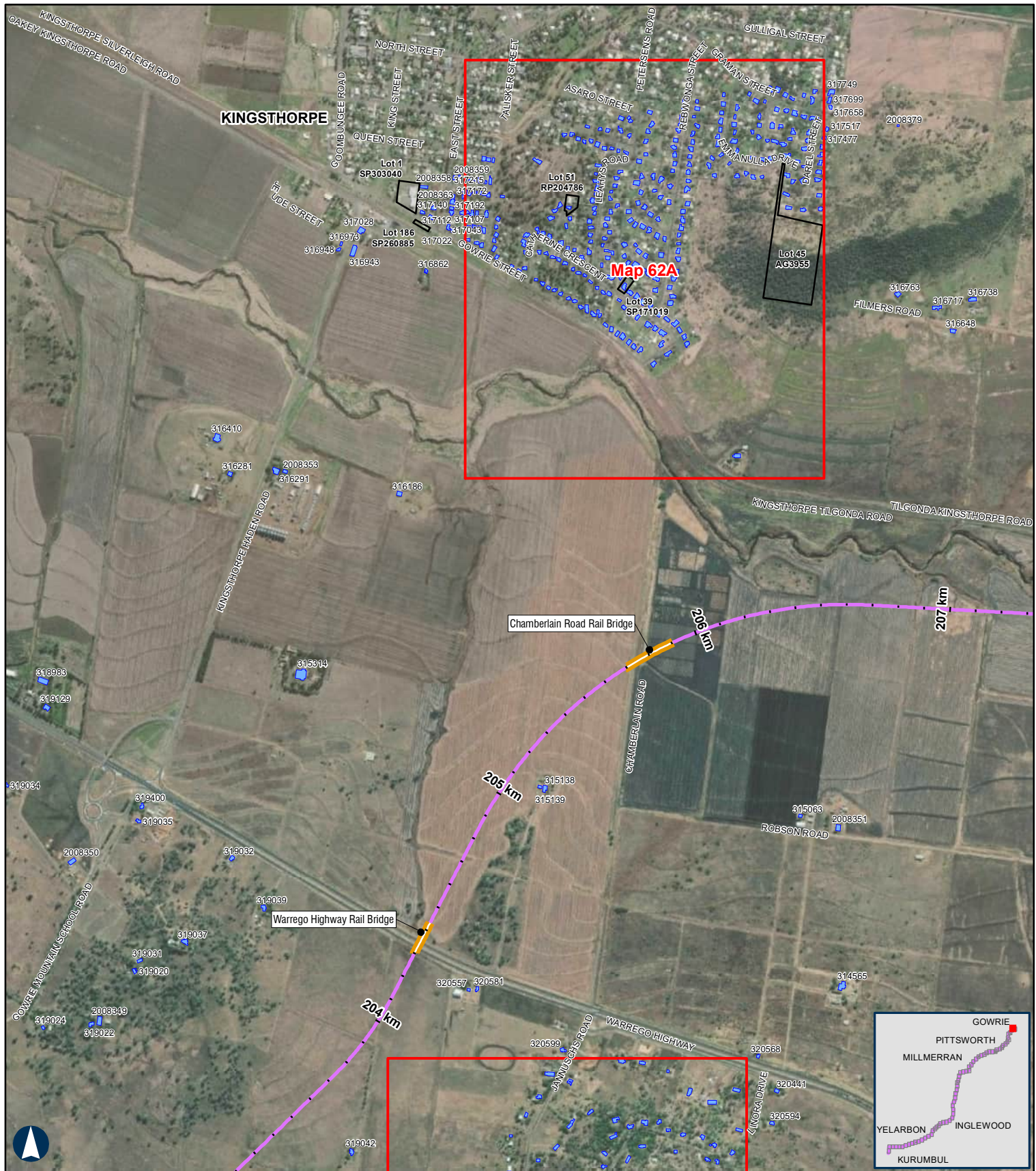
- Level Crossings
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BORDER TO GOWRIE

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APPENDIX A - Map 62 of 63

500 m

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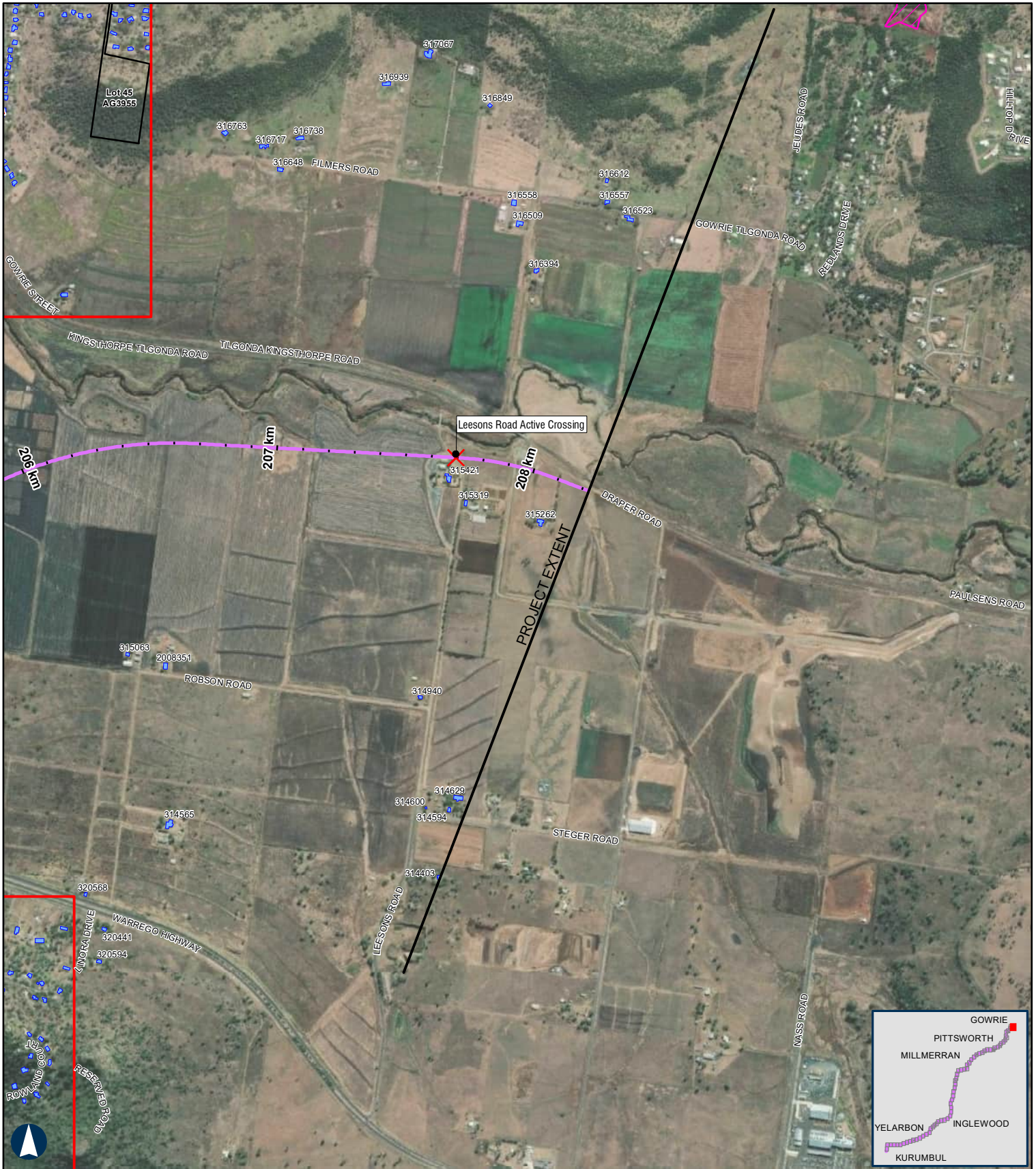
- ✗ Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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- ▢ Parkland
- ▢ Future Developments

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BORDER TO GOWRIE

Sensitive Receptors

APPENDIX A - Map 63 of 63

500 m

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Scale: 1:20,000

- X Level Crossings
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▨ Koala Habitat Area

Sensitive Receptor Type

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APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix B Noise prediction model verification (Queensland)

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Overview

The level and character of railway noise within the local environment is specific to the rollingstock operations, condition of the rails and the daily rail traffic. Because of the wide range in variability of these factors, noise prediction models for railway infrastructure are commonly developed from a database of verified source noise emission levels for the rollingstock.

Organisations such as TfNSW and QR provide train noise emission databases for the use in noise modelling and railway noise impact assessments. A similar verified noise emission database has been adopted for the Inland Rail project.

Comparison between the IR source level database and QR database is provided in **Table B1** with SEL levels normalised to a 15m distance from the track.

Table B1 source levels comparison

Rollingstock category	Train class	Gradient/Notch	SEL (dBA)
Inland Rail Source Levels			
Diesel electric locomotives	NR	Flat	85
		Downhill	84
		Uphill	90
	GT46C ¹	Flat	84
		Downhill	84
		Uphill	89
	82	Flat	83
		Downhill	84
		Uphill	88
	PR22L	Flat	84
		Downhill	84
		Uphill	89
QR database levels			
Diesel electric locomotives	Current Generation	Notch 4	84
		Notch 5	87
		Notch 6	90
		Notch 7	93
		Notch 8	96
	New Generation	Notch 4	77
		Notch 5	79
		Notch 6	81
		Notch 7	83
		Notch 8	85

The methodology to predict railway noise within the environment adjacent to the Inland Rail project has also been verified with reference to existing railway noise levels monitored by SLR at sections of existing West Moreton Line.



The details of the railway noise monitoring and noise model verification in three townships in QLD are provided in the following sections. Whilst the specific verification sites are outside the Project study area, the outcomes of the verification are reliable for the verification of the noise model and modelling methodology.

Monitoring locations and methodology

The noise monitoring locations were selected based on the following criteria, designed to provide a consistent approach across the noise monitoring locations:

- At monitoring sites adjacent to the rail line(s) that could be safely and regularly accessed without requiring entry to the rail corridor.
- Generally, locations were within 50 m of the rail corridor to be representative of the nearest sensitive receptors that align the rail corridor and to be close enough to limit the potential influence of local weather conditions.
- Where the track was generally straight and observed to be in relatively good condition. This requirement limited the potential influence of unique factors such as curving noise or prominent track wear which can substantially increase localised rail noise levels.
- Where daily rail traffic was comparable to the proposed rail movements with the Inland Rail project.
- Railway operations were predominately heavy rail traffic (coal and freight trains) and the locomotives were expected to generally be at a constant speed to minimise potential for discrete events such as braking or acceleration (high notch).

Railway noise levels for the daily existing trains movements were monitored at five individual locations at the townships of Gatton, Forest Hill and Calvert, as summarised in **Table B2** and presented in **Figure B2**.

Table B2 Noise monitoring locations in QLD

SLR ID	Location	Monitoring dates	Equipment ^{1,2}
1	Smithfield Road, Gatton 40 m from the outer rail	20 to 27 March 2019	SVAN 957 noise logger (27580)
2	Chadwick Road, Gatton 17 m from the outer rail	20 to 27 March 2019	SVAN 957 noise logger (23241)
3	Railway Street, Forest Hill 15 m from the outer rail	20 to 27 March 2019	NGARA noise logger (8781A5)
4	Gordon Street, Forest Hill 18 m from the outer rail	20 to 27 March 2019	NGARA noise logger (8780FF)
5	Newcastle Street, Calvert 78 m from the outer rail	21 to 27 March 2019	NGARA noise logger (8780AF)

Note 1 All monitoring equipment complies with the requirements of Australian Standard AS1259-1990 (part 1 and 2) and IEC 61672.

Note 2 All equipment was calibrated before and after the monitoring period with any drift in signal less than 1 dB.





QLD NOISE MODEL VERIFICATION

FIGURE B1 - Map 1 of 3

200 metres

Coordinate System: GDA 1994 MGA Zone 56

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- Noise Monitoring Locations
- Rail Alignment/Centreline
- Bridges and Viaducts
- Watercourses

Paper: A4

Scale: 1:10,000

Date: 24-Jun-2020

Author: JG

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QLD NOISE MODEL VERIFICATION

200 metres

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Date: 24-Jun-2020
Author: JG

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FIGURE B1 - Map 2 of 3

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QLD NOISE MODEL VERIFICATION

FIGURE B1 - Map 3 of 3

200 metres

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● Noise Monitoring Locations

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Paper: A4

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To avoid the influence of surrounding buildings and structures on the railway noise levels, the railway noise levels were monitored in the free-field environment at 1.5 m above ground level for a period of seven consecutive days at each location. The noise levels were measured at intervals of 1/10th of a second in order to isolate the discrete noise contribution from the train passby events.

The noise monitoring data was analysed to determine the noise emission level and duration of each clearly discernible train passby event. Applying principles from ISO 3095, the noise levels were analysed to define each train passby event. The analytical process for each location adopted the following approach:

- Identifying all noise level events above an initial threshold and sustained for a defined period of time; this was site specific and provided a first pass filter to identify likely train passby events.
- The length of each event was identified from the start and end points where the noise levels were within 10 dBA of the ambient noise level.
- Each event was visually inspected to identify statistically valid train profiles i.e. a train passby signature that can be used to refine the processing of identifying each passby event.
- The audio data for each identified noise event was reviewed to confirm it was a train passby and no other, erroneous, activity nearby to the monitoring location.

Monitored daily rail noise levels

The highest daily L_{Aeq} and SEM railway noise levels at each monitoring location are detailed in the following table. The L_{Aeq} and SEM noise levels are the highest noise levels reported over a 24-hour period for each period.

Weather data was referenced from the nearest Bureau of Meteorology weather station at Gatton, station number 94562. The local weather conditions, principally wind speed and precipitation, were found to not have influenced the monitoring noise levels for the train passby events. This was also, in part, due to the proximity of the monitoring locations to the rail lines.

The monitored railway noise levels at the locations in Gatton, Forest Hill and Calvert are detailed in **Table B3**.

Table B3 Monitored daily railway noise levels

Monitoring location	Monitored railway noise levels, dBA	
	L _{Aeq} ,24hr	SEM ¹
ID 1 Gatton	56.3	83.6
ID 2 Gatton	55.6	83.7
ID 3 Forest Hill	60.6	86.4
ID 4 Forest Hill	60.3	86.3
ID 5 Calvert	47.3	71.6

Note 1 Single Event Maximum as defined by Section 3.1.3 of the DTMR Interim Guideline, Operational Railway Noise and Vibration, March 2019.

The analysis of the monitored noise levels and audio recordings for the train passbys, along with on-site observations, identified the following:

- At ID 1 in Gatton, the nearby steel framed railway bridge did not substantially influence the rolling noise, when compared to the adjacent surface track sections. The trains



speed of approximately 50 km/h in Gatton may not have been sufficient for the bridge structure to be a source of elevated rolling noise.

- The maximum noise levels in Gatton were, at times, influenced by trains accelerating using short-lived higher notch settings as the train departed the centre of Gatton. The specific notch settings and acceleration was dependent on the driver and varied for each train.
- The monitored noise levels vary by 1 to 2 dBA between the two monitoring locations at Forest Hill and demonstrate rail noise levels are generally consistent either side of the immediate rail corridor.
- At Calvert, whilst the train passbys were clearly audible, the ambient noise levels and local environment (buildings and vegetation) had an influence on the ability to isolate the complete duration, and L_{Aeq} noise level, of some train passbys events. The maximum noise levels were clearly defined.
- At all monitoring locations the SEM was in the order of 1 to 6 dBA lower than the daytime or night-time 95th percentile L_{Amax} noise levels.

Noise modelling

To enable verification of the monitored noise levels, the SoundPLAN noise modelling developed for the Inland Rail project, as discussed in **Section 6.0** of this report, was applied to calculate railway noise levels at each noise monitoring location.

A summary of the key noise modelling data and methodologies for the existing railway noise levels is provided in **Table B4**.

Table B4 Noise modelling inputs

Noise model attribute	Source data/ modelling approach
Daily train movements	Refer to Table C1 for the West Moreton Line
Rail line speeds	Referencing the monitored data the train speeds were estimated as 50 km/h in Gatton, 60 km/h in Forest Hill and Calvert.
Railway acoustic corrections	Nil, all track was straight with no tight-radius curves, turnouts etc. within 100 m of each monitoring location.
Track strings	The alignment of the existing rail tracks was referenced from publicly available datasets and rail corridor designs supplied by INLAND RAIL.
Consist information	All trains modelled with consist 850 m in length
Passenger rail traffic	There were no passenger rail movements on the West Moreton Line
Local environment	3-dimensional digital terrain models were developed for the existing environment at each monitoring location. Ground conditions were modelled as hard ground (ground absorption co-efficient of 0.0).



Noise model attribute	Source data/ modelling approach		
Locomotive source noise emission levels	Based on available information, the West Morton System has 2300 class locomotives, which are an upgraded GT22LC-2 type locomotives. These locomotives are also currently operated on the Millmerran line to haul grain traffic. In order to validate the Inland Rail Project noise model, the noise emission levels were assigned based on the Inland Rail noise emission database, with reference to comparable datasets developed by TfNSW and QR.		
	Rollingstock category	Reference length	Reference noise level, dBA SEL
	West Moreton Line, Queensland		
	82 Class locomotive (two per train) (representative of typical coal train locomotives)	22 m	83
	NR Class locomotive (two per train) (representative of typical freight locomotives)	22 m	85
	Note All noise levels are referenced at a distance of 15 m for a speed of 80 km/h.		
	Rollingstock category	Reference length	Reference noise level, dBA SEM
	West Moreton Line, Queensland		
	Locomotive (combination of 82 and NR class)	22 m	88
	Wagon (80 km/hr)	850 m	86

Noise model verification

The predicted and monitored L_{Aeq} and L_{Amax} railway noise levels at each location were compared as part of the noise model verification, as detailed in **Table B5**. The model was determined to be verified to a suitable accuracy where the predicted noise levels were within ± 2 dBA of the measured railway noise levels.

The modelled locomotive noise emissions at location ID 1 in Gatton included a +4 dBA adjustment to the modelled source levels to account for the intermittent localised increases in notch setting which were observed and monitored as trains had passed through the centre of Gatton.

Table B5 Modelled railway noise levels

Monitoring location	Railway noise levels, dBA	
	$L_{Aeq,24hr}$	SEM
West Moreton Line, QLD		
ID 1 Gatton	57.4	86.5
ID 2 Gatton	59.6	89.6
ID 3 Forest Hill	61.0	89.2
ID 4 Forest Hill	60.9	89.1
ID 5 Calvert	53.0	77.3



The monitored and modelled L_{Aeq} and SEM noise levels at each location were compared, as detailed in **Table B5**. The noise model validation was determined for all five noise monitoring locations. Because the monitored L_{Aeq} noise levels at Calvert were at times influenced by the local environment the validation was also undertaken for the locations at Gatton and Forest Hill (total four monitoring locations).

Overall, the L_{Aeq} noise levels verify within 2 dBA of the monitored L_{Aeq} noise and achieves DTMR guidelines on transport noise model validation. The SEM noise levels are predicted to be approximately 4 dB above the monitored level. Considering the volatile nature of maximum noise levels, the validation exercise shows that the assumed SEM methodology is conservative in nature. The comparison at each location is presented in **Table B6**. At the EIS stage it is satisfactory to over-predict the railway noise levels to provide conservatism in both the assessment of potential noise impacts and the recommendations for potential noise mitigations.

The validation exercise also demonstrates that the source levels for locomotives used (from the Inland Rail assessment method) for modelling results in higher noise levels compared to the measured noise levels on the West Moreton system. Consequently, the freight locomotive noise missions derived from the NSW database are deemed conservative, and satisfies the modelling requirement of worst-case conditions, as required by the Interim Guideline.

Table B6 Noise model verification

Monitoring location	Model verification, dBA	
	$L_{Aeq,24hr}$	SEM
West Moreton Line, QLD		
ID 1 Gatton	1.2	2.9
ID 2 Gatton	4.0	5.9
ID 3 Forest Hill	0.5	2.8
ID 4 Forest Hill	0.6	2.8
ID 5 Calvert	5.6	5.7
Model validation all locations	2.4	4.0
Model validation locations ID 1,2,3 & 4	1.6	3.6

The following features of the existing railway operations and the noise modelling methodology are considered to have influenced the noise model validation.

- In Gatton the noise monitoring data and on-site observations identify potential for the speed of individual trains to vary depending on the time of day and driver behaviour. The monitored L_{Aeq} noise levels are sensitive to variations to factors such as train speed. The noise model assumes a consistent train speed of 50 km/h in Gatton and does not account for individual trains travelling at varying speeds.
- In Forest Hill the train speed was observed to be generally consistent and is suitably replicated by the consistent train speed applied in the noise model.
- The modelling of L_{Aeq} noise levels at Calvert does not account for the localised ambient noise which at times influenced the monitored L_{Aeq} railway noise levels.



APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix C Noise and vibration from double-stacked freight wagons

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

The load on the axles from freight wagons has the potential to influence the noise and vibration emission levels during the train passby event. The load will vary depending on the configuration of single stacked and double stacked containers and the contents of the containers which can vary from empty to the capacity weight.

To investigate the noise and vibration emission levels, SLR conducted a noise and vibration monitoring survey in January 2019 at a section of straight track near to Merriton, approximately 170 km north of Adelaide. The freight trains in the area were known to have both single stacked and double stacked containers on the wagons.

Based on site observations from outside the rail corridor area, the following features of the track were identified:

- The track was single line, on a ballasted track with concrete sleepers with train movements in both directions.
- The depth of the ballast was estimated at 700 mm on clay and sandy top soil.
- Based on site observations the train speeds ranged from 80 km/h to 100 km/h.

During train passby events, noise and vibration levels were monitored simultaneously at six locations along the track section. A comparison of the noise and vibration level across the whole train passby was made for the trains that had only single stacked containers on the wagons and those trains with a combination of double stacked and single stacked containers. It was noted that no trains had all wagons loaded with double stacked containers and the analysis did not isolate those wagons that were empty or stacked with empty containers.

The noise level over the duration of the train passby events are presented for the three noise monitoring locations (Channel 4, Channel 5 and Channel 6) in **Figure C1**. Spot 2D acoustic intensity measurements confirmed the rail and wheel are key noise sources (and not say radiated vibration of containers).

The locomotives at the front of the train are the initial elevated noise levels with the sections of known single stacked and double stacked containers identified thereafter. It can be seen that the noise levels at the three monitoring locations were approximately 2 dBA or less during the passby of the double stacked wagons.

As shown in **Figure C2**, consistent with the measured noise levels, albeit a more marginal difference, the vibration velocity levels (in dBV) are higher with the single stacked container wagons.

It is considered that if a noise emission correction factor were to be applied to the stacking configuration, this would be complicated by many factors in practice, particularly:

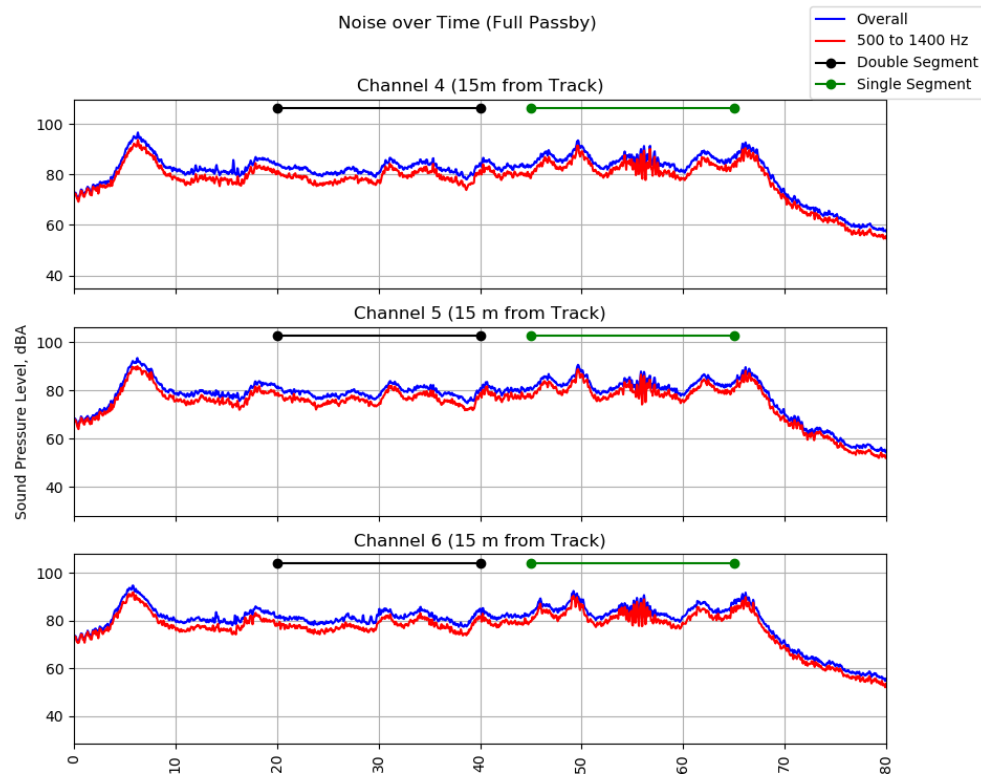
- the proportion of wagons with single and double stacked containers and where they are located,
- the number and position of empty wagons (no containers), and;
- the load of the individual wagons, which can vary from empty to the maximum load capacity.

Consequently, whilst the loading of the freight consist can vary considerably depending on the mix of empty or fully loaded containers, the measurements to date find it insignificant with respect to rolling noise and vibration emissions compared to other factors such as individual wheel and track condition.

On the basis of the above analysis, correction factors to the noise and/or vibration emissions from double stacked wagons should not be considered in the Inland Rail operational rail noise and vibration assessments.

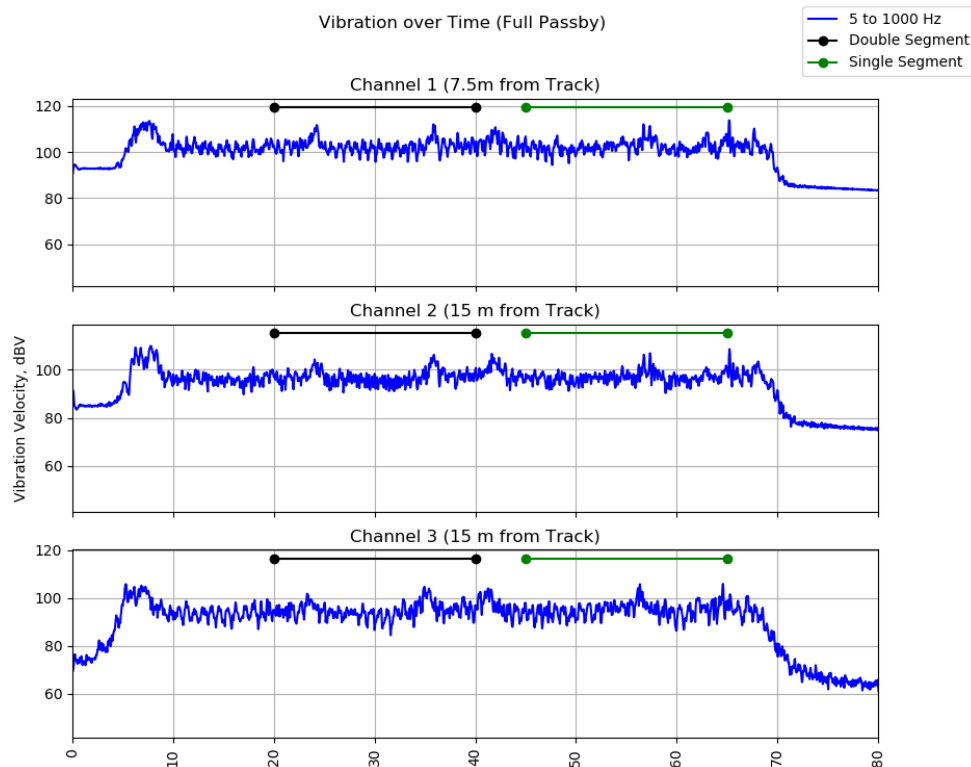


Figure C1 A-weighted noise levels for the entire train passby



The ground vibration levels at three locations (Channel 1, Channel 2 and Channel 3) for the same train passby event is presented in **Figure C2**.

Figure C2 Vibration velocity levels for the entire train passby



APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix D Predicted airborne railway noise levels—Opening year 2028

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

The predicted unmitigated railway noise levels for the Opening Year 2028 scenario are detailed in the tables on the following pages. These tables present the predicted noise levels for the identified sensitive receptors within the 2 km study area. This includes all sensitive receptors where the predicted noise levels triggered an investigation of noise mitigation. Note that for outdoor sensitive areas, the predicted levels tabulated relate to 12-hour L_{Aeq} as required under the Interim Guideline.

Following the tabulated results are the predicted noise contour maps. All noise contours are predicted at 1.8 m above ground level including where there are bridges and viaducts. Whilst the contours presented for L_{Aeq} are for a 24-hour assessment period, the predicted levels also apply for outdoor sensitive spaces (which require a 12-hour assessment period) as the train movements are assumed to be equally distributed during the day.

The noise contours are calculated from the interpolation of thousands of calculation points and provide an overview of the railway noise levels to assist the interpretation of the assessment and its outcomes. The tabulated noise levels at the individual sensitive receptors should be referenced when assessing railway noise levels against the criteria.



Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254161	Residential	60	82	63	88	63
254164	Residential	60	82	63	88	63
254168	Residential	60	82	64	90	65
254170	Residential	60	82	63	88	63
254179	Residential	60	82	61	86	61
254181	Residential	60	82	59	84	59
254188	Residential	60	82	55	80	55
254193	Residential	60	82	55	79	55
254219	Residential	60	82	53	78	53
254221	Residential	60	82	51	76	51
254250	Residential	60	82	65	91	65
254255	Residential	60	82	57	82	57
254261	Residential	60	82	45	70	45
254271	Residential	60	82	68	93	68
254276	Residential	60	82	61	86	61
254282	Residential	60	82	48	72	48
254290	Residential	60	82	48	71	48
254295	Residential	60	82	38	63	38
254300	Residential	60	82	48	73	48
254307	Residential	60	82	48	71	48
254308	Residential	60	82	47	71	47
254312	Residential	60	82	49	72	49
254313	Residential	60	82	45	69	45
254314	Residential	60	82	49	72	49
254315	Residential	60	82	45	70	45
254318	Residential	60	82	49	73	49
254319	Residential	60	82	48	73	48
254320	Residential	60	82	48	72	48
254324	Residential	60	82	46	70	46
254325	Residential	60	82	44	69	44
254332	Residential	60	82	48	72	48
254336	Residential	60	82	44	69	44
254340	Residential	60	82	52	77	52
254344	Residential	60	82	51	76	51
254346	Residential	60	82	51	76	51
254347	Residential	60	82	61	86	61
254348	Residential	60	82	51	75	51
254354	Residential	60	82	50	74	50
254357	Residential	60	82	45	69	45
254358	Residential	60	82	48	73	48
254361	Residential	60	82	47	71	47
254365	Residential	60	82	48	71	48
254367	Residential	60	82	47	71	47
254369	Residential	60	82	50	75	50
254370	Residential	60	82	47	70	47
254372	Residential	60	82	46	70	46
254376	Residential	60	82	52	77	52
254377	Residential	60	82	50	73	50
254378	Residential	60	82	48	71	48
254381	Residential	60	82	44	68	44
254383	Residential	60	82	44	69	44
254384	Residential	60	82	48	73	48
254387	Residential	60	82	41	66	41
254388	Residential	60	82	48	72	48
254389	Residential	60	82	48	72	48
254391	Residential	60	82	48	72	48
254396	Residential	60	82	48	73	48
254400	Residential	60	82	49	74	49

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254401	Residential	60	82	46	71	46
254402	Residential	60	82	48	72	48
254403	Residential	60	82	49	74	49
254404	Residential	60	82	47	71	47
254406	Residential	60	82	50	74	50
254408	Residential	60	82	48	72	48
254410	Residential	60	82	48	73	48
254411	Residential	60	82	48	72	48
254412	Residential	60	82	53	78	53
254419	Residential	60	82	48	73	48
254421	Residential	60	82	53	78	53
254422	Residential	60	82	48	72	48
254425	Residential	60	82	49	73	49
254427	Residential	60	82	49	73	49
254431	Residential	60	82	49	73	49
254433	Residential	60	82	52	77	52
254437	Residential	60	82	51	75	51
254438	Residential	60	82	46	71	46
254440	Residential	60	82	45	69	45
254441	Residential	60	82	51	75	51
254442	Residential	60	82	49	73	49
254444	Residential	60	82	50	74	50
254446	Residential	60	82	49	73	49
254448	Residential	60	82	51	74	51
254449	Residential	60	82	50	73	50
254453	Residential	60	82	52	77	52
254456	Residential	60	82	50	74	50
254458	Residential	60	82	51	76	51
254460	Residential	60	82	47	72	47
254462	Residential	60	82	50	75	50
254463	Residential	60	82	49	74	49
254465	Residential	60	82	48	72	48
254468	Residential	60	82	49	73	49
254469	Residential	60	82	51	75	51
254470	Residential	60	82	52	76	52
254476	Residential	60	82	56	81	56
254478	Residential	60	82	50	75	50
254484	Residential	60	82	51	76	51
254486	Residential	60	82	53	77	53
254487	Residential	60	82	51	76	51
254490	Residential	60	82	50	75	50
254492	Residential	60	82	52	76	52
254493	Residential	60	82	50	75	50
254494	Residential	60	82	50	74	50
254499	Residential	60	82	49	74	49
254500	Residential	60	82	52	77	52
254501	Residential	60	82	51	76	51
254502	Residential	60	82	55	80	55
254507	Residential	60	82	51	75	51
254508	Residential	60	82	54	78	54
254516	Residential	60	82	54	79	54
254517	Residential	60	82	52	77	52
254521	Residential	60	82	54	79	54
254524	Residential	60	82	53	77	53
254526	Residential	60	82	54	79	54
254529	Residential	60	82	54	79	54
254531	Residential	60	82	54	79	54
254532	Residential	60	82	52	76	52

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254533	Residential	60	82	52	76	52
254534	Residential	60	82	57	82	57
254535	Residential	60	82	54	79	54
254536	Residential	60	82	55	80	55
254537	Residential	60	82	54	79	54
254539	Residential	60	82	56	81	56
254540	Residential	60	82	54	79	54
254542	Residential	60	82	54	79	54
254546	Residential	60	82	55	80	55
254549	Residential	60	82	55	80	55
254550	Residential	60	82	55	79	55
254551	Residential	60	82	61	87	61
254558	Residential	60	82	65	90	65
254559	Residential	60	82	65	90	65
254560	Residential	60	82	50	74	50
254562	Residential	60	82	65	91	65
254565	Residential	60	82	65	90	65
254568	Residential	60	82	53	78	53
254571	Residential	60	82	57	82	57
254573	Residential	60	82	55	80	55
254576	Residential	60	82	63	88	63
254578	Residential	60	82	58	83	58
254587	Residential	60	82	57	82	57
254589	Residential	60	82	64	89	64
254594	Residential	60	82	57	82	57
254595	Residential	60	82	64	89	64
254598	Residential	60	82	64	89	64
254601	Residential	60	82	59	84	59
254603	Residential	60	82	64	89	64
254609	Residential	60	82	69	94	69
254612	Residential	60	82	63	89	63
254614	Residential	60	82	68	93	68
254628	Residential	60	82	58	83	58
254635	Residential	60	82	60	86	60
254640	Residential	60	82	48	72	48
254656	Residential	60	82	52	76	52
254657	Residential	60	82	44	69	44
254661	Residential	60	82	58	83	58
254675	Residential	60	82	49	73	49
254681	Residential	60	82	48	72	48
254682	Residential	60	82	47	72	47
254683	Residential	60	82	45	70	45
254689	Residential	60	82	48	72	48
254690	Residential	60	82	48	72	48
254691	Residential	60	82	48	72	48
254705	Residential	60	82	50	73	50
254714	Residential	60	82	49	73	49
254717	Residential	60	82	50	75	50
254719	Residential	60	82	42	67	42
254720	Residential	60	82	44	69	44
254728	Residential	60	82	47	72	47
254730	Residential	60	82	47	72	47
254731	Residential	60	82	43	68	43
254736	Residential	60	82	41	65	41
254745	Residential	60	82	45	70	45
254747	Residential	60	82	47	73	47
254755	Residential	60	82	45	70	45
254757	Residential	60	82	50	73	50

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254762	Residential	60	82	45	70	45
254769	Residential	60	82	49	72	49
254783	Residential	60	82	51	75	51
254787	Residential	60	82	57	81	57
254790	Residential	60	82	56	80	56
254808	Residential	60	82	49	73	49
254810	Residential	60	82	38	63	38
254817	Residential	60	82	43	67	43
254828	Residential	60	82	59	84	59
254837	Residential	60	82	40	64	40
254892	Residential	60	82	43	66	43
254987	Residential	60	82	45	70	45
255054	Residential	60	82	42	66	42
255080	Residential	60	82	45	69	45
255091	Residential	60	82	41	65	41
255093	Residential	60	82	41	66	41
255097	Residential	60	82	44	68	44
255114	Residential	60	82	42	68	42
255143	Residential	60	82	47	71	47
255156	Residential	60	82	45	70	45
255158	Residential	60	82	45	70	45
255159	Residential	60	82	42	66	42
255192	Residential	60	82	42	68	42
255220	Residential	60	82	41	67	41
255223	Residential	60	82	46	70	46
255238	Residential	60	82	47	72	47
255240	Residential	60	82	48	72	48
255248	Residential	60	82	51	75	51
255277	Residential	60	82	51	76	51
255295	Residential	60	82	45	70	45
255307	Residential	60	82	42	65	42
255309	Residential	60	82	42	65	42
255318	Residential	60	82	57	81	57
255333	Residential	60	82	58	83	58
255336	Residential	60	82	54	79	54
255346	Residential	60	82	60	85	60
255349	Residential	60	82	55	79	55
255350	Residential	60	82	60	85	60
255357	Residential	60	82	57	82	57
255377	Residential	60	82	50	74	50
255387	Residential	60	82	50	75	50
255388	Residential	60	82	54	78	54
255394	Residential	60	82	52	77	52
255395	Residential	60	82	47	70	47
255396	Residential	60	82	49	73	49
255402	Residential	60	82	45	69	45
255406	Residential	60	82	43	68	43
255412	Residential	60	82	46	69	46
255433	Residential	60	82	56	81	56
255453	Residential	60	82	50	75	50
255455	Residential	60	82	51	75	51
255487	Residential	60	82	50	74	50
255511	Residential	60	82	54	78	54
255514	Residential	60	82	54	79	54
255518	Residential	60	82	36	61	36
255520	Residential	60	82	35	60	35
255558	Residential	60	82	40	64	40
255595	Residential	60	82	45	69	45

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
255601	Residential	60	82	47	71	47
255603	Residential	60	82	53	78	53
255605	Residential	60	82	51	75	51
255617	Residential	60	82	43	67	43
255620	Residential	60	82	36	60	36
255621	Residential	60	82	37	61	37
255630	Residential	60	82	49	74	49
255640	Residential	60	82	36	61	36
255641	Residential	60	82	50	75	50
255691	Residential	60	82	53	78	53
255776	Residential	60	82	56	81	56
255777	Residential	60	82	54	79	54
255835	Residential	60	82	48	73	48
255861	Residential	60	82	46	71	46
255865	Residential	60	82	45	70	45
255892	Residential	60	82	43	68	43
255934	Residential	60	82	49	73	49
255984	Residential	60	82	52	77	52
256012	Residential	60	82	39	62	39
256019	Residential	60	82	60	85	60
256048	Residential	60	82	50	74	50
256057	Residential	60	82	53	77	53
256166	Residential	60	82	59	84	59
256191	Residential	60	82	52	77	52
256192	Residential	60	82	54	79	54
256213	Residential	60	82	55	80	55
256248	Residential	60	82	46	70	46
256284	Residential	60	82	47	72	47
256289	Residential	60	82	44	69	44
256408	Residential	60	82	50	73	50
256574	Residential	60	82	48	72	48
256709	Residential	60	82	47	72	47
256813	Residential	60	82	42	68	42
256817	Residential	60	82	50	75	50
256879	Residential	60	82	42	67	42
256882	Residential	60	82	46	70	46
256926	Residential	60	82	46	71	46
256951	Residential	60	82	44	69	44
257009	Residential	60	82	46	71	46
257028	Residential	60	82	54	78	54
257039	Residential	60	82	45	68	45
257046	Residential	60	82	53	77	53
257128	Residential	60	82	45	70	45
259291	Residential	60	82	50	75	50
259381	Residential	60	82	49	74	49
259957	Residential	60	82	51	75	51
260029	Residential	60	82	51	75	51
260058	Residential	60	82	64	89	65
260067	Residential	60	82	62	87	62
260069	Residential	60	82	53	77	53
260119	Residential	60	82	59	84	59
260150	Residential	60	82	58	83	58
260165	Residential	60	82	57	81	57
260169	Residential	60	82	60	85	60
260170	Residential	60	82	61	86	61
260189	Residential	60	82	62	87	62
260213	Residential	60	82	63	89	63
260446	Residential	60	82	50	75	50

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
260528	Residential	60	82	62	87	62
260630	Residential	60	82	47	72	47
260789	Residential	60	82	38	63	38
260930	Residential	60	82	56	82	56
261084	Residential	60	82	60	86	60
261368	Residential	60	82	59	84	59
261386	Residential	60	82	60	85	60
261419	Residential	60	82	49	73	49
261452	Residential	60	82	57	82	57
261465	Residential	60	82	57	82	57
261493	Residential	60	82	59	84	59
261535	Residential	60	82	56	81	56
261542	Residential	60	82	45	69	45
261572	Residential	60	82	55	80	55
261608	Residential	60	82	53	78	53
261613	Residential	60	82	51	76	51
261633	Residential	60	82	47	71	47
261638	Residential	60	82	58	83	58
261649	Residential	60	82	56	81	56
261661	Residential	60	82	55	80	55
261665	Residential	60	82	59	84	59
261686	Residential	60	82	61	86	61
261687	Residential	60	82	59	84	59
261703	Residential	60	82	59	84	59
261713	Residential	60	82	51	76	52
261717	Residential	60	82	57	82	57
261720	Residential	60	82	61	86	61
261729	Residential	60	82	61	87	62
261739	Residential	60	82	62	87	62
261781	Residential	60	82	50	75	51
261786	Residential	60	82	50	75	51
261806	Residential	60	82	51	76	51
261855	Residential	60	82	51	75	51
261888	Residential	60	82	47	72	47
261892	Residential	60	82	49	73	49
261908	Residential	60	82	62	87	62
261910	Residential	60	82	47	72	47
261913	Residential	60	82	46	71	46
261927	Residential	60	82	48	73	48
261958	Residential	60	82	48	73	48
261969	Residential	60	82	61	86	61
261999	Residential	60	82	46	71	46
262034	Residential	60	82	50	75	50
262063	Residential	60	82	51	75	51
262104	Residential	60	82	50	75	50
262181	Residential	60	82	51	75	51
262211	Residential	60	82	48	72	48
262286	Residential	60	82	52	76	52
263137	Residential	60	82	50	75	50
263676	Residential	60	82	48	73	48
263929	Residential	60	82	46	71	46
314565	Residential	60	82	49	72	49
314594	Residential	60	82	46	70	46
314600	Residential	60	82	47	71	47
314629	Residential	60	82	49	72	49
314940	Residential	60	82	50	73	50
315063	Residential	60	82	52	76	52
315138	Residential	60	82	59	84	59

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
315139	Residential	60	82	61	87	61
315262	Residential	60	82	59	84	59
315314	Residential	60	82	51	75	51
315319	Residential	60	82	60	85	60
315421	Residential	60	82	63	88	63
316186	Residential	60	82	49	73	49
316281	Residential	60	82	40	65	40
316291	Residential	60	82	39	64	39
316328	Residential	60	82	53	77	53
316394	Residential	60	82	52	76	52
316410	Residential	60	82	41	66	41
316470	Residential	60	82	50	74	50
316509	Residential	60	82	51	75	51
316523	Residential	60	82	50	74	50
316557	Residential	60	82	49	73	49
316558	Residential	60	82	50	74	50
316573	Residential	60	82	49	74	49
316600	Residential	60	82	49	74	49
316608	Residential	60	82	48	73	48
316612	Residential	60	82	46	71	46
316617	Residential	60	82	48	73	48
316621	Residential	60	82	49	73	49
316622	Residential	60	82	48	73	48
316637	Residential	60	82	47	72	47
316641	Residential	60	82	48	73	48
316648	Residential	60	82	50	74	50
316649	Residential	60	82	48	73	48
316659	Residential	60	82	48	72	48
316673	Residential	60	82	47	72	47
316675	Residential	60	82	47	72	47
316677	Residential	60	82	47	72	47
316695	Residential	60	82	47	72	47
316710	Residential	60	82	47	72	47
316712	Residential	60	82	47	72	47
316713	Residential	60	82	46	71	46
316716	Residential	60	82	47	72	47
316717	Residential	60	82	49	73	49
316720	Residential	60	82	47	72	47
316722	Residential	60	82	47	72	47
316724	Residential	60	82	47	72	47
316726	Residential	60	82	46	71	46
316734	Residential	60	82	46	70	46
316738	Residential	60	82	49	73	49
316739	Residential	60	82	45	70	45
316746	Residential	60	82	46	72	46
316747	Residential	60	82	46	71	46
316756	Residential	60	82	47	72	47
316762	Residential	60	82	46	71	46
316763	Residential	60	82	49	73	49
316764	Residential	60	82	46	71	46
316770	Residential	60	82	46	71	46
316772	Residential	60	82	46	71	46
316776	Residential	60	82	45	70	45
316778	Residential	60	82	47	72	47
316781	Residential	60	82	46	71	46
316787	Residential	60	82	46	71	46
316793	Residential	60	82	46	71	46
316797	Residential	60	82	46	71	46

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
316800	Residential	60	82	45	69	45
316811	Residential	60	82	46	71	46
316815	Residential	60	82	46	71	46
316820	Residential	60	82	47	72	47
316821	Residential	60	82	46	71	46
316823	Residential	60	82	46	71	46
316825	Residential	60	82	46	71	46
316826	Residential	60	82	44	69	44
316831	Residential	60	82	45	71	45
316833	Residential	60	82	45	70	45
316846	Residential	60	82	46	71	46
316848	Residential	60	82	44	69	44
316849	Residential	60	82	47	72	47
316860	Residential	60	82	45	70	45
316861	Residential	60	82	46	71	46
316862	Residential	60	82	44	69	44
316866	Residential	60	82	45	70	45
316869	Residential	60	82	45	70	45
316877	Residential	60	82	45	70	45
316878	Residential	60	82	45	70	45
316880	Residential	60	82	45	70	45
316889	Residential	60	82	45	70	45
316890	Residential	60	82	45	70	45
316902	Residential	60	82	45	70	45
316903	Residential	60	82	45	70	45
316907	Residential	60	82	45	70	45
316908	Residential	60	82	45	70	45
316914	Residential	60	82	45	70	45
316915	Residential	60	82	45	70	45
316916	Residential	60	82	45	70	45
316917	Residential	60	82	45	70	45
316920	Residential	60	82	45	70	45
316924	Residential	60	82	45	70	45
316926	Residential	60	82	46	71	46
316927	Residential	60	82	45	70	45
316929	Residential	60	82	45	70	45
316930	Residential	60	82	43	68	43
316931	Residential	60	82	44	69	44
316938	Residential	60	82	44	69	44
316939	Residential	60	82	47	71	47
316942	Residential	60	82	43	68	43
316943	Residential	60	82	41	67	41
316944	Residential	60	82	40	65	40
316948	Residential	60	82	40	65	40
316952	Residential	60	82	41	67	41
316953	Residential	60	82	42	67	42
316954	Residential	60	82	40	65	40
316957	Residential	60	82	45	70	45
316960	Residential	60	82	44	69	44
316962	Residential	60	82	45	70	45
316963	Residential	60	82	40	65	40
316966	Residential	60	82	42	67	42
316970	Residential	60	82	44	69	44
316971	Residential	60	82	44	69	44
316973	Residential	60	82	39	64	39
316975	Residential	60	82	36	61	36
316976	Residential	60	82	44	69	44
316980	Residential	60	82	44	69	44

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
316982	Residential	60	82	45	70	45
316992	Residential	60	82	43	68	43
316993	Residential	60	82	42	67	42
316997	Residential	60	82	44	69	44
317002	Residential	60	82	42	68	42
317003	Residential	60	82	44	69	44
317005	Residential	60	82	41	66	41
317011	Residential	60	82	41	66	41
317013	Residential	60	82	43	68	43
317018	Residential	60	82	44	69	44
317021	Residential	60	82	42	67	42
317022	Residential	60	82	43	69	43
317024	Residential	60	82	41	66	41
317027	Residential	60	82	42	68	42
317028	Residential	60	82	32	56	32
317030	Residential	60	82	39	65	39
317033	Residential	60	82	43	68	43
317035	Residential	60	82	41	66	41
317041	Residential	60	82	43	68	43
317042	Residential	60	82	40	65	40
317043	Residential	60	82	43	68	43
317044	Residential	60	82	40	66	40
317045	Residential	60	82	42	67	42
317046	Residential	60	82	39	64	39
317047	Residential	60	82	43	68	43
317060	Residential	60	82	39	64	39
317062	Residential	60	82	42	67	42
317063	Residential	60	82	44	69	44
317067	Residential	60	82	46	71	46
317068	Residential	60	82	41	67	41
317074	Residential	60	82	34	60	34
317077	Residential	60	82	43	68	43
317078	Residential	60	82	43	68	43
317079	Residential	60	82	42	67	42
317084	Residential	60	82	42	67	42
317090	Residential	60	82	41	66	41
317094	Residential	60	82	42	67	42
317096	Residential	60	82	42	67	42
317099	Residential	60	82	39	64	39
317100	Residential	60	82	43	68	43
317101	Residential	60	82	42	67	42
317102	Residential	60	82	40	66	40
317103	Residential	60	82	23	47	23
317104	Residential	60	82	43	69	43
317105	Residential	60	82	41	67	41
317107	Residential	60	82	42	67	42
317109	Residential	60	82	42	68	42
317110	Residential	60	82	23	48	23
317112	Residential	60	82	41	66	41
317118	Residential	60	82	43	68	43
317124	Residential	60	82	23	48	23
317131	Residential	60	82	30	56	30
317135	Residential	60	82	41	67	41
317136	Residential	60	82	42	67	42
317140	Residential	60	82	26	51	26
317144	Residential	60	82	41	66	41
317145	Residential	60	82	43	68	43
317151	Residential	60	82	43	68	43

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317154	Residential	60	82	43	68	43
317159	Residential	60	82	41	66	41
317161	Residential	60	82	39	64	39
317171	Residential	60	82	36	61	36
317172	Residential	60	82	36	62	36
317180	Residential	60	82	40	65	40
317183	Residential	60	82	42	68	42
317189	Residential	60	82	23	47	23
317191	Residential	60	82	42	68	42
317192	Residential	60	82	37	62	37
317193	Residential	60	82	34	60	34
317197	Residential	60	82	39	65	39
317198	Residential	60	82	42	67	42
317199	Residential	60	82	42	67	42
317200	Residential	60	82	39	65	39
317201	Residential	60	82	39	64	39
317206	Residential	60	82	40	65	40
317207	Residential	60	82	42	67	42
317212	Residential	60	82	42	68	42
317213	Residential	60	82	42	67	42
317215	Residential	60	82	41	66	41
317216	Residential	60	82	41	66	41
317223	Residential	60	82	39	65	39
317228	Residential	60	82	41	66	41
317230	Residential	60	82	41	66	41
317241	Residential	60	82	38	64	38
317242	Residential	60	82	22	47	22
317245	Residential	60	82	22	47	22
317246	Residential	60	82	22	47	22
317247	Residential	60	82	41	66	41
317248	Residential	60	82	39	64	39
317250	Residential	60	82	41	66	41
317256	Residential	60	82	39	64	39
317257	Residential	60	82	35	60	35
317258	Residential	60	82	41	66	41
317264	Residential	60	82	33	59	33
317265	Residential	60	82	35	60	35
317266	Residential	60	82	27	52	27
317268	Residential	60	82	38	63	38
317269	Residential	60	82	35	60	35
317270	Residential	60	82	36	61	36
317271	Residential	60	82	37	62	37
317273	Residential	60	82	22	47	22
317274	Residential	60	82	38	63	38
317277	Residential	60	82	41	66	41
317278	Residential	60	82	37	62	37
317282	Residential	60	82	30	54	30
317285	Residential	60	82	21	47	22
317286	Residential	60	82	37	62	37
317290	Residential	60	82	36	62	36
317297	Residential	60	82	40	65	40
317300	Residential	60	82	40	65	40
317312	Residential	60	82	21	46	21
317322	Residential	60	82	41	66	41
317325	Residential	60	82	39	64	39
317326	Residential	60	82	39	64	39
317330	Residential	60	82	21	46	21
317331	Residential	60	82	38	63	38

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317335	Residential	60	82	40	65	40
317346	Residential	60	82	21	46	21
317352	Residential	60	82	23	48	23
317355	Residential	60	82	41	66	41
317357	Residential	60	82	21	47	22
317358	Residential	60	82	23	48	23
317361	Residential	60	82	38	64	38
317371	Residential	60	82	38	63	38
317372	Residential	60	82	21	46	21
317373	Residential	60	82	21	46	21
317378	Residential	60	82	38	64	38
317379	Residential	60	82	34	59	34
317385	Residential	60	82	37	62	37
317397	Residential	60	82	38	63	38
317399	Residential	60	82	30	55	30
317411	Residential	60	82	32	58	32
317412	Residential	60	82	20	46	20
317418	Residential	60	82	37	62	37
317423	Residential	60	82	20	46	21
317426	Residential	60	82	38	63	38
317428	Residential	60	82	37	62	37
317429	Residential	60	82	32	57	32
317437	Residential	60	82	21	46	21
317443	Residential	60	82	29	55	29
317452	Residential	60	82	36	61	36
317456	Residential	60	82	20	45	20
317457	Residential	60	82	32	58	32
317460	Residential	60	82	20	45	20
317462	Residential	60	82	26	51	26
317466	Residential	60	82	21	46	21
317467	Residential	60	82	34	60	34
317468	Residential	60	82	36	61	36
317471	Residential	60	82	32	57	32
317473	Residential	60	82	33	58	33
317474	Residential	60	82	20	45	20
317477	Residential	60	82	20	45	20
317480	Residential	60	82	21	46	21
317481	Residential	60	82	37	62	37
317485	Residential	60	82	24	50	24
317489	Residential	60	82	33	58	33
317493	Residential	60	82	20	45	20
317498	Residential	60	82	28	53	28
317499	Residential	60	82	33	58	33
317502	Residential	60	82	34	60	34
317504	Residential	60	82	21	47	21
317506	Residential	60	82	19	45	20
317508	Residential	60	82	21	46	21
317516	Residential	60	82	29	54	29
317517	Residential	60	82	20	45	20
317523	Residential	60	82	31	56	31
317526	Residential	60	82	23	48	23
317528	Residential	60	82	29	54	29
317530	Residential	60	82	31	56	31
317536	Residential	60	82	30	55	30
317539	Residential	60	82	20	45	20
317544	Residential	60	82	19	44	19
317549	Residential	60	82	19	44	19
317550	Residential	60	82	25	50	25

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317554	Residential	60	82	21	46	21
317558	Residential	60	82	30	55	30
317562	Residential	60	82	27	52	27
317580	Residential	60	82	21	46	21
317586	Residential	60	82	28	53	28
317589	Residential	60	82	19	44	19
317602	Residential	60	82	18	43	18
317606	Residential	60	82	20	45	20
317609	Residential	60	82	19	44	19
317611	Residential	60	82	24	49	24
317613	Residential	60	82	25	50	25
317630	Residential	60	82	18	43	18
317636	Residential	60	82	20	45	20
317641	Residential	60	82	18	43	18
317649	Residential	60	82	17	42	17
317658	Residential	60	82	18	43	18
317663	Residential	60	82	20	45	20
317696	Residential	60	82	16	41	16
317697	Residential	60	82	16	42	17
317699	Residential	60	82	17	42	17
317703	Residential	60	82	17	42	17
317712	Residential	60	82	16	41	16
317732	Residential	60	82	15	40	15
317734	Residential	60	82	15	39	15
317749	Residential	60	82	16	41	16
317757	Residential	60	82	15	40	16
318983	Residential	60	82	40	65	40
318985	Residential	60	82	51	75	51
318986	Residential	60	82	36	61	36
318992	Residential	60	82	46	71	46
318997	Residential	60	82	47	70	47
318998	Residential	60	82	39	64	39
318999	Residential	60	82	43	68	43
319002	Residential	60	82	28	54	28
319003	Residential	60	82	50	74	50
319005	Residential	60	82	39	63	39
319009	Residential	60	82	51	76	51
319012	Residential	60	82	52	77	52
319013	Residential	60	82	41	66	41
319016	Residential	60	82	49	74	49
319017	Residential	60	82	48	72	48
319019	Residential	60	82	56	81	56
319020	Residential	60	82	46	71	46
319022	Residential	60	82	48	73	48
319024	Residential	60	82	47	72	47
319031	Residential	60	82	43	67	43
319032	Residential	60	82	50	74	50
319034	Residential	60	82	39	64	39
319035	Residential	60	82	41	66	41
319037	Residential	60	82	50	74	50
319039	Residential	60	82	52	77	52
319040	Residential	60	82	48	72	48
319042	Residential	60	82	51	74	51
319044	Residential	60	82	50	76	50
319045	Residential	60	82	58	83	58
319048	Residential	60	82	53	77	53
319049	Residential	60	82	48	73	48
319052	Residential	60	82	39	64	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319053	Residential	60	82	39	64	39
319054	Residential	60	82	41	66	41
319055	Residential	60	82	42	67	42
319057	Residential	60	82	42	67	42
319058	Residential	60	82	45	70	45
319059	Residential	60	82	43	68	43
319061	Residential	60	82	34	59	34
319062	Residential	60	82	40	65	40
319064	Residential	60	82	40	64	40
319066	Residential	60	82	45	70	45
319071	Residential	60	82	44	69	44
319073	Residential	60	82	38	63	38
319076	Residential	60	82	23	47	23
319077	Residential	60	82	44	68	44
319082	Residential	60	82	41	66	41
319088	Residential	60	82	48	72	48
319090	Residential	60	82	46	71	46
319094	Residential	60	82	45	69	45
319098	Residential	60	82	51	77	51
319099	Residential	60	82	52	77	52
319100	Residential	60	82	50	75	50
319101	Residential	60	82	59	84	59
319103	Residential	60	82	58	83	58
319104	Residential	60	82	56	82	56
319111	Residential	60	82	46	70	46
319112	Residential	60	82	45	70	45
319114	Residential	60	82	46	71	46
319117	Residential	60	82	45	70	45
319121	Residential	60	82	61	87	61
319122	Residential	60	82	35	59	35
319126	Residential	60	82	47	72	47
319129	Residential	60	82	42	67	42
319133	Residential	60	82	44	69	44
319134	Residential	60	82	44	69	44
319135	Residential	60	82	43	68	43
319138	Residential	60	82	56	80	56
319141	Residential	60	82	48	73	48
319143	Residential	60	82	41	67	41
319145	Residential	60	82	49	72	49
319147	Residential	60	82	49	74	49
319150	Residential	60	82	60	85	60
319152	Residential	60	82	31	55	31
319154	Residential	60	82	56	81	56
319157	Residential	60	82	46	71	46
319163	Residential	60	82	49	74	49
319166	Residential	60	82	58	83	58
319167	Residential	60	82	43	66	43
319168	Residential	60	82	49	74	49
319174	Residential	60	82	47	71	47
319175	Residential	60	82	50	74	50
319178	Residential	60	82	27	50	27
319180	Residential	60	82	32	58	32
319183	Residential	60	82	44	69	44
319184	Residential	60	82	44	69	44
319185	Residential	60	82	43	68	43
319186	Residential	60	82	39	63	39
319190	Residential	60	82	46	71	46
319191	Residential	60	82	61	86	61

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319193	Residential	60	82	59	84	59
319194	Residential	60	82	45	70	45
319199	Residential	60	82	49	74	49
319200	Residential	60	82	56	81	56
319201	Residential	60	82	44	69	44
319203	Residential	60	82	46	71	46
319205	Residential	60	82	49	72	49
319206	Residential	60	82	51	76	51
319210	Residential	60	82	40	66	40
319214	Residential	60	82	50	72	50
319219	Residential	60	82	51	75	51
319220	Residential	60	82	50	74	50
319224	Residential	60	82	45	71	45
319225	Residential	60	82	46	71	46
319226	Residential	60	82	54	79	54
319228	Residential	60	82	40	65	41
319230	Residential	60	82	42	67	42
319235	Residential	60	82	49	74	49
319239	Residential	60	82	30	55	30
319240	Residential	60	82	40	63	40
319246	Residential	60	82	46	69	46
319247	Residential	60	82	53	77	53
319248	Residential	60	82	30	55	30
319249	Residential	60	82	29	54	29
319254	Residential	60	82	40	64	40
319261	Residential	60	82	45	70	45
319263	Residential	60	82	49	74	49
319267	Residential	60	82	47	72	47
319269	Residential	60	82	47	72	47
319275	Residential	60	82	48	72	48
319276	Residential	60	82	45	70	45
319279	Residential	60	82	51	76	51
319280	Residential	60	82	44	68	44
319283	Residential	60	82	47	71	47
319285	Residential	60	82	50	74	50
319287	Residential	60	82	50	74	50
319289	Residential	60	82	47	71	47
319292	Residential	60	82	49	74	49
319293	Residential	60	82	52	76	52
319294	Residential	60	82	55	80	55
319297	Residential	60	82	55	80	55
319298	Residential	60	82	47	71	47
319299	Residential	60	82	53	78	53
319300	Residential	60	82	51	76	51
319302	Residential	60	82	53	78	53
319303	Residential	60	82	47	70	47
319308	Residential	60	82	38	64	38
319309	Residential	60	82	34	59	34
319312	Residential	60	82	43	68	43
319315	Residential	60	82	53	78	53
319317	Residential	60	82	41	63	41
319318	Residential	60	82	40	63	40
319320	Residential	60	82	42	67	42
319323	Residential	60	82	35	60	35
319327	Residential	60	82	49	73	49
319328	Residential	60	82	47	71	47
319331	Residential	60	82	52	77	52
319332	Residential	60	82	41	67	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319336	Residential	60	82	41	66	41
319341	Residential	60	82	50	75	50
319344	Residential	60	82	42	67	42
319349	Residential	60	82	53	77	53
319352	Residential	60	82	38	64	38
319356	Residential	60	82	49	73	49
319357	Residential	60	82	49	73	49
319362	Residential	60	82	50	74	50
319363	Residential	60	82	50	74	50
319364	Residential	60	82	51	76	51
319365	Residential	60	82	49	74	49
319374	Residential	60	82	47	71	47
319396	Residential	60	82	37	62	37
319400	Residential	60	82	34	58	34
319409	Residential	60	82	31	56	32
319420	Residential	60	82	40	65	40
319452	Residential	60	82	55	80	55
319464	Residential	60	82	44	68	44
319465	Residential	60	82	55	80	55
319481	Residential	60	82	56	81	56
319483	Residential	60	82	42	66	42
319485	Residential	60	82	61	86	61
319490	Residential	60	82	46	72	46
319491	Residential	60	82	30	54	30
319493	Residential	60	82	51	75	51
319495	Residential	60	82	43	68	43
319500	Residential	60	82	45	70	45
319505	Residential	60	82	46	71	46
319570	Residential	60	82	37	61	37
319605	Residential	60	82	56	81	56
319629	Residential	60	82	43	68	43
319630	Residential	60	82	37	61	37
319640	Residential	60	82	47	72	47
319652	Residential	60	82	54	79	54
319653	Residential	60	82	47	72	47
319659	Residential	60	82	30	55	30
319682	Residential	60	82	36	60	36
319693	Residential	60	82	37	61	37
319704	Residential	60	82	40	65	40
319707	Residential	60	82	44	69	44
319718	Residential	60	82	49	72	49
319732	Residential	60	82	48	71	48
319733	Residential	60	82	55	80	55
319734	Residential	60	82	50	75	50
319736	Residential	60	82	51	75	51
319737	Residential	60	82	42	68	42
319748	Residential	60	82	39	63	39
319752	Residential	60	82	26	51	26
319767	Residential	60	82	45	70	45
319803	Residential	60	82	49	74	49
319816	Residential	60	82	37	63	37
319848	Residential	60	82	60	85	60
320062	Residential	60	82	46	68	46
320180	Residential	60	82	54	78	54
320263	Residential	60	82	38	62	38
320346	Residential	60	82	35	61	35
320350	Residential	60	82	45	70	45
320355	Residential	60	82	29	53	29

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320356	Residential	60	82	36	60	36
320357	Residential	60	82	41	64	41
320358	Residential	60	82	52	77	52
320359	Residential	60	82	41	66	41
320360	Residential	60	82	47	72	47
320363	Residential	60	82	51	76	51
320364	Residential	60	82	46	71	46
320365	Residential	60	82	50	75	50
320366	Residential	60	82	45	70	45
320376	Residential	60	82	55	79	55
320432	Residential	60	82	45	70	45
320433	Residential	60	82	46	70	46
320434	Residential	60	82	44	69	44
320435	Residential	60	82	48	71	48
320436	Residential	60	82	43	68	43
320437	Residential	60	82	49	73	49
320439	Residential	60	82	48	72	48
320440	Residential	60	82	25	49	25
320441	Residential	60	82	48	71	48
320442	Residential	60	82	50	74	50
320444	Residential	60	82	50	73	50
320448	Residential	60	82	48	72	48
320449	Residential	60	82	51	75	51
320450	Residential	60	82	35	60	35
320451	Residential	60	82	43	68	43
320453	Residential	60	82	41	66	41
320454	Residential	60	82	46	71	46
320456	Residential	60	82	49	72	49
320457	Residential	60	82	47	71	47
320458	Residential	60	82	41	66	41
320459	Residential	60	82	48	72	48
320460	Residential	60	82	47	70	47
320461	Residential	60	82	50	74	50
320462	Residential	60	82	47	71	47
320463	Residential	60	82	46	70	46
320465	Residential	60	82	49	73	49
320467	Residential	60	82	25	50	25
320468	Residential	60	82	45	70	45
320469	Residential	60	82	49	72	49
320470	Residential	60	82	46	70	46
320471	Residential	60	82	49	72	49
320472	Residential	60	82	52	76	52
320473	Residential	60	82	46	71	46
320474	Residential	60	82	48	71	48
320475	Residential	60	82	51	75	51
320476	Residential	60	82	47	71	47
320477	Residential	60	82	51	75	51
320478	Residential	60	82	49	72	49
320479	Residential	60	82	48	72	48
320484	Residential	60	82	50	74	50
320492	Residential	60	82	42	67	42
320496	Residential	60	82	47	72	47
320501	Residential	60	82	45	70	45
320503	Residential	60	82	35	60	35
320507	Residential	60	82	45	69	45
320524	Residential	60	82	50	73	50
320550	Residential	60	82	51	75	51
320551	Residential	60	82	42	67	42

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320555	Residential	60	82	45	70	45
320557	Residential	60	82	57	83	57
320562	Residential	60	82	46	71	46
320567	Residential	60	82	27	51	27
320568	Residential	60	82	45	69	45
320569	Residential	60	82	26	50	26
320570	Residential	60	82	46	71	46
320572	Residential	60	82	49	73	49
320573	Residential	60	82	48	71	48
320574	Residential	60	82	47	71	47
320575	Residential	60	82	42	67	42
320576	Residential	60	82	46	71	46
320577	Residential	60	82	47	71	47
320579	Residential	60	82	47	71	47
320580	Residential	60	82	47	71	47
320581	Residential	60	82	56	81	56
320582	Residential	60	82	44	68	44
320583	Residential	60	82	45	69	45
320584	Residential	60	82	51	75	51
320585	Residential	60	82	46	71	46
320586	Residential	60	82	30	55	30
320587	Residential	60	82	47	71	47
320588	Residential	60	82	48	72	48
320589	Residential	60	82	49	73	49
320590	Residential	60	82	49	72	49
320591	Residential	60	82	46	70	46
320592	Residential	60	82	49	73	49
320593	Residential	60	82	49	73	49
320594	Residential	60	82	46	70	46
320596	Residential	60	82	26	50	26
320597	Residential	60	82	49	73	49
320598	Residential	60	82	52	76	52
320599	Residential	60	82	52	76	52
320600	Residential	60	82	47	72	47
320601	Residential	60	82	49	73	49
320602	Residential	60	82	49	73	49
320603	Residential	60	82	48	71	48
320604	Residential	60	82	47	71	47
320605	Residential	60	82	43	68	43
320606	Residential	60	82	50	74	50
320607	Residential	60	82	32	57	32
320612	Residential	60	82	45	70	45
320645	Residential	60	82	49	73	49
320646	Residential	60	82	47	71	47
320647	Residential	60	82	41	66	41
320658	Residential	60	82	32	57	32
320661	Residential	60	82	45	69	45
320665	Residential	60	82	46	70	46
320669	Residential	60	82	38	61	38
320678	Residential	60	82	46	70	46
320684	Residential	60	82	25	50	25
320685	Residential	60	82	33	58	33
320686	Residential	60	82	49	73	49
320687	Residential	60	82	45	70	45
320688	Residential	60	82	31	56	31
320689	Residential	60	82	36	61	36
320691	Residential	60	82	43	68	43
320692	Residential	60	82	41	66	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320695	Residential	60	82	33	58	33
320698	Residential	60	82	32	57	32
320700	Residential	60	82	39	65	39
320704	Residential	60	82	26	51	26
320707	Residential	60	82	39	64	39
320708	Residential	60	82	44	69	44
320709	Residential	60	82	37	62	37
320710	Residential	60	82	29	54	29
320713	Residential	60	82	28	53	28
320714	Residential	60	82	42	67	42
320716	Residential	60	82	45	70	45
320718	Residential	60	82	44	69	44
320719	Residential	60	82	32	57	32
320720	Residential	60	82	27	52	27
320721	Residential	60	82	28	53	28
320722	Residential	60	82	30	55	30
320724	Residential	60	82	34	58	34
320728	Residential	60	82	32	57	32
320733	Residential	60	82	33	58	33
320734	Residential	60	82	31	56	31
320739	Residential	60	82	31	56	31
320740	Residential	60	82	34	59	35
320742	Residential	60	82	38	63	38
320743	Residential	60	82	43	68	43
320744	Residential	60	82	34	59	34
320753	Residential	60	82	33	58	33
320754	Residential	60	82	39	65	39
320769	Residential	60	82	39	64	39
320841	Residential	60	82	35	59	35
320844	Residential	60	82	39	63	39
320845	Residential	60	82	34	59	34
320846	Residential	60	82	45	69	45
320850	Residential	60	82	41	66	41
320851	Residential	60	82	39	63	39
320854	Residential	60	82	35	59	35
320855	Residential	60	82	34	59	34
320856	Residential	60	82	49	73	49
320857	Residential	60	82	49	73	49
320859	Residential	60	82	50	75	50
320860	Residential	60	82	54	79	54
320863	Residential	60	82	38	62	38
320864	Residential	60	82	39	63	39
320867	Residential	60	82	42	65	42
320870	Residential	60	82	41	65	41
320871	Residential	60	82	43	65	43
320872	Residential	60	82	40	65	40
320873	Residential	60	82	40	63	40
320874	Residential	60	82	39	62	39
320877	Residential	60	82	32	57	32
320878	Residential	60	82	34	59	34
320885	Residential	60	82	37	61	37
320886	Residential	60	82	40	64	40
320889	Residential	60	82	58	83	58
320890	Residential	60	82	55	80	55
320891	Residential	60	82	34	59	34
320892	Residential	60	82	36	60	36
320895	Residential	60	82	51	76	51
320896	Residential	60	82	40	64	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320897	Residential	60	82	40	64	40
320899	Residential	60	82	39	62	39
320900	Residential	60	82	39	64	39
320934	Residential	60	82	39	63	39
320937	Residential	60	82	52	77	52
320939	Residential	60	82	47	72	47
320940	Residential	60	82	38	63	38
320941	Residential	60	82	34	59	34
320942	Residential	60	82	36	59	36
320943	Residential	60	82	38	62	38
320946	Residential	60	82	50	75	50
320947	Residential	60	82	41	66	41
320951	Residential	60	82	50	75	50
320954	Residential	60	82	39	63	39
320955	Residential	60	82	40	64	40
320957	Residential	60	82	37	61	37
320977	Residential	60	82	53	79	53
320980	Residential	60	82	42	65	42
320985	Residential	60	82	46	71	46
320986	Residential	60	82	41	65	41
320987	Residential	60	82	37	61	37
320988	Residential	60	82	34	59	34
320990	Residential	60	82	52	77	52
320991	Residential	60	82	33	57	33
320992	Residential	60	82	33	57	33
320994	Residential	60	82	33	57	33
320996	Residential	60	82	38	62	38
320997	Residential	60	82	40	64	40
321001	Residential	60	82	44	68	44
321016	Residential	60	82	44	69	44
321017	Residential	60	82	39	62	39
321019	Residential	60	82	45	69	45
321020	Residential	60	82	52	76	52
321021	Residential	60	82	39	63	39
321024	Residential	60	82	39	62	39
321025	Residential	60	82	38	61	38
321031	Residential	60	82	43	67	43
321032	Residential	60	82	48	72	48
321033	Residential	60	82	49	74	49
321034	Residential	60	82	52	76	52
321058	Residential	60	82	38	63	38
321061	Residential	60	82	38	62	38
321062	Residential	60	82	37	61	37
321064	Residential	60	82	39	63	39
321065	Residential	60	82	37	62	37
321066	Residential	60	82	32	57	32
321067	Residential	60	82	37	61	37
321068	Residential	60	82	37	61	37
321069	Residential	60	82	36	61	36
321073	Residential	60	82	44	68	44
321075	Residential	60	82	43	67	43
321077	Residential	60	82	36	61	36
321098	Residential	60	82	39	63	39
321099	Residential	60	82	39	63	39
321100	Residential	60	82	42	67	42
321104	Residential	60	82	43	67	43
321106	Residential	60	82	23	48	23
321111	Residential	60	82	40	63	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321118	Residential	60	82	42	65	42
321123	Residential	60	82	35	60	35
321124	Residential	60	82	44	67	44
321135	Residential	60	82	42	67	42
321141	Residential	60	82	46	71	46
321142	Residential	60	82	34	59	34
321144	Residential	60	82	38	62	38
321147	Residential	60	82	47	72	47
321155	Residential	60	82	34	59	34
321182	Residential	60	82	39	63	39
321184	Residential	60	82	59	84	59
321185	Residential	60	82	36	60	36
321186	Residential	60	82	33	58	33
321192	Residential	60	82	41	65	41
321197	Residential	60	82	48	72	48
321198	Residential	60	82	51	75	51
321199	Residential	60	82	40	64	40
321200	Residential	60	82	36	61	36
321205	Residential	60	82	31	56	31
321206	Residential	60	82	33	58	33
321207	Residential	60	82	35	60	35
321208	Residential	60	82	34	59	34
321209	Residential	60	82	35	60	35
321210	Residential	60	82	43	67	43
321214	Residential	60	82	37	62	37
321231	Residential	60	82	31	55	31
321233	Residential	60	82	38	62	38
321237	Residential	60	82	40	64	40
321241	Residential	60	82	30	55	30
321246	Residential	60	82	48	73	48
321247	Residential	60	82	38	62	38
321248	Residential	60	82	35	60	35
321249	Residential	60	82	48	72	48
321250	Residential	60	82	40	63	40
321252	Residential	60	82	42	65	42
321254	Residential	60	82	48	73	48
321256	Residential	60	82	46	71	46
321258	Residential	60	82	45	70	45
321277	Residential	60	82	36	60	36
321281	Residential	60	82	41	66	41
321282	Residential	60	82	40	64	40
321283	Residential	60	82	40	64	40
321284	Residential	60	82	50	75	50
321286	Residential	60	82	48	73	48
321292	Residential	60	82	42	66	42
321294	Residential	60	82	42	67	42
321296	Residential	60	82	49	74	49
321297	Residential	60	82	49	73	49
321299	Residential	60	82	36	61	36
321300	Residential	60	82	40	64	40
321301	Residential	60	82	36	60	36
321303	Residential	60	82	32	57	32
321305	Residential	60	82	40	64	40
321309	Residential	60	82	32	56	32
321332	Residential	60	82	50	75	50
321339	Residential	60	82	34	59	34
321343	Residential	60	82	35	59	35
321344	Residential	60	82	38	62	38

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321346	Residential	60	82	29	54	29
321347	Residential	60	82	33	58	33
321352	Residential	60	82	41	65	41
321353	Residential	60	82	40	64	40
321354	Residential	60	82	41	64	41
321356	Residential	60	82	39	64	39
321357	Residential	60	82	40	64	40
321358	Residential	60	82	45	69	45
321370	Residential	60	82	45	69	45
321371	Residential	60	82	38	62	38
321372	Residential	60	82	43	67	43
321373	Residential	60	82	41	65	41
321375	Residential	60	82	36	60	36
321376	Residential	60	82	37	61	37
321379	Residential	60	82	39	63	39
321381	Residential	60	82	56	81	56
321383	Residential	60	82	42	65	42
321385	Residential	60	82	41	63	41
321391	Residential	60	82	32	57	32
321394	Residential	60	82	40	63	40
321417	Residential	60	82	36	60	36
321422	Residential	60	82	34	59	34
321429	Residential	60	82	49	74	49
321431	Residential	60	82	35	60	35
321433	Residential	60	82	34	59	34
321434	Residential	60	82	36	60	36
321435	Residential	60	82	35	59	35
321436	Residential	60	82	40	63	40
321437	Residential	60	82	32	57	32
321438	Residential	60	82	39	63	39
321439	Residential	60	82	39	63	39
321440	Residential	60	82	42	67	42
321448	Residential	60	82	41	65	41
321451	Residential	60	82	40	63	40
321452	Residential	60	82	43	68	43
321457	Residential	60	82	58	82	58
321458	Residential	60	82	58	83	58
321485	Residential	60	82	37	62	37
321486	Residential	60	82	38	61	38
321489	Residential	60	82	47	72	47
321490	Residential	60	82	44	68	44
321491	Residential	60	82	43	67	43
321492	Residential	60	82	43	67	43
321494	Residential	60	82	28	53	28
321496	Residential	60	82	33	58	33
321502	Residential	60	82	30	55	30
321504	Residential	60	82	48	73	48
321533	Residential	60	82	42	67	42
321535	Residential	60	82	30	55	30
321539	Residential	60	82	51	75	51
321540	Residential	60	82	40	63	40
321541	Residential	60	82	38	62	38
321543	Residential	60	82	35	60	35
321544	Residential	60	82	42	66	42
321546	Residential	60	82	46	71	46
321548	Residential	60	82	46	71	46
321549	Residential	60	82	49	74	49
321551	Residential	60	82	40	64	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321555	Residential	60	82	49	74	49
321561	Residential	60	82	31	56	31
321562	Residential	60	82	33	58	33
321563	Residential	60	82	39	63	39
321564	Residential	60	82	42	66	42
321566	Residential	60	82	34	59	34
321567	Residential	60	82	38	63	38
321568	Residential	60	82	46	71	46
321569	Residential	60	82	45	69	45
321578	Residential	60	82	36	60	36
321581	Residential	60	82	44	68	44
321582	Residential	60	82	32	56	32
321583	Residential	60	82	34	59	34
321584	Residential	60	82	43	66	43
321585	Residential	60	82	50	74	50
321586	Residential	60	82	38	62	38
321587	Residential	60	82	36	60	36
321589	Residential	60	82	32	57	32
321590	Residential	60	82	35	60	35
321605	Residential	60	82	50	75	50
321612	Residential	60	82	39	63	39
321613	Residential	60	82	39	63	39
321618	Residential	60	82	58	83	58
321631	Residential	60	82	32	57	32
321632	Residential	60	82	35	60	35
321633	Residential	60	82	37	62	37
321634	Residential	60	82	40	65	40
321644	Residential	60	82	37	63	37
321645	Residential	60	82	33	57	33
321646	Residential	60	82	29	54	29
321648	Residential	60	82	32	57	32
321650	Residential	60	82	32	57	32
321655	Residential	60	82	26	51	26
321656	Residential	60	82	29	54	29
321657	Residential	60	82	42	67	42
321658	Residential	60	82	35	60	35
321659	Residential	60	82	37	62	37
321660	Residential	60	82	46	70	46
321663	Residential	60	82	27	53	27
321665	Residential	60	82	31	56	31
321666	Residential	60	82	32	58	32
321676	Residential	60	82	43	68	43
321677	Residential	60	82	40	65	40
321678	Residential	60	82	35	60	35
321679	Residential	60	82	38	63	38
321682	Residential	60	82	28	53	28
321687	Residential	60	82	45	69	45
321688	Residential	60	82	35	58	35
321689	Residential	60	82	49	73	49
321690	Residential	60	82	32	58	32
321691	Residential	60	82	46	70	46
321694	Residential	60	82	33	58	33
321695	Residential	60	82	35	60	35
321696	Residential	60	82	34	59	34
321697	Residential	60	82	31	56	31
321698	Residential	60	82	33	58	33
321699	Residential	60	82	32	57	32
321701	Residential	60	82	45	70	45

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321702	Residential	60	82	29	54	29
321706	Residential	60	82	44	69	44
321708	Residential	60	82	46	70	46
321709	Residential	60	82	33	58	33
321715	Residential	60	82	32	57	32
321716	Residential	60	82	32	57	32
321717	Residential	60	82	37	62	37
321718	Residential	60	82	31	56	31
321723	Residential	60	82	34	59	34
321724	Residential	60	82	34	59	34
321725	Residential	60	82	32	57	32
321726	Residential	60	82	43	68	43
321727	Residential	60	82	41	66	41
321733	Residential	60	82	44	69	44
321735	Residential	60	82	31	56	31
321737	Residential	60	82	31	56	31
321740	Residential	60	82	46	71	46
321742	Residential	60	82	25	51	25
321743	Residential	60	82	48	71	48
321747	Residential	60	82	44	69	44
321748	Residential	60	82	45	69	45
321751	Residential	60	82	27	52	27
321752	Residential	60	82	36	61	36
321753	Residential	60	82	33	58	33
321755	Residential	60	82	46	70	46
321756	Residential	60	82	38	63	38
321758	Residential	60	82	41	66	41
321759	Residential	60	82	44	69	44
321760	Residential	60	82	46	71	46
321762	Residential	60	82	27	52	27
321770	Residential	60	82	49	74	49
321789	Residential	60	82	37	61	37
321813	Residential	60	82	39	64	39
321814	Residential	60	82	32	57	32
321819	Residential	60	82	38	62	38
321821	Residential	60	82	49	74	49
321822	Residential	60	82	41	65	41
321842	Residential	60	82	43	67	43
321890	Residential	60	82	39	63	39
321903	Residential	60	82	37	61	37
321904	Residential	60	82	36	60	36
321907	Residential	60	82	50	75	50
321908	Residential	60	82	40	63	40
321909	Residential	60	82	49	73	49
321910	Residential	60	82	47	70	47
321911	Residential	60	82	37	62	37
321915	Residential	60	82	33	57	33
321920	Residential	60	82	50	74	50
321935	Residential	60	82	34	59	34
321936	Residential	60	82	35	59	35
321944	Residential	60	82	39	63	39
321947	Residential	60	82	42	65	42
321955	Residential	60	82	35	59	35
321957	Residential	60	82	41	65	41
321961	Residential	60	82	39	62	39
321963	Residential	60	82	36	61	36
321964	Residential	60	82	36	60	36
321965	Residential	60	82	39	63	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321968	Residential	60	82	42	66	42
321970	Residential	60	82	38	63	38
321971	Residential	60	82	38	62	38
321973	Residential	60	82	42	67	42
321974	Residential	60	82	50	75	50
321975	Residential	60	82	53	77	53
321976	Residential	60	82	33	58	33
321977	Residential	60	82	43	68	43
321978	Residential	60	82	38	63	38
321979	Residential	60	82	36	60	36
321980	Residential	60	82	37	62	37
321982	Residential	60	82	53	78	53
321987	Residential	60	82	39	63	39
321996	Residential	60	82	40	64	40
321999	Residential	60	82	41	65	41
322005	Residential	60	82	48	72	48
322011	Residential	60	82	42	66	42
322013	Residential	60	82	42	66	42
322021	Residential	60	82	39	63	39
322029	Residential	60	82	44	69	44
322031	Residential	60	82	43	68	43
322032	Residential	60	82	42	66	42
322033	Residential	60	82	44	68	44
322034	Residential	60	82	48	73	48
322036	Residential	60	82	49	73	49
322037	Residential	60	82	49	74	49
322038	Residential	60	82	39	63	39
322039	Residential	60	82	34	59	34
322040	Residential	60	82	39	63	39
322041	Residential	60	82	49	74	49
322042	Residential	60	82	49	74	49
322043	Residential	60	82	46	70	46
322044	Residential	60	82	53	78	53
322046	Residential	60	82	48	73	48
322047	Residential	60	82	56	81	56
322048	Residential	60	82	50	75	50
322049	Residential	60	82	35	59	35
322050	Residential	60	82	45	70	45
322051	Residential	60	82	33	58	33
322052	Residential	60	82	41	66	41
322053	Residential	60	82	42	67	42
322072	Residential	60	82	39	62	39
322073	Residential	60	82	40	63	40
322074	Residential	60	82	30	54	30
322076	Residential	60	82	45	70	45
322077	Residential	60	82	46	71	46
322078	Residential	60	82	39	64	39
322089	Residential	60	82	29	54	29
322096	Residential	60	82	47	71	47
322103	Residential	60	82	46	70	46
322104	Residential	60	82	46	70	46
322111	Residential	60	82	39	62	39
322112	Residential	60	82	30	55	30
322115	Residential	60	82	49	74	49
322116	Residential	60	82	42	67	42
322117	Residential	60	82	53	78	53
322118	Residential	60	82	37	62	37
322119	Residential	60	82	37	62	37

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322120	Residential	60	82	48	73	48
322122	Residential	60	82	39	64	39
322123	Residential	60	82	43	67	43
322124	Residential	60	82	37	61	37
322125	Residential	60	82	50	74	50
322127	Residential	60	82	33	58	33
322128	Residential	60	82	44	69	44
322129	Residential	60	82	35	60	35
322130	Residential	60	82	32	57	32
322131	Residential	60	82	51	76	51
322134	Residential	60	82	52	76	52
322135	Residential	60	82	52	76	52
322136	Residential	60	82	49	74	49
322139	Residential	60	82	51	76	51
322140	Residential	60	82	40	64	40
322142	Residential	60	82	46	71	46
322145	Residential	60	82	39	64	39
322153	Residential	60	82	44	69	44
322156	Residential	60	82	39	62	39
322166	Residential	60	82	47	72	47
322169	Residential	60	82	39	63	39
322170	Residential	60	82	35	60	35
322173	Residential	60	82	35	60	35
322180	Residential	60	82	37	62	37
322190	Residential	60	82	42	65	42
322192	Residential	60	82	45	70	45
322194	Residential	60	82	51	75	51
322195	Residential	60	82	49	74	49
322197	Residential	60	82	32	57	32
322198	Residential	60	82	39	62	39
322199	Residential	60	82	38	62	38
322202	Residential	60	82	41	66	41
322204	Residential	60	82	24	49	24
322205	Residential	60	82	37	61	37
322207	Residential	60	82	42	67	42
322208	Residential	60	82	40	63	40
322214	Residential	60	82	48	72	48
322215	Residential	60	82	40	65	40
322218	Residential	60	82	44	69	44
322233	Residential	60	82	32	57	32
322235	Residential	60	82	53	78	53
322236	Residential	60	82	35	60	35
322237	Residential	60	82	37	60	37
322238	Residential	60	82	51	75	51
322239	Residential	60	82	38	61	38
322241	Residential	60	82	42	66	42
322242	Residential	60	82	49	73	49
322243	Residential	60	82	40	64	40
322244	Residential	60	82	25	50	25
322245	Residential	60	82	40	64	40
322246	Residential	60	82	54	79	54
322249	Residential	60	82	42	67	42
322252	Residential	60	82	46	71	46
322255	Residential	60	82	36	61	36
322258	Residential	60	82	42	67	42
322259	Residential	60	82	43	67	43
322262	Residential	60	82	31	56	31
322267	Residential	60	82	34	59	34

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322269	Residential	60	82	39	63	39
322278	Residential	60	82	41	64	41
322281	Residential	60	82	41	64	41
322282	Residential	60	82	36	61	36
322292	Residential	60	82	40	64	40
322293	Residential	60	82	31	56	31
322294	Residential	60	82	33	58	33
322295	Residential	60	82	43	67	43
322296	Residential	60	82	42	66	42
322297	Residential	60	82	44	69	44
322298	Residential	60	82	41	65	41
322302	Residential	60	82	48	73	48
322303	Residential	60	82	47	71	47
322304	Residential	60	82	37	62	37
322305	Residential	60	82	36	61	36
322306	Residential	60	82	38	61	38
322307	Residential	60	82	41	65	41
322308	Residential	60	82	35	59	35
322309	Residential	60	82	42	65	42
322312	Residential	60	82	35	59	35
322318	Residential	60	82	37	61	37
322320	Residential	60	82	37	60	37
322323	Residential	60	82	35	60	35
322328	Residential	60	82	43	68	43
322350	Residential	60	82	51	76	51
322353	Residential	60	82	37	61	37
322354	Residential	60	82	40	64	40
322355	Residential	60	82	25	50	25
322356	Residential	60	82	42	67	42
322358	Residential	60	82	40	64	40
322359	Residential	60	82	39	64	39
322363	Residential	60	82	36	61	36
322365	Residential	60	82	41	65	41
322367	Residential	60	82	28	53	28
322368	Residential	60	82	34	58	34
322371	Residential	60	82	35	60	35
322375	Residential	60	82	35	59	35
322384	Residential	60	82	39	62	39
322386	Residential	60	82	41	64	41
322389	Residential	60	82	39	63	39
322391	Residential	60	82	54	79	54
322399	Residential	60	82	38	62	38
322420	Residential	60	82	35	59	35
322421	Residential	60	82	39	62	39
322423	Residential	60	82	47	72	47
322425	Residential	60	82	41	65	41
322426	Residential	60	82	41	65	41
322429	Residential	60	82	56	81	56
322430	Residential	60	82	37	61	37
322432	Residential	60	82	49	74	49
322435	Residential	60	82	50	75	50
322436	Residential	60	82	42	66	42
322439	Residential	60	82	43	67	43
322440	Residential	60	82	40	62	40
322443	Residential	60	82	42	67	42
322444	Residential	60	82	52	76	52
322445	Residential	60	82	41	63	41
322446	Residential	60	82	31	56	31

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322448	Residential	60	82	46	70	46
322449	Residential	60	82	40	64	40
322450	Residential	60	82	41	64	41
322451	Residential	60	82	41	64	41
322453	Residential	60	82	53	77	53
322456	Residential	60	82	35	60	35
322458	Residential	60	82	39	63	39
322460	Residential	60	82	42	66	42
322462	Residential	60	82	49	73	49
322470	Residential	60	82	30	55	30
322473	Residential	60	82	50	74	50
322478	Residential	60	82	37	60	37
322486	Residential	60	82	32	57	32
322488	Residential	60	82	40	63	40
322489	Residential	60	82	48	72	48
322490	Residential	60	82	50	74	50
322491	Residential	60	82	41	64	41
322492	Residential	60	82	53	78	53
322493	Residential	60	82	49	73	49
322494	Residential	60	82	56	81	56
322495	Residential	60	82	37	61	37
322496	Residential	60	82	47	72	47
322498	Residential	60	82	48	71	48
322500	Residential	60	82	39	63	39
322501	Residential	60	82	37	62	37
322507	Residential	60	82	41	64	41
322511	Residential	60	82	42	66	42
322514	Residential	60	82	40	65	40
322515	Residential	60	82	41	64	41
322518	Residential	60	82	39	63	39
322522	Residential	60	82	32	57	32
322523	Residential	60	82	33	58	33
322525	Residential	60	82	39	64	39
322526	Residential	60	82	36	60	36
322528	Residential	60	82	50	75	50
322529	Residential	60	82	55	80	55
322530	Residential	60	82	45	69	45
322531	Residential	60	82	39	64	39
322532	Residential	60	82	39	63	39
322533	Residential	60	82	34	59	34
322534	Residential	60	82	34	58	34
322542	Residential	60	82	45	69	45
322543	Residential	60	82	49	72	49
322546	Residential	60	82	30	55	30
322547	Residential	60	82	28	53	28
322549	Residential	60	82	25	50	25
322550	Residential	60	82	40	63	40
322551	Residential	60	82	30	55	30
322552	Residential	60	82	62	87	62
322553	Residential	60	82	40	64	40
322554	Residential	60	82	36	61	36
322557	Residential	60	82	36	60	36
322558	Residential	60	82	38	63	38
322559	Residential	60	82	40	65	40
322561	Residential	60	82	42	66	42
322562	Residential	60	82	46	71	46
322566	Residential	60	82	43	67	43
322567	Residential	60	82	50	75	50

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322569	Residential	60	82	37	62	37
322574	Residential	60	82	38	62	38
322575	Residential	60	82	41	65	41
322577	Residential	60	82	41	65	41
322578	Residential	60	82	46	70	46
322579	Residential	60	82	34	59	34
322581	Residential	60	82	38	62	38
322582	Residential	60	82	37	61	37
322583	Residential	60	82	40	63	40
322584	Residential	60	82	47	70	47
322589	Residential	60	82	42	66	42
322590	Residential	60	82	40	64	40
322592	Residential	60	82	34	59	34
322593	Residential	60	82	37	61	37
322595	Residential	60	82	31	55	31
322597	Residential	60	82	34	59	34
322598	Residential	60	82	39	63	39
322599	Residential	60	82	39	63	39
322600	Residential	60	82	51	76	51
322602	Residential	60	82	44	68	44
322603	Residential	60	82	48	73	48
322605	Residential	60	82	46	71	46
322606	Residential	60	82	43	67	43
322607	Residential	60	82	36	60	36
322608	Residential	60	82	37	61	37
322609	Residential	60	82	39	63	39
322610	Residential	60	82	39	63	39
322615	Residential	60	82	45	70	45
322617	Residential	60	82	42	67	42
322624	Residential	60	82	52	77	52
322625	Residential	60	82	54	79	54
322627	Residential	60	82	43	66	43
322628	Residential	60	82	40	64	40
322629	Residential	60	82	40	63	40
322630	Residential	60	82	44	68	44
322631	Residential	60	82	41	64	41
322635	Residential	60	82	36	60	36
322636	Residential	60	82	38	62	38
322637	Residential	60	82	38	62	38
322638	Residential	60	82	41	64	41
322639	Residential	60	82	39	63	39
322640	Residential	60	82	39	63	39
322643	Residential	60	82	39	63	39
322644	Residential	60	82	39	62	39
322646	Residential	60	82	52	76	52
322648	Residential	60	82	41	65	41
322649	Residential	60	82	45	69	45
322650	Residential	60	82	39	63	39
322651	Residential	60	82	43	68	43
322652	Residential	60	82	39	63	39
322654	Residential	60	82	42	66	42
322656	Residential	60	82	39	62	39
322660	Residential	60	82	51	76	51
322662	Residential	60	82	32	57	32
322663	Residential	60	82	33	58	33
322665	Residential	60	82	56	81	56
322666	Residential	60	82	43	68	43
322668	Residential	60	82	44	68	44

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322672	Residential	60	82	41	65	41
322673	Residential	60	82	39	62	39
322679	Residential	60	82	45	70	45
322681	Residential	60	82	38	63	38
322687	Residential	60	82	45	70	45
322714	Residential	60	82	41	65	41
322716	Residential	60	82	41	65	41
322719	Residential	60	82	45	70	45
322720	Residential	60	82	30	55	30
322723	Residential	60	82	30	55	30
322724	Residential	60	82	36	61	36
322725	Residential	60	82	37	61	37
322726	Residential	60	82	38	63	38
322728	Residential	60	82	38	62	38
322729	Residential	60	82	44	68	44
322730	Residential	60	82	45	69	45
322732	Residential	60	82	52	76	52
322733	Residential	60	82	43	67	43
322735	Residential	60	82	35	60	35
322781	Residential	60	82	43	68	43
322784	Residential	60	82	28	53	28
322785	Residential	60	82	31	56	31
322786	Residential	60	82	46	70	46
322787	Residential	60	82	41	65	41
322788	Residential	60	82	40	64	40
322789	Residential	60	82	37	61	37
322791	Residential	60	82	47	71	47
322792	Residential	60	82	50	75	50
322794	Residential	60	82	52	76	52
322798	Residential	60	82	53	78	53
322808	Residential	60	82	50	73	50
322809	Residential	60	82	39	64	39
322810	Residential	60	82	45	70	45
322850	Residential	60	82	41	65	41
322851	Residential	60	82	40	64	40
322852	Residential	60	82	34	58	34
322889	Residential	60	82	40	63	40
322890	Residential	60	82	32	56	32
322894	Residential	60	82	40	64	40
322946	Residential	60	82	36	60	36
322950	Residential	60	82	37	61	37
322996	Residential	60	82	37	62	37
322997	Residential	60	82	31	56	31
323033	Residential	60	82	40	65	40
323037	Residential	60	82	38	61	38
323066	Residential	60	82	45	70	45
323074	Residential	60	82	28	53	28
323100	Residential	60	82	33	57	33
323105	Residential	60	82	48	73	48
323146	Residential	60	82	34	58	34
323147	Residential	60	82	45	70	45
323149	Residential	60	82	41	64	41
323153	Residential	60	82	37	62	37
323154	Residential	60	82	37	62	37
323156	Residential	60	82	40	64	40
323159	Residential	60	82	42	66	42
323221	Residential	60	82	34	59	34
323222	Residential	60	82	41	65	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323225	Residential	60	82	35	60	35
323226	Residential	60	82	43	66	43
323227	Residential	60	82	39	61	39
323231	Residential	60	82	39	63	39
323234	Residential	60	82	45	67	45
323279	Residential	60	82	38	62	38
323281	Residential	60	82	39	62	39
323282	Residential	60	82	48	71	48
323286	Residential	60	82	42	67	42
323288	Residential	60	82	37	62	37
323290	Residential	60	82	37	62	37
323304	Residential	60	82	40	64	40
323307	Residential	60	82	37	61	37
323308	Residential	60	82	37	61	37
323309	Residential	60	82	40	64	40
323311	Residential	60	82	37	61	37
323312	Residential	60	82	37	62	37
323313	Residential	60	82	36	61	36
323325	Residential	60	82	31	56	31
323340	Residential	60	82	40	64	40
323351	Residential	60	82	42	66	42
323355	Residential	60	82	38	62	38
323356	Residential	60	82	39	63	39
323384	Residential	60	82	39	62	39
323397	Residential	60	82	45	69	45
323399	Residential	60	82	41	65	41
323401	Residential	60	82	41	65	41
323402	Residential	60	82	37	61	37
323403	Residential	60	82	45	69	45
323404	Residential	60	82	39	62	39
323406	Residential	60	82	55	80	55
323407	Residential	60	82	37	62	37
323408	Residential	60	82	49	73	49
323409	Residential	60	82	39	63	39
323411	Residential	60	82	38	63	38
323414	Residential	60	82	50	75	50
323415	Residential	60	82	53	77	53
323416	Residential	60	82	54	79	54
323417	Residential	60	82	49	74	49
323419	Residential	60	82	46	70	46
323420	Residential	60	82	41	65	41
323421	Residential	60	82	48	73	48
323423	Residential	60	82	40	64	40
323424	Residential	60	82	39	62	39
323425	Residential	60	82	41	64	41
323428	Residential	60	82	38	63	38
323429	Residential	60	82	39	63	39
323430	Residential	60	82	38	62	38
323432	Residential	60	82	40	64	40
323435	Residential	60	82	47	72	47
323436	Residential	60	82	50	74	50
323437	Residential	60	82	34	59	34
323438	Residential	60	82	27	52	27
323439	Residential	60	82	34	58	34
323440	Residential	60	82	39	63	39
323441	Residential	60	82	35	59	35
323442	Residential	60	82	33	58	33
323443	Residential	60	82	40	64	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323444	Residential	60	82	36	61	36
323445	Residential	60	82	37	61	37
323446	Residential	60	82	43	66	43
323447	Residential	60	82	30	55	30
323449	Residential	60	82	54	79	54
323452	Residential	60	82	44	68	44
323453	Residential	60	82	49	74	49
323456	Residential	60	82	33	58	33
323457	Residential	60	82	33	58	33
323458	Residential	60	82	52	76	52
323459	Residential	60	82	41	66	41
323461	Residential	60	82	53	78	53
323462	Residential	60	82	44	69	44
323463	Residential	60	82	45	70	45
323464	Residential	60	82	39	64	39
323465	Residential	60	82	48	73	48
323466	Residential	60	82	51	76	51
323467	Residential	60	82	39	64	39
323468	Residential	60	82	30	55	30
323469	Residential	60	82	50	75	50
323470	Residential	60	82	39	64	39
323472	Residential	60	82	28	53	28
323473	Residential	60	82	25	50	25
323474	Residential	60	82	34	59	34
323475	Residential	60	82	38	63	38
323476	Residential	60	82	48	72	48
323478	Residential	60	82	40	65	40
323480	Residential	60	82	40	64	40
323485	Residential	60	82	47	72	47
323487	Residential	60	82	44	68	44
323488	Residential	60	82	44	69	44
323489	Residential	60	82	31	56	31
323490	Residential	60	82	31	56	31
323491	Residential	60	82	41	65	41
323492	Residential	60	82	41	65	41
323493	Residential	60	82	34	59	34
323494	Residential	60	82	33	58	33
323495	Residential	60	82	34	59	34
323496	Residential	60	82	34	59	34
323497	Residential	60	82	34	59	34
323499	Residential	60	82	24	49	24
323500	Residential	60	82	29	53	29
323501	Residential	60	82	38	62	38
323502	Residential	60	82	46	70	46
323503	Residential	60	82	50	74	50
323504	Residential	60	82	48	73	48
323505	Residential	60	82	45	69	45
323507	Residential	60	82	35	60	35
323508	Residential	60	82	48	73	48
323510	Residential	60	82	48	72	48
323511	Residential	60	82	48	72	48
323512	Residential	60	82	45	68	45
323513	Residential	60	82	40	64	40
323515	Residential	60	82	35	59	35
323517	Residential	60	82	32	57	32
323518	Residential	60	82	36	60	36
323519	Residential	60	82	35	60	35
323520	Residential	60	82	31	56	31

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323522	Residential	60	82	50	75	50
323523	Residential	60	82	43	68	43
323524	Residential	60	82	40	64	40
323525	Residential	60	82	56	81	56
323526	Residential	60	82	36	60	36
323527	Residential	60	82	38	63	38
323528	Residential	60	82	42	65	42
323529	Residential	60	82	40	63	40
323530	Residential	60	82	44	68	44
323531	Residential	60	82	41	66	41
323533	Residential	60	82	46	70	46
323535	Residential	60	82	39	63	39
323536	Residential	60	82	39	62	39
323539	Residential	60	82	37	60	37
323541	Residential	60	82	35	59	35
323543	Residential	60	82	47	71	47
323544	Residential	60	82	38	62	38
323545	Residential	60	82	37	62	37
323546	Residential	60	82	35	60	35
323547	Residential	60	82	34	59	34
323548	Residential	60	82	35	59	35
323549	Residential	60	82	51	75	51
323550	Residential	60	82	32	57	32
323551	Residential	60	82	33	57	33
323552	Residential	60	82	30	55	30
323553	Residential	60	82	41	65	41
323554	Residential	60	82	35	59	35
323555	Residential	60	82	40	63	40
323556	Residential	60	82	50	74	50
323557	Residential	60	82	46	70	46
323558	Residential	60	82	40	63	40
323559	Residential	60	82	40	63	40
323560	Residential	60	82	52	77	52
323561	Residential	60	82	41	65	41
323562	Residential	60	82	41	65	41
323564	Residential	60	82	49	74	49
323565	Residential	60	82	44	69	44
323566	Residential	60	82	33	58	33
323567	Residential	60	82	32	57	32
323568	Residential	60	82	41	65	41
323569	Residential	60	82	56	81	56
323570	Residential	60	82	52	76	52
323572	Residential	60	82	44	68	44
323573	Residential	60	82	39	63	39
323574	Residential	60	82	28	53	28
323575	Residential	60	82	51	76	51
323576	Residential	60	82	52	76	52
323577	Residential	60	82	52	76	52
323578	Residential	60	82	43	68	43
323579	Residential	60	82	43	66	43
323580	Residential	60	82	38	61	38
323581	Residential	60	82	42	66	42
323582	Residential	60	82	33	58	33
323583	Residential	60	82	40	65	40
323584	Residential	60	82	39	64	39
323585	Residential	60	82	40	64	40
323586	Residential	60	82	37	61	37
323587	Residential	60	82	37	61	37

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323588	Residential	60	82	32	57	32
323589	Residential	60	82	37	61	37
323590	Residential	60	82	38	63	38
323591	Residential	60	82	46	69	46
323592	Residential	60	82	50	75	50
323593	Residential	60	82	44	68	44
323594	Residential	60	82	46	70	46
323595	Residential	60	82	44	69	44
323596	Residential	60	82	40	65	40
323597	Residential	60	82	45	70	45
323598	Residential	60	82	51	75	51
323599	Residential	60	82	40	63	40
323600	Residential	60	82	42	66	42
323601	Residential	60	82	43	67	43
323602	Residential	60	82	42	66	42
323603	Residential	60	82	41	65	41
323605	Residential	60	82	54	79	54
323606	Residential	60	82	48	72	48
323607	Residential	60	82	47	71	47
323609	Residential	60	82	36	61	36
323610	Residential	60	82	33	57	33
323611	Residential	60	82	36	59	36
323612	Residential	60	82	31	56	31
323613	Residential	60	82	38	62	38
323614	Residential	60	82	36	60	36
323615	Residential	60	82	34	59	34
323618	Residential	60	82	39	63	39
323619	Residential	60	82	38	63	38
323620	Residential	60	82	46	69	46
323621	Residential	60	82	43	65	43
323622	Residential	60	82	49	74	49
323623	Residential	60	82	51	75	51
323625	Residential	60	82	44	68	44
323626	Residential	60	82	43	67	43
323627	Residential	60	82	50	74	50
323628	Residential	60	82	50	73	50
323630	Residential	60	82	31	56	31
323631	Residential	60	82	30	55	30
323635	Residential	60	82	53	78	53
323636	Residential	60	82	53	77	53
323638	Residential	60	82	40	64	40
323639	Residential	60	82	42	65	42
323640	Residential	60	82	41	65	41
323641	Residential	60	82	33	57	33
323642	Residential	60	82	39	64	39
323643	Residential	60	82	31	56	31
323644	Residential	60	82	30	55	30
323645	Residential	60	82	38	61	38
323646	Residential	60	82	38	62	38
323647	Residential	60	82	37	61	37
323648	Residential	60	82	39	63	39
323650	Residential	60	82	43	68	43
323651	Residential	60	82	52	76	52
323652	Residential	60	82	44	68	44
323653	Residential	60	82	40	62	40
323654	Residential	60	82	47	72	47
323655	Residential	60	82	48	72	48
323656	Residential	60	82	51	75	51

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323658	Residential	60	82	51	76	51
323659	Residential	60	82	34	59	34
323661	Residential	60	82	26	51	26
323662	Residential	60	82	36	61	36
323663	Residential	60	82	38	62	38
323665	Residential	60	82	29	54	29
323666	Residential	60	82	36	61	36
323667	Residential	60	82	41	65	41
323668	Residential	60	82	40	63	40
323669	Residential	60	82	40	63	40
323670	Residential	60	82	50	74	50
323671	Residential	60	82	46	70	46
323672	Residential	60	82	37	61	37
323673	Residential	60	82	39	64	39
323674	Residential	60	82	41	65	41
323675	Residential	60	82	42	65	42
323676	Residential	60	82	40	63	40
323678	Residential	60	82	57	82	57
323680	Residential	60	82	53	77	53
323681	Residential	60	82	40	63	40
323682	Residential	60	82	27	51	27
323683	Residential	60	82	51	75	51
323685	Residential	60	82	32	57	32
323686	Residential	60	82	34	59	34
323687	Residential	60	82	35	60	35
323688	Residential	60	82	34	59	34
323689	Residential	60	82	29	54	29
323690	Residential	60	82	30	55	30
323691	Residential	60	82	32	57	32
323693	Residential	60	82	35	60	35
323694	Residential	60	82	35	59	35
323695	Residential	60	82	40	63	40
323696	Residential	60	82	41	64	41
323697	Residential	60	82	37	61	37
323698	Residential	60	82	46	70	46
323699	Residential	60	82	48	73	48
323700	Residential	60	82	41	65	41
323701	Residential	60	82	40	64	40
323702	Residential	60	82	50	75	50
323703	Residential	60	82	46	70	46
323704	Residential	60	82	42	66	42
323705	Residential	60	82	41	64	41
323706	Residential	60	82	32	57	32
323708	Residential	60	82	34	59	34
323709	Residential	60	82	29	54	29
323710	Residential	60	82	52	76	52
323711	Residential	60	82	50	75	50
323712	Residential	60	82	41	66	41
323713	Residential	60	82	35	60	35
323714	Residential	60	82	52	76	52
323716	Residential	60	82	37	61	37
323717	Residential	60	82	39	63	39
323718	Residential	60	82	37	61	37
323720	Residential	60	82	58	82	58
323722	Residential	60	82	54	79	54
323723	Residential	60	82	29	53	29
323724	Residential	60	82	28	53	28
323726	Residential	60	82	36	60	36

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323727	Residential	60	82	39	64	39
323728	Residential	60	82	35	60	35
323729	Residential	60	82	34	59	34
323730	Residential	60	82	39	63	39
323731	Residential	60	82	35	60	35
323732	Residential	60	82	37	60	37
323733	Residential	60	82	37	61	37
323734	Residential	60	82	37	61	37
323735	Residential	60	82	41	65	41
323736	Residential	60	82	38	62	38
323737	Residential	60	82	39	63	39
323738	Residential	60	82	45	70	45
323739	Residential	60	82	32	56	32
323740	Residential	60	82	33	57	33
323741	Residential	60	82	36	61	36
323742	Residential	60	82	43	68	43
323743	Residential	60	82	40	63	40
323744	Residential	60	82	41	63	41
323745	Residential	60	82	49	73	49
323746	Residential	60	82	49	73	49
323747	Residential	60	82	35	59	35
323748	Residential	60	82	48	72	48
323749	Residential	60	82	36	60	36
323750	Residential	60	82	34	59	34
323751	Residential	60	82	34	58	34
323752	Residential	60	82	33	58	33
323754	Residential	60	82	44	69	44
323756	Residential	60	82	47	71	47
323757	Residential	60	82	43	67	43
323758	Residential	60	82	41	64	41
323759	Residential	60	82	49	73	49
323760	Residential	60	82	45	70	45
323761	Residential	60	82	47	71	47
323762	Residential	60	82	41	64	41
323763	Residential	60	82	38	63	38
323767	Residential	60	82	40	64	40
323768	Residential	60	82	39	63	39
323769	Residential	60	82	40	65	40
323770	Residential	60	82	47	71	47
323771	Residential	60	82	42	66	42
323772	Residential	60	82	34	59	34
323773	Residential	60	82	41	64	41
323774	Residential	60	82	35	60	35
323775	Residential	60	82	34	59	34
323777	Residential	60	82	36	61	36
323778	Residential	60	82	34	58	34
323780	Residential	60	82	51	76	51
323782	Residential	60	82	43	68	43
323783	Residential	60	82	44	69	44
323784	Residential	60	82	33	57	33
323785	Residential	60	82	38	62	38
323786	Residential	60	82	51	76	51
323788	Residential	60	82	42	66	42
323789	Residential	60	82	51	76	51
323790	Residential	60	82	42	66	42
323791	Residential	60	82	43	67	43
323792	Residential	60	82	43	67	43
323793	Residential	60	82	38	62	38

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323794	Residential	60	82	41	65	41
323795	Residential	60	82	51	75	51
323796	Residential	60	82	57	82	57
323797	Residential	60	82	52	77	52
323798	Residential	60	82	51	75	51
323799	Residential	60	82	39	63	39
323800	Residential	60	82	39	63	39
323801	Residential	60	82	43	68	43
323802	Residential	60	82	29	54	29
323803	Residential	60	82	51	75	51
323804	Residential	60	82	57	82	57
323805	Residential	60	82	48	73	48
323806	Residential	60	82	51	76	51
323808	Residential	60	82	49	74	49
323809	Residential	60	82	50	74	50
323811	Residential	60	82	35	60	35
323812	Residential	60	82	33	58	33
323813	Residential	60	82	35	60	35
323815	Residential	60	82	39	64	39
323816	Residential	60	82	39	64	39
323817	Residential	60	82	40	64	40
323818	Residential	60	82	38	62	38
323819	Residential	60	82	54	79	54
323823	Residential	60	82	53	77	53
323824	Residential	60	82	30	55	30
323825	Residential	60	82	45	69	45
323828	Residential	60	82	30	55	30
323829	Residential	60	82	41	65	41
323830	Residential	60	82	47	72	47
323831	Residential	60	82	47	71	47
323832	Residential	60	82	50	75	50
323833	Residential	60	82	47	72	47
323834	Residential	60	82	38	62	38
323835	Residential	60	82	40	64	40
323836	Residential	60	82	44	68	44
323837	Residential	60	82	32	57	32
323838	Residential	60	82	32	57	32
323839	Residential	60	82	39	63	39
323840	Residential	60	82	38	62	38
323841	Residential	60	82	40	63	40
323843	Residential	60	82	40	64	40
323844	Residential	60	82	53	78	53
323845	Residential	60	82	49	74	49
323846	Residential	60	82	53	78	53
323847	Residential	60	82	50	75	50
323848	Residential	60	82	53	77	53
323849	Residential	60	82	38	62	38
323850	Residential	60	82	40	64	40
323851	Residential	60	82	39	62	39
323852	Residential	60	82	41	65	41
323853	Residential	60	82	40	63	40
323854	Residential	60	82	61	86	61
323856	Residential	60	82	43	68	43
323857	Residential	60	82	48	72	48
323862	Residential	60	82	42	66	42
323866	Residential	60	82	48	72	48
323867	Residential	60	82	50	75	50
323868	Residential	60	82	55	80	55

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323871	Residential	60	82	40	64	40
323872	Residential	60	82	29	53	29
323876	Residential	60	82	51	75	51
323877	Residential	60	82	37	61	37
323878	Residential	60	82	36	61	36
323879	Residential	60	82	34	59	34
323880	Residential	60	82	35	60	35
323882	Residential	60	82	36	60	36
323883	Residential	60	82	35	59	35
323884	Residential	60	82	43	67	43
323885	Residential	60	82	45	70	45
323887	Residential	60	82	51	76	51
323891	Residential	60	82	37	61	37
323893	Residential	60	82	49	74	49
323894	Residential	60	82	46	70	46
323895	Residential	60	82	43	68	43
323896	Residential	60	82	42	65	42
323897	Residential	60	82	40	64	40
323898	Residential	60	82	40	64	40
323899	Residential	60	82	46	70	46
323901	Residential	60	82	35	60	35
323902	Residential	60	82	36	61	36
323903	Residential	60	82	33	58	33
323904	Residential	60	82	40	64	40
323905	Residential	60	82	45	70	45
323906	Residential	60	82	43	67	43
323907	Residential	60	82	45	69	45
323908	Residential	60	82	46	71	46
323909	Residential	60	82	26	51	26
323910	Residential	60	82	46	70	46
323911	Residential	60	82	44	68	44
323912	Residential	60	82	49	73	49
323913	Residential	60	82	49	73	49
323914	Residential	60	82	49	73	49
323915	Residential	60	82	41	65	41
323916	Residential	60	82	39	62	39
323917	Residential	60	82	40	64	40
323918	Residential	60	82	42	66	42
323919	Residential	60	82	41	65	41
323920	Residential	60	82	41	65	41
323921	Residential	60	82	42	66	42
323922	Residential	60	82	43	66	43
323923	Residential	60	82	41	65	41
323925	Residential	60	82	52	77	52
323926	Residential	60	82	35	59	35
323927	Residential	60	82	44	68	44
323928	Residential	60	82	40	63	40
323929	Residential	60	82	40	63	40
323930	Residential	60	82	49	73	49
323931	Residential	60	82	35	59	35
323932	Residential	60	82	34	59	34
323933	Residential	60	82	37	62	37
323934	Residential	60	82	37	61	37
323935	Residential	60	82	42	66	42
323936	Residential	60	82	42	65	42
323937	Residential	60	82	39	62	39
323938	Residential	60	82	40	63	40
323939	Residential	60	82	37	60	37

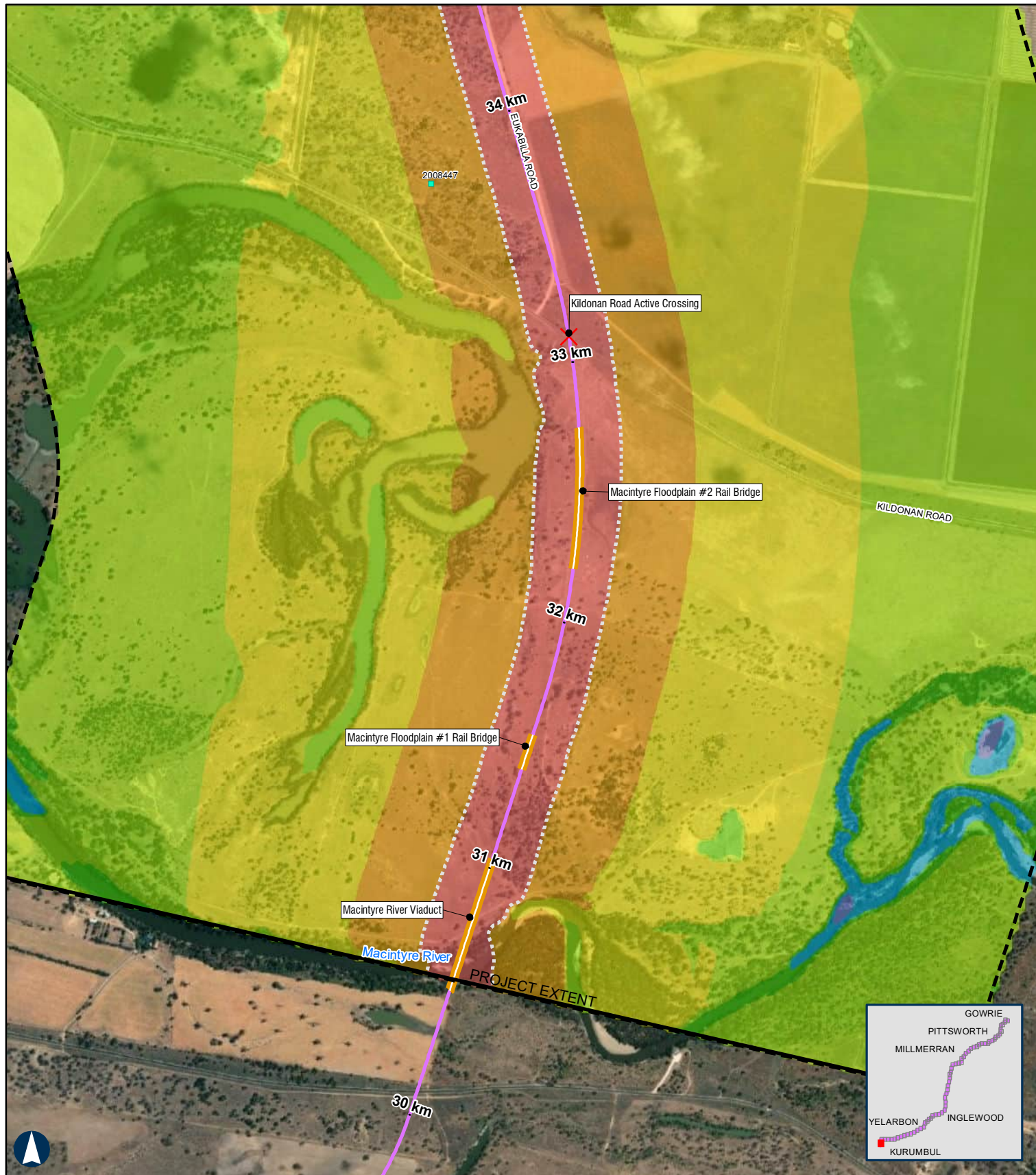
Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323940	Residential	60	82	37	60	37
323941	Residential	60	82	52	77	52
323942	Residential	60	82	31	56	31
323943	Residential	60	82	44	68	44
323944	Residential	60	82	44	68	44
323945	Residential	60	82	43	67	43
323946	Residential	60	82	47	71	47
323947	Residential	60	82	29	54	29
324270	Residential	60	82	62	87	62
324274	Residential	60	82	50	75	50
324277	Residential	60	82	51	75	51
324333	Residential	60	82	58	83	58
324347	Residential	60	82	52	77	52
1000000	Residential	60	82	46	71	46
1000001	Residential	60	82	40	64	40
2004721	Residential	60	82	52	77	52
2007798	Residential	60	82	40	64	40
2007851	Residential	60	82	42	67	42
2008222	Residential	60	82	48	72	48
2008224	Residential	60	82	58	83	59
2008226	Residential	60	82	37	62	37
2008227	Residential	60	82	42	67	42
2008232	Residential	60	82	49	73	49
2008234	Residential	60	82	48	72	48
2008306	Residential	60	82	36	61	36
2008307	Residential	60	82	35	59	35
2008308	Residential	60	82	39	63	39
2008309	Residential	60	82	31	56	31
2008314	Residential	60	82	45	70	45
2008315	Residential	60	82	42	65	42
2008316	Residential	60	82	51	76	51
2008317	Residential	60	82	51	75	51
2008318	Residential	60	82	55	80	55
2008319	Residential	60	82	56	81	56
2008321	Residential	60	82	45	70	45
2008322	Residential	60	82	42	68	42
2008323	Residential	60	82	35	60	35
2008324	Residential	60	82	33	58	33
2008325	Residential	60	82	44	69	44
2008326	Residential	60	82	28	53	28
2008328	Residential	60	82	41	67	41
2008329	Residential	60	82	43	67	43
2008330	Residential	60	82	38	63	38
2008331	Residential	60	82	22	47	22
2008332	Residential	60	82	23	48	23
2008333	Residential	60	82	51	74	51
2008335	Residential	60	82	48	72	48
2008336	Residential	60	82	46	70	46
2008338	Residential	60	82	42	67	42
2008339	Residential	60	82	38	63	38
2008340	Residential	60	82	54	79	54
2008341	Residential	60	82	49	74	49
2008342	Residential	60	82	40	65	40
2008343	Residential	60	82	47	71	47
2008344	Residential	60	82	25	50	25
2008346	Residential	60	82	23	48	23
2008347	Residential	60	82	55	79	55
2008349	Residential	60	82	48	73	48

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
2008350	Residential	60	82	39	64	39
2008351	Residential	60	82	50	74	50
2008353	Residential	60	82	40	65	40
2008355	Residential	60	82	48	73	48
2008357	Residential	60	82	48	73	48
2008358	Residential	60	82	33	59	33
2008359	Residential	60	82	29	54	29
2008360	Residential	60	82	35	60	35
2008361	Residential	60	82	31	57	31
2008364	Residential	60	82	32	57	32
2008365	Residential	60	82	24	49	24
2008366	Residential	60	82	24	50	24
2008367	Residential	60	82	25	50	25
2008368	Residential	60	82	23	48	23
2008369	Residential	60	82	22	47	22
2008371	Residential	60	82	21	46	21
2008372	Residential	60	82	18	43	18
2008373	Residential	60	82	18	43	18
2008374	Residential	60	82	19	44	19
2008376	Residential	60	82	13	38	14
2008377	Residential	60	82	11	36	12
2008379	Residential	60	82	20	45	20
2008380	Residential	60	82	22	47	22
2008393	Residential	60	82	18	43	18
2008394	Residential	60	82	50	75	50
2008396	Residential	60	82	45	70	45
2008397	Residential	60	82	41	66	41
2008398	Residential	60	82	41	66	41
2008399	Residential	60	82	39	64	39
2008400	Residential	60	82	44	70	44
2008401	Residential	60	82	39	64	39
2008402	Residential	60	82	37	62	37
2008403	Residential	60	82	36	61	36
2008404	Residential	60	82	44	69	44
2008405	Residential	60	82	39	64	39
2008406	Residential	60	82	36	62	36
2008407	Residential	60	82	36	61	36
2008408	Residential	60	82	44	69	44
2008409	Residential	60	82	40	65	40
2008410	Residential	60	82	37	62	37
2008411	Residential	60	82	36	61	36
2008412	Residential	60	82	44	69	44
2008413	Residential	60	82	41	67	41
2008414	Residential	60	82	40	65	40
2008415	Residential	60	82	48	71	48
2008417	Residential	60	82	48	73	48
2008418	Residential	60	82	47	72	47
2008420	Residential	60	82	47	72	47
2008421	Residential	60	82	42	67	42
2008422	Residential	60	82	40	65	40
2008423	Residential	60	82	40	64	40
2008431	Residential	60	82	37	61	37
2008437	Residential	60	82	50	74	50
2008438	Residential	60	82	49	74	49
2008439	Residential	60	82	39	64	39
254513	Community	60	82	54	78	-
254515	Education	60	82	54	78	-
254527	Education	60	82	51	75	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254564	Community	60	82	64	89	-
254574	Office	60	82	63	89	-
254592	Community	60	82	63	88	-
254619	Office	60	82	71	96	-
254852	Office	60	82	48	72	-
254858	Office	60	82	45	69	-
256773	Office	60	82	40	65	-
256806	Office	60	82	38	63	-
260123	Community	60	82	61	86	-
260154	Community	60	82	65	90	-
261287	Office	60	82	61	87	-
261321	Office	60	82	60	85	-
261544	Outdoor	57	79	59	84	-
261639	Office	60	82	59	84	-
261738	Worship	60	82	52	76	-
261749	Education	60	82	62	87	-
261795	Education	60	82	61	87	-
261821	Education	60	82	55	80	-
261823	Education	60	82	55	80	-
261831	Education	60	82	49	75	-
261890	Office	60	82	49	74	-
262035	Community	60	82	53	78	-
318994	Community	60	82	48	73	-
319762	Community	60	82	42	65	-
320693	Education	60	82	30	53	-
320726	Education	60	82	41	66	-
320741	Education	60	82	41	66	-
320763	Education	60	82	36	60	-
320847	Community	60	82	42	65	-
320848	Education	60	82	38	62	-
320887	Office	60	82	42	67	-
320888	Worship	60	82	37	61	-
320893	Education	60	82	37	62	-
320894	Education	60	82	37	61	-
320958	Education	60	82	32	56	-
320979	Office	60	82	45	70	-
320981	Office	60	82	48	72	-
321057	Education	60	82	43	68	-
321060	Education	60	82	46	71	-
321251	Office	60	82	44	67	-
321289	Education	60	82	45	70	-
321378	Community	60	82	38	63	-
321427	Community	60	82	44	69	-
321428	Office	60	82	39	63	-
321459	Office	60	82	41	65	-
321461	Office	60	82	41	66	-
321463	Office	60	82	45	68	-
321558	Outdoor	57	79	37	60	-
321588	Education	60	82	47	71	-
321619	Office	60	82	46	71	-
321620	Office	60	82	37	61	-
321643	Education	60	82	42	67	-
321668	Community	60	82	43	68	-
321670	Education	60	82	43	68	-
321739	Community	60	82	39	64	-
321765	Community	60	82	37	61	-
321774	Education	60	82	36	60	-
321787	Community	60	82	39	62	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321812	Office	60	82	41	66	-
321816	Office	60	82	47	71	-
321913	Education	60	82	37	61	-
321939	Office	60	82	46	70	-
322010	Office	60	82	40	64	-
322099	Education	60	82	32	55	-
322109	Worship	60	82	38	63	-
322113	Education	60	82	33	57	-
322165	Community	60	82	50	75	-
322240	Office	60	82	43	67	-
322315	Community	60	82	43	67	-
322378	Education	60	82	31	55	-
322379	Education	60	82	33	58	-
322402	Outdoor	57	79	44	68	-
322427	Office	60	82	46	70	-
322428	Education	60	82	32	57	-
322441	Office	60	82	43	67	-
322442	Office	60	82	40	64	-
322474	Office	60	82	50	74	-
322480	Outdoor	57	79	37	61	-
322504	Office	60	82	50	74	-
322505	Office	60	82	47	71	-
322541	Community	60	82	30	55	-
322576	Education	60	82	37	61	-
322658	Community	60	82	43	66	-
322664	Education	60	82	35	58	-
322718	Office	60	82	46	70	-
322790	Worship	60	82	58	83	-
322813	Education	60	82	41	66	-
322848	Education	60	82	39	63	-
322867	Office	60	82	39	64	-
322939	Outdoor	57	79	44	68	-
323410	Office	60	82	42	65	-
323422	Office	60	82	47	71	-
323427	Office	60	82	47	72	-
323431	Office	60	82	40	64	-
323434	Office	60	82	53	78	-
323481	Childcare	60	82	38	62	-
323514	Education	60	82	36	61	-
323537	Education	60	82	32	55	-
323633	Office	60	82	42	65	-
323634	Office	60	82	42	65	-
323657	Office	60	82	51	76	-
323660	Office	60	82	41	65	-
323677	Worship	60	82	38	63	-
323764	Worship	60	82	42	66	-
323776	Worship	60	82	37	61	-
323807	Community	60	82	51	76	-
323861	Worship	60	82	41	64	-
323863	Worship	60	82	44	68	-
323874	Office	60	82	41	64	-
323889	Education	60	82	46	71	-
323890	Education	60	82	46	71	-
2008433	Education	60	82	43	68	-
2008434	Community	60	82	42	65	-
2008440	Outdoor	57	79	33	56	-
2008441	Outdoor	57	79	26	51	-
2008442	Outdoor	57	79	34	58	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
2008443	Outdoor	57	79	32	57	-
2008444	Outdoor	57	79	32	56	-
2008445	Outdoor	57	79	50	74	-
2008446	Outdoor	57	79	60	85	-
2008447	Outdoor	57	79	54	78	-
2008448	Outdoor	57	79	45	68	-
2008449	Outdoor	57	79	40	66	-
2008450	Outdoor	57	79	36	60	-
2008451	Outdoor	57	79	40	65	-
2008488	Outdoor	57	79	59	85	-



BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 1 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

