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Appendix B3

Construction Noise and Vibration Management Sub-Plan

HumeLink West

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Signed	
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The document is uncontrolled when printed. One controlled hard copy of the Management Plan will be maintained by the Quality Manager at the HLW office and on the HumeLink website, were relevant.

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Definitions

Term	Definition
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Construction	All physical work to enable operation, including but not limited to the construction of transmission infrastructure and ancillary facilities carried out before the commencement of operation, excluding pre-construction minor works, road upgrades and Enabling work (as defined in this Table of definitions and enabling works management plan)
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the “A” filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Enabling Works	An initial stage (as defined under an approved Enabling Works Management Plan under condition B64 of this approval) of the following activities defined as low risk in the Enabling Works Management Plan: 1. Site establishment and the operation of construction compounds, including excavations, surface preparation, site access points and utility connections; 2. Site establishment of worker accommodation facilities; 3. Minor adjustments to existing access tracks and road improvement; 4. Utility relocations and adjustments; 5. Establishment of new access tracks in the Enabling Works Management Plan.
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation’s activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s environmental aspects.
Environmental Impact Statement	The Environmental Impact Statement referred to in Condition A2, submitted to the Planning Secretary seeking approval to carry out the development described in it, as revised if required by the Planning Secretary under the EP&A Act, and including any additional information provided by the Proponent in support of the application for approval of the project.

Term	Definition
Environmental incident	An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment.
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental policy	Statement by an organisation of its intention and principles for environmental performance.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Environmental Representative	A suitably qualified and experienced person independent of HumeLink design and construction personnel employed for the duration of construction. The principal point of advice in relation to all questions and complaints concerning environmental performance.
Feasible	Means what is possible and practical in the circumstances
Heavy Vehicle	As defined under the Heavy Vehicle National Law (NSW), but excluding light and medium rigid trucks and buses no more than 8 tonnes and with no more than 2 axles
Highly noise affected	As defined in the ICNG
Highly noise intensive works	Works which are defined as annoying under the ICNG, including: (a) use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work (b) grinding metal, concrete or masonry (c) rock drilling (d) line drilling (e) vibratory rolling (f) bitumen milling or profiling (g) jackhammering, rock hammering or rock breaking (h) rail tamping and regulating (i) impact piling.
HumeLink Approvals	HumeLink approvals include: • HumeLink Infrastructure Approval NSW SSI 36656827 • HumeLink EPBC Approval Cth EPBC 2021/9121
LAF(max)	The A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
LAeq(15min)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-minute period and excludes other noise sources such as from industry, road, rail and the community.

Term	Definition
LAeq(15hour)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-hour period
LAeq(9hour)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 9-hour period
LAeq(1hour)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 1-hour period
LA90(15 minute)	The A-weighted noise level exceeded for 90% of the time over a fifteen minute period. The bottom 10% of the sample is the LA90 noise level expressed in units of dB(A).
Minimise	Implement all reasonable and feasible mitigation measures to reduce the noise and vibration impacts during construction of the Project
Non-associated residence	Means: • a residence on privately-owned land in respect of which the owner has not reached an agreement with the Proponent in relation to the development (as provided by this approval); or • a residence on privately-owned land in respect of which the owner has reached an agreement with the Proponent in relation to the development (as provided by this approval), but the agreement does not cover the relevant impact or the performance measure for such impact under that agreement has been exceeded.
Non-compliance	Failure to comply with the requirements of the HumeLink Approvals or any applicable licence, permit or legal requirements.
Non-conformance	Failure to conform to the requirements of HLW system documentation or supporting documentation, but is not considered a non-compliance.
Operation	The carrying out of the approved purpose of the development upon completion Operation, but does not include commissioning trials of equipment or use of temporary facilities. Note: There may be overlap between the carrying out of construction and operation if the phases of the development are staged. Commissioning trials of equipment and temporary use of any part of the development are within the definition of construction. The carrying out of the approved purpose of the development upon completion
Planning Approval Documentation	*The NSW planning approval documents, as they relate to the HLW and as listed in MCoA A2 of the NSW Infrastructure Approval for HumeLink (SSI 36656827)*
Pre-construction minor works	Includes: i) the following activities: • surveys • building and road dilapidation surveys; • investigative drilling, excavation or salvage; • establishing temporary site office (in locations meeting the criteria

Term	Definition
	identified in the conditions of this approval) • installation of environmental impact mitigation measures, fencing, enabling works; ii) construction of minor access roads and minor adjustments to services/ utilities, etc, for the activities identified in i) above; and iii) minor clearing or translocation of native vegetation for the activities identified in i) and ii) above.
Principal, the	Transgrid
Reasonable	Means applying judgement in arriving at a decision, considering mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Residence	Residence Existing or approved dwelling at the date of grant of this approval
Sensitive receivers	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), passive recreation areas (including outdoor grounds used for teaching) and active recreation areas (e.g. sports grounds). Receivers that may be considered to be sensitive include commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds), childcare centres, restaurants, office premises and retail spaces, and industrial premises.
Sleep disturbance event	Where the subject development / premises night-time noise levels at a residential location exceed: (a) $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and / or (b) L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.
Synergy	UGL-EMS incident management software program to manage, report, record and take action on emergency and incidents.

Abbreviations

Abbreviation	Expanded text
AR	*HumeLink Amendment Report, Rev 0* (May 2024)
AVTG	NSW Assessing Vibration – a technical guideline
BMP	Biodiversity Management sub-plan
CCS	Community consultation strategy
CEMP	Construction Environmental Management Plan
CEMS	Contractors Environmental Management System
CNVMP	Construction Noise and Vibration Management Plan
CoMA	Commonwealth Conditions of Ministerial Approval (EPBC:2021/9121)
CSSI	Critical State Significant Infrastructure
Cth	Commonwealth of Australia
DCCEEW - Cth	The Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW – NSW[1]	Department of Climate Change, Energy, the Environment and Water (NSW) (formerly DPE)
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing, and Infrastructure (formerly DPE)
DPI	Department of Primary Industries
ECM	Environmental Constraints Map
EIS	Environmental Impact Statement
EMS	Environmental Management System
ER	Environmental Representative.
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPA	NSW Environment Protection Authority
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1989 (Cth)
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
eVDV	Estimated Vibration Dose Value
EWMP	Enabling Works Management Plan
EWMS	Environmental Work Method Statement
GIS	Geographic Information System

[1] As of the 1st January 2024, the NSW Department of Planning and Environment has split into the Department of Climate Change, Energy, the Environment and Water (NSW) and the Department of Planning, Housing, and Infrastructure. DCCEEW (NSW) includes the environmental regulators (such as NSW EPA, BCD, NPWS, DPE-Water), while the Department of Planning, Housing, and Infrastructure (DPHI) includes planning regulatory services.

Abbreviation	Expanded text
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
HLW	The HumeLink West Stage of the HumeLink project
ICNG	*Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009)*
LGA	Local government area
Minister (NSW), the	NSW Minister for Planning and Environment
Minister (Cth), the	Cth Minister for Climate Change, Energy, the Environment and Water
MCoA	NSW Minister's Conditions of Approval (SSI-36656827)
NCA	Noise Catchment Area
NML	Noise Management Level
NPfI	*Noise Policy for Industry 2017 (EPA)*
NCA	Noise Catchment Area
NSW	New South Wales
NVMP	Noise and Vibration Management Sub-plan
OOHW	Out-of-hours work
PESCP	Progressive Erosion and Sediment Control Plan
POEO Act	*Protection of the Environment Operations Act 1997 (NSW)*
RBL	Rating Background noise Level
RNP	NSW Road Noise Policy
ROL	Road occupancy licence
RtS	Response to Submissions Report
SEARs	Secretary's Environmental Assessment Requirements
SPL	Sound Pressure Level
SSI	State Significant Infrastructure
SWL	Sound Power Level
UMM	Updated Mitigation Measure
VDV	Vibration Dose Values

1. Introduction

1.1. Context

This Construction Noise and Vibration Management Sub-Plan (NVMP or Plan) forms part of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). The NVMP has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Updated Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under MCoA A2. The plan also describes how the HLWJV will meet its sustainability commitments associated with noise and vibration management.

1.2. Background and project description

The background and description of the HumeLink project (HumeLink) and the staging of HumeLink into the HumeLink East project (HLE) and the HumeLink West project (HLW) is detailed in Section 1.1 and Section 1.3 of the CEMP and represented in Figure 1-1.

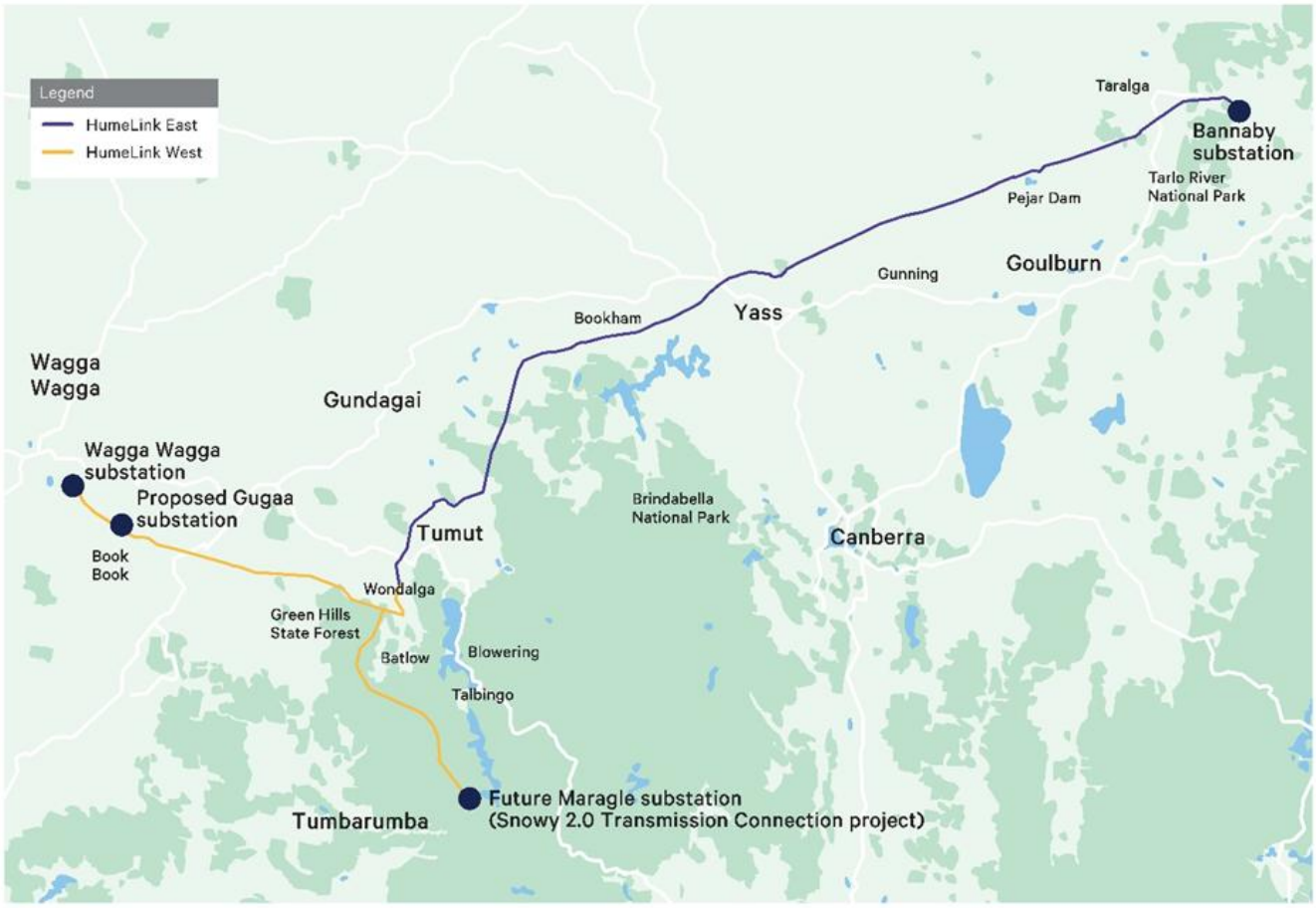


Figure 1-1 Staging for HumeLink

1.3. Scope

The MCoA for the Project permit staging of any plans required by the MCoA. The Project is being staged in accordance with the approved Staging Request (TransGrid, 22 November 2024), which was approved by DPHI (NSW Department of Planning Housing and Infrastructure) on 22 November 2024. This Plan describes how HLWJV proposes to manage noise and vibration impacts during construction of HLW. It does not address operational impacts. A separate NVMP has been developed for the HLE project.

This plan also describes the responsibilities of the HLWJV team including delivering continuous improvement, the auditing and reporting structure to be used during construction of the HLW.

1.4. Interface with other planning documents

This Plan is a component of a suite of documents, prepared as part of the implementation of the HLW Environmental Management System. The Environmental Management System overview is described in Section 1.4 of the CEMP.

The key documents that interface with this Plan are outlined in the table below.

Table 1 Key interfaces with this document

Plan	Reference	Interface
Construction Environmental Management Plan (CEMP)	Internal construction document	• Provides details on overall HLW staging, interactions between Sub-Plans of the CEMP, and management of cumulative impacts. • Provides a framework for how the construction works will be managed. • Identifies procedures, processes and management systems that will apply in relation to construction activities. • Provides environmental planning and controls for construction including environmental risk assessment, regulatory requirements, protection measures and sustainability requirements.
Emergency Management Plan	MCoA B52	• Details framework for health and safety processes. • Provides health and safety procedures for those wastes that have potential human health risks.
Interface and Third-Party Management Plan	Internal construction document	• Details framework for third party interaction. • Provides procedures, processes and management systems that will apply in relation third party management.

Plan	Reference	Interface
Community Communication Strategy	MCoA A24	• Details the framework for management of stakeholders and how to engage them. • Provides processes and procedures that guide the outcome of community engagement. • Provides an assessment of sensitive receivers indicating special considerations that will impact traffic control devices.
Heritage Management Sub-Plan	MCoA B33	• Specifies control measures relating to management of heritage aspects of the HLW that require control measures. • Provides a management framework for minimising impacts on heritage. • Describes a heritage monitoring and management measures to evaluate and report against performance criteria.

In addition to the HLWJV's documents the NVMP will also interface with external documents including, but not limited to the HLE works and the Snowy 2.0 Transmission Line works (SSI-9717). These documents are separate to the UGL-EMS and do not form part of the approval of this CEMP document and will be managed through the HLWJV Interface Management Plan to assist in the management of cumulative impacts.

2. Purpose and objectives

2.1. Purpose

The purpose of this Plan is to address the construction noise and vibration management requirements detailed within the HumeLink Infrastructure Approval NSW SSI 36656827 and HumeLink EPBC Approval Cth EPBC 2021/9121 (HumeLink Approvals). This includes the Planning Approval Documentation listed in the Minister's Conditions of Approval (MCoA) A2:

- HumeLink - EIS (Transgrid)
- RtS EIS (Transgrid)
- HumeLink - Amendment Report (Transgrid,)
- HomeLink – Addendum to EIS Technical Report 09 – Noise and Vibration Impact Assessment (Transgrid)

2.2. Objectives

The key objective of the NVMP is to ensure all requirements relevant to noise and vibration management during construction of HLW are captured, scheduled, and assigned responsibility as outlined in:

- The HumeLink Approval:
    - HumeLink Infrastructure Approval NSW SSI 36656827
    - HumeLink EPBC Approval Cth EPBC 2021/9121
- Planning Approval Documentation listed in the MCoA A2 and as amended:
- Updated Mitigation Measures
- Relevant legislation and other requirements described in Section 3.1 of this Plan

2.3. Targets

The following targets have been established for the management of noise and vibration impacts during the HLW:

- Ensure compliance with the relevant legislative requirements.
- Ensure compliance with the HumeLink Approvals and Planning Approvals Documentation, where required.
- Effective management of noise and vibration impacts during construction in accordance with the relevant noise and vibration guidelines and policies.
- Ensure training is provided in the form of inductions to relevant HLW personnel relating to noise and vibration issues before they begin work on site.
- Notify affected sensitive receivers of upcoming works and any out-of-hours works.
- Implement reasonably practicable measures to minimise noise and vibration impacts on surrounding residents, commercial and other sensitive receivers during construction.
- No exceedance of predicted noise and vibration impacts during construction of HLW as a result of HLW works.
- Address complaints in a timely and efficient manner and in line with the Community Consultation Strategy (CCS).

The following performance outcomes relevant to noise and vibration (as identified in Chapter 15 Chapter 6 '*Compilation of performance outcomes*' of the EIS/AR respectively) are detailed in Table 2 below.

Table 2 Performance outcomes relevant to this Plan

Performance outcomes	How performance will be addressed	Records
Full compliance with statutory approvals.	Compliance with legislation, statutory approvals and the Infrastructure Approval	Community Engagement Records Compliance report
Compliance with CEMP	Implement and comply with the CEMP and associated management plans	Compliance report
Record and respond to complaints, including noise and vibration complaints, within a timely manner	All complaints are reviewed within the timeframes specified within the Community Communication Strategy	Community Engagement Records

3. Environmental requirements

3.1. Legislation

Legislation and regulatory requirements relevant to noise and vibration for the HLW include:

- *Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act)*
- *Environmental Planning and Assessment Regulation 2021*
- *Protection of the Environment Operations Act 1997 (POEO Act)*
- *Protection of the Environment Operations (Noise Control) Regulation 2017*
- *Civil Aviation Act 1988 (Cth)*
- *Air Navigation (Aircraft Noise) Regulations 2018 (Cth)*

Relevant provisions of the above legislation are available in the register of legal and other requirements included in Appendix A3 of the CEMP.

