Bulloo Interlink Pipeline

Environmental Authority

Noise and Vibration Impact Assessment

APA Bulloo Interlink Pipeline Pty Ltd

June 2026



Contents

Executive summary iv

Acronyms and abbreviations vi

Glossary viii

1. Introduction 1

1.1 Project overview 1

1.2 Purpose and scope of this document 3

1.3 Report structure and content 3

1.4 Limitations 3

2. Legislative Policy and Context 4

3. Methodology 6

3.1 Study area 6

3.2 Construction outline 6

3.3 Operation works and maintenance 12

3.4 Construction and operational noise 12

3.5 Construction vibration 15

3.6 Blasting assessment 19

3.7 Road traffic noise 21

4. Existing environment 25

4.1 Sensitive receptors 25

4.2 Existing noise environment 27

5. Construction impacts 28

5.1 Construction noise 28

5.2 Construction vibration 33

5.3 Construction road traffic noise 34

5.4 Blasting 34

6. Operation impacts 36

7. Cumulative impacts 37

8. Decommissioning impacts 38

9. Recommended mitigation and management measures 39

9.1 Approach to mitigation 39

9.2 Recommended mitigation measures 40

10. Conclusion 42

11. References 43

Table index

Table 1.1	Structure and content	3
Table 2.1	Relevant noise and vibration legislation	4
Table 2.2	Relevant noise and vibration policies and guidelines	4
Table 3.1	Construction equipment sound power levels	9
Table 3.2	Adjustments to be added to noise levels at sensitive receptors (ESR/2016/1989)	10
Table 3.3	Modelled construction scenarios	10
Table 3.4	Noise intensity of transient pipeline construction works	11
Table 3.5	Specified activities that may be undertaken outside project working hours	12
Table 3.6	ESR/2016/1935 noise criteria at dwellings	13
Table 3.7	Adopted noise criteria at sensitive receptors	14
Table 3.8	Noise model inputs and assumptions	15
Table 3.9	Acceptable VDV for human comfort (BS6472-1:2008)	16
Table 3.10	Guidance on effect of vibration levels for human comfort (BS 5228-2:2009)	16
Table 3.11	Transient vibration guide values – minimal risk of building damage (BS7385-2:1993)	16
Table 3.12	Guideline values for short-term vibration on structures (DIN 4150-3:2016)	17
Table 3.13	Vibration guide values for underground services – BS 5228	17
Table 3.14	Guideline values for vibration on buried pipework – DIN 4150-3	17
Table 3.15	Representative vibration generating equipment	18
Table 3.16	Typical vibration levels at distances	18
Table 3.17	Safe buffer distances to comply with the adopted vibration criteria	19
Table 3.18	Airblast overpressure variables	20
Table 3.19	Ground vibration variables	20
Table 3.20	Road traffic noise screening levels	21
Table 3.21	Existing traffic volumes along nominated haulage roads	21
Table 3.22	Estimated construction traffic generation by activity	22
Table 3.23	Construction traffic generation by project road	23
Table 4.1	Sensitive receptors	25
Table 4.2	Minimum background noise levels for isolated rural areas	27
Table 5.1	Summarised transient construction noise levels above the noise criteria at residential receptors	29
Table 5.2	Predicted transient construction noise levels at non-residential receptors	29
Table 5.3	Summarised stationary construction noise levels above the noise criteria at residential receptors	31
Table 5.4	Predicted stationary construction noise levels at non-residential receptors	31
Table 5.5	Construction road traffic noise levels	34
Table 9.1	Noise and vibration mitigation measures	40
Table 9.2	Best practice mitigation and management options	41

Figure index

Figure 1.1	Project location and key features	2
Figure 3.1	Study area	7
Figure 3.2	Noise level comparisons	14
Figure 4.1	Sensitive receptors	26
Figure 5.1	Predicted sound pressure level over distance for hydrostatic testing activities	32
Figure 5.2	Predicted airblast overpressure over distance with varying MICs	35
Figure 5.3	Predicted ground vibration at distances with varying MICs	35

Appendices

Appendix A	Construction scenarios equipment
Appendix B	Predicted construction noise levels

Executive summary

The project

APA Bulloo Interlink Pipeline Pty Ltd (APA), which is part of the APA group of companies (the APA Group), is planning to develop the Bulloo Interlink Pipeline, an underground high-pressure gas pipeline linking the South West Queensland Pipeline in Queensland with the Moomba to Wilton Pipeline in New South Wales (NSW). The Queensland section of the Bulloo Interlink Pipeline (referred to as 'the project' for the purposes of this document) is about 236 kilometres (km) long. Overall, the pipeline has a total length of about 339 km and would provide a more direct route for natural gas to travel from Australia's northern production areas to southern gas markets.

This report

This report has been prepared by GHD Pty Ltd (GHD) as part of the Environmental Authority (EA) application for the project. The EA supports an application for approval of the project in accordance with the *Environmental Protection Act 1994* (Qld) (EP Act).

This report assesses the potential noise and vibration impacts of the project in accordance with the environmental assessment requirements of the following:

– Environmental Protection (Noise) Policy 2019
– *Application Requirements for Petroleum Activities guideline* (DESI, 2024)
– *Prescribing noise conditions for environmental authorities for petroleum activities* (DETSI, 2025)
– *Streamlined model conditions for petroleum activities* (DESI, 2024).

Existing environment

The study area for the assessment is an isolated rural environment with a very low population density and relatively few sensitive receptors. A total of 13 sensitive receptors have been identified within a 5 km buffer of the project site, with most located more than 2 km from the pipeline alignment. The receptors include residences, temporary accommodation (the Noccundra Hotel) and commercial premises, predominantly in the vicinity of the Noccundra township. Additionally, parks and gardens (outdoor recreational areas) were identified within the study area.

The existing noise environment is very quiet, with no major noise sources present in the area. The minimum background noise levels for isolated rural areas set by the *Prescribing noise conditions for environmental authorities for petroleum activities* (DETSI, 2025) have been adopted conservatively for the purpose of the assessment.

Impacts from the project during construction

Construction noise and vibration impacts would arise from a combination of transient works progressing along the construction right of way, such as clearing, trenching and backfilling, and a number of stationary activities at specific locations, including crossings, hydrostatic testing and construction facilities.

The assessment indicates that construction noise may exceed relevant noise criteria at a limited number of nearby residential receptors during some activities, particularly for early morning, daytime and occasional out-of-hours works. However, these impacts would generally be short-term and localised, with transient works moving progressively along the alignment and noise above criteria at any one receptor typically limited to one to two days for a given activity.

Most stationary activities are predicted to comply with the applicable criteria, with the exception of some works close to residential receptors and hydrostatic testing depressurisation, which has the potential to generate higher noise levels over greater distances but can be planned and managed to avoid unreasonable disturbance. Predicted construction noise levels are below the applicable criteria at non-residential receptors, and construction traffic is not expected to result in road traffic noise impacts.

Construction vibration is not expected to cause structural damage, as no structures are located within the relevant safe-working distances. One receptor is located within the human comfort safe-working distance for potential compaction works associated with access track upgrades, and mitigation measures would be implemented if required.

If blasting is required, it would be managed through site-specific blast design and controls to minimise potential impacts, with no receptors located within the ground vibration buffer distances.

Overall, construction noise and vibration impacts are expected to be temporary, localised and able to be effectively managed through standard mitigation and consultation measures.

Impacts from the project during operation

No noise impacts during operation (including maintenance) are expected. Routine inspections, maintenance and pipeline cleaning from the existing Meadows scraper station would be scheduled during the day period as defined in the *Environmental Protection (Noise) Policy 2019*.

Impacts from the project during decommissioning

All decommissioning activities are expected to be of short duration at any given location (typically less than one week) and would be less intensive than construction activities. Measures to manage potential noise and vibration generating activities during decommissioning would be defined in the decommissioning environmental management plan, which would include a noise and vibration subplan adapted from the construction noise and vibration management plan.

Recommended mitigation measures

To address the key noise and vibration impacts identified during the assessment, a targeted suite of mitigation measures will be implemented. These include a preparation and implementation of a construction noise and vibration management plan (CNVMP), including controls and requirements for out-of-hours work.

Sensitive receptors will be notified in advance of potentially disruptive activities and where noise levels are above the noise criteria alternative arrangements will be established to manage environmental nuisance.

Additional measures will address specific risks such as potential blasting. This includes a blasting management plan to confirm compliance with the *Streamlined model conditions for petroleum activities* (DESI, 2024) airblast overpressure and ground vibration maximum levels.

Collectively, these measures are designed to minimise disruption to nearby communities while allowing the project to proceed efficiently and responsibly.

Conclusion

While some temporary noise impacts are predicted during construction, particularly during non-standard working hours and at locations close to the CRoW or access tracks and roads which require upgrades or maintenance, these are considered manageable with the proposed mitigation measures. Potential construction impacts would be short in duration and limited in extent. No significant operational or decommissioning noise impacts are expected. With the implementation of the CNVMP and associated controls, the project's noise and vibration impacts are expected to remain within acceptable limits.

Acronyms and abbreviations

Abbreviation/term	Definition
AADT	Annual Average Daily Traffic
APA	APA Bulloo Interlink Pipeline Pty Ltd (APA), which is part of the APA group of companies (the APA Group)
APGA	Australian Pipelines and Gas Association
AQO	Acoustic Quality Objective
AS	Australian Standard
AS 2187.2:2006	*AS 2187.2:2006: Explosives - Storage and use - Part 2: Use of explosives* (Standards Australia, 2006)
BS	British Standard
BS 5228-2:2009	*BS 5228-2:2009: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (British Standards Institute, 2009)
BS 6472-1:2008	*BS 6472-1:2008: Guide to evaluation of human exposure to vibration in buildings* (British Standards Institute, 2008)
CEMP	Construction environmental management plan
CNVG	*Construction Noise and Vibration Guideline (Roads)* (Transport for NSW, 2026)
CNVMP	Construction noise and vibration management plan
CoP Vol 1	*Code of Practice Volume 1 – Road Traffic Noise* (TMR, 2013)
CoRTN	*Calculation of Road Traffic Noise* (Department of Transport, Welsh Office, 1988)
CRoW	Construction right of way
DECCW	Department of Environment, Climate Change and Water (NSW) (former)
DES	Department of Environment and Science (QLD) (former)
DES Guideline	*Noise and vibration from blasting guideline* (DES, 2022)
DESI	Department of Environment, Science and Innovation (QLD) (former)
DETSI	Department of the Environment, Tourism, Science and Innovation (QLD)
DIN	Deutsches Institut für Normung e.V. (the German Institute for Standardisation)
DIN 4150-3	*DIN 4150-3:2016 Vibrations in buildings – Part 3: Effects on structures* (Deutsches Institut für Normung, 2016)
DTMR	Department of Transport and Main Roads (QLD)
EA	Environmental Authority
EIS	Environmental impact statement
EP Act	*Environmental Protection Act 1994* (Qld)
EPP (Noise)	*Environmental Protection (Noise) Policy 2019*
ESR/2016/1935	*Prescribing noise conditions for environmental authorities for petroleum activities* (DETSI, 2025)
ESR/2016/1989	*Streamlined model conditions for petroleum activities* (DESI, 2024)
ESR/2016/2357	*Application requirements for petroleum activities* (DESI, 2024)
GHD	GHD Pty Ltd
HDD	Horizontal Directional Drilling
Hertz	Used to measure frequency, or cycles per second
HV	Heavy vehicles
ISO	International Organization for Standardization

Abbreviation/term	Definition
kg	kilograms
K_g	Site specific constant. A measure used in predicting ground vibration levels
km	kilometres
LGA	Local Government Area
km/h	kilometres per hour
LV	Light vehicles
m	metres
mm/s	millimetre per second
MIC	Maximum instantaneous charge
NPfI	*Noise Policy for Industry* (EPA, 2017)
NSW	New South Wales
PPV	Peak particle velocity
RBL	Rating background level
RNP	*NSW Road Noise Policy* (DECCW, 2011)
SWL	Used to abbreviate the sound power level
TIA	Traffic Impact Assessment
VDV	Vibration dose value

Glossary

Term	Definition
A weighting	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
Acoustic quality objective (AQO)	For a sensitive receptor, means the maximum level of noise that should be experienced in the acoustic environment of the sensitive receptor.
Alignment	The centreline of the construction right of way.
Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the L_{90} descriptor.
Background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90% of the measurement time period T of not less than 15 minutes (or $L_{A90,adj,15\ mins}$), using Fast response.
Construction right of way (CRoW)	The area that would be directly disturbed to construct the pipeline within the study area (includes the trench, temporary storage areas and construction manoeuvring areas). The nominal corridor width is up to 40 m.
Daytime	Means the period after 7am on a day to 6pm on the day.
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics.
dBA	Decibel expressed with the frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at low and high frequencies.
dBZ	The dBZ value is the unweighted sound pressure level.
Environmental nuisance	Environmental nuisance has the meaning in section 15 of the *Environmental Protection Act 1994* and means unreasonable interference or likely interference with an environmental value caused by: (a) aerosols, fumes, light, noise, odour, particles or smoke; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.
Evening	Means the period after 6pm on a day to 10pm on the day.
Hertz	Used to measure frequency, or cycles per second.
$L_{A90,\ period}$	Means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.
$L_{Aeq,\ period}$	Means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.
L_{Amax}	The absolute maximum noise level in a noise sample.
Long-term noise event	Means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
Low frequency	Noise containing major components in the low-frequency range (10 hertz [Hz] to 160 Hz) of the frequency spectrum.
Max $L_{pA,15min}$	Means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
Maximum noise event	The loudest event or events within a given period of time. This is generally described using the L_{max} descriptor.
Medium-term noise event	Means a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.

Term	Definition
Meteorological conditions (adverse)	Wind and temperature inversion conditions.
Most-affected location	Location(s) that experience (or would likely experience) the greatest noise impact from the construction works under consideration. In determining these locations, existing background noise levels, noise source location(s), distance and any shielding between the construction works (or proposed works) and the residences and other sensitive land uses need to be considered.
Night-time	means the period after 10pm on a day to 7am on the next day.
Pipeline alignment	The pipeline centreline.
Peak particle velocity (PPV)	The maximum vector sum of three orthogonal time-synchronized velocity components regardless of whether these component maxima occurred simultaneously.
Project	The project includes constructing, operating (including maintaining) and decommissioning approximately 236 km of underground natural gas transmission pipeline located in Queensland, and associated above ground infrastructure to connect to the South West Queensland Pipeline.
Project site	The term project site is used to refer to the land required to construct, operate (including maintain) and decommission the project, and defines the extent of land subject to project approval. The project site comprises the 40 metre wide construction right of way, within which the permanent 30 m easement and surface operational facilities would be located. It also includes additional land required outside the construction right of way for temporary and ancillary facilities, including construction compounds, temporary workspaces, temporary accommodation facilities, access track works, and land required to support the project's water servicing strategy.
Residence	Includes a building, or part of building, capable of being used as a dwelling.
Sensitive receptor	Means an area or place where noise is measured in accordance with the EPP (Noise) and includes.
Sensitive place	Means: – a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel) – a library, childcare centre, kindergarten, school, university or other educational institution – a medical centre, surgery or hospital – a protected area – a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment – a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees' accommodation or public roads.
Short-term noise event	Means a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
Study area	For the purpose of the noise and vibration assessment the study area has been defined as a five-kilometre buffer around the project site.
Temperature inversion	An atmospheric condition in which temperature increases with height above the ground.
Tonal noise	Tonal noise contains one or more prominent tones (i.e. distinct frequency components) and is normally regarded as more offensive than 'broad band' noise.
Vibration dose value (VDV)	As defined in BS 6472-1:2008, VDV is given by the fourth root of the integral of the fourth power of the frequency weighted acceleration.
vi(t)	Term vi refers to vibration levels in any of the x, y or z axes.

1. Introduction

1.1 Project overview

APA Bulloo Interlink Pipeline Pty Ltd (APA), which is part of the APA group of companies (the APA Group) is planning to develop the Bulloo Interlink Pipeline, an underground high-pressure gas pipeline that will link the South West Queensland Pipeline in Queensland with the Moomba to Wilton Pipeline in New South Wales (NSW).

The Bulloo Interlink Pipeline includes an approximately 236-kilometre (km) long section in Queensland, which will provide a more direct route for natural gas to travel from Australia's northern production areas to southern gas markets. The pipeline has a total length of approximately 339 km, comprising about 103 km in NSW.

The section of the Bulloo Interlink Pipeline located in Queensland (referred to as 'the project' for the purposes of this document) will require an environmental authority (EA) under the *Environmental Protection Act 1994* (Qld) (EP Act). Approval for the NSW section of the Bulloo Interlink Pipeline will be sought under a separate approval process in accordance with NSW legislation and approval requirements.

1.1.1 Location

The project is located within the Bulloo Shire local government area in the vicinity of the Noccundra township within the traditional Country of the Wangkumarra People and Kullilli People. The project site extends south from the tie-in point with the South West Queensland Pipeline for about 186 km, then traverses south-west for about 30 km, and south about 20 km to the Queensland–NSW border. The project location and key project features are shown in Figure 1.1.

1.1.2 Key project features

The project will be designed, constructed and operated in accordance with the *AS 2885 Pipelines – Gas and Liquid Petroleum* series of standards (AS 2885) and the Australian Pipelines and Gas Association (APGA) *Code of Environmental Practice – Onshore Pipelines* (APGA Code of Environmental Practice) (APGA, 2022).

The key operational features of the project include:

– an underground high pressure, steel gas transmission pipeline with a length of about 236 km
– a permanent easement of up to 30 metres (m)
– supporting surface infrastructure, including:
    - beginning of line facility, including a connection to the South West Queensland Pipeline
    - temperature control station, including main line valve
    - cathodic protection units
    - main line valve
    - pipeline marker signs
    - permanent access tracks.

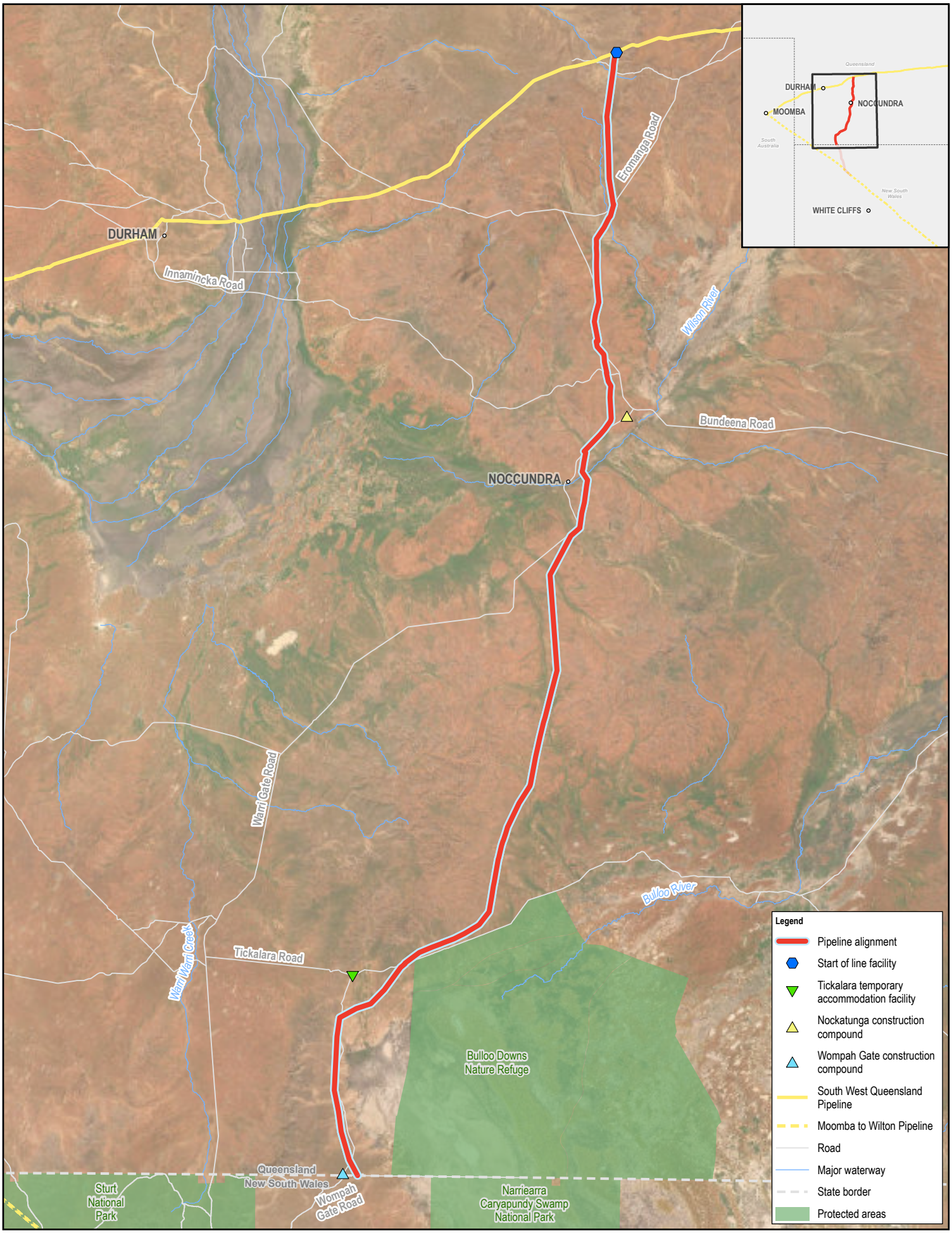
An approximately 40 m wide CRoW will be established to facilitate construction and access.

Key ancillary facilities and infrastructure outside the CRoW would include:

– a temporary accommodation facility located at the intersection of Wompah Gate Road and Tickalara Road
– a construction compound facility to stockpile line pipe located on Wompah Gate Road near the southern end of the project site.

Smaller temporary workspaces are also proposed at regular intervals along the CRoW to support construction activities.

Further information on the project's features and indicative construction methodology is provided in Chapter 4 (Project description) of the Environmental Authority Supporting Information Report.



Paper Size ISO A4

0 4.5 9 13.5 18

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Project No. **12661648**
Revision No. **0**
Date **15/06/2026**

Project location and key features

Figure 1.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_OBIL_1.aprx - BIL_KeyFeatures_QLD_1pg_A4P / Print date: 15 Jun 2026 - 10:00

Data source: Earthstar Geographics, Esri, CGIARDNRMMRRD: Roads, Watercourse (2023), LGA (2025); GA: State border (2006). APA: Pipeline alignments, infrastructure, pipe stockpiles, camps (2026). NPWS: Estates (2026). Created by: acjackson

1.2 Purpose and scope of this document

This report assesses the potential noise and vibration impacts of the project in accordance with the environmental assessment requirements of the *Application Requirements for Petroleum Activities guideline* (DESI, 2024). This report:

– describes the existing environment with respect to noise and vibration
– identifying sources of noise and vibration associated with the project
– establish acoustic quality objectives for the assessment
– assesses the impacts of constructing, operating and decommissioning the project in relation to noise and vibration
– recommends measures to mitigate and manage the impacts identified.

1.3 Report structure and content

The structure and content of this report are outlined in Table 1.1.

Table 1.1 Structure and content

Section	Description
Section 1 – Introduction	Outlines the key elements of the project, relevant requirements, and the purpose of this report (this section).
Section 2 – Legislative Policy and Context	Summarises the key legislative requirements and guidelines relevant to noise and vibration.
Section 3 – Methodology	Describes the study area and methodology for the assessment.
Section 4 – Existing environment	Describes the existing environmental values of the study area and project site relevant to noise and vibration.
Section 5 – Construction impacts	Examines the potential for noise and vibration impacts during construction.
Section 6 – Operation impacts	Examines the potential for noise impacts during operation (which includes maintenance).
Section 7 – Cumulative impacts	Provides an assessment of cumulative impacts.
Section 8 – Decommissioning impacts	Examines the potential for noise and vibration impacts during decommissioning.
Section 9 – Recommended mitigation and management measures	Recommends measures to mitigate and manage the potential impacts identified.
Section 10 – Conclusion	Provides the key findings of the assessment.

1.4 Limitations

This report has been prepared by GHD for APA Bulloo Interlink Pipeline Pty Ltd and may only be used and relied on by APA Bulloo Interlink Pipeline Pty Ltd for the purpose agreed between GHD and APA Bulloo Interlink Pipeline Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than APA Bulloo Interlink Pipeline Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations and assumptions set out in this report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Legislative Policy and Context

Table 2.1 presents an overview of the key legislation and policy that forms the regulatory framework for noise management in Queensland. Further, an overview of relevant noise policies and guidelines which are used when undertaking noise impact assessments is presented in Table 2.2.

The EP Act and the *Environmental Protection (Noise) Policy 2019* (EPP (Noise)) regulate commercial and industrial noise affecting noise-sensitive areas in Queensland. Noise is classified as a contaminant, and noise nuisance as environmental harm, defined as unreasonable interference with acoustic values that materially affect property or personal comfort.

The EPP (Noise) protects Queensland's acoustic environment by identifying environmental values, setting acoustic quality objectives, and providing a framework for consistent decision-making aligned with ecologically sustainable development principles.

Under Section 6 of the EPP (Noise), the environmental values to be enhanced or protected include the qualities of the acoustic environment conducive to protecting ecosystem health and biodiversity, human health and wellbeing (including sleep, study, and recreation), and community amenity.

The *Prescribing noise conditions for environmental authorities for petroleum activities* (Department of Environment, Technology, Science and Innovation (DETSI), 2025) and *Streamlined model conditions petroleum activities* (DESI, 2024) provide guidance on noise conditions for petroleum activities.

Table 2.1 Relevant noise and vibration legislation

Legislation	Brief description
Environmental Protection Act 1994 (EP Act)	Establishes the general environmental duty and the requirement that activities must not cause environmental nuisance at sensitive places, except where alternative arrangements are in place.
Environmental Protection Regulation 2019 (EP Regulation)	Prescribes environmentally relevant activities and EA administration requirements.
Environmental Protection (Noise) Policy 2019 (EPP (Noise))	The EPP (Noise) identifies environmental values to be protected and provides a framework for making consistent, equitable and informed decisions about the acoustic environment. The policy sets acoustic quality objectives, addresses management of background noise creep and provides the management hierarchy of noise. The acoustic quality objectives are used to inform the noise targets during operation of the project.

Table 2.2 Relevant noise and vibration policies and guidelines

Policies and guideline	Brief description
Application requirements for petroleum activities guideline (Department of Environment, Science and Innovation (DESI), 2024) (referred to as ESR/2016/2357)	This guideline provides noise assessment requirements for petroleum activities and provides a high level framework which is expanded on in the *Prescribing noise conditions for environmental authorities for petroleum activities* (DETSI, 2025). The application requirements, management hierarchy and management practices provided in the guideline were adopted in this assessment.
Prescribing noise conditions for environmental authorities for petroleum activities (DETSI, 2025) (referred to as ESR/2016/1935)	This guideline is intended to assist in the assessment of noise impacts and the development of noise conditions for petroleum activities within the general framework provided by the EP Act. It provides the primary framework for assessing noise risk during construction, operation and decommissioning of petroleum activities EAs and background noise levels. The deemed background noise levels and noise criteria based on exposure duration from this guideline were adopted in this assessment.
Streamlined model conditions petroleum activities (DESI, 2024) (referred to as ESR/2016/1989)	Provides streamlined conditions for incorporation into an EA to regulate petroleum activities and achieve the objectives of the EP Act. These conditions reflect acceptable management approaches and constraints designed to protect environmental values.

Policies and guideline	Brief description
	Conditions relating to the protection of acoustic values are based on *Prescribing noise conditions for environmental authorities for petroleum activities* (DETSI, 2025) and provide additional conditions for adjustment factors and blasting. The streamlined model conditions from this guideline were adopted in this assessment were applicable.
Transport Noise Management Code of Practice: Volume 1 – Road Traffic Noise (CoP Vol 1) (DTMR, 2013)	The petroleum activity guidelines (ESR/2016/1935, ESR/2016/1989 and ESR/2016/2357) do not specify criteria for road traffic noise generated by the project. As such, this code of practice does not establish regulatory compliance criteria for petroleum activities. However, as road traffic noise can cause environmental nuisance, the methodology and criteria from this code of practice have been adopted to undertake a screening assessment for potential road traffic noise impacts.

3. Methodology

3.1 Study area

For the purpose of the assessment, the study area has been defined as a 5 km buffer around the project disturbance footprint including the CRoW, access tracks, temporary accommodation facilities and construction compounds and is shown in Figure 3.1. This buffer distance is considered sufficient to identify the potential for noise and vibration impacts on sensitive receptors such as residences.

The area is an isolated rural environment with a low population density and relatively few sensitive receptors (see section 4.1).

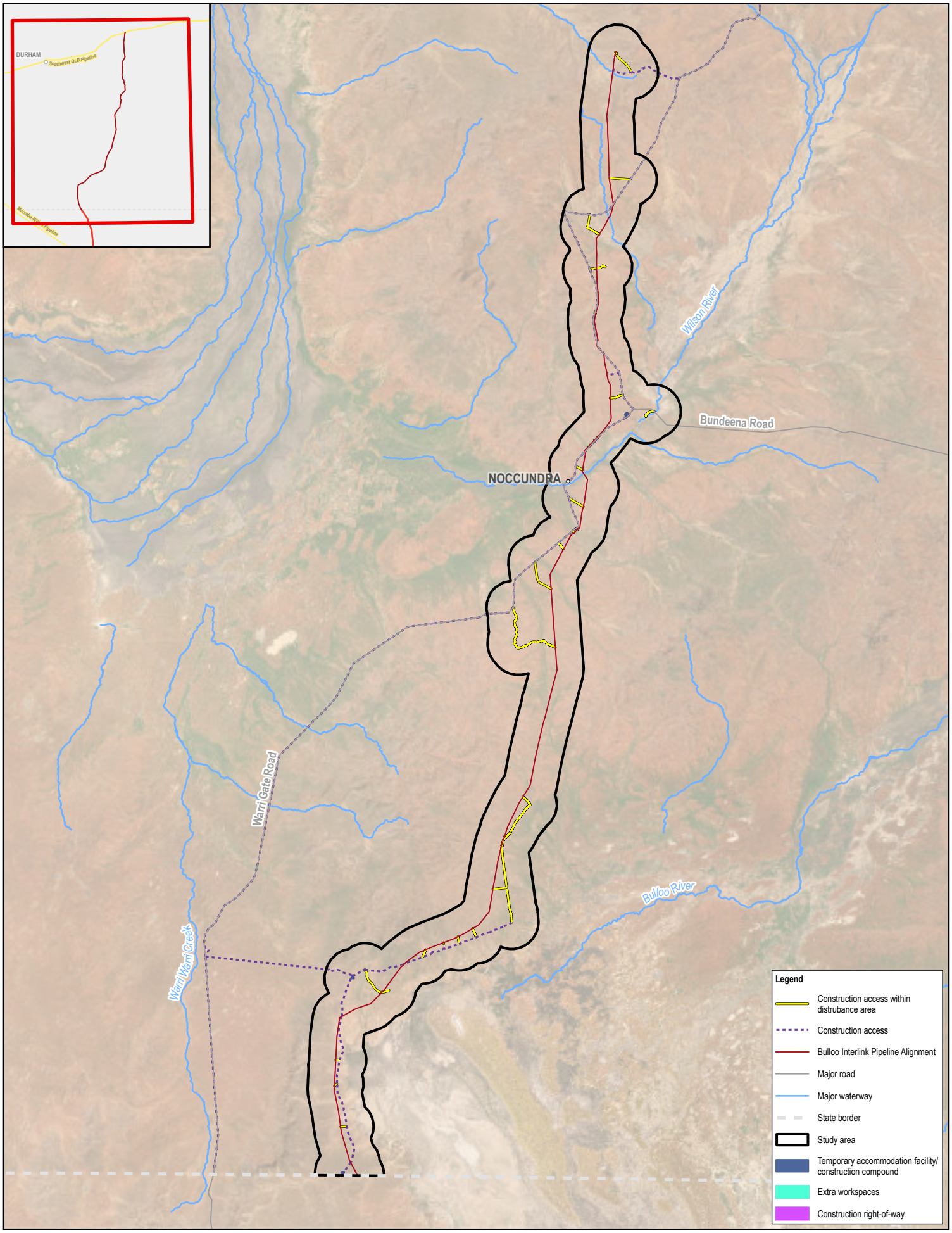
3.2 Construction outline

To assess the potential for environmental nuisance, this section outlines key aspects of the proposed approach to construction relevant to the noise and vibration assessment. Further detail on the assessment methodology for noise and vibration is provided in sections 3.4 to 3.7. A full description is provided in chapter 4 (Project description) of the Environmental Authority Supporting Information Report.

3.2.1 Construction work description

Pipeline construction involves a repetitive sequence of activities that are planned, scheduled and integrated to function as a continuous production process. The majority of the pipeline would be installed by open trenching. Trenchless construction methods (such as horizontal directional drilling (HDD)) would be used for nominated watercourse and infrastructure crossings as shown in Figure 3.1.

The daily trenching distance would vary depending on terrain, equipment used and weather conditions. Typically, about 2.5 km can be completed per day under favourable conditions. Construction activities would be executed sequentially, with each main activity (e.g. clearing, grading, trenching) commencing several days after the preceding one.



Paper Size ISO A4

0 4.5 9 13.5 18

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Study area

Figure 3.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:29

Data source: Earthstar Geographics, Esri, CGIARDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026), GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026), GHD: Study area (2026). Created by: acjackson

3.2.2 Construction equipment and scenarios

Construction equipment and sound power levels

Sound power levels (SWLs) used for modelling were derived from recognised industry references and comparable pipeline projects. These sources were selected to provide conservative inputs for modelling purposes in the absence of Queensland-specific construction noise databases for large-scale pipeline infrastructure.

Plant and equipment anticipated to be used are listed in Table 3.1 along with corresponding SWLs were sourced from the following:

– *AS 2436 – 2010 Guide to Noise and Vibration Control on Construction* (Australian Standard, 2010)
– *BS5228,2009 – A1:2014 Code of practice for noise and vibration control on construction and open sites* (British Standards, 1992)
– *Construction Noise and Vibration Guideline (Roads)* (Transport for NSW, 2026) (CNVG).

Where SWLs of equipment was not available in the above guidelines and standards, the following reports were used as reference:

– *Narrabri Lateral Pipeline – Environmental Impact Statement - Technical Report 5 – Noise and Vibration* (GHD, 2025)
– *Moomba to Wilton Pipeline – Modification 6 – Noise and Vibration Impact Assessment* (GHD, 2024).

Total SWL and L_{Amax} noise levels for each construction scenario have been established using the proposed construction equipment and are summarised in Table 3.1 and detailed in Appendix A.

All inputs have been selected conservatively to ensure predicted noise levels from construction equipment represent reasonable worst-case construction scenarios.

Adjustment factors

The ESR/2016/1989 notes that if noise at a sensitive receptor is tonal or impulsive, adjustments should be added to the predicted noise levels as it may cause greater annoyance. To account for these distinct noise characteristics, a +2 to +5 dB penalty can be applied to noise levels should construction activities of the project contain annoying characteristics. The adjustment factors for annoying noise characteristics provided by the ESR/2016/1989 are replicated in Table 3.2.

Rock hammering is known to emit impulsive noise characteristics with the potential to cause greater annoyance to sensitive receptors. Conservatively, a +5 dB penalty has been added to the sound power level of the excavator with rock hammer to account for the impulsive characteristics.

No other proposed construction equipment is considered to emit impulsive noise characteristics.

Construction scenarios

A scenario-based approach has been adopted that reflects the linear, transient nature of pipeline construction, while separately identifying stationary construction activities that may occur for longer durations at fixed locations.

Fifteen indicative construction scenarios, providing representative construction activity configurations, have been developed and form the basis for the construction noise assessment. These scenarios provide a conservative basis for assessing potential noise exposure at nearby sensitive places.

The construction scenarios listed in Table 3.3 are characterised as either transient or stationary, reflecting both the nature of the activity and its potential duration at a given location:

– Transient scenarios involve activities that move progressively along the alignment (such as clearing, trenching and pipe installation). These activities are typically executed sequentially, with construction fronts advancing along the corridor such that any noise experienced at an individual sensitive place is short-term.
– Stationary scenarios are confined to specific locations (such as trenchless crossings, construction compounds or hydrostatic testing locations) and may occur over longer durations.

To assess noise impacts at sensitive receptors, the construction scenarios SWL are conservatively based on the three of the loudest items of equipment operating simultaneously at full capacity. Transient pipeline construction works are categorised by noise intensity of the activities for noise modelling purposes as shown in Table 3.4.

Table 3.1 Construction equipment sound power levels

Equipment	Sound power level (dBA)	
	$L_{Aeq,T}$	L_{Amax}
4WD cars/utes	98	108
Auger bore spread	111[2]	117
Bending machine	94[2]	104
Blasting truck	109[2]	115
Bobcat with auger drill	102[2]	108
Bucket wheel trencher	117[2]	125
Chain trencher	117[2]	125
Compactor	113	125
Compressor	101	107
Compressors and pumps	106[2]	107
Container refrigeration system	95[2]	100
Dining / wet mess hall	92[2]	105
Dozer	116	125
Excavator 30T	110	115
Excavator 45T	113	118
Excavator 45T with rock hammer	127[2]	130
Excavator with vacuum lift	113	118
Forklift	106	111
Generator	99	105
Generator 100 KVa	91[2]	100
Generator 320 and 350 KVa	97[2]	105
Grader	113	118
HDD Spread	110[2]	115
Medium truck	103	108
Membrane bioreactor	100[2]	105
Mobile crane	98	115
Pipe facing machine	109[2]	115
Post Driver	117[2]	125
Screener	109	115
Shakedown/washdown pad	100[2]	106
Sideboom	110[2]	115
Spray machine	109[2]	115
Tracked dumper	108	118
Tractor	108	118
Truck (>30T)	108	115
Vacuum truck	109	115
Water truck	108	115
Welding machine	105[2]	115
Wheel Loader	105	115

Notes: 1. The presented SWL includes a +5 dB penalty to account for annoying noise characteristics associated with use of a rock hammer.
2. These SWLs have been based on similar projects.

Table 3.2 Adjustments to be added to noise levels at sensitive receptors (ESR/2016/1989)

Noise characteristic	Adjustment to noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is detectable	+ 2 to + 5 dBA

Note: 1. Where two or more adjustment factors are indicated, a maximum correction of 10 dBA can be applied.

Table 3.3 Modelled construction scenarios

Scenario ID	Description	Location of construction works	Total $L_{Aeq,adj,15min}$ sound power level (dBA)	Construction hours
Transient scenarios				
CS01	Very high intensity transient pipeline construction works such as pre-trenching	Moves along the alignment	128[1]	Project working hours: Mon-Sun 6am to 6pm
CS02	High intensity transient pipeline construction works such as clear and grading		121	
CS03	Medium intensity transient pipeline construction works such as bending or welding		113	
CS04	Low intensity transient pipeline construction works such as surveying		103	Project working hours: Mon-Sun 6am to 6pm Non-destructive testing may be undertaken during out-of-hours work: Mon-Sun 6pm to 6am
CS05	Access track and road upgrade or maintenance	Transient at access tracks and roads which require upgrades	119	Project working hours: Mon-Sun 6am to 6pm
Stationary scenarios				
CS06	Watercourse and road open cut crossings	Stationary at several road and watercourse crossings	117	Project working hours: Mon-Sun 6am to 6pm
CS07	Trenchless crossings (HDD)	Stationary at Wilson River, Eromanga Road, Bundeena Road, Innamincka Road and Warri Gate Road	114	Project working hours: Mon-Sun 6am to 6pm Out-of-hours work: Mon-Sun 6pm to 6am
CS08	Trenchless crossings (Bores)		115	
CS09	Tie Ins	Stationary at road and watercourse crossings and at large bends in the alignment	118	Project working hours: Mon-Sun 6am to 6pm
CS10	Hydrostatic testing	Stationary at scraper stations and several locations along the CRoW	109	Project working hours: Mon-Sun 6am to 6pm Out-of-hours work: Mon-Sun 6pm to 6am
CS11	Hydrostatic testing depressurisation		125	
CS12	Above ground infrastructure	Stationary at scraper stations on either end of the alignment and at two locations along the alignment	113	Project working hours: Mon-Sun 6am to 6pm

Scenario ID	Description	Location of construction works	Total $L_{Aeq,adj,15min}$ sound power level (dBA)	Construction hours
CS13	Construction of compounds/ temporary accommodation facility	Construction of compounds and temporary accommodation facility	116	
CS14	Operation of construction compounds	Construction compounds	115	
CS15	Operation of temporary accommodation facility	temporary accommodation facility	106	Project working hours: Mon-Sun 6am to 6pm Out-of-hours work: Mon-Sun 6pm to 6am

Note: 1. The presented SWL includes a 5 dB penalty to account for annoying noise characteristics associated with use of a rock hammer.

Table 3.4 Noise intensity of transient pipeline construction works

Noise intensity category	Transient pipeline construction works
Very high	Pre-trenching (rock medium to hard)
High	Clear & grade, stringing, mainline welding, trenching (other than rock), lower in, backfill, reinstatement
Medium	Bending, coating
Low	Survey, non-destructive testing, cathodic protection

3.2.3 Project working hours

Construction activities for the project would be undertaken in accordance with the EP Act and ESR/2016/1935, which require that petroleum activities must not cause environmental nuisance at a sensitive receptor, except where alternative arrangements are in place.

The construction workforce would work either a 21 days on/nine days off roster or a 28 days on/nine days off roster. During work periods, work is proposed to be undertaken generally during daylight hours (6am to 6pm), seven days a week.

These project working hours during the working periods reflect the remote and sparsely populated setting of the project and the transient nature of the construction activities at any one location, and are proposed to:

– reduce the overall construction timeframe of the project, including the length of time that individual receptors are exposed to environmental nuisance
– maximise the use of the employees once mobilised to site
– provide flexibility to program a range of work activities.

Out of hours work (pm to 6am) would also be required as described in Table 3.5. These works would be required:

– to minimise disruption to traffic and disturbance to surrounding landholders
– as a result of the type of construction equipment, processes and methodologies
– for the safety of the construction employees and community
– to minimise the potential for environmental nuisance.

Work would also be undertaken out-of-hours where there are no affected receptors or if an alternative arrangement is in place.

Out-of-hours work would be subject to management controls, including alternative arrangement and consultation where relevant, as specified in the construction environmental management plan (CEMP) for the project (see section 9).

Table 3.5 Specified activities that may be undertaken outside project working hours

Specified activity	Justification
Trenchless construction methods such as HDD	Once trenchless construction methods (such as HDD) are operating, they must keep running to maintain the borehole and drilling fluid integrity until drilling is complete. This may need to occur out-of-hours.
Hydrostatic testing and drying	Hydrostatic testing needs to be completed as a single process and cannot cease midway as the pipeline needs to be maintained at pressure and monitored during the entirety of the testing procedure.
Non-destructive testing	Some testing works may be completed outside standard working hours to minimise the duration the pipeline trench remains open.
Out-of-hours deliveries	Delivery of construction plant, equipment and materials that require transport outside recommended standard working hours.
Maintenance of plant and equipment	Plant and equipment maintenance may be undertaken outside project working hours to ensure machinery can operate efficiently.
Emergencies/unexpected circumstances	Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm.
Fauna spotter / catcher activity	Open trenches would be inspected by fauna spotter / catcher pre-dawn.
Work agreed to by potentially affected residents and work with no potentially affected residences	Work that does not result in environmental nuisance consistent with the ESR/2016/1935 or work carried out in accordance with alternative arrangements with residents (owners and occupiers).

3.3 Operation works and maintenance

Noise generating activities during the ordinary operating conditions of the pipeline are expected to include the routine operation and maintenance program and gas releases at the existing Meadows scraper station during internal cleaning only. These activities are detailed as follows:

– A routine operation and maintenance program would be implemented, which would include external coating surveys, ground and/or aerial patrols, repair or replacement of faulty/damaged components, internal cleaning of the pipeline, corrosion monitoring and remediation and easement maintenance.
– Releases of small quantities of gas would result from internal pipeline cleaning and would involve the release of about two cubic metres of methane into the atmosphere. These events would be infrequent and only occur about once per year on average.
– Aerial and/or ground inspections would include activities such as checking for vegetation encroachment close to the easement, detection of erosion, monitoring of rehabilitation success and detection of weed species.
– Other maintenance activities may be undertaken infrequently as required, which could include limited areas of excavation around the pipeline. Any excavation of material would be undertaken in a similar manner to construction (that is, topsoil would be stockpiled separately from trench spoil and the site would be restored as soon as practical following completion of maintenance works in accordance with the rehabilitation strategy).

3.4 Construction and operational noise

A noise assessment has been undertaken to determine whether the project's construction and operational activities have the potential to cause environmental nuisance at sensitive receptors, consistent with the EP Act and the ESR/2016/1935.

3.4.1 Noise criteria

Assessment of construction and operational noise is undertaken by selecting a noise criteria which represents a level which, if exceeded, is considered to have the potential to cause environmental nuisance at sensitive receptors.

ESR/2016/1935 sets out best practice noise criteria based on duration of exposure for petroleum activities based on the acoustic quality objectives (AQO) of the *Environmental Protection (Noise) Policy 2019* (EPP (Noise)) and are replicated in Table 3.6. These limits are consistent with streamlined model condition Noise 1 of ESR/2016/1989, which also states that noise levels below these limits are not considered to be an environmental nuisance.

The best practice noise criteria at residential receptors are established using the deemed background noise levels provided in ESR/2016/1935 (see section 4.2). The relationship between exposure duration and annoyance at sensitive receptors is reflected with the use of short-, medium- and long-term noise criteria. Short term criteria are set higher than the medium and long-term criteria, recognising that receptors are more tolerant of noise over brief periods.

ESR/2016/1935 defines the duration of noise events as follows:

– Short-term noise events: total noise exposure no more than eight hours, not recurring within seven days.
– Medium-term noise events: total noise exposure no more than five days, not recurring within four weeks.
– Long-term noise events: exposure lasting more than five days, even if there are quiet periods in between.

Although construction noise at any one location would be short-term as the works move along the alignment, similar levels of noise are likely to return within four weeks as new work fronts approach. Because the main construction works would last about eight months, the long-term noise criteria have been used for the noise assessment.

Conservatively, the long-term noise criteria have also been adopted for operational noise from the project. Although operational activities are expected to be infrequent, additional noise-generating activities may occur periodically throughout the project's lifetime.

The low-frequency noise criteria in ESR/2016/1989 Noise 3 are not considered directly applicable to pipeline construction activities due to the temporary and mobile nature of the works. These criteria are primarily intended for continuous low-frequency noise generated by fixed plant operating at a single location over extended periods. In contrast, pipeline construction progresses along the alignment, resulting in short-term exposure at any individual receptor and predominantly broadband, intermittent construction noise rather than sustained low-frequency emissions. Accordingly, low-frequency noise impacts are expected to be limited and manageable through standard construction noise controls.

Tonal and impulsive noise characteristics from ESR/2016/1989 Noise 2 are considered in the adopted sound power levels for the modelled construction activities, as described in section 3.2.2.

Table 3.6 ESR/2016/1935 noise criteria at dwellings

Time period	Metric	Noise criteria (dBA)		
		Short-term	Medium-term	Long-term
7am to 6pm	$L_{Aeq,adj,15min}$	45 (35[1] + 10)	43 (35[1] + 8)	40 (35[1] + 5)
6pm to 10pm	$L_{Aeq,adj,15min}$	40 (30[1] + 10)	38 (30[1] + 8)	35 (30[1] + 5)
10pm to 6am	$L_{Aeq,adj,15min}$	28 (25[1] + 3)	28 (25[1] + 3)	28 (25[1] + 3)
	$L_{Amax,15min}$	55	55	55
6am to 7am	$L_{Aeq,adj,15min}$	40 (30[1] + 10)	38 (30[1] + 8)	35 (30[1] + 5)

Note 1: Deemed background noise level

Other sensitive receptors within the study area include commercial premises, protected or critical areas and parks or gardens open to the public (other than for sport or organised entertainment), in accordance with the EPP (Noise). The EPP (Noise) specifies the following AQOs for these receptors:

– Commercial premises: 45 dBA $L_{Aeq,adj,1hr}$ indoors, equivalent to 52 dBA $L_{Aeq,adj,1hr}$ outdoors.[1]
– Park or garden that is open to the public (other than for sport or organised entertainment): a noise level that preserves the existing amenity of the area or place.

[1] The indoor criteria have been converted to an outdoor criteria by adding 7 dB to the indoor criteria, as per the *Noise and Vibration EIS information guideline* (DES, 2022).