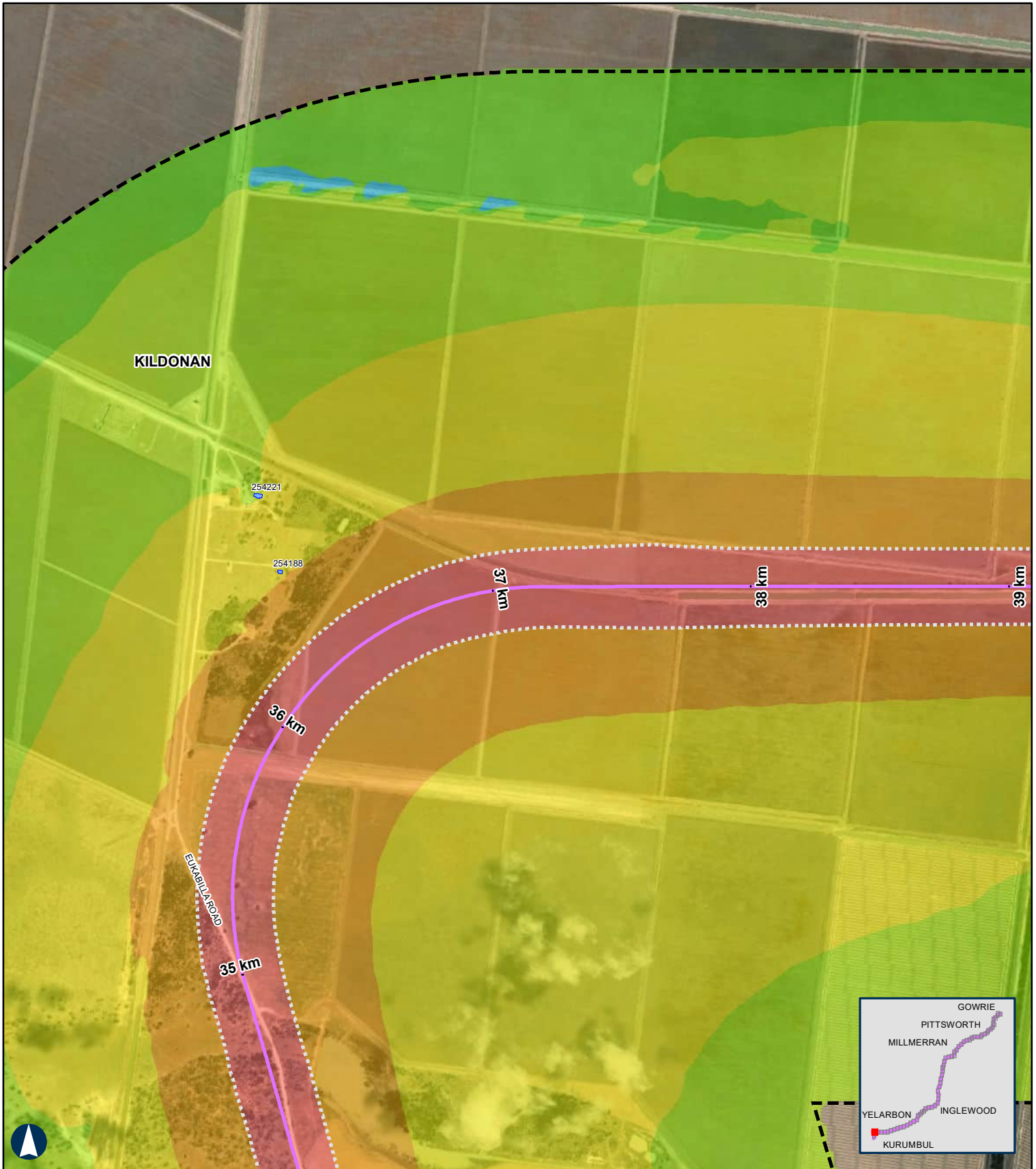
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 2 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG
Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

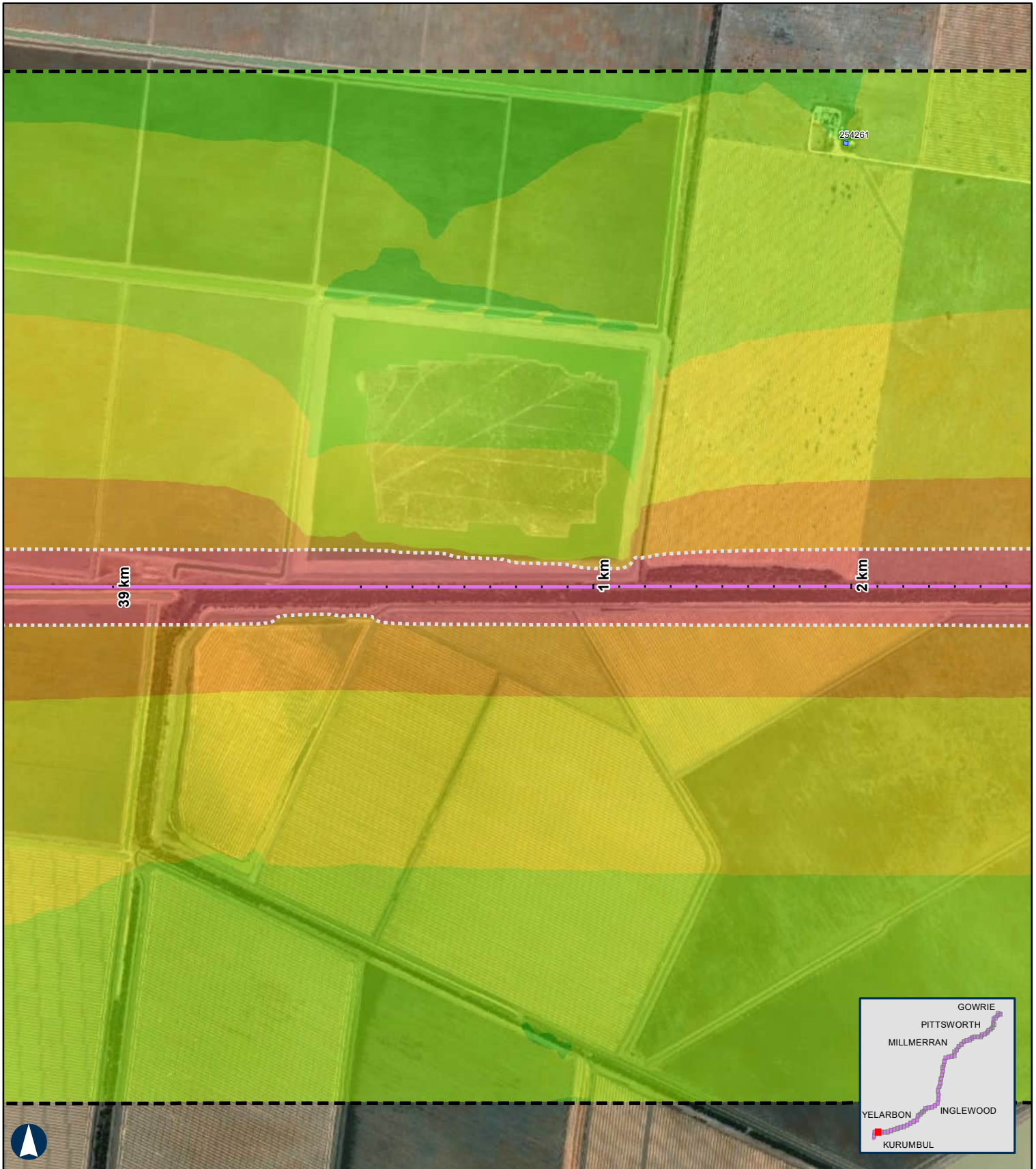
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 3 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

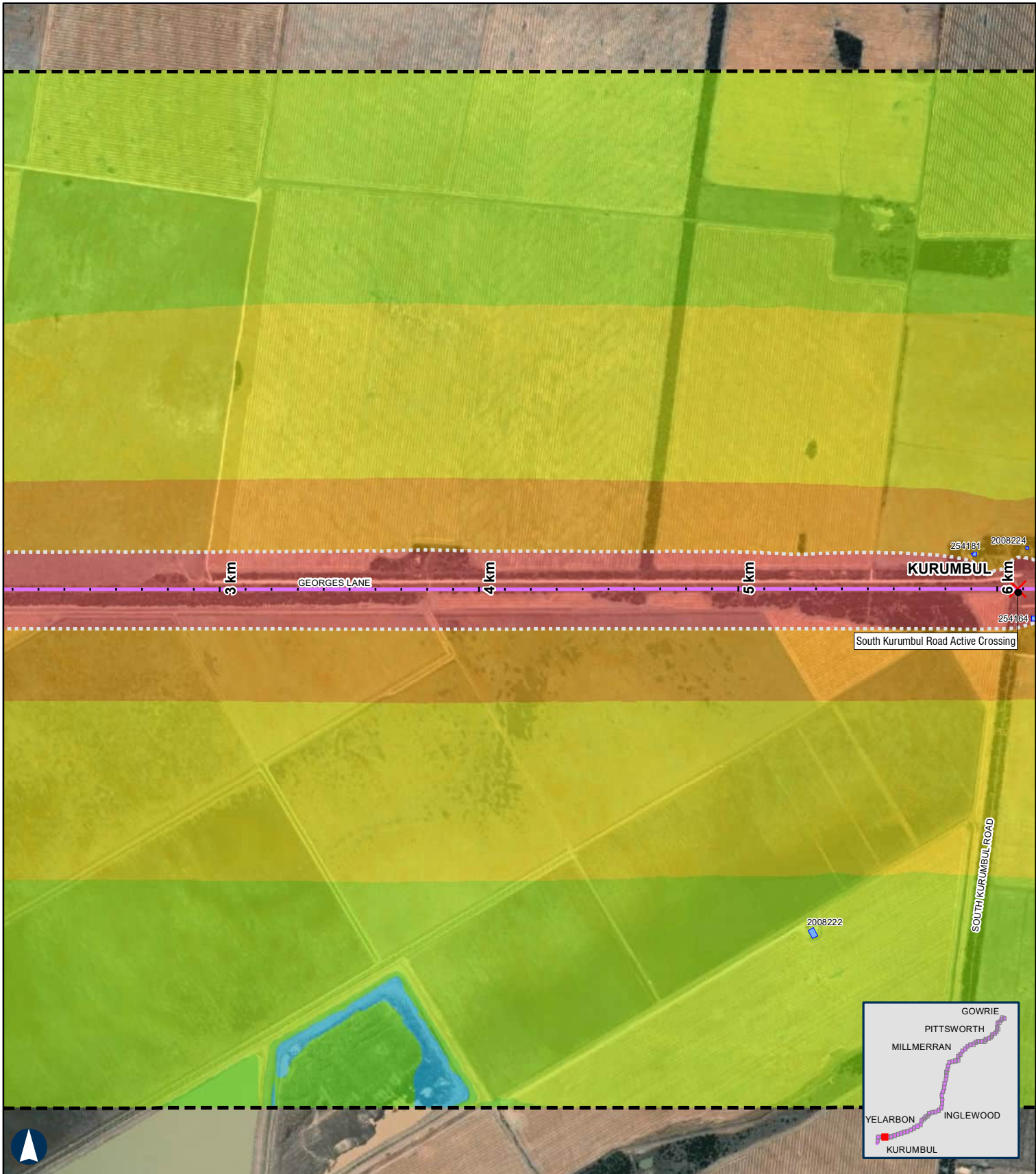
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028 Leq,24h**

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

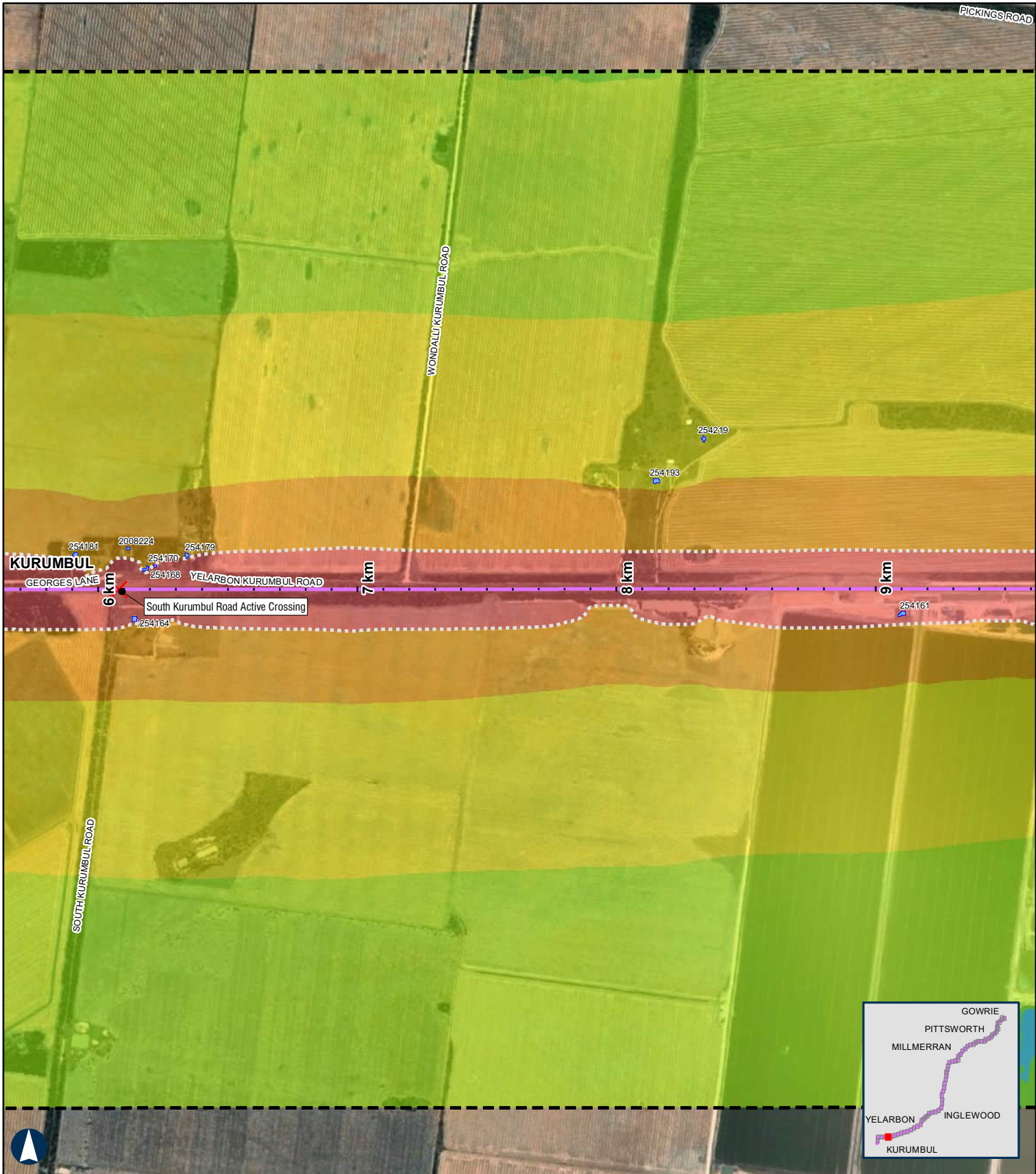
- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

APPENDIX D - Map 4 of 63



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 5 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

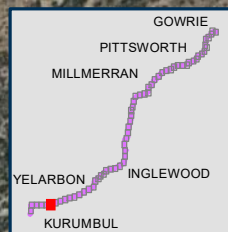
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 6 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/
Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

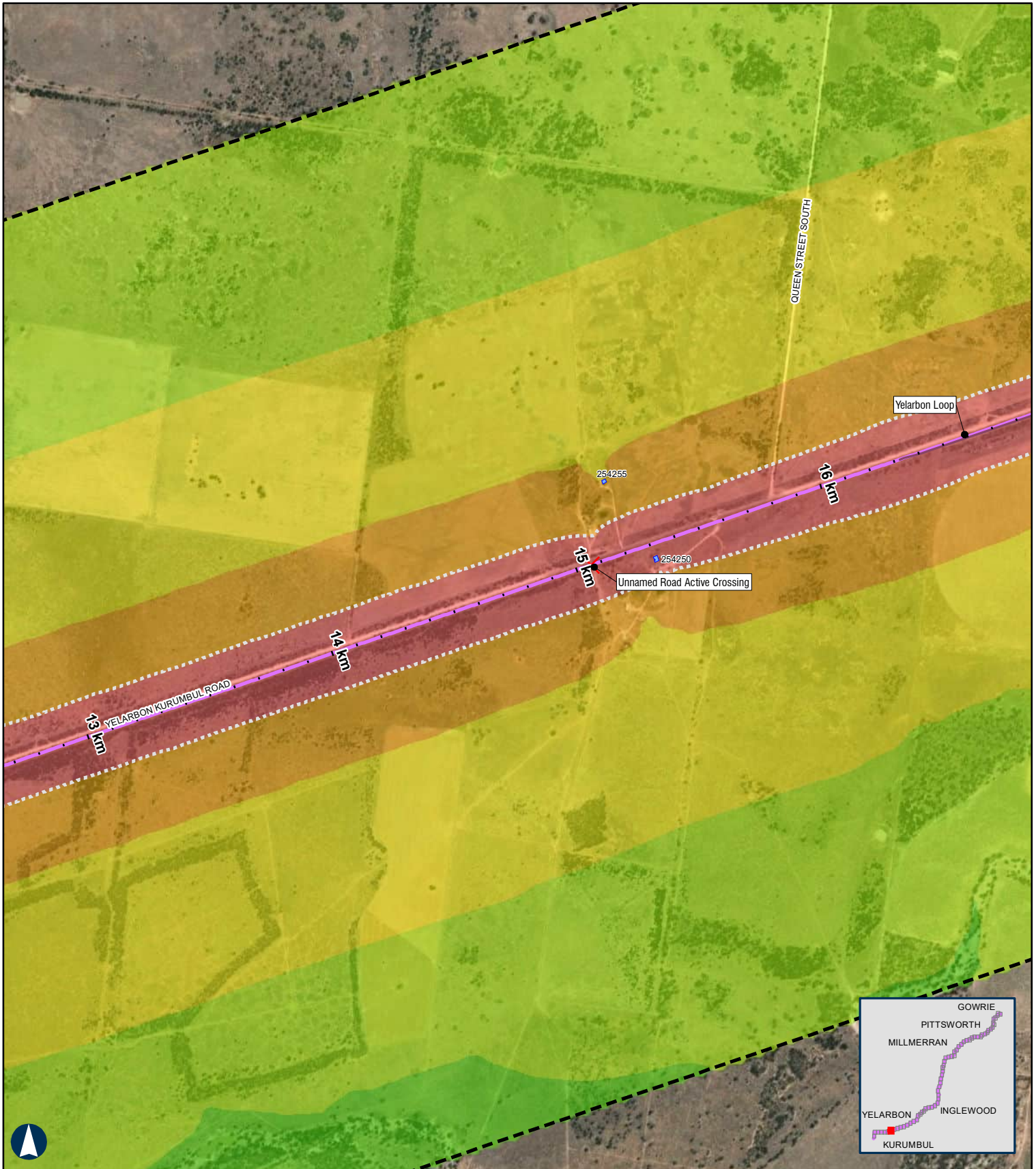
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 7 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▬ Modelling Area
- ▭ Koala Habitat Area

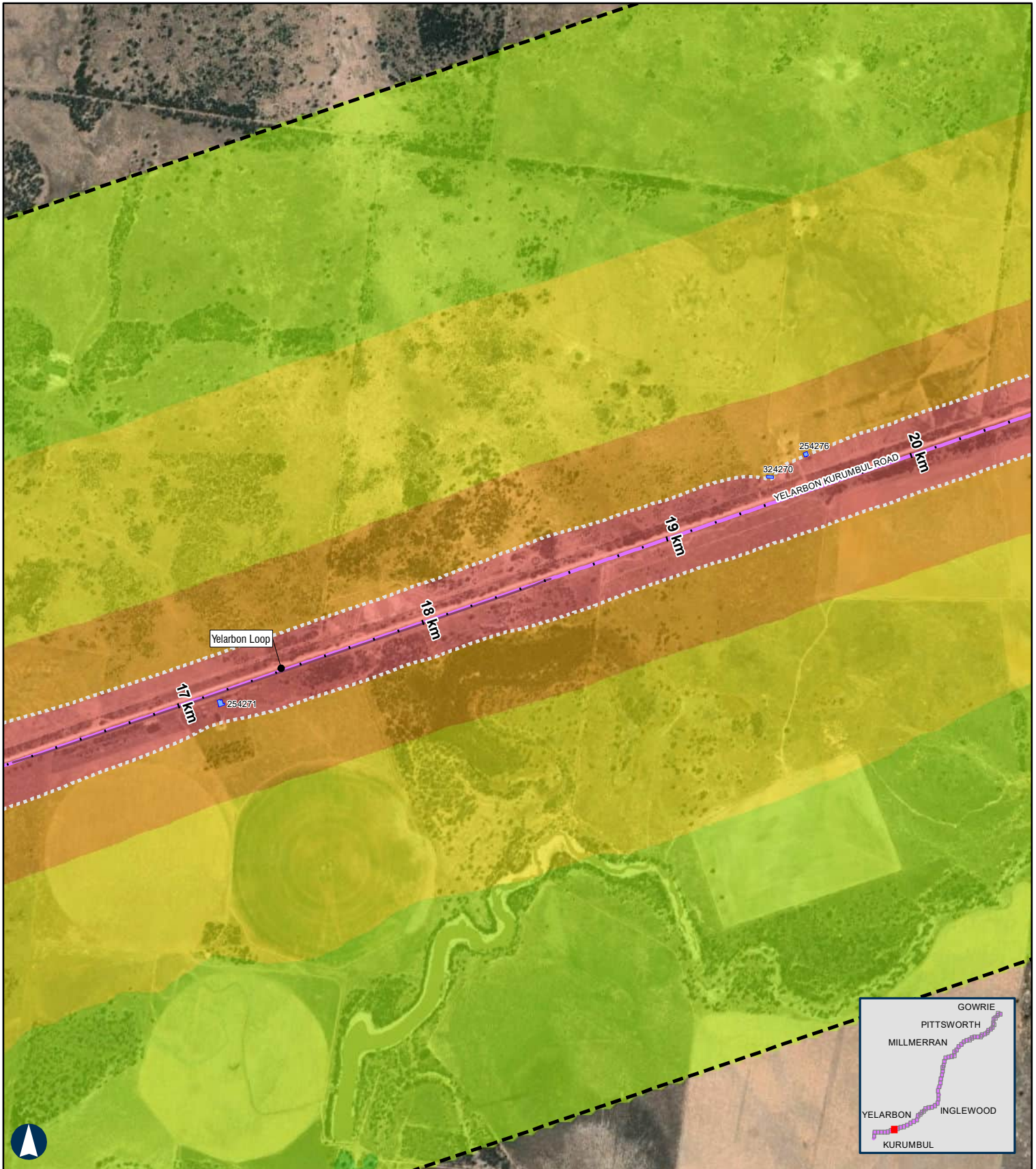
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - ▭ Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 8 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

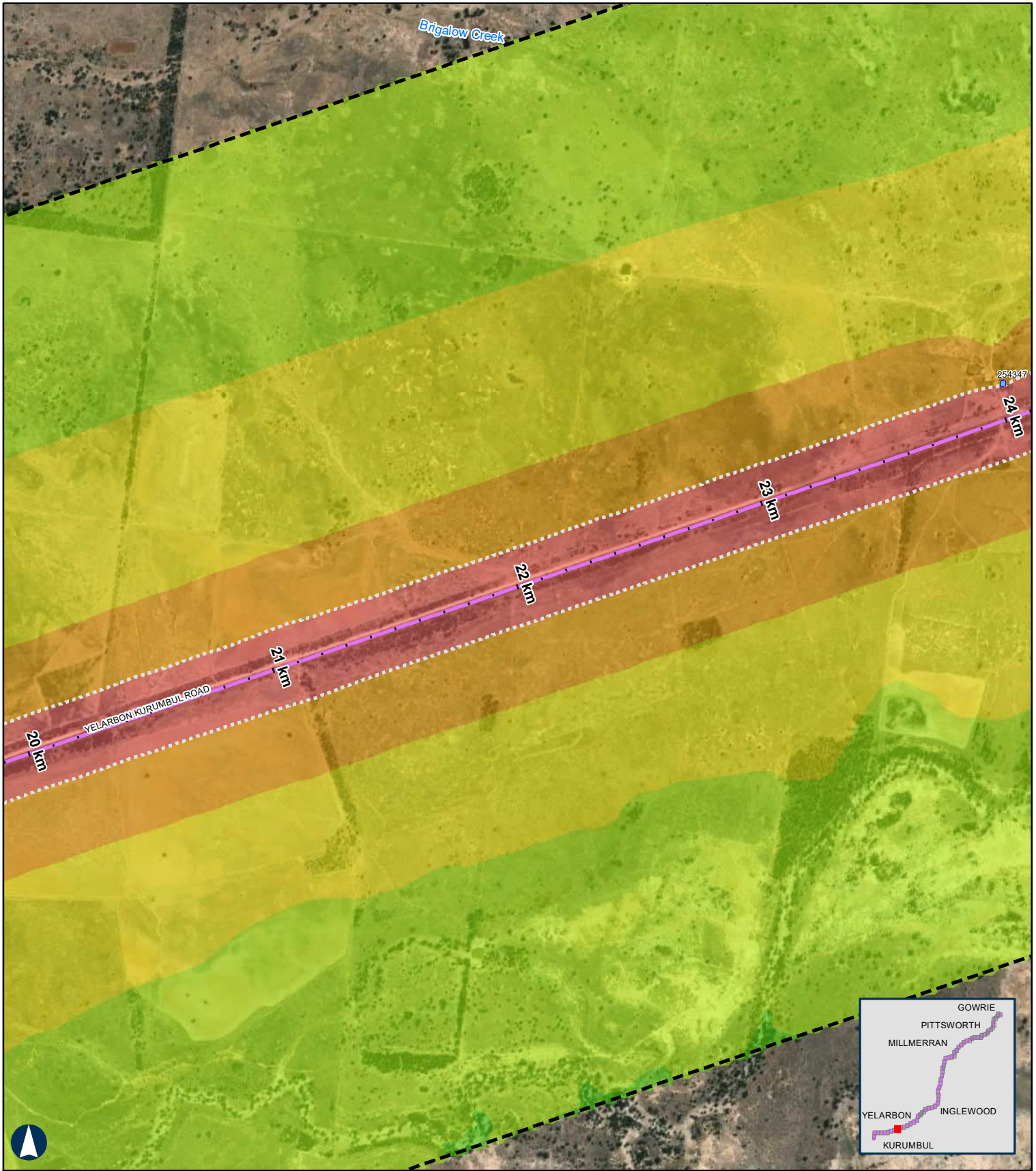
- Sensitive Receptor Type**
- ▭ Residential
 - ▭ Community
 - ▭ Educational
 - ▭ Commercial
 - ▭ Parkland
 - ▭ Future Developments

- Criterion (60 dBA)
- Noise Levels**
- ▭ 30 - 35 dBA
 - ▭ 35 - 40 dBA
 - ▭ 40 - 45 dBA
 - ▭ 45 - 50 dBA
 - ▭ 50 - 55 dBA
 - ▭ 55 - 60 dBA
 - ▭ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 9 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

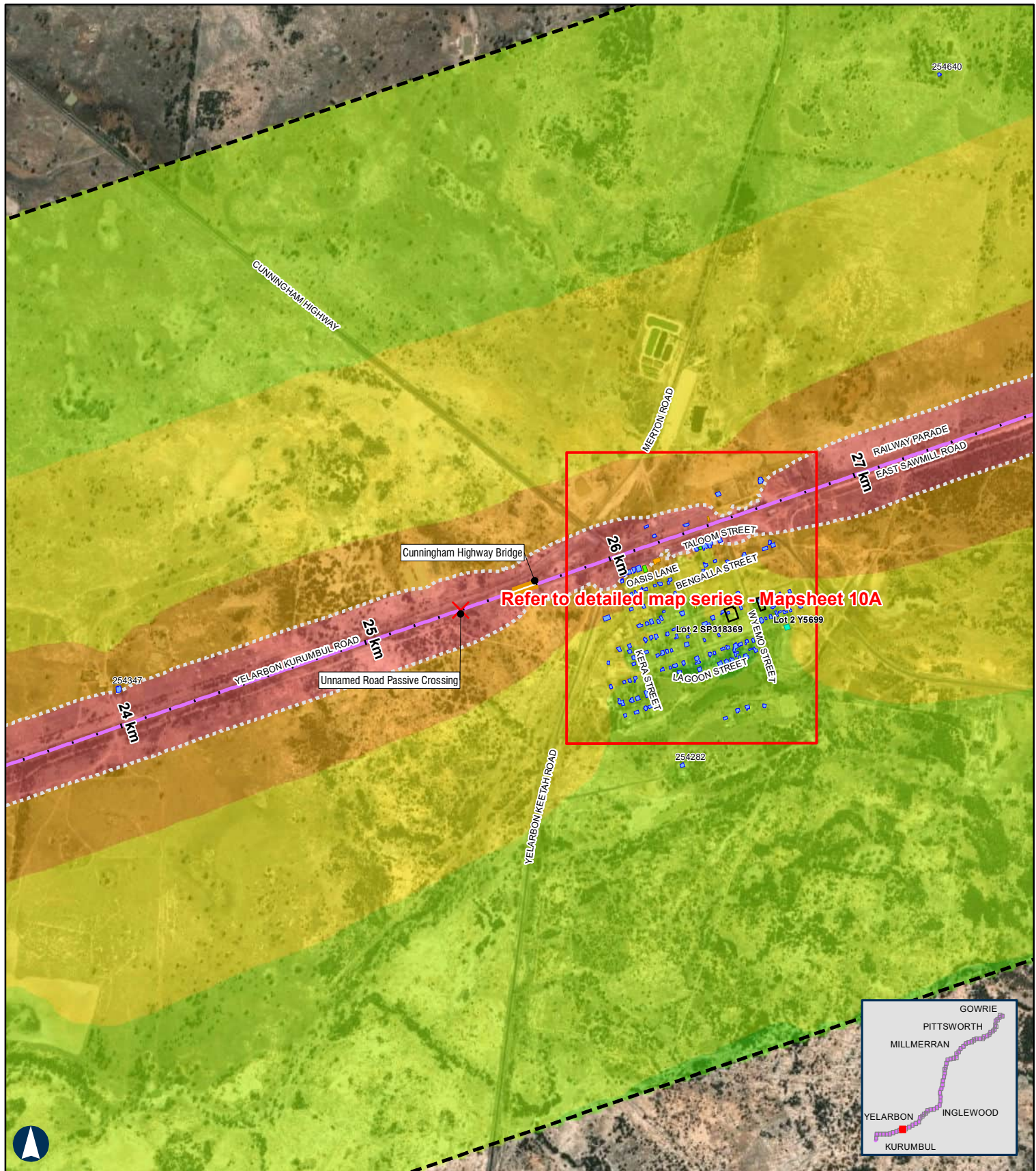
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 10 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

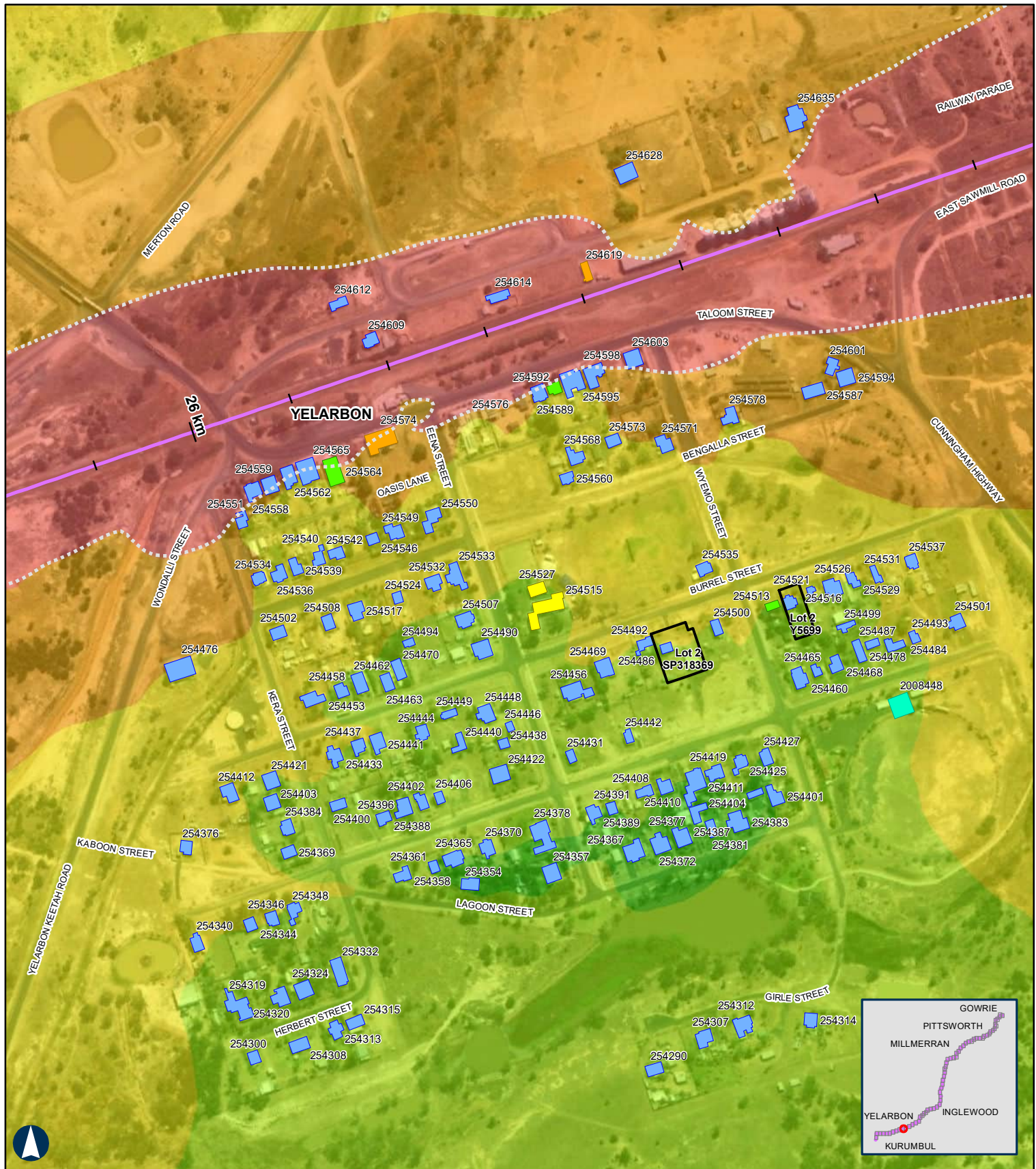
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 10A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:5,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

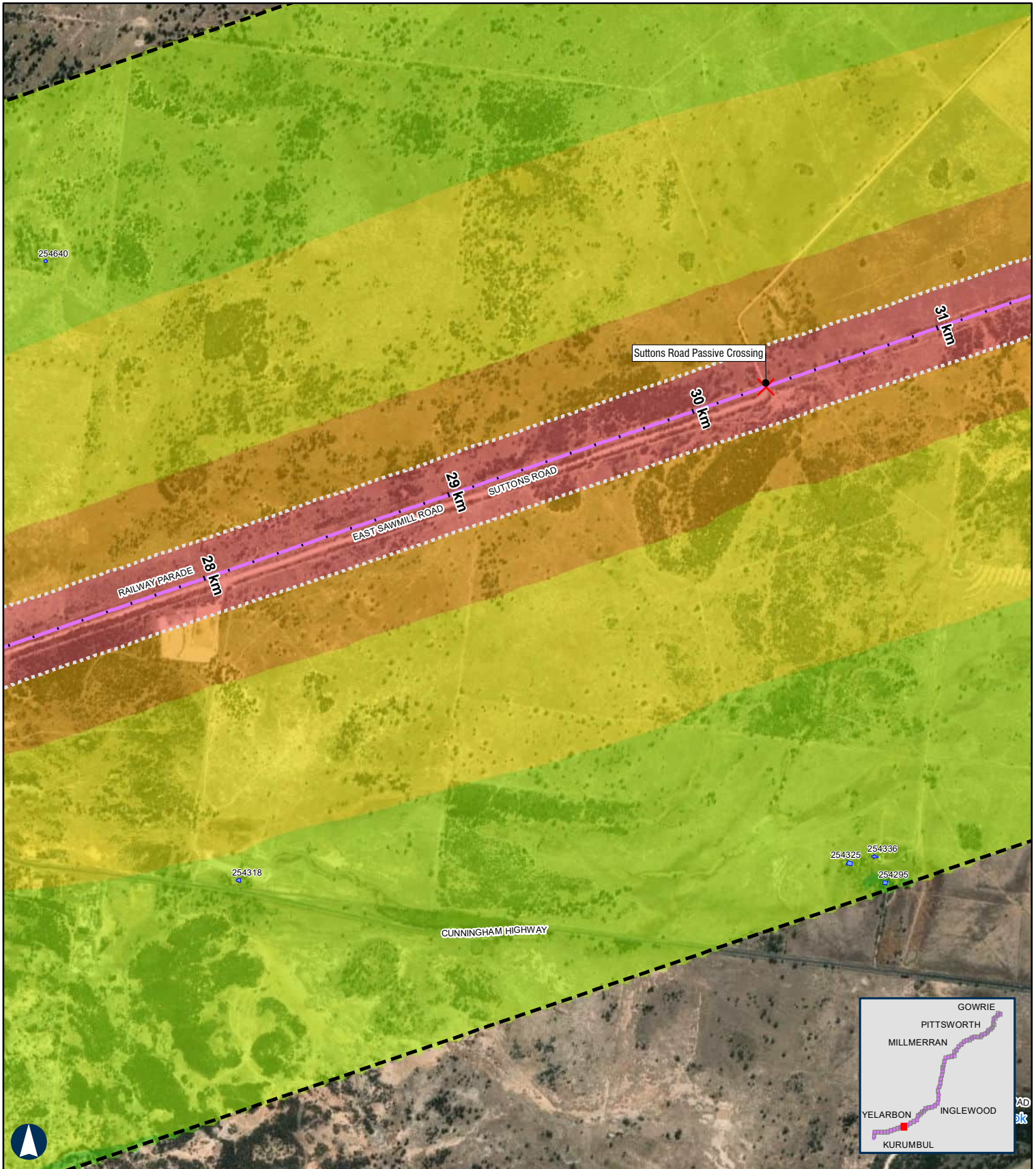
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 11 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

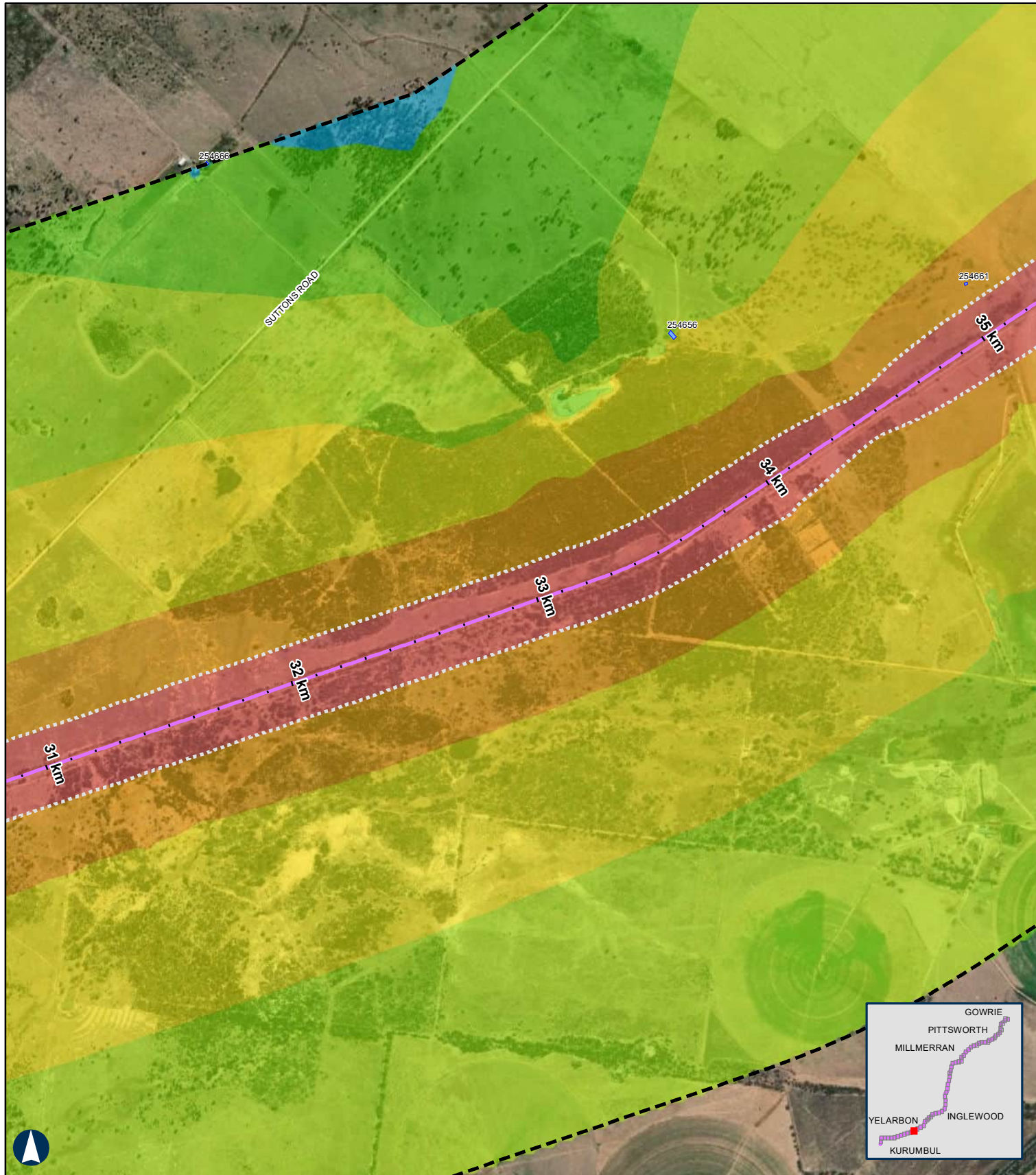
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 12 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- - - Modelling Area
- - - Koala Habitat Area

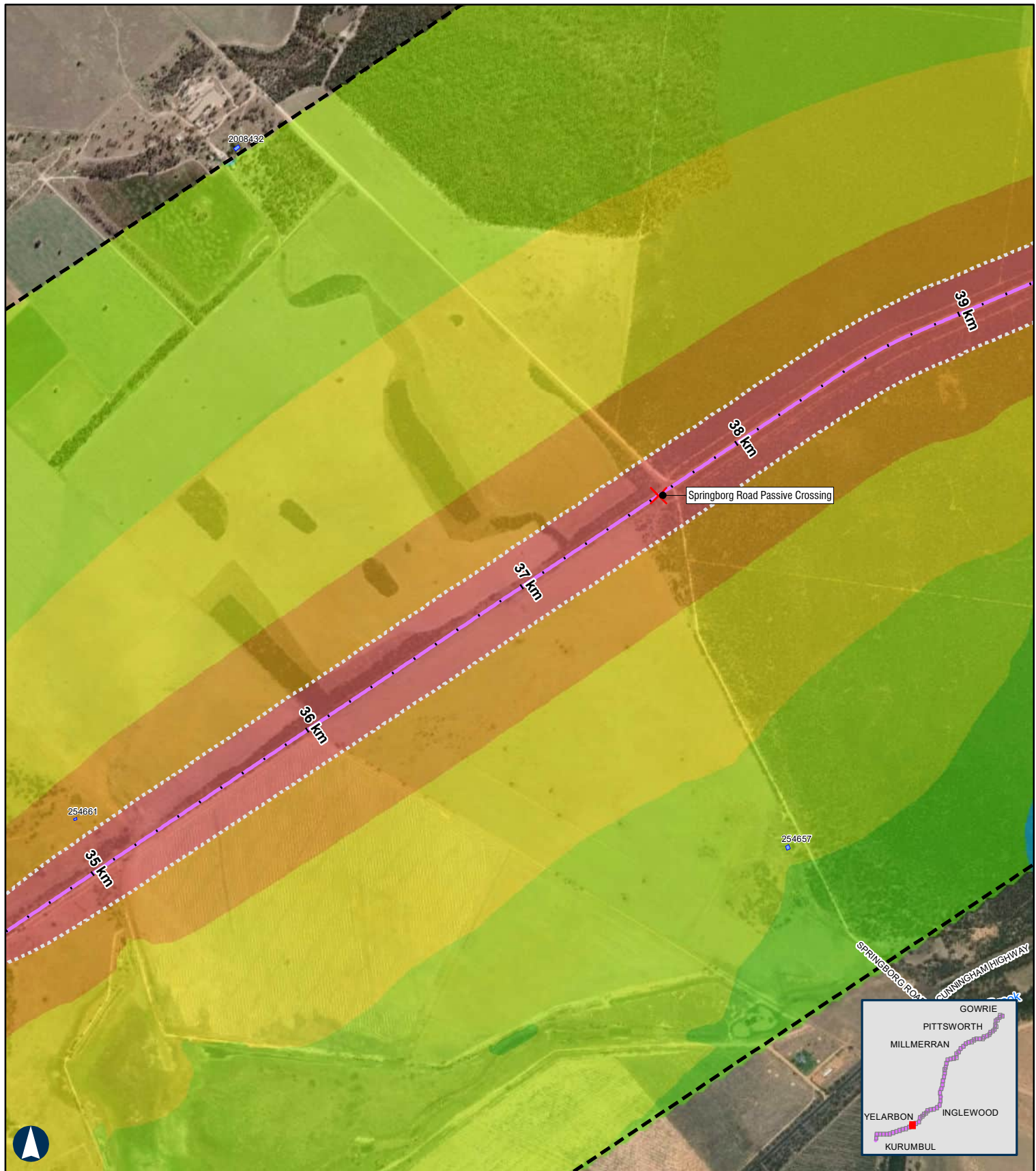
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- - - Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 13 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

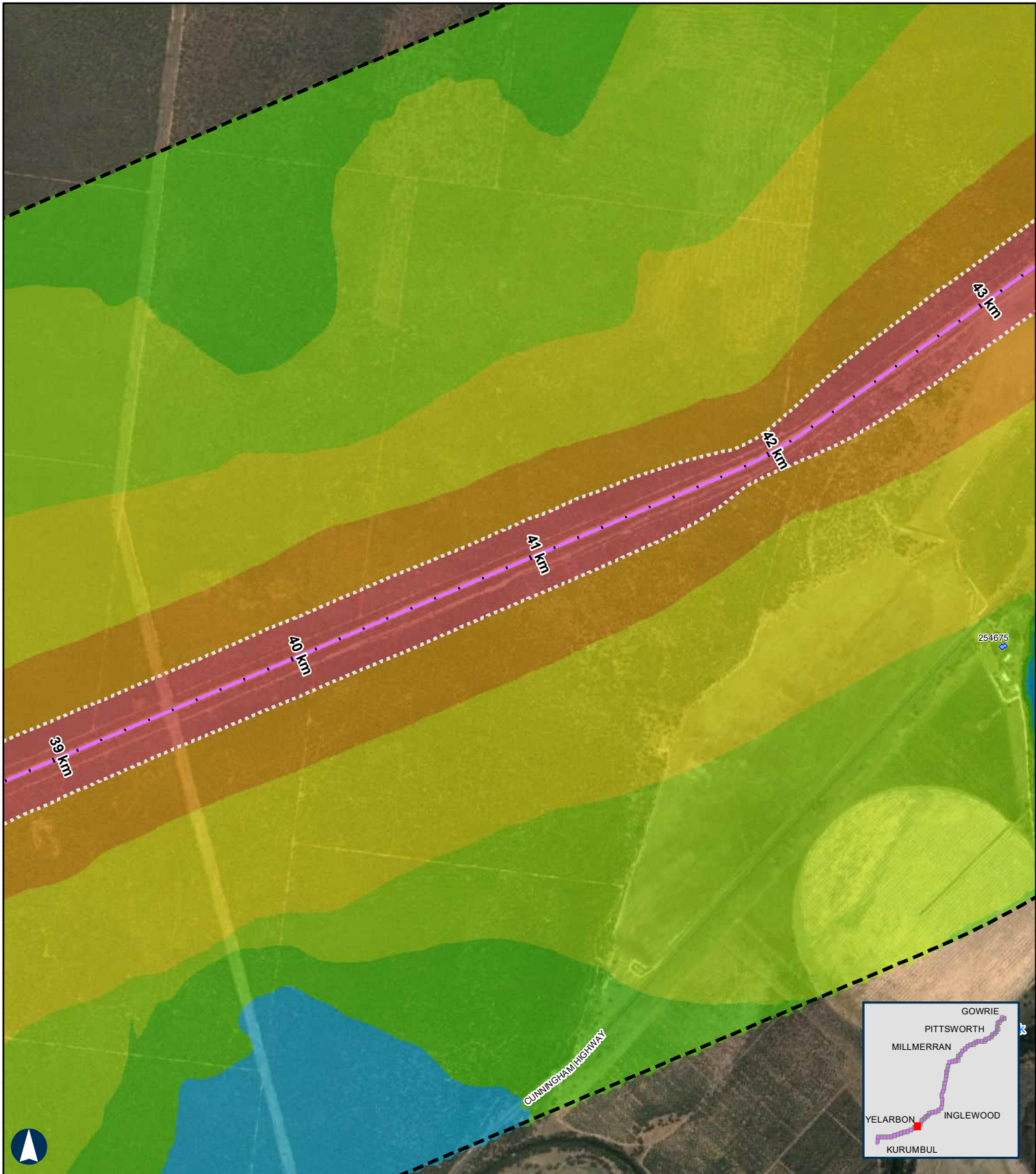
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 14 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

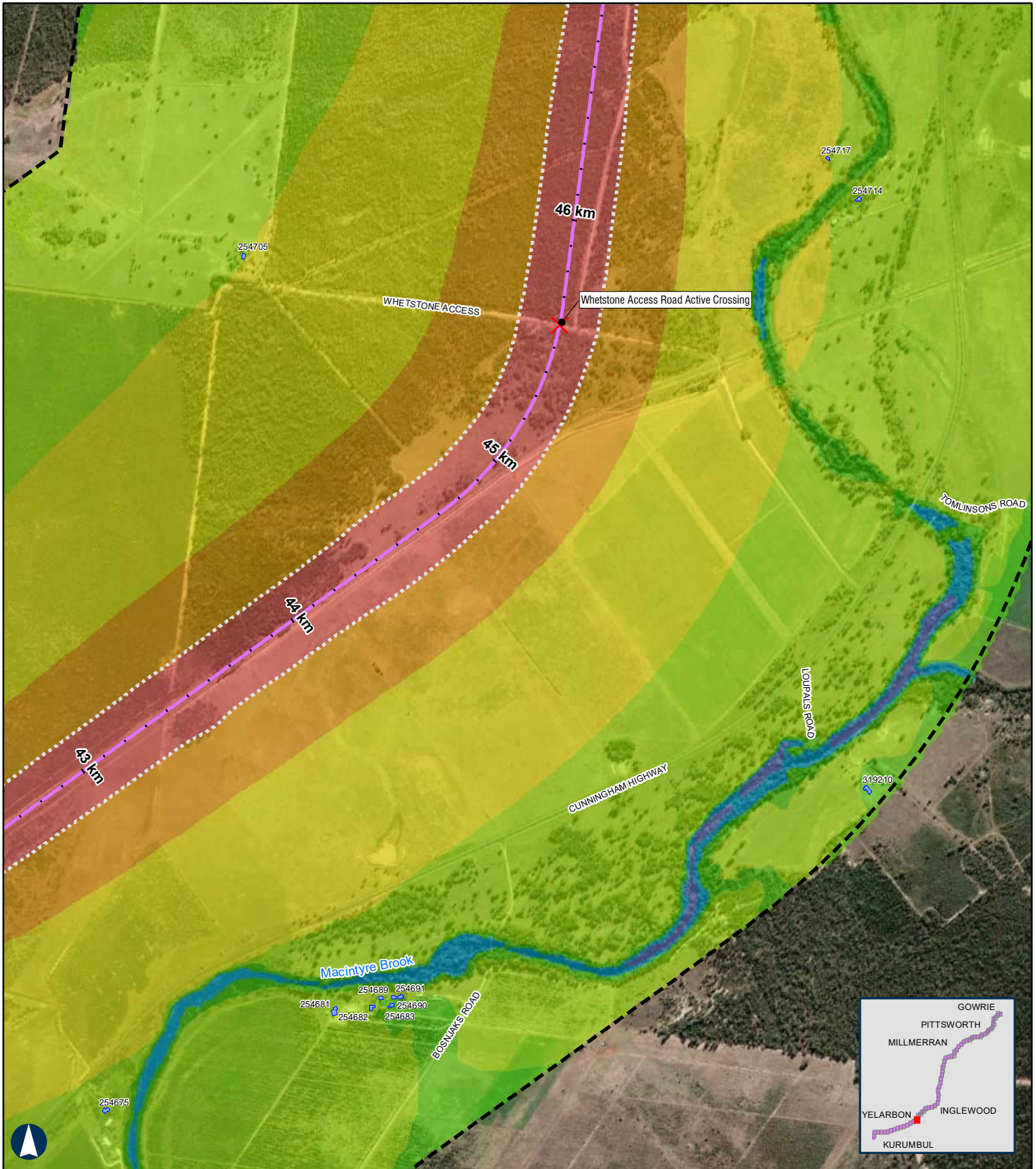
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 15 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

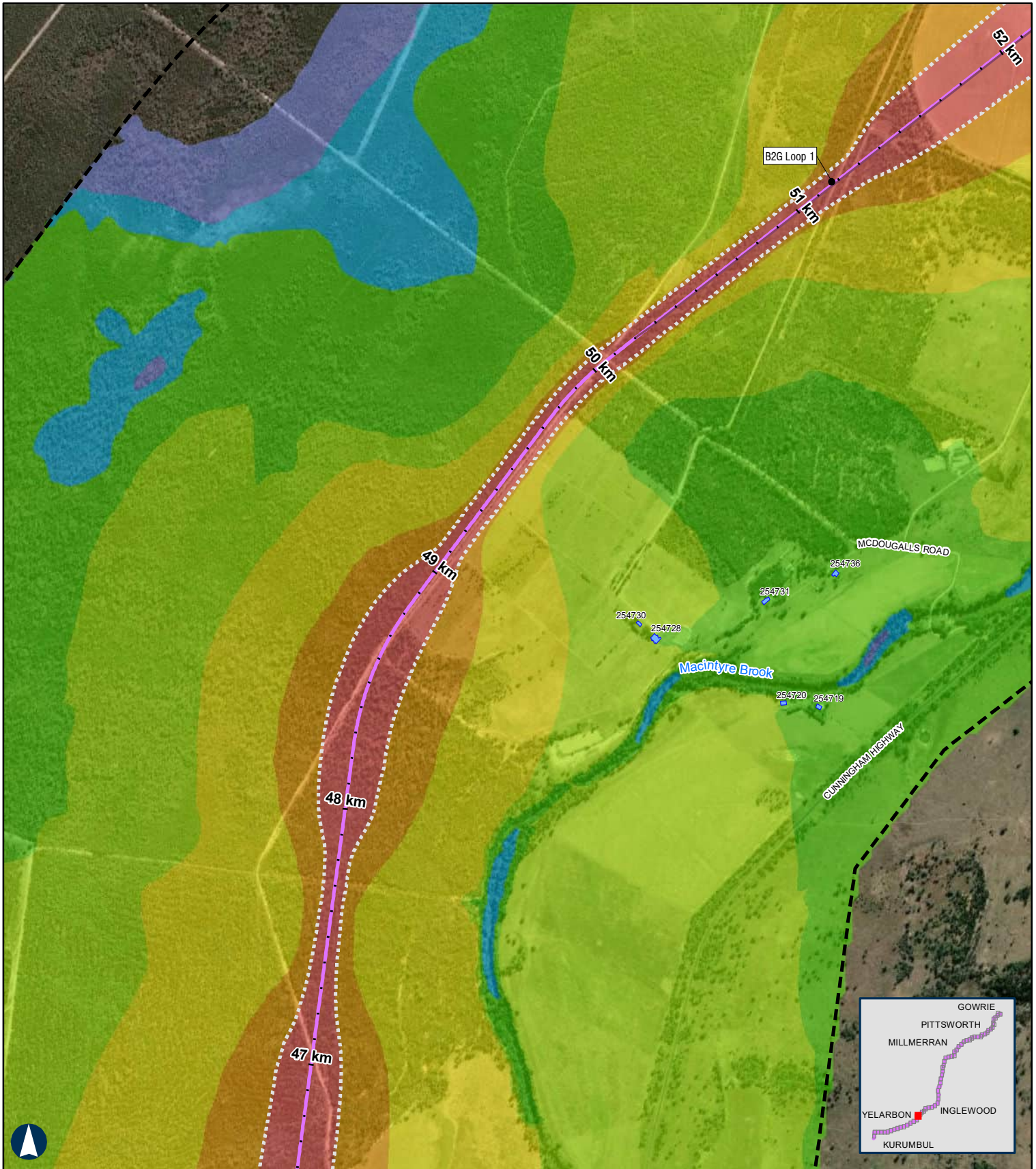
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 16 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

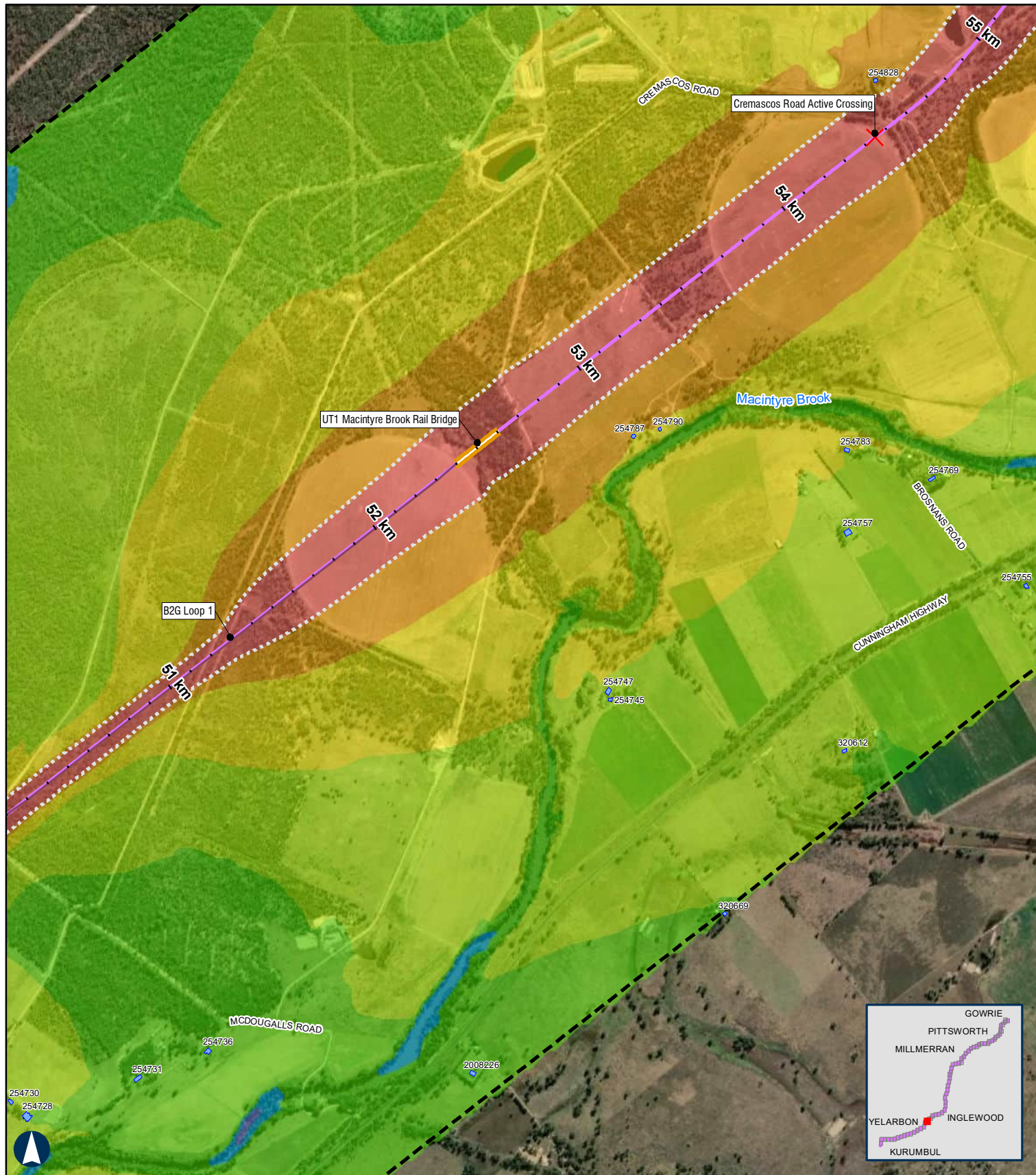
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 17 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

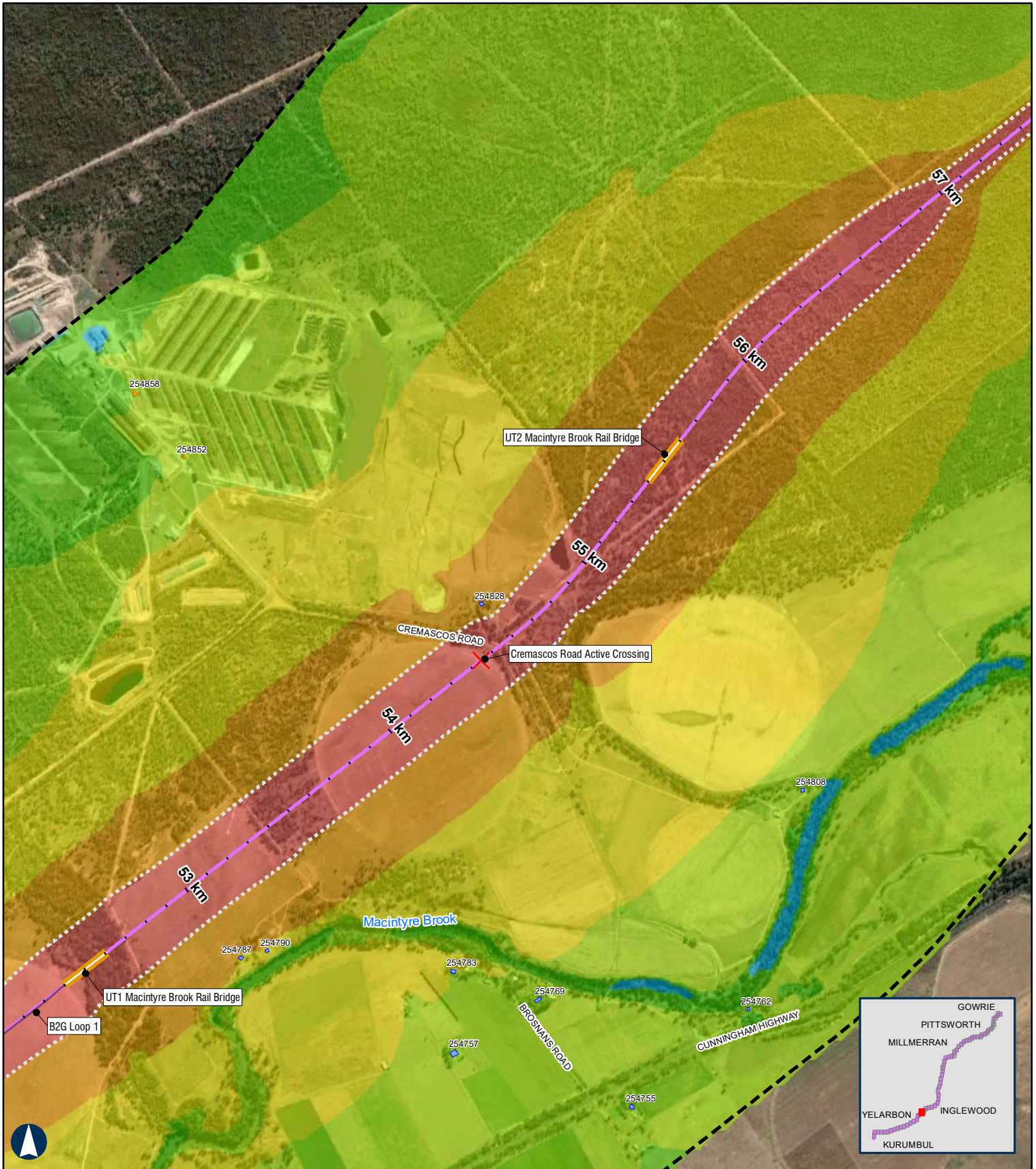
Date: 21-Oct-2024

Author: JG

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 18 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

Level Crossings

Flying Fox Camp

Project Extent

Crossing Loops

Bridges and Viaducts

Rail Alignment/ Centreline

Modelling Area

Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

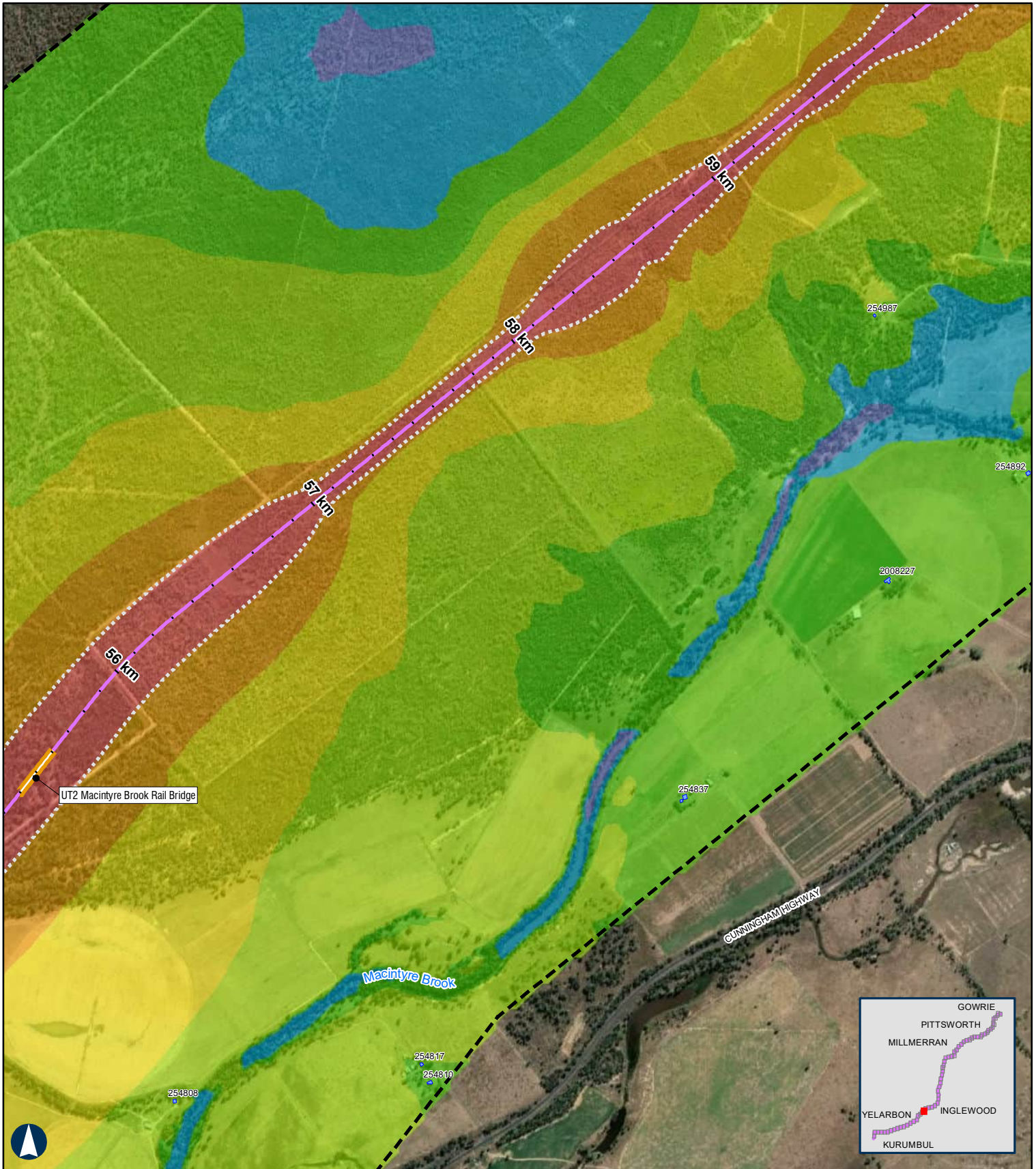
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 19 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

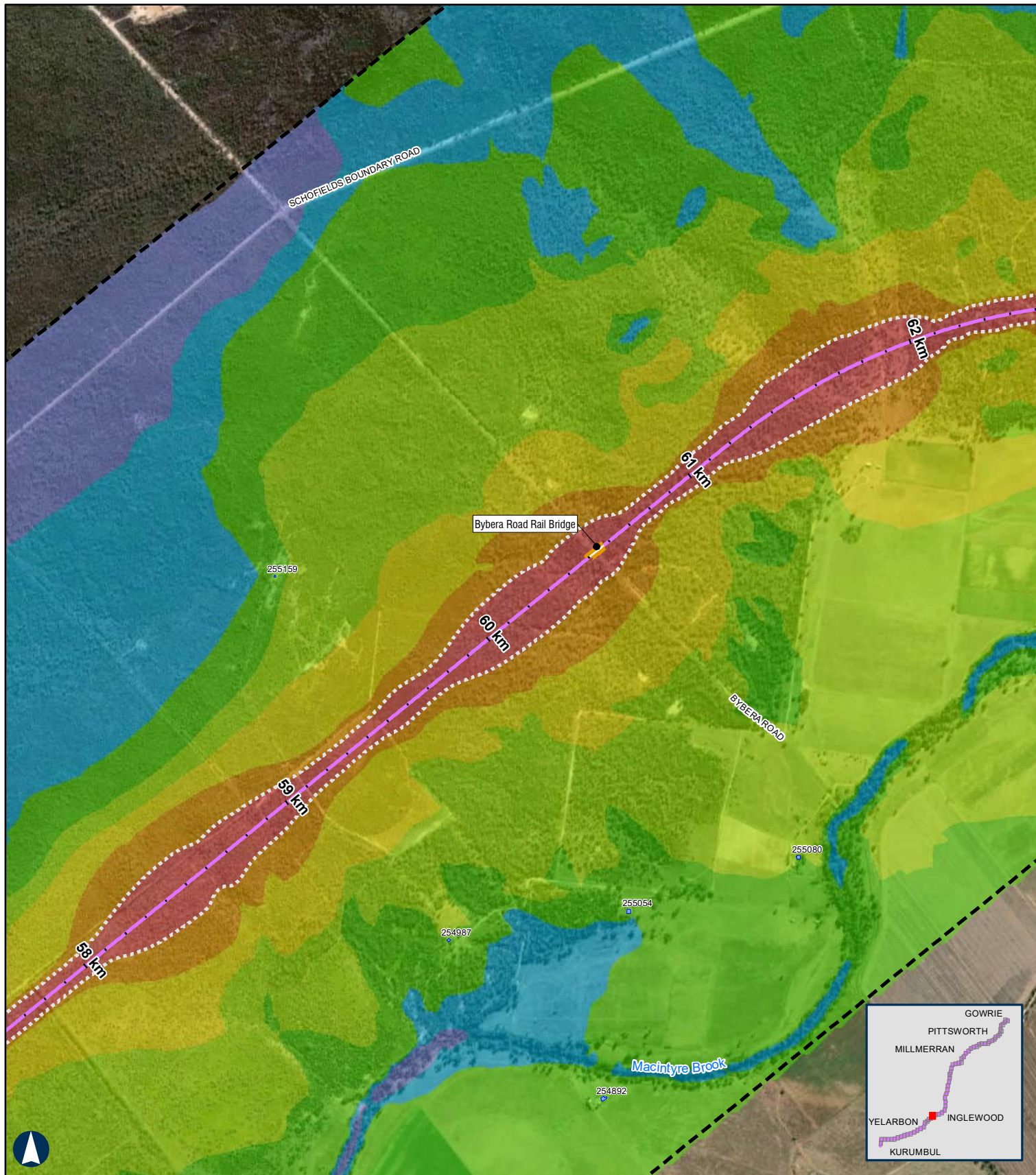
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 20 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

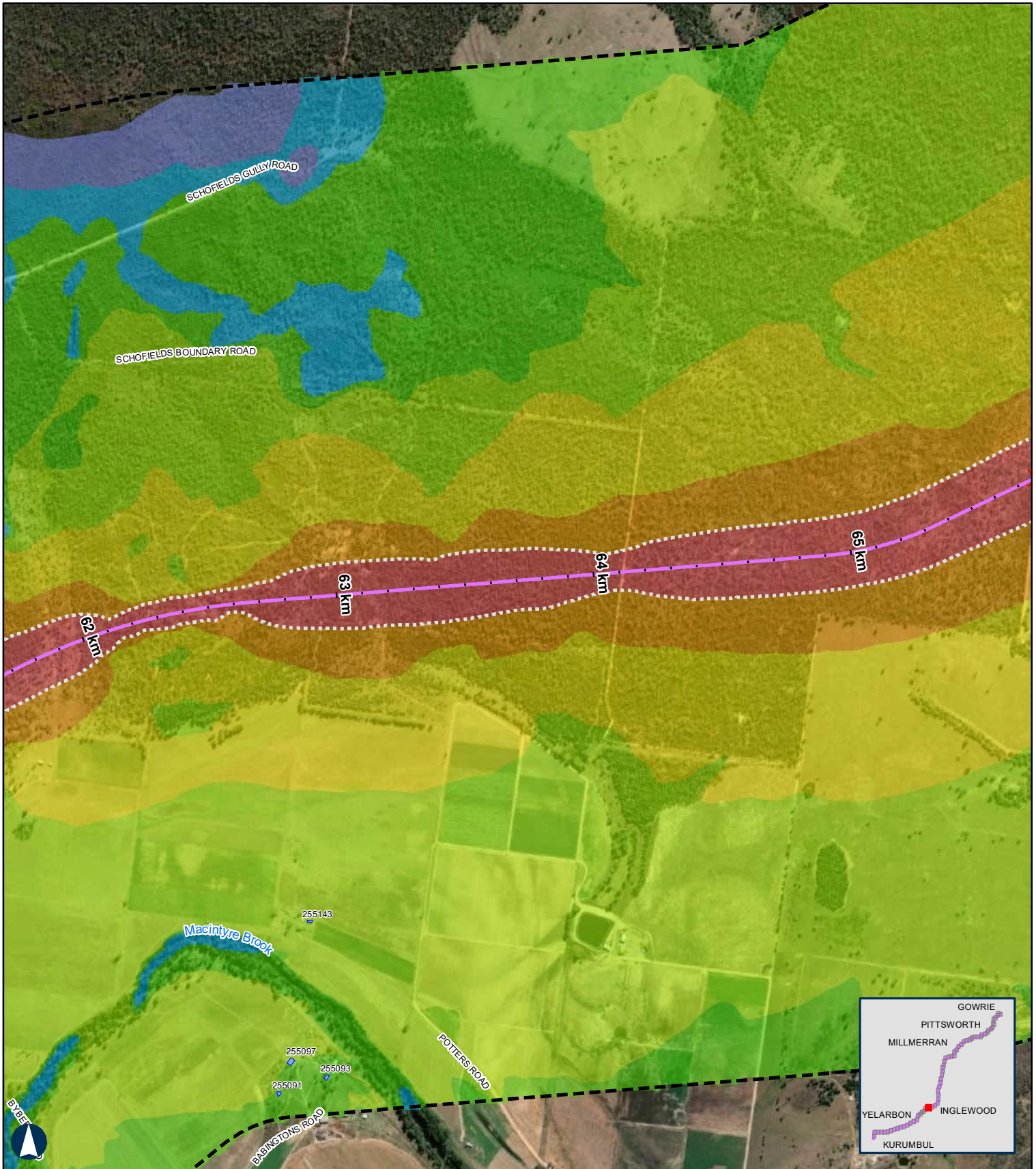
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 21 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

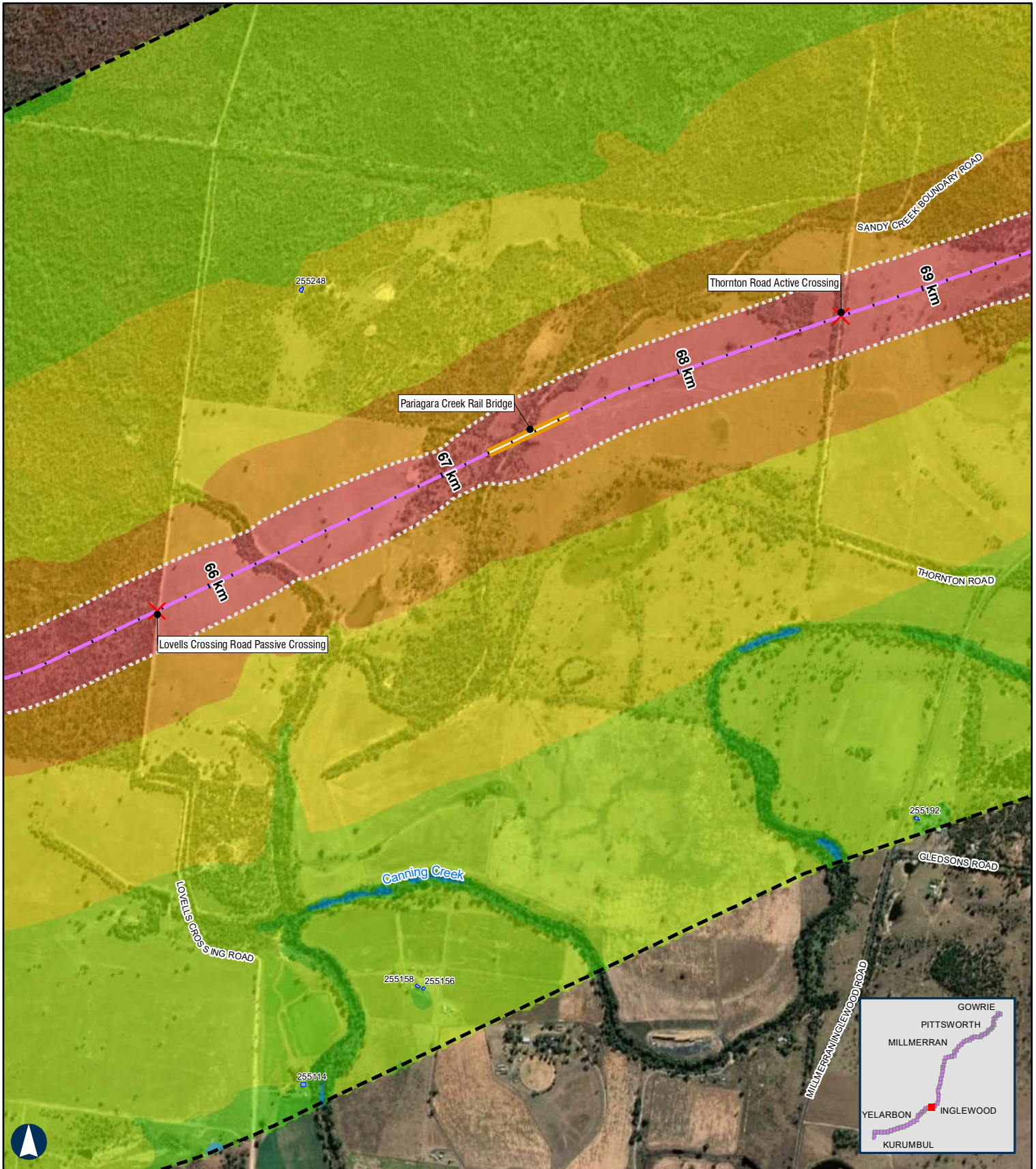
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 22 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

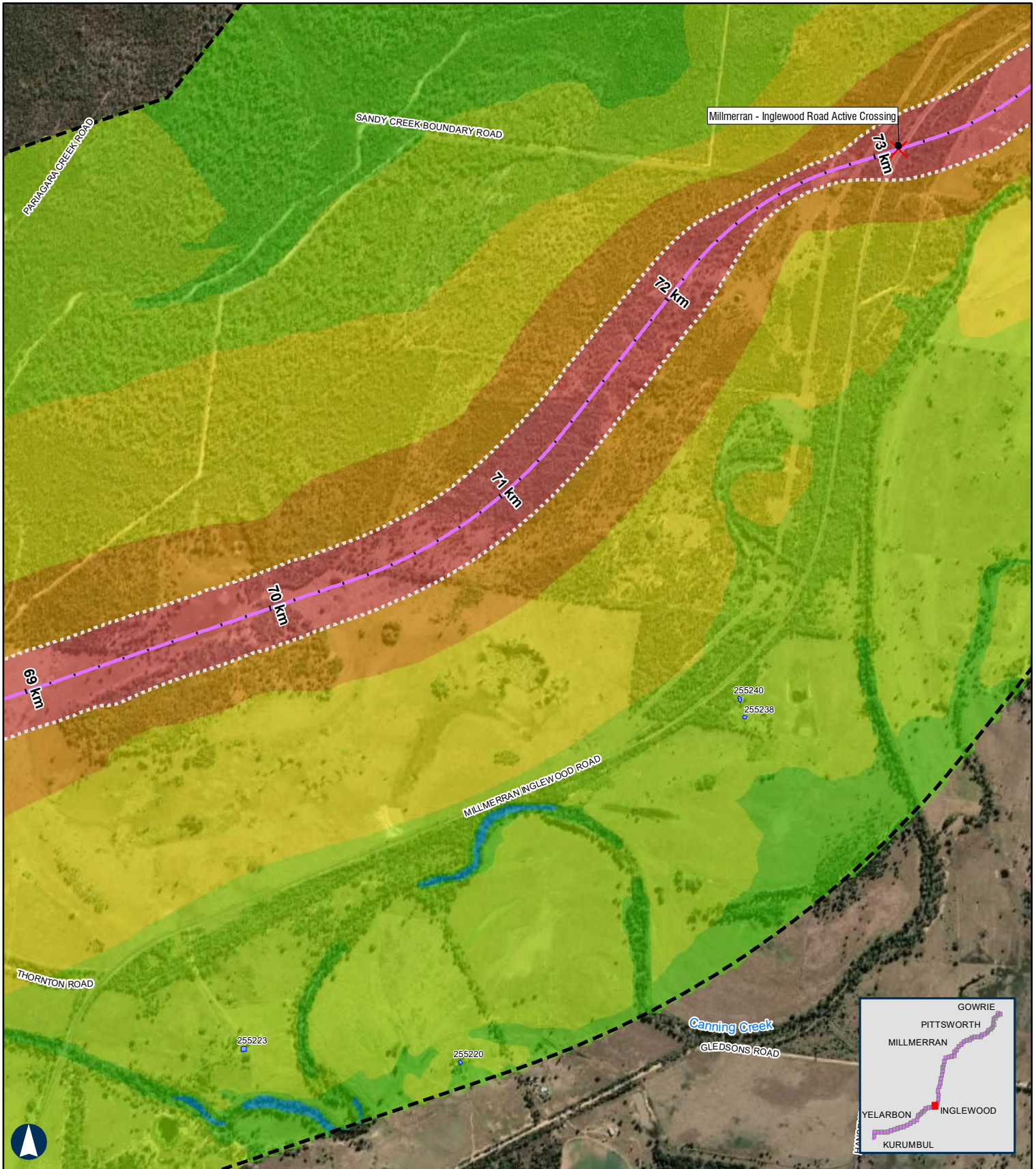
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 23 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

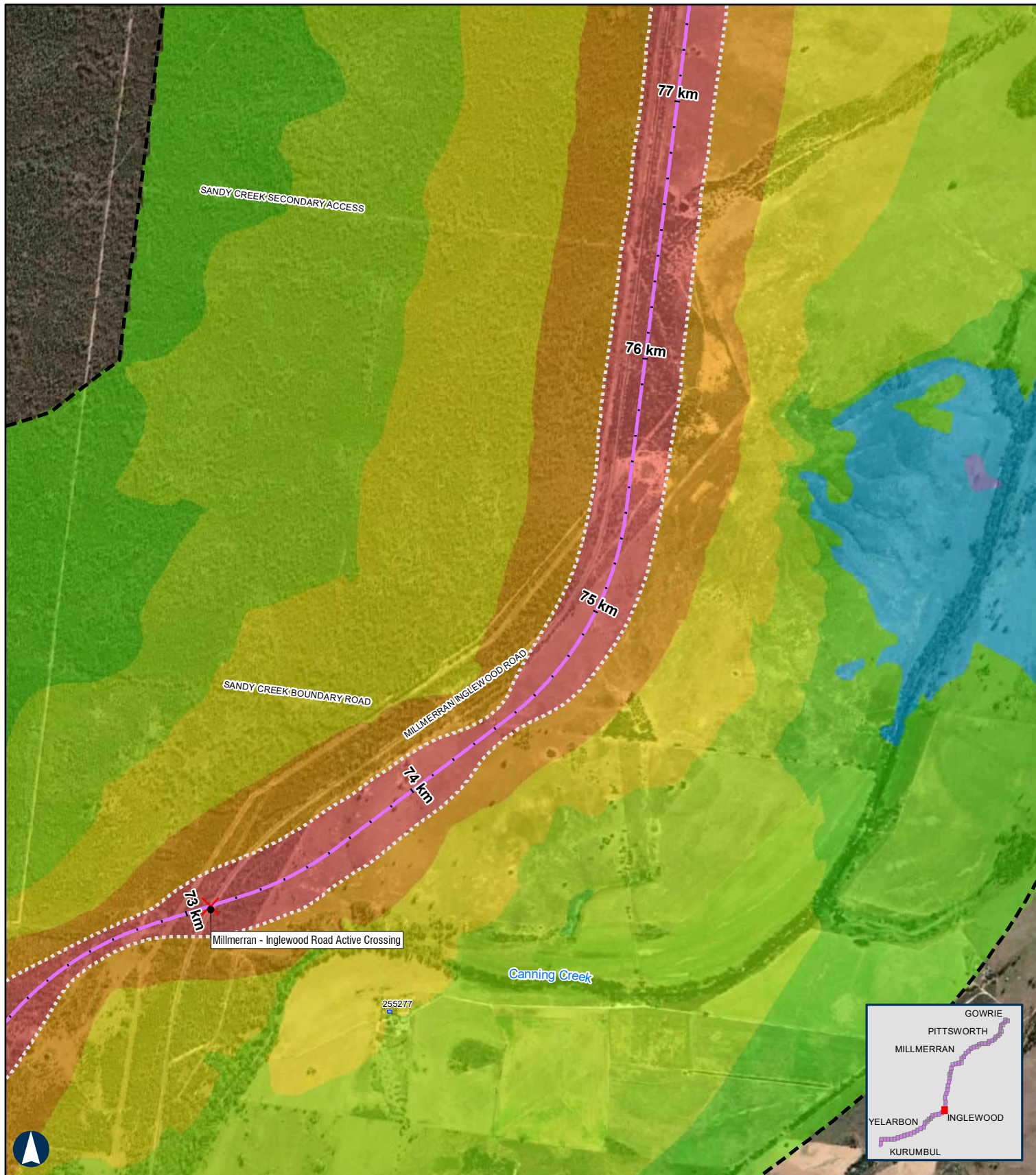
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - [] Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 24 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

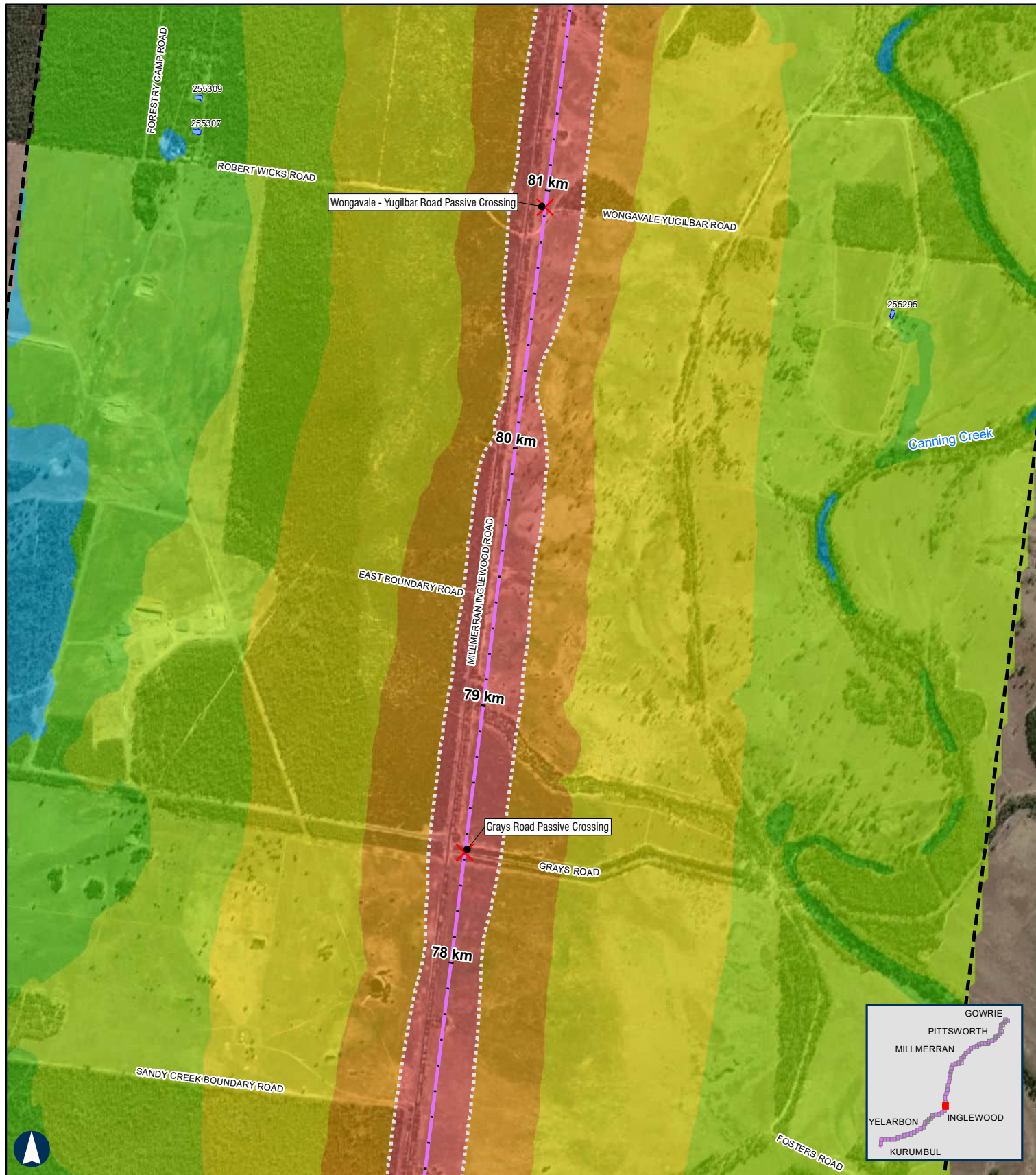
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 25 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 26 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 27 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

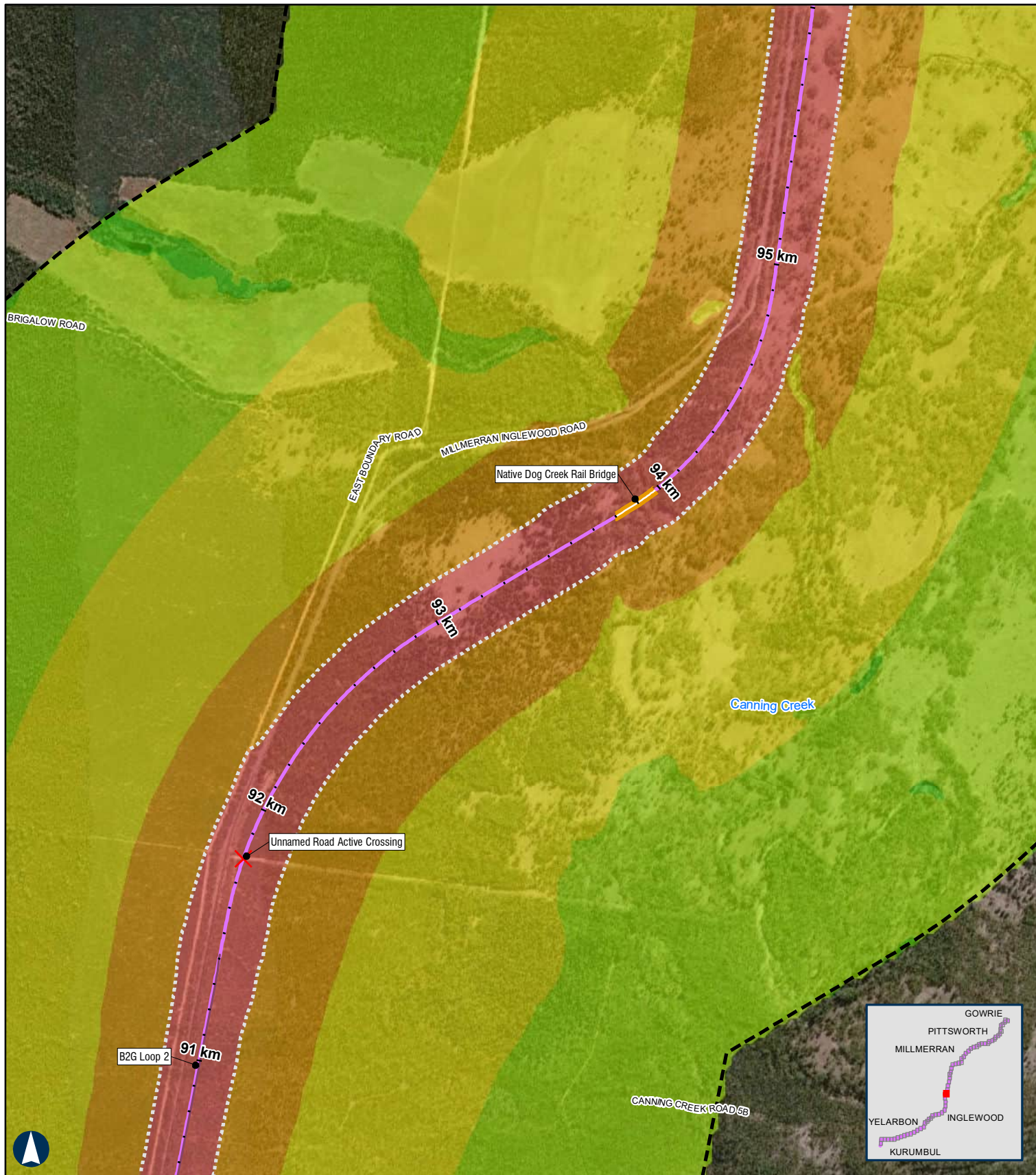
- Sensitive Receptor Type**
- ▭ Residential
 - ▭ Community
 - ▭ Educational
 - ▭ Commercial
 - ▭ Parkland
 - ▭ Future Developments

- Criterion (60 dBA)
- Noise Levels**
- ▭ 30 - 35 dBA
 - ▭ 35 - 40 dBA
 - ▭ 40 - 45 dBA
 - ▭ 45 - 50 dBA
 - ▭ 50 - 55 dBA
 - ▭ 55 - 60 dBA
 - ▭ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 28 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

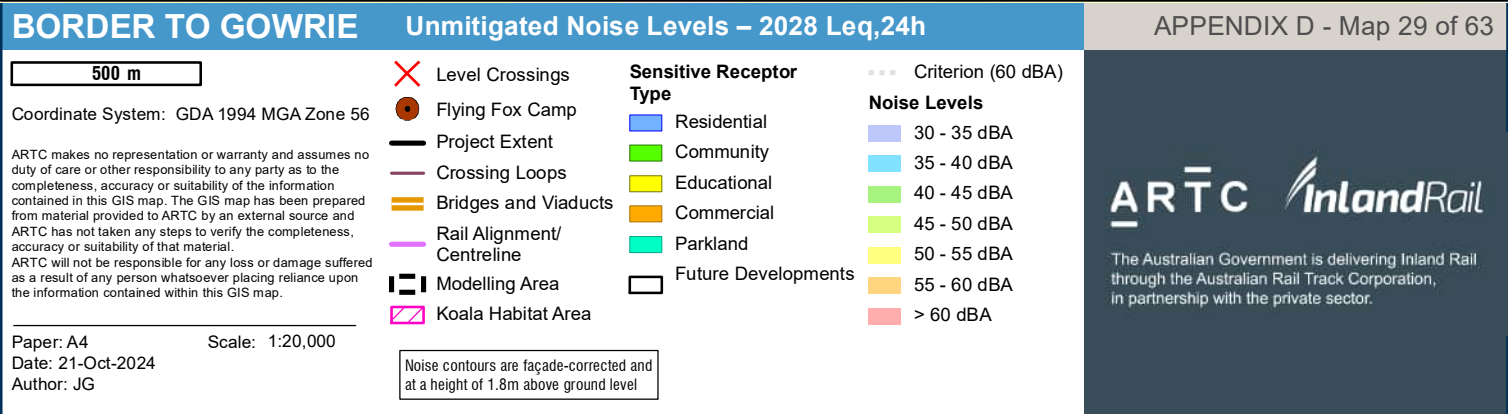
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

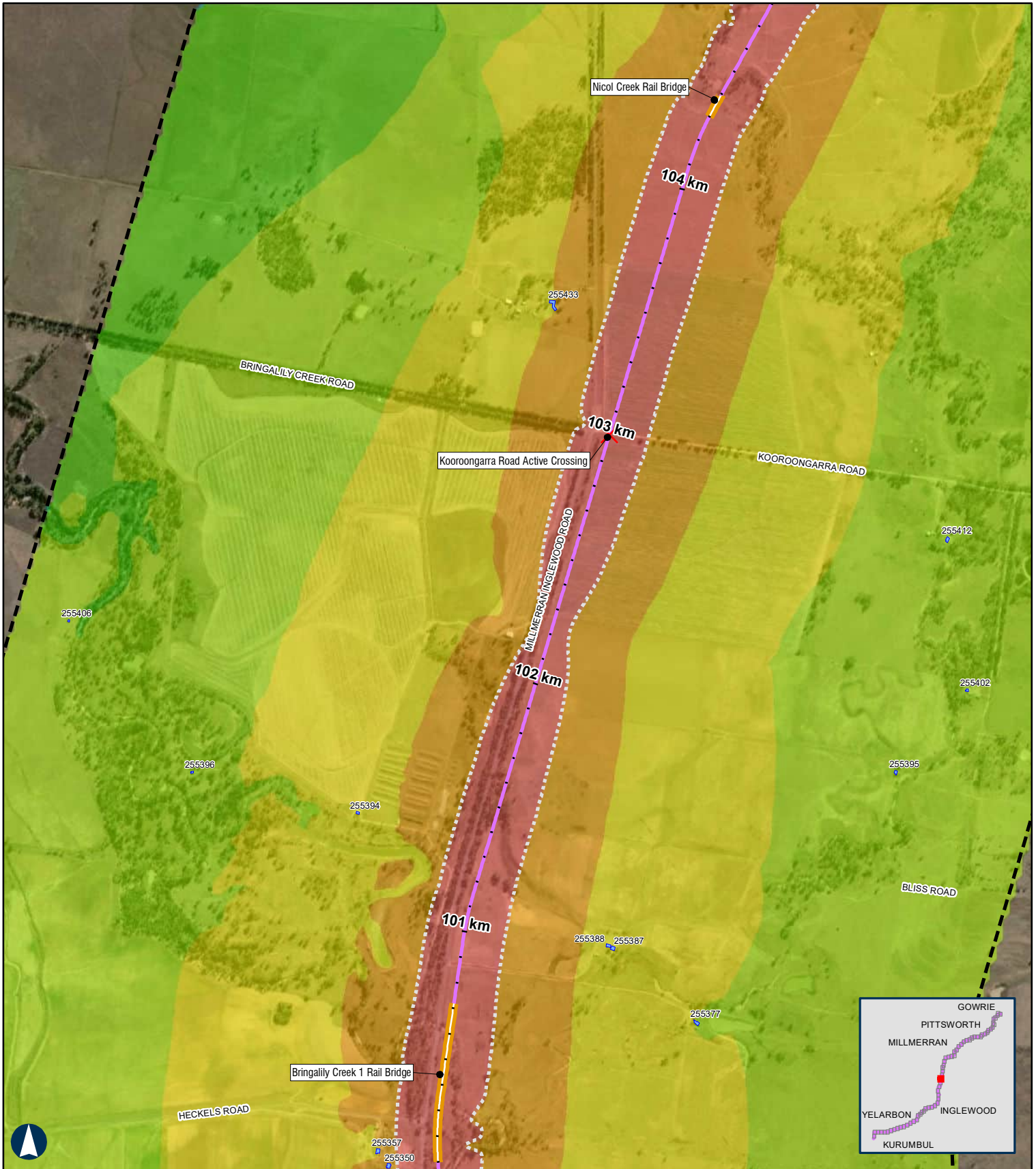
- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 30 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

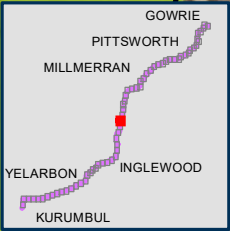
Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

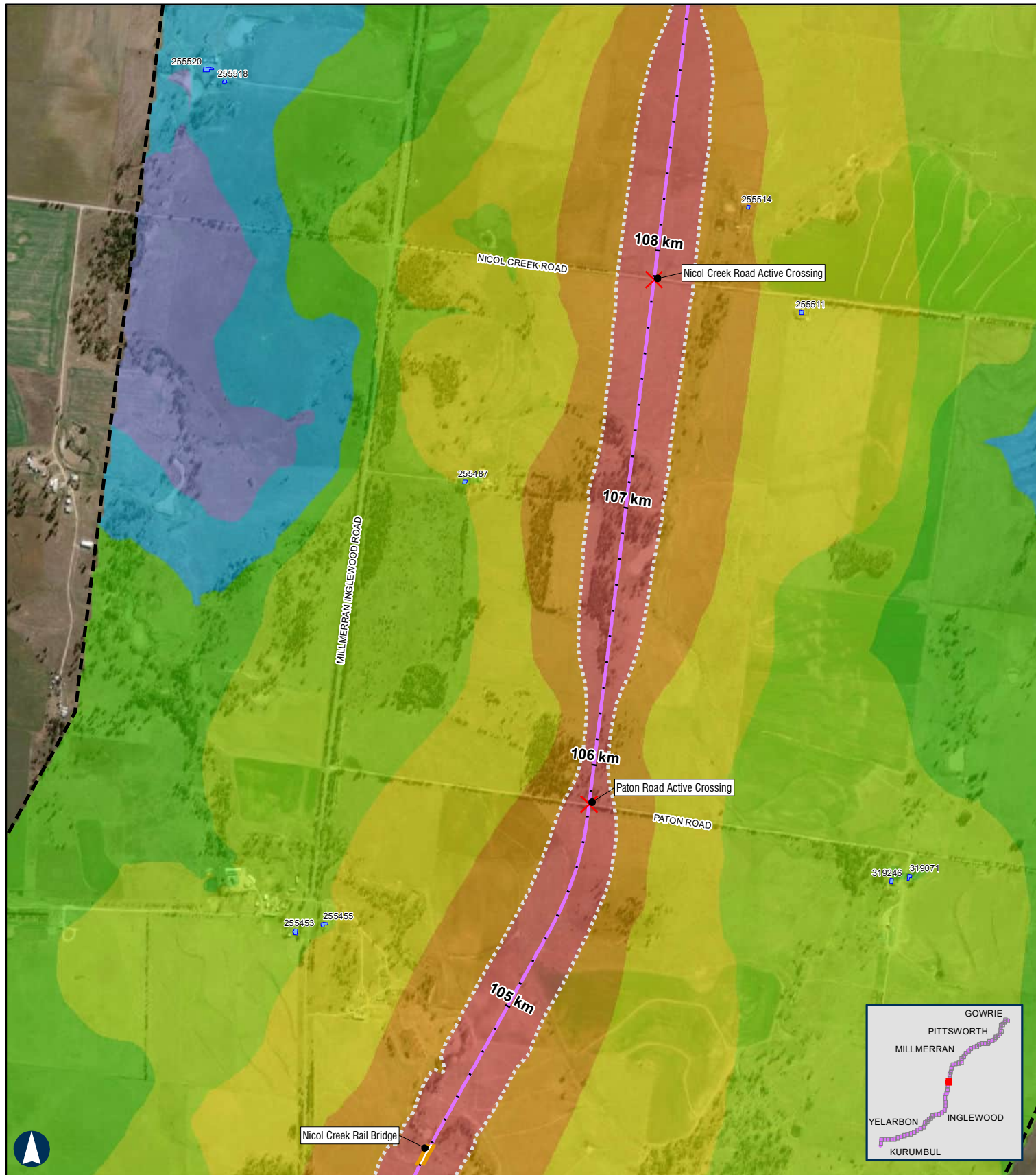
- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 31 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

--- Modelling Area

▨ Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

55 - 60 dBA

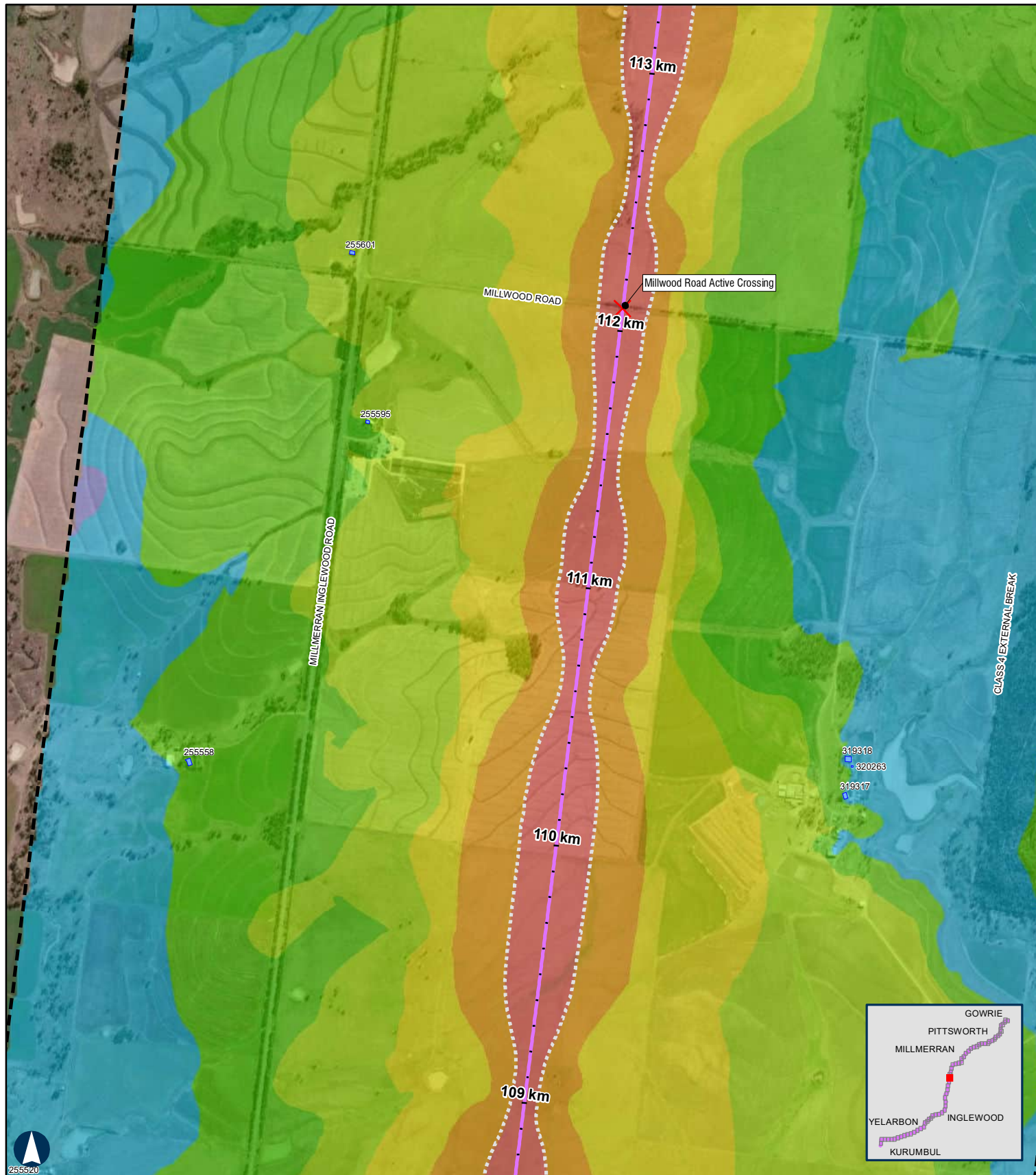
> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 32 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

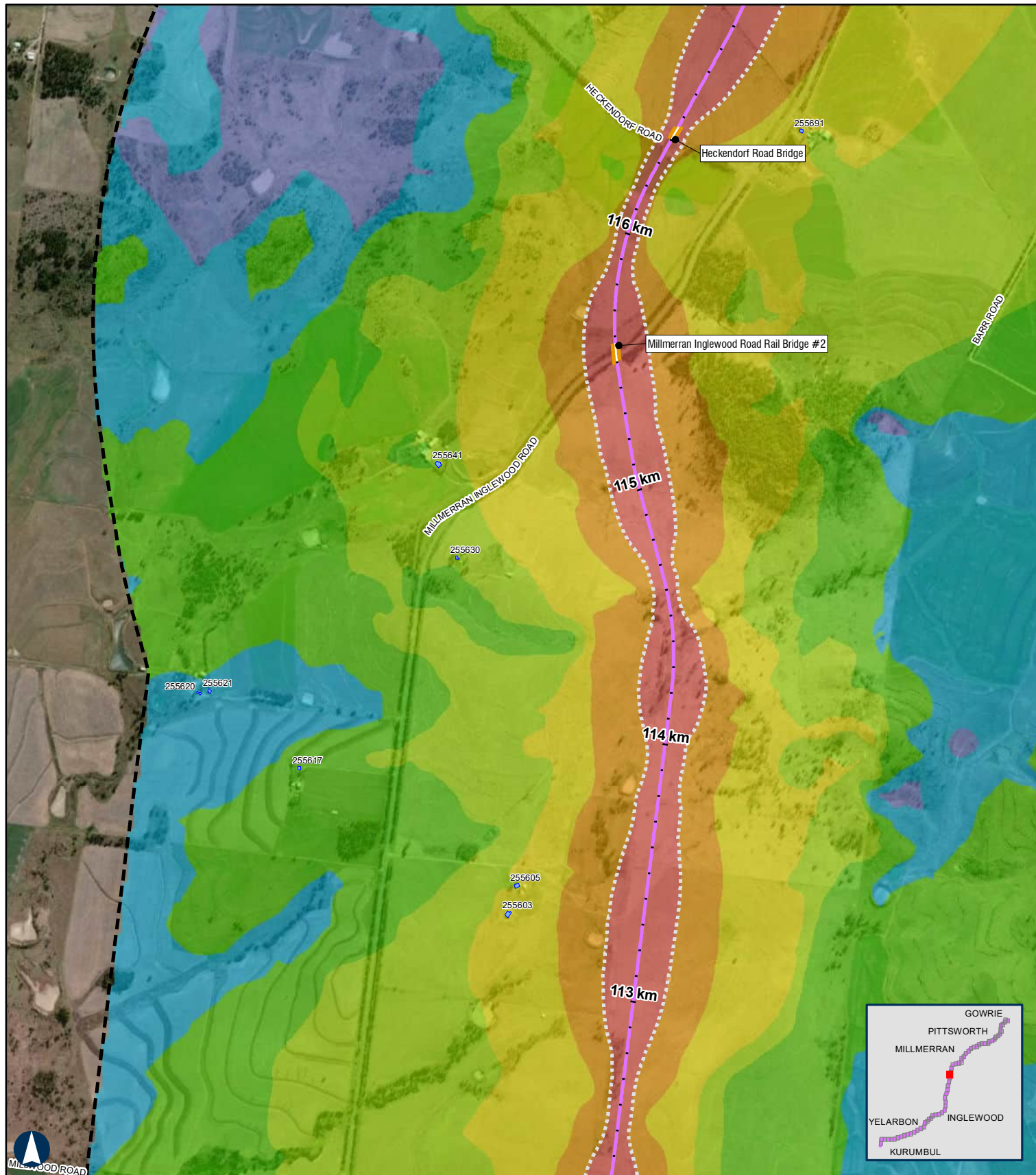
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Criterion (60 dBA)
- Noise Levels**
- [] 30 - 35 dBA
 - [] 35 - 40 dBA
 - [] 40 - 45 dBA
 - [] 45 - 50 dBA
 - [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 33 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

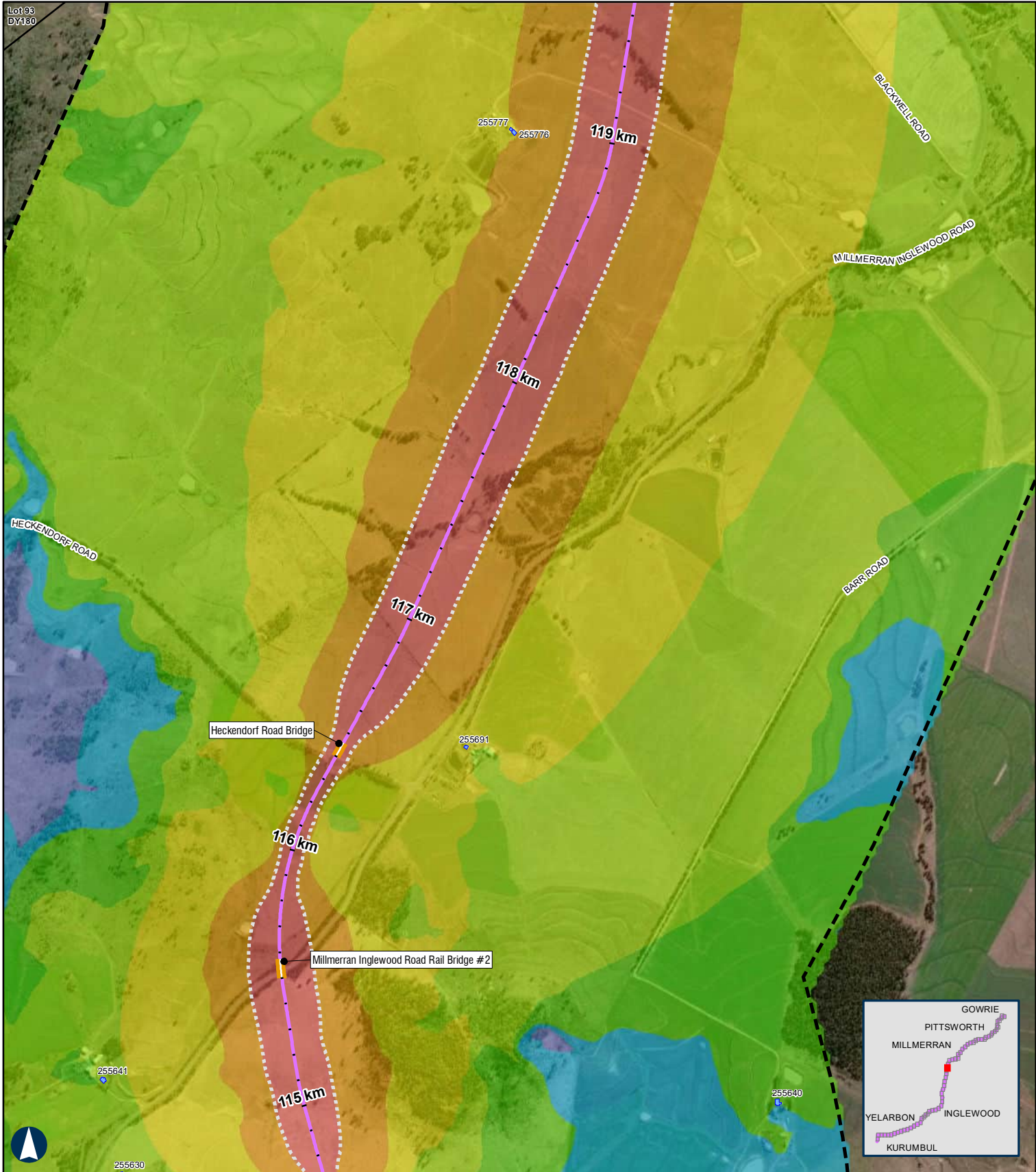
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 34 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG
Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

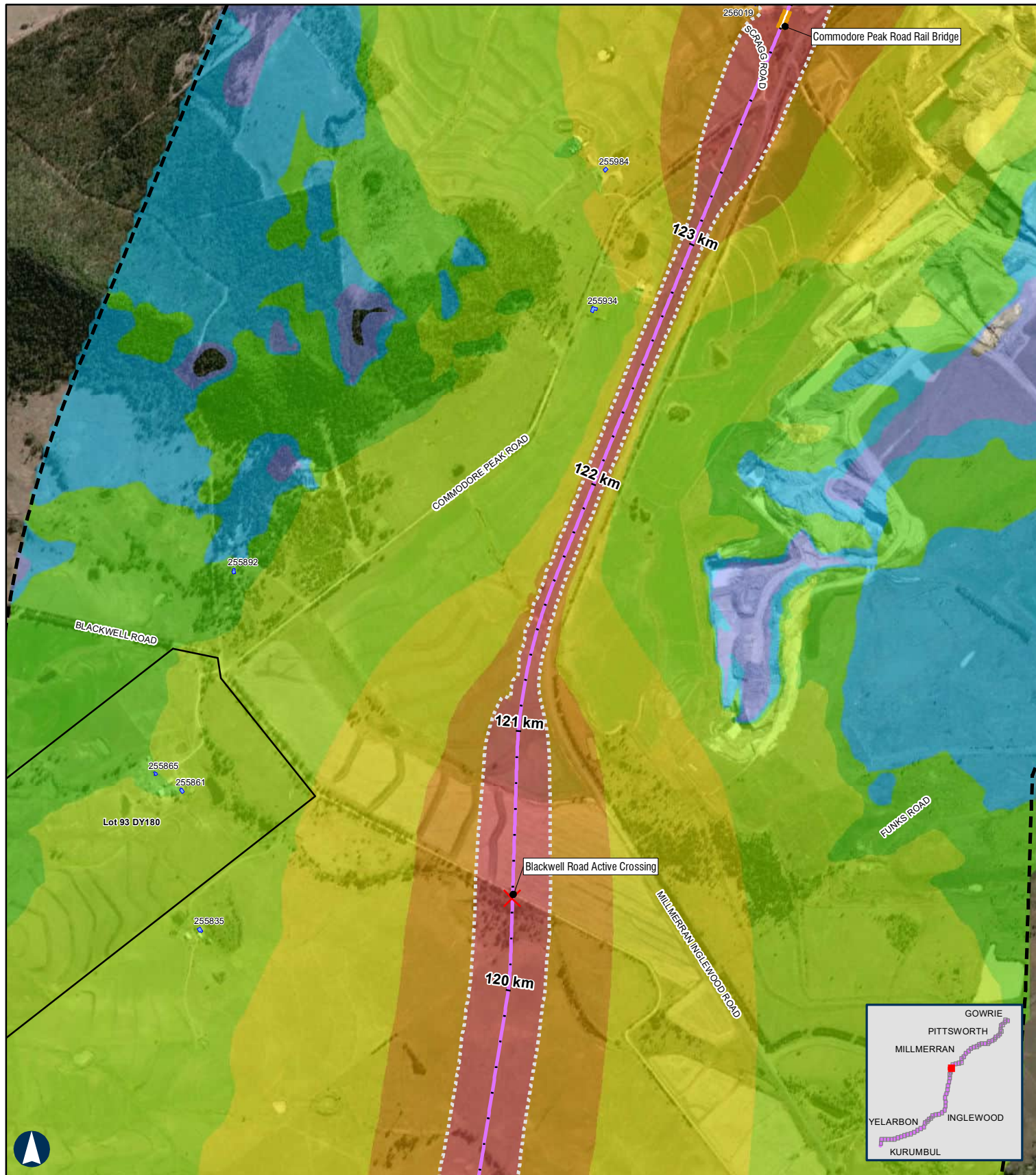
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 35 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

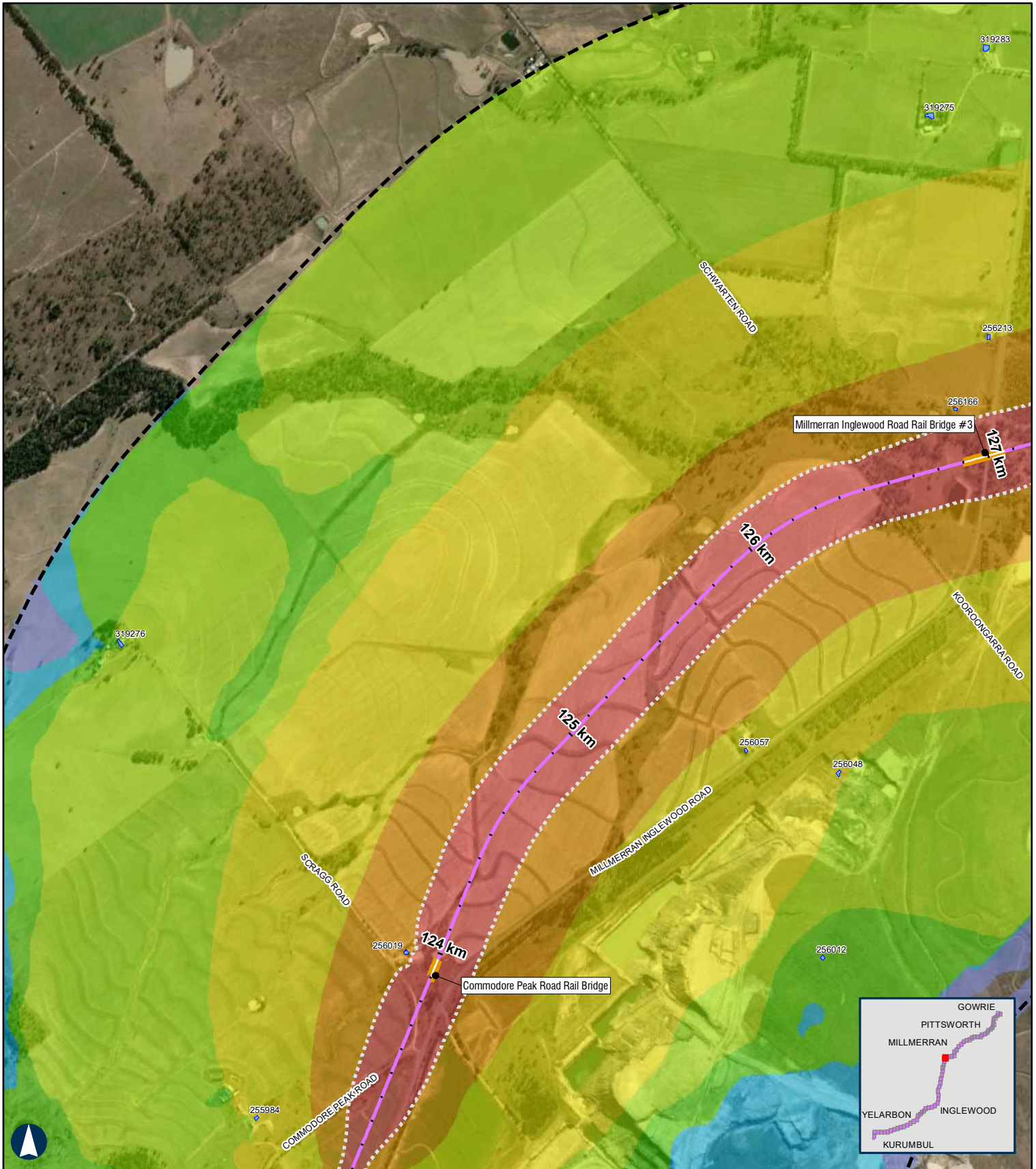
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 36 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

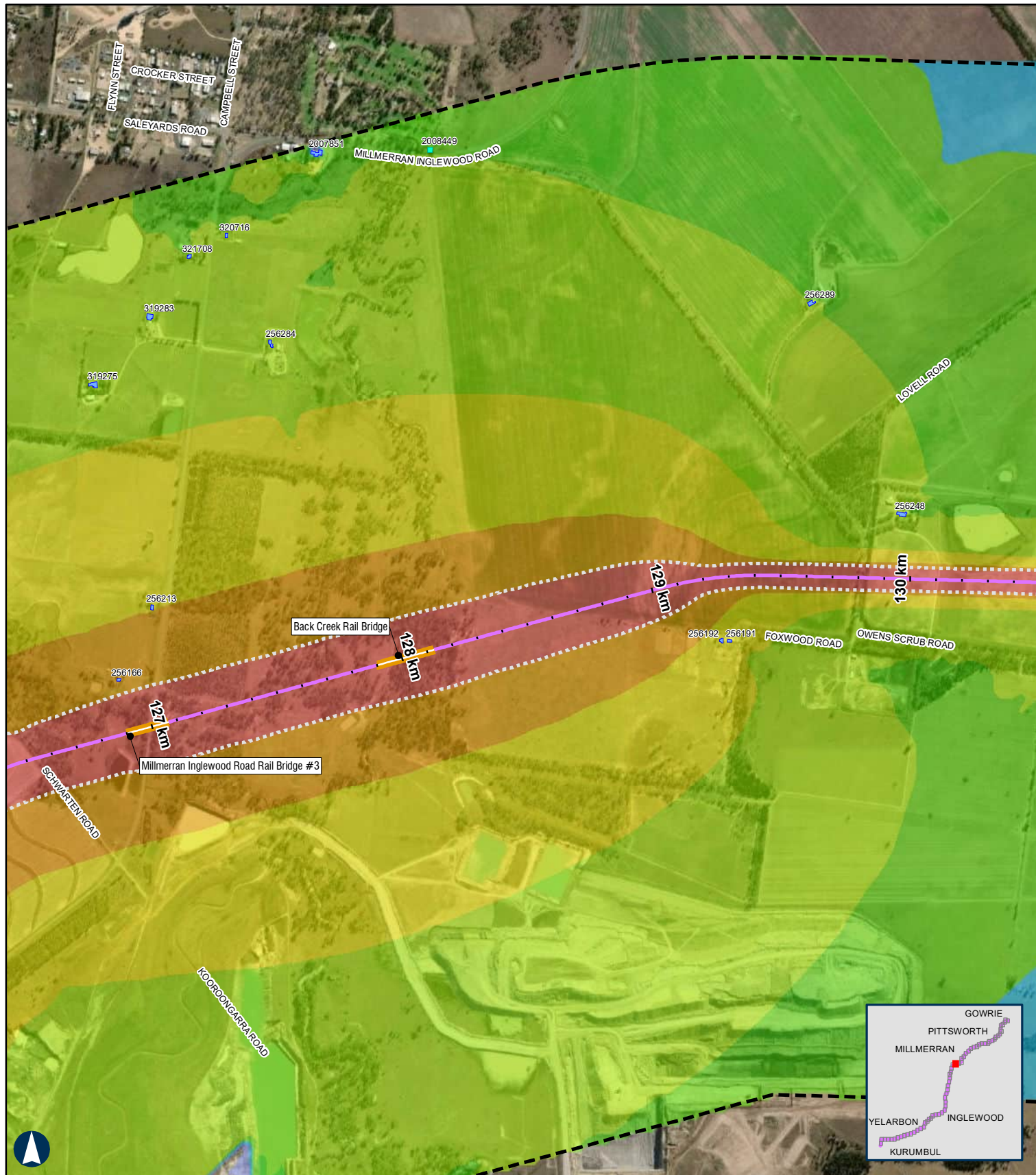
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 37 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

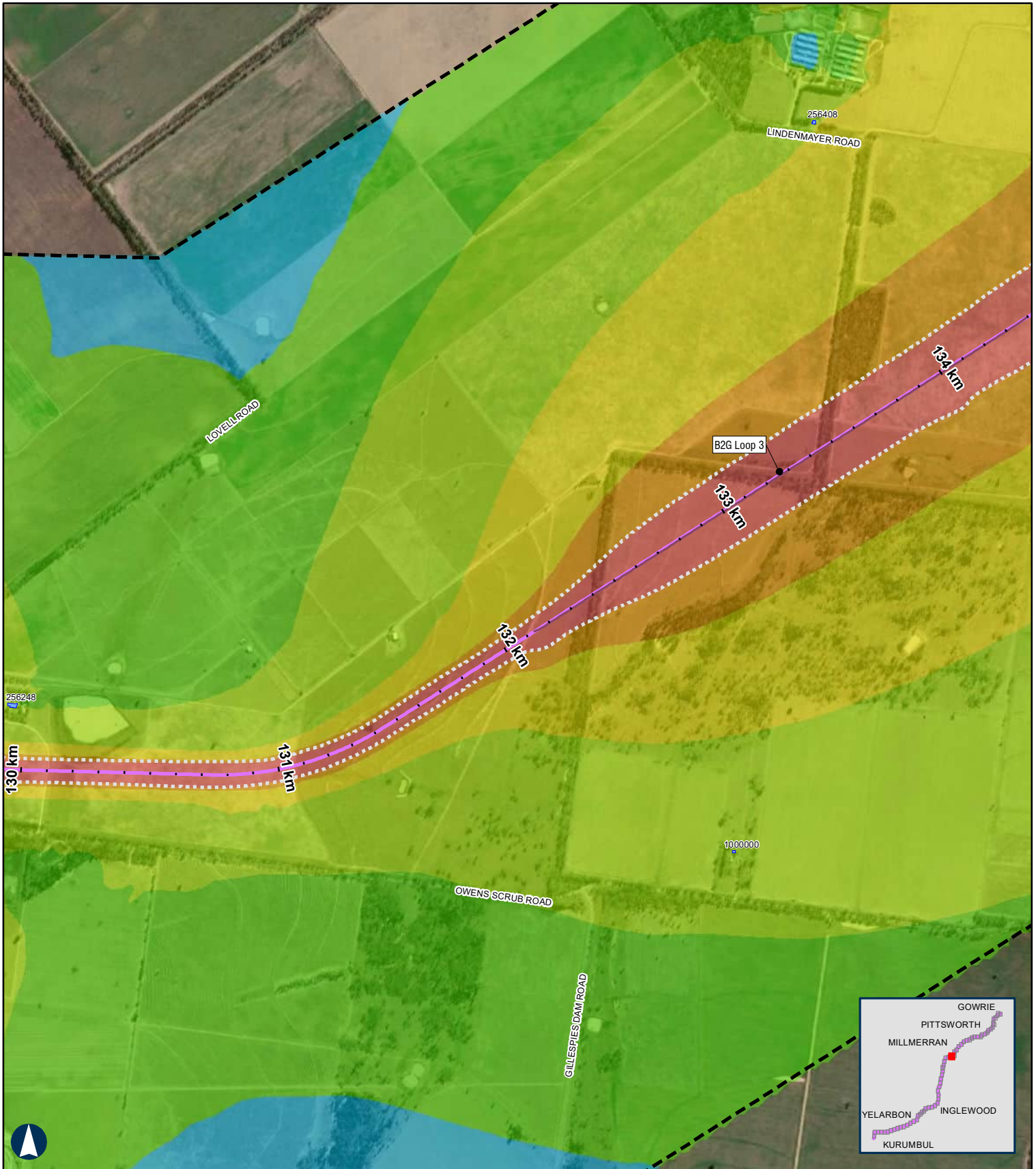
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 38 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