3.2. Guidelines and standards

The main guidelines, specifications and policy documents relevant to this plan include:

- NSW Interim Construction Noise Guideline (ICNG), Department of Environment and Climate Change 2009
- NSW Noise Policy for Industry (NPfI), Environment Protection Authority 2017
- NSW Assessing Vibration – a technical guideline (AVTG), Department of Environment and Conservation 2006
- NSW Road Noise Policy (RNP), Department of Environment, Climate Change and Water (DECCW), 2011
- NSW Approved Methods for the Measurement and Analysis of Environmental Noise, Environment Protection Authority 2022
- Construction Noise and Vibration Guideline' (CNVG), Roads and Maritime 2016
- Australian Standard AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors
- Australian Standard AS 2187.2:2006 Explosives - Storage and use - Part 2 Use of explosives
- Australian Standard AS2436-2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites
- British Standard BS 6472-2008, 'Evaluation of human exposure to vibration in buildings (1-80Hz)
- British Standard 7385: Part 2-1993 'Evaluation and measurement of vibration in buildings'
- German Standard DIN 4150-2016 Structural vibration Part 3: Effects of vibration on Structures
- Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration, Australian and New Zealand Environmental Conservation Council (ANZECC), 1990
- Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002)

3.3. Minister's Conditions of Approval

The MCoA relevant to this Plan are listed in Table 3. A cross reference is also included to indicate where and how the conditions are addressed in this Plan or other HLW management documents.

Table 3 MCoA relevant to the CNVMP

MCoA No.	Condition Requirements	Document Reference
Evidence of Consultation		
A8	Where conditions of this approval require consultation with an identified party, the Proponent must: (a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and (b) provide details of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any disagreement remaining between the party consulted and the Proponent and how the Proponent has addressed the matters not resolved.	Section 4.1 Annexure B
Operation of Plant and Equipment		
A21	All plant and equipment used on site, or in connection with the development must be: (a) maintained in a proper and efficient condition; (b) operated in a proper and efficient manner.	Section 7.4
Construction Hours		
B1	Pre-construction minor works, road upgrades, Enabling Works, construction (including operation of construction compounds), demolition, upgrading or decommissioning activities (excluding blasting) may only be undertaken between: (a) 7 am to 6 pm Monday to Friday; (b) 8 am to 1 pm Saturdays; and (c) at no time on Sundays and NSW public holidays; unless the Planning Secretary agrees otherwise.	Section 7.1.1
B2	The following activities may be carried outside the hours specified in condition B1 above: (a) the delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons; (b) emergency work to avoid the loss of life, property or to prevent material harm to the environment; (c) works carried out in accordance with the hours and noise limits specified in any negotiated agreements with sensitive receivers (owners and occupiers), provided the negotiated agreements are in writing and finalised before	Section 7.1.3

MCoA No.	Condition Requirements	Document Reference
	the commencement of works; (d) activities that do not result in noise affected sensitive receivers, as defined in Interim Construction Noise Guidelines (DECC, 2009); (e) road upgrades required by the relevant roads authority to be undertaken outside the standard construction hours; (f) where a rail authority requires a rail possession for the activities to be performed outside of standard construction hours; (g) activities that require a network outage on another utility, distribution or transmission network, and the operator of the network requires the outage and associated works outside standard construction hours; (h) where different hours are permitted or required under an EPL in force in respect of the CSSI; or (i) works carried out in accordance with an Out-of-Hours Work Protocol approved in accordance with condition B16.	
Memorial Avenue Construction Compound		
B3	The following activities must not be carried out at the Memorial Avenue Construction Compound: (a) any activities outside the hours specified in condition B1; (b) helicopter arrivals or departures; (c) crushing or screening; (d) concrete batching; or (e) any other noise generating activity that would result in noise levels at sensitive receivers or sensitive land uses exceeding the construction 'highly noise affected' noise management level criteria established using the Interim Construction Noise Guideline (DECC, 2009).	Section 6.2.7
Helicopter activities		
B4	Helicopter use associated with the development may only be carried out: (a) between 9 am to 5 pm Monday to Friday; (b) between 9 am to 1 pm on Saturday; and (c) no helicopter use is allowed on Sunday or NSW public holidays; unless different hours are permitted or required under an EPL in force in respect of the CSSI or the Planning Secretary agrees otherwise.	Section 7.1.2

MCoA No.	Condition Requirements	Document Reference
Construction and Decommissioning		
B5	The Proponent must take all reasonable and feasible steps to minimise the pre-construction minor works, Enabling Works, road upgrade, construction, upgrading or decommissioning noise of the development in locations where the noise is audible to sensitive receivers, including any associated traffic noise.	Section 5.3 Section 7.2 Section 7.3 Section 7.4
B6	The Proponent must ensure that the noise generated by any construction, upgrading or decommissioning activities is managed in accordance with the requirements outlined in the *Interim Construction Noise Guideline* (DECC, 2009).	Section 5.3 Section 7.2 Section 7.3 Section 7.4
B7	The Proponent must implement mitigation measures with the aim of achieving the road traffic noise assessment criteria for land uses from NSW Road Noise Policy (DECCW, 2011).	Section 5.3.2 and Section 7.4.3
B8	The Proponent must comply with the following vibration limits: (a) vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); (b) BS 7385 Part 2-1993 “Evaluation and measurement for vibration in buildings Part 2” as they are “applicable to Australian conditions”; and (c) vibration limits set out in the German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures (for structural damage).	Section 5.4 and Section 7
B9	Where a sensitive receiver is identified as potentially exceeding the construction 'noise affected' noise management level or sleep disturbance criteria established using the Interim Construction Noise Guideline (DECC, 2009), or its latest version, as a result of the construction or operation of the accommodation camps or construction compounds, mitigation measures must be implemented with the objective of reducing construction noise below the relevant criteria at each relevant sensitive receiver. Activities that would exceed the 'noise affected' noise management level or sleep disturbance criteria during construction or operation of these facilities must not commence until the measures identified in this condition have been implemented, unless otherwise agreed with the Planning Secretary. However, this does not apply if the Proponent has an agreement with the relevant owner/s of these receivers to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.	Section 5.3.1.2 Section 6.2.1 Section 7

<table>
<tr><th>MCoA No.</th><th>Condition Requirements</th><th>Document Reference</th></tr>
<tr><td></td><td>Note: Mitigation measures may include path barrier controls, at-property treatment, or a combination of path controls and at-property treatment.</td><td></td></tr>
<tr><td>B10</td><td>Where a sensitive receiver is identified as potentially exceeding the 'highly noise affected' noise management level established using the Interim Construction Noise Guideline (DECC, 2009), or its latest version, during Enabling Works or construction, mitigation measures must be implemented with the objective of reducing construction noise below the highly noise affected noise management level at each relevant sensitive receiver.
Activities that would exceed the ‘highly noise affected’ noise management level during construction must not commerce until the measures identified in this condition have been implemented, unless otherwise agreed with the Planning Secretary. However, this does not apply if the Proponent has an agreement with the relevant owner/s of these receivers to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.
Note: Mitigation measures may include path barrier controls, at-property treatment, or a combination of path controls and at-property treatment.</td><td>Section 5.3.1.1
Section 6.2
Section 7.2</td></tr>
<tr><td colspan="3">Blasting</td></tr>
<tr><td>B11</td><td>Blasting may only be carried out on the site:
(a) between 9 am to 5 pm Monday to Friday;
(b) between 9 am to 1 pm on Saturday; and
(c) no blasting is allowed on Sunday or NSW public holidays.</td><td>Section 7.1.4</td></tr>
<tr><td>B12</td><td>The Proponent must ensure that any blasting carried out on the site does not exceed the criteria in Table 2.
Table 2: Blasting Criteria
<table>
<tr><th>Location</th><th>Airblast overpressure (dB(Lin Peak))</th><th>Ground vibration (mm/s)</th><th>Allowable exceedance</th></tr>
<tr><td rowspan="2">Any residential receiver</td><td>120</td><td>10</td><td>0%</td></tr>
<tr><td>115</td><td>5</td><td>5% of the total number of blasts or events over a rolling period of 12 months</td></tr>
</table></td><td>Section 5.5
Section 7.1.4</td></tr>
<tr><td colspan="3">Noise and Vibration EMP Sub-Plan</td></tr>
<tr><td>B16</td><td>Prior to the commencement of construction (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works</td><td>As applicable, this Plan (see above)
Conditions B13 and</td></tr>
</table>

MCoA No.	Condition Requirements	Document Reference
	Management Plan of condition B64), the Proponent must prepare a Noise and Vibration Management Plan to the satisfaction of the Planning Secretary. This plan must: (a) include measures and processes to ensure the requirements in conditions B1 to B14 are complied with;	B14 are concerning Operation of the Project and are not applicable to the scope of this Stage of the NVMP.
	(b) include a description of the reasonable and feasible measures that would be implemented to minimise noise and vibration impacts of the development;	Section 7
	(c) include a description of the measures that would be implemented to minimise aircraft noise at sensitive receivers, including measures relating to the number and timing of trips, flight paths and consultation with affected receivers;	Section 5.3.3 Section 6.2.8 Section 7.3
	(d) include a detailed description of the noise and vibration management system for the development;	This NVMP, Section 7.4
	(e) include a protocol for the identification, notification and management of works that exceed the noise management levels;	Sections 7.2.1 8.5 and 8.6
	(f) include a monitoring program that evaluates and reports on the effectiveness of the noise and vibration management systems and identify additional noise mitigation measures that are to be implemented and the timeframe to be implemented;	Section 8.3
	(g) include a monitoring program that evaluates and reports on the operational noise performance of the development and the effectiveness of operational noise mitigation measures; and	Not addressed in this Construction NVMP
	(h) if the monitoring programs in B16((f) and (g)) identify exceedances, then identify additional noise mitigation measures that are to be implemented and the timeframe to be implemented	Section 8.5
	(i) include an Out-of-Hours Work Protocol to identify a process for the consideration, management and approval of works outside the hours defined in conditions B1 and B11, which must: (i) be prepared in consultation with the relevant Council; (ii) identify low risk activities that can be undertaken without the approval of the Planning Secretary and with the approval of the ER;	Annexure A

MCoA No.	Condition Requirements	Document Reference
	(iii) identify high risk activities that must be approved by the Planning Secretary; and (iv) identify Department, Council and community notification arrangements for approved out of hours work. Following the Planning Secretary's approval, the Proponent must implement the Noise and Vibration Management Plan. *Note: The Noise and Vibration Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	

3.4. Environmental Management Measures

UMMs are listed in Table 4 below. A cross reference is also included to indicate where and how the UMMs are addressed in this Plan or other HLW management documents.

Table 4 UMMs relevant to the NVMP

UMM No.	Commitment	Document Reference
Noise and Vibration		
NV1	Where receivers are predicted to be noise affected and near construction compounds or fixed work sites with long durations (i.e., several months), path control, such as hoarding, or earth bunds will be investigated. Practical measures will be implemented where required. Positioning of site structures will also be considered to act as barriers between noisy work and receivers where practical.	Section 6.2 Section 7.3 Section 7.4.3

UMM No.	Commitment	Document Reference
NV2	An out-of-hours work protocol that details how the project will identify, assess, and approve out of hours work outside standard construction hours that are likely to generate noise levels that exceed the relevant noise management levels at sensitive receivers will be developed and implemented. The protocol will include provisions to: • carry out additional assessments for work proposed outside standard construction hours, to confirm noise levels at potentially affected sensitive receivers and determine suitable mitigation measures to minimise noise levels • notify and engage with potentially noise affected receivers about upcoming work outside standard construction hours and address any associated complaints • identify appropriate respite for noise affected receivers (where required) The out-of-hours work protocol will not apply to the operation of the worker accommodation facilities.	Section 7.2 Section 7.3 Section 7.6.2 Annexure A - Out of Hours Works Protocol
NV3	A Blast Management Plan will be developed to minimise the potential for airblast overpressure and vibration impacts. Maximum instantaneous charge calculations will be undertaken for specific locations within the potential blasting areas. Individual blast designs will be based on meeting the criteria rather than restrictions on maximum instantaneous charge. All controlled blasting, including initial controlled trial blasting will be monitored to obtain data which can be used to confirm site constants and compliance with controlled blasting criteria. Landowner notification and consultation requirements will be identified in the Blast Management Plan.	Section 5.5 Section 7.1.4 Section 7.3 Blast Management Plan

UMM No.	Commitment	Document Reference
NV4	Where construction is likely to result in exceedances of noise management levels (NMLs) at sensitive receivers, mitigation and management measures will be implemented where practicable and appropriate. This will include (but is not limited to) the following measures: • select quieter plant and equipment and use alternative construction methods to minimise noise levels • plan and schedule concurrent noisy activities to minimise the number of items of noisy plant operating at one time and cumulative noise levels • install screens or use barriers to mitigate noise from stationary noise sources • maximise the offset distance between noisy plant and sensitive receivers • orient noisy plant and equipment away from sensitive receivers • use noise source controls, such as residential class mufflers, to reduce noise from all regularly used plant including cranes, excavators, and trucks • use non-tonal reversing alarms in place of traditional beeper reversing alarms during out of hours where noise impacts are predicted turn off machinery when not in use • confirm equipment is maintained in accordance with manufacturer's requirements to minimise generation of excessive noise • operate machinery in a manner which reduces occurrence of maximum noise level events, such as excavator bucket impacts, material drop heights, steel on steel impacts and dragging materials across hard surfaces • provide awareness training regarding noise mitigation measures to be implemented as part of regular toolbox meetings • notify and consult with potentially noise affected receivers about upcoming noisy activities • confirm that noise affected receivers outside standard construction hours and highly noise affected sensitive receivers are managed with consideration to the *Construction Noise and Vibration Guideline* (Transport for NSW, 2023) (CNVG) additional mitigation measures such as notifications, verification, and respite where appropriate	Section 4 Section 7.2 Section 7.3 Section 7.4 Section 8.3.1

UMM No.	Commitment	Document Reference
NV5	Monitoring will be carried out for noise intensive activities that have the potential to cause noise exceedances at sensitive receivers, to confirm that actual levels are consistent with the predictions and that appropriate mitigation measures have been implemented.	Section 7.2 Section 8.3
NV6	All construction vehicle movements will adhere to the following measures: • out-of-hours vehicle movements will be minimised where possible • construction delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible • use of engine compression brakes will be avoided at night and in residential areas • site access points and roads/flight paths will be located as far as possible away from sensitive receivers • traffic flow, parking and loading/unloading areas will be planned to minimise reversing movements • construction inductions will include driver behaviour requirements to minimise vehicle noise emissions	Section 7.3 Section 7.4
NV7	Where vibration intensive work is required within the recommended minimum working distances and is considered likely to exceed the cosmetic damage criteria: • different construction methods with lower source vibration levels will be investigated and implemented, where feasible • vibration monitoring will be undertaken at the start of work to determine actual vibration levels at the receiver • work will be ceased if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria	Section 7.3 Section 7.5 Section 8.3.2 Section 8.5

UMM No.	Commitment	Document Reference
NV10	Management measures will be implemented to minimise aircraft noise at sensitive receivers where practicable and appropriate. Measures may include (but are not limited to): • Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This would include use of helipads within construction compounds and combined worker accommodation facilities and construction compounds, flight paths outside of the project footprint and stringing or other work within the transmission line corridor. Notification would include scheduled dates, locations, indicative hours and a description of the proposed work. • Prioritising us of helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers. • Varying flight paths between helipads and the transmission line corridor to avoid repeated helicopter noise at sensitive receivers. • Operating aircraft in accordance with Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.	Section 5.3.1 Section 7.4.2 Section 6.2.8.2 CCS Annexure D
SW6	Where controlled blasting is required, a suitably qualified blasting specialist will be engaged to carry out a detailed blasting assessment and trial blasts (if required) to determine blasting design and site-specific parameters. The blasting assessment should identify measures to limit vibrations to the recommended “safe” levels (defined in *AS 2187.2-2006 Explosives - Storage and use*), limit rock mass damage, avoid "over-blasting" and consider and mitigate potential impacts to: • groundwater dependent ecosystems • groundwater users • surface water bodies.	Section 5.5 Blast Management Plan

3.5. Licences and permits

Subject to the outcomes of geotechnical investigations, crushing and screening may be required. If necessary, an Environment Protection Licence (EPL) will be obtained for the HLW for the scheduled activity of crushing and screening. The EPL will detail conditions which must be complied with when undertaking the crushing and screening activities. If an EPL is required, any relevant conditions of the EPL will be incorporated into this NVMP as required by the EPL or Infrastructure Approval.

4. Consultation

4.1. Consultation for plan preparation

Earlier revisions of this plan were provided to Wagga Wagga City Council (WWCC) & Snowy Valleys Council (SVC) for consultation. Further consultation with WCC and SVC on the OOHW Protocol was undertaken by Transgrid as a component of the Enabling Works Management Plan (EWMP). The OOHW Protocol is a joint management document for use across both stages of HumeLink (HLE and HLW) prepared to be applicable to Enabling Works and Construction phases of HumeLink. This NVMP has been provided to WWCC and SVC for information with the intention to consult on the OOHW Protocol as it is approved under the Early Works Management Plan.

A summary of the consultation undertaken for the development of this NVMP, and the consultation summary on subsequent revisions of the plan is provided in Annexure B.

Additional consultation with the above stakeholders, and organisers will also be triggered as a result of special event planning or as a result of significant or procedural change to the document. Any minor or administrative changes will be made and endorsed by the Environmental Representative and the subsequent revised document will be issued for information.