For this assessment, the AQO for commercial premises has been adopted as the noise criteria above which environmental nuisance may occur. In accordance with ESR/2016/2357 and ESR/2016/1989, receptors which provide temporary accommodation such as motel, hotel or hostels, are considered dwellings.

For parks or gardens, the EPP (Noise) requires preservation of existing acoustic amenity. This is achieved by adopting noise criteria of 5 dB above background during the day and evening and 3 dB above background during the night-time. Accordingly, noise criteria for these receptors were derived from the deemed background noise levels.

A summary of the adopted noise criteria for each sensitive receptor is presented in Table 3.7.

Table 3.7 Adopted noise criteria at sensitive receptors

Sensitive receptor	Time of day	Noise criteria ($L_{Aeq,adj,15min}$)
Dwelling	7am to 6pm	40
	6pm to 10pm and 6am to 7am	35
	10pm to 6am	28
Commercial premises	When open for business	52
Park or garden that is open to the public (other than for sport or entertainment)	7am to 6pm	40
	6pm to 10pm and 6am to 6am	35
	10pm to 7am	28

A comparison of typical noise levels is provided in Figure 3.2 for reference. The perception of noise is strongly influenced by people's environment. A noise level that is perceived as loud in one situation may appear quiet in another.

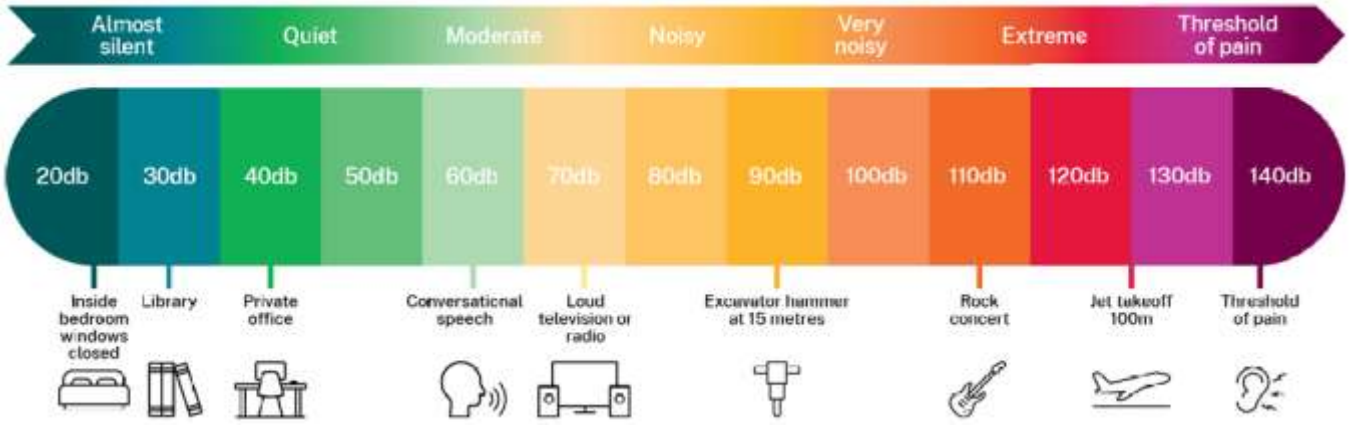


Figure 3.2 Noise level comparisons

3.4.2 Sleep disturbance

ESR/2016/1989 adopts a noise criteria of 55 dBA L_{Amax} between 10pm and 6am to protect for sleep disturbance impacts. As project working hours are typically between 6am and 6pm, sleep disturbance impacts are not anticipated during regular construction works. However, where specified activities (see Table 3.5) are required to be undertaken outside project working hours, there is potential for sleep disturbance and has been assessed as such.

Operational activities would typically be undertaken during the daytime and would not cause sleep disturbance impacts.

3.4.3 Noise modelling methodology

Noise modelling was undertaken using SoundPLAN 9.1 noise modelling software to predict noise levels generated by the proposed works at sensitive receptors. The noise model inputs and assumptions for this assessment are provided in Table 3.8.

To assess potential noise exposure at sensitive receptors, modelling was undertaken using conservative assumptions, namely:

– concurrent operation of the three loudest items of plant relevant to each construction scenario
– plant operating at full capacity and therefore highest noise emissions
– equipment positioned at the closest distance within the project site to the sensitive receptor.

These assumptions ensure predicted noise levels represent the upper bound of potential exposure and provide a conservative basis for assessing whether construction activities could give rise to environmental nuisance.

Construction scenarios that move along the alignment (refer to Table 3.3) are modelled on the edge of the CRoW using the applicable noise emissions. Stationary construction scenarios are modelled at the designated areas, with the exception of hydrostatic testing activities (CS10 and CS11). As hydrostatic testing locations may be refined during detailed design, buffer distances to the noise criteria have been calculated.

Table 3.8 Noise model inputs and assumptions

Input / assumption	Description
Prediction algorithm	International Organization for Standardization (ISO) 9613-2 as implemented in SoundPLAN 9.1.
Atmospheric absorption	Based on an average temperature of 20 °C and an average humidity of 70%.
Meteorology	A moderate temperature inversion or downwind meteorological conditions is considered in the ISO 9613-2 prediction algorithm.
Model inputs	
Topography	5 m intervals based on the 1 arc second digital elevation model. Flat terrain is considered when calculating buffer distances for stationary construction scenarios CS10 and CS11 and operational noise from gas releases during pipeline cleaning activities.
Receptor locations	At 1 m from the external façade.
Receptor heights	1.5 m above ground level.
Ground absorption coefficient	0.75, assumed mainly soft grounds with a relatively high absorption coefficient.

3.5 Construction vibration

Vibration is not listed as a form of environmental nuisance under section 15 of the EP Act. However, vibration has the potential to cause unreasonable interference at sensitive receptors, or material environmental harm under section 16 and has therefore been included in the assessment.

Neither ESR/2016/1989 nor ESR/2016/1935 prescribe vibration criteria for non-blasting activities. In the absence of specific guidance, the widely adopted British and German Standards have been referenced to assess vibration impacts.

3.5.1 Human comfort

Vibration is assessed based on the criteria in *BS 6472: Guide to evaluation of human exposure to vibration in buildings* (1 Hz to 80 Hz) (British Standards Institute, 2008) (BS 6472-1:2008) is recognised by the guideline as the preferred standard for assessing the ‘human comfort criteria’.

Intermittent vibration is assessed using the vibration dose value (VDV). Acceptable VDV are presented in Table 3.9 for residential receivers.

While the assessment of response to vibration in BS 6472-1:2008 is based on VDV and weighted acceleration, for construction related vibration, it is considered more appropriate to undertake the assessment in terms of a peak particle velocity (PPV), since this parameter is likely to be more routinely predicted and can be used to develop buffer distances, whereas VDV is generally measured during compliance.

Humans are capable of detecting vibration at levels that are well below those causing risk of damage to a building. The degrees of perception for humans are suggested by the vibration level categories given in BS 5228-2:2009 (see Table 3.10).

To develop safe buffer distances and assess impacts it is recommended that PPV values of one millimetre per second (mm/s) during the day and 0.3 mm/s during the night time are adopted; however, compliance would be measured against the VDV values in Table 3.9.

Table 3.9 Acceptable VDV for human comfort (BS6472-1:2008)

Receiver type	Period	Intermittent VDV ($m/s^{1.75}$)	
		Preferred value	Maximum value
Residential	Day[1]	0.2	0.4
	Night[1]	0.13	0.26

Note: 1. Day is between 7am and 10pm and night is between 10pm and 7am.

Table 3.10 Guidance on effect of vibration levels for human comfort (BS 5228-2:2009)

Vibration level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration at this level in residential environments will cause complaints, but can be tolerated if prior warning and explanation has been given to receivers.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure.

3.5.2 Building damage

British Standard *BS7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 - Guide to damage levels from ground borne vibration* (British Standards, 1993) is typically used to assess the likelihood of building damage from ground vibration. The vibration levels in this standard are adopted as building damage criteria and are presented in Table 3.11.

Table 3.11 Transient vibration guide values – minimal risk of building damage (BS7385-2:1993)

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Consistent with other major projects of a similar type, guidance on limiting vibration values has also been obtained by reference to German Standard *Deutsches Institut für Normung* (DIN) *4150-3: 2016 Structural Vibration – Part 3: Effects of vibration on structures.* Short-term vibration guideline values for vibration at the foundation of a structure are listed in Table 3.12.

Table 3.12 Guideline values for short-term vibration on structures (DIN 4150-3:2016)

Line	Type of structure	Guideline values for velocity, vi(t)[1] (mm/s)		
		1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz[2]
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50
2	Dwellings and buildings of similar design and/or occupancy.	5	5 to 15	15 to 20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (such as heritage listed buildings under preservation order).	3	3 to 8	8 to 10

Notes: 1. The term v_i refers to vibration levels in any of the x, y or z axes
2. At frequencies above 100 Hz the values given in this column may be used as minimum values

3.5.3 Vibration damage to utilities

The British Standard *BS 5228-2:2009 Code of Practice for noise and vibration control on construction and open sites* and the German Standard *DIN 4150-3: 2016 Structural Vibration – Part 3: Effects of vibration on structures* provide information on the vulnerability of ground-related services, utilities and structures to vibration. Table 3.13 and Table 3.14 present the vibration guideline values in the British Standard and German Standard, respectively.

For the purpose of this assessment, the BS criteria (the more conservative criteria) has been adopted for damage to underground services due to vibration and can be summarised as 30 mm/s for intermittent or transient vibrations (excavators, pile driving, trucks etc.) and 15 mm/s for continuous vibrations (compactors and rollers).

Table 3.13 Vibration guide values for underground services – BS 5228

Type of Utility	Guideline maximum values for velocity measured on the pipe (mm/s)	
	Intermittent or transient vibrations	Continuous vibrations
Underground services	30	15

Table 3.14 Guideline values for vibration on buried pipework – DIN 4150-3

Line	Type of Utility	Guideline values for velocity measured on the pipe (mm/s)
1	Steel (including welded pipes)	100
2	Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with and without flange)	80
3	Masonry, plastic	50

3.5.4 Construction vibration prediction methodology

Vibration has been assessed by using vibration source levels from guidance documents and determining the safe buffer distances.

Typical vibration levels for representative vibration generating equipment associated with the construction works are presented in Table 3.15.

Energy from equipment is transmitted into the ground and transformed into vibration, which attenuates with distance. The magnitude and attenuation of ground vibration are dependent on the following:

– efficiency of the energy transfer mechanism of the equipment (i.e. impulsive, reciprocating, rolling or rotating equipment)
– frequency content
– impact medium stiffness
– type of wave (surface or body)
– ground type and topography.

Due to the above factors, there is inherent variability in ground vibration predictions without site-specific measurement data. Typical rates of vibration attenuation can be calculated from the following regression analysis formula:

$V = kD^{-n}$, where:

– V = Peak Particle Velocity
– D = Distance
– k = site constant (if k is unknown, the site constant can be calculated from the other known parameters)
– *n* = site attenuation exponent.

The value of the site attenuation exponent, n, depends on the soil and ground type. *Construction noise and vibration impact on sensitive premises* (Roberts, 2009) suggests the following values for *n*:

– 1.4 for weak or soft soils such as loose soils, mud, loose beach sand, dune sand and ploughed ground
– 1.3 for component soils such as most sands, sandy clays, gravel, silts and weathered rock
– 1.1 for hard soils such as dense compacted sand, dry consolidated clay and some exposed rocks
– 1.0 for hard competent rock such as bedrock and freshly exposed hard rock.

Lower values of *n* imply a more efficient vibration transmission rate. Hence, a conservative site attenuation exponent value of one has been assumed for this assessment.

Vibration levels at various distances from representative plant and equipment have been predicted using the above formula and are provided in Table 3.16. Vibration safe buffer distances to comply with the adopted PPV vibration criteria are presented in Table 3.17.

Table 3.15 Representative vibration generating equipment

Equipment	Peak particle velocity source levels (mm/s)	Data reference
Bulldozer	2.5 to 4 at 10 m distance	*Environmental Noise Management Manual* (RTA, 2001)
Backhoe	1 at 10 m distance	
Compactor	7 at 10 m distance	
Excavator	2.5 at 8 m distance	*Ground Vibration Damaging Effects to Buildings* (Tynans, 1973)
Grader	2.5 at 8 m distance	
Scraper	2.5 at 8 m distance	
Excavator with hydraulic hammer	7.1 at 15 m distance	*Ground Vibrations Emanating from Construction Equipment Final Report* (New Hampshire Department of Transport, 2012)

Table 3.16 Typical vibration levels at distances

Equipment	PPV (mm/s) at distance						
	10 m	20 m	30 m	40 m	50 m	100 m	200 m
Bulldozer	4.0	2.0	1.3	1.0	0.8	0.4	0.2
Backhoe	1.0	0.5	0.3	0.3	0.2	0.1	0.1
Compactor	7.0	3.5	2.3	1.8	1.4	0.7	0.4
Excavator/Grader/Scraper	2.0	1.0	0.7	0.5	0.4	0.2	0.1
Excavator with hydraulic hammer	8.8	4.4	2.9	2.2	1.8	0.9	0.4

Table 3.17 Safe buffer distances to comply with the adopted vibration criteria

Equipment	Human comfort		Structural damage	Underground services	
	Day (PPV 1 mm/s)	Night (PPV 0.3 mm/s)	PPV 5 mm/s	Intermittent (PPV 30 mm/s)	Continuous (PPV 15 mm/s)
Dozer	40	135	10	<5	N/A[1]
Backhoe	10	35	<5	<5	N/A[1]
Compactor	70	235	15	N/A[2]	5
Excavator/grader/scraper	20	65	5	<5	N/A[1]
Excavator hydraulic hammer	90	295	20	5	N/A[1]

Notes: 1. Not applicable: vibration from this equipment is considered intermittent.
2. Not applicable: vibration from this equipment is considered continuous.

3.6 Blasting assessment

Controlled blasting may be used in hard rock terrain where the use of standard trenching machinery may not be feasible. The need for blasting would be confirmed based on geotechnical investigations undertaken during detailed design and construction planning.

The *Drill and Blast Management Plan* (Nacap, 2022) developed for the Northern Goldfields Interconnect project is referenced to quantify the used maximum instantaneous charges (MIC) for similar blasting activities with likely similar geotechnical conditions.

For the Northern Goldfields Interconnect project a MIC of up to 3.7 kilograms was used. As site conditions of the project may vary, a MIC between one and ten kilograms has been considered for the indicative assessment.

3.6.1 Assessment criteria

ESR/2016/1989 provides the following streamlined model conditions relevant to blasting activities:

– Noise 4: A blast management plan must be developed for each blasting activity in accordance with Australian Standard 2187.
– Noise 5: blasting operations must be designed to not exceed an Airblast overpressure of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.
– Noise 6: Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10 mm/s at any time, when measured at or extrapolated to any sensitive place.

3.6.2 Airblast overpressure

Airblast is the pressure wave produced by a blast and transmitted through the air. This may be audible if it contains energy within the audible frequency range between 20 Hz to 20 kHz. The energy in an airblast may be sub-audible below 20 Hz and this low frequency pressure wave can create secondary audible effects from rattling windows and sliding doors.

The airblast overpressure generated from a blast can be estimated using the following equation outlined in Appendix J7.2 of *AS 2187.2:2006 Explosives – Storage and use – Part 2: Use of explosives* (AS2187.2, 2006):

$$P = K_a \left(\frac{R}{Q^{\frac{1}{3}}} \right)^a$$

The variables of the equation above are detailed in Table 3.18. The *AS2187.2:2006* provides a site exponent (a) -1.45 for confined blasthole charges. The site constant (K_a) commonly ranges between ten and 100 when using the site exponent. Because the explosive charge mass and site-specific constants are unknown, airblast overpressure levels have been predicted using different charge mass sizes and site-specific constants to establish a range of likely impact levels.

Airblast overpressure propagation can increase as a result of unfavourable meteorological conditions and decrease with topographic shielding. The equations presented in *AS2187.2:2006* are simple charge weight scaling laws and do not consider meteorological conditions. The standard states that airblast overpressure levels may need to be increased by up to 20 dBL in unfavourable meteorological conditions.

The pressure has been converted to a decibel using the following equation for assessment against the recommended limits for airblast provided in Table 3.18.

$$dB = 20log_{10}\left(\frac{P}{p_{ref}}\right) = 20log_{10}\left(\frac{P}{20\mu Pa}\right)$$

The blasts should be contained below ground, so this assessment does not consider the airblast overpressure levels of charges that are not buried.

Table 3.18 Airblast overpressure variables

Variable	Description	Units	Typical Range
P	Pressure	kilopascals (kPa)	-
Q or MIC	Explosive charge mass	kilograms (kg)	1 to 10 kg
R	Distance from blast	metres (m)	100 to 2,000
K_a	Site constant	-	50
a	Site exponent	-	-1.45 (site specific exponent)

3.6.1 Ground vibration

Ground vibration is the pressure wave produced by a blast and transmitted through the ground. The ground vibration transmission mechanism is complex and can propagate at different velocities and magnitudes depending on the medium it is travelling through.

The ground vibration generated from a blast can be estimated using the following equation outlined in Appendix J7.3 of *AS 2187.2:2006*:

$$V = K_g\left(\frac{R}{Q^{\frac{1}{2}}}\right)^{-1.6}$$

The variables of the equation above are detailed in Table 3.19. Values for the site constant (K_g) are based on 'average site conditions' outlined in *AS 2187.2:2006*.

The ground vibration that is generated is dependent on the MIC (effective charge mass per delay) and not the total charge mass, assuming that the delay interval has been selected appropriately.

Table 3.19 Ground vibration variables

Variable	Description	Units	Typical Range
V	Peak particle velocity	millimetres per second (mm/s)	-
R	Distance from blast	metres (m)	25 to 500
Q	Maximum instantaneous charge	kilograms (kg)	1 to 10
K_g	Site/rock property constant	-	1140 for 'average' conditions

3.7 Road traffic noise

Road traffic noise is assessed to determine whether road traffic generated by the project has the potential to cause environmental nuisance at sensitive receptors. There is no criteria specifically for assessing construction road traffic noise in ESR/2016/1935, ESR/2016/1989 or ESR/2016/2357 and the EPP (Noise). The *Code of Practice Volume 1 – Road Traffic Noise* (TMR, 2013) (CoP Vol 1) is considered to apply predominantly for operational road traffic noise and does not provide criteria for temporary increases in road traffic during construction of a project.

Considering the above, a screening assessment has been undertaken adopting the methodology of the CoP Vol 1. The road traffic noise criteria are adopted as screening levels to identify whether environmental nuisance can occur due to increased road traffic volumes.

3.7.1 Screening levels

A summary of the CoP Vol 1 road traffic screening noise goals is provided in Table 3.20.

Table 3.20 Road traffic noise screening levels

Sensitive receptor	Existing residences (façade corrected)	Educational, community and health buildings (façade corrected)	Outdoor educational and passive recreational areas, including parks (free field)
New road	63 dBA L_{A10} (18h) where existing level > 55 dBA L_{A10} (18h) 60 dBA L_{A10} (18h) where existing level ≤55 dBA L_{A10} (18h)	58 dBA L_{A10} (1h)	63 dBA L_{A10} (12h)
Upgrading existing road	68 dBA L_{A10} (18h)	65 dBA L_{A10} (1h)	
Existing road – no roadworks			N/A

3.7.2 Existing traffic volumes

The key roads that would be used to access the project site include Warri Gate Road, Cooper Developmental Road, Bulloo Developmental Road, Wompah Gate Road and Tickalara Road. Table 3.21 summarises the traffic data sourced from DTMR for Bulloo Developmental Road. The data included 2024 Annual Average Daily Traffic (AADT) volumes, directional split and heavy vehicle percentages.

As the traffic data does not include hourly volumes to determine the split in volumes, it is assumed that 80% of the traffic occurs during the day between 6am to 12am and the remainder during the night between 12am to 6am.

Table 3.21 Existing traffic volumes along nominated haulage roads

Road	Road surface	Posted speed (km/h)	Daily (12am to 11:59pm)		Day and evening (6am to 12am)		Night (12am to 6am)	
			LV	HV	LV	HV	LV	HV
Cooper Developmental Road	Sealed	100	30	8	16	14	4	4
Bulloo Developmental Road (north of Warri Gate Road)	Sealed	100	28	7	11	17	3	4
Bulloo Developmental Road (south of Warri Gate Road)	Sealed	100	29	7	18	11	4	3
Bulloo Developmental Road (north of Thargomindah)	Sealed	100	49	12	30	19	7	5

There is currently no traffic data available for Warri Gate Road, Wompah Gate Road or Tickalara Road. Given the rural nature of the area and the low daily traffic volume of the adjacent Bulloo Developmental Road, it is likely that the AADT of Warri Gate Road is also very low. For the purpose of the assessment, it is assumed daily traffic volumes on Warri Gate Road are equal to those on Bulloo Developmental Road north of Warri Gate Road.

3.7.3 Construction traffic generation

Vehicles associated with construction activities would include light and heavy vehicles. The estimated number of trips per day and during peak hour are shown in Table 3.22 and have been sourced from the Traffic Impact Assessment (Appendix G of the Environmental Authority Supporting Information Report). The Traffic Impact Assessment generally provides daily vehicle movement information; however, to complete the construction road traffic noise assessment the following assumptions have been made:

– for 'equipment and plant mobilisation' no vehicle split is provided and conservatively, all movements have been assumed to be heavy vehicles (HV) for this activity
– for 'Stockpile 2 (Wompah Gate) pipe haulage employees, it can be noted that both light vehicles (LV) and HV are required for this activity and an equal split between LV and HV has been assumed
– up to 10% of daily traffic volumes are assumed to occur during the night time between 10pm to 6am
– traffic volumes along access tracks are assumed to be equal to the worst-case volumes of the nominated roads.

Based on the construction traffic generation volumes, as well as the construction activities schedule provided in the Traffic Impact Assessment, the period with worst-case road traffic volumes along each project road has been adopted and is summarised in Table 3.23.

Table 3.22 Estimated construction traffic generation by activity

Construction activity	Active periods	Project roads to be used	Daily vehicle movements	
			HV	LV
Stockpile 2 (Wompah Gate) establishment employees	March 2027	Warri Gate Road, Tickalara Road, Wompah Gate Road	0	12
Stockpile 2 (Wompah Gate) pipe haulage	May 2027 to September 2027	Wompah Gate Road	11	0
Stockpile 2 (Wompah Gate) pipe haulage employees	May 2027 to September 2027	Warri Gate Road, Tickalara Road, Wompah Gate Road	10	10
Equipment and plant mobilisation	April 2027 to June 2027	Bulloo Developmental Road, Cooper Developmental Road	5	0
Camp 1 (Nockatunga) servicing	June 2027 to November 2027	Bulloo Developmental Road, Warri Gate Road	10	0
Camp 2 (Tickalara) establishment employees	May 2027 to June 2027	Warri Gate Road, Tickalara Road, Wompah Gate Road	0	12
Camp 2 (Tickalara) servicing	June 2027 to Jan 2028	Bulloo Developmental Road, Warri Gate Road, Tickalara Road	10	0
Camp 2 (Tickalara) construction materials delivery	May 2027 to June 2027	Wompah Gate Road	4	0
Camp 1 (Nockatunga) employee movements	June 2027 to November 2027	Bulloo Developmental Road, Cooper Developmental Road, Warri Gate Road	0	106
Stockpile 1 (Nockatunga) pipe delivery to CRoW	June 2027 to November 2027	Bulloo Developmental Road, Cooper Developmental Road, Warri Gate Road	22	0

Construction activity	Active periods	Project roads to be used	Daily vehicle movements	
			HV	LV
Stockpile 1 (Nockatunga) pipeline construction servicing deliveries	June 2027 to November 2027	Bulloo Developmental Road, Cooper Developmental Road, Warri Gate Road	10	0
Camp 2 (Tickalara) employee movements	August 2027 to January 2028	Wompah Gate Road, Tickalara Road	0	84
Stockpile 2 (Wompah Gate) pipe delivery to CRoW	August 2027 to January 2028	Wompah Gate Road, Tickalara Road	18	0
Stockpile 2 (Wompah Gate) pipeline construction servicing deliveries	August 2027 to January 2028	Wompah Gate Road, Tickalara Road	10	0
Camp fly-in fly-out buses temporary accommodation facility Camp 1 (Nockatunga)	June 2027 to September 2027	Bulloo Developmental Road	1	0
Camp fly-in fly-out buses temporary accommodation facility Camp 2 (Tickalara)	September 2027 to January 2028	Bulloo Developmental Road, Wari Gate Road, Tickalara Road	1	0

Table 3.23 Construction traffic generation by project road

Road	Daily vehicle movements							
	1 September 2027				15 September 2027			
	Day (6am to 10pm)		Night (10pm to 6am)		Day (6am to 10pm)		Night (10pm to 6am)	
	HV	LV	HV	LV	HV	LV	HV	LV
Warri Gate Road	65	95	7	11	47	20	5	2
Tickalara Road	52	20	6	2	35	76	4	8
Wompah Gate Road	53	20	6	2	25	76	3	8
Bulloo Developmental Road	48	95	5	11	48	20	5	2
Cooper Developmental Road	29	95	3	11	29	20	3	2
Access tracks	65	95	7	11	47	76	5	2

3.7.4 Operational traffic generation

Traffic generation during operation would be limited to maintenance inspections, typically using light vehicles. The light vehicles could use local roads; however, because of the limited operational traffic volume, frequency and short duration, noise impacts from operational traffic would be negligible and therefore have not been assessed.

3.7.5 Assessment methodology

The Calculation of Road Traffic Noise (CoRTN) (Department of Transport, Welsh Office 1988) prediction method was used to assess the increase in road traffic noise levels along the local road network due to additional traffic generated by the construction of the project. The assessment uses the following parameters:

– existing traffic volumes along local roads are based on the assumptions and traffic volumes outlined in Table 3.21
– pavement surface is conservatively considered to be dense graded asphalt
– ground type of areas outside the road is considered rural
– construction traffic generated by the project are based on the volumes presented in Table 3.23
– speed limit of 100 km/h which is representative of the default speed limit on the local road network.

4. Existing environment

4.1 Sensitive receptors

The EPP (Noise) and ESR/2016/1935 define noise sensitive receptors based on the type of occupancy and the activities performed.

To identify sensitive receptors within the defined study area, geocoded national address file data was sourced and cross-checked with aerial imagery. A general review of aerial imagery within the study area was also conducted to identify any further receptors. APA was also consulted to confirm receptors, as the pipeline alignment is within the property of potentially affected receptors. For the purpose of the assessment, the Noccundra Hotel is conservatively considered to be a residential receptor to protect visitors' health and wellbeing.

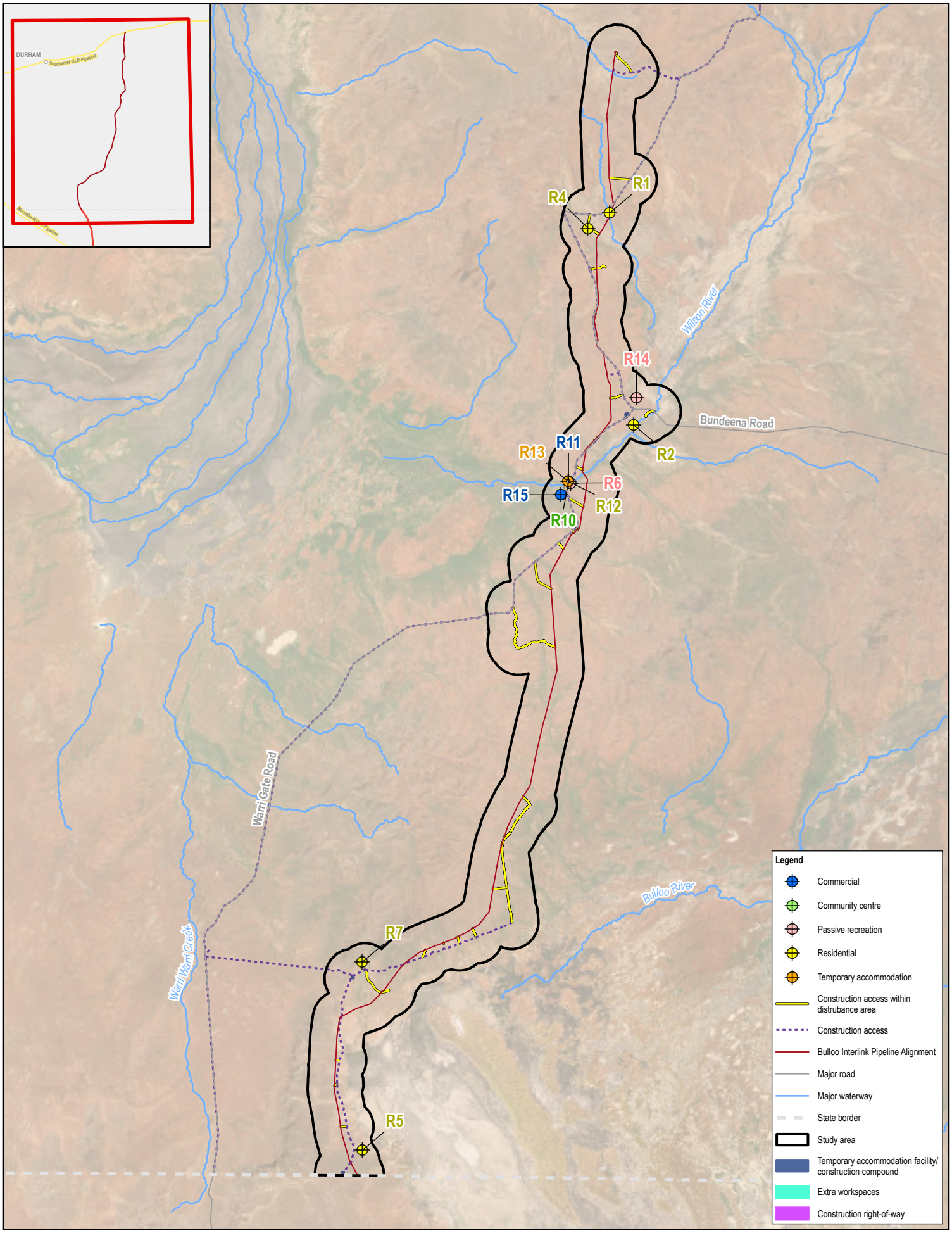
A total of 13 sensitive receptors has been identified within the study area for the noise and vibration assessment. These are detailed in Table 4.1. The receptor locations are shown in Figure 4.1. It is noted that sensitive receptors R3, R8 and R9 were identified in the Air Quality Impact Assessment (GHD, 2026); however, these are not considered noise-sensitive receptors in accordance with the EPP (Noise) and have therefore not been included in this assessment.

Most sensitive receptors are located more than 2 km from the project site, which is representative of the isolated rural environment. Most receptors are residences or provide temporary accommodation. Receptor R1 (unoccupied) is located nearest to the CRoW at about 254 m.

The temporary accommodation facilities, Camp 1 (Nockatunga) and Camp 2 (Tickalara), are considered sensitive receptors due to their use for sleeping and resting, which are noise-sensitive activities. However, sleep disturbance impacts are unlikely to occur, as construction activities would not be undertaken while workers are asleep, except for specified activities. These specified activities would occur at sufficient separation distances from the temporary accommodation facilities such that construction noise is unlikely to result in sleep disturbance. In addition, APA has full control over both the construction activities and the design and operation of the temporary accommodation facilities, allowing potential noise impacts to be effectively managed in the CNVMP. Therefore impacts to the workers within the temporary accommodation facilities have not been considered further in this assessment.

Table 4.1 Sensitive receptors

Receptor ID	Receptor category	Coordinates in ESPG 7854 (m)		Distance to project site (m)	
		Easting (m)	Northing (m)	CRoW (m)	Access roads/tracks used for construction (m)
R1	Residential (unoccupied)	664,292	6,972,453	254	171
R2	Residential	668,827	6,932,553	1,998	1,993
R4	Residential	660,225	6,969,538	2,345	53
R5	Residential	617,801	6,796,298	2,846	1,551
R6	Passive recreation (park or garden)	656,995	6,921,682	2,950	382
R7	Residential	617,748	6,831,651	3,007	1,488
R10	Commercial (community centre)	656,592	6,921,982	3,124	33
R11	Commercial	656,547	6,922,014	3,145	16
R12	Residential	656,545	6,921,971	3,170	13
R13	Temporary accommodation	656,488	6,921,978	3,213	41
R14	Passive recreation (park or garden)	669,339	6,937,678	3,281	1,840
R15	Commercial	655,150	6,919,455	4,496	1,073
R16	Commercial	655,041	6,919,429	4,601	1,177



Paper Size ISO A4

0 4.5 9 13.5 18

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sensitive receptors

Figure 4.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:29

Data source: Earthstar Geographics, Esri, CGIARDNMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026), GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, sensitive receptors (2026). Created by: acjackson

4.2 Existing noise environment

The sensitive receptors are located in an isolated rural area, in the far west of Queensland. The existing noise environment is expected to be very quiet as there are no major noise sources, such as roads or industries, present in the area. As such, the existing noise environment would consist of environmental noises such as wind and fauna.

Background noise monitoring was not undertaken since the existing background noise levels are expected to be similar to, or below, the minimum background noise levels in Table 2 of ESR/2016/1935, replicated in Table 4.2. Instead, the minimum background noise levels have been adopted for the purpose of this assessment which is deemed conservative.

Table 4.2 Minimum background noise levels for isolated rural areas

Time of day	Minimum background noise level (dBA)
7am to 6pm	35
6pm to 10pm	30
10pm to 6am	25
6am to 7am	30

5. Construction impacts

5.1 Construction noise

Construction noise levels were predicted for 15 different construction scenarios (see Table 3.3) at sensitive receptors within the study area. These construction scenarios represent different activities of the pipeline construction process, including:

– Transient construction activities which progress along the CRoW, such as surveying clearing and grading, trenching and backfilling. The transient activities have been categorised by noise intensity to assess typical noise levels from such activities.
– Stationary construction activities, which remain in one location for a period of time. This includes construction of compounds and temporary accommodation facilities, trenchless crossings, trenched watercourse and road crossings, tie-ins and backfilling and hydrostatic testing.

The predicted noise levels at residential receptors were compared against the long-term noise criteria established in section 3.4.1 during the following hours (see section 3.2.3 for the construction working hours discussion):

– project working hours between 7am to 6pm: 40 dBA
– project working hours between 6am to 7am: 35 dBA
– out-of-hours work between 6pm to 10pm: 35 dBA
– out-of-hours work between 10pm to 6am: 28 dBA.

Noise levels at non-residential receptors were compared against the applicable noise criteria (as detailed in section 3.4.1) where available.

The anticipated impacts of the transient and stationary construction works are summarised in sections 5.1.1 and 5.1.2, respectively. Sleep disturbance impacts from construction activities undertaken between 10pm to 6am are assessed in section 5.1.3.

A detailed overview of the predicted $L_{Aeq,adj,15min}$ and L_{Amax} construction noise levels, along with $L_{Aeq,adj,15min}$ noise contours is included in Appendix B.

5.1.1 Transient construction works

Summary of predicted noise levels

The highest predicted construction noise levels of transient construction scenarios at residential receptors range between 41 to 73 dBA, as shown in Table 5.1. The highest predicted construction noise levels at non-residential receptors are shown in Table 5.2. Up to two sensitive receivers are predicted to experience noise levels above the noise criteria between 6am to 6pm. Outside of these hours, transient construction activities are limited to non-destructive testing, which exceed the noise level at a single receptor.

Project working hours between 7am to 6pm

Between 7am to 6pm, a single residential receptor (R1) (currently unoccupied) is predicted to experience noise levels above the noise criteria during all transient pipeline construction activities (CS01 to CS04 respectively). Access track and road upgrade or maintenance works (CS05) is also predicted to exceed the noise criteria at a single residential receptor (R4).

Project working hours between 6am to 7am

Between 6am to 7am, up to two residential receptors (R1 and R4) are predicted to experience noise levels above the noise criteria of 35 dBA during all transient pipeline construction activities (CS01 to CS04). Access track and road upgrade or maintenance works (CS05) is predicted to exceed the noise criteria at two residential receptors (R4 and R7).

Out-of-hours between 6pm to 6am

Non-destructive testing would occur during out-of-hours work and is categorised as a low intensity transient pipeline construction activity (CS04). During these works, a single residential receptor (R1) is predicted to experience noise levels above the noise criteria of 35 dBA between 6pm to 10pm and 28 dBA between 10pm to 6am.

Table 5.1 Summarised transient construction noise levels above the noise criteria at residential receptors

Values	Time period	Noise criteria (dBA)	Intensity of transient pipeline construction works				Access track and road upgrade or maintenance
			Very high	High	Medium	Low	
			CS01	CS02	CS03	CS04	CS05
Highest predicted $L_{Aeq,adj,15min}$ receptor noise level (dBA)			66	60	51	41	73
Number of exceedances at residential receptors	7am to 6pm	40	1	1	1	1	1
	6am to 7am	35	2	1	1	1	2
	6pm to 10pm	35	N/A[1]	N/A[1]	N/A[1]	1	N/A[1]
	10pm to 6am	28	N/A[1]	N/A[1]	N/A[1]	1	N/A[1]

Note 1: Not applicable: these construction scenarios would not occur between 6pm to 6am.

Table 5.2 Predicted transient construction noise levels at non-residential receptors

Receptor category	Time period	Noise criteria (dBA)	Highest predicted construction noise level $L_{Aeq,adj,15min}$ (dBA)				
			CS01	CS02	CS03	CS04	CS05
Commercial	When open for business	52	32	26	17	<10	34
Park or garden (outdoor recreation)	7am to 6pm	40	33	27	18	<10	27
	6am to 7am	35					
	6pm to 10pm	35	N/A[1]	N/A[1]	N/A[1]	<10	N/A[1]
	10pm to 6am	28	N/A[1]	N/A[1]	N/A[1]	<10	N/A[1]

Note 1: Not applicable: these construction scenarios would not occur between 6pm to 6am.

Duration of predicted noise levels

Transient construction scenarios would progress along the CRoW in a sequential manner, with each construction activity starting after the previous one has progressed sufficiently. The construction scenarios would progress at a rate of about 2.5 km per day, which would result in an impact zone moving along the CRoW. Given the progression rate, noise levels above the noise criteria at any specific location would be short term, typically lasting one or two days for each construction scenario.

Where access track and road upgrade or maintenance is required, the duration of the works would depend on how much of the access track/road has to be upgraded. Construction of access tracks or road upgrades would typically be completed within one month. However, where upgrade works are minor, or maintenance is required, works would typically last several days up to one week.

Significance of predicted noise levels

Where noise levels are above the noise criteria, receptors could experience environmental nuisance in accordance with ESR/2016/1989. Whilst noise levels above the noise criteria from transient construction works would be temporary and short term, alternative arrangements with affected receptors would be established to manage environmental nuisance from construction noise.

5.1.2 Stationary construction works

Summary of predicted noise levels

The highest predicted construction noise level of stationary construction scenarios at residential receptors range between 15 to 44 dBA, as shown in Table 5.3. The highest predicted construction noise levels at non-residential receptors are shown in Table 5.4. It shows that noise levels comply with the noise criteria during all time periods.

Buffer distances for hydrostatic testing activities (CS10 and CS11) are shown in Figure 5.1, along with the relevant noise criteria.

Project working hours between 7am to 6pm

Between 7am to 6pm, a single sensitive receptor (R1) is predicted to experience noise levels above the noise criteria during watercourse and road open cut crossings (CS06) and tie in and backfill (CS09) activities. Noise levels from other stationary construction activities are predicted to be below the noise criteria for all stationary construction activities. Hydrostatic testing activities (CS10 and CS11) have the potential to result in noise levels above the noise criteria at the following distances:

– Hydrostatic testing (continuous) (CS10): 550 m
– Hydrostatic testing (depressurisation) (CS11): 1,590 m.

A single receptor (R1) is located within 1,590 m of the CRoW and may experience noise levels above the noise criteria if hydrostatic testing (depressurisation) occurs within this range.

Project working hours between 6am to 7am

Between 6am and 7am, receptor R1 is predicted to experience noise levels above the noise criteria during watercourse and road open cut crossings (CS06) and tie in and backfill (CS09) activities. Hydrostatic testing activities (CS10 and CS11) have the potential to result in noise levels above the noise criteria at the following distances:

– Hydrostatic testing (continuous) (CS10): 834 m
– Hydrostatic testing (depressurisation) (CS11): 2,092 m.

A single receptor (R1) is located within 2,092 m of the CRoW and may experience noise levels above the noise criteria if hydrostatic testing occurs within this range.

Out-of-hours between 6pm to 6am

During out-of-hours works, trenchless construction methods and hydrostatic testing would occur, as well as operation of temporary accommodation facilities. During trenchless construction works using HDD (CS07) and bores (CS08) or operation of temporary accommodation facilities, no residential receptors are predicted to experience noise levels above the noise criteria.

For hydrostatic testing activities, noise levels may be above the noise criteria at the following distances:

– 6pm to 10pm (35 dBA)
  - Hydrostatic testing (continuous) (CS10): 834 m
  - Hydrostatic testing (depressurisation) (CS11): 2,092 m.
– 10pm to 6am (28 dBA):
  - Hydrostatic testing (continuous) (CS10): 1,590 m
  - Hydrostatic testing (depressurisation) (CS11): 2,948 m.

A single receptor (R1) is located within 2,092 m of the CRoW and may experience noise levels above the noise criteria if hydrostatic testing occurs within this range between 6pm to 10pm.

Four receptors (R1, R2, R4 and R5) are located within 2,948 metres of the CRoW and may experience noise levels above the noise criteria if hydrostatic testing depressurisation (CS11) occurs between 10pm to 6am within this range.

Table 5.3 Summarised stationary construction noise levels above the noise criteria at residential receptors

Value	Time period	Noise criteria (dBA)	Watercourse and road open cut crossings	Trenchless crossings (HDD)	Trenchless crossings (Bores)	Tie ins and backfill	Scraper stations / above ground facilities	Construction of compounds/ temporary accommodation facility	Operation of construction compounds	Operation of temporary accommodation facility
			CS06	CS07	CS08	CS09	CS12	CS13	CS14	CS15
Highest predicted $L_{Aeq,adj,15min}$ receptor noise level (dBA)			44	29	29	45	19	26	25	15
Number of exceedances at residential receptors	7am to 6pm	40	1	0	0	1	0	0	0	0
	6am to 7am	35	1	0	0	1	0	0	0	0
	6pm to 10pm	35	N/A[1]	0	0	N/A[1]	N/A[1]	N/A[1]	N/A[1]	0
	10pm to 6am	28	N/A[1]	0	0	N/A[1]	N/A[1]	N/A[1]	N/A[1]	0

Note 1: Not applicable: these construction scenarios would not occur between 10pm to 6am.

Table 5.4 Predicted stationary construction noise levels at non-residential receptors

Receptor category	Time period	Noise criteria (dBA)	Highest predicted construction noise level $L_{Aeq,adj,15min}$ (dBA)							
			CS06	CS07	CS08	CS09	CS12	CS13	CS14	CS15
Community centre	When open for business	52	<10	21	22	23	<10	<10	<10	<10
Park or garden (outdoor recreation)	7am to 6pm	40	12	23	23	28	<10	18	17	<10
	6am to 7am	35								
	6pm to 10pm	35	N/A[1]	23	23	N/A[1]	N/A[1]	N/A[1]	N/A[1]	<10
	10pm to 6am	28	N/A[1]	23	23	N/A[1]	N/A[1]	N/A[1]	N/A[1]	<10

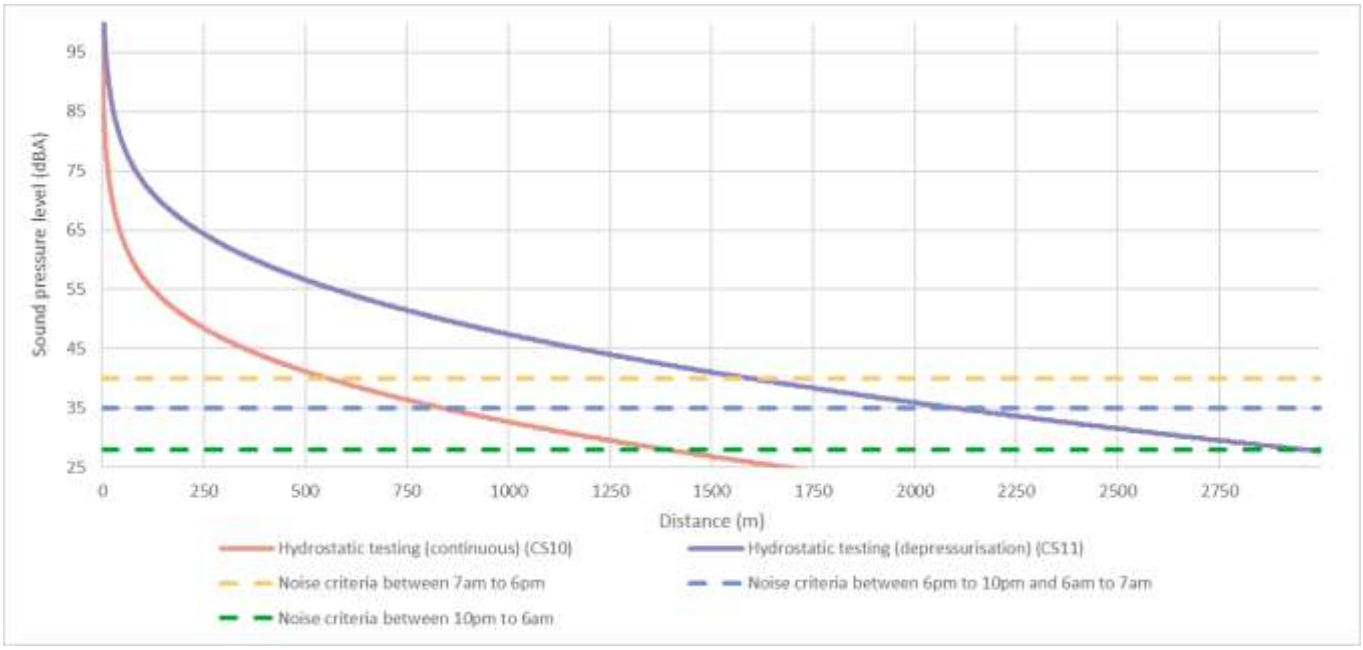


Figure 5.1 Predicted sound pressure level over distance for hydrostatic testing activities

Duration of predicted noise levels

Unlike transient construction activities, stationary construction works occur at fixed locations for extended periods of time:

- Watercourse and road open cut crossings, tie-ins and backfills would be undertaken during the eight-month construction period at defined locations, each lasting from a few days to about a week.
- Trenchless crossings typically take several days to several weeks to complete, depending on the methodology, specific site conditions and crossing length.
- Establishment of construction facilities would require about one month and all construction facilities are anticipated to be operational for the duration of the construction program, being about 18 months.
- Hydrostatic testing is estimated to take about five to 10 days per test section. The test pressure would be sustained for the required period, after which the test section would be depressurised. Noise generated during depressurisation lasts about an hour.

Significance of predicted noise levels

Where noise levels are above the noise criteria, receptors could experience environmental nuisance in accordance with ESR/2016/1989. Exceedances are predicted during watercourse and road open cut crossings (CS06) and tie-ins and backfill (CS09) activities; however, these activities are expected to be short term.

Hydrostatic testing activities have the potential to cause environmental nuisance at up to four receptors, particularly during depressurisation once the hydrostatic testing activities (CS11) are complete.

Alternative arrangements with these receptors would be established to manage environmental nuisance caused by construction noise.

5.1.3 Sleep disturbance impacts

To assess the potential for sleep disturbance, the predicted noise levels from the construction activities have been evaluated against the L_{Amax} sleep disturbance criteria as defined in section 3.4.2. An overview of these predicted L_{Amax} construction noise levels is provided in Appendix B.

Results of the assessment are summarised as follows:

- Trenchless crossing methods and operation of temporary accommodation facilities would occur between 6pm to 6am. The predicted L_{Amax} noise levels are well below the sleep disturbance criteria, and as such no sleep disturbance impacts are anticipated.

– L_{Amax} noise levels from hydrostatic testing activities are anticipated to be below the screening sleep disturbance criteria at the following distances:
    - Hydrostatic testing (continuous) (CS10): 126 m
    - Hydrostatic testing (depressurisation) (CS11): 834 m.

    A single sensitive receptor (R1) is located within 834 metres of the CRoW and could experience L_{Amax} noise levels of more than 55 dBA during hydrostatic testing depressurisation activities (CS11).

The potential for sleep disturbance impacts from out-of-hours works (specified activities as defined in Table 3.5) are limited to depressurisation once hydrostatic testing is completed (CS11).