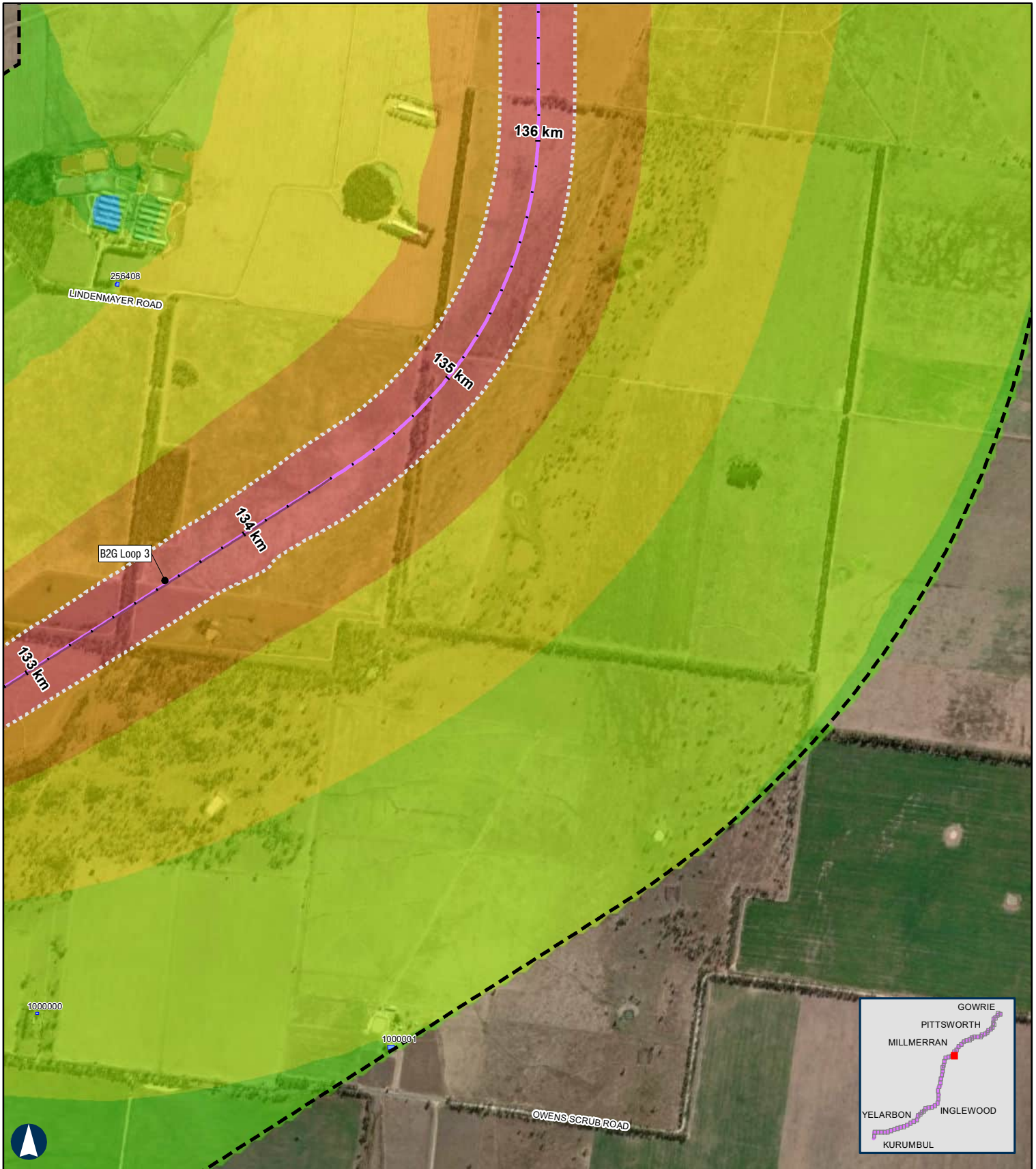
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 39 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

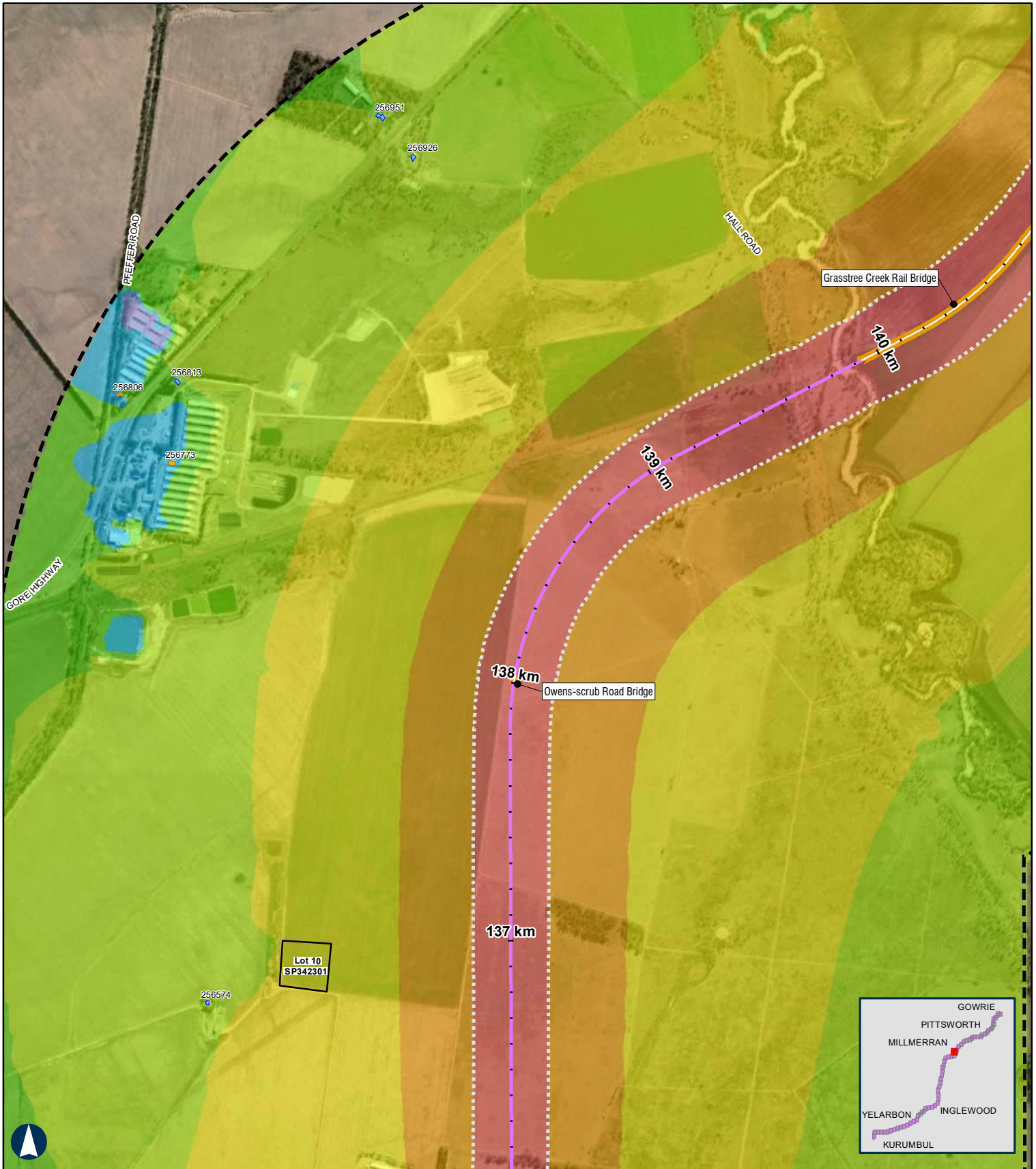
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 40 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

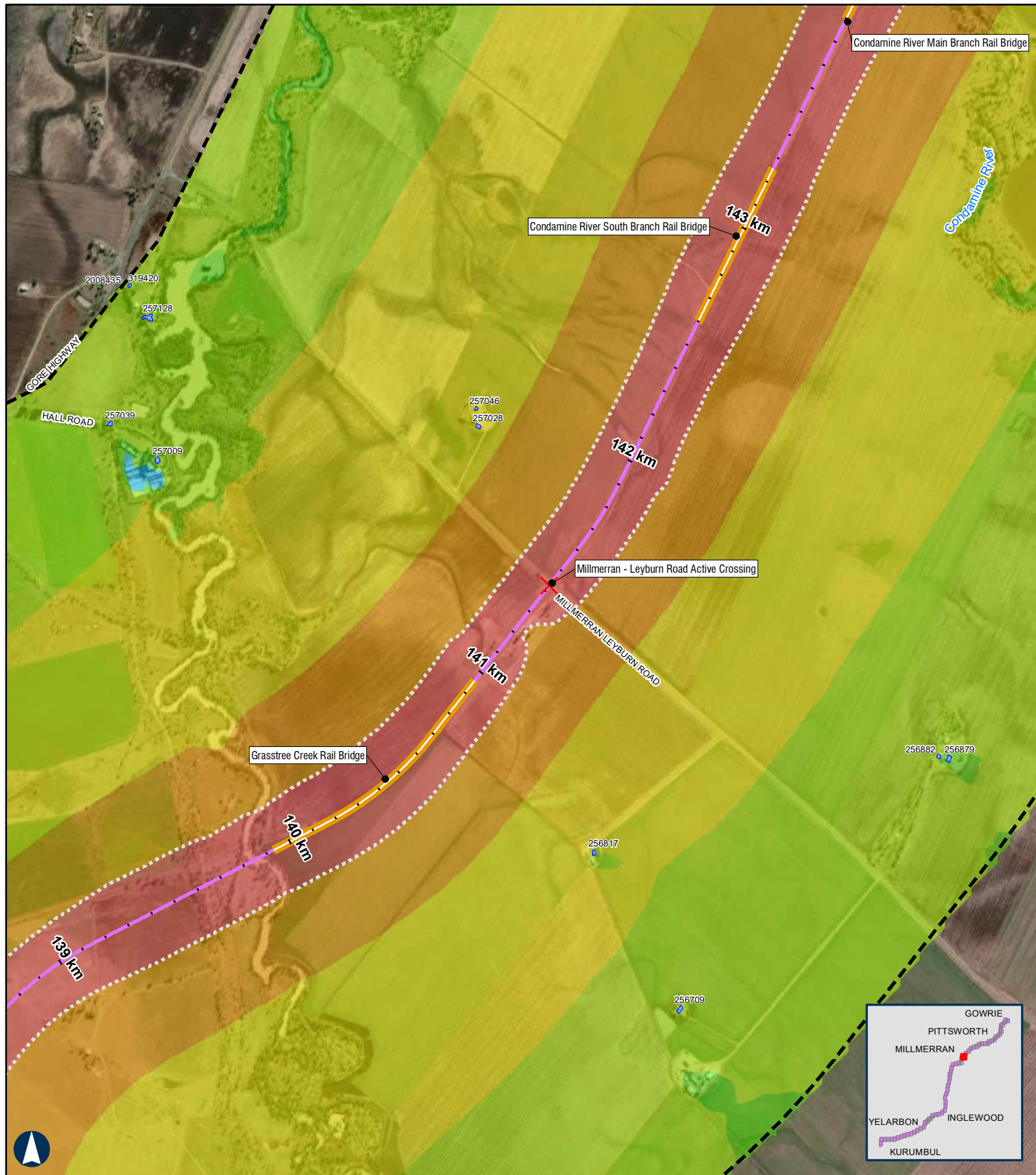
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 41 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

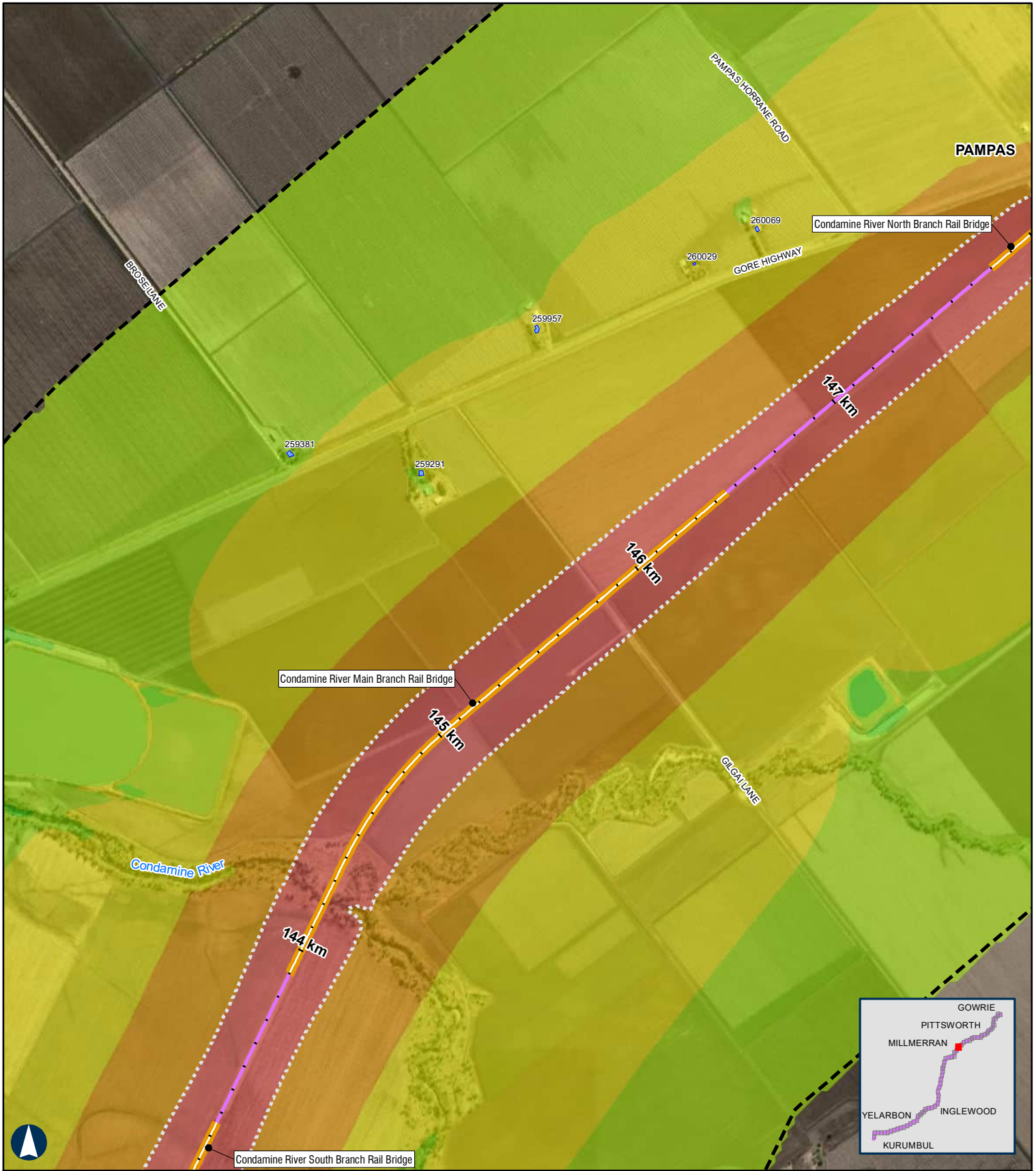
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Criterion (60 dBA)
- Noise Levels**
- [] 30 - 35 dBA
 - [] 35 - 40 dBA
 - [] 40 - 45 dBA
 - [] 45 - 50 dBA
 - [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 42 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

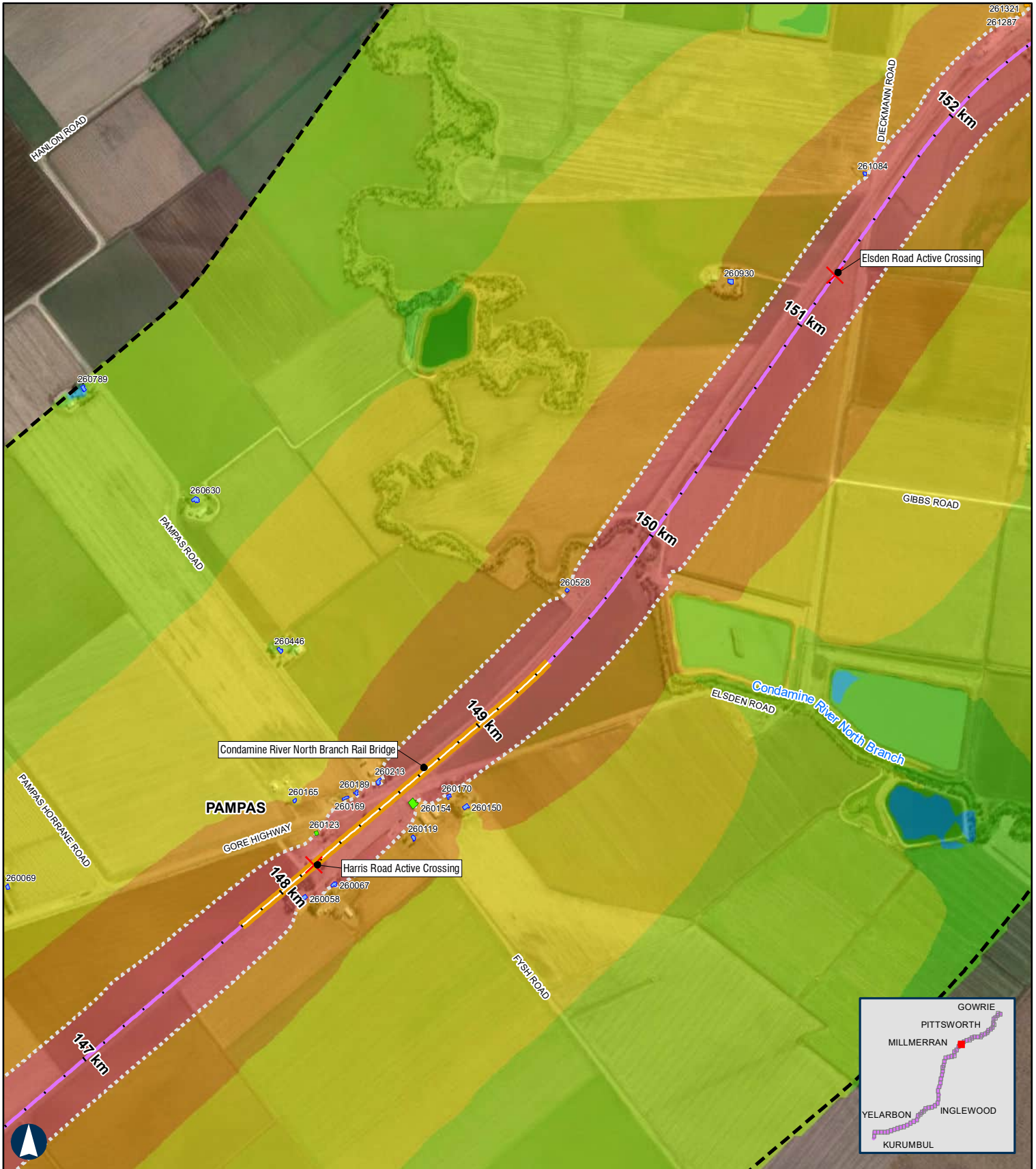
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Criterion (60 dBA)
- Noise Levels**
- [] 30 - 35 dBA
 - [] 35 - 40 dBA
 - [] 40 - 45 dBA
 - [] 45 - 50 dBA
 - [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 43 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG
Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

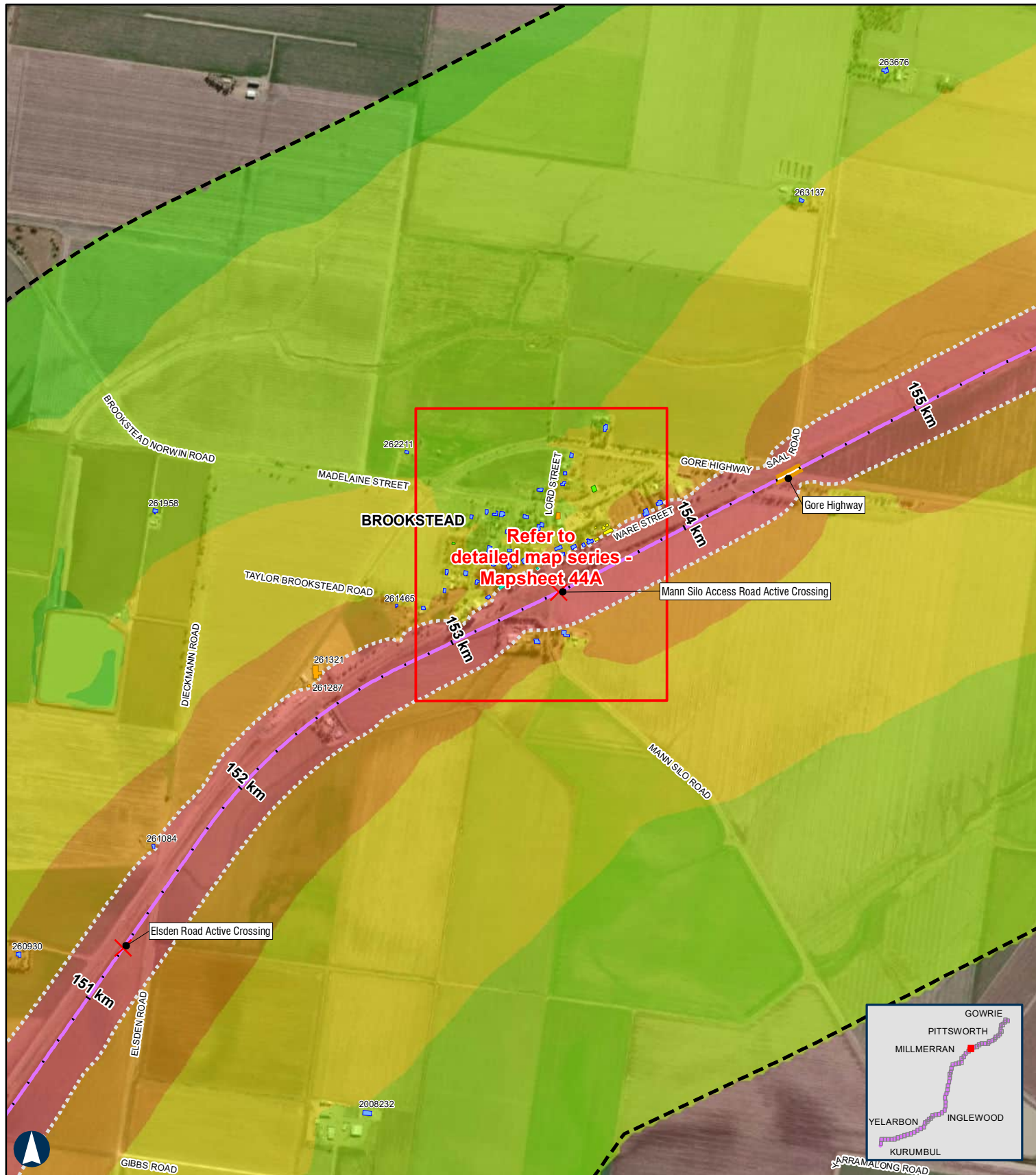
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 44 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

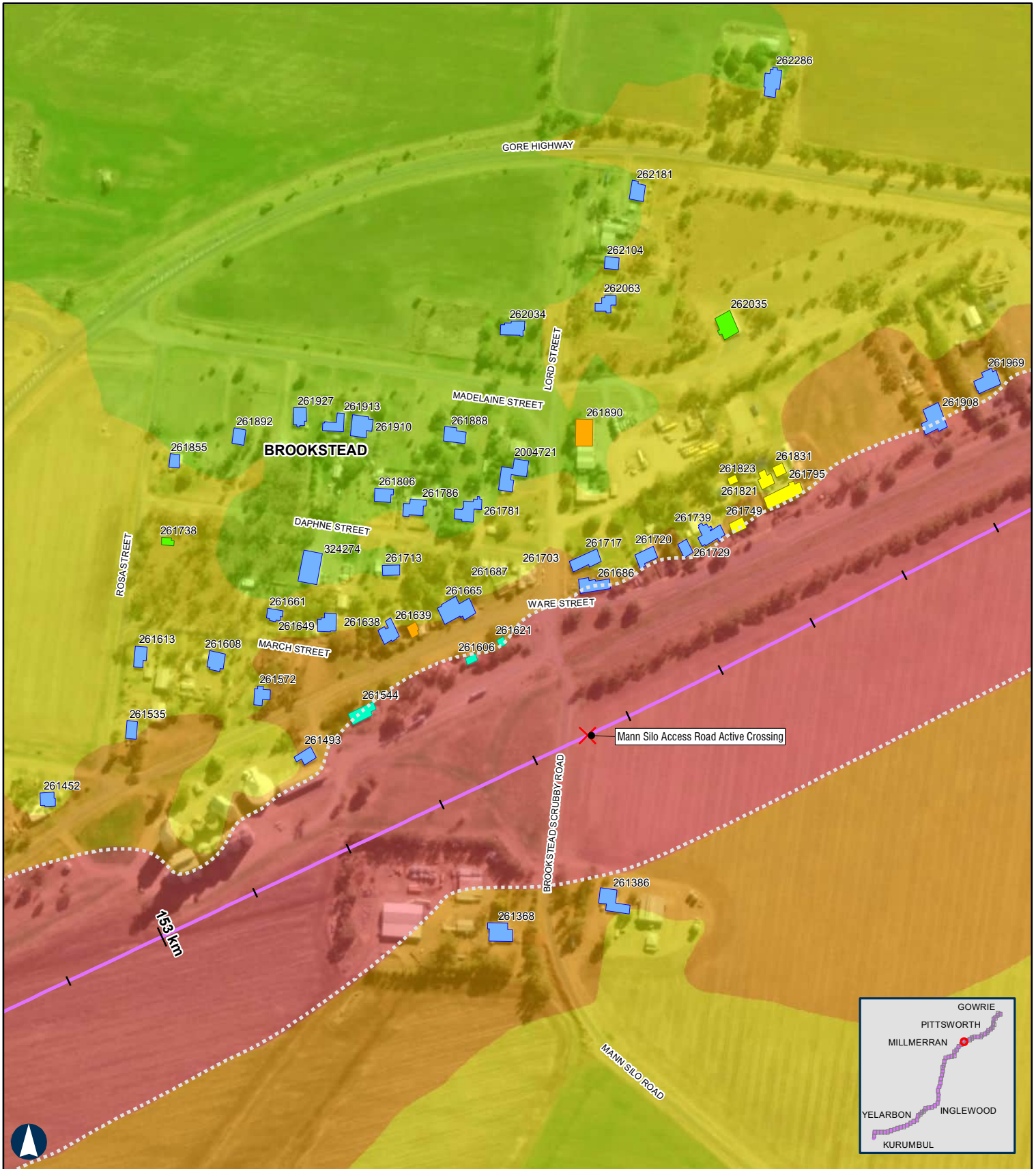
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028 Leq,24h**

APPENDIX D - Map 44A of 63

100 m	Level Crossings	Sensitive Receptor Type	Criterion (60 dBA)
Coordinate System: GDA 1994 MGA Zone 56	Flying Fox Camp	Residential	Noise Levels
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ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.	Crossing Loops	Educational	35 - 40 dBA
	Bridges and Viaducts	Commercial	40 - 45 dBA
	Rail Alignment/ Centreline	Parkland	45 - 50 dBA
	Modelling Area	Future Developments	50 - 55 dBA
	Koala Habitat Area		55 - 60 dBA
			> 60 dBA

Paper: A4 Scale: 1:5,000
Date: 21-Oct-2024
Author: JG

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 45 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 46 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

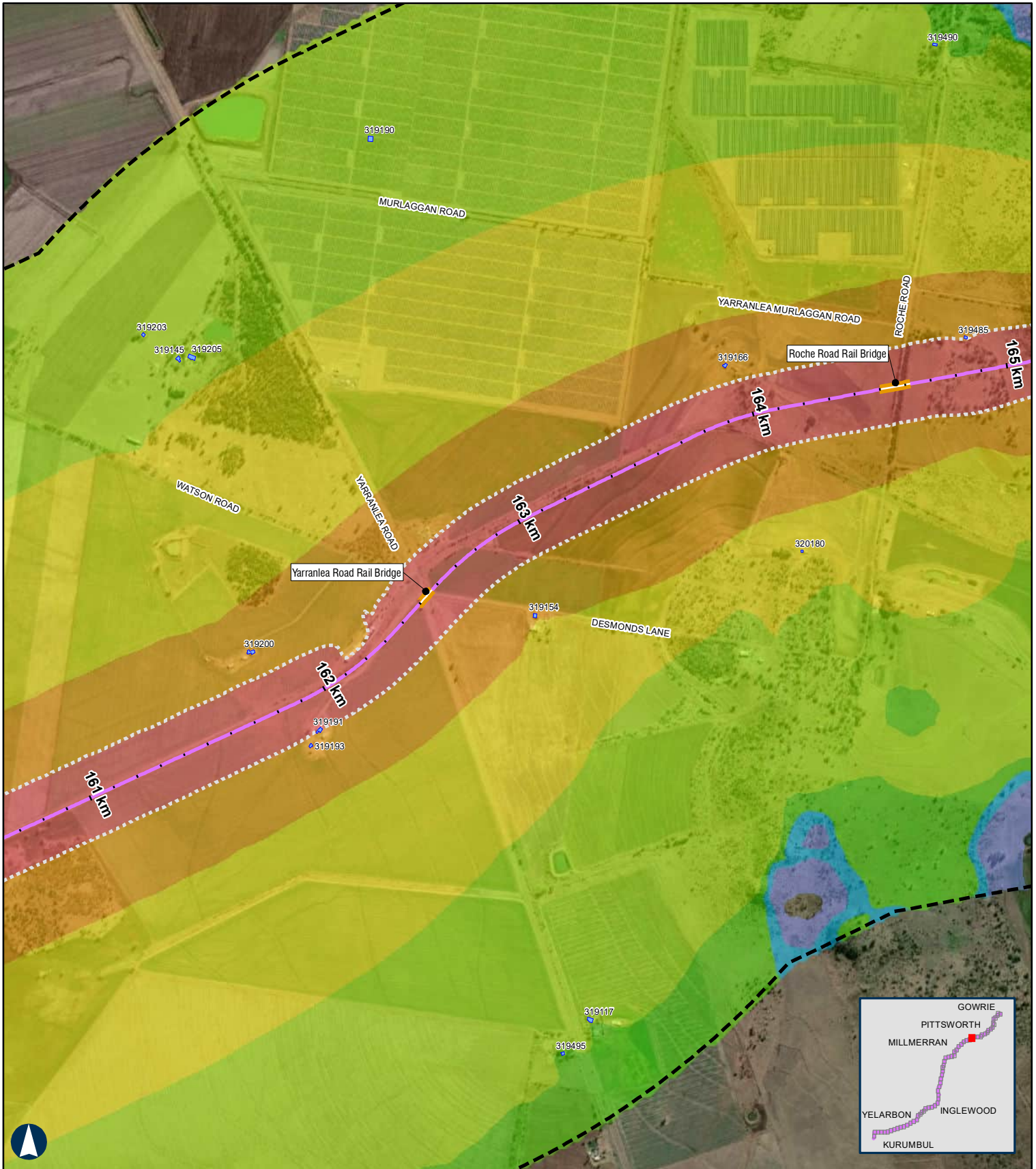
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 47 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

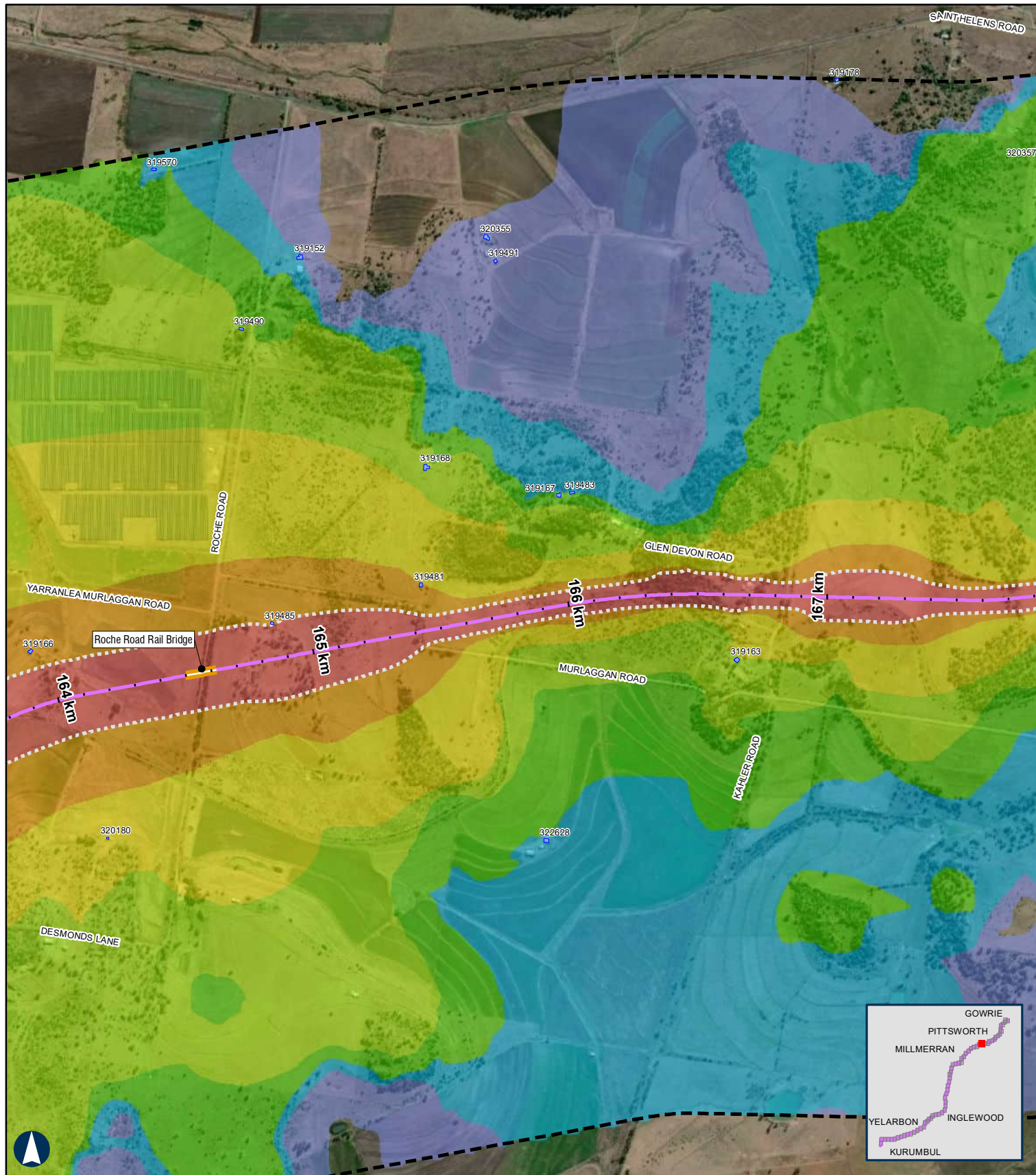
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 48 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

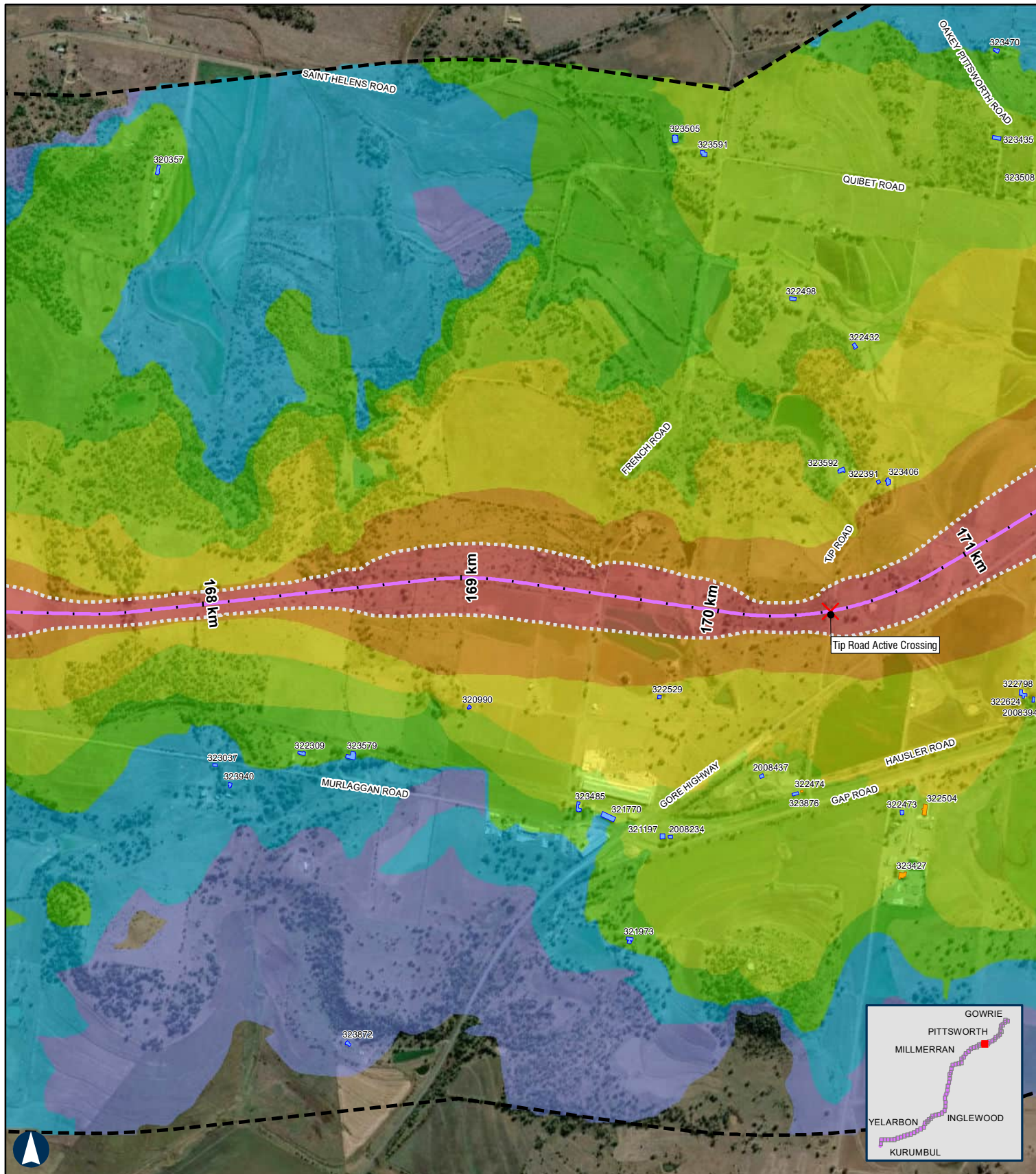
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 49 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

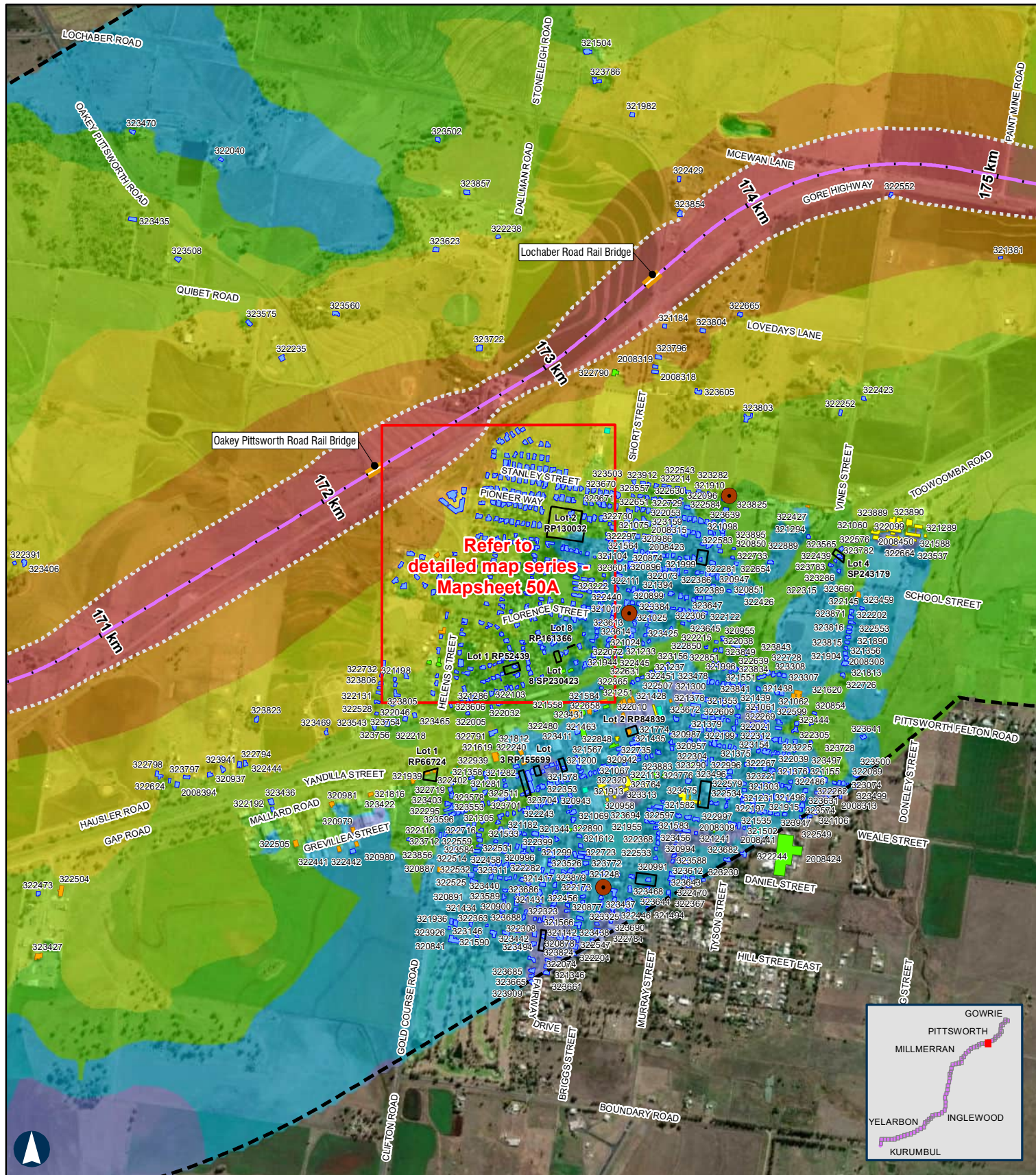
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 50 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

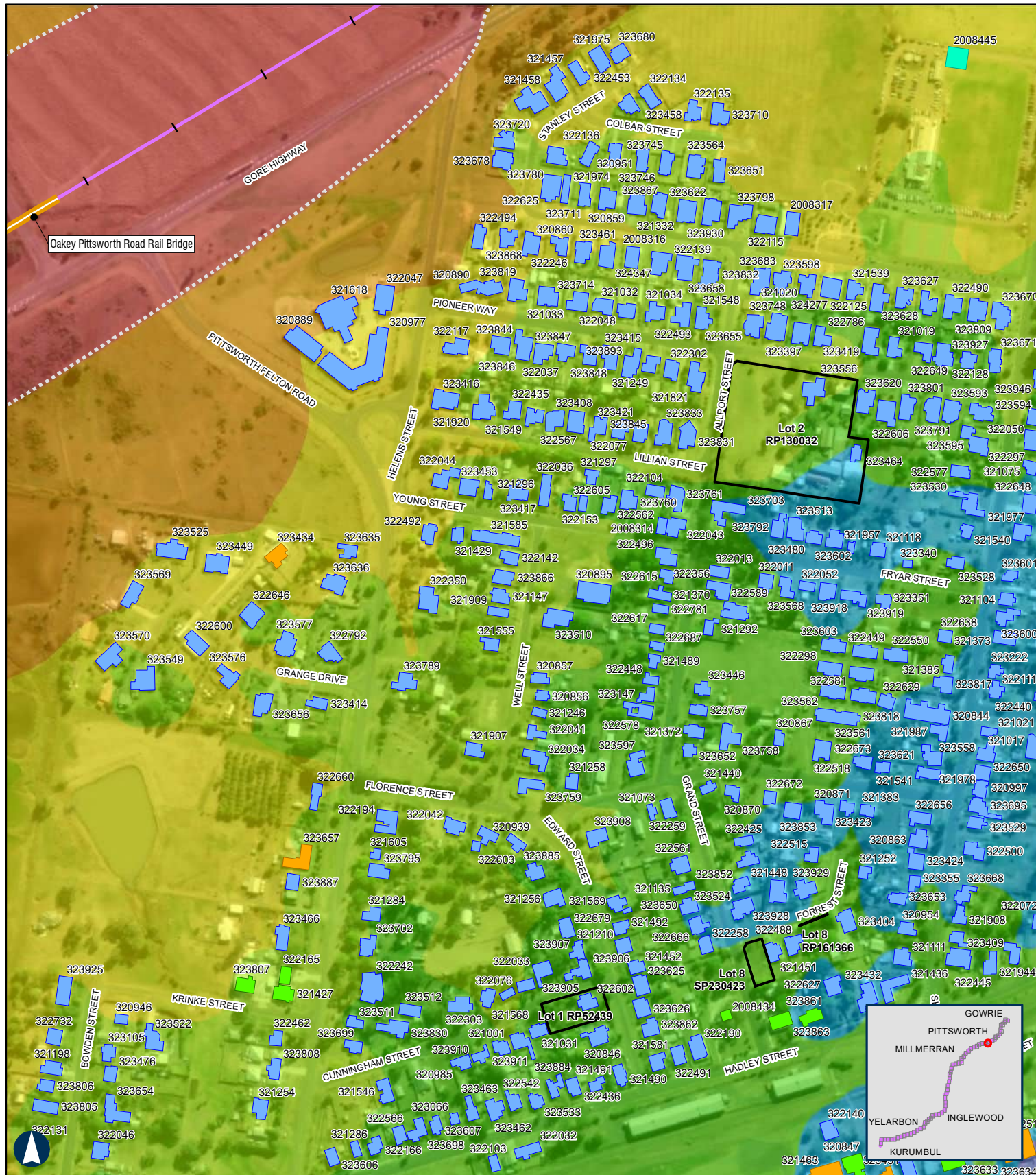
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 50A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

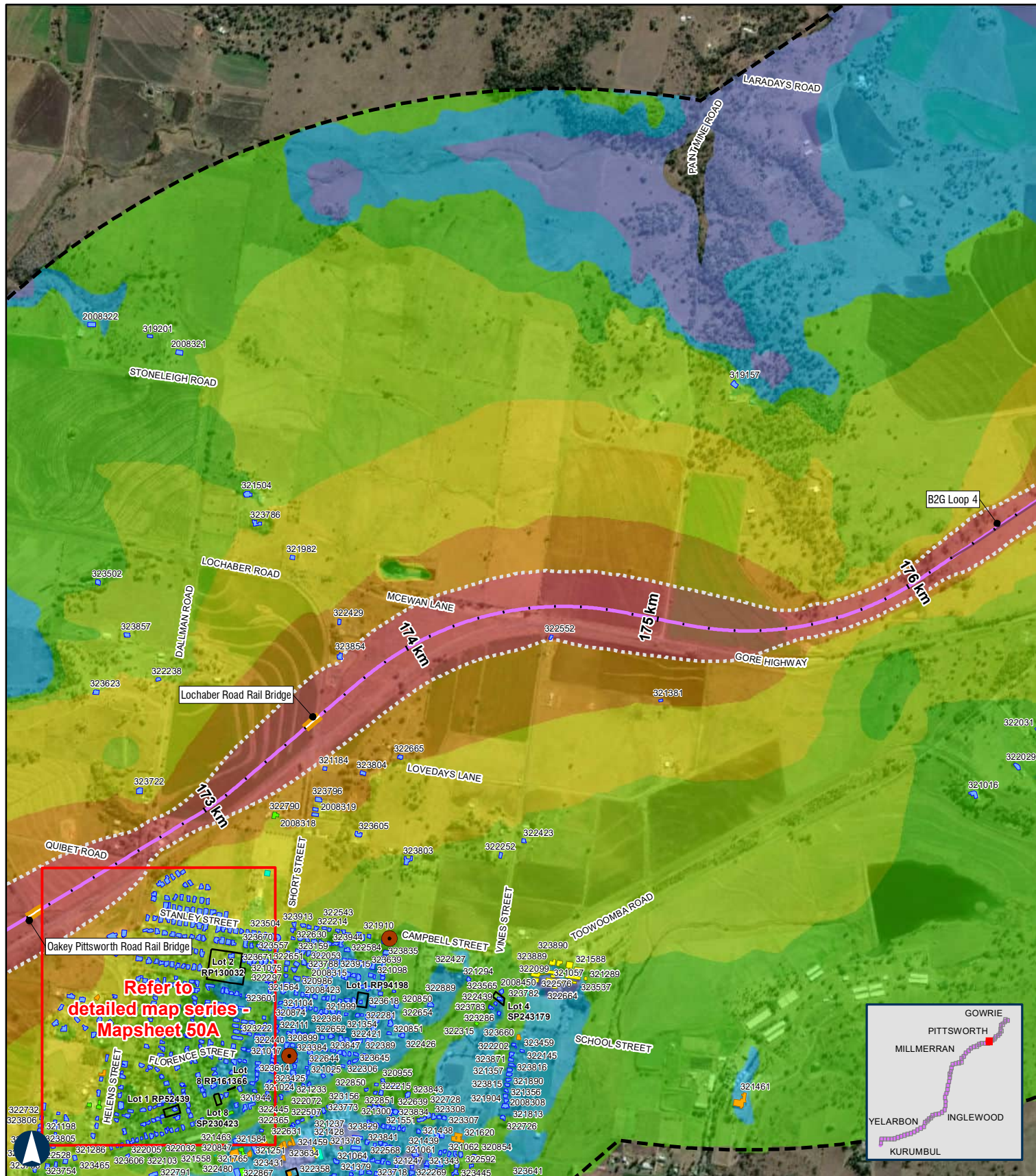
Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:5,000

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC *InlandRail*

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 51 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

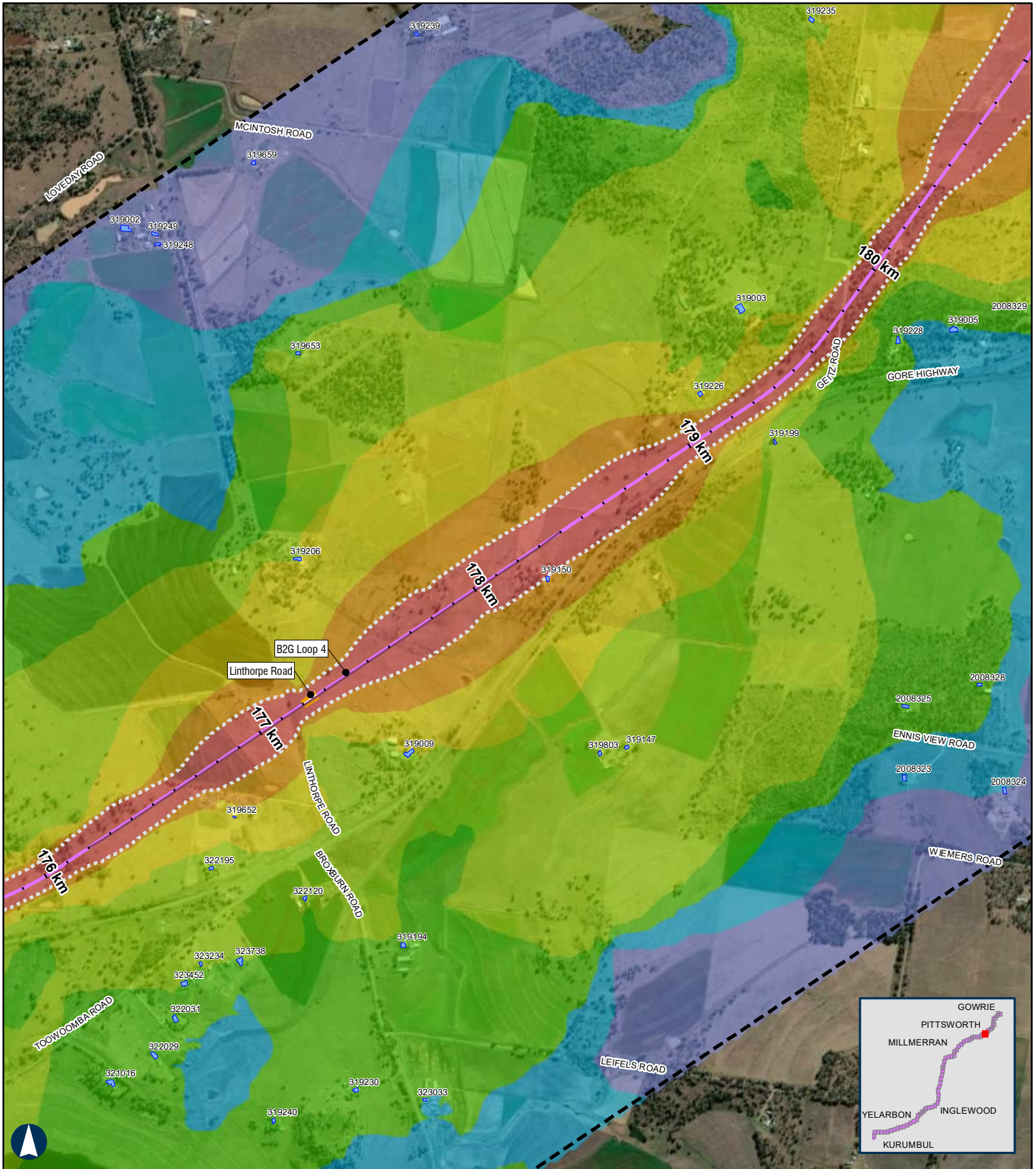
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Noise Levels**
- [] 30 - 35 dBA
 - [] 35 - 40 dBA
 - [] 40 - 45 dBA
 - [] 45 - 50 dBA
 - [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 52 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

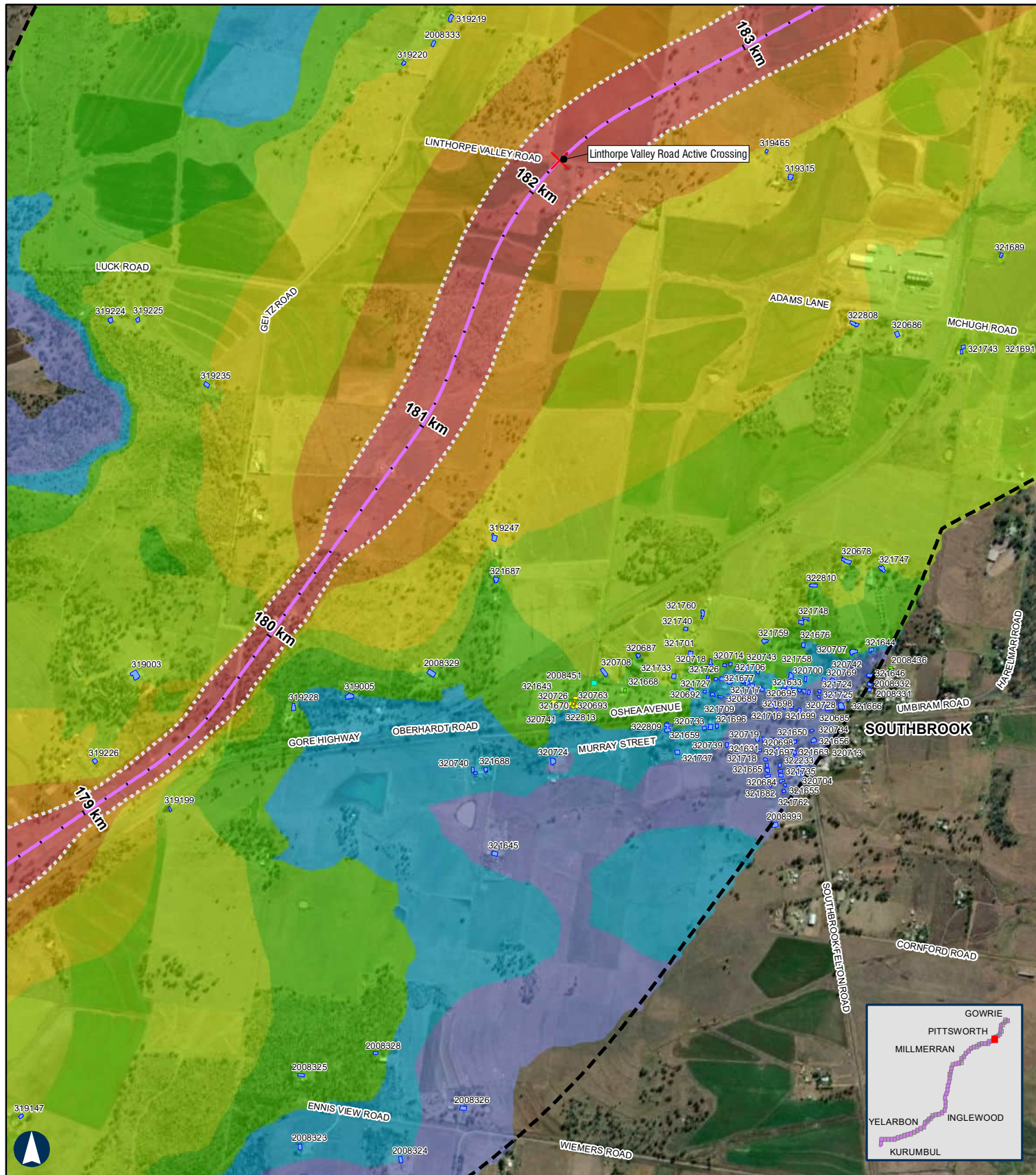
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 53 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

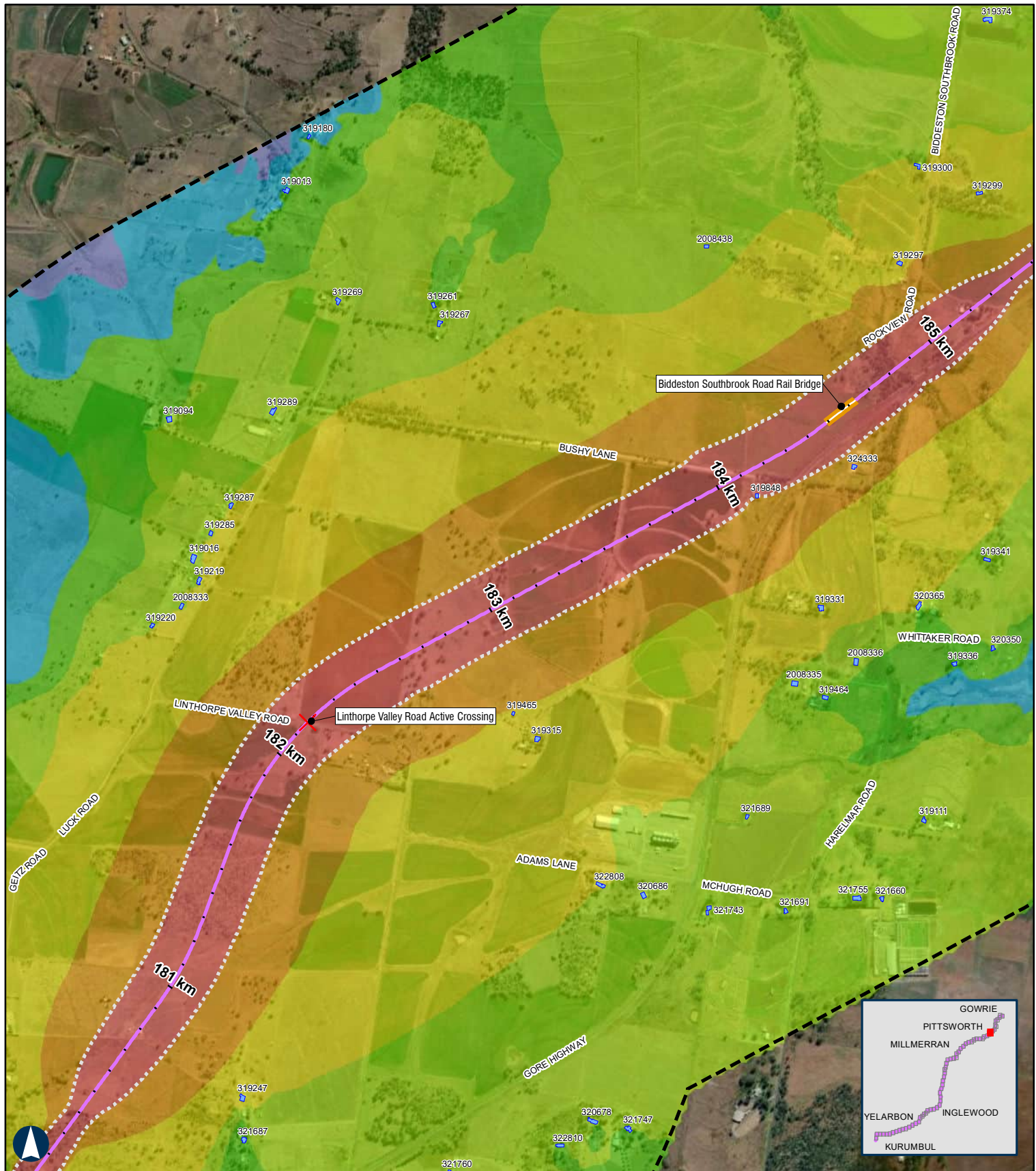
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 54 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

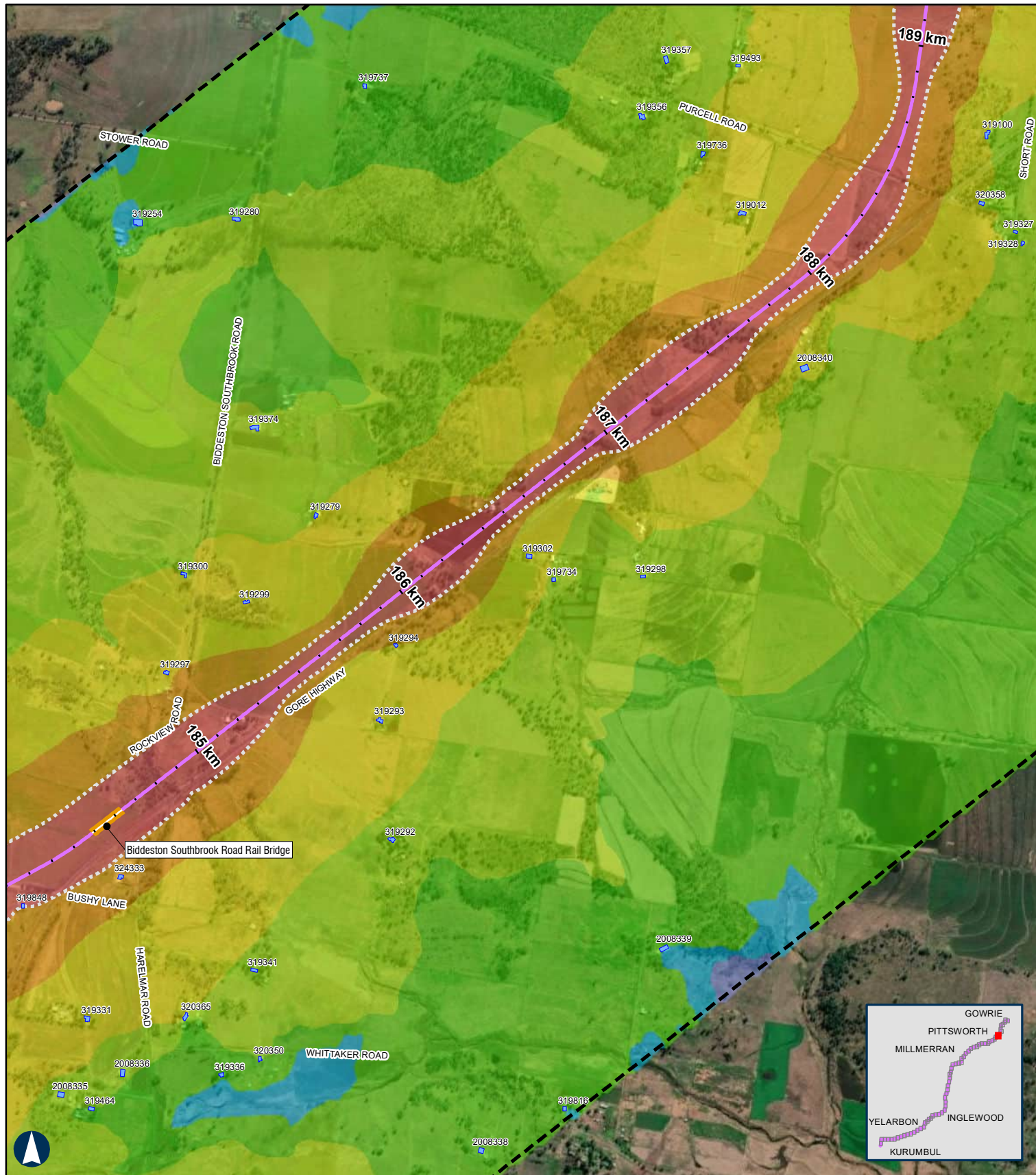
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 55 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

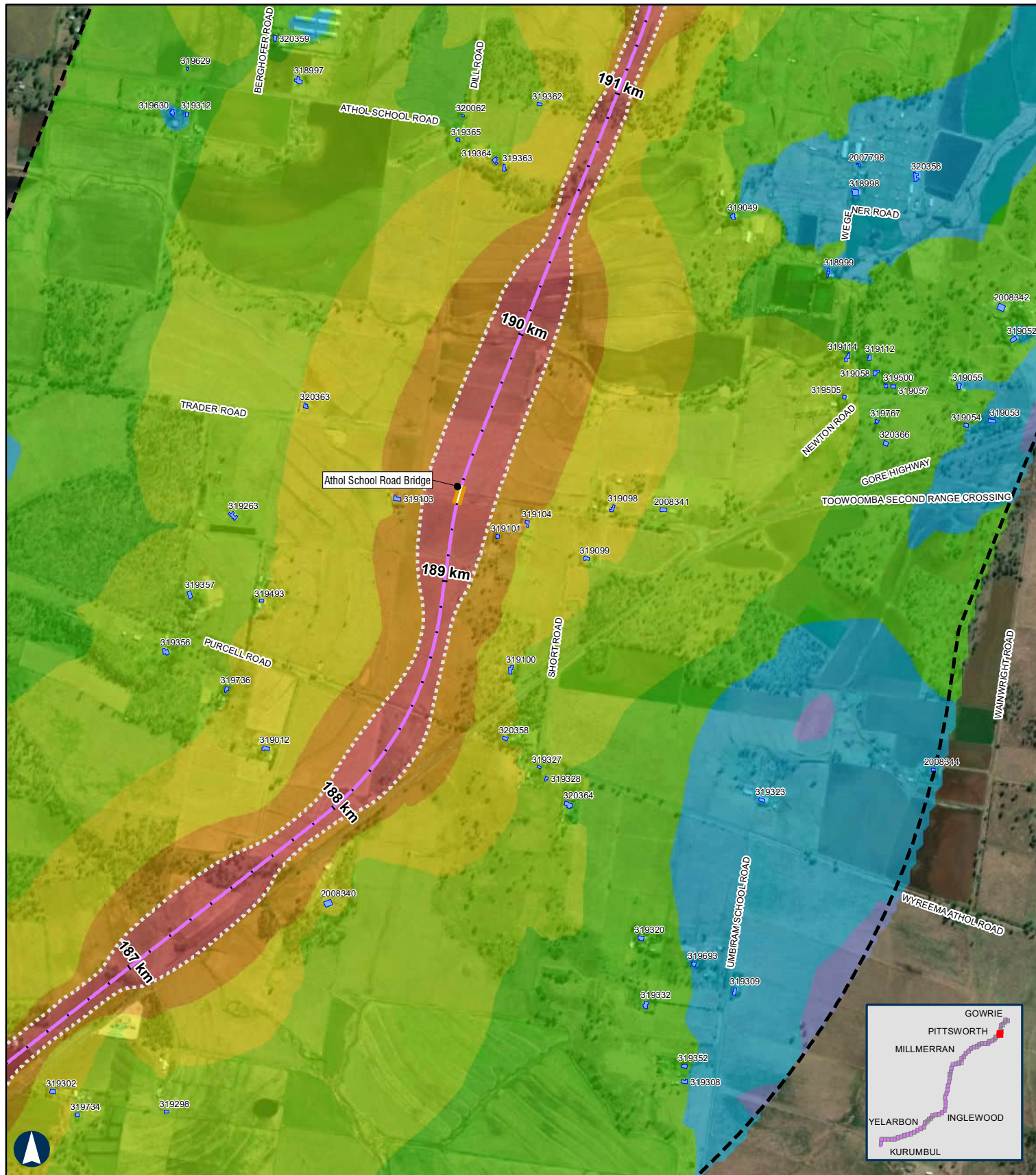
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 56 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

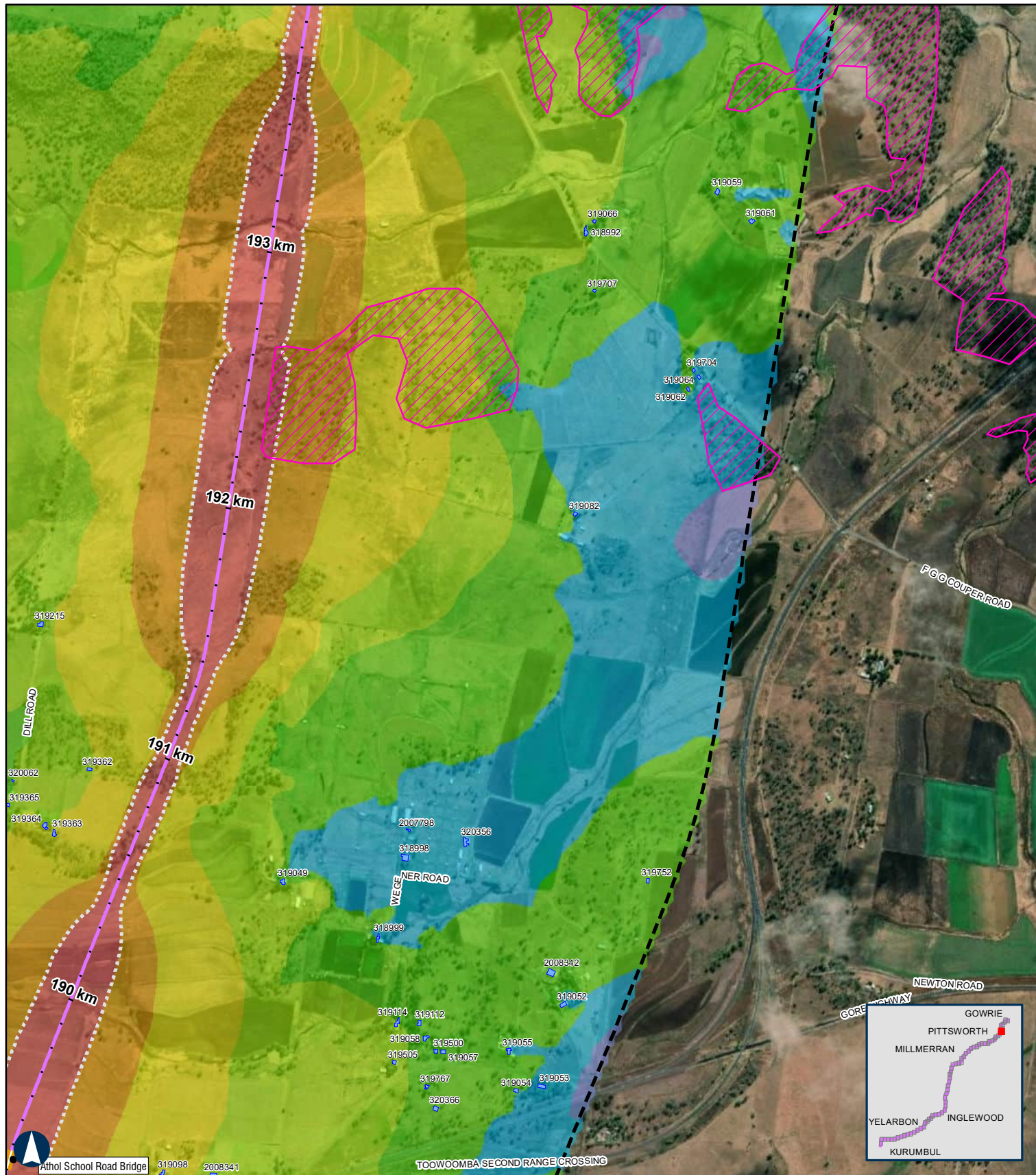
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 57 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

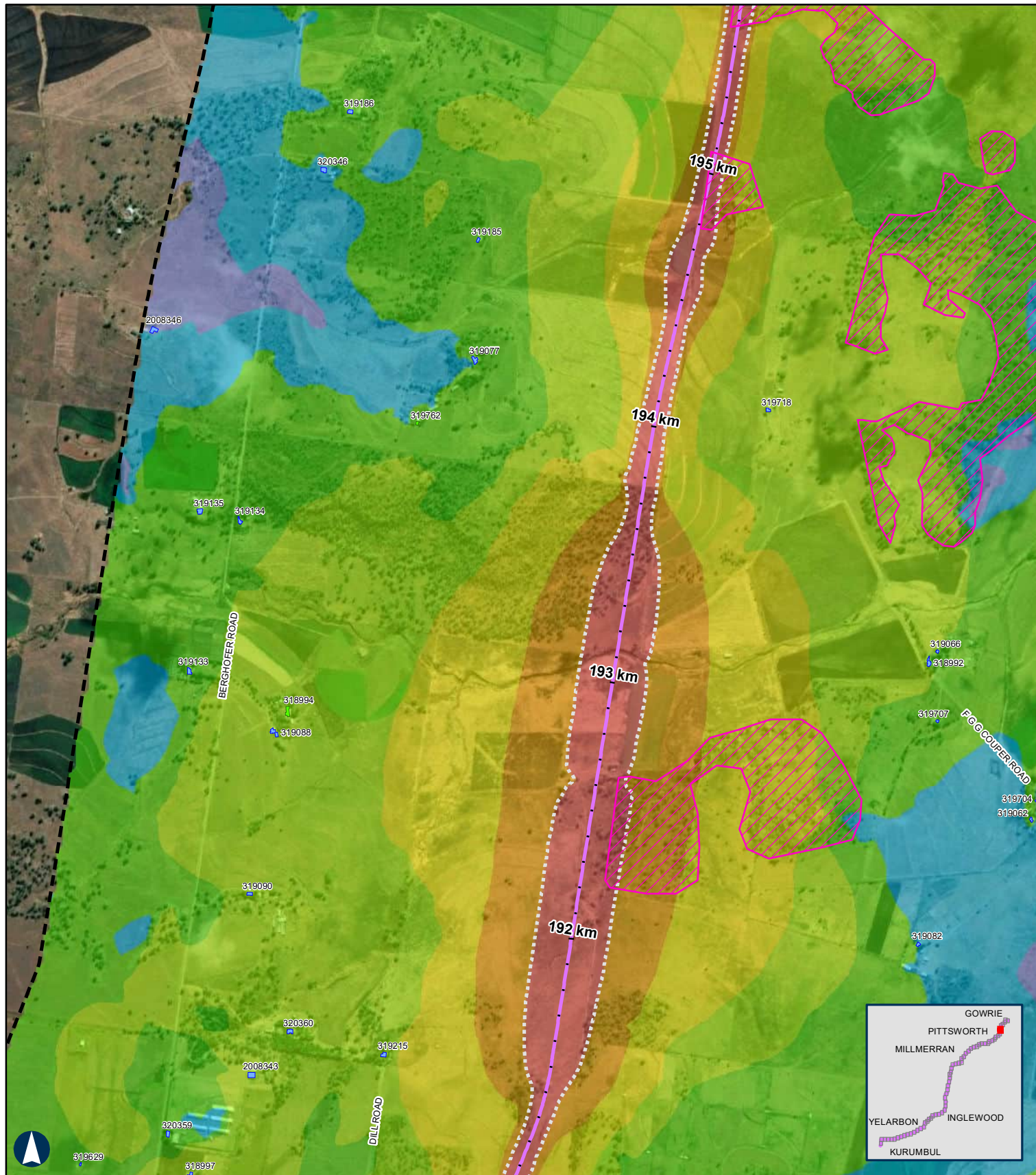
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 58 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

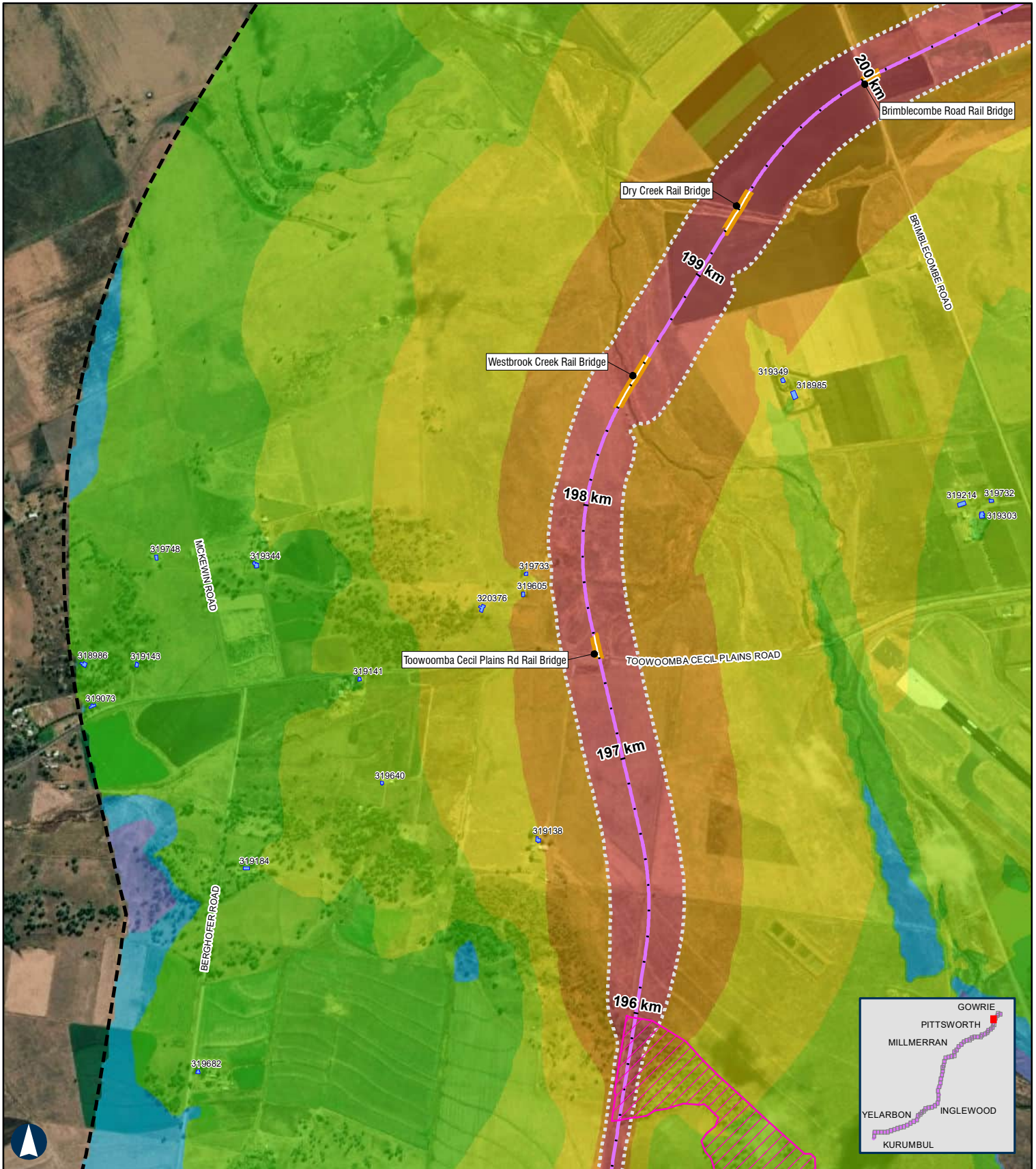
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 59 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

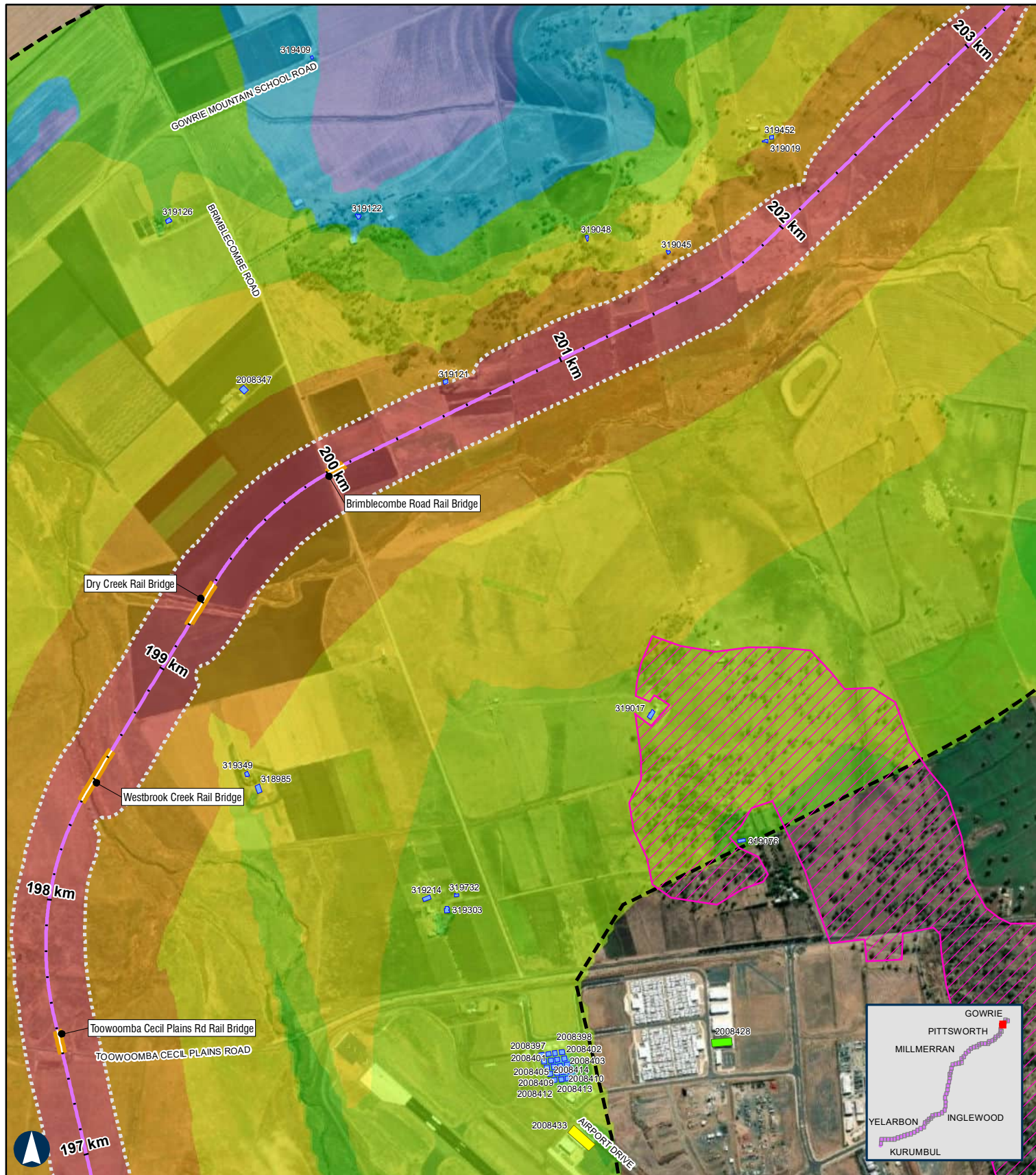
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 60 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

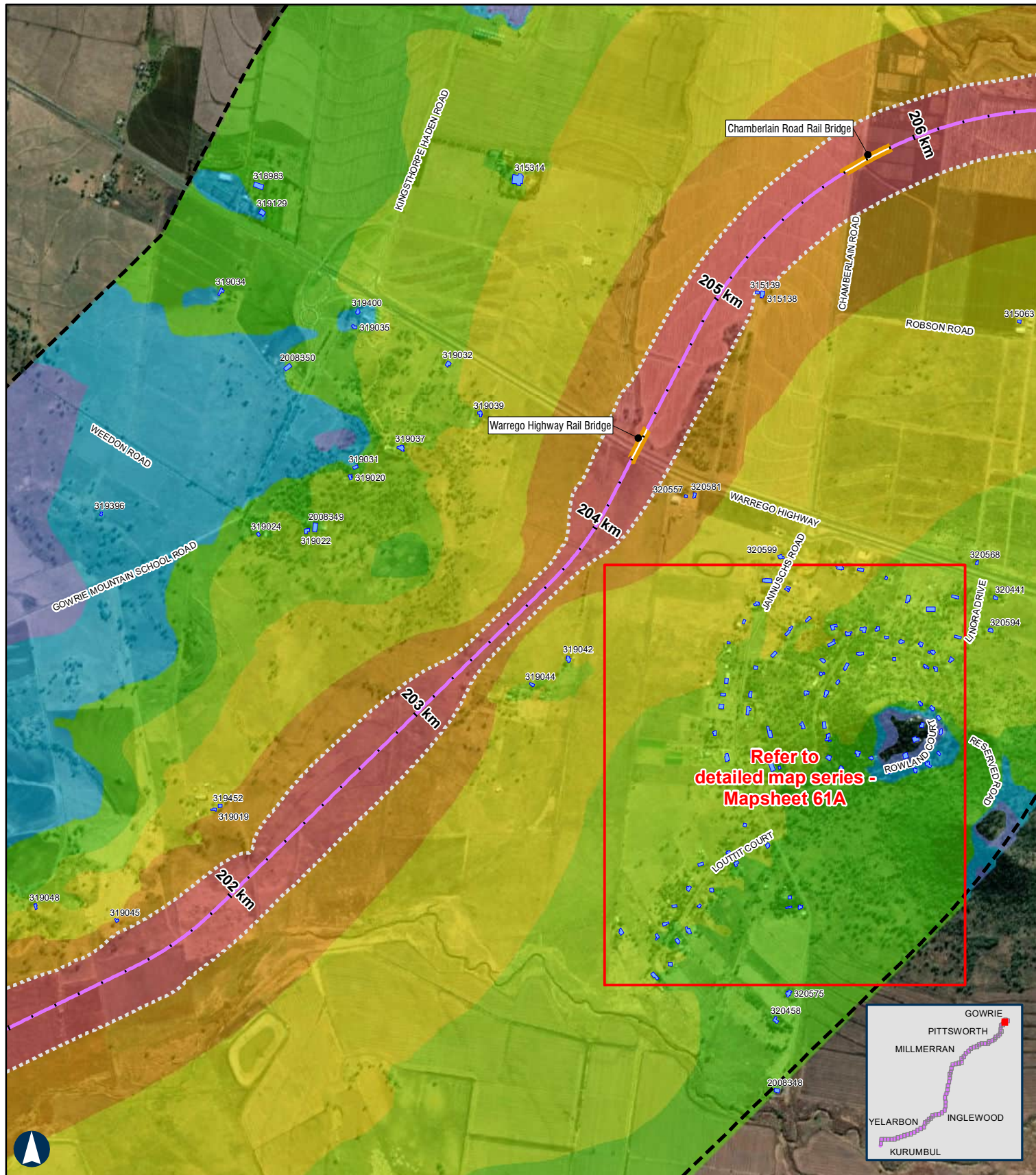
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 61 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

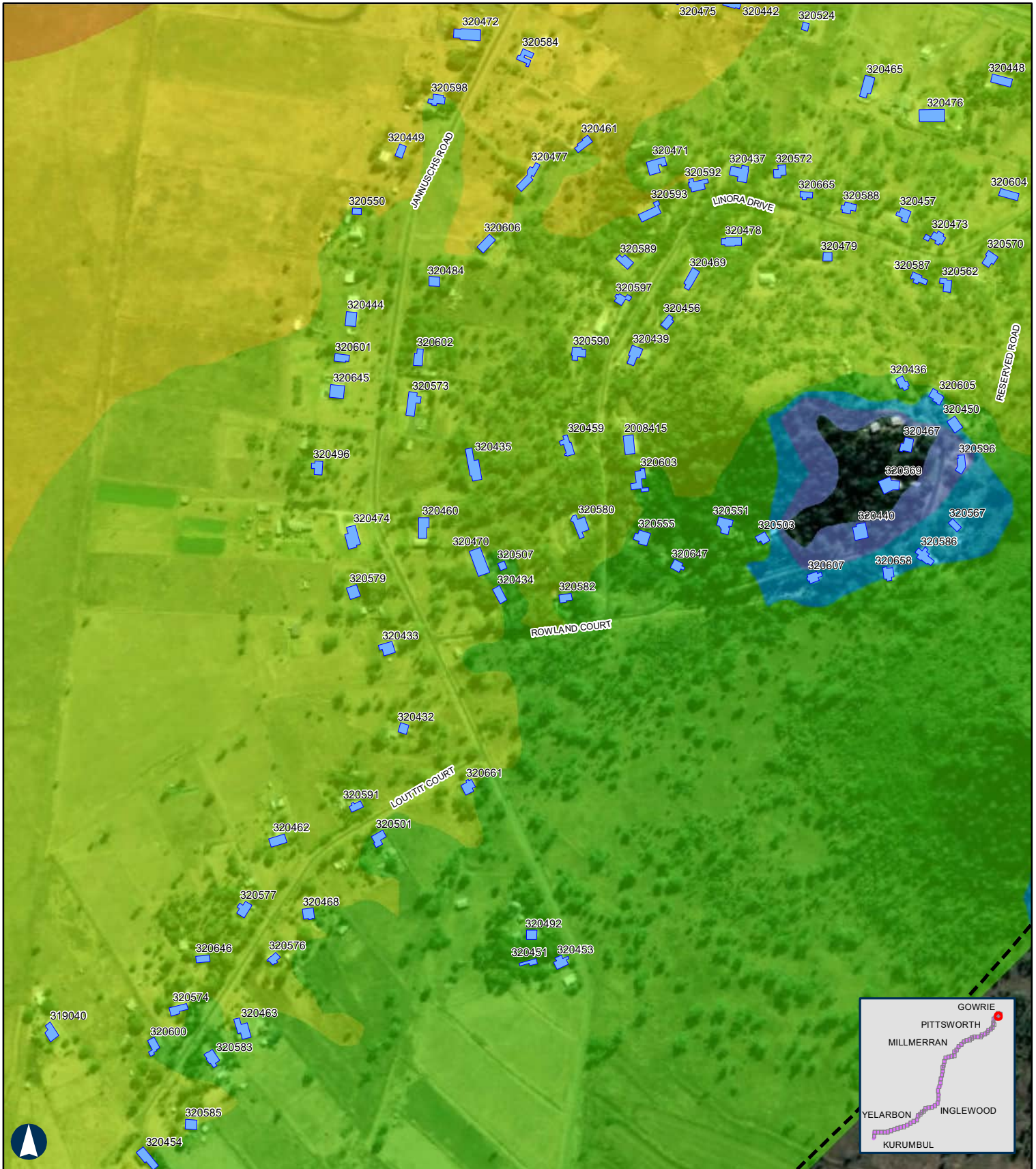
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 61A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:7,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

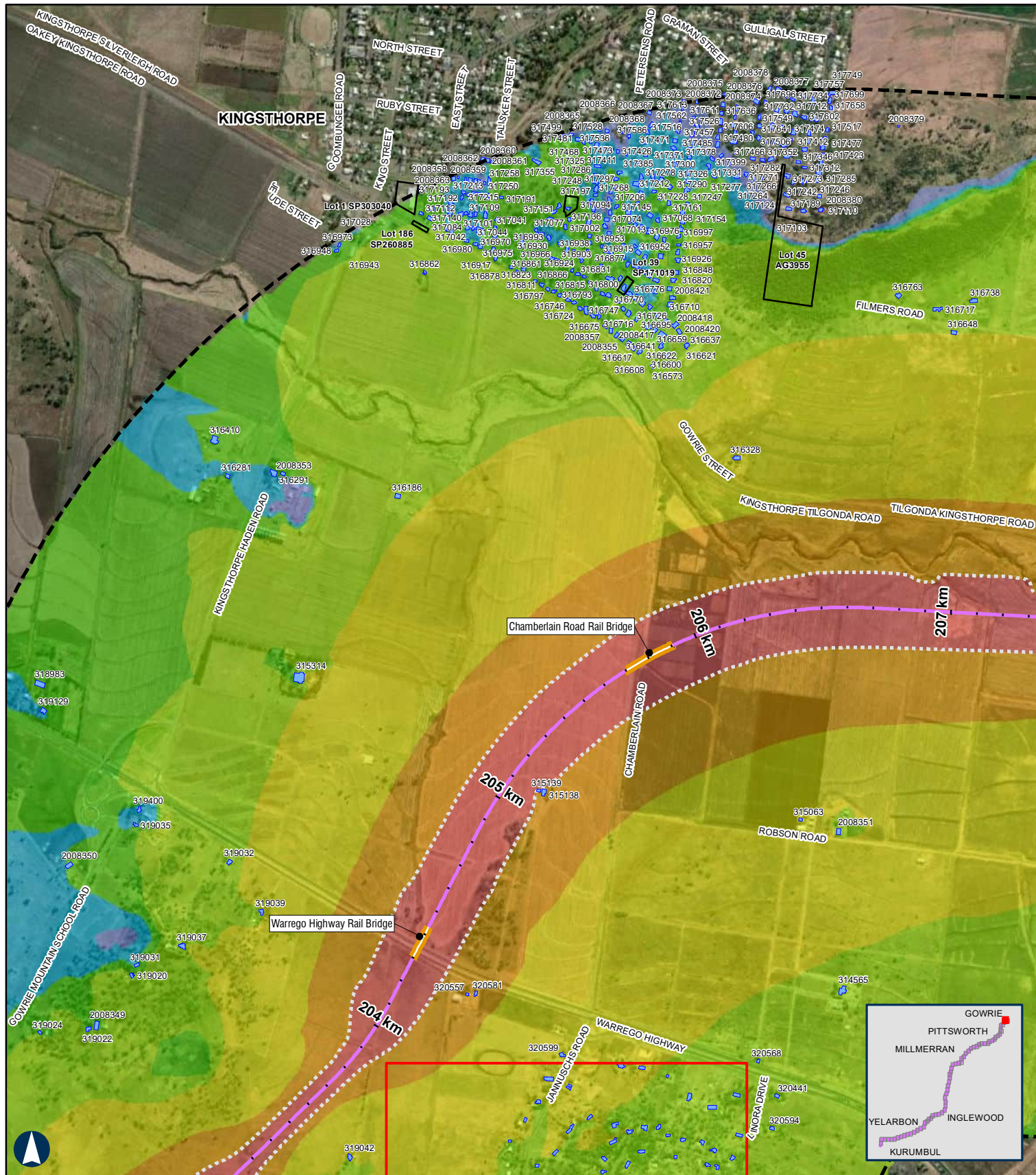
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 62 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

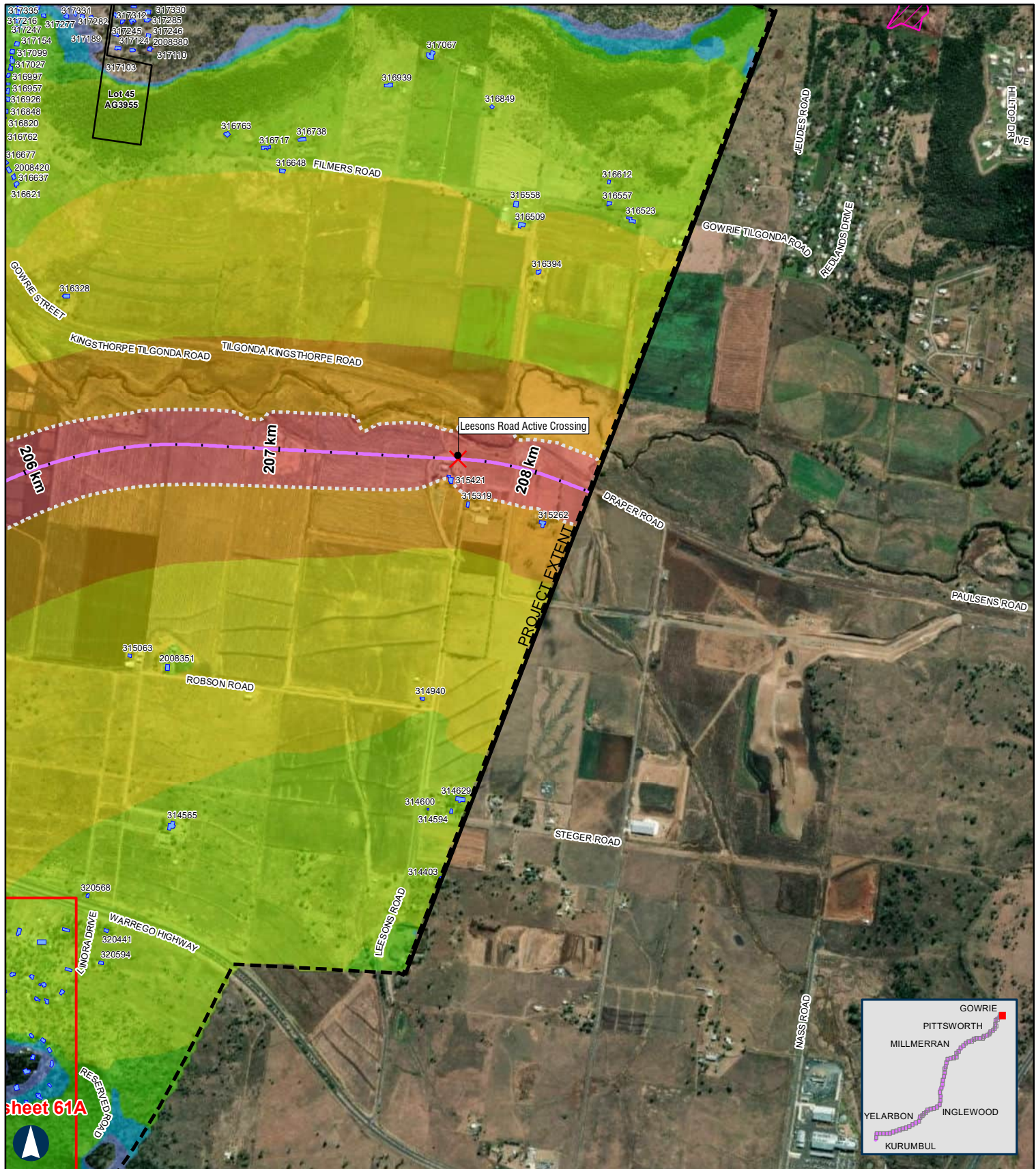
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028 Leq,24h

APPENDIX D - Map 63 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

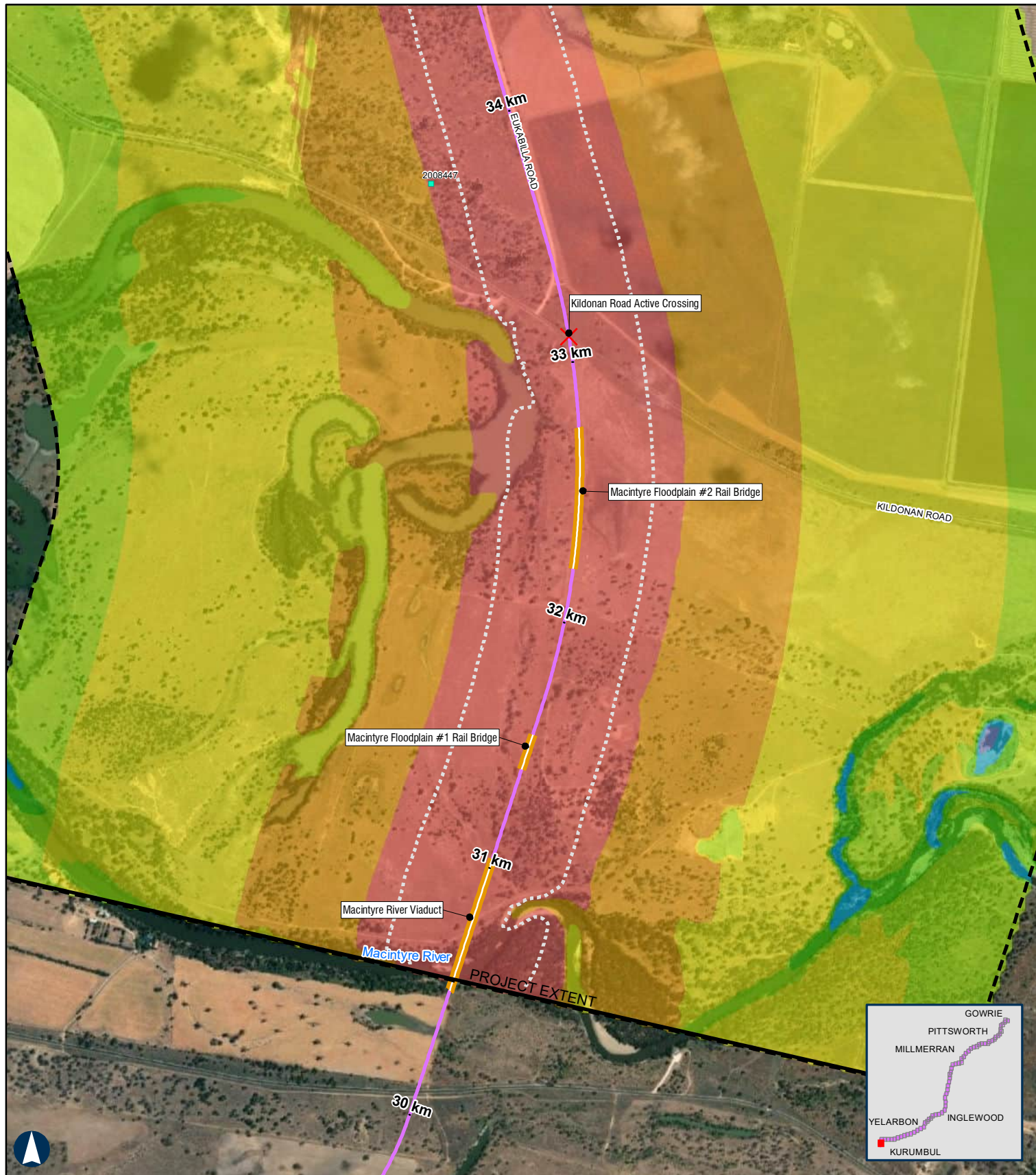
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 1 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

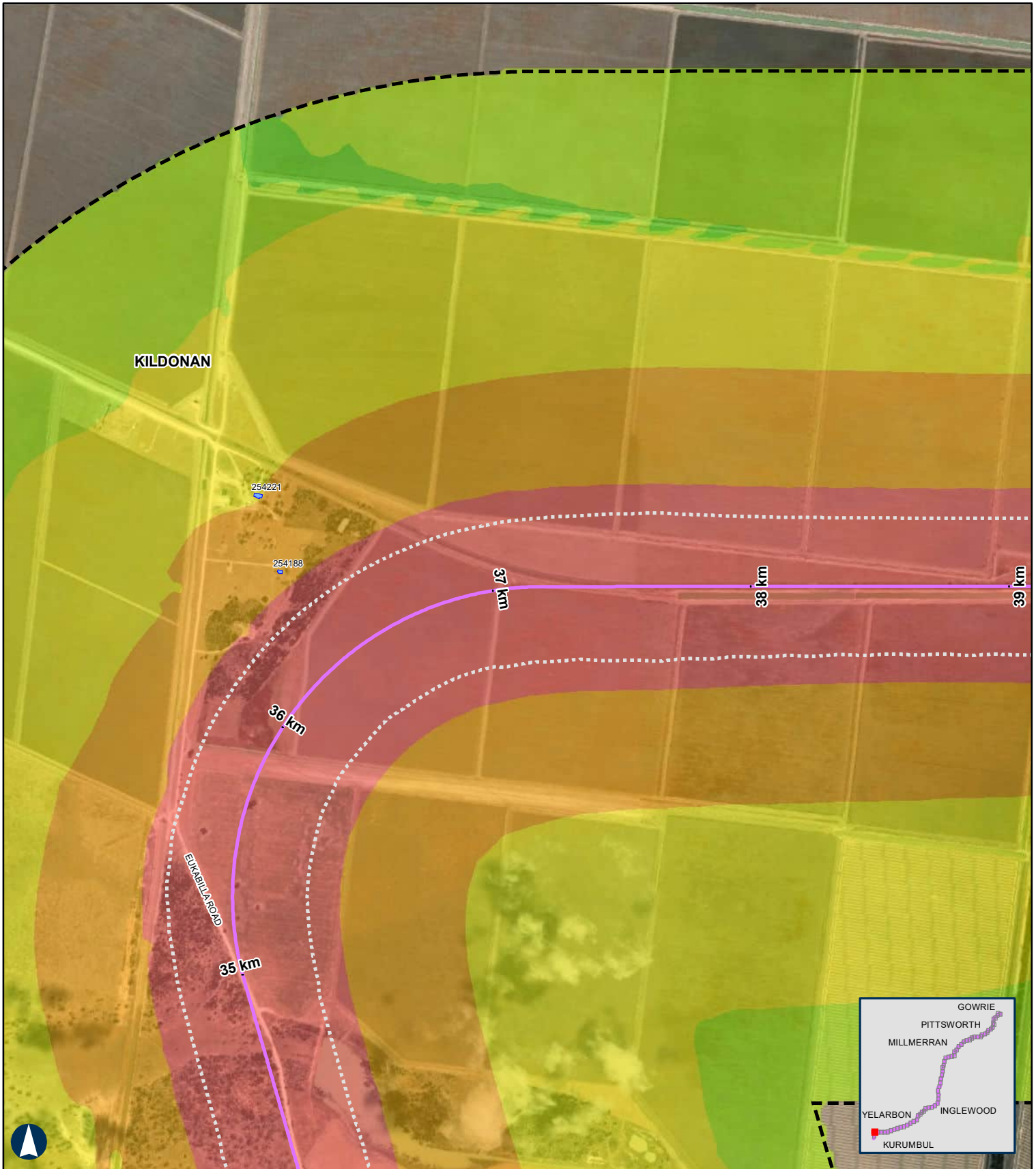
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 2 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (82 dBA)

Noise Levels

50 - 55 dBA

55 - 60 dBA

60 - 65 dBA

65 - 70 dBA

70 - 75 dBA

75 - 80 dBA

> 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 3 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

--- Criterion (82 dBA)

Noise Levels

■ 50 - 55 dBA

■ 55 - 60 dBA

■ 60 - 65 dBA

■ 65 - 70 dBA

■ 70 - 75 dBA

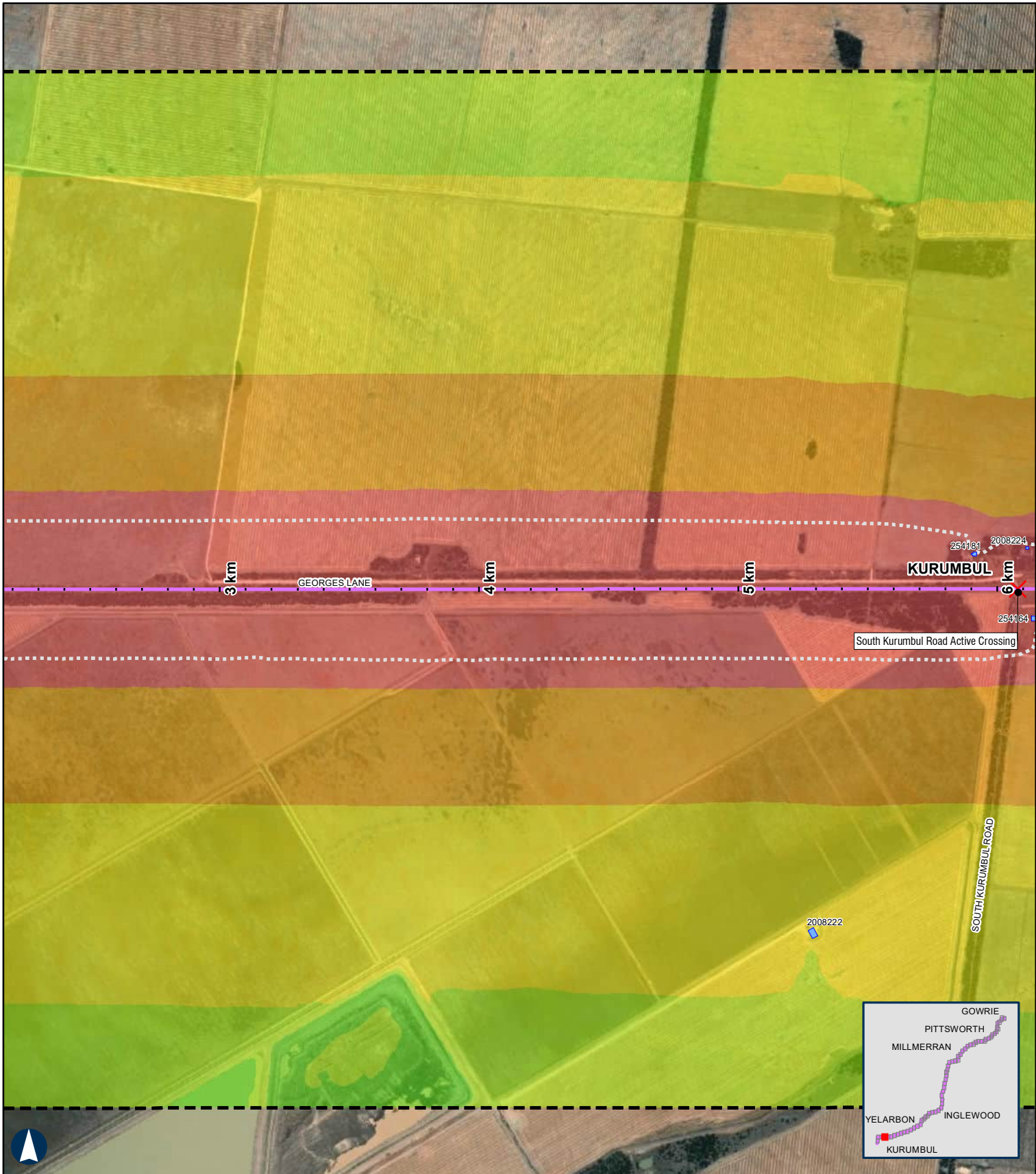
■ 75 - 80 dBA

■ > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 4 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

▭ Modelling Area

▨ Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (82 dBA)

Noise Levels

50 - 55 dBA

55 - 60 dBA

60 - 65 dBA

65 - 70 dBA

70 - 75 dBA

75 - 80 dBA

> 80 dBA

Paper: A4
Date: 21-Oct-2024
Author: JG

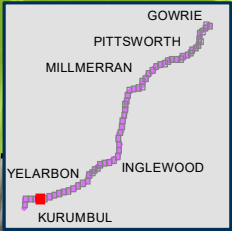
Scale: 1:20,000

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC

InlandRail

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028/2040 SEM**

Map 5 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4 Scale: 1:20,000
Date: 21-Oct-2024
Author: JG

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

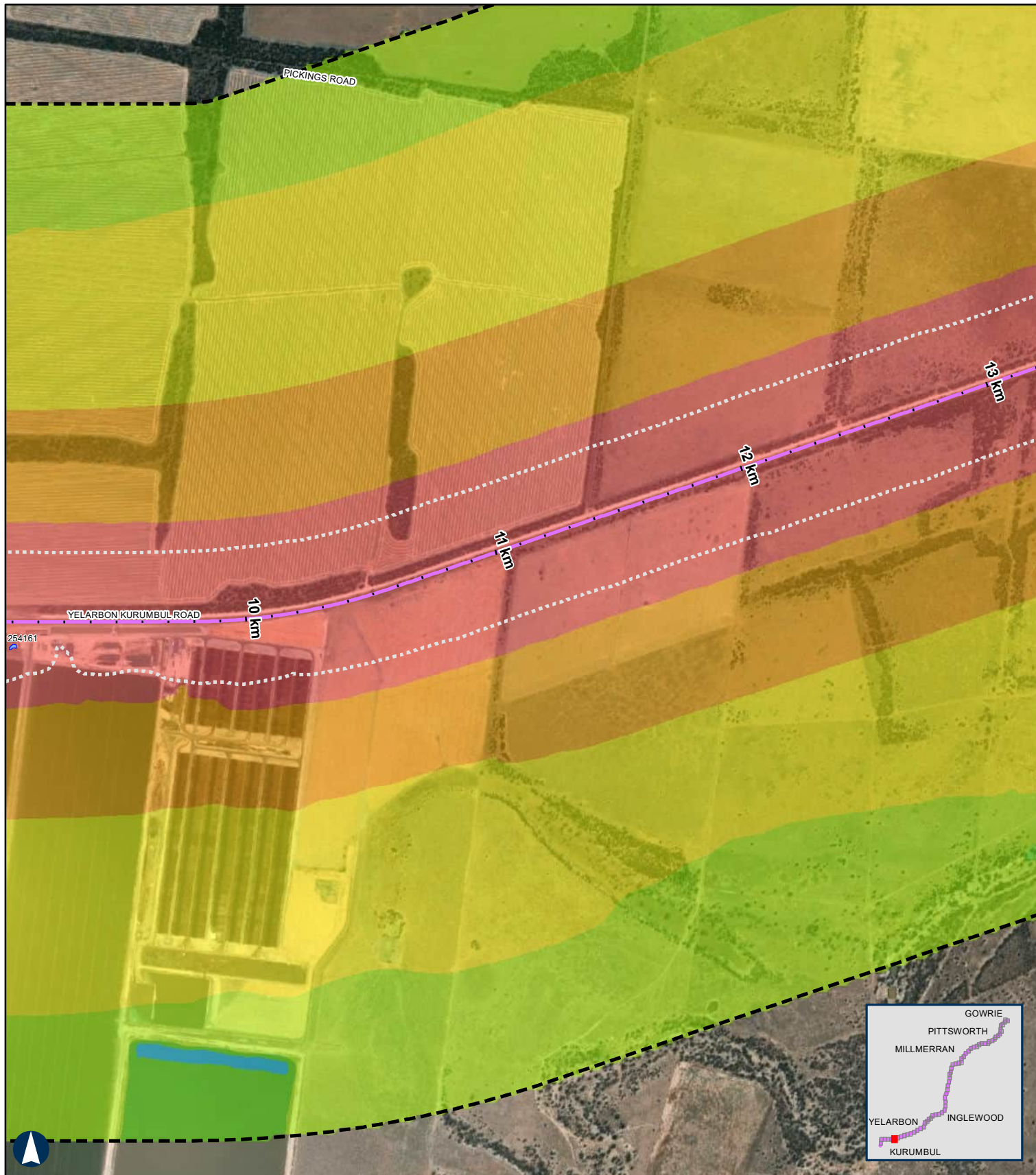
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 6 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

--- Criterion (82 dBA)

Noise Levels

■ 50 - 55 dBA

■ 55 - 60 dBA

■ 60 - 65 dBA

■ 65 - 70 dBA

■ 70 - 75 dBA

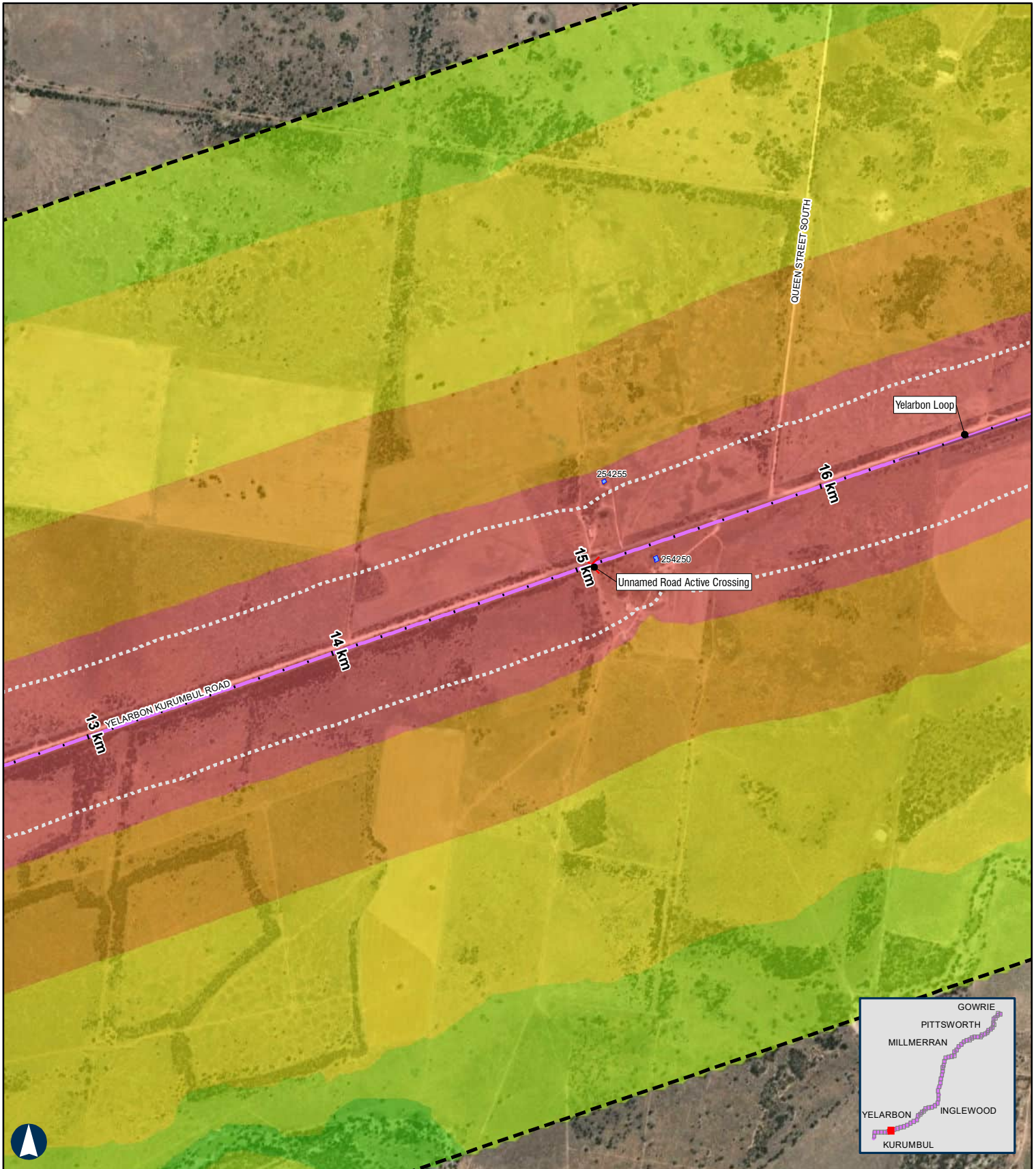
■ 75 - 80 dBA

■ > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 7 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▨ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

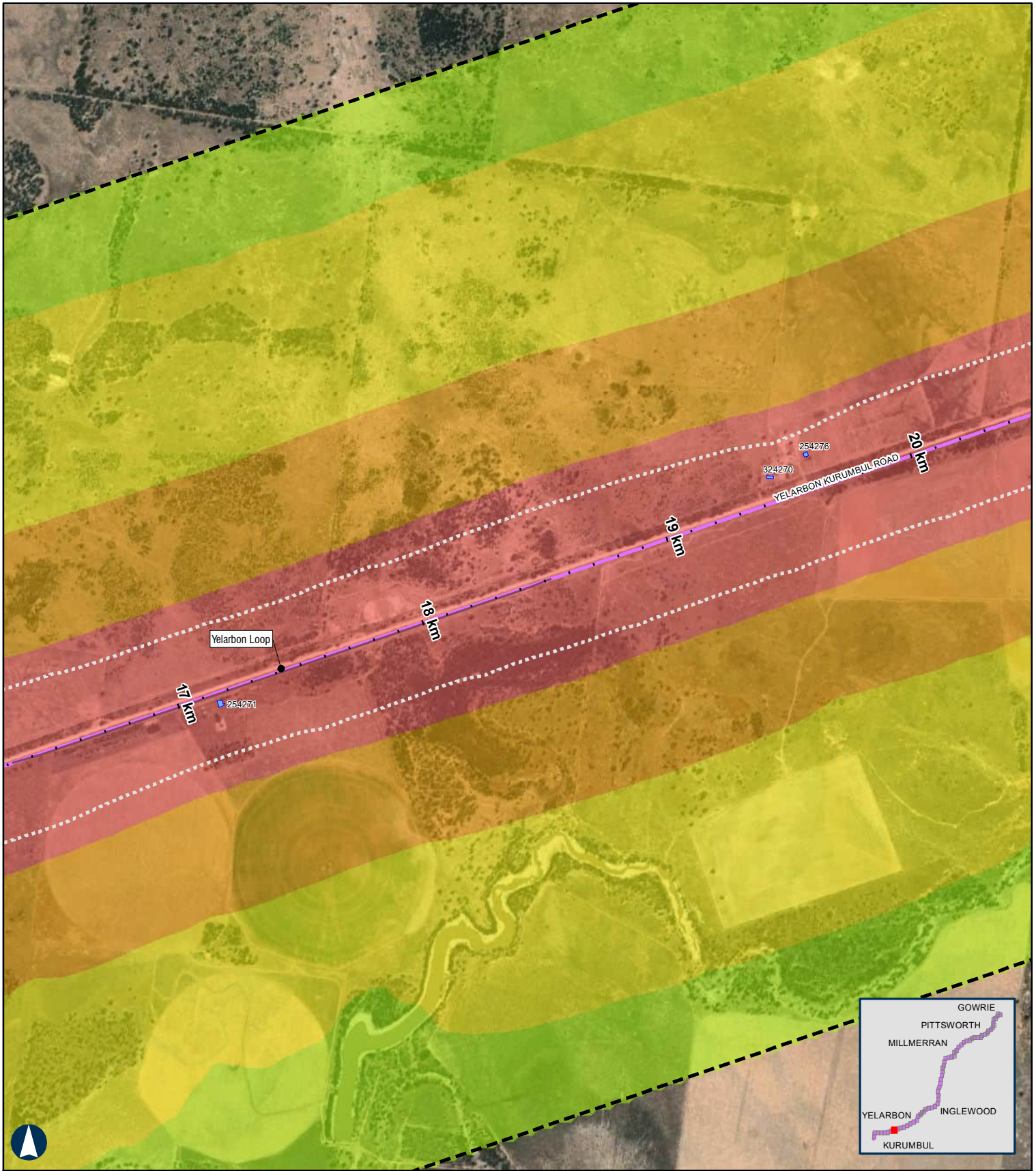
Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 8 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

- Sensitive Receptor Type**
- ▭ Residential
 - ▭ Community
 - ▭ Educational
 - ▭ Commercial
 - ▭ Parkland
 - ▭ Future Developments

- Criterion (82 dBA)
- Noise Levels**
- ▭ 50 - 55 dBA
 - ▭ 55 - 60 dBA
 - ▭ 60 - 65 dBA
 - ▭ 65 - 70 dBA
 - ▭ 70 - 75 dBA
 - ▭ 75 - 80 dBA
 - ▭ > 80 dBA

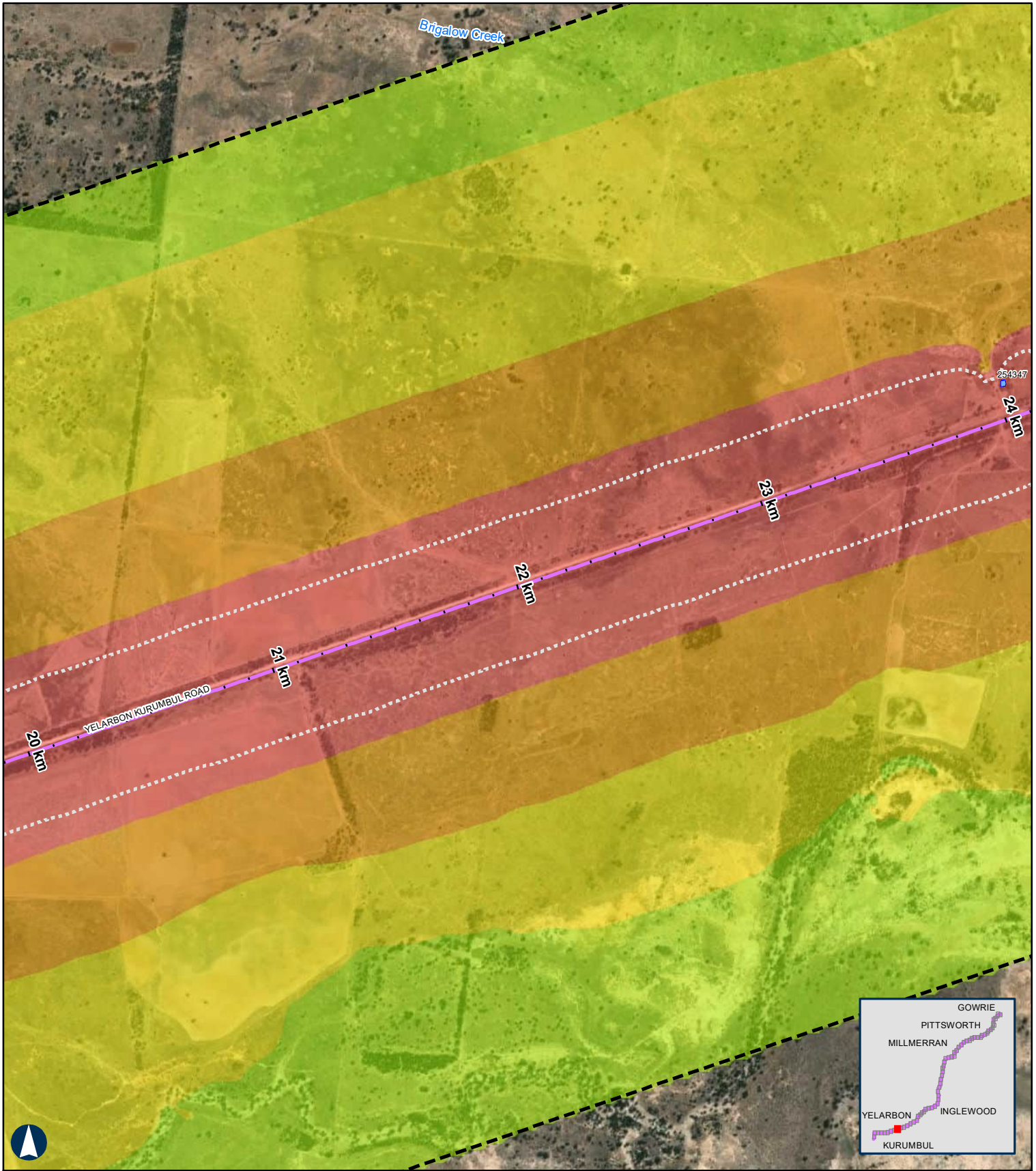
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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 9 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

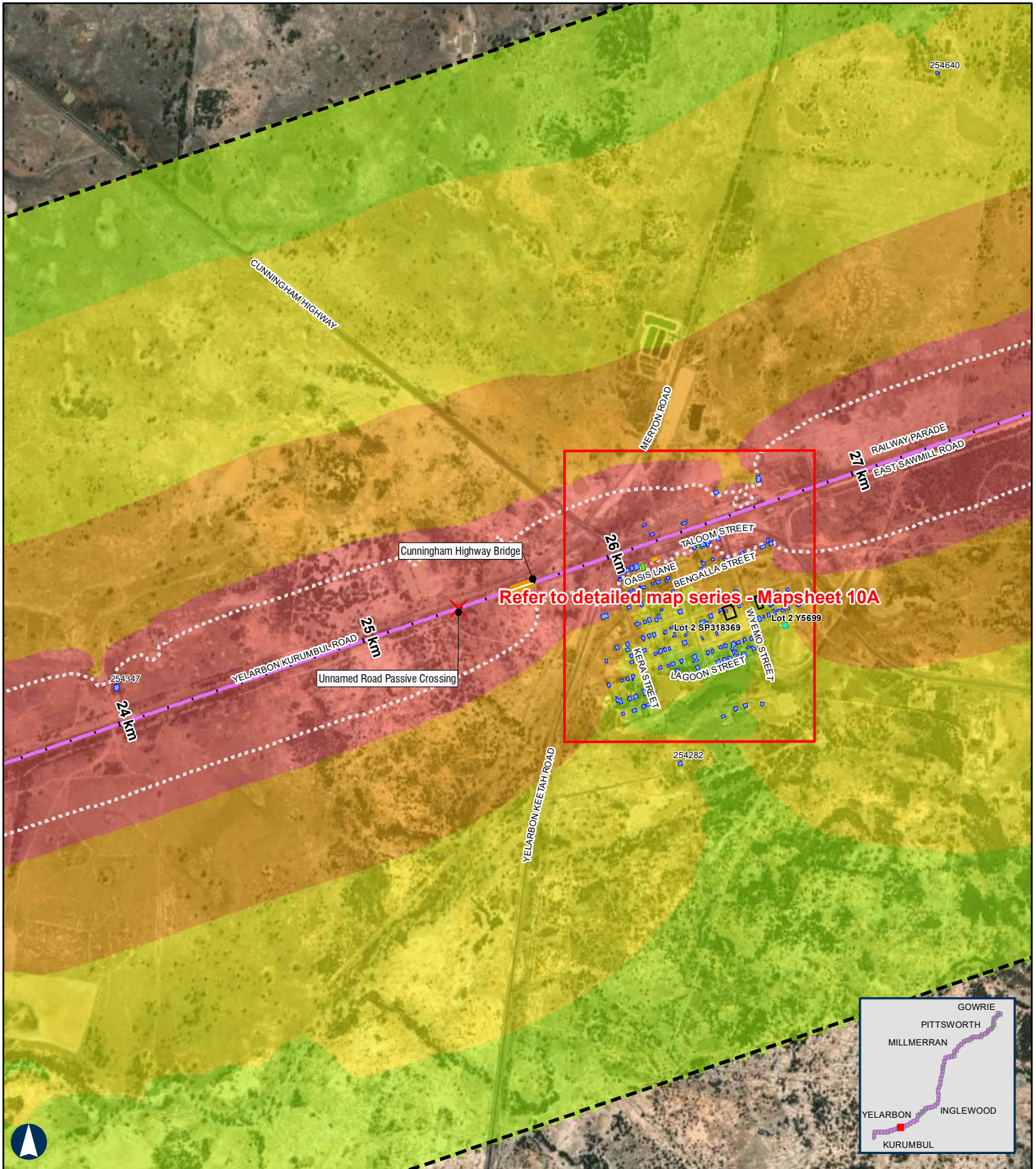
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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 10 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

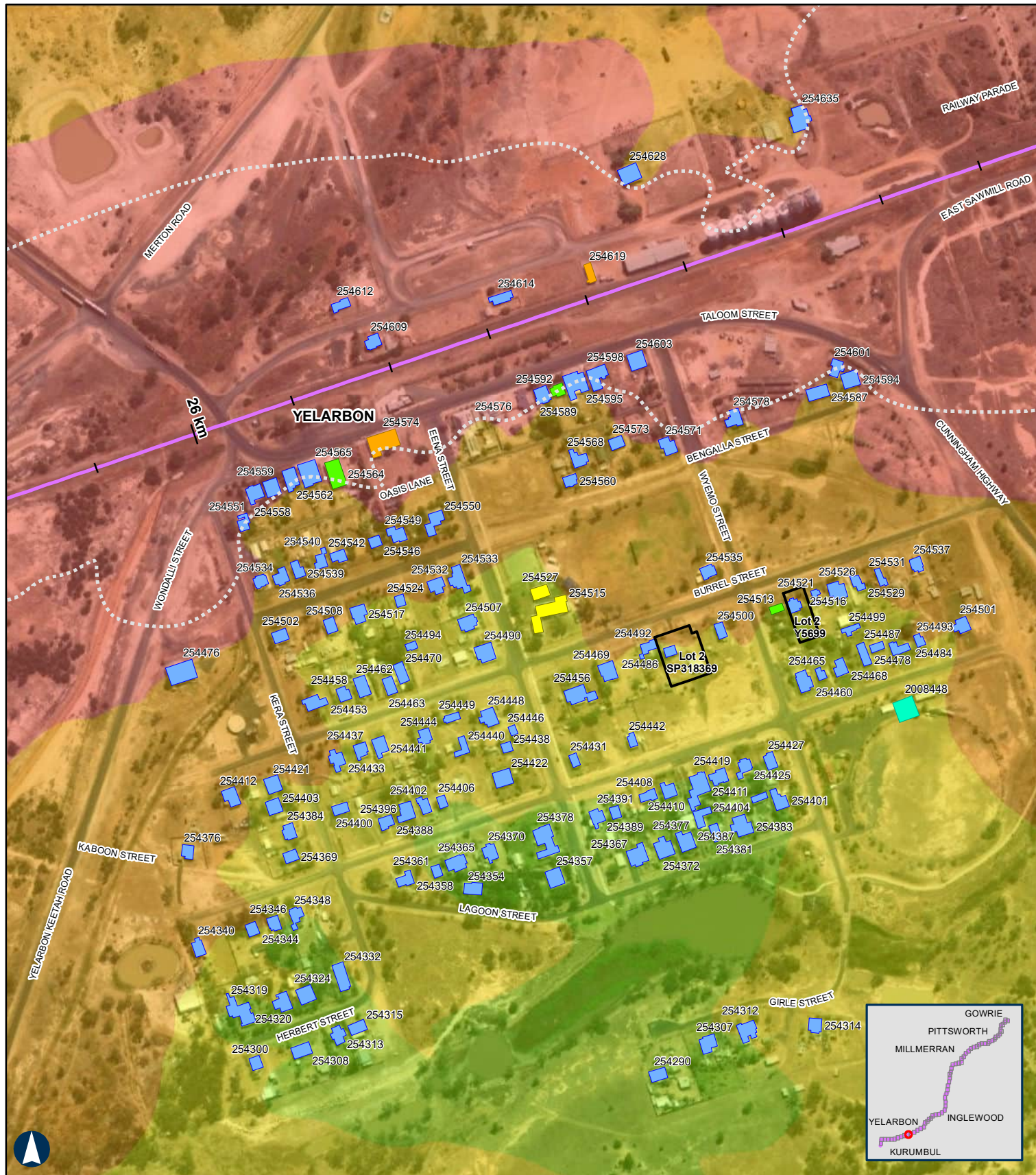
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 10A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:5,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