4.2. Ongoing consultation

Ongoing consultation with relevant councils and other stakeholders (including affected landowners) will continue to be undertaken, throughout the construction of HLW, regarding the construction noise and vibration impact and the effectiveness of mitigation strategies. Updates will be provided through regular meetings (at a frequency agreed with key stakeholders) to communicate upcoming changes and impacts in advance of the changes taking place.

Ongoing consultation with sensitive receivers will continue throughout the construction of HLW, including engagement on negotiated agreements on working hours, noise levels and mitigation measures and where applicable OOHW.

Works to be carried out in accordance with the hours and noise limits specified in any negotiated agreements with sensitive receivers (owners and occupiers), will be documented in a report which will be finalised before the commencement of works in accordance with MCoA B2(c).

Community notification, feedback and complaints relating to construction noise and vibration will be managed with in accordance with Section 3.6 of the CEMP.

The project website https://www.transgrid.com.au/projects-innovation/humelink and a 24-hour toll-free telephone number (1800 317 367) are available for any project enquiries. In accordance with CoA C15 b) the information on the website will be kept up to date.

4.3. Cumulative and consecutive noise impact

Ongoing consultation will include regular coordination with State significant developments; infrastructure projects and other construction works being undertaken within 500 metres of the HLW. Infrastructure project located within the vicinity of HLW with the potential to result in cumulative noise and vibration impacts are described in Section 6.2.10.

This consultation will be undertaken with the aim of coordinating works to manage cumulative noise and vibration impacts. Reasonable and feasible management and mitigation measures designed to address potential consecutive impacts will be developed and used to minimise the impacts, in consultation with the affected communities, in accordance with NV4.

4.4. Endorsement and approval

In accordance with MCoA - A13 and Section 2 of the CEMP, the ER must review and endorse this NVMP prior to lodgement to DPHI. This NVMP must be lodged to DPHI for approval prior to the commencement of construction works.

5. Existing environment

The following sections summarise existing noise environment and sensitive receivers within and adjacent to the HLW. Data presented within this plan is based on information contained in Section 15 and Appendix 09 Noise and Vibration Impact Assessment of the EIS, EIS Technical Report 09 Noise and Vibration Impact Assessment Addendum and AR.

The following sections summarise what is known about factors influencing noise and vibration impacts, within and adjacent to the HLW corridor.

5.1. Site location and sensitive receivers

The HLW is located within a predominantly rural setting and within Forestry Commission NSW (FCNSW) land. The HLW is located in a remote area with the background noise generally dominated by environmental noise sources such as wind blowing through vegetation, wildlife calls and the occasional vehicle travelling along rural and local roads. Background noise may occasionally be impacted by forestry activities within FCNSW land, recreational activities within the State Forests and agricultural activities.

The nearest towns to the HLW include Wagga Wagga, Tumut, Batlow, and Tumbarumba. In addition, there are a number of rural residential receivers along the alignment which have the potential to be impacted. To facilitate the assessment of noise impacts from the HLW, sensitive receivers along the route have been identified and incorporated into a Geographic Information System (GIS) along with the NSW cadastral database. The GIS allows potentially critical areas that are sensitive to construction noise and vibration impacts to be easily identified and updated as land uses change during the delivery of the HLW. The data can be readily included into the HLW Gatewave noise and vibration management tool, to allow effective identification and management of identified sensitive receivers.

Identified receivers at the time of issue of this CNVMP are presented in **Annexure C**.

5.1.1. Sensitive heritage receivers

The heritage listed buildings and structures near to the HLW amended Project footprint which are potentially sensitive to vibration are detailed in Table 5.

Table 5: Heritage listed items

Item name	Address	Heritage Significance	Council Local Environmental Plan (LEP) item number	Distance to nearest structure[1]
Ivydale Woolshed	9 Ivydale Road, Gregadoo	Local	I73	600m
Stone ruin	1149 Gregadoo East Road, Gregadoo	Local	I71	500m
Elizabeth Nugent grave on College Creek	1615 Humula Road, Tarcutta	Local	I202	430m

1. Approximate minimum horizontal distance from the amended project footprint to the nearest structure of the heritage listed item.

5.2. Background noise levels

The background noise levels for HLW were assessed as part of the Planning Approvals Documentation at the locations detailed in Table 5-1. With the exception of the Memorial Ave compound, background noise levels (RBLs) for HLW were below the threshold detailed in the Noise Policy for Industry (NPfI) (EPA, 2017). As such the NPfI base line RBLs will generally be adopted for the HLW (refer to Table 6 below).

Table 6 Adopted background noise levels (dB(A)) for the HLW

Locality	Nearest construction worksite	Monitor ID (EIS)	Day[1,2] (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
Batlow	Memorial Avenue compound, Batlow	L06	35	35[3]	32
Tarcutta	Tarcutta construction compound and accommodation facility	L10	39	39[3]	39
All other receivers	All other worksites	L01, L02, L05, L07	35	30	30

Note: 1. The RBL noise levels have been determined with reference to the procedures in the NPfI.
2. Day-time is 7am to 6pm, evening is 6pm to 10pm and night-time is 10pm to 7am.
3. The monitored evening level was found to be higher than the day. In this situation the NPfI requires that the evening level be reduced to match the day. The monitored level is shown in brackets.

5.3. HLW airborne noise objectives

5.3.1. Airborne construction noise management levels

The ICNG provides guidelines for the assessment and management of airborne construction noise. The ICNG focuses on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels. The main objectives of the ICNG are to:

- Identify and minimise noise from construction works;
- Focus on applying all ‘feasible’ and ‘reasonable’ work practices to minimise construction noise impacts;
- Encourage construction during the recommended standard hours only, unless approval is given for works that cannot be undertaken during these hours;
- Reduce time spent dealing with complaints at the HLW implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

5.3.1.1. Residential receivers

Table 7 below, which was sourced from the ICNG, shows how NMLs at residential receivers are determined and how they are to be applied. The rating background level (RBL) is used when determining the noise management level (NML). The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term and methodology to obtain RBLs is described in detail within the Noise Policy for Industry (NPfI) (EPA, 2017).

Table 7 NMLs for residences

Time of day	Noise Management Level $L_{Aeq\ (15min)}$	How to apply
Standard construction hours: Monday to Friday: 7am – 6pm Saturday: 8am to 1pm No work public holidays and Sunday	'Noise affected'. RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	'Highly noise affected' +75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	'Noise affected'. RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.

5.3.1.2. Sleep disturbance

Where construction works are planned to extend over more than two consecutive nights, the ICNG recommends that an assessment of sleep disturbance impacts be completed.

A night-time sleep disturbance 'screening criterion' noise goal of RBL + 15dB or 52dBA (whichever is higher) is used to identify the receivers where there is potential for sleep disturbance.

Where there are noise events found to be above the initial screening level, further analysis is made to identify:

- the likely number of events that might occur during the night assessment period; and

- Whether events exceed an 'awakening reaction' level of 55 dB(A) L_{AFmax} (internal) that equates to NML of 65 dB(A) externally (assuming open windows).

Sleep disturbance screening and awakening criteria is provided in Table 8 below.

5.3.1.3. Adopted Project noise management levels (NMLs) for residential receivers

Table 8shows the NMLs for residential receivers identified in **Annexure C**. NMLs apply at the most noise-affected locations within the property boundary and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence.

Table 8 Construction Noise Management Levels (NMLs) for residential receivers (external)

Locality	Monitor ID (EIS)	Noise management level ($L_{Aeq\ (15\ minute)}$ – dB(A))				Sleep disturbance L_{AFmax}	
		Standard hours[1] (RBL + 10 dB)	Out-of-hours[2] (RBL + 5 dB)			Screening (RBL + 15 dB)	Awakening[4]
		Daytime	Daytime	Evening	Night	Night	Night
Batlow	L06	45	40	40	37	52 (47)[3]	65
Tarcutta	L10	49	44	44	44	54	65
All other receivers	L01, L02, L05, L07, L09	45	40	35	35	52 (45)[3]	65

Notes:
1. Standard construction hours are 7am to 6pm Monday to Friday and 8am to 1pm Saturdays.
2. Daytime out-of-hours are 7am to 8am and 1pm to 6pm on Saturday, and 8am to 6pm on Sunday and public holidays; evening out-of-hours are 6pm to 10pm Monday to Sunday; and night-time out-of-hours are 10pm to 7am Monday to Friday, to 8am on Saturday, Sunday and public holidays.
3. A night-time sleep disturbance 'screening criterion' noise goal of RBL + 15dB or 52dBA (whichever is higher) is used to identify the receivers where there is potential for sleep disturbance. Value in brackets is RBL+15
4. 'Awakening reaction' level of 55 dB(A) LAFmax (internal) equates to NML of 65 dB(A) externally (assuming open windows).

5.3.1.4. Other sensitive land uses

The ICNG provides noise management levels for commercial and industrial premises and 'other sensitive' land uses (ICNG, Table 3). The management levels for other noise sensitive receivers not listed in the ICNG that are applicable to the HLW, such as hotels and childcare centres, are derived from AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors and the AAAC Guideline for Child Care Centre Acoustic Assessment. The management levels from AS2107 are the upper range levels to account for the variable and short-term nature of construction noise. Noise Management Levels for other sensitive receivers are featured in Table 9.

Table 9 Adopted background noise levels (dB(A)) for the HLW

Landuse	NML $L_{Aeq(15min)}$ (internal/ indoor)	Where NML applies	Referenced from:	Assumed facade loss (conservative)	External equivalent NML - $L_{Aeq(15min)}$
Hotel (Sleeping areas: Hotels near major roads)	40 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	60 dB(A)
Classrooms at schools and other educational institutions	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)

Landuse	NML $L_{Aeq(15min)}$ (internal/ indoor)	Where NML applies	Referenced from:	Assumed facade loss (conservative)	External equivalent NML - $L_{Aeq(15min)}$
Childcare centre (sleeping areas)	40 dB(A)	Internal noise level	AAAC - guideline for Child Care Centre Acoustic Assessment	10 dB(A)	50 dB(A)
Hospital wards and operating theatres	45 dB(A)	Internal noise level	ICNG	20 dB(A)	65 dB(A)
Places of worship	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)
Hotel (bars and lounges)	50 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	70 dB(A)
Community centres – Municipal Buildings	50 dB(A)	Internal noise level	AS2107 'maximum'	10 dB(A)	60 dB(A)
Passive recreation (e.g. area used for reading, meditation)	60 dB(A)	External noise level	ICNG	-	60 dB(A)
Active recreation (e.g. sports fields)	65 dB(A)	External noise level	ICNG	-	65 dB(A)
Commercial premises (including offices and retail outlets)	70 dB(A)	External noise level	ICNG	-	70 dB(A)
Industrial premises	75 dB(A)	External noise level	ICNG	-	75 dB(A)

Note: Internal noise levels are assessed at the centre of the occupied room. External noise levels are assessed at the most affected point within 50m of the area boundary. Where internal noise levels cannot be measured, external noise levels may be used. The assumed façade loss, that is the difference between the internal noise level and the external noise level is typically 10 dB(A) with windows open for adequate ventilation (ICNG p12) and 20 dB(A) for a light framed building (RTA Environmental Noise Management Manual p20) This may be adjusted on a case-by-case basis, where the building construction is found to provide a different facade loss to that assumed.

5.3.1.5. Annoying noise

The ICNG identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction Noise Management Level. Annoying activities identified in the ICNG include:

- use of 'beeper' style reversing or movement alarms, particularly at night-time;
- use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work;
- grinding metal, concrete or masonry;
- rock drilling;
- line drilling;
- vibratory rolling;
- rail tamping and regulating;
- bitumen milling or profiling;
- jackhammering, rock hammering or rock breaking; and
- impact piling.

Where monitoring has confirmed that activities described above do not possess annoying

characteristics in accordance with the NPfI (e.g. tonality, low frequency), the above addition of 5 dB(A) will not apply.

5.3.2. Construction traffic noise

The ICNG guidance for the assessment of noise associated with additional traffic generated during construction refers to the NSW Road Noise Policy (RNP) for the assessment of noise from construction traffic on public roads.

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB due to construction traffic. Where this is considered likely, further assessment is required using the RNP base criteria shown in Table 10.

Table 10: RNP Criteria for assessing construction traffic on public roads

Road Category	Type of project / land use	Assessment criteria (dBA)	
		Day-time	Night-time
Freeway / arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)

Where the criteria are exceeded, the RNP requires the project to consider the use of all feasible and reasonable mitigation and management measures to minimise the impacts.

5.3.3. Drone and/or helicopter use

Noise emissions from flight operations of aircraft in Australia are regulated by the Air Navigation (Aircraft Noise) Regulations 2018, which is made under the Air Navigation Act 1920. This Regulation applies to the noise emissions from aircraft including helicopters and remote piloted aircrafts (RPAs, commonly referred to as drones) used during the construction of the HLW for transportation of construction equipment and materials.

The regulations require that a noise certificate will be issued for the aircraft or RPA where the aircraft meets the relevant standards. These activities are not considered for construction or regulated under the Protection of the Environment Operations Act 1997 (POEO Act) in NSW.

There is no applicable NSW environmental noise assessment guidance methodology for helicopter or drone noise. In the EIS, the impact of helicopter arrival and departure at construction compounds and combined worker accommodation facilities and construction compounds was assessed by determining the likely number of residential receivers exposed to L_{AFmax} noise levels above L_{AFmax} 75 dBA and L_{AFmax} 85 dBA.

Any ground activity supporting aircraft operation such as a use of a refuelling truck is assessed against the ICNG (section 5.3.1).

5.4. HLW vibration criteria

5.4.1. Overview

Vibration arising from construction activities can result in impacts on human comfort or the damage of physical structures such as dwellings. These two outcomes have different criteria levels, with the effects of vibration on human comfort having a lower threshold.

Effects of ground vibration resulting from construction may be placed into three categories:

- Human exposure – disturbance to building occupants: vibration in which the occupants or users of the building are inconvenienced or possibly disturbed
- Effects on building structures – vibration in which the integrity of the building or structure itself may be prejudiced
- Effects on building contents – vibration where the building contents may be affected

5.4.2. Human comfort

Vibration criteria relating to human comfort is sourced from the *Environmental Noise Management – Assessing Vibration: a technical guideline* (DEC, 2006). This guideline defines three vibration types, as detailed in Table 11.

Table 11 Examples of types of vibration

Continuous vibration	Impulsive vibration	Intermittent vibration
Machinery, steady road traffic, continuous construction activity (e.g., drilling)	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g., occasional dropping of heavy equipment, occasional loading and unloading.	Intermittent nearby construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer these would be assessed against impulsive vibration criteria.

Preferred and maximum values of human exposure for continuous and impulsive vibrations are listed (DECC, February 2006) in Table 12 below.

Table 12 Preferred and maximum weighted root mean squared (rms) values for continuous/ impulsive vibration acceleration (m/s2) 1-80Hz

Location	Assessment Period	Preferred values		Maximum Values	
		z axis	x and y axis	z axis	x and y axis
Continuous vibration					
Critical areas	Day or night	0.0050	0.0036	0.010	0.0072
Residences	Day	0.010	0.0071	0.020	0.014
	Night	0.007	0.005	0.014	0.010
Offices, schools, educational institutions, and places of worship	Day or night	0.020	0.014	0.040	0.028
Impulsive vibration					
Critical areas[1]	Day or night	0.0050	0.0036	0.010	0.0072
Residences	Day	0.30	0.21	0.60	0.42
	Night	0.10	0.071	0.20	0.14
Offices, schools, educational institutions, and places of worship	Day or night	0.64	0.46	1.28	0.92

Location	Assessment Period	Preferred values		Maximum Values	
		z axis	x and y axis	z axis	x and y axis
Workshops	Day or night	0.64	0.46	1.28	0.92

Notes:
1. Includes operating theatres, precision laboratories and other areas where vibration-sensitive activities may occur.

Intermittent vibration is assessed differently using vibration dose values (VDV). Preferred and maximum VDVs for different types of receivers have been reproduced in Table 13.

Table 13 Preferred and maximum VDVs for intermittent vibration (ms-1.75) (DEC, 2006)

Location	Day time (7am to 10pm)		Night time (10pm to 7am)	
	Preferred VDV	Maximum VDV	Preferred VDV	Maximum VDV
Critical areas[1]	0.10	0.20	0.10	0.2
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions, and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes:
1. Includes operating theatres, precision laboratories and other areas where vibration-sensitive activities may occur.

To assess the potential for vibration impact on human comfort, an initial screening test will be done based on peak velocity units, as this metric is also used for the cosmetic building damage vibration assessment. This screening test is a conservative approach since it is based on the continuous vibration velocity criteria (i.e. vibration that continues uninterrupted for a defined assessment period) whilst construction works are mostly intermittent. The initial screening test for vibration disturbance to building occupants, based on the peak particle velocity (ppv, mm/s) are presented in Table 14. If the predicted vibration exceeds the initial screening test, the total estimated Vibration Dose Value (i.e. eVDV) will be determined based on the level and duration of the vibration event causing exceedance.

Table 14 Construction vibration disturbance to building occupants – initial screening test

Location	Maximum peak velocity, mm/s (>8Hz)	
	Day time (7am to 10pm)	Night time (10pm to 7am)
Critical areas[1]	0.28	0.28
Residences	0.56	0.40
Offices, schools, educational institutions, and places of worship	1.10	1.10
Workshops	2.20	2.20

Notes:
1. Includes operating theatres, precision laboratories and other areas where vibration-sensitive activities may occur.

5.4.3. Vibration limits to minimise damage to buildings and structures

Where vibration significant plant is required to operate within or near the recommended minimum working distances described in Section 7.5, vibration monitoring against the vibration limits

outlined in this section will be carried out to confirm the minimum working distances at specific sites.