Where L_{Amax} noise levels are above 55 dBA, alternative arrangements would be established to manage the potential for environmental nuisance at these receptors.

5.2 Construction vibration

5.2.1 Human comfort

The most vibration-intensive activities associated with construction of the project, other than blasting, are:

– the excavator with a hydraulic hammer within the project site, excluding access tracks, which has the potential to be above the human comfort vibration criteria should these works occur within 295 metres of sensitive receptors
– the compactor for road or access track works, which has the potential to be above the human comfort vibration criteria should these works occur within 235 metres of sensitive receptors.

No sensitive receptors have been identified within the safe-working distances of the excavator with a hydraulic hammer. However, receptor R4 is located within 30 metres of the landholder's access track which is proposed to be used for the project. This is within the safe-working distance of the compactor for road or access track works.

Alternative arrangements with these receptors would be established to manage the potential for environmental nuisance at this receptor.

5.2.2 Building damage

An excavator with a hydraulic hammer or compactor has the potential to be above the structural damage vibration criteria should these works occur within 20 or 15 metres of structures, respectively. No structures have been identified within these distances of the project site or access tracks, and as such, no adverse structural damage vibration impacts are anticipated.

5.2.3 Damage to utilities

Damage to utilities, such as underground services or buried pipework, could occur when vibration-intensive activities are undertaken in very close proximity to the utilities.

Intermittent vibrations from bulldozers or excavators with a hydraulic hammer or continuous vibrations from a compactor have the potential to be above the adopted guideline values should these works be undertaken within five metres of underground services.

The potential for vibration impacts to buried pipework is considered limited to where the project connects to the existing South West Queensland Pipeline. This pipeline is owned and operated by APA.

As gas pipelines are typically constructed of steel, the potential for vibration impacts is considered minimal. Where vibration-intensive works occur in very close proximity (i.e. <5 metres) to the other pipelines, APA would manage the potential vibration impacts internally.

5.3 Construction road traffic noise

The predicted construction road traffic noise levels at the nearest receptor and the increase in noise level along each road is presented in Table 5.5.

Several new access tracks would be required to provide access to the CRoW. However, none of these access tracks are located close to sensitive receptors and are therefore not anticipated to cause environmental nuisance.

The predicted noise levels show that road traffic noise levels are below the screening levels along all roads at the most affected receptors.

Table 5.5 Construction road traffic noise levels

Road	Distance from road edge to nearest receptor (m)	Screening level (dBA)	Existing traffic noise level at nearest residential receptor (dBA)		Traffic noise level during construction (dBA)		Increase in noise level (dB)	
			Day	Night	Day	Night	Day	Night
Warri Gate Road	13	68 dBA $L_{A10(18hour)}$	50.6	50.1	59.2	55.3	50.6	50.1
Tickalara Road	162		35.4	34.9	42.6	39	35.4	34.9
Wompah Gate Road	111		33.3	32.7	44.4	40.1	33.3	32.7
Bulloo Developmental Road (north of Warri Gate Road)	10		53.8	52.6	60.2	56.5	53.8	52.6
Bulloo Developmental Road (south of Warri Gate Road)	10		52.4	51	59.9	56	52.4	51
Bulloo Developmental Road (north of Thargomindah)	10		50.3	49	59.6	55.4	50.3	49
Cooper Developmental Road	18		51.3	49.9	55.9	52.6	51.3	49.9
Access tracks	45		39.9	39.4	48.6	44.6	39.9	39.4

5.4 Blasting

5.4.1 Airblast overpressure

The MIC for blasting activities is expected to be in the order of one to ten kilograms. Figure 5.2 shows the airblast overpressure levels over various distances due to blasting when considering a site constant of 50. Based on varying MIC mass, to be below the maximum level from ESR/2016/1989 Noise 5 for airblast overpressure, the following buffer distances are predicted:

– 220 metres distance when using a MIC of one kilogram
– 275 metres distance when using a MIC of two kilograms
– 380 metres distance when using a MIC of five kilograms
– 475 metres distance when using a MIC of ten kilograms.

A single receptor (R1) is located within the above buffer distances for a MIC of more than two kilograms from the pipeline alignment at a distance of about 254 metres. It is noted that the blast design is the responsibility of the blasting contractor. Once the exact location and details of any blasting are known, the distance to the nearest receptor would be used to estimate the charge mass that should not be exceeded so as to not cause environmental nuisance at sensitive receptors.

If blasting is required such that sensitive receptors have the potential to be experience environmental nuisance, a blast management plan will be prepared as described in section 9.

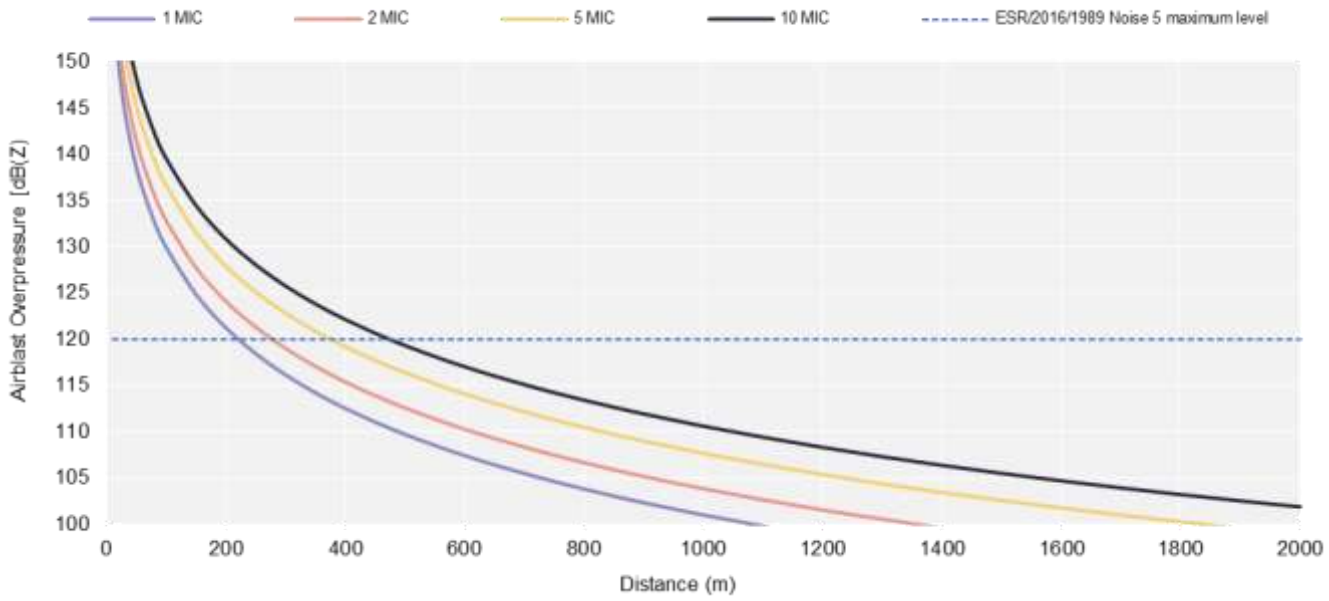


Figure 5.2 Predicted airblast overpressure over distance with varying MICs

5.4.2 Ground vibration

Predicted ground vibration levels are based on varying MIC sizes and an 'average' site specific constant (K_g) of 1,140. Figure 5.3 shows the predicted ground vibration levels. Based on varying MIC mass, to be below maximum level from ESR/2016/1989 Noise 6 for ground vibration, the following buffer distances are predicted:

– 20 metres distance when using a MIC of one kilogram
– 30 metres distance when using a MIC of two kilograms
– 45 metres distance when using a MIC of five kilograms
– 60 metres distance when using a MIC of ten kilograms.

As no sensitive receptors are located within 60 metres of the pipeline alignment, ground vibration impacts from blasting are not anticipated.

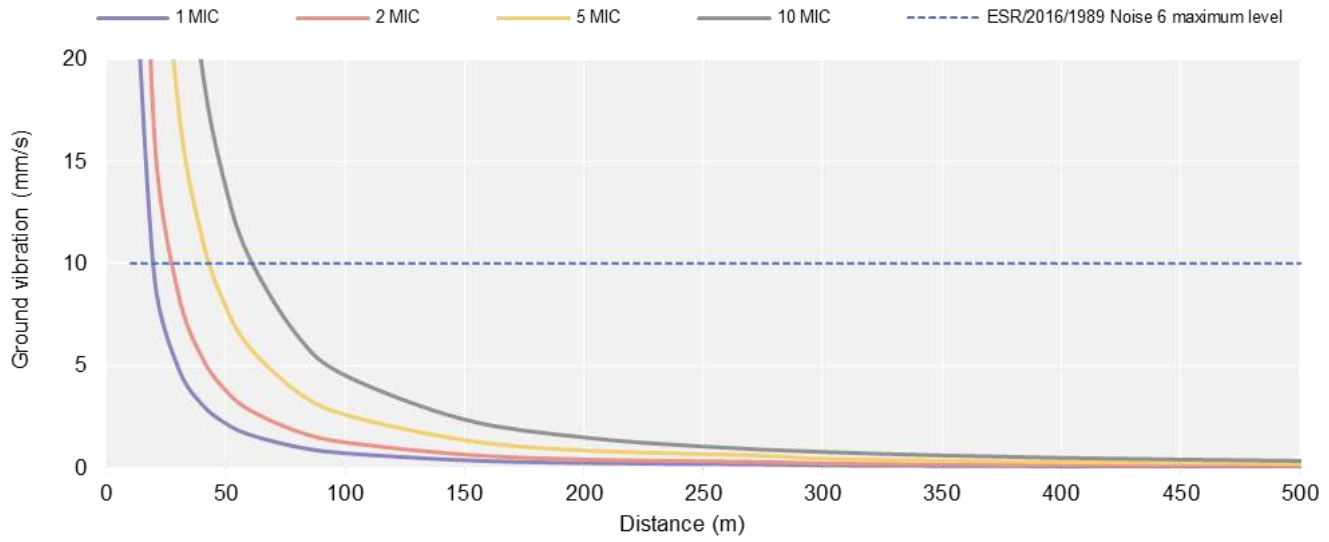


Figure 5.3 Predicted ground vibration at distances with varying MICs

6. Operation impacts

The only potential for operational noise would be due to gas releases during routine pipeline cleaning activities at scraper stations. However, given that the project connects to the existing Meadows scraper station, these maintenance activities are consistent with the existing use of this scraper station. The nature, frequency and duration of gas releases would not result in a material change to the existing noise emission from this scraper station. Therefore, no noise impacts due to operation of the project are expected.

7. Cumulative impacts

Cumulative impacts can be defined as the successive, incremental and combined effect of multiple impacts, which may in themselves be minor, but could become significant when considered together.

No relevant major future projects in the vicinity of the project site have been identified from the Queensland Department of Housing and Public Works website that would be developed concurrently with the project. Accordingly, cumulative noise and vibration impacts are not anticipated.

If any projects were to occur concurrently with the project, cumulative impacts are not anticipated to be significant due to:

– the proposed rate of construction, resulting in short duration of construction disturbance in the vicinity of any sensitive receptor
– low number of sensitive receptors close to the project and the distance to these receptors
– limited impacts identified in this assessment.

Accordingly, cumulative construction noise impacts are not anticipated.

8. Decommissioning impacts

At the end of the project's operational life, decommissioning would be undertaken in accordance with the structured, risk-based process outlined in section 4.9 of the Environmental Authority Supporting Information Report as required by applicable legislation and industry standards (currently the *Petroleum and Gas (Production and Safety) Act 2004 (Queensland),* and AS 2885). This process involves a safety management study, segment analysis and preparing an abandonment plan, which together manage that potential risks (including environmental and safety risks) are identified, assessed and managed.

Specific decommissioning activities would be determined through this process and would generally involve reducing remaining gas in the pipeline as much as possible; managing residual gas; disconnecting and removing surface facilities; and, where required by the segment analysis and abandonment plan, cutting, capping and filling sections of the pipeline. The pipeline would be left in place to minimise land disturbance and only limited areas would be subject to surface works.

Activities with the potential to result in noise and vibration impacts (if inadequately managed) include:

– excavation of bell holes and cutting/capping pipeline sections, involving diesel-powered machinery similar to that used during construction
– removal of surface facilities and transport of materials, which would involve truck movements and equipment operation
– residual gas management, which may (depending on the outcomes of the safety management study and abandonment plan) involve controlled release or combustion using portable equipment
– general site works, including operation of machinery.

Potential noise impacts associated with decommissioning include:

– short-term increases in daytime noise levels during excavation and removal of infrastructure
– localised noise from diesel machinery operation and, if required, controlled release or combustion of residual gas.

These activities would use equipment comparable to that used during construction; however, decommissioning works would be less intensive than construction activities, involving fewer personnel, less equipment and shorter durations of work at any given location (typically lasting less than one week). Although maximum noise levels may be similar to those experienced during construction, the potential impact would be reduced due to the limited scope and temporary nature of the works.

Measures to manage potential noise and vibration generating activities during decommissioning would be defined in the decommissioning environmental management plan, which would include a noise and vibration subplan adapted from the construction noise and vibration management plan. The plan would outline specific measures to manage and minimise noise and vibration impacts, including:

– scheduling noisier activities during standard hours where feasible
– arrangements for consultation with affected sensitive receptors, including notification and complaint handling procedures
– measures to manage potential noise impacts
– monitoring noise levels where required to confirm compliance with relevant noise criteria.

The plan would be developed in accordance with current regulatory and best practice requirements and tailored to the nature and location of decommissioning activities. Given the short duration, localised nature and lower intensity of decommissioning activities and with implementation of the above processes and measures, no significant noise or vibration impacts are expected at sensitive receptors.

9. Recommended mitigation and management measures

9.1 Approach to mitigation

Due to the nature of construction, it is inevitable that impacts arise where construction occurs near sensitive receptors. During construction, some sensitive receptors may experience environmental nuisance during certain times and certain construction activities.

In accordance with the noise management hierarchy detailed in ESR/2016/2357, the project avoids impacts where practicable by planning works away from sensitive receptors where feasible and scheduling the works during less sensitive time periods where practicable.

Where impacts cannot be avoided, mitigation focuses on minimising disruption through project-specific controls. In particular, impacts are reduced by maintaining a fast-moving work front, which limits the duration of exposure at any one receptor and by implementing respite periods between rostered working periods. Additional minimisation measures include sequencing higher-noise tasks to daytime periods where practicable at nearby sensitive receptors.

To manage residual impacts, and to address the potential for residential receptors to experience construction noise levels above the criteria, a construction noise and vibration management plan (CNVMP) will be developed and implemented as part of the CEMP. The CNVMP will identify high-noise activities and prescribe reasonable and practicable work practices to reduce their impact, and will include notification, consultation, and alternative arrangement procedures where exceedances are predicted or measured.

Potential impacts of specified activities during out-of-hour works are limited to hydrostatic testing activities should these occur close to sensitive receptors. The potential for impacts, including sleep disturbance impacts, will be managed by ensuring noise generating equipment is located outside of the buffer distances presented in section 5.1.2 and by scheduling depressurisation activities between 7am to 6pm, unless alternative arrangements are in place.

Vibrations during access tracks and road upgrades or maintenance may be above the vibration limit for human comfort at a single receptor. To mitigate this, less vibration intensive equipment would be used near this receptor, or vibration intensive works such as use of compactors will be undertaken during less sensitive time periods or as agreed through an alternative arrangement.

Where noise and vibration levels are anticipated to be above the noise criteria, alternative arrangements will be established to manage environmental nuisance at affected receptors.

Blasting may be required in areas of hard rock. If required, a blasting management plan will be developed to confirm compliance with the ESR/2016/1989 airblast overpressure and ground vibration maximum levels. This plan will include site-specific charge mass limits, monitoring and community notification procedures.

The recommended mitigation measures are summarised in section 9.2.

9.2 Recommended mitigation measures

Mitigation measures to minimise or manage impacts to noise and vibration are recommended in Table 9.1.

Table 9.1 Noise and vibration mitigation measures

Impact/issue	Recommended mitigation measure	Timing
Construction noise and vibration management	A construction noise and vibration management plan will be prepared and implemented as part of the CEMP. The plan will identify: – potentially high noise and vibration generating activities associated with construction – reasonable and practicable measures to manage identified impacts which include, but are not limited to, the best practice mitigation measures provided in Table 9.2 – arrangements for consultation with affected sensitive receptors, including notification and complaint handling procedures – an out of hours work protocol.	Pre-construction, construction
Out of hours work	Out-of-hours work will be subject to management controls, including alternative arrangement and communication requirements in accordance with APA's communication procedures, where relevant. These controls and requirements will be specified in the CNVMP.	Pre-construction
Construction vibration	Where vibration intensive activities are planned within the safe-working distances, reasonable and practicable mitigation measures will be implemented. These measures will include, but not limited to: – alternative construction methods and equipment with lower source vibration levels will be investigated and implemented, where practicable – schedule the use of vibration-intensive equipment during the least sensitive times of the day.	Pre-construction, construction
Blasting	The need for blasting will be confirmed during detailed construction planning. In the event that blasting is required, the blast parameters will be designed and allowable charge mass confirmed, to achieve the maximum airblast overpressure and ground vibration levels in accordance with the *Streamlined model conditions for petroleum* activities (ESR/2016/1989) (DESI, 2024). This will include trial blasting and airblast/vibration monitoring to confirm site-specific constraints and refine safe blasting distances. If blasting is required, a blasting management plan will be prepared and implemented as part of the construction noise and vibration management plan. The plan will define: – allowable charge mass – detonation methods and debris control – timing of blasting and periods of relief (if required) – safety requirements.	Pre-construction
Decommissioning noise	A noise and vibration subplan will be included in the decommissioning environmental management plan and implemented during decommissioning to minimise the potential for impacts on sensitive receptors. Measures will include, but not be limited to: – scheduling noisier activities during standard hours where feasible – arrangements for consultation with affected sensitive receptors, including notification and complaint handling procedures – measures to manage potential noise impacts.	Decommissioning

Table 9.2 Best practice mitigation and management options

Control type	Recommended mitigation measure	Timing
Administrative procedures	Opportunities to reduce construction noise levels through the implementation of administrative controls will be examined, confirmed and implemented where reasonable and practicable and may include, but not be limited to: – inductions for site personnel will include noise mitigation techniques/measures to be implemented when on site and accessing the site – ongoing education of supervisors, operators and sub-contractors on the need to minimise noise and vibration through toolbox meetings and on-site training – avoid the use of radios, stereos, shouting or slamming vehicle doors where neighbours may be affected.	Pre-construction, construction
Plant and equipment	Where residential receptors are predicted to experience noise levels above the noise criteria, all reasonable and practicable mitigation measures to reduce noise at the source will be considered, confirmed and implemented where reasonable and practicable and may include, but not be limited to: – selecting plant and equipment based on noise and vibration emission levels – turning off plant and equipment or throttling them down to a minimum when not in use – selecting appropriately sized equipment for the task, such as vibratory compactors and rock excavation equipment – avoiding use of plant and equipment simultaneously adjacent to sensitive receptors where possible – machinery will be operated in a manner which reduces maximum noise level events such as shaking excavator buckets, dropping materials into trucks from a height or steel on steel contact – plant and equipment will be well maintained to ensure that excessive noise is not generated – avoid dropping materials from a height or metal-to-metal contact on equipment.	Pre-construction, construction
Transmission path	Where residential receptors are predicted to experience noise levels above the noise criteria, all reasonable and practicable mitigation measures to reduce noise in the transmission path will be considered, confirmed and implemented where reasonable and practicable and may include, but not be limited to: – the offset distance between noisy plant items and sensitive receptors will be maximised, where reasonable and practicable – portable temporary noise screens will be erected adjacent to stationary or long term static noise sources, or noise generating items, where reasonable and practicable.	Pre-construction, construction

10. Conclusion

The noise and vibration assessment has identified that the project has the potential to result in noise levels above the noise criteria during construction, particularly for transient pipeline construction activities.

For transient construction works between 6am to 6pm, a single residential receptor (R1) is predicted to experience noise levels above the noise criteria of 40 dBA during all intensity transient pipeline construction activities (CS01 to CS04). Access track and road upgrade or maintenance works (CS05) are predicted to exceed the noise criteria at a single residential receptor (R4). Between 6am to 7am, up to three residential receptors are anticipated to exceed the noise criteria during access track and road upgrade or maintenance works. During out-of-hours works between 6pm to 6am, a single residential receptor (R1) (unoccupied) is predicted to experience noise levels above the noise criteria.

The predicted noise levels would be of short duration as construction progresses along the pipeline alignment at a rate of about 2.5 km per day. Impacts at any one location from a single construction activity are expected to be brief (typically one to two days per construction scenario); nonetheless, mitigation measures to minimise noise causing environmental nuisance would be implemented during construction, unless alternative arrangements with receptors have been established.

For stationary construction works, a single residential receptor (R1) is predicted to experience noise levels above the noise criteria during watercourse and road open cut crossings (CS06) and tie ins and backfill (CS09) between 6am to 6pm. Noise levels from other stationary construction works are predicted to be below the noise criteria at all sensitive receptors. However, hydrostatic testing (depressurisation) has the potential to result in noise levels above the criteria at distances of up to 2,948 metres should this occur between 10pm to 6am. These potential impacts will be managed by ensuring noise generating equipment is located outside of the identified buffer distances and by scheduling depressurisation activities during project working hours, unless alternative arrangements with receptors have been established.

Vibration impacts are not anticipated to result in structural damage at any sensitive receptors or structures due to their distance from construction activities. A single receptor (R4) is located within the human comfort safe-working distance for compactor use during potential access track upgrades. Appropriate mitigation measures will be implemented if these works are required.

Construction traffic along Bulloo Developmental Road through Thargomindah is predicted to result in an increase in noise levels of 9 dB above existing traffic levels. However, the road traffic noise levels are anticipated to comply with the screening level and are unlikely to cause road traffic noise impacts.

If blasting is required, the blast parameters will be designed and allowable charge mass confirmed to achieve the requirements of the ESR/2016/1989. A single receptor (R1) is located within the airblast overpressure buffer distance if a charge mass of two kilograms or more is required. Site-specific charge mass limits will be determined to ensure compliance. No receptors are located within the ground vibration buffer distances.

Mitigation and management measures will include implementing a CNVMP to minimise environmental nuisance at sensitive receptors, with a nine-day respite period following each 21-day or 28-day mobilisation period, excluding specified activities as defined in Table 3.5. Where noise and vibration levels are anticipated to be above the noise criteria, alternative arrangements will be established to manage environmental nuisance at affected receptors.

Routine inspections and maintenance would use the existing Meadows scraper station and are not anticipated to result in a material change of noise from this existing scraper station. Therefore, no noise impacts due to operation of the project are expected.

No relevant major future projects in the vicinity of the project site have been identified that would be developed concurrently with the project. Accordingly, cumulative noise and vibration impacts are not anticipated.

Overall, while some temporary noise impacts are unavoidable during construction, the proposed mitigation and management measures would minimise disruption to sensitive receptors as far as reasonably practicable. With these measures in place, the project's noise and vibration impacts are considered manageable, allowing the project to proceed while maintaining an acceptable level of amenity for the surrounding community.

11. References

AS2187.2. (2006). *Explosives - Storage and use Part 2: Use of explosives.*

Australian Standard. (2010). *AS2436 - Guide to Noise Control on Construction, Maintenance and Demolition Site.*

British Standard. (2008). *BS 6472-1: Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting.*

British Standards. (1992). *BS6472: Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*

British Standards. (1993). *BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 – Guide to damage.*

British Standards. (2009). *BS5228-2: Code of Practice Part 2 Vibration for noise and vibration on construction and open sites - Part 2: Vibration.*

British Standards Institute. (2008). *BS6472: Guide to Evaluation of Human Exposure to Vibration in Buildings.*

DECCW. (2011). *NSW Road Noise Policy.*

Department of Transport, Welsh Office. (1988). *Calculation of Road Traffic Noise (CoRTN).*

DES. (2022). *Noise and Vibration EIS information guideline.*

DES. (2022). *Noise and vibration from blasting guideline.*

DESI. (2020). *Noise Measurement Manual.*

DESI. (2024). *Application Requirements for Petroleum Activities guideline.*

DESI. (2024). *Streamlined model conditions for petroleum activities.*

DETSI. (2025). *Prescribing noise conditions for environmental authorities for petroleum activities.*

Deutsches Institut für Normung. (2016). *DIN 4150-3 Vibrations in buildings – Part 3: Effects on structures.* DTMR. (2013). *Transport Noise Management Code of Practice Volume 1 - Road Traffic Noise.*

DTMR. (2023). *Transport Noise Management Code of Practice: Volume 2 - Construction Noise and Vibration.*

EPA. (2017). *Noise Policy for Industry.*

GHD. (2024). *Moomba to Wilton Pipeline – Modification 6 – Noise and Vibration Impact Assessment .*

GHD. (2025). *Narrabri Lateral Pipeline – Environmental Impact Statement - Technical Report 5 – Noise and Vibration.*

Nacap. (2022). *Drill and Blast Management Plan.*

New Hampshire Department of Transport. (2012). *Ground Vibrations Emanating from Construction Equipment Final Report.*

Roberts. (2009). *Construction noise and vibration impact on sensitive premises.*

RTA. (2001). *Environmental Noise Management Manual.*

TMR. (2013). *Transport Noise Management Code of Practice Volume 1 - Road Traffic Noise.*

Transport for NSW. (2026). *Construction Noise and Vibration Guideline (Roads).*

Tynans. (1973). *Ground Vibration Damaging Effects to Buildings.*

Appendices

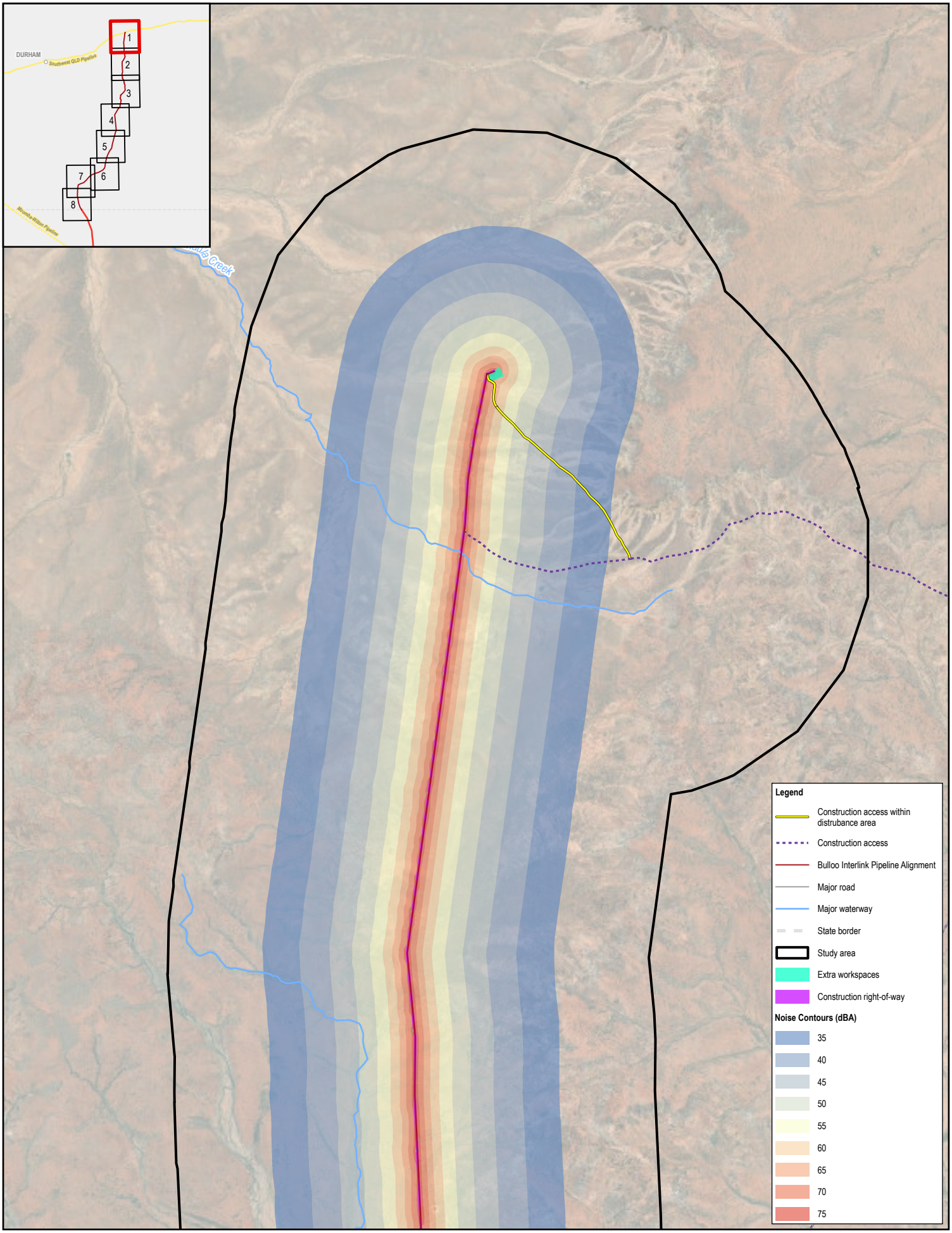
Appendix A

Construction scenarios equipment

Equipment	Sound power level (dBA)		Source	Construction scenarios																							
				Very high intensity transient pipeline construction works	High intensity transient pipeline construction works							Medium intensity transient pipeline construction works		Low intensity transient pipeline construction works													
				Pre-trenching (rock medium to hard)	Clear & Grade	Stringing	Mainline Welding	Trenching (other than rock)	Lower in	Backfill	Reinstatement	Bending	Coating	Survey	Cathodic Protection	Non-Destructive Testing	Access & CROW Maintenance	Watercourse and road open cut crossings	Trenchless crossings (HDD)	Trenchless crossings (Bores)	Tie Ins and backfill	Hydrostatic Testing	Hydrostatic Testing (depressurisation)	Scraper stations / above ground infrastructure	Construction of stockpiles/camps	Operation of stockpiles	Operation of temporary accommodation camps
	LAeq	*LAmax*	Source	CS01	CS02							CS03		CS04			CS05	CS06	CS07	CS08	CS09	CS10	CS11	CS12	CS13	CS14	CS15
4WD cars/utes	98	108	AS2436, L_{Aeq} is corrected for idling/heavy acceleration in a 15 minute period	2	4	2	4	5	2	2	2	2	3	3	1	3	4	2	2	2	3	2	2	2	1	1	1
Auger bore spread	111	117	NLP NVIA																	1							
Bending machine	94	104	NLP NVIA									2															
Blasting truck	109	115	NLP NVIA										2	2													
Bobcat with auger drill	102	108	NLP NVIA		1						1																
Bucket wheel trencher	117	125	NLP NVIA					1																			
Chain trencher	117	125	NLP NVIA	1																							
Compactor	113	125	NLP NVIA														1										
Compressor	101	107	AS2436																					2			
Compressors and pumps	106	107	AS2436																			2	2				
Container refrigeration system	95	100	APA M2W MOD 6																								1
Dining / wet mess hall	92	105	APA M2W MOD 6																								1
Dozer	116	125	NLP NVIA	1	2					1							1										
Excavator 30T	110	115	AS2436		1					2	2						1	3	1	1				1	2	3	
Excavator 45T	113	118	AS2436				1	3	1												2						
Excavator 45T with rock hammer	127	130	CNVG	1																							
Excavator with vacuum lift	113	118	AS2436			2																					
Forklift	106	111	AS2436																								
Generator	99	105	AS2436																							1	
Generator 100 KVa	91	100	APA M2W MOD 6																								1
Generator 320 and 350 KVa	97	105	APA M2W MOD 6																								2
Grader	113	118	AS2436	1	2					2	2						1										
HDD Spread	110	115	NLP NVIA																1								
Medium truck	103	108	AS2436			2	2				1		2	2				1									
Membrane bioreactor	100	105	APA M2W MOD 6																								2
Mobile crane	98	115	AS2436																					1			
Pipe facing machine	109	115	BS5228				1																				
Post Driver	117	125	NLP NVIA								1																
Screener	109	115	BS5228																								
Shakedown/washdown pad	100	106	NLP NVIA																							1	1
Sideboom	110	115	NLP NVIA						4			1						1			2						
Spray machine	109	115	NLP NVIA																								
Tracked dumper	108	118	BS5228										2	2													
Tractor	108	118	BS5228			2																					
Truck (>30T)	108	115	AS2436			2											1	1	1	1				1	2		
Vacuum truck	109	115	CNVG		1														1	1							
Water truck	108	115	AS2436														1								1		
Welding machine	105	115	NLP NVIA																		1						
Wheel Loader	105	115	AS2436														1										
Pipeline depressurisation	125	130	Estimated based on provided info APA																				1				
			Total	**128**	**121**							**113**		**103**			**119.0**	**117**	**114**	**115**	**118**	**109**	**125**	**113**	**116**	**115**	**106**

Appendix B

Predicted construction noise levels



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

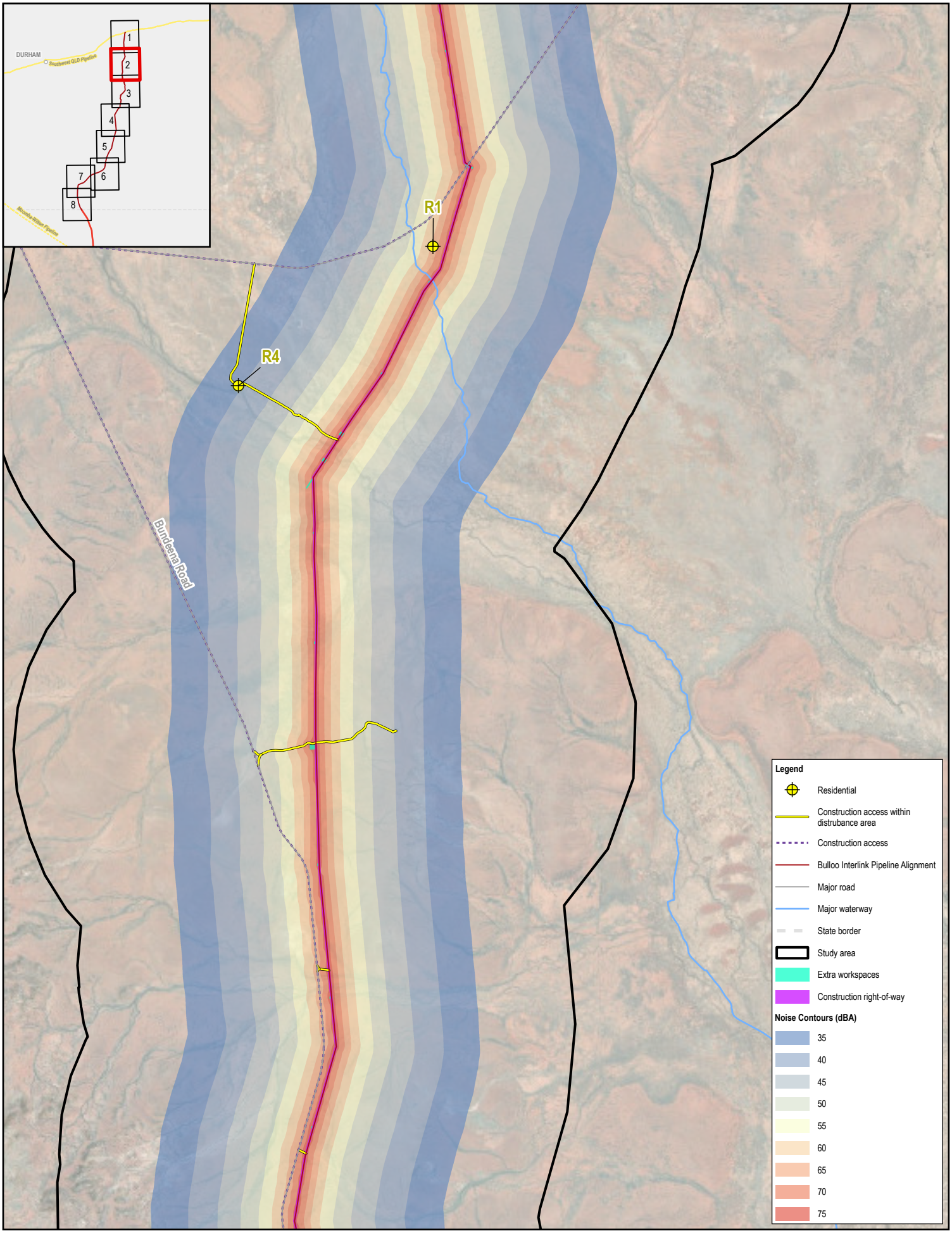
Project No.	**12661648**
Revision No.	**0**
Date	**17/06/2026**

Sheet 1 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:41

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

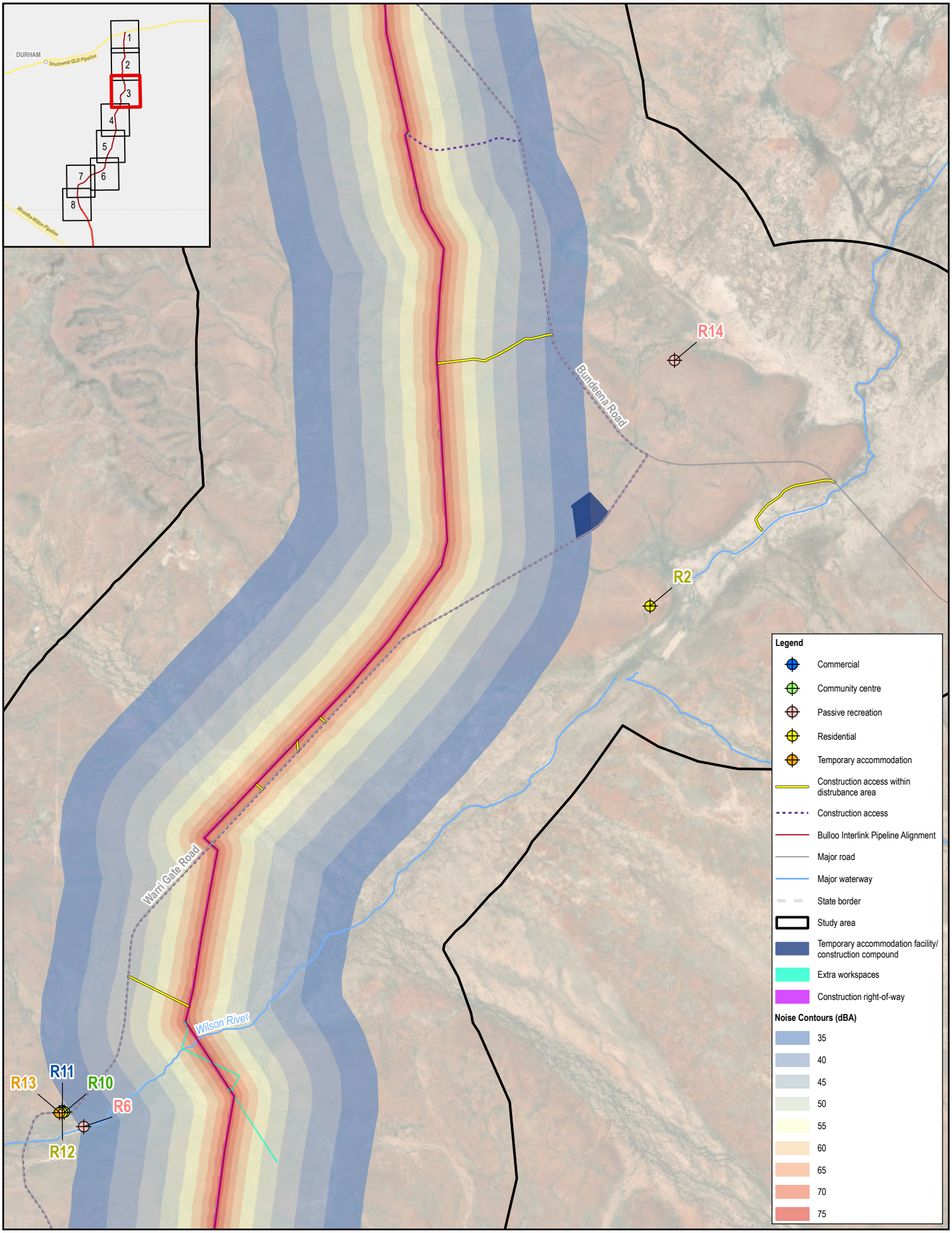
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:41

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

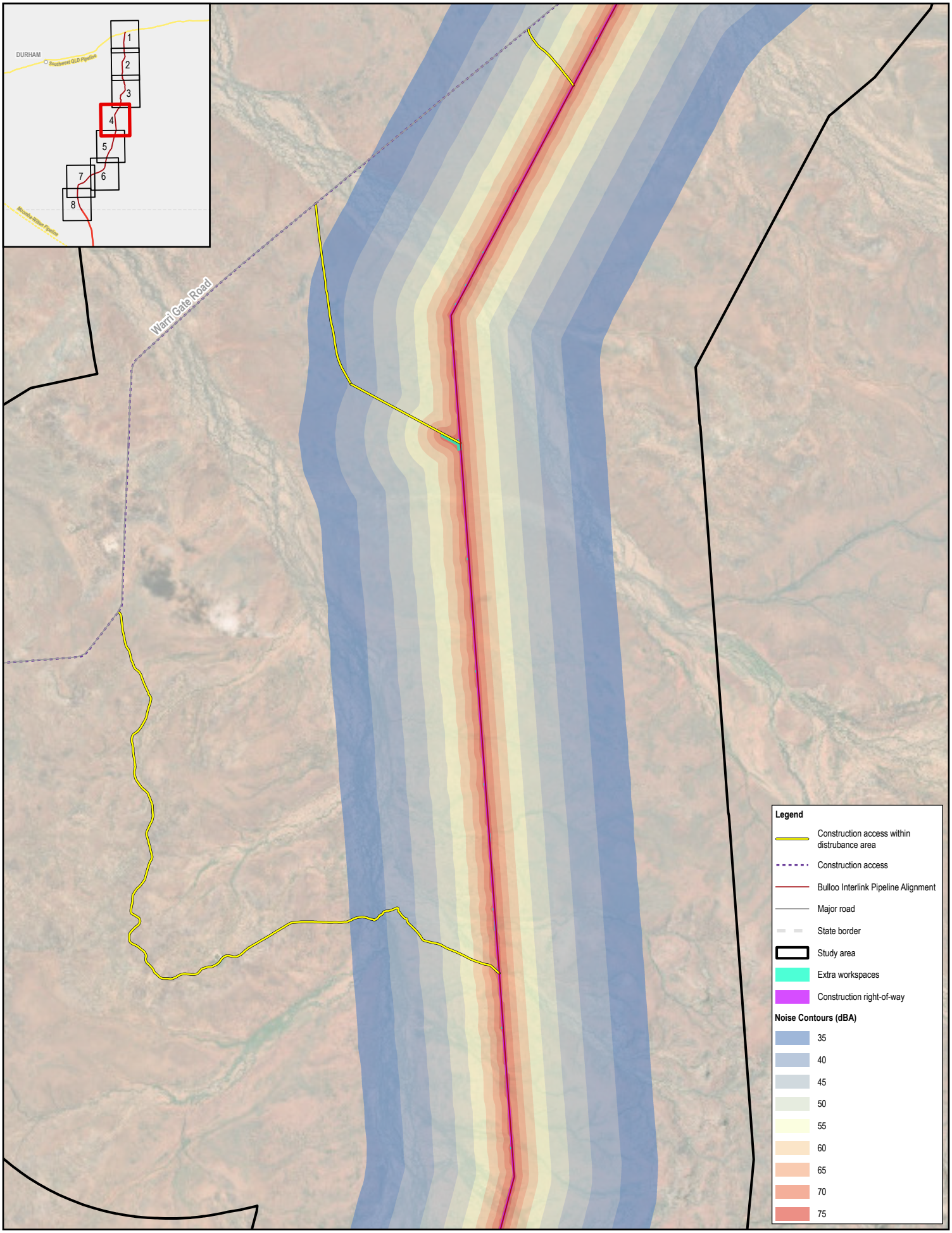
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:42

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

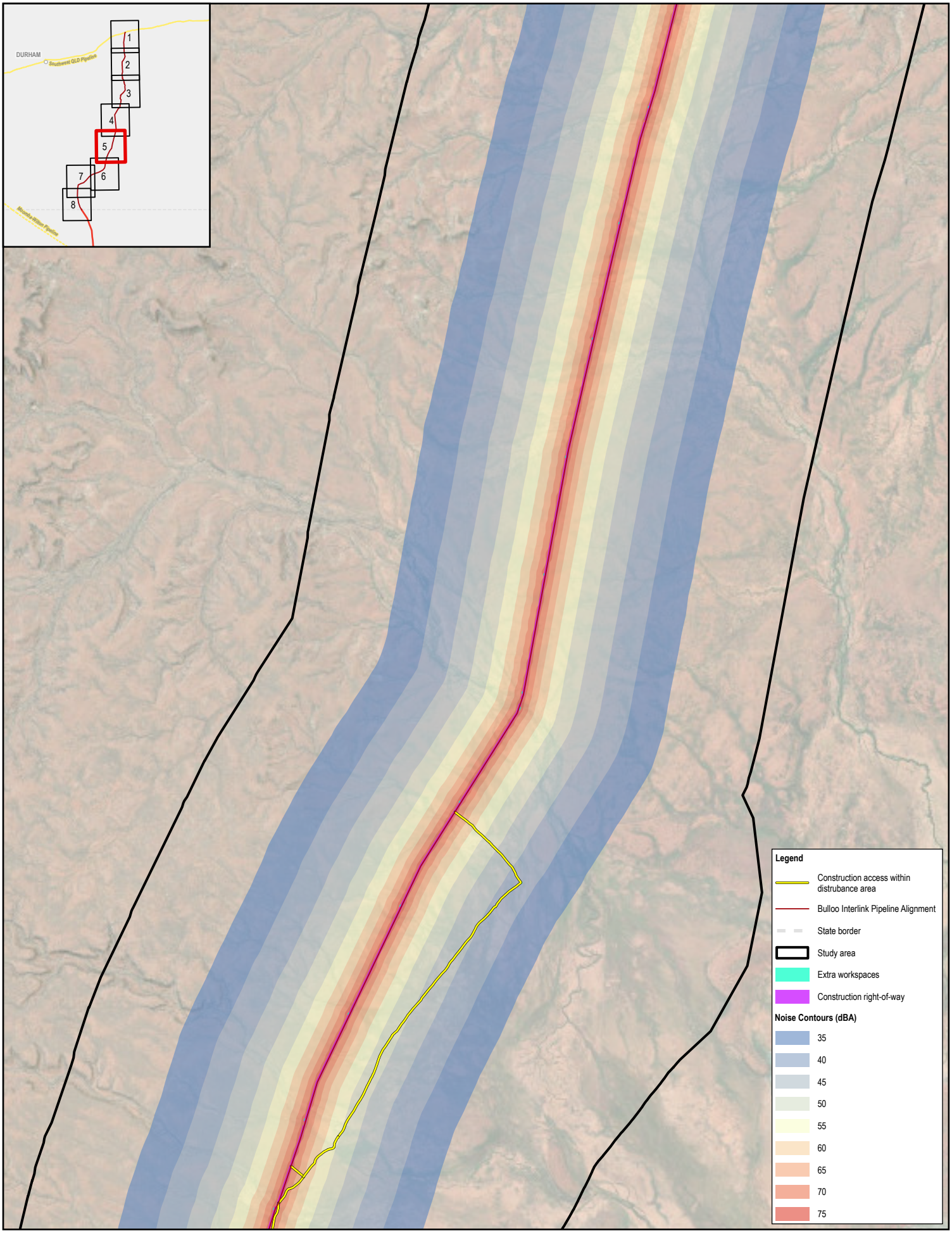
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:43