■ Future Developments

--- Criterion (82 dBA)

Noise Levels

■ 50 - 55 dBA

■ 55 - 60 dBA

■ 60 - 65 dBA

■ 65 - 70 dBA

■ 70 - 75 dBA

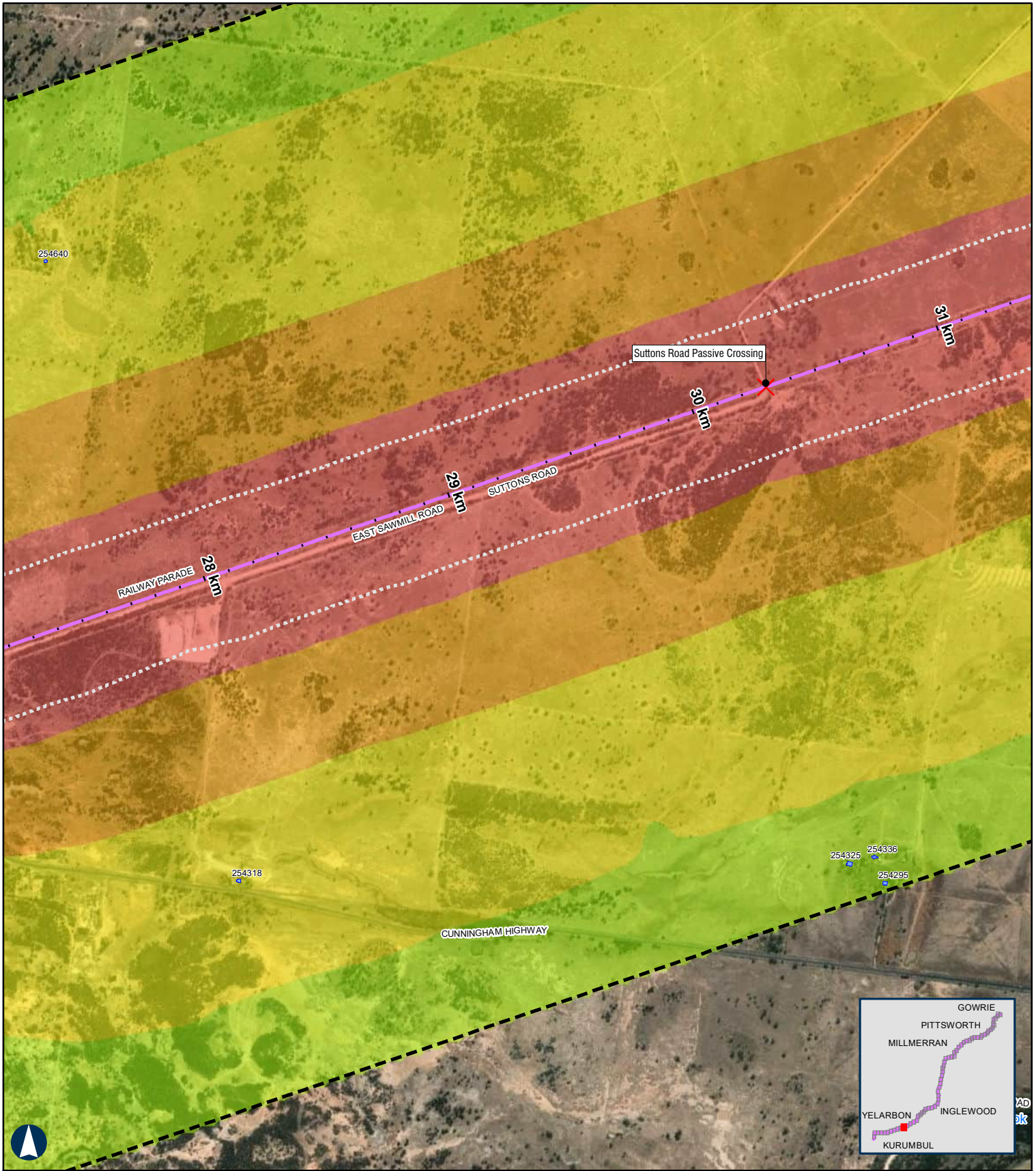
■ 75 - 80 dBA

■ > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 11 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

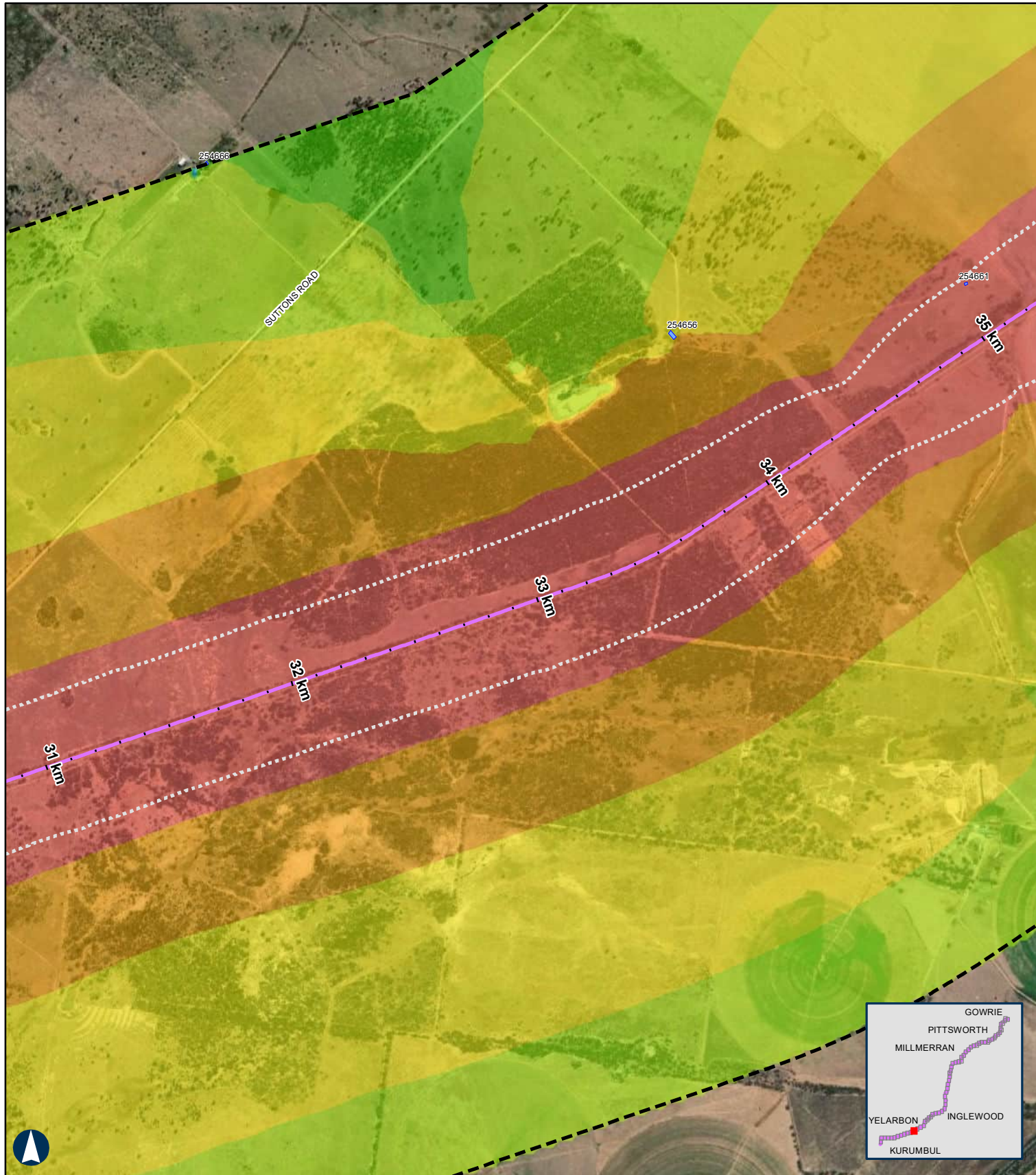
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 12 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (82 dBA)

Noise Levels

50 - 55 dBA

55 - 60 dBA

60 - 65 dBA

65 - 70 dBA

70 - 75 dBA

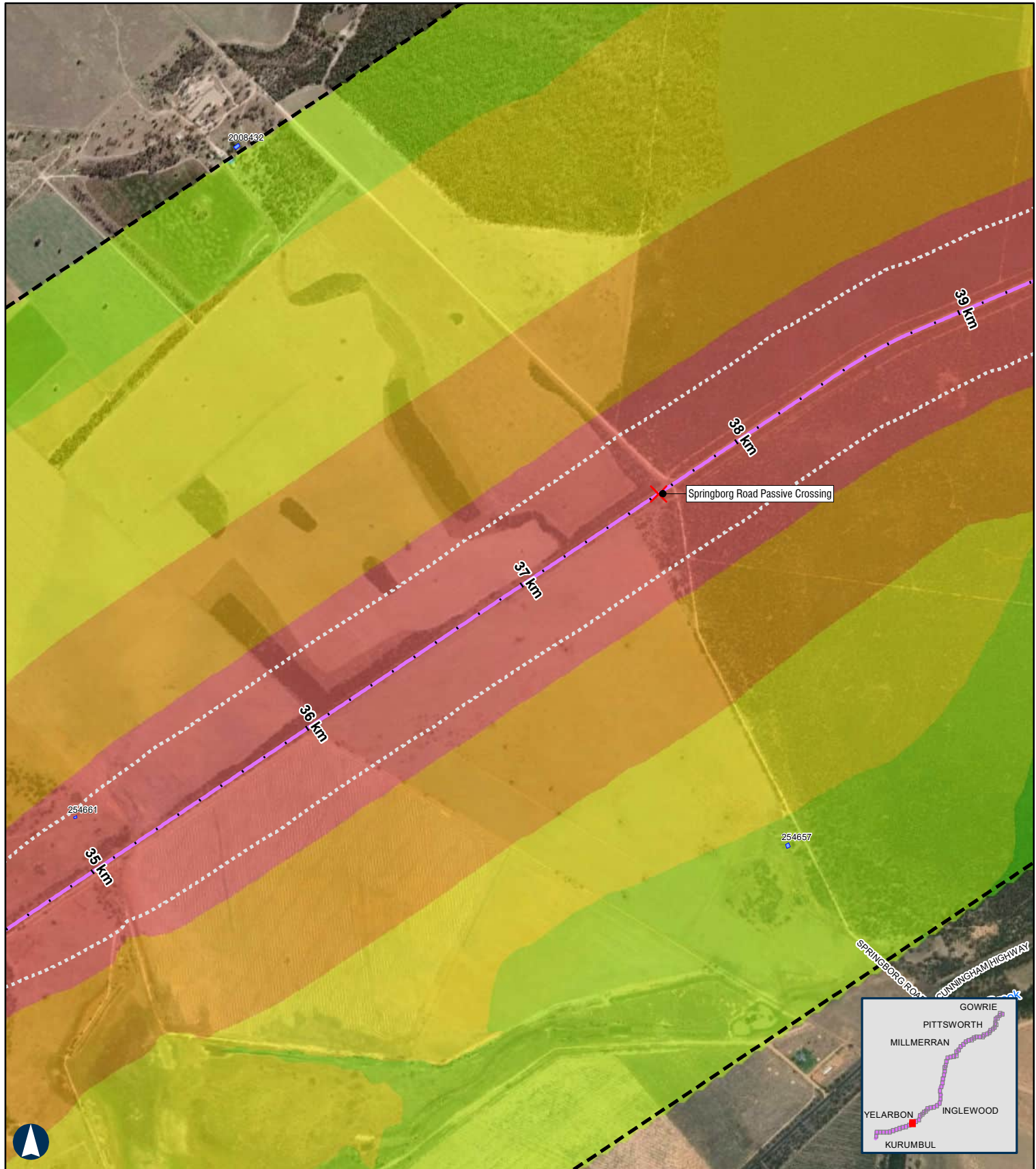
75 - 80 dBA

> 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 13 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

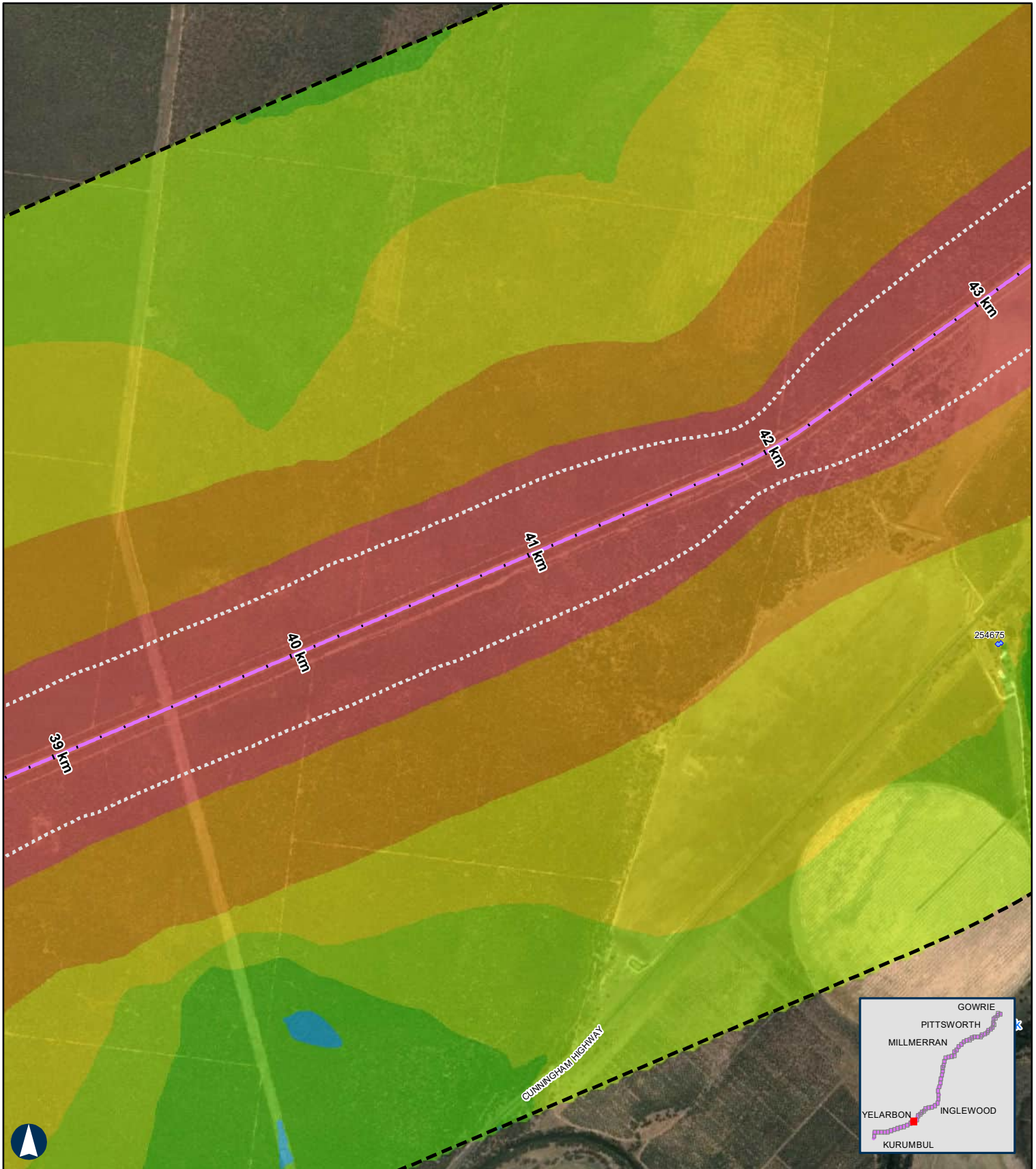
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Criterion (82 dBA)
- Noise Levels**
- [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] 60 - 65 dBA
 - [] 65 - 70 dBA
 - [] 70 - 75 dBA
 - [] 75 - 80 dBA
 - [] > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 14 of 63

500 m

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

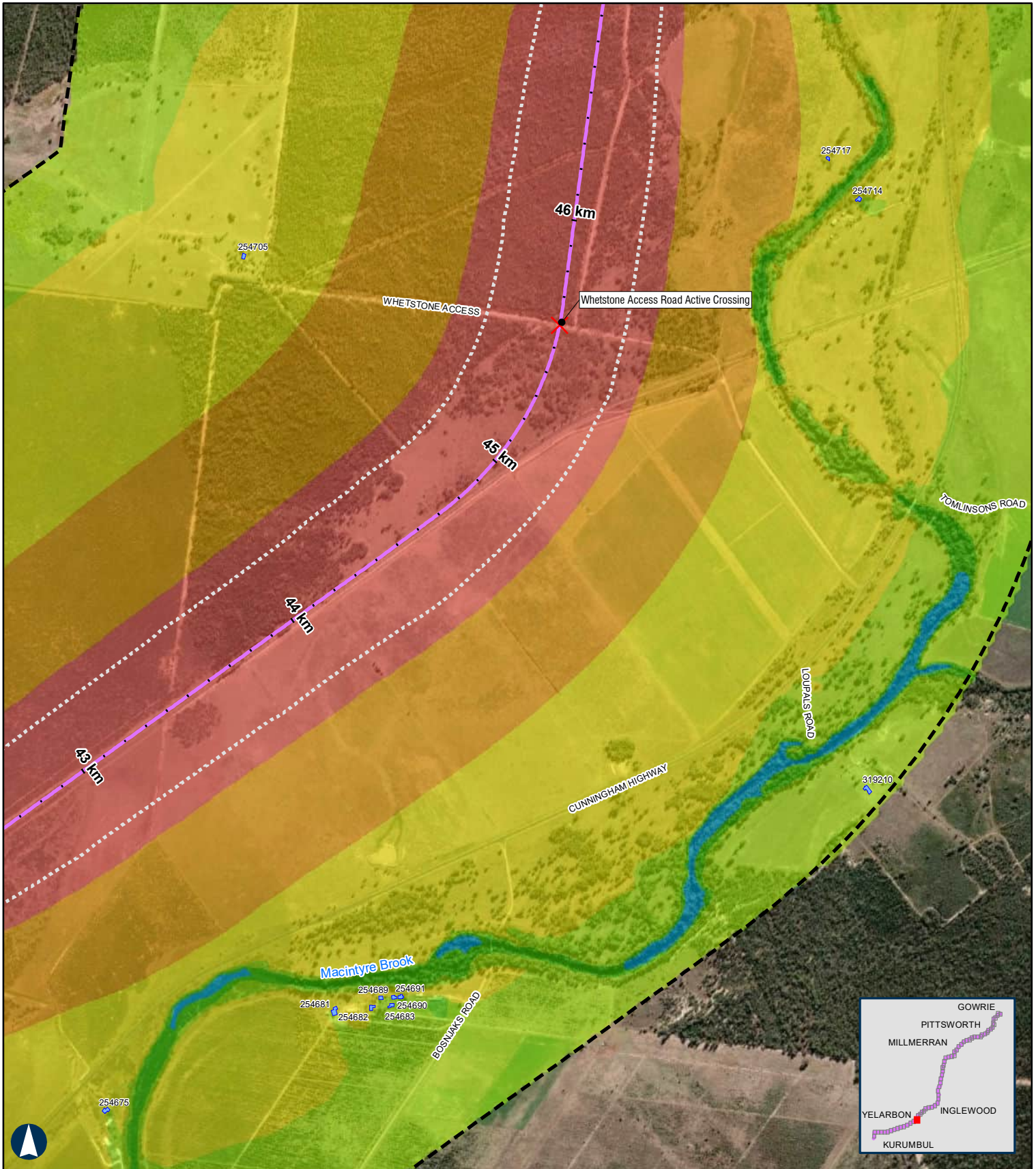
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
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 - > 80 dBA

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 15 of 63

500 m

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- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

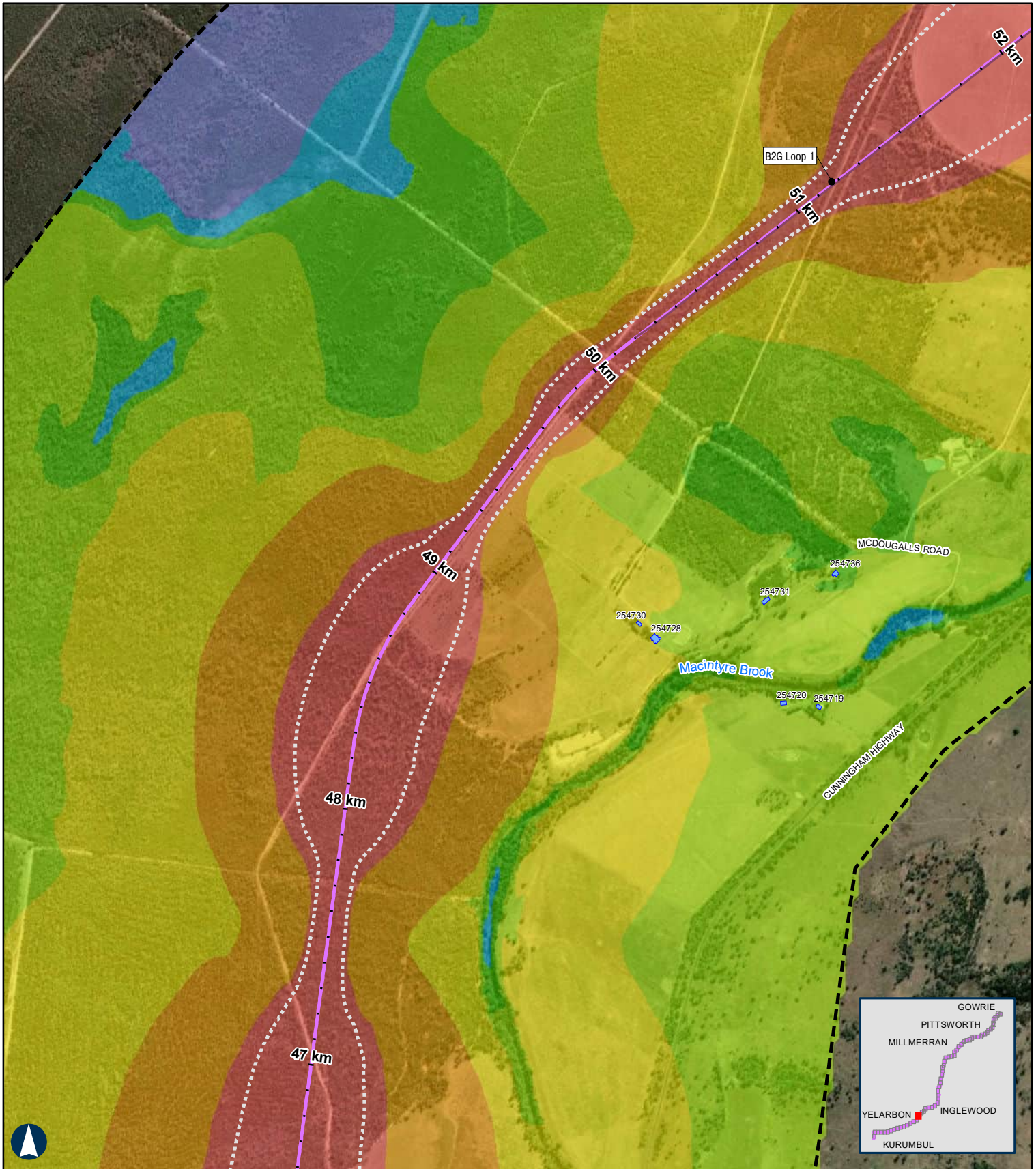
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
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 - 70 - 75 dBA
 - 75 - 80 dBA
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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 16 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

- Sensitive Receptor Type**
- ▭ Residential
 - ▭ Community
 - ▭ Educational
 - ▭ Commercial
 - ▭ Parkland
 - ▭ Future Developments

- Criterion (82 dBA)
- Noise Levels**
- ▭ 50 - 55 dBA
 - ▭ 55 - 60 dBA
 - ▭ 60 - 65 dBA
 - ▭ 65 - 70 dBA
 - ▭ 70 - 75 dBA
 - ▭ 75 - 80 dBA
 - ▭ > 80 dBA

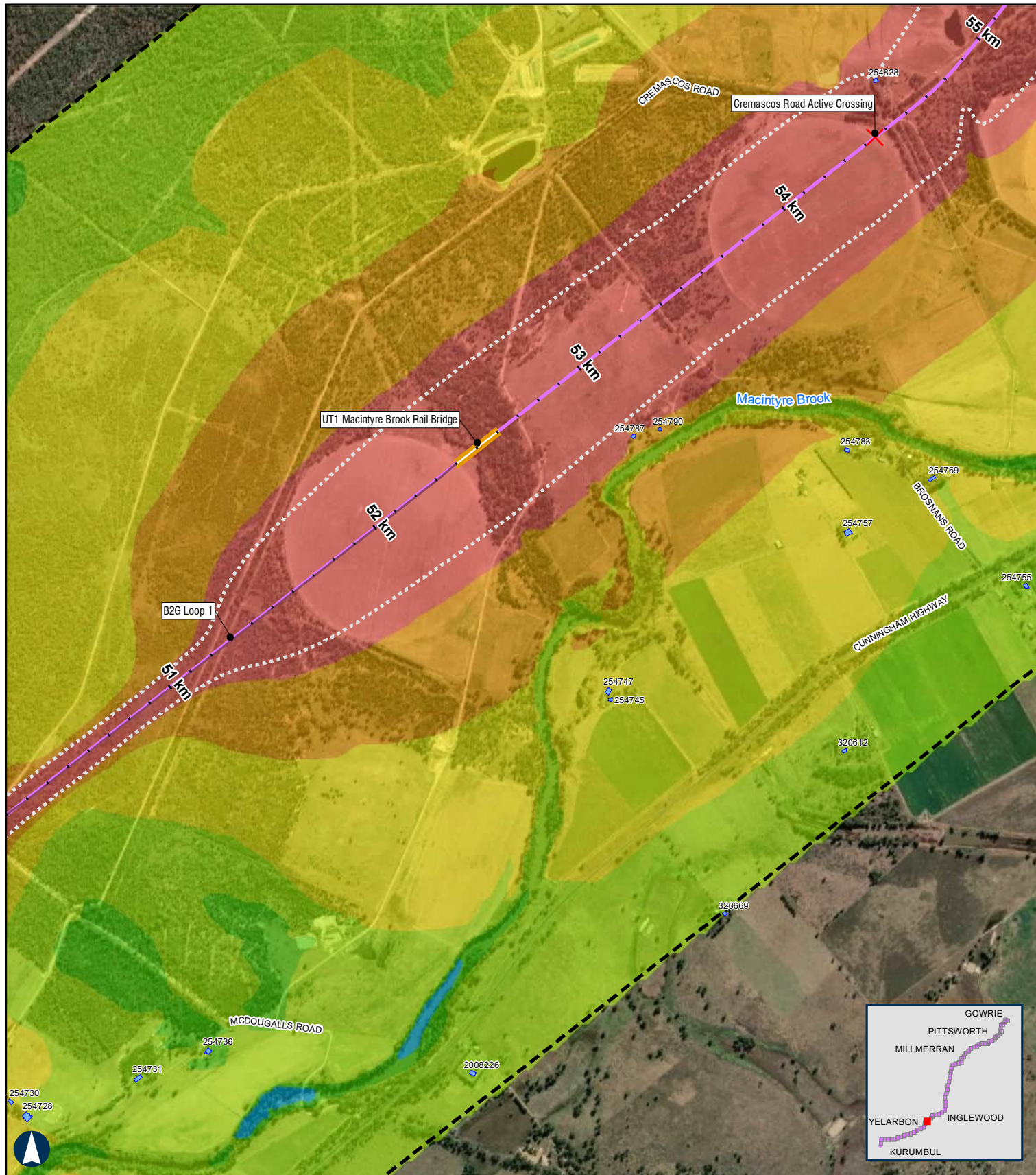
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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 17 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Modelling Area
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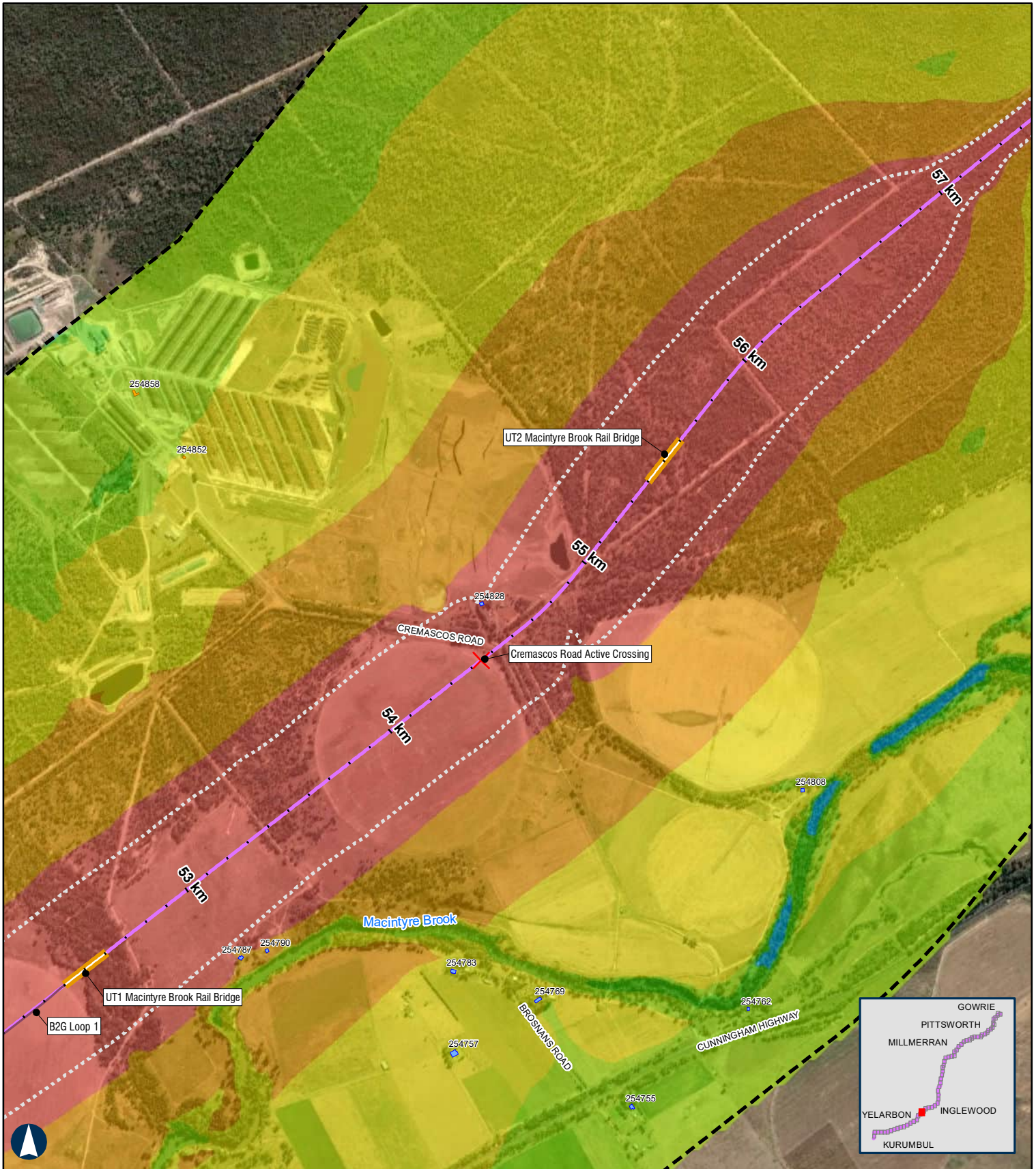
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 18 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

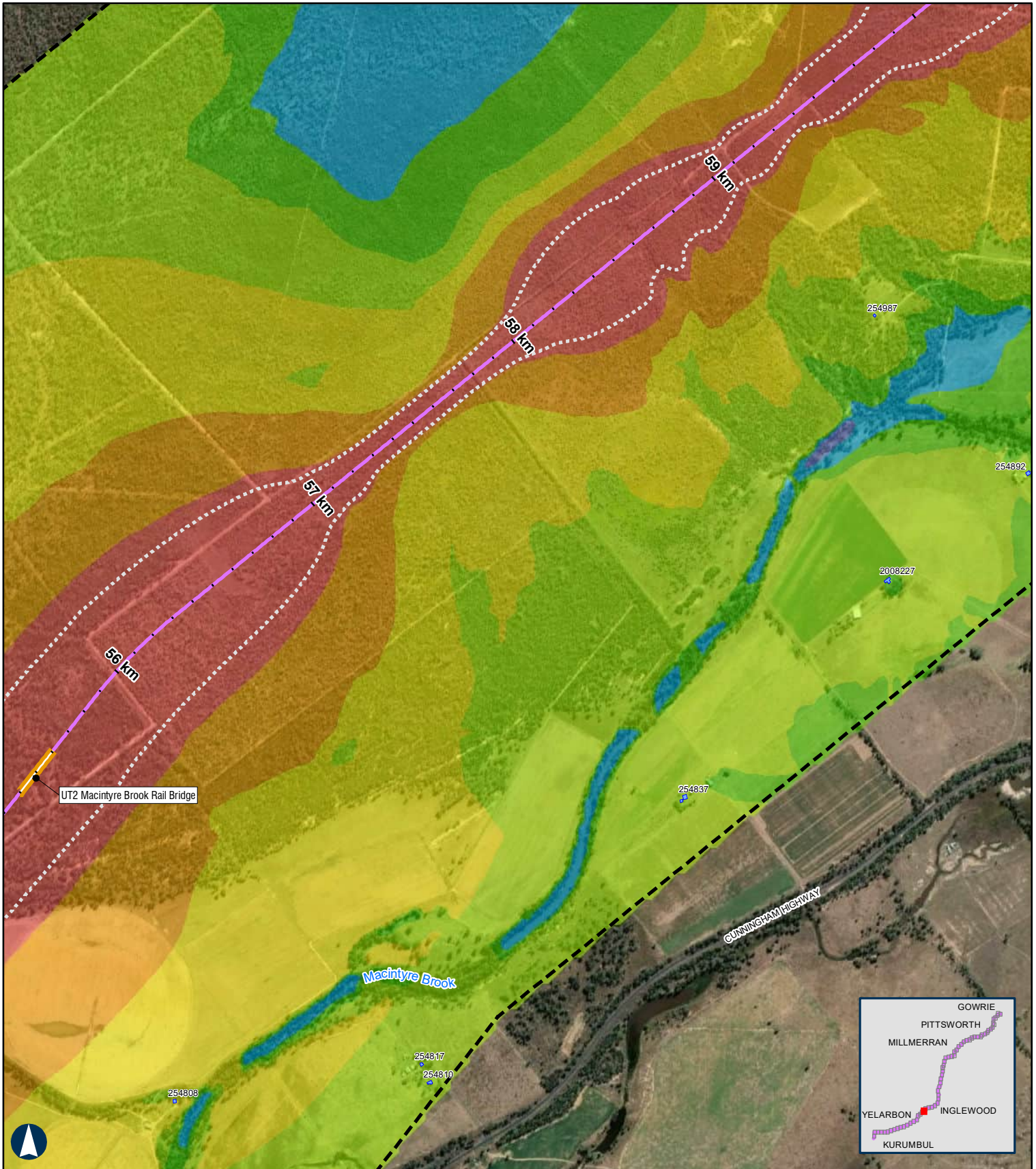
- Sensitive Receptor Type**
- Residential
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 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 19 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
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- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

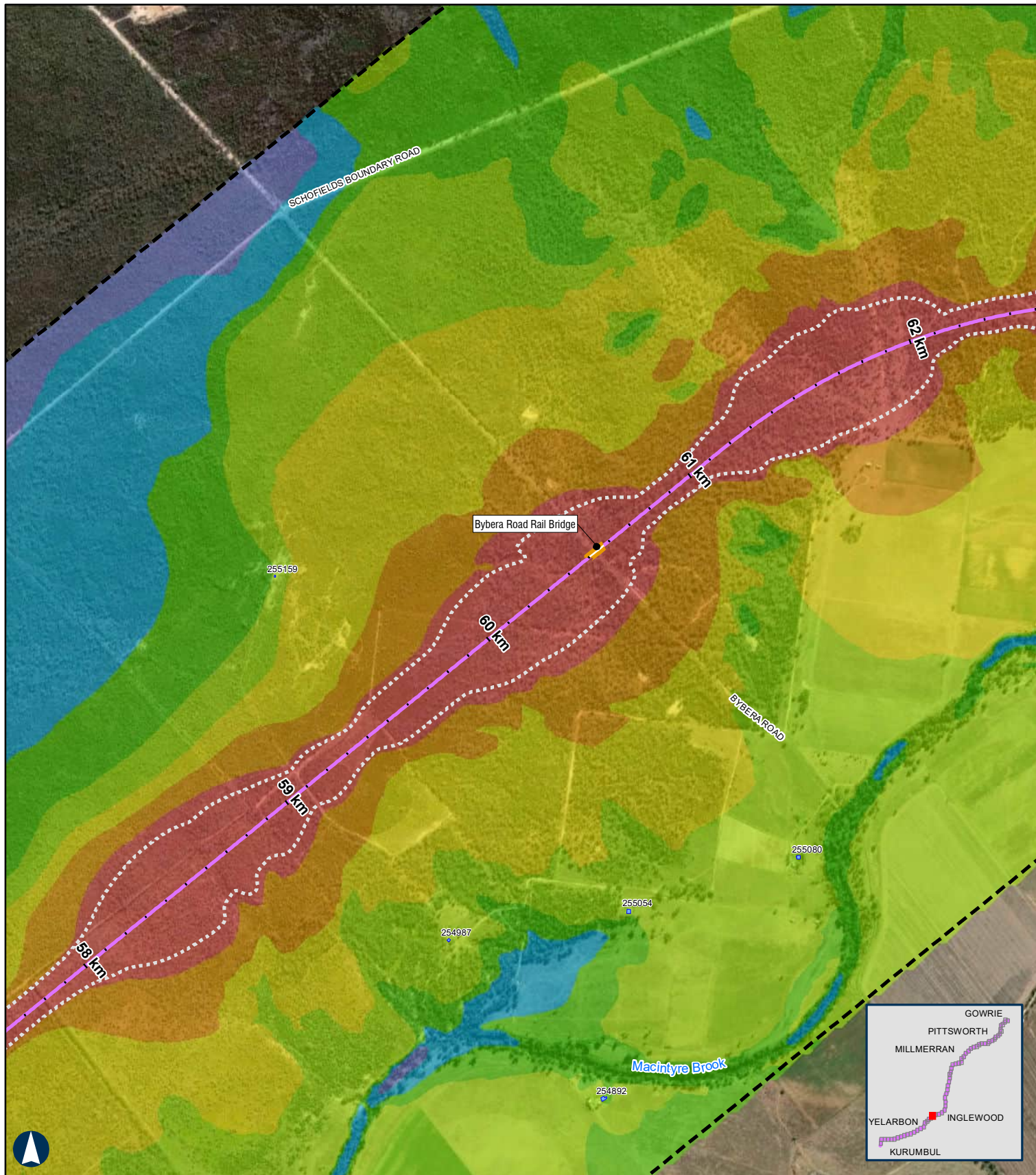
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
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 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 20 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

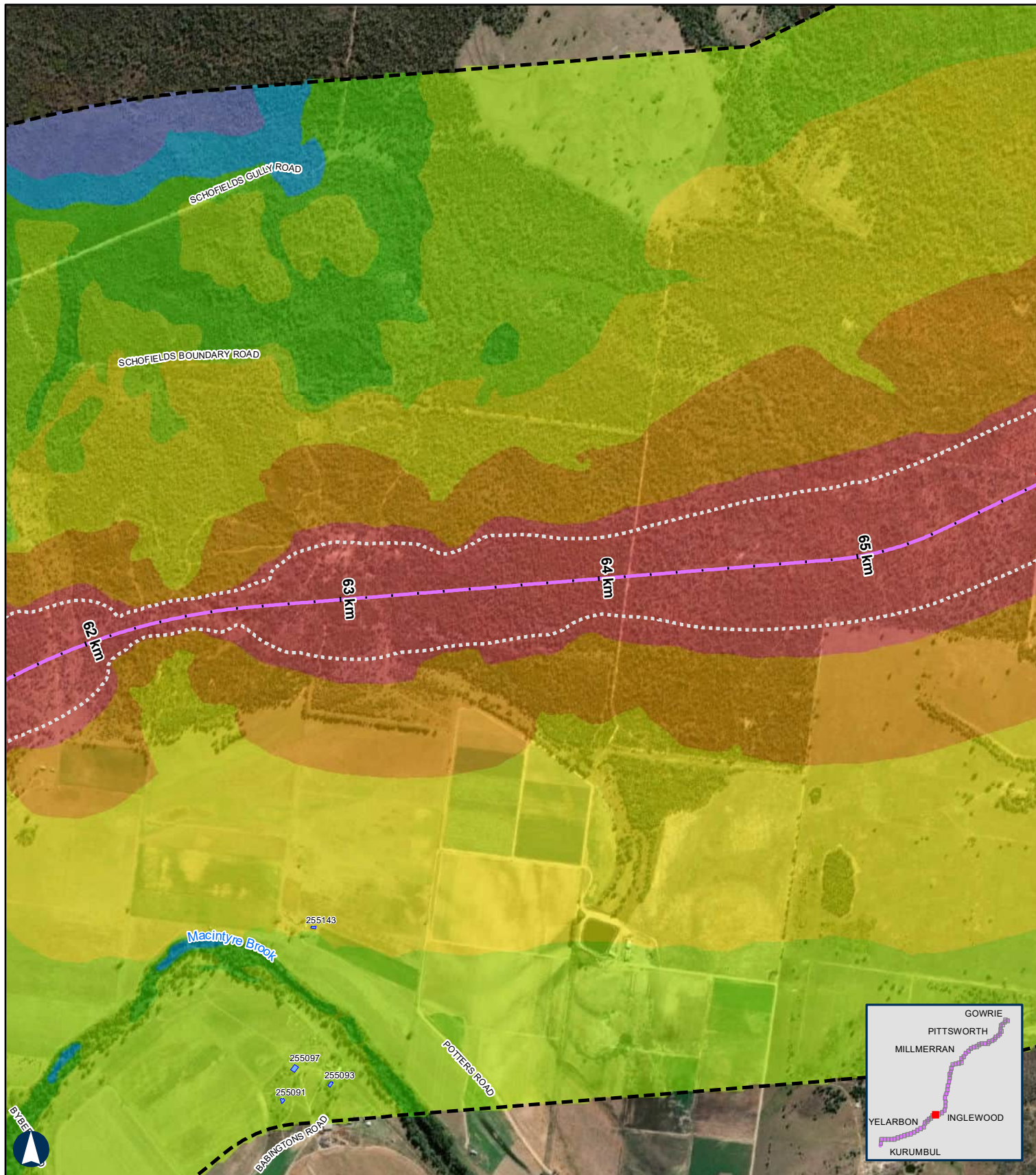
- Sensitive Receptor Type**
- Residential
 - Community
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 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 21 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

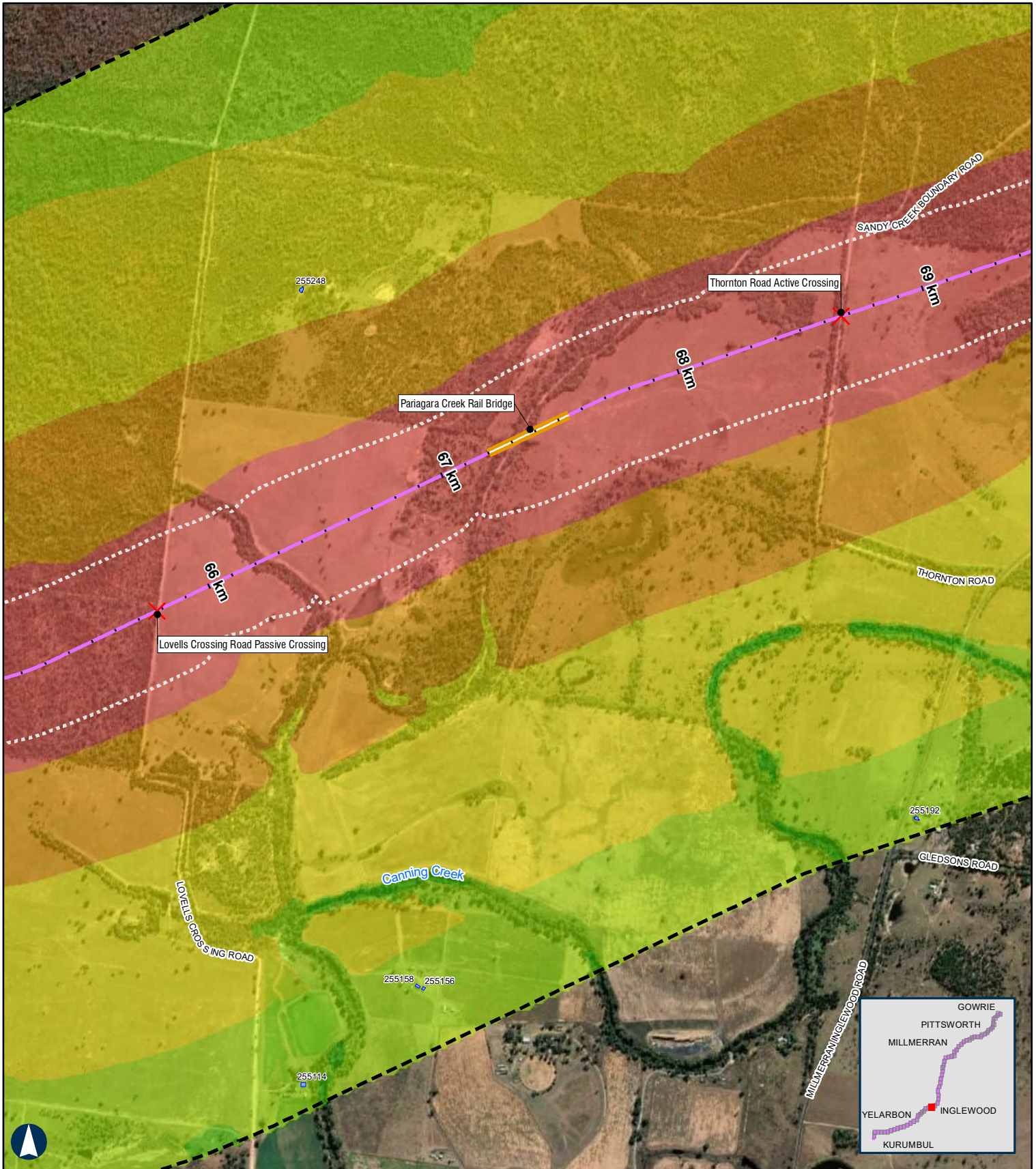
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
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 - 70 - 75 dBA
 - 75 - 80 dBA
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Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 22 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

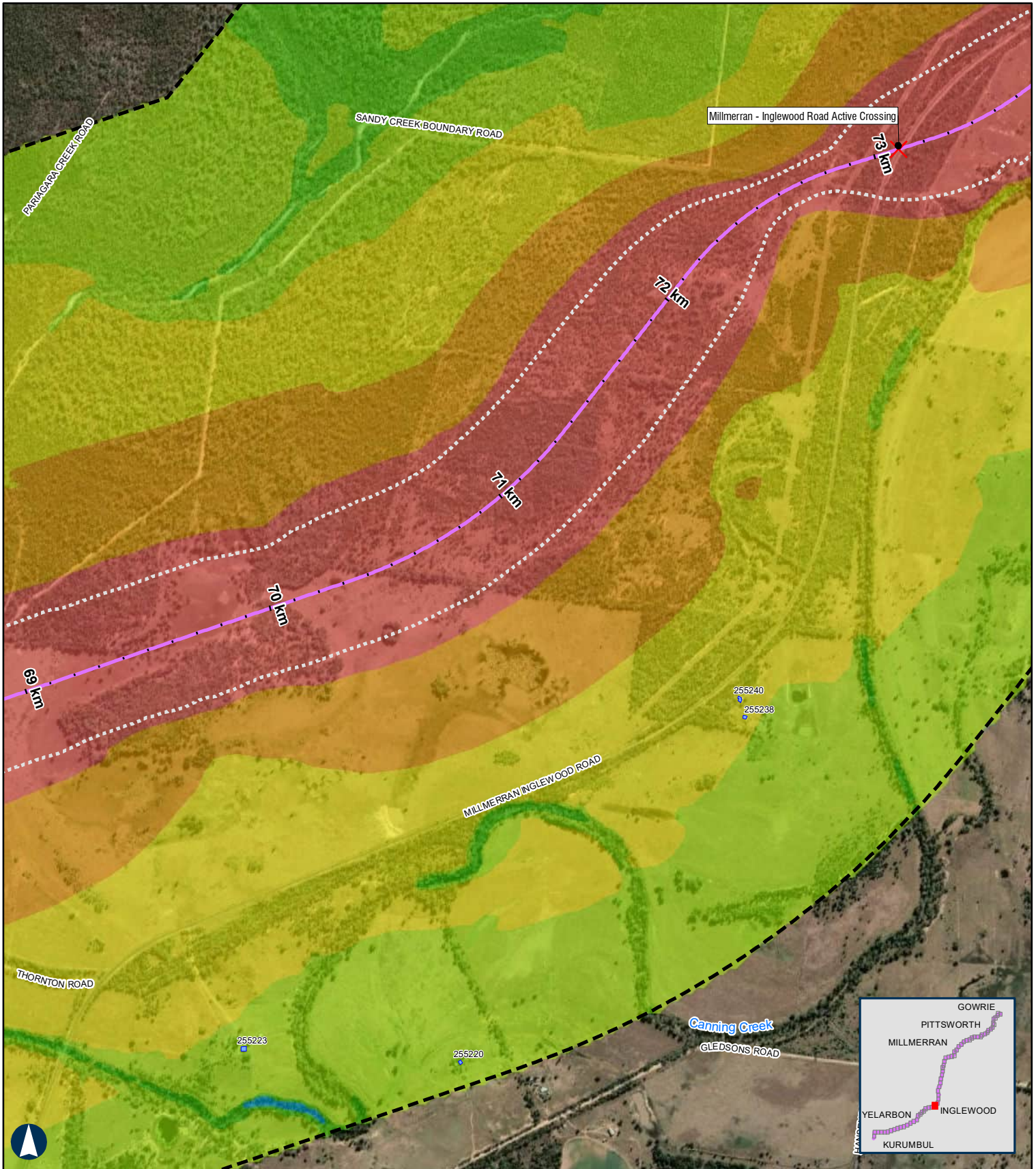
Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 23 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

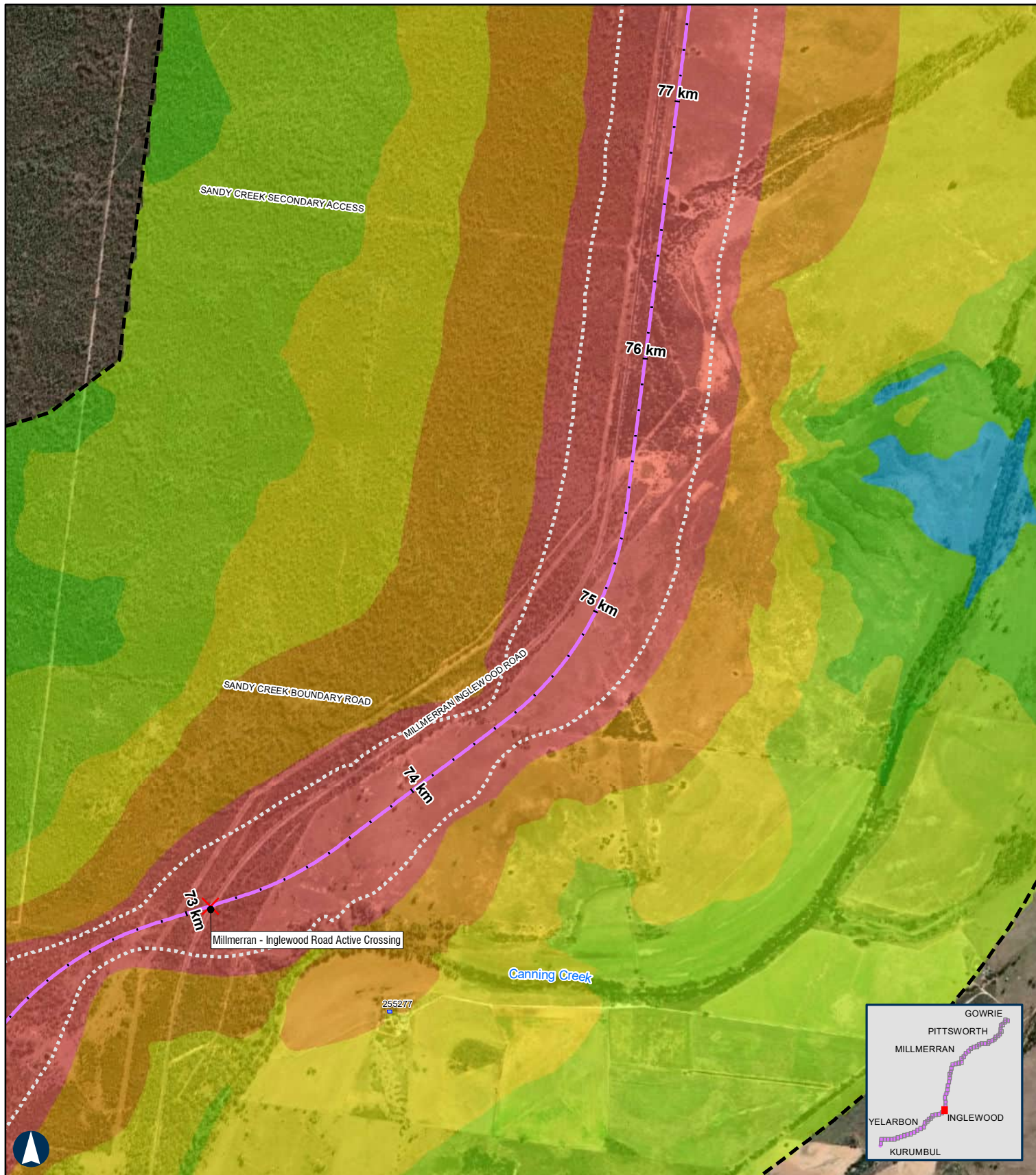
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 24 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

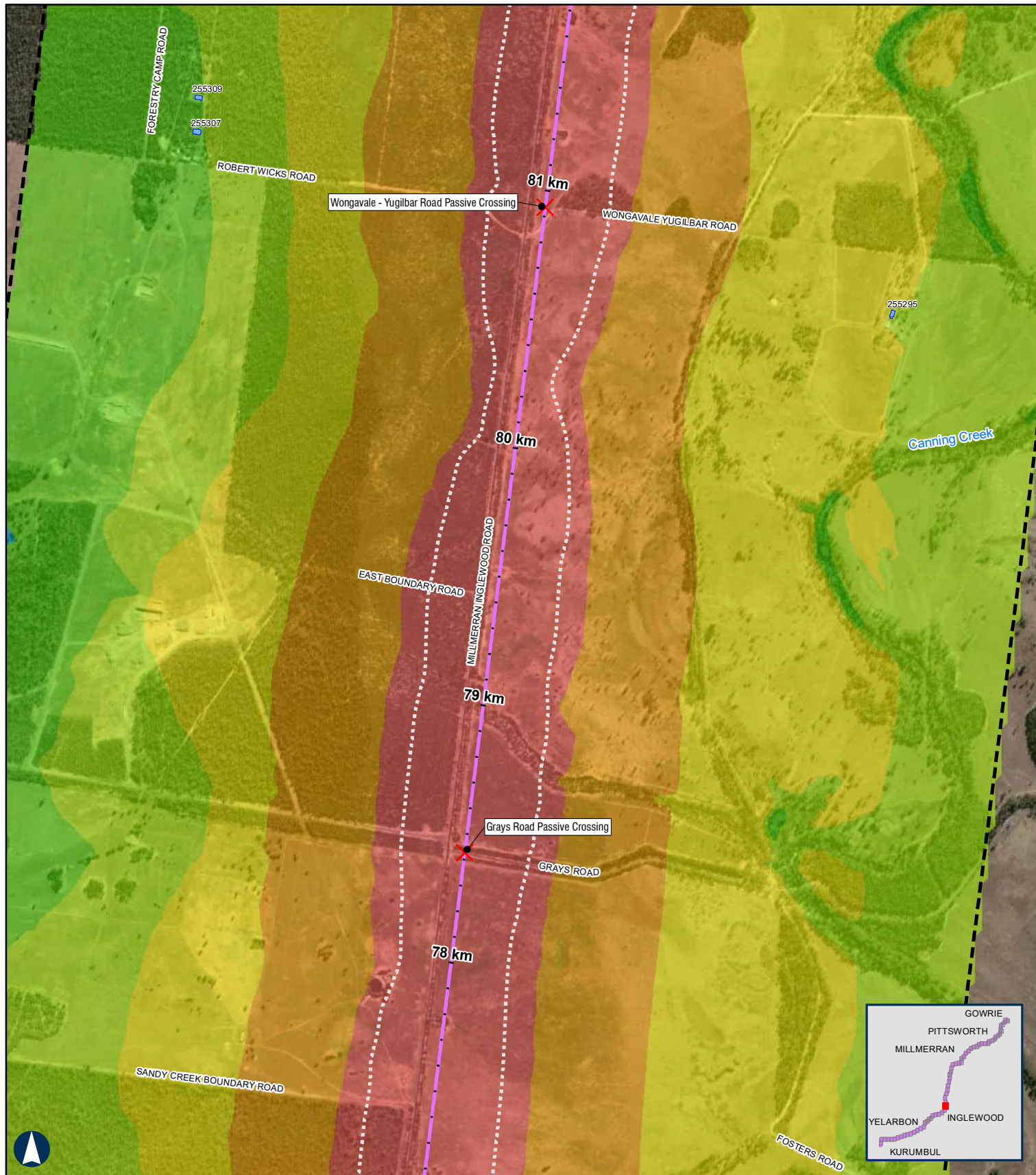
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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 25 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

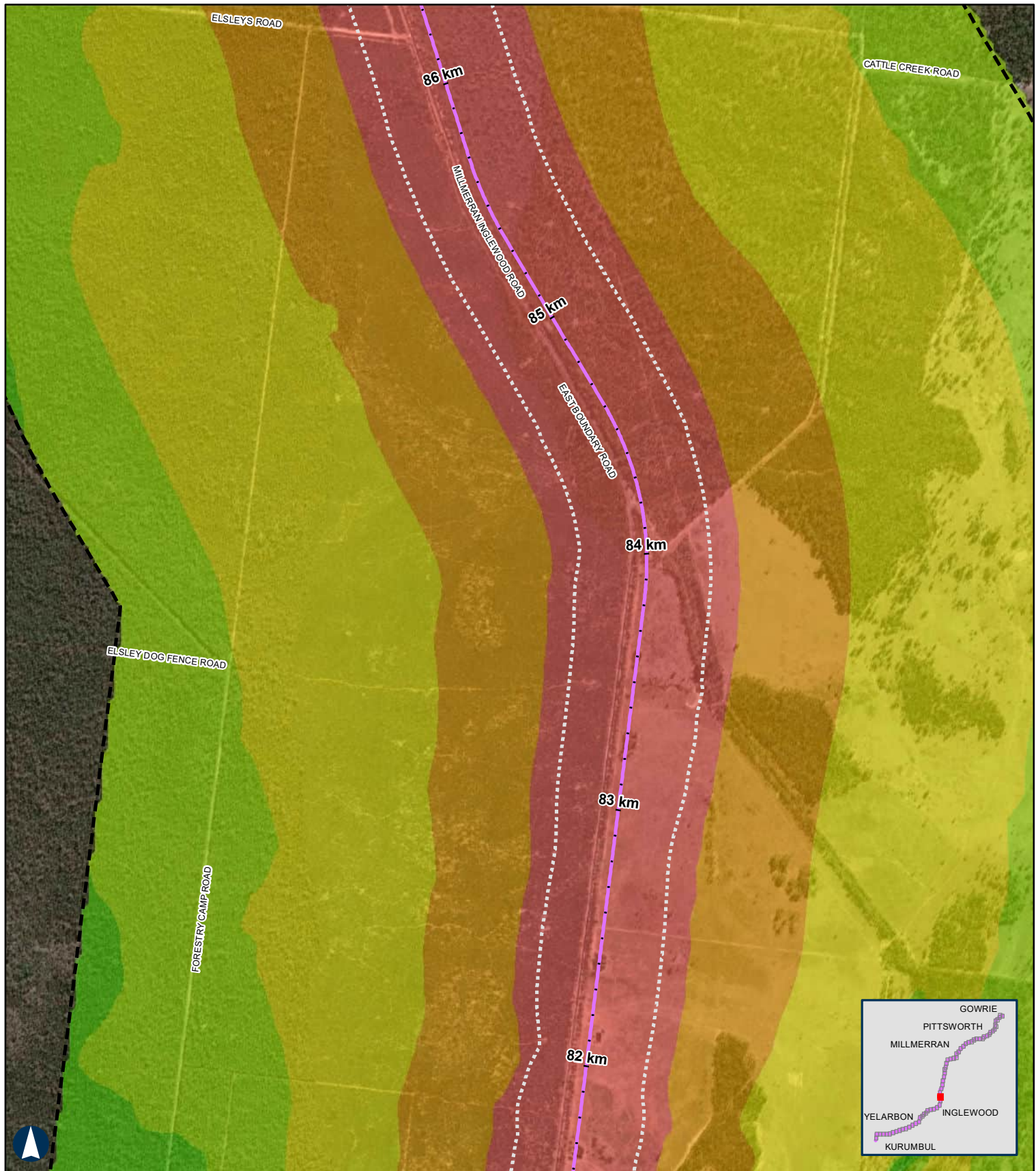
Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 26 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA
- Criterion (82 dBA)

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 27 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

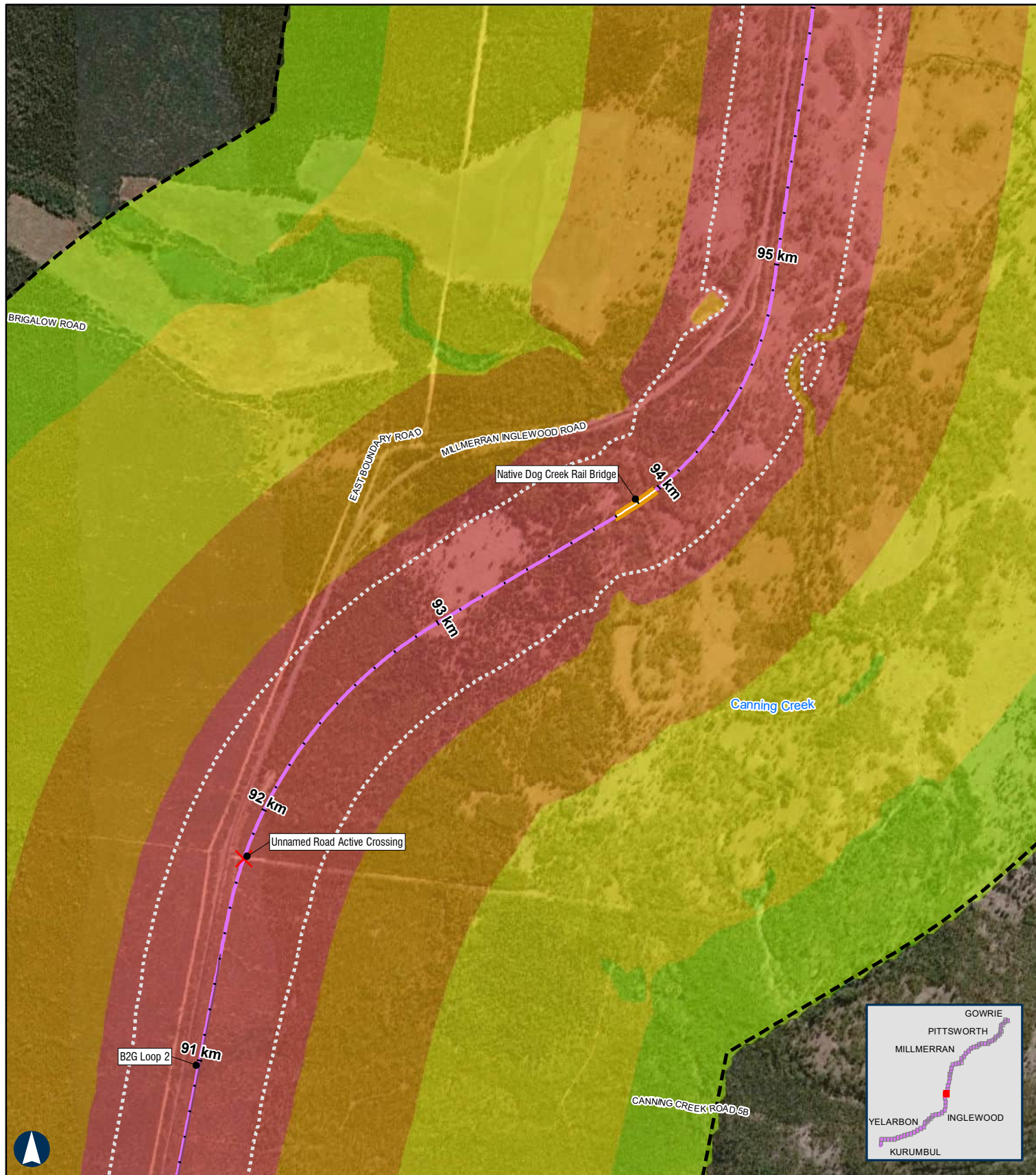
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 28 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

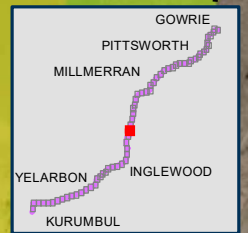
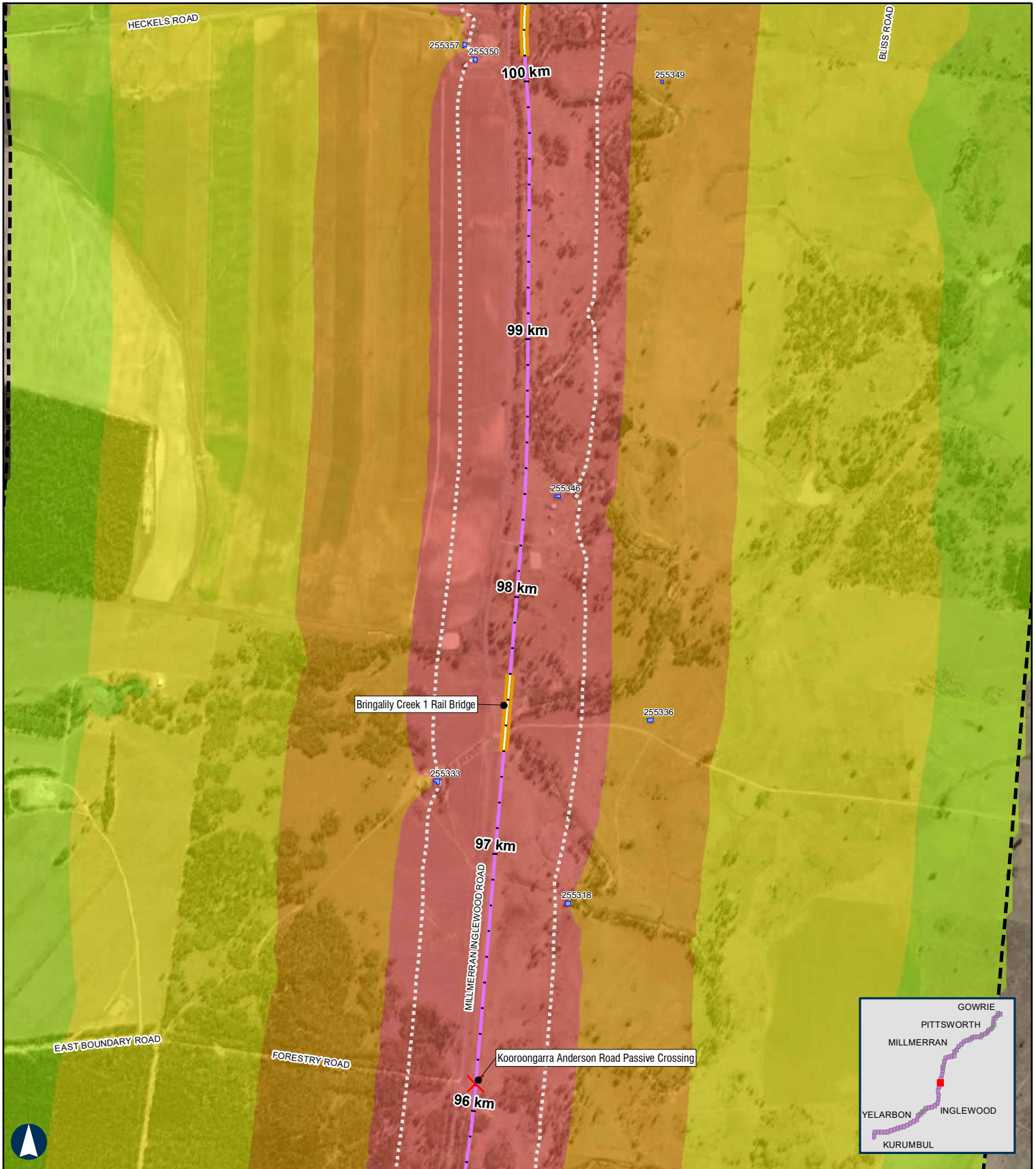
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 29 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

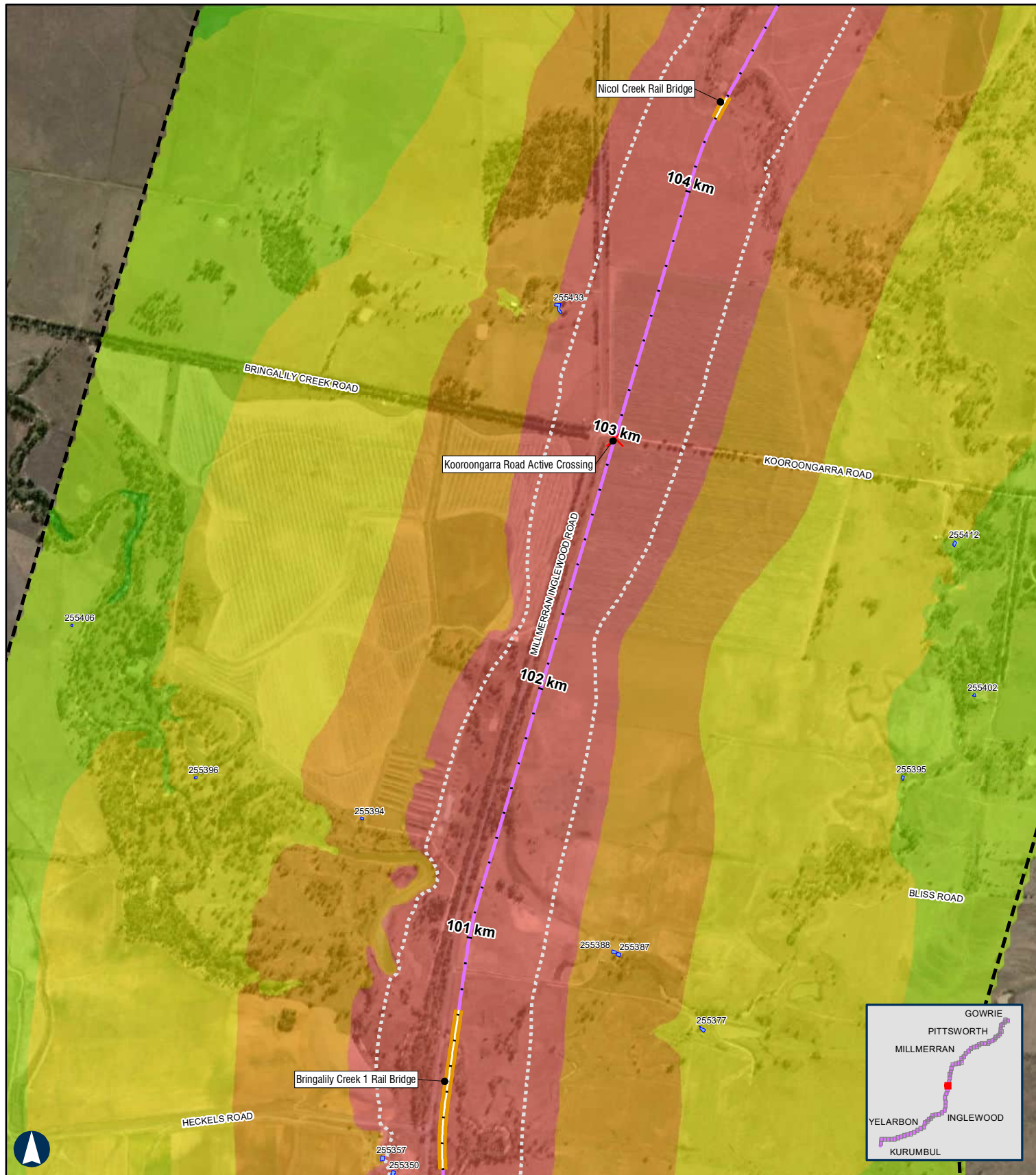
Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 30 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

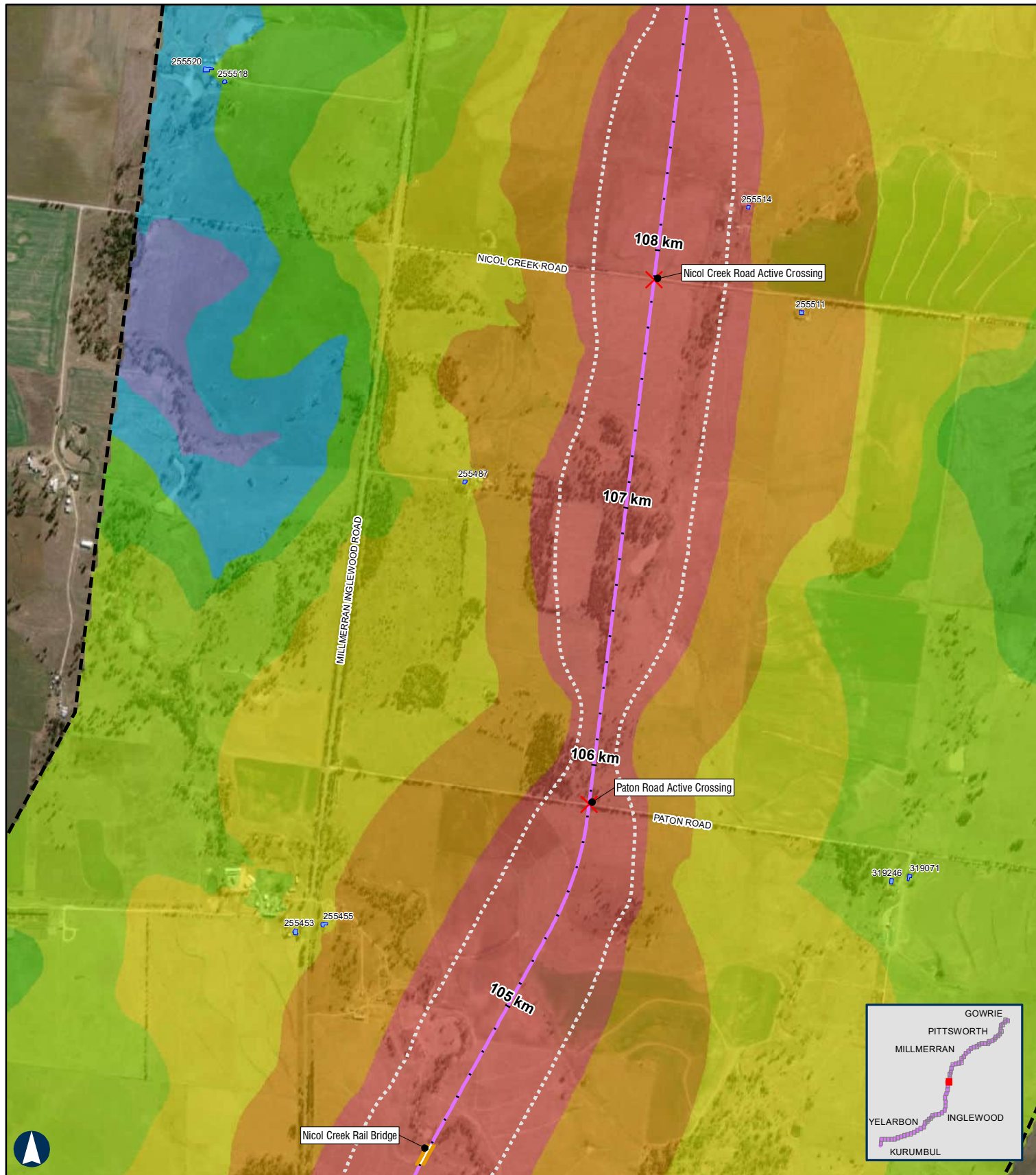
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 31 of 63

500 m

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Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

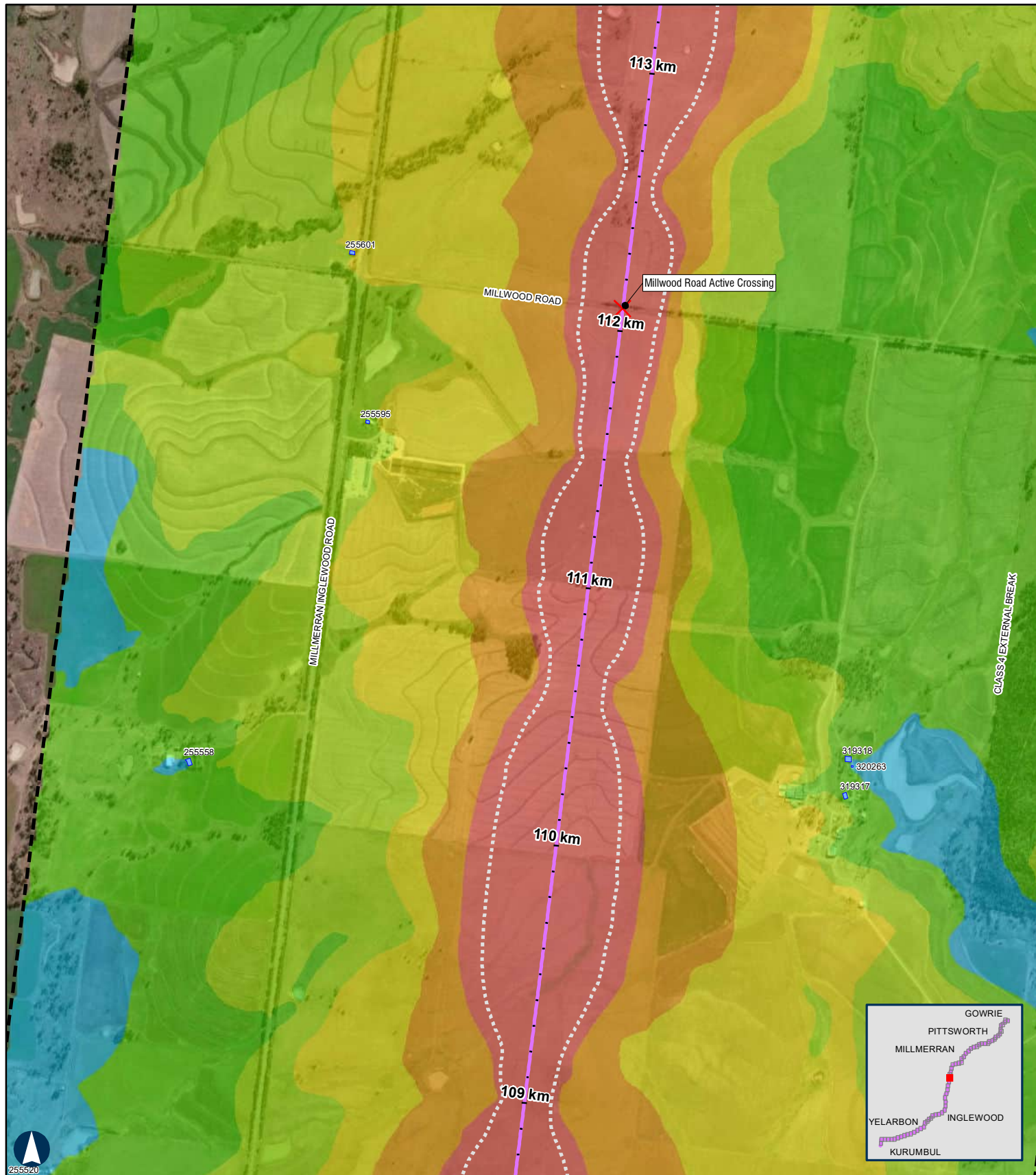
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 32 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

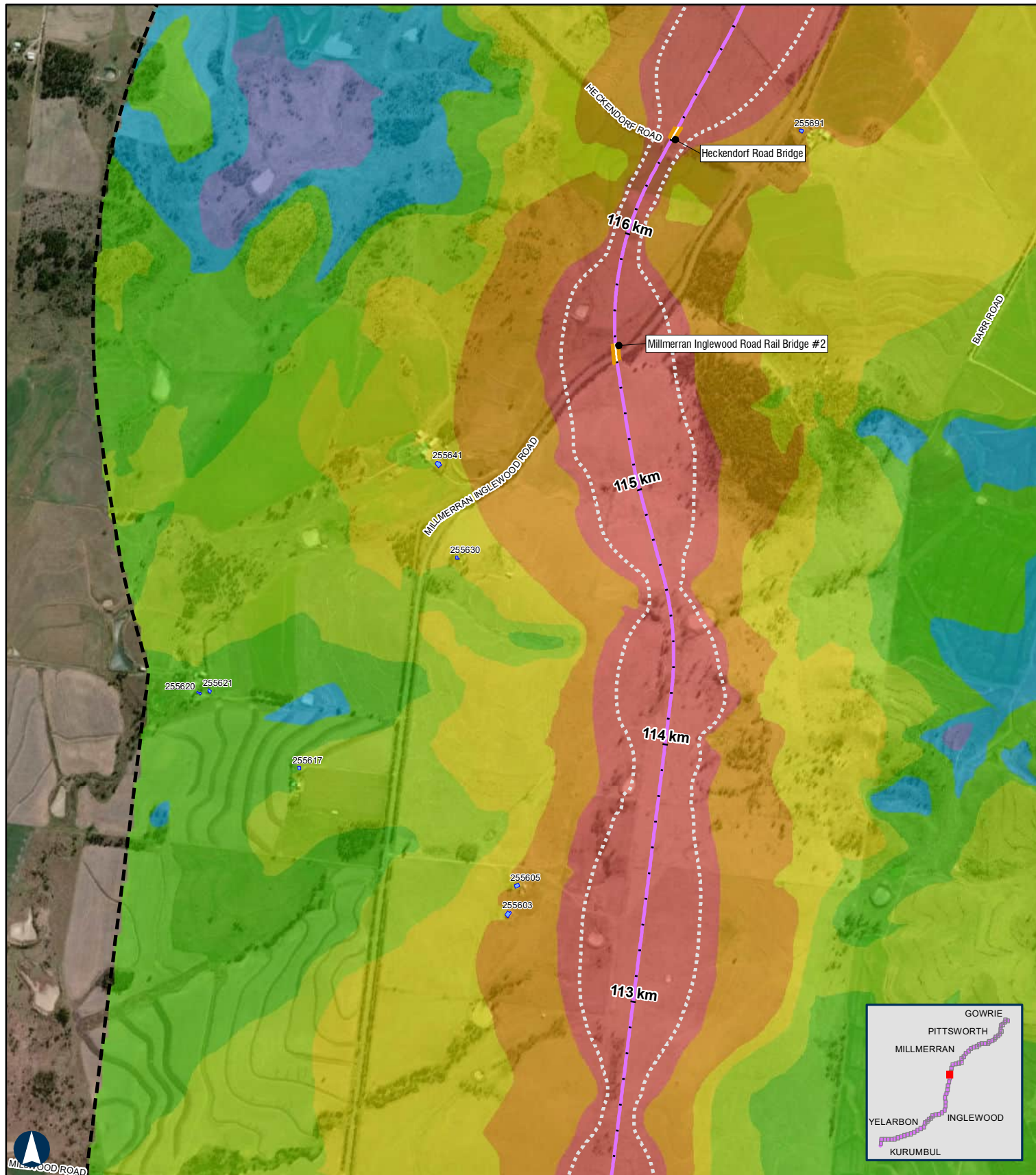
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 33 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

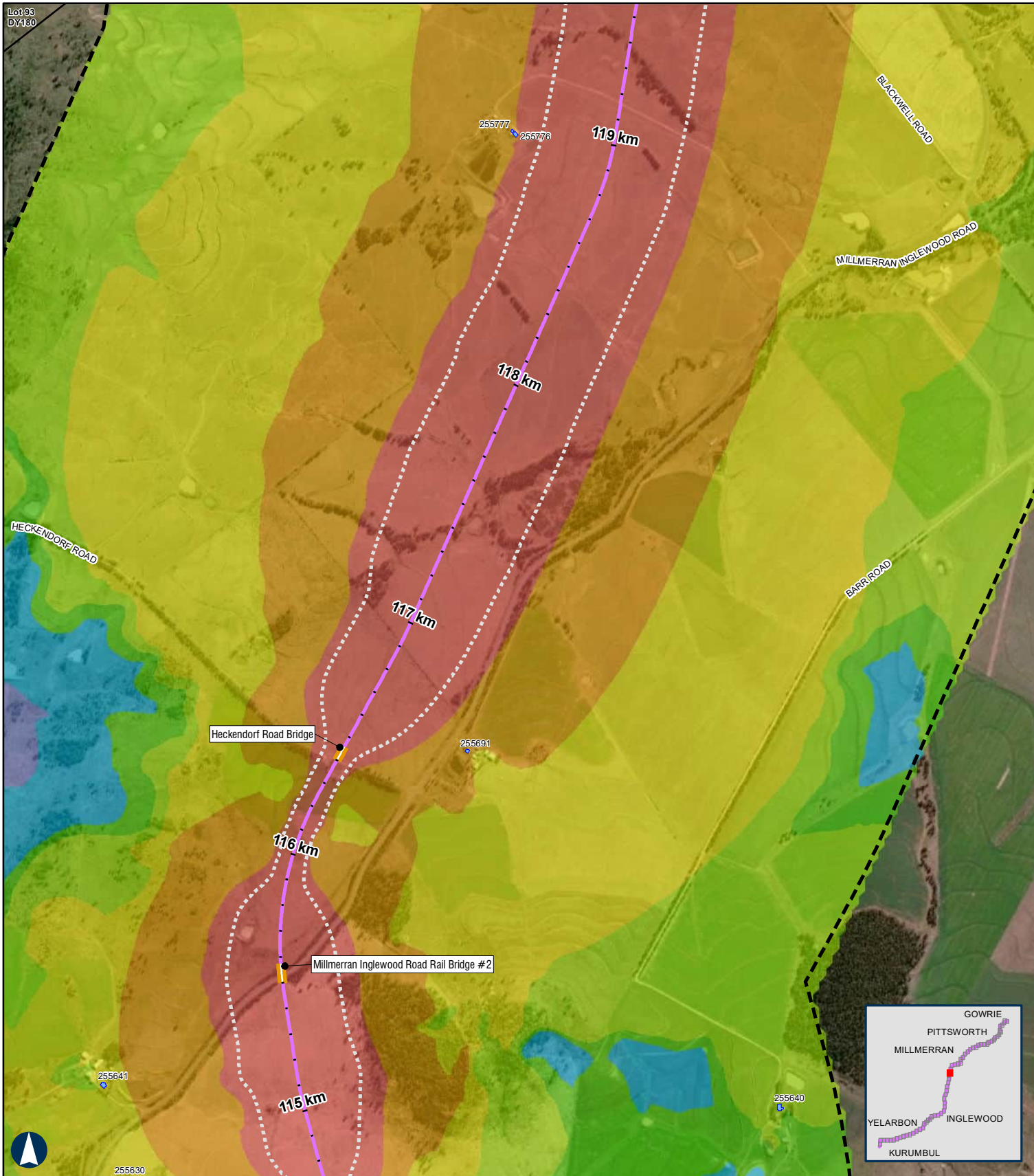
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 34 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

Sensitive Receptor Type

- ▭ Residential
- ▭ Community
- ▭ Educational
- ▭ Commercial
- ▭ Parkland
- ▭ Future Developments

--- Criterion (82 dBA)

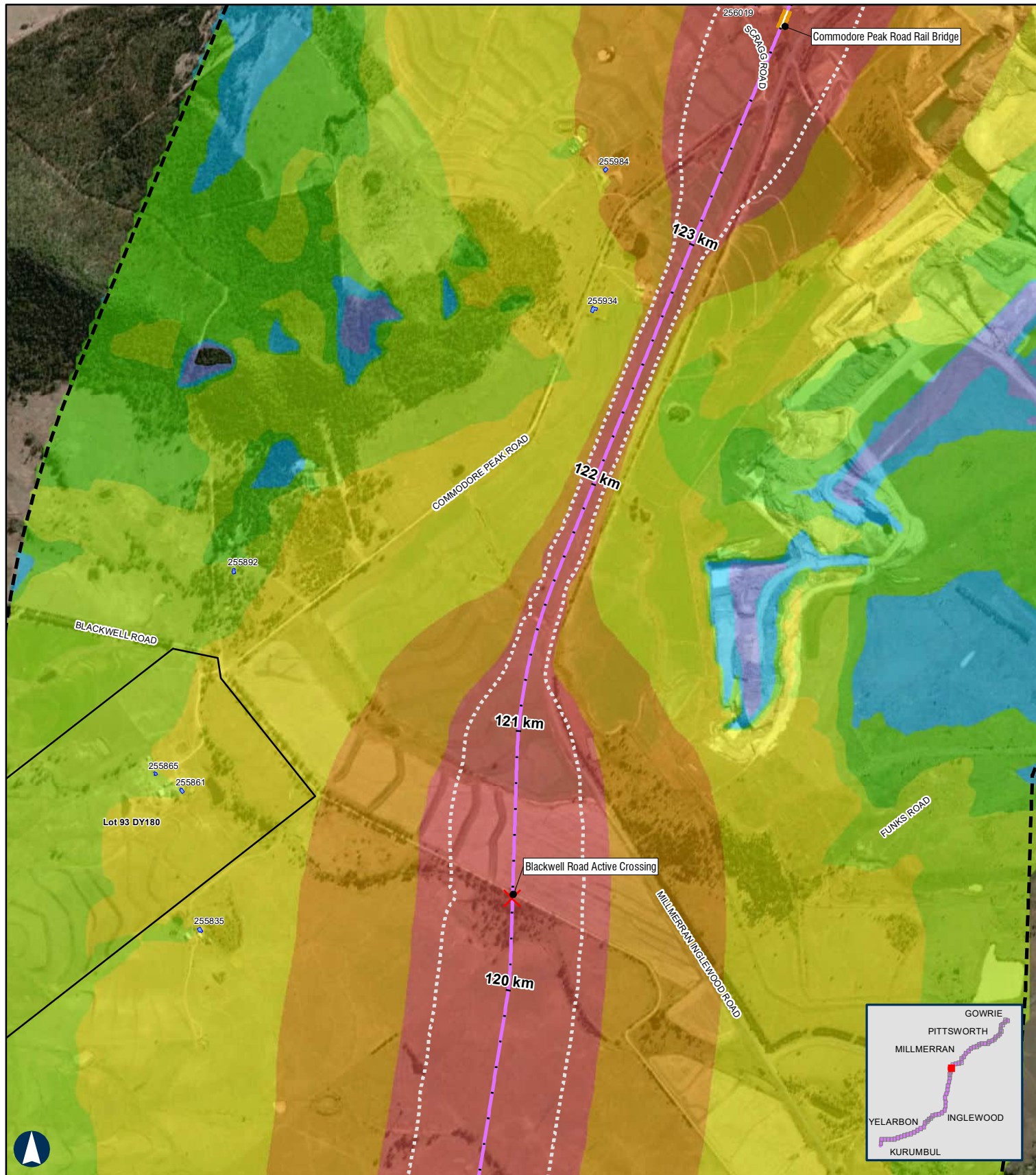
Noise Levels

- ▭ 50 - 55 dBA
- ▭ 55 - 60 dBA
- ▭ 60 - 65 dBA
- ▭ 65 - 70 dBA
- ▭ 70 - 75 dBA
- ▭ 75 - 80 dBA
- ▭ > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 35 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

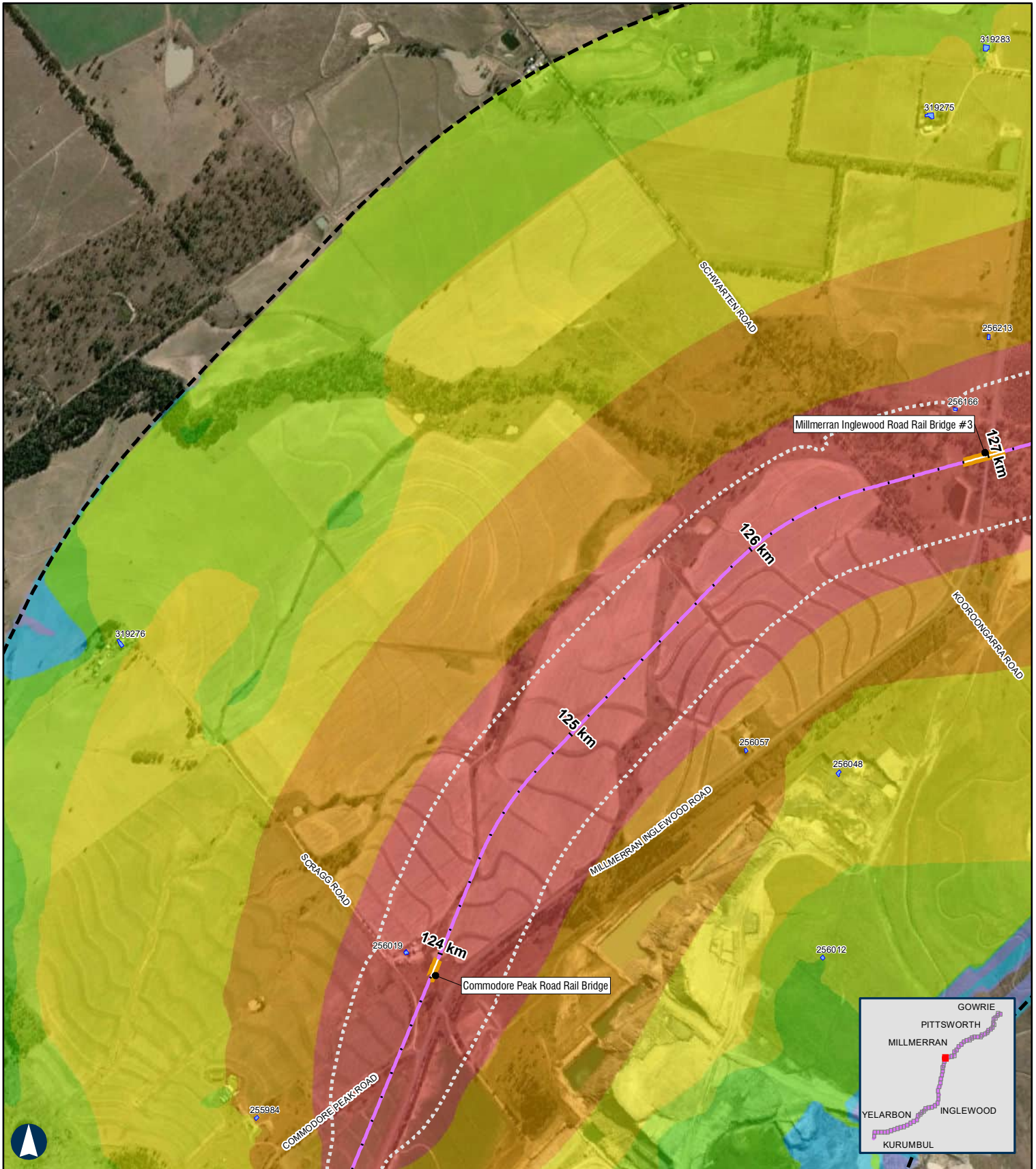
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)**
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 36 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

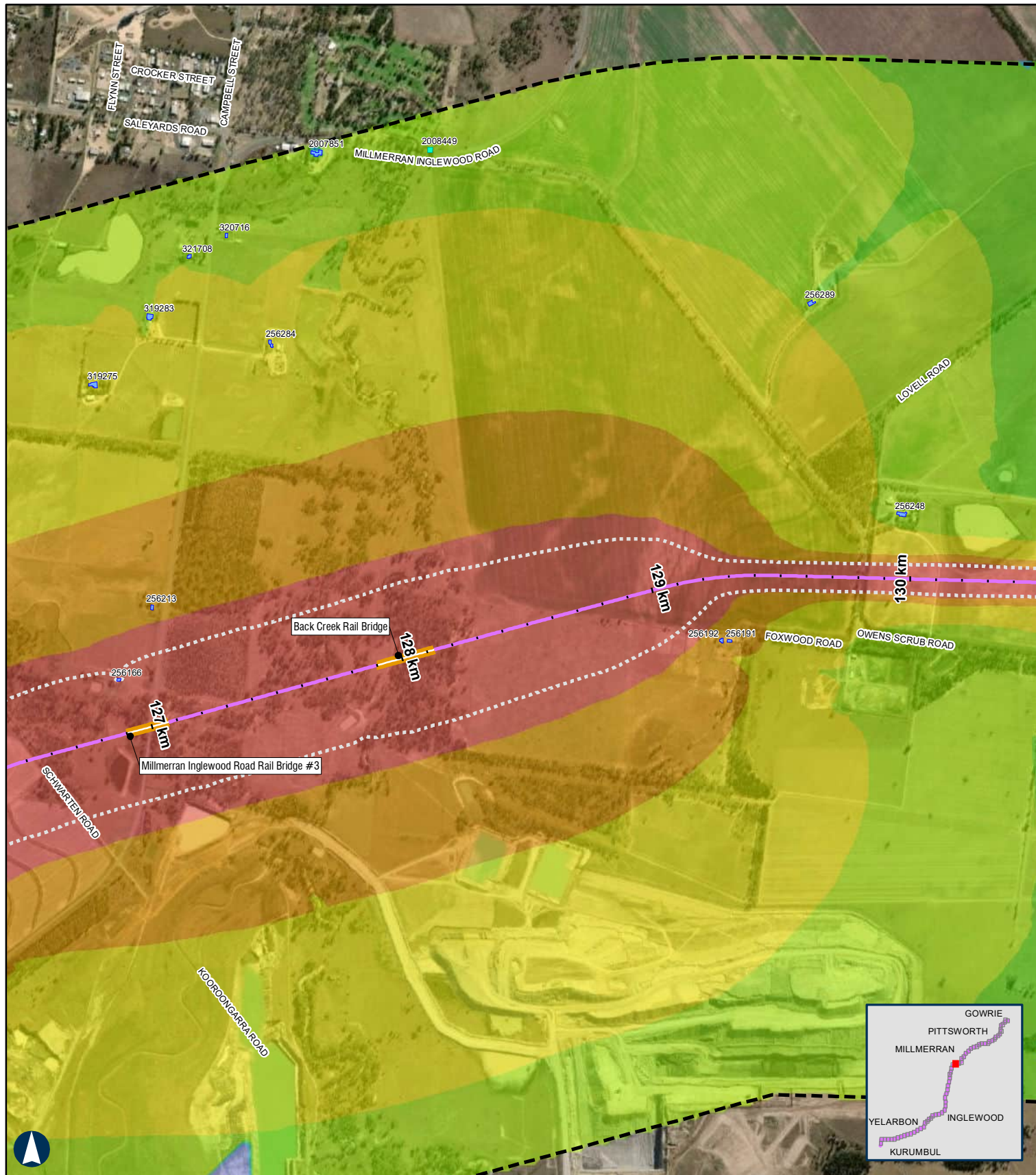
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 37 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

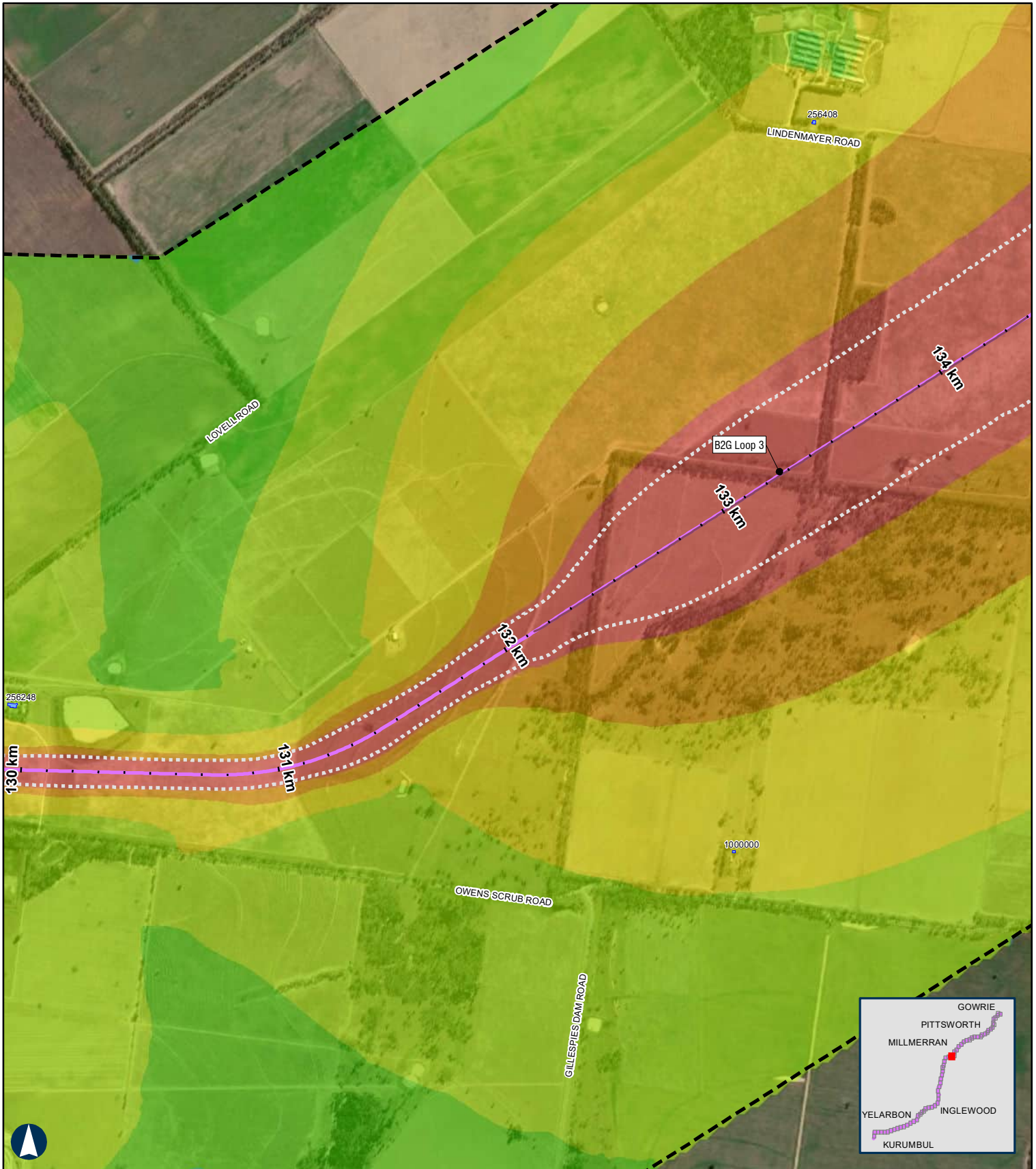
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 38 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

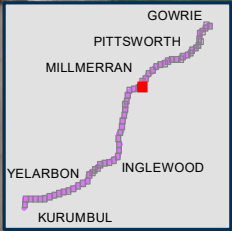
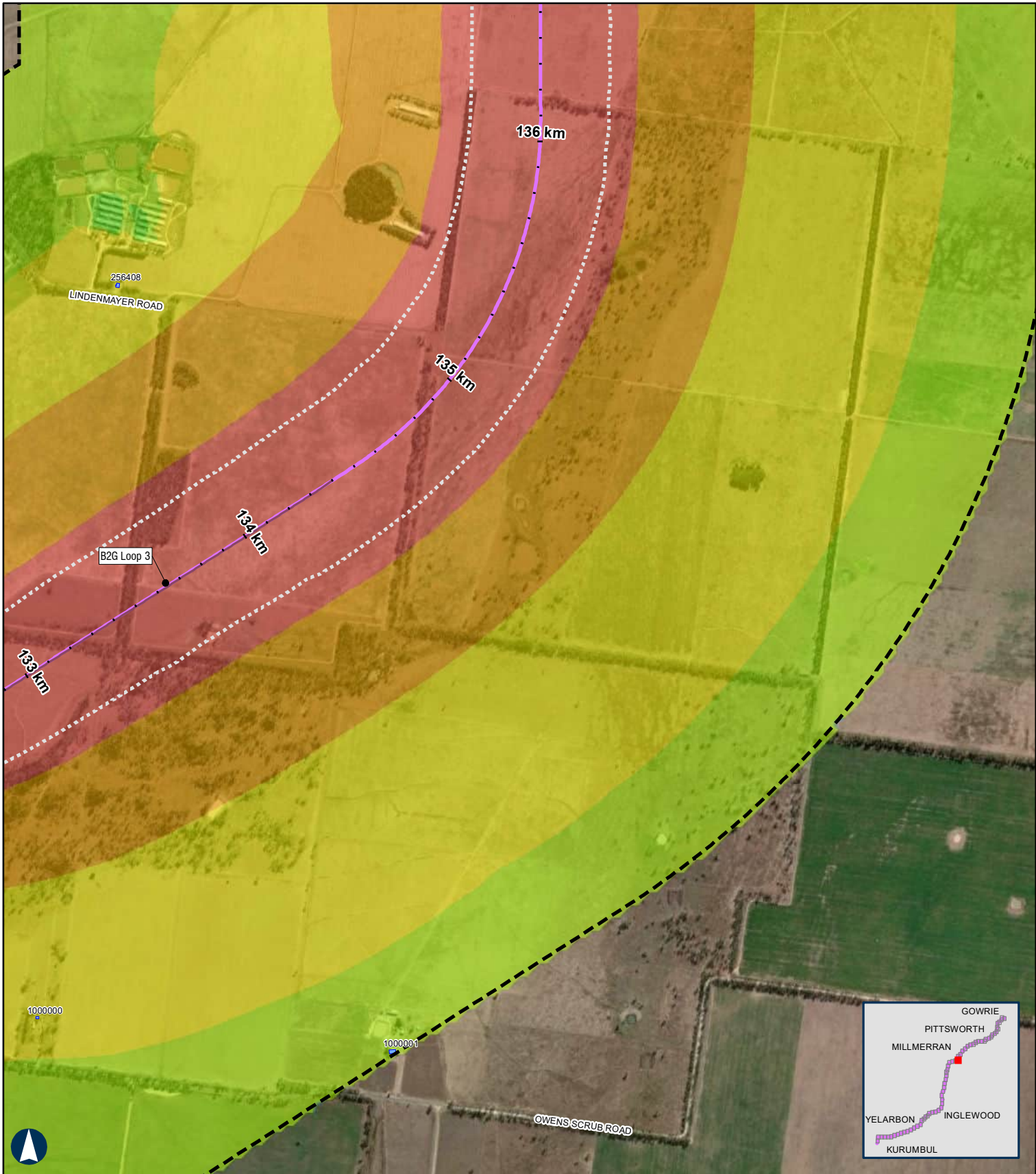
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Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028/2040 SEM**

Map 39 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▨ Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

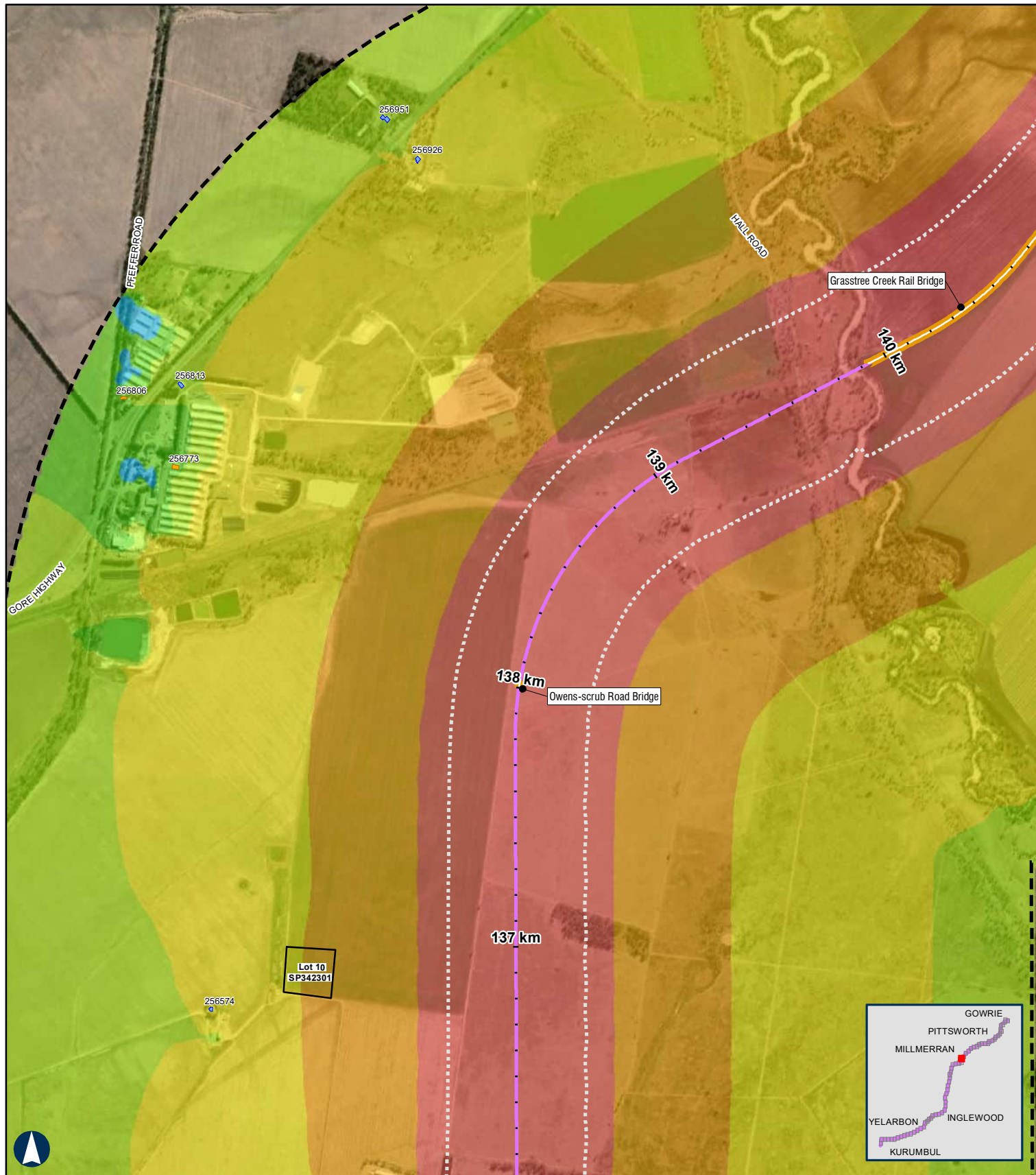
- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Paper: A4 Scale: 1:20,000
Date: 21-Oct-2024
Author: JG

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 40 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/
Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (82 dBA)

Noise Levels

50 - 55 dBA

55 - 60 dBA

60 - 65 dBA

65 - 70 dBA

70 - 75 dBA

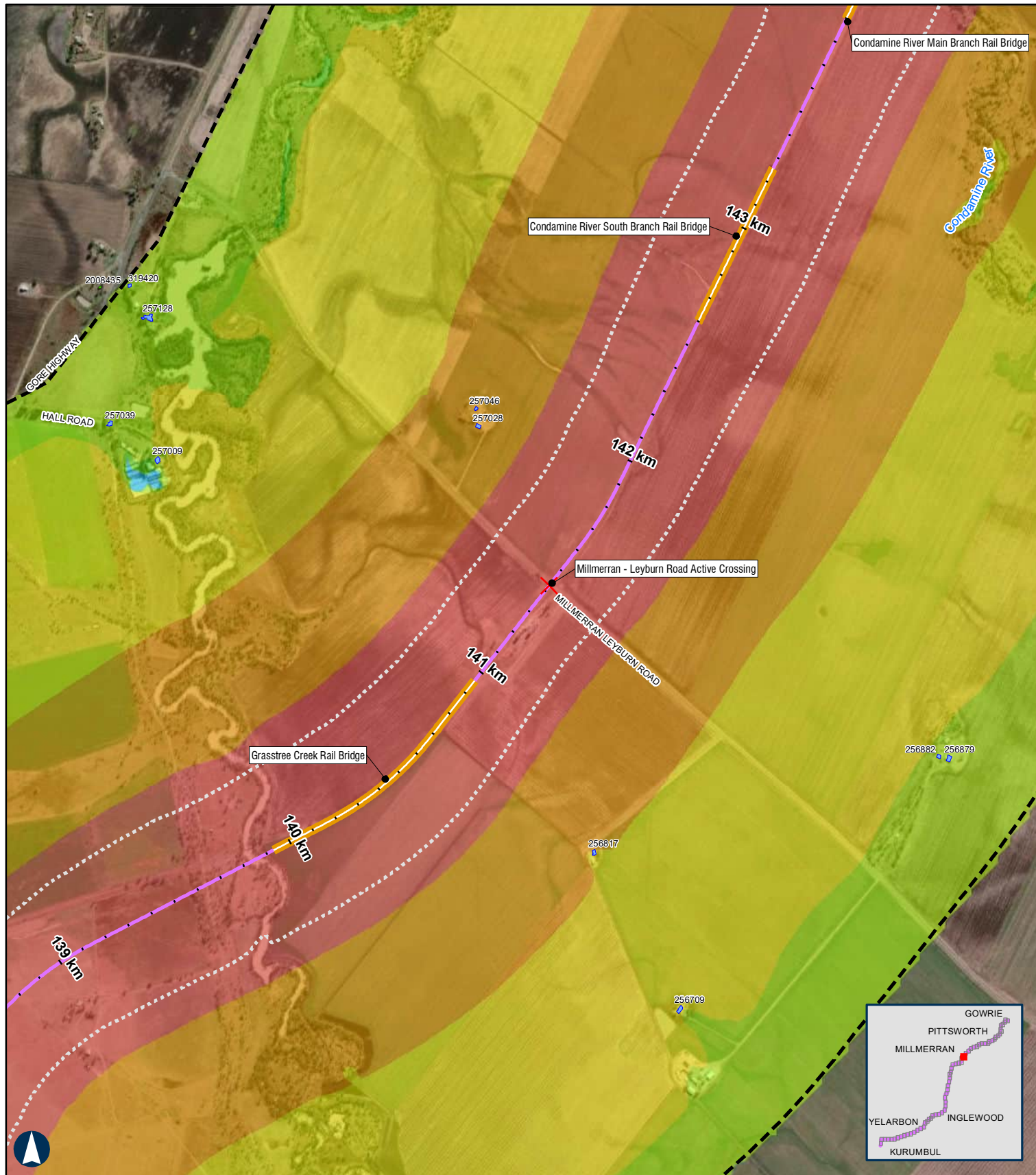
75 - 80 dBA

> 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 41 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

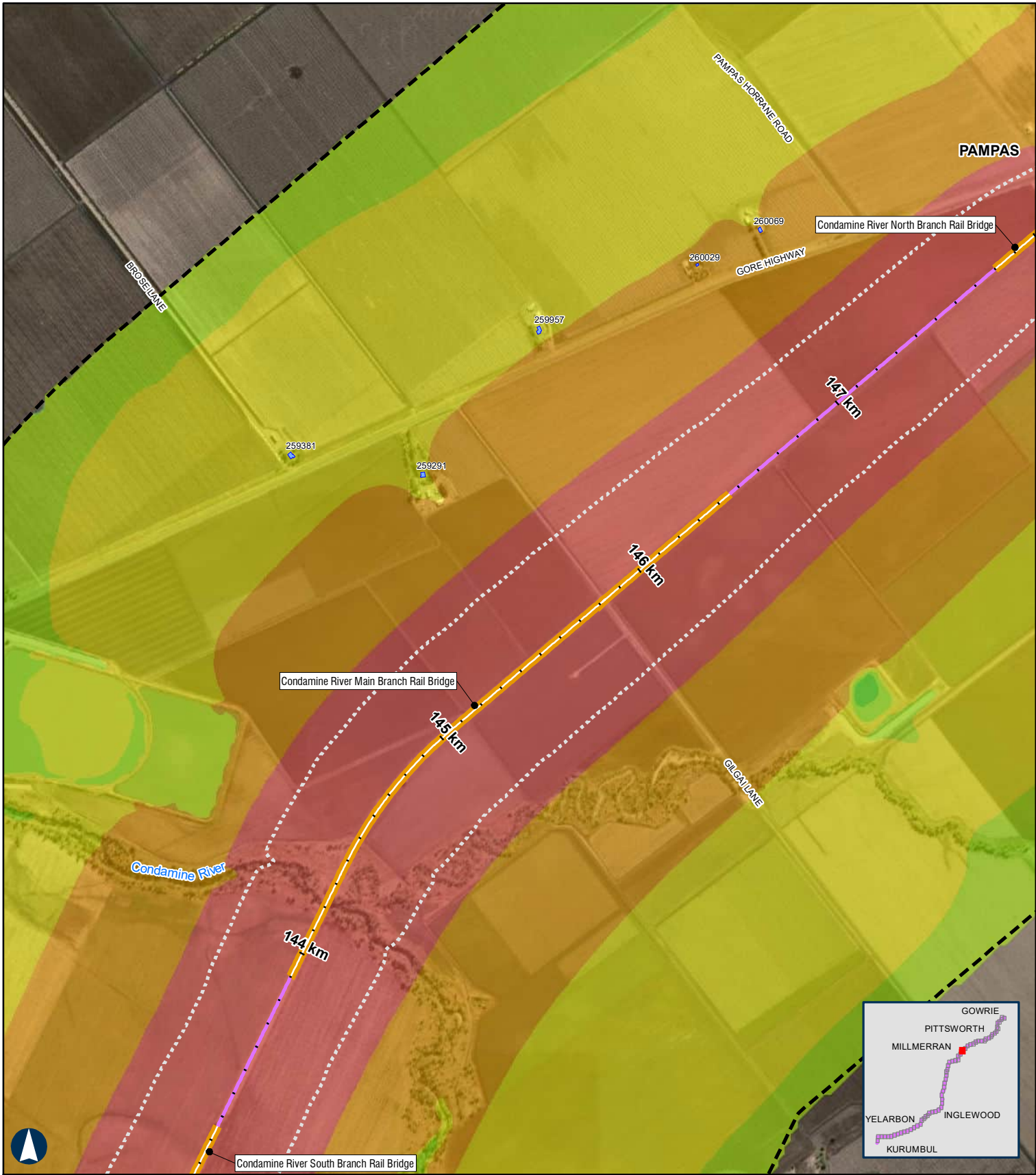
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 42 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

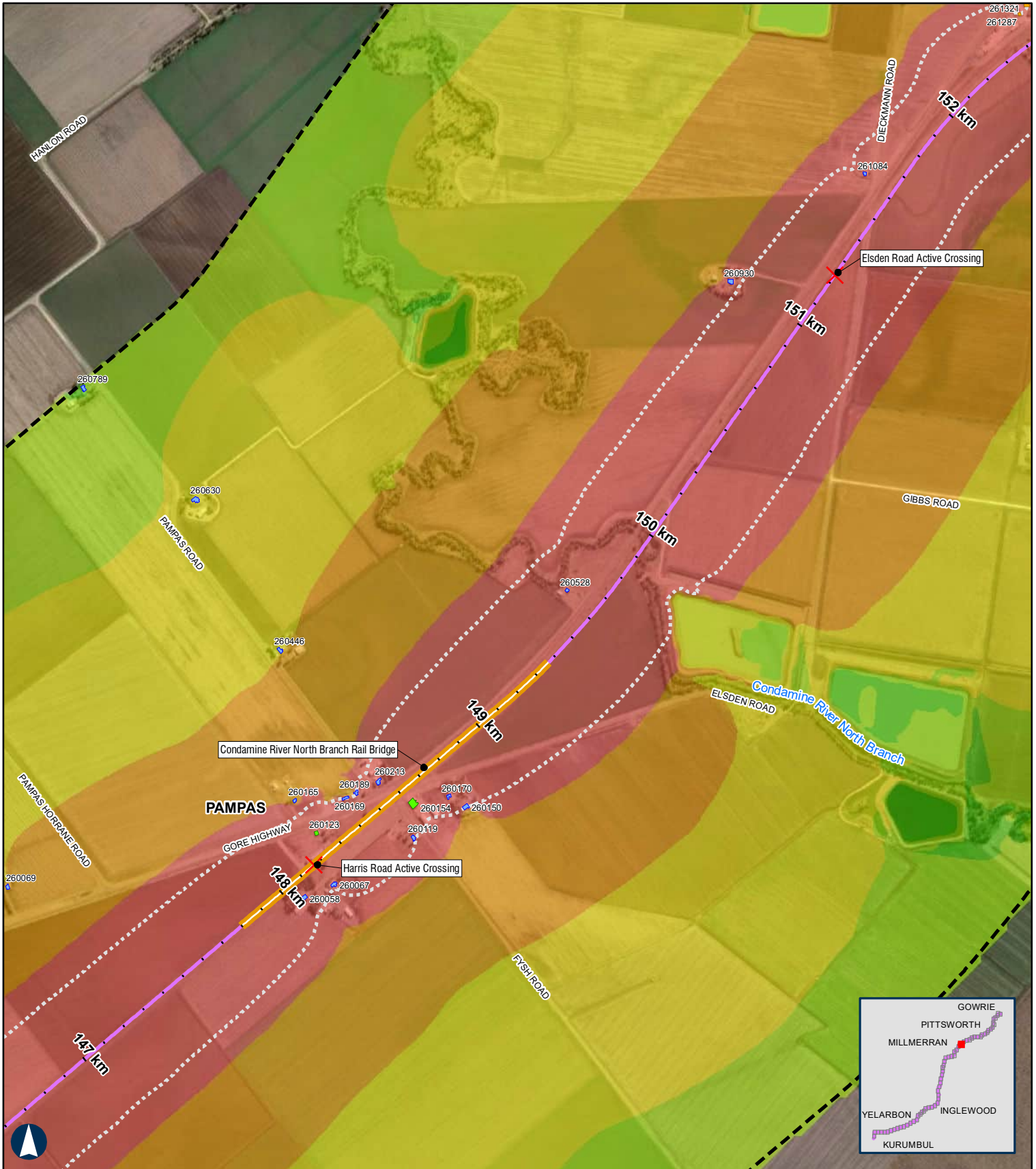
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 43 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

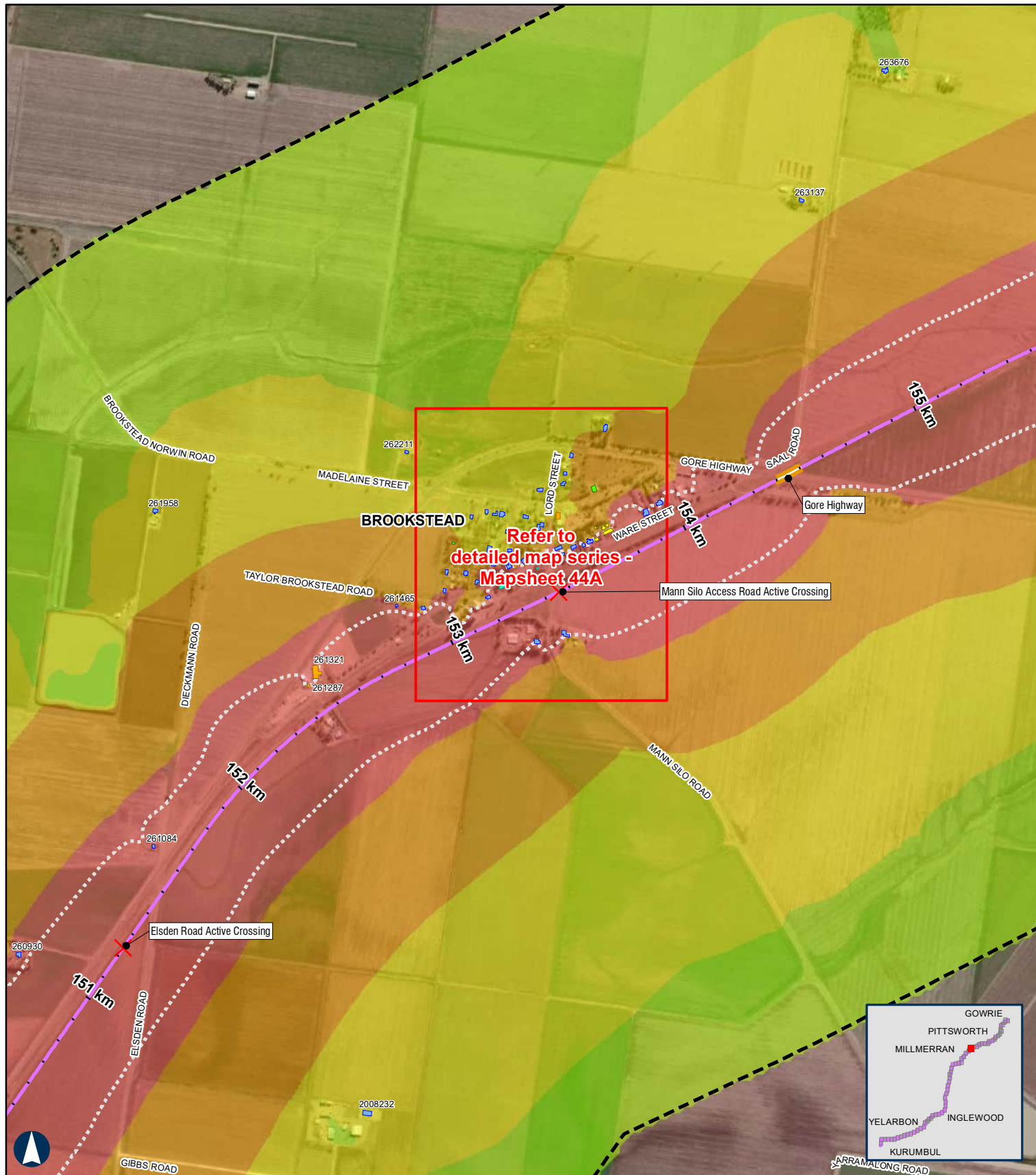
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC *InlandRail*

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 44 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

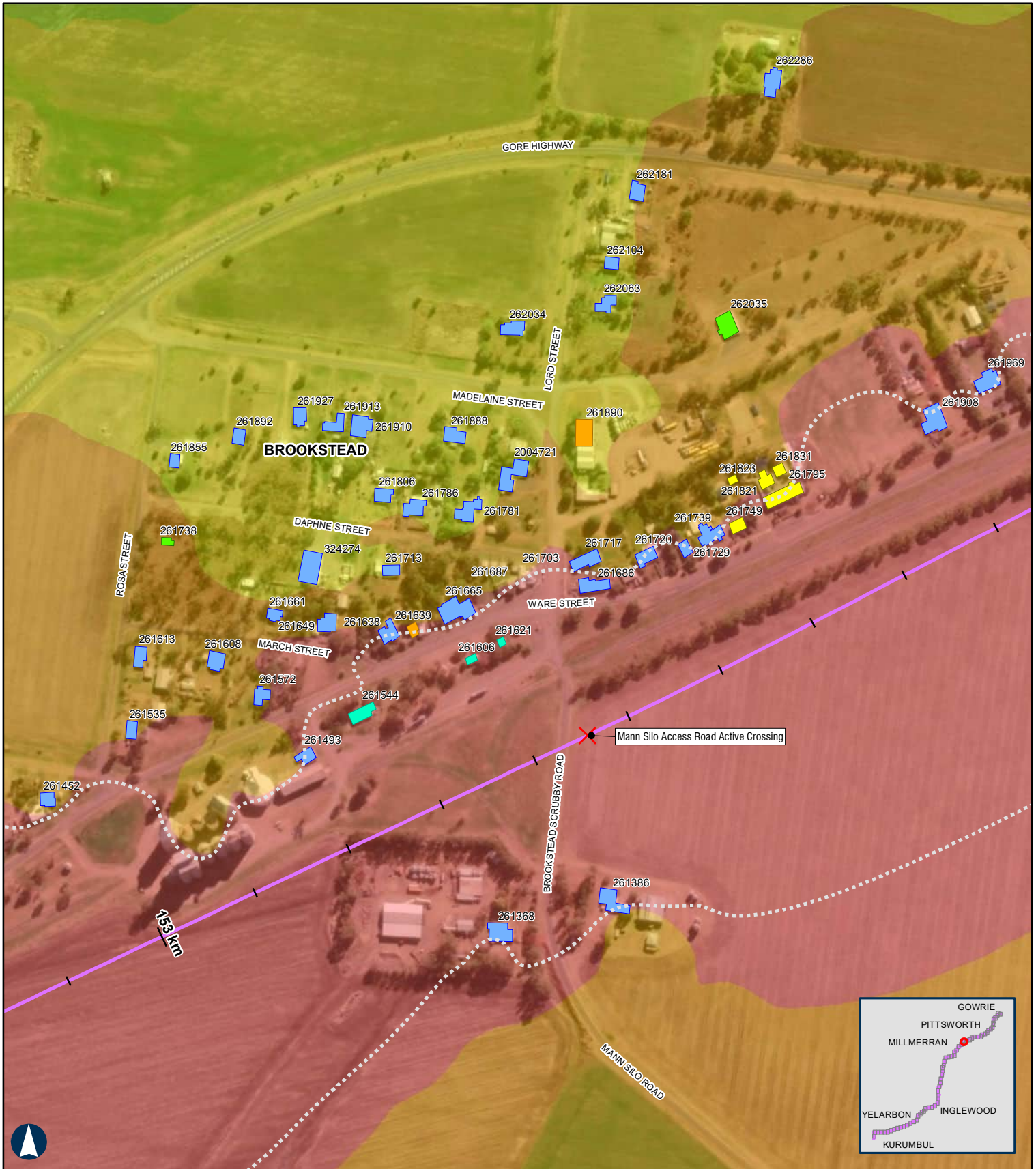
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 44A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:5,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (82 dBA)

Noise Levels

50 - 55 dBA

55 - 60 dBA

60 - 65 dBA

65 - 70 dBA

70 - 75 dBA

75 - 80 dBA

> 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 45 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