5.4.3.1. Buildings

Cosmetic damage vibration limits for buildings and associated minimum working distances are identified in the Construction Noise and Vibration Guideline, British Standard BS7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150: Part 3-2016 Structural vibration – Effects of vibration on structures.

The cosmetic damage levels set by BS7385 are considered 'safe limits' up to which no damage due to vibration effects has been observed for certain particular building types. Table 15 sets out the recommended vibration limits from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential, commercial, and industrial buildings and is frequency dependent and specific to particular categories of structure. The recommended limits for transient vibration are provided and represent minimal risks for cosmetic damage to residential and industrial buildings.

Table 15 Transient vibration guideline values

Type of building	Peak component particle range of predominant pulse		
	4Hz to 15 Hz	15Hz to 40Hz	40Hz and above
Reinforced or framed structures: Industrial / heavy commercial buildings	50mm/s at 4Hz and above		
Unreinforced or light framed structures: Residential or light commercial type buildings	15mm/s at 4Hz increasing to 20mm/s at 15Hz	20mm/s at 15Hz increasing to 50mm/s at 40Hz	50mm/s

Guidance for more sensitive structures is presented in the German standard, *DIN 4150-3 Vibrations in buildings – Part 3: Effects on structures* (DIN 4150-3: 2016). Vibration velocities not exceeding 3 mm/s at 1 to 10 Hz are recommended in this standard.

5.4.3.2. Vibration screening criteria for buildings

The limits presented in Table 15 above relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, then the guide values in Table 15 may need to be reduced by up to 50 percent. This is especially applicable at the lower frequencies where lower guide values apply.

On this basis, a conservative vibration screening criteria per receiver type is given below:

- Reinforced or framed structures (Line 1): 25.0 mm/s
- Unreinforced or light framed structures (Line 2): 7.5 mm/s

At locations where the predicted and/or measured vibration levels are greater than shown above (peak component particle velocity), a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level. The analysis would take into consideration the transient vibration guide values for minimal risk of cosmetic damage set out in Table 15.

5.4.3.3. Heritage items

AS 2187.2 states that buildings of historical value should not (unless structurally unsound) be assumed to be more sensitive than their surrounding counterparts. The criteria outlined above (7.5mm/s) will be used for historical buildings unless a structural engineer advises otherwise.

If a heritage building or structure is found to be structurally unsound (as advised by a structural engineer) a more conservative 2.5 mm/s peak component particle velocity (based on the German Standard DIN 4150-2016 Structural Vibration Part 3: Effects of Vibration on Structures) will be considered as a screening level. If found to be a risk, the cosmetic damage criteria in DIN 4150-2016 will apply.

If found to be a risk, the cosmetic damage criteria in DIN 4150-2016 will apply (MCoA B8(c)) and further evaluation will be undertaken. The criteria will be based on the 'Group 3' type structures because of their potential sensitivity to vibration and intrinsic value.

Table 16: DIN 4150-3 guideline values for short-term vibration velocity on structures for Group 3 sensitive structures

Foundations, all directions at a frequency of:			Topmost floor, horizontal	Floor slabs, vertical
1 to 10Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
3 mm/s	3 to 8 mm/s	3 to 8 mm/s	8 mm/s	20 mm/s

5.4.3.4. Other vibration-sensitive items

The potential effect of vibration on other sensitive assets, including utilities or sensitive scientific and medical equipment can vary depending on many factors including their existing structural integrity and use. Criteria in the order of 20-100 mm/s are typically applied by regulatory authorities to other infrastructure items including tunnels, rock structures and transmission lines.

Consultation with asset owners will be undertaken to apply the most appropriate vibration criteria for each asset. A technical memorandum will be completed (as required) for each asset and provided to the asset owner (Note: these technical memorandums will sit outside of this Plan). Where assets have a specific exclusion zone for vibration intensive works, this will also be considered in the technical memorandum.

5.5. Blasting criteria

A Blast Management Plan (BLMP) has been prepared to ensure blasting is managed in accordance with criteria detailed in this section as per UMM NV3

The ICNG requires vibration and overpressure from blasting to be assessed against the ANZECC *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990).

The criteria in the ANZECC guideline are applicable to long-term operations, such as those at mining sites and quarries, and are targeted to protect human comfort from vibration. As a result, guideline levels can be considered conservative in the context of construction, which typically occur for much shorter time periods.

HLW-JV will ensure blasting will not exceed the limits in Table 17 in accordance with the ANZECC Guideline and MCoA B12.

Table 17 Blasting criteria (refer MCoA B12, Table 2)

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Any residential receiver	120	10	0%
	115	5	5% of the total number of blasts or events over a rolling period of 12 months

Where controlled blasting is required, a suitably qualified blasting specialist will be engaged to carry out a detailed blasting assessment and trial blasts to determine blasting design and site-specific parameters.

The blasting assessment would identify measures to limit vibrations to the recommended “safe” levels (defined in AS 2187.2-2006 Explosives - Storage and use), limit rock mass damage, avoid "over-blasting" and consider and mitigate potential impacts to:

- groundwater dependent ecosystems
- groundwater users
- surface water bodies.
- Existing utilities (including existing transmission lines)

It is noted the proposed HLW blast methodology is an aid to piling (not a replacement) and the extent of resulting rock fracturing must be limited to the radius of the pile. Therefore the blast charge size must be small to ensure fracturing is controlled is minimised.

6. Environmental aspects and impacts

The following sections summarise the potential impacts pertaining to HLJV for the purpose of construction of HLW. The key reference document is Chapter 15 Noise and Vibration and Technical Report 9 Noise and Vibration Impact Assessment of the EIS and Chapter 15 and Technical Paper 09 Noise and Vibration Impact Assessment Addendum of the AR, respectively.

6.1. Construction activities

The HLW will involve a range of activities incorporating various heavy machinery, plant and equipment that will operate in a number of locations across HLW. In order to assess the level of potential impact on noise and vibration sensitive receivers, the broad categories of construction activity likely to interact with these receivers are identified below.

- Enabling works and site establishment (covered under the Enabling Works Management Plan)
- Earthworks and vegetation clearing
- Construction of access tracks and points
- Sire establishment and deliveries
- Civil, foundations and building works
- Installation of high voltage equipment and associated infrastructure
- Tower assembly
- Tower erection of structures including the use of helicopters
- Stringing of lines using helicopters, drones
- Other aerial operations
- Pre commissioning activities
- Site clean-up and landscaping
- Quarrying
- Blasting
- Batch plants
- Construction traffic.

6.2. Potential impacts arising from construction

The Noise and Vibration assessment included in the Planning Approvals Documentation determined that due to the conservative nature of the assessment scenarios, the actual construction noise levels would be less than the predicted in the EIS assessment. There are predicted to be over 300 sensitive receivers impacted by construction noise across the various construction activities. The major potential sources of noise impacts for HLW would be from earthworks and clearing activities and site establishment. With 14 receivers likely to be Highly Noise Affected during earthworks and clearing and 13 during site establishment activities.

The major potential sources of vibration impact for the HLW would be the use of hydraulic rock breakers and vibratory rollers activities, and to a lesser extent soil auguring for tower foundations. Due to the distance to sensitive receivers, building cosmetic damage and human comfort impacts would be unlikely to occur.

The predicted noise and vibration impacts determined during the EIS Noise and Vibration Assessment are summarised below. The complete assessment is available in Technical Report 9 of the EIS and Appendix 09 of the Amendment Report.

6.2.1. Construction compounds and facilities

The number of residential receivers where NML exceedances are predicted for the construction compounds, worker accommodation facilities and construction facilities are summarised in Table 18(taken from the EIS Noise and Vibration Technical Report).

The accommodation facilities will operate 24 hours. The Tarcutta accommodation facility and compound (AC03) is not likely to have impacts during the out-of-hours day and evening periods. Up to three residential receivers may experience noise levels within 1 to 5 dB(A) of the NML during the night period. There is potential for sleep disturbance impacts from this site at 4 receivers, based on the worst case scenario.

There are 1 to 2 residential receivers potentially impacted by the operation of the Green Hills accommodation facility and compound (AC07) during the out-of-hours day, evening and night period, with 1 receiver potentially exposed to L_{AFmax} noise levels above the sleep disturbance screening level.

All construction works will be managed as described in Section 7. Considering this it is unlikely that sleep disturbance impacts would occur during construction of the HLW.

Table 18 Predicted worst case construction noise levels – construction compounds

Compound	Scenario	Duration[1]	Number of receivers			
			HNA[2]	With NML exceedance[3]		
				1-10 dB	11-20 dB	>20 dB
Wagga 330 kV substation compound (C01)	Site establishment	3-4 weeks	-	9	1	-
	Compound operation	HLW duration	-	5	-	-
Amended Gregadoo Road compound (C06)	Site establishment	3-4 weeks	-	3	-	-
	Compound operation	HLW duration	-	1	-	-
Amended Memorial Avenue compound (C14)	Site establishment	3-4 weeks	1	446	84	6
	Compound operation	HLW duration	1	347	19	4
Ellerslie Road compound (C21)	Site establishment	3-4 weeks	-	1	-	-
	Compound operation	HLW duration	-	-	-	-
Tarcutta accommodation facility and compound (AC03)	Site establishment	3-4 weeks	-	3	3	-
	Compound operation	HLW duration	-	-	-	-
	Accommodation facility operation	HLW duration	-	-	-	-
Green Hills ((Kunama) accommodation facility and compound (AC07)	Site establishment	3-4 weeks	-	3	-	1
	Compound operation	HLW duration	-	1	1	-
	Accommodation facility operation	HLW duration	-	1	-	-
North Tarcutta Batching Plant	Site establishment	3-4 weeks	-	1	-	-
	Compound operation	HLW duration	-	1	-	-
Lower Bago	Site establishment	5-6 weeks	-	-	-	-
	Compound operation	HLW duration	-	-	-	-

Notes: 1. Durations should be regarded as indicative and representative of a typical work site.
2. Highly Noise Affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise level at residential receiver is 75

dBA or greater).
3. Based on worst-case predicted noise levels.

6.2.2. Substations

The number of residential receivers where NML exceedances are predicted for the substation construction works are summarised in Table 19.

Installation of high voltage equipment and associated structures at the substations (identified as "Typical works" in Table 19) will require approx. 1 month of out-of-hours work. Predicted impacts from out-of-hours works at the Wagga 330 kV substation indicate there may be up to 5 receivers above the NML during the out-of-hours day period, and up to 14 receivers above the NML during the out-of-hours evening/ night period. There is 1 receiver potentially at risk of sleep disturbance.

Out-of-hours construction at the proposed Gugaa 500 kV substation may have up to 2 receivers above the NML during the out-of-hours periods, based on the worst case scenario. No receivers are predicted to experience L_{AFmax} noise levels above the sleep disturbance screening level.

All construction works will be managed as described in Section 7. Considering this it is unlikely that sleep disturbance impacts would occur during substation construction for the HLW.

Table 19 Predicted worst case construction noise levels – substations

Compound	Scenario	Duration[1]	Number of receivers			
			HNA[2]	With NML exceedance[3]		
				1-10 dB	11-20 dB	>20 dB
Wagga 330 kV substation	Site establishment	4 months	-	-	-	-
	Typical works[4]	12-14 months	-	1	-	-
	Worst case works[5]	2-4 months	-	9	1	-
Proposed Gugaa 500 kV substation	Site establishment	4 months	-	-	-	-
	Typical works[4]	12-14 months	-	-	-	-
	Worst case works[5]	2-4 months	-	2	-	-
Amended Memorial Avenue compound (C14)	Site establishment	3-4 weeks	1	446	84	6
	Compound operation	HLW duration	1	347	19	4

Notes: 1. Durations should be regarded as indicative and representative of a typical work site.
2. Highly Noise Affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise level at residential receiver is 75 dBA or greater).
3. Based on worst-case predicted noise levels.
4. Typical works are the longest duration works for the site, and include civil and building work; and installation of high voltage equipment and associated structures.
5. Worst case works are the works identified in the EIS as having the highest noise impact (earthwork and vegetation clearance)

6.2.3. Construction noise transmission line works

The predicted worst-case construction noise levels for the worst case construction activity during standard construction hours has been assessed and summarised in Table 20.

Some transmission line construction works will be required to be completed outside standard construction hours. The predicted worst-case noise levels were within 15 dB(A) of the night NML. There were 6 receivers within 1-5 dB of the NML and 1 receiver within 6-15 dB of the NML.

Table 20 Predicted worst case construction noise levels - transmission lines

Worst case Scenario	Duration[1]	Number of receivers			
		HNA[2]	With NML exceedance[3]		
			1-10 dB	11-20 dB	>20 dB
Transmission line construction	6-9 weeks per transmission line structure/ stringing site	8	55	28	8
Access track construction	1-2 days per track	13	81	20	13

Notes:
1. Durations should be regarded as indicative and representative of a typical work site.
2. Highly Noise Affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise level at residential receiver is 75 dBA or greater).
3. Based on worst-case predicted noise levels

6.2.4. Construction traffic impacts

Amendment Report Tech Paper 9 sets out a worst case of scenario assessment of the impact of construction generated road traffic noise on the existing road network. In summary,

- Construction traffic is likely to result in a noticeable increase in noise levels (>2 dB) on all local roads and around 40 per cent of the arterial / sub-arterial roads due to low existing traffic volumes on the routes
- For unsealed local roads, exceedances of the RNP criteria are predicted for:
  - All roads if receivers are 100 metres from the road edge
  - Around half of the roads if receivers are 250 metres from the road edge
  - No roads if receivers are 500 metres from the road edge
- For sealed local roads, exceedances of the RNP criteria are predicted for:
  - All roads if receivers are 100 metres from the road edge
  - 10 of 104 roads if receivers are 250 metres from the road edge
  - One road if receivers are 500 metres from the road edge (Clinton Street)
- For arterial / sub-arterial roads, no exceedances of the RNP criteria are predicted for roads where receivers are at least 50 metres from the road edge, which is generally expected to be the case for this class of road

Attachment G3 of the EIS Technical Report 9 Noise and Vibration Impact Assessment Addendum presents the worst-case predicted road traffic noise increase, dB (all periods) for all roads likely to be used for the HLW, based on the worst case road traffic noise increase for each road (day or night).

6.2.5. Construction vibration impacts

Amendment Report Tech Paper 9 identifies the following vibration impacts from construction:

- The 7 receivers closest to transmission line or access track construction are likely to be within the minimum working distance for cosmetic damage (i.e. 20 metres for a large vibratory roller). Of these receivers, 3 are within the HLW footprint
- The 21 receivers closest to transmission line or access track construction are likely to be within the human comfort minimum working distance (i.e. 100 metres for a large vibratory roller).

More detailed review of potential vibration impact will be undertaken as part of the design documentation stage, in Construction Noise and Vibration Impact Statements prepared for the HLW, or from Gatewave modelling and assessment.

6.2.6. Construction blasting

Maximum Instantaneous Charge (MIC) calculations undertaken for sites where blasting is required are to be based on meeting MIC criteria for variables including, location, aspect if near an open face, etc and would be managed through a Blasting Management Plan. Blasting may only be undertaken between 9 am and 5 pm Monday to Friday and between 9 am to 1 pm on Saturday. No blasting is allowed on Sundays or public holidays.

6.2.7. Memorial Avenue construction compound

In accordance with MCoA B3 there are a number of restrictions of activities for the operation of the construction compound at Memorial Avenue, noting that the requirement for construction activities at the site are minimal based on being an established commercial/industrial compound with a cleared and sealed area suitable for laydown and storage.

Exclusions that apply to Memorial Avenues operations include:

- Any activities outside the hours specified in condition B1.
- Helicopter arrivals or departures.
- Crushing or screening.
- Concrete batching; or
- Any other noise generating activity that would result in noise levels at sensitive receivers or sensitive land uses exceeding the construction 'highly noise affected' noise management level criteria established using the Interim Construction Noise Guideline (DECC, 2009).

6.2.8. Drone and/or helicopter use

Potential construction aircraft noise associated with the Project is included in AR Technical Report 9 and summarised below. It is currently anticipated that aircraft use for the HLW works would be limited to the use of drones.

As part of the stringing activities, the HLW will use commercial drone (UAV) or helicopters.

6.2.8.1. For Drones

The drone guides a thin draw wire through the tower pulleys which is then replaced, using a brake and winch setup, with larger sized draw wires eventually capable of pulling through the conductor. The conductor is then clipped in when the required tension has been achieved.

The drone will be operated by a commercial drone operator under relevant licensing. The operator has advised generic noise emissions for this unit at an altitude under 50m is estimated to be at 60-70db. The closest sensitive receiver is 110m from the base of operations.

6.2.8.2. For Helicopters

Helicopters will be used for stringing work, platform work, and to install final components such as conductor spacers on transmission lines.

Typically, aircraft would progressively fly draw wires through the transmission line structures between each brake and winch site. A total of eight draw wires would be required for the six phase conductors, optical ground wire and overhead earth wire. Drones may also be used for survey and vegetation management within the transmission line corridor.

Helicopter LAmax noise levels have been predicted for all potential helipad locations in *AR Technical Report 9*. The number of residential receivers predicted to be exposed to L_{AFmax} noise levels above 75 dB(A) and above 85 dB(A) for helipad locations are summarised in Table 21. The predictions take into consideration:

- Arrival and departure may occur in any direction (i.e. assessment is representative of the maximum noise from helicopter movements in all directions)

- Helicopter take off and landings have a 30 degree flight angle
- Helicopters are climbing to or descending from a height of 1,000 ft above ground level (AGL)
- Helipad locations are indicatively assumed to be around the centroids of each construction compound and combined worker accommodation facility and construction compound.