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

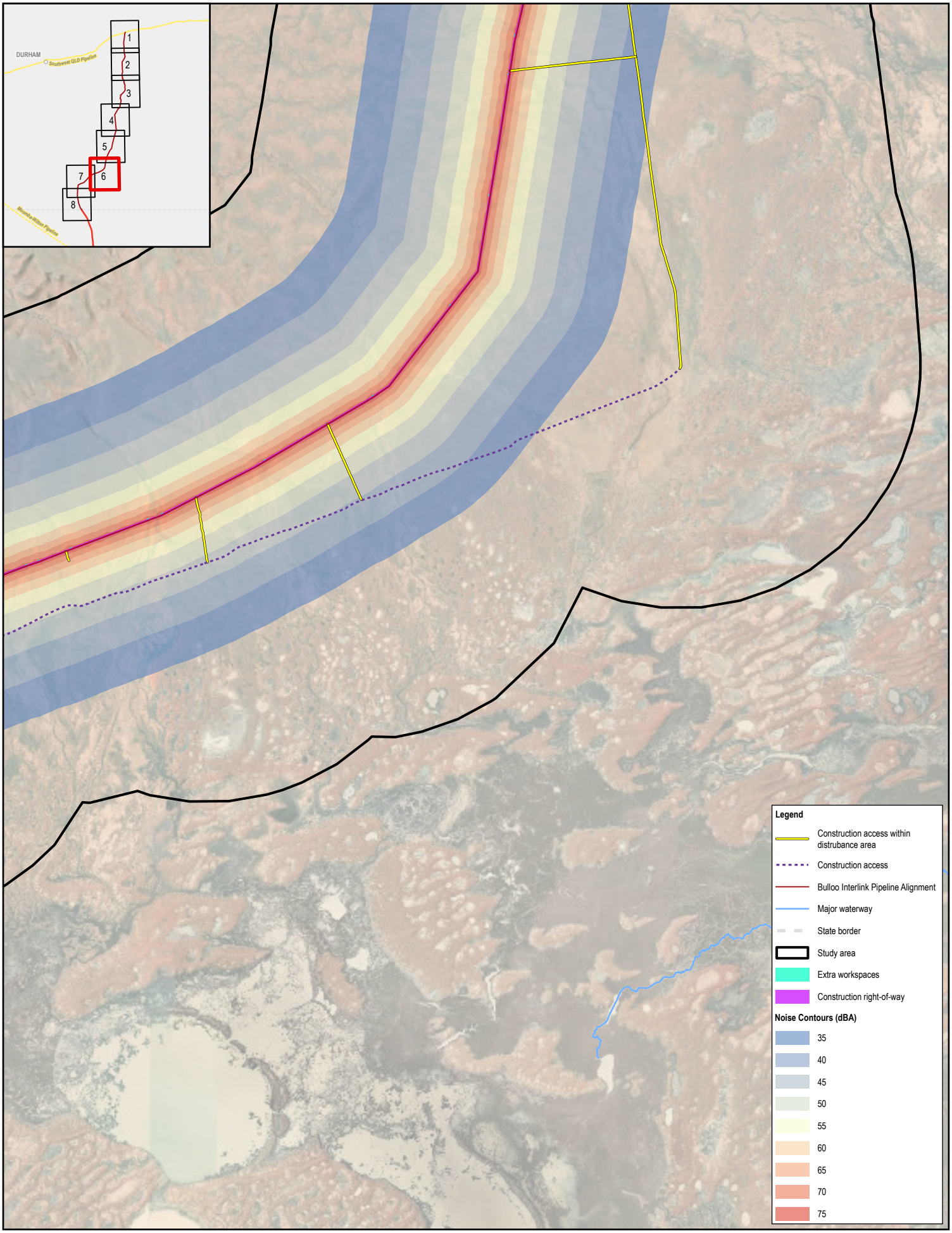
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 5 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:44

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

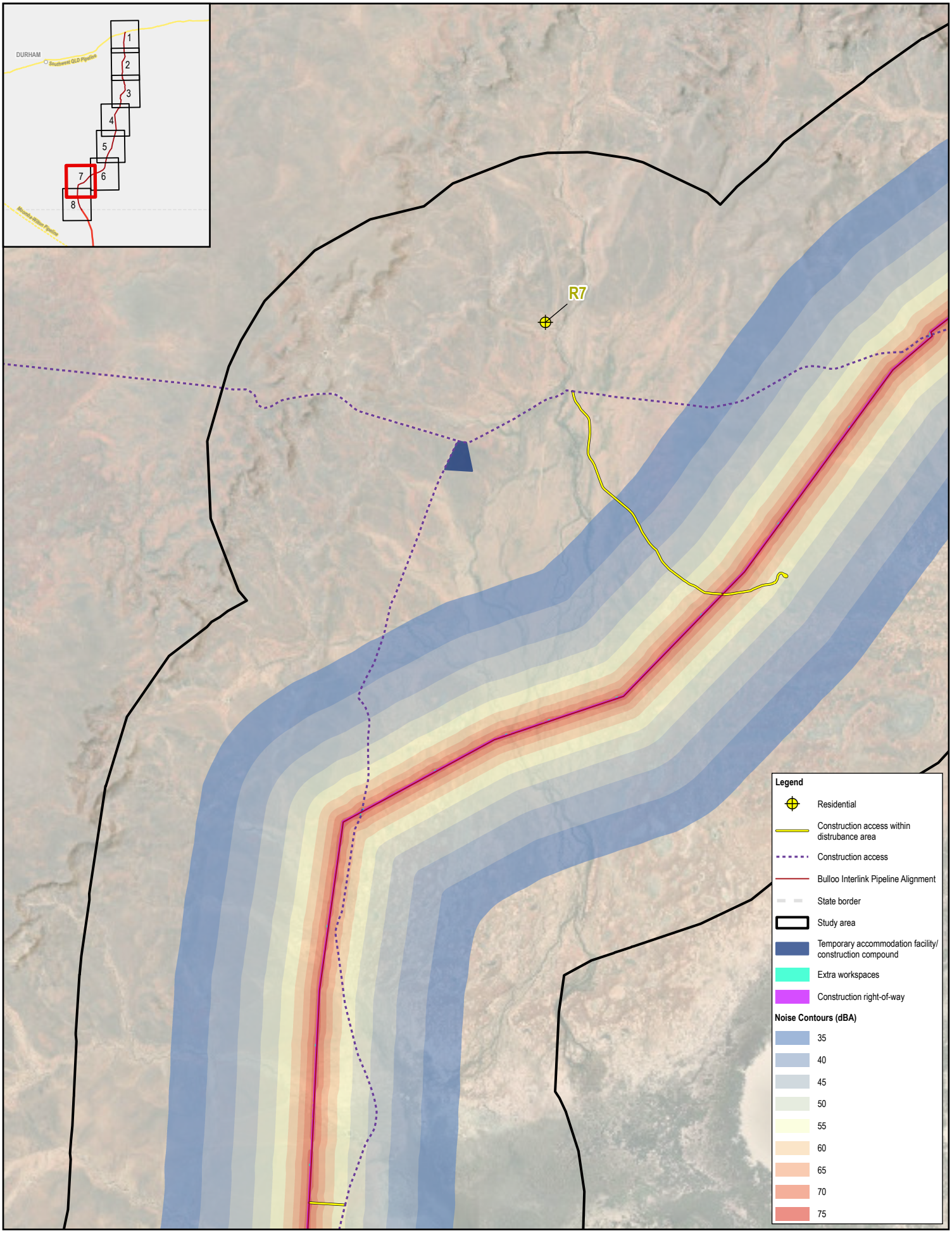
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:45

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

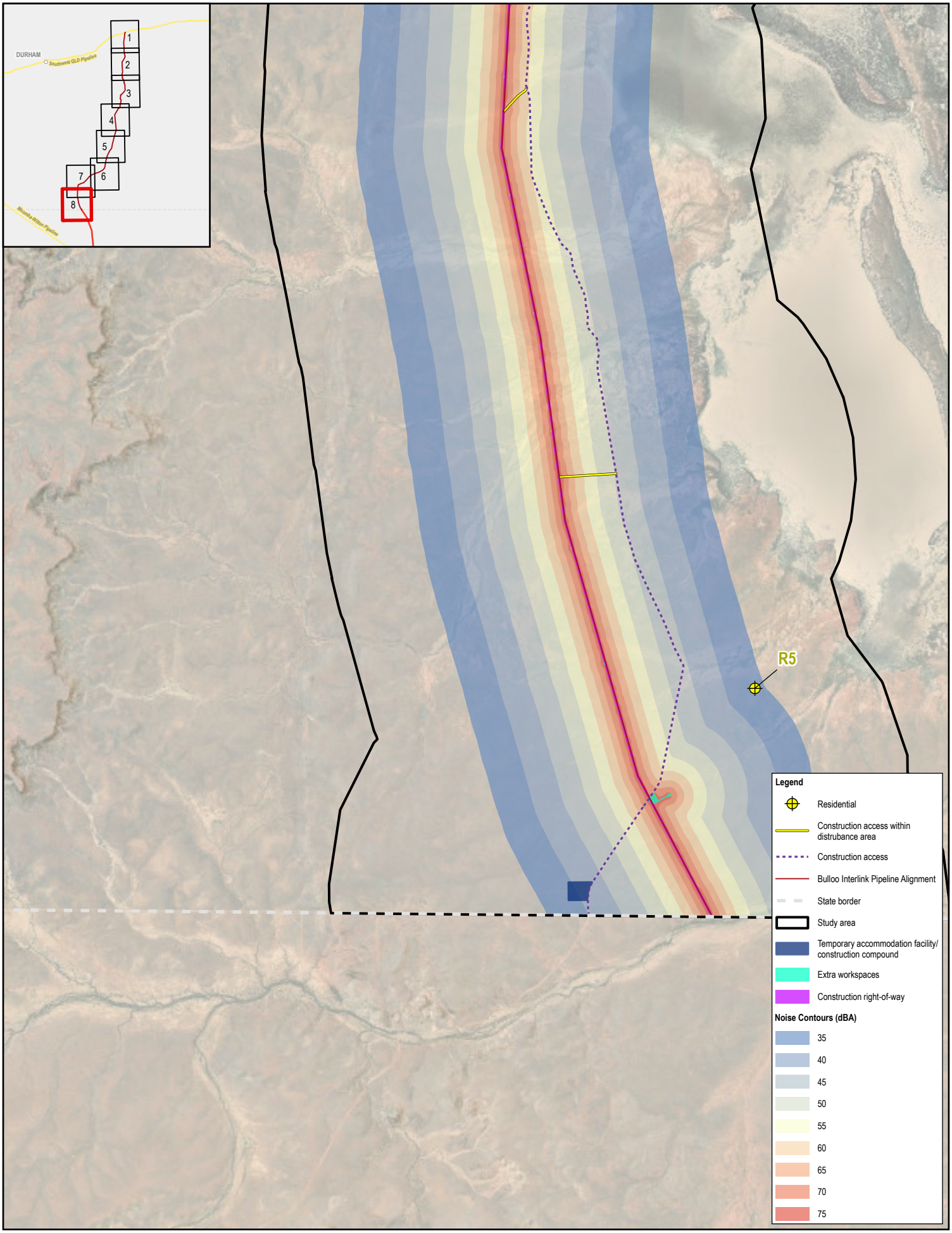
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 7 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:46

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Very high intensity pipeline works (CS01)

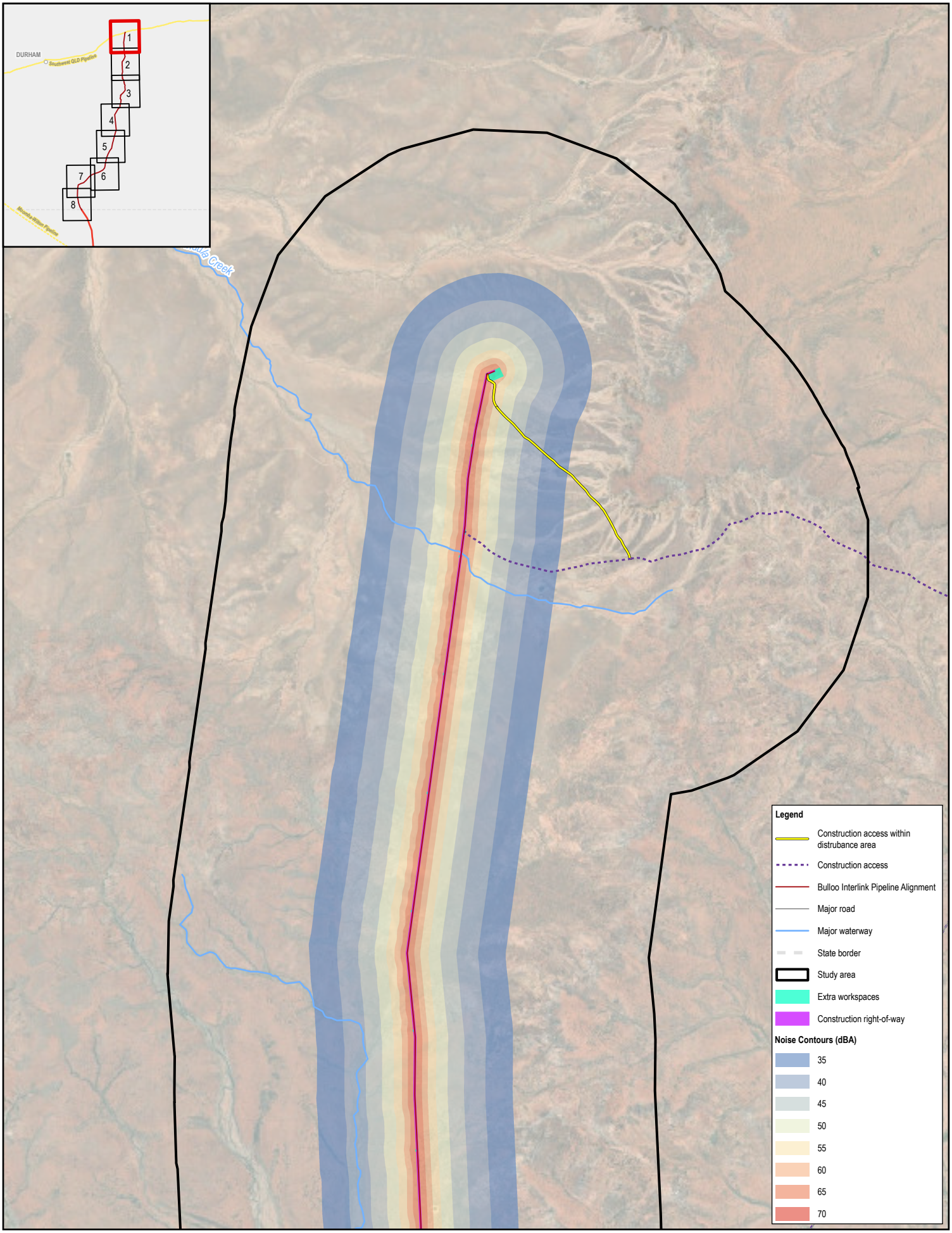
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 8 / 8

Figure B.1

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:46

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

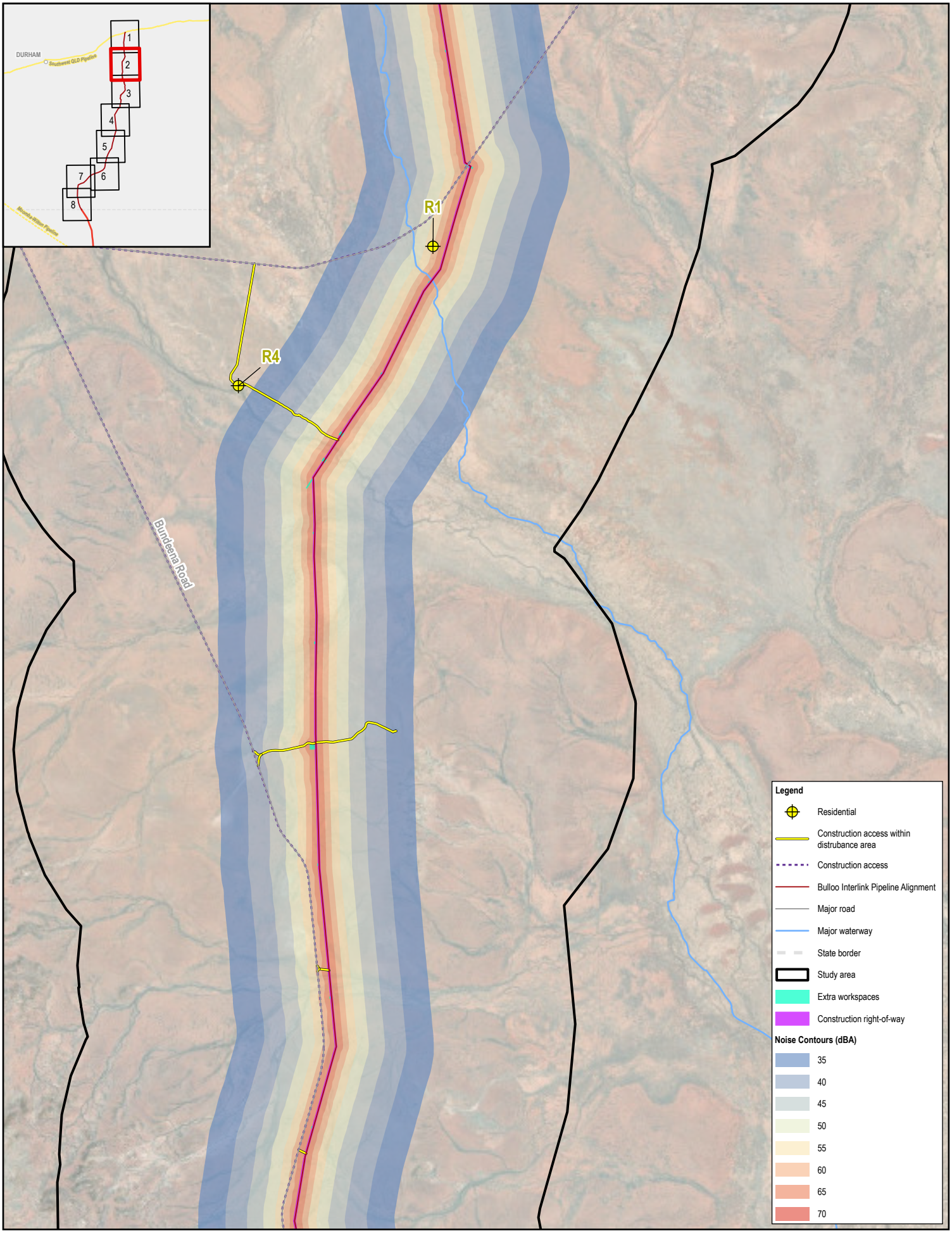
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:50

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

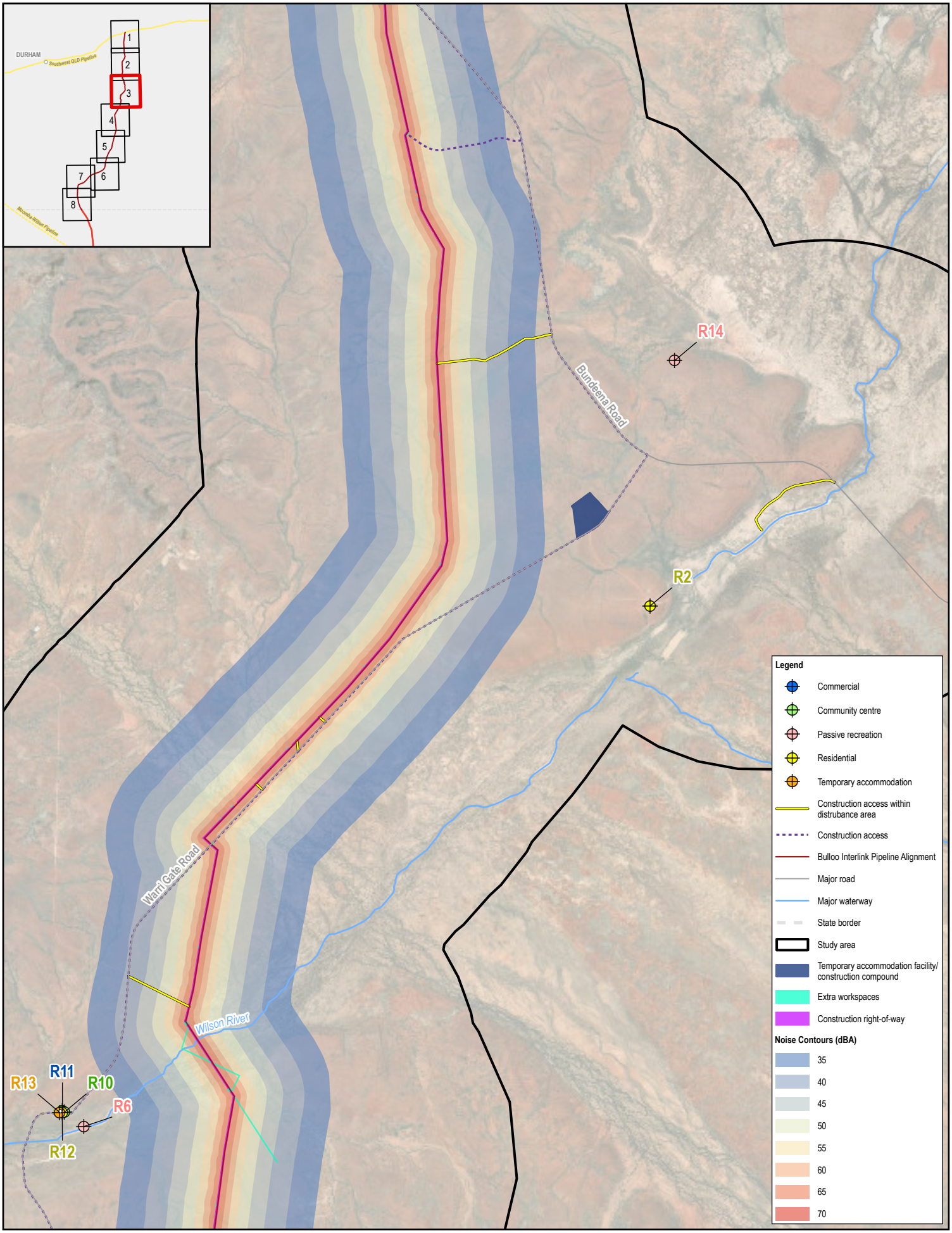
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:51

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

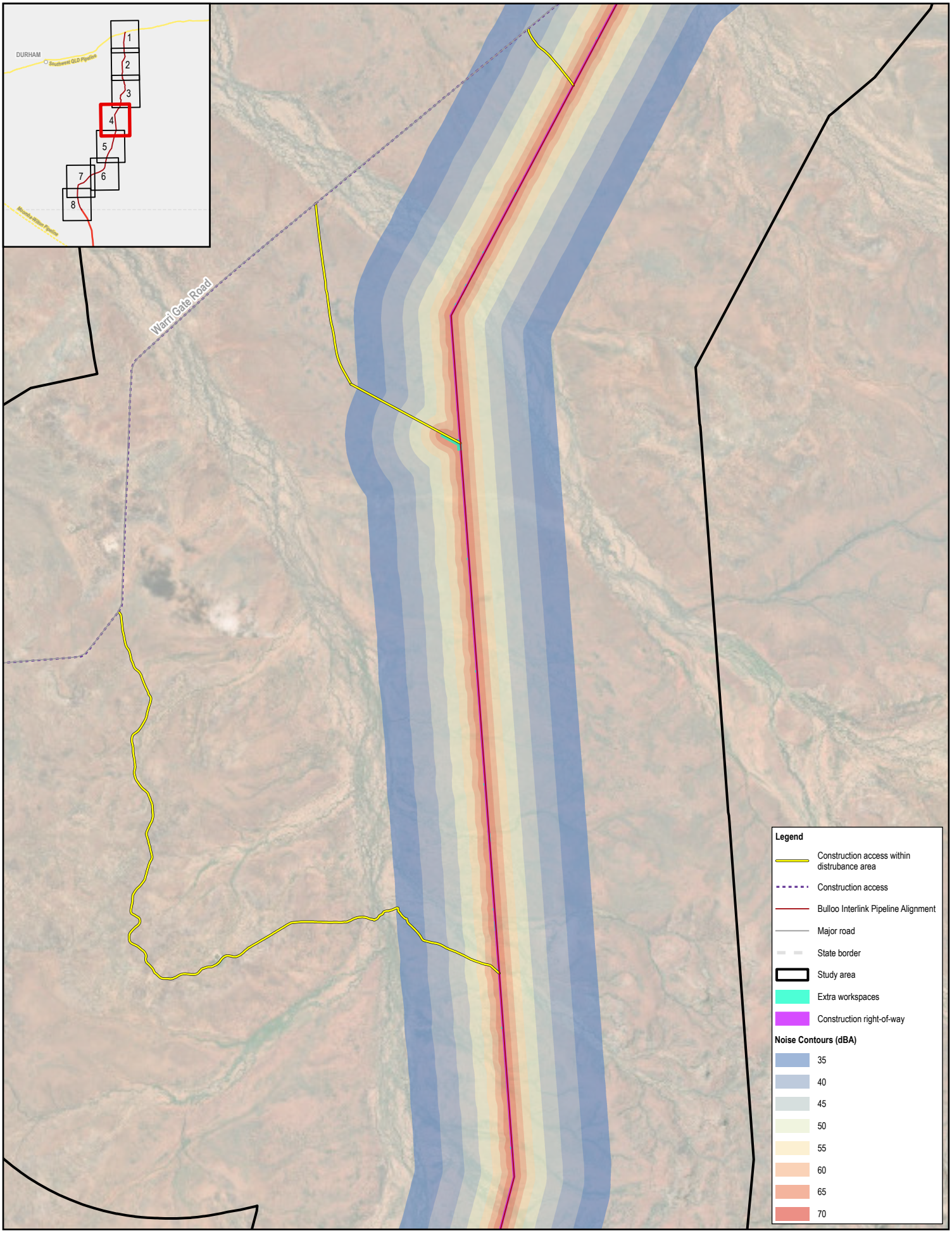
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:52

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

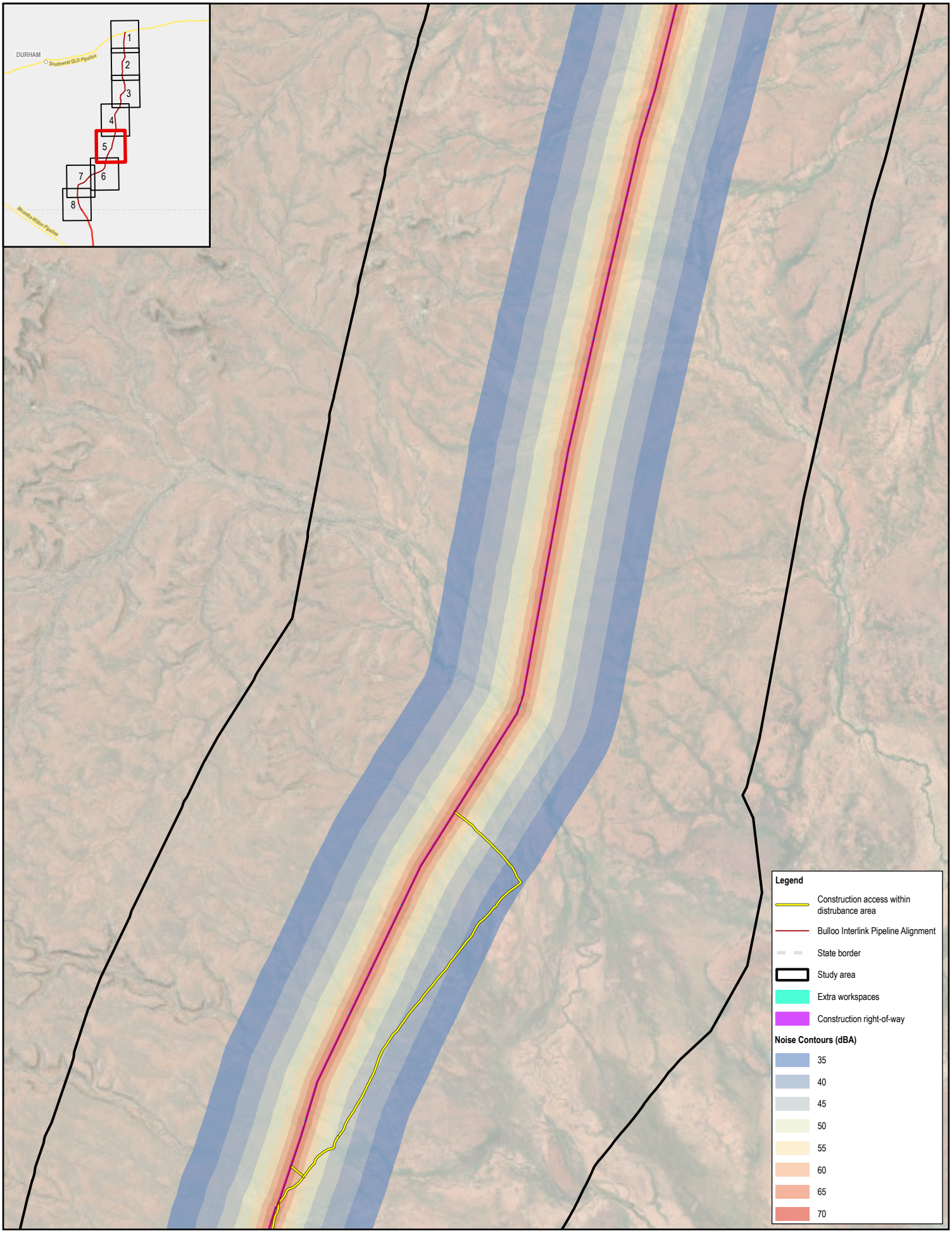
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:52

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

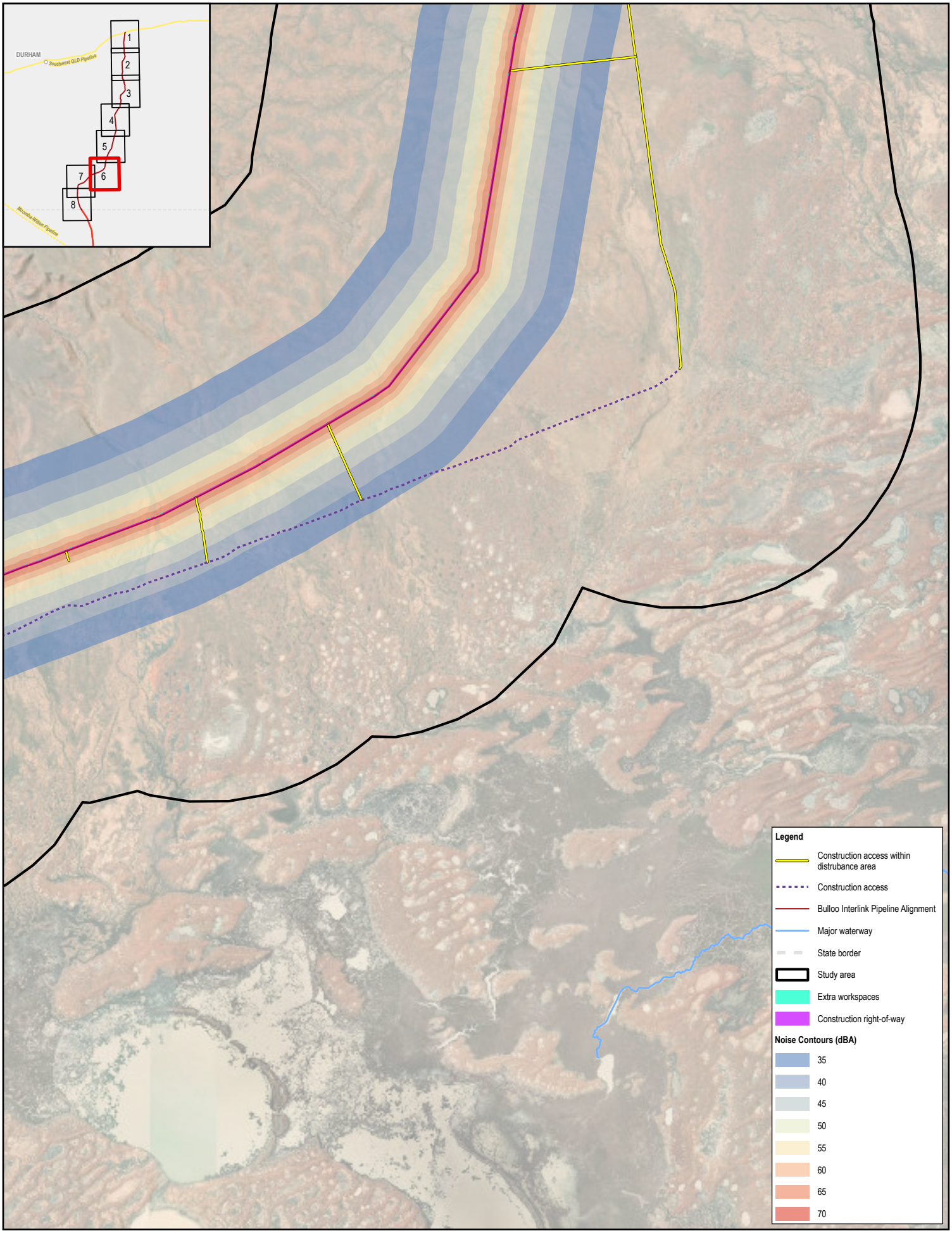
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 5 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:54

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

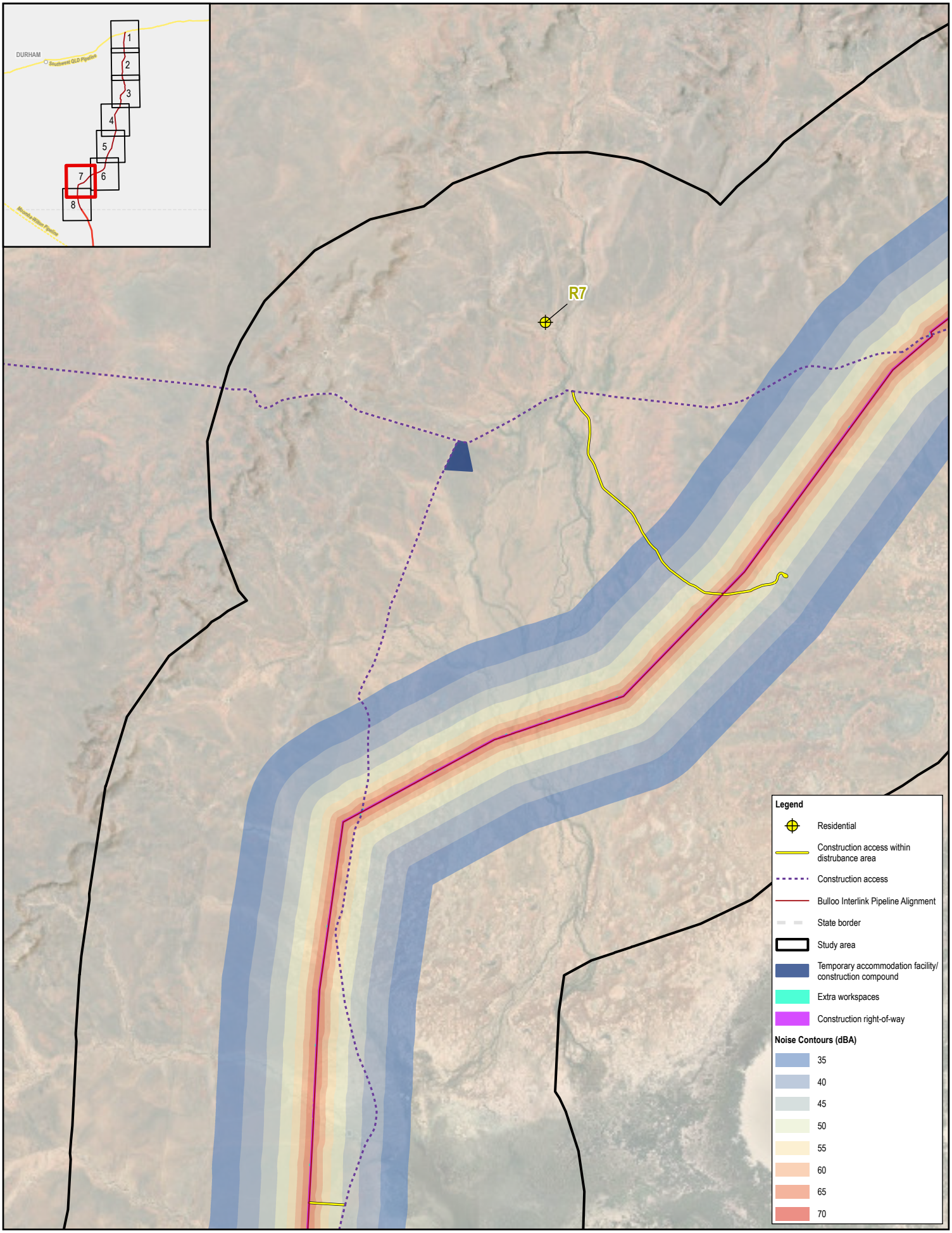
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 6 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:54

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Project No. 12661648
Revision No. 0
Date 17/06/2026

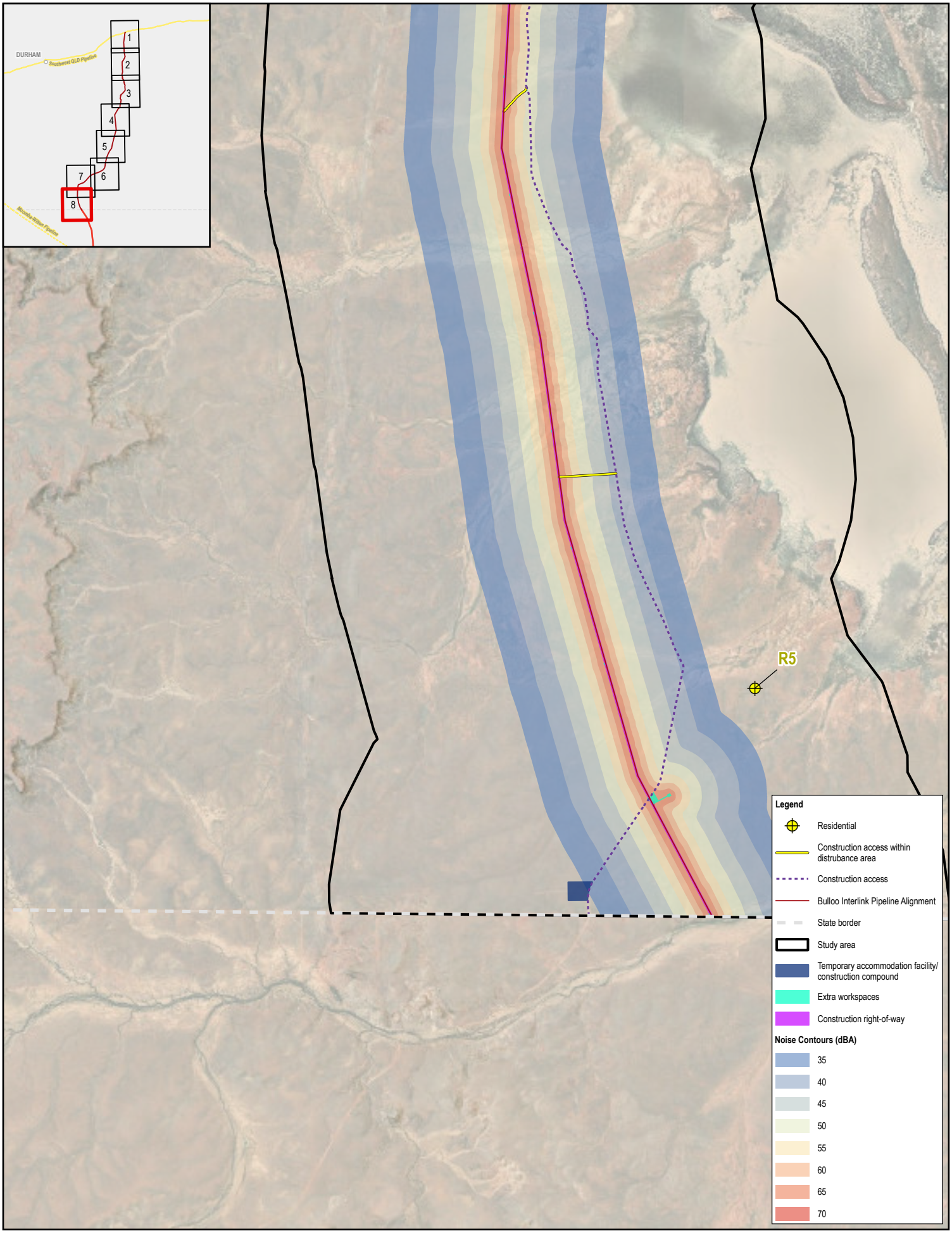
Sheet 7 / 8

Construction noise contours - High intensity pipeline works (CS02)

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:55

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - High intensity pipeline works (CS02)

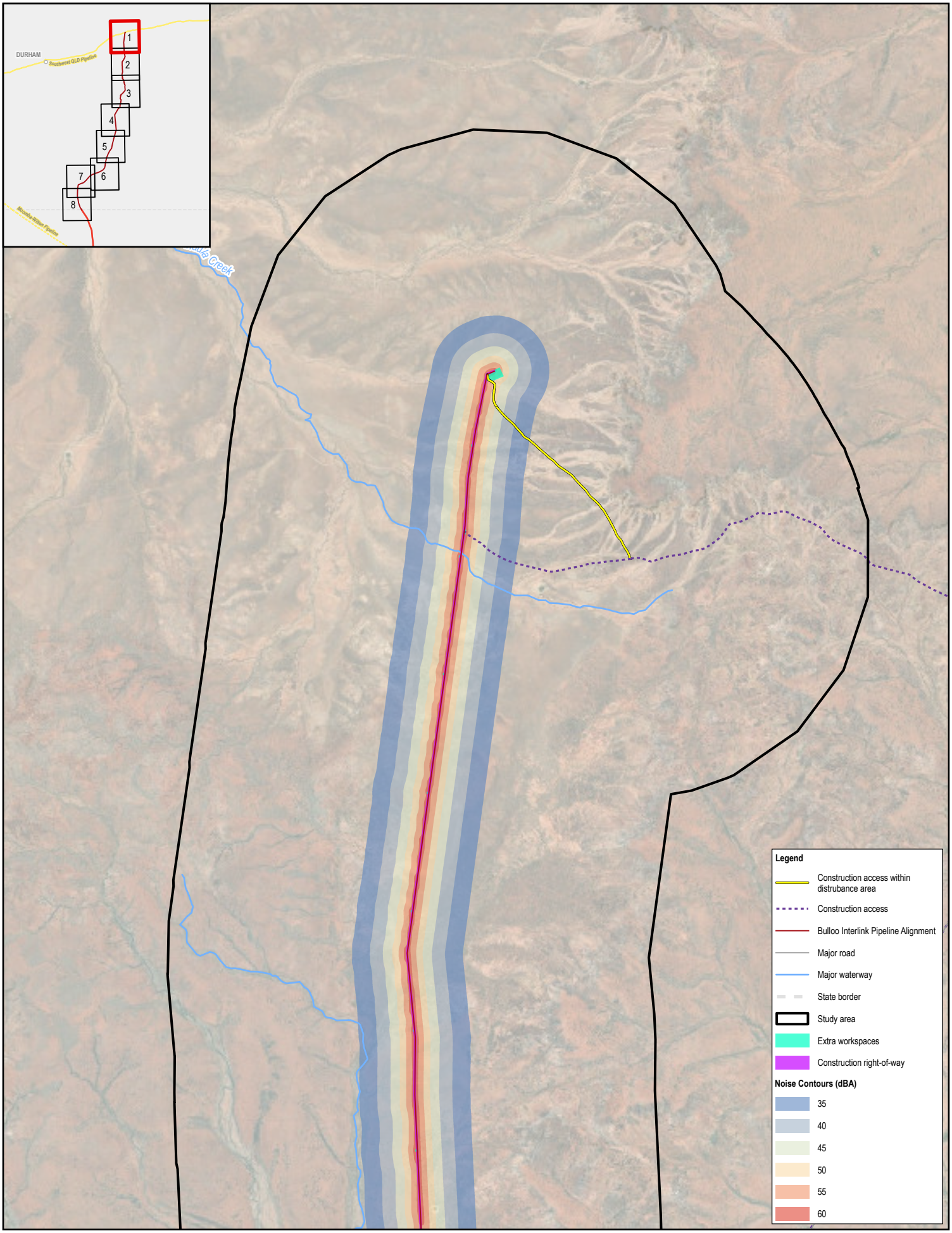
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.2

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:56

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

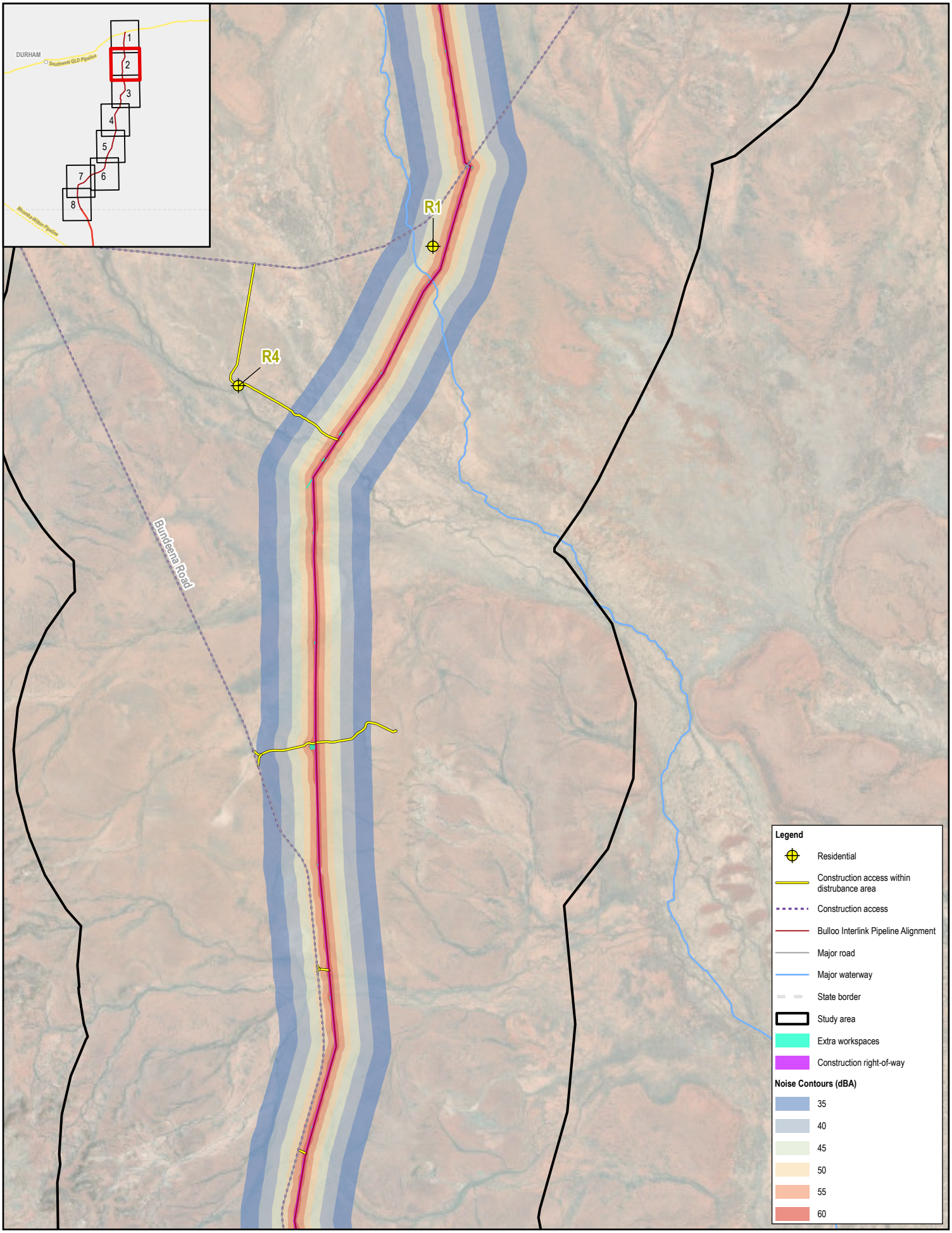
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 1 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 11:59