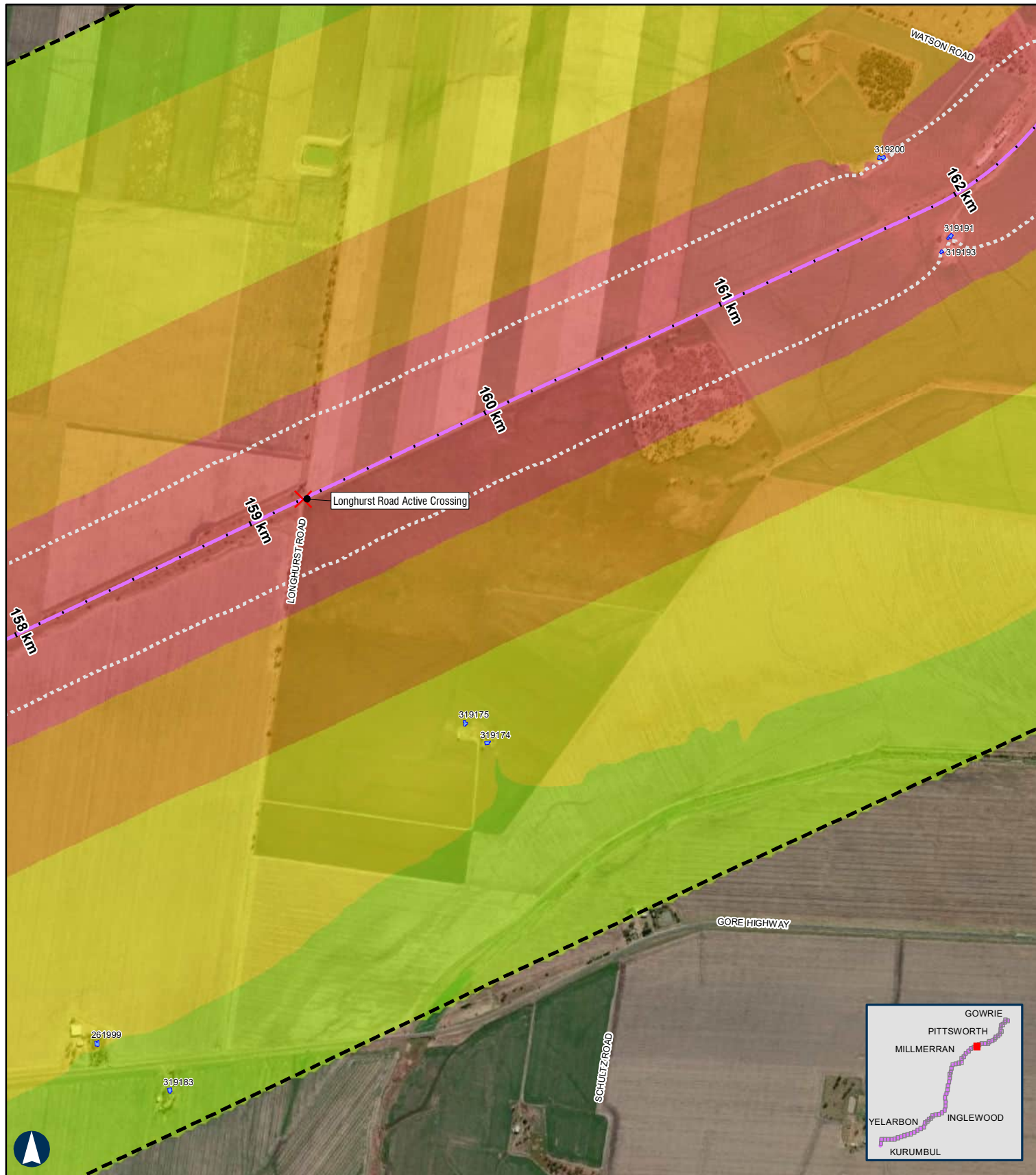
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 46 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

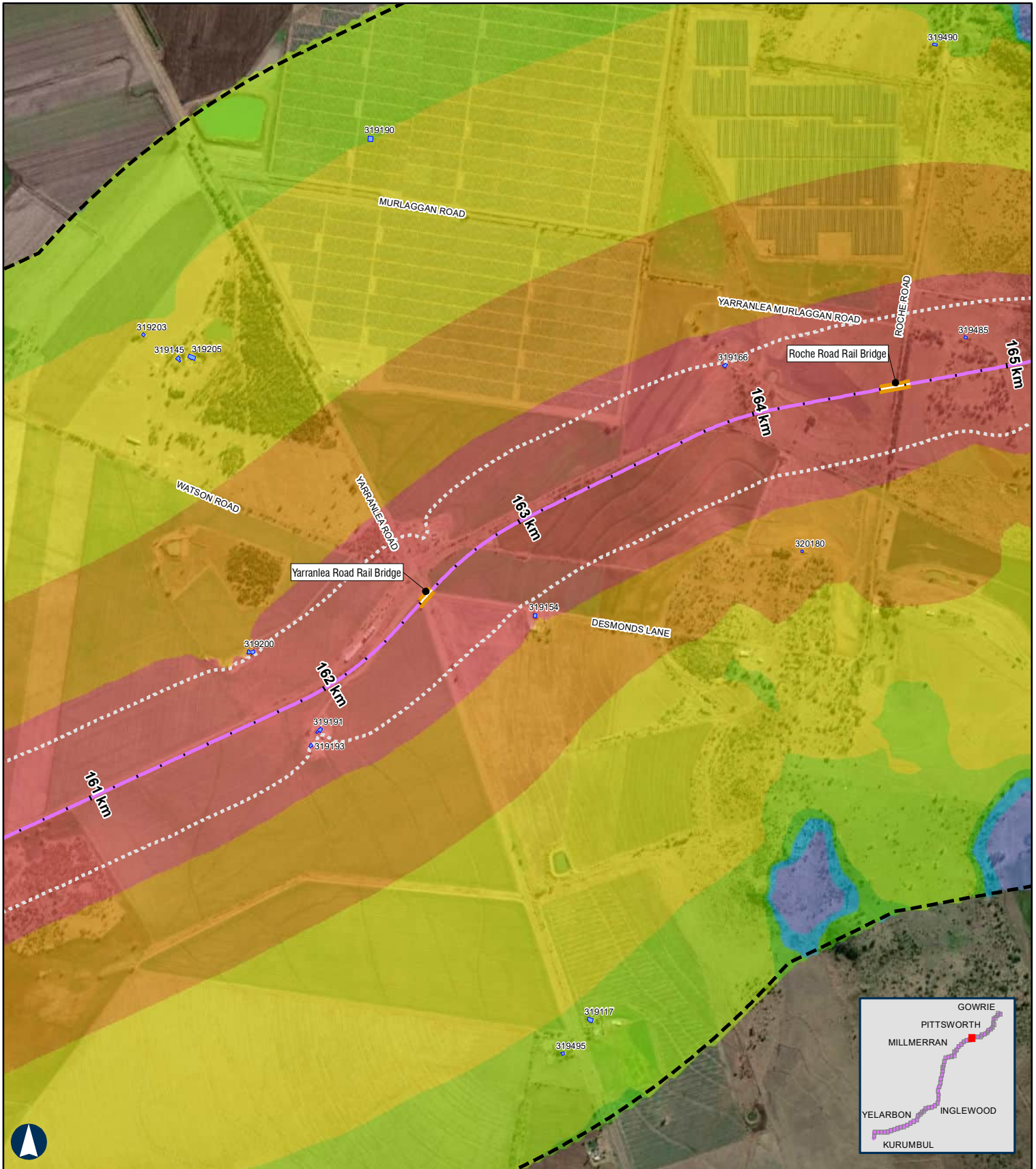
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028/2040 SEM**

Map 47 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

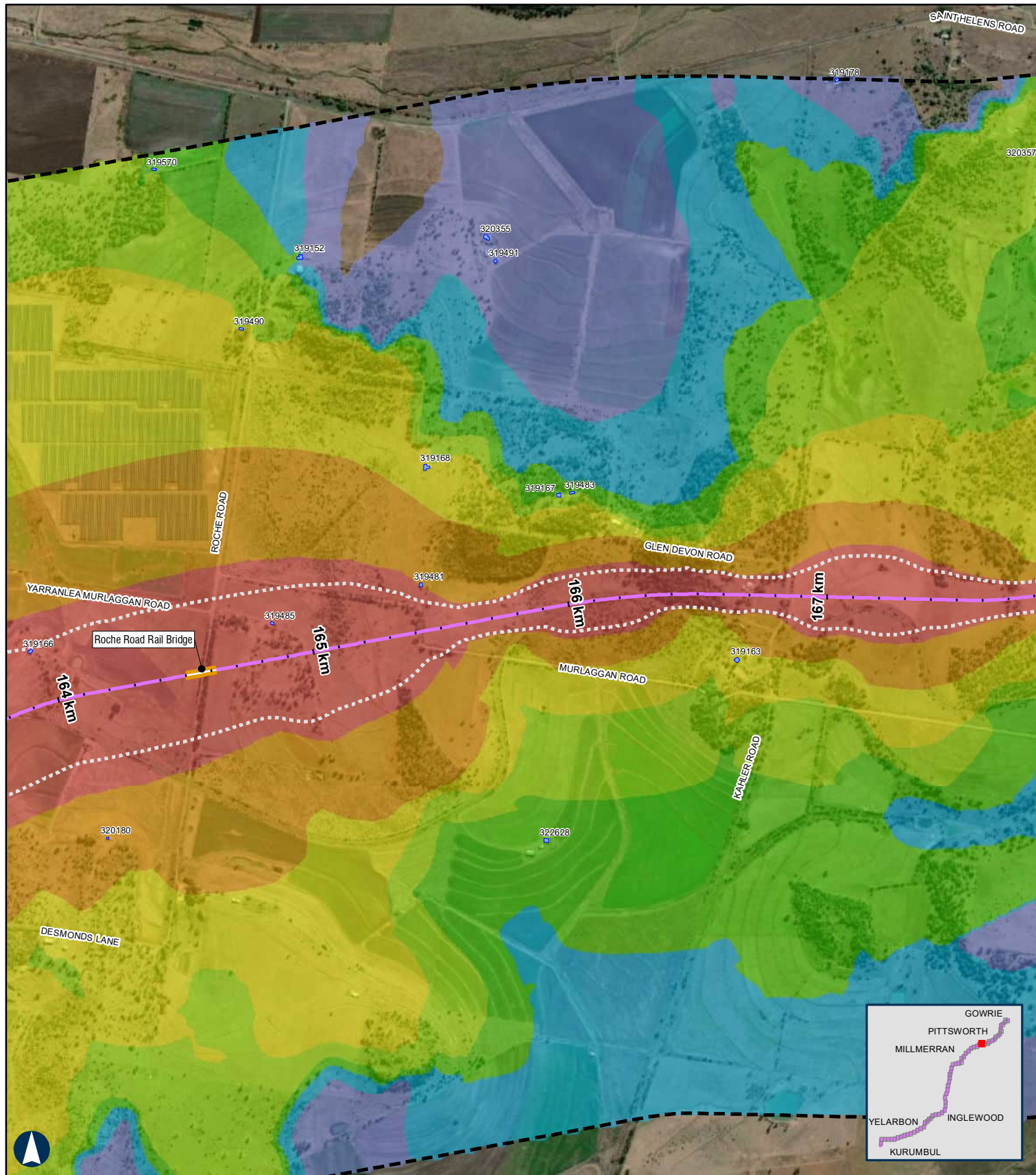
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 48 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

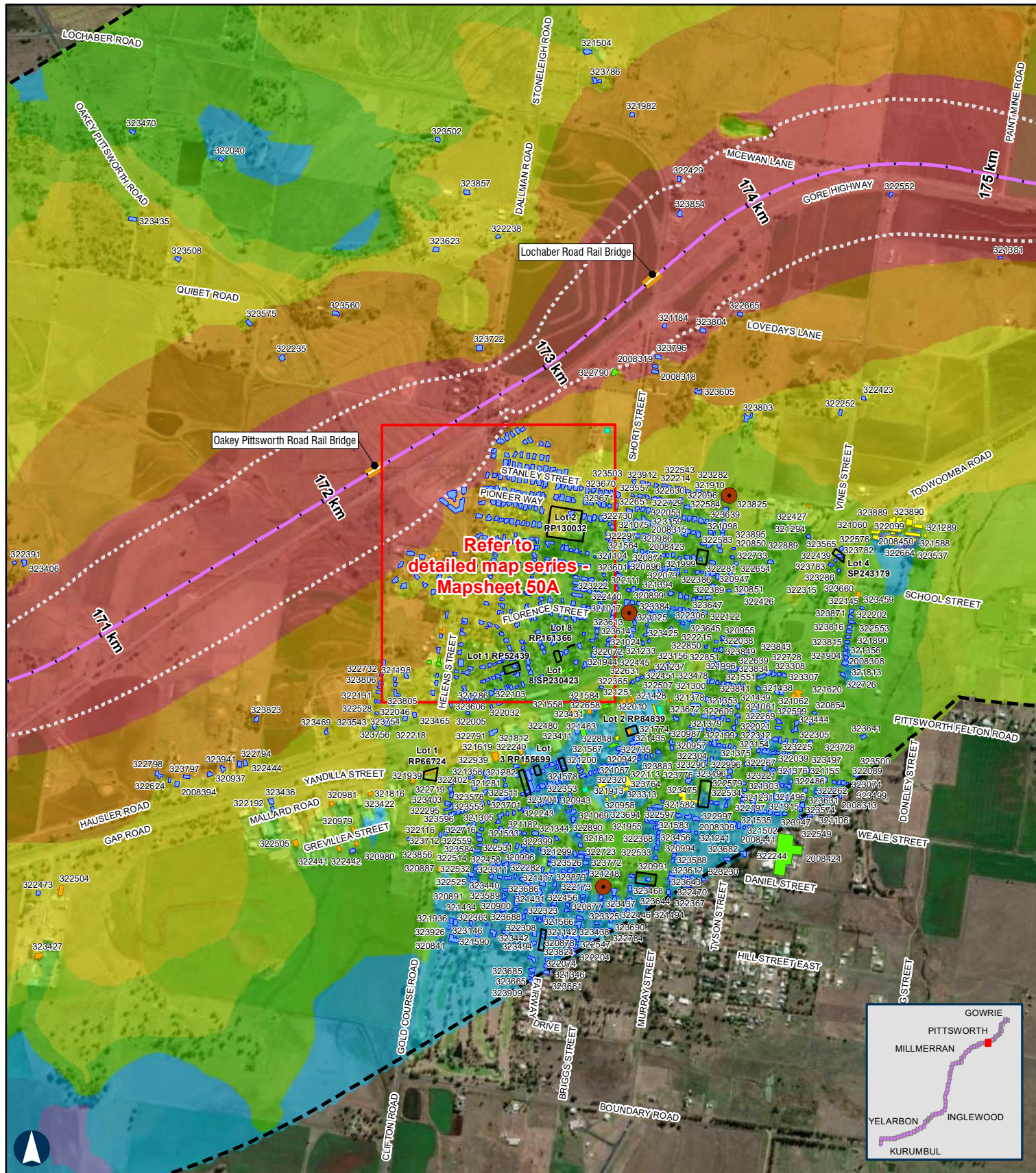
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 50 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

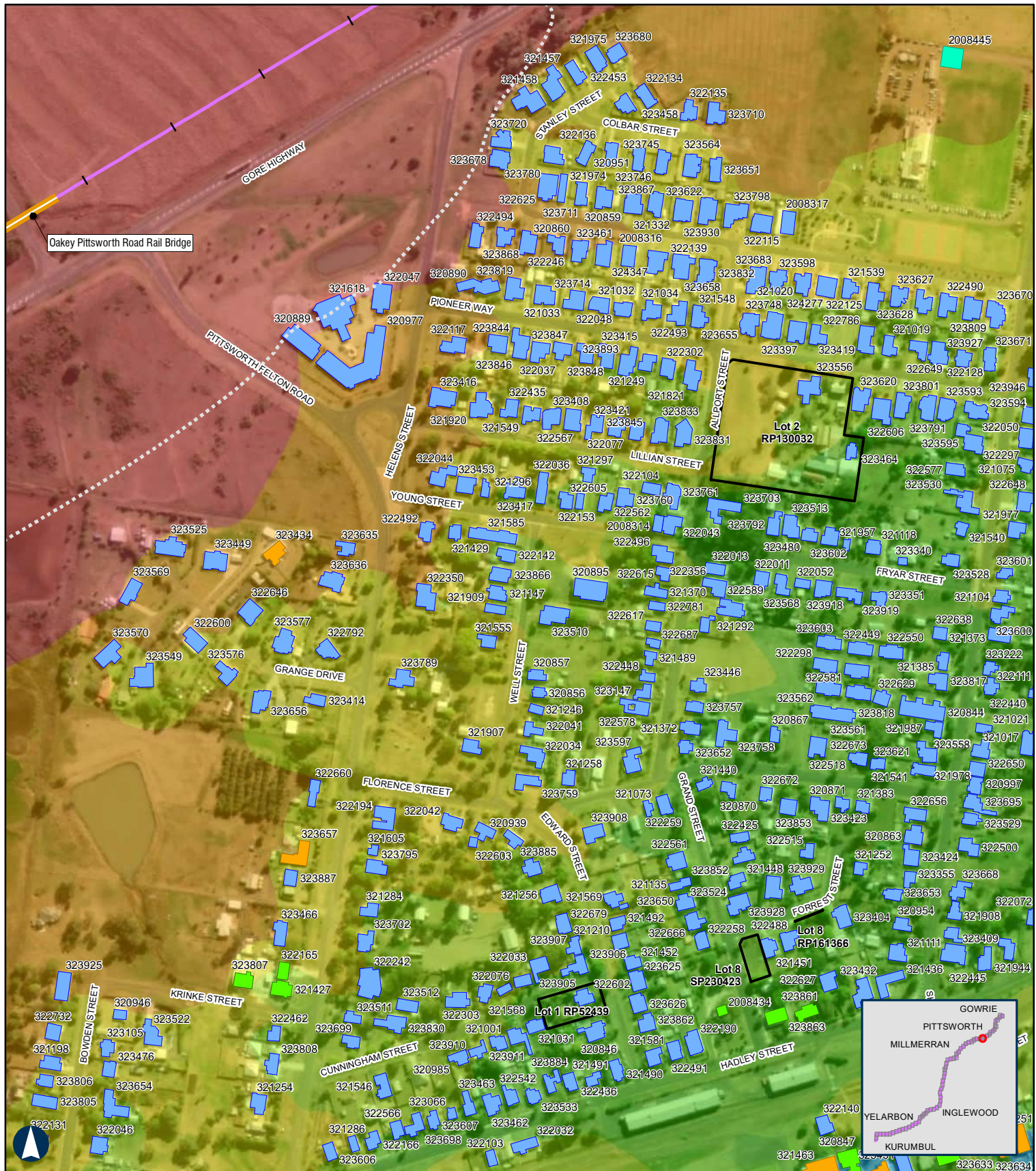
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Noise Levels**
- Criterion (82 dBA)
 - 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 50A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
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Author: JG

Scale: 1:5,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

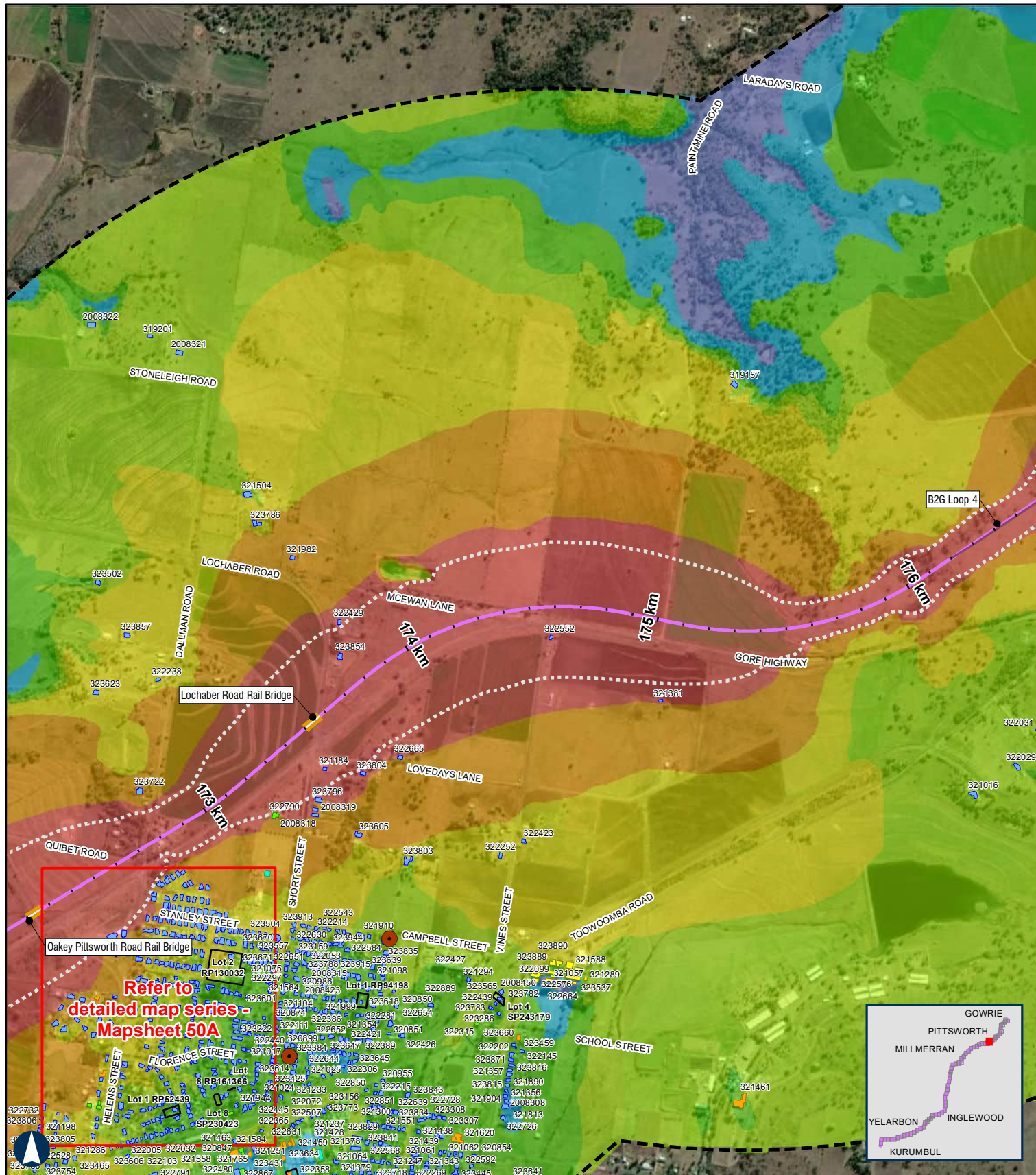
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 51 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

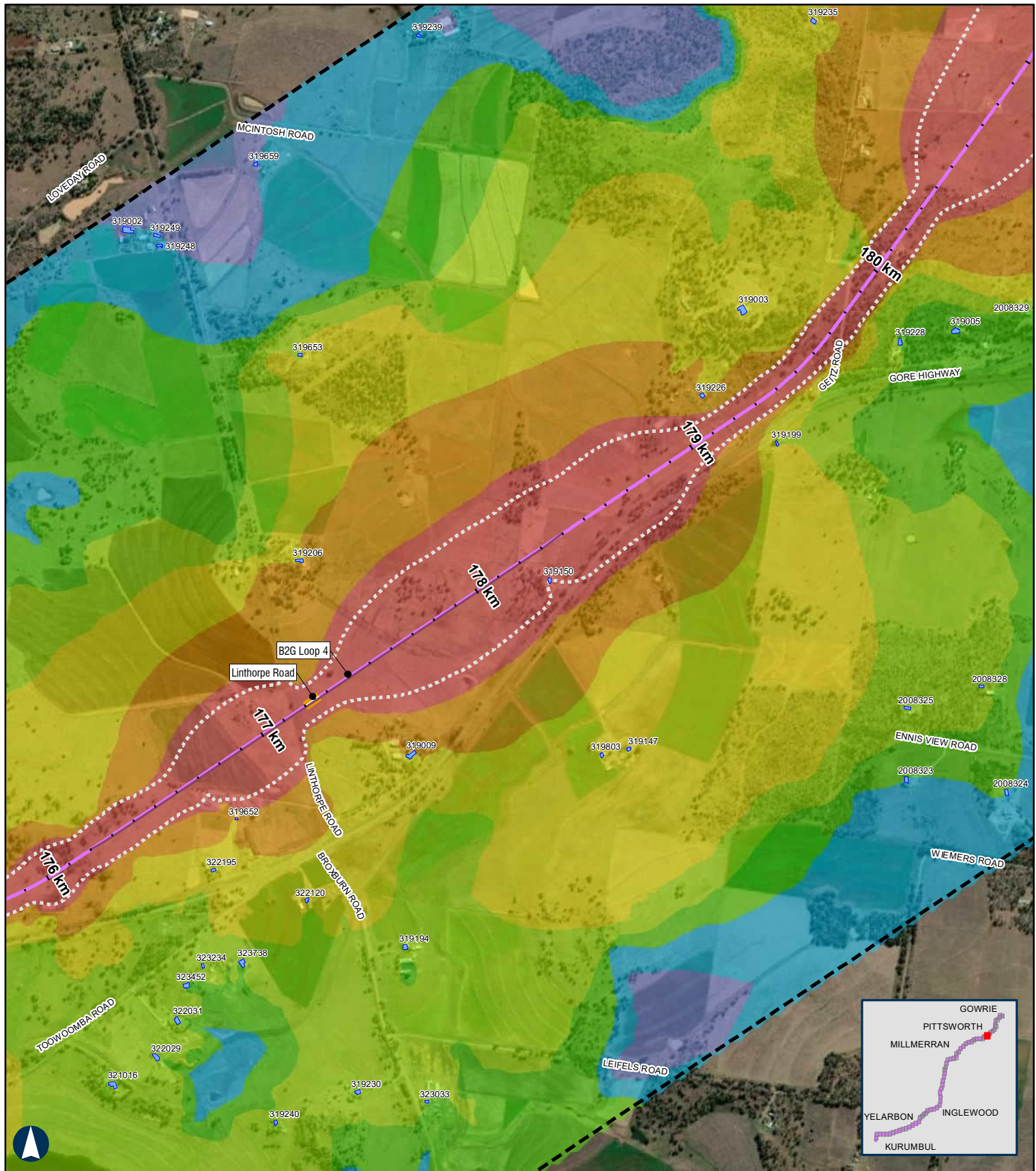
- Sensitive Receptor Type**
- [] Residential
 - [] Community
 - [] Educational
 - [] Commercial
 - [] Parkland
 - [] Future Developments

- Criterion (82 dBA)
- Noise Levels**
- [] 50 - 55 dBA
 - [] 55 - 60 dBA
 - [] 60 - 65 dBA
 - [] 65 - 70 dBA
 - [] 70 - 75 dBA
 - [] 75 - 80 dBA
 - [] > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 52 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

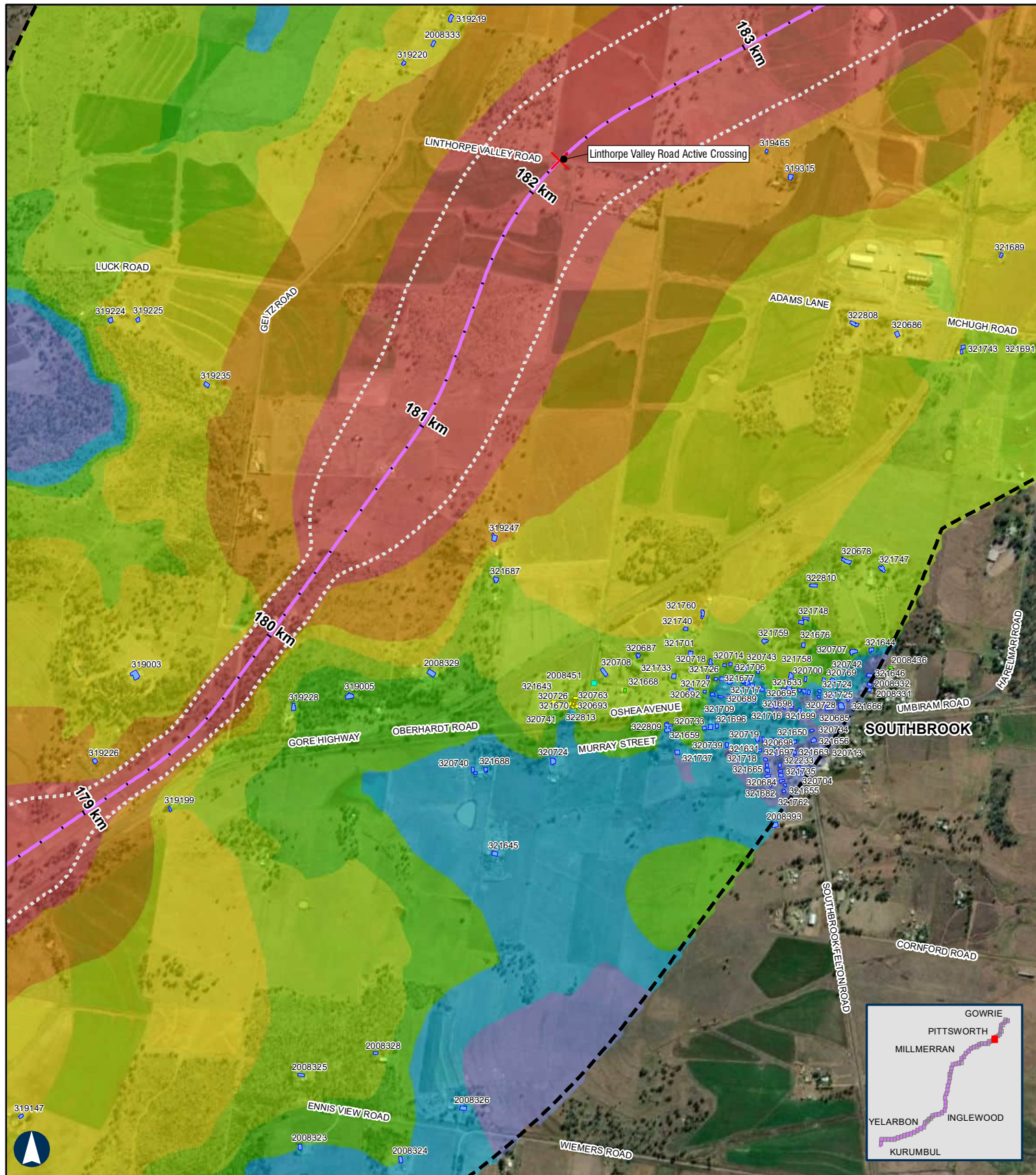
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 53 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

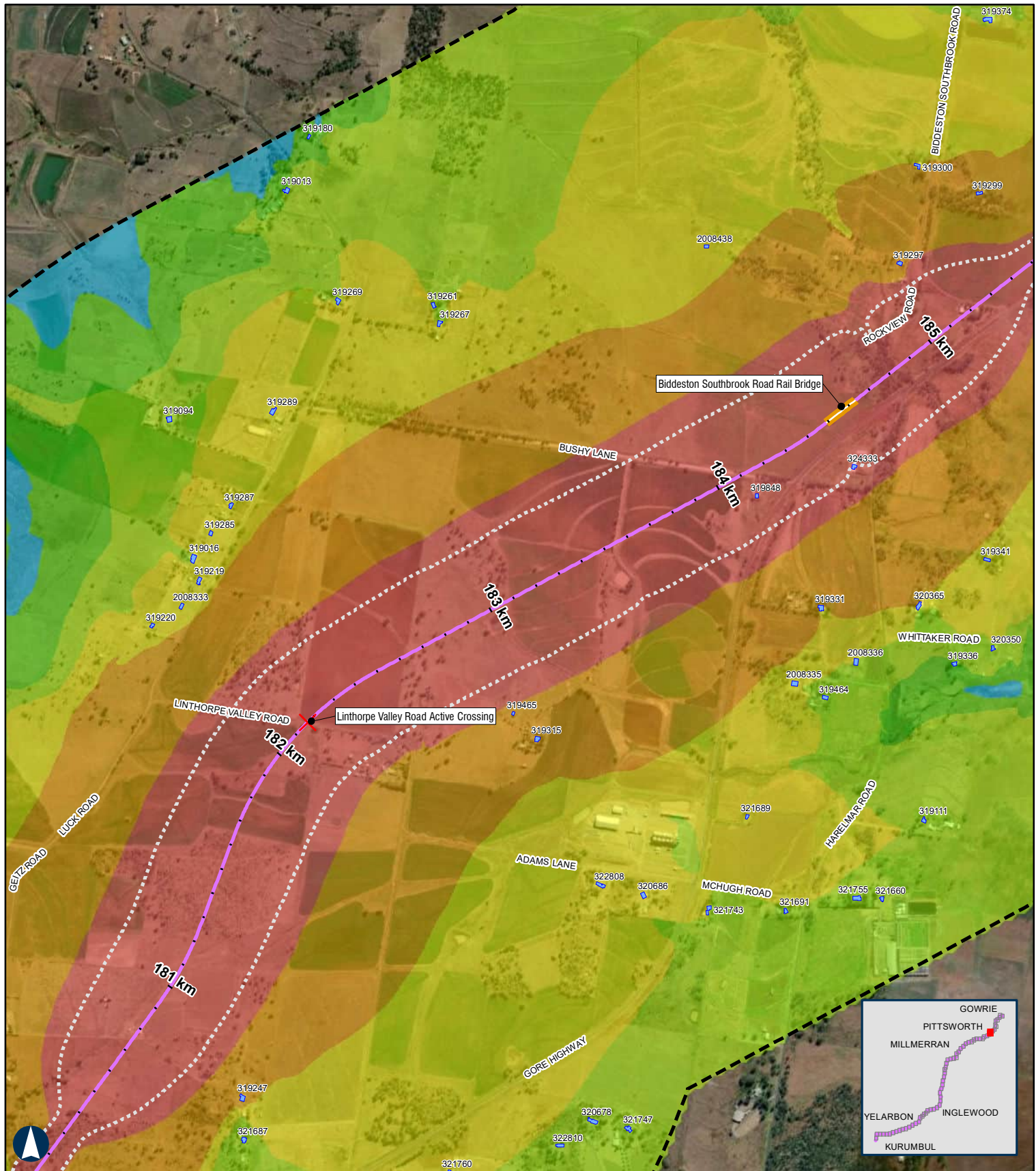
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2028/2040 SEM**

Map 54 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4 Scale: 1:20,000
Date: 21-Oct-2024
Author: JG

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

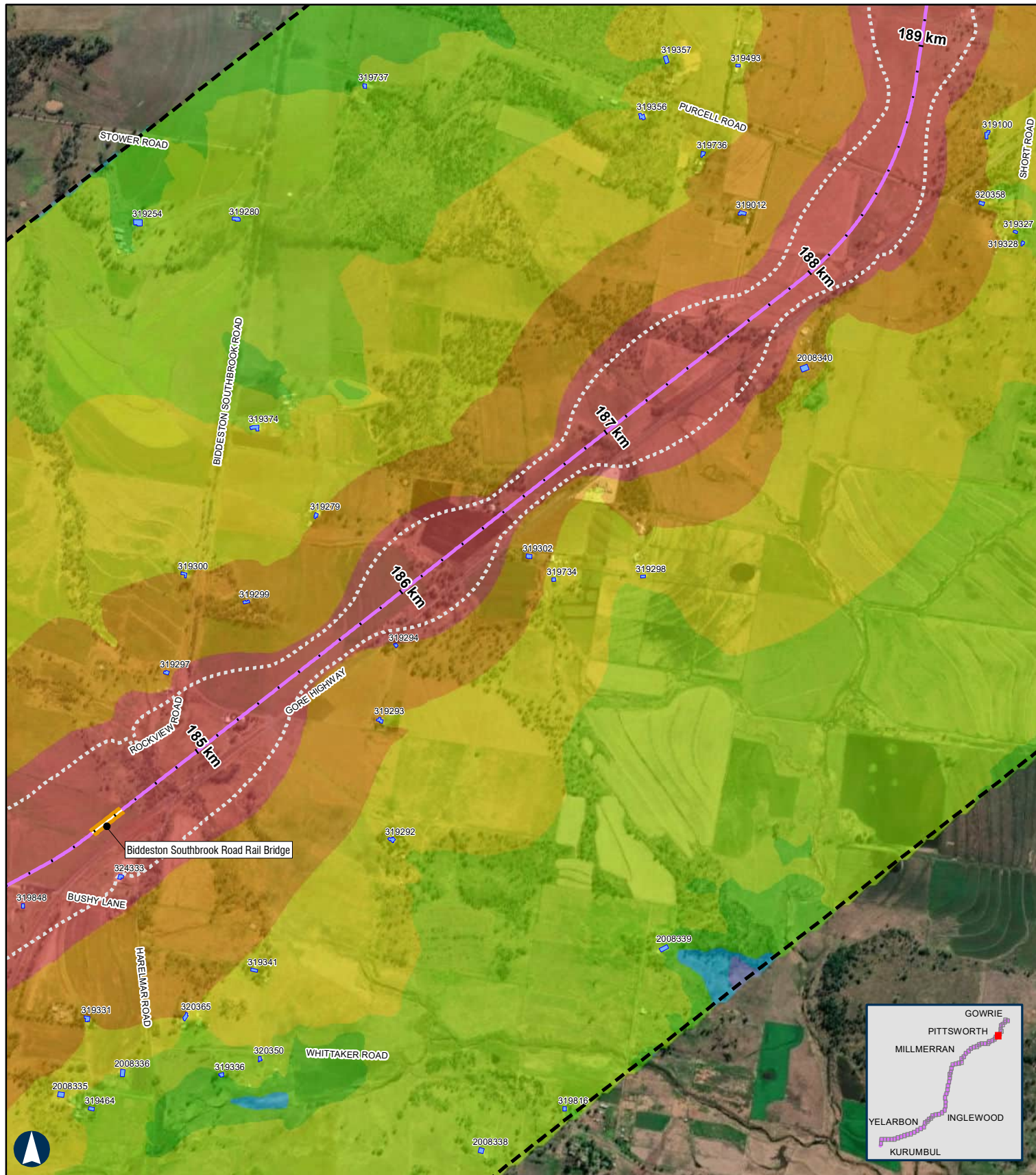
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 55 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

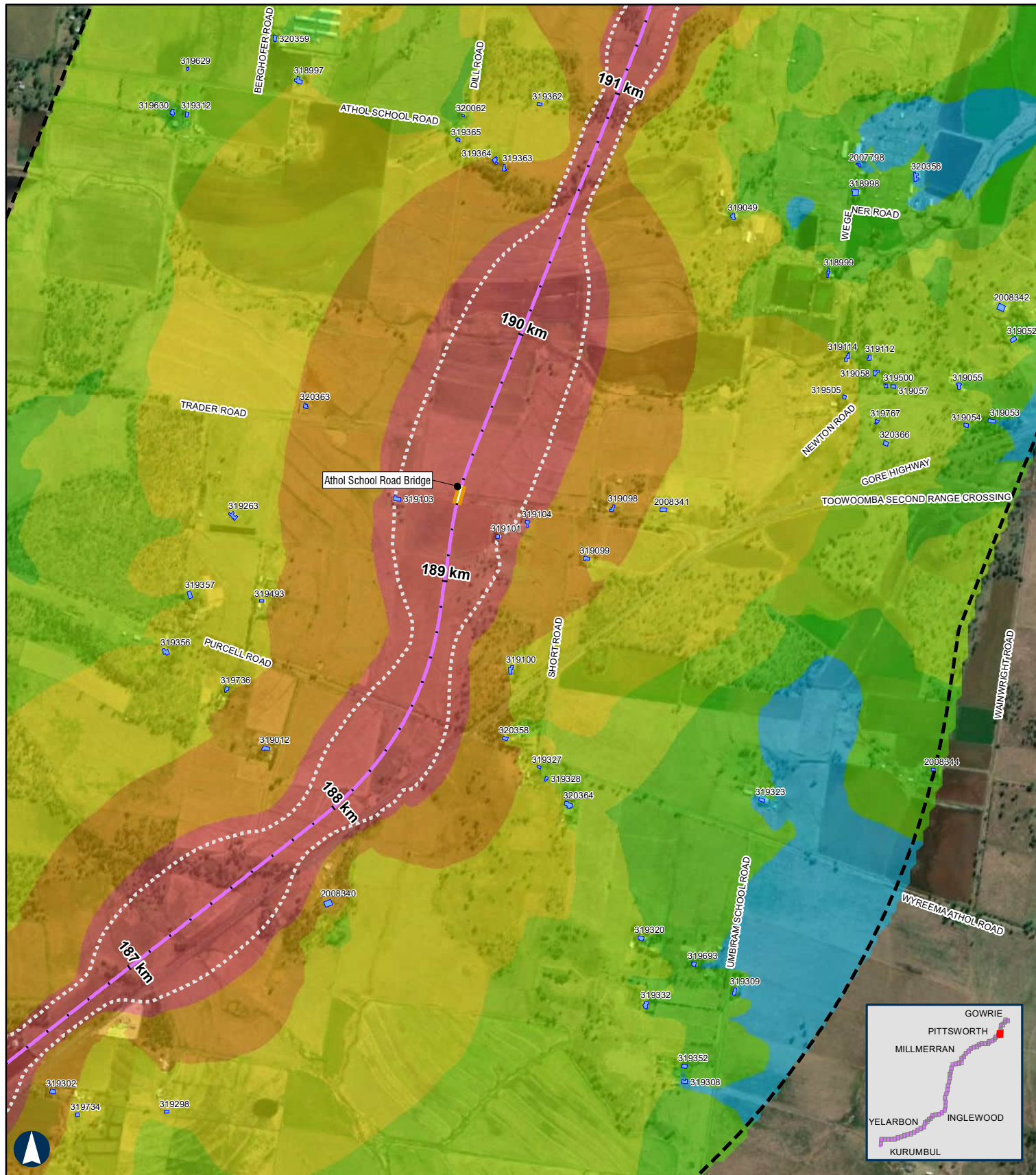
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 56 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

Sensitive Receptor Type

- [] Residential
- [] Community
- [] Educational
- [] Commercial
- [] Parkland
- [] Future Developments

--- Criterion (82 dBA)

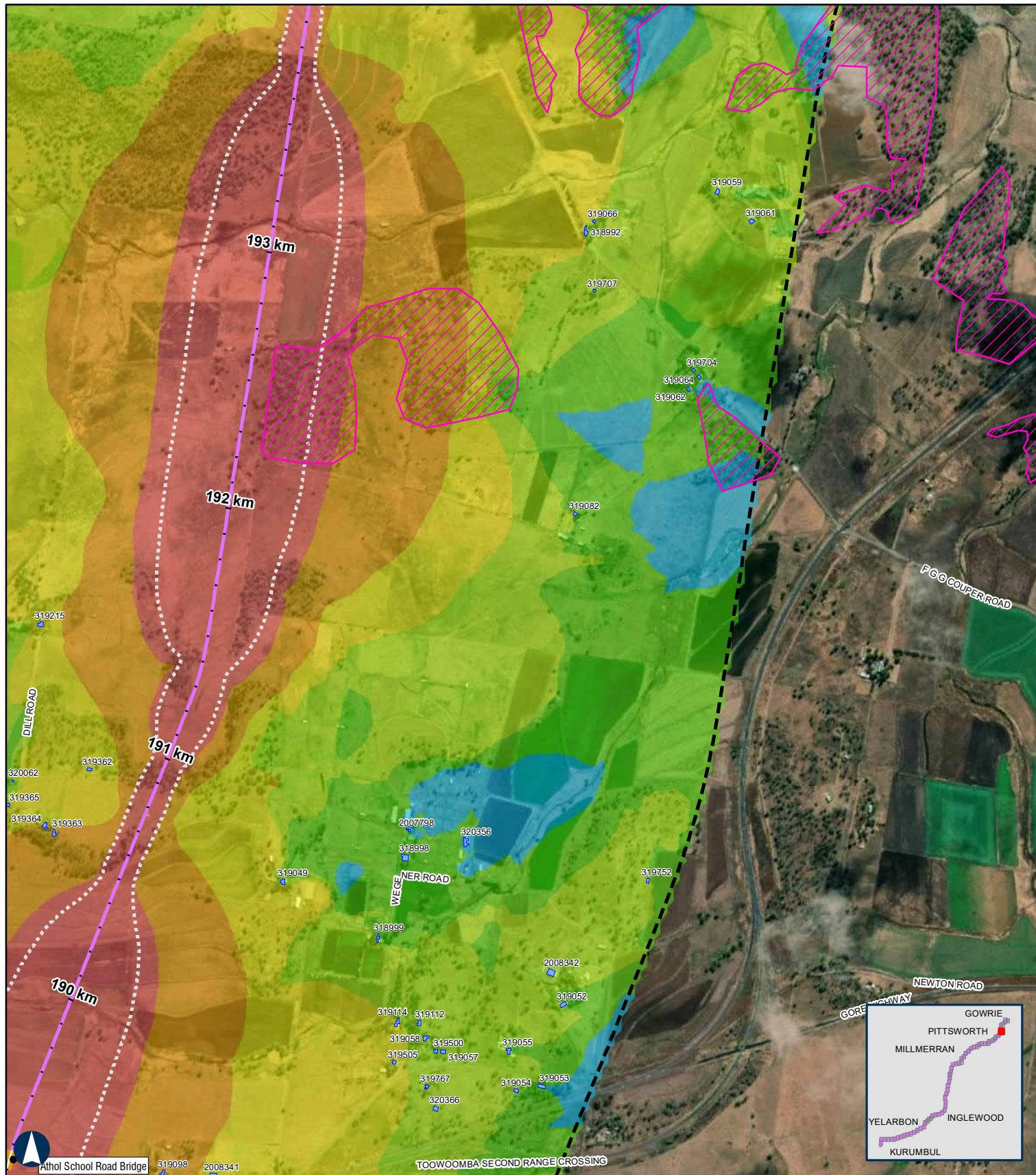
Noise Levels

- [] 50 - 55 dBA
- [] 55 - 60 dBA
- [] 60 - 65 dBA
- [] 65 - 70 dBA
- [] 70 - 75 dBA
- [] 75 - 80 dBA
- [] > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 57 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

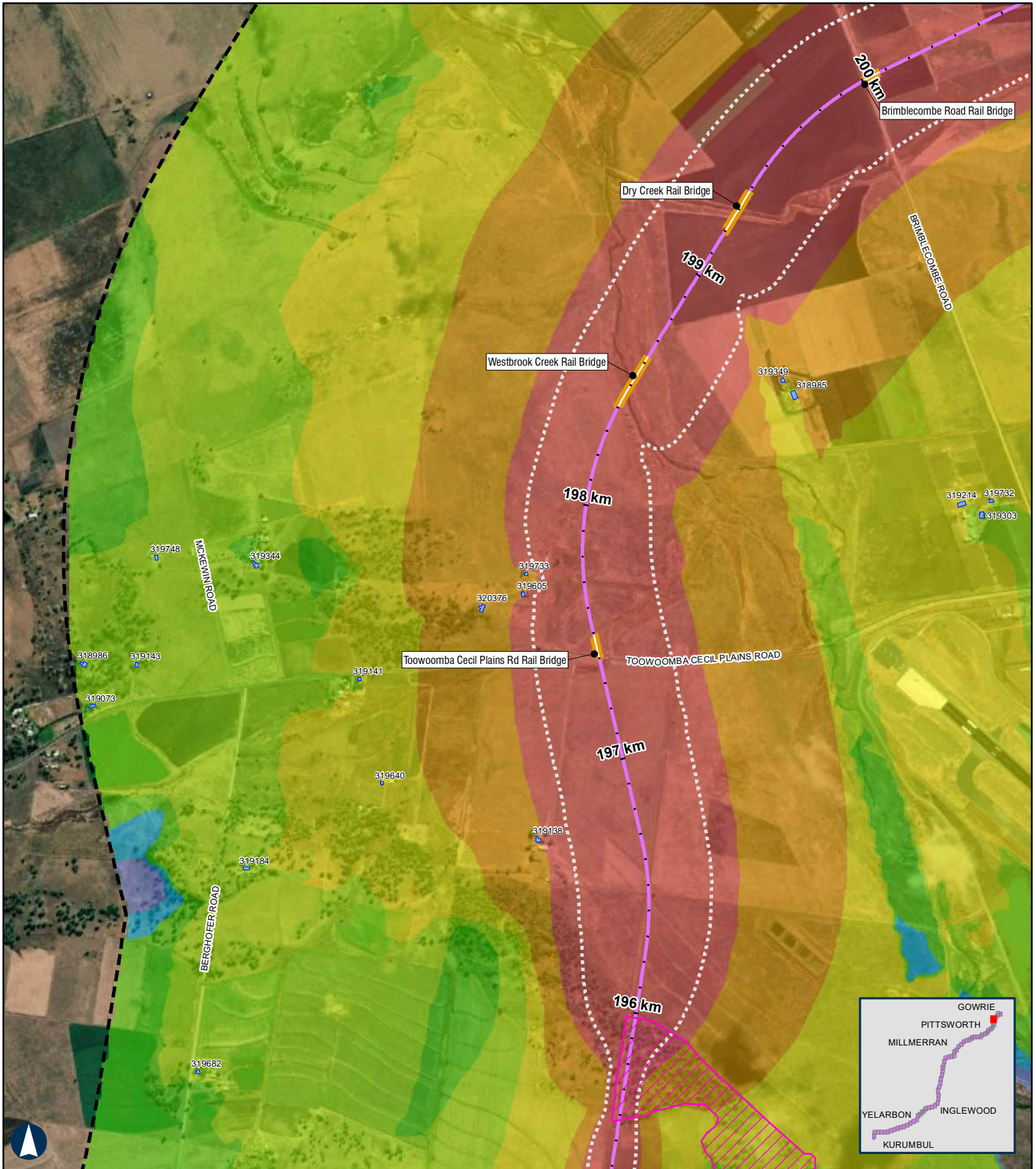
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 59 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▨ Koala Habitat Area

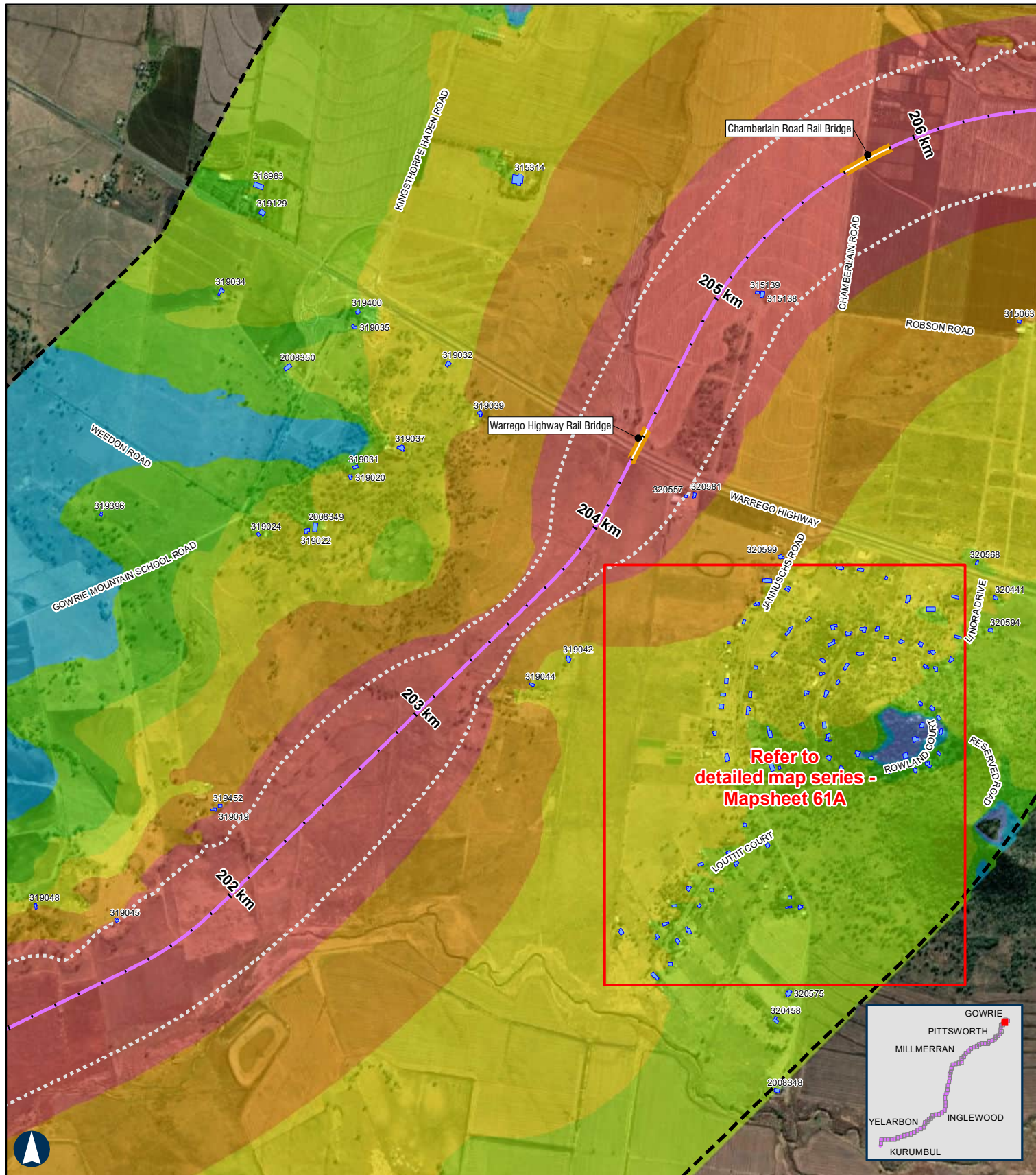
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (82 dBA)
- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 61 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

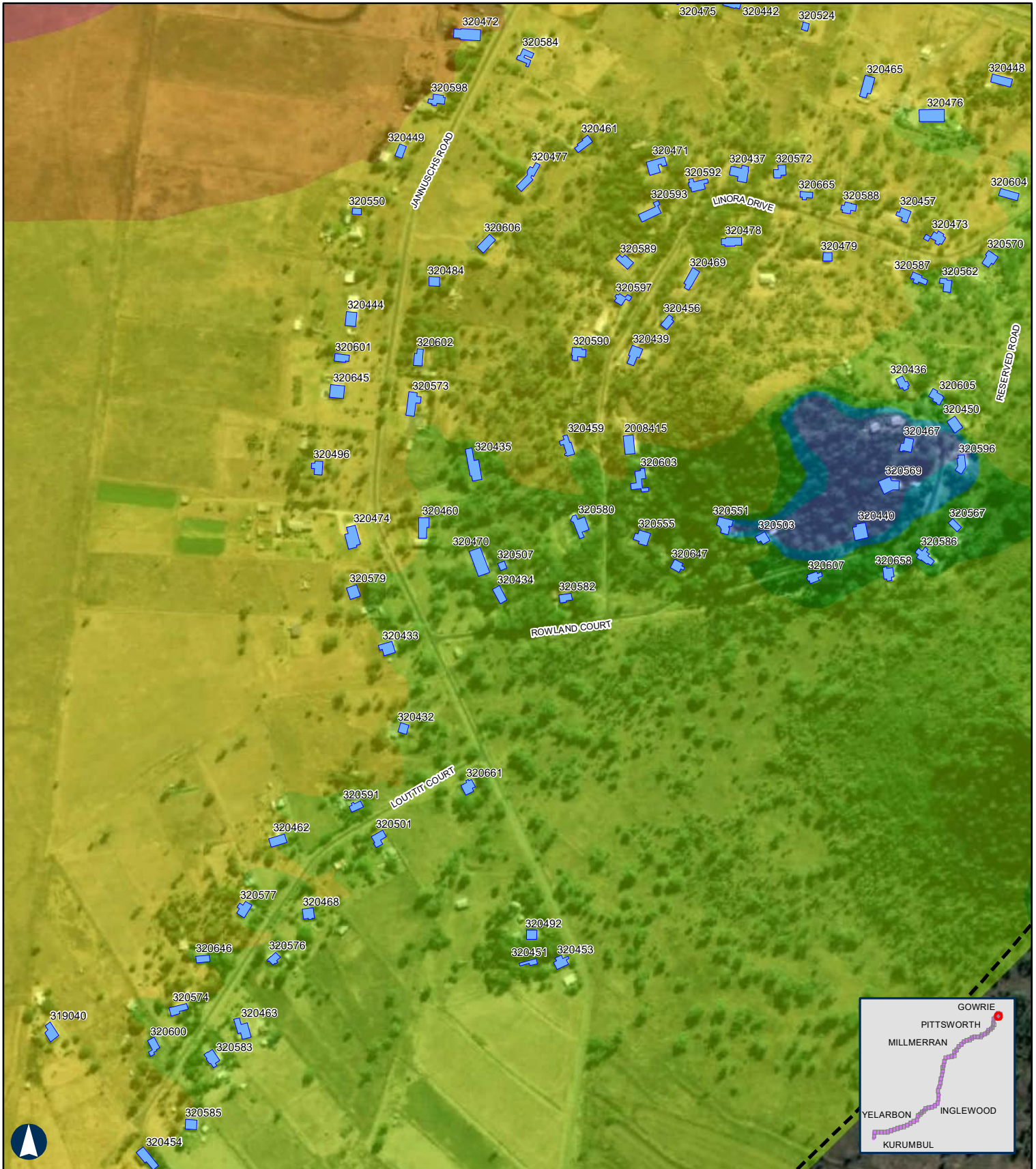
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 61A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:7,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (82 dBA)

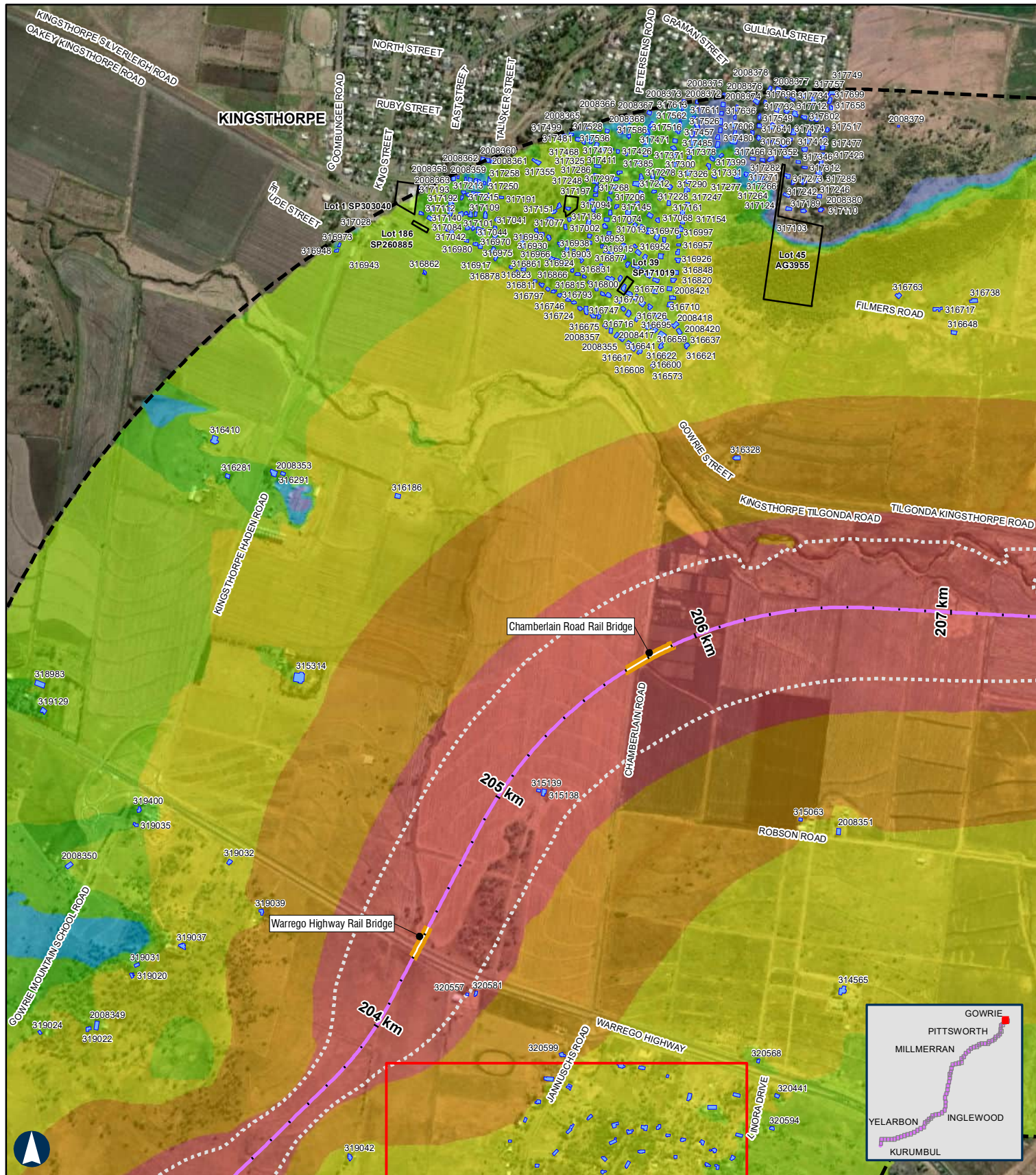
Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Map 62 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

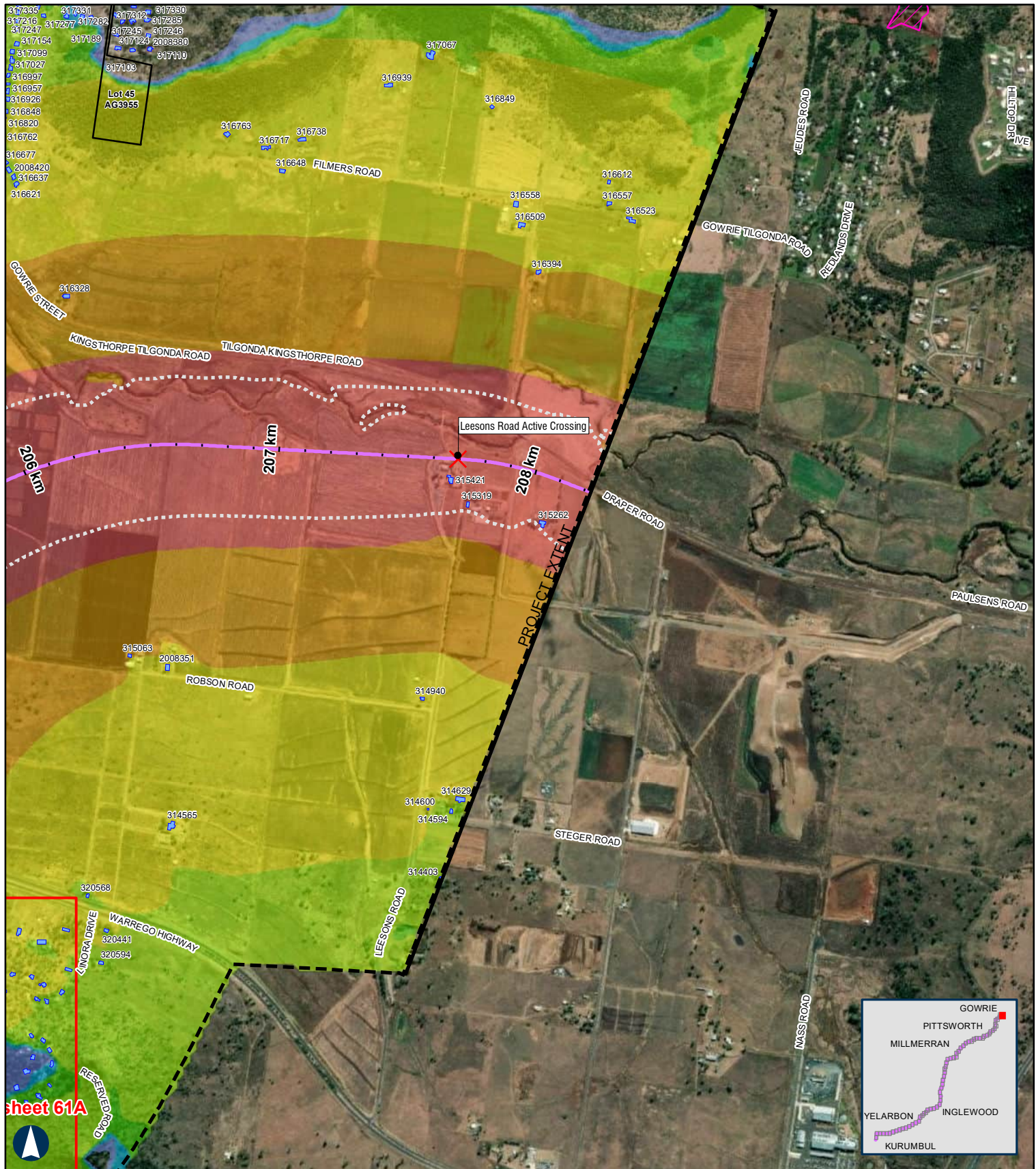
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Noise Levels**
- 50 - 55 dBA
 - 55 - 60 dBA
 - 60 - 65 dBA
 - 65 - 70 dBA
 - 70 - 75 dBA
 - 75 - 80 dBA
 - > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Map 63 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/

Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

--- Criterion (82 dBA)

Noise Levels

■ 50 - 55 dBA

■ 55 - 60 dBA

■ 60 - 65 dBA

■ 65 - 70 dBA

■ 70 - 75 dBA

■ 75 - 80 dBA

■ > 80 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix E Predicted airborne railway noise levels—Design year 2040

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

The predicted unmitigated railway noise levels for the Design Year 2040 scenario are detailed in the tables on the following pages. These tables present the predicted noise levels for the identified sensitive receptors within the 2 km study area. This includes all sensitive receptors where the predicted noise levels triggered an investigation of noise mitigation. Note that for outdoor sensitive areas, the predicted levels tabulated relate to 12-hour LAeq as required under the Interim Guideline.

Following the tabulated results are the predicted noise contour maps. Note that the contours for the SEM noise levels are presented in Appendix D above as they are the same for the Opening Year 2028 and Design Year 2040 scenarios. All noise contours are predicted at 1.8 m above ground level including where there are bridges and viaducts. Whilst the contours presented for LAeq are for a 24-hour assessment period, the predicted levels also apply for outdoor sensitive spaces (which require a 12-hour assessment period) as the train movements are assumed to be equally distributed during the day.

The noise contours are calculated from the interpolation of thousands of calculation points and provide an overview of the railway noise levels to assist the interpretation of the assessment and its outcomes. The tabulated noise levels at the individual sensitive receptors should be referenced when assessing railway noise levels against the criteria.



Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254161	Residential	60	82	64	88	64
254164	Residential	60	82	64	88	65
254168	Residential	60	82	66	90	67
254170	Residential	60	82	64	88	65
254179	Residential	60	82	63	86	63
254181	Residential	60	82	61	84	61
254188	Residential	60	82	57	80	57
254193	Residential	60	82	56	79	56
254219	Residential	60	82	55	78	55
254221	Residential	60	82	53	76	53
254250	Residential	60	82	67	91	67
254255	Residential	60	82	59	82	59
254261	Residential	60	82	47	70	47
254271	Residential	60	82	69	93	69
254276	Residential	60	82	62	86	63
254282	Residential	60	82	50	72	50
254290	Residential	60	82	50	71	50
254295	Residential	60	82	39	63	39
254300	Residential	60	82	50	73	50
254307	Residential	60	82	50	71	50
254308	Residential	60	82	48	71	49
254312	Residential	60	82	50	72	50
254313	Residential	60	82	47	69	47
254314	Residential	60	82	50	72	50
254315	Residential	60	82	47	70	47
254318	Residential	60	82	51	73	51
254319	Residential	60	82	50	73	50
254320	Residential	60	82	50	72	50
254324	Residential	60	82	48	70	48
254325	Residential	60	82	45	69	45
254332	Residential	60	82	50	72	50
254336	Residential	60	82	45	69	45
254340	Residential	60	82	54	77	54
254344	Residential	60	82	53	76	53
254346	Residential	60	82	53	76	53
254347	Residential	60	82	63	86	63
254348	Residential	60	82	52	75	52
254354	Residential	60	82	51	74	51
254357	Residential	60	82	46	69	46
254358	Residential	60	82	50	73	50
254361	Residential	60	82	49	71	49
254365	Residential	60	82	49	71	50
254367	Residential	60	82	48	71	48
254369	Residential	60	82	51	75	52
254370	Residential	60	82	48	70	49
254372	Residential	60	82	47	70	47
254376	Residential	60	82	54	77	54
254377	Residential	60	82	52	73	52
254378	Residential	60	82	49	71	49
254381	Residential	60	82	45	68	45
254383	Residential	60	82	46	69	46
254384	Residential	60	82	50	73	50
254387	Residential	60	82	43	66	43
254388	Residential	60	82	50	72	50
254389	Residential	60	82	50	72	50
254391	Residential	60	82	49	72	49
254396	Residential	60	82	50	73	50
254400	Residential	60	82	50	74	51

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254401	Residential	60	82	48	71	48
254402	Residential	60	82	50	72	50
254403	Residential	60	82	51	74	51
254404	Residential	60	82	49	71	49
254406	Residential	60	82	52	74	52
254408	Residential	60	82	50	72	50
254410	Residential	60	82	50	73	50
254411	Residential	60	82	49	72	49
254412	Residential	60	82	54	78	55
254419	Residential	60	82	50	73	50
254421	Residential	60	82	54	78	54
254422	Residential	60	82	50	72	50
254425	Residential	60	82	50	73	50
254427	Residential	60	82	50	73	50
254431	Residential	60	82	51	73	51
254433	Residential	60	82	53	77	54
254437	Residential	60	82	52	75	52
254438	Residential	60	82	48	71	48
254440	Residential	60	82	46	69	46
254441	Residential	60	82	52	75	52
254442	Residential	60	82	51	73	51
254444	Residential	60	82	52	74	52
254446	Residential	60	82	50	73	50
254448	Residential	60	82	53	74	53
254449	Residential	60	82	51	73	51
254453	Residential	60	82	54	77	54
254456	Residential	60	82	51	74	51
254458	Residential	60	82	53	76	53
254460	Residential	60	82	49	72	49
254462	Residential	60	82	52	75	52
254463	Residential	60	82	51	74	51
254465	Residential	60	82	50	72	50
254468	Residential	60	82	50	73	50
254469	Residential	60	82	53	75	53
254470	Residential	60	82	53	76	53
254476	Residential	60	82	58	81	58
254478	Residential	60	82	52	75	52
254484	Residential	60	82	53	76	53
254486	Residential	60	82	54	77	54
254487	Residential	60	82	52	76	52
254490	Residential	60	82	52	75	52
254492	Residential	60	82	54	76	54
254493	Residential	60	82	52	75	52
254494	Residential	60	82	52	74	52
254499	Residential	60	82	51	74	51
254500	Residential	60	82	54	77	54
254501	Residential	60	82	52	76	52
254502	Residential	60	82	57	80	57
254507	Residential	60	82	53	75	53
254508	Residential	60	82	55	78	55
254516	Residential	60	82	56	79	56
254517	Residential	60	82	54	77	54
254521	Residential	60	82	55	79	55
254524	Residential	60	82	54	77	54
254526	Residential	60	82	56	79	56
254529	Residential	60	82	56	79	56
254531	Residential	60	82	56	79	56
254532	Residential	60	82	53	76	53

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254533	Residential	60	82	54	76	54
254534	Residential	60	82	58	82	58
254535	Residential	60	82	56	79	56
254536	Residential	60	82	57	80	57
254537	Residential	60	82	56	79	56
254539	Residential	60	82	57	81	57
254540	Residential	60	82	56	79	56
254542	Residential	60	82	55	79	55
254546	Residential	60	82	57	80	57
254549	Residential	60	82	57	80	57
254550	Residential	60	82	56	79	56
254551	Residential	60	82	63	87	63
254558	Residential	60	82	66	90	66
254559	Residential	60	82	66	90	66
254560	Residential	60	82	51	74	51
254562	Residential	60	82	67	91	67
254565	Residential	60	82	67	90	67
254568	Residential	60	82	55	78	55
254571	Residential	60	82	59	82	59
254573	Residential	60	82	57	80	57
254576	Residential	60	82	65	88	65
254578	Residential	60	82	60	83	60
254587	Residential	60	82	58	82	58
254589	Residential	60	82	65	89	65
254594	Residential	60	82	59	82	59
254595	Residential	60	82	66	89	66
254598	Residential	60	82	66	89	66
254601	Residential	60	82	61	84	61
254603	Residential	60	82	66	89	66
254609	Residential	60	82	70	94	70
254612	Residential	60	82	65	89	65
254614	Residential	60	82	70	93	70
254628	Residential	60	82	60	83	60
254635	Residential	60	82	62	86	62
254640	Residential	60	82	50	72	50
254656	Residential	60	82	53	76	53
254657	Residential	60	82	45	69	45
254661	Residential	60	82	60	83	60
254675	Residential	60	82	50	73	50
254681	Residential	60	82	50	72	50
254682	Residential	60	82	49	72	49
254683	Residential	60	82	47	70	47
254689	Residential	60	82	49	72	49
254690	Residential	60	82	49	72	49
254691	Residential	60	82	50	72	50
254705	Residential	60	82	51	73	51
254714	Residential	60	82	50	73	50
254717	Residential	60	82	52	75	52
254719	Residential	60	82	44	67	44
254720	Residential	60	82	46	69	46
254728	Residential	60	82	49	72	49
254730	Residential	60	82	49	72	49
254731	Residential	60	82	45	68	45
254736	Residential	60	82	43	65	43
254745	Residential	60	82	46	70	46
254747	Residential	60	82	49	73	49
254755	Residential	60	82	46	70	46
254757	Residential	60	82	51	73	51

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254762	Residential	60	82	47	70	47
254769	Residential	60	82	50	72	50
254783	Residential	60	82	53	75	53
254787	Residential	60	82	58	81	58
254790	Residential	60	82	57	80	57
254808	Residential	60	82	50	73	50
254810	Residential	60	82	40	63	40
254817	Residential	60	82	44	67	44
254828	Residential	60	82	60	84	60
254837	Residential	60	82	41	64	41
254892	Residential	60	82	44	66	44
254987	Residential	60	82	47	70	47
255054	Residential	60	82	43	66	43
255080	Residential	60	82	46	69	46
255091	Residential	60	82	42	65	42
255093	Residential	60	82	43	66	43
255097	Residential	60	82	46	68	46
255114	Residential	60	82	44	68	44
255143	Residential	60	82	49	71	49
255156	Residential	60	82	46	70	46
255158	Residential	60	82	47	70	47
255159	Residential	60	82	44	66	44
255192	Residential	60	82	44	68	44
255220	Residential	60	82	43	67	43
255223	Residential	60	82	47	70	47
255238	Residential	60	82	48	72	48
255240	Residential	60	82	50	72	50
255248	Residential	60	82	53	75	53
255277	Residential	60	82	53	76	53
255295	Residential	60	82	47	70	47
255307	Residential	60	82	43	65	43
255309	Residential	60	82	43	65	43
255318	Residential	60	82	58	81	58
255333	Residential	60	82	60	83	60
255336	Residential	60	82	56	79	56
255346	Residential	60	82	62	85	62
255349	Residential	60	82	56	79	56
255350	Residential	60	82	61	85	61
255357	Residential	60	82	59	82	59
255377	Residential	60	82	52	74	52
255387	Residential	60	82	51	75	51
255388	Residential	60	82	55	78	55
255394	Residential	60	82	53	77	53
255395	Residential	60	82	48	70	48
255396	Residential	60	82	50	73	50
255402	Residential	60	82	47	69	47
255406	Residential	60	82	45	68	45
255412	Residential	60	82	47	69	47
255433	Residential	60	82	58	81	58
255453	Residential	60	82	51	75	51
255455	Residential	60	82	52	75	52
255487	Residential	60	82	51	74	51
255511	Residential	60	82	55	78	55
255514	Residential	60	82	56	79	56
255518	Residential	60	82	37	61	37
255520	Residential	60	82	36	60	36
255558	Residential	60	82	42	64	42
255595	Residential	60	82	47	69	47

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
255601	Residential	60	82	48	71	48
255603	Residential	60	82	54	78	54
255605	Residential	60	82	52	75	52
255617	Residential	60	82	44	67	44
255620	Residential	60	82	38	60	38
255621	Residential	60	82	39	61	39
255630	Residential	60	82	50	74	50
255640	Residential	60	82	38	61	38
255641	Residential	60	82	51	75	51
255691	Residential	60	82	55	78	55
255776	Residential	60	82	58	81	58
255777	Residential	60	82	56	79	56
255835	Residential	60	82	49	73	49
255861	Residential	60	82	48	71	48
255865	Residential	60	82	47	70	47
255892	Residential	60	82	45	68	45
255934	Residential	60	82	51	73	51
255984	Residential	60	82	53	77	53
256012	Residential	60	82	40	62	40
256019	Residential	60	82	61	85	61
256048	Residential	60	82	52	74	52
256057	Residential	60	82	54	77	54
256166	Residential	60	82	61	84	61
256191	Residential	60	82	53	77	53
256192	Residential	60	82	56	79	56
256213	Residential	60	82	57	80	57
256248	Residential	60	82	48	70	48
256284	Residential	60	82	49	72	49
256289	Residential	60	82	46	69	46
256408	Residential	60	82	51	73	51
256574	Residential	60	82	50	72	50
256709	Residential	60	82	49	72	49
256813	Residential	60	82	44	68	44
256817	Residential	60	82	51	75	51
256879	Residential	60	82	44	67	44
256882	Residential	60	82	47	70	47
256926	Residential	60	82	48	71	48
256951	Residential	60	82	45	69	45
257009	Residential	60	82	48	71	48
257028	Residential	60	82	55	78	56
257039	Residential	60	82	47	68	47
257046	Residential	60	82	55	77	55
257128	Residential	60	82	46	70	46
259291	Residential	60	82	52	75	52
259381	Residential	60	82	51	74	51
259957	Residential	60	82	53	75	53
260029	Residential	60	82	52	75	52
260058	Residential	60	82	66	89	66
260067	Residential	60	82	64	87	64
260069	Residential	60	82	54	77	54
260119	Residential	60	82	60	84	61
260150	Residential	60	82	59	83	59
260165	Residential	60	82	58	81	59
260169	Residential	60	82	61	85	61
260170	Residential	60	82	62	86	62
260189	Residential	60	82	63	87	63
260213	Residential	60	82	65	89	65
260446	Residential	60	82	52	75	52

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
260528	Residential	60	82	63	87	63
260630	Residential	60	82	48	72	48
260789	Residential	60	82	39	63	39
260930	Residential	60	82	58	82	58
261084	Residential	60	82	62	86	62
261368	Residential	60	82	60	84	61
261386	Residential	60	82	61	85	62
261419	Residential	60	82	51	73	51
261452	Residential	60	82	59	82	59
261465	Residential	60	82	59	82	59
261493	Residential	60	82	61	84	61
261535	Residential	60	82	57	81	57
261542	Residential	60	82	47	69	47
261572	Residential	60	82	57	80	57
261608	Residential	60	82	55	78	55
261613	Residential	60	82	52	76	52
261633	Residential	60	82	49	71	49
261638	Residential	60	82	60	83	60
261649	Residential	60	82	57	81	58
261661	Residential	60	82	56	80	57
261665	Residential	60	82	60	84	61
261686	Residential	60	82	63	86	63
261687	Residential	60	82	60	84	61
261703	Residential	60	82	61	84	61
261713	Residential	60	82	53	76	54
261717	Residential	60	82	58	82	58
261720	Residential	60	82	62	86	63
261729	Residential	60	82	63	87	63
261739	Residential	60	82	63	87	63
261781	Residential	60	82	52	75	53
261786	Residential	60	82	52	75	53
261806	Residential	60	82	52	76	53
261855	Residential	60	82	52	75	53
261888	Residential	60	82	49	72	49
261892	Residential	60	82	50	73	51
261908	Residential	60	82	63	87	63
261910	Residential	60	82	49	72	49
261913	Residential	60	82	48	71	48
261927	Residential	60	82	50	73	50
261958	Residential	60	82	50	73	50
261969	Residential	60	82	62	86	62
261999	Residential	60	82	48	71	48
262034	Residential	60	82	52	75	52
262063	Residential	60	82	52	75	53
262104	Residential	60	82	52	75	52
262181	Residential	60	82	52	75	52
262211	Residential	60	82	49	72	49
262286	Residential	60	82	53	76	53
263137	Residential	60	82	52	75	52
263676	Residential	60	82	50	73	50
263929	Residential	60	82	48	71	48
314565	Residential	60	82	51	72	51
314594	Residential	60	82	47	70	47
314600	Residential	60	82	48	71	48
314629	Residential	60	82	50	72	50
314940	Residential	60	82	51	73	51
315063	Residential	60	82	54	76	54
315138	Residential	60	82	60	84	60

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
315139	Residential	60	82	63	87	63
315262	Residential	60	82	61	84	61
315314	Residential	60	82	52	75	52
315319	Residential	60	82	61	85	61
315421	Residential	60	82	65	88	65
316186	Residential	60	82	51	73	51
316281	Residential	60	82	42	65	42
316291	Residential	60	82	41	64	41
316328	Residential	60	82	55	77	55
316394	Residential	60	82	53	76	53
316410	Residential	60	82	42	66	42
316470	Residential	60	82	51	74	51
316509	Residential	60	82	52	75	52
316523	Residential	60	82	51	74	51
316557	Residential	60	82	51	73	51
316558	Residential	60	82	52	74	52
316573	Residential	60	82	50	74	50
316600	Residential	60	82	51	74	51
316608	Residential	60	82	50	73	50
316612	Residential	60	82	47	71	47
316617	Residential	60	82	50	73	50
316621	Residential	60	82	50	73	50
316622	Residential	60	82	49	73	49
316637	Residential	60	82	48	72	48
316641	Residential	60	82	49	73	49
316648	Residential	60	82	51	74	51
316649	Residential	60	82	50	73	50
316659	Residential	60	82	49	72	49
316673	Residential	60	82	49	72	49
316675	Residential	60	82	49	72	49
316677	Residential	60	82	49	72	49
316695	Residential	60	82	49	72	49
316710	Residential	60	82	49	72	49
316712	Residential	60	82	49	72	49
316713	Residential	60	82	48	71	48
316716	Residential	60	82	49	72	49
316717	Residential	60	82	51	73	51
316720	Residential	60	82	49	72	49
316722	Residential	60	82	48	72	48
316724	Residential	60	82	48	72	48
316726	Residential	60	82	48	71	48
316734	Residential	60	82	47	70	47
316738	Residential	60	82	51	73	51
316739	Residential	60	82	47	70	47
316746	Residential	60	82	48	72	48
316747	Residential	60	82	47	71	47
316756	Residential	60	82	48	72	48
316762	Residential	60	82	47	71	47
316763	Residential	60	82	50	73	50
316764	Residential	60	82	47	71	47
316770	Residential	60	82	48	71	48
316772	Residential	60	82	48	71	48
316776	Residential	60	82	47	70	47
316778	Residential	60	82	48	72	48
316781	Residential	60	82	48	71	48
316787	Residential	60	82	48	71	48
316793	Residential	60	82	48	71	48
316797	Residential	60	82	48	71	48

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
316800	Residential	60	82	46	69	46
316811	Residential	60	82	48	71	48
316815	Residential	60	82	48	71	48
316820	Residential	60	82	48	72	48
316821	Residential	60	82	48	71	48
316823	Residential	60	82	47	71	47
316825	Residential	60	82	47	71	47
316826	Residential	60	82	45	69	45
316831	Residential	60	82	47	71	47
316833	Residential	60	82	46	70	46
316846	Residential	60	82	47	71	47
316848	Residential	60	82	46	69	46
316849	Residential	60	82	49	72	49
316860	Residential	60	82	46	70	46
316861	Residential	60	82	47	71	47
316862	Residential	60	82	46	69	46
316866	Residential	60	82	47	70	47
316869	Residential	60	82	47	70	47
316877	Residential	60	82	46	70	46
316878	Residential	60	82	47	70	47
316880	Residential	60	82	46	70	46
316889	Residential	60	82	47	70	47
316890	Residential	60	82	47	70	47
316902	Residential	60	82	46	70	46
316903	Residential	60	82	47	70	47
316907	Residential	60	82	47	70	47
316908	Residential	60	82	47	70	47
316914	Residential	60	82	47	70	47
316915	Residential	60	82	47	70	47
316916	Residential	60	82	47	70	47
316917	Residential	60	82	47	70	47
316920	Residential	60	82	47	70	47
316924	Residential	60	82	46	70	46
316926	Residential	60	82	48	71	48
316927	Residential	60	82	46	70	46
316929	Residential	60	82	46	70	46
316930	Residential	60	82	45	68	45
316931	Residential	60	82	45	69	45
316938	Residential	60	82	46	69	46
316939	Residential	60	82	49	71	49
316942	Residential	60	82	44	68	44
316943	Residential	60	82	43	67	43
316944	Residential	60	82	42	65	42
316948	Residential	60	82	41	65	41
316952	Residential	60	82	43	67	43
316953	Residential	60	82	44	67	44
316954	Residential	60	82	41	65	41
316957	Residential	60	82	46	70	46
316960	Residential	60	82	46	69	46
316962	Residential	60	82	47	70	47
316963	Residential	60	82	42	65	42
316966	Residential	60	82	44	67	44
316970	Residential	60	82	46	69	46
316971	Residential	60	82	46	69	46
316973	Residential	60	82	41	64	41
316975	Residential	60	82	37	61	37
316976	Residential	60	82	46	69	46
316980	Residential	60	82	45	69	45

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
316982	Residential	60	82	47	70	47
316992	Residential	60	82	44	68	44
316993	Residential	60	82	43	67	43
316997	Residential	60	82	45	69	45
317002	Residential	60	82	44	68	44
317003	Residential	60	82	45	69	45
317005	Residential	60	82	42	66	42
317011	Residential	60	82	43	66	43
317013	Residential	60	82	45	68	45
317018	Residential	60	82	46	69	46
317021	Residential	60	82	44	67	44
317022	Residential	60	82	45	69	45
317024	Residential	60	82	43	66	43
317027	Residential	60	82	44	68	44
317028	Residential	60	82	33	56	33
317030	Residential	60	82	41	65	41
317033	Residential	60	82	44	68	44
317035	Residential	60	82	42	66	42
317041	Residential	60	82	44	68	44
317042	Residential	60	82	42	65	42
317043	Residential	60	82	45	68	45
317044	Residential	60	82	42	66	42
317045	Residential	60	82	43	67	43
317046	Residential	60	82	41	64	41
317047	Residential	60	82	44	68	44
317060	Residential	60	82	40	64	40
317062	Residential	60	82	43	67	43
317063	Residential	60	82	46	69	46
317067	Residential	60	82	48	71	48
317068	Residential	60	82	43	67	43
317074	Residential	60	82	36	60	36
317077	Residential	60	82	45	68	45
317078	Residential	60	82	44	68	44
317079	Residential	60	82	44	67	44
317084	Residential	60	82	44	67	44
317090	Residential	60	82	43	66	43
317094	Residential	60	82	44	67	44
317096	Residential	60	82	44	67	44
317099	Residential	60	82	41	64	41
317100	Residential	60	82	44	68	44
317101	Residential	60	82	44	67	44
317102	Residential	60	82	42	66	42
317103	Residential	60	82	24	47	24
317104	Residential	60	82	45	69	45
317105	Residential	60	82	43	67	43
317107	Residential	60	82	44	67	44
317109	Residential	60	82	44	68	44
317110	Residential	60	82	25	48	25
317112	Residential	60	82	42	66	42
317118	Residential	60	82	44	68	44
317124	Residential	60	82	24	48	24
317131	Residential	60	82	32	56	32
317135	Residential	60	82	43	67	43
317136	Residential	60	82	43	67	43
317140	Residential	60	82	27	51	27
317144	Residential	60	82	42	66	42
317145	Residential	60	82	44	68	44
317151	Residential	60	82	44	68	44

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317154	Residential	60	82	45	68	45
317159	Residential	60	82	43	66	43
317161	Residential	60	82	41	64	41
317171	Residential	60	82	38	61	38
317172	Residential	60	82	38	62	38
317180	Residential	60	82	41	65	41
317183	Residential	60	82	44	68	44
317189	Residential	60	82	24	47	24
317191	Residential	60	82	44	68	44
317192	Residential	60	82	39	62	39
317193	Residential	60	82	36	60	36
317197	Residential	60	82	41	65	41
317198	Residential	60	82	44	67	44
317199	Residential	60	82	44	67	44
317200	Residential	60	82	41	65	41
317201	Residential	60	82	40	64	40
317206	Residential	60	82	42	65	42
317207	Residential	60	82	43	67	43
317212	Residential	60	82	44	68	44
317213	Residential	60	82	43	67	43
317215	Residential	60	82	42	66	42
317216	Residential	60	82	42	66	42
317223	Residential	60	82	41	65	41
317228	Residential	60	82	43	66	43
317230	Residential	60	82	42	66	42
317241	Residential	60	82	40	64	40
317242	Residential	60	82	24	47	24
317245	Residential	60	82	24	47	24
317246	Residential	60	82	24	47	24
317247	Residential	60	82	42	66	42
317248	Residential	60	82	41	64	41
317250	Residential	60	82	42	66	42
317256	Residential	60	82	40	64	40
317257	Residential	60	82	37	60	37
317258	Residential	60	82	43	66	43
317264	Residential	60	82	35	59	35
317265	Residential	60	82	37	60	37
317266	Residential	60	82	28	52	28
317268	Residential	60	82	39	63	39
317269	Residential	60	82	36	60	36
317270	Residential	60	82	38	61	38
317271	Residential	60	82	39	62	39
317273	Residential	60	82	24	47	24
317274	Residential	60	82	40	63	40
317277	Residential	60	82	43	66	43
317278	Residential	60	82	39	62	39
317282	Residential	60	82	31	54	31
317285	Residential	60	82	23	47	23
317286	Residential	60	82	38	62	38
317290	Residential	60	82	38	62	38
317297	Residential	60	82	42	65	42
317300	Residential	60	82	42	65	42
317312	Residential	60	82	23	46	23
317322	Residential	60	82	42	66	42
317325	Residential	60	82	41	64	41
317326	Residential	60	82	41	64	41
317330	Residential	60	82	23	46	23
317331	Residential	60	82	39	63	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317335	Residential	60	82	42	65	42
317346	Residential	60	82	23	46	23
317352	Residential	60	82	24	48	24
317355	Residential	60	82	43	66	43
317357	Residential	60	82	23	47	23
317358	Residential	60	82	25	48	25
317361	Residential	60	82	40	64	40
317371	Residential	60	82	39	63	39
317372	Residential	60	82	23	46	23
317373	Residential	60	82	23	46	23
317378	Residential	60	82	40	64	40
317379	Residential	60	82	36	59	36
317385	Residential	60	82	38	62	38
317397	Residential	60	82	40	63	40
317399	Residential	60	82	32	55	32
317411	Residential	60	82	34	58	34
317412	Residential	60	82	22	46	22
317418	Residential	60	82	39	62	39
317423	Residential	60	82	22	46	22
317426	Residential	60	82	40	63	40
317428	Residential	60	82	39	62	39
317429	Residential	60	82	34	57	34
317437	Residential	60	82	22	46	22
317443	Residential	60	82	31	55	31
317452	Residential	60	82	38	61	38
317456	Residential	60	82	22	45	22
317457	Residential	60	82	34	58	34
317460	Residential	60	82	22	45	22
317462	Residential	60	82	28	51	28
317466	Residential	60	82	23	46	23
317467	Residential	60	82	36	60	36
317468	Residential	60	82	38	61	38
317471	Residential	60	82	34	57	34
317473	Residential	60	82	35	58	35
317474	Residential	60	82	21	45	22
317477	Residential	60	82	22	45	22
317480	Residential	60	82	23	46	23
317481	Residential	60	82	38	62	38
317485	Residential	60	82	26	50	26
317489	Residential	60	82	34	58	34
317493	Residential	60	82	21	45	21
317498	Residential	60	82	30	53	30
317499	Residential	60	82	34	58	34
317502	Residential	60	82	36	60	36
317504	Residential	60	82	23	47	23
317506	Residential	60	82	21	45	21
317508	Residential	60	82	23	46	23
317516	Residential	60	82	31	54	31
317517	Residential	60	82	21	45	21
317523	Residential	60	82	33	56	33
317526	Residential	60	82	24	48	24
317528	Residential	60	82	31	54	31
317530	Residential	60	82	32	56	32
317536	Residential	60	82	32	55	32
317539	Residential	60	82	21	45	22
317544	Residential	60	82	21	44	21
317549	Residential	60	82	21	44	21
317550	Residential	60	82	27	50	27

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
317554	Residential	60	82	23	46	23
317558	Residential	60	82	32	55	32
317562	Residential	60	82	29	52	29
317580	Residential	60	82	23	46	23
317586	Residential	60	82	29	53	29
317589	Residential	60	82	21	44	21
317602	Residential	60	82	20	43	20
317606	Residential	60	82	21	45	21
317609	Residential	60	82	21	44	21
317611	Residential	60	82	25	49	25
317613	Residential	60	82	26	50	26
317630	Residential	60	82	19	43	20
317636	Residential	60	82	22	45	22
317641	Residential	60	82	19	43	19
317649	Residential	60	82	19	42	19
317658	Residential	60	82	20	43	20
317663	Residential	60	82	21	45	21
317696	Residential	60	82	18	41	18
317697	Residential	60	82	18	42	18
317699	Residential	60	82	19	42	19
317703	Residential	60	82	18	42	18
317712	Residential	60	82	17	41	17
317732	Residential	60	82	17	40	17
317734	Residential	60	82	16	39	16
317749	Residential	60	82	18	41	18
317757	Residential	60	82	17	40	17
318983	Residential	60	82	42	65	42
318985	Residential	60	82	52	75	52
318986	Residential	60	82	38	61	38
318992	Residential	60	82	47	71	47
318997	Residential	60	82	49	70	49
318998	Residential	60	82	41	64	41
318999	Residential	60	82	45	68	45
319002	Residential	60	82	30	54	30
319003	Residential	60	82	51	74	52
319005	Residential	60	82	41	63	41
319009	Residential	60	82	52	76	52
319012	Residential	60	82	54	77	54
319013	Residential	60	82	43	66	43
319016	Residential	60	82	51	74	51
319017	Residential	60	82	50	72	50
319019	Residential	60	82	57	81	57
319020	Residential	60	82	48	71	48
319022	Residential	60	82	50	73	50
319024	Residential	60	82	49	72	49
319031	Residential	60	82	44	67	44
319032	Residential	60	82	51	74	51
319034	Residential	60	82	41	64	41
319035	Residential	60	82	42	66	42
319037	Residential	60	82	51	74	51
319039	Residential	60	82	54	77	54
319040	Residential	60	82	49	72	49
319042	Residential	60	82	52	74	52
319044	Residential	60	82	51	76	51
319045	Residential	60	82	60	83	60
319048	Residential	60	82	54	77	55
319049	Residential	60	82	50	73	50
319052	Residential	60	82	40	64	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319053	Residential	60	82	40	64	40
319054	Residential	60	82	43	66	43
319055	Residential	60	82	43	67	43
319057	Residential	60	82	44	67	44
319058	Residential	60	82	47	70	47
319059	Residential	60	82	45	68	45
319061	Residential	60	82	35	59	35
319062	Residential	60	82	42	65	42
319064	Residential	60	82	42	64	42
319066	Residential	60	82	46	70	46
319071	Residential	60	82	46	69	46
319073	Residential	60	82	39	63	39
319076	Residential	60	82	24	47	24
319077	Residential	60	82	46	68	46
319082	Residential	60	82	42	66	42
319088	Residential	60	82	50	72	50
319090	Residential	60	82	48	71	48
319094	Residential	60	82	47	69	47
319098	Residential	60	82	53	77	53
319099	Residential	60	82	53	77	53
319100	Residential	60	82	52	75	52
319101	Residential	60	82	61	84	61
319103	Residential	60	82	59	83	59
319104	Residential	60	82	58	82	58
319111	Residential	60	82	48	70	48
319112	Residential	60	82	47	70	47
319114	Residential	60	82	47	71	47
319117	Residential	60	82	47	70	47
319121	Residential	60	82	63	87	63
319122	Residential	60	82	37	59	37
319126	Residential	60	82	49	72	49
319129	Residential	60	82	44	67	44
319133	Residential	60	82	46	69	46
319134	Residential	60	82	45	69	45
319135	Residential	60	82	45	68	45
319138	Residential	60	82	57	80	57
319141	Residential	60	82	50	73	50
319143	Residential	60	82	43	67	43
319145	Residential	60	82	50	72	50
319147	Residential	60	82	50	74	50
319150	Residential	60	82	62	85	62
319152	Residential	60	82	32	55	32
319154	Residential	60	82	58	81	58
319157	Residential	60	82	48	71	48
319163	Residential	60	82	51	74	51
319166	Residential	60	82	59	83	59
319167	Residential	60	82	44	66	44
319168	Residential	60	82	51	74	51
319174	Residential	60	82	48	71	48
319175	Residential	60	82	52	74	52
319178	Residential	60	82	28	50	28
319180	Residential	60	82	33	58	33
319183	Residential	60	82	46	69	46
319184	Residential	60	82	46	69	46
319185	Residential	60	82	45	68	45
319186	Residential	60	82	40	63	40
319190	Residential	60	82	47	71	47
319191	Residential	60	82	62	86	62

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319193	Residential	60	82	61	84	61
319194	Residential	60	82	46	70	46
319199	Residential	60	82	51	74	51
319200	Residential	60	82	58	81	58
319201	Residential	60	82	45	69	45
319203	Residential	60	82	48	71	48
319205	Residential	60	82	50	72	50
319206	Residential	60	82	52	76	52
319210	Residential	60	82	42	66	42
319214	Residential	60	82	51	72	51
319219	Residential	60	82	52	75	52
319220	Residential	60	82	52	74	52
319224	Residential	60	82	47	71	47
319225	Residential	60	82	48	71	48
319226	Residential	60	82	55	79	56
319228	Residential	60	82	42	65	42
319230	Residential	60	82	43	67	43
319235	Residential	60	82	51	74	51
319239	Residential	60	82	31	55	31
319240	Residential	60	82	41	63	41
319246	Residential	60	82	48	69	48
319247	Residential	60	82	54	77	54
319248	Residential	60	82	32	55	32
319249	Residential	60	82	31	54	31
319254	Residential	60	82	41	64	41
319261	Residential	60	82	47	70	47
319263	Residential	60	82	50	74	50
319267	Residential	60	82	49	72	49
319269	Residential	60	82	49	72	49
319275	Residential	60	82	50	72	50
319276	Residential	60	82	47	70	47
319279	Residential	60	82	52	76	52
319280	Residential	60	82	45	68	45
319283	Residential	60	82	48	71	48
319285	Residential	60	82	52	74	52
319287	Residential	60	82	52	74	52
319289	Residential	60	82	48	71	48
319292	Residential	60	82	51	74	51
319293	Residential	60	82	53	76	53
319294	Residential	60	82	57	80	57
319297	Residential	60	82	57	80	57
319298	Residential	60	82	48	71	48
319299	Residential	60	82	55	78	55
319300	Residential	60	82	52	76	52
319302	Residential	60	82	54	78	54
319303	Residential	60	82	49	70	49
319308	Residential	60	82	39	64	39
319309	Residential	60	82	36	59	36
319312	Residential	60	82	45	68	45
319315	Residential	60	82	55	78	55
319317	Residential	60	82	42	63	42
319318	Residential	60	82	41	63	41
319320	Residential	60	82	44	67	44
319323	Residential	60	82	37	60	37
319327	Residential	60	82	50	73	50
319328	Residential	60	82	49	71	49
319331	Residential	60	82	54	77	54
319332	Residential	60	82	43	67	43

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
319336	Residential	60	82	43	66	43
319341	Residential	60	82	51	75	51
319344	Residential	60	82	44	67	44
319349	Residential	60	82	54	77	54
319352	Residential	60	82	40	64	40
319356	Residential	60	82	51	73	51
319357	Residential	60	82	50	73	50
319362	Residential	60	82	52	74	52
319363	Residential	60	82	51	74	51
319364	Residential	60	82	53	76	53
319365	Residential	60	82	51	74	51
319374	Residential	60	82	49	71	49
319396	Residential	60	82	39	62	39
319400	Residential	60	82	35	58	35
319409	Residential	60	82	33	56	33
319420	Residential	60	82	42	65	42
319452	Residential	60	82	57	80	57
319464	Residential	60	82	46	68	46
319465	Residential	60	82	57	80	57
319481	Residential	60	82	57	81	57
319483	Residential	60	82	44	66	44
319485	Residential	60	82	63	86	63
319490	Residential	60	82	48	72	48
319491	Residential	60	82	31	54	31
319493	Residential	60	82	53	75	53
319495	Residential	60	82	44	68	44
319500	Residential	60	82	46	70	46
319505	Residential	60	82	47	71	47
319570	Residential	60	82	38	61	38
319605	Residential	60	82	58	81	58
319629	Residential	60	82	45	68	45
319630	Residential	60	82	39	61	39
319640	Residential	60	82	49	72	49
319652	Residential	60	82	56	79	56
319653	Residential	60	82	48	72	48
319659	Residential	60	82	32	55	32
319682	Residential	60	82	37	60	37
319693	Residential	60	82	38	61	38
319704	Residential	60	82	42	65	42
319707	Residential	60	82	46	69	46
319718	Residential	60	82	50	72	50
319732	Residential	60	82	50	71	50
319733	Residential	60	82	57	80	57
319734	Residential	60	82	52	75	52
319736	Residential	60	82	53	75	53
319737	Residential	60	82	44	68	44
319748	Residential	60	82	40	63	40
319752	Residential	60	82	27	51	27
319767	Residential	60	82	46	70	46
319803	Residential	60	82	50	74	50
319816	Residential	60	82	39	63	39
319848	Residential	60	82	62	85	62
320062	Residential	60	82	47	68	47
320180	Residential	60	82	55	78	55
320263	Residential	60	82	40	62	40
320346	Residential	60	82	37	61	37
320350	Residential	60	82	46	70	46
320355	Residential	60	82	31	53	31

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320356	Residential	60	82	38	60	38
320357	Residential	60	82	42	64	42
320358	Residential	60	82	54	77	54
320359	Residential	60	82	42	66	42
320360	Residential	60	82	49	72	49
320363	Residential	60	82	52	76	52
320364	Residential	60	82	48	71	48
320365	Residential	60	82	52	75	52
320366	Residential	60	82	46	70	46
320376	Residential	60	82	56	79	56
320432	Residential	60	82	47	70	47
320433	Residential	60	82	47	70	47
320434	Residential	60	82	46	69	46
320435	Residential	60	82	49	71	49
320436	Residential	60	82	45	68	45
320437	Residential	60	82	50	73	50
320439	Residential	60	82	50	72	50
320440	Residential	60	82	26	49	26
320441	Residential	60	82	49	71	49
320442	Residential	60	82	52	74	52
320444	Residential	60	82	51	73	51
320448	Residential	60	82	50	72	50
320449	Residential	60	82	53	75	53
320450	Residential	60	82	37	60	37
320451	Residential	60	82	45	68	45
320453	Residential	60	82	43	66	43
320454	Residential	60	82	48	71	48
320456	Residential	60	82	50	72	50
320457	Residential	60	82	49	71	49
320458	Residential	60	82	42	66	42
320459	Residential	60	82	50	72	50
320460	Residential	60	82	48	70	48
320461	Residential	60	82	52	74	52
320462	Residential	60	82	49	71	49
320463	Residential	60	82	48	70	48
320465	Residential	60	82	50	73	50
320467	Residential	60	82	27	50	27
320468	Residential	60	82	47	70	47
320469	Residential	60	82	50	72	50
320470	Residential	60	82	48	70	48
320471	Residential	60	82	51	72	51
320472	Residential	60	82	53	76	53
320473	Residential	60	82	48	71	48
320474	Residential	60	82	49	71	49
320475	Residential	60	82	52	75	52
320476	Residential	60	82	49	71	49
320477	Residential	60	82	52	75	52
320478	Residential	60	82	50	72	50
320479	Residential	60	82	49	72	49
320484	Residential	60	82	52	74	52
320492	Residential	60	82	44	67	44
320496	Residential	60	82	49	72	49
320501	Residential	60	82	47	70	47
320503	Residential	60	82	37	60	37
320507	Residential	60	82	47	69	47
320524	Residential	60	82	51	73	51
320550	Residential	60	82	53	75	53
320551	Residential	60	82	44	67	44

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320555	Residential	60	82	47	70	47
320557	Residential	60	82	59	83	59
320562	Residential	60	82	48	71	48
320567	Residential	60	82	29	51	29
320568	Residential	60	82	47	69	47
320569	Residential	60	82	28	50	28
320570	Residential	60	82	47	71	47
320572	Residential	60	82	51	73	51
320573	Residential	60	82	50	71	50
320574	Residential	60	82	49	71	49
320575	Residential	60	82	43	67	43
320576	Residential	60	82	48	71	48
320577	Residential	60	82	49	71	49
320579	Residential	60	82	48	71	48
320580	Residential	60	82	49	71	49
320581	Residential	60	82	58	81	58
320582	Residential	60	82	46	68	46
320583	Residential	60	82	46	69	46
320584	Residential	60	82	53	75	53
320585	Residential	60	82	48	71	48
320586	Residential	60	82	32	55	32
320587	Residential	60	82	48	71	48
320588	Residential	60	82	49	72	49
320589	Residential	60	82	51	73	51
320590	Residential	60	82	50	72	50
320591	Residential	60	82	48	70	48
320592	Residential	60	82	51	73	51
320593	Residential	60	82	51	73	51
320594	Residential	60	82	48	70	48
320596	Residential	60	82	27	50	27
320597	Residential	60	82	51	73	51
320598	Residential	60	82	53	76	53
320599	Residential	60	82	54	76	54
320600	Residential	60	82	49	72	49
320601	Residential	60	82	51	73	51
320602	Residential	60	82	51	73	51
320603	Residential	60	82	49	71	49
320604	Residential	60	82	48	71	48
320605	Residential	60	82	45	68	45
320606	Residential	60	82	52	74	52
320607	Residential	60	82	33	57	33
320612	Residential	60	82	46	70	46
320645	Residential	60	82	51	73	51
320646	Residential	60	82	48	71	48
320647	Residential	60	82	43	66	43
320658	Residential	60	82	34	57	34
320661	Residential	60	82	47	69	47
320665	Residential	60	82	48	70	48
320669	Residential	60	82	39	61	39
320678	Residential	60	82	47	70	47
320684	Residential	60	82	27	50	27
320685	Residential	60	82	34	58	34
320686	Residential	60	82	51	73	51
320687	Residential	60	82	46	70	46
320688	Residential	60	82	33	56	33
320689	Residential	60	82	38	61	38
320691	Residential	60	82	45	68	45
320692	Residential	60	82	43	66	43

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320695	Residential	60	82	34	58	34
320698	Residential	60	82	34	57	34
320700	Residential	60	82	41	65	41
320704	Residential	60	82	27	51	27
320707	Residential	60	82	41	64	41
320708	Residential	60	82	45	69	45
320709	Residential	60	82	38	62	38
320710	Residential	60	82	30	54	30
320713	Residential	60	82	30	53	30
320714	Residential	60	82	44	67	44
320716	Residential	60	82	47	70	47
320718	Residential	60	82	46	69	46
320719	Residential	60	82	33	57	33
320720	Residential	60	82	28	52	28
320721	Residential	60	82	29	53	29
320722	Residential	60	82	31	55	31
320724	Residential	60	82	35	58	35
320728	Residential	60	82	34	57	34
320733	Residential	60	82	35	58	35
320734	Residential	60	82	32	56	32
320739	Residential	60	82	33	56	33
320740	Residential	60	82	36	59	36
320742	Residential	60	82	39	63	39
320743	Residential	60	82	45	68	45
320744	Residential	60	82	35	59	35
320753	Residential	60	82	35	58	35
320754	Residential	60	82	41	65	41
320769	Residential	60	82	40	64	40
320841	Residential	60	82	36	59	36
320844	Residential	60	82	41	63	41
320845	Residential	60	82	35	59	35
320846	Residential	60	82	46	69	46
320850	Residential	60	82	43	66	43
320851	Residential	60	82	41	63	41
320854	Residential	60	82	36	59	36
320855	Residential	60	82	36	59	36
320856	Residential	60	82	50	73	50
320857	Residential	60	82	50	73	50
320859	Residential	60	82	52	75	52
320860	Residential	60	82	55	79	55
320863	Residential	60	82	40	62	40
320864	Residential	60	82	40	63	40
320867	Residential	60	82	43	65	43
320870	Residential	60	82	43	65	43
320871	Residential	60	82	44	65	44
320872	Residential	60	82	42	65	42
320873	Residential	60	82	41	63	41
320874	Residential	60	82	40	62	40
320877	Residential	60	82	34	57	34
320878	Residential	60	82	36	59	36
320885	Residential	60	82	39	61	39
320886	Residential	60	82	42	64	42
320889	Residential	60	82	60	83	60
320890	Residential	60	82	56	80	56
320891	Residential	60	82	36	59	36
320892	Residential	60	82	37	60	37
320895	Residential	60	82	53	76	53
320896	Residential	60	82	42	64	42

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
320897	Residential	60	82	42	64	42
320899	Residential	60	82	40	62	40
320900	Residential	60	82	41	64	41
320934	Residential	60	82	41	63	41
320937	Residential	60	82	54	77	54
320939	Residential	60	82	49	72	49
320940	Residential	60	82	40	63	40
320941	Residential	60	82	36	59	36
320942	Residential	60	82	37	59	37
320943	Residential	60	82	40	62	40
320946	Residential	60	82	52	75	52
320947	Residential	60	82	43	66	43
320951	Residential	60	82	52	75	52
320954	Residential	60	82	41	63	41
320955	Residential	60	82	42	64	42
320957	Residential	60	82	39	61	39
320977	Residential	60	82	55	79	55
320980	Residential	60	82	43	65	43
320985	Residential	60	82	48	71	48
320986	Residential	60	82	42	65	42
320987	Residential	60	82	38	61	38
320988	Residential	60	82	35	59	35
320990	Residential	60	82	54	77	54
320991	Residential	60	82	34	57	34
320992	Residential	60	82	35	57	35
320994	Residential	60	82	34	57	34
320996	Residential	60	82	39	62	39
320997	Residential	60	82	42	64	42
321001	Residential	60	82	46	68	46
321016	Residential	60	82	46	69	46
321017	Residential	60	82	40	62	40
321019	Residential	60	82	47	69	47
321020	Residential	60	82	53	76	53
321021	Residential	60	82	41	63	41
321024	Residential	60	82	41	62	41
321025	Residential	60	82	40	61	40
321031	Residential	60	82	45	67	45
321032	Residential	60	82	50	72	50
321033	Residential	60	82	51	74	51
321034	Residential	60	82	53	76	53
321058	Residential	60	82	40	63	40
321061	Residential	60	82	40	62	40
321062	Residential	60	82	38	61	38
321064	Residential	60	82	41	63	41
321065	Residential	60	82	39	62	39
321066	Residential	60	82	34	57	34
321067	Residential	60	82	39	61	39
321068	Residential	60	82	38	61	38
321069	Residential	60	82	38	61	38
321073	Residential	60	82	46	68	46
321075	Residential	60	82	45	67	45
321077	Residential	60	82	38	61	38
321098	Residential	60	82	41	63	41
321099	Residential	60	82	41	63	41
321100	Residential	60	82	44	67	44
321104	Residential	60	82	44	67	44
321106	Residential	60	82	25	48	25
321111	Residential	60	82	41	63	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321118	Residential	60	82	44	65	44
321123	Residential	60	82	37	60	37
321124	Residential	60	82	45	67	45
321135	Residential	60	82	44	67	44
321141	Residential	60	82	48	71	48
321142	Residential	60	82	36	59	36
321144	Residential	60	82	39	62	39
321147	Residential	60	82	49	72	49
321155	Residential	60	82	36	59	36
321182	Residential	60	82	40	63	40
321184	Residential	60	82	60	84	60
321185	Residential	60	82	37	60	37
321186	Residential	60	82	35	58	35
321192	Residential	60	82	42	65	42
321197	Residential	60	82	50	72	50
321198	Residential	60	82	52	75	52
321199	Residential	60	82	42	64	42
321200	Residential	60	82	38	61	38
321205	Residential	60	82	33	56	33
321206	Residential	60	82	35	58	35
321207	Residential	60	82	36	60	36
321208	Residential	60	82	36	59	36
321209	Residential	60	82	37	60	37
321210	Residential	60	82	44	67	44
321214	Residential	60	82	39	62	39
321231	Residential	60	82	32	55	32
321233	Residential	60	82	40	62	40
321237	Residential	60	82	42	64	42
321241	Residential	60	82	32	55	32
321246	Residential	60	82	50	73	50
321247	Residential	60	82	40	62	40
321248	Residential	60	82	37	60	37
321249	Residential	60	82	49	72	49
321250	Residential	60	82	41	63	41
321252	Residential	60	82	43	65	43
321254	Residential	60	82	50	73	50
321256	Residential	60	82	47	71	47
321258	Residential	60	82	47	70	47
321277	Residential	60	82	37	60	37
321281	Residential	60	82	43	66	43
321282	Residential	60	82	41	64	41
321283	Residential	60	82	41	64	41
321284	Residential	60	82	52	75	52
321286	Residential	60	82	50	73	50
321292	Residential	60	82	44	66	44
321294	Residential	60	82	44	67	44
321296	Residential	60	82	51	74	51
321297	Residential	60	82	50	73	50
321299	Residential	60	82	38	61	38
321300	Residential	60	82	42	64	42
321301	Residential	60	82	38	60	38
321303	Residential	60	82	34	57	34
321305	Residential	60	82	42	64	42
321309	Residential	60	82	34	56	34
321332	Residential	60	82	52	75	52
321339	Residential	60	82	36	59	36
321343	Residential	60	82	36	59	36
321344	Residential	60	82	40	62	40

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321346	Residential	60	82	31	54	31
321347	Residential	60	82	34	58	34
321352	Residential	60	82	42	65	42
321353	Residential	60	82	42	64	42
321354	Residential	60	82	43	64	43
321356	Residential	60	82	41	64	41
321357	Residential	60	82	41	64	41
321358	Residential	60	82	46	69	46
321370	Residential	60	82	46	69	46
321371	Residential	60	82	40	62	40
321372	Residential	60	82	45	67	45
321373	Residential	60	82	43	65	43
321375	Residential	60	82	37	60	37
321376	Residential	60	82	39	61	39
321379	Residential	60	82	41	63	41
321381	Residential	60	82	58	81	58
321383	Residential	60	82	44	65	44
321385	Residential	60	82	42	63	42
321391	Residential	60	82	33	57	33
321394	Residential	60	82	42	63	42
321417	Residential	60	82	37	60	37
321422	Residential	60	82	36	59	36
321429	Residential	60	82	51	74	51
321431	Residential	60	82	37	60	37
321433	Residential	60	82	36	59	36
321434	Residential	60	82	37	60	37
321435	Residential	60	82	37	59	37
321436	Residential	60	82	42	63	42
321437	Residential	60	82	33	57	33
321438	Residential	60	82	41	63	41
321439	Residential	60	82	41	63	41
321440	Residential	60	82	44	67	44
321448	Residential	60	82	42	65	42
321451	Residential	60	82	41	63	41
321452	Residential	60	82	45	68	45
321457	Residential	60	82	59	82	59
321458	Residential	60	82	60	83	60
321485	Residential	60	82	39	62	39
321486	Residential	60	82	39	61	39
321489	Residential	60	82	49	72	49
321490	Residential	60	82	45	68	45
321491	Residential	60	82	45	67	45
321492	Residential	60	82	44	67	44
321494	Residential	60	82	30	53	30
321496	Residential	60	82	35	58	35
321502	Residential	60	82	31	55	31
321504	Residential	60	82	49	73	49
321533	Residential	60	82	44	67	44
321535	Residential	60	82	32	55	32
321539	Residential	60	82	52	75	52
321540	Residential	60	82	41	63	41
321541	Residential	60	82	40	62	40
321543	Residential	60	82	36	60	36
321544	Residential	60	82	44	66	44
321546	Residential	60	82	48	71	48
321548	Residential	60	82	48	71	48
321549	Residential	60	82	51	74	51
321551	Residential	60	82	41	64	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321555	Residential	60	82	51	74	51
321561	Residential	60	82	33	56	33
321562	Residential	60	82	35	58	35
321563	Residential	60	82	41	63	41
321564	Residential	60	82	44	66	44
321566	Residential	60	82	36	59	36
321567	Residential	60	82	40	63	40
321568	Residential	60	82	48	71	48
321569	Residential	60	82	47	69	47
321578	Residential	60	82	37	60	37
321581	Residential	60	82	45	68	45
321582	Residential	60	82	33	56	33
321583	Residential	60	82	36	59	36
321584	Residential	60	82	44	66	44
321585	Residential	60	82	51	74	51
321586	Residential	60	82	39	62	39
321587	Residential	60	82	37	60	37
321589	Residential	60	82	34	57	34
321590	Residential	60	82	37	60	37
321605	Residential	60	82	52	75	52
321612	Residential	60	82	40	63	40
321613	Residential	60	82	40	63	40
321618	Residential	60	82	60	83	60
321631	Residential	60	82	33	57	33
321632	Residential	60	82	36	60	36
321633	Residential	60	82	39	62	39
321634	Residential	60	82	41	65	41
321644	Residential	60	82	39	63	39
321645	Residential	60	82	34	57	34
321646	Residential	60	82	31	54	31
321648	Residential	60	82	33	57	33
321650	Residential	60	82	33	57	33
321655	Residential	60	82	27	51	27
321656	Residential	60	82	31	54	31
321657	Residential	60	82	44	67	44
321658	Residential	60	82	37	60	37
321659	Residential	60	82	38	62	38
321660	Residential	60	82	47	70	47
321663	Residential	60	82	29	53	29
321665	Residential	60	82	33	56	33
321666	Residential	60	82	34	58	34
321676	Residential	60	82	45	68	45
321677	Residential	60	82	42	65	42
321678	Residential	60	82	36	60	36
321679	Residential	60	82	39	63	39
321682	Residential	60	82	29	53	29
321687	Residential	60	82	46	69	46
321688	Residential	60	82	36	58	36
321689	Residential	60	82	50	73	50
321690	Residential	60	82	34	58	34
321691	Residential	60	82	48	70	48
321694	Residential	60	82	35	58	35
321695	Residential	60	82	36	60	36
321696	Residential	60	82	36	59	36
321697	Residential	60	82	32	56	32
321698	Residential	60	82	34	58	34
321699	Residential	60	82	34	57	34
321701	Residential	60	82	46	70	46

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321702	Residential	60	82	30	54	30
321706	Residential	60	82	45	69	45
321708	Residential	60	82	47	70	47
321709	Residential	60	82	34	58	34
321715	Residential	60	82	33	57	33
321716	Residential	60	82	33	57	33
321717	Residential	60	82	39	62	39
321718	Residential	60	82	33	56	33
321723	Residential	60	82	36	59	36
321724	Residential	60	82	36	59	36
321725	Residential	60	82	34	57	34
321726	Residential	60	82	44	68	44
321727	Residential	60	82	43	66	43
321733	Residential	60	82	45	69	45
321735	Residential	60	82	33	56	33
321737	Residential	60	82	33	56	33
321740	Residential	60	82	47	71	47
321742	Residential	60	82	27	51	27
321743	Residential	60	82	49	71	49
321747	Residential	60	82	46	69	46
321748	Residential	60	82	46	69	46
321751	Residential	60	82	28	52	28
321752	Residential	60	82	38	61	38
321753	Residential	60	82	34	58	34
321755	Residential	60	82	47	70	47
321756	Residential	60	82	39	63	39
321758	Residential	60	82	43	66	43
321759	Residential	60	82	46	69	46
321760	Residential	60	82	48	71	48
321762	Residential	60	82	28	52	28
321770	Residential	60	82	51	74	51
321789	Residential	60	82	39	61	39
321813	Residential	60	82	41	64	41
321814	Residential	60	82	33	57	33
321819	Residential	60	82	40	62	40
321821	Residential	60	82	51	74	51
321822	Residential	60	82	43	65	43
321842	Residential	60	82	44	67	44
321890	Residential	60	82	41	63	41
321903	Residential	60	82	38	61	38
321904	Residential	60	82	37	60	37
321907	Residential	60	82	52	75	52
321908	Residential	60	82	41	63	41
321909	Residential	60	82	50	73	50
321910	Residential	60	82	48	70	48
321911	Residential	60	82	39	62	39
321915	Residential	60	82	34	57	34
321920	Residential	60	82	51	74	51
321935	Residential	60	82	35	59	35
321936	Residential	60	82	36	59	36
321944	Residential	60	82	41	63	41
321947	Residential	60	82	43	65	43
321955	Residential	60	82	37	59	37
321957	Residential	60	82	43	65	43
321961	Residential	60	82	40	62	40
321963	Residential	60	82	38	61	38
321964	Residential	60	82	37	60	37
321965	Residential	60	82	41	63	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321968	Residential	60	82	43	66	43
321970	Residential	60	82	40	63	40
321971	Residential	60	82	40	62	40
321973	Residential	60	82	44	67	44
321974	Residential	60	82	52	75	52
321975	Residential	60	82	54	77	54
321976	Residential	60	82	35	58	35
321977	Residential	60	82	45	68	45
321978	Residential	60	82	40	63	40
321979	Residential	60	82	37	60	37
321980	Residential	60	82	39	62	39
321982	Residential	60	82	55	78	55
321987	Residential	60	82	40	63	40
321996	Residential	60	82	42	64	42
321999	Residential	60	82	43	65	43
322005	Residential	60	82	50	72	50
322011	Residential	60	82	43	66	43
322013	Residential	60	82	43	66	43
322021	Residential	60	82	41	63	41
322029	Residential	60	82	46	69	46
322031	Residential	60	82	45	68	45
322032	Residential	60	82	44	66	44
322033	Residential	60	82	46	68	46
322034	Residential	60	82	50	73	50
322036	Residential	60	82	50	73	50
322037	Residential	60	82	51	74	51
322038	Residential	60	82	40	63	40
322039	Residential	60	82	35	59	35
322040	Residential	60	82	41	63	41
322041	Residential	60	82	51	74	51
322042	Residential	60	82	51	74	51
322043	Residential	60	82	47	70	47
322044	Residential	60	82	55	78	55
322046	Residential	60	82	50	73	50
322047	Residential	60	82	58	81	58
322048	Residential	60	82	52	75	52
322049	Residential	60	82	37	59	37
322050	Residential	60	82	47	70	47
322051	Residential	60	82	35	58	35
322052	Residential	60	82	43	66	43
322053	Residential	60	82	44	67	44
322072	Residential	60	82	41	62	41
322073	Residential	60	82	42	63	42
322074	Residential	60	82	31	54	31
322076	Residential	60	82	47	70	47
322077	Residential	60	82	48	71	48
322078	Residential	60	82	41	64	41
322089	Residential	60	82	31	54	31
322096	Residential	60	82	49	71	49
322103	Residential	60	82	47	70	47
322104	Residential	60	82	47	70	47
322111	Residential	60	82	40	62	40
322112	Residential	60	82	32	55	32
322115	Residential	60	82	51	74	51
322116	Residential	60	82	44	67	44
322117	Residential	60	82	55	78	55
322118	Residential	60	82	39	62	39
322119	Residential	60	82	39	62	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322120	Residential	60	82	49	73	49
322122	Residential	60	82	41	64	41
322123	Residential	60	82	45	67	45
322124	Residential	60	82	38	61	38
322125	Residential	60	82	52	74	52
322127	Residential	60	82	35	58	35
322128	Residential	60	82	46	69	46
322129	Residential	60	82	37	60	37
322130	Residential	60	82	34	57	34
322131	Residential	60	82	53	76	53
322134	Residential	60	82	54	76	54
322135	Residential	60	82	54	76	54
322136	Residential	60	82	51	74	51
322139	Residential	60	82	53	76	53
322140	Residential	60	82	42	64	42
322142	Residential	60	82	48	71	48
322145	Residential	60	82	41	64	41
322153	Residential	60	82	46	69	46
322156	Residential	60	82	40	62	40
322166	Residential	60	82	48	72	48
322169	Residential	60	82	40	63	40
322170	Residential	60	82	37	60	37
322173	Residential	60	82	37	60	37
322180	Residential	60	82	39	62	39
322190	Residential	60	82	44	65	44
322192	Residential	60	82	46	70	46
322194	Residential	60	82	52	75	52
322195	Residential	60	82	51	74	51
322197	Residential	60	82	34	57	34
322198	Residential	60	82	40	62	40
322199	Residential	60	82	40	62	40
322202	Residential	60	82	43	66	43
322204	Residential	60	82	25	49	25
322205	Residential	60	82	39	61	39
322207	Residential	60	82	44	67	44
322208	Residential	60	82	41	63	41
322214	Residential	60	82	50	72	50
322215	Residential	60	82	42	65	42
322218	Residential	60	82	46	69	46
322233	Residential	60	82	34	57	34
322235	Residential	60	82	55	78	55
322236	Residential	60	82	37	60	37
322237	Residential	60	82	38	60	38
322238	Residential	60	82	52	75	52
322239	Residential	60	82	40	61	40
322241	Residential	60	82	44	66	44
322242	Residential	60	82	50	73	50
322243	Residential	60	82	41	64	41
322244	Residential	60	82	27	50	27
322245	Residential	60	82	42	64	42
322246	Residential	60	82	55	79	55
322249	Residential	60	82	44	67	44
322252	Residential	60	82	47	71	47
322255	Residential	60	82	38	61	38
322258	Residential	60	82	44	67	44
322259	Residential	60	82	45	67	45
322262	Residential	60	82	32	56	32
322267	Residential	60	82	36	59	36

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322269	Residential	60	82	40	63	40
322278	Residential	60	82	42	64	42
322281	Residential	60	82	42	64	42
322282	Residential	60	82	38	61	38
322292	Residential	60	82	42	64	42
322293	Residential	60	82	33	56	33
322294	Residential	60	82	35	58	35
322295	Residential	60	82	45	67	45
322296	Residential	60	82	44	66	44
322297	Residential	60	82	46	69	46
322298	Residential	60	82	43	65	43
322302	Residential	60	82	50	73	50
322303	Residential	60	82	48	71	48
322304	Residential	60	82	39	62	39
322305	Residential	60	82	38	61	38
322306	Residential	60	82	40	61	40
322307	Residential	60	82	43	65	43
322308	Residential	60	82	36	59	36
322309	Residential	60	82	44	65	44
322312	Residential	60	82	37	59	37
322318	Residential	60	82	39	61	39
322320	Residential	60	82	39	60	39
322323	Residential	60	82	36	60	36
322328	Residential	60	82	45	68	45
322350	Residential	60	82	53	76	53
322353	Residential	60	82	39	61	39
322354	Residential	60	82	41	64	41
322355	Residential	60	82	27	50	27
322356	Residential	60	82	44	67	44
322358	Residential	60	82	41	64	41
322359	Residential	60	82	41	64	41
322363	Residential	60	82	38	61	38
322365	Residential	60	82	43	65	43
322367	Residential	60	82	29	53	29
322368	Residential	60	82	36	58	36
322371	Residential	60	82	37	60	37
322375	Residential	60	82	37	59	37
322384	Residential	60	82	41	62	41
322386	Residential	60	82	42	64	42
322389	Residential	60	82	41	63	41
322391	Residential	60	82	56	79	56
322399	Residential	60	82	39	62	39
322420	Residential	60	82	36	59	36
322421	Residential	60	82	41	62	41
322423	Residential	60	82	49	72	49
322425	Residential	60	82	43	65	43
322426	Residential	60	82	43	65	43
322429	Residential	60	82	58	81	58
322430	Residential	60	82	38	61	38
322432	Residential	60	82	51	74	51
322435	Residential	60	82	52	75	52
322436	Residential	60	82	43	66	43
322439	Residential	60	82	44	67	44
322440	Residential	60	82	41	62	41
322443	Residential	60	82	44	67	44
322444	Residential	60	82	54	76	54
322445	Residential	60	82	42	63	42
322446	Residential	60	82	33	56	33

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322448	Residential	60	82	48	70	48
322449	Residential	60	82	42	64	42
322450	Residential	60	82	42	64	42
322451	Residential	60	82	42	64	42
322453	Residential	60	82	55	77	55
322456	Residential	60	82	37	60	37
322458	Residential	60	82	40	63	40
322460	Residential	60	82	44	66	44
322462	Residential	60	82	50	73	50
322470	Residential	60	82	31	55	31
322473	Residential	60	82	51	74	51
322478	Residential	60	82	38	60	38
322486	Residential	60	82	34	57	34
322488	Residential	60	82	42	63	42
322489	Residential	60	82	50	72	50
322490	Residential	60	82	51	74	51
322491	Residential	60	82	43	64	43
322492	Residential	60	82	55	78	55
322493	Residential	60	82	50	73	50
322494	Residential	60	82	58	81	58
322495	Residential	60	82	39	61	39
322496	Residential	60	82	49	72	49
322498	Residential	60	82	50	71	50
322500	Residential	60	82	41	63	41
322501	Residential	60	82	39	62	39
322507	Residential	60	82	43	64	43
322511	Residential	60	82	44	66	44
322514	Residential	60	82	42	65	42
322515	Residential	60	82	42	64	42
322518	Residential	60	82	40	63	40
322522	Residential	60	82	34	57	34
322523	Residential	60	82	35	58	35
322525	Residential	60	82	41	64	41
322526	Residential	60	82	38	60	38
322528	Residential	60	82	52	75	52
322529	Residential	60	82	56	80	56
322530	Residential	60	82	47	69	47
322531	Residential	60	82	41	64	41
322532	Residential	60	82	40	63	40
322533	Residential	60	82	36	59	36
322534	Residential	60	82	35	58	35
322542	Residential	60	82	47	69	47
322543	Residential	60	82	50	72	50
322546	Residential	60	82	32	55	32
322547	Residential	60	82	30	53	30
322549	Residential	60	82	26	50	26
322550	Residential	60	82	42	63	42
322551	Residential	60	82	32	55	32
322552	Residential	60	82	63	87	63
322553	Residential	60	82	41	64	41
322554	Residential	60	82	37	61	37
322557	Residential	60	82	38	60	38
322558	Residential	60	82	40	63	40
322559	Residential	60	82	42	65	42
322561	Residential	60	82	43	66	43
322562	Residential	60	82	47	71	47
322566	Residential	60	82	45	67	45
322567	Residential	60	82	52	75	52

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322569	Residential	60	82	39	62	39
322574	Residential	60	82	39	62	39
322575	Residential	60	82	42	65	42
322577	Residential	60	82	43	65	43
322578	Residential	60	82	47	70	47
322579	Residential	60	82	35	59	35
322581	Residential	60	82	40	62	40
322582	Residential	60	82	39	61	39
322583	Residential	60	82	41	63	41
322584	Residential	60	82	48	70	48
322589	Residential	60	82	44	66	44
322590	Residential	60	82	42	64	42
322592	Residential	60	82	36	59	36
322593	Residential	60	82	39	61	39
322595	Residential	60	82	32	55	32
322597	Residential	60	82	36	59	36
322598	Residential	60	82	41	63	41
322599	Residential	60	82	40	63	40
322600	Residential	60	82	52	76	52
322602	Residential	60	82	46	68	46
322603	Residential	60	82	49	73	49
322605	Residential	60	82	48	71	48
322606	Residential	60	82	45	67	45
322607	Residential	60	82	37	60	37
322608	Residential	60	82	39	61	39
322609	Residential	60	82	41	63	41
322610	Residential	60	82	41	63	41
322615	Residential	60	82	47	70	47
322617	Residential	60	82	44	67	44
322624	Residential	60	82	54	77	54
322625	Residential	60	82	56	79	56
322627	Residential	60	82	45	66	45
322628	Residential	60	82	42	64	42
322629	Residential	60	82	42	63	42
322630	Residential	60	82	46	68	46
322631	Residential	60	82	43	64	43
322635	Residential	60	82	38	60	38
322636	Residential	60	82	40	62	40
322637	Residential	60	82	40	62	40
322638	Residential	60	82	43	64	43
322639	Residential	60	82	40	63	40
322640	Residential	60	82	41	63	41
322643	Residential	60	82	41	63	41
322644	Residential	60	82	40	62	40
322646	Residential	60	82	53	76	53
322648	Residential	60	82	43	65	43
322649	Residential	60	82	46	69	46
322650	Residential	60	82	40	63	40
322651	Residential	60	82	45	68	45
322652	Residential	60	82	41	63	41
322654	Residential	60	82	44	66	44
322656	Residential	60	82	40	62	40
322660	Residential	60	82	53	76	53
322662	Residential	60	82	34	57	34
322663	Residential	60	82	35	58	35
322665	Residential	60	82	57	81	57
322666	Residential	60	82	45	68	45
322668	Residential	60	82	46	68	46