6.2.8.3. Helicopter Stringing and associated works

A Construction Noise and Vibration Impact Statement (CNVIS) has been prepared by acoustic consultant Renzo Tonin for helicopter stringing and associated activities to address UMM NV10 (refer Annexure D). Potential noise impacts for helicopter actives are listed in Section 5.3.3 of the CNVIS.

The following mitigation measures for helicopter activities to address UMM NV10 are listed in Section 5.3.3 of the CNVIS (Annexure D).

- Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include use of helipads within construction compounds and combined worker accommodation facilities and construction compounds, flight paths outside of the project footprint and stringing or other work within the transmission line corridor. Notification will include scheduled dates, locations, indicative hours and a description of the proposed work.
- Prioritising use of helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers.
    - This will only happen at Gugaa, Ellerslie, Tarcutta CBP, Snubba, Lower Bago, Kunama. These locations will only be used for long term parking (2+ days) for security reasons. No landing and take offs will occur within the same day at these locations. Majority of landings and take offs will occur at break and winch sites.
- Varying flight paths between helipads and the transmission line corridor to avoid repeated helicopter noise at sensitive receivers.
    - Where flight paths within the alignment travels directly over a receiver, the helicopter will change its flight path to avoid directly flying over a receiver and reduce potential noise impacts, where feasible.
- Operating aircraft in accordance with Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.
    - Where feasible, all helicopter activities will take place in accordance with ASA with Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.
    - Avoid noise-sensitive areas altogether
    - When possible, follow high ambient noise routes such as highways
    - When possible, follow less populated or unpopulated routes such as industrial areas or waterways
    - If it is necessary to fly near noise-sensitive areas, whenever possible:
        - Use a steep take-off profile, then
        - Maintain an altitude as high as possible and consistent with flight safety, ATC and other environmental and operational constraints/requirements,
        - Fly normal cruising speed or slower,
        - Avoid sharp and aggressive manoeuvres,
        - Vary the route, since repetition contributes to annoyance, and
        - Using a low-noise speed and descent profile in accordance with available model specific noise abatement guidance during landing.

To further reduce potential impacts on residents, livestock and animals:

- Helicopter operations will be limited to daylight hours unless required by a network operator
- Flights will be planned to minimise flight noise near communities
- Noisy activities will be scheduled for the middle of the day when impacts are the lowest
- Activities will be coordinated so that multiple noise tasks don't occur at once

Helicopter take-off and landing locations will be located within the project footprint at predominantly brake and winch sites however also at some construction compounds. Brake and winch sites will be used as the primary locations for take-offs and landings as this will minimise the number of receivers affected during flights to stringing work areas.

Each proposed take-off and landing location would be utilized for up to 2-weeks (approximately 1 week in either direction from the brake and winch site). The flight paths taken during the works would be varied to minimise impacts to receivers and subject to weather events e.g. wind direction and speed. There will be a maximum of 8 movements (take-off and landing for 4 flights) per day excluding emergencies. Section 5.3.3 in Annexure D list mitigation measures to reduce impacts on sensitive receivers. All helicopter activities will be in accordance with Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.

Attended noise monitoring will be undertaken to verify that noise levels resulting from helicopter works are consistent with the levels predicted in the CNVIS. Noise monitoring should be conducted within 30m of the residential property. Monitoring will be undertaken at the proposed locations listed in Table 5-7 of Annexure D. Monitoring shall be undertaken in accordance with the procedures outlined in Section 8.3.1.

Standard work hours for helicopter works would be as per MCoA B4:

- between 9 am to 5 pm Monday to Friday;
- between 9 am to 1 pm on Saturday;
- and no helicopter use is allowed on Sunday or NSW public holidays;

All community notification and any consultation will be undertaken in accordance with the CCS. These notifications will include scheduled dates, locations, indicative hours and a description of the proposed work.

Table 21 Potential helipad take-off and landing locations and noise levels for the HLW works

Site name	Distance to closest residential receiver	Number of receivers with potential aircraft Lamax noise level	
		>75 dB(A)	> 85 dB(A)
Amended Gregadoo Road compound (C06)	600 m	-	-
Tarcutta accommodation facility (AC03)*	170 m	4	-
Ellerslie Road compound (C21)	930 m	-	-
Ardrossan Headquarters Road compound (C17)*	30 m	1	1
Green Hills accommodation facility and compound (AC07)	110 m	1	-
Snubba Road compound (C18)	3,000 m	-	-
North Tarcutta Batching Plant	200 m	1	-
Lower Bago	3,000 m	-	-
Various brake and winch sites	> 1,000m	-	-

*Sites no longer proposed for take-off and landings.

6.2.9. Blasting

Blasting trials have been undertaken to confirm noise and vibration impacts. The results from these trials have been incorporated into each site-specific blast plan, which informs the mitigation measures required and notifications.

Monitoring of noise and vibration will be undertaken for each blast at the relevant distance from the blast. If a sensitive receiver is within 500mof a blast vibration monitoring will be conducted. Noise and vibration monitoring locations will also incorporate wind speed and direction when picking monitoring locations. All monitoring results are reviewed against the MCoA to ensure no exceedances of that listed in Table 17.

Blasting will occur during the times listed below as per MCoA B11:

- between 9 am to 5 pm Monday to Friday;
- between 9 am to 1 pm on Saturday;
- and no blasting is allowed on Sunday or NSW public holidays.

All sensitive receivers within a 500m radius of blasting actives and the relevant councils and/or authorities will be notified prior to a blast occurring as per the BLMP and CCS. All complaints will be managed as per the CCS.

Monitoring from an initial trial blast on 10 June 2026 indicated the blast method proposed resulted in noise and vibration below the relevant criteria at 20m.

6.2.10. Cumulative impacts

Cumulative noise and vibration impacts may arise from the interaction of other approved or proposed projects in the area.

Works will be scheduled with the aim of minimising impacts from concurrent works near sensitive receivers in consultation with managers of other nearby projects that are likely to result in a cumulative impact. This will include coordination between other projects as necessary for the duration of construction.

The following projects will be considered when reviewing potential cumulative impacts in relation to the HLW:

- HumeLink East (HLE)
- Project EnergyConnect - NSW Eastern Section (PEC East)
- Snowy 2.0 - Transmission Connection
- Gregadoo Solar Farm

Mitigation measures to minimise these cumulative construction noise impacts are considered in Section 7 of the NVMP and OOHW Protocol.

7. Environmental control measures

7.1. Construction hours

7.1.1. Standard construction hours

In accordance with the MCoA B1, the standard construction working hours for the HLW (excluding blasting) are, unless the Planning Secretary agrees otherwise, defined as being:

- 7:00 am to 6:00 pm Mondays to Fridays; inclusive
- 8:00am to 6:00pm Saturdays; and
- at no time on Sundays or public holidays

7.1.2. Helicopter activities hours of operation

In accordance with the MCoA B4 helicopters may only undertake construction activities for the HLW as defined as, unless in accordance with an EPL or as agreed by the Planning Secretary:

- between 9 am to 5 pm Monday to Friday;
- between 9 am to 1 pm on Saturday; and
- no helicopter use is allowed on Sunday or NSW public holidays;

A request for an extension to the working hours specified in Condition B4 has been submitted to the Planning Secretary. The permitted working hours, subject to Planning Secretary approval, are as follows;

- Between 7am and 6pm Monday to Friday
- Between 8am and 6pm Saturday and Sunday
- *Between 8am and 6pm Public Holidays*
- *Night works (6pm to 7am Monday to Sunday* and 7-8am Saturday and Sunday*) are not planned or expected, however may be required if directed by a network operator*

Helicopter operations may only occur during the extended hours once consultation has been undertaken with potentially noise-affected receivers and an internal B4 Out of Hours Works permit (Appendix E) has been signed off by the environmental manger. Receivers who are potentially impacted >5dB (NML), will be consulted with prior to extended hours occurring. Receivers who are potentially impacted <5db (NML), will only be notified before extended hours work occur.

If a noise-affected receiver has not provided consent for extended work hours, an exclusion zone will be placed on their property and, where required, a 1 km radius of the residence. No work may be undertaken within this exclusion zone during extended hours. No evening or night works are proposed for HLW works, except in the following circumstances:

- A request from network operator, road or rail authority (e.g. TfNSW, ARTC, Essential Energy) for safety or operational reasons (e.g. where a network outage on another utility distribution or transmission network is required and the operator of the network requires works to be undertaken outside of B4 helicopter hours), provided the request is in writing and received before the commencement of works.
- Emergency work to avoid the loss of life, property or prevent material harm to the environment.

The ER and DPHI will be notified 14 days prior to the first helicopter usage.

Noise affected receivers are to be notified 14 days prior to works commencing (emergencies excepted).

A CNVIS has been prepared as per Section 7.2.1 of this Plan (Annexure D) which covers standard and extended hours.

7.1.3. Out of hours works

The MCoA B2 permits work outside standard construction hours for the following activities:

- The delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons.
- Emergency work to avoid the loss of life, property or prevent material harm to the environment.
- Works carried out in accordance with the hours and noise limits specified in any negotiated agreements with sensitive receivers (owners and occupiers), provided the negotiated agreements are in writing and finalised before the commencement of works.
- Activities that do not result in noise affected sensitive receivers, as defined in Interim Construction Noise Guidelines (DECC, 2009) (or its latest version).
- Road upgrades required by the relevant road authority to be undertaken outside the standard construction hours.
- Where a rail authority requires a rail possession for the activities to be performed outside of standard construction hours.
- Activities that require a network outage on another utility, distribution or transmission network, and the operator of the network requires the outage and associated works outside standard construction hours.
- Where different hours are permitted or required under an EPL in force in respect of the CSSI.
- Works carried out in accordance with an Out-of-Hours Work Protocol in accordance with MCoA B16.

NV5 requires consideration of the Transport for NSW Construction Nosie and Vibration Guideline (CNVG) additional mitigation measures when managing noise and vibration impacts outside standard construction hours. The CNVG categorises the time outside standard construction hours into two OOHW time periods, for the purpose of managing impacts and identifying additional mitigation measures.

Table 22 CNVG assessment periods

Day/ Time	12am – 1am	1am – 2am	2am – 3am	3am – 4am	4am – 5am	5am – 6am	6am – 7am	7am – 8am	8am – 9am	9am – 10am	10am – 11am	11am – 12pm	12pm – 1pm	1pm – 2pm	2pm – 3pm	3pm – 4pm	4pm – 5pm	5pm – 6pm	6pm – 7pm	7pm – 8pm	8pm – 9pm	9pm – 10pm	10pm – 11pm	11pm – 12am
Monday to Friday										Standard Construction Hours									OOHW Period 1					
Saturday																								
Sunday or Public Holiday		OOHW Period 2										OOHW Period 1								OOHW Period 2				

An Out of Hours Works (OOHW) protocol and permitting system, endorsed by the ER, and approved by the DPHI, has been produced and is detailed in **Annexure A**.

7.1.4. Blasting hours

In accordance with the MCoA B11 Blasting may only be carried out on the site between 9 am and 5 pm Monday to Friday and between 9 am to 1 pm on Saturday. No blasting is allowed on Sundays or public holidays.

7.2. Construction noise and vibration assessment

7.2.1. Construction noise and vibration impact statements

The Construction Noise and Vibration Impact Statements (CNVIS) will be a key site management tool providing clear instructions for managing each construction compound and construction compound and accommodation facility. Each CNVIS will be prepared before any works that result in noise and vibration impacts commence at the relevant construction worksite and will be based on detailed design, which has taken into consideration noise and vibration generating activities and equipment, and located, orientated and/or shielded these activities and/or equipment to minimise impact.

Each CNVIS will set out the mitigation and management measures required for the construction stage in accordance with the ICNG and to ensure the vibration limits are met. They will address:

- Scope of work covered by CNVIS.
- Justification for OOHW (where required).
- Nearest noise and vibration sensitive receivers (refer to **Annexure C**).
- Construction noise and vibration objectives (outlined in Section 2.2).
- Construction noise and vibration impact assessment.
- Mitigation options, preferred management measures and ongoing risk management.
- Noise and vibration monitoring requirements and auditing process.

Construction noise and vibration impacts associated with a construction compound and construction compound and accommodation facilities will be assessed by identifying the construction activities for each worksite and area of the HLW, including likely plant and equipment. Construction noise and vibration from the identified activities would be predicted and assessed against the relevant noise and vibration objectives to identify the risk of impact. Where there is a risk of impact, all reasonable and feasible noise and vibration management measures would be recommended to reduce or manage the impacts.

During construction, noise and vibration levels will be measured and analysed against the predictions made in the relevant CNVIS. This will allow for ongoing review and verification of the predictive model planning tool (described in Section 7.2.2), and a feedback mechanism to

construction planning to ensure ongoing noise and vibration risks are identified and managed appropriately.

Physical noise mitigation measures such as noise barriers and acoustic enclosures around fixed plant will be outlined in the CNVIS. Furthermore, specific management measures such as staging of works, respite periods and community notification will also be summarised, and implemented.

The CNVIS will identify the sensitive receivers that HLWJV is required to notify regarding upcoming works to ensure ongoing noise and vibration risks are managed throughout the HLW.

This notification will include the likely noise and vibration impacts during the assessed works, the duration of impact and any additional mitigation (e.g., respite periods) that may be required to manage noise and vibration impacts.

The key CNVIS to be prepared under the NVMP are summarised in Table 23. Further to this, the Gatewave noise and vibration management tool will be used to manage ongoing noise and vibration risks and guide the identification of appropriate mitigation measures as works progress, as outlined in Section 7.3.

Table 23 Key CNVIS locations

ID	Location	Outcomes
CNVIS1	Green Hills (Kunama) accommodation facility and compound AC07	Residential receivers and other sensitive receivers are predicted to experience noise levels below the corresponding NMLs during standard construction hours and outside standard construction hours. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.
CNVIS2	Tarcutta accommodation facility and compound AC03	1 residential receiver (15 Mates Gully Road, Tarcutta NSW 2652) is predicted to experience noise levels above the NML when high impact site establishment activities are occurring during standard construction hours. During typical site establishment activities, compound operation and accommodation facility operation, all receivers are predicted to experience construction noise levels below the corresponding NMLs. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.
CNVIS3	Ellerslie Road C21 compound	1 residential receiver (1226 Yaven Creek Rd, Darlow 2729) is predicted to experience noise levels above the NML when high impact site establishment activities are occurring during standard construction hours. During typical site establishment activities and compound operation, all receivers are predicted to experience construction noise levels below the corresponding NMLs. No buildings/structures have been identified within the minimum working

ID	Location	Outcomes
		distances for cosmetic damage and human annoyance.
CNVIS4	Amended Memorial Avenue compound C14	Given the proximity of receivers relative to the site, 28 residential receivers are predicted to experience noise levels above the NMLs during site establishment activities during standard construction hours. 6 residential receivers are predicted to experience noise levels above the NMLs during compound operations. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.
CNVIS5	Wagga Wagga substation offices and laydown compound C01	9 residential receivers are predicted to experience noise levels above the NMLs during high impact site establishment activities during standard construction hours. During typical activities site establishment activities and compound operation, all receivers are predicted to experience construction noise levels below the corresponding NMLs. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.
CNVIS6	Gugaa substation offices and laydown compound C06	1 residential receiver (1070 Livingstone Gully Road, Gregadoo NSW 2650) is predicted to experience noise levels above the NML when high impact site establishment activities are occurring in standard construction hours. During typical site establishment activities and compound operation, all receivers are predicted to experience construction noise levels below the corresponding NMLs. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.
CNVIS7	North Tarcutta Batch Plant	1 residential receiver (8 Gundala Ln, Tarcutta NSW 2652) is predicted to experience noise levels above the NML when high impact site establishment activities are occurring in standard construction hours. During typical site establishment activities and compound operation, all receivers are predicted to experience construction noise levels below the corresponding NMLs. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.

ID	Location	Outcomes
CNVIS8	Lower Bago Batch Plant	Residential receivers and other sensitive receivers are predicted to experience noise levels below the corresponding NMLs during standard construction hours and outside standard construction hours. No buildings/structures have been identified within the minimum working distances for cosmetic damage and human annoyance.

7.2.2. Gatewave noise and vibration management tool

A 2D construction noise and vibration management tool, Gatewave (www.gatewave.com.au), has been developed specifically for the HLW to allow specific work areas and activities to be planned, assessed, and managed as construction works progress. It would also allow cumulative noise impact from other aspects of the HLW or, where relevant, noise from other construction projects, to be assessed and managed in accordance with this NVMP.

Gatewave incorporates ground elevation contours, building heights, the built environment, and atmospheric conditions to predict construction noise in accordance with the International Standard ISO 9613-2:1996 implementing quality standard ISO 17534-1:2015. All sensitive receivers (see **Annexure C**) are integrated into the Gatewave tool.

CNVISs prepared for the HLW would establish the overall impacts associated with construction compounds and construction compound and accommodation facilities. The HLW environment team would use Gatewave to manage construction noise and vibration impact by defining specific work areas/activities in the CNVIS as construction progresses and identifying:

- Sensitive receivers where predicted noise levels are above the NMLs so that, where there are residual impacts even after all feasible and reasonable mitigation measures have been adopted, mitigation and additional management measures can be applied in accordance with this NVMP (see Section 8.3.1)
- Buildings/structures within minimum working distances established for cosmetic damage and human annoyance so that appropriate mitigation and management measures can be applied in accordance with this NVMP (see Section 7.5.3)

In addition to the above, the HLW environment team will undertake an assessment using the Gatewave tool prior to works commencing in the following circumstances:

- Where the Project Assessment Documentation has identified ‘moderately intrusive’ or higher noise impacts at sensitive receivers for activities for which a CNVIS has not been prepared.
- Prior to undertaking OOHW for activities for which a CNVIS has not been prepared.
- Where vibration intensive plant is proposed to be used within the vicinity of any sensitive receivers (including heritage items).