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

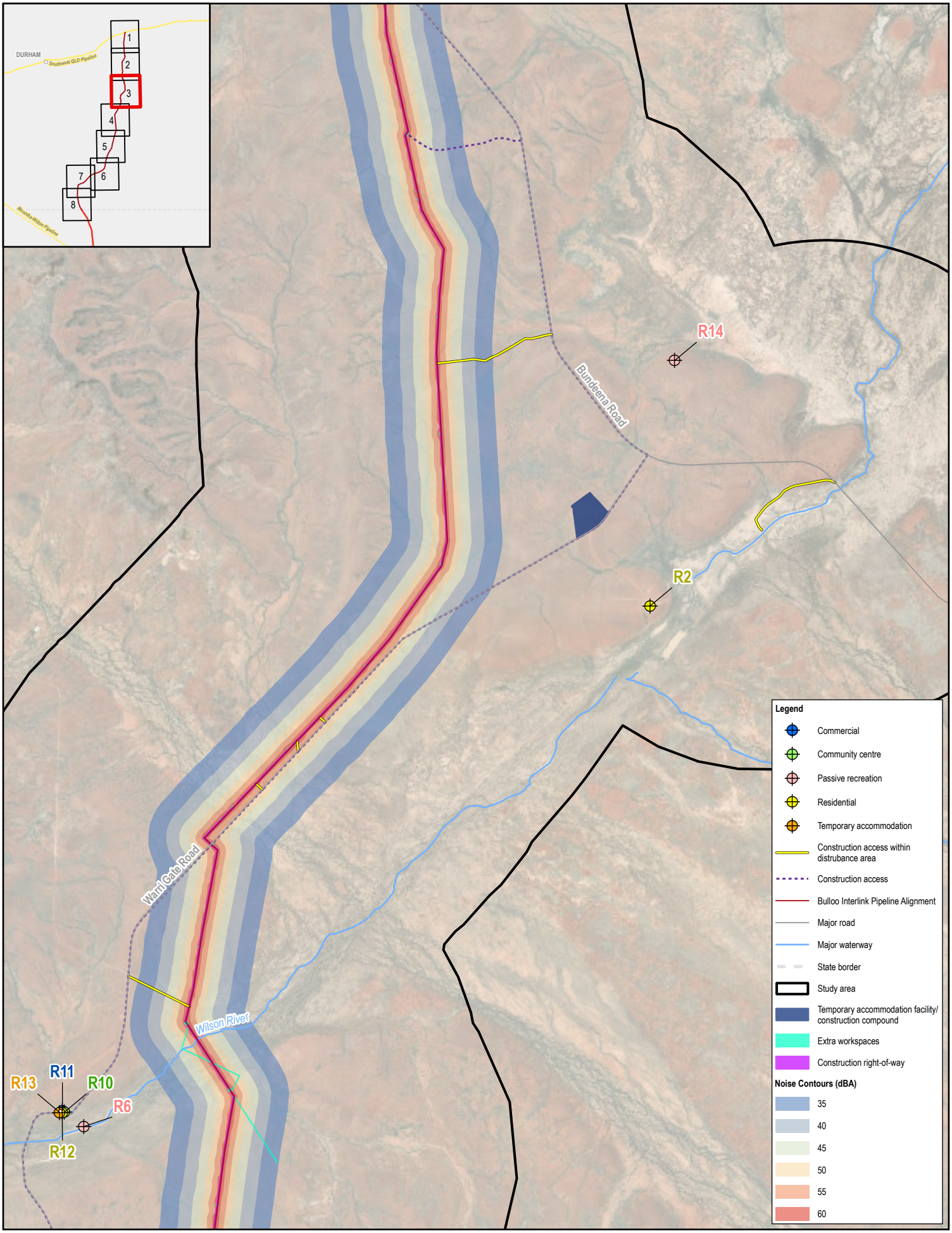
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:00

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

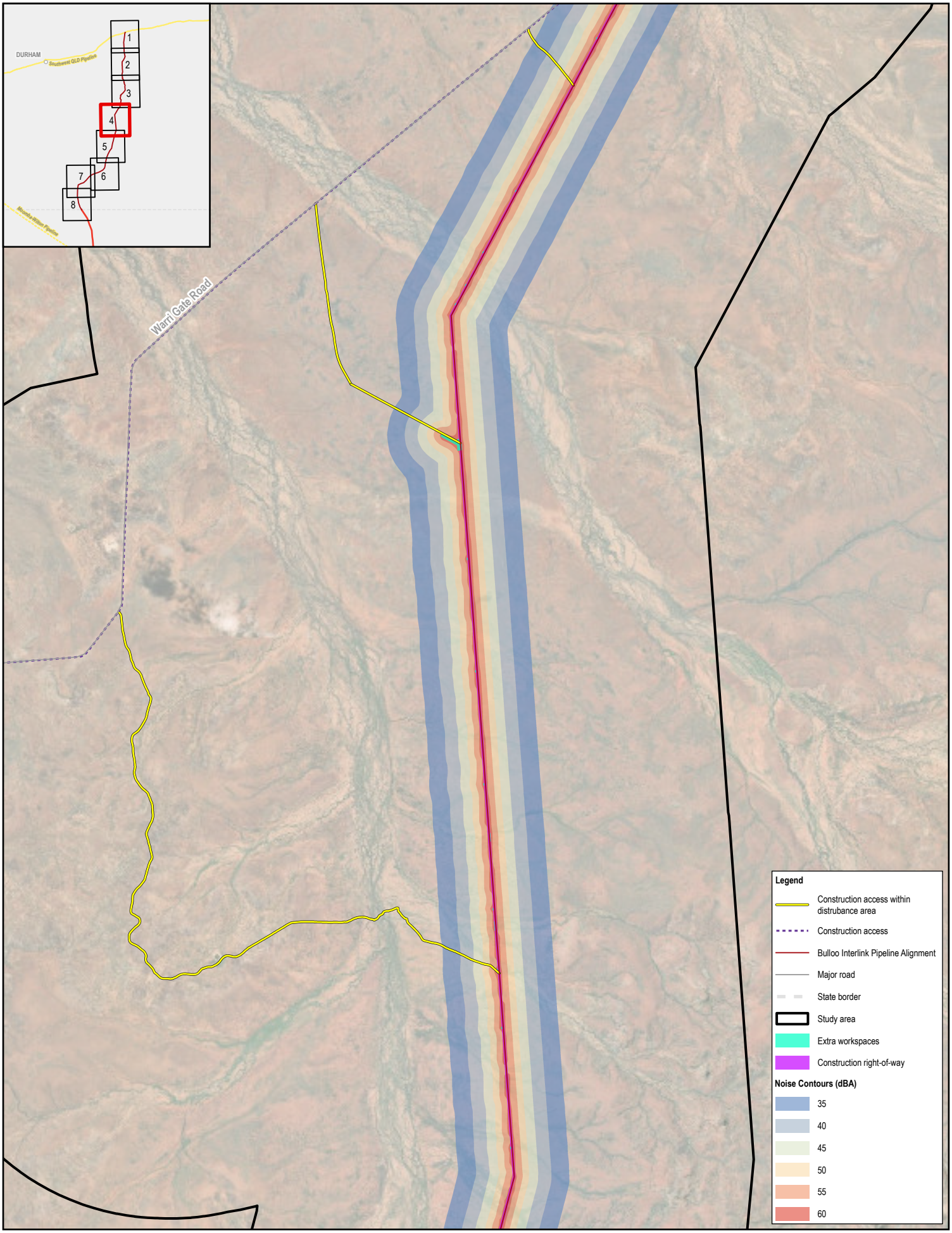
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 3 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:00

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

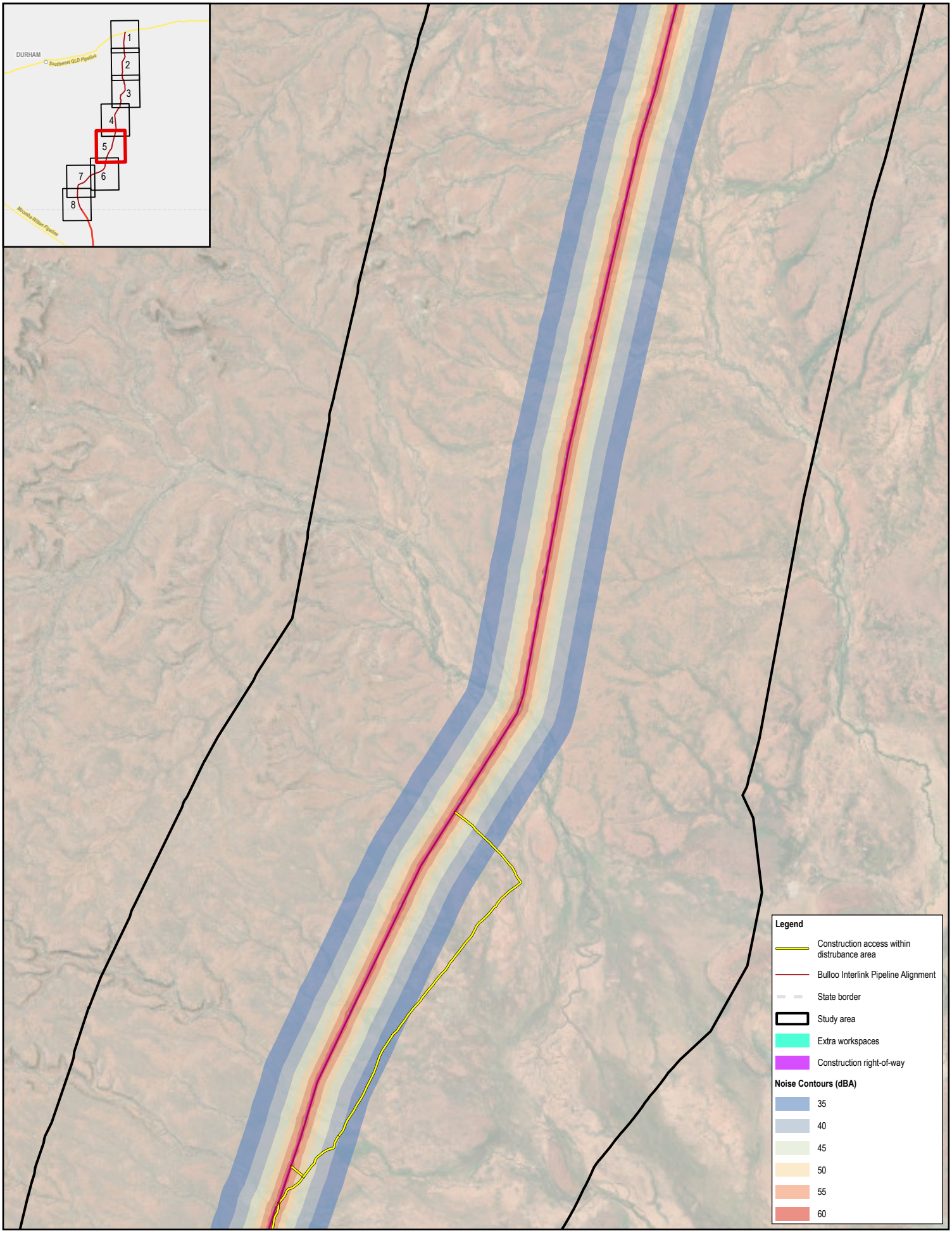
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:01

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

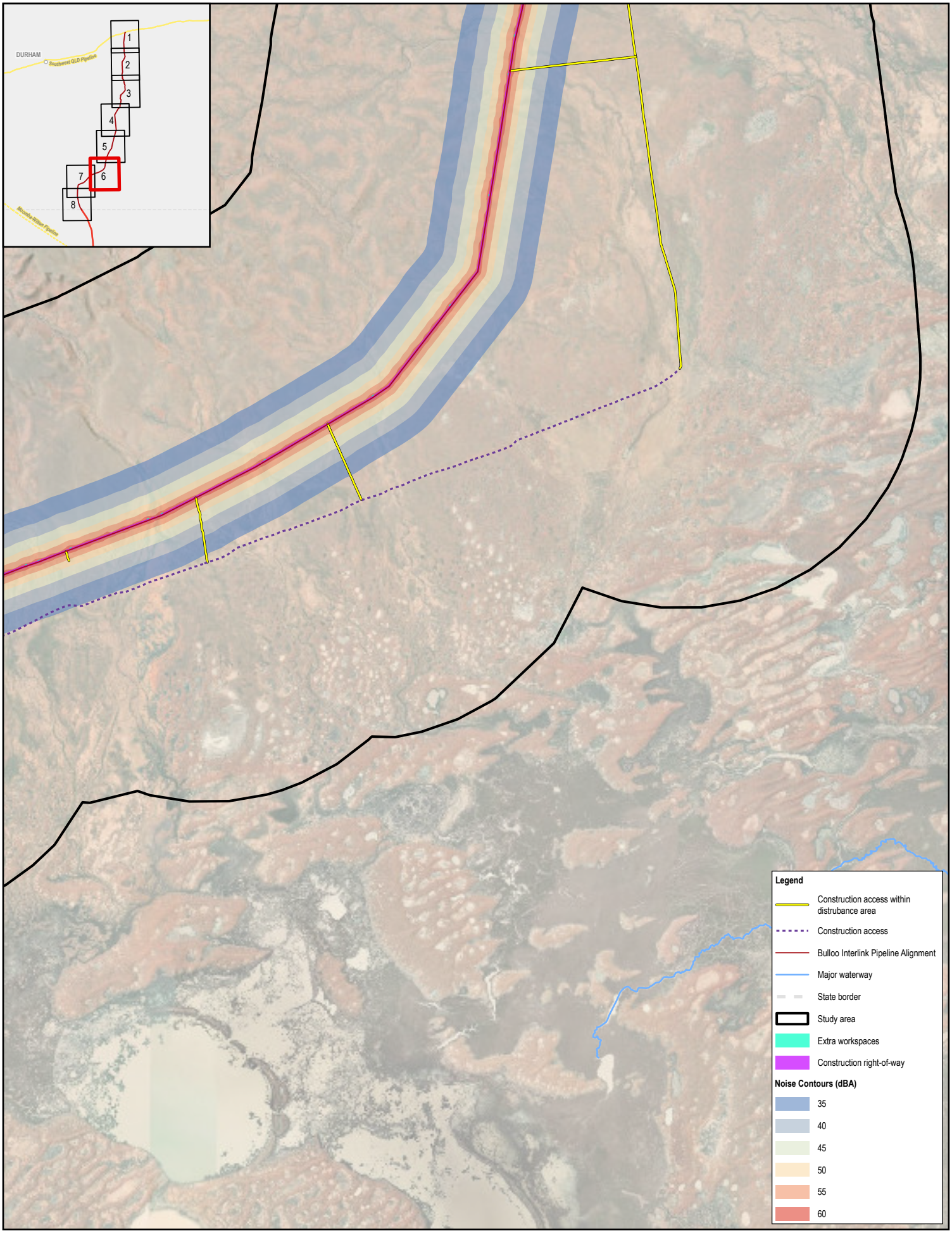
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 5 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:02

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

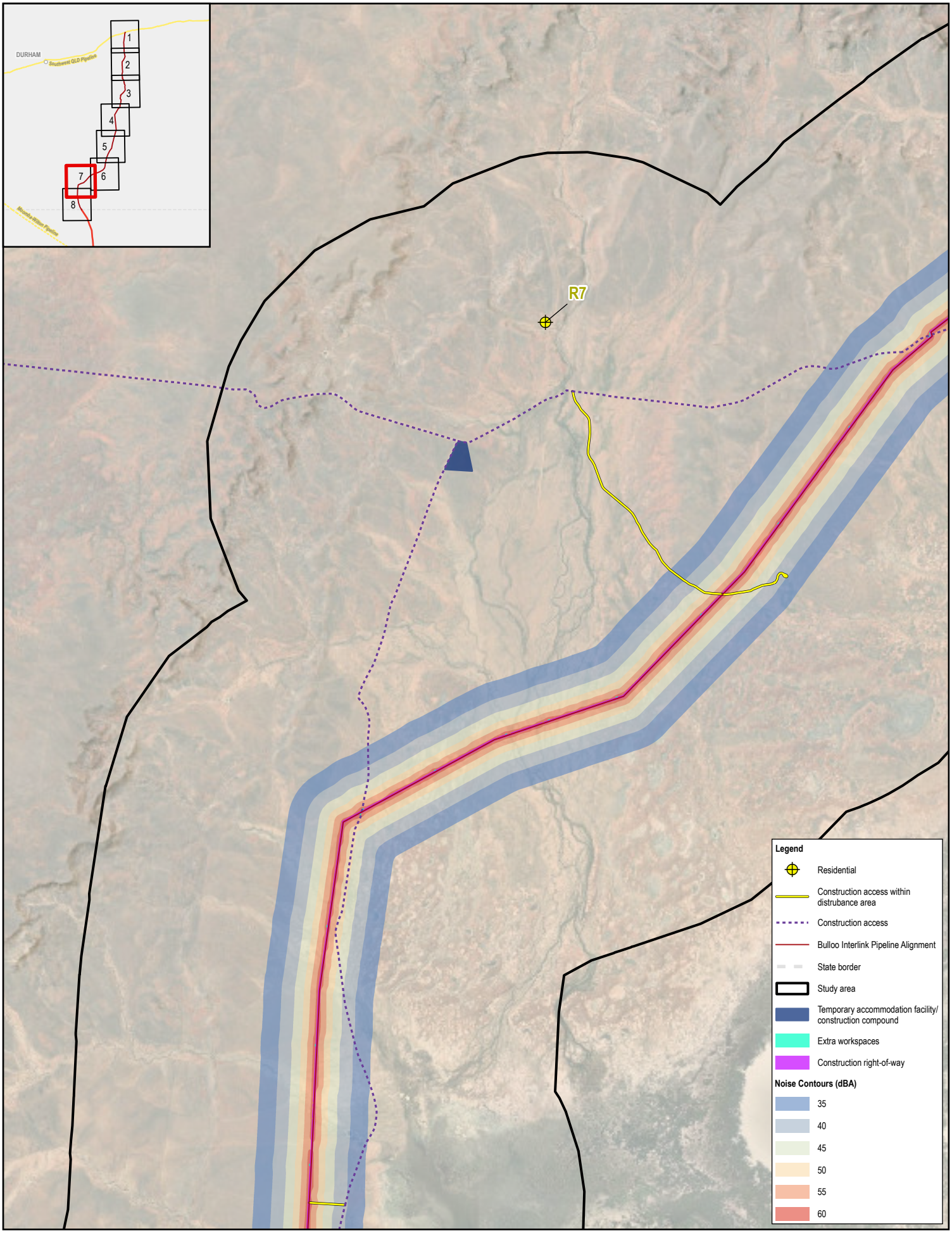
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:02

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

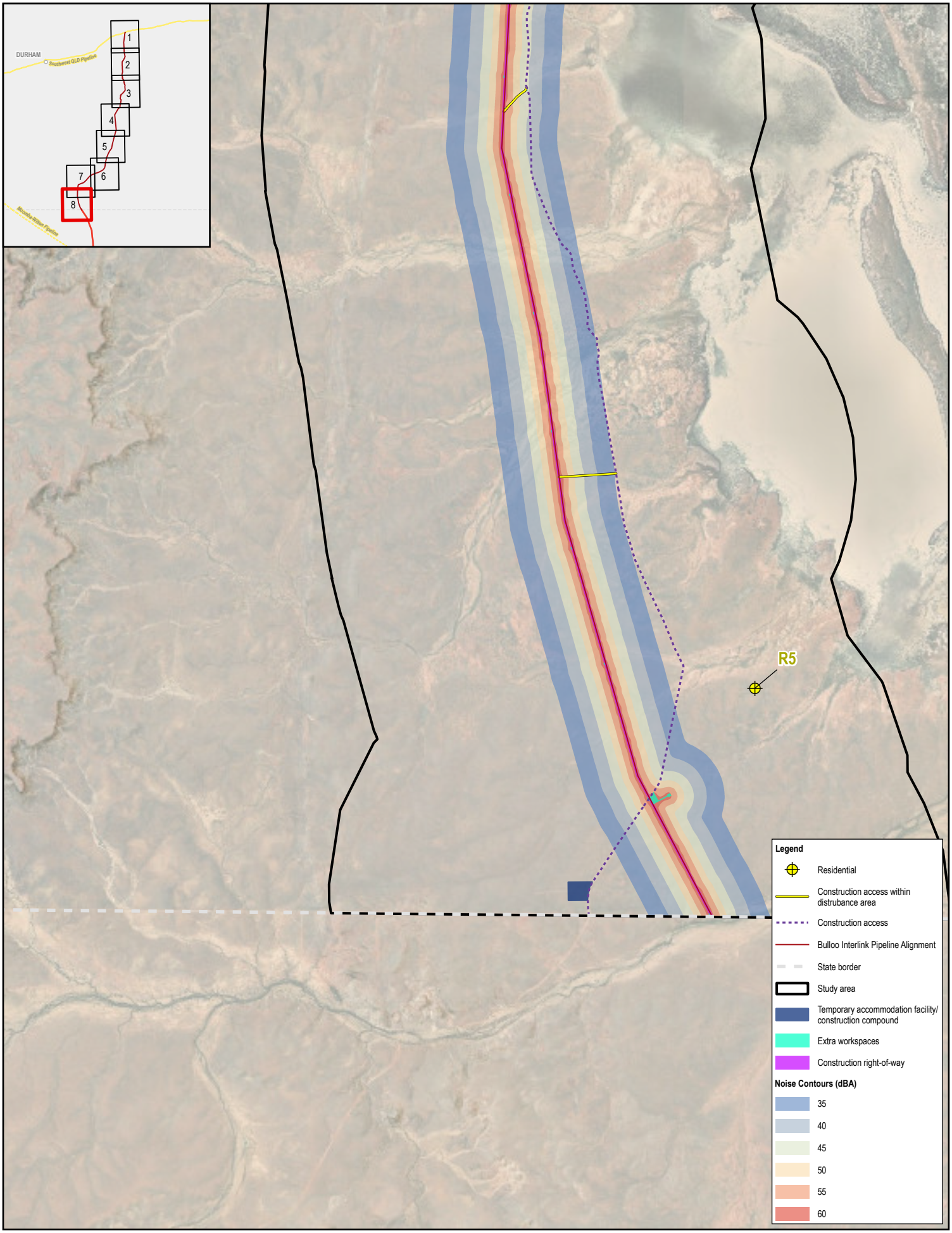
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 7 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:03

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Medium intensity pipeline works(CS03)

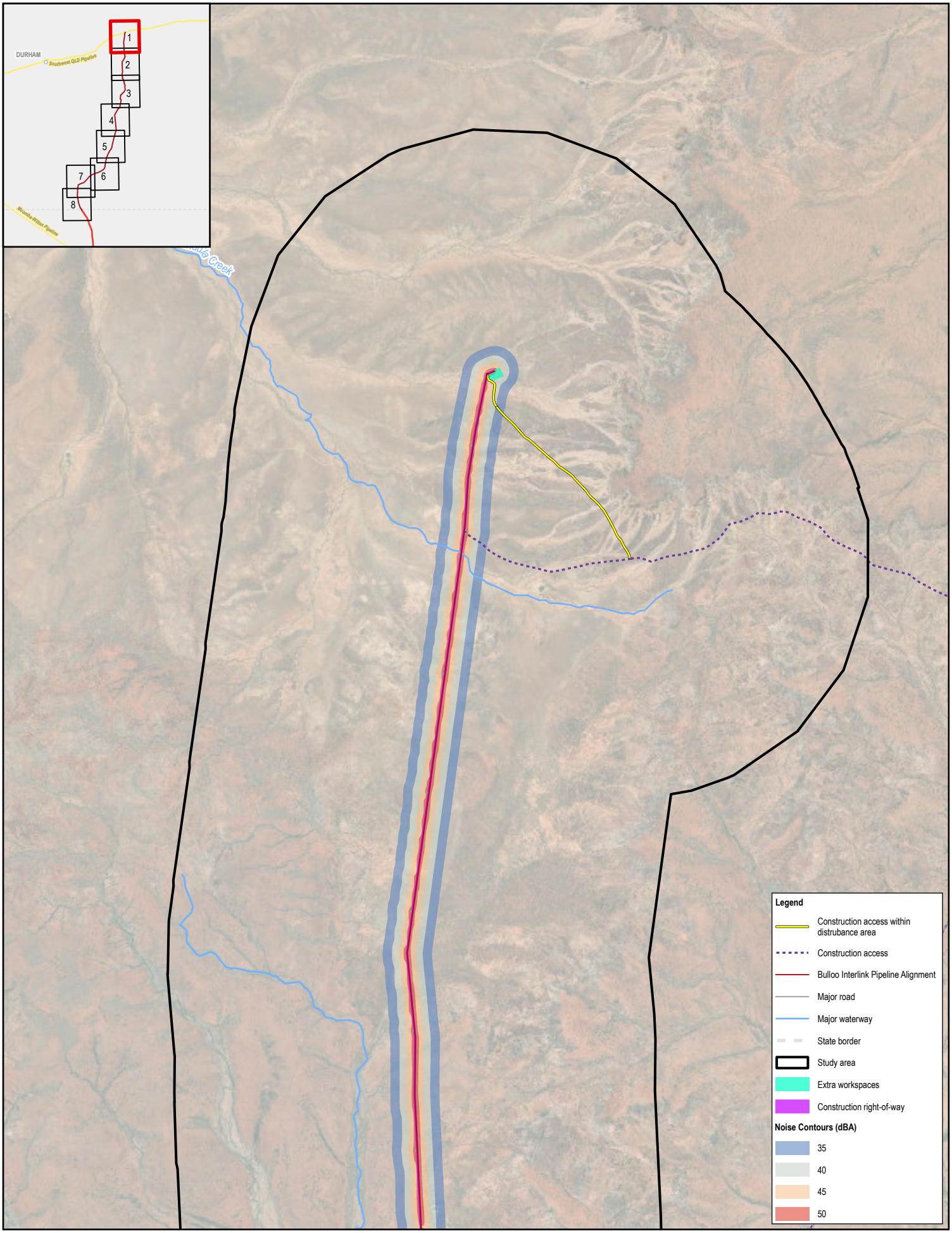
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.3

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:04

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

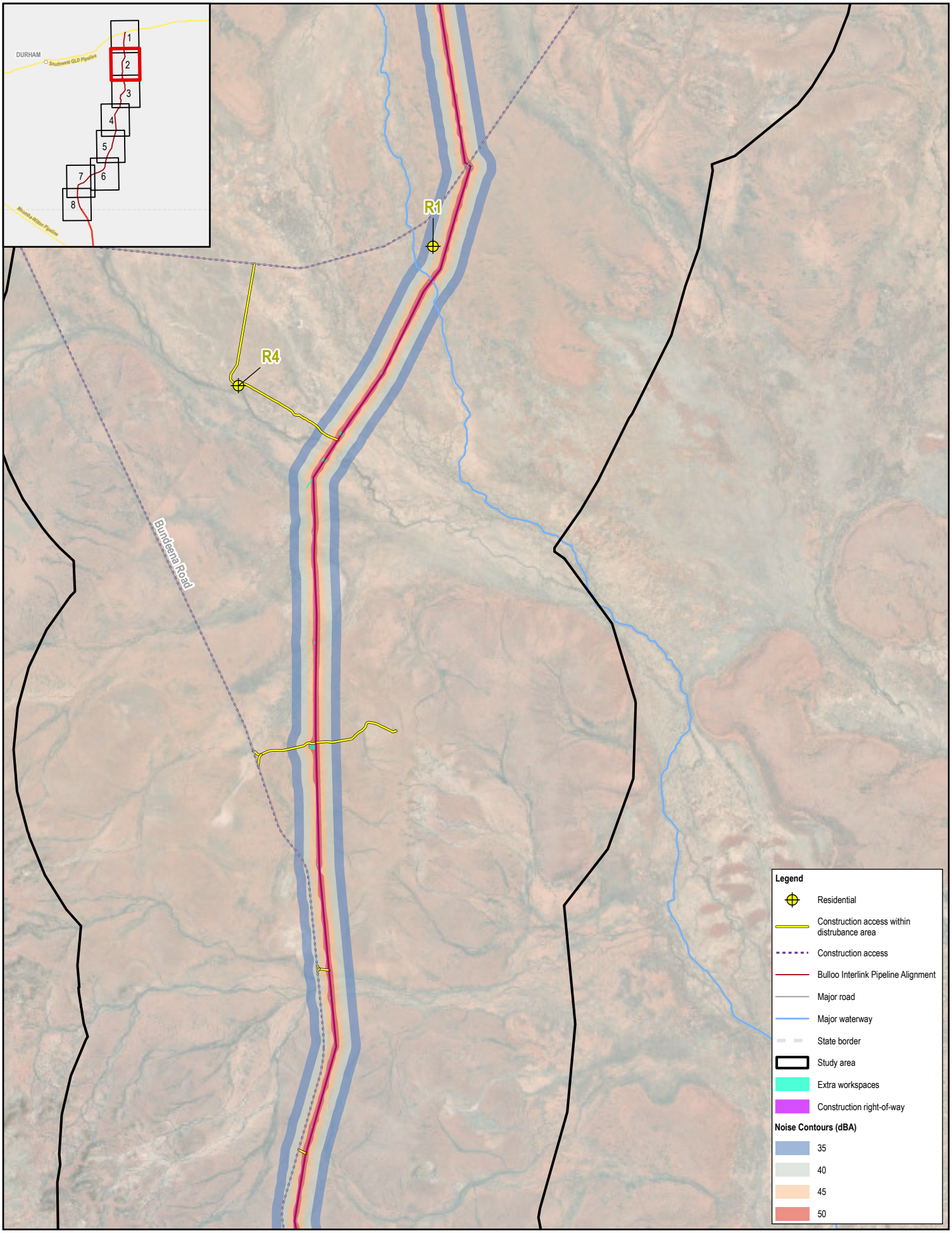
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:06

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

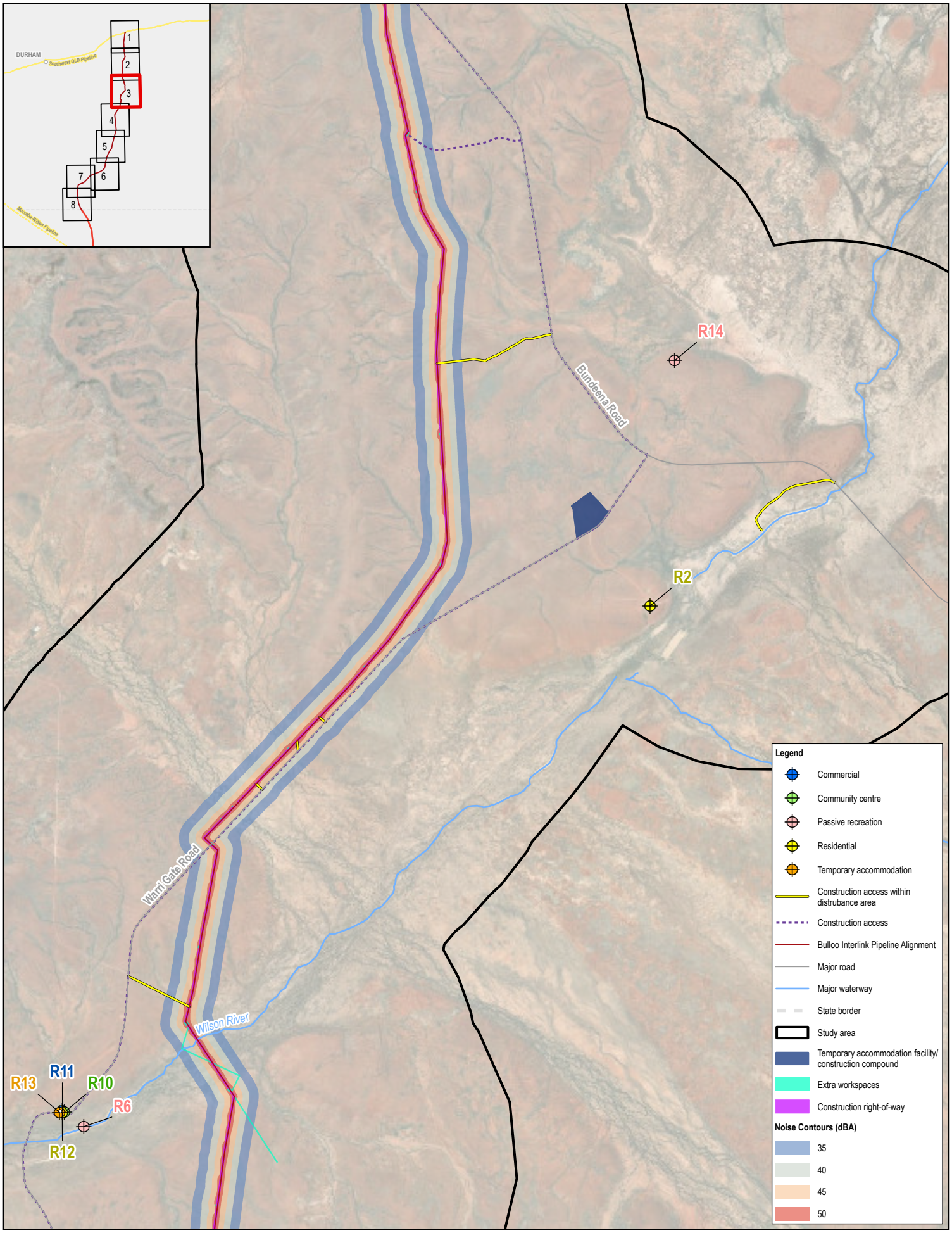
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 2 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:06

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

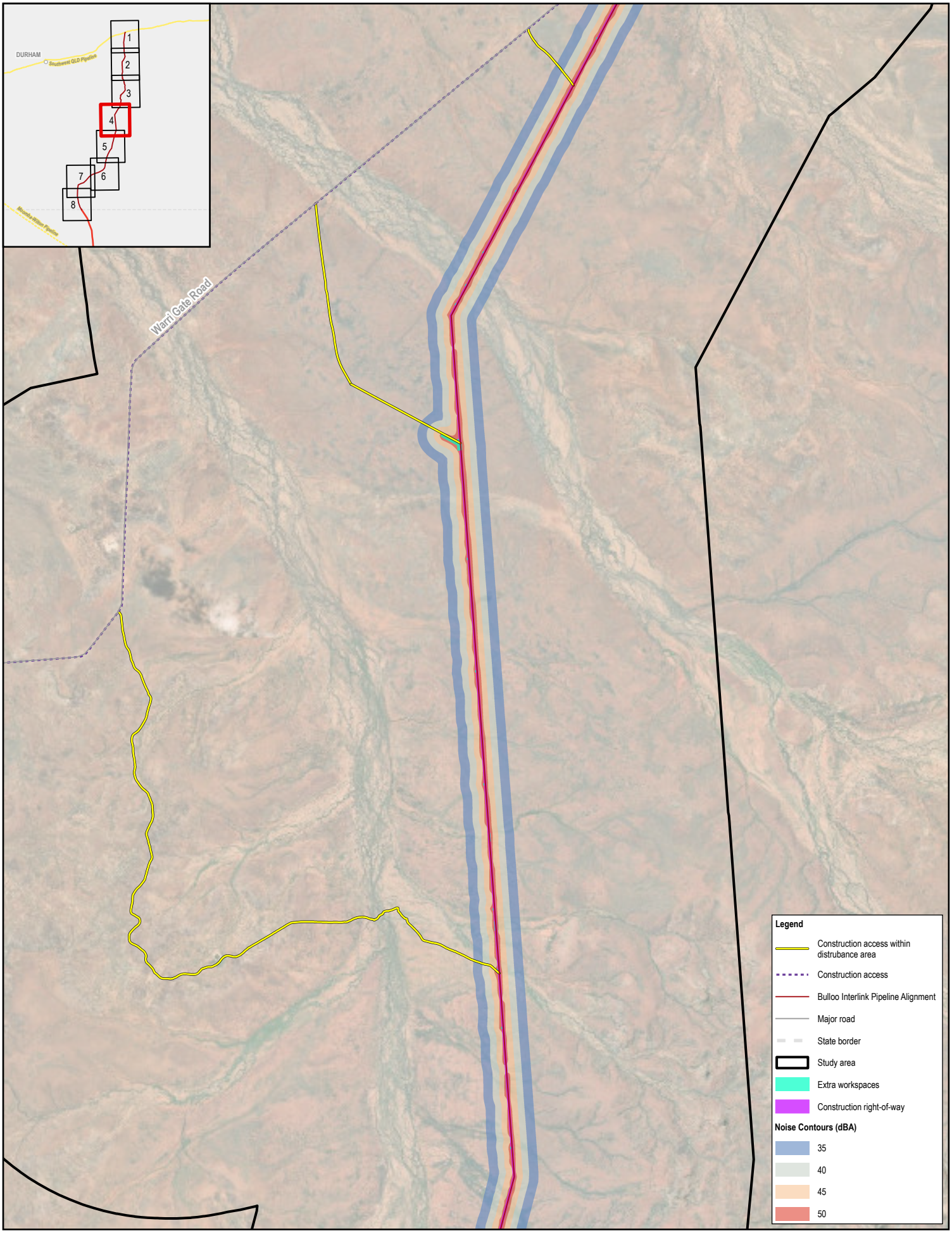
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:07

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/DNRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

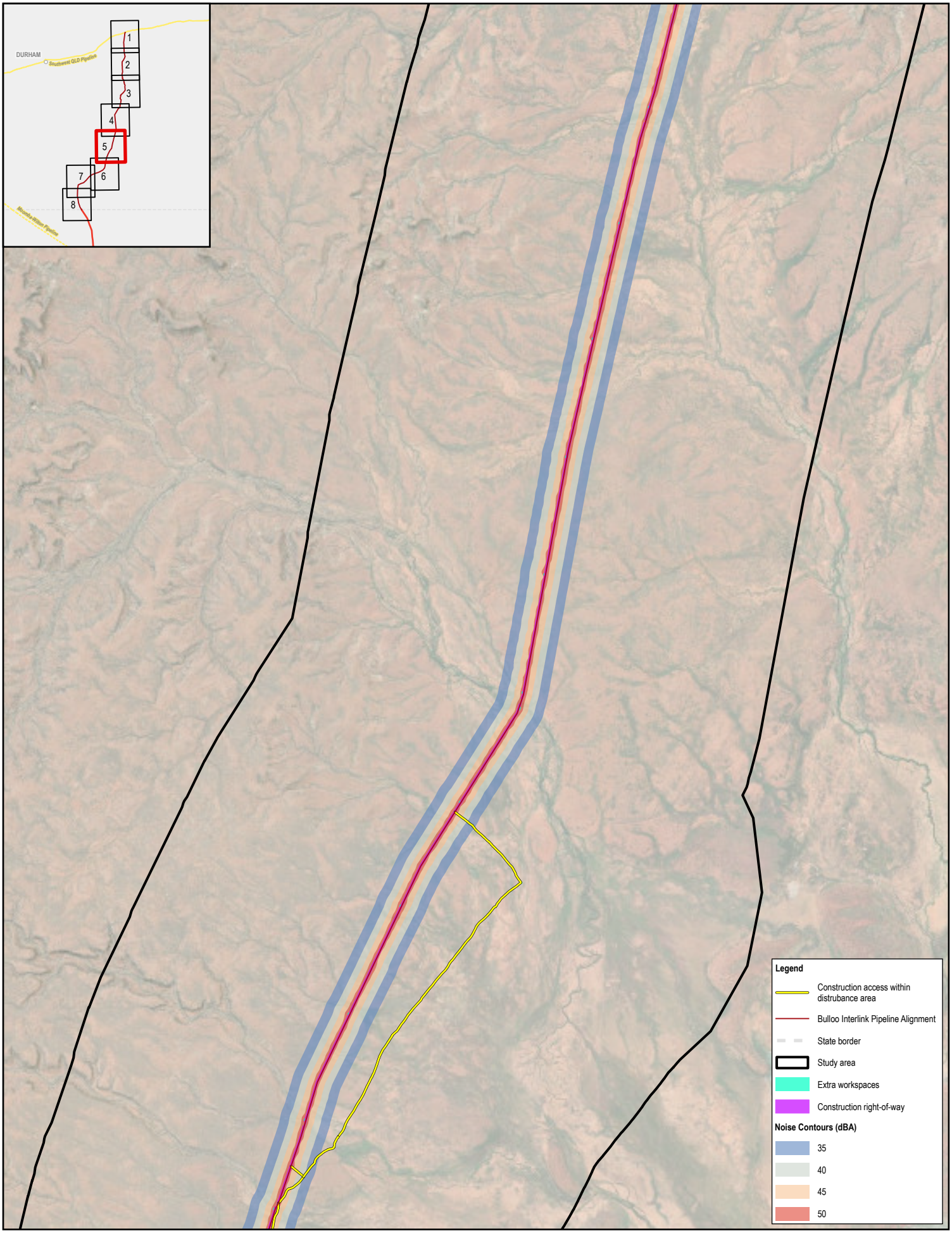
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:07

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

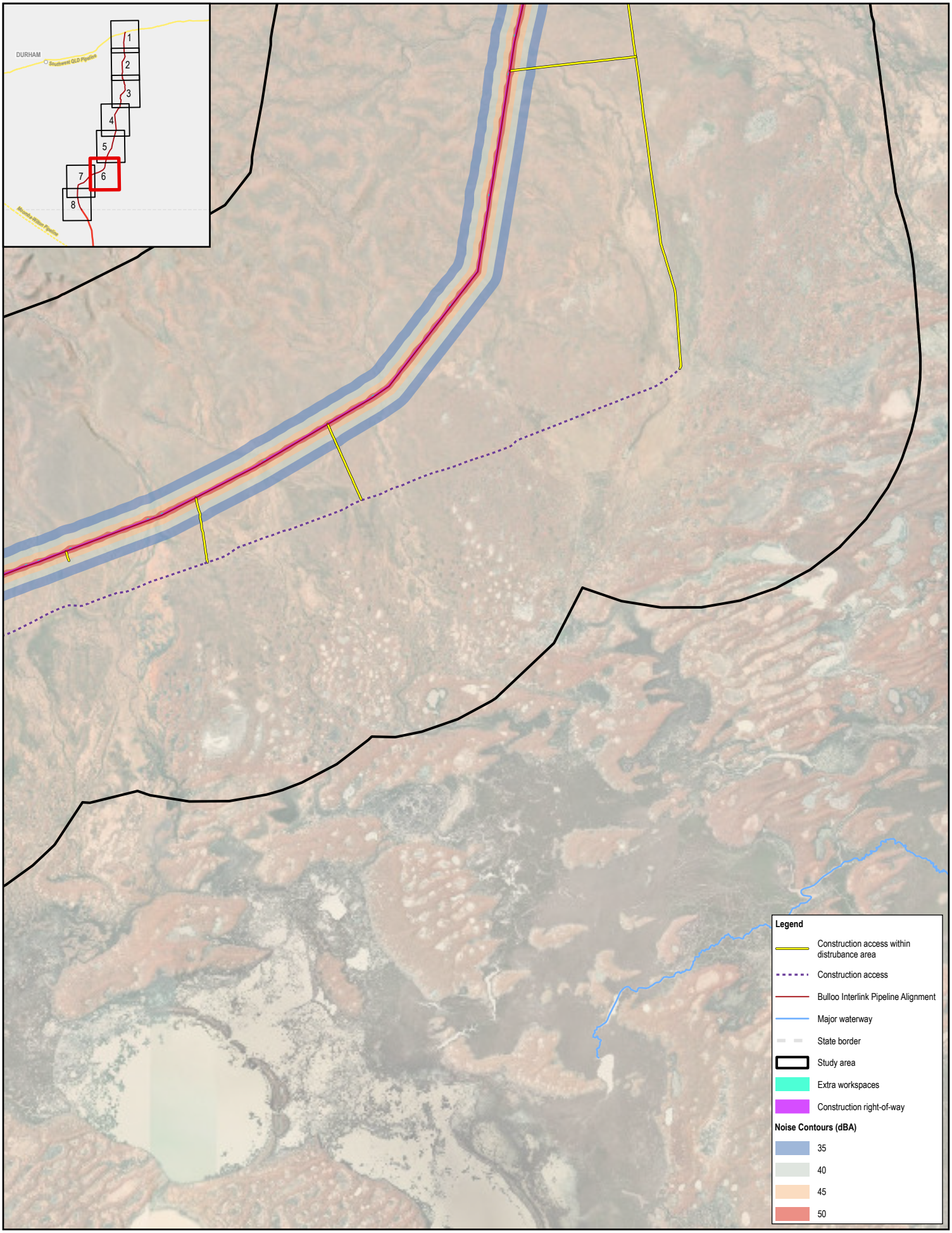
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 5 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:08

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

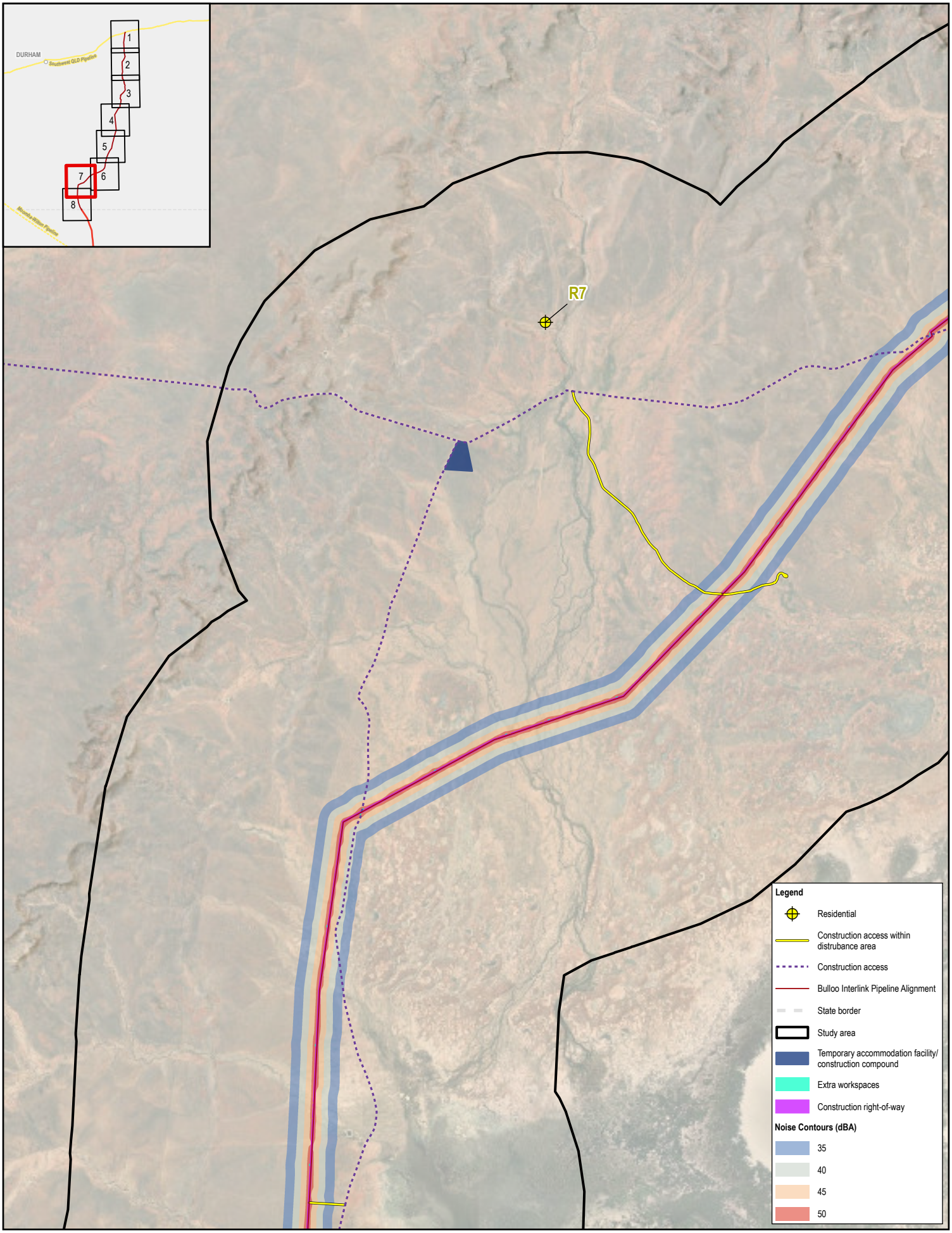
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:08