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
322672	Residential	60	82	43	65	43
322673	Residential	60	82	41	62	41
322679	Residential	60	82	47	70	47
322681	Residential	60	82	40	63	40
322687	Residential	60	82	47	70	47
322714	Residential	60	82	43	65	43
322716	Residential	60	82	42	65	42
322719	Residential	60	82	46	70	46
322720	Residential	60	82	32	55	32
322723	Residential	60	82	32	55	32
322724	Residential	60	82	38	61	38
322725	Residential	60	82	39	61	39
322726	Residential	60	82	40	63	40
322728	Residential	60	82	40	62	40
322729	Residential	60	82	46	68	46
322730	Residential	60	82	46	69	46
322732	Residential	60	82	53	76	53
322733	Residential	60	82	45	67	45
322735	Residential	60	82	37	60	37
322781	Residential	60	82	45	68	45
322784	Residential	60	82	29	53	29
322785	Residential	60	82	32	56	32
322786	Residential	60	82	47	70	47
322787	Residential	60	82	42	65	42
322788	Residential	60	82	41	64	41
322789	Residential	60	82	38	61	38
322791	Residential	60	82	48	71	48
322792	Residential	60	82	52	75	52
322794	Residential	60	82	54	76	54
322798	Residential	60	82	55	78	55
322808	Residential	60	82	52	73	52
322809	Residential	60	82	40	64	40
322810	Residential	60	82	47	70	47
322850	Residential	60	82	42	65	42
322851	Residential	60	82	42	64	42
322852	Residential	60	82	35	58	35
322889	Residential	60	82	41	63	41
322890	Residential	60	82	34	56	34
322894	Residential	60	82	41	64	41
322946	Residential	60	82	38	60	38
322950	Residential	60	82	39	61	39
322996	Residential	60	82	39	62	39
322997	Residential	60	82	33	56	33
323033	Residential	60	82	42	65	42
323037	Residential	60	82	39	61	39
323066	Residential	60	82	47	70	47
323074	Residential	60	82	30	53	30
323100	Residential	60	82	34	57	34
323105	Residential	60	82	50	73	50
323146	Residential	60	82	36	58	36
323147	Residential	60	82	47	70	47
323149	Residential	60	82	42	64	42
323153	Residential	60	82	39	62	39
323154	Residential	60	82	39	62	39
323156	Residential	60	82	42	64	42
323159	Residential	60	82	43	66	43
323221	Residential	60	82	35	59	35
323222	Residential	60	82	42	65	42

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323225	Residential	60	82	37	60	37
323226	Residential	60	82	45	66	45
323227	Residential	60	82	40	61	40
323231	Residential	60	82	40	63	40
323234	Residential	60	82	46	67	46
323279	Residential	60	82	40	62	40
323281	Residential	60	82	41	62	41
323282	Residential	60	82	49	71	49
323286	Residential	60	82	44	67	44
323288	Residential	60	82	39	62	39
323290	Residential	60	82	39	62	39
323304	Residential	60	82	42	64	42
323307	Residential	60	82	39	61	39
323308	Residential	60	82	39	61	39
323309	Residential	60	82	41	64	41
323311	Residential	60	82	39	61	39
323312	Residential	60	82	39	62	39
323313	Residential	60	82	38	61	38
323325	Residential	60	82	32	56	32
323340	Residential	60	82	42	64	42
323351	Residential	60	82	44	66	44
323355	Residential	60	82	40	62	40
323356	Residential	60	82	41	63	41
323384	Residential	60	82	40	62	40
323397	Residential	60	82	47	69	47
323399	Residential	60	82	42	65	42
323401	Residential	60	82	42	65	42
323402	Residential	60	82	38	61	38
323403	Residential	60	82	46	69	46
323404	Residential	60	82	41	62	41
323406	Residential	60	82	57	80	57
323407	Residential	60	82	39	62	39
323408	Residential	60	82	50	73	50
323409	Residential	60	82	41	63	41
323411	Residential	60	82	40	63	40
323414	Residential	60	82	52	75	52
323415	Residential	60	82	54	77	54
323416	Residential	60	82	56	79	56
323417	Residential	60	82	51	74	51
323419	Residential	60	82	47	70	47
323420	Residential	60	82	42	65	42
323421	Residential	60	82	50	73	50
323423	Residential	60	82	42	64	42
323424	Residential	60	82	41	62	41
323425	Residential	60	82	42	64	42
323428	Residential	60	82	40	63	40
323429	Residential	60	82	40	63	40
323430	Residential	60	82	40	62	40
323432	Residential	60	82	42	64	42
323435	Residential	60	82	49	72	49
323436	Residential	60	82	52	74	52
323437	Residential	60	82	35	59	35
323438	Residential	60	82	29	52	29
323439	Residential	60	82	35	58	35
323440	Residential	60	82	40	63	40
323441	Residential	60	82	36	59	36
323442	Residential	60	82	34	58	34
323443	Residential	60	82	41	64	41

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323444	Residential	60	82	38	61	38
323445	Residential	60	82	38	61	38
323446	Residential	60	82	44	66	44
323447	Residential	60	82	32	55	32
323449	Residential	60	82	56	79	56
323452	Residential	60	82	46	68	46
323453	Residential	60	82	50	74	50
323456	Residential	60	82	35	58	35
323457	Residential	60	82	35	58	35
323458	Residential	60	82	54	76	54
323459	Residential	60	82	43	66	43
323461	Residential	60	82	54	78	54
323462	Residential	60	82	46	69	46
323463	Residential	60	82	47	70	47
323464	Residential	60	82	41	64	41
323465	Residential	60	82	49	73	49
323466	Residential	60	82	53	76	53
323467	Residential	60	82	41	64	41
323468	Residential	60	82	32	55	32
323469	Residential	60	82	52	75	52
323470	Residential	60	82	41	64	41
323472	Residential	60	82	30	53	30
323473	Residential	60	82	26	50	26
323474	Residential	60	82	35	59	35
323475	Residential	60	82	40	63	40
323476	Residential	60	82	49	72	49
323478	Residential	60	82	42	65	42
323480	Residential	60	82	42	64	42
323485	Residential	60	82	49	72	49
323487	Residential	60	82	46	68	46
323488	Residential	60	82	46	69	46
323489	Residential	60	82	33	56	33
323490	Residential	60	82	33	56	33
323491	Residential	60	82	43	65	43
323492	Residential	60	82	42	65	42
323493	Residential	60	82	36	59	36
323494	Residential	60	82	35	58	35
323495	Residential	60	82	36	59	36
323496	Residential	60	82	36	59	36
323497	Residential	60	82	36	59	36
323499	Residential	60	82	25	49	25
323500	Residential	60	82	30	53	30
323501	Residential	60	82	40	62	40
323502	Residential	60	82	47	70	47
323503	Residential	60	82	51	74	51
323504	Residential	60	82	50	73	50
323505	Residential	60	82	47	69	47
323507	Residential	60	82	37	60	37
323508	Residential	60	82	50	73	50
323510	Residential	60	82	49	72	49
323511	Residential	60	82	50	72	50
323512	Residential	60	82	46	68	46
323513	Residential	60	82	41	64	41
323515	Residential	60	82	37	59	37
323517	Residential	60	82	34	57	34
323518	Residential	60	82	37	60	37
323519	Residential	60	82	36	60	36
323520	Residential	60	82	33	56	33

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323522	Residential	60	82	52	75	52
323523	Residential	60	82	45	68	45
323524	Residential	60	82	42	64	42
323525	Residential	60	82	57	81	57
323526	Residential	60	82	37	60	37
323527	Residential	60	82	40	63	40
323528	Residential	60	82	44	65	44
323529	Residential	60	82	42	63	42
323530	Residential	60	82	46	68	46
323531	Residential	60	82	43	66	43
323533	Residential	60	82	47	70	47
323535	Residential	60	82	41	63	41
323536	Residential	60	82	40	62	40
323539	Residential	60	82	38	60	38
323541	Residential	60	82	37	59	37
323543	Residential	60	82	49	71	49
323544	Residential	60	82	40	62	40
323545	Residential	60	82	39	62	39
323546	Residential	60	82	37	60	37
323547	Residential	60	82	35	59	35
323548	Residential	60	82	36	59	36
323549	Residential	60	82	52	75	52
323550	Residential	60	82	34	57	34
323551	Residential	60	82	34	57	34
323552	Residential	60	82	32	55	32
323553	Residential	60	82	42	65	42
323554	Residential	60	82	36	59	36
323555	Residential	60	82	41	63	41
323556	Residential	60	82	52	74	52
323557	Residential	60	82	47	70	47
323558	Residential	60	82	41	63	41
323559	Residential	60	82	41	63	41
323560	Residential	60	82	54	77	54
323561	Residential	60	82	43	65	43
323562	Residential	60	82	42	65	42
323564	Residential	60	82	51	74	51
323565	Residential	60	82	46	69	46
323566	Residential	60	82	35	58	35
323567	Residential	60	82	34	57	34
323568	Residential	60	82	43	65	43
323569	Residential	60	82	57	81	57
323570	Residential	60	82	53	76	53
323572	Residential	60	82	45	68	45
323573	Residential	60	82	40	63	40
323574	Residential	60	82	30	53	30
323575	Residential	60	82	53	76	53
323576	Residential	60	82	53	76	53
323577	Residential	60	82	53	76	53
323578	Residential	60	82	45	68	45
323579	Residential	60	82	44	66	44
323580	Residential	60	82	39	61	39
323581	Residential	60	82	43	66	43
323582	Residential	60	82	35	58	35
323583	Residential	60	82	42	65	42
323584	Residential	60	82	41	64	41
323585	Residential	60	82	41	64	41
323586	Residential	60	82	38	61	38
323587	Residential	60	82	39	61	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323588	Residential	60	82	34	57	34
323589	Residential	60	82	38	61	38
323590	Residential	60	82	39	63	39
323591	Residential	60	82	48	69	48
323592	Residential	60	82	51	75	52
323593	Residential	60	82	46	68	46
323594	Residential	60	82	48	70	48
323595	Residential	60	82	46	69	46
323596	Residential	60	82	41	65	41
323597	Residential	60	82	47	70	47
323598	Residential	60	82	52	75	52
323599	Residential	60	82	42	63	42
323600	Residential	60	82	44	66	44
323601	Residential	60	82	45	67	45
323602	Residential	60	82	44	66	44
323603	Residential	60	82	43	65	43
323605	Residential	60	82	56	79	56
323606	Residential	60	82	50	72	50
323607	Residential	60	82	48	71	48
323609	Residential	60	82	38	61	38
323610	Residential	60	82	35	57	35
323611	Residential	60	82	37	59	37
323612	Residential	60	82	33	56	33
323613	Residential	60	82	40	62	40
323614	Residential	60	82	38	60	38
323615	Residential	60	82	36	59	36
323618	Residential	60	82	41	63	41
323619	Residential	60	82	40	63	40
323620	Residential	60	82	47	69	47
323621	Residential	60	82	44	65	44
323622	Residential	60	82	51	74	51
323623	Residential	60	82	53	75	53
323625	Residential	60	82	45	68	45
323626	Residential	60	82	44	67	44
323627	Residential	60	82	52	74	52
323628	Residential	60	82	51	73	51
323630	Residential	60	82	33	56	33
323631	Residential	60	82	32	55	32
323635	Residential	60	82	55	78	55
323636	Residential	60	82	54	77	54
323638	Residential	60	82	42	64	42
323639	Residential	60	82	44	65	44
323640	Residential	60	82	43	65	43
323641	Residential	60	82	35	57	35
323642	Residential	60	82	41	64	41
323643	Residential	60	82	33	56	33
323644	Residential	60	82	31	55	31
323645	Residential	60	82	39	61	39
323646	Residential	60	82	40	62	40
323647	Residential	60	82	39	61	39
323648	Residential	60	82	40	63	40
323650	Residential	60	82	45	68	45
323651	Residential	60	82	53	76	53
323652	Residential	60	82	45	68	45
323653	Residential	60	82	41	62	41
323654	Residential	60	82	48	72	48
323655	Residential	60	82	49	72	49
323656	Residential	60	82	52	75	52

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323658	Residential	60	82	53	76	53
323659	Residential	60	82	36	59	36
323661	Residential	60	82	28	51	28
323662	Residential	60	82	38	61	38
323663	Residential	60	82	39	62	39
323665	Residential	60	82	31	54	31
323666	Residential	60	82	38	61	38
323667	Residential	60	82	42	65	42
323668	Residential	60	82	42	63	42
323669	Residential	60	82	41	63	41
323670	Residential	60	82	52	74	52
323671	Residential	60	82	48	70	48
323672	Residential	60	82	38	61	38
323673	Residential	60	82	41	64	41
323674	Residential	60	82	43	65	43
323675	Residential	60	82	44	65	44
323676	Residential	60	82	42	63	42
323678	Residential	60	82	59	82	59
323680	Residential	60	82	54	77	54
323681	Residential	60	82	41	63	41
323682	Residential	60	82	28	51	28
323683	Residential	60	82	53	75	53
323685	Residential	60	82	34	57	34
323686	Residential	60	82	35	59	35
323687	Residential	60	82	36	60	36
323688	Residential	60	82	36	59	36
323689	Residential	60	82	31	54	31
323690	Residential	60	82	32	55	32
323691	Residential	60	82	33	57	33
323693	Residential	60	82	37	60	37
323694	Residential	60	82	36	59	36
323695	Residential	60	82	41	63	41
323696	Residential	60	82	43	64	43
323697	Residential	60	82	38	61	38
323698	Residential	60	82	47	70	47
323699	Residential	60	82	50	73	50
323700	Residential	60	82	42	65	42
323701	Residential	60	82	42	64	42
323702	Residential	60	82	52	75	52
323703	Residential	60	82	47	70	47
323704	Residential	60	82	43	66	43
323705	Residential	60	82	43	64	43
323706	Residential	60	82	34	57	34
323708	Residential	60	82	35	59	35
323709	Residential	60	82	30	54	30
323710	Residential	60	82	53	76	53
323711	Residential	60	82	52	75	52
323712	Residential	60	82	43	66	43
323713	Residential	60	82	37	60	37
323714	Residential	60	82	53	76	53
323716	Residential	60	82	39	61	39
323717	Residential	60	82	40	63	40
323718	Residential	60	82	39	61	39
323720	Residential	60	82	59	82	59
323722	Residential	60	82	56	79	56
323723	Residential	60	82	30	53	30
323724	Residential	60	82	29	53	29
323726	Residential	60	82	38	60	38

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323727	Residential	60	82	41	64	41
323728	Residential	60	82	37	60	37
323729	Residential	60	82	35	59	35
323730	Residential	60	82	41	63	41
323731	Residential	60	82	37	60	37
323732	Residential	60	82	38	60	38
323733	Residential	60	82	38	61	38
323734	Residential	60	82	38	61	38
323735	Residential	60	82	43	65	43
323736	Residential	60	82	40	62	40
323737	Residential	60	82	41	63	41
323738	Residential	60	82	47	70	47
323739	Residential	60	82	33	56	33
323740	Residential	60	82	34	57	34
323741	Residential	60	82	38	61	38
323742	Residential	60	82	45	68	45
323743	Residential	60	82	42	63	42
323744	Residential	60	82	42	63	42
323745	Residential	60	82	50	73	50
323746	Residential	60	82	50	73	50
323747	Residential	60	82	36	59	36
323748	Residential	60	82	49	72	49
323749	Residential	60	82	37	60	37
323750	Residential	60	82	36	59	36
323751	Residential	60	82	35	58	35
323752	Residential	60	82	35	58	35
323754	Residential	60	82	46	69	46
323756	Residential	60	82	48	71	48
323757	Residential	60	82	44	67	44
323758	Residential	60	82	43	64	43
323759	Residential	60	82	50	73	50
323760	Residential	60	82	47	70	47
323761	Residential	60	82	48	71	48
323762	Residential	60	82	42	64	42
323763	Residential	60	82	40	63	40
323767	Residential	60	82	41	64	41
323768	Residential	60	82	41	63	41
323769	Residential	60	82	42	65	42
323770	Residential	60	82	49	71	49
323771	Residential	60	82	44	66	44
323772	Residential	60	82	36	59	36
323773	Residential	60	82	43	64	43
323774	Residential	60	82	37	60	37
323775	Residential	60	82	36	59	36
323777	Residential	60	82	38	61	38
323778	Residential	60	82	35	58	35
323780	Residential	60	82	53	76	53
323782	Residential	60	82	45	68	45
323783	Residential	60	82	46	69	46
323784	Residential	60	82	34	57	34
323785	Residential	60	82	40	62	40
323786	Residential	60	82	53	76	53
323788	Residential	60	82	44	66	44
323789	Residential	60	82	53	76	53
323790	Residential	60	82	43	66	43
323791	Residential	60	82	45	67	45
323792	Residential	60	82	44	67	44
323793	Residential	60	82	39	62	39

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323794	Residential	60	82	43	65	43
323795	Residential	60	82	52	75	52
323796	Residential	60	82	59	82	59
323797	Residential	60	82	54	77	54
323798	Residential	60	82	53	75	53
323799	Residential	60	82	40	63	40
323800	Residential	60	82	40	63	40
323801	Residential	60	82	45	68	45
323802	Residential	60	82	31	54	31
323803	Residential	60	82	53	75	53
323804	Residential	60	82	59	82	59
323805	Residential	60	82	50	73	50
323806	Residential	60	82	53	76	53
323808	Residential	60	82	50	74	50
323809	Residential	60	82	51	74	51
323811	Residential	60	82	36	60	36
323812	Residential	60	82	35	58	35
323813	Residential	60	82	37	60	37
323815	Residential	60	82	41	64	41
323816	Residential	60	82	41	64	41
323817	Residential	60	82	42	64	42
323818	Residential	60	82	39	62	39
323819	Residential	60	82	56	79	56
323823	Residential	60	82	55	77	55
323824	Residential	60	82	31	55	31
323825	Residential	60	82	47	69	47
323828	Residential	60	82	31	55	31
323829	Residential	60	82	42	65	42
323830	Residential	60	82	49	72	49
323831	Residential	60	82	48	71	48
323832	Residential	60	82	52	75	52
323833	Residential	60	82	49	72	49
323834	Residential	60	82	39	62	39
323835	Residential	60	82	42	64	42
323836	Residential	60	82	45	68	45
323837	Residential	60	82	34	57	34
323838	Residential	60	82	33	57	33
323839	Residential	60	82	41	63	41
323840	Residential	60	82	39	62	39
323841	Residential	60	82	41	63	41
323843	Residential	60	82	41	64	41
323844	Residential	60	82	55	78	55
323845	Residential	60	82	51	74	51
323846	Residential	60	82	55	78	55
323847	Residential	60	82	52	75	52
323848	Residential	60	82	54	77	54
323849	Residential	60	82	40	62	40
323850	Residential	60	82	42	64	42
323851	Residential	60	82	41	62	41
323852	Residential	60	82	42	65	42
323853	Residential	60	82	42	63	42
323854	Residential	60	82	63	86	63
323856	Residential	60	82	45	68	45
323857	Residential	60	82	49	72	49
323862	Residential	60	82	43	66	43
323866	Residential	60	82	49	72	49
323867	Residential	60	82	51	75	51
323868	Residential	60	82	56	80	56

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323871	Residential	60	82	42	64	42
323872	Residential	60	82	31	53	31
323876	Residential	60	82	52	75	52
323877	Residential	60	82	38	61	38
323878	Residential	60	82	37	61	37
323879	Residential	60	82	36	59	36
323880	Residential	60	82	36	60	36
323882	Residential	60	82	38	60	38
323883	Residential	60	82	37	59	37
323884	Residential	60	82	44	67	44
323885	Residential	60	82	47	70	47
323887	Residential	60	82	52	76	52
323891	Residential	60	82	38	61	38
323893	Residential	60	82	51	74	51
323894	Residential	60	82	47	70	47
323895	Residential	60	82	45	68	45
323896	Residential	60	82	43	65	43
323897	Residential	60	82	42	64	42
323898	Residential	60	82	41	64	41
323899	Residential	60	82	47	70	47
323901	Residential	60	82	37	60	37
323902	Residential	60	82	38	61	38
323903	Residential	60	82	34	58	34
323904	Residential	60	82	42	64	42
323905	Residential	60	82	46	70	46
323906	Residential	60	82	45	67	45
323907	Residential	60	82	46	69	46
323908	Residential	60	82	48	71	48
323909	Residential	60	82	27	51	27
323910	Residential	60	82	47	70	47
323911	Residential	60	82	46	68	46
323912	Residential	60	82	51	73	51
323913	Residential	60	82	51	73	51
323914	Residential	60	82	50	73	50
323915	Residential	60	82	43	65	43
323916	Residential	60	82	40	62	40
323917	Residential	60	82	41	64	41
323918	Residential	60	82	44	66	44
323919	Residential	60	82	43	65	43
323920	Residential	60	82	42	65	42
323921	Residential	60	82	44	66	44
323922	Residential	60	82	44	66	44
323923	Residential	60	82	43	65	43
323925	Residential	60	82	54	77	54
323926	Residential	60	82	36	59	36
323927	Residential	60	82	45	68	45
323928	Residential	60	82	42	63	42
323929	Residential	60	82	42	63	42
323930	Residential	60	82	51	73	51
323931	Residential	60	82	36	59	36
323932	Residential	60	82	36	59	36
323933	Residential	60	82	39	62	39
323934	Residential	60	82	39	61	39
323935	Residential	60	82	44	66	44
323936	Residential	60	82	44	65	44
323937	Residential	60	82	41	62	41
323938	Residential	60	82	41	63	41
323939	Residential	60	82	39	60	39

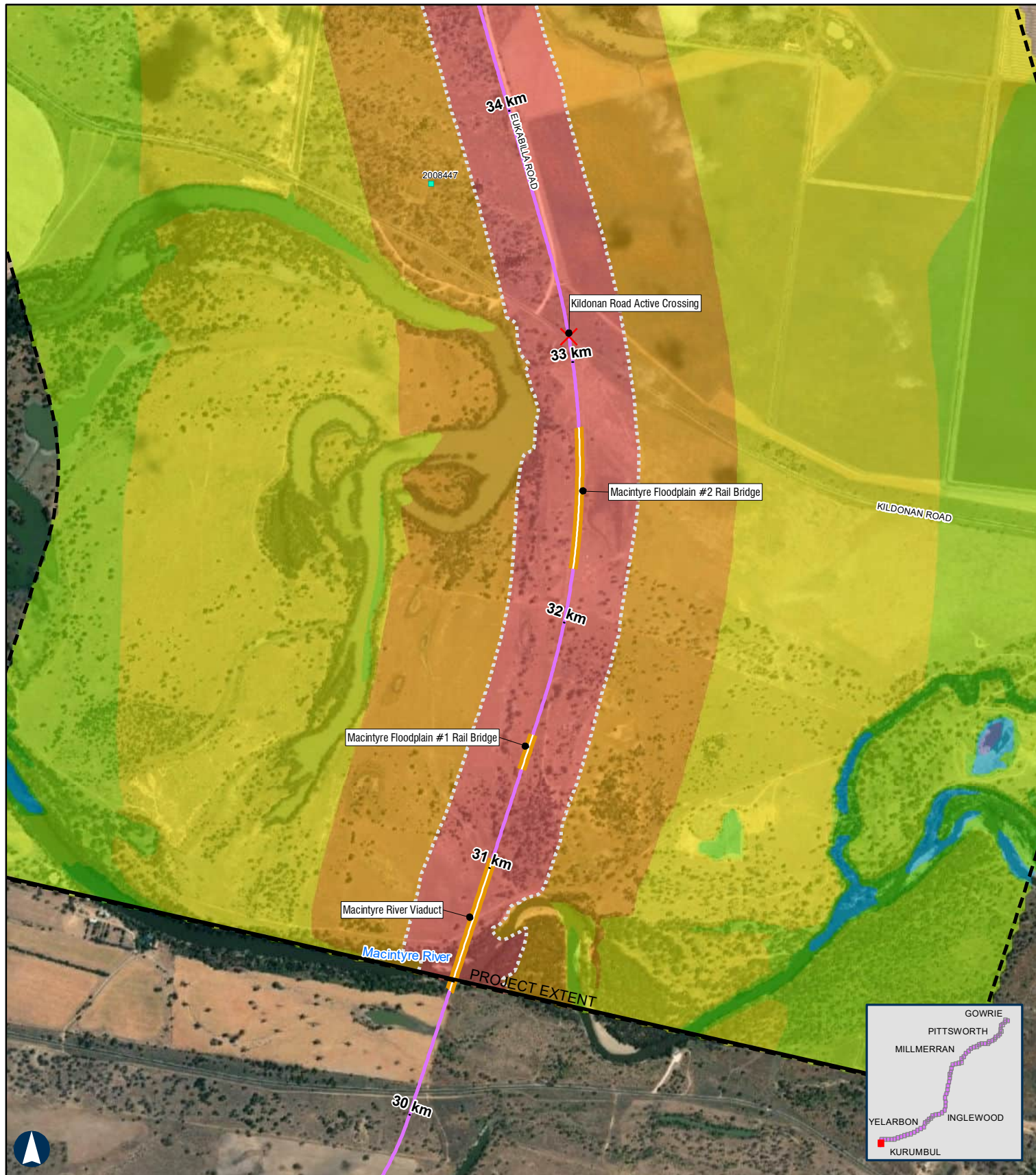
Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
323940	Residential	60	82	39	60	39
323941	Residential	60	82	54	77	54
323942	Residential	60	82	33	56	33
323943	Residential	60	82	46	68	46
323944	Residential	60	82	46	68	46
323945	Residential	60	82	45	67	45
323946	Residential	60	82	48	71	48
323947	Residential	60	82	30	54	30
324270	Residential	60	82	64	87	64
324274	Residential	60	82	51	75	52
324277	Residential	60	82	52	75	52
324333	Residential	60	82	60	83	60
324347	Residential	60	82	53	77	53
1000000	Residential	60	82	48	71	48
1000001	Residential	60	82	41	64	41
2004721	Residential	60	82	53	77	54
2007798	Residential	60	82	41	64	41
2007851	Residential	60	82	43	67	43
2008222	Residential	60	82	50	72	50
2008224	Residential	60	82	60	83	60
2008226	Residential	60	82	39	62	39
2008227	Residential	60	82	44	67	44
2008232	Residential	60	82	51	73	51
2008234	Residential	60	82	50	72	50
2008306	Residential	60	82	38	61	38
2008307	Residential	60	82	36	59	36
2008308	Residential	60	82	40	63	40
2008309	Residential	60	82	32	56	32
2008314	Residential	60	82	47	70	47
2008315	Residential	60	82	43	65	43
2008316	Residential	60	82	52	76	52
2008317	Residential	60	82	53	75	53
2008318	Residential	60	82	57	80	57
2008319	Residential	60	82	57	81	57
2008321	Residential	60	82	46	70	46
2008322	Residential	60	82	44	68	44
2008323	Residential	60	82	37	60	37
2008324	Residential	60	82	35	58	35
2008325	Residential	60	82	46	69	46
2008326	Residential	60	82	29	53	30
2008328	Residential	60	82	43	67	43
2008329	Residential	60	82	45	67	45
2008330	Residential	60	82	40	63	40
2008331	Residential	60	82	23	47	23
2008332	Residential	60	82	24	48	24
2008333	Residential	60	82	52	74	52
2008335	Residential	60	82	49	72	49
2008336	Residential	60	82	48	70	48
2008338	Residential	60	82	43	67	43
2008339	Residential	60	82	39	63	39
2008340	Residential	60	82	56	79	56
2008341	Residential	60	82	51	74	51
2008342	Residential	60	82	42	65	42
2008343	Residential	60	82	49	71	49
2008344	Residential	60	82	26	50	26
2008346	Residential	60	82	25	48	25
2008347	Residential	60	82	56	79	56
2008349	Residential	60	82	50	73	50

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
2008350	Residential	60	82	41	64	41
2008351	Residential	60	82	52	74	52
2008353	Residential	60	82	42	65	42
2008355	Residential	60	82	49	73	49
2008357	Residential	60	82	49	73	49
2008358	Residential	60	82	35	59	35
2008359	Residential	60	82	31	54	31
2008360	Residential	60	82	37	60	37
2008361	Residential	60	82	33	57	33
2008364	Residential	60	82	34	57	34
2008365	Residential	60	82	26	49	26
2008366	Residential	60	82	26	50	26
2008367	Residential	60	82	26	50	26
2008368	Residential	60	82	24	48	24
2008369	Residential	60	82	24	47	24
2008371	Residential	60	82	23	46	23
2008372	Residential	60	82	20	43	20
2008373	Residential	60	82	19	43	19
2008374	Residential	60	82	20	44	20
2008376	Residential	60	82	15	38	15
2008377	Residential	60	82	13	36	13
2008379	Residential	60	82	21	45	21
2008380	Residential	60	82	24	47	24
2008393	Residential	60	82	20	43	20
2008394	Residential	60	82	52	75	52
2008396	Residential	60	82	46	70	46
2008397	Residential	60	82	43	66	43
2008398	Residential	60	82	42	66	42
2008399	Residential	60	82	41	64	41
2008400	Residential	60	82	46	70	46
2008401	Residential	60	82	40	64	40
2008402	Residential	60	82	39	62	39
2008403	Residential	60	82	38	61	38
2008404	Residential	60	82	46	69	46
2008405	Residential	60	82	40	64	40
2008406	Residential	60	82	38	62	38
2008407	Residential	60	82	37	61	37
2008408	Residential	60	82	46	69	46
2008409	Residential	60	82	41	65	41
2008410	Residential	60	82	38	62	38
2008411	Residential	60	82	38	61	38
2008412	Residential	60	82	45	69	45
2008413	Residential	60	82	43	67	43
2008414	Residential	60	82	42	65	42
2008415	Residential	60	82	49	71	49
2008417	Residential	60	82	50	73	50
2008418	Residential	60	82	48	72	48
2008420	Residential	60	82	49	72	49
2008421	Residential	60	82	44	67	44
2008422	Residential	60	82	42	65	42
2008423	Residential	60	82	42	64	42
2008431	Residential	60	82	38	61	38
2008437	Residential	60	82	51	74	51
2008438	Residential	60	82	51	74	51
2008439	Residential	60	82	40	64	40
254513	Community	60	82	55	78	-
254515	Education	60	82	56	78	-
254527	Education	60	82	52	75	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
254564	Community	60	82	65	89	-
254574	Office	60	82	65	89	-
254592	Community	60	82	64	88	-
254619	Office	60	82	72	96	-
254852	Office	60	82	50	72	-
254858	Office	60	82	46	69	-
256773	Office	60	82	41	65	-
256806	Office	60	82	39	63	-
260123	Community	60	82	63	86	-
260154	Community	60	82	67	90	-
261287	Office	60	82	63	87	-
261321	Office	60	82	62	85	-
261544	Outdoor	57	79	60	84	-
261639	Office	60	82	60	84	-
261738	Worship	60	82	53	76	-
261749	Education	60	82	63	87	-
261795	Education	60	82	63	87	-
261821	Education	60	82	56	80	-
261823	Education	60	82	56	80	-
261831	Education	60	82	51	75	-
261890	Office	60	82	50	74	-
262035	Community	60	82	55	78	-
318994	Community	60	82	50	73	-
319762	Community	60	82	44	65	-
320693	Education	60	82	31	53	-
320726	Education	60	82	43	66	-
320741	Education	60	82	43	66	-
320763	Education	60	82	37	60	-
320847	Community	60	82	44	65	-
320848	Education	60	82	40	62	-
320887	Office	60	82	44	67	-
320888	Worship	60	82	39	61	-
320893	Education	60	82	39	62	-
320894	Education	60	82	39	61	-
320958	Education	60	82	33	56	-
320979	Office	60	82	47	70	-
320981	Office	60	82	50	72	-
321057	Education	60	82	45	68	-
321060	Education	60	82	48	71	-
321251	Office	60	82	46	67	-
321289	Education	60	82	46	70	-
321378	Community	60	82	40	63	-
321427	Community	60	82	46	69	-
321428	Office	60	82	40	63	-
321459	Office	60	82	43	65	-
321461	Office	60	82	42	66	-
321463	Office	60	82	46	68	-
321558	Outdoor	57	79	39	60	-
321588	Education	60	82	48	71	-
321619	Office	60	82	48	71	-
321620	Office	60	82	39	61	-
321643	Education	60	82	43	67	-
321668	Community	60	82	45	68	-
321670	Education	60	82	44	68	-
321739	Community	60	82	41	64	-
321765	Community	60	82	39	61	-
321774	Education	60	82	37	60	-
321787	Community	60	82	40	62	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
321812	Office	60	82	43	66	-
321816	Office	60	82	49	71	-
321913	Education	60	82	38	61	-
321939	Office	60	82	48	70	-
322010	Office	60	82	41	64	-
322099	Education	60	82	34	55	-
322109	Worship	60	82	40	63	-
322113	Education	60	82	35	57	-
322165	Community	60	82	52	75	-
322240	Office	60	82	44	67	-
322315	Community	60	82	45	67	-
322378	Education	60	82	32	55	-
322379	Education	60	82	35	58	-
322402	Outdoor	57	79	45	68	-
322427	Office	60	82	47	70	-
322428	Education	60	82	34	57	-
322441	Office	60	82	44	67	-
322442	Office	60	82	42	64	-
322474	Office	60	82	52	74	-
322480	Outdoor	57	79	39	61	-
322504	Office	60	82	52	74	-
322505	Office	60	82	48	71	-
322541	Community	60	82	32	55	-
322576	Education	60	82	39	61	-
322658	Community	60	82	45	66	-
322664	Education	60	82	36	58	-
322718	Office	60	82	47	70	-
322790	Worship	60	82	59	83	-
322813	Education	60	82	43	66	-
322848	Education	60	82	41	63	-
322867	Office	60	82	41	64	-
322939	Outdoor	57	79	45	68	-
323410	Office	60	82	44	65	-
323422	Office	60	82	48	71	-
323427	Office	60	82	49	72	-
323431	Office	60	82	42	64	-
323434	Office	60	82	55	78	-
323481	Childcare	60	82	40	62	-
323514	Education	60	82	38	61	-
323537	Education	60	82	33	55	-
323633	Office	60	82	44	65	-
323634	Office	60	82	43	65	-
323657	Office	60	82	53	76	-
323660	Office	60	82	43	65	-
323677	Worship	60	82	40	63	-
323764	Worship	60	82	43	66	-
323776	Worship	60	82	38	61	-
323807	Community	60	82	52	76	-
323861	Worship	60	82	42	64	-
323863	Worship	60	82	46	68	-
323874	Office	60	82	42	64	-
323889	Education	60	82	48	71	-
323890	Education	60	82	48	71	-
2008433	Education	60	82	44	68	-
2008434	Community	60	82	43	65	-
2008440	Outdoor	57	79	35	56	-
2008441	Outdoor	57	79	28	51	-
2008442	Outdoor	57	79	36	58	-

Receptor ID	Type	Criteria- dBA		Noise level- dBA		
		Leq(24h)	SEM	Leq(24h)	SEM	Leq(night)
2008443	Outdoor	57	79	34	57	-
2008444	Outdoor	57	79	34	56	-
2008445	Outdoor	57	79	51	74	-
2008446	Outdoor	57	79	62	85	-
2008447	Outdoor	57	79	55	78	-
2008448	Outdoor	57	79	47	68	-
2008449	Outdoor	57	79	42	66	-
2008450	Outdoor	57	79	38	60	-
2008451	Outdoor	57	79	42	65	-
2008488	Outdoor	57	79	61	85	-



BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 1 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

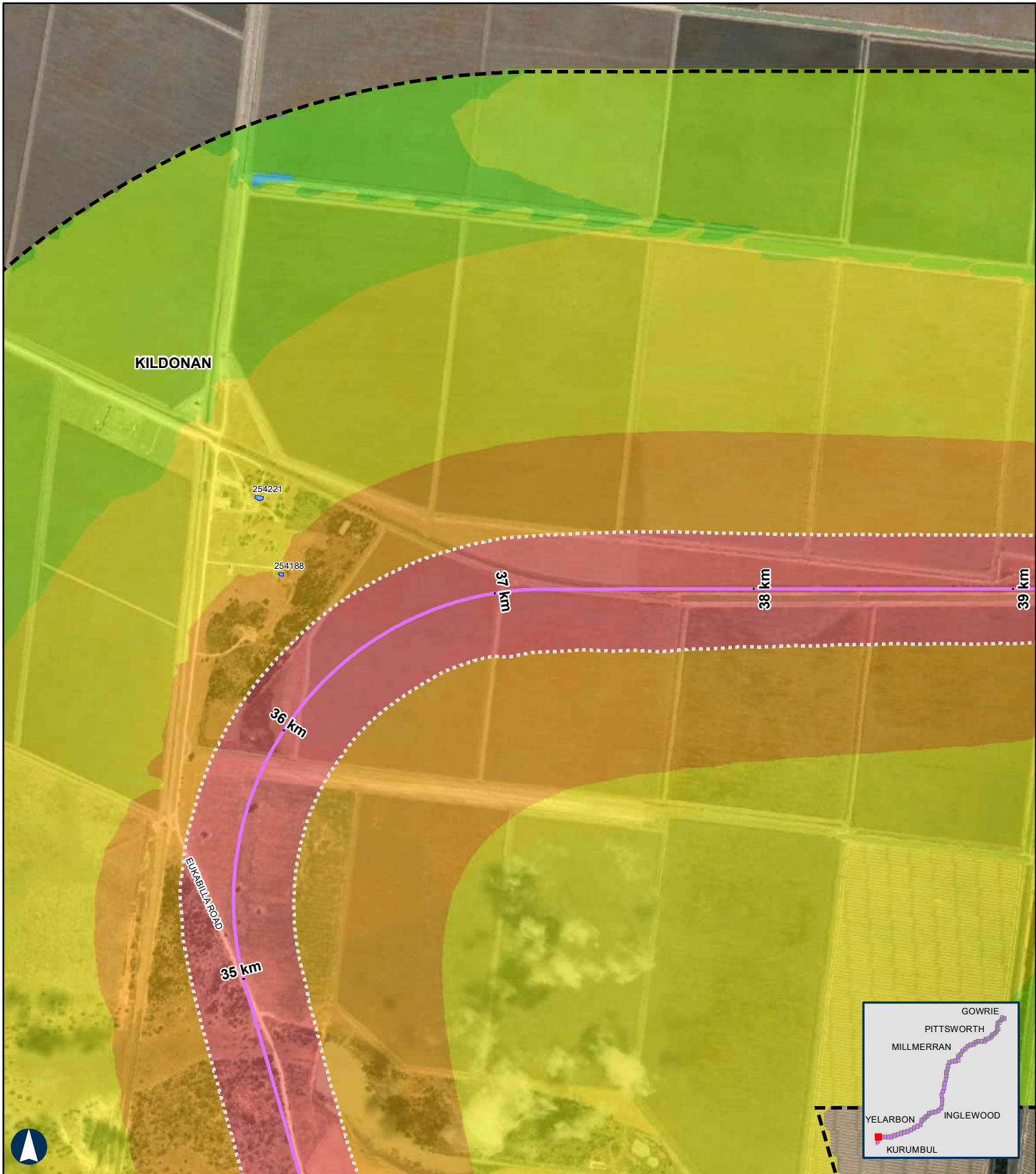
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 2 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

... Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

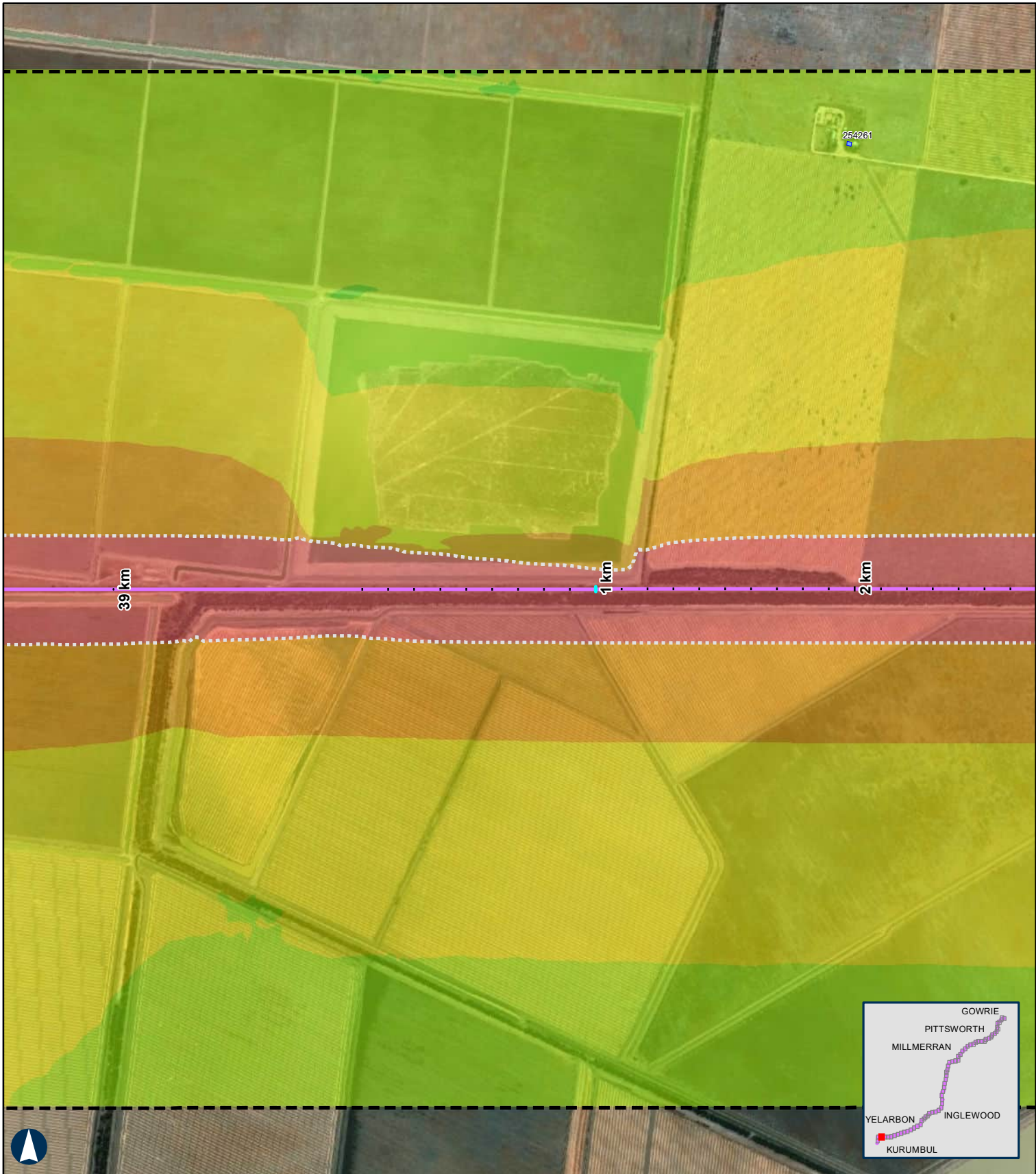
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 3 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/
Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

... Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

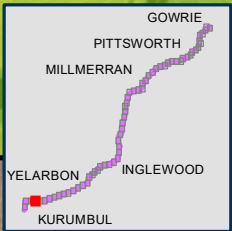
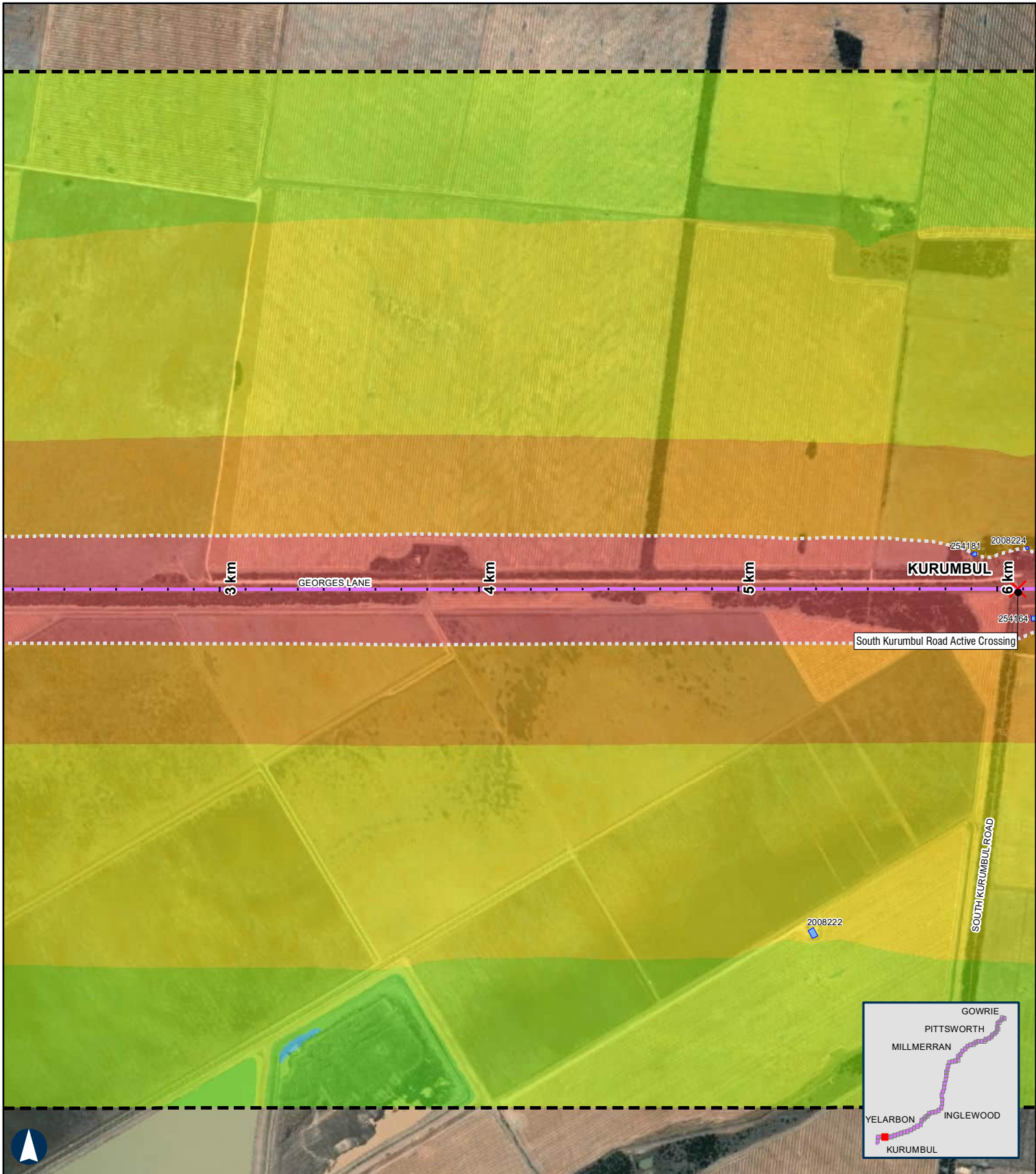
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and
at a height of 1.8m above ground level

ARTC InlandRail

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through the Australian Rail Track Corporation,
in partnership with the private sector.



BORDER TO GOWRIE **Unmitigated Noise Levels – 2040 Leq,24h**

APPENDIX E - Map 4 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

▨ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

... Criterion (60 dBA)

Noise Levels

■ 30 - 35 dBA

■ 35 - 40 dBA

■ 40 - 45 dBA

■ 45 - 50 dBA

■ 50 - 55 dBA

■ 55 - 60 dBA

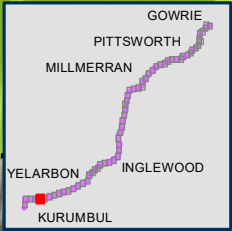
■ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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Paper: A4 Scale: 1:20,000
Date: 21-Oct-2024
Author: JG



BORDER TO GOWRIE **Unmitigated Noise Levels – 2040 Leq,24h**

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

▭ Modelling Area

▨ Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

... Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

55 - 60 dBA

> 60 dBA

Paper: A4 Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

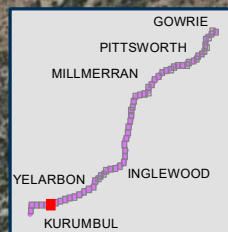
Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC

InlandRail

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Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 6 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

▨ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

--- Criterion (60 dBA)

Noise Levels

■ 30 - 35 dBA

■ 35 - 40 dBA

■ 40 - 45 dBA

■ 45 - 50 dBA

■ 50 - 55 dBA

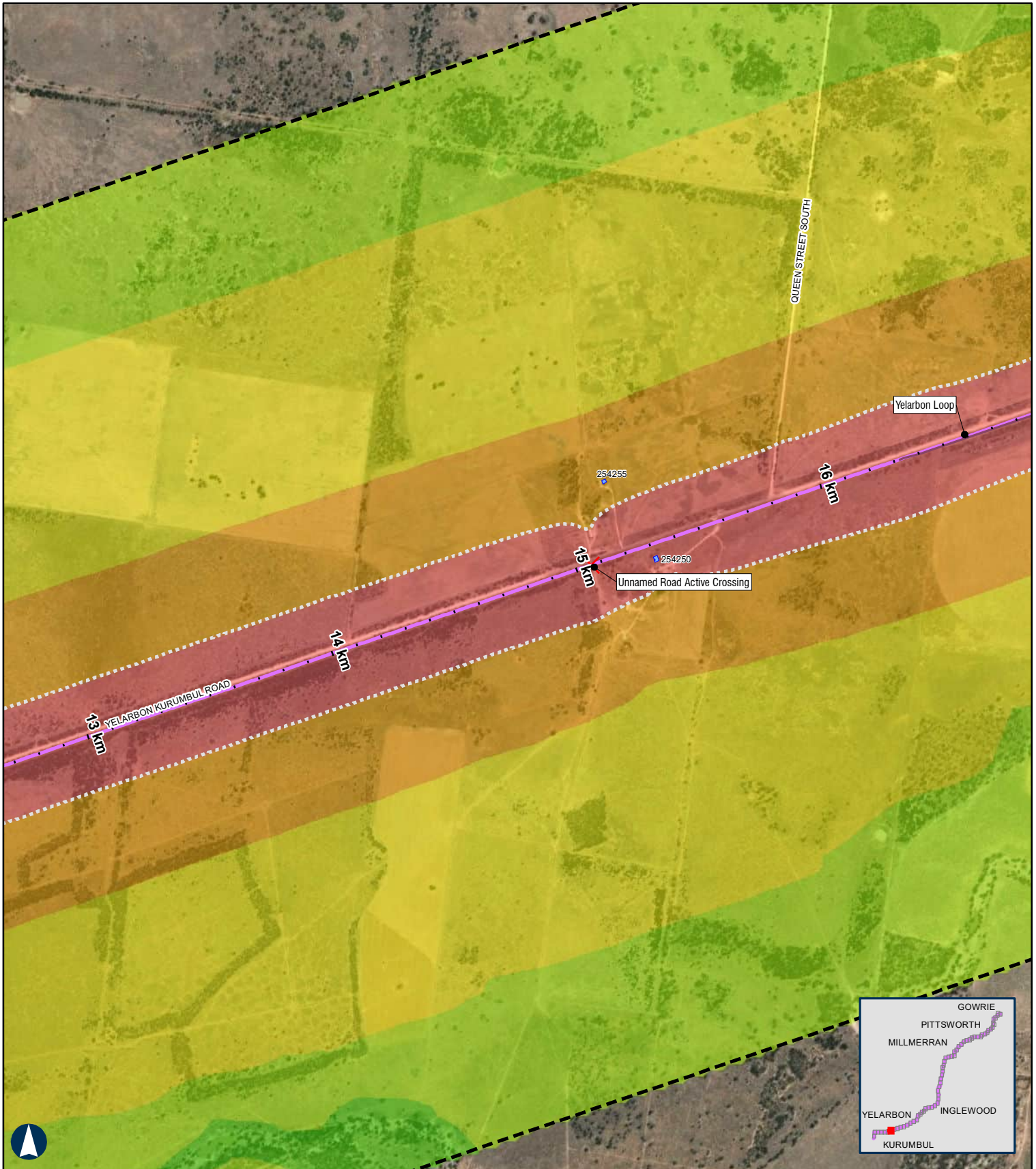
■ 55 - 60 dBA

■ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 7 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

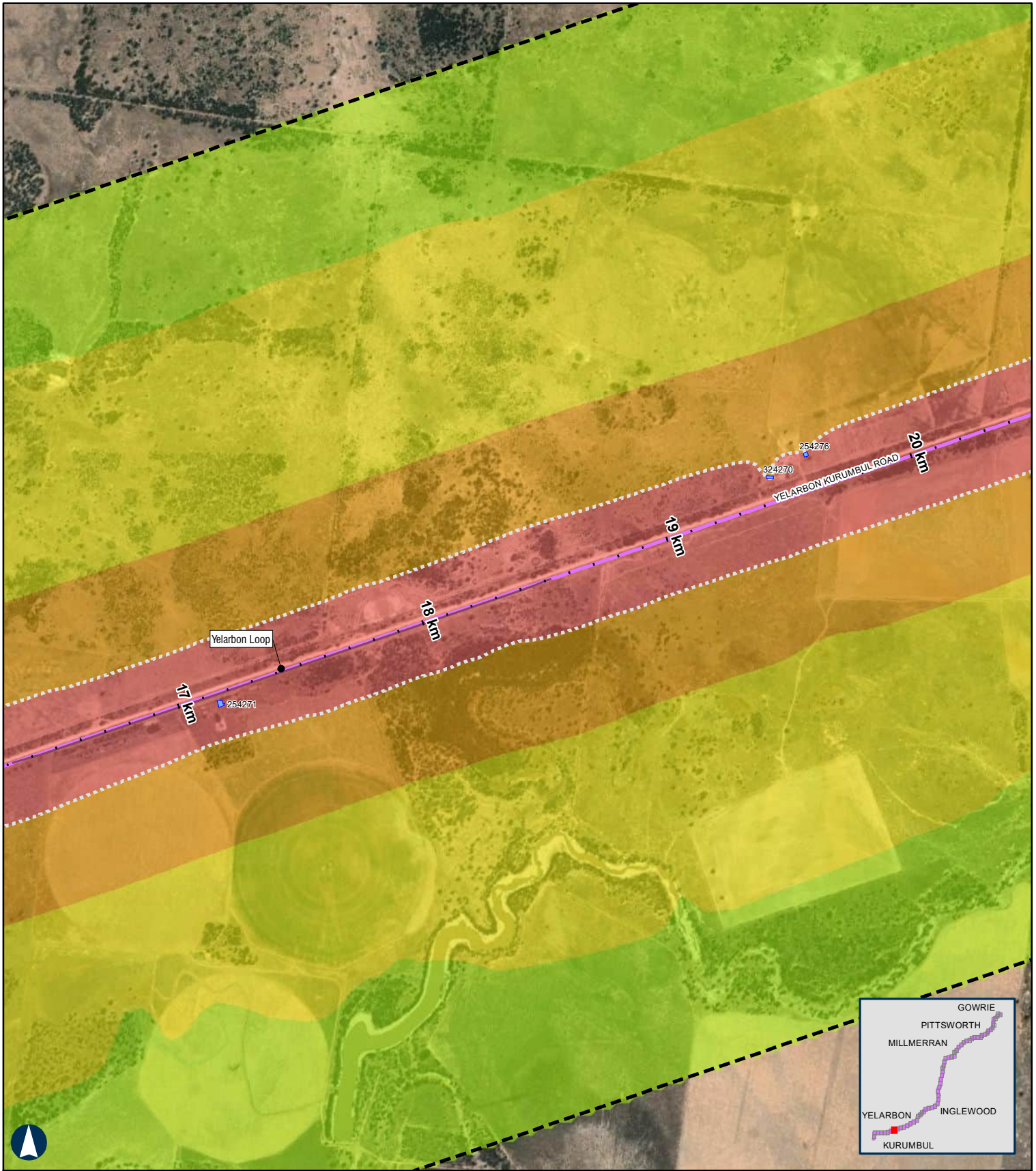
Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 8 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

□ Future Developments

--- Criterion (60 dBA)

Noise Levels

■ 30 - 35 dBA

■ 35 - 40 dBA

■ 40 - 45 dBA

■ 45 - 50 dBA

■ 50 - 55 dBA

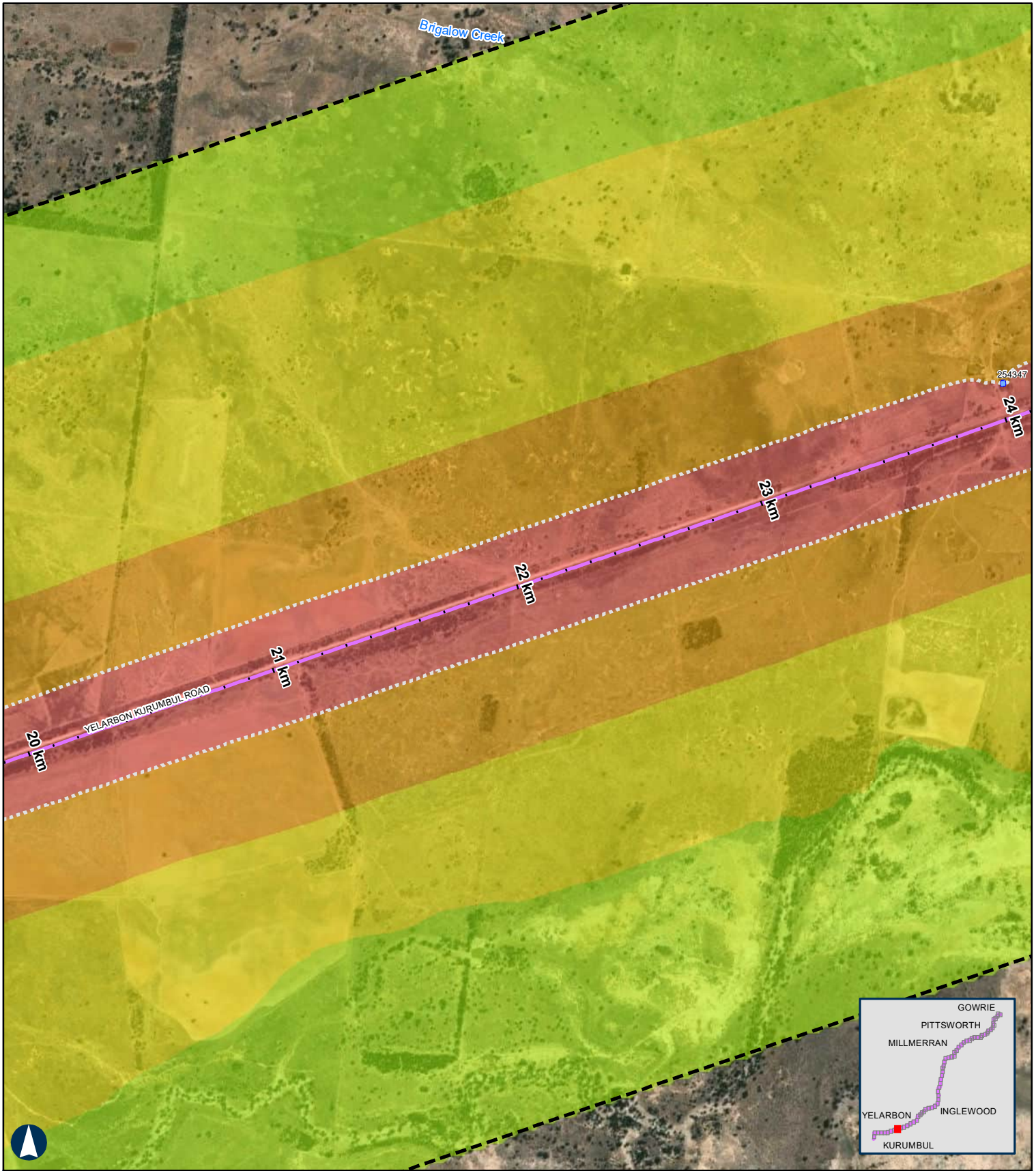
■ 55 - 60 dBA

■ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 9 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

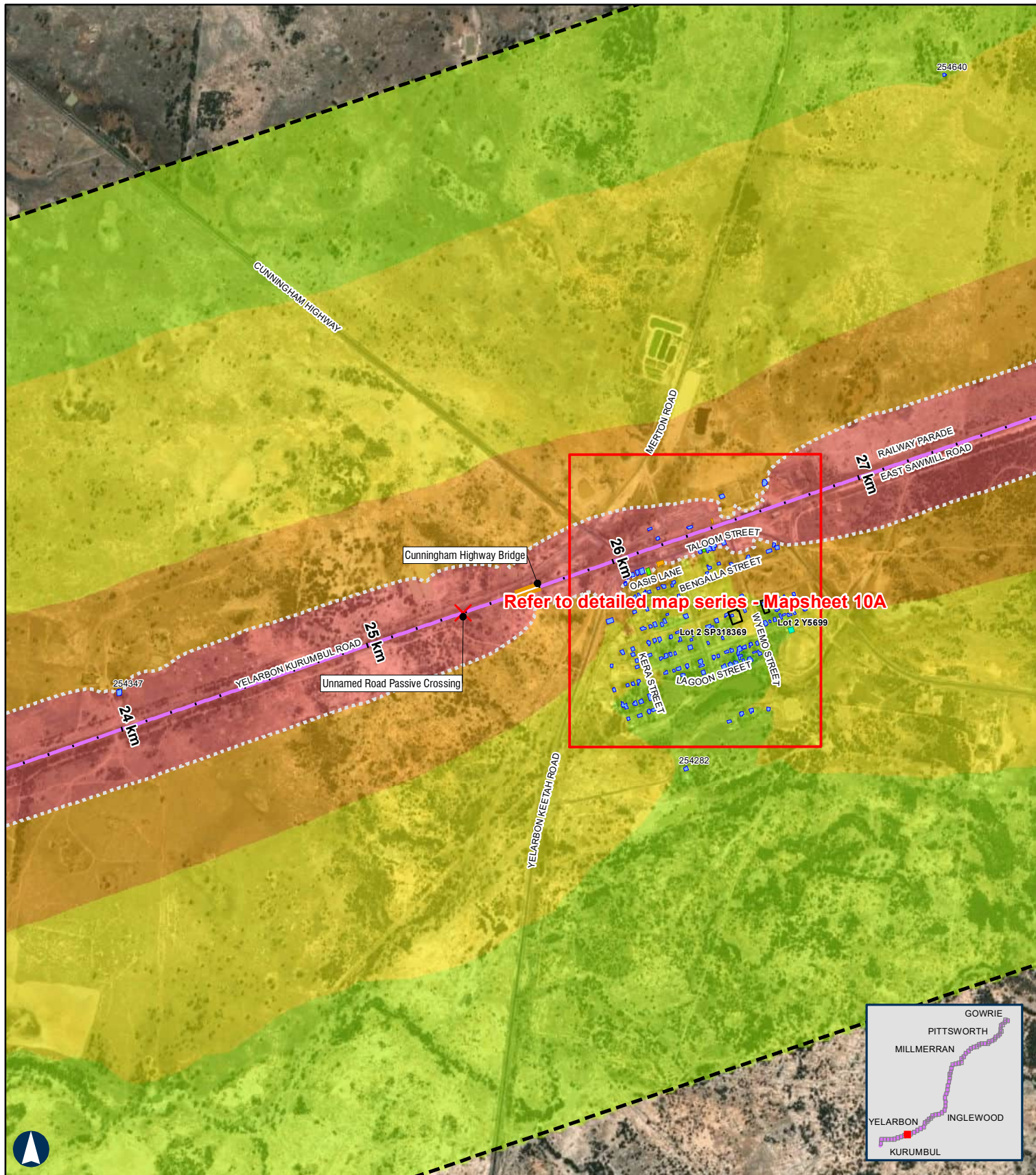
Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 10 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

55 - 60 dBA

> 60 dBA

Paper: A4

Scale: 1:20,000

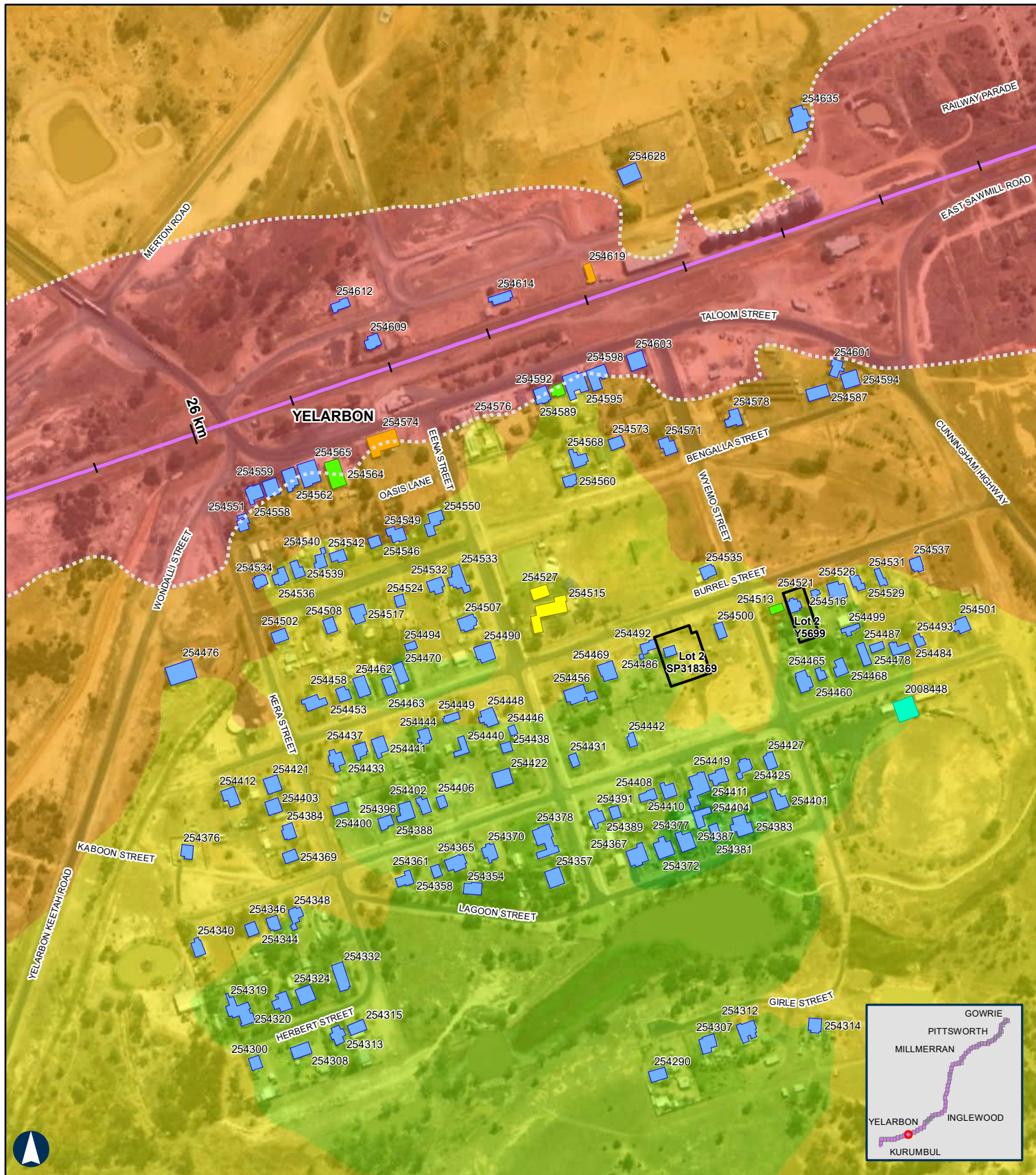
Date: 21-Oct-2024

Author: JG

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 10A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:5,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

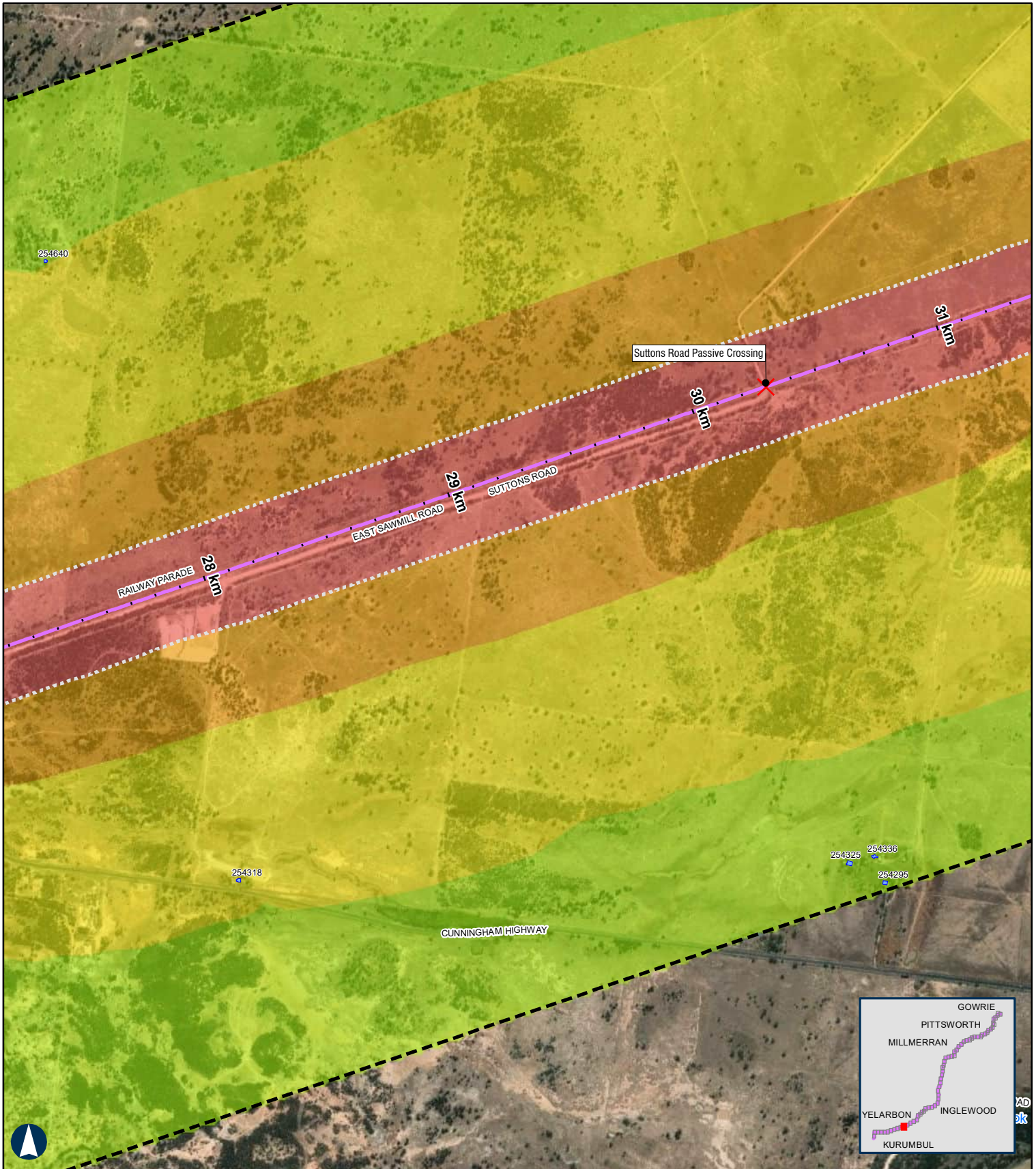
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 11 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

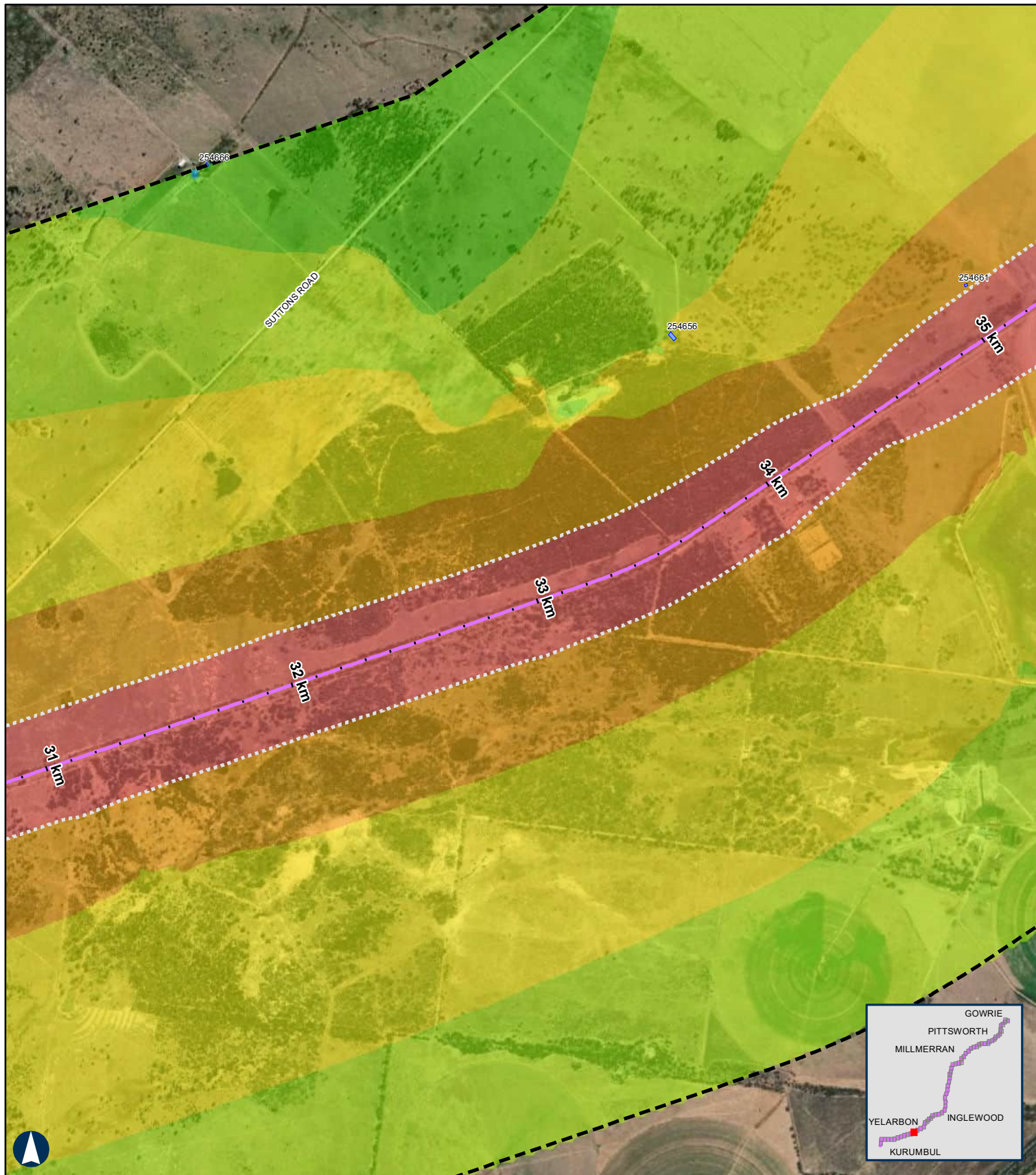
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 12 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

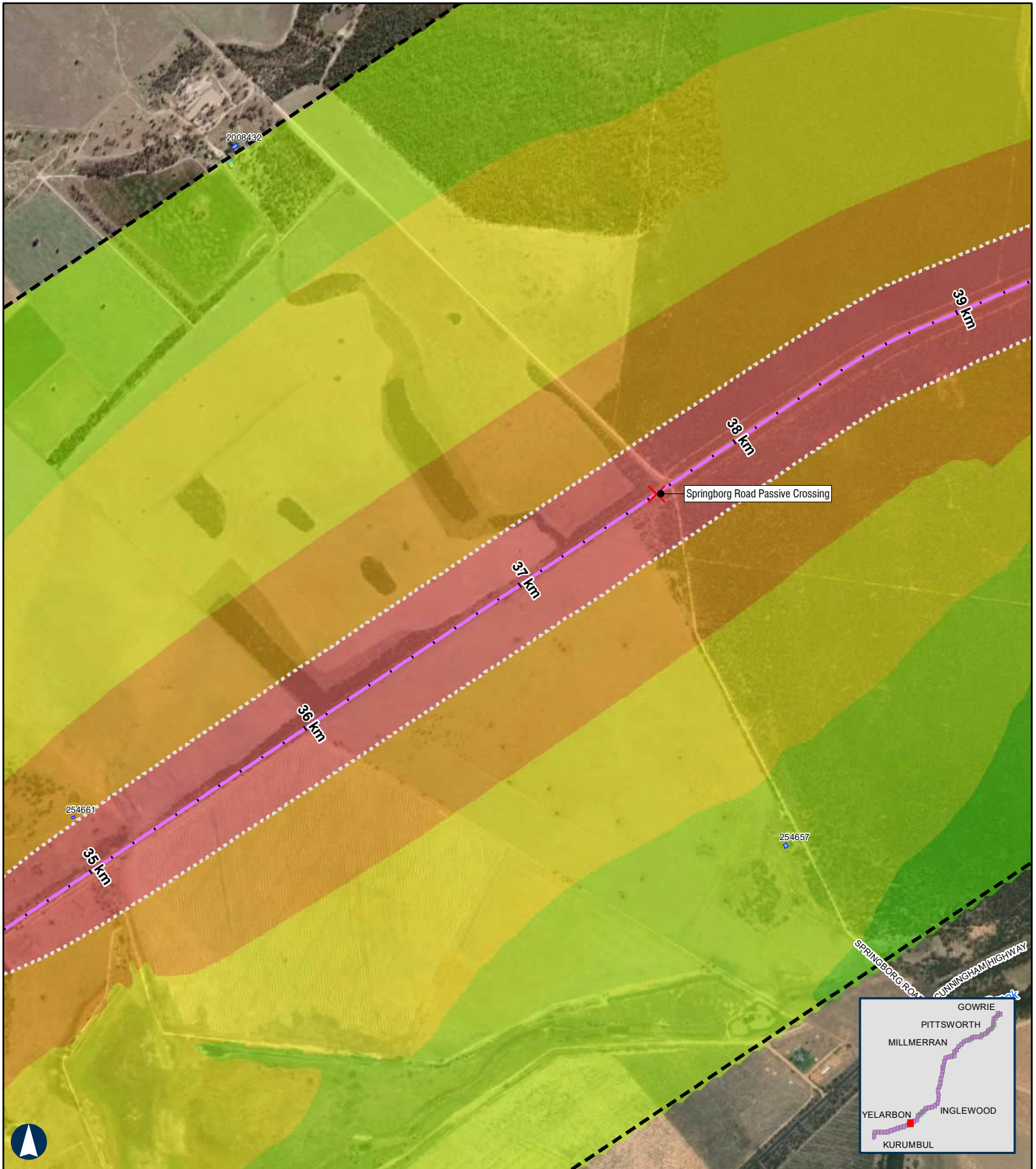
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 13 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

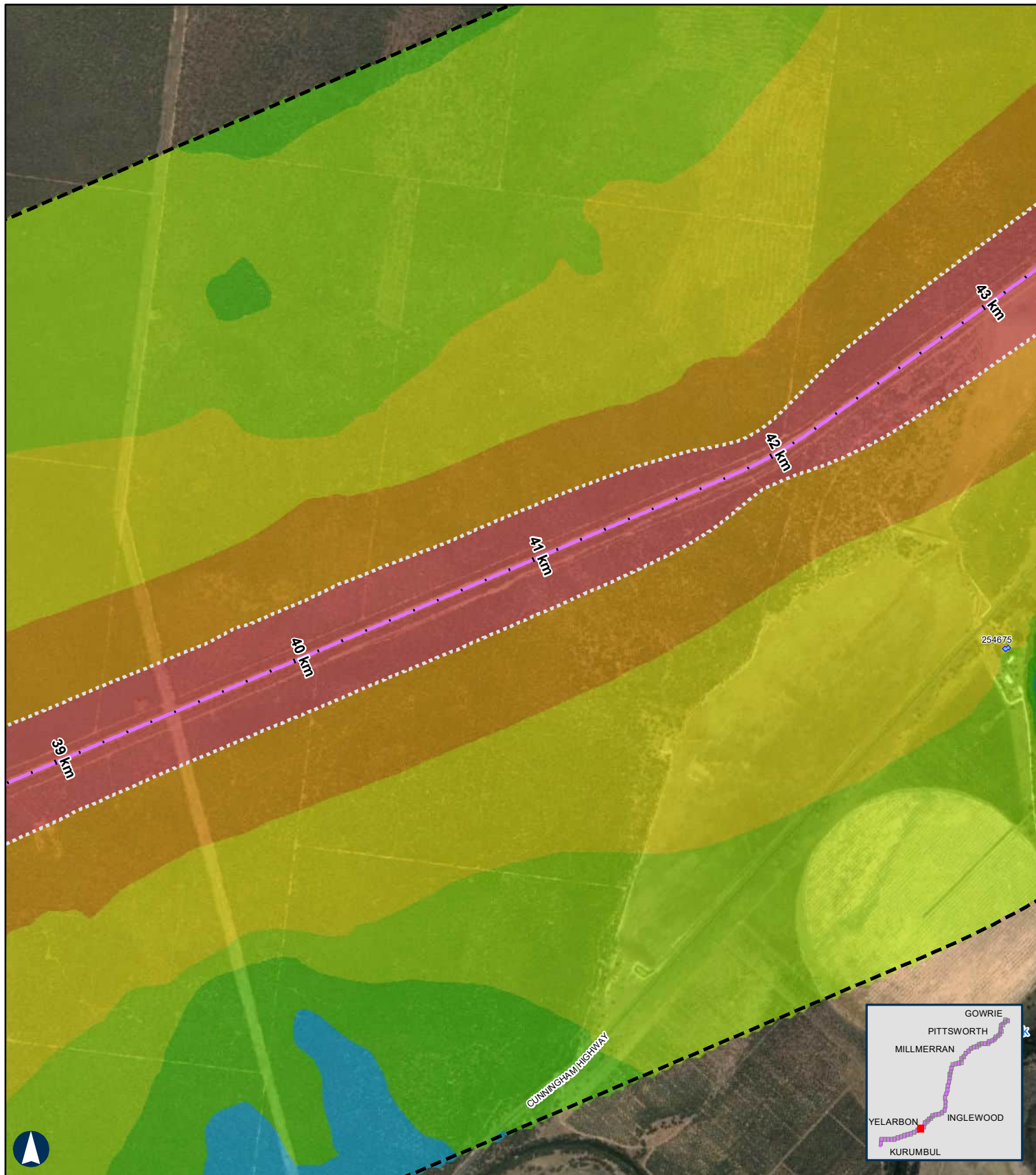
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 14 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/
Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

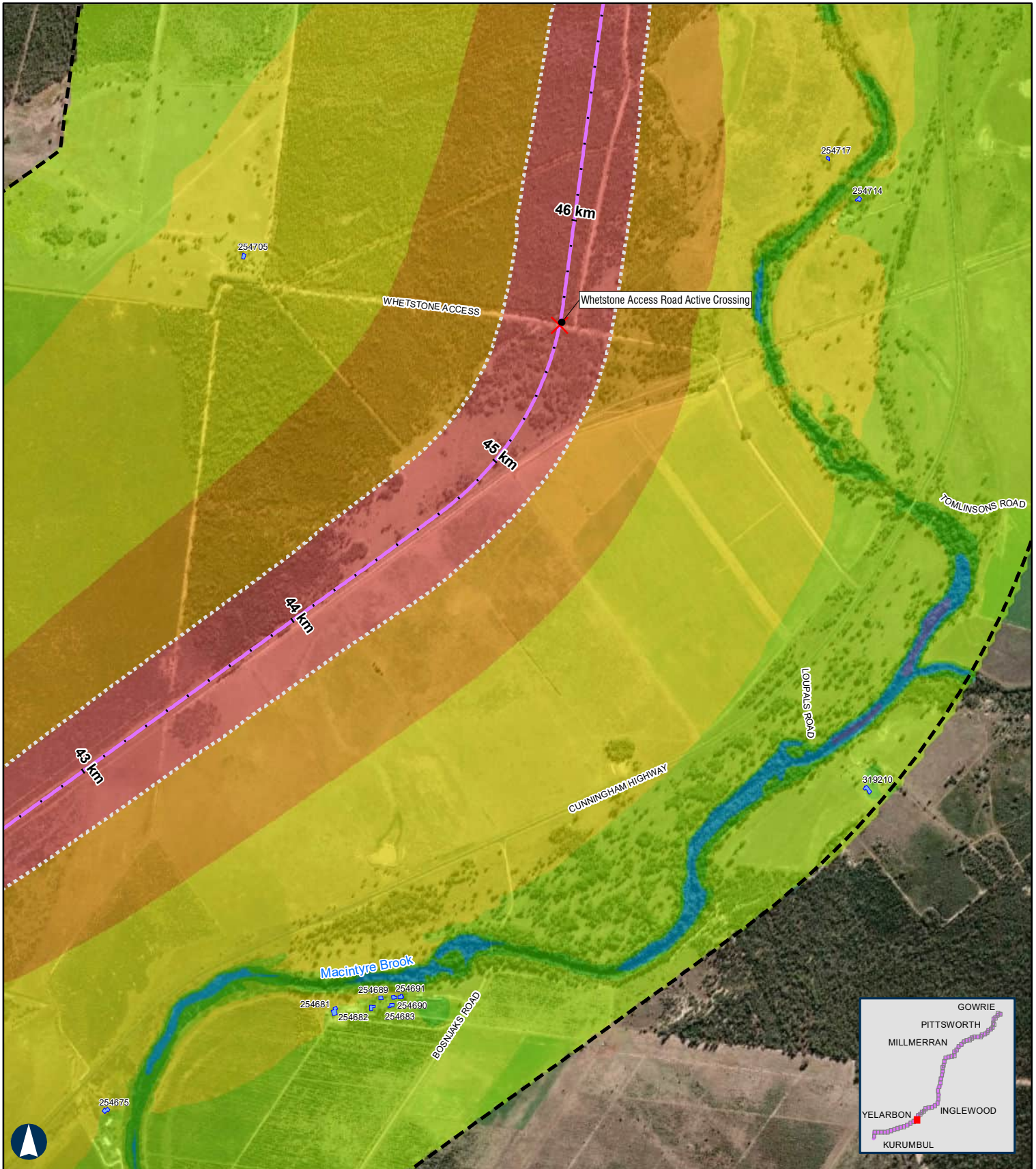
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 15 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▭ Koala Habitat Area

Sensitive Receptor Type

- ▭ Residential
- ▭ Community
- ▭ Educational
- ▭ Commercial
- ▭ Parkland
- ▭ Future Developments

--- Criterion (60 dBA)

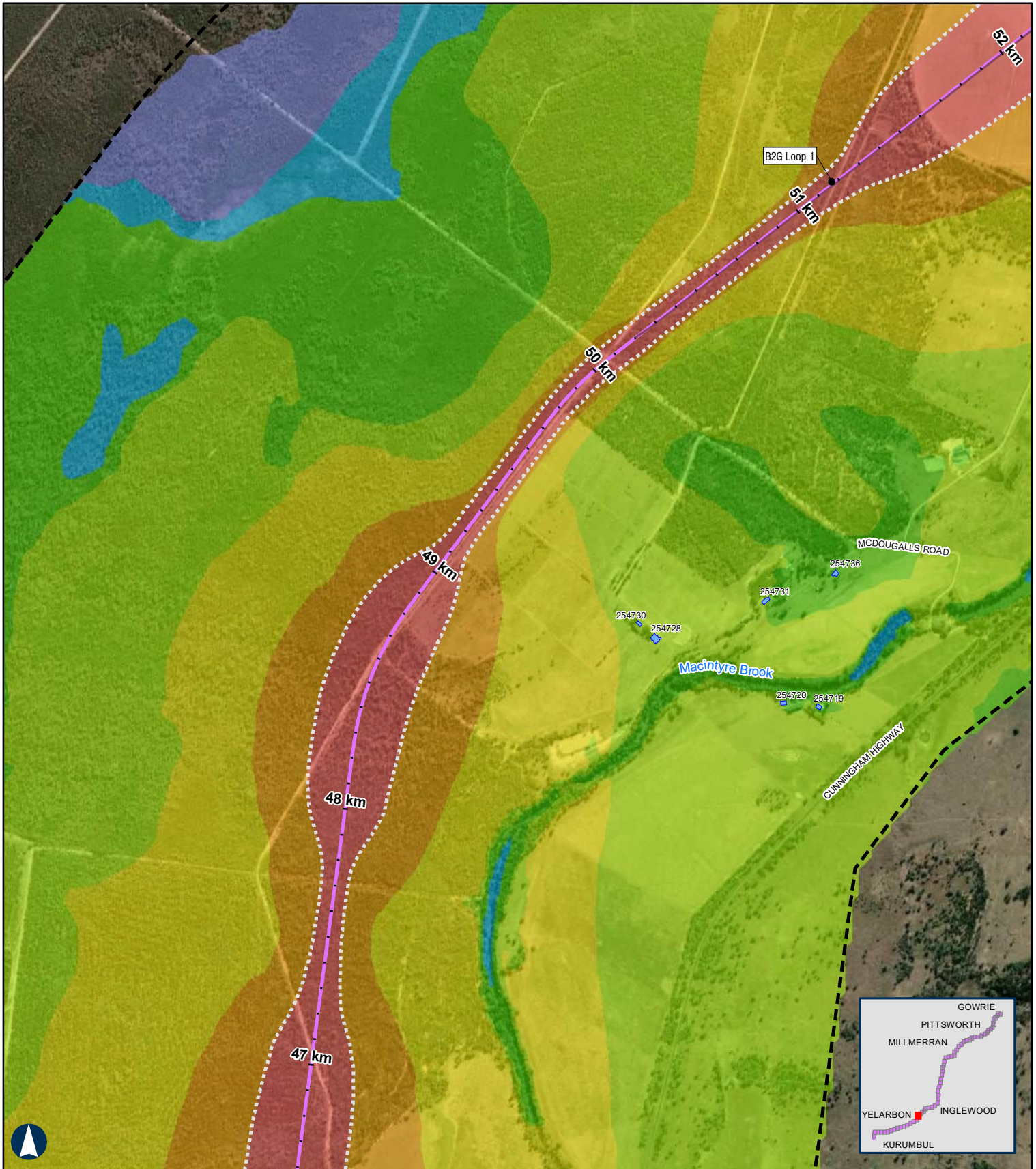
Noise Levels

- ▭ 30 - 35 dBA
- ▭ 35 - 40 dBA
- ▭ 40 - 45 dBA
- ▭ 45 - 50 dBA
- ▭ 50 - 55 dBA
- ▭ 55 - 60 dBA
- ▭ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 16 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

55 - 60 dBA

> 60 dBA

Paper: A4

Scale: 1:20,000

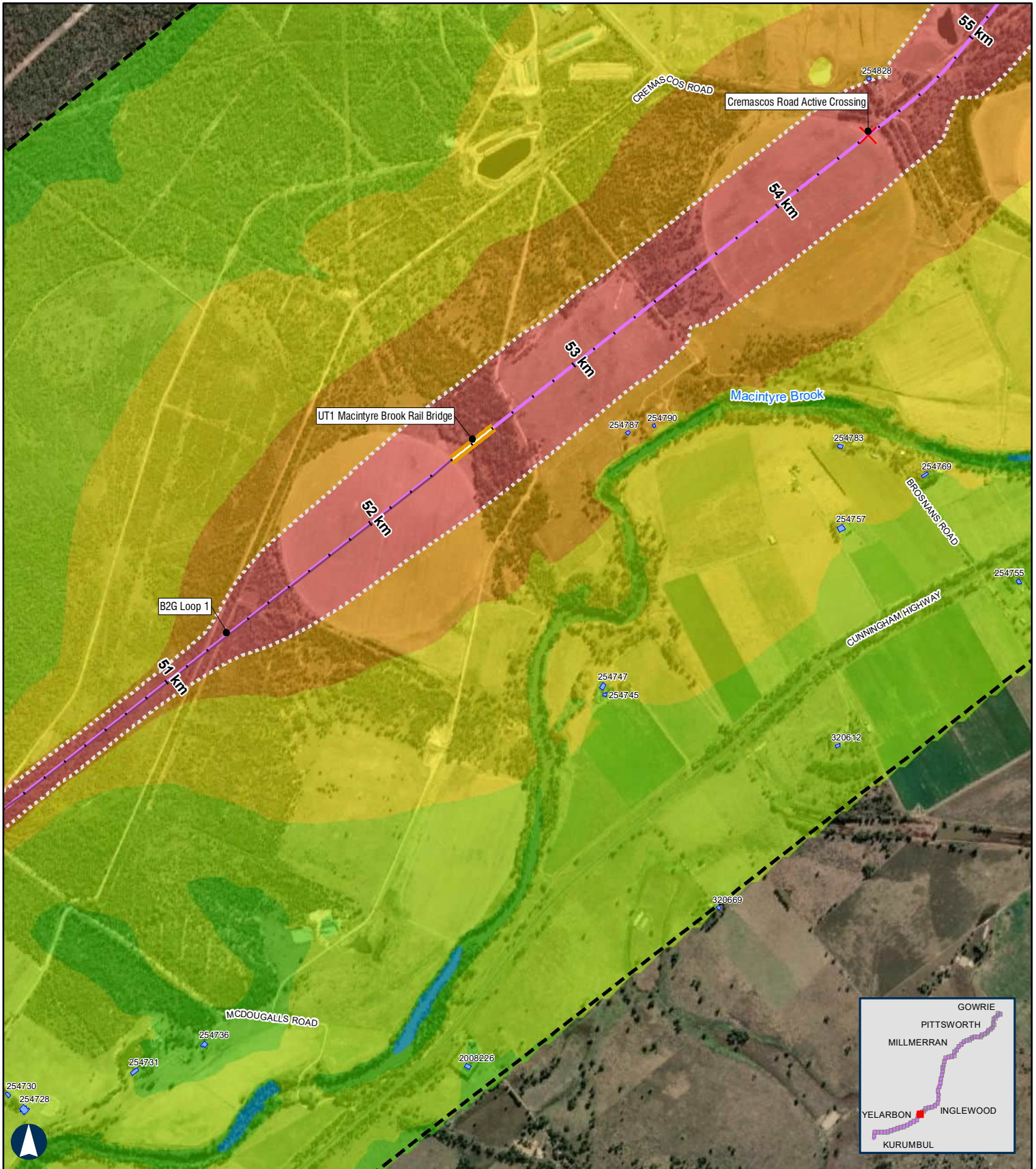
Date: 21-Oct-2024

Author: JG

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE **Unmitigated Noise Levels – 2040 Leq,24h**

APPENDIX E - Map 17 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

55 - 60 dBA

> 60 dBA

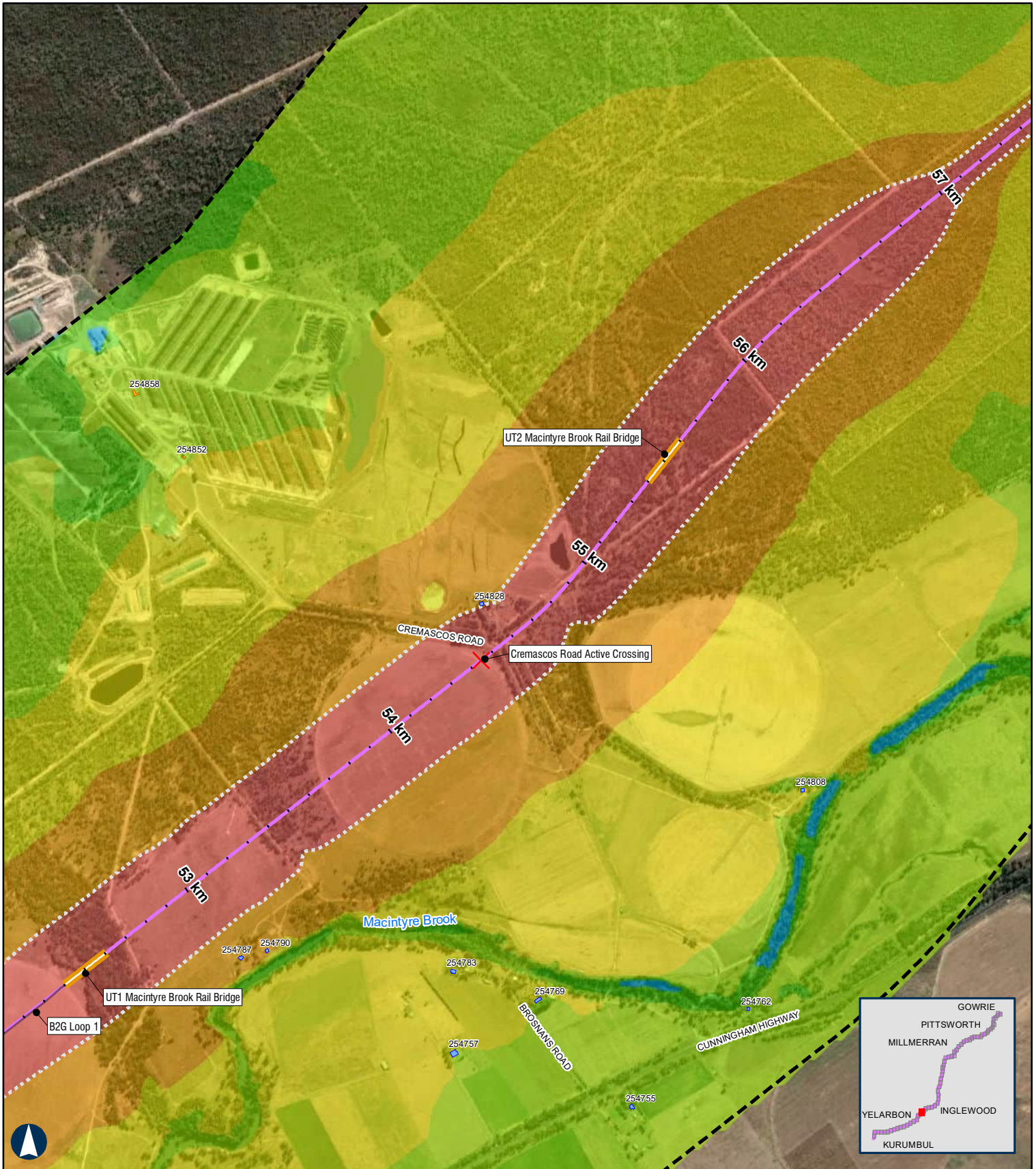
Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC

InlandRail

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.

H:\Projects\SLR\620-BNE\620-BNE\620.12209 Inland Rail\06 SLR Data\06 CAD\GIS\ArcGIS\B2G\SLR62012209_B2G_NoiseLevels_2040_LAeq.mxd
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 18 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

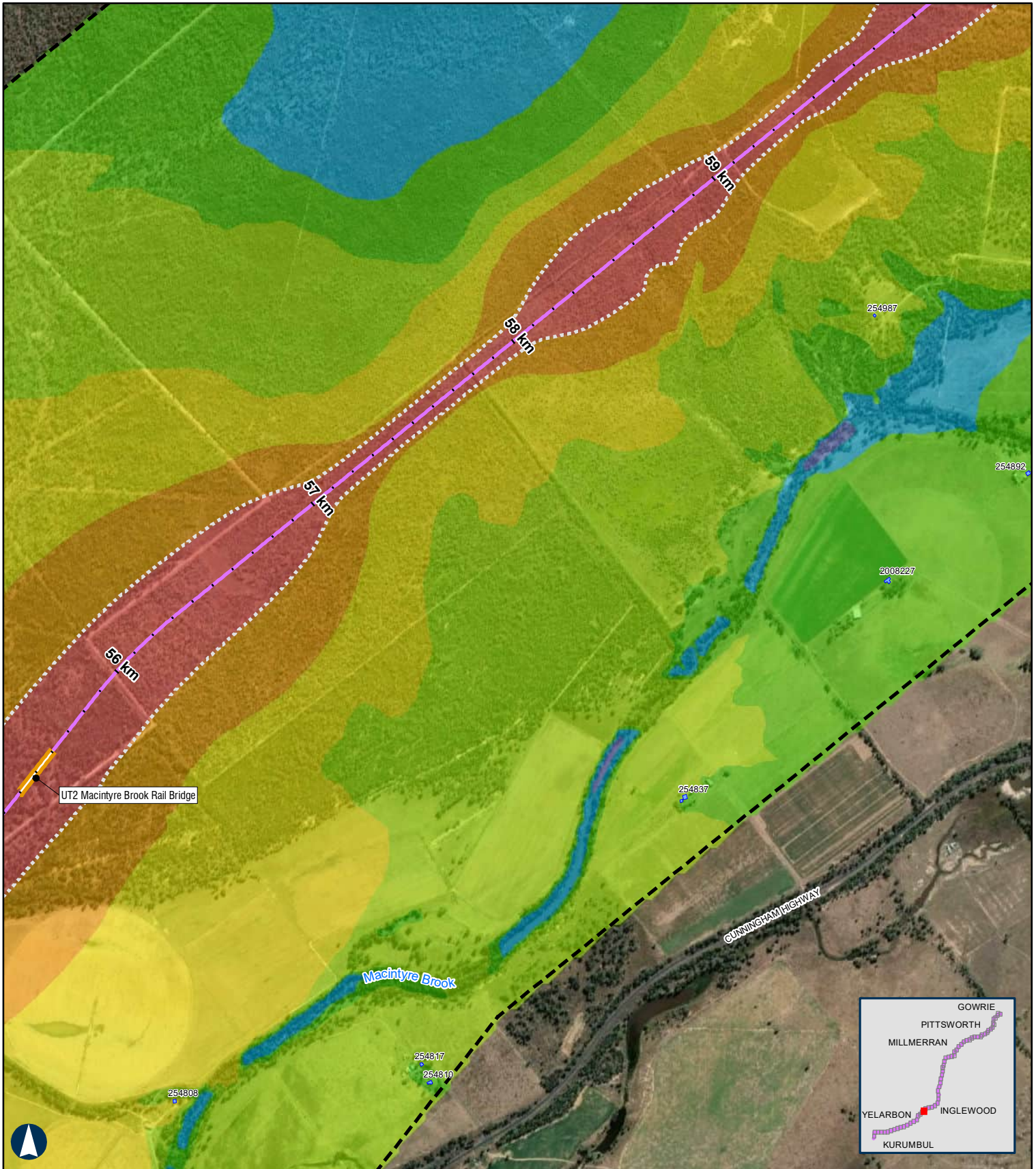
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 19 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

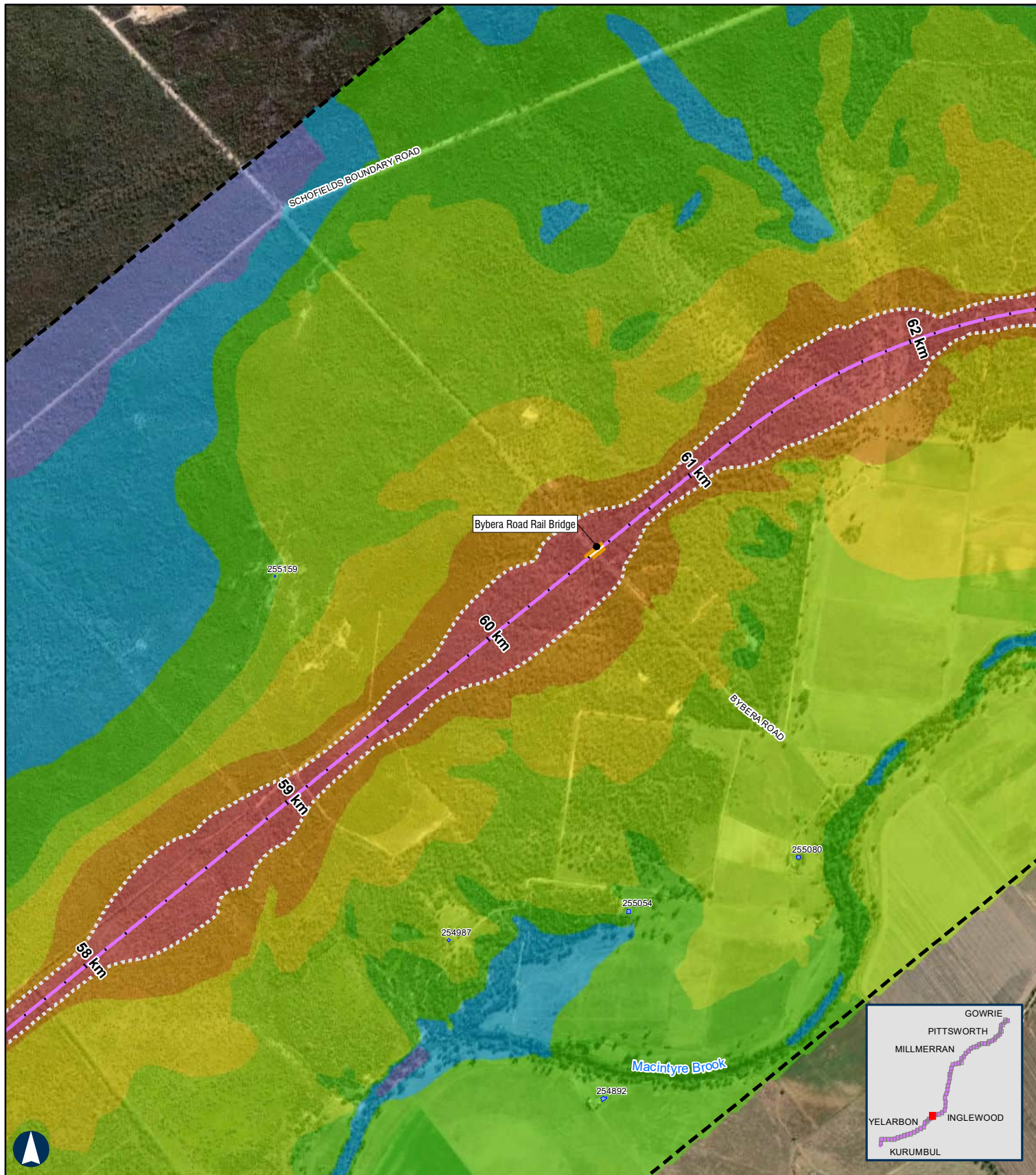
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 20 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

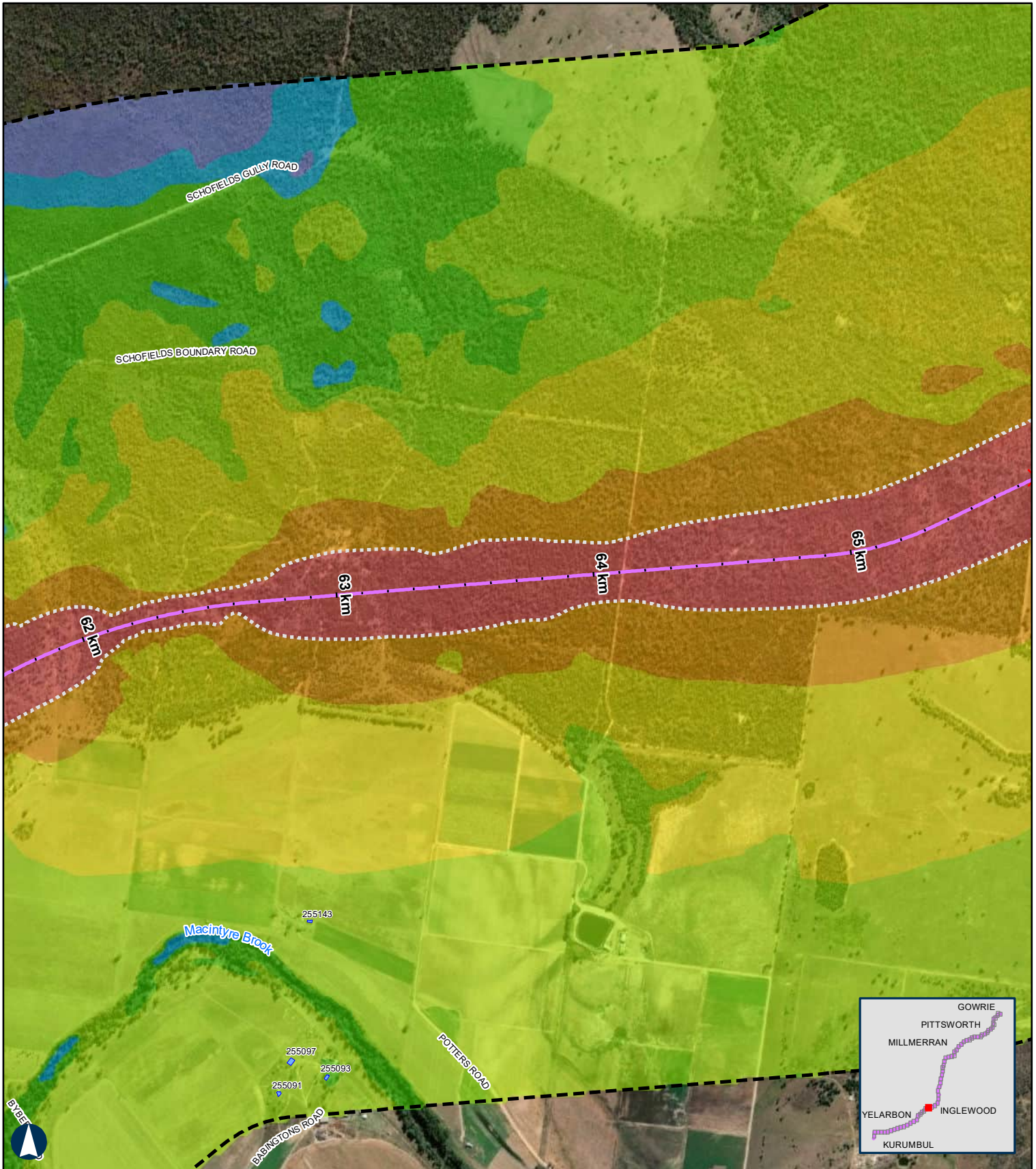
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 21 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- [] Modelling Area
- [] Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- [] Future Developments

--- Criterion (60 dBA)

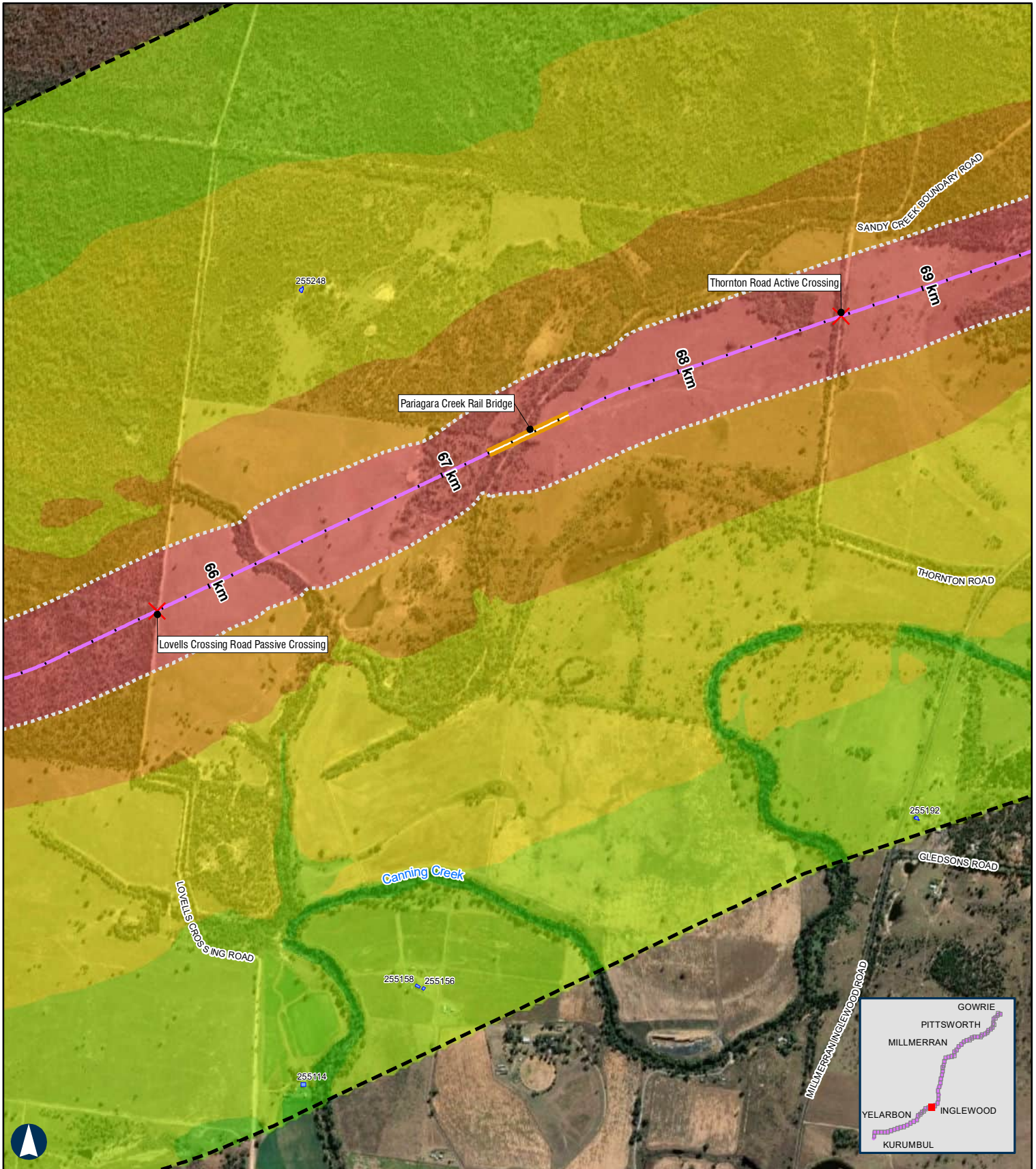
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 22 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

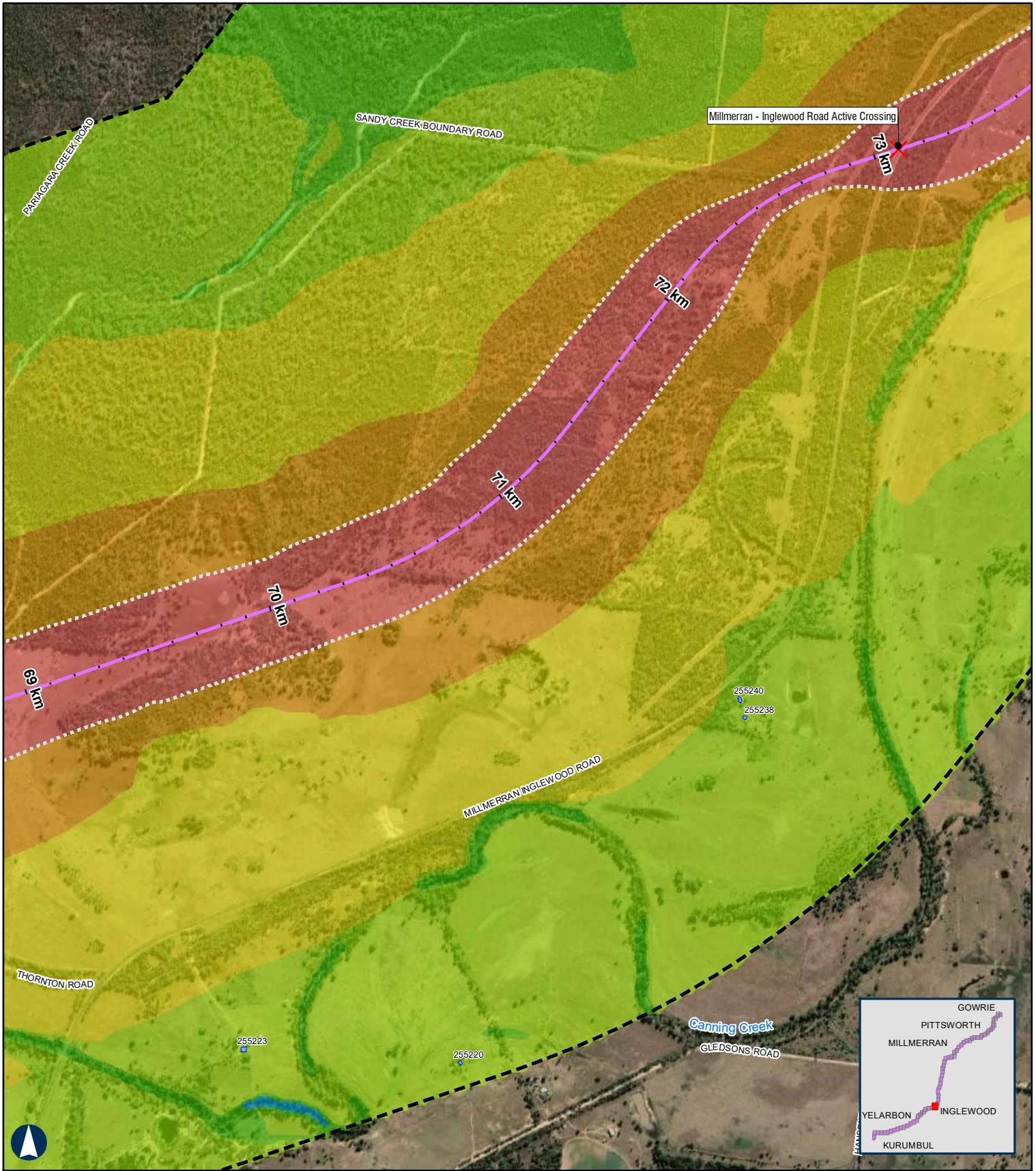
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 23 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

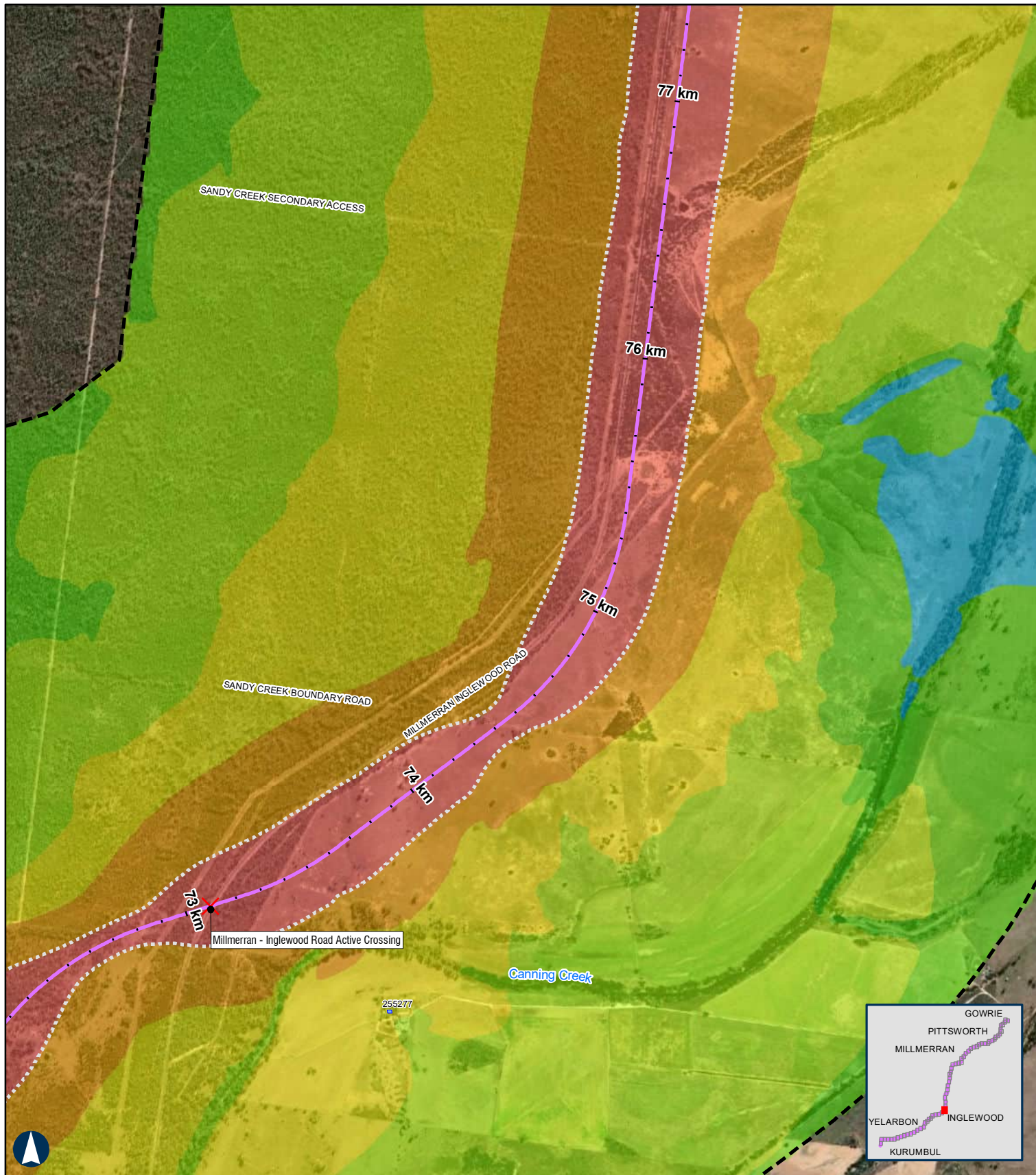
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 24 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

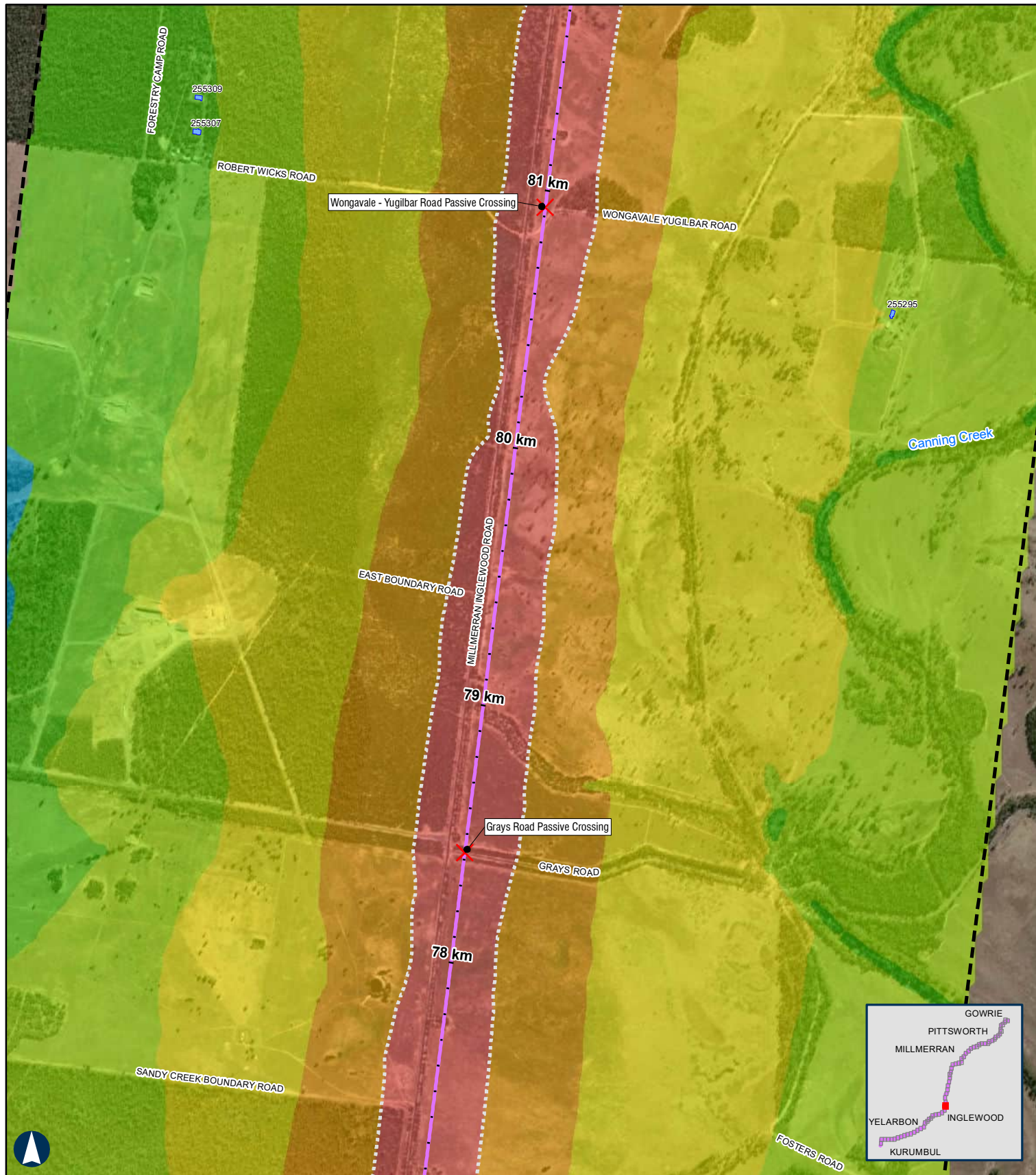
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG
Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 25 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 26 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 27 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

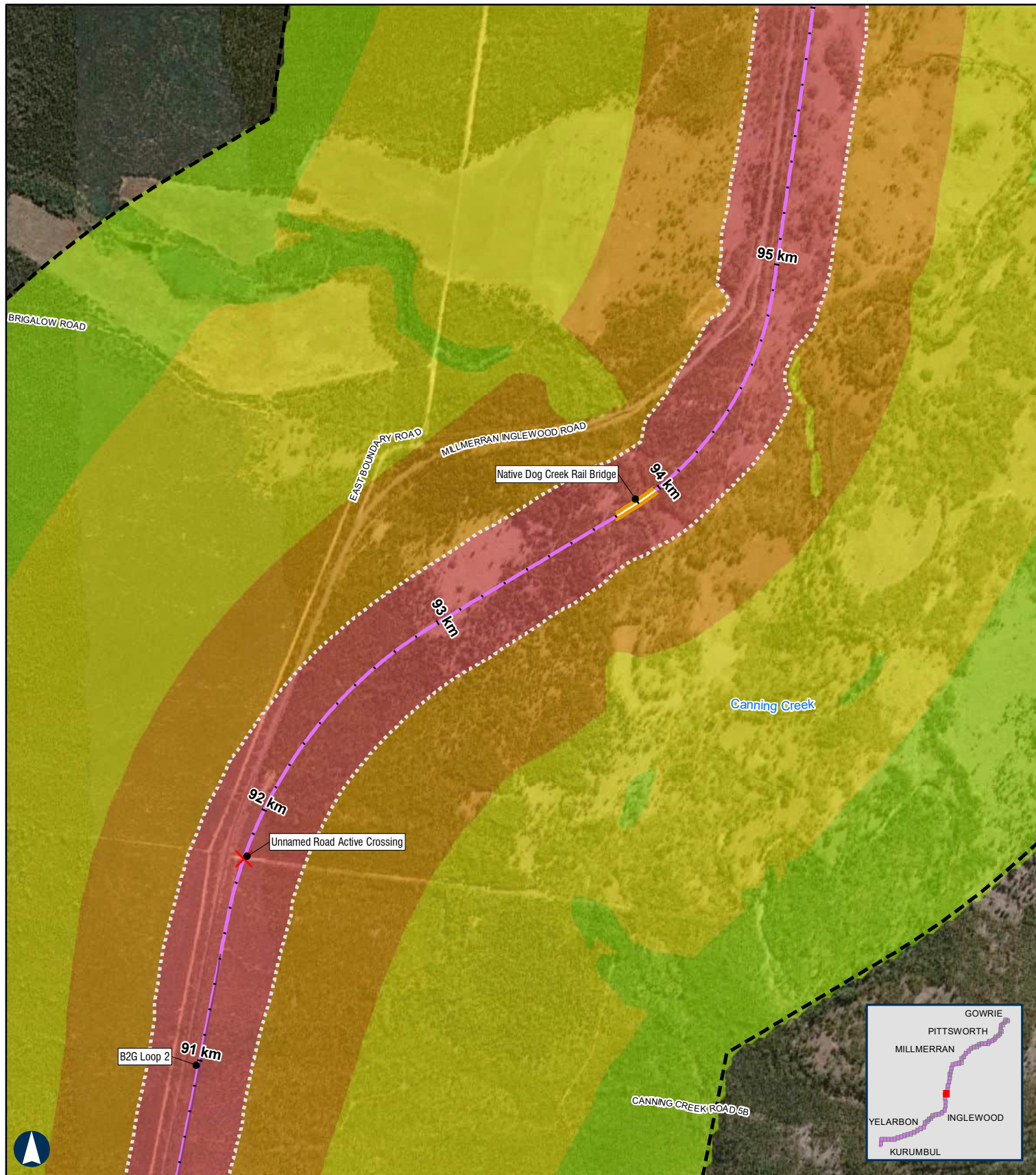
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 28 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

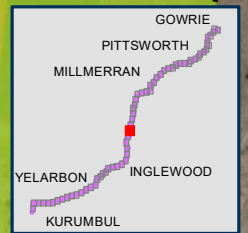
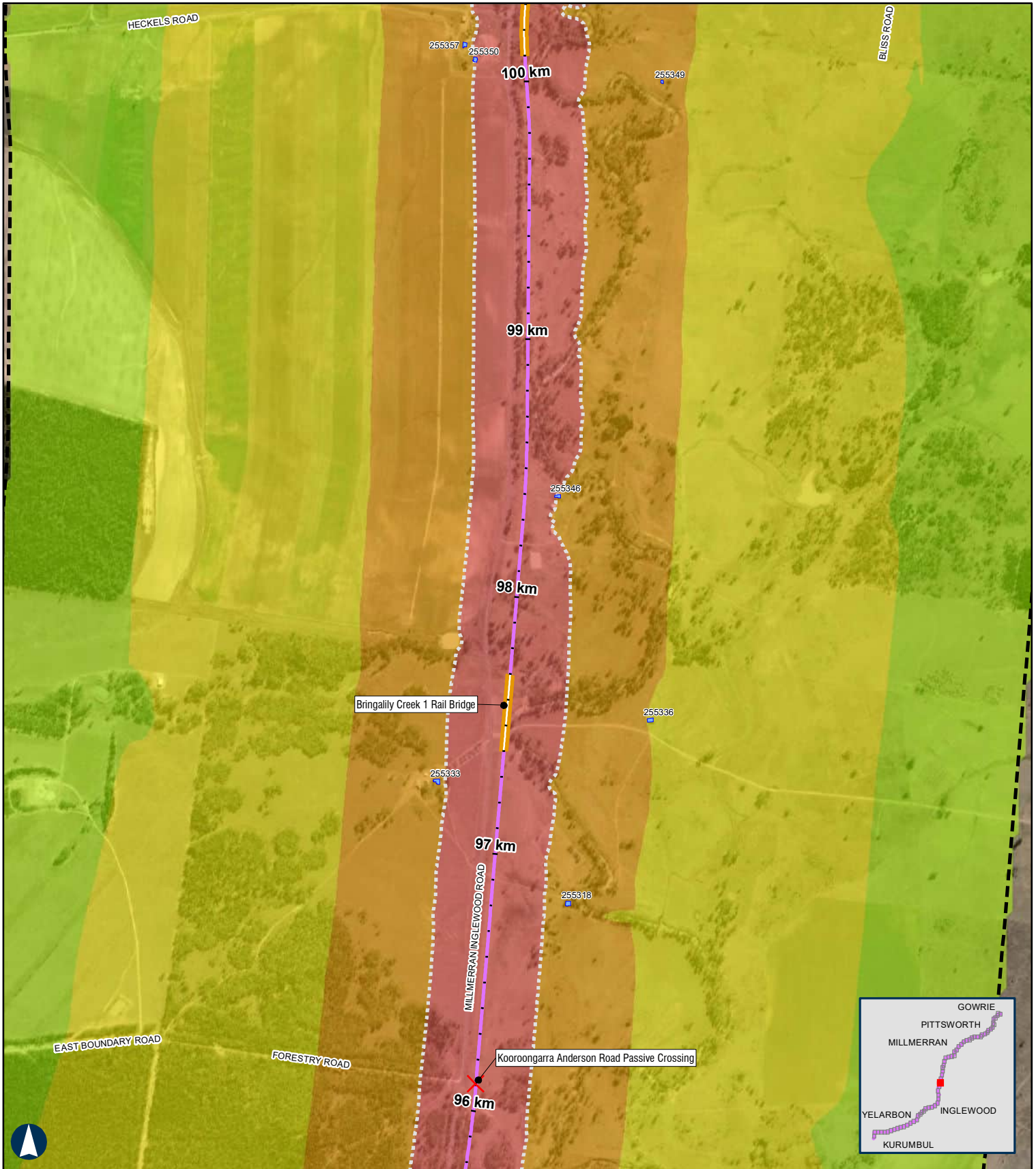
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG
Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 29 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