Construction noise and vibration impacts will be assessed by identifying the construction activities for each worksite and area of the HLW, including likely plant and equipment. Construction noise and vibration from the identified activities would be predicted and assessed against the relevant noise and vibration objectives to identify the risk of impact. Where there is a risk of impact, all reasonable and feasible noise and vibration management measures will be recommended to reduce or manage the impacts.

The outcomes of the assessment would be documented in a Gatewave assessment report. Each Gatewave assessment report would set out the mitigation and management measures required for

the scope of works in accordance with the ICNG and to ensure the vibration limits are met. They will address:

- Scope of work covered by the Gatewave assessment report
- Justification for OOHW (where required).
- Nearest noise and vibration sensitive receivers (refer to **Annexure C**).
- Construction noise and vibration objectives (outlined in Section 2.2).
- Construction noise and vibration impact assessment.
- Mitigation options, preferred management measures and ongoing risk management.
- Noise and vibration monitoring requirements

Physical noise mitigation measures such as noise barriers will be outlined in the Gatewave assessment report. Furthermore, specific management measures such as staging of works, respite periods and community notification will also be summarised, and implemented. Where a sensitive receiver is identified as potentially exceeding the 'highly noise affected' noise management level, the relevant works will not commence until mitigation measures have been implemented with the objective of reducing construction noise below the highly noise affected noise management level at the affected receiver in accordance with MCoA B10.

The Gatewave assessment report will identify the sensitive receivers that HLWJV is required to notify regarding upcoming works to ensure ongoing noise and vibration risks are managed throughout the HLW.

Noise and vibration monitoring data would be collected and reviewed throughout the delivery of the HLW. This feedback loop would ensure the prediction tool is verified and adjusted as required to ensure accuracy across the HLW.

7.3. Environmental management and mitigation measures

Management and mitigation measures relevant to the HLW are outlined in the Table 24 below. These will be implemented to minimise impacts from construction noise and vibration and ensure all commitments and requirements of the project approval are met. These specific management and mitigation measures have been developed to address the requirements of applicable legislation, the MCoAs and commitments of the UMMs.

Table 24 Noise and Vibration management and mitigation measures

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
Construction Noise					
MMNV1	Where receivers are predicted to be noise affected and near construction compounds or fixed work areas with long durations (i.e. several months), path control, such as hoarding or earth bunds will be investigated. Practical measures will be implemented where required. Positioning of site structures will also be considered to act as barriers between noisy work and receivers where practical.	Detailed Design Construction	Project Manager Environmental manager	UMM NV1	Design report CNVIS
MMNV2	An out-of-hours work protocol that details how the project will identify, assess and approve out of hours work outside standard construction hours that are likely to generate noise levels that exceed the relevant noise management levels at sensitive receivers will be developed and implemented. The protocol will include provisions to: • carry out additional assessments for work proposed outside standard construction hours, to confirm noise levels at potentially affected sensitive receivers and determine suitable mitigation measures to minimise noise levels • notify and engage with potentially noise affected receivers about upcoming work outside standard construction hours and address any associated complaints.	Detailed Design Construction	Project Manager Environmental Manager Community Liaison Officer	UMM NV2	OOHW Protocol Communications Records

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	• identify appropriate respite for noise affected receivers (where required). The out-of-hours work protocol will not apply to the operation of the worker accommodation facilities.				
MMNV3	A Blast Management Plan will be developed to minimise the potential airblast overpressure and vibration impacts. Maximum instantaneous charge calculations will be undertaken for specific locations within the potential blasting areas. Individual blast designs will be based on meeting the criteria rather than restrictions on maximum instantaneous charge. All controlled blasting, including initial controlled trial blasting will be monitored to obtain data which can be used to confirm site constants and compliance with controlled blasting criteria. Landowner notification and consultation requirements will be identified in the Blast Management Plan.	Detailed Design Construction	Project Manager Environmental Manager Community Liaison Officer	UMM NV3	Blast Management Plan Site records Communications Records
MMNV4	The likelihood of cumulative construction noise impacts will be reviewed as the project progresses and detailed construction schedules are available for all projects considered for cumulative impacts. Coordination will occur between the various projects to minimise concurrent work in the same areas, where possible. The potential consecutive impacts from HumeLink	Detailed Design Construction	Project Manager Environmental Manager	Best Practice	CNVIS Gatewave assessment reports Design compliance report

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	and other projects will be investigated further as the project progresses. Specific additional management and mitigation measures designed to address potential consecutive impacts will be developed and used to minimise the impacts as far as practicable, in consultation with the affected communities.				
MMNV5	Where construction is likely to result in exceedances of NMLs at sensitive receivers, mitigation and management measures will be implemented where practicable and appropriate. This will include (but is not limited to) the following measures: • select quieter plant and equipment and use alternative construction methods to minimise noise levels • plan and schedule concurrent noisy activities to minimise the number of items of noisy plant operating at one time and cumulative noise levels • install screens or use barriers to mitigate noise from stationary noise sources • maximise the offset distance between noisy plant and sensitive receivers • orient noisy plant and equipment away from sensitive receivers • use noise source controls, such as residential class mufflers, to reduce noise from all regularly	Construction	Project Manger Environmental Manager Community Liaison Officer	UMM NV4	Site records Noise model output Communication records

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	used plant including cranes, excavators and trucks • use non-tonal reversing alarms in place of traditional beeper reversing alarms during out-of- hours where noise impacts are predicted • turn off machinery when not in use • confirm equipment is maintained in accordance with manufacturer's requirements to minimise generation of excessive noise • operate machinery in a manner which reduces occurrence of maximum noise level events, such as excavator bucket impacts, material drop heights, steel on steel impacts and dragging materials across hard surfaces • provide awareness training regarding noise mitigation measures to be implemented as part of regular toolbox meetings • notify and consult with potentially noise affected receivers about upcoming noisy activities • confirm that noise affected receivers outside standard construction hours and highly noise affected sensitive receivers are managed with consideration to the CNVG additional mitigation measures such as notifications, verification, and respite where appropriate.				
MMNV6	Monitoring will be carried out for noise intensive	Construction	Environmental	UMM NV5	Monitoring

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	activities that have the potential to cause noise exceedances at sensitive receivers, to confirm that actual levels are consistent with the predictions and that appropriate mitigation measures have been implemented.		Manager		records
MMNV7	All construction vehicle movements will adhere to the following measures: • out-of-hours vehicle movements will be minimised where possible • construction delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible • use of engine compression brakes will be avoided at night and in residential areas • site access points and roads/flight paths will be located as far as possible away from sensitive receivers • traffic flow, parking and loading/unloading areas will be planned to minimise reversing movements • construction inductions will include driver behaviour requirements to minimise vehicle noise emissions.	Construction	Training Manager Project Manger Environmental Manager	UMM NV6	Induction records Inspection records
Vibration					
MMNV8	Where vibration intensive work is required within the	Construction	Project	UMM NV7	Site records

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	recommended minimum working distances and is considered likely to exceed the cosmetic damage criteria: • different construction methods with lower source vibration levels will be investigated and implemented, where feasible • vibration monitoring will be undertaken at the start of work to determine actual vibration levels at the receiver • work will be ceased if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria		Manager Environmental Manager		
Construction aircraft noise					
MMNV11	Management measures will be implemented to minimise aircraft noise at sensitive receivers where practicable and appropriate. Measures may include (but are not limited to): • Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include use of helipads within construction compounds and combined worker accommodation facilities and construction compounds, flight paths outside of the project footprint and stringing or other work within the transmission line corridor. Notification would include scheduled dates,	Construction	Project Manager Environmental Manager Environment and Stakeholder Manager	UMM NV10	Site records

ID	Management / Mitigation Measure	When to implement	Responsibility	Reference	Evidence
	locations, indicative hours and a description of the proposed work • Prioritising use of potential helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers • Varying flight paths between helipads and the transmission line corridor to avoid repeated helicopter noise at sensitive receivers • Operating aircraft in accordance with Airservices Australia (ASA*) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise* (2002) and the Helicopter Association International (HAI*) Fly Neighbourly Guide*				

7.4. Construction noise management

7.4.1. Maximum noise levels for plant and equipment

The Sound Power Level (SWL) represents the total noise output of operating plant and equipment. The SWL is used in computer noise models to predict Sound Pressure Levels (SPLs) at nearby receivers.

Plant and equipment used for the HLW Works will have SWL no higher than the corresponding levels specified in the relevant CNVIS or Gatewave assessment report. Where plant and equipment with SWLs higher than those identified in the relevant CNVIS or Gatewave assessment report are proposed for use, predicted noise levels will be reviewed using Gatewave to ensure the environmental requirements can be met, or replaced with alternative quieter operating equipment, where feasible and reasonable.

Plant and equipment will be subject to compliance checks as detailed in Section 8.3. In addition, noise-focussed checks will be incorporated into the weekly inspections of the environmental controls, for example, subjective listening test for items such as deflective mufflers, excessively loud squawkers, and squeaking excavator tracks.

7.4.2. Drone specifications

Drone specifications are detailed in Section 5.3.3. Based on these specifications and current drone usage laws in Australia, a minimum setback of 30m to people and sensitive structures has been assigned and will be observed during stringing, unless otherwise governed (and mitigated) under a Safe work method statement.

7.4.3. Standard noise mitigation measures

The standard noise mitigation measures summarised in Table 25 will be considered during the preparation of CNVIS or Gatewave assessment report. All reasonable and feasible mitigation measures identified within the CNVIS or Gatewave assessment report will be implemented at the relevant worksite or incorporated into works procedures to minimise noise impacts.

Table 25 Standard noise mitigation and management measures

Standard mitigation measure	Details
Equipment selection	Use quieter and less noise emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise impacts. For regularly used plant (e.g. cranes, excavators, and trucks), consider use of residential class mufflers/ silencers to reduce noise. Ensure plant including the silencer is well maintained.
Use and siting of plant	Plant will be operated in a proper and efficient manner The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site.
Plan worksites to	Locate compounds away from sensitive receivers and discourage access from

Standard mitigation measure	Details
minimise noise	local roads. Consider site topography, or where practicable, incorporate earth mounding into compound design. Use site buildings to provide a noise barrier from noisy plant to sensitive receivers. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
Non-tonal and ambient sensitive reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
Minimise disturbance arising from delivery of goods to construction sites.	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Engine compression brakes	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained Original Equipment Manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'In-service test procedure' and standard.
Shield stationary noise sources, e.g. pumps, compressors etc.	Stationary noise sources will be enclosed or shielded where feasible and reasonable whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.
Behavioural practices	As part of site induction and regular toolbox talks, ensure construction team follows good behavioural practices to minimise noise impact, such as • No swearing or unnecessary shouting or loud stereos/radios on site. • No dropping of materials from height, throwing of metal items and slamming of doors. • Driver behaviour requirements to minimise vehicle noise emissions.

7.4.4. Additional mitigation measures

The additional mitigation measures to be applied are outlined below:

Notification: The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification will be provided to potentially affected receivers seven business days prior to the start of works. Given that the affected

sensitive receivers are also likely to be affected landholders for the project, phone call and email will be favoured for these notifications.

Respite: Where out-of-hours construction noise is proposed to occur during OOHW period 1 (evening) or OOHW period 2 (night) the following will apply:

- For OOHW period 1 (evening) where work occurs for three or more consecutive evenings, respite will occur; or
- For OOHW period 2 (night) where work occurs for two or more consecutive nights, respite will occur.

Duration Respite: Respite periods may be counterproductive in reducing the impact on the community for longer duration projects. In these instances, where it can be agreed by affected residents, it may be beneficial to increase the work duration, number of evenings or nights worked through duration respite so that the project can be completed more quickly. The project will engage with affected receivers to determine support for duration respite. Where possible, negotiated agreements are the preferred project approach in lieu of duration respite.

Verification: Verification of construction noise and vibration levels will occur to ensure the actual impacts are consistent with the predicted levels.

Alternative Accommodation: Alternate accommodation options (i.e. accommodation in motels away from the worksite) will be offered to residents living in close proximity to works that are likely to incur noise levels substantially above the applicable NML across two or more consecutive sleep periods (as defined in Table 26).

Table 26: Additional mitigation measures

Predicted airborne LAeq(15min) noise level at receiver		**Additional mitigation measures**
Perception	dBA above NML	
Standard hours		
Clearly audible	≤10	-
Moderately Intrusive	>10 to 20	V
Highly Intrusive	>20	V
OOHW Period 1		
Noticeable	<5	N, V
Clearly audible	5-15	N, V
Moderately intrusive	15-25	N, V, R3
Highly intrusive	>25	N, V, R3, DR
OOHW Period 2		
Noticeable	<5	N, V
Clearly audible	5-15	N, V

Predicted airborne LAeq(15min) noise level at receiver		Additional mitigation measures
Perception	dBA above NML	
Moderately intrusive	15-25	N, V, R2, DR
Highly intrusive	>25	N, V, R2, DR, AA

Notes: N = Notification, RO = Short term respite offer, R2 = Respite offered when impacts occur over two or more consecutive nights, R3 = Respite offered when impacts occur over three or more consecutive nights, DR = Duration respite, V = Verification, AA = Alternative accommodation.

7.4.5. Cumulative noise impact

Construction noise impacts will be identified in the CNVIS and Gatewave assessment reports, taking into consideration potential cumulative impacts identified in Section 4.3. Concurrent (or consecutive) noisy activities will be scheduled to minimise the number of items of noisy plant operating at one time (where practicable) and to ensure respite periods are maintained, especially during the OOHW period.

7.5. Minimising vibration impacts

The pattern of vibration radiation is very different to the pattern of airborne noise radiation and is site specific. Final vibration levels are dependent on various factors including the actual plant used, its operation and the intervening geology between the activity and the receiver.

Recommended minimum working distances presented in the following sections provide a conservative screening method for indicating buildings and structures where there is a risk of vibration impact. In preparing CNVISs and Gatewave assessment reports, recommended minimum working distances for specific vibration intensive construction equipment will be identified.

Vibration monitoring will be carried out to confirm the minimum working distances at specific sites, where vibration significant plant is required to operate within or near the recommended minimum working distances.

7.5.1. Human exposure

Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures. At properties near the construction works, nearby receivers may be able to feel vibration when vibration-generating equipment is being utilised. For this reason, it is appropriate to identify properties where there is a probability of perceived vibration so that impacts can be managed.

Recommended minimum working distances for typical vibration intensive construction equipment for human comfort (response) are shown in Table 27. These recommended distances relate to continuous vibration and are presented as a guide only. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels occurring over shorter time periods are allowed.

Table 27 Recommended minimum working distances (m) - human comfort (response)

Vibration significant plant item	Residence (Day)	Residence (Night)	Office	Workshop
Concrete saw	10	10	5	5
Excavator (tracked) ≤ 5t + hydraulic hammer	20	20	15	10
Excavator (tracked) ≤ 15t + hydraulic hammer	20	25	15	10
Excavator (tracked) ≤ 35t + hydraulic hammer	25	30	20	15
Percussive drill (small)	10	15	5	5
Piling rig – bored (rock)	15	15	10	10
Piling rig – bored (soft ground)	10	10	5	5
Piling rig - vibratory driven	30	35	20	15
Pneumatic hammer (jackhammer)	15	20	10	5
Terrain leveller	15	20	5	5
Vibratory roller (11t) padfoot - High vibration	70	90	40	25
Vibratory roller (11t) padfoot - Low vibration	60	80	35	20
Vibratory roller (13t) smooth drum - High vibration	55	75	30	15
Vibratory roller (13t) smooth drum - Low vibration	40	55	20	10
Wacker packer	10	15	5	5

7.5.2. Buildings and structures

Recommended minimum working distances to reduce the risk of cosmetic damage to buildings or structures from typical vibration intensive construction equipment are presented in Table 28. These are aimed at reducing the risk of cosmetic damage (as per BS 7385:1993 and DIN 4150-3:2016) and are based on the vibration screening assessment approach outlined in Section 5.4.3.2.

Unlike noise, vibration cannot be readily predicted. The minimum working distances in Table 28 are indicative and will vary depending on the plant item, building types, foundations and local geotechnical conditions. Vibration monitoring will be carried out to confirm the site-specific minimum working distances for the HLW Works.

Table 28 Minimum working distances (m) - cosmetic damage[1]

Vibration significant plant item	Reinforced or frame structures (BS7385)[2]	Unreinforced or light framed structures (BS7385)[2]	Structurally unsound heritage structures (DIN 4150-3)[3]
Concrete saw	5	5	5
Excavator (tracked) ≤ 5t + hydraulic hammer	5	5	10
Excavator (tracked) ≤ 15t + hydraulic hammer	5	10	10
Excavator (tracked) ≤ 35t + hydraulic hammer	5	10	20
Percussive drill (small)	5	5	10
Piling rig – bored (rock)	5	5	5
Piling rig – bored (soft ground)	5	5	5
Piling rig - vibratory driven	5	10	15
Pneumatic hammer (jackhammer)	15	30	65
Terrain leveller	10	15	35
Vibratory roller (11t) padfoot - High vibration	10	20	50
Vibratory roller (11t) padfoot - Low vibration	5	5	5
Vibratory roller (13t) smooth drum - High vibration	5	10	20
Vibratory roller (13t) smooth drum - Low vibration	5	5	15
Wacker packer	5	5	10

NOTES:
1. Minimum working distances are in 5m increments only to account for the intrinsic uncertainty of this screening method
2. Minimum working distance based on vibration screening criterion which reduced the cosmetic damage levels set by BS7385 (see Table 15) by 50% due to potential dynamic magnification
4. A building condition inspection will determine whether a heritage item is structurally unsound.