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

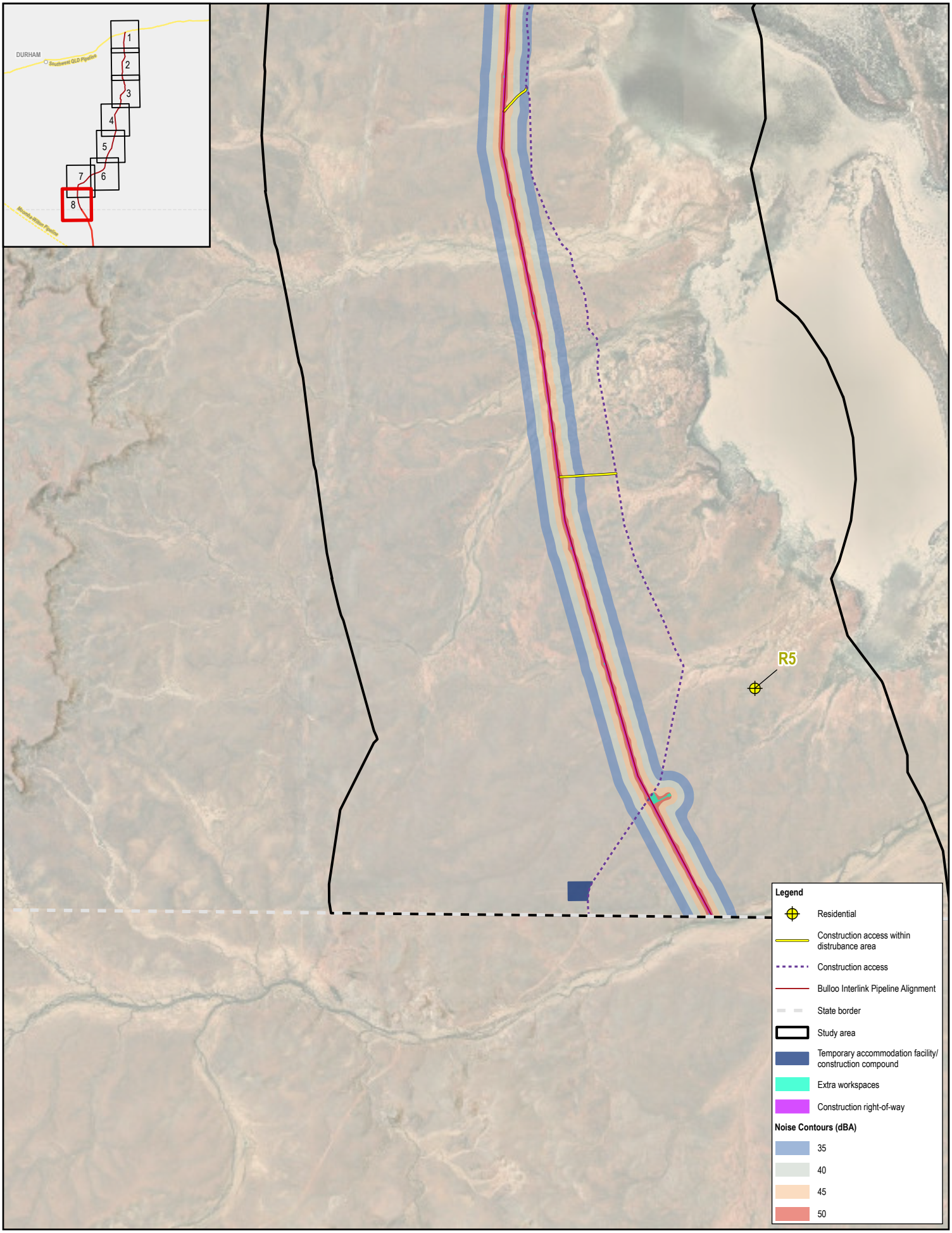
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 7 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:08

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Low intensity pipeline works (CS04)

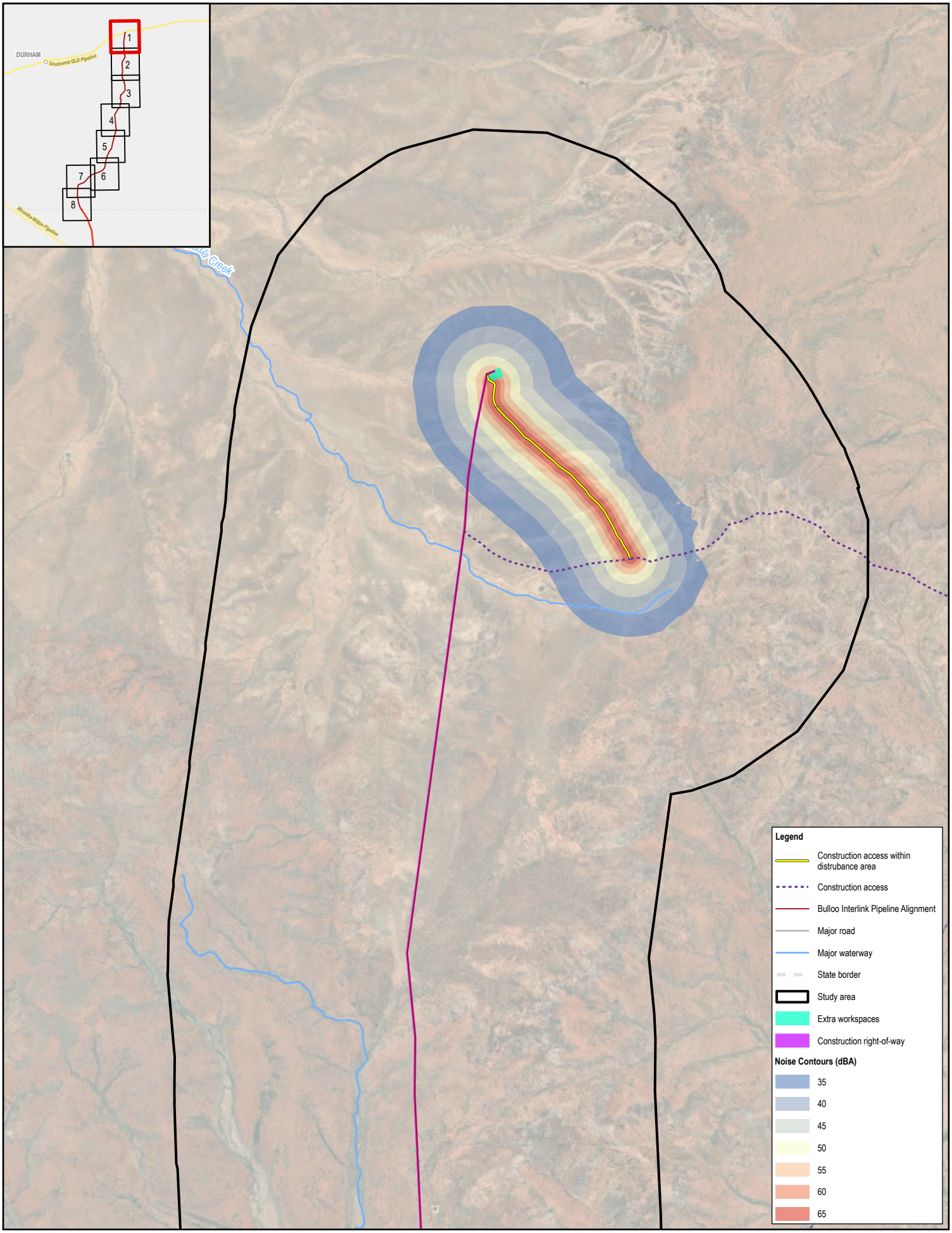
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.4

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:09

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

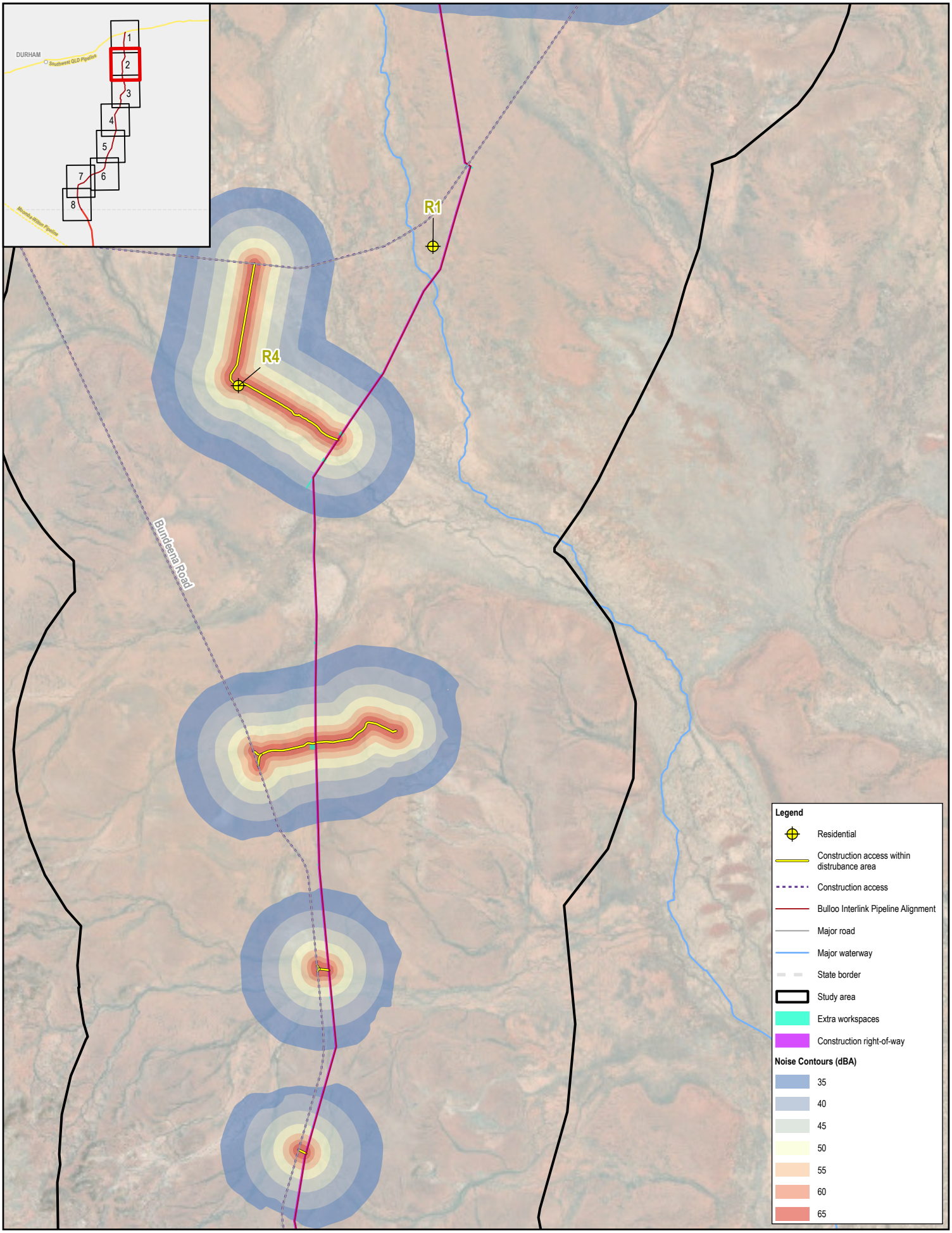
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:10

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

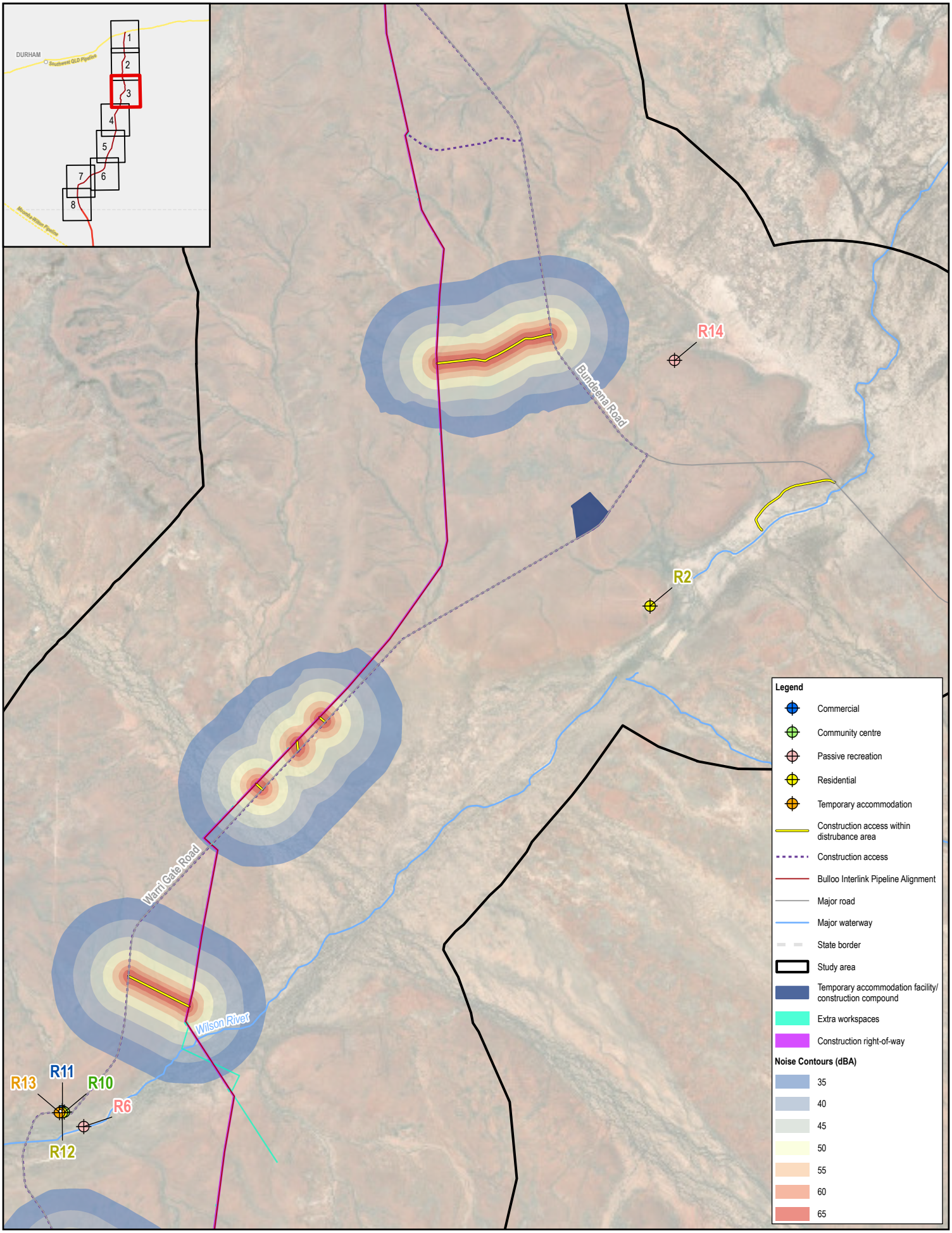
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:10

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

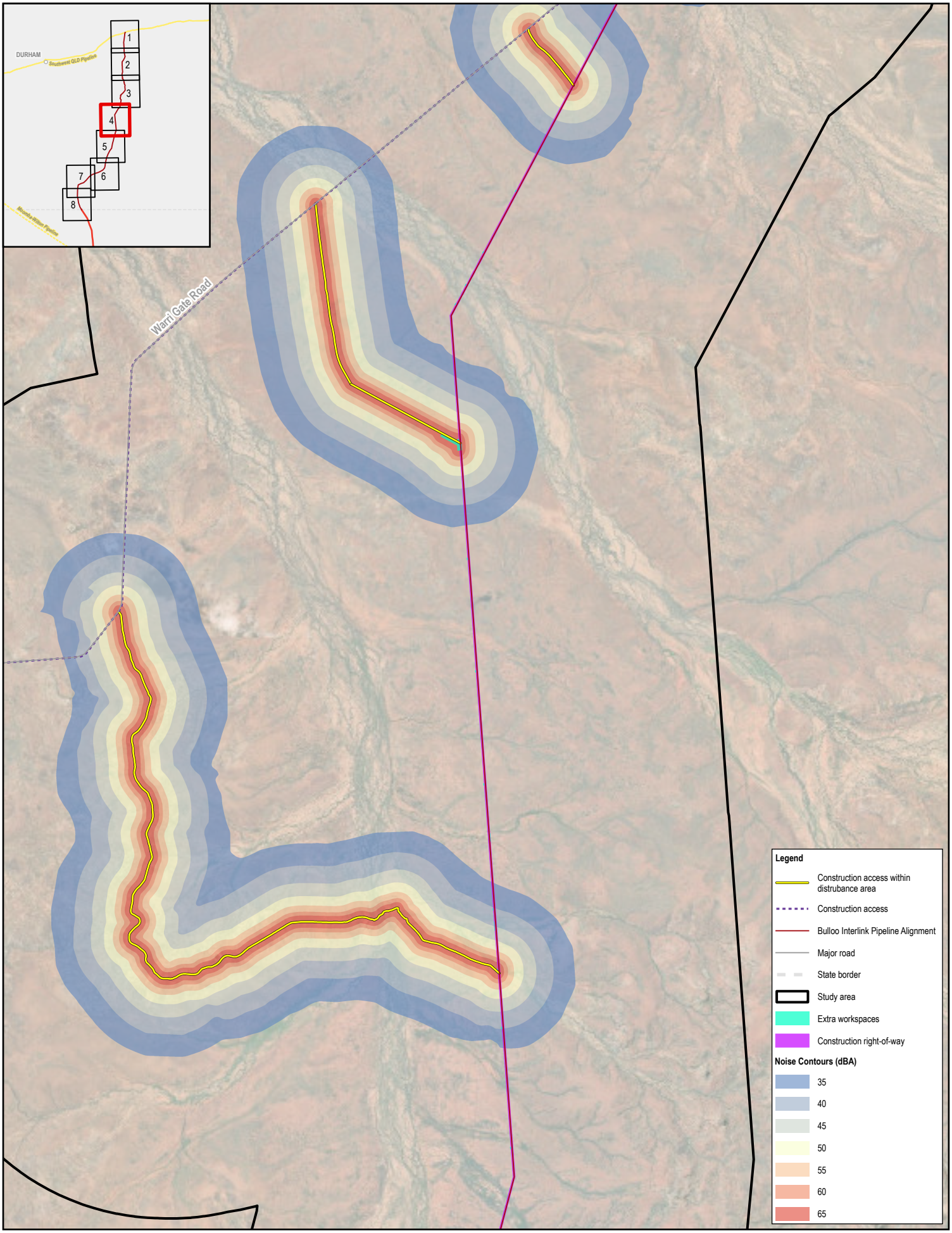
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:10

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

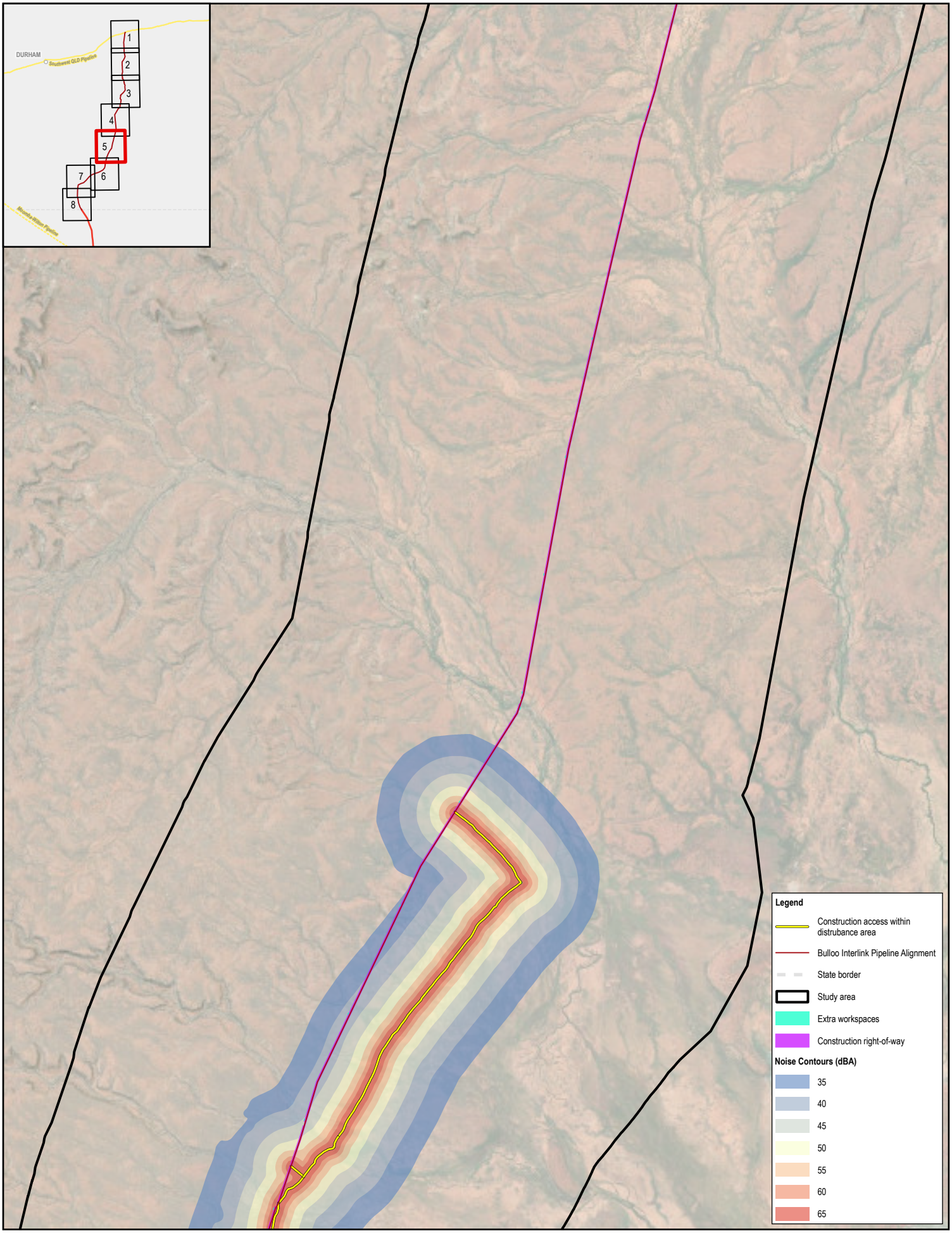
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 4 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:10

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/DNRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

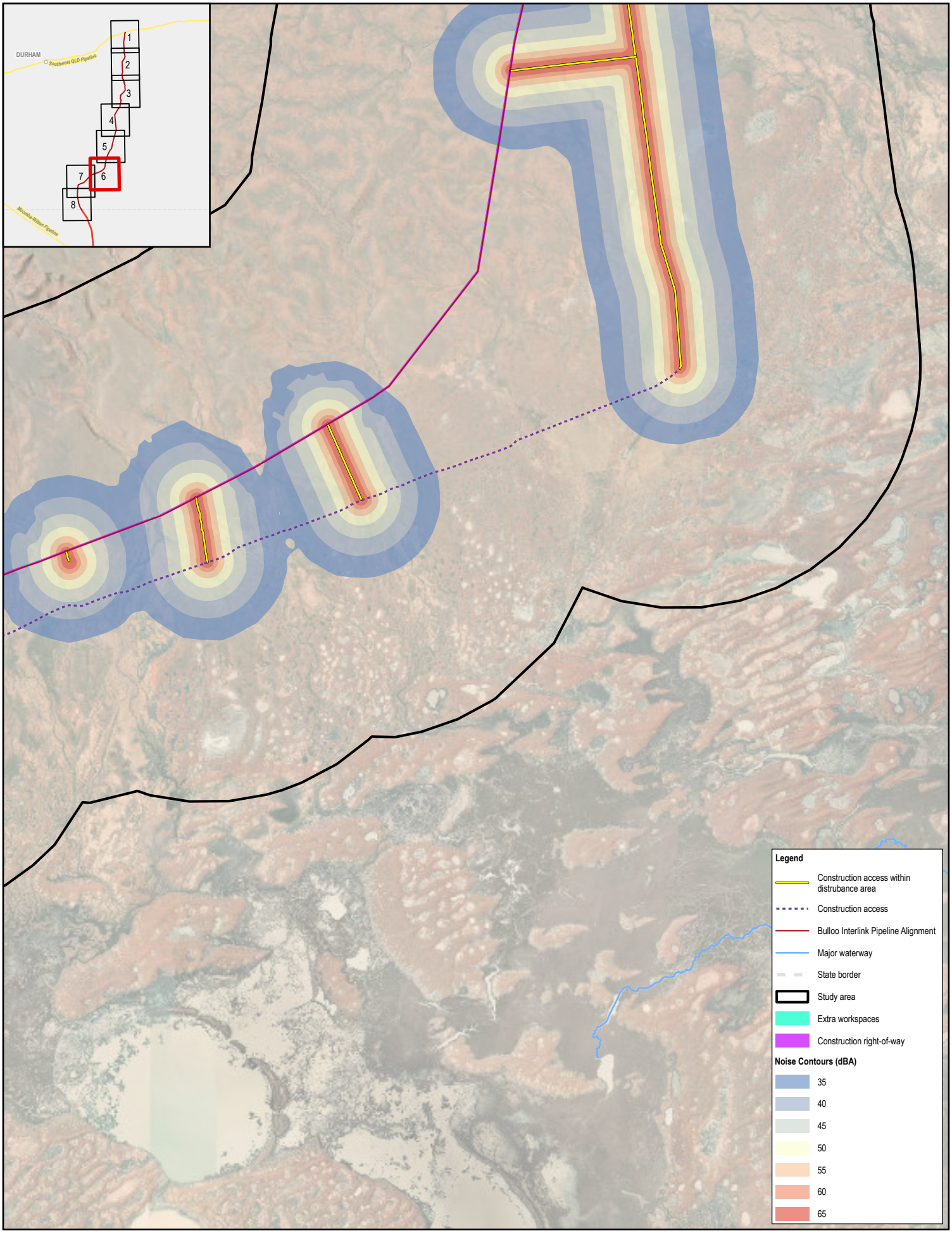
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 5 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:10

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

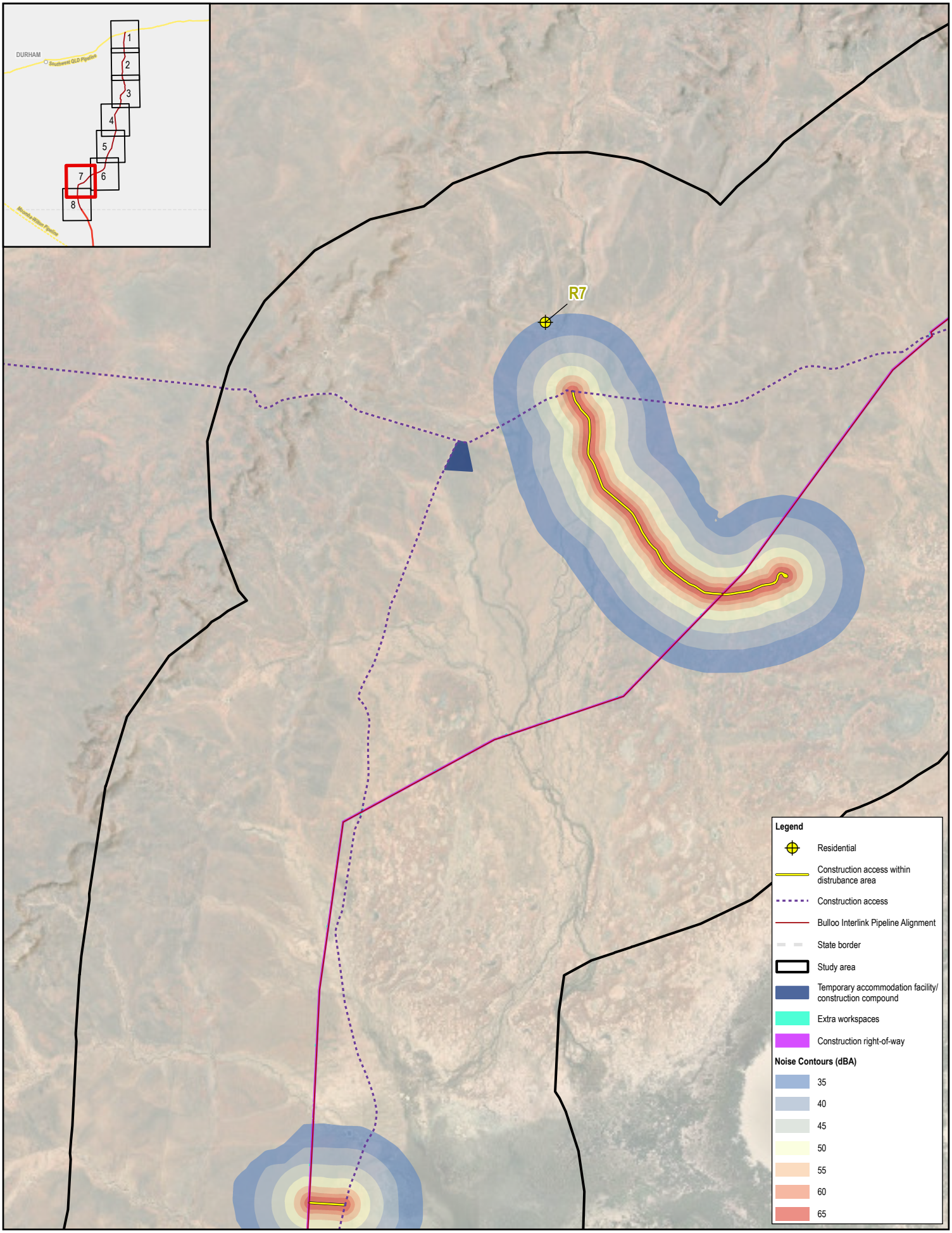
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:11

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

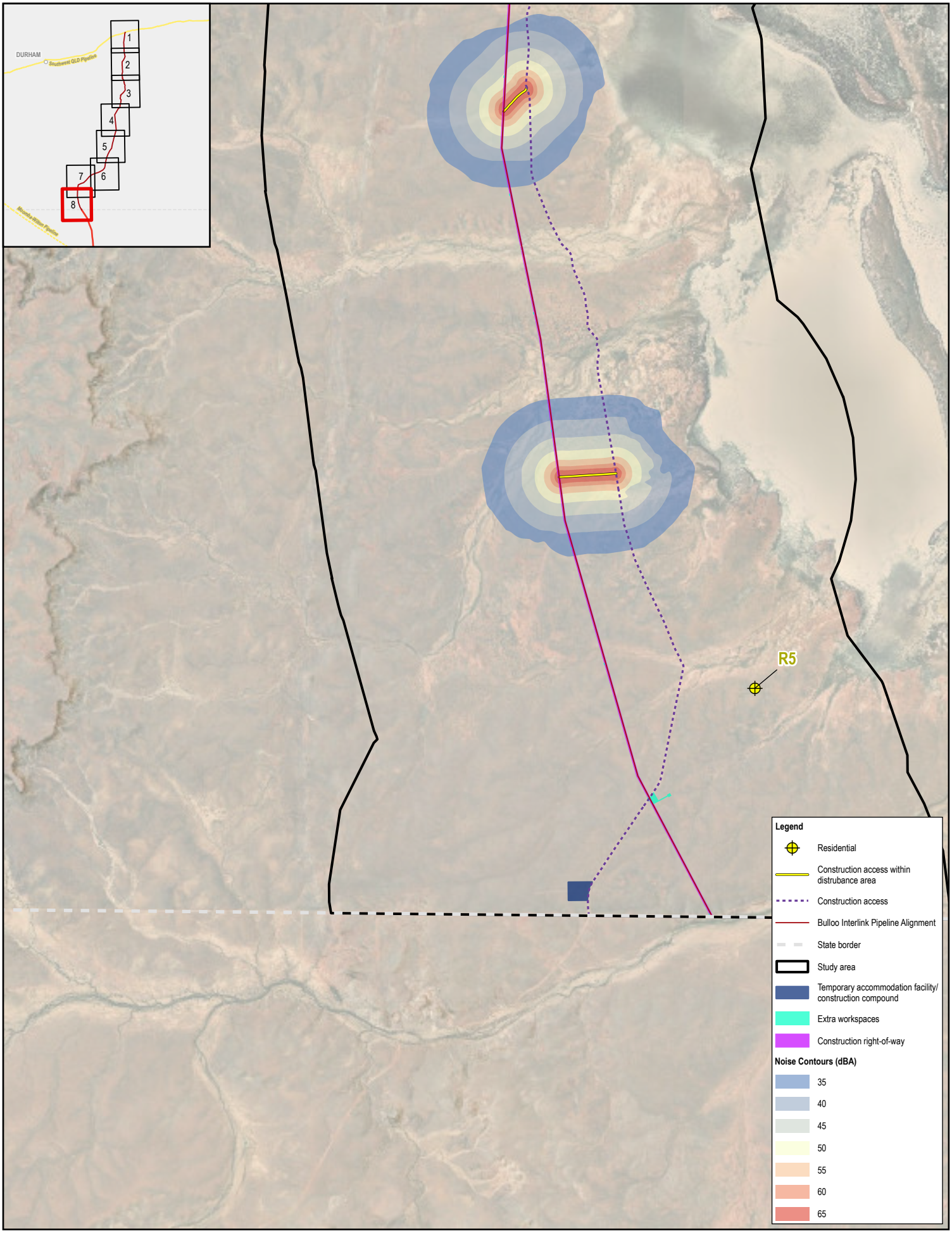
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 7 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:11

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours Access track road upgrade or maintenance works (CS05)

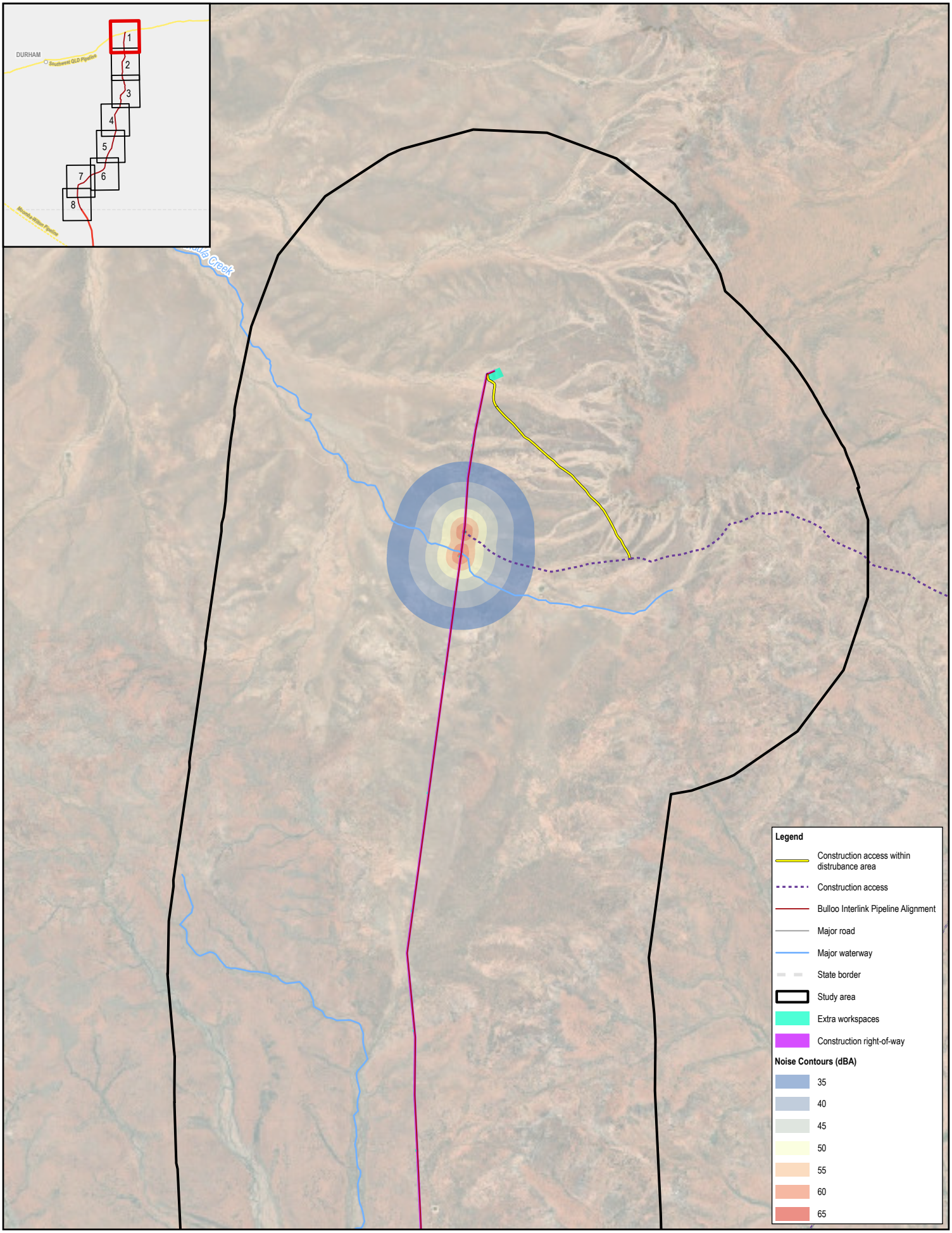
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.5

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:11

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

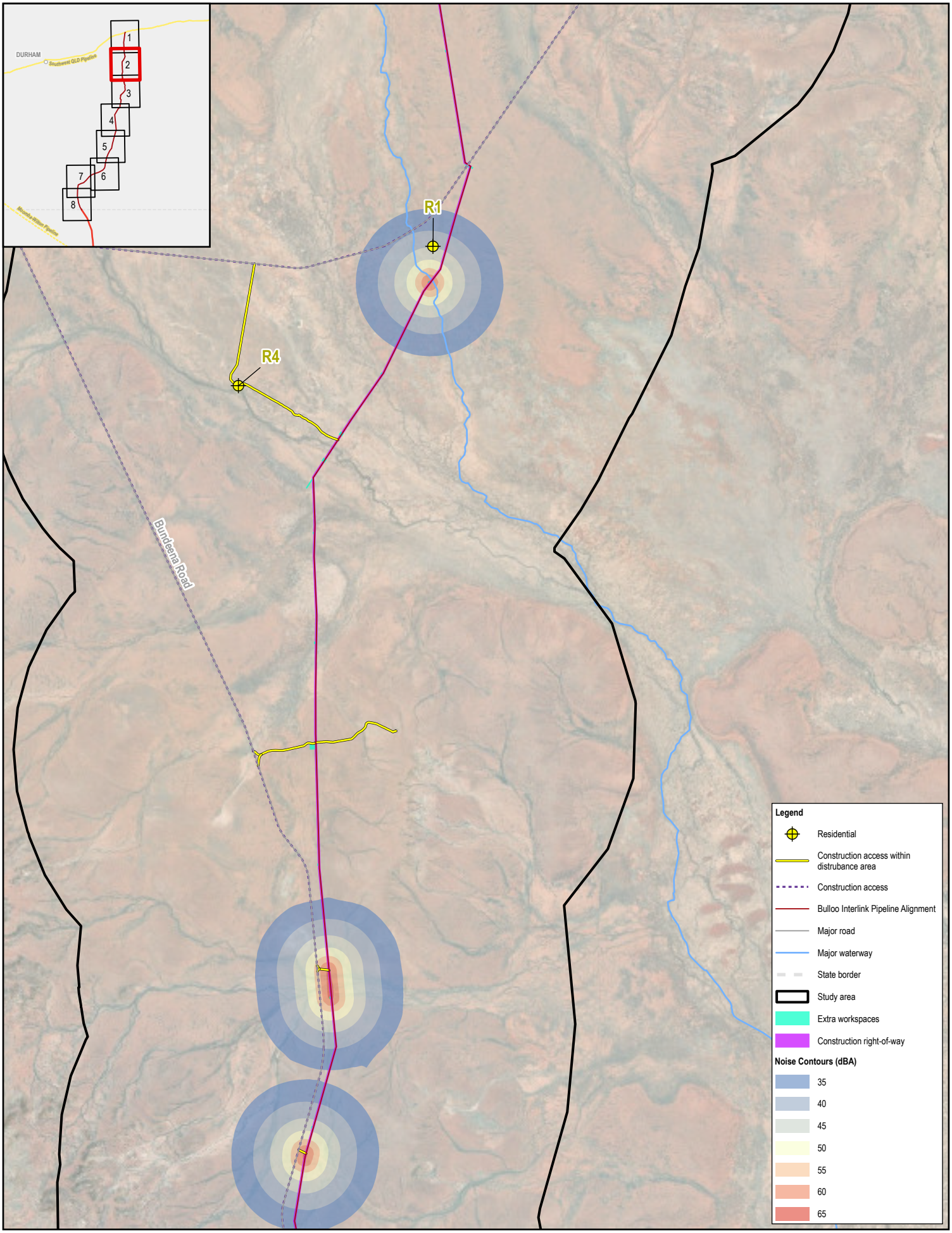
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:11

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

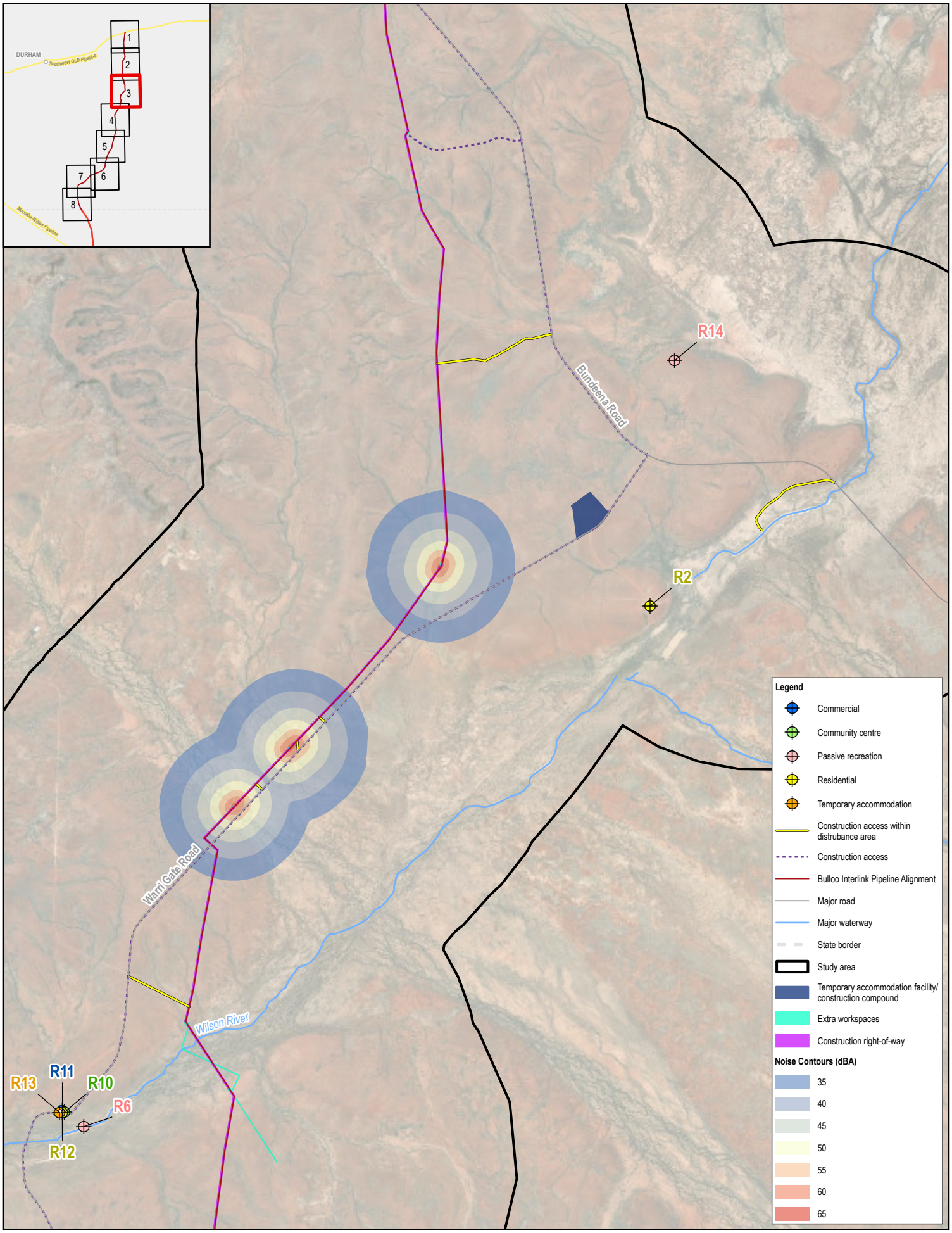
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:12

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

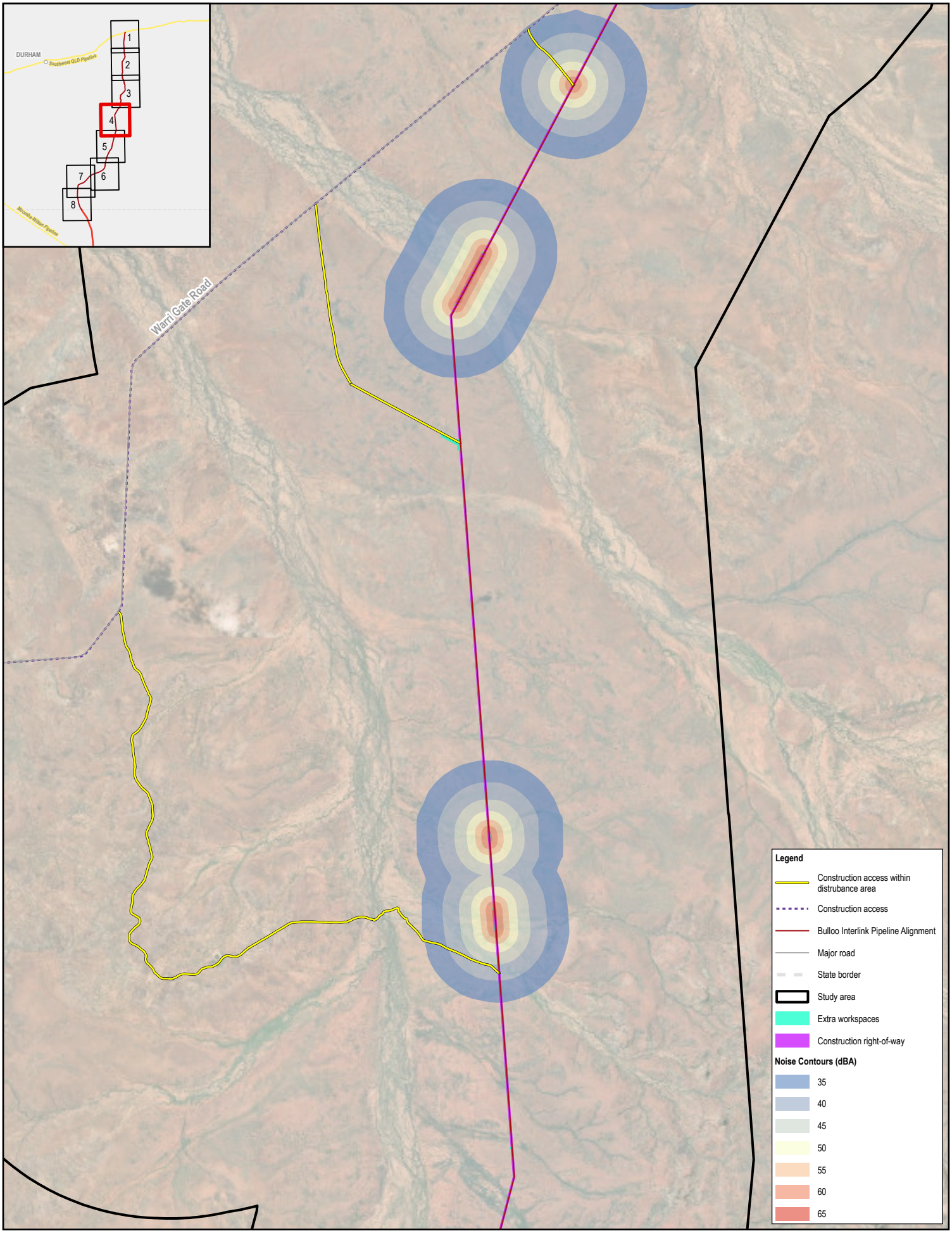
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:12