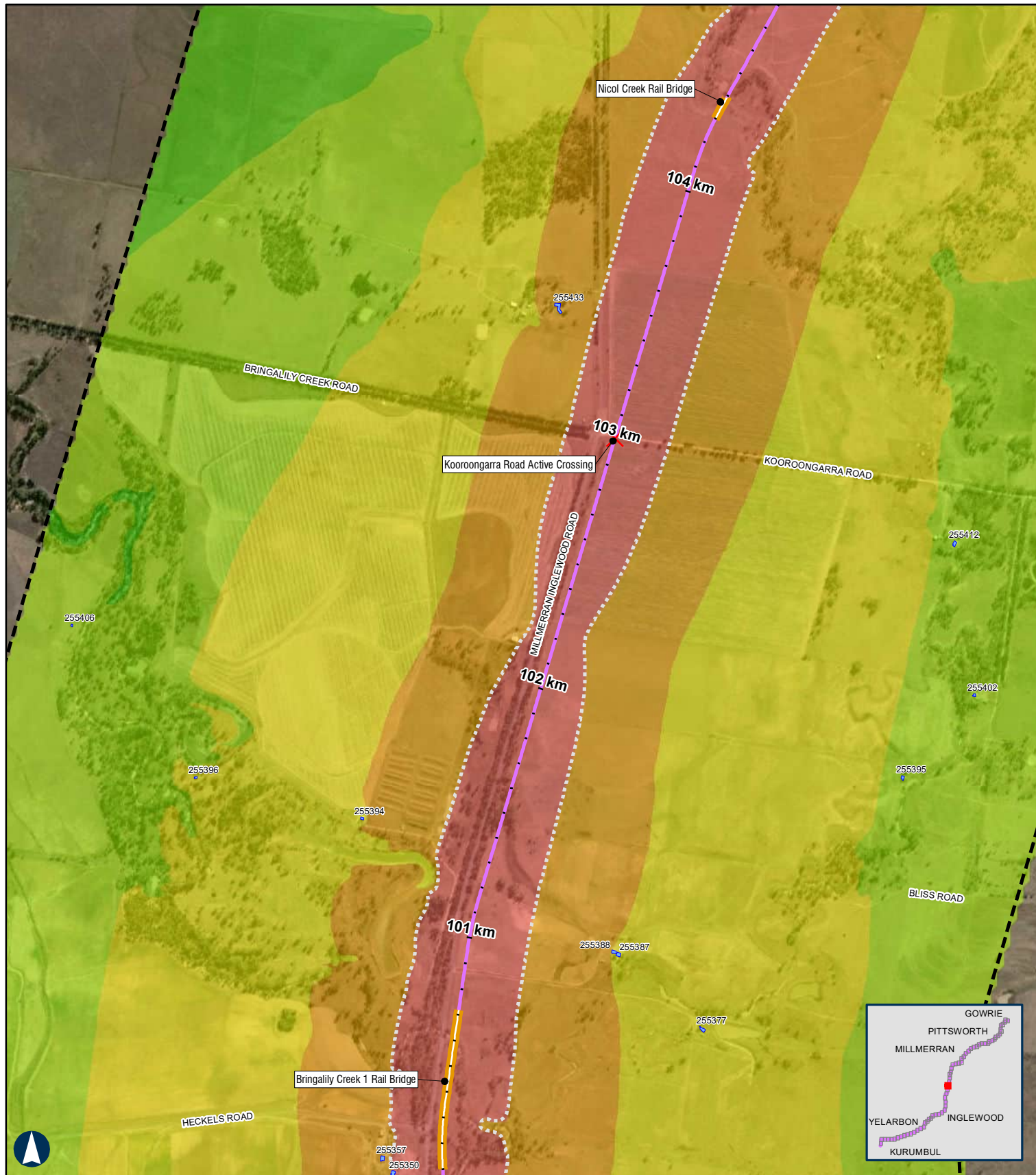
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 30 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

■ Modelling Area

■ Koala Habitat Area

Sensitive Receptor Type

■ Residential

■ Community

■ Educational

■ Commercial

■ Parkland

■ Future Developments

--- Criterion (60 dBA)

Noise Levels

■ 30 - 35 dBA

■ 35 - 40 dBA

■ 40 - 45 dBA

■ 45 - 50 dBA

■ 50 - 55 dBA

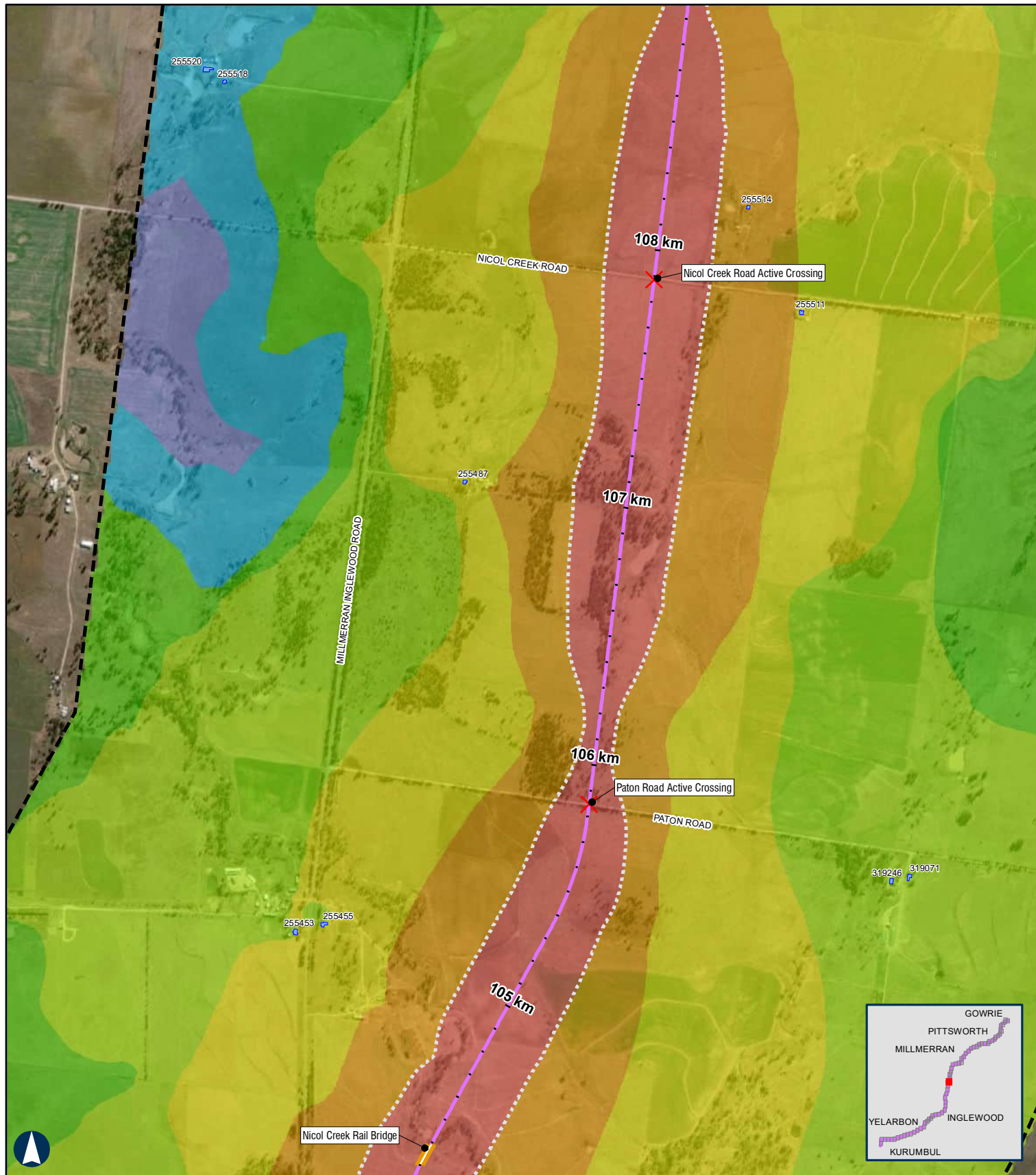
■ 55 - 60 dBA

■ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 31 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

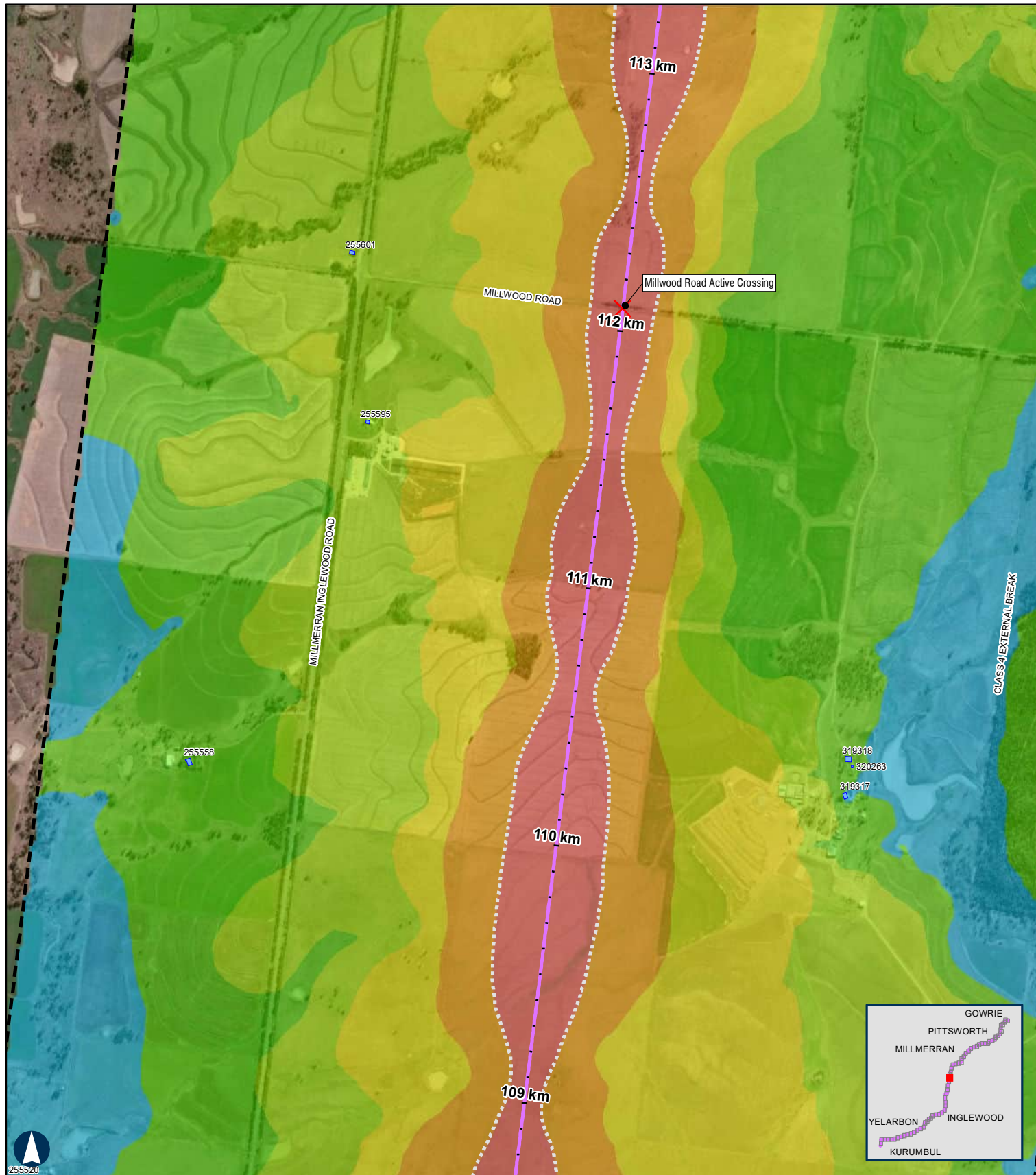
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 32 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

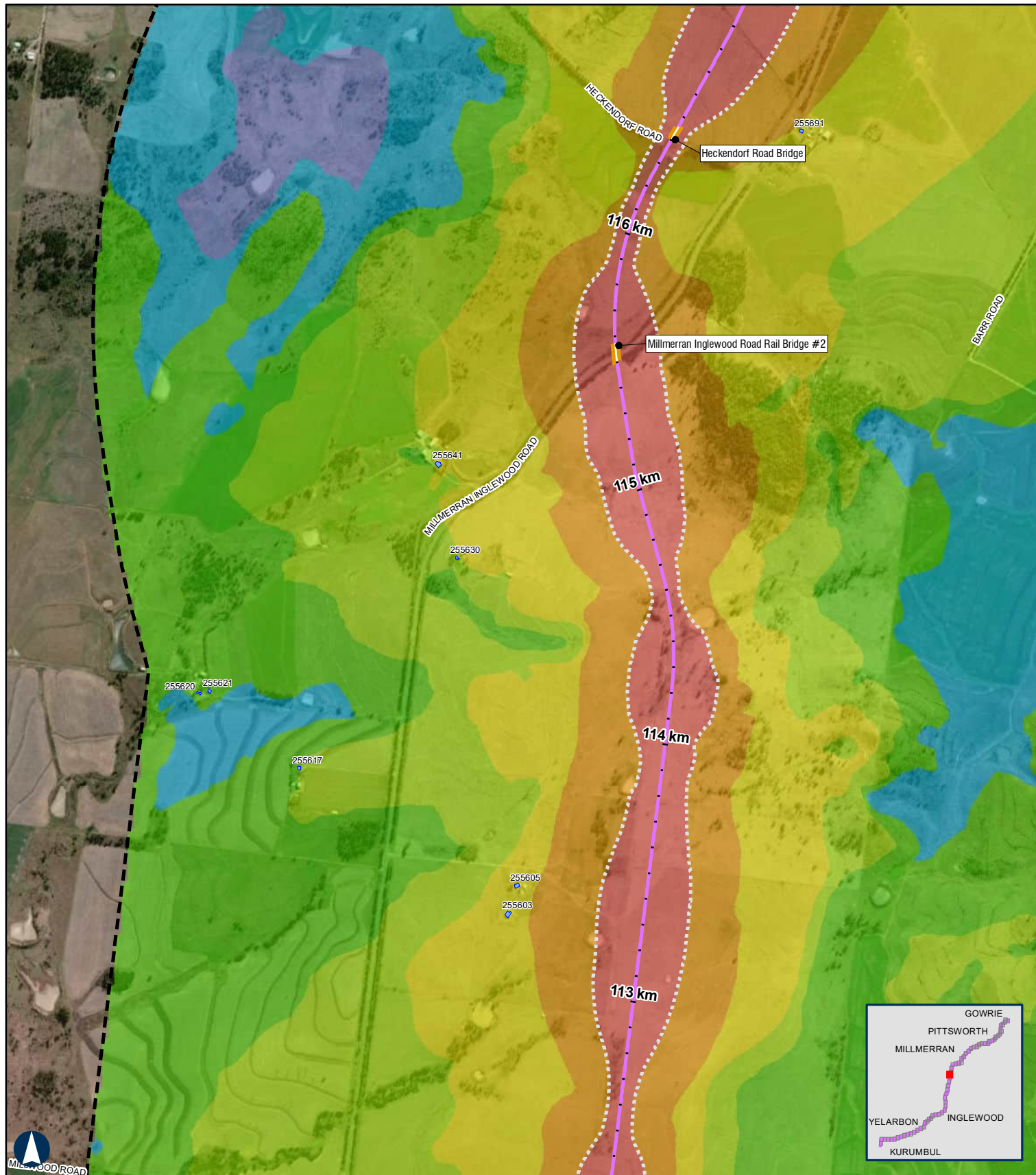
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 33 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

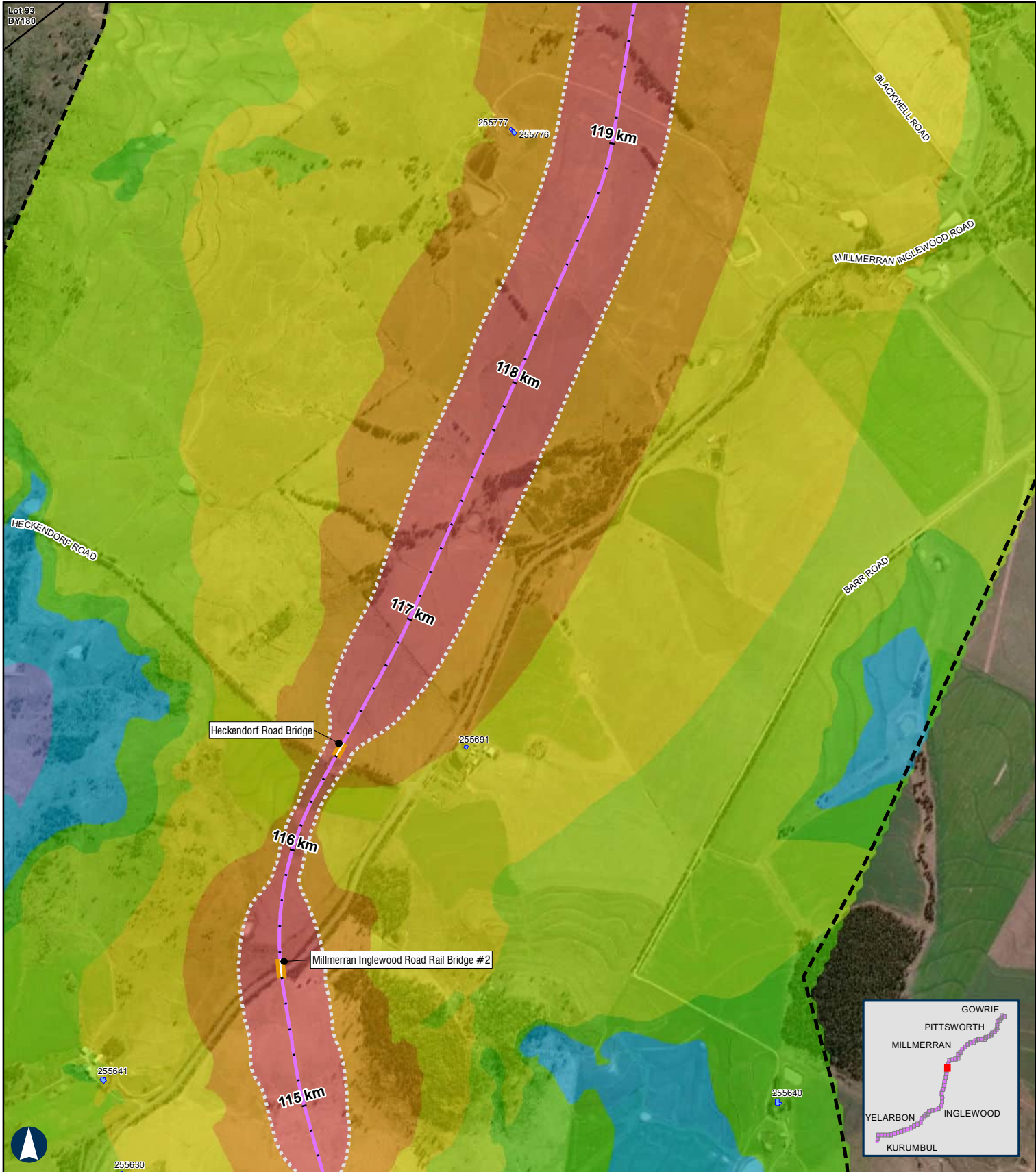
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 34 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

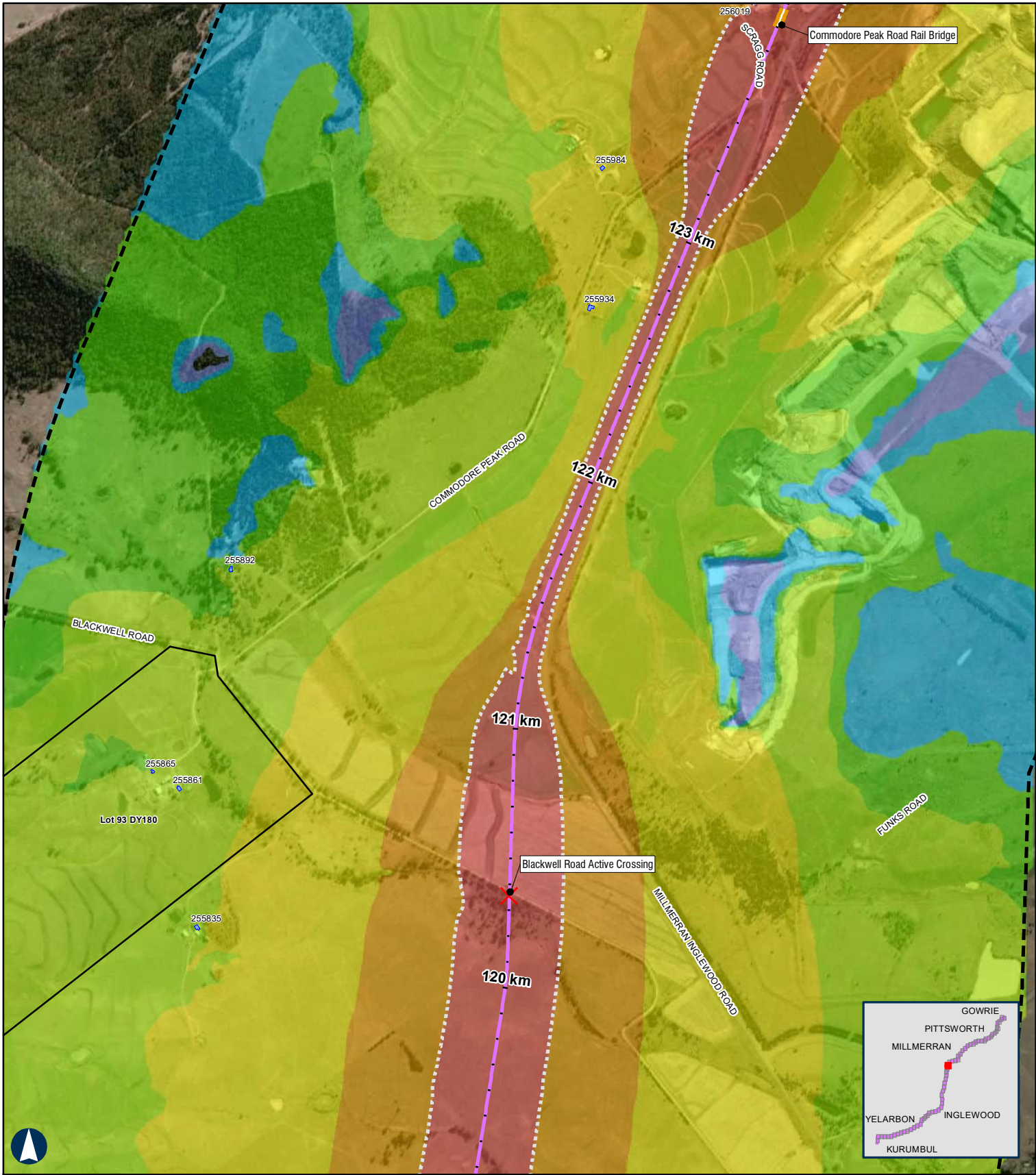
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 35 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

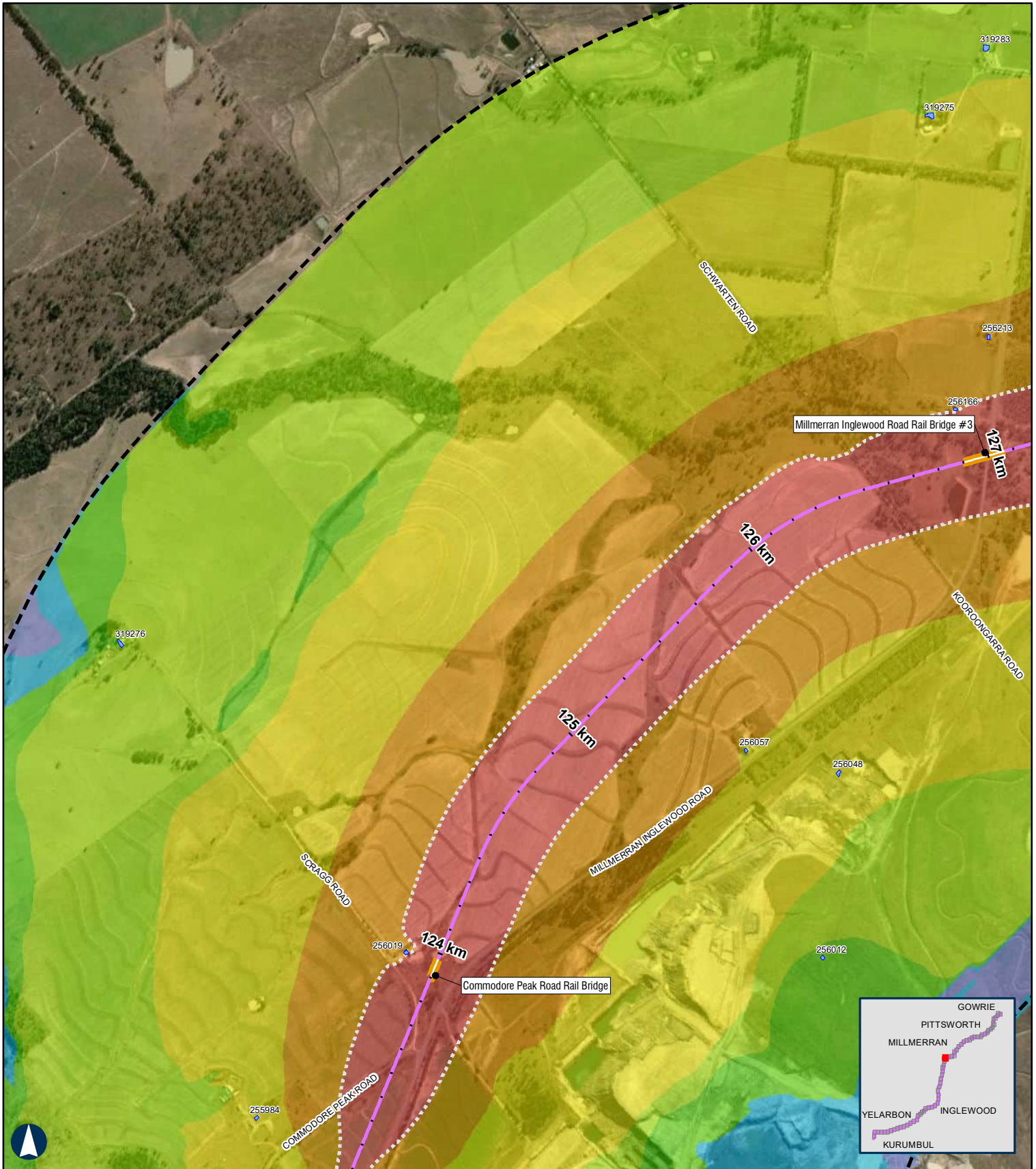
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 36 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

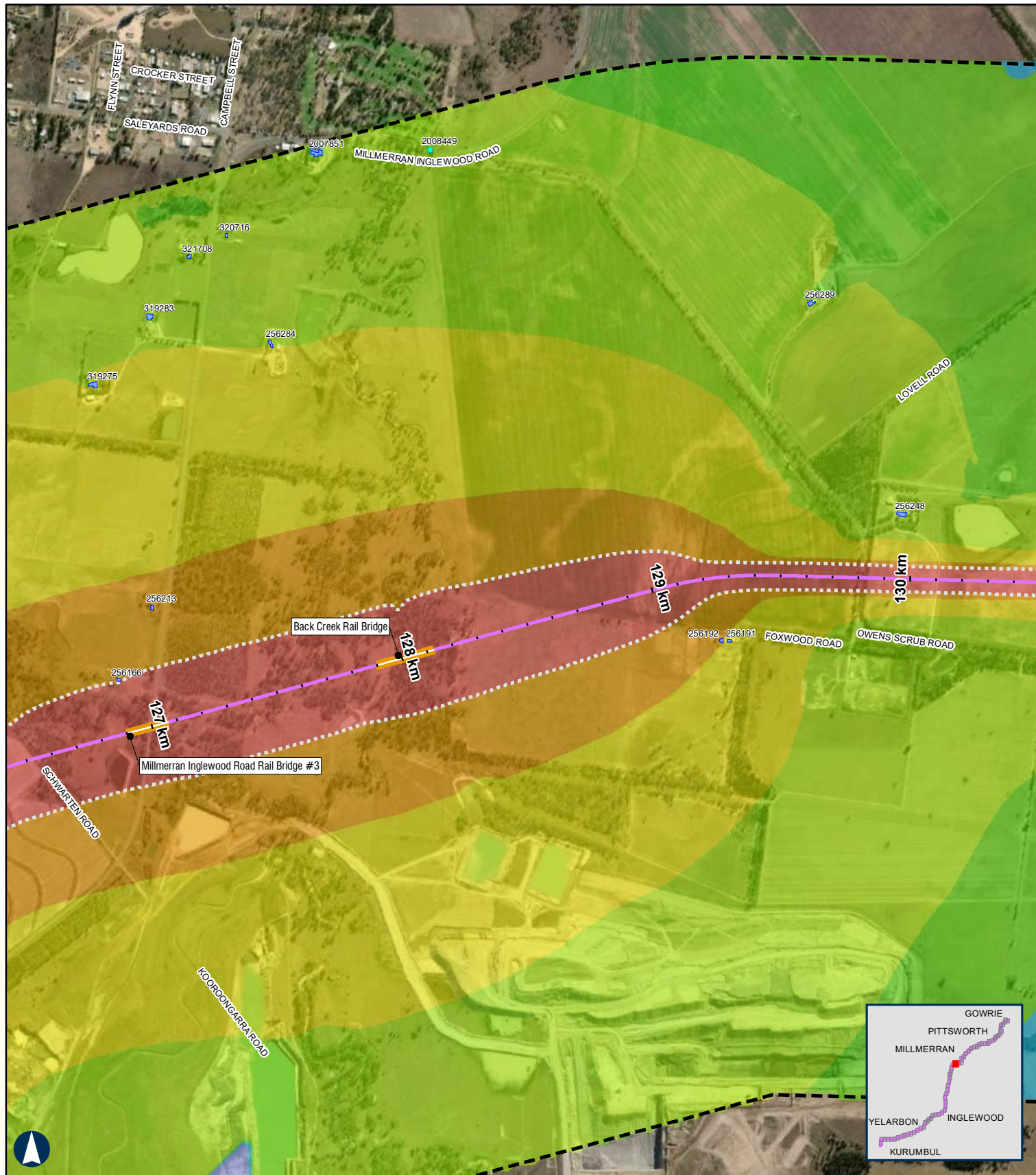
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 37 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

... Criterion (60 dBA)

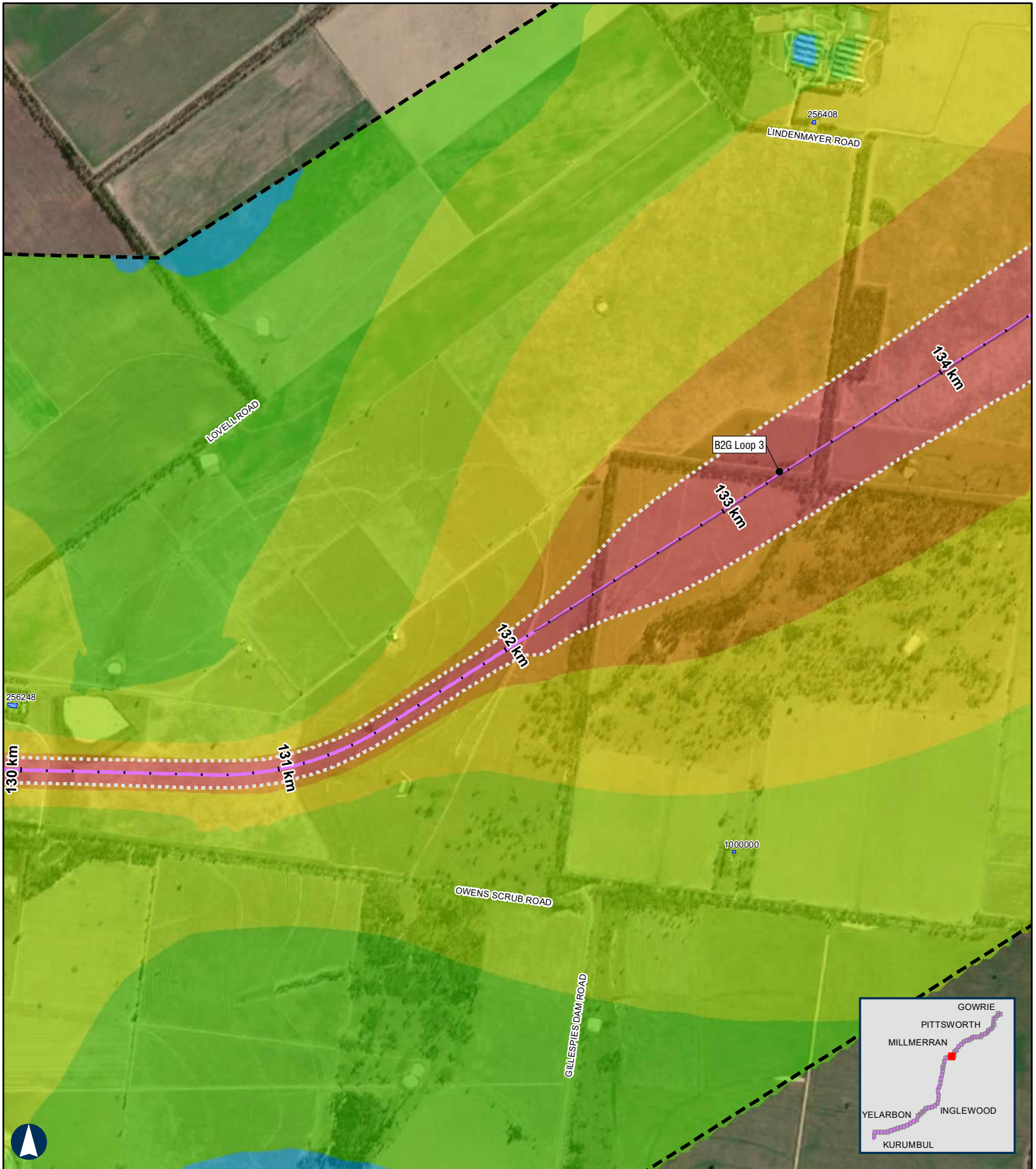
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 38 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:20,000

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

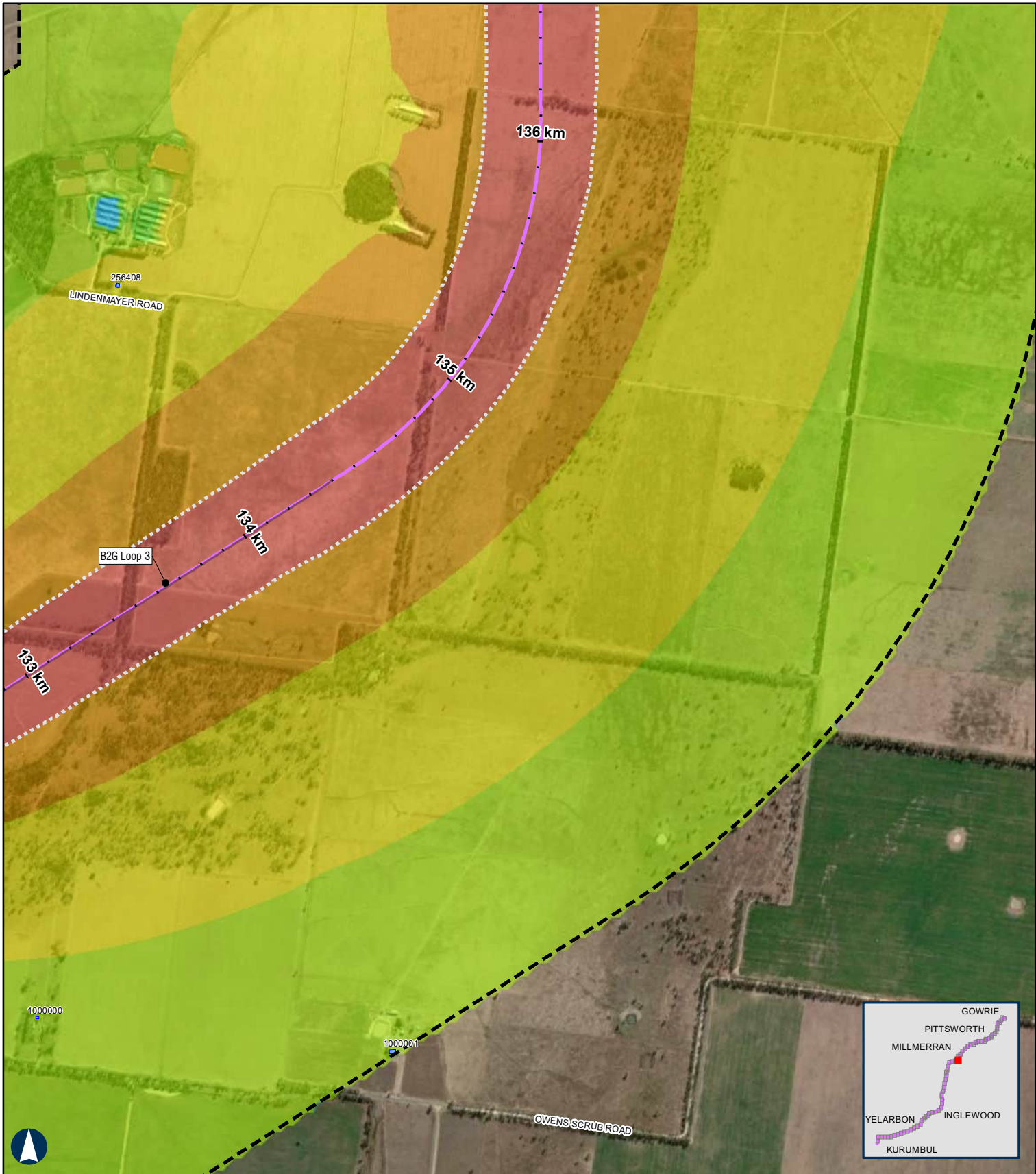
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE **Unmitigated Noise Levels – 2040 Leq,24h**

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

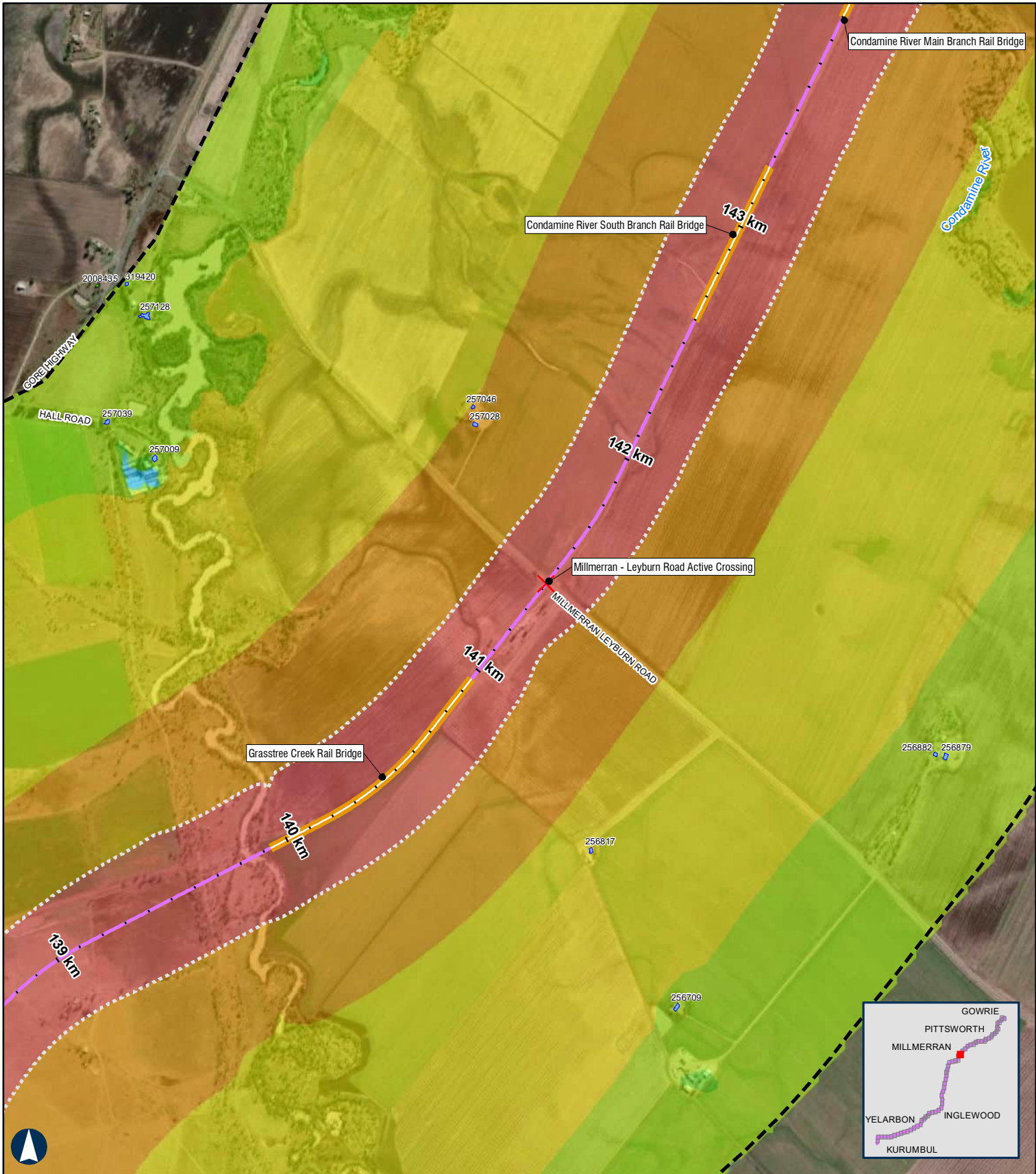
- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

APPENDIX E - Map 39 of 63



The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.



BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 41 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

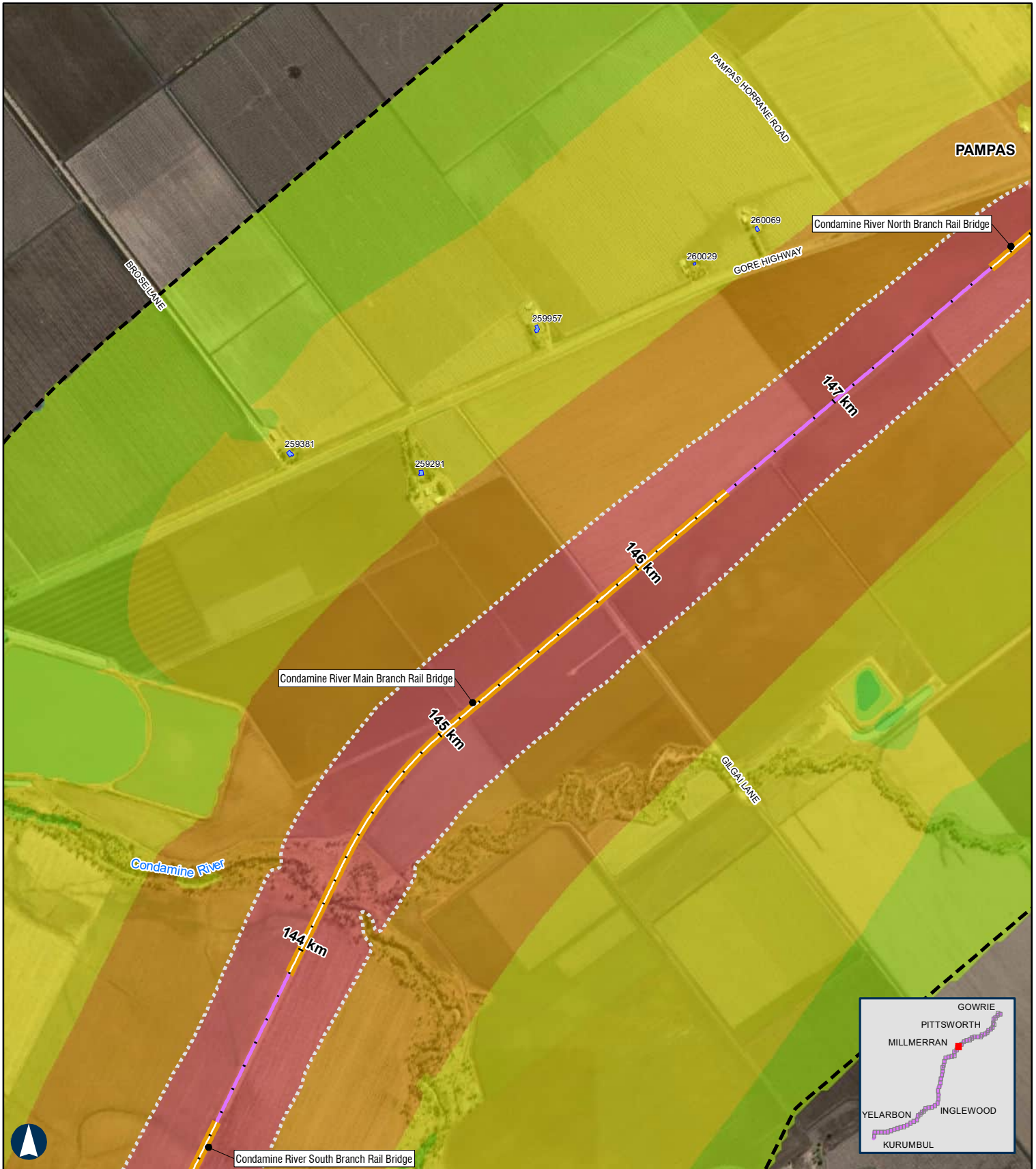
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- ... Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 42 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

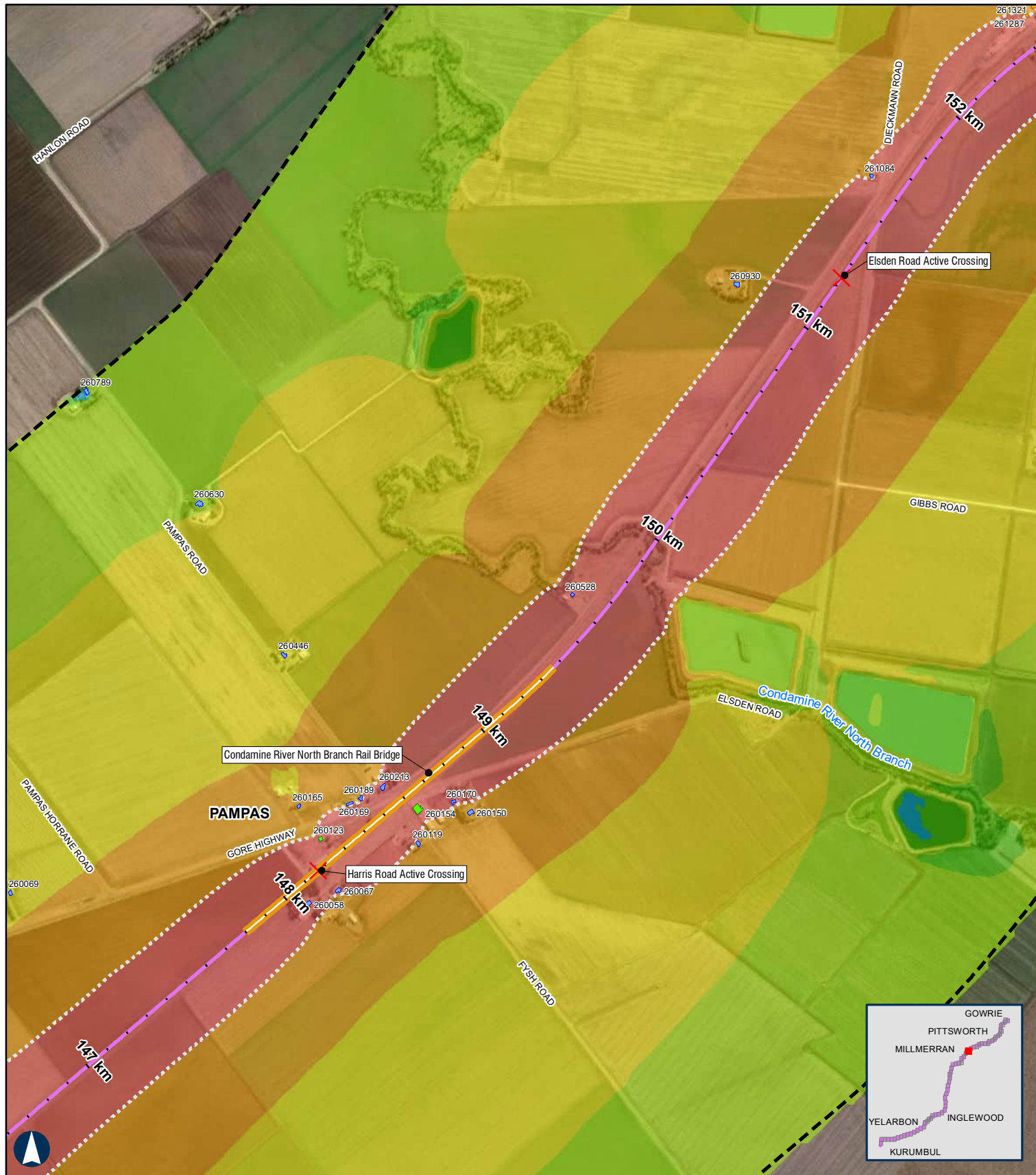
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 43 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

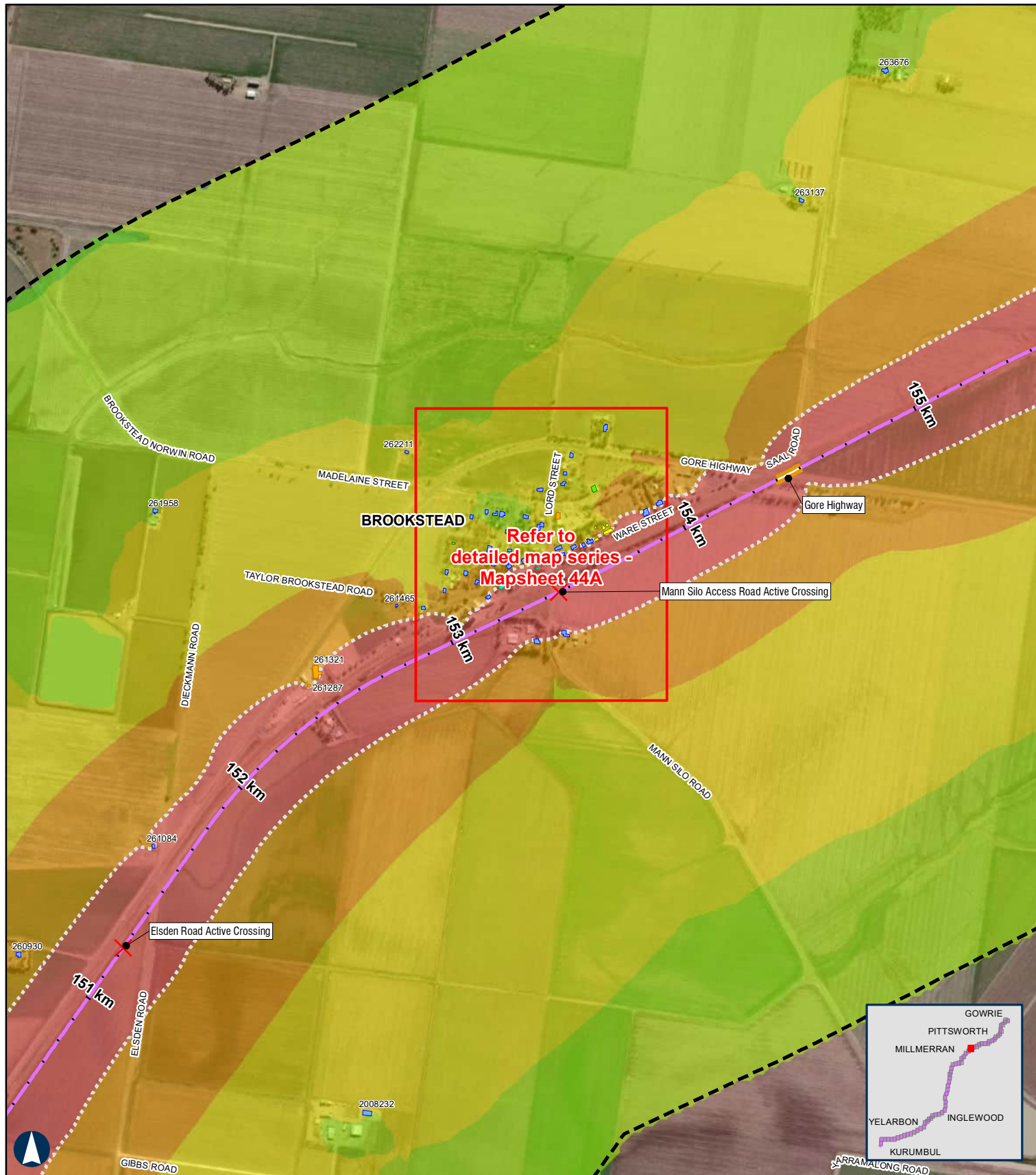
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 44 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

... Criterion (60 dBA)

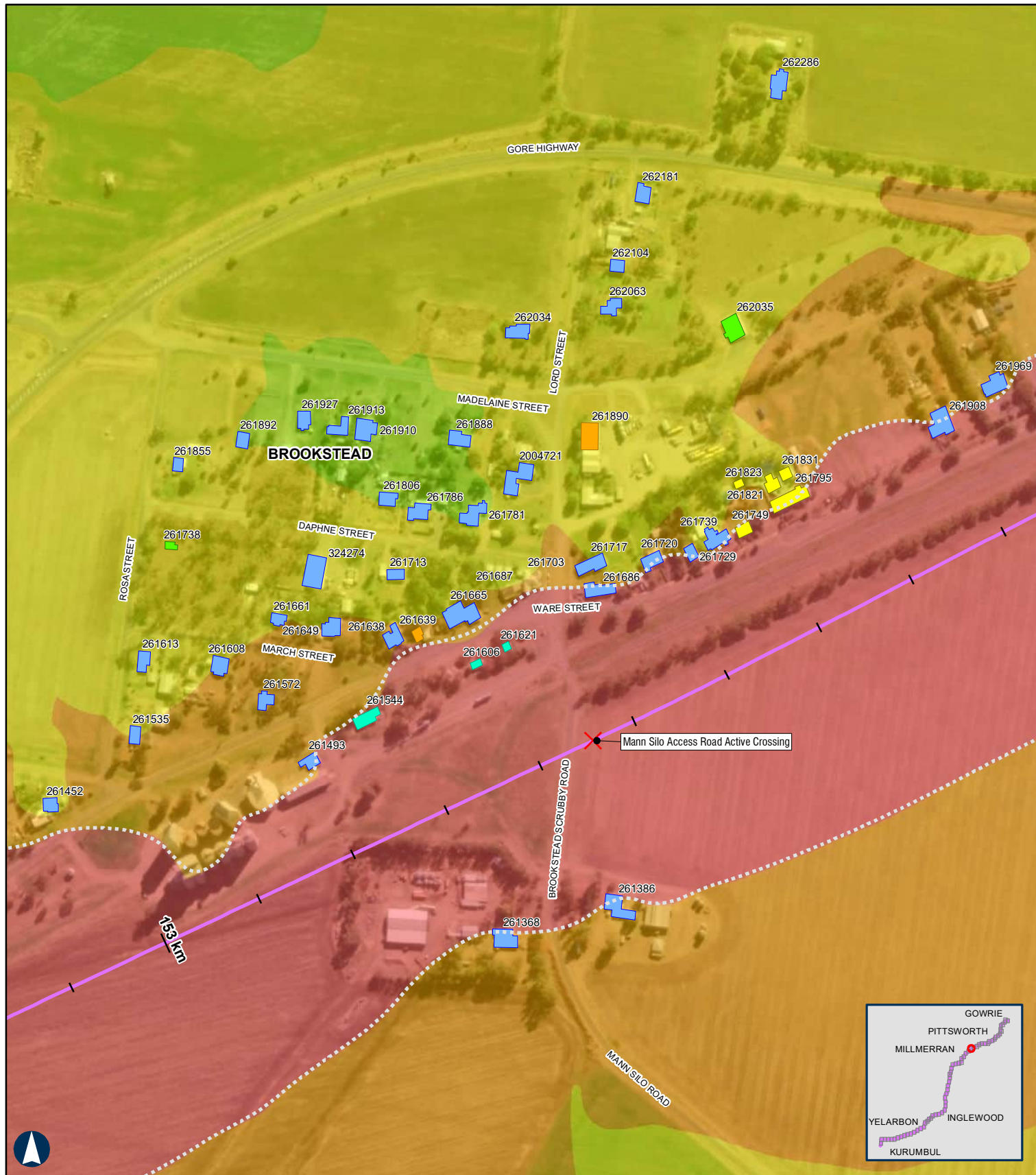
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 44A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:5,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

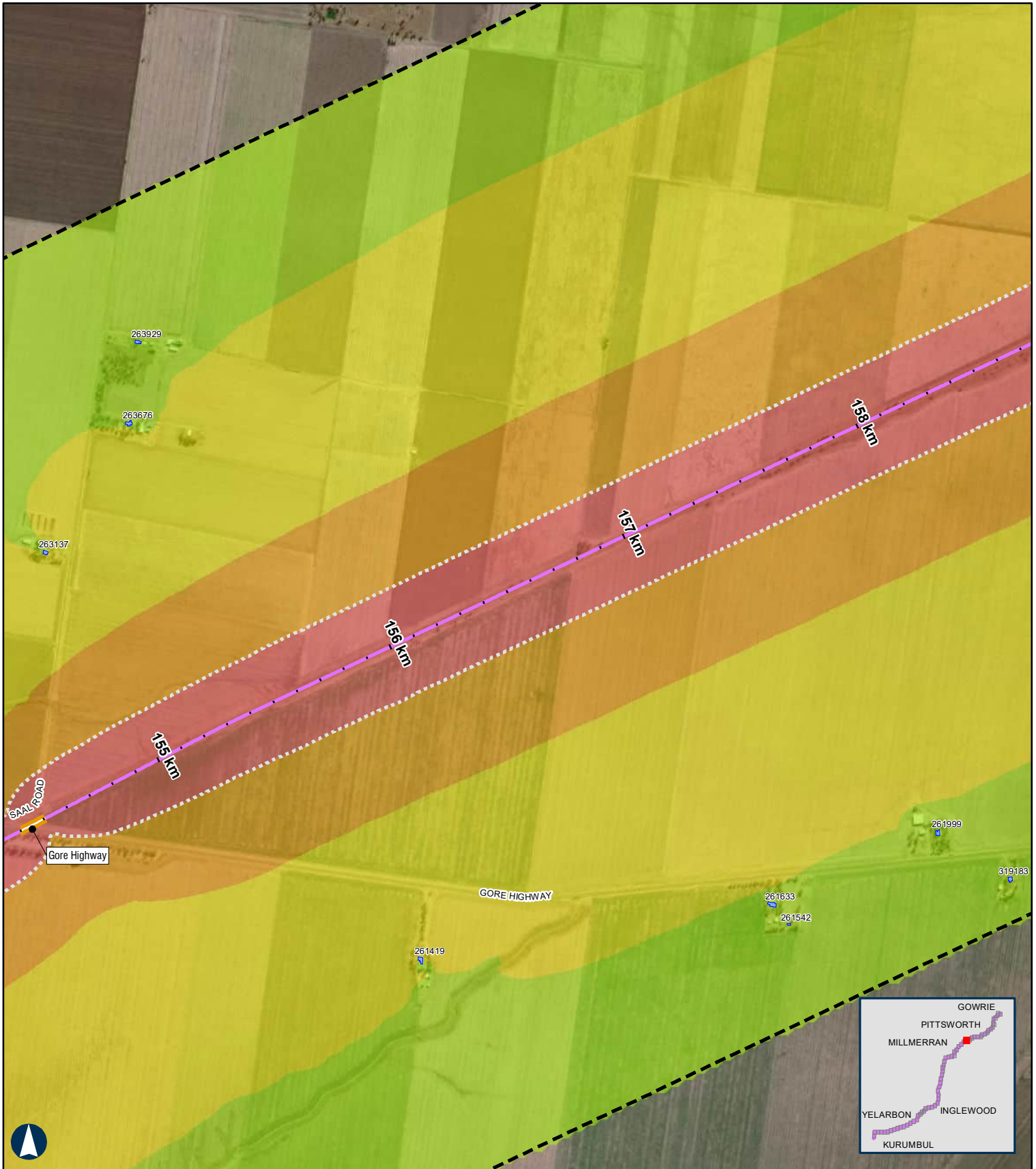
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 45 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

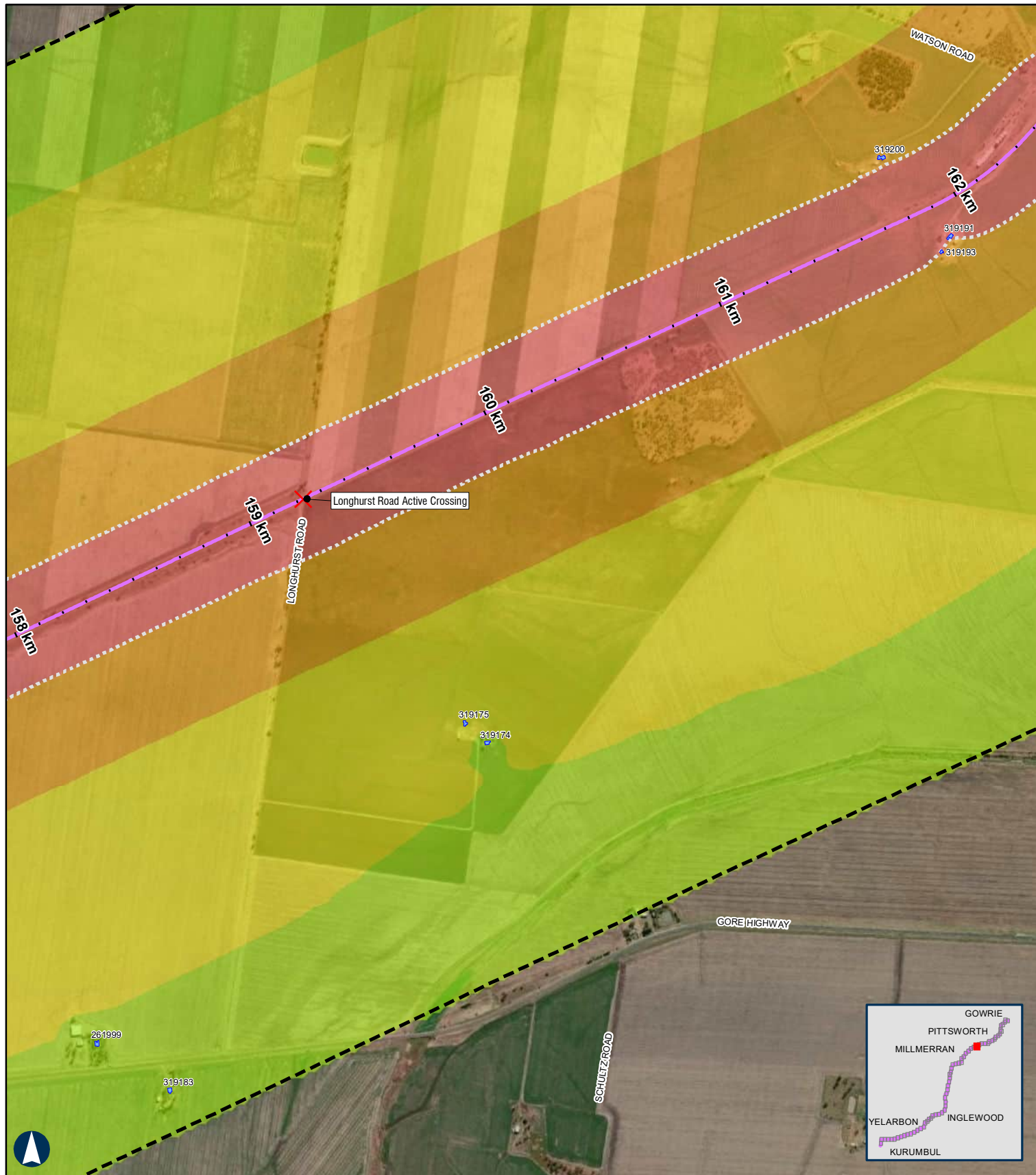
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 46 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

... Criterion (60 dBA)

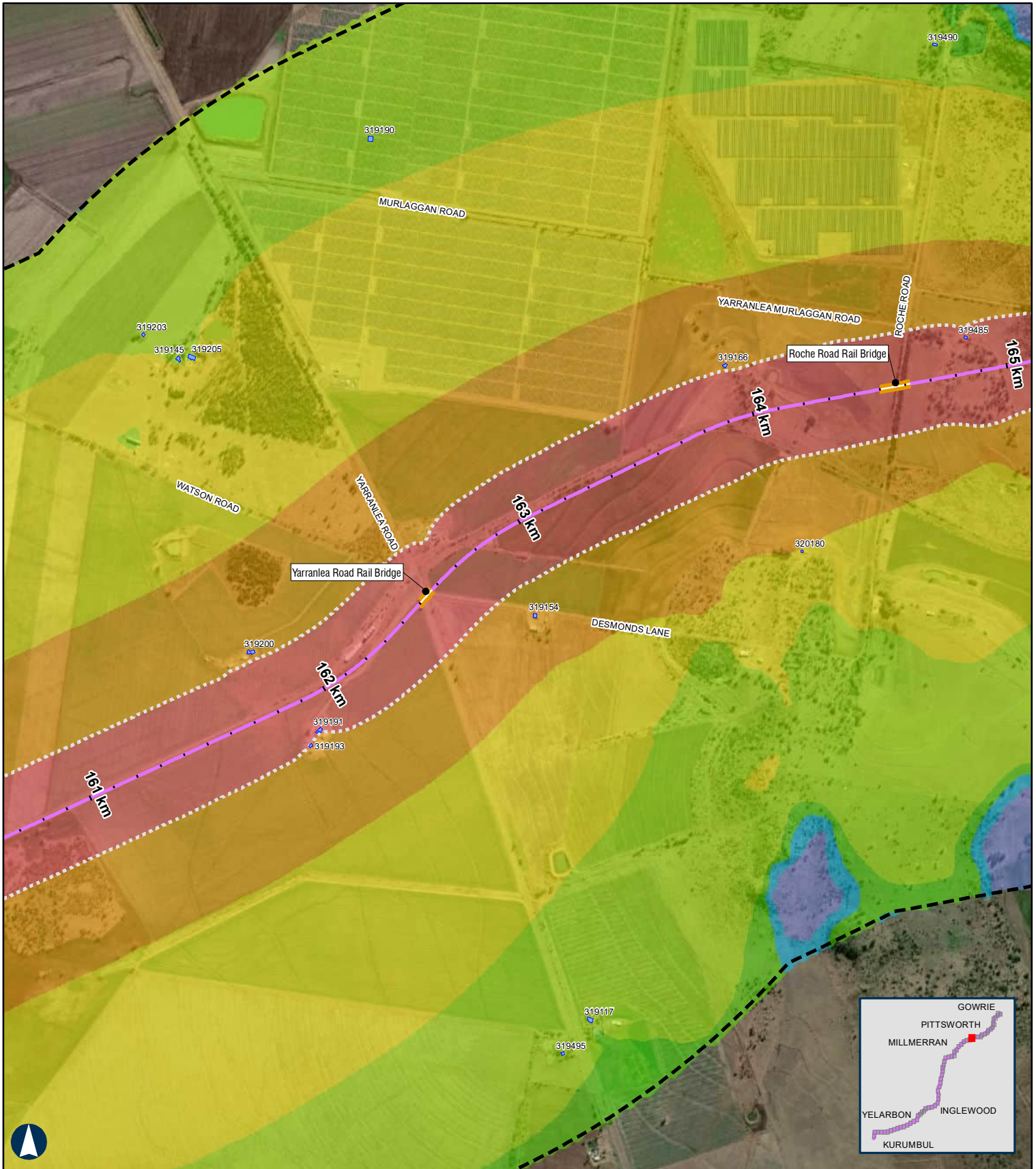
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 47 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

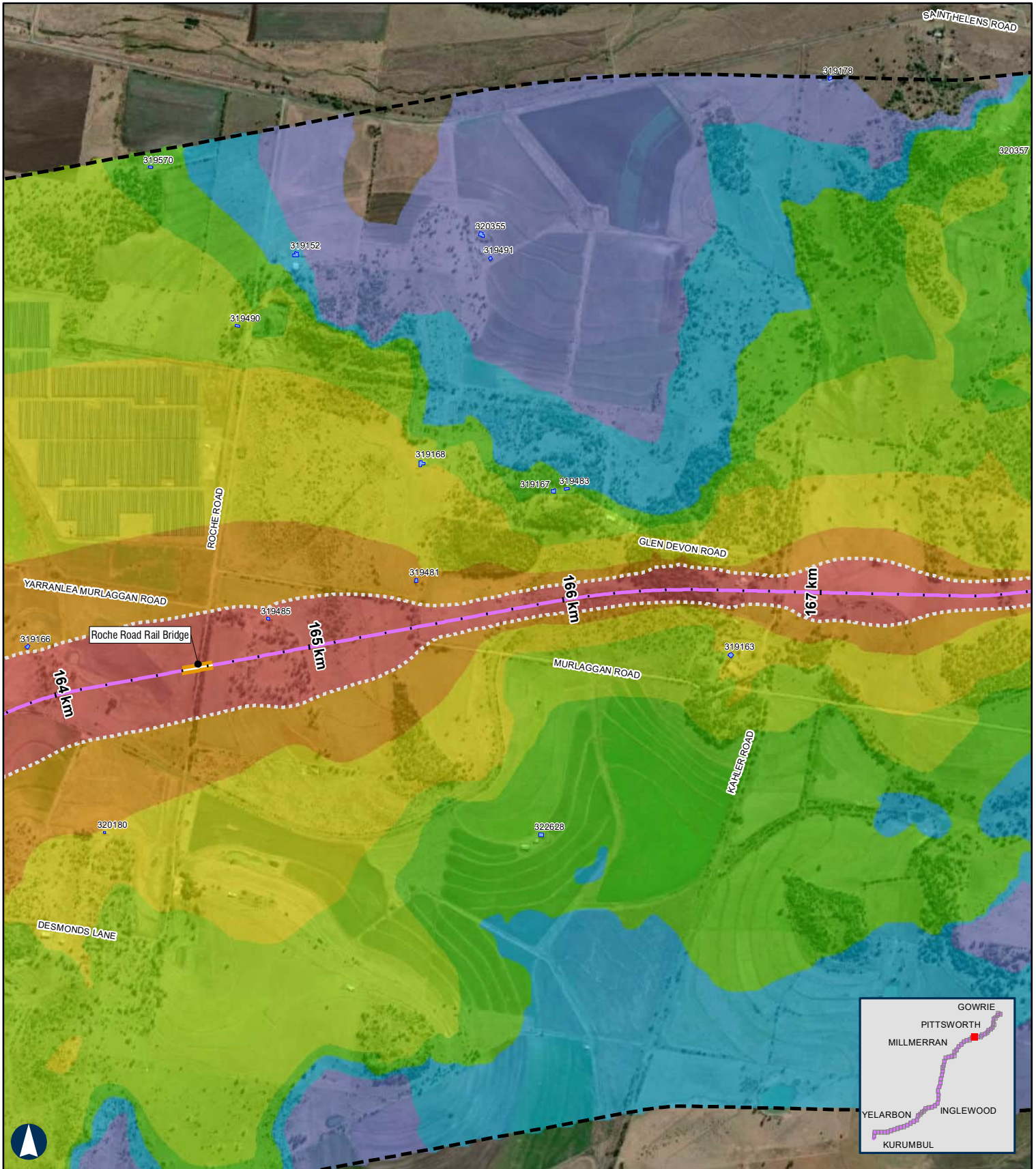
Noise contours are façade-corrected and at a height of 1.8m above ground level

Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 48 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

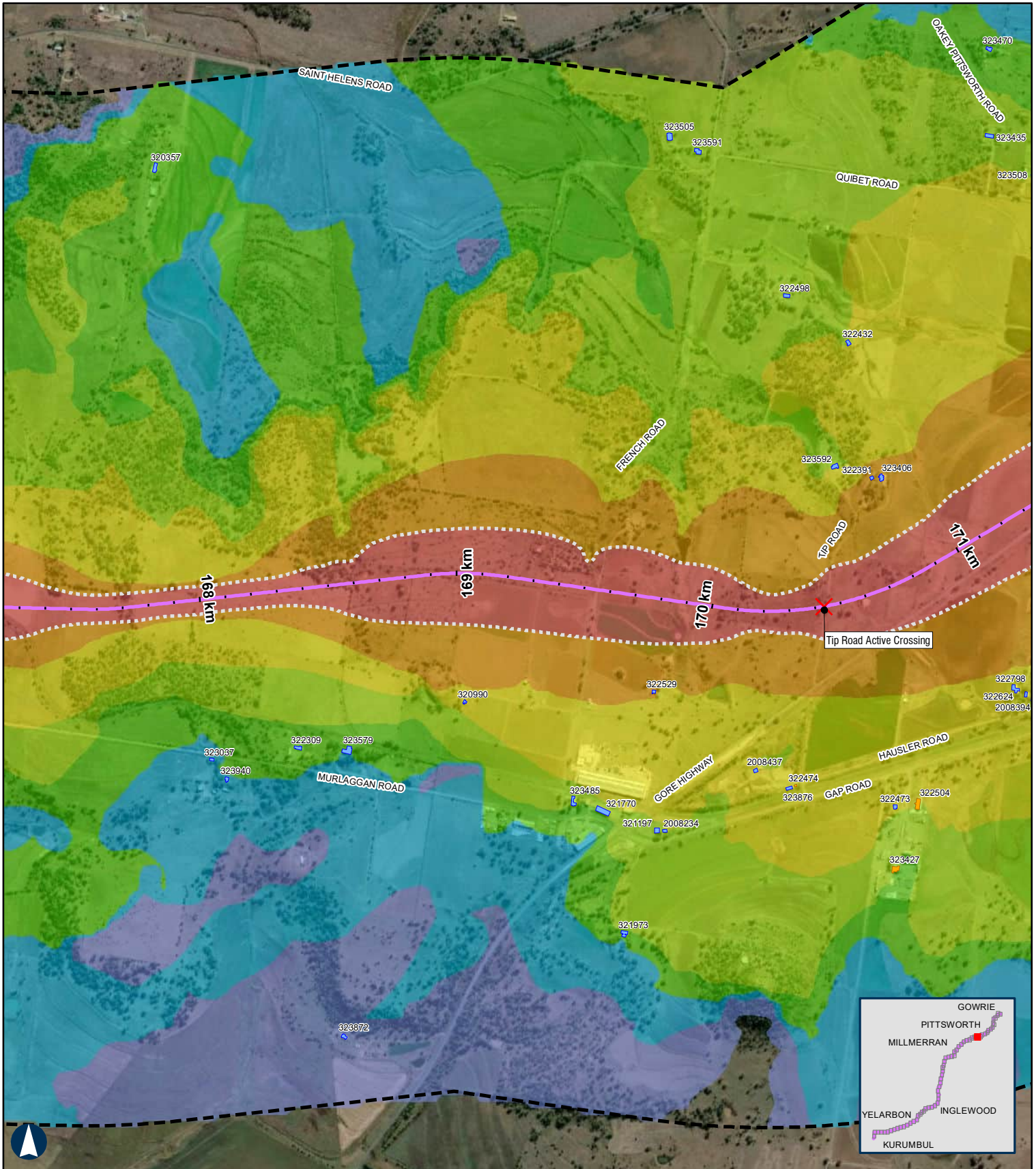
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC InlandRail

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 49 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4

Scale: 1:20,000

Date: 21-Oct-2024

Author: JG

✕ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

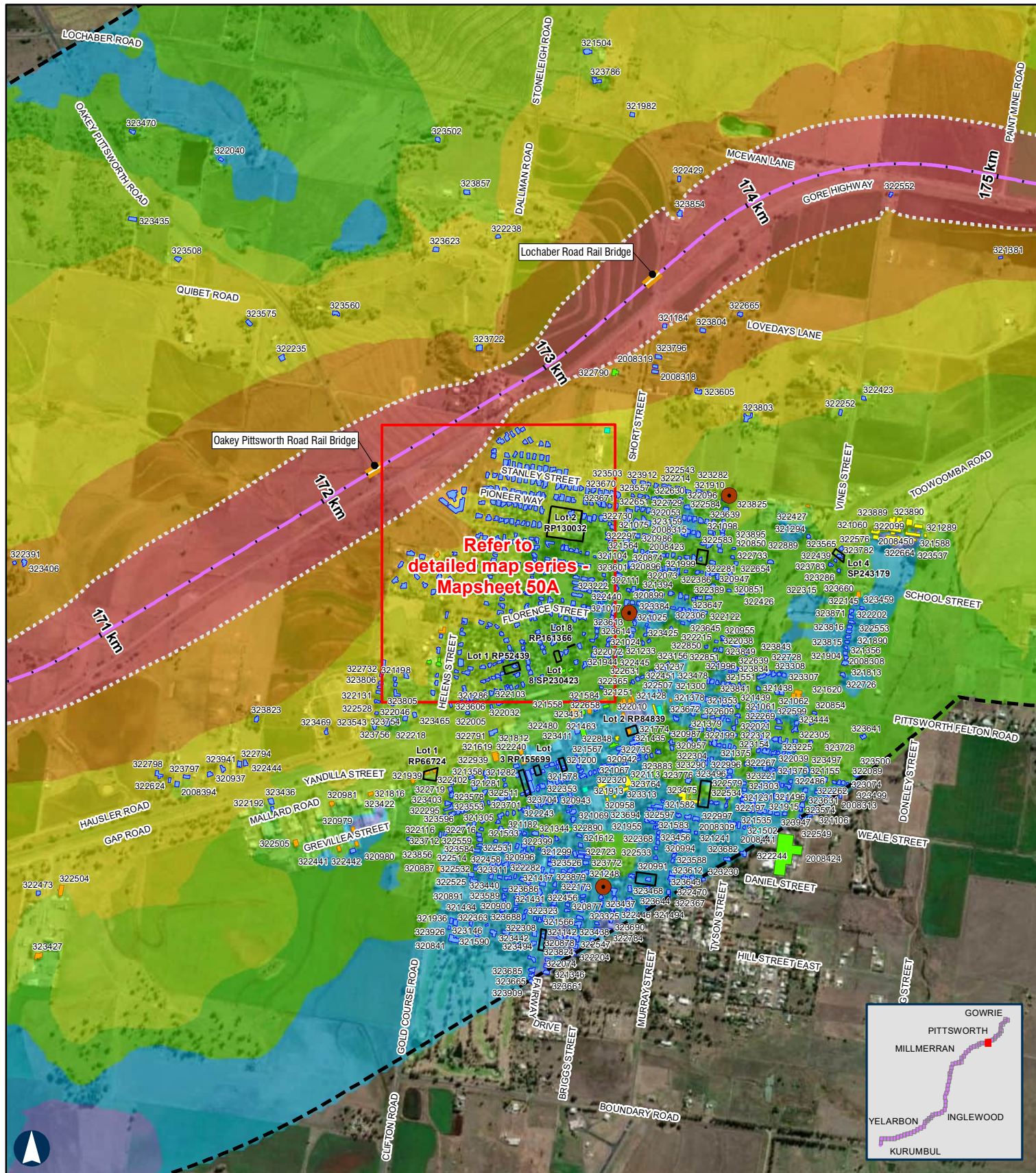
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 50 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

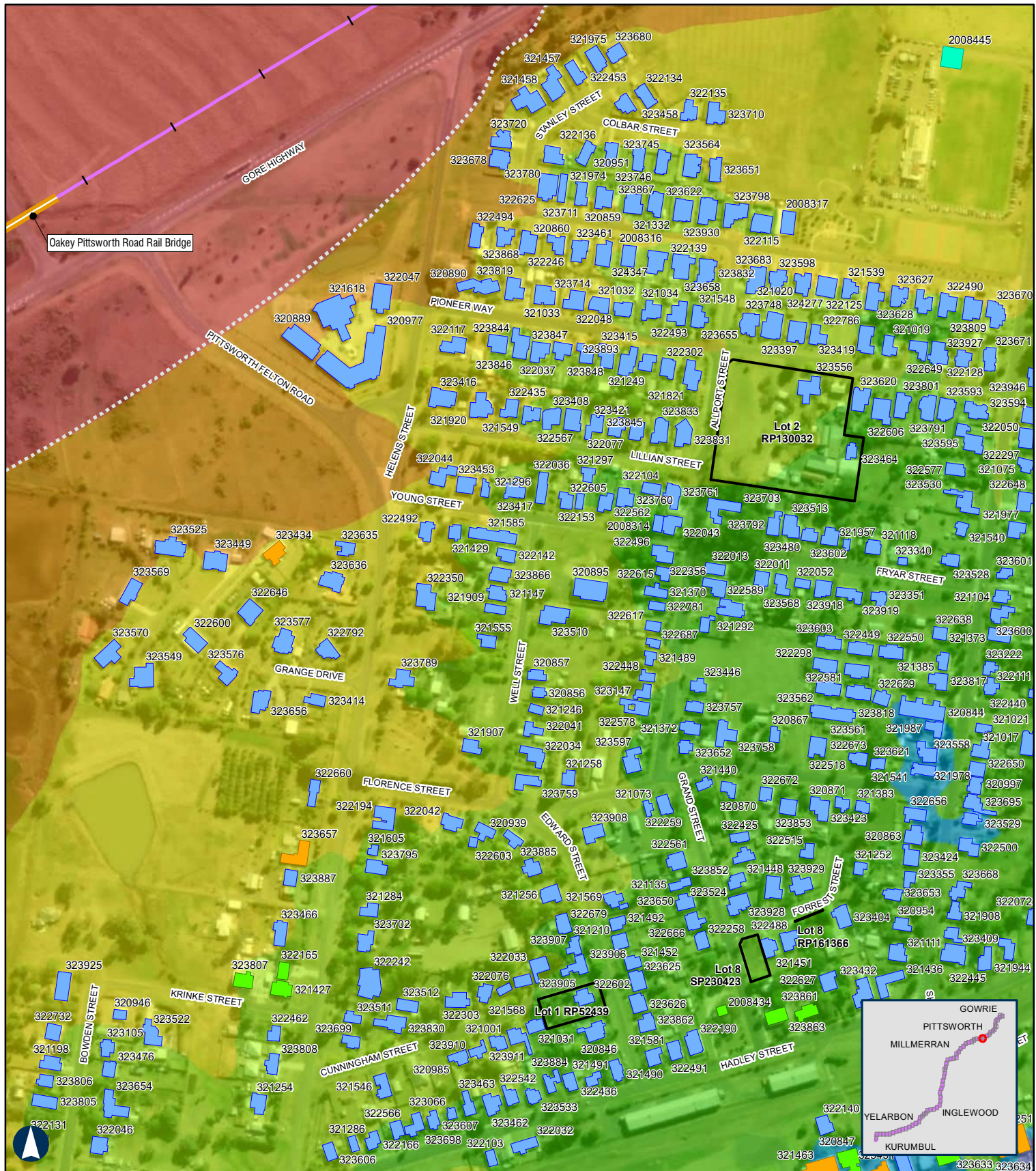
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **InlandRail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 50A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:5,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

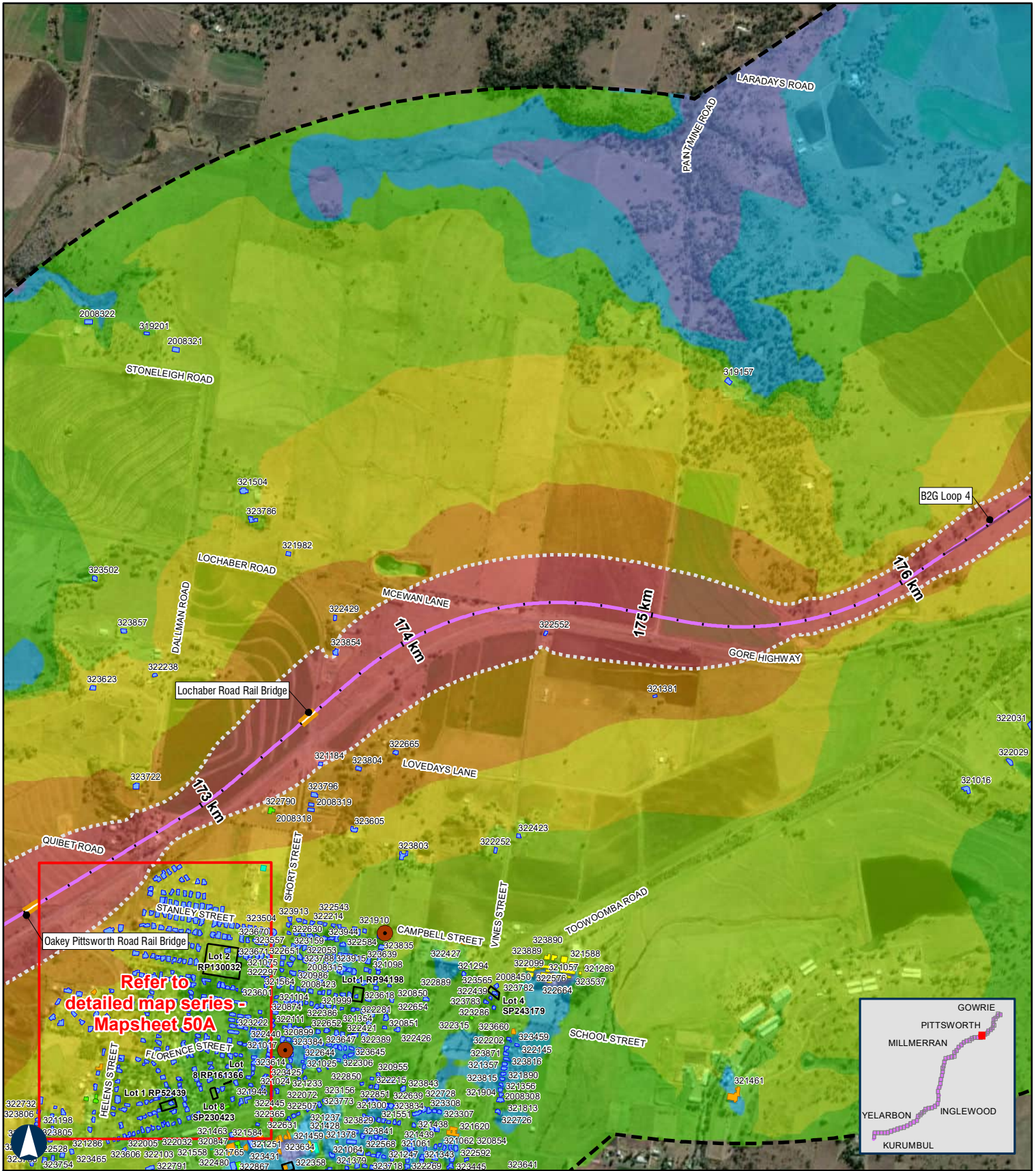
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 51 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

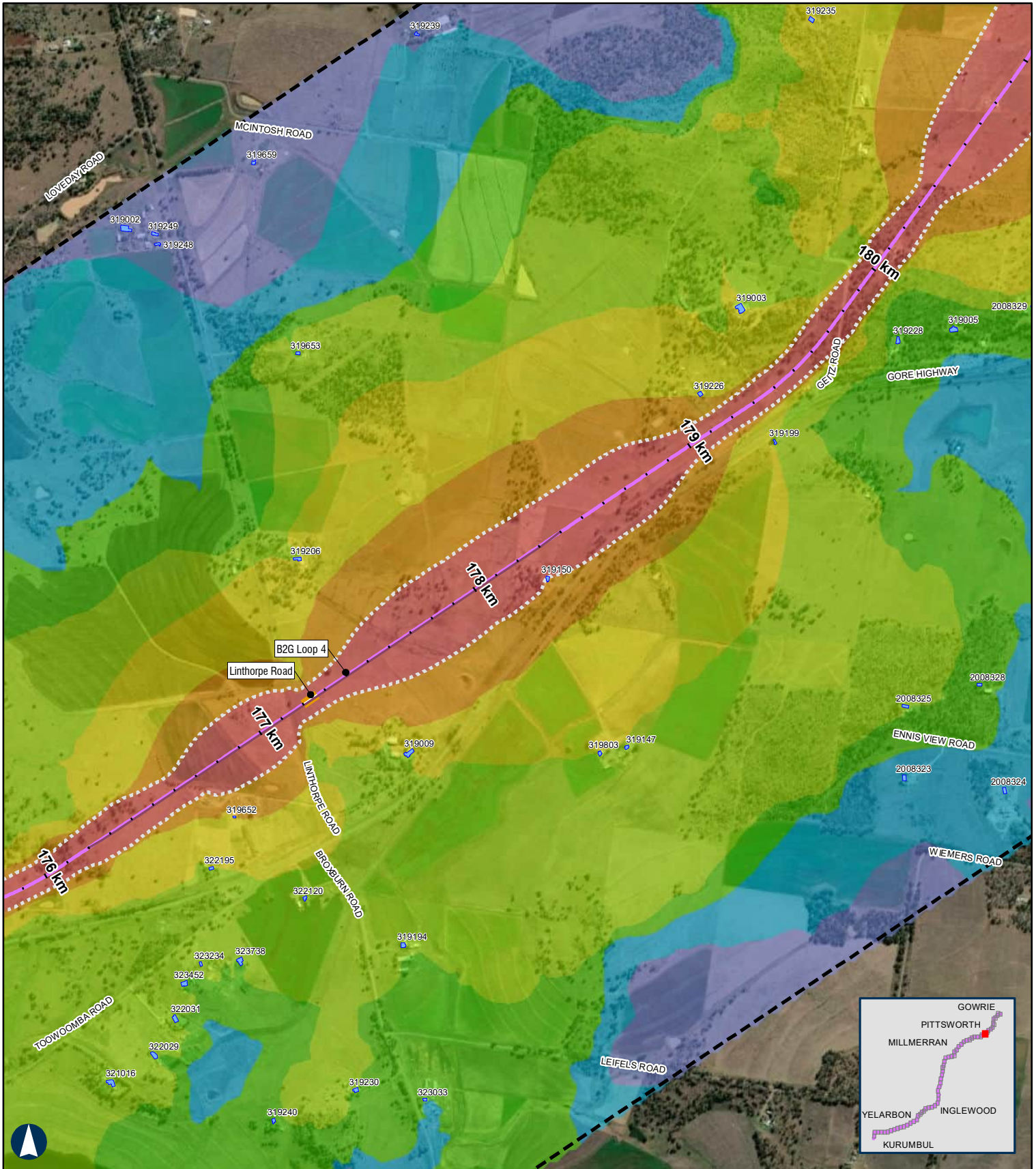
Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 52 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

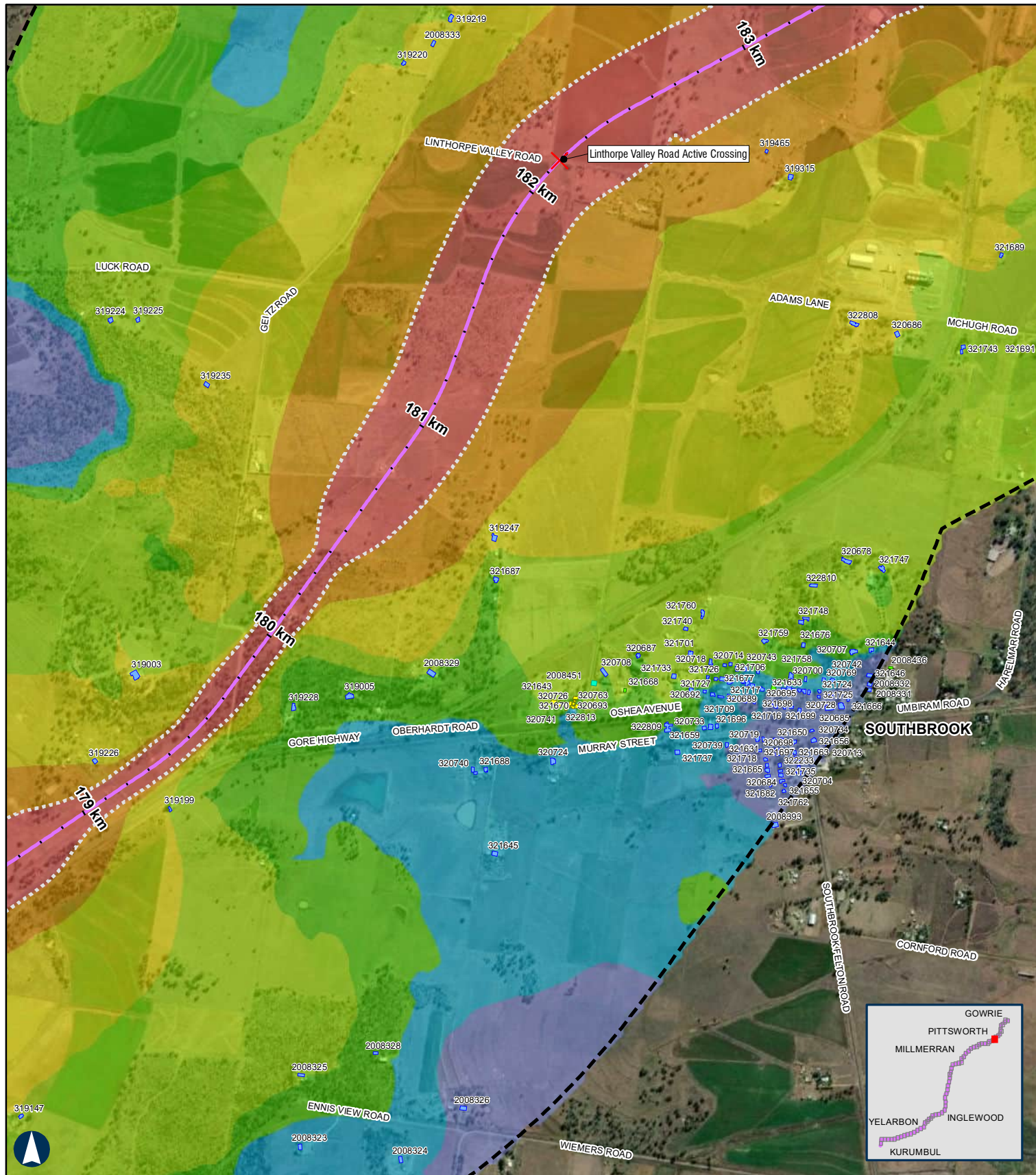
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 53 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

✗ Level Crossings

● Flying Fox Camp

— Project Extent

— Crossing Loops

— Bridges and Viaducts

— Rail Alignment/ Centreline

— Modelling Area

— Koala Habitat Area

Sensitive Receptor Type

Residential

Community

Educational

Commercial

Parkland

Future Developments

--- Criterion (60 dBA)

Noise Levels

30 - 35 dBA

35 - 40 dBA

40 - 45 dBA

45 - 50 dBA

50 - 55 dBA

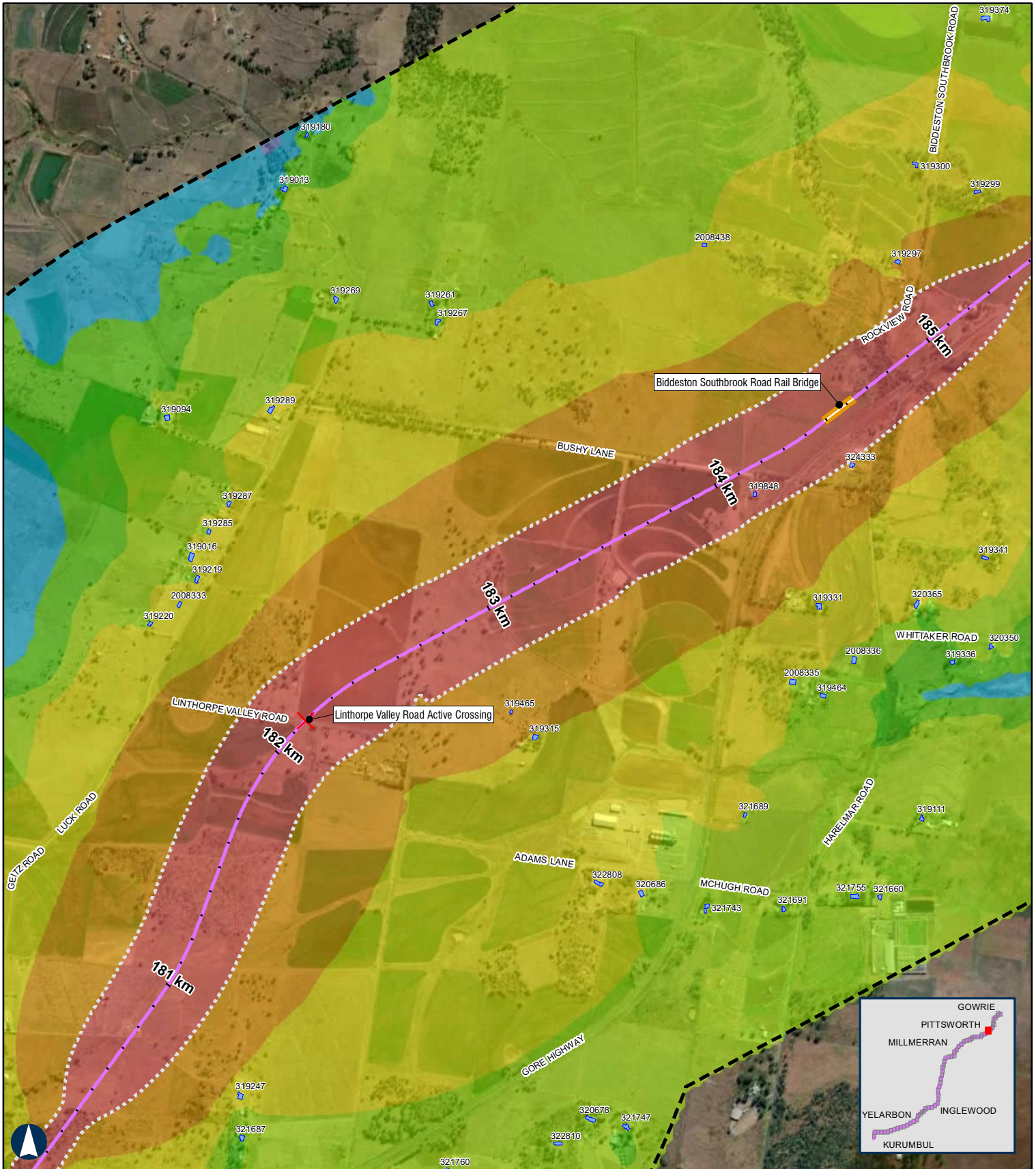
55 - 60 dBA

> 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 54 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

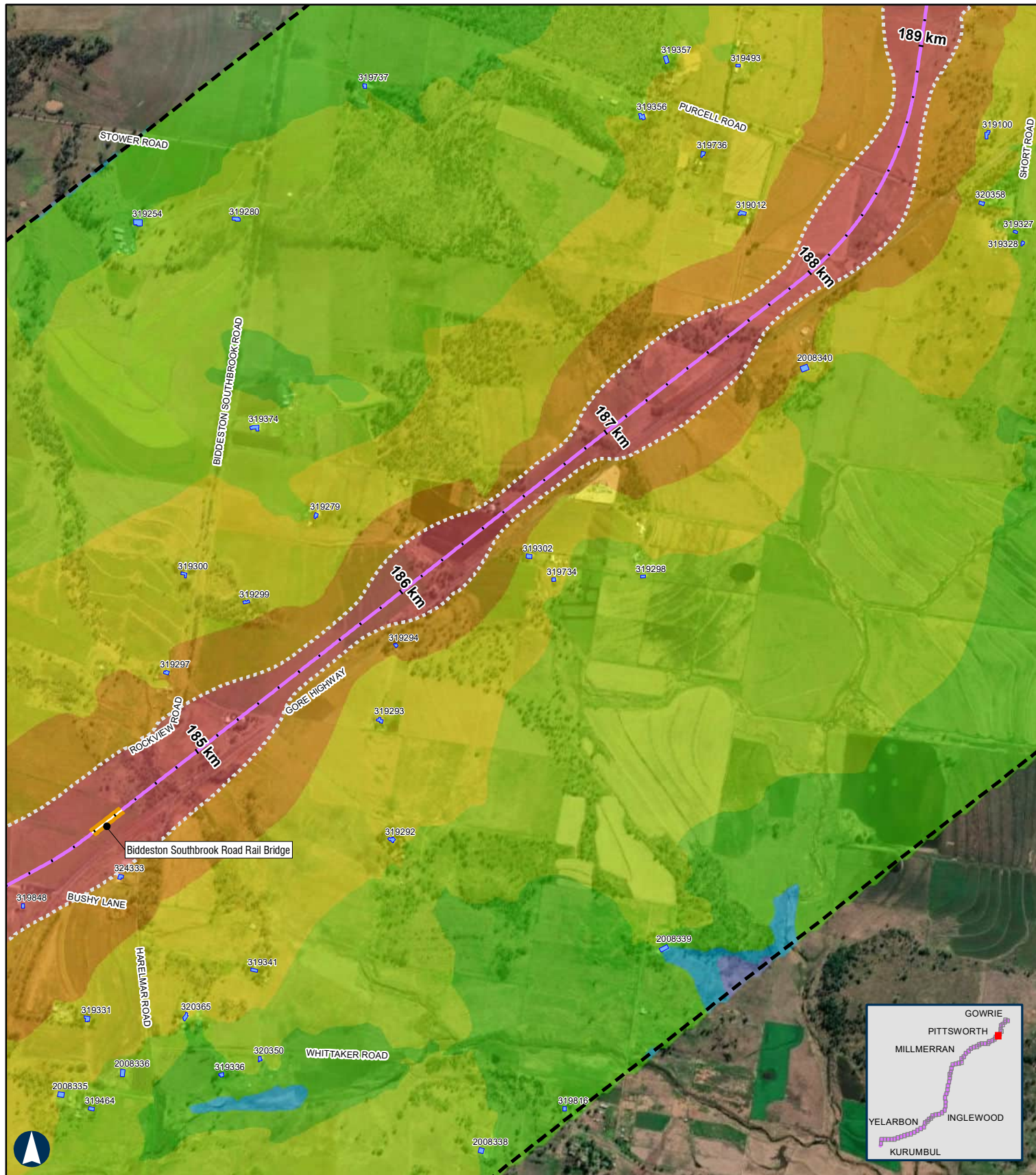
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 55 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▭ Koala Habitat Area

Sensitive Receptor Type

- ▭ Residential
- ▭ Community
- ▭ Educational
- ▭ Commercial
- ▭ Parkland
- ▭ Future Developments

... Criterion (60 dBA)

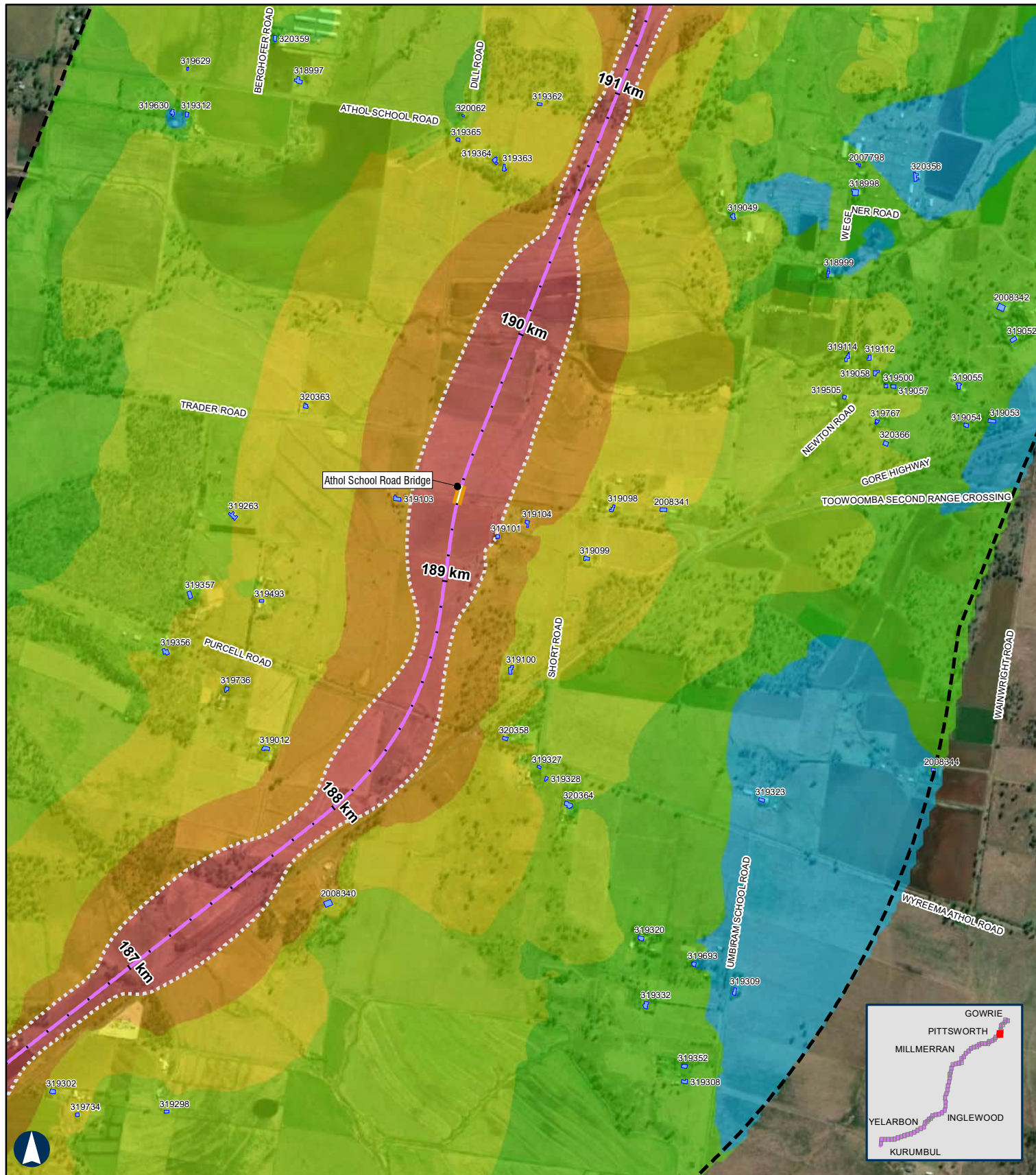
Noise Levels

- ▭ 30 - 35 dBA
- ▭ 35 - 40 dBA
- ▭ 40 - 45 dBA
- ▭ 45 - 50 dBA
- ▭ 50 - 55 dBA
- ▭ 55 - 60 dBA
- ▭ > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 56 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

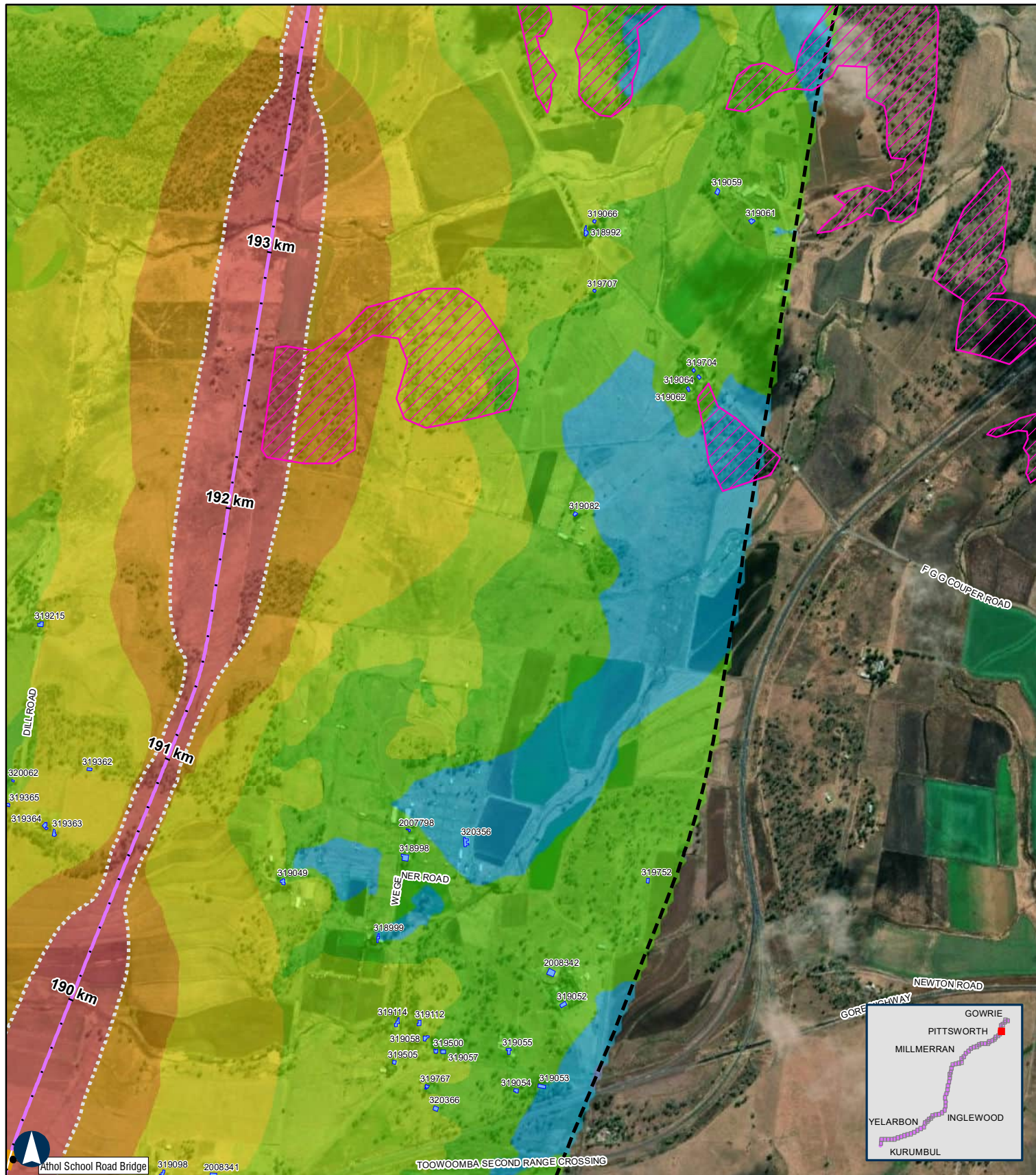
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 57 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

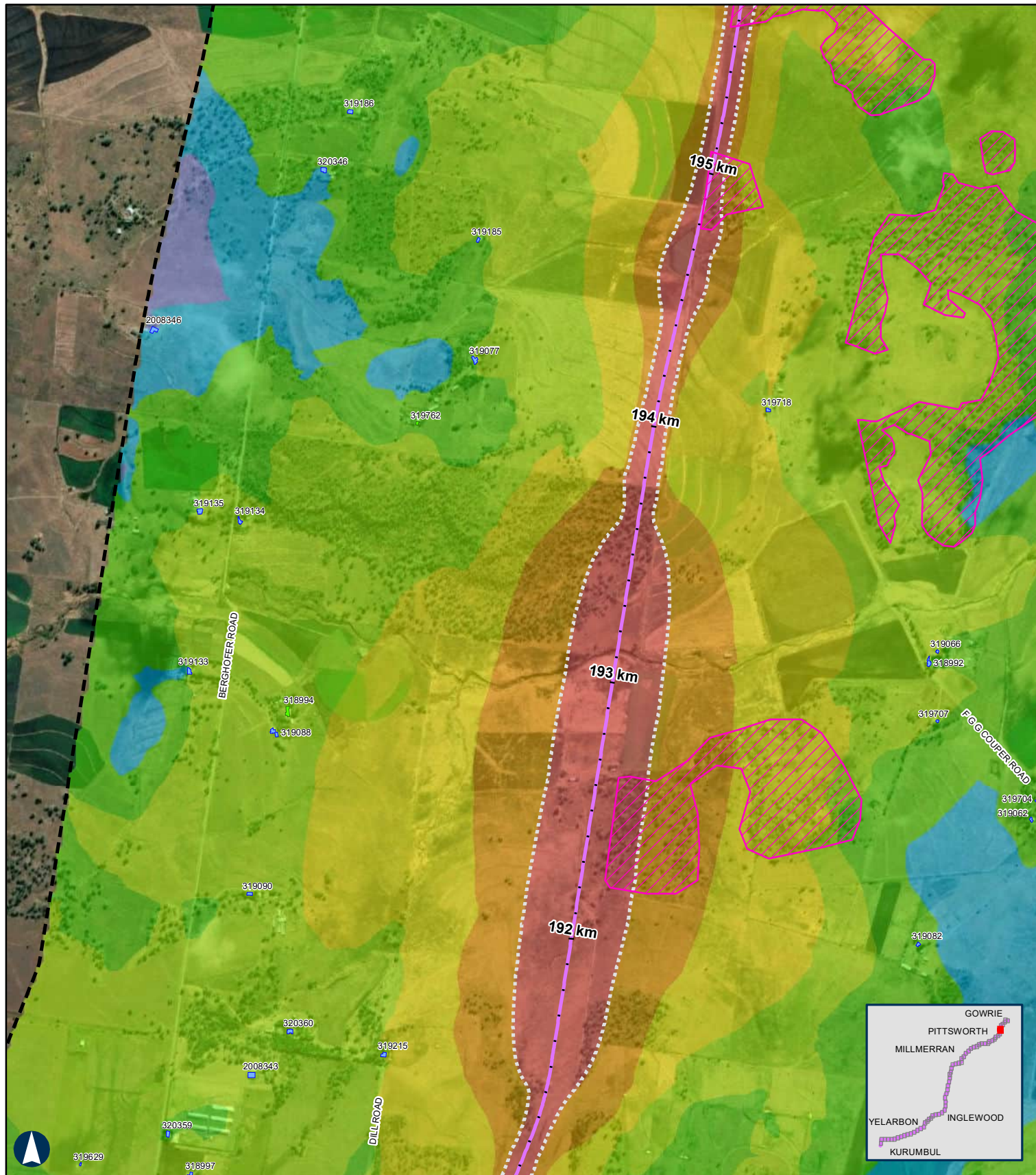
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 58 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

Criterion (60 dBA)

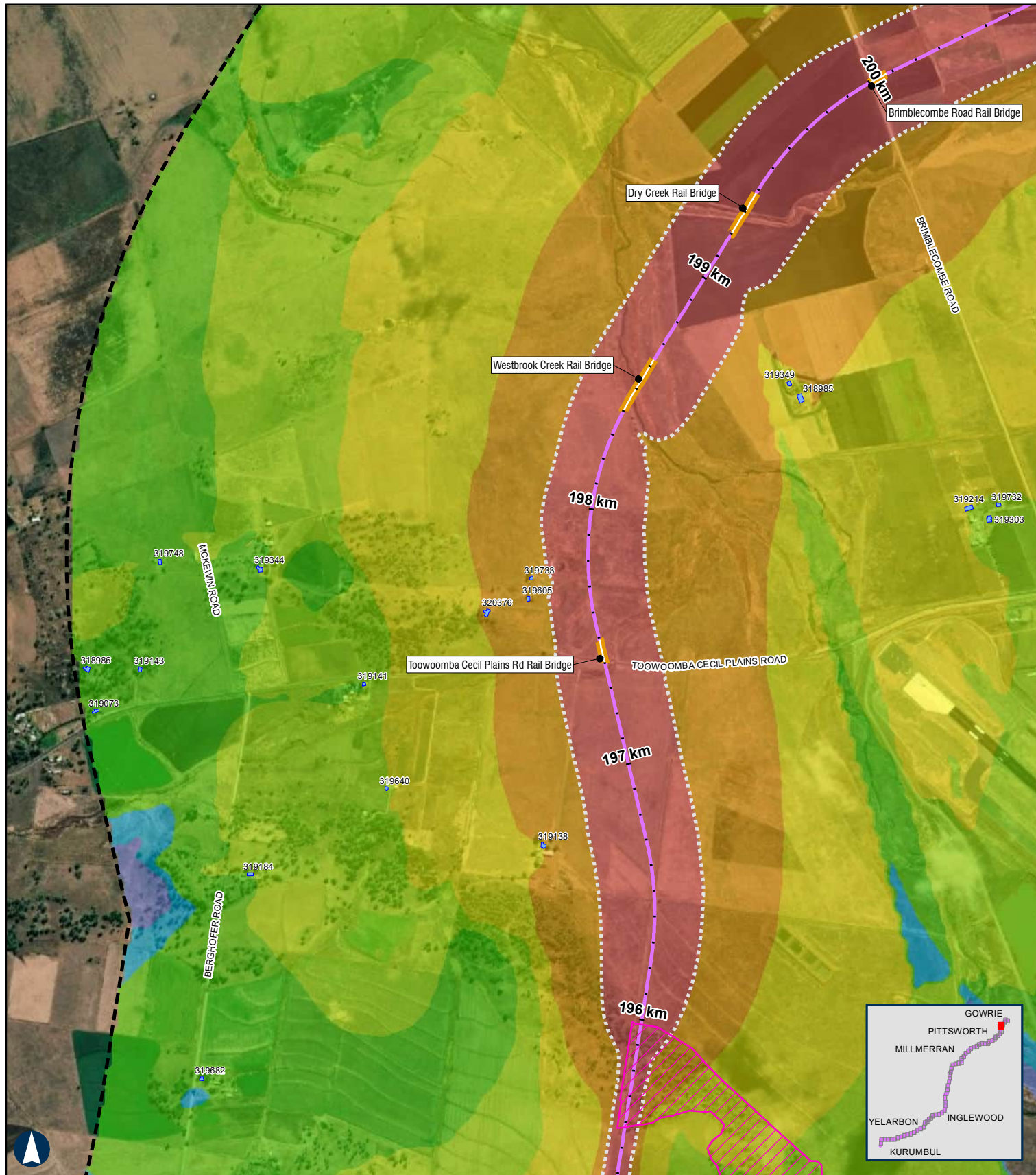
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 59 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

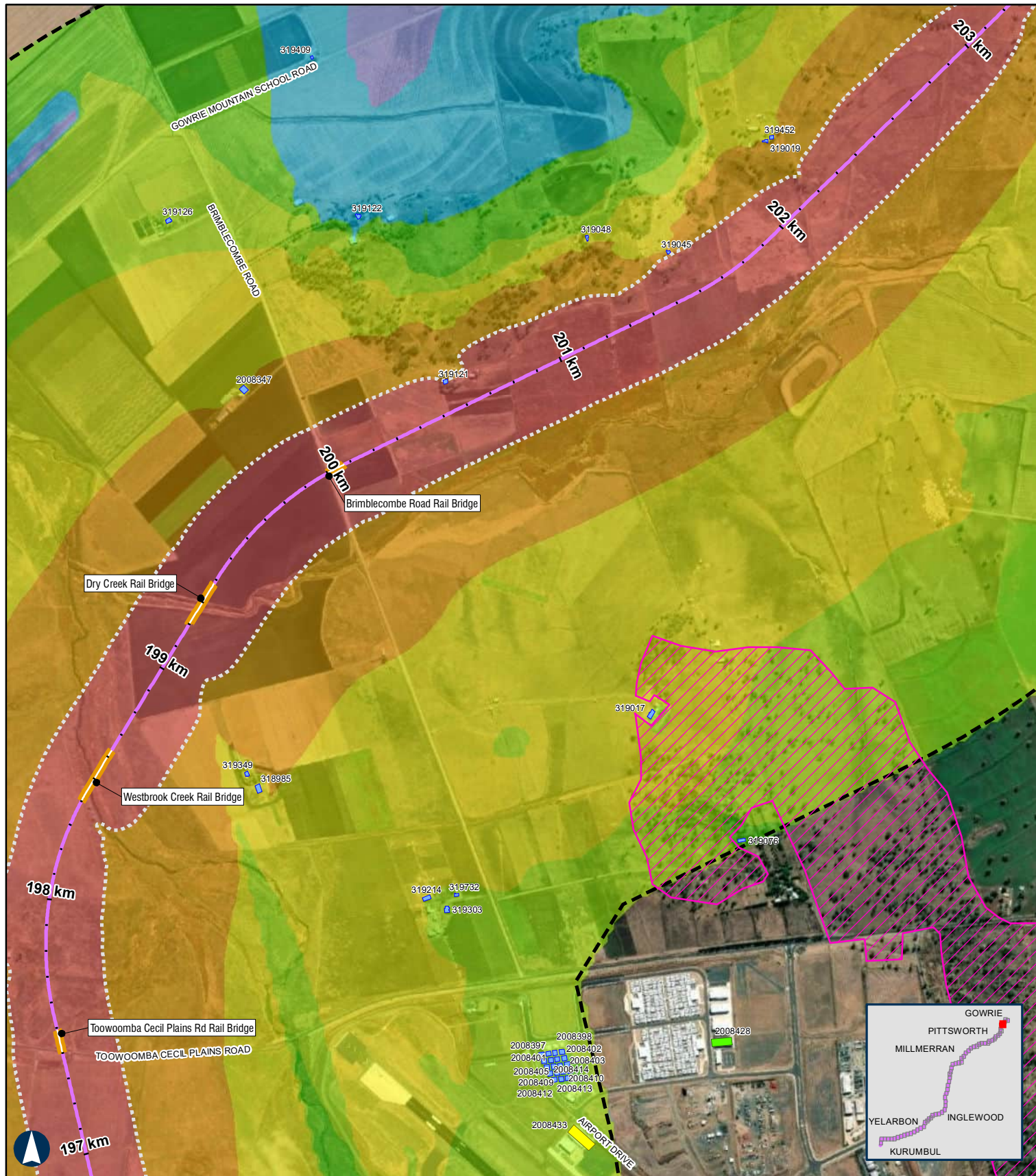
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 60 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

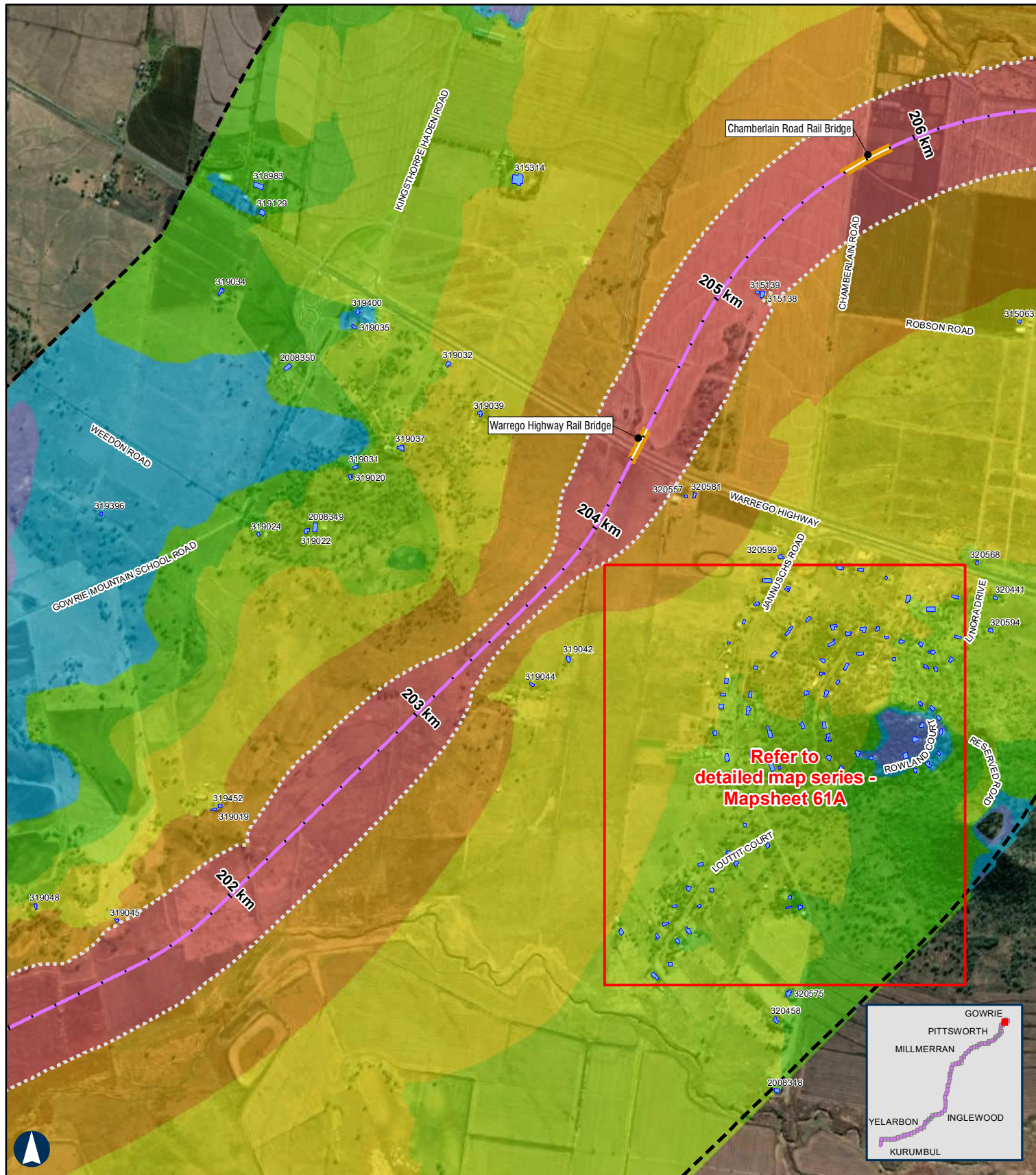
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 61 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- ✕ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

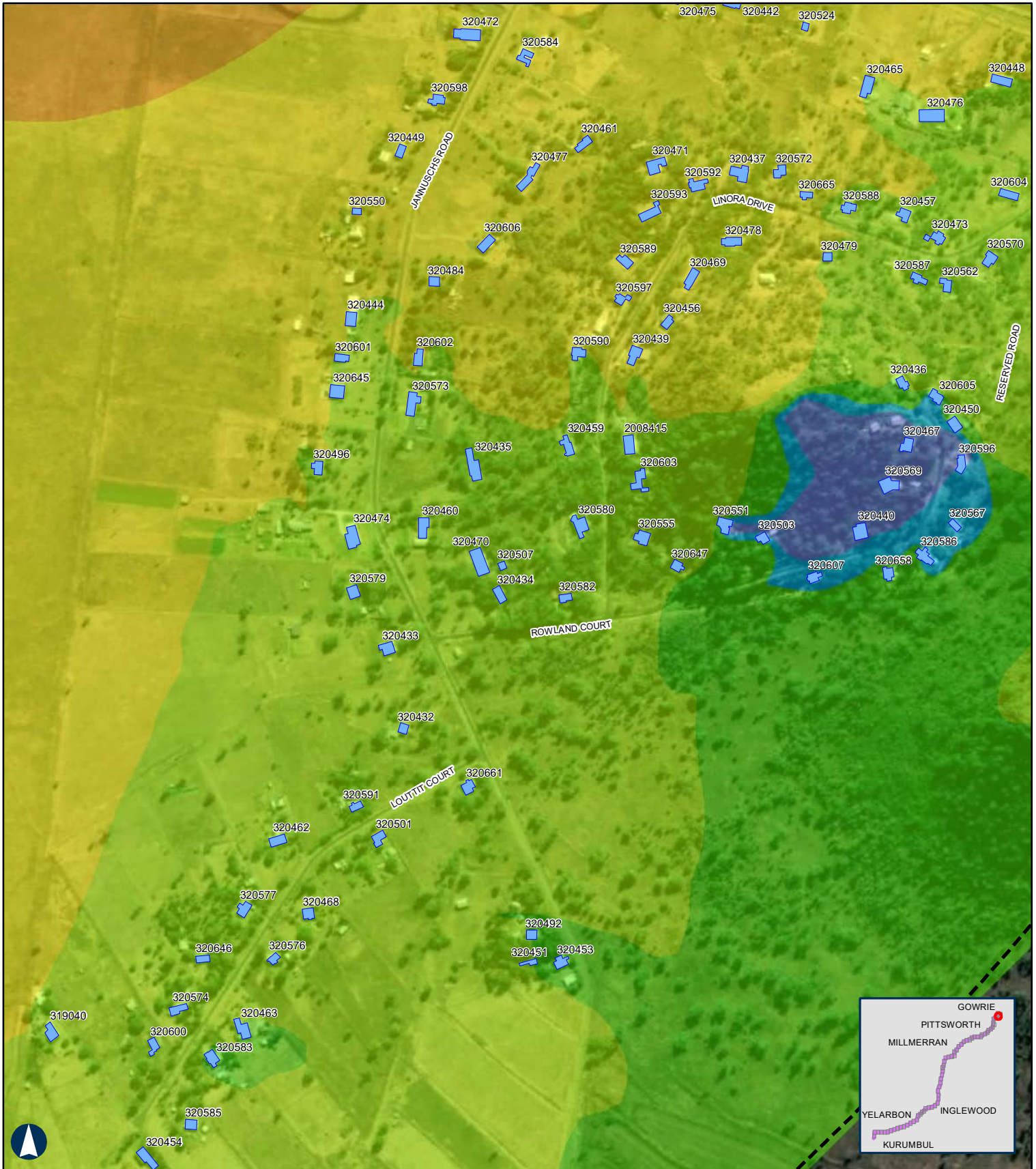
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 61A of 63

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:7,000

- ✗ Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- ▭ Modelling Area
- ▭ Koala Habitat Area

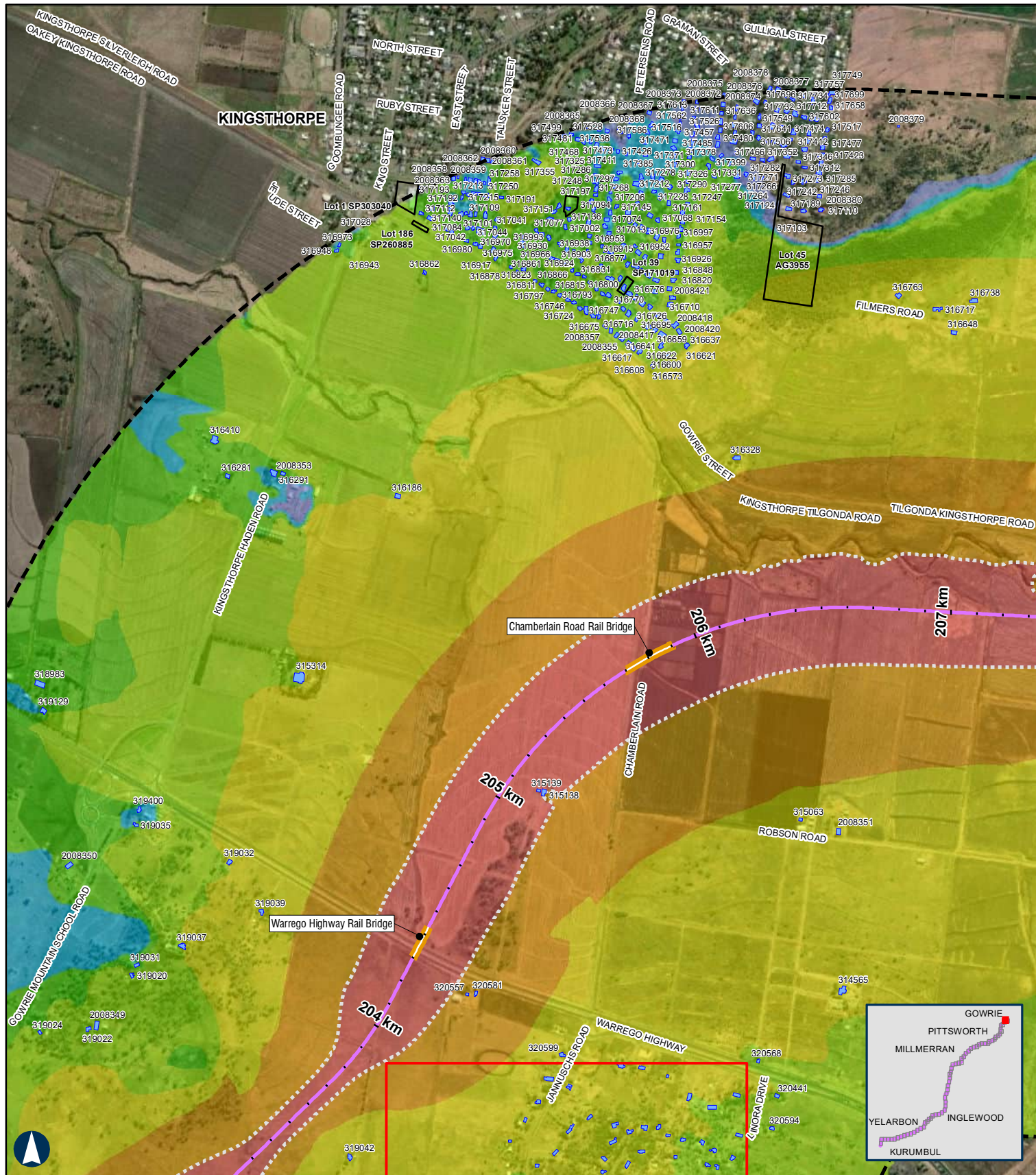
- Sensitive Receptor Type**
- Residential
 - Community
 - Educational
 - Commercial
 - Parkland
 - Future Developments

- Criterion (60 dBA)
- Noise Levels**
- 30 - 35 dBA
 - 35 - 40 dBA
 - 40 - 45 dBA
 - 45 - 50 dBA
 - 50 - 55 dBA
 - 55 - 60 dBA
 - > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 62 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Paper: A4
Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

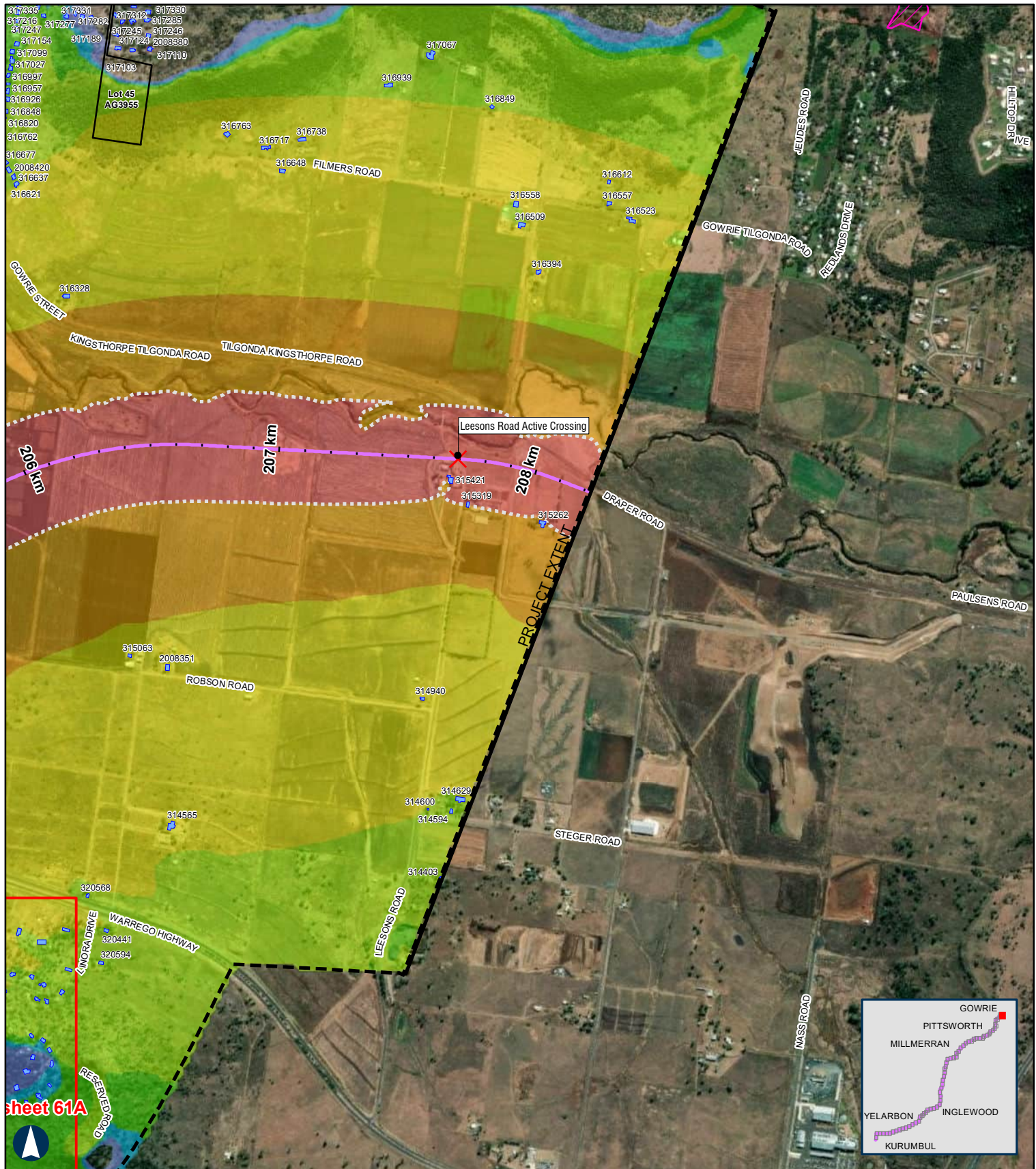
Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

ARTC **Inland Rail**

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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,24h

APPENDIX E - Map 63 of 63

500 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 21-Oct-2024
Author: JG

Scale: 1:20,000

- X Level Crossings
- Flying Fox Camp
- Project Extent
- Crossing Loops
- Bridges and Viaducts
- Rail Alignment/ Centreline
- Modelling Area
- ▨ Koala Habitat Area

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland
- Future Developments

--- Criterion (60 dBA)

Noise Levels

- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are façade-corrected and at a height of 1.8m above ground level

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APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix F Analysis method for SEM

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

The SEM value is defined under the Interim Guideline as the average of the 15 loudest pass-by events within a 24-hour period. Considering that different locomotive classes are operated along the proposed alignment, the database of noise levels for each locomotive class were analysed to determine appropriate SEM values. Assuming each pass-by L_{Amax} level of the database for a particular locomotive class may have an equal probability of occurring, a Monte Carlo-based average method was used to identify the maximum noise level occurring for 15 pass-by events. The simulation randomly selected 15 pass-by measurements and obtained an arithmetic average of the values. This process was repeated 10,000 times to obtain the most expected average for a particular locomotive. Using the combination of the most expected value for each locomotive and the proposed train timetables, the SEM value was obtained for the project.