The CNVISs prepared for each construction site will identify properties within the recommended minimum working distances for specific vibration intensive construction equipment and therefore at risk of exceeding the screening criteria for cosmetic damage. Further vibration monitoring would then be undertaken to confirm vibration impacts under the site-specific conditions. Vibration monitoring will be undertaken as described in Section 8.3.2.

Owners and occupiers of identified properties will be notified before works that generate vibration commences in the vicinity of those properties.

To limit the risks of vibration-induced damage on all nearby buildings and structures, pre- and post-building condition surveys will be conducted by an appropriate professional. The inspections

will document the location of all cracks or defects observed and any changes in crack width or defect size will be measured after construction completion. The post construction survey will record any changes to the property at construction completion.

These guidelines do not provide recommended setbacks for drone or helicopter use, or for blasting. Blasting required setbacks are determined as part of a Blast Management Plan via site-specific Blast packs.

7.5.3. Standard vibration mitigation measures

The standard vibration mitigation measures summarised in Table 29 will be considered during the preparation of CNVIS and Gatewave assessment report. All reasonable and feasible mitigation measures will be incorporated into the worksite or works procedures to minimise vibration impacts.

Table 29 Standard vibration mitigation and management measures

Standard mitigation measure	Details
Equipment selection	Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Where vibratory rolling plant is operating close to sensitive structures, consider operating in 'non-vibratory' mode to reduce potential vibration impact.
Attended vibration measurements	Where required attended vibration measurements will be undertaken at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Reduced equipment power	Use only the necessary equipment size and power.
Building condition surveys	Building condition surveys will be completed for buildings identified to be within the recommended minimum working distance for vibration significant plant (see Section 7.5.2 and Table 28).

7.6. Mitigation and management of out-of-hours works

7.6.1. Safety and emergency works

Where OOHW are required for safety or in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm (MCoA B2 (b)), we will notify the ER and the Planning Secretary of the reasons for emergency works. Best practice endeavours will be used to notify all potentially noise and/or vibration-affected sensitive receivers of the likely impact and duration of the emergency works at the earliest opportunity.

7.6.2. Out-of-Hours Works Protocol

An OOHW Protocol been prepared as part of this NVMP in accordance with MCoA B16(i). The OOHW Protocol is provided in Annexure A. The OOHW Protocol provides a process for the consideration, management, and approval of work outside the approved construction hours.

The aim of the OOHW Protocol is to ensure that OOHW are assessed and managed via a rigorous process to identify the associated risk of adverse impacts on sensitive receivers including:

- Justification for why OOHW need to occur

- Consideration of the OOHW against the relevant NMLs and vibration criteria, and providing a determination of low or high-risk work
- Processes for selecting and implementing mitigation measures for residual impacts in consultation with the community

8. Procedures to facilitate the coordination of Project Compliance management

8.1. Roles and responsibilities

The HLWJV Team's organisational structure and overall roles and responsibilities are outlined in Section 3.5 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 7.5 of this Plan.

8.2. Training

All site personnel will undergo the HLJV site induction training relating to noise and vibration management issues. The induction training will address elements related to noise and vibration management including:

- Existence and requirements of this NVMP.
- Relevant legislation.
- Normal working hours.
- The process for seeking approval for out of hours works, including consultation.
- Location of sensitive receivers and heritage structures.
- Roles and responsibilities for noise and vibration management.
- Noise and vibration mitigation and management measures.
- the Out of Hours Work Protocol.

Further details regarding staff induction and training are outlined in Section 6 of the CEMP.

8.3. Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction. Noise and vibration monitoring requirements to be implemented during construction are outlined Table 30.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 3.9 of the CEMP.

Table 30 Monitoring program

Item	Scope	Frequency	Equipment	Responsibility	Records/ reporting
Noise verification monitoring	Noise monitoring at sensitive receivers predicted to be impacted by moderate exceedances of the NML or higher from work in standard hours	As required	Handheld calibrated noise monitor	Environmental Advisor	Noise monitoring records
Commencement of OOHW activities	At the commencement of a new OOHW activities or location where exceedances of the noise management levels are predicted to occur at the most affected receiver. This will be at select locations/occasions which are determined based on risk.	Commencement of OOHW activities predicted to exceed noise management levels. This will be on select occasions which are determined based on risk.	Handheld calibrated noise monitor	Environmental Advisor	Noise monitoring records
Commencement of new activity near structures/ receivers within minimum vibration working distances	Attended vibration measurements would be undertaken at the start of the works to determine actual vibration levels at the structure.	Commencement of works for receivers/ structures within minimum working distances	Vibration monitor	Environmental Advisor	Vibration monitoring records
Complaint-based monitoring	Where complaints are received, noise (or vibration) monitoring may be undertaken at sensitive receivers to determine if the actual construction noise generated exceeds the predicted 'worst case'	As required	Handheld calibrated noise monitor or vibration monitor	Environmental Manager, Environmental Advisor	Noise (or vibration) monitoring records

Item	Scope	Frequency	Equipment	Responsibility	Records/ reporting
	construction noise levels identified in this plan.				
Weekly inspections	Inspection of the environmental controls and implementation of the noise and vibration mitigation measures outlined in Table 24.	Weekly	Not applicable	Environmental Advisor, Supervisors	Weekly Environmental Inspection Checklist

8.3.1. Noise monitoring

Noise monitoring will be undertaken as outlined in Table 30. The monitoring will include operator-attended noise monitoring and be undertaken in accordance with the relevant Australian Standards and EPA guidelines including:

- AS 1055.1 – 1997 Acoustics – Description and measurement of environmental noise – General procedures
- AS/NZS IEC 61672.1 – 2019 Electroacoustics – Sound level meters, Part 1: Specifications
- Australian Standard 2659.1 – 1998 Guide to the use of sound measuring equipment – portable sound level meters
- NSW Interim Construction Noise Guideline, Department of Environment and Climate Change 2009
- NSW Noise Policy for Industry (NPfI) (EPA, 2017)

All acoustic instrumentation used for monitoring under this plan will have current NATA or manufacturer calibration certificates. Noise monitoring will, where practicable, be in positions with unobstructed views of general site activities, whilst shielded as much as possible from non-construction site noise (e.g. road traffic, rail noise and other surrounding noise). In accordance with Australian Standard AS1055, outdoor noise monitoring will be undertaken at least 3.5m from any reflecting structure other than the ground. The preferred measurement height is 1.2-1.5m above the ground. Where the noise monitors are placed within 3.5 metres of building facades, walls or cliffs, then a reflection correction of up to -2.5dB(A) shall be applied to remove the effect of increased noise due to sound reflections from such structures.

The noise monitoring results will be assessed against the noise management levels (NMLs) outlined in Section 5.3. The results will also be compared with predicted noise levels and documented with discussion about the details of work underway at the time and the mitigation in place.

If exceedance of the NML is identified, a review of site-specific mitigation measures will be undertaken to confirm that all reasonable and feasible mitigation and management measures have been implemented and confirm if there are any opportunities to further reduce noise levels on site.

Where, after all reasonable and feasible mitigation measures have been implemented, measured noise levels above the NMLs will be compared to the predicted noise levels in the relevant CNVIS or Gatewave assessment report. If, after all reasonable and feasible mitigation measures have been implemented, an exceedance of the predicted noise levels is identified, a management response will be triggered. The management response is detailed in Section 8.5.

8.3.2. Vibration monitoring

Vibration monitoring will be undertaken as outlined in Table 30 and be undertaken generally in accordance with the relevant Australian Standards and EPA guidelines including:

- NSW Assessing Vibration – a technical guideline (AVTG), Department of Environment and Conservation 2006
- Australian Standard 2775 Mechanical Mounting of Accelerometers
- British Standard BS 6472-2008, ‘Evaluation of human exposure to vibration in buildings (1-80Hz)
- British Standard 7385: Part 2-1993 'Evaluation and measurement of vibration in buildings'

The focus of vibration monitoring will be at risk buildings, structures and utilities identified in the pre-construction condition surveys and/or geotechnical analysis. Selection of a suitable vibration monitoring location will consider the following:

- Whether there is a predicted exceedance of the cosmetic damage criteria and / or community concerns have been raised regarding vibration
- Placement of vibration monitoring equipment outside at the footings or foundations of the building of interest closest to the vibrating plant
- The surface should be solid and rigid to best represent the vibration entering the structure of the building under investigation
- The vibration sensor or transducer shall not be mounted on loose tiles, loose gravel or other resilient surfaces
- The vibration sensor or transducer shall be directly mounted to the vibrating surface using either adhesive, double sided tape or a magnetic mounting plate onto a steel washer, plate or bracket which shall be either fastened or glued to the surface of interest
- Where a suitable mounting surface is unavailable, then a metal ground spike shall be driven into solid ground adjacent to the building of interest, and the vibration sensor or transducer shall be mounted on that. Where it is not possible to use a ground spike, the vibration sensor or transducer will be placed on the measurement surface and covered with a heavy weight such as a sandbag.

Where vibration levels are predicted to exceed the screening criteria outlined in Section 5.4.3.2, a more detailed assessment of the structure (in consultation with a structural engineer) and vibration monitoring will be carried out to ensure vibration levels remain below appropriate limits for that structure. Construction methodology would also be reviewed, where practicable.

Vibration monitoring will include equipment placed at the heritage item with a trigger level based on the frequency dependent DIN 4150-3 vibration criteria. If the vibration level on the equipment is reached a visual alarm will be triggered to alert the operators that the vibration criteria have been exceeded.

A vibration monitoring procedure is presented below in Figure 8-1.

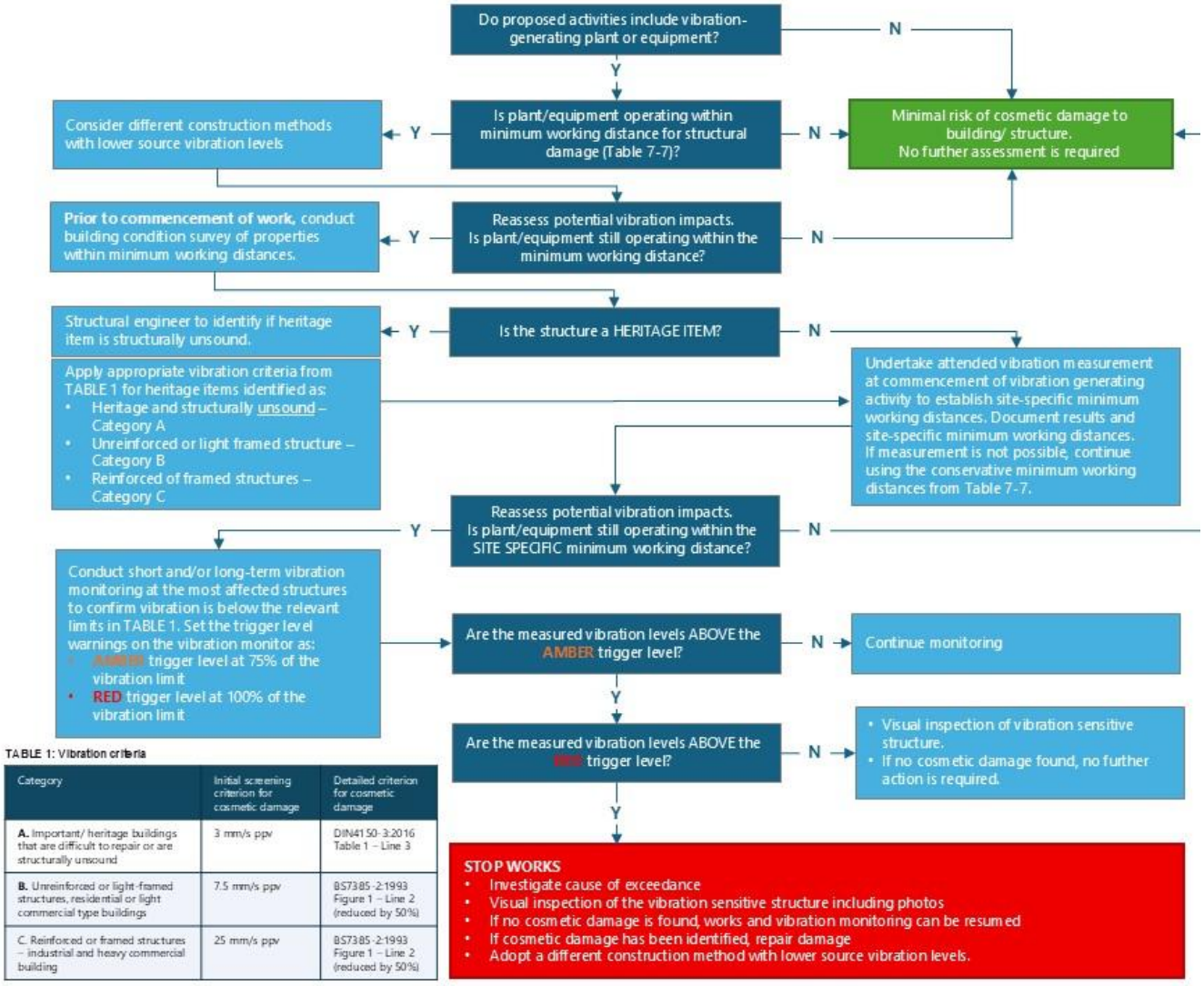


TABLE 1: Vibration criteria

Category	Initial screening criterion for cosmetic damage	Detailed criterion for cosmetic damage
A. Important/ heritage buildings that are difficult to repair or are structurally unsound	3 mm/s ppv	DIN4150-3:2016 Table 1 – Line 3
B. Unreinforced or light-framed structures, residential or light commercial type buildings	7.5 mm/s ppv	BS7385-2:1993 Figure 1 – Line 2 (reduced by 50%)
C. Reinforced or framed structures – industrial and heavy commercial building	25 mm/s ppv	BS7385-2:1993 Figure 1 – Line 2 (reduced by 50%)

Figure 8-1 Vibration monitoring procedure – damage to buildings

8.4. Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, infrastructure approval and other relevant approvals, licences, and guidelines. Audit requirements are detailed in Section 3.9.3 of the CEMP.

8.5. Incidents and non-compliances

Environmental incidents relating to noise and vibration incidents may include but not be limited to:

- Exceedances of noise and vibration criteria
- Potential damage to structures, buildings, and heritage items

Monitored noise and vibration levels will be analysed against the predictions made in the relevant noise and vibration assessments as detailed in Section 7.2. Where monitored noise levels are found to be above modelling predictions or vibration goals are exceeded, the actions outlined in Table 31 will be undertaken.

Table 31: Additional mitigations / management response to be implemented in the event of an exceedance

Management response	Timing
Cease the noise and/or vibration generating source identified as potentially **caus**ing **the exceeded predictions**	Immediately upon identifying an exceedance
Confirm the monitored levels are not being impacted by other (non-HLW **related) noise or vibration sources**	
Continue work where impacts can be reduced **or where exceedance is determined to be non-Project related**	
Confirm if the exceedance is due to an uncharacteristically loud piece of equipment	Prior to recommencing works that exceed modelled predictions where exceedance is identified as potentially attributed to HLW works
Identify if the equipment can be swapped out for another piece of equipment or alternative equipment or plant, or if additional mitigation can be included in the site design	
Confirm that the modelling reflects the actual activity being undertaken	
Confirm that the noise and vibration management and mitigation measures (Section **7** of the NVMP and specific mitigation and management measures identified in the relevant **CNVIS or Gatewave assessment report**) have been implemented	
Implement other feasible and reasonable measures which may include reducing plant size, modifying time of works, changing operational settings (such as turning off the vibratory function of the machine), and utilising alternative construction methodology or a combination of these	
Review work practices to ensure compliance with the management levels set out in this NVMP	
Ensure that the learnings from the above are fed back into the noise modelling assessment process for fine-tuning	As soon as reasonably practicable
Communicate lessons learnt to relevant personnel.	

The investigation into the exceedance will determine if the exceedance is related to Project activities or noise and / or vibration from another source. If a noise exceedance is attributed to Project activities, the exceedance will be classified as a non-compliance.

HLWJV will promptly advise Transgrid on any exceedances in accordance with the reporting requirements and responsibilities documented in Section 3.9.4 of the CEMP.

Transgrid will advise the DPHI accordingly for any notifiable incidents or non-compliances.

8.6. Reporting

As detailed in Section 3.9.4 of the CEMP, HLWJV will prepare a Monthly Environmental Report for submission to Transgrid and the ER. An annual monitoring report, including the noise and vibration matters below, will be made available on the project website in accordance with CoA C15.

Details of any noise and vibration monitoring undertaken within the reporting period will be included within the Monthly Environmental Report and would include:

- The date(s) and time at which the monitoring was undertaken
- The locations and description of monitoring undertaken
- Compliance monitoring results with predicted levels, relevant noise management levels or vibration criteria
- Identification of exceedances of the nominated criteria and descriptions of the causes of these exceedances
- Details of any management responses initiated in response to an exceedance
- Summary of any complaints received regarding noise and vibration.

9. Review and improvement

9.1. Continuous improvement

As outlined in Section 3.12.1 of the CEMP, management reviews will be undertaken as part of the continual improvement process. The reviews will be initiated by the Environmental Manager and include relevant HLW team members and stakeholders. Continuous improvement of this plan and of monitoring requirements detailed in Section 8.3 of this Plan will be achieved by the ongoing evaluation of environmental management performance against planning approval requirements, environmental policies, objectives, and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Recognise good behaviour and practice.
- Reward innovation.
- Identify plant and equipment with good noise/vibration performance and prioritise use in sensitive locations.
- Make comparisons with objectives and targets outlined in Section 2.2 and Section 2.3 of this Plan.

9.2. Plan update and amendment

The processes described in Section 3.9 to Section 3.12 of the CEMP may result in the need to update or revise this Plan. Annual management reviews of this NVMP will be undertaken as part of the continual improvement process. Any revisions to this plan will be in accordance with the process outlined in Section 3.12 of the CEMP.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 3.12 of the CEMP.

Annexure A. Out of Hours Works (OOHW) Protocol

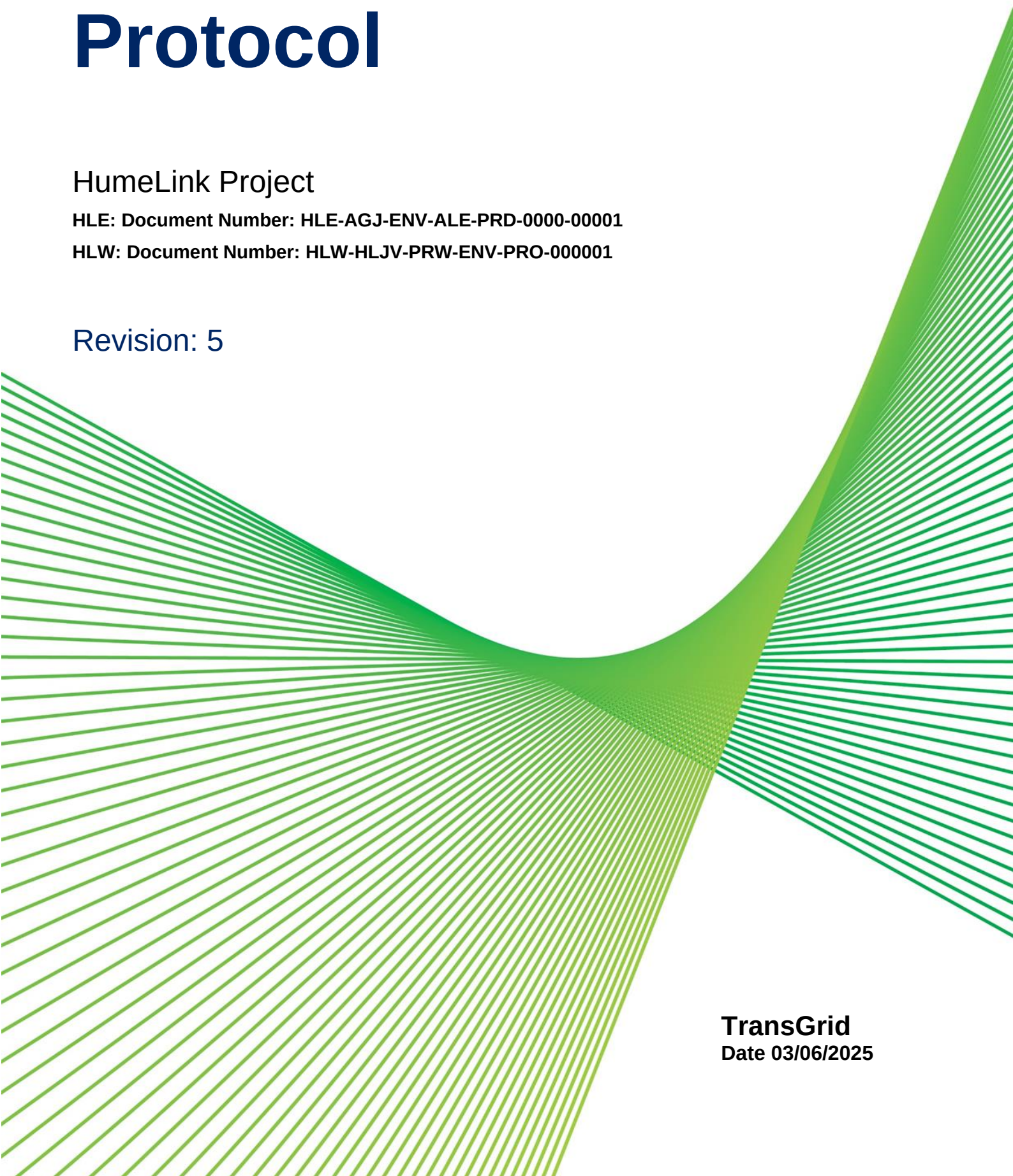
Out Of Hours Works Protocol

HumeLink Project

HLE: Document Number: HLE-AGJ-ENV-ALE-PRD-0000-00001

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Revision: 5



TransGrid

Date 03/06/2025

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1 Introduction

This Out-of-Hours Work Protocol (herein referred to as the Protocol) for the Humelink transmission line project (the Project) has been prepared in accordance with the Minister's Conditions of Approval (MCoA) B16 (i) of the Infrastructure Approval SSI 36656827 (Infrastructure Approval) and Updated Mitigation Measure (UMM) NV2 to define the process for assessment and approval of work undertaken outside of standard construction working hours (out-of-hours work, OOHW).

OOHW have the potential to exceed relevant noise management levels (NMLs) determined in accordance with the approach outlined in the Interim Construction Noise Guidelines (DECC, 2009) (ICNG). As OOHW has the potential to impact on the amenity of adjacent sensitive receivers, the work requires assessment and approval prior to commencement.

This Protocol is applicable only to the works that are proposed outside the hours defined in the in the Infrastructure Approval at MCoA B1 and B11. Works that comply with the hours defined in the Infrastructure Approval are not required to be undertaken in accordance with the processes outlined in this OOHW Protocol.

In accordance with UMM NV2, the operation of the accommodation camp facilities would not be subject to this OOHW Protocol, as these camps will be operational 24 hours a day, 7 days a week.

2 Construction Hours

2.1 Standard construction hours

MCoA B1 of the Infrastructure Approval states that construction (including operation of construction compounds), demolition, upgrading or decommissioning activities (excluding blasting) may only be undertaken between:

a) 7:00am to 6:00pm Mondays to Fridays

b) 8:00am to 1:00pm Saturdays

c) At no time on Sundays or public holidays.

Unless the Planning Secretary agrees otherwise

Additionally, MCoA B4 and B11 of the Infrastructure Approval states that if required, helicopter activities and blasting, respectively, are permitted also as per the ICNG as follows:

a) 9:00am to 5:00pm Mondays to Fridays.

b) 9:00am to 1:00pm Saturdays.

c) At no time on Sundays or public holidays.

Unless, in the case of helicopter activities, different hours are permitted or required under an EPL in force in respect of the CSSI or the Planning Secretary agrees otherwise.

2.2 Variation to standard construction hours

There are times where works outside the above hours are unavoidable and may be undertaken under specific circumstances as described in MCoA B2. This includes:

a) The delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons;

b) Emergency work to avoid the loss of life, property or to prevent material harm to the environment;

c) Works carried out in accordance with the hours and noise limits specified in any negotiated agreements with sensitive receivers (owners and occupiers), provided the negotiated agreements are in writing and finalised before the commencement of works;

d) Activities that do not result in noise affected sensitive receivers, as defined in Interim Construction Noise Guidelines (DECC, 2009);

e) Road upgrades required by the relevant roads authority to be undertaken outside the standard construction hours;

f) Where a rail authority requires a rail possession for the activities to be performed outside of standard construction hours;

g) Activities that require a network outage on another utility, distribution or transmission network, and the operator of the network requires the outage and associated works outside standard construction hours;

h) Where different hours are permitted or required under an EPL in force in respect of the CSSI; or

i) Works carried out in accordance with an Out-of-Hours Work Protocol in accordance with condition (MCoA) B16.

Any works proposed to occur outside of the hours detailed within Section 2.1, which do not fall into categories (a) – (h) above, must be undertaken in accordance with this Protocol.

Any activities outside of the standard construction hours defined in MCoA B1 are not permitted at the Memorial Avenue construction compound in Batlow.

3 Purpose and Scope

OOHW has the potential to exceed noise management levels (NMLs) determined in accordance with the approach outlined in the ICNG and requires assessment and approval prior to commencement. This Protocol provides the process by which this assessment and approval must be undertaken for OOHW subject to this Protocol as permitted under the Infrastructure Approval and UMM NV2.

Relevant commitments for this OOHW Protocol are provided in Table 3-1. A cross-reference is included to indicate where each commitment is addressed in this OOHW Protocol or other project management document.

Table 3-1: MCoAs and UMMs relevant to this Protocol.

Commitment	Requirement	Where addressed
MCoA B16	Prior to the commencement of construction (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64), the Proponent must prepare a Noise and Vibration Management Plan to the satisfaction of the Planning Secretary. This plan must: i). include an Out-of-Hours Work Protocol to identify a process for the consideration, management and approval of works outside the hours defined in conditions B1 and B11, which must: (i) be prepared in consultation with the relevant Council; (ii) identify low risk activities that can be undertaken without the approval of the Planning Secretary and with the approval of the ER; (iii) identify high risk activities that must be approved by the Planning Secretary; and (iv) identify Department, Council and community notification arrangements for approved out of hours work.	This document Community Communication Strategy

Commitment	Requirement	Where addressed
UMM NV2	An out-of-hours work protocol that details how the project will identify, assess and approve out of hours work outside standard construction hours that are likely to generate noise levels that exceed the relevant noise management levels at sensitive receivers will be developed and implemented. The protocol will include provisions to: • carry out additional assessments for work proposed outside standard construction hours, to confirm noise levels at potentially affected sensitive receivers and determine suitable mitigation measures to minimise noise levels • notify and engage with potentially noise affected receivers about upcoming work outside standard construction hours and address any associated complaints. • identify appropriate respite for noise affected receivers (where required). The out-of-hours work protocol will not apply to the operation of the worker accommodation facilities.	This document

4 OOHW Justification

4.1 OOHW subject to this protocol

Work associated with the Project will be undertaken in accordance with the assessment and management approach outlined in the ICNG.

The approved construction hours for the Project are outlined in Section 2.1. Where work is proposed outside of these hours, it must be appropriately justified with consideration to the ICNG and in accordance with Table 3-1. Any activities outside of the standard construction hours defined in MCoA B1 are not permitted at the Memorial Avenue construction compound in Batlow.

The Section 2.3 of the ICNG outlines categories of work that might be undertaken out of hours. Generally, the following are considered to justify OOHW:

- To sustain the operational integrity of the wider associated transmission network.
- Where disruption to essential services and/or considerations of worker safety do not allow work within standard hours.
- Where out of hours works shorten the length of construction and are supported by the affected community as outlined in written and agreed negotiated agreements.
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.
- Where works are required to be completed continuously (over a longer period than the ICNG standard construction day).

4.2 OOHW not subject to this protocol

Certain works for the Project would not need to follow the OOHW process outlined in this protocol. These are defined in (a) to (h) in Section 2.2.

Where construction activities can occur outside of the standard construction hours in accordance with Section 2.1, or where construction activities are justified outside standard construction hours,

associated activities at the relevant construction compounds to support the activities are also justified.

5 OOHW Process

For any proposed OOHW subject to this Protocol, the following process will be implemented:

1) When it is identified that OOHW are required, an OOHW application (OOHW Permit) will be prepared by the team requesting the works, detailing:
    - A summary of the proposed activity (including plant and equipment required).
    - Duration of the proposed activity within and across OOHW periods (including start and finish times).
    - Location of the proposed activity (including a diagram or figure).
    - Justification for the need to carry out the specific work as OOHW, in accordance with Section 4.1.
    - The OOHW Permit will be submitted to the Environment Team who will undertake a noise assessment. This may include use of the construction noise and vibration management tool developed for the Project. This assessment will utilise the information provided in step 1 to:
        - Identify any potentially affected sensitive receivers.
        - Produce noise and vibration predictions based upon required plant and equipment (as described in Section 6.1).
    - Determine risk level based upon noise and vibration predictions (risk levels are defined in Section 7).
    - Provide a description of mitigation measures to be implemented based upon risk level and predicted impacts (as described in Section 6.4).
2) The OOHW Permit will be submitted to the appropriate party for review and approval (refer to Section 7).
3) Approval of the OOHW Permit will follow the process outlined in Section 6 of this Protocol.
4) If approved, Community consultation and notification will be undertaken in accordance with the Community and Stakeholder and Engagement Community Communication Strategy and Section 1 of this Protocol.
5) Following approval, the activity will be undertaken in accordance with the OOHW Permit.

OOHW permits may be issued for extended periods of time where the risk of amenity impacts due to noise and vibration are negligible.

OOHW permits may also be issued on an area basis (rather than an activity basis) so that project areas can be identified where project activities can occur with approved mitigation and management measures. The approval process for OOHW is identified in Section 6.



Figure 3-1: Approval process for OOHW subject to this Protocol

6 OOHW Assessment

6.1 Noise assessment

The following section outlines the assessment criteria to determine the risk level of the proposed OOHW. The risk category considers both the predicted noise impact relative to the appropriate noise management level, OOHW period, and the duration of works.

OOHW categorisation periods are as follows:

OOHW Period 1: (Evening & Extended Day)

- Monday to Friday: 6pm to 10pm (i.e., 'Evening')
- Saturday: 7am to 8am and 1pm to 10pm (i.e., 'Evening' & 'Extended Day")
- Sunday and Public Holidays: 8am to 6pm (i.e., 'Extended Day').

OOHW Period 2: (Night)

- Monday to Friday: after 10pm and prior to 7am
- Saturday: after 10pm and prior to 7am
- Sunday and Public Holidays: after 6pm and prior to 8am.

A construction noise assessment will be undertaken to consider proposed works outside of the hours defined in Section 2.1. Assessments would be undertaken through a construction noise tool, or otherwise by a construction noise specialist.

The construction noise tool will enable the prediction and assessment of potential noise impacts resulting from proposed OOHW in specific work areas. The construction noise tool will predict noise and vibration impacts on sensitive receivers, based on the specific work areas and types of plant and equipment operating in the work area. The tool will identify potentially noise affected sensitive receivers, as well as the magnitude of any predicted exceedance of relevant noise management levels.

The results of the noise assessment(s) will be used to determine the requirements for management actions in accordance with this Protocol.

6.2 Noise and Vibration criteria

Guidelines for establishing project-specific noise and vibration criteria to guide the application of mitigation measures include the following.

- Airborne and ground-borne noise - the Interim Construction Noise Guideline (DECC, 2009)[1].
- Vibration (human comfort) - Assessing vibration: a technical guideline (DEC, 2006).
- Building damage - BS 7385 Part 2-1993 'Evaluation and measurement for vibration in buildings Part 2' as they are 'applicable to Australian conditions'.
- Heritage items - German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage) (applicable when a heritage-listed structure is identified in poor condition).

- [1] Note: The Interim Construction Noise Guideline identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction Noise Management Level (NML)

Project-specific NMLs have been calculated for each Noise Catchment Area (NCA) within the Project area and are summarised in Table 15-3 of the EIS. Recommended minimum working distances from vibration intensive equipment that have been adopted for the project are summarised in Table 15-6 of the EIS.

Where works are planned to extend over more than two consecutive nights, the potential for works to disturb sleep should be considered. Factors that may be important in assessing the extent of impact on sleep include how often high noise events occur at night, the predicted maximum noise levels, whether there are times when there is a clear change in the noise environment (such as during early morning shoulder periods), and the degree of maximum noise levels above the background noise level.

A night-time sleep disturbance 'screening criterion' noise goal of RBL + 15dB or 52dBA (whichever is higher) is used to identify the receivers where there is potential for sleep disturbance (Noise Policy for Industry (NSW EPA, 2017)).

Where the sleep disturbance screening criterion is exceeded, further assessment is conducted to determine whether the 'awakening reaction' level of LAmax 55dBA internal (i.e. 65dBA external assuming an open window or 75dBA external assuming a closed window) would be exceeded and the likely number of these events. The awakening reaction level is the level above which sleep disturbance is considered likely (NSW Environmental Criteria for Road Traffic Noise (NSW EPA, 1999)).

6.3 Reporting

A report for each noise assessment will be generated and attached to the OOHW permit application and will include:

- Details of the nature and scope of each activity, including times, location(s) of works, duration.
- Plant and equipment to be used with estimated equipment sound power levels (including 5 dB penalty where applicable for annoying characteristics).
- Justification of the need to work outside standard hours.
- Relevant noise management levels and vibration criteria.
- An evaluation of predicted noise levels with a summary of the number of exceedances and predicted maximum noise levels.
- Assessment of vibration (whether works are likely to be within safe working distances for selected plant).
- Recommended standard and additional mitigation measures.

Any additional mitigation measures will be recommended based on identified reasonable and feasible measures and the predicted levels of exceedance at each identified sensitive receiver as outlined in Table 6-1 and Table 6-2. Where the Environment Manager and/or the Communications and Stakeholder Manager have amended the approach to specific additional mitigation measures due to an affected receiver(s) individual circumstances (see Section 6.4), this will be documented within the OOHW Permit.

6.4 Mitigation

All reasonable and feasible measures for noise mitigation and management described in the CNVMP will be implemented regardless of predicted noise levels. These actions will include:

- Managing behaviour such as avoiding shouting and swearing, turning off idling equipment when not in use and avoiding impulsive noise (metal on metal contact).
- Selecting quieter equipment such as smaller, lower powered, newer, or better maintained.

- Examining alternative technologies and methods to complete activities more quietly.
- Programming to avoid noisy activities after during the sleep disturbance period (10pm to 7am) as far as practicable such as hammering, sawing and rattle guns.
- Using screens and enclosures to reduce noise emissions from equipment.
- Ensuring adequate consultation and notification (as described in Section 8).
- Implementing noise and vibration