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

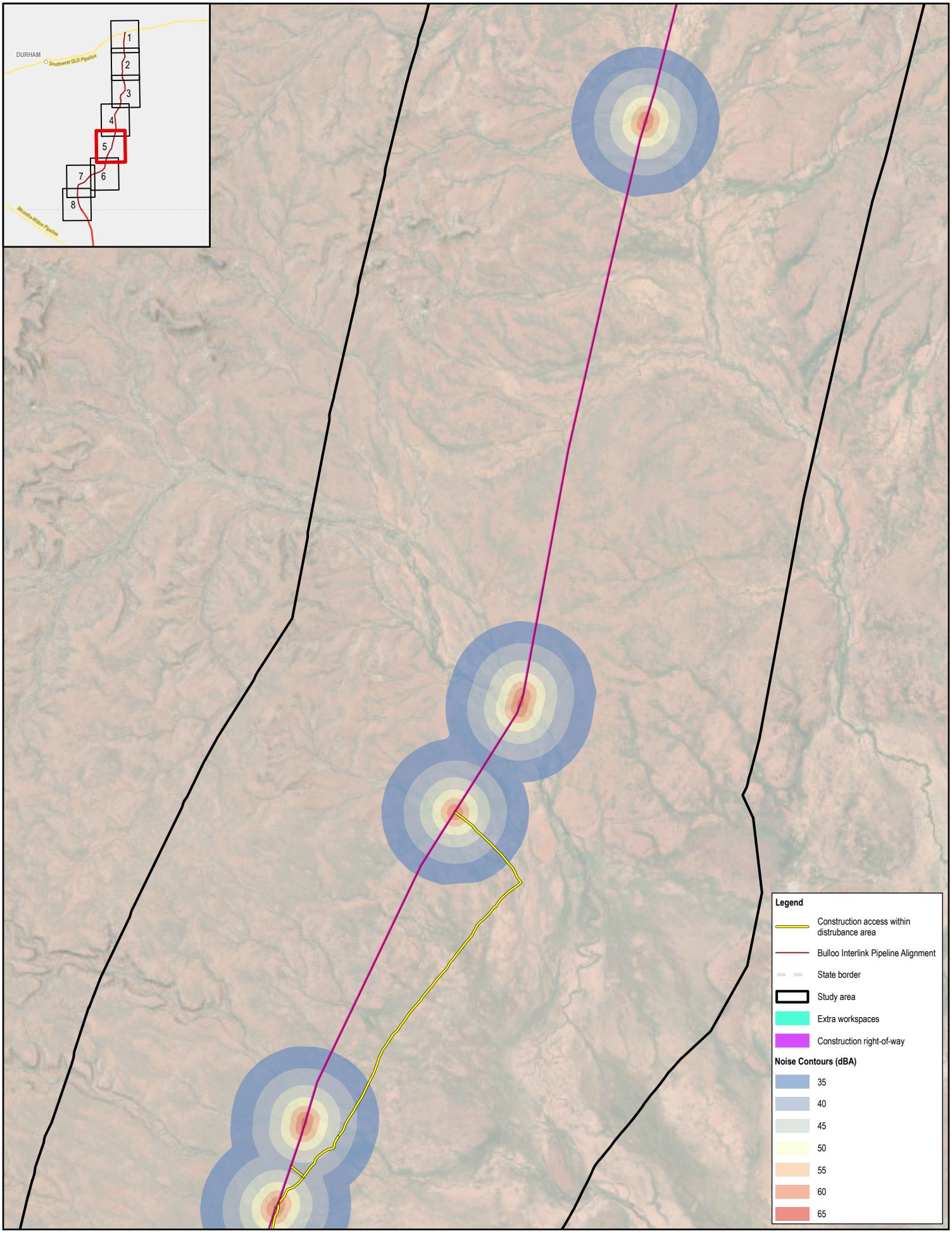
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 4 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:12

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

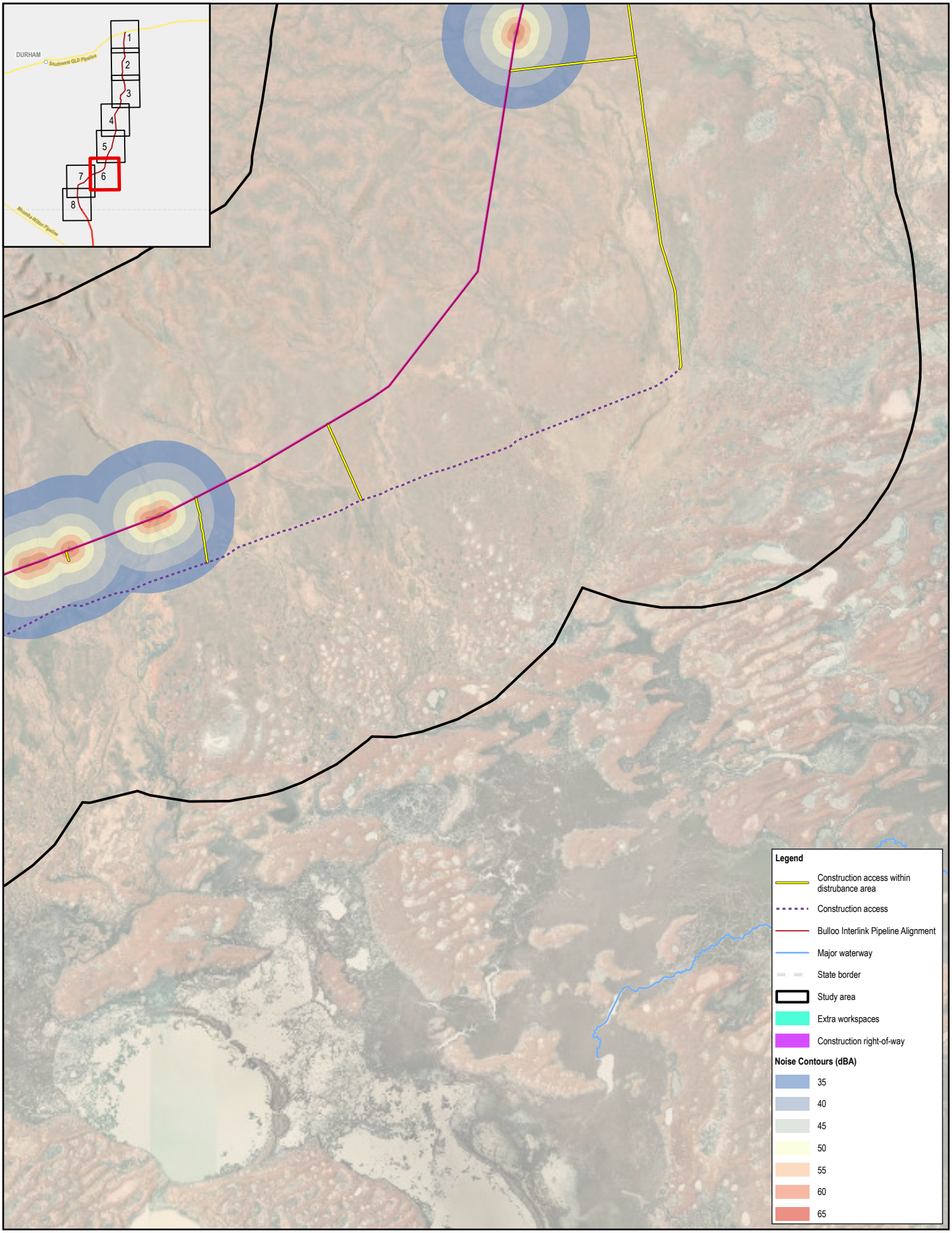
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 5 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:12

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

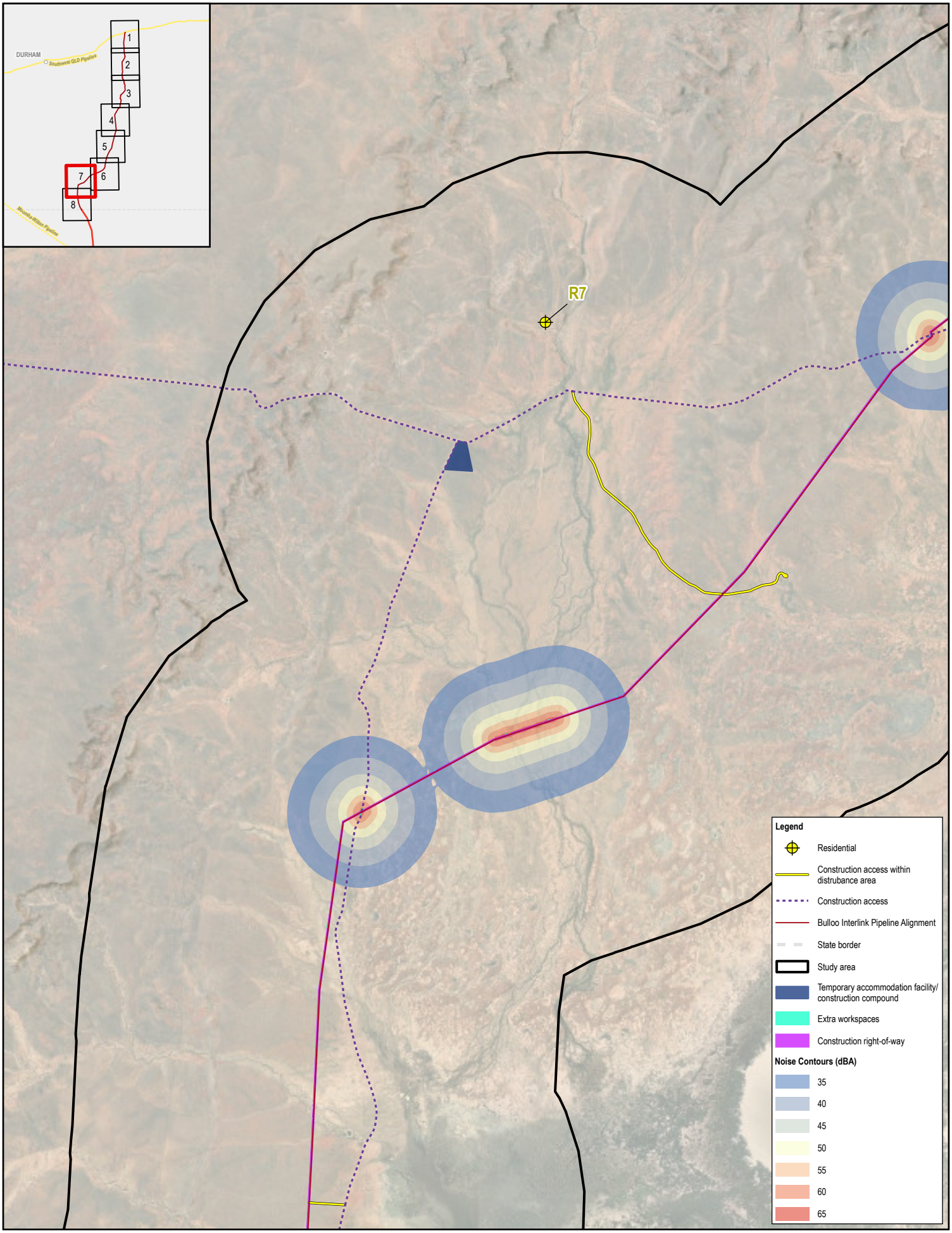
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:12

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

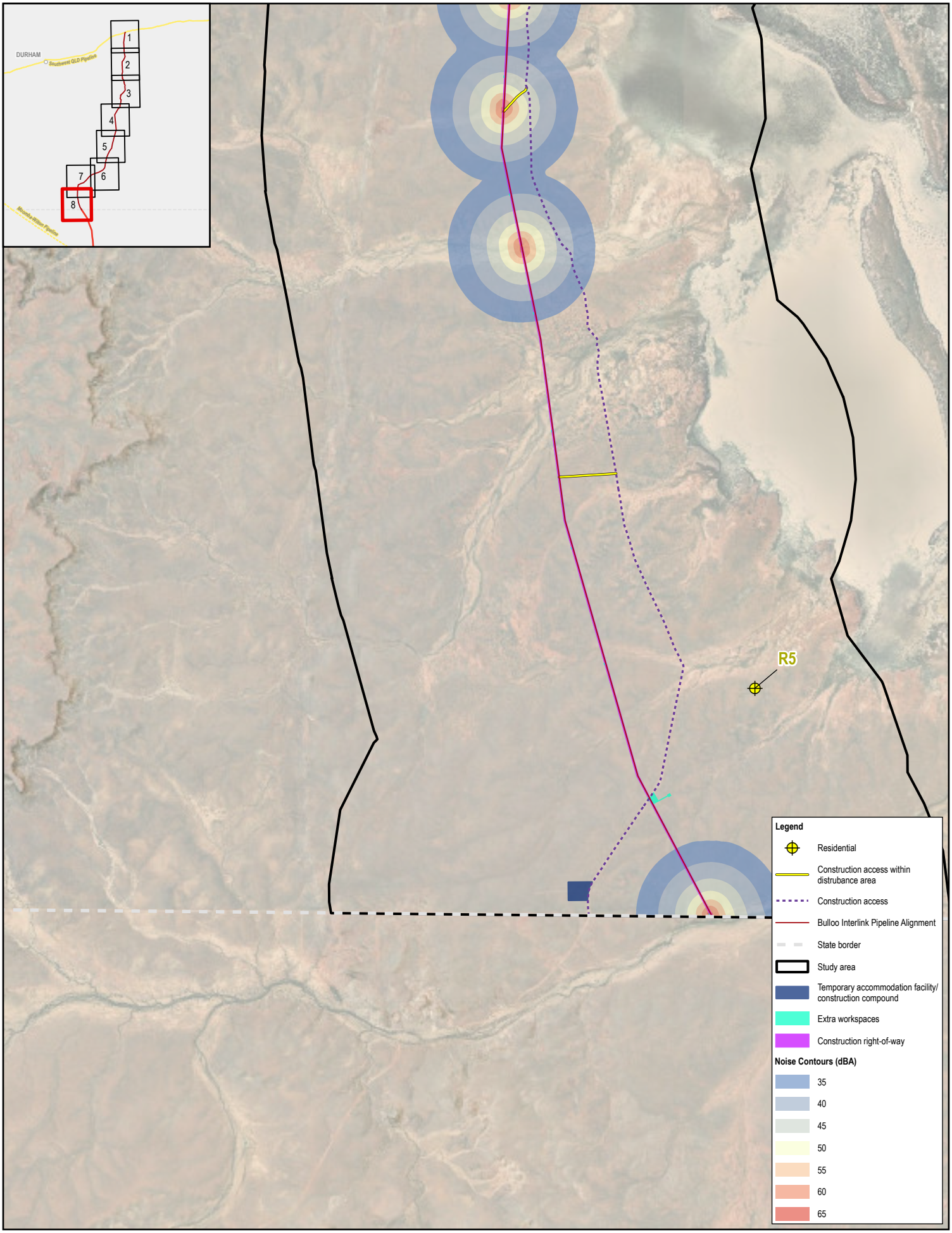
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 7 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:13

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Watercourse, road open cut open cut crossings (CS06)

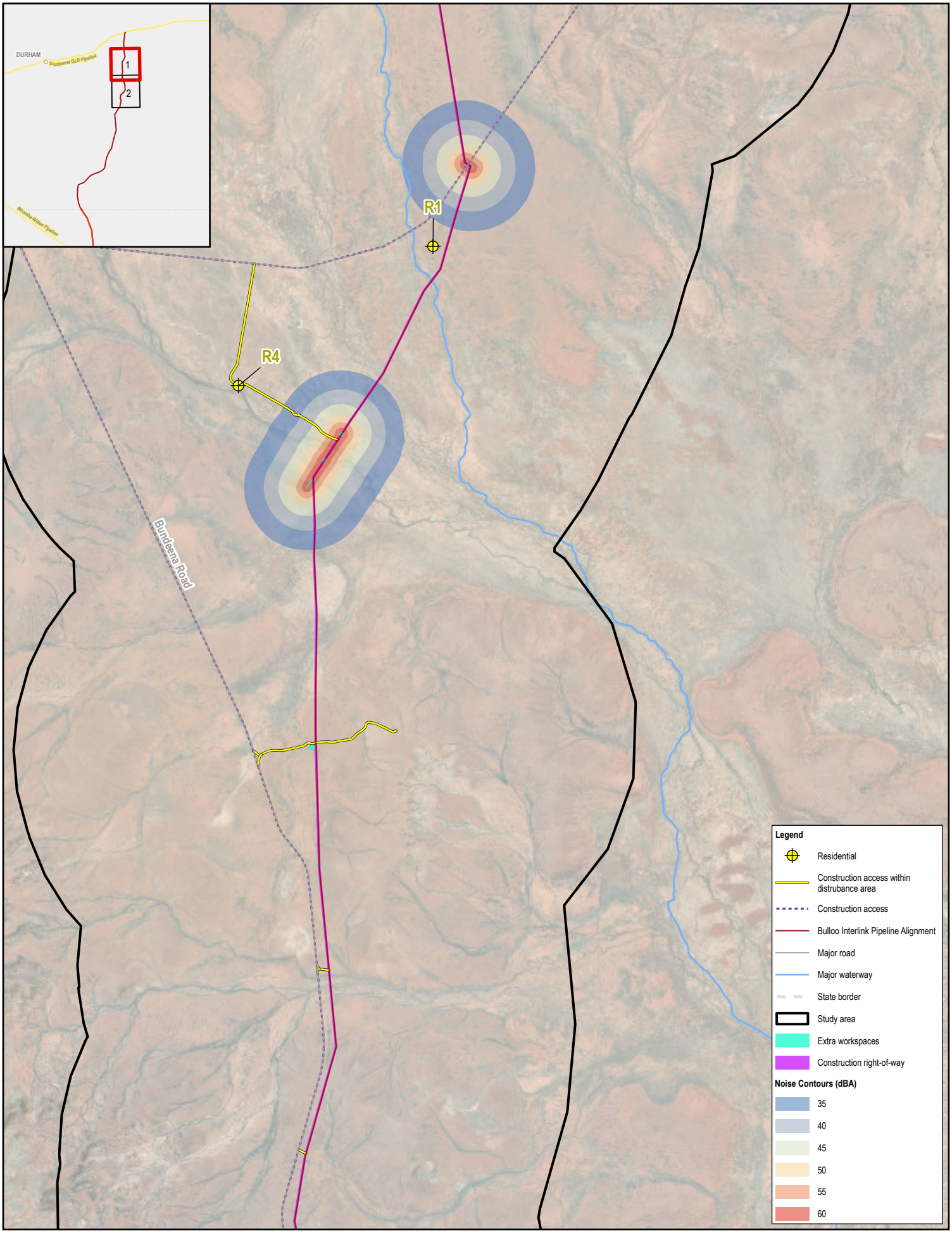
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.6

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:13

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (HDD)

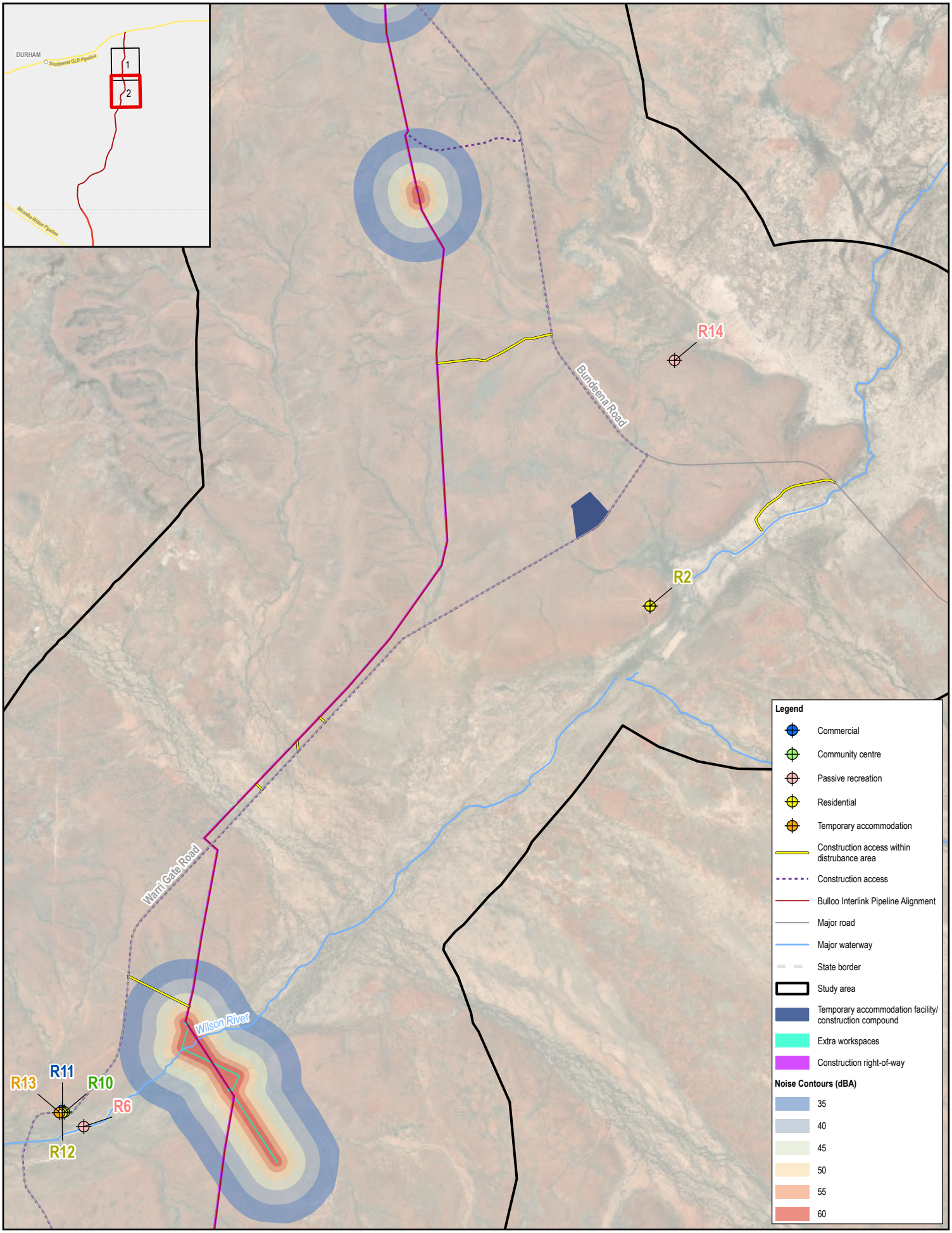
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 1 / 2

Figure B.7

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:20

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (HDD)

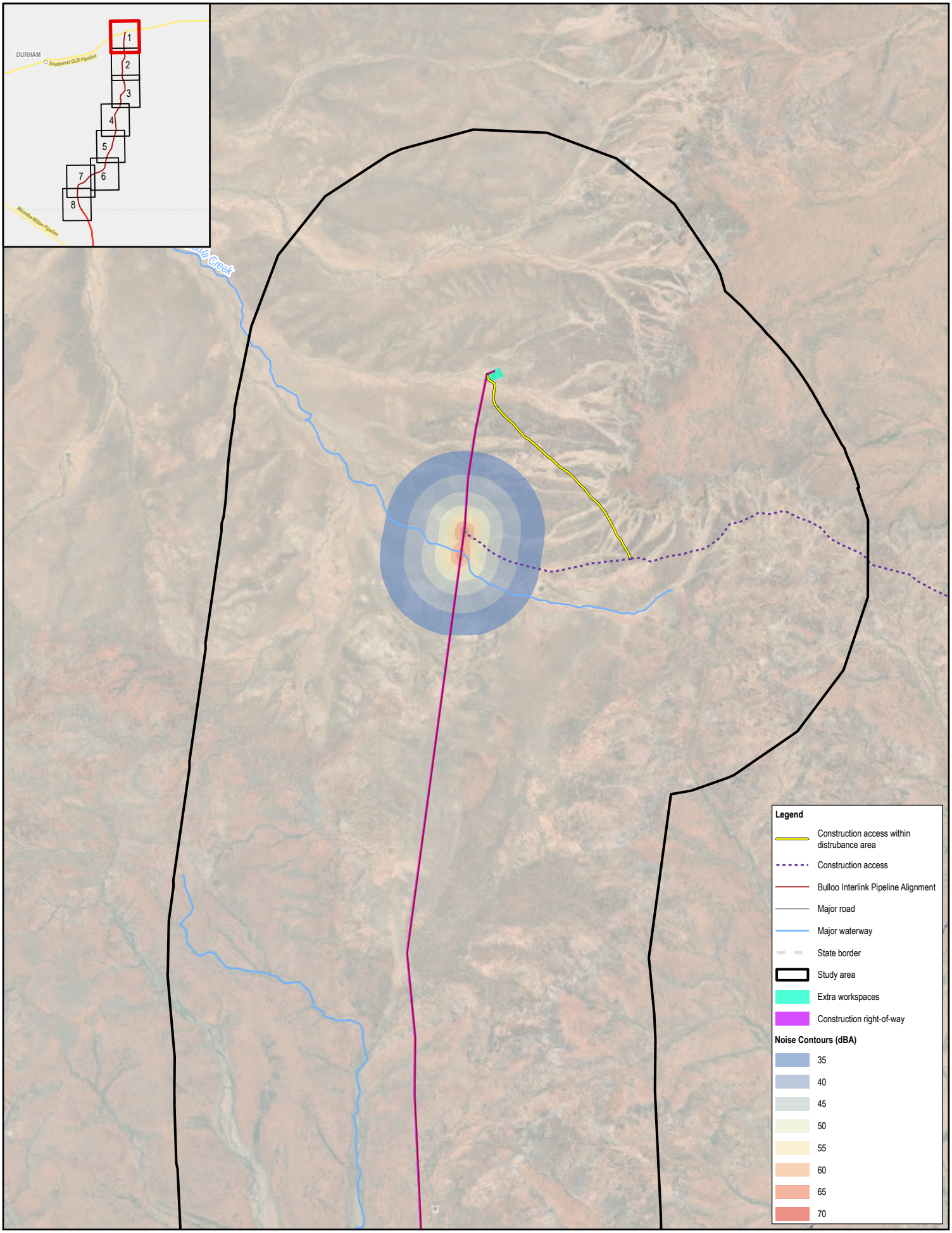
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 2

Figure B.7

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:20

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

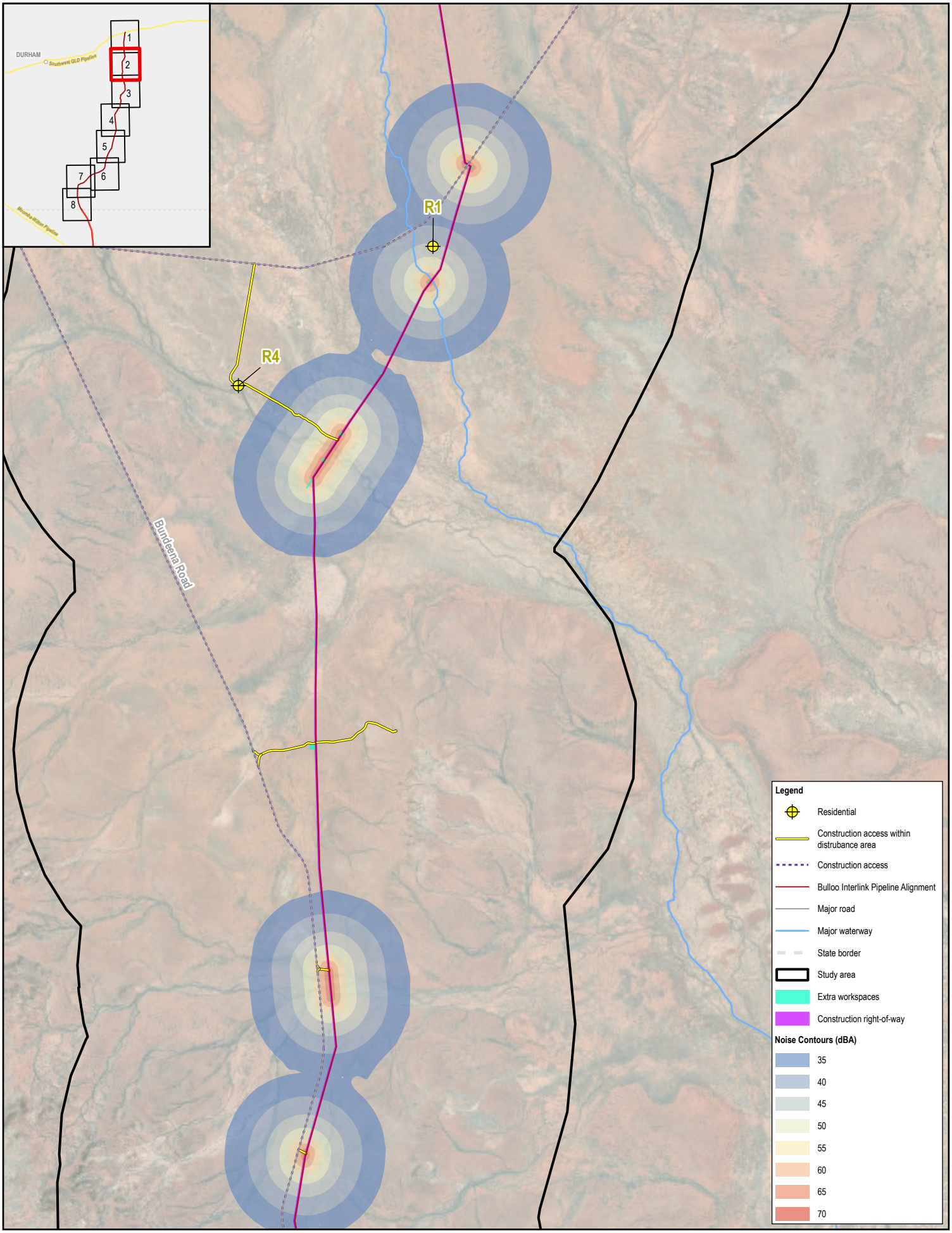
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:13

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

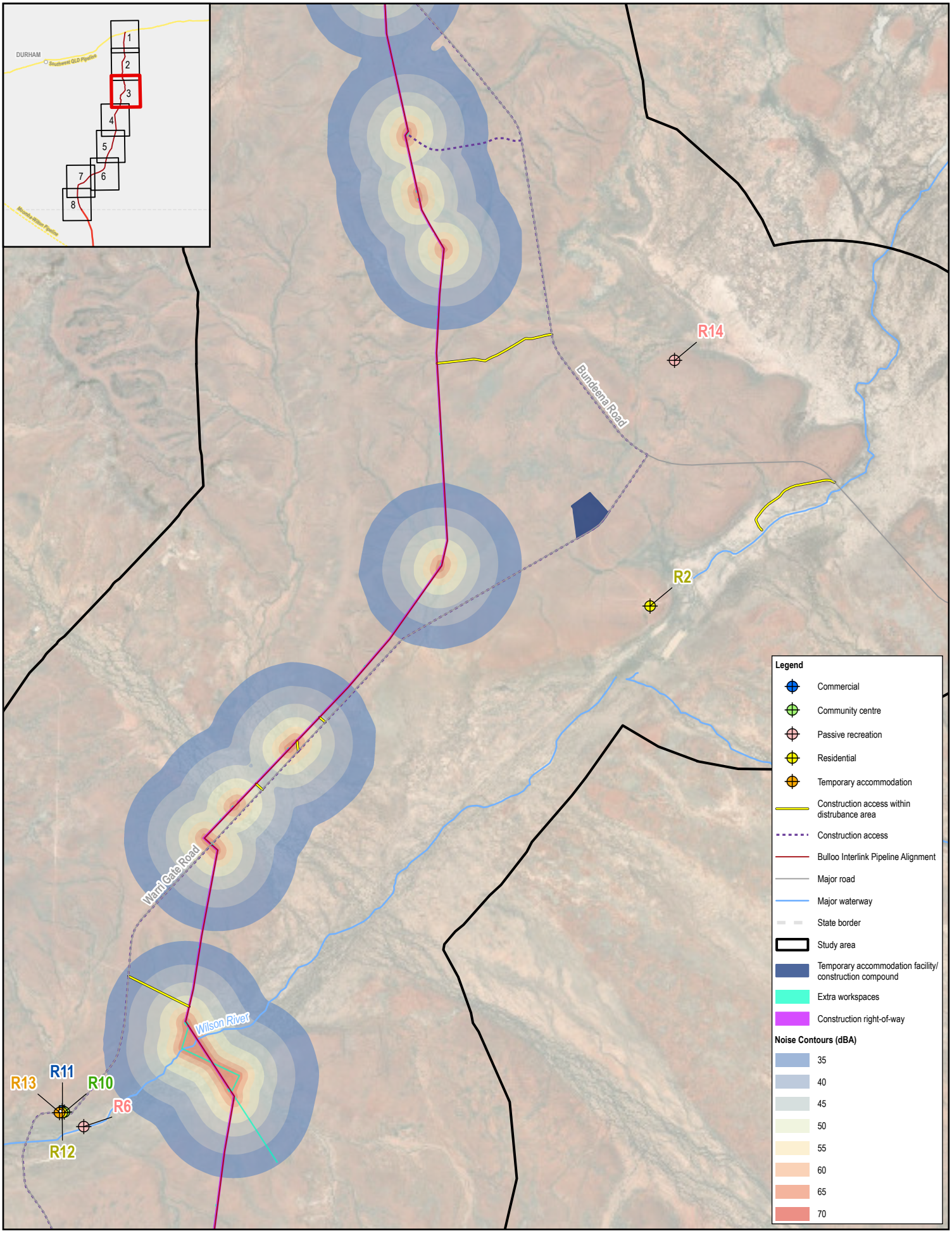
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:13

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

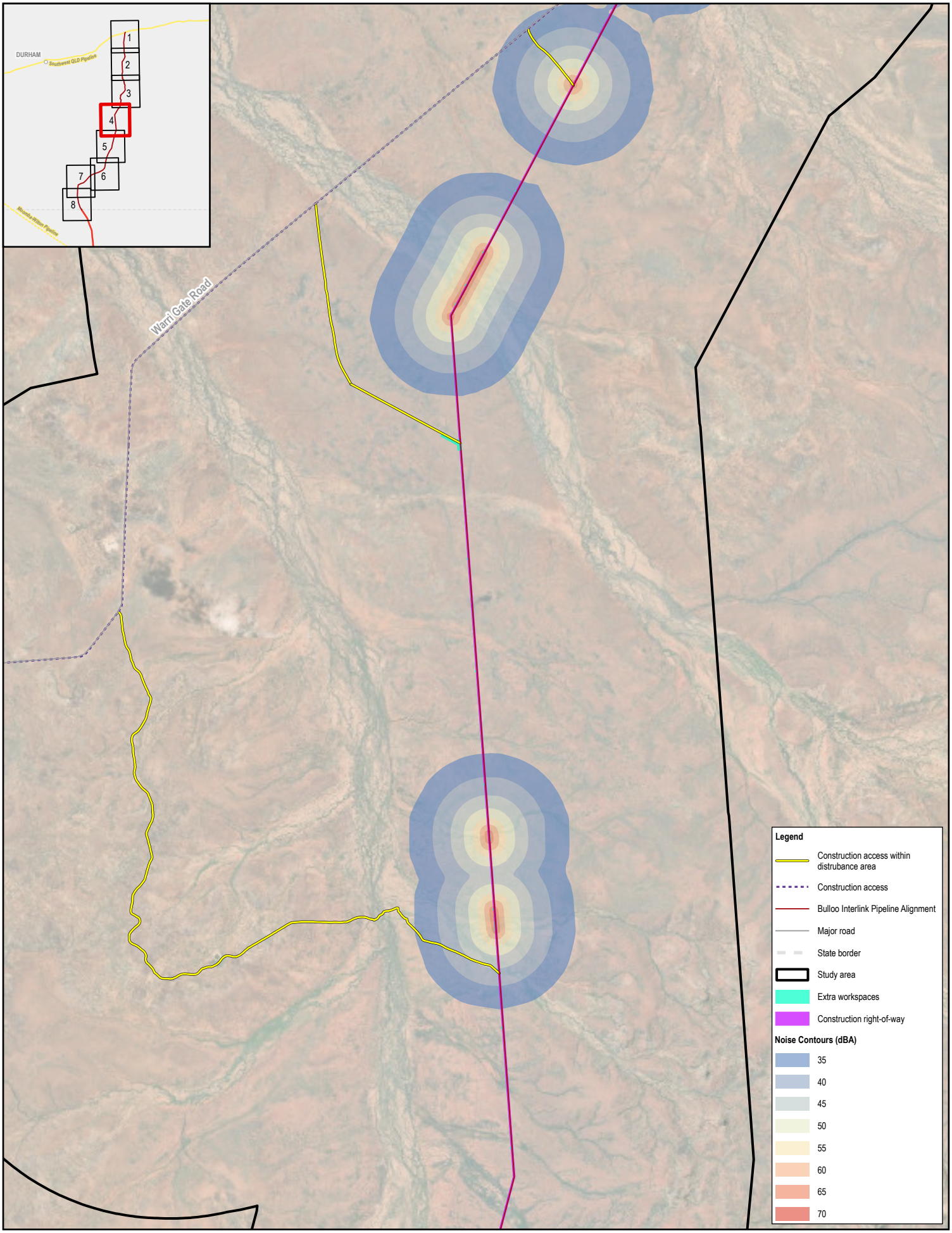
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

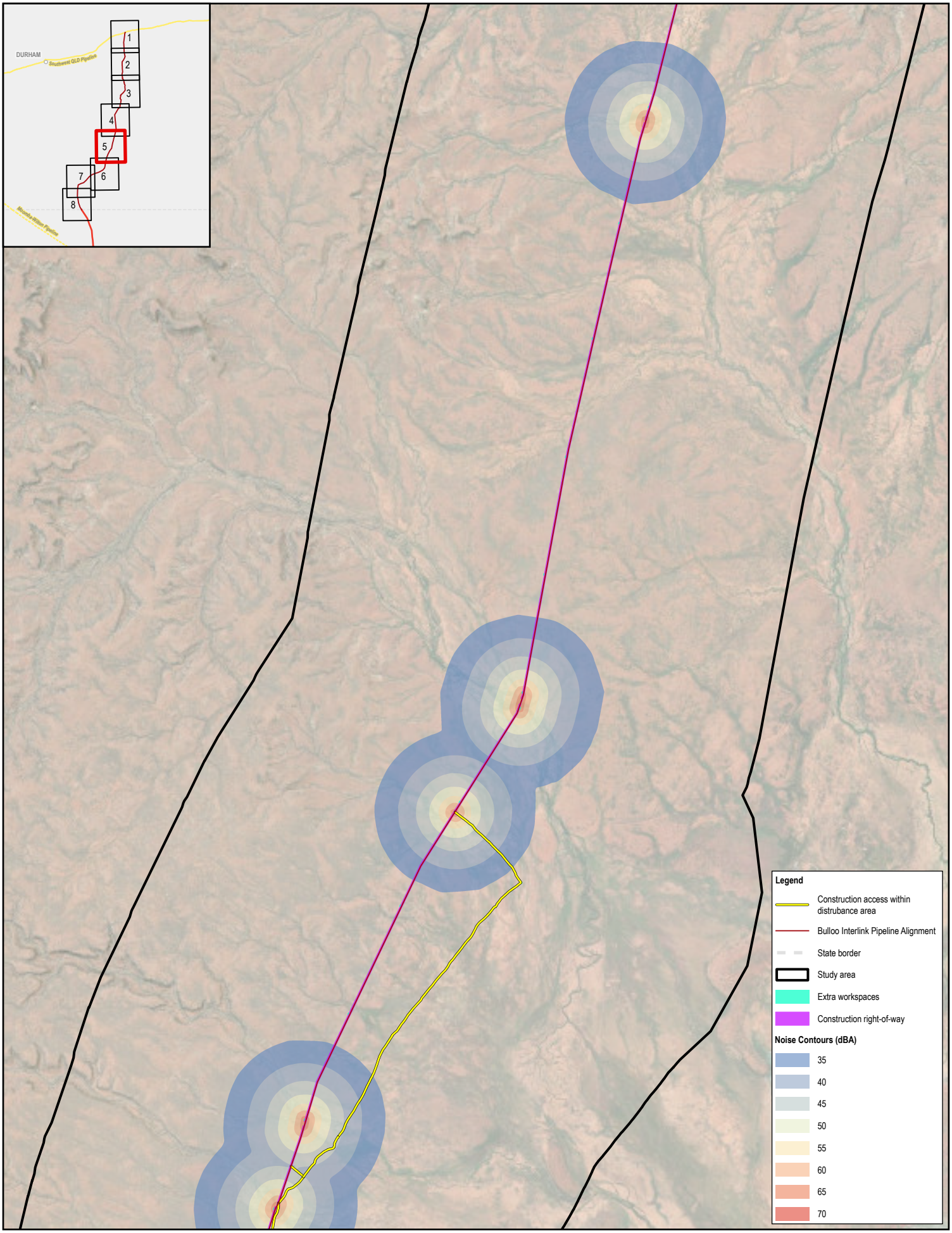
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

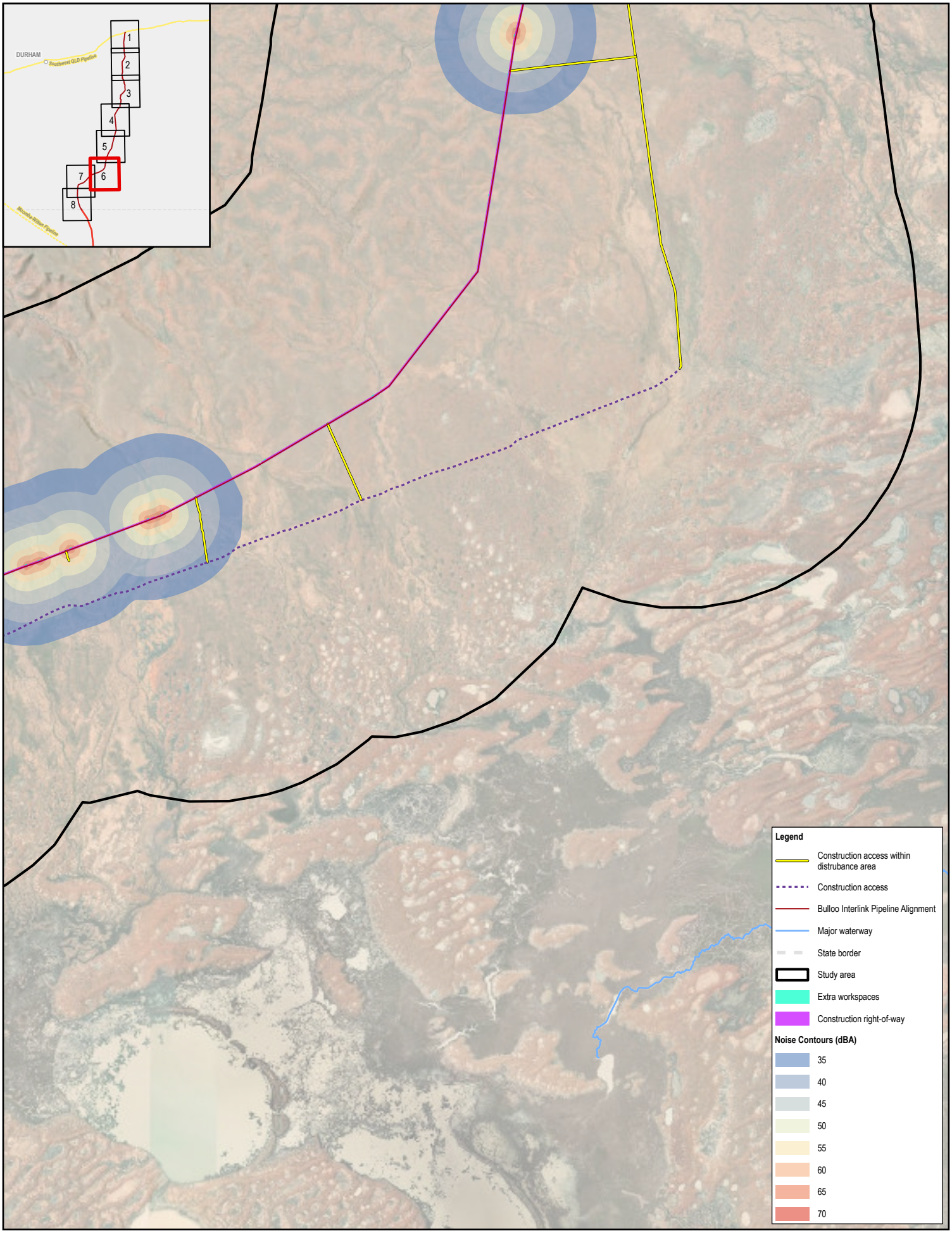
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 5 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

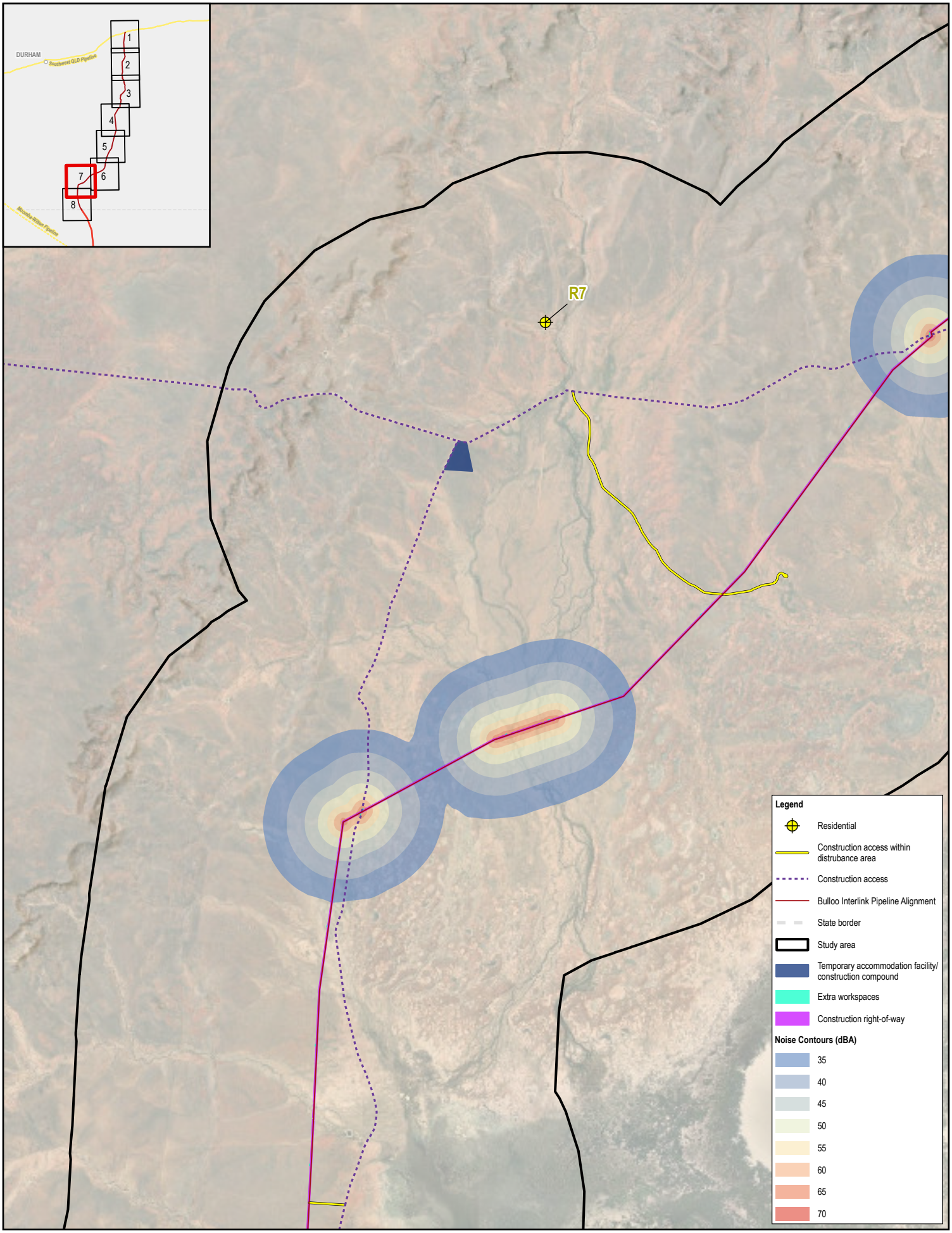
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 6 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

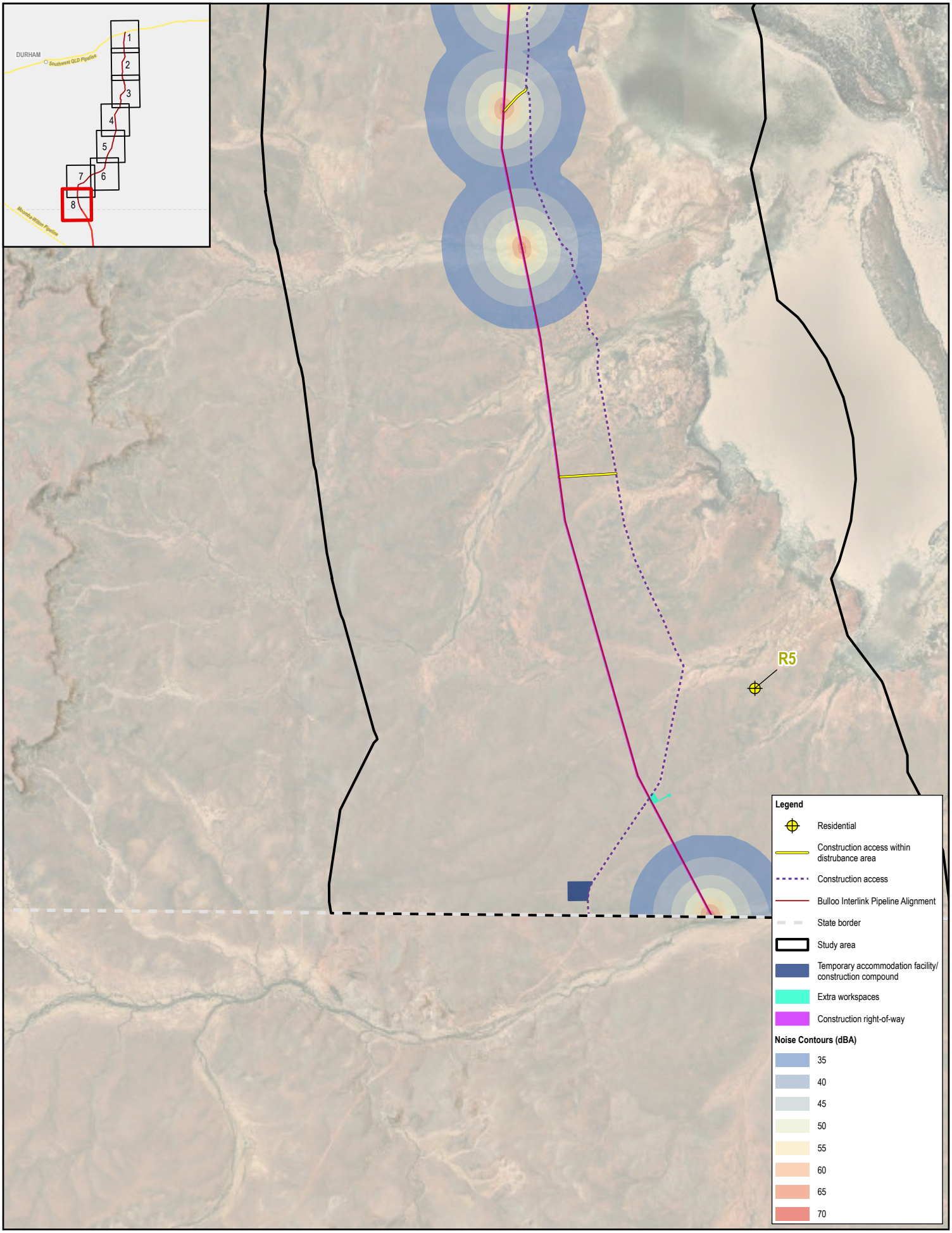
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 7 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Trenchless crossings (Bores) (CS08)

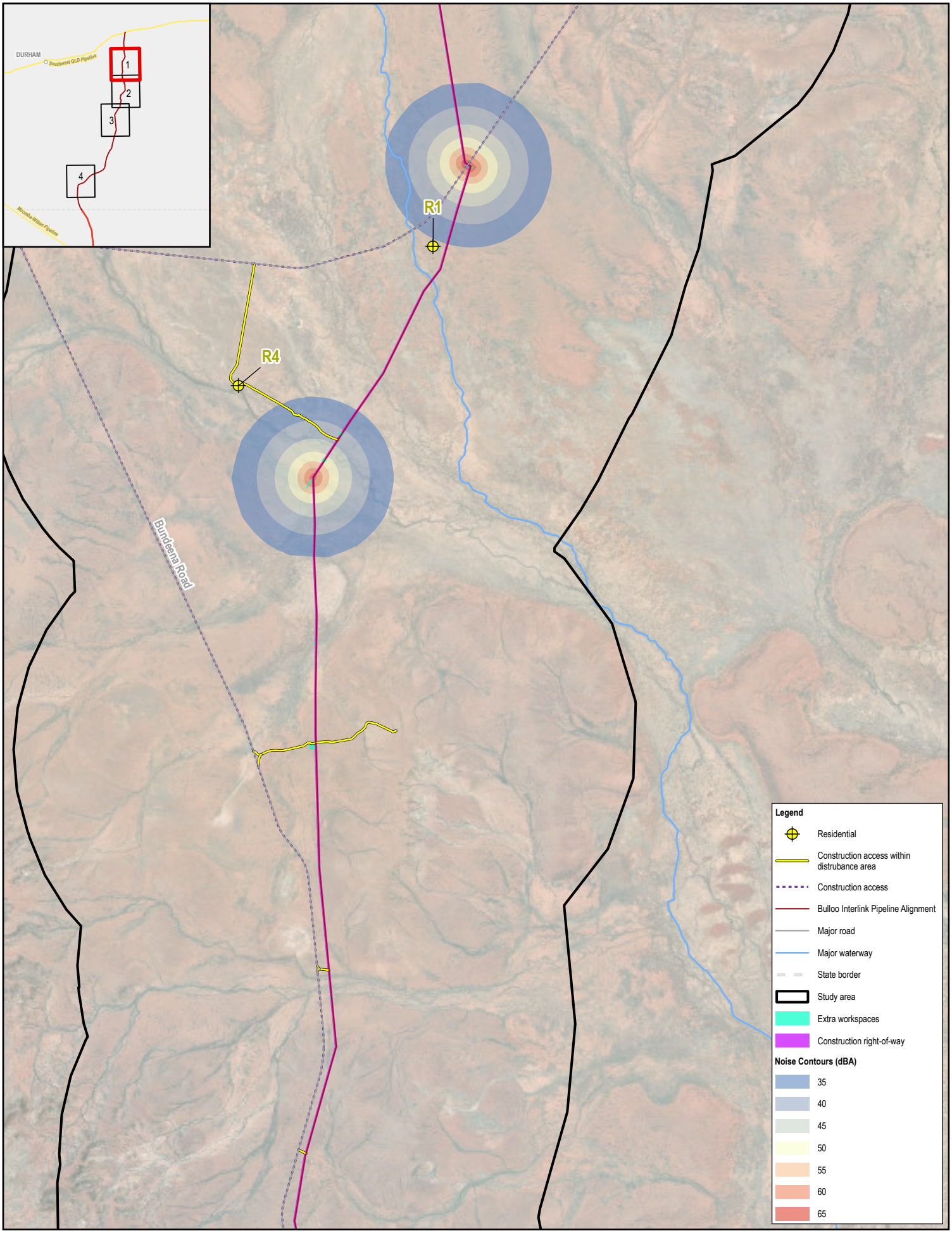
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 8 / 8

Figure B.8

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:14

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Tie ins (CS09)

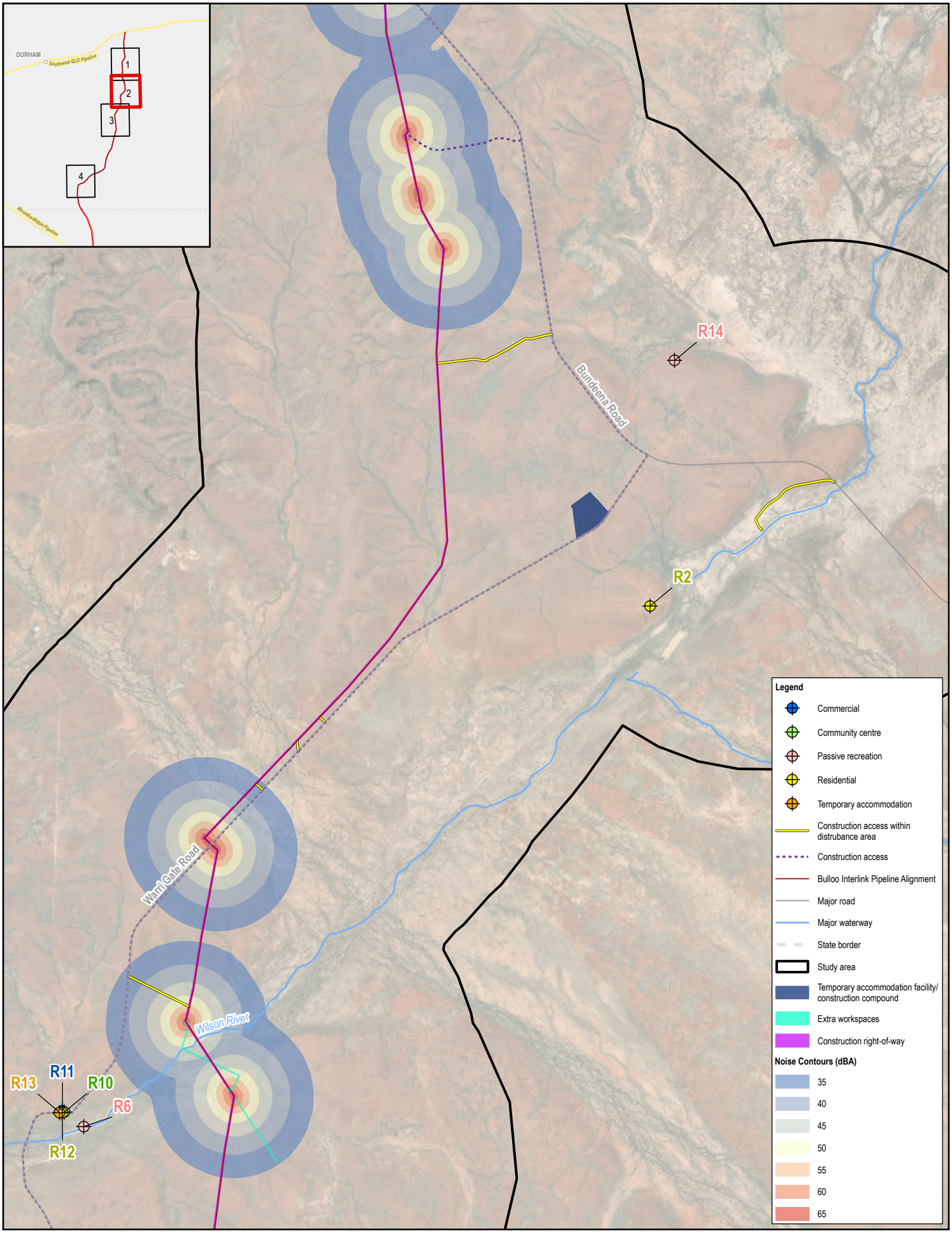
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 4

Figure B.9

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:42

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Tie ins (CS09)

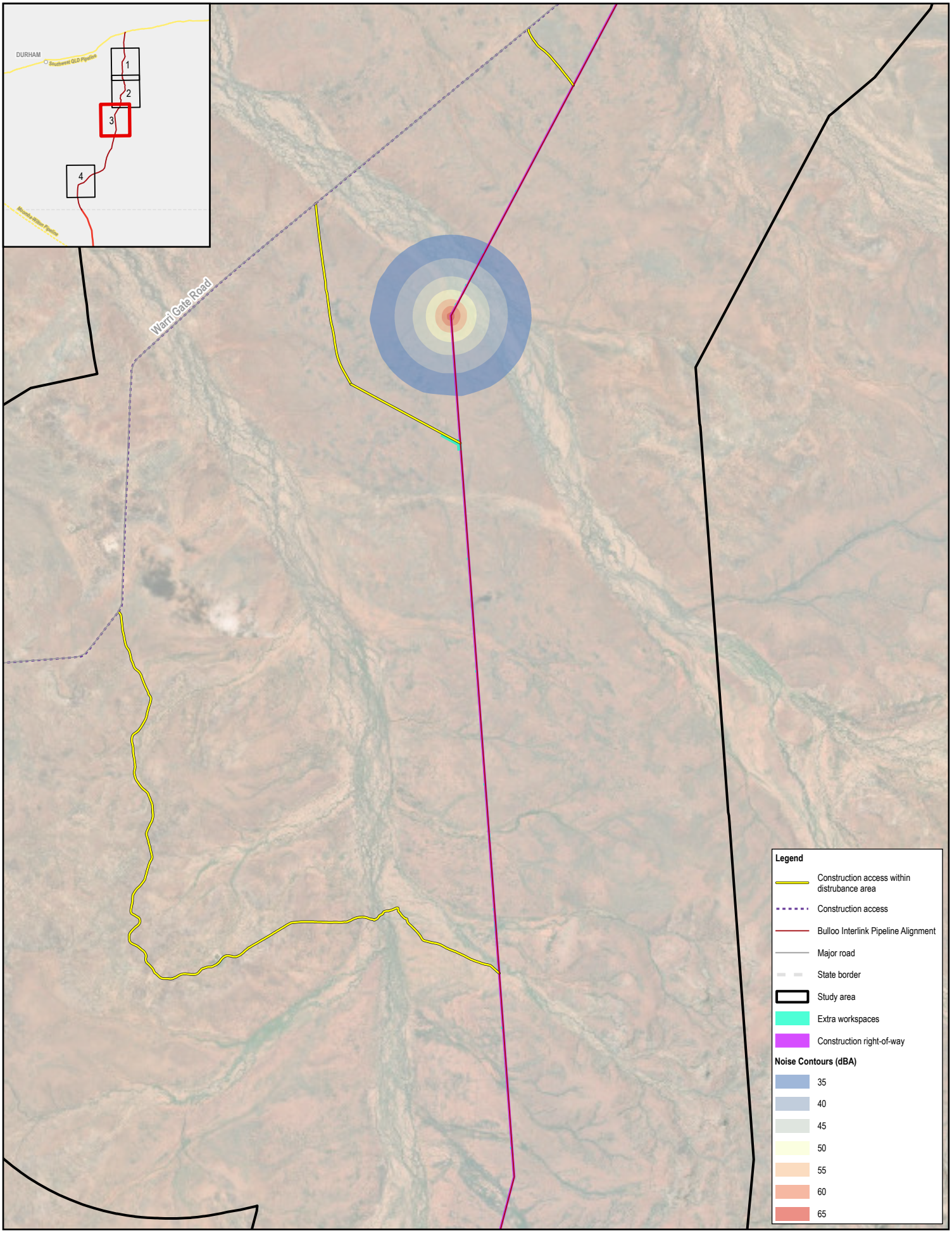
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 4

Figure B.9

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:42

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Tie ins (CS09)

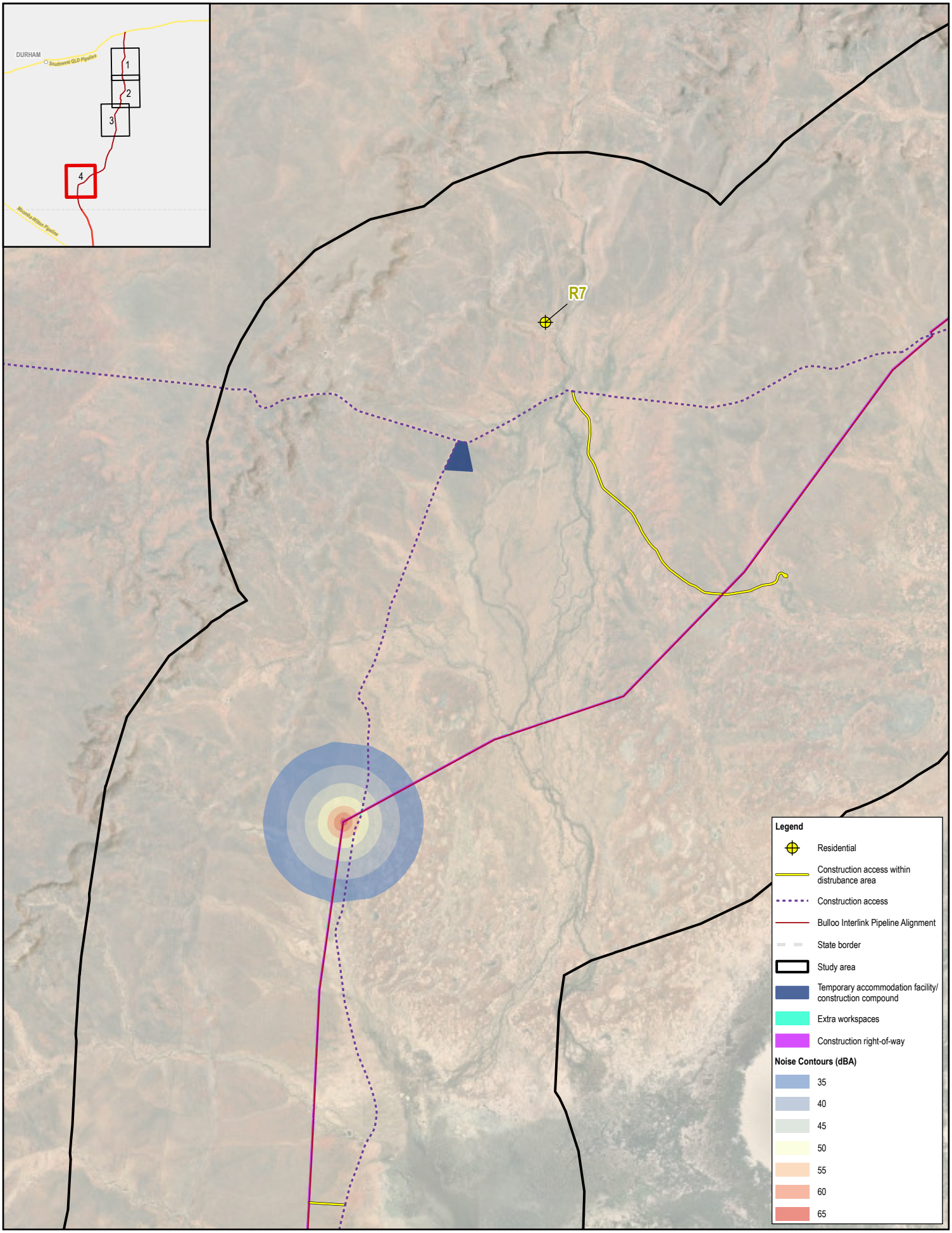
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 3 / 4

Figure B.9

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:42

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Tie ins (CS09)

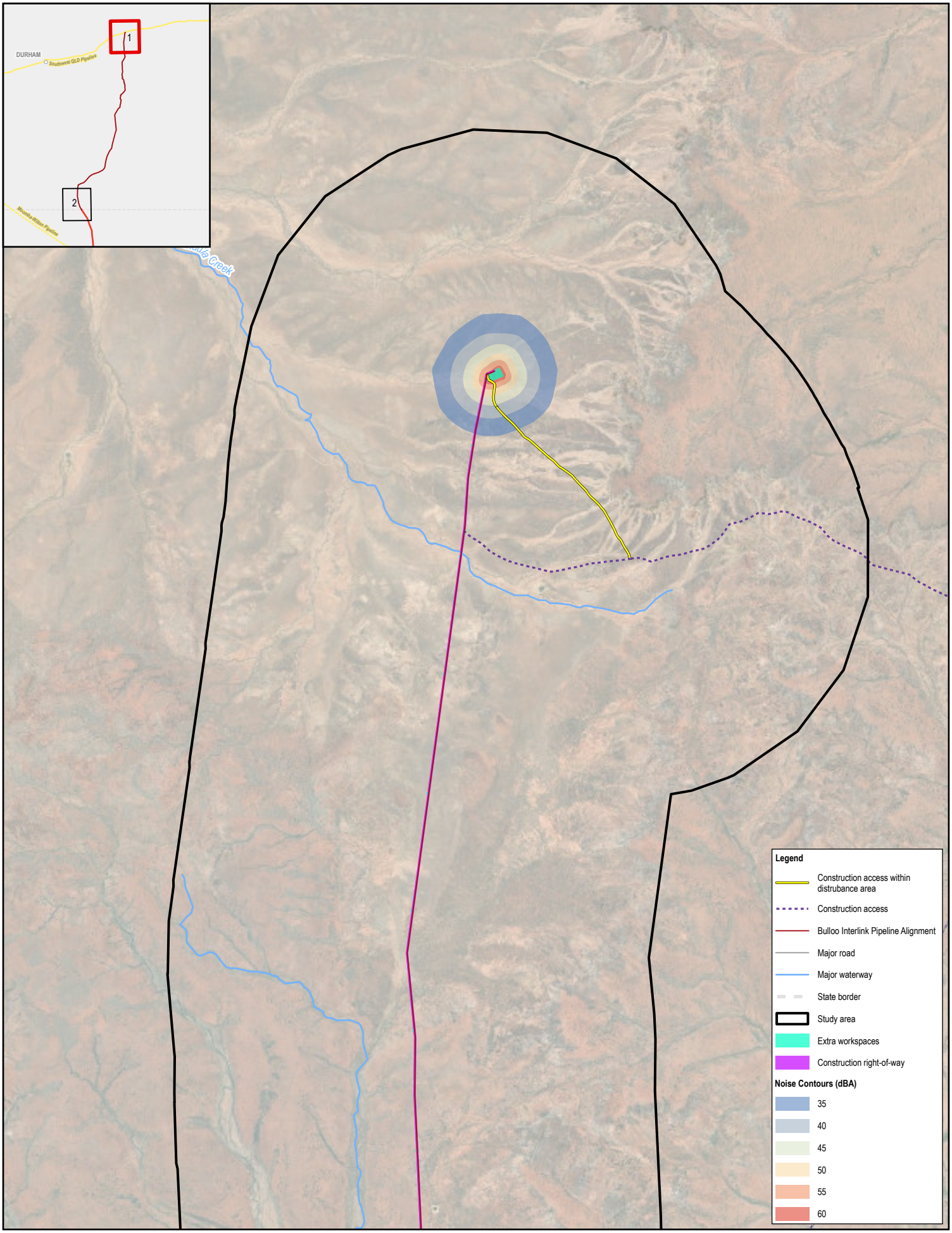
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 4 / 4

Figure B.9

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 12:42

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Above ground infrastructure (CS12)

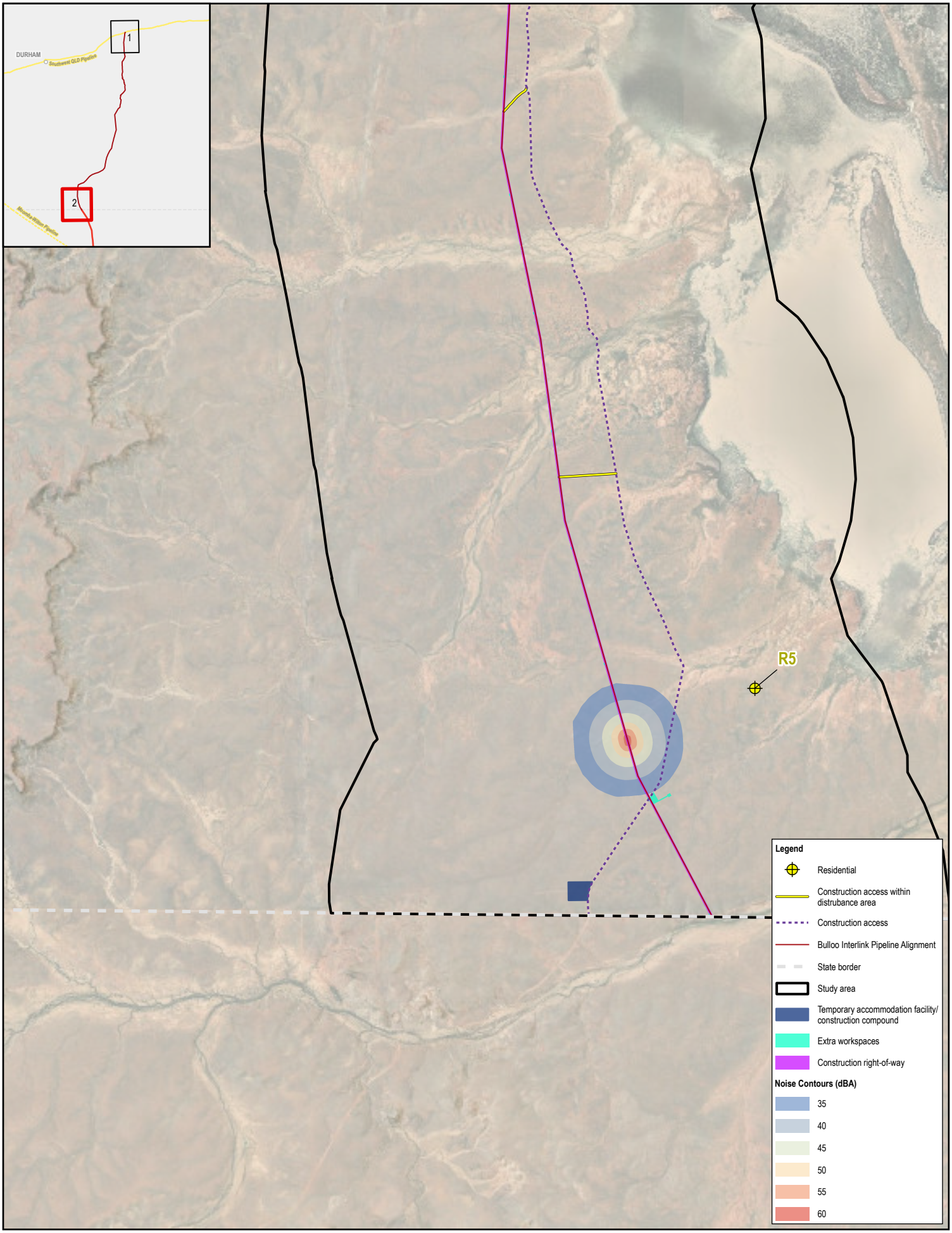
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 2

Figure B.10

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:02

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Above ground infrastructure (CS12)

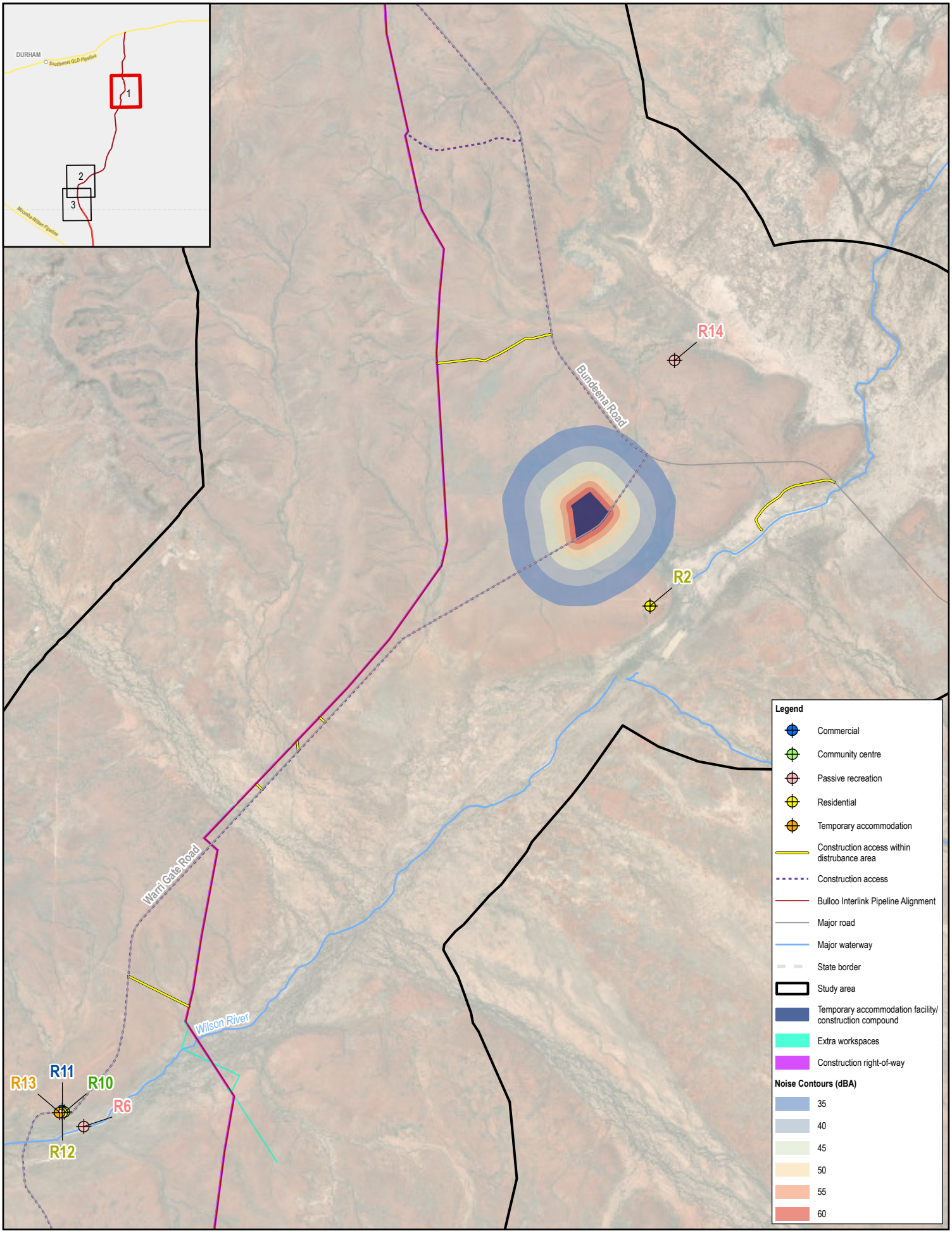
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 2

Figure B.10

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:02

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Construction of construction compound and temporary accommodation facility (CS13)

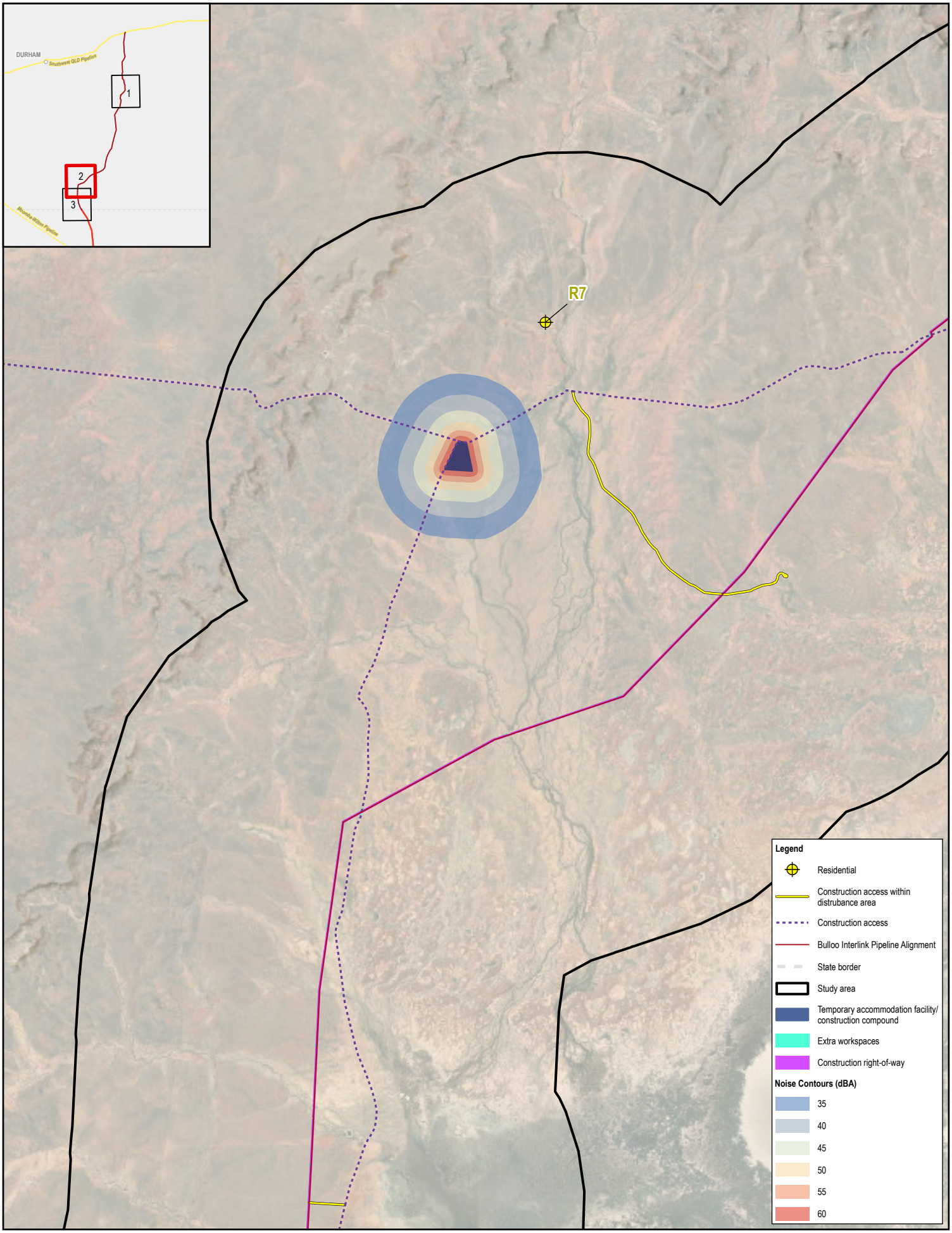
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 3

Figure B.11

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:03

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Construction of construction compound and temporary accommodation facility (CS13)

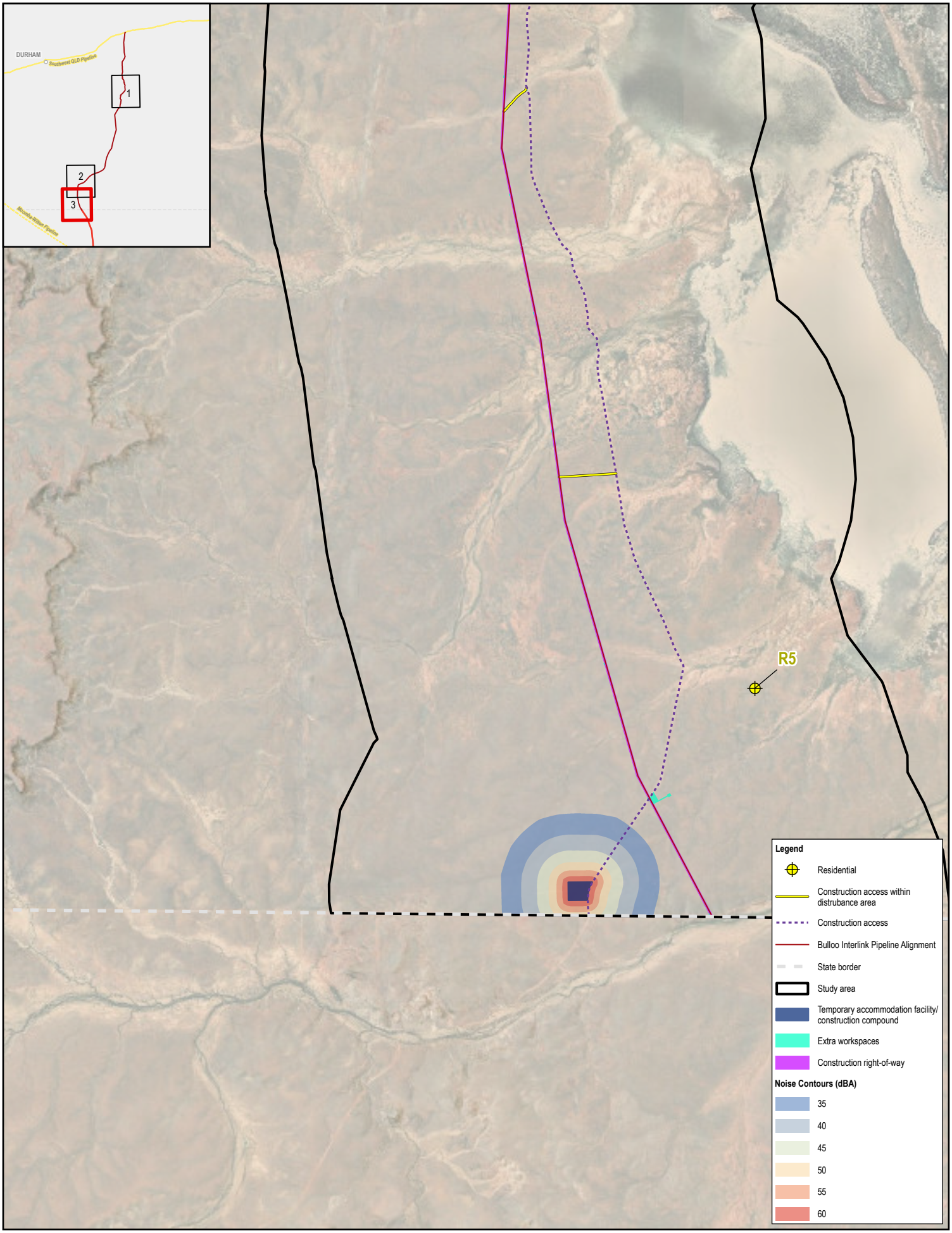
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 2 / 3

Figure B.11

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:03

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGSDNRMMRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Construction of construction compound and temporary accommodation facility (CS13)

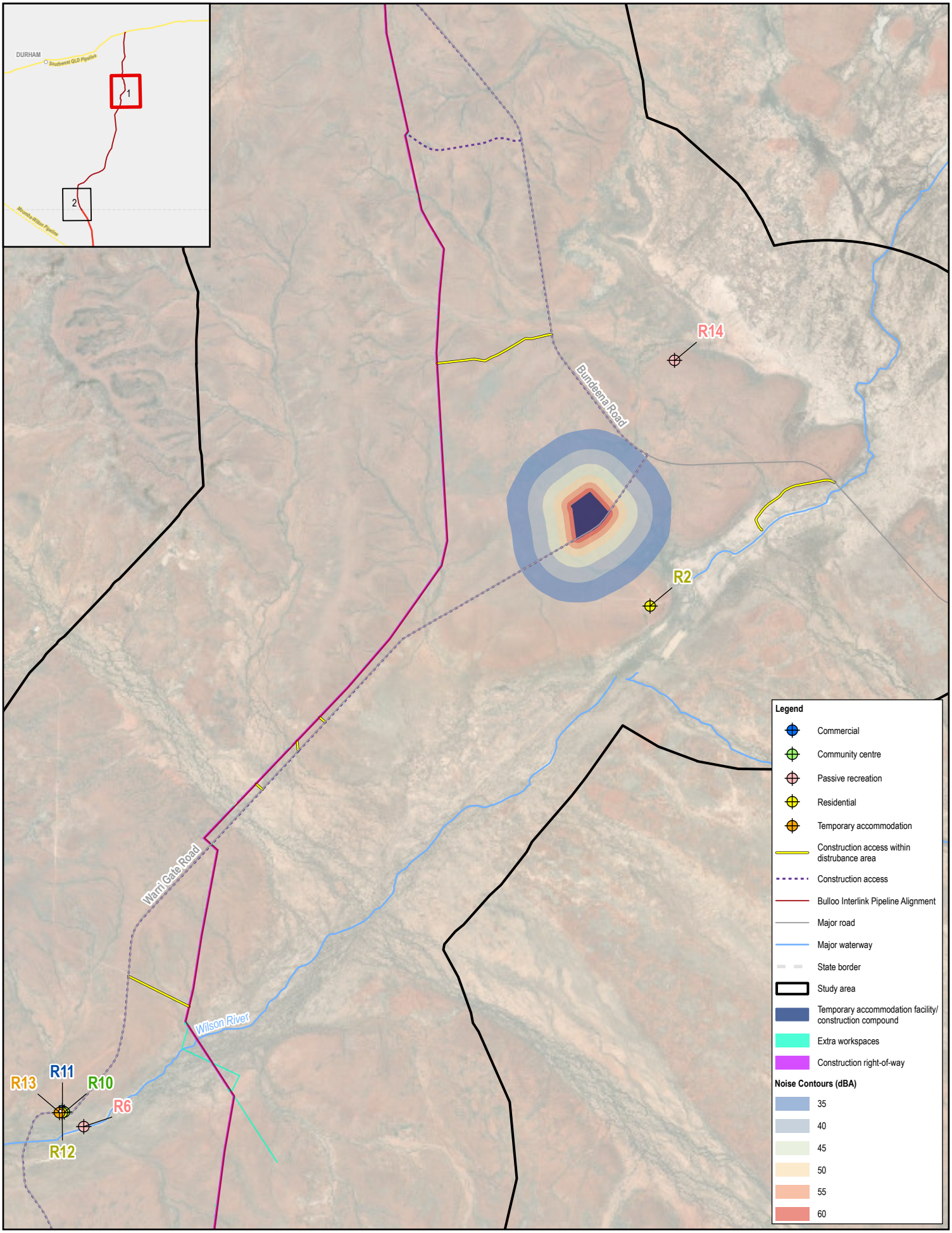
Project No. **12661648**
Revision No. **0**
Date **17/06/2026**

Sheet 3 / 3

Figure B.11

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:03

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Operation of construction compound (CS14)

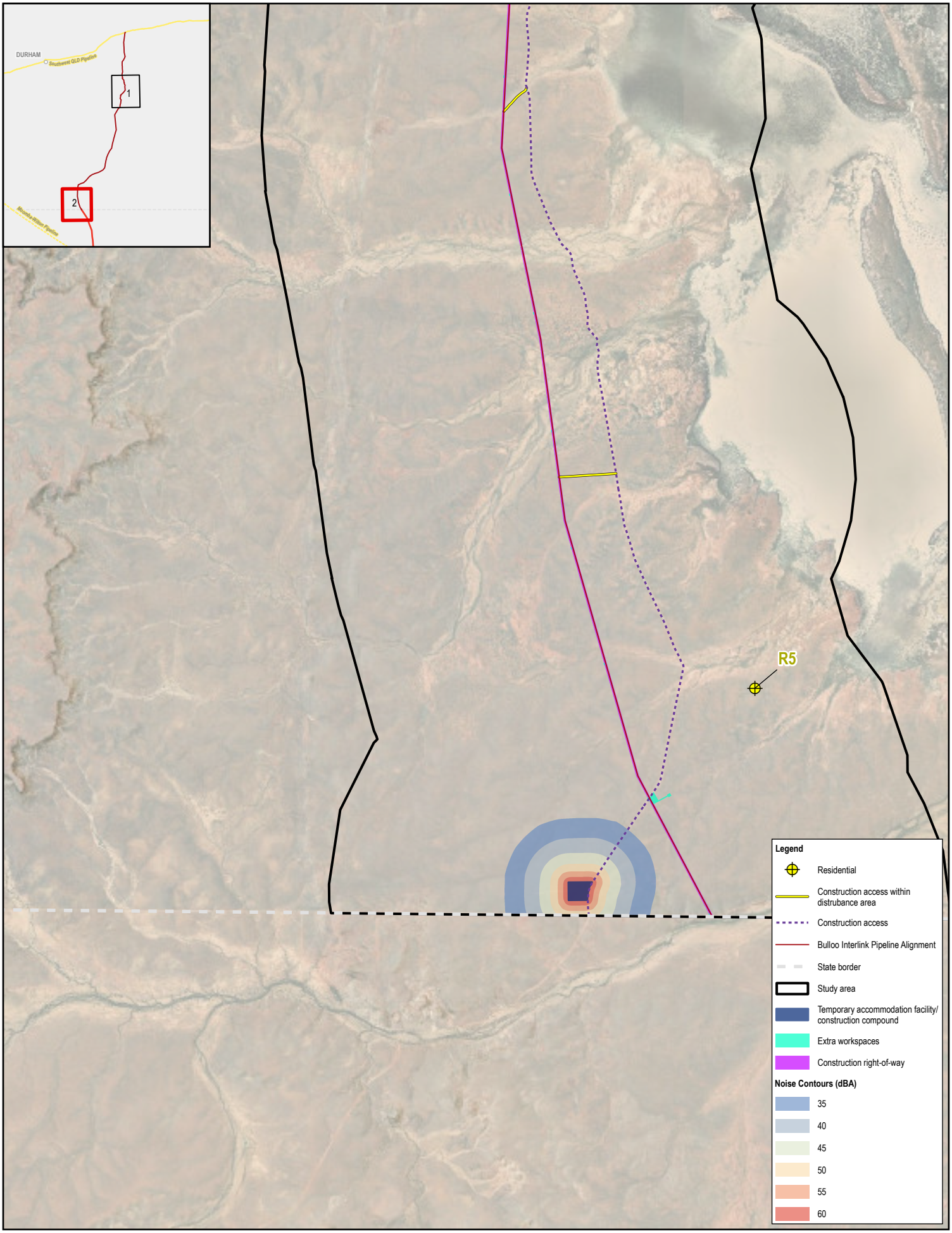
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 1 / 2

Figure B.12

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:05

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Operation of construction compound (CS14)

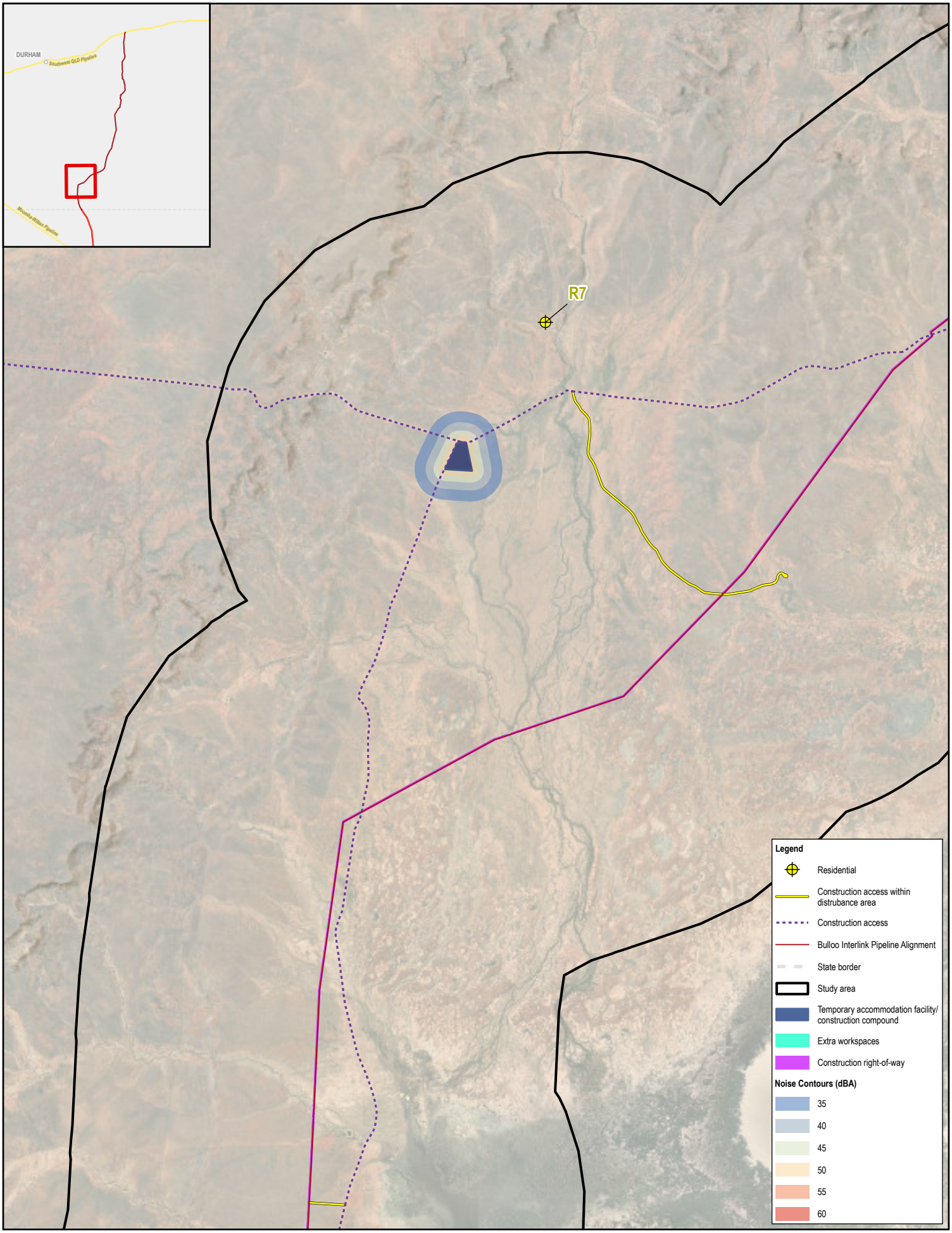
Project No. 12661648
Revision No. 0
Date 17/06/2026

Sheet 2 / 2

Figure B.12

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:05

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS\DNRM\MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



Paper Size ISO A4

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

APA

GHD

APA Group
Bulloo Interlink Pipeline

Construction noise contours - Operation of temporary accommodation facility (CS15)

Project No. 12661648
Revision No. 0
Date 17/06/2026

Figure B.13

N:\AU\Sydney\Projects\21\12661648\GIS\Maps\Deliverables\Queensland\12661648_NVIA_1.aprx - BIL_NVIA_1pg_A4P / Print date: 17 Jun 2026 - 13:07

Data source: Earthstar Geographics, Esri, Geoscience Australia, NASA, NGA, USGS/NRM/MRRD: Roads, Watercourse (2023), LGA (2025), Cadastre (2026); GA: State border (2006); APA: Pipeline alignment, Facility area, Extra workspaces, Construction right of way (2026); GHD: Study area, noise contours, sensitive receptors (2026). Created by: acjackson



ghd.com

The Power of Commitment