However, the L_{max} parameter is considered a non-repeatable parameter as the maximum level of noise from the rolling stock could have significant variations for each pass-by. Since the SEM levels are based on the most expected values from the database of measurements, there is a certain level of probability that the SEM levels measured post-construction may be higher. In this regard, the calculated SEM + 1.7 x standard deviation is adopted as the preferred SEM for modelling purposes. This level represents a conservative level which is equivalent to obtaining an average of 15 loudest events based on the 95th percentile level of each locomotive type for this project.

Comparison of the measured 95th percentile L_{Amax} levels and SEM previously measured¹⁹ for existing coal rolling stock operations on the West Moreton rail line project identified the SEM levels were generally 3 dB to 6 dB lower than the 95th percentile L_{Amax} levels. The option of applying the SEM based on average + 1.7 x standard deviation is proposed as a conservative approach as the determined SEM for modelling is 2 dB lower than the 95th percentile L_{Amax} pass-by for locomotives.

The wagon database was also screened to obtain the pass-by maximum levels for wagons without any known defects. These were then normalised for length, speed and distance. The database was then analysed using the same Monte-carlo principles.

Considering all wagons were analysed irrespective of their model, type and make, the average of the 15 loudest L_{Amax} levels from the database were utilised in order to remain conservative for the SEM predictions from wagons.

Where there are gradients along the proposed alignment, a + 4 dB correction is proposed for uphill sections and crossing loop accelerations, and a +2 dB correction for downhill sections. This correction is considered conservative as the locomotives do not always increase their notch settings or apply dynamic braking in uphill and downhill scenarios respectively. These corrections are based on general trends observed in the TfNSW and ARTC databases based on uphill/downhill measurements and are wholistically applied due to the lack of significant database values available for different notch settings under each locomotive type to undertake any detailed statistical analysis.

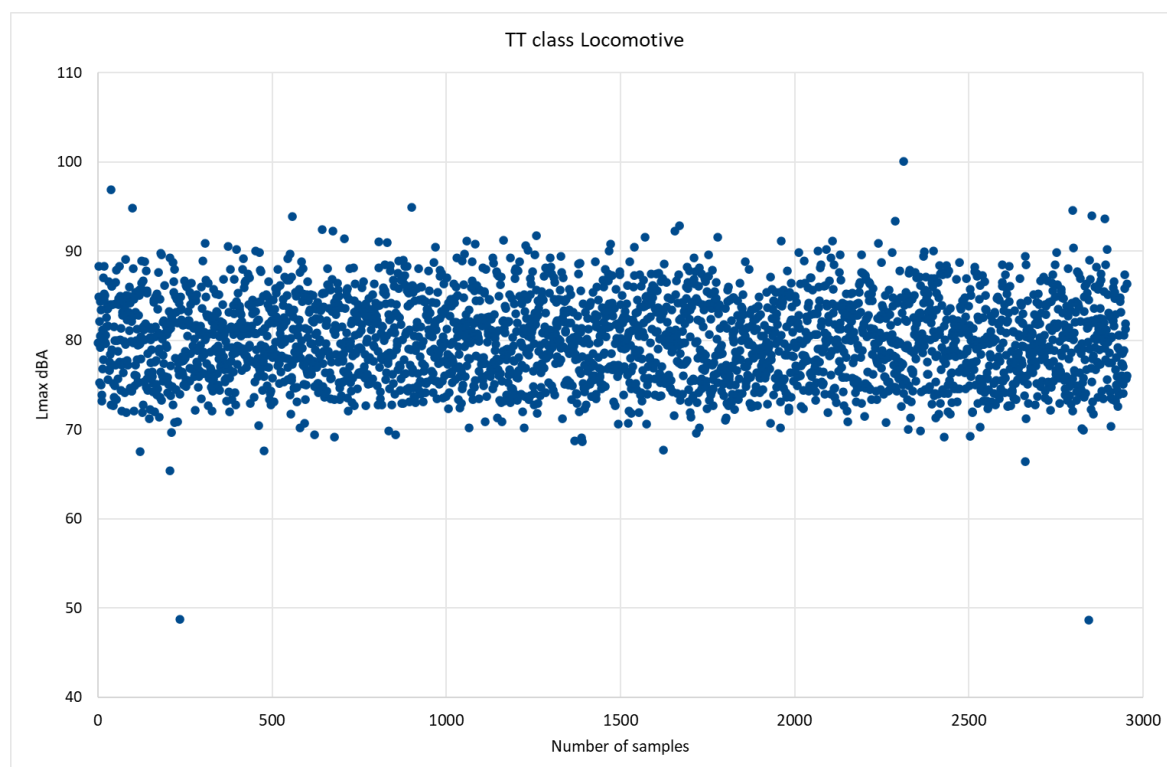
Monte-Carlo analysis example

An example of how the individual pass-by maximum noise levels are analysed for determining the expected SEM value is provided below. **Figure F.1** provides the maximum noise level data for the TT class locomotive from the TfNSW database reviewed for this study. There were approximately 3,000 samples used, and the levels were normalised for the measurement distance. The levels were all measured on a flat gradient.

¹⁹ SLR document 620.12209-M02-DTMR Criteria Review H2C Summary.v1.0.



Figure F.1 L_{max} samples for TT class locomotive normalised at 15 m



It can be seen that the measured data has a large range between which the L_{max} pass-by level could be expected. A range of 20 dB variance (excluding the outliers) is generally considered large, and validates the fact that maximum pass-by levels are generally not very repeatable.

Out of these measured database samples, 15 data points were randomly chosen to obtain the average value. This random picking process was repeated 10,000 times to obtain 10,000 average value data points. The obtained average values are shown in **Figure F.2** below. It can be seen that the average values generally tend to have a small range between the lowest and highest average values.

Considering the iterations undertaken, a probability distribution was developed to determine the most expected average value based on the database analysed. **Figure F.3** shows the probability distribution of the average values indicating the number of occurrences (out of the 10,000 iterations) within each average value range.

Table F.1 provides the analysis results showing that the most expected average value (equivalent to SEM) based on the analysis for the given database is 80 dBA. However, the distribution shows that whilst this value occurred approximately 88% of the time, this value could be exceeded occasionally. A value of 83 dBA is found to have a 5% occurrence (i.e. levels above 83 dBA have less than 5% chance of occurring).

The SEM values were similarly obtained where data were available from databases. These values, along with the proposed timetable, were used to estimate the overall SEM for locomotives for the predictive modelling exercise. Since the individual locomotive values derived have a low probability of being under-predicted, the derived overall SEM based on 15 loudest pass-by events is considered conservative. The table also shows the 95th percentile L_{Amax} data from the locomotive class database values for comparison.



Figure F.2 Average values obtained through Monte Carlo iterations

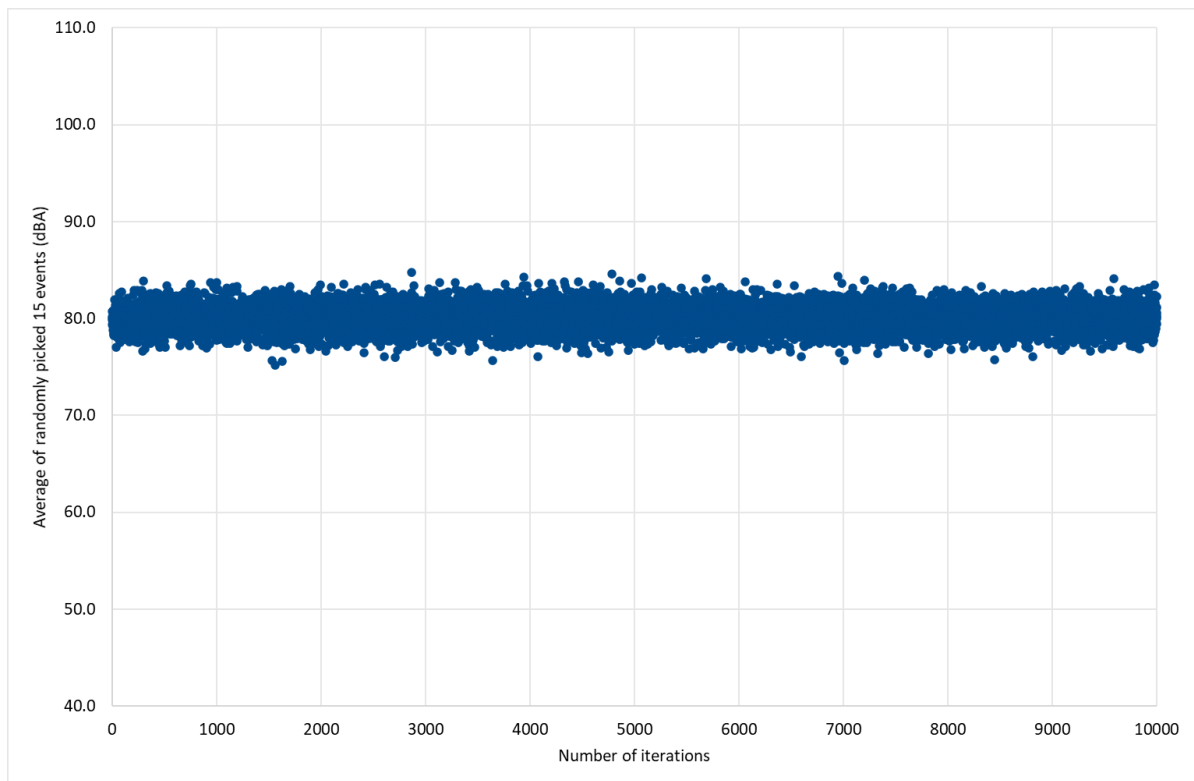


Figure F.3 Monte Carlo distribution of the average values

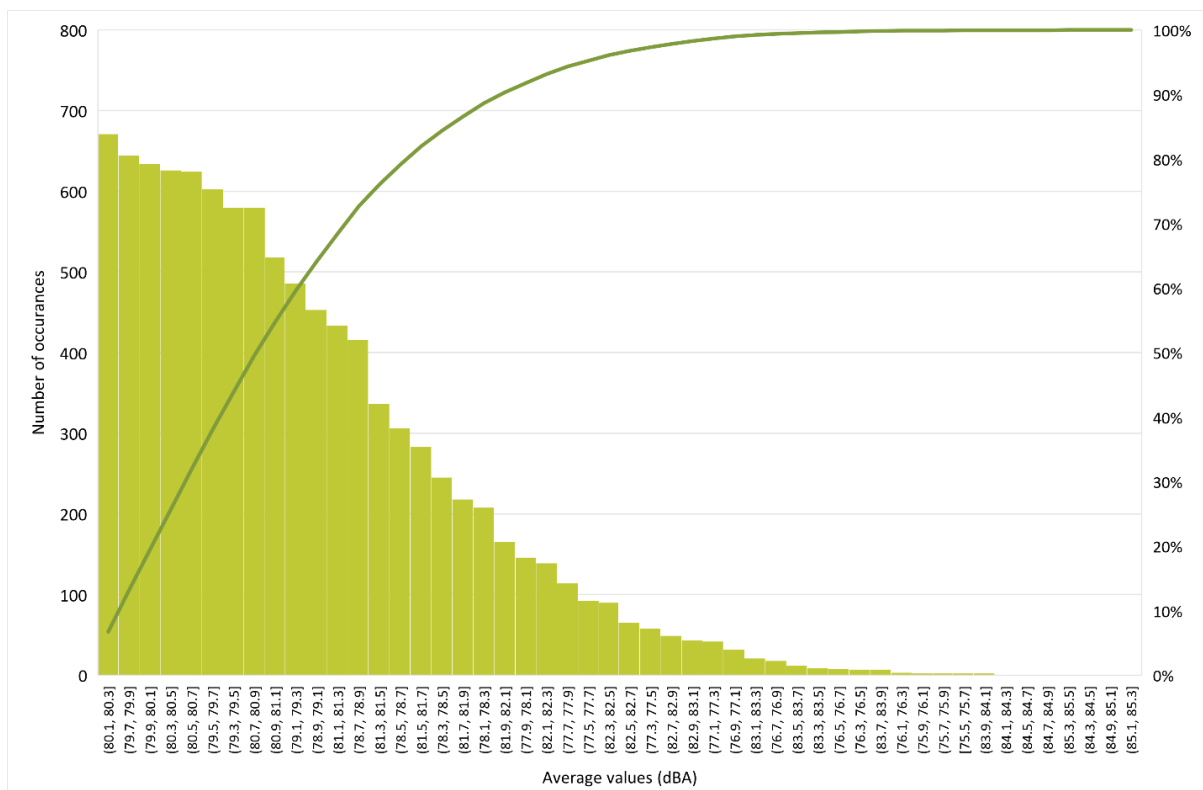


Table F.1 Estimated SEM values for the TT class for comparison

Parameter	Level (dBA)
Most expected SEM value	80
95 th percentile SEM value	83
95 th percentile LA _{max} value	88

Conservatism applied in SEM source levels

The SEM analysis considered the following:

- Individual most-expected SEM value (as described in the Monte-Carlo analysis) for each locomotive type.
- The types of locomotives in a given day along with the proposed train volumes to determine the average of loudest 15 pass-bys.
- Apply a factor of safety (1.7 x standard deviation) to the obtained average to determine the final SEM source level for modelling.

In order to compare the derived SEM levels adopted for the assessment against other database values, the TfNSW and ARTC databases were used to determine the 95th percentile LA_{max} value and the median LA_{max} value based on the available data for the locomotive classes operational on this Project. The Queensland Rail LA_{max} source data were also used for comparison.

Figure F.4 and **Figure F.5** show the various noise levels compared for the locomotives and general freight wagon consist respectively. Considering the fact that SEM is an average of 15 loudest pass-by events in day, it will always be lower than the loudest LA_{max} event within a given day, and always lower than the 95th percentile LA_{max} value when there are less than 300 pass-by events within a day (B2G has only 25 train pass-by events).

In this regard, the adopted SEM value for modelling and assessment purposes is considered to be sufficiently conservative to represent a worst-case scenario. This conservatism is also reflected in the validation exercise (presented in **Appendix B** of this Report) where the model is (on average) 4 dB over-predicting in comparison to measurements.



Figure F.4 Comparison of locomotive pass-by levels

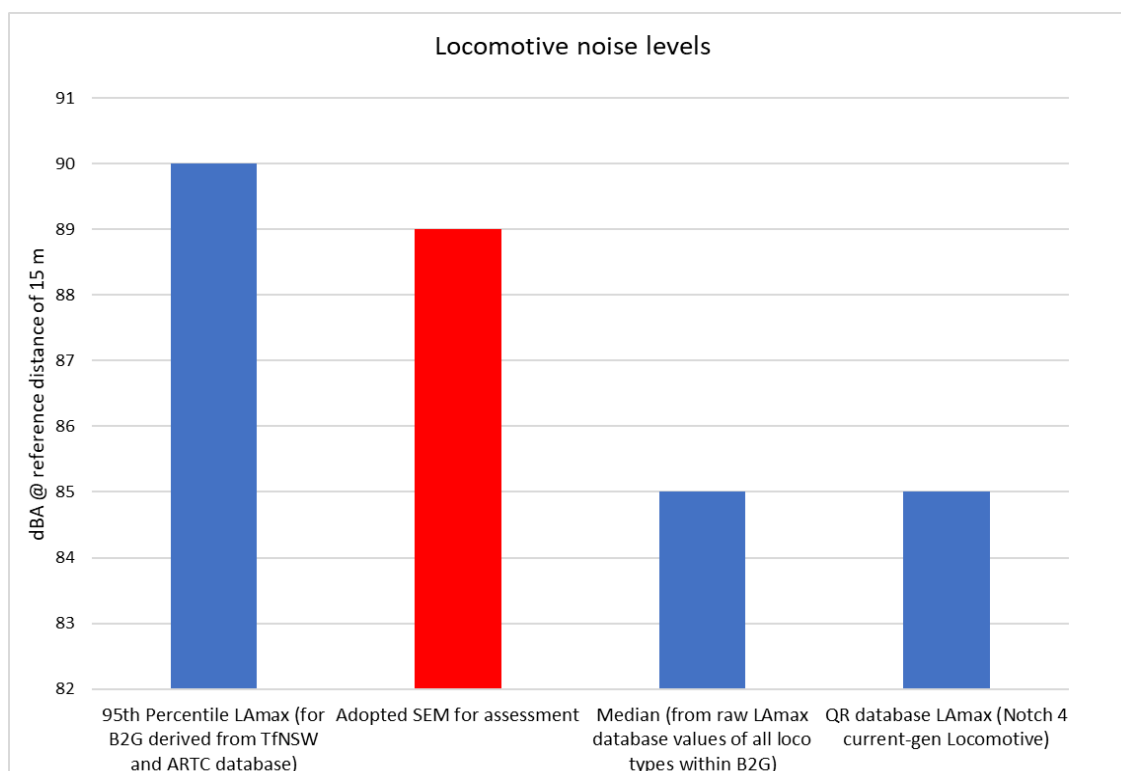
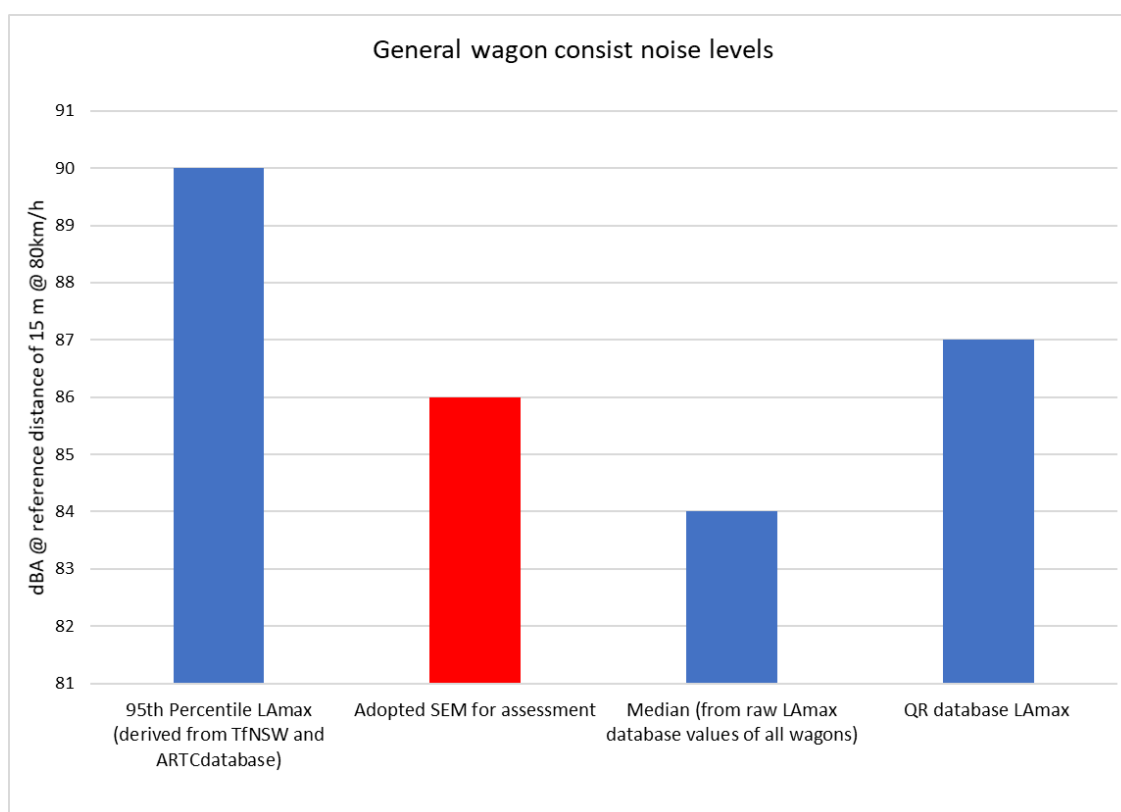


Figure F.5 Comparison of general freight wagon pass-by levels



APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix G Predictions of meteorological effects

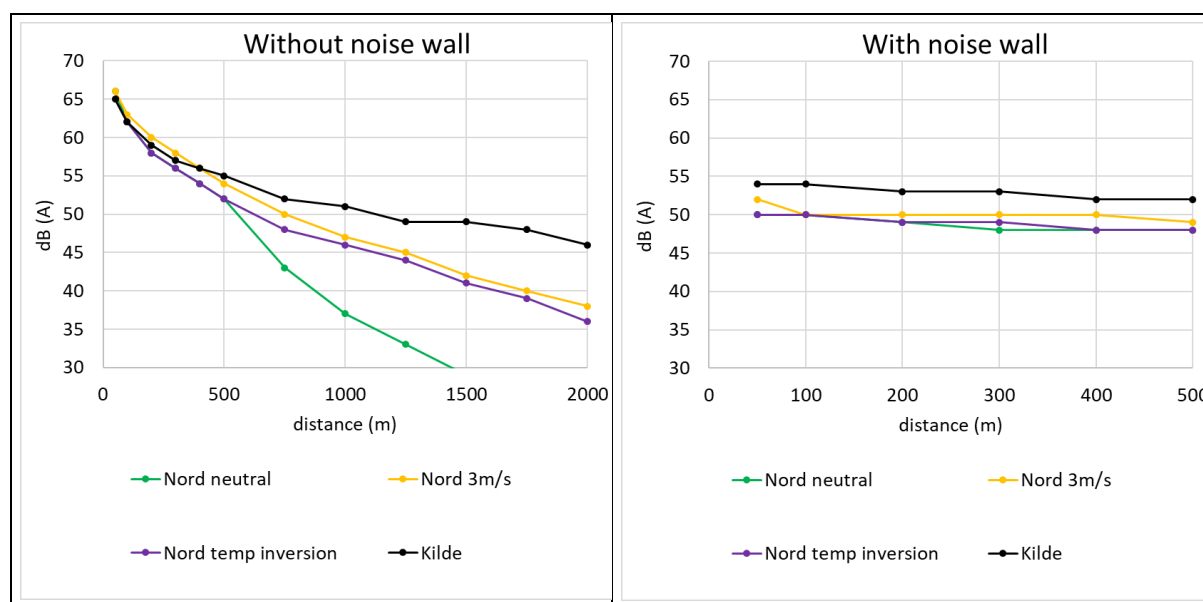
BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Meteorological Effects

Potential meteorological effects on long-distance propagation have been presented by comparing predictions from the Kilde propagation methodology with the Nord2000 propagation methodology. The Kilde methodology doesn't allow the user to modify the meteorological conditions nor take into consideration the associated absorption and refraction effects, hence provides a conservative prediction.

The investigation was conducted using a section of the acoustic model where the track was in a straight line. Noise levels were predicted at distances of 50 metres to 2,000 metres from the railway line using conditions of Kilde, Nord2000 neutral, Nord2000 3 m/s downwind and Nord2000 with temperature inversion. A scenario without any noise walls was considered. A second scenario including a 5 metre high noise wall (located 20 metres from the railway) to show weather affects behind a barrier was also considered. These scenarios were based on a single reference train passby at 115km/hr and calculated as an L_{Aeq} 1hr. Model parameters included reflective ground from 0-600m from the railway and soft ground from 600m – 2000m which is consistent with the overall B2G noise model and is also conservative. The results of the modelling are shown in **Figure G.1** below.

Figure G.1 Meteorological effect comparison



The above results indicate that the Kilde methodology as recommended in the Interim Guideline is unlikely to underpredict noise enhancing weather conditions given its conservatism in comparison to the Nordic prediction algorithms.



APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix H Predictions of low-frequency noise from rail

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Low Frequency Noise

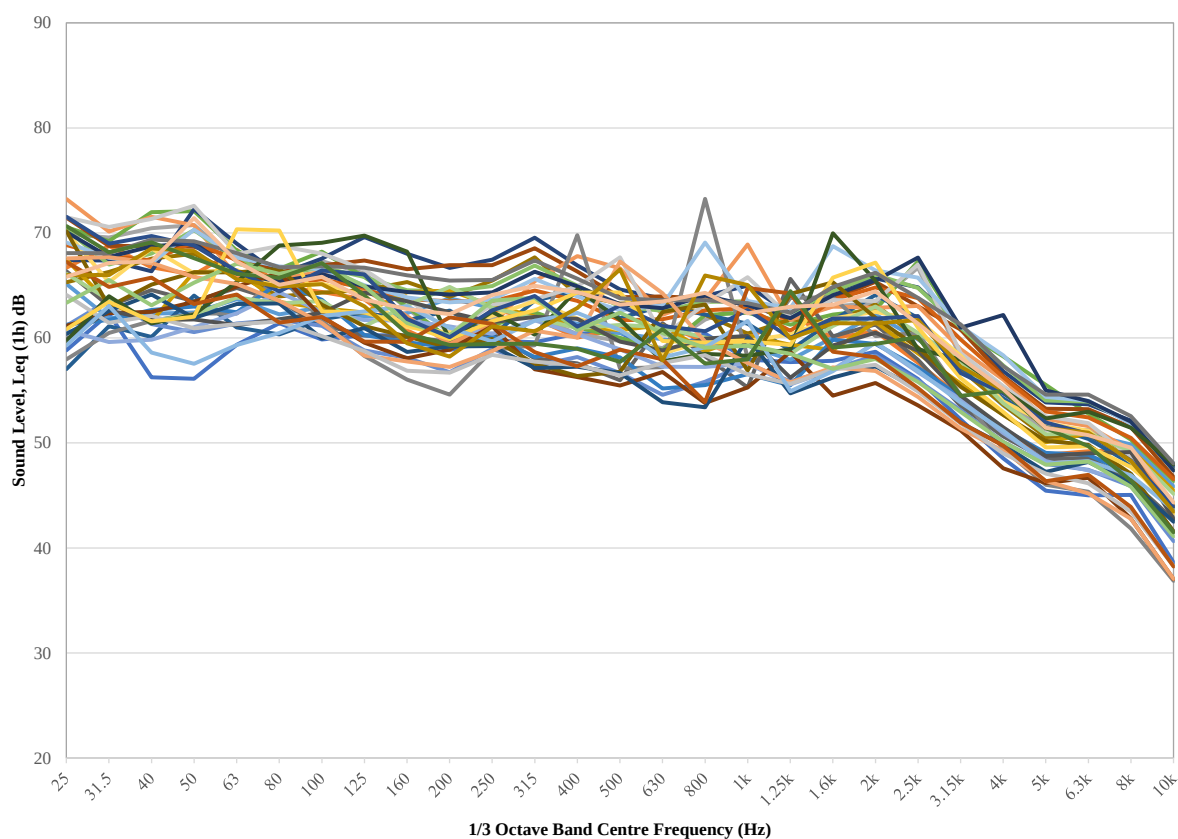
In order to quantify frequency content (including low frequency content below 200Hz) and provide an indication of train passbys noise which would occur on the B2G project, measurements data from a section of the southern railway line in NSW at Illabo is presented below. This measurement location included similar train types lengths and operating speeds as the forecast future B2G operations.

During the measurements, the operation of intermodal and grain trains was present. The measurements were conducted over a 7 day period in February 2023 and includes intermodal trains at speeds up to 110km/hr of up to 1750m in length. Grain trains were up to 800m in length and operating at lower speeds.

Results of measurements for intermodal (25 passbys) and grain trains (15 passbys) are plotted in **Figure H.2** with each passby normalised as L_{Aeq} averaged over one hour (1hr). This L_{Aeq} measurement parameter was chosen to represent a single train pass-by per hour, which is expected for the Project. The measurement was free field within the rail corridor.

A summary of the train types with locomotives, and the range of noise levels with A and C weightings are presented in **Table H.1**. The C-weighted noise level removes the correction for lower frequency content which is applied to the A-weighting correction and provides an indication of low frequency content. The measured noise levels from train passby show a similar shaped noise spectrum for the various passby events across a 10-15dB range.

Figure H.2 Trackside Noise Levels with Frequency Spectrum



Note 1 Each coloured line represents an individual train pass by

Table H.1 At Source Passby Noise Level A and C weighted dB

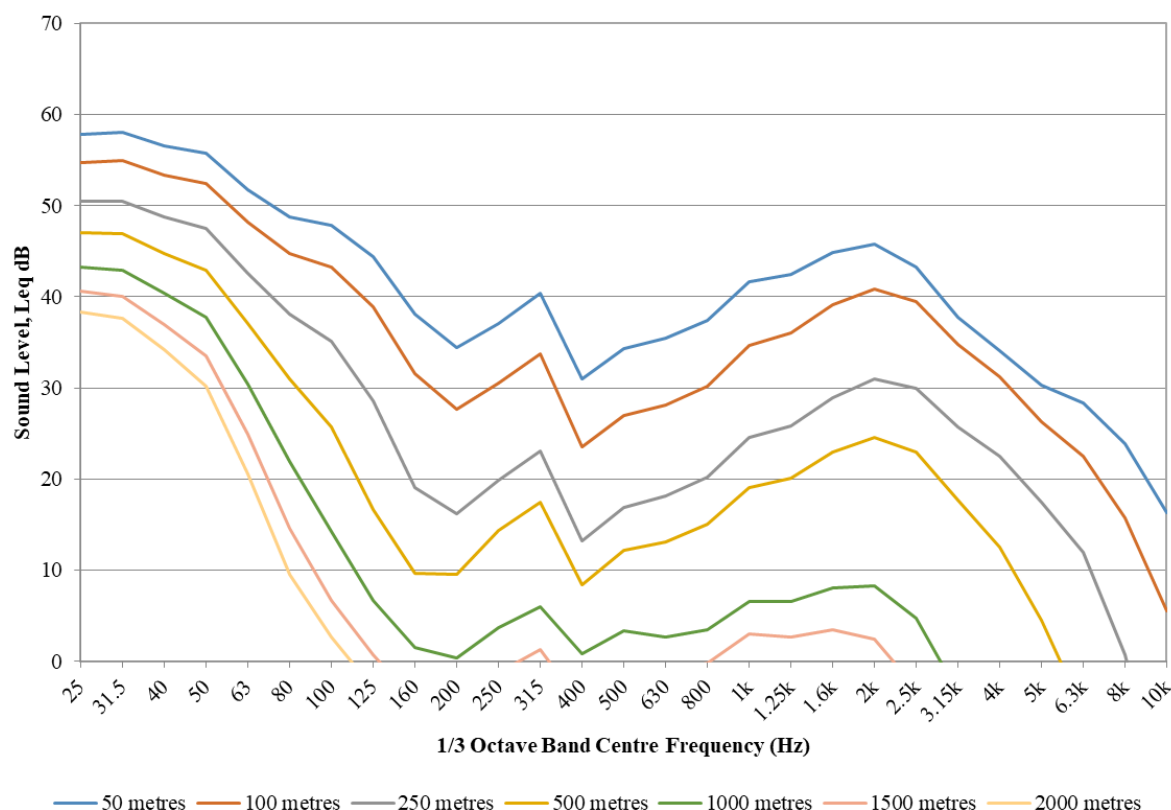


Train Type	Locomotive classes	L _{Aeq} (1hr) dB		L _{Ceq} (1hr) dB	
		min	max	min	max
Intermodal	SCT, NR, CM,	67	76	72	80
Grain	81, 82, CF, CM	66	74	72	78

In order to demonstrate frequency content (including low frequency content below 200Hz) at sensitive receptors, an example train passby event has been modelled using the Nord2000 calculation method and 1/3 octave data. The measurement data was collected from intermodal freight train of 1.5km in length travelling at 100km/hr with two NR class locomotives from the above presented dataset. This test scenario adopted a section of the proposed B2G alignment east of Yelarbon (open level ground with no obstructions) with the example train modelled using the Nord2000 method and resultant noise levels with 1/3 octave frequency content calculated between 50 m and 2000 m from the track centreline. Wind conditions were modelled as neutral and soft ground conditions were modelled.

Results of these predictions (as A-weighted spectra) are plotted in **Figure H.3** for L_{Aeq} averaged over one hour (1hr).

Figure H.3 At Receiver Predicted Frequency Spectrum



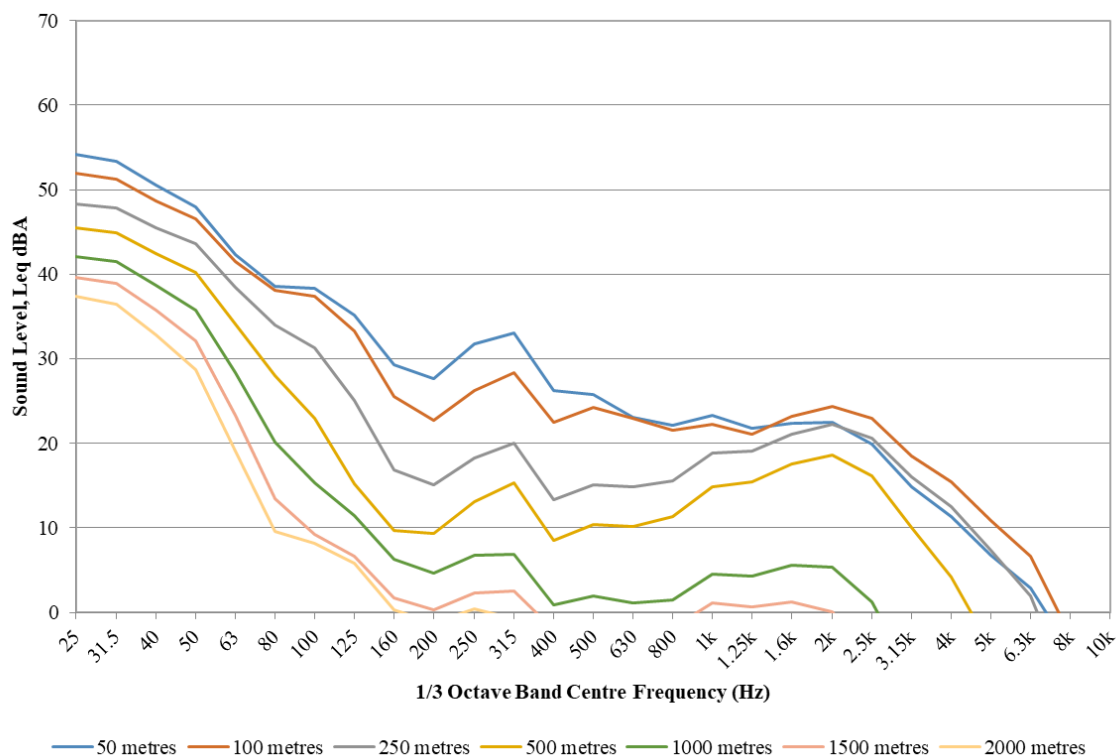
The predicted spectrum is representative of noise experienced by receptors with a clear view of the train line at the listed setback distances. There are low frequency components (below 200Hz) however noise between 200Hz to 2000Hz are predicted to be the dominant frequencies contributing to overall A-weighted noise levels.

An additional comparison is provided to demonstrate the effect of a barrier on the frequency spectrum at the receiver for an example situation where the receiver is between 50m and 2000m from the railway. This example situation (modelled using the Nord2000



methodology) is similar to Yelarbon and representative of receivers behind a 5m barrier. Results of these predictions are plotted in **Figure H.4** for L_{Aeq} averaged over one hour (1hr).

Figure H.4 At Receiver Predicted Frequency Spectrum with Barrier



A summary of the predicted receptor noise levels shown in the above figures with A and C weightings are presented in **Table H2**.

Table H.2 At receiver Noise Level A and C weighted dB

Receiver Position	L_{Aeq} (1hr) dB	L_{Ceq} (1hr) dB
No Barrier		
50m	53	62
100m	48	58
250m	38	53
500m	31	49
1,000m	17	45
1,500m	13	42
2,000m	7	39
With Barrier		
50m	34	56
100m	34	54
250m	30	50
500m	26	47
1,000m	15	43



Receiver Position	L _{Aeq} (1hr) dB	L _{Ceq} (1hr) dB
1,500m	11	40
2,000m	7	38

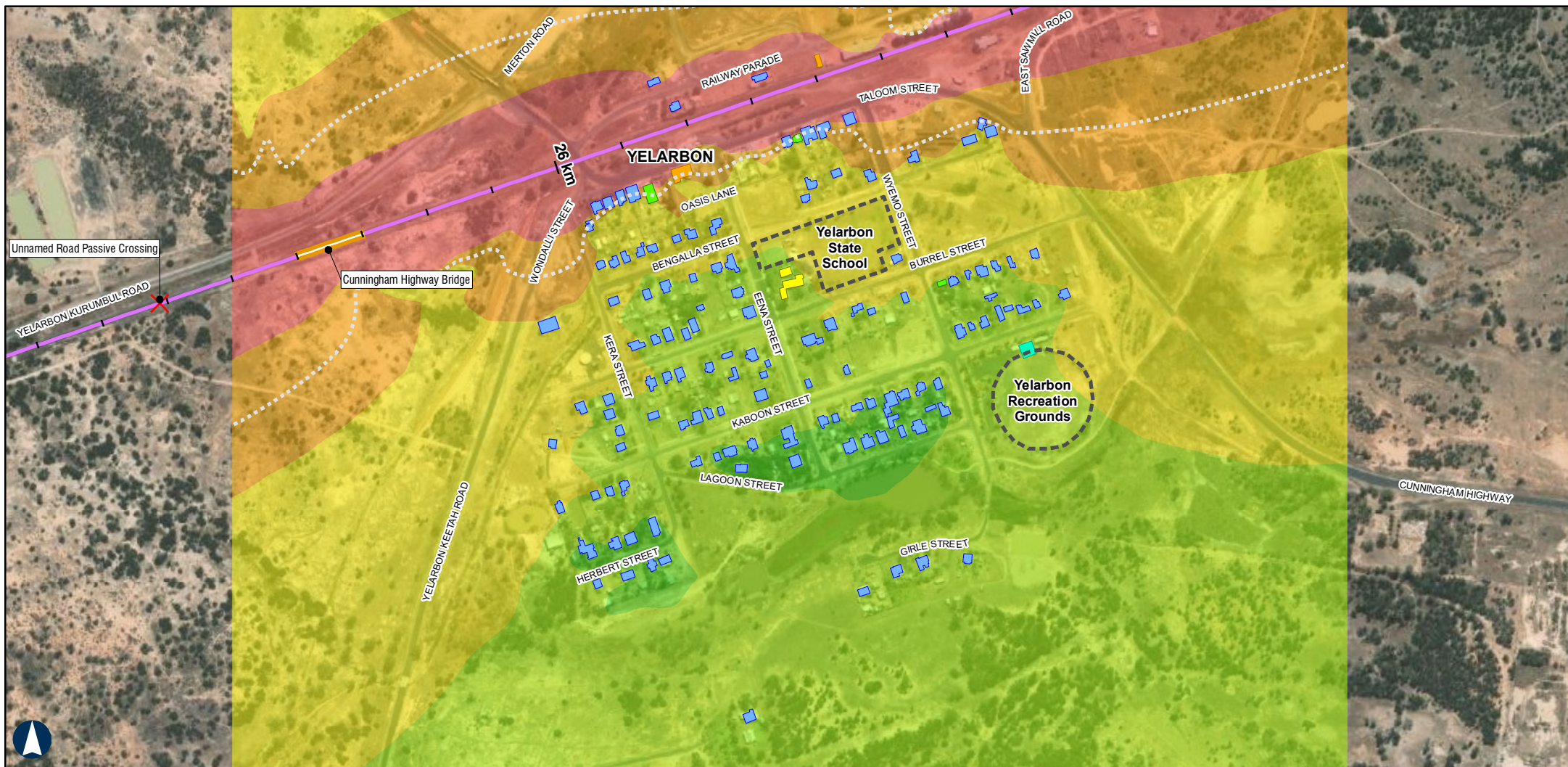


APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix I Noise contours for outdoor receptors

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT



BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,12h

Yelarbon - Map 1 of 4

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Scale: 1:8,000

Date: 17-Oct-2024

Author: JG

- ✕ Level Crossings
- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Outdoor Receptors

Sensitive Receptor Type

- Residential
- Community
- Educational
- Commercial
- Parkland

--- Criterion (57 dBA)

Noise Levels

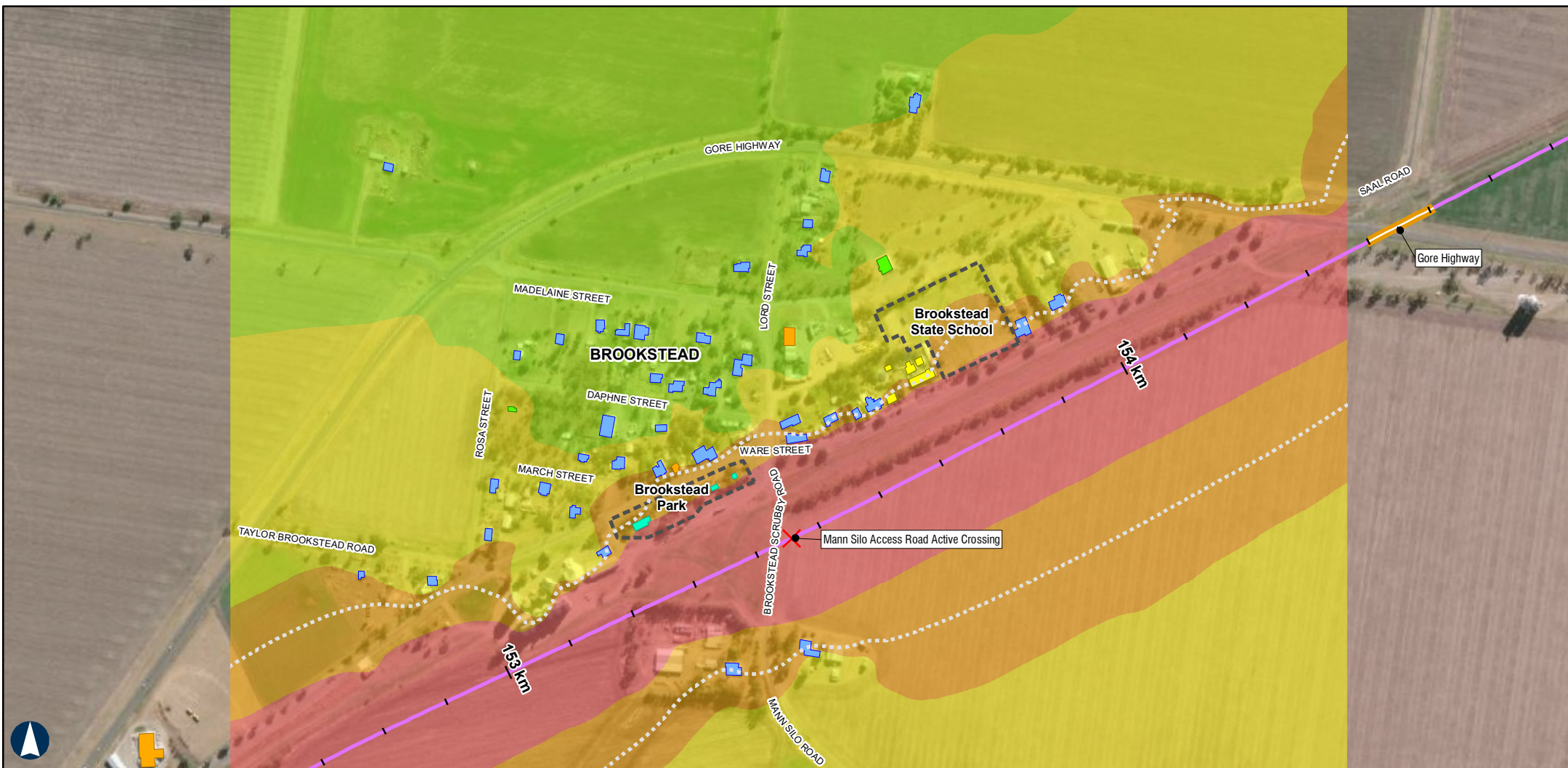
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,12h

Brookstead - Map 2 of 4

100 m

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Sensitive Receptor Type

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- Educational
- Commercial
- Parkland

Criterion (57 dBA)

Noise Levels

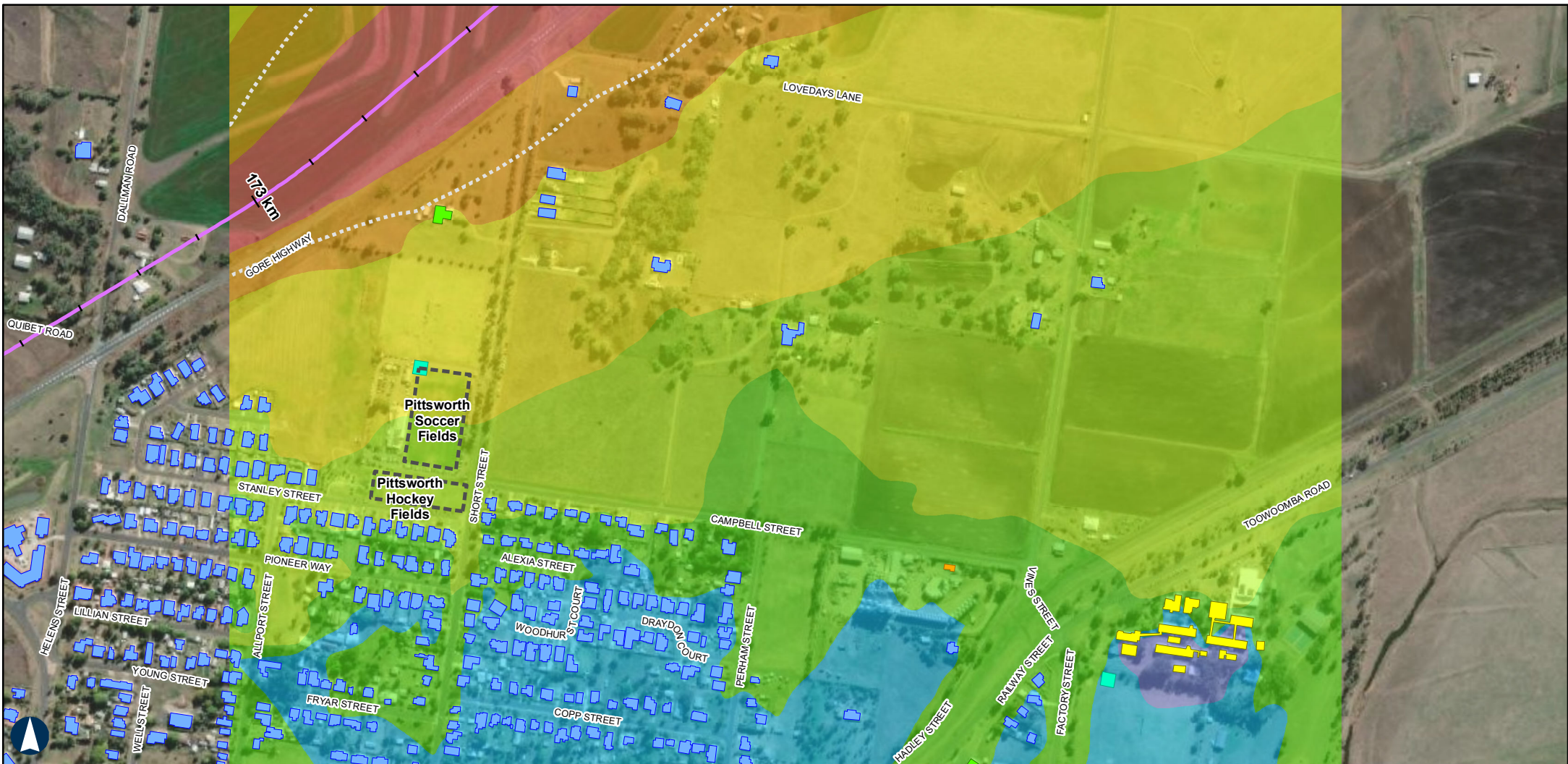
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- > 60 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,12h

Pittsworth - Map 3 of 4

100 m

Coordinate System: GDA 1994 MGA Zone 56

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--- Criterion (57 dBA)

Noise Levels

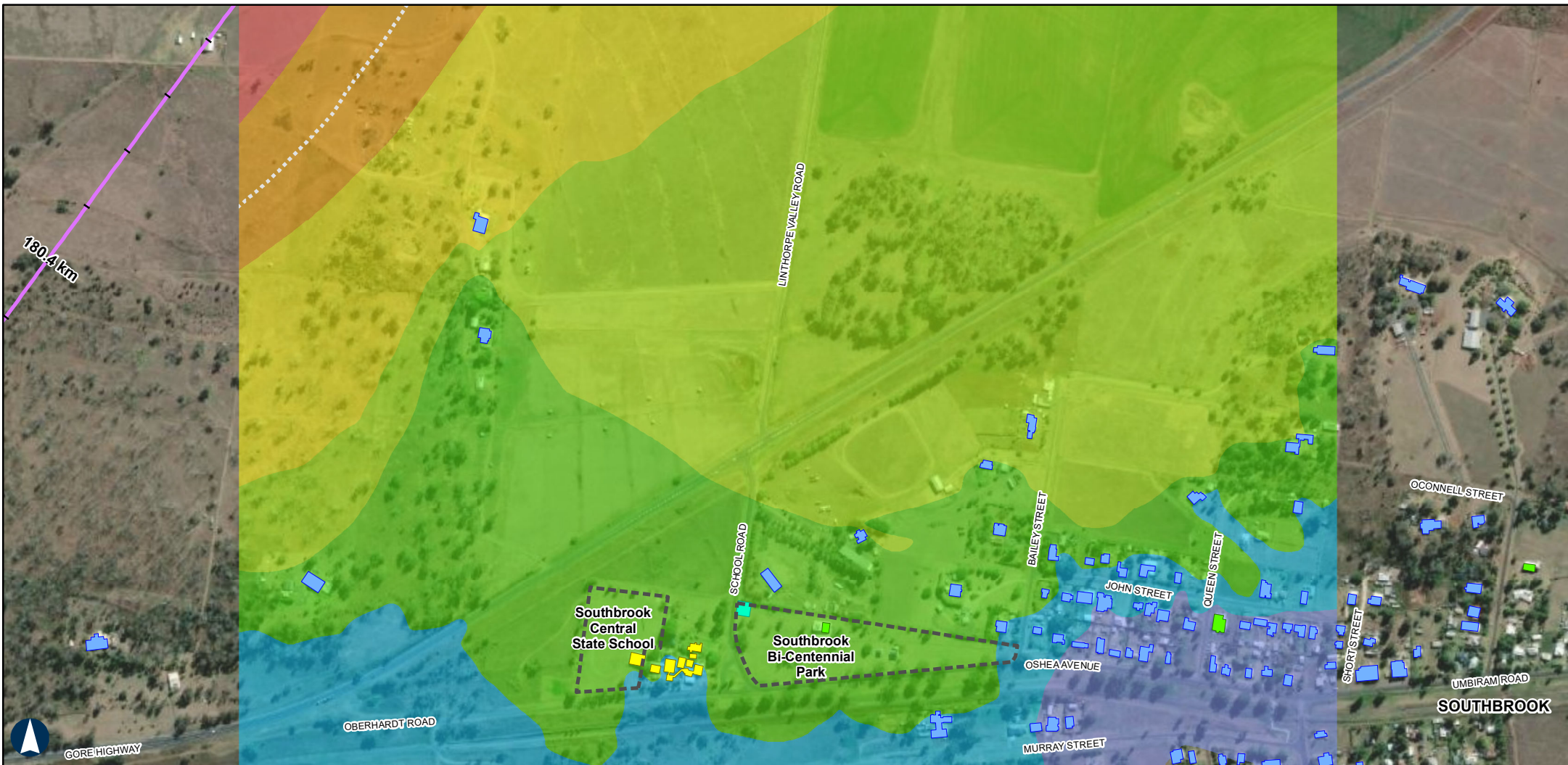
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
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BORDER TO GOWRIE

Unmitigated Noise Levels – 2040 Leq,12h

Southbrook - Map 4 of 4

100 m

Coordinate System: GDA 1994 MGA Zone 56

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--- Criterion (57 dBA)

Noise Levels

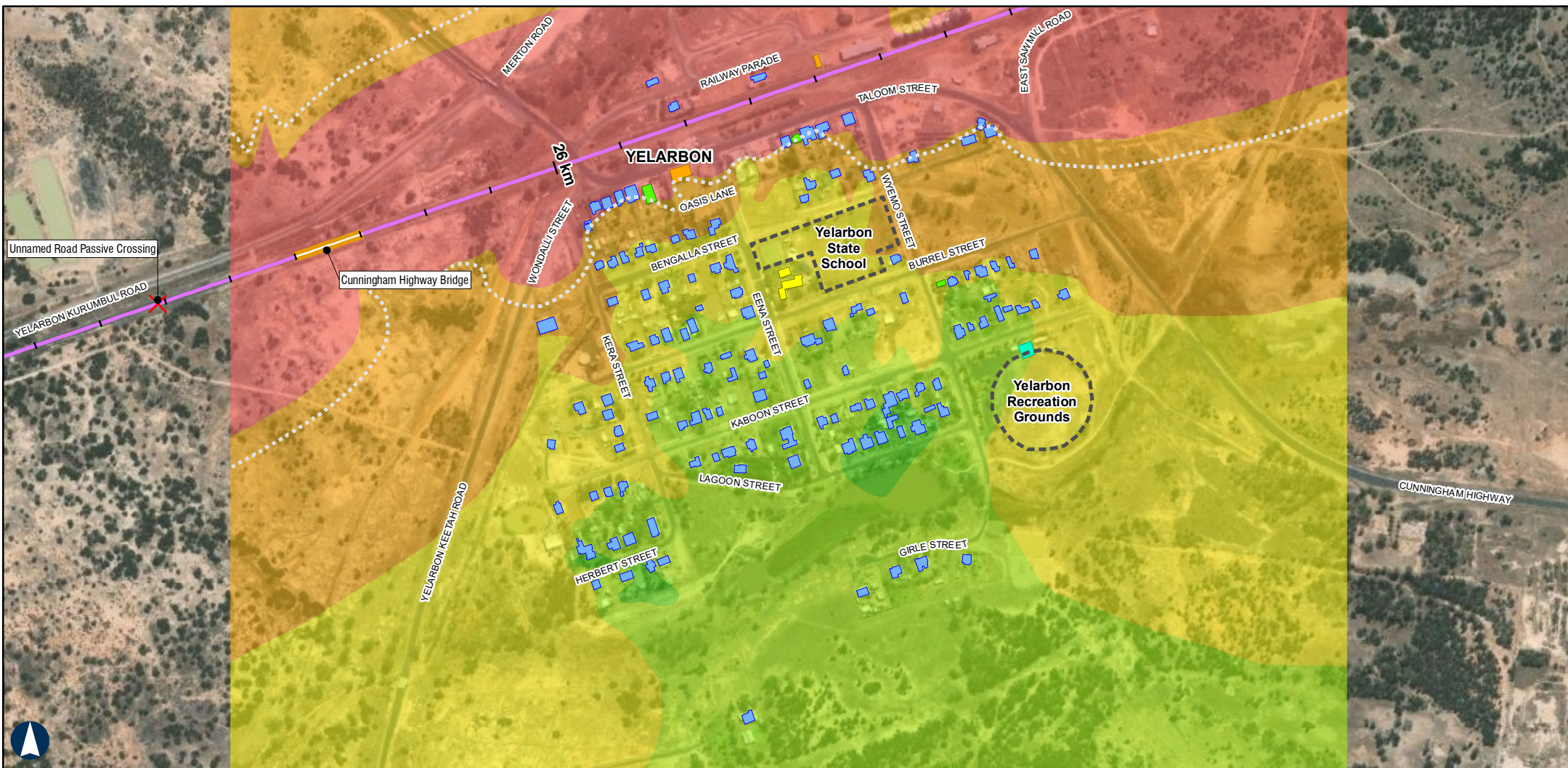
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
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Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Yelarbon - Map 1 of 4

100 m

Coordinate System: GDA 1994 MGA Zone 56

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Sensitive Receptor Type

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- Commercial
- Parkland

--- Criterion (79 dBA)

Noise Levels

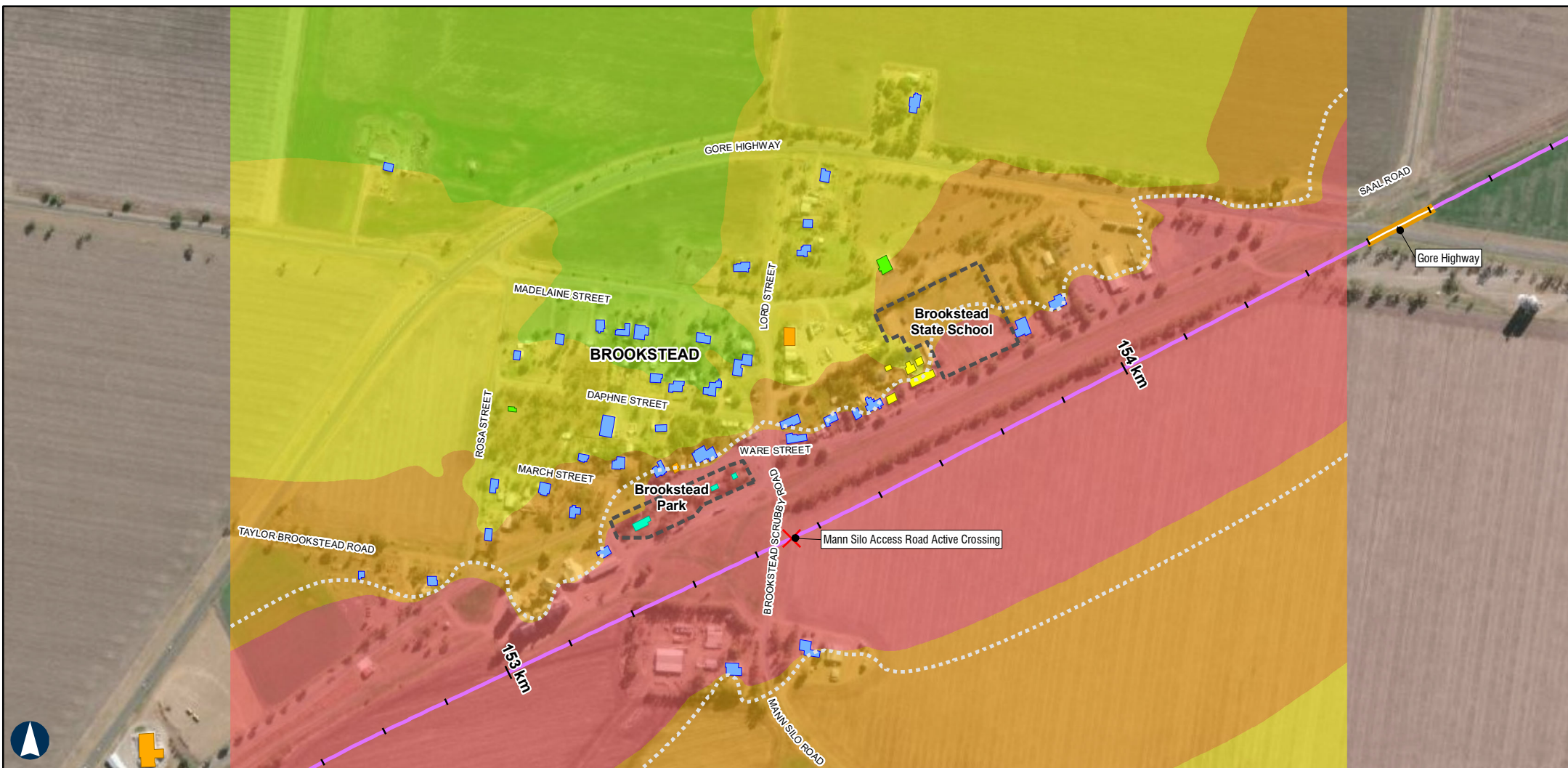
- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Brookstead - Map 2 of 4

100 m

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Noise Levels

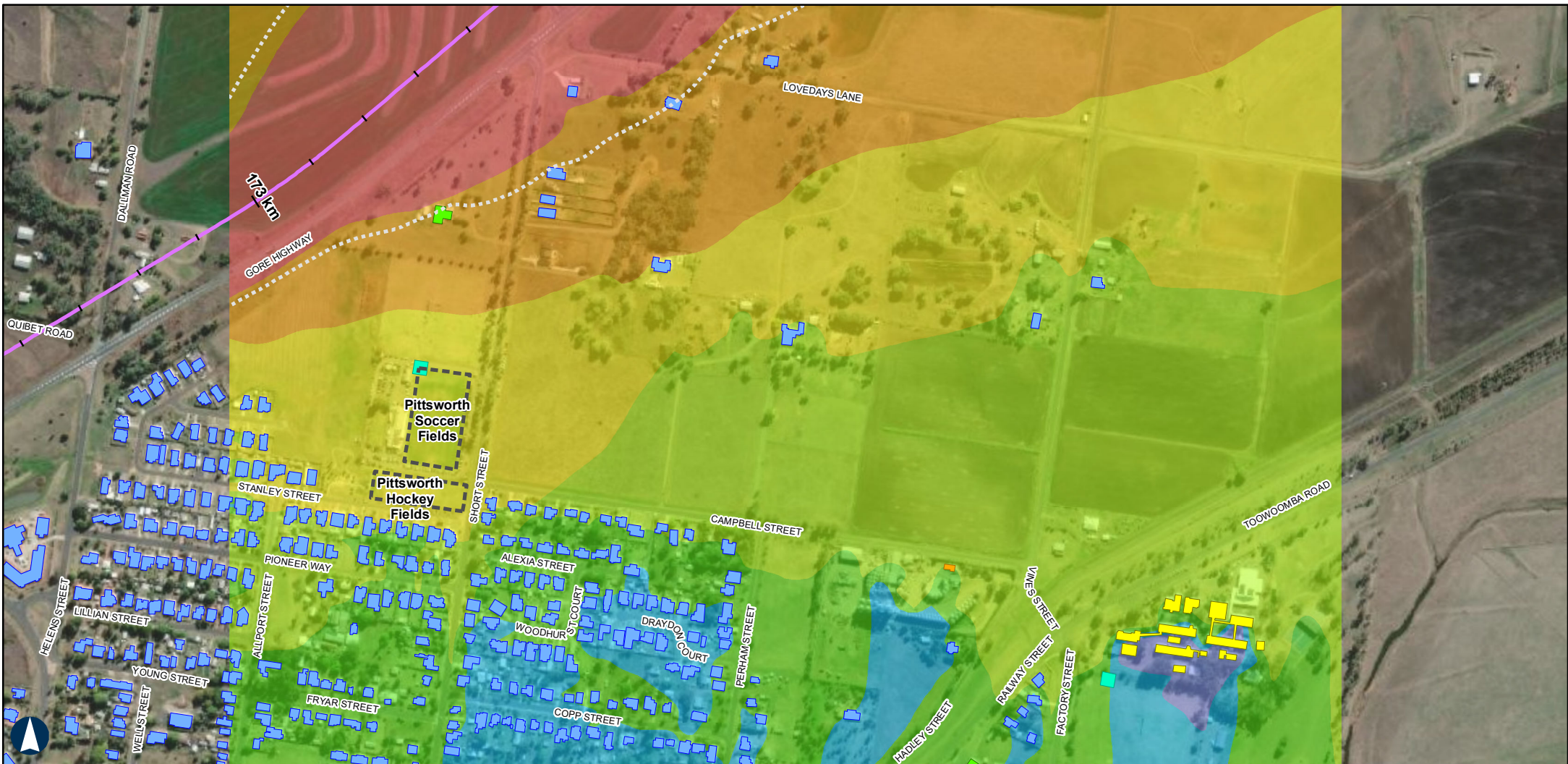
- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE Unmitigated Noise Levels – 2028/2040 SEM

Pittsworth - Map 3 of 4

100 m

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- Outdoor Receptors

Sensitive Receptor Type

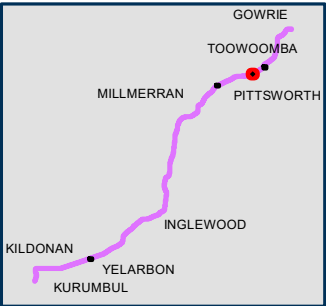
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- Community
- Educational
- Commercial
- Parkland

--- Criterion (79 dBA)

Noise Levels

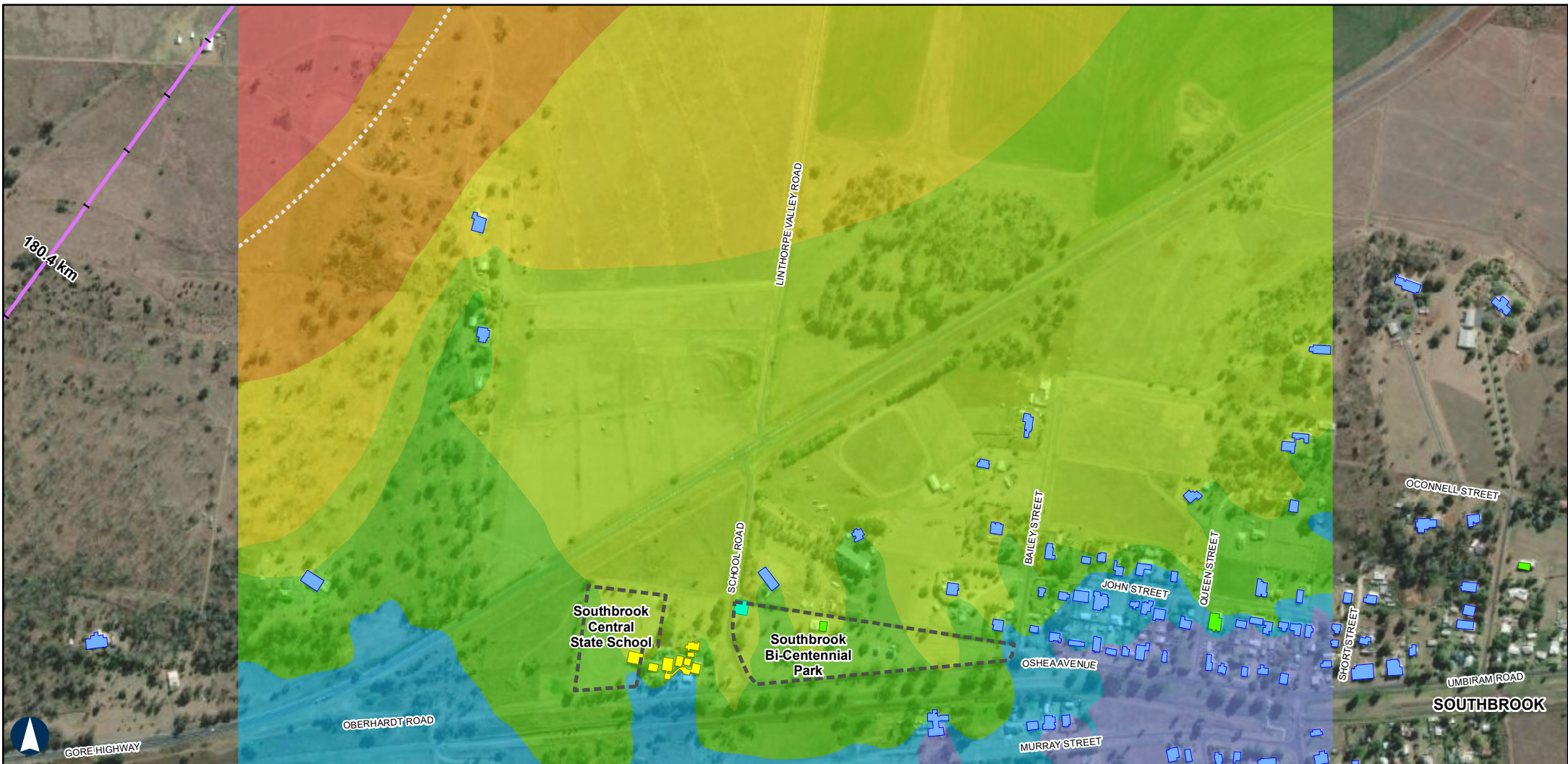
- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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BORDER TO GOWRIE

Unmitigated Noise Levels – 2028/2040 SEM

Southbrook - Map 4 of 4

100 m

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Noise Levels

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- > 80 dBA

Noise contours are free-field and at a height of 1.5m above ground level



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APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix J Cumulative road and rail noise levels

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

The below table provides the cumulative noise levels from road and rail noise levels. The levels above the respective criteria are highlighted in red.

Table J-1 Cumulative road and rail noise levels

ID	Combined Leq, 24 hr, dBA	Road Leq, 24 hr dBA	rail Leq, 24h dBA	Rail SEM, dBA
254340	55	48	54	77
254344	54	47	53	76
254346	54	47	53	76
254348	53	47	52	75
254369	52	47	51	75
254384	51	45	50	73
254388	51	46	50	72
254400	52	48	50	74
254403	53	48	51	74
254396	51	45	50	73
254402	51	45	50	72
254412	55	50	54	78
254376	55	50	54	77
254421	55	49	54	78
254433	55	48	54	77
254437	53	47	52	75
254441	53	46	52	75
254444	53	45	52	74
254449	52	45	51	73
254448	54	45	53	74
254453	55	50	54	77
254458	54	48	53	76
254463	52	47	51	74
254462	53	48	52	75
254460	52	48	49	72
254465	52	48	50	72
254470	54	47	53	76
254476	60	56	58	81
254468	53	49	50	73
254490	53	46	52	75
254484	55	51	53	76
254487	55	51	52	76
254478	54	50	52	75
254494	53	46	52	74
254493	56	54	52	75
254502	58	52	57	80
254500	55	49	54	77
254501	59	58	52	76
254508	56	49	55	78

ID	Combined Leq, 24 hr, dBA	Road Leq, 24 hr dBA	rail Leq, 24h dBA	Rail SEM, dBA
254507	54	46	53	75
254517	55	49	54	77
254513	56	51	55	78
254524	55	49	54	77
254521	56	51	55	79
254526	57	51	56	79
254532	54	47	53	76
254529	57	52	56	79
254534	59	54	58	82
254533	55	49	54	76
254531	58	54	56	79
254535	57	50	56	79
254539	58	53	57	81
254536	58	53	57	80
254537	60	57	56	79
254540	57	52	56	79
254542	56	49	55	79
254546	58	52	57	80
254549	58	52	57	80
254551	64	59	63	87
254550	58	53	56	79
254558	69	66	66	90
254559	69	65	66	90
254560	53	49	51	74
254562	70	67	67	91
254562	70	67	67	91
254565	69	64	67	90
254568	57	52	55	78
254573	58	53	57	80
254576	65	54	65	88
254578	61	55	60	83
254587	61	58	58	82
254589	68	65	65	89
254595	69	66	66	89
254598	69	65	66	89
254594	65	64	59	82
254609	70	56	70	94
254612	65	54	65	89
254614	70	57	70	93
256166	62	52	61	84
260058	66	56	66	89
260067	65	55	64	87

ID	Combined Leq, 24 hr, dBA	Road Leq, 24 hr dBA	rail Leq, 24h dBA	Rail SEM, dBA
260165	63	62	58	81
260169	68	67	61	85
260189	70	69	63	87
260213	71	70	65	89
260930	61	57	58	82
261084	66	64	62	86
261908	64	59	63	87
261969	64	60	62	86
262034	61	60	52	75
262063	62	61	52	75
262104	63	63	52	75
262181	71	71	52	75
262286	66	66	53	76
323569	59	54	57	81
323525	60	57	57	81
322790	64	63	59	83
2008318	62	60	57	80
2008319	62	61	57	81
323796	63	61	59	82
323804	63	61	59	82
322665	61	59	57	81
321184	65	64	60	84
323854	65	61	63	86
324333	65	63	60	83
319605	60	55	58	81
320557	69	69	59	83
321618	64	62	60	83
320889	64	61	60	83
320977	58	54	55	79
322047	63	61	58	81

APPENDIX W

Noise and Vibration Assessment—Railway Operations

Appendix K Impacts on intensive animal operations

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Potential impacts to intensive animal operations

The construction and operation of the Project will generate noise and vibration that could potentially impact intensive animal operations. This Appendix provides a discussion on the noise and vibration impacts to intensive animal operations from construction and operation of the Project.

The assessment focuses on intensive animal operations which typically include buildings or enclosures used to confine or house livestock, examples include livestock barns, cattle feedlots, poultry rearing sheds, and piggeries. The assessment does not cover grazing land, hobby farms or other locations where livestock have sufficient land to move away from the railway/ construction site.

Intensive animal operations within or in proximity (approximately 1 km) of the Project have been identified based on the Queensland Agricultural Land Audit (refer to Chapter 8: Land Use and Tenure of the revised draft EIS). A summary of the various intensive animal operation identified are detailed in **Table K-1** and are also shown in **Figure K-1** and **Figure K-2**.

Table K-1 Intensive animal operations

Name of Intensive Animal Operations	Description
Yarranbrook Farms Pty Ltd (Yarranbrook Feedlot)	Cattle feedlot at Whetstone (Ch 54.0 km) The Project footprint traverses through multiple lots associated with the Yarranbrook Feedlot, before crossing the access point, Cremascos Road, and traversing along the southeast corner of Lot 511 on RP226715. EA No. FL-087 Capacity: 15,000 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 750 m
D M Fletcher	Cattle feedlot at Bringalily (Ch 103.5 km) Project footprint traverses north to south through the centre of the land parcel associated with this feedlot (Lot 2 on RP197967) at Bringalily. EA No. F1-0153 Capacity: 250 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 200 m
Russell Sydney and Kim Maree Stevens (R Sydney and KM Stevens Feedlot)	Cattle feedlot at Millwood (Ch 111.2 km) The Project footprint traverses north to south through the east extent of the land parcel associated with this feedlot (Lot 6 on MH364) at Millwood EA No. F1-0026 Capacity: 999 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 550 m
Cameron Pastoral Co. Pty Ltd (Moyness Piggery)	Piggery at Yandilla (Ch 136.0 km) The Project footprint traverses through the west corner of Lot 3 on RP16081 and through the centre of Lot 3683 on DER34116 associated with the Moyness Piggery at Yandilla. EA No. P1-0019 Capacity: 12,500 standard animal units



Name of Intensive Animal Operations	Description
	Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 370 m
Doug Hall Poultry Pty Ltd	Poultry Farm at Yandilla (Ch 137.0 km) The Project footprint traverses approximately 1 km east of the lots (Lot 2 on RP898480 and Lot 4 SP153098) associated with the Doug Hall Poultry Farm at Yandilla. EA No. RSO000291 Capacity: >20,000 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 550 m
Smithfield Service Pty Ltd (Sapphire Feedlot)	Cattle feedlot at Yelarbon (Ch 10.0 km) The Sapphire Feedlot is located to the south of the Project footprint, adjoining the Project footprint and existing South Western Line rail corridor. The Project footprint does not traverse this feedlot. Lot 56 on MH235 and Lot 55 on SP169191 EA No. 2017–05 capacity: 20,000 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 75 m
RJ and FE Verdon	Cattle feedlot at Whetstone (Ch 35.0 km) The land parcel (L 56 RP884730) associated with this feedlot is located to the southeast of the Project, adjoining the Project and the existing South Western Line rail corridor. The Project does not traverse the lots associated with this feedlot. EA No.51–0150 Capacity: 999 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 1.8 km
Boondooma Country Pork Pty Ltd	Piggery at Millwood (Ch 112.0 km) The land parcel associated with this piggery is located approximately 250 m to the east of the Project footprint at Millwood. The Project footprint does not traverse this piggery. Lot Plan 7MH364 EA No. P2–0210 Capacity: 4,700 standard animal units Indicative separation distance of closest farm building or feedlot to the Project alignment is approximately 820 m

Potential noise impact literature review

Inland Rail engaged The Australian Centre for Rail Innovation (ACRI) to undertake a literature review of studies that directly or indirectly addressed domestic livestock species, and noise, vibration or other impacts of rail operation applicable to the freight rail context. Findings from literature indicate that the response to noise among livestock species varies. A summary of findings from the literature reviews on common types of livestock and their responses to noise impacts are shown in **Table K-2**.



Table K-2 Summary of noise levels and associated animal responses

Animal Species	Reference	Context	Noise Impacts
Fowl (chickens)	(Hanson, 2008)	Brownfield and greenfield	Interrupted brooding at 115 dB
	(Mestre, 2008)	Greenfield	Aircraft and general noise >100dB increase stress and impaired brooding and egg production
	(Brouček, 2014)	Greenfield and experimental	Sudden loud noises can produce hysteria, aggression, or panic in chickens
	(McAdie , et al., 1993)	Experimental	Hens prefer a noise-reduced environment. Train noise can adversely affect hen welfare (>80 dBA)
Fowl (Ducks)	(Goudie, 2006)	Greenfield	Ducks responded to low flying aircraft (≥100 dBA) by increasing alert behaviour and becoming inactive or immobile. The alert response to noise generated from low level military jets increased in a dose response manner
	(Goudie & Jones, 2004)	Greenfield	There was a dose response relationship between alertness and aircraft noise. A threshold of 80 dBA is recommended to minimise negative behavioural and welfare effects.
Fowl (Japanese Quail)	(Dooling, 2005)	Experimental	Quail lost hearing at 70 dB and had not fully recovered hearing a year after exposure. Birds showed an initial hearing loss at about 50 dB for 12-hour exposure.
Fowl (Turkeys)	(Hanson, 2008)	Brownfield and greenfield	Panic crowding at 100 dB
Fowl General	(Hanson, et al., 2012)	Not specified	Use the interim criterion of 100 dBA as the maximum amount of exposure for livestock animals
Birds (General)	(Archer, 2014)	Brownfield	Episodic noise can impact birds' behaviour at 60 – 80 dBA (nesting/roosting), and over 80 dBA (nesting/roosting/feeding)
Livestock (Cows)	(Hanson, 2008)	Brownfield and greenfield	Dairy cows 97 dB to 110 dB (changed blood composition), 105 dB (reduced milk production)
	(Owen, 2017)	Greenfield	Cow milk production is not affected at maximum noise levels up to 99 dBA. Livestock can habituate reasonably quickly to loud sounds at 90 – 120 dBA SEL
	(Mestre, 2008)	Greenfield	Dairy cow exposed to tractor engine 97 dB, increased glucose and leukocyte counts, decreased haemoglobin and thyroxin
	(Brouček, 2014)	Greenfield and experimental	90 – 100 dB discomfort, 110 dB physical damage, dairy breeds more sensitive to noise than beef breeds
Livestock (Pigs)	(Hanson, 2008)	Brownfield and greenfield	93 – 123 dB (hormonal changes), 120 – 135 dB (increased heart rate)
	(Mestre, 2008)	Greenfield	93 – 120 dB, adrenal and hormonal stress response.
	(Brouček, 2014)	Greenfield and experimental	55 Hz and 40 kHz, auditory range, 500 Hz to 16 kHz, sensitive range.



Animal Species	Reference	Context	Noise Impacts
Livestock (Sheep)	(Hanson, 2008)	Brownfield and greenfield	90 dB (decreased thyroid activity), 100 dB (increased heart rate and respiration), 100 dB (increased lambs per ewe);
	(Mestre, 2008)	Greenfield	White noise, 90 – 100 dB, increased heart rate and thyroid activity
	(Brouček, 2014)	Greenfield and experimental	Sheep can adapt to continuous noise at around 60 –90 dB (e.g., transport vehicles)
Livestock (General)	Archer, 2014; Mancini, 1988)	Brownfield	Noise above 90 dBA is likely to be aversive to mammals and associated with aversive behaviour (retreat, freezing, startling). Sound levels below about 90 dBA usually cause much less aversive behaviour
	(Hanson, et al., 2012)	Not specified	Until more definitive information on thresholds can be developed, an interim criterion of 100 dB SEL will be used for disturbance by high-speed rail operations
Equines (Horses)	(Haas & Scrivener, 2015)	Greenfield	Horses can habituate to loud noises from 65 – 90dBA (loud, live music). As noise level of 100 dBA SEL have the potential to harm horses, levels must be screened for possible conflicts.

Based on this literature review, ACRI made the following recommendations regarding noise impacts on animals:

- Avian exposure to freight rail noise more than 100 dBA L_{max} should be avoided or mitigated to reduce the potential for stress and harm from a physiological and behavioural perspective.
- Extent of avian exposure to high level operational noise ≥ 90 dBA L_{max} proximal to the Inland Rail should be estimated or modelled to allow for measures that reduce or avoid exposure.
- Mammalian livestock exposure to freight rail noise in the range of 90 – 110 dBA L_{max} should be minimised to avoid aversive behavioural responses.
- Frequency and duration of mammalian livestock exposure to high level freight rail noise ≥ 100 dBA L_{max} proximal to Inland Rail project sites should be estimated or modelled to allow for measures that reduce or avoid noise exposure.

Assessment of potential noise impacts

Considering the above literature review findings and recommendations, a 90 dBA L_{max} level which is similar to the SEM noise level predicted for rail operations has been used to assess noise impacts on intensive animal operations adjacent to the Project. To illustrate impacts of construction and operational noise to the various intensive livestock operations identified, L_{Amax} noise levels were predicted and detailed noise contours are provided in **Figure K-1** and **Figure K-2** below.

Several construction scenarios have been modelled as part of the construction noise assessment (Appendix V: Noise and Vibration – Construction and Road Traffic), and for the purposes of assessing construction impacts to intensive animal operations, earthworks scenario: cut and fill has been selected as the most noise intensive scenario occurring throughout the Project alignment, noting that construction activities are temporary. The



predicted noise levels for earthworks indicate that the 90 dBA L_{max} noise level is largely confined to the construction area. The modelled noise levels further indicate that noise levels during construction at intensive livestock facilities such as farm buildings, sheds or feedlots visible from aerial imagery, are less than 90 dBA L_{max} . Based on this, construction activities are not expected to significantly impact intensive animal operations.

The predicted noise levels (L_{max}) for the railway operations at the design year 2040 indicate that the 90 dBA L_{max} noise levels occur very close to the rail alignment. Noise levels at all farm buildings, sheds and feedlots within intensive livestock properties are less than 90 dBA L_{max} . The predicted operational noise levels indicate that there are no significant impacts to livestock that are expected to occur for the receptors identified.

Potential vibration impacts literature review

There are no known studies that assess rail vibration on livestock productivity and welfare. However, a review of literature identified vibration impacts on common types of livestock in experimental settings. It is likely that the intensity and duration of vibration experienced by animals being transported is far greater than that experienced by animals near a railway, as the animal behaviour and physiological effects rely on the frequency and magnitude of vibration (Rabey, et al., 2015). Railway-derived vibrations are generated primarily at the wheel rail interface (ranging from 2 to 80 Hz depending on track structure and train velocity) and travel into the soil.

In order to provide a conservative estimate of the potential impacts of vibration on intensive livestock facilities, the human vibration limits for railway operations (accommodation activities) and construction (human comfort,) have been applied.

Assessment of Vibration Impacts

An assessment of the Project's vibration impacts during the railway operations has been done as part of Appendix W: Noise and Vibration – Railway Operations primarily to assess impacts on the identified sensitive receptors. Rail vibration levels were predicted to determine the minimum offset distance from the outer rail where ground borne vibration criteria would be expected to be achieved. The assessment determined that the vibration criteria would be achieved where receptors are greater than 12 m from the closest rail (based on the most stringent limit for the night-time period). The assessment found that there were no sensitive receptors triggering the ground-borne vibration criteria from railway operations.

For intensive animal operations, considering that structures such as farm buildings, sheds or feedlots visible from aerial imagery, are located at distances significantly farther away than the estimated off-set distance of 12 m, it is anticipated that ground borne vibration impacts to livestock are not likely to be expected in these locations.

Ground vibration impacts for the construction phase were assessed as part of Section 6.1.2 of Appendix V: Noise and Vibration – Construction and Road Traffic Impact. During construction, it is standard practice to maintain adequate separation distance or 'safe' working distance where possible and/or monitor vibration levels at sensitive receptor locations during vibration intensive construction works.

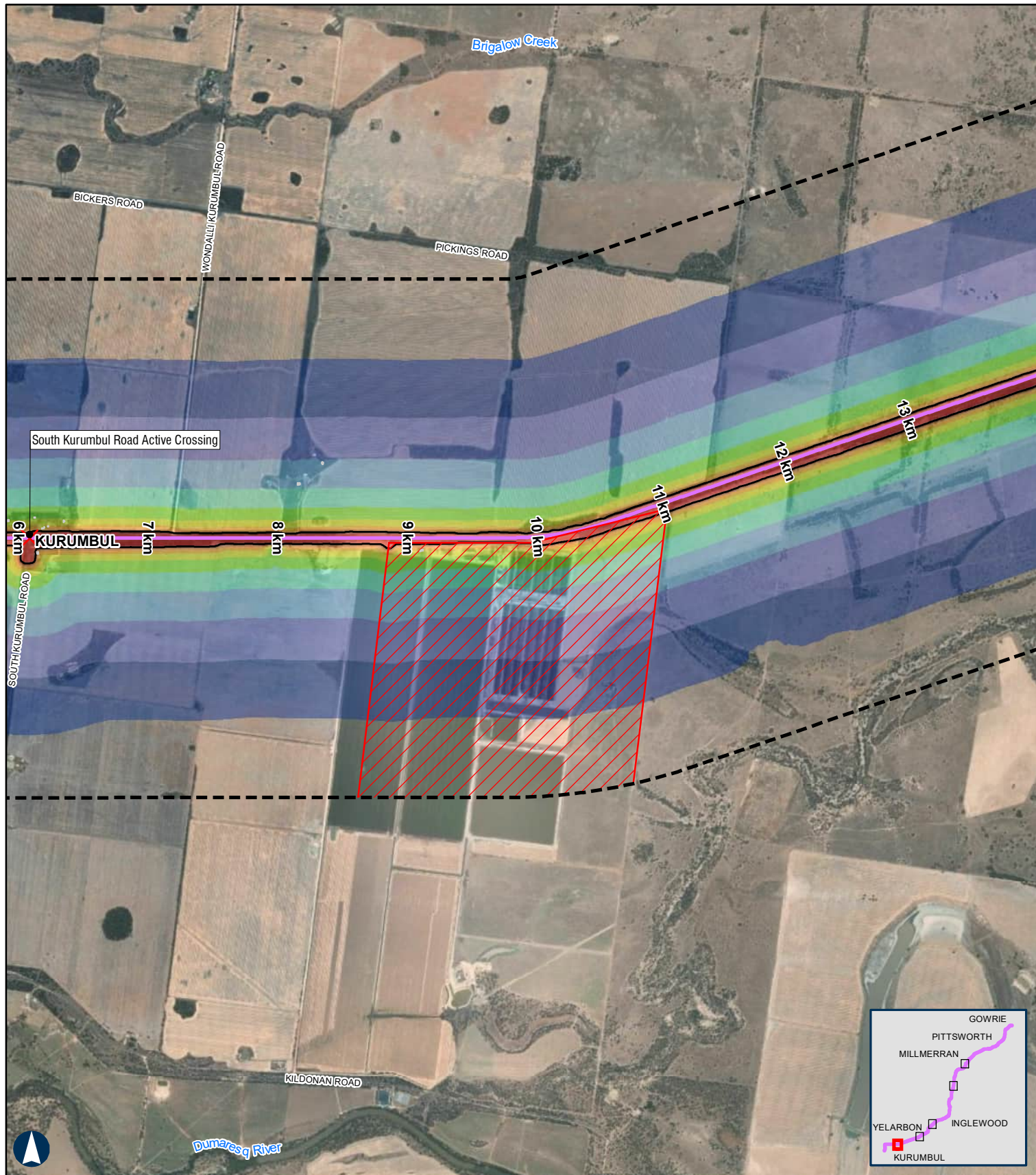
The safe working distances provide a simple and conservative guide to site personnel to manage the likelihood of vibration impacts to sensitive receptors. Human comfort safe working distances in the order of 300 m have been calculated for the largest vibratory rollers during start-up/run down on the high amplitude setting. Vibration safe working distance contour maps for all relevant sources of construction vibration are provided in Appendix E of Appendix V: Noise and Vibration – Construction and Road Traffic Impact. The assessment of human comfort safe working distances indicate that potential impacts could occur at three intensive animal operations sites. It is recommended that all vibration sensitive receptors,



including any intensive animal operations that could be impacted, located within the conservative human comfort safe working distances (provided as contour maps in Appendix E) are notified in advance of the potential for vibration levels to be perceptible during the Project construction works.

To mitigate potential vibration impacts, measures such as preconstruction conditions surveys, use of smaller construction equipment, alternative construction methodology and vibration monitoring, will likely be required for all Project vibration intensive works occurring within the safe working distance.





BORDER TO GOWRIE

Intensive Animal Operations – Construction Noise (Earthworks: cut and fill)

Figure K-1 Map 1 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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Date: 23-Oct-2024
Author: JG

Scale: 1:40,000

- ✕ Level Crossings
- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Study Area
- ▨ Livestock Area
- Sensitive Receptor

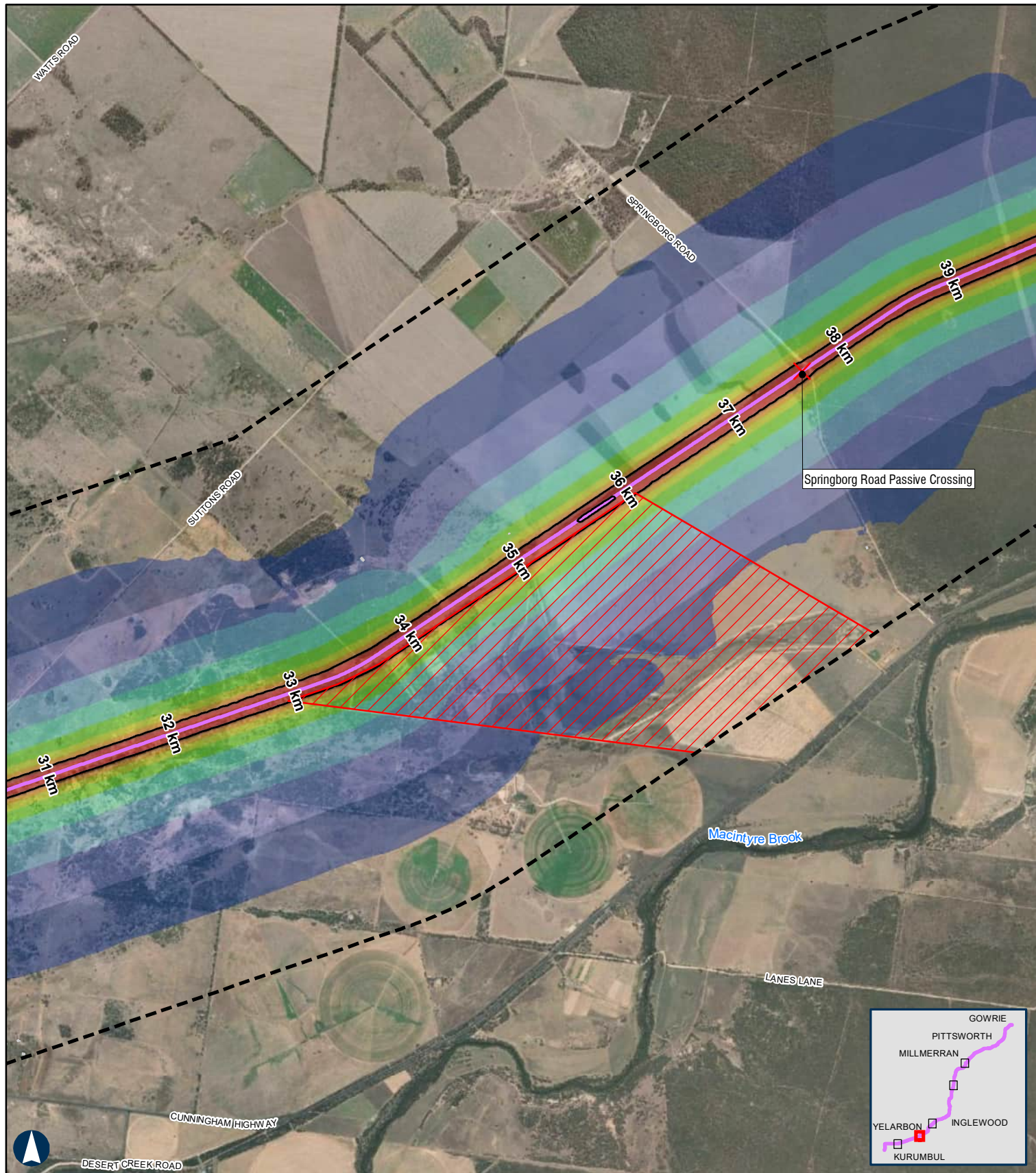
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Construction Noise (Earthworks: cut and fill)

Figure K-1 Map 2 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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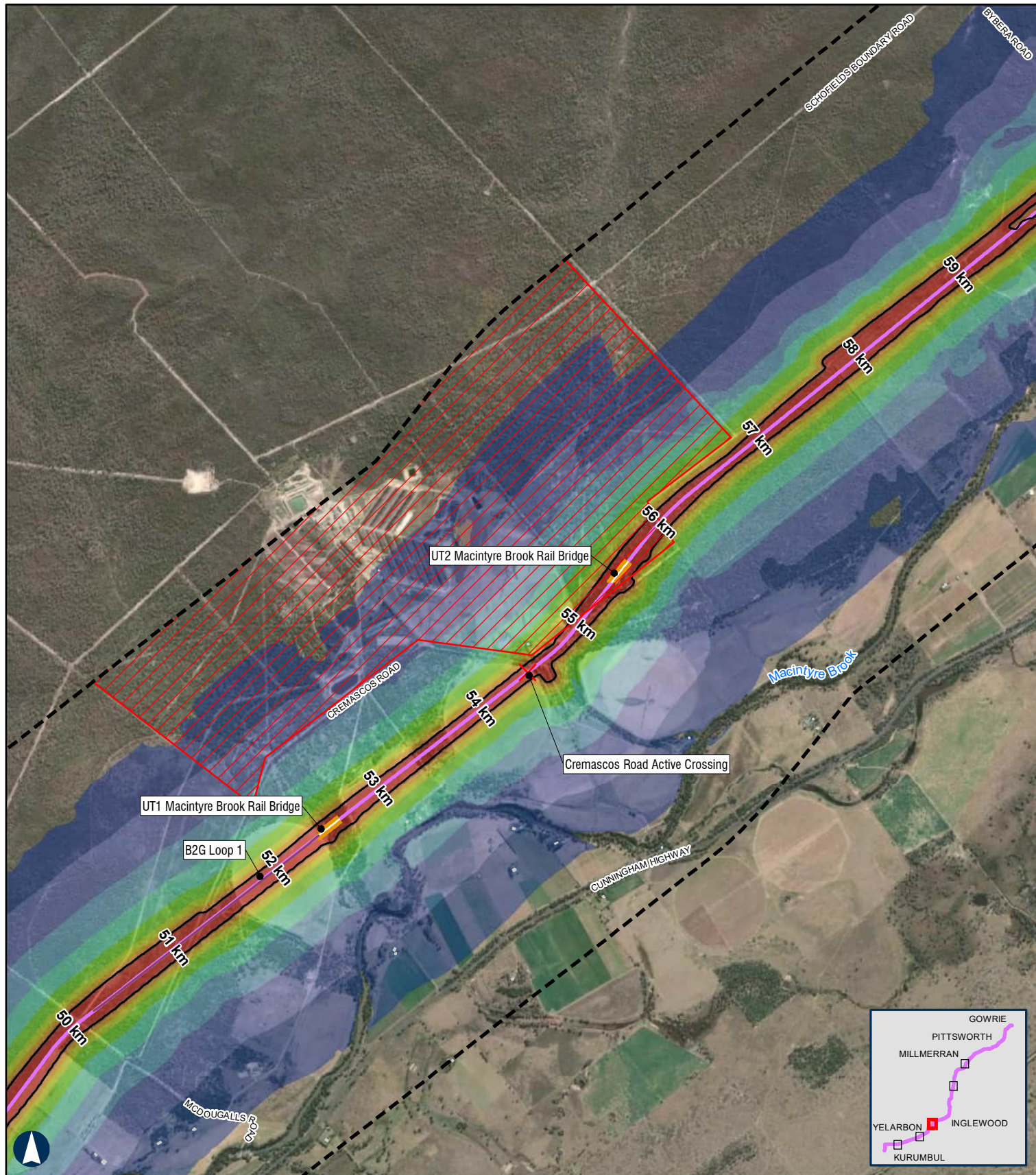
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Construction Noise (Earthworks: cut and fill)

Figure K-1 Map 3 of 5

1000 m

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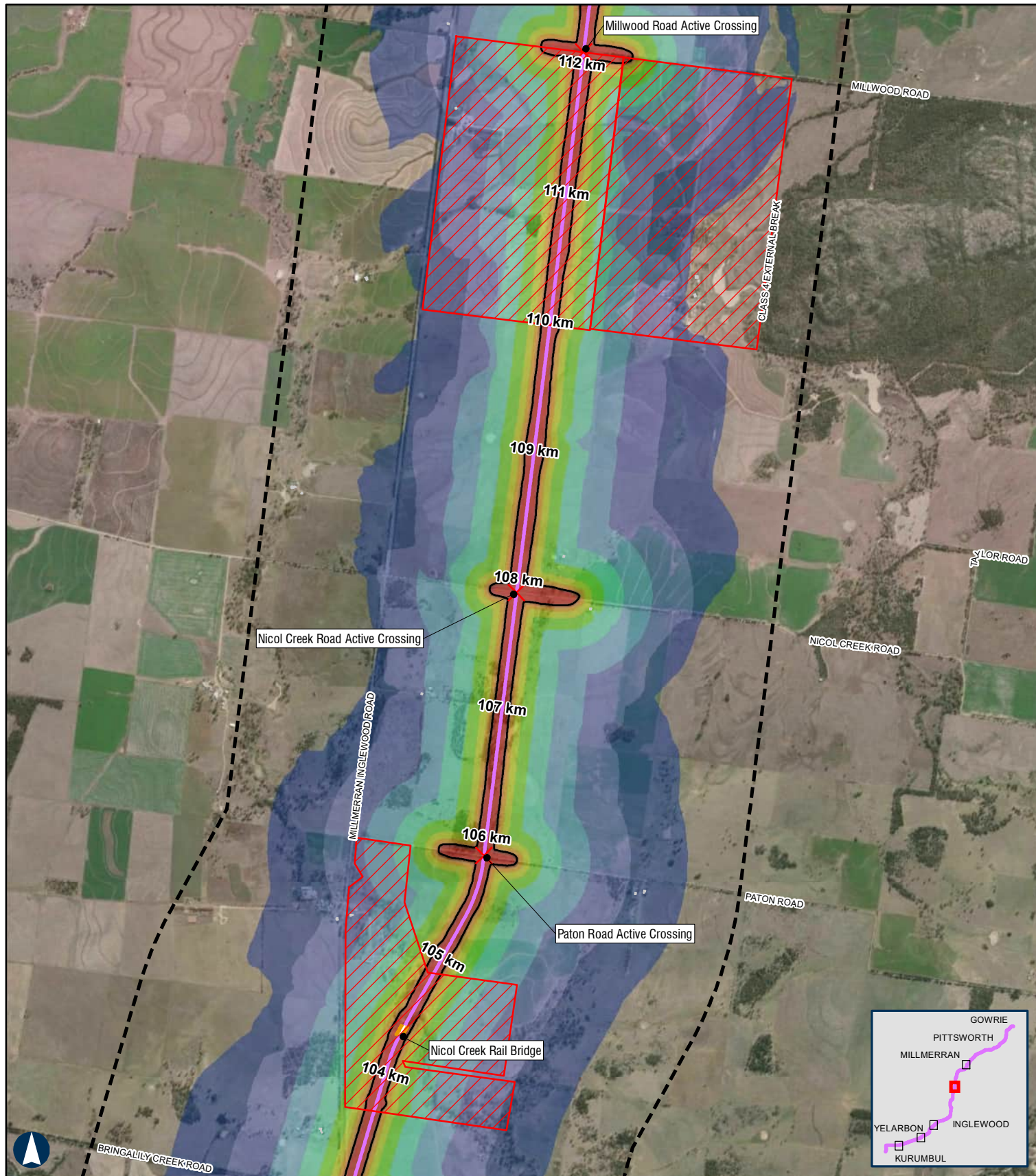
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Construction Noise (Earthworks: cut and fill)

Figure K-1 Map 4 of 5

1000 m

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Author: JG

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- ✗ Level Crossings
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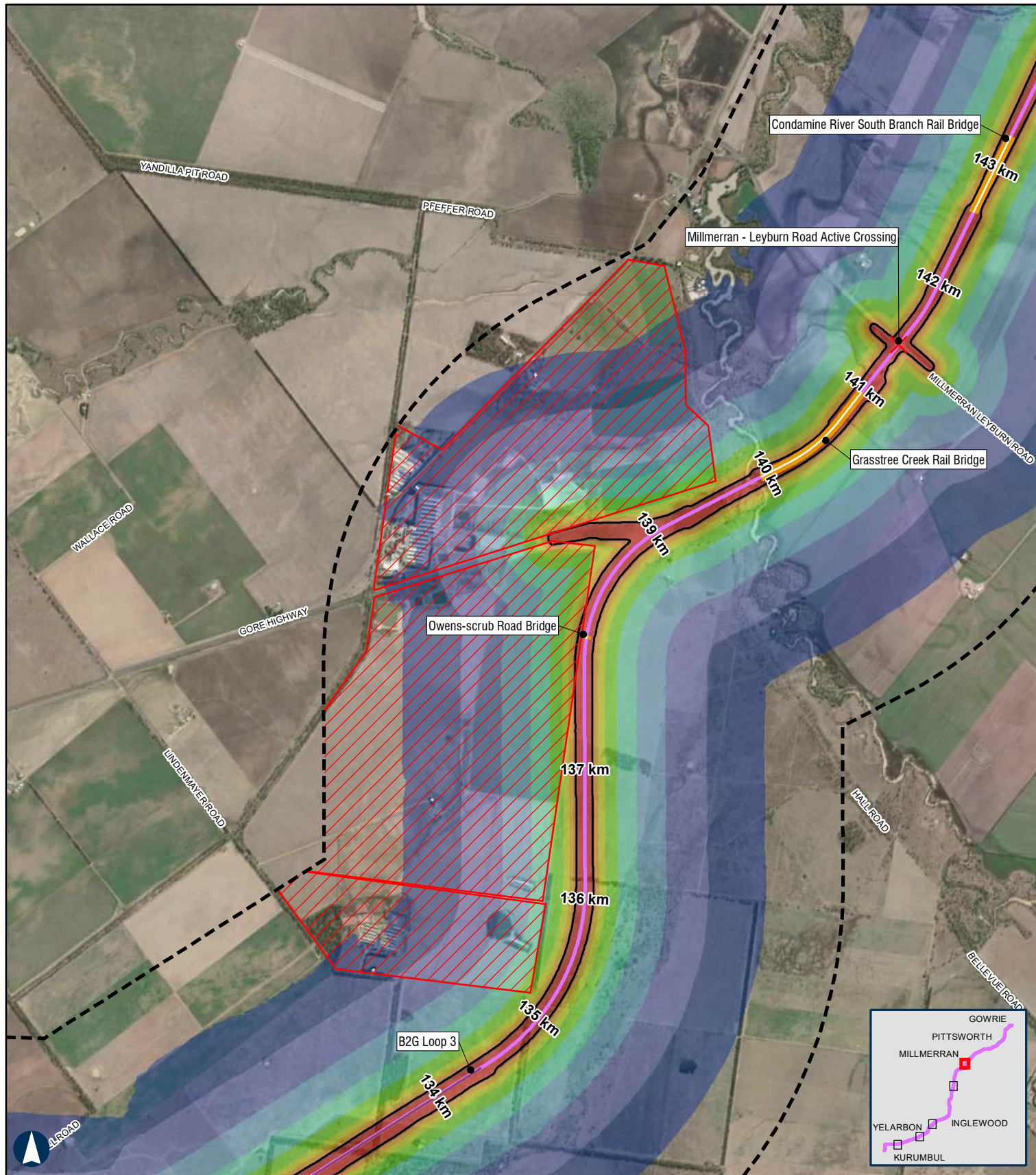
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Construction Noise (Earthworks: cut and fill)

Figure K-1 Map 5 of 5

1000 m

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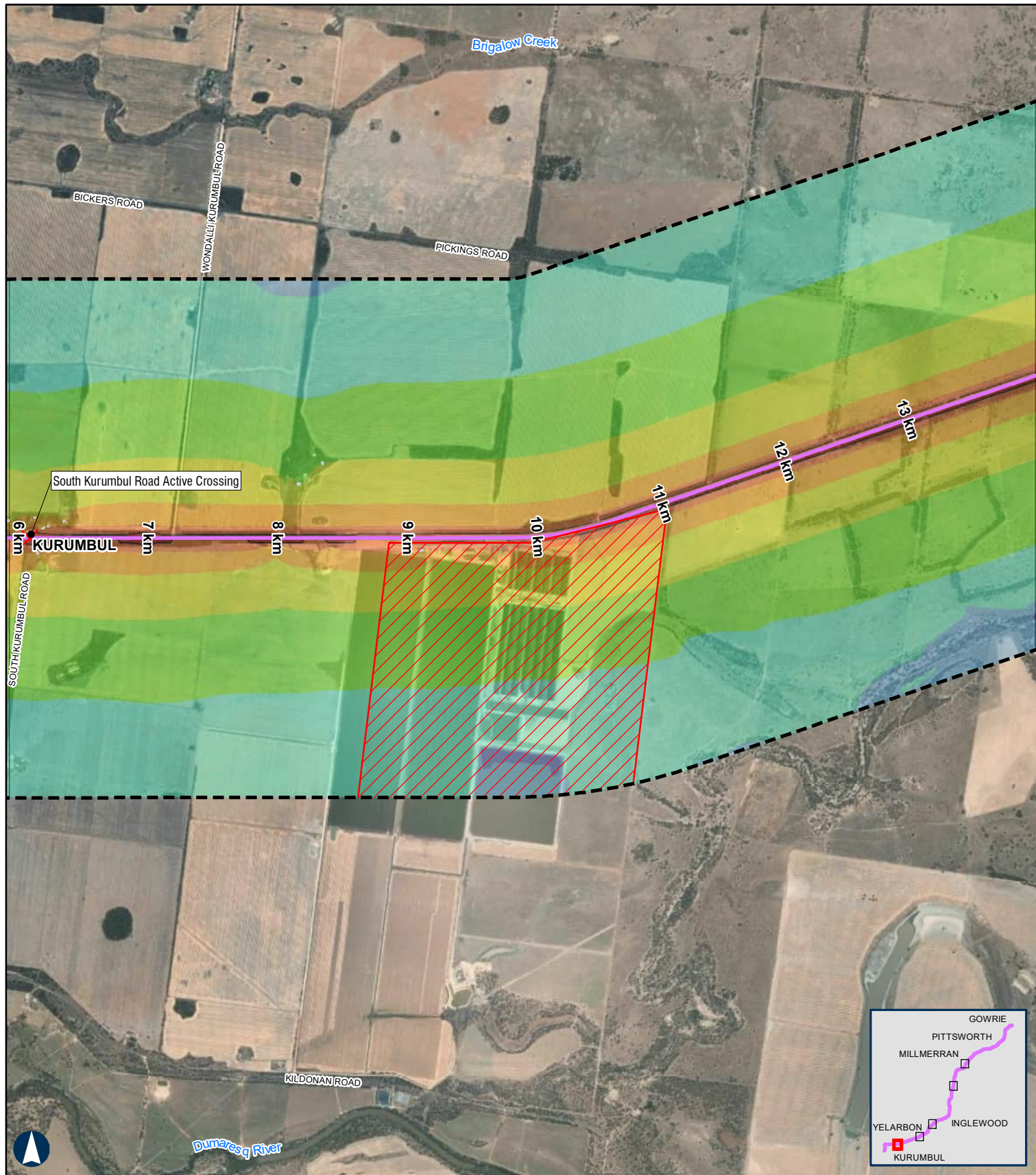
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Railway Noise

Figure K-2 Map 1 of 5

1000 m

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- Study Area
- Livestock Area
- Sensitive Receptor

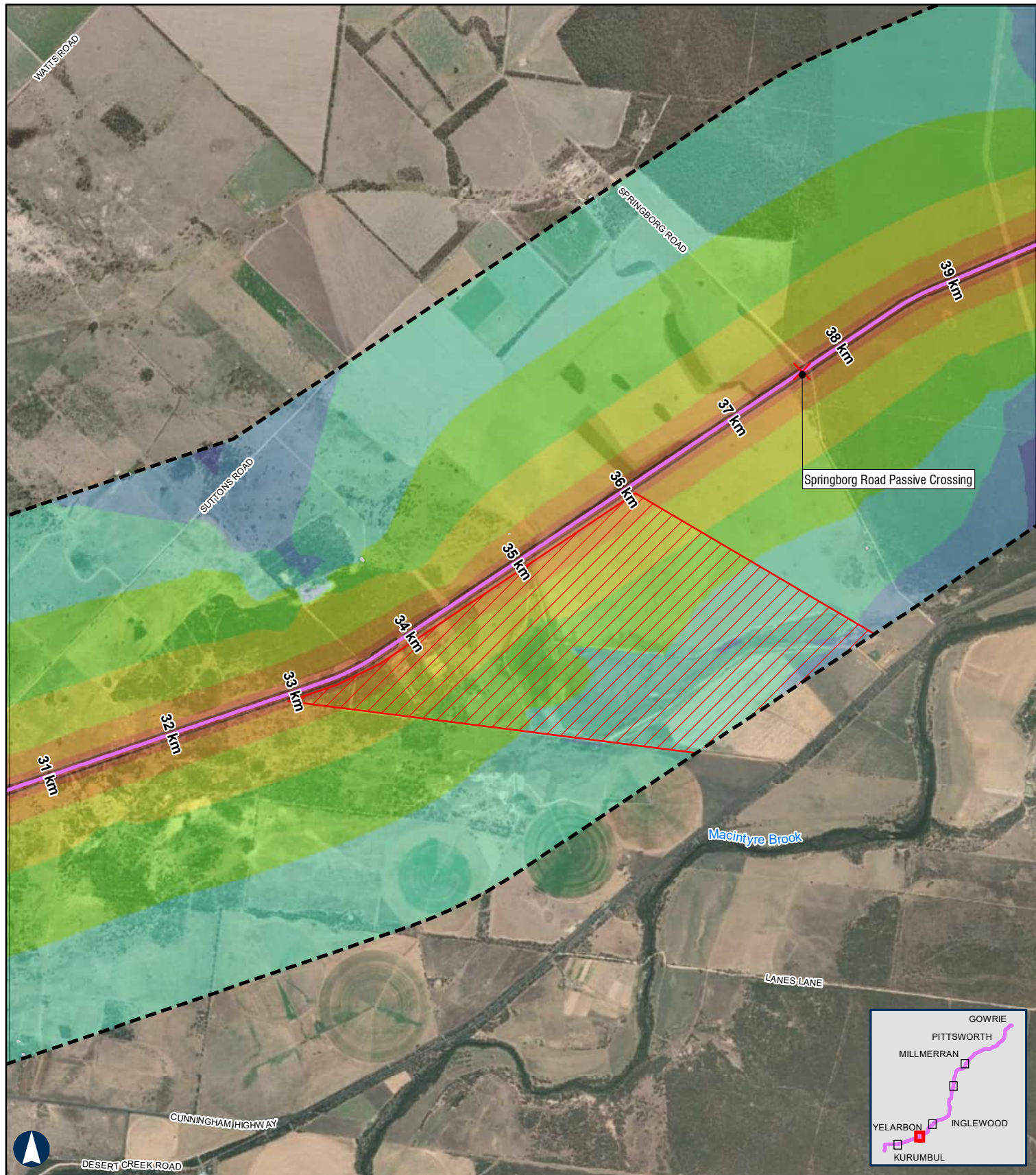
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Railway Noise

Figure K-2 Map 2 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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- Study Area
- ▨ Livestock Area
- Sensitive Receptor

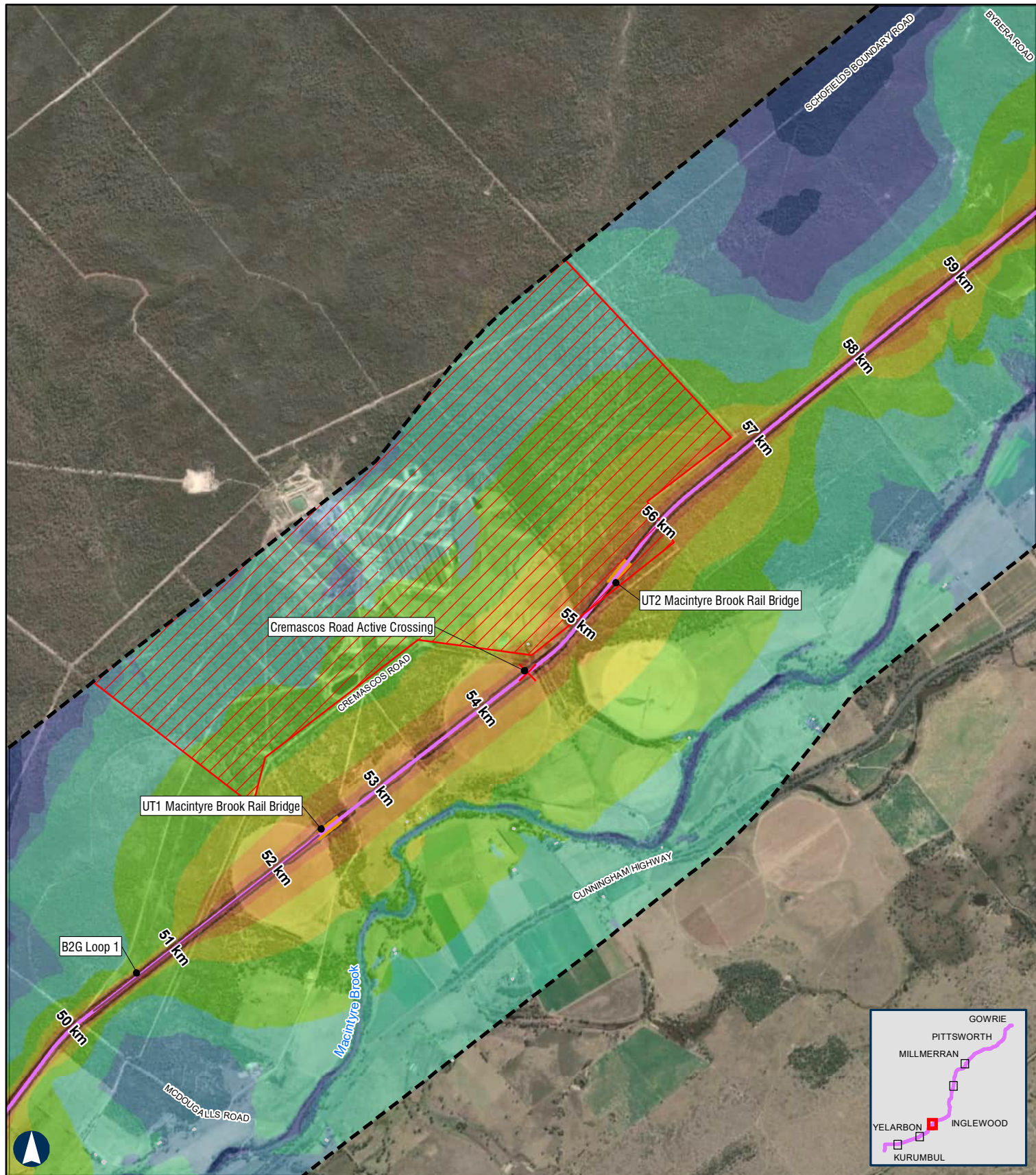
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Railway Noise

Figure K-2 Map 3 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Study Area
- Livestock Area
- Sensitive Receptor

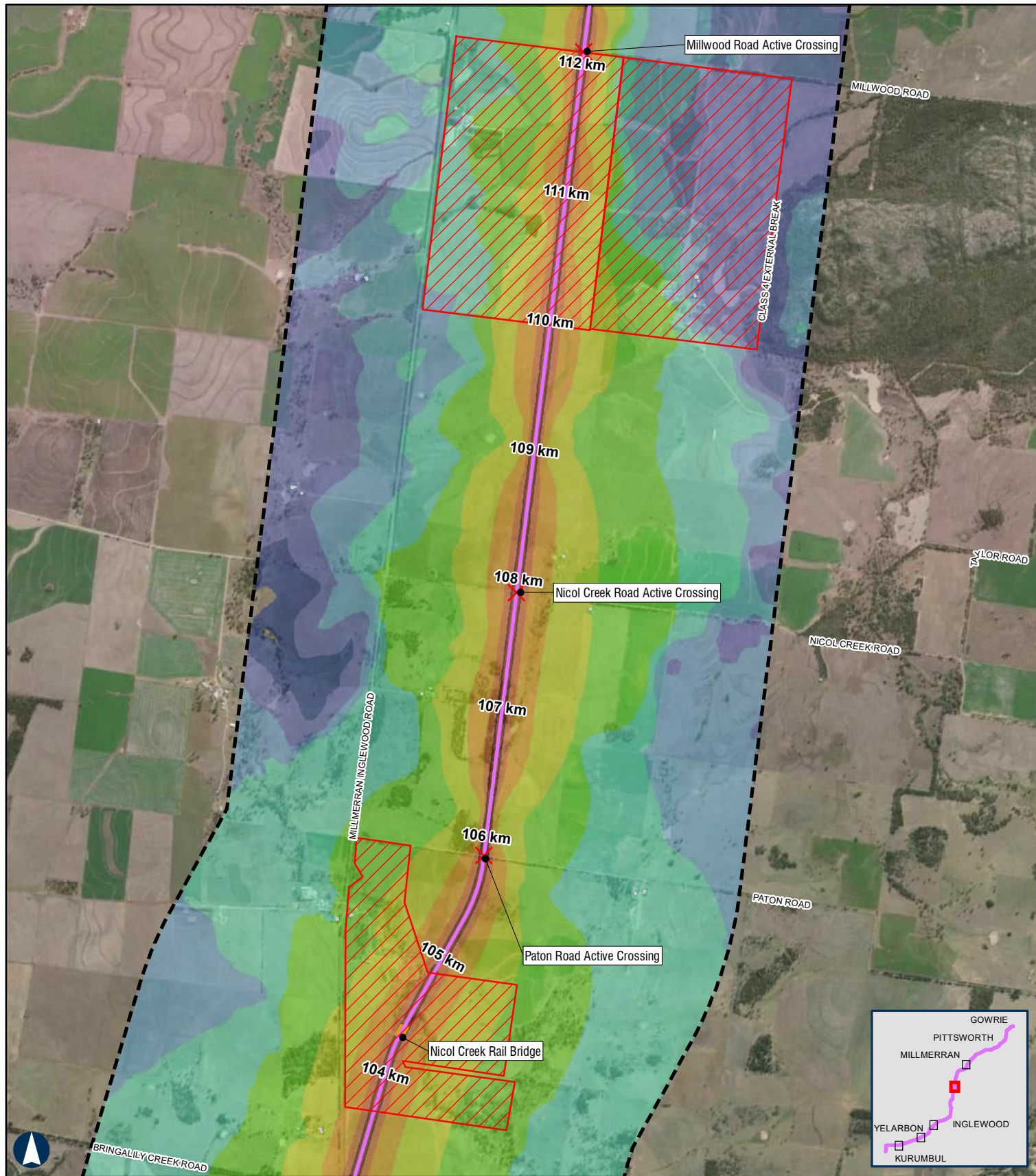
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

ARTC **InlandRail**

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BORDER TO GOWRIE

Intensive Animal Operations – Railway Noise

Figure K-2 Map 4 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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Author: JG

Scale: 1:40,000

- ✗ Level Crossings
- Rail Alignment/ Centreline
- Crossing Loops
- Bridges and Viaducts
- Study Area
- ▨ Livestock Area
- Sensitive Receptor

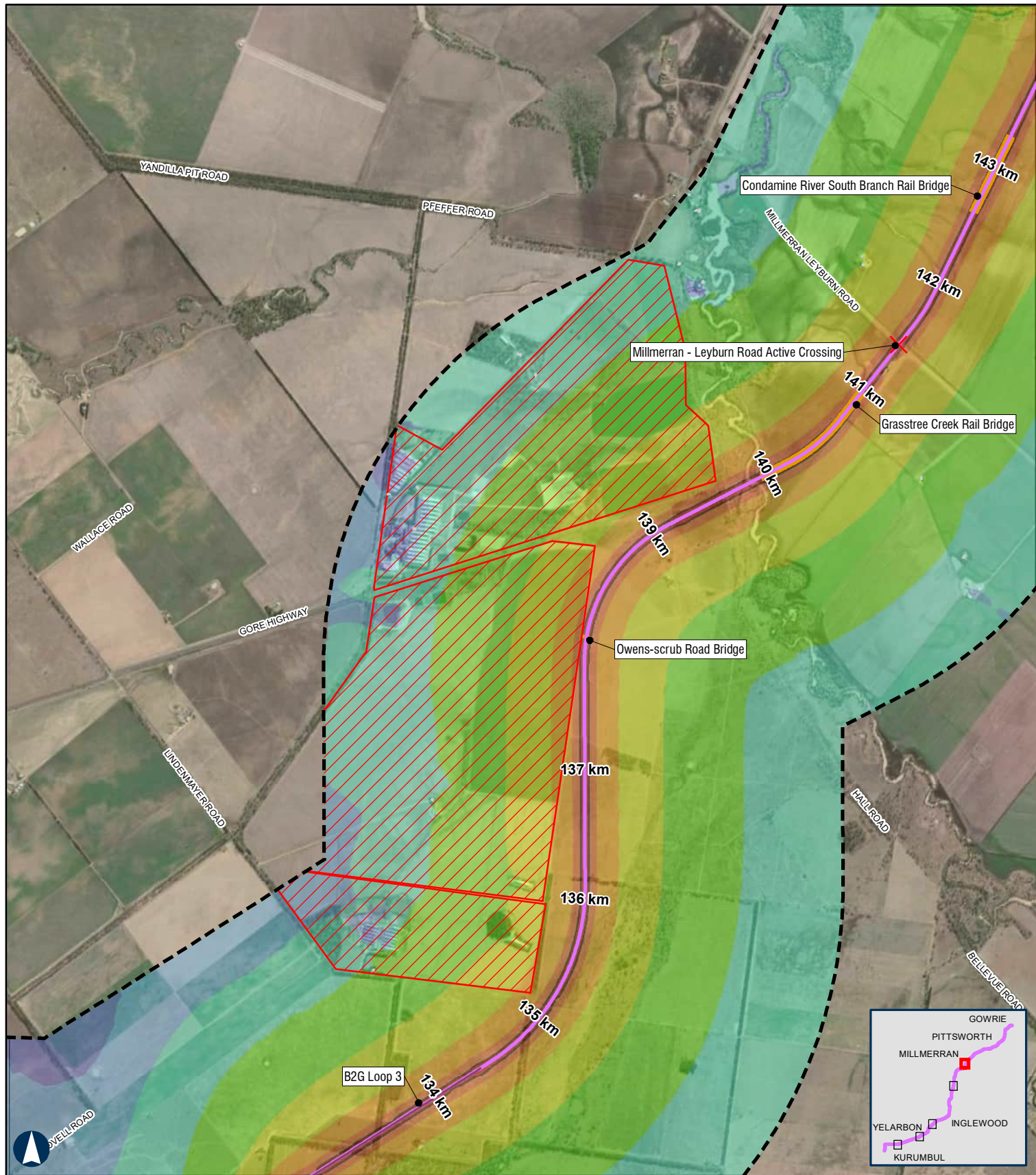
Noise contours are façade-corrected and at a height of 1.8m above ground level

Noise Levels (Lmax)

- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA
- 70 - 75 dBA
- 75 - 80 dBA
- 80 - 85 dBA
- 85 - 90 dBA
- >90 dBA

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BORDER TO GOWRIE

Intensive Animal Operations – Railway Noise

Figure K-2 Map 5 of 5

1000 m

Coordinate System: GDA 1994 MGA Zone 56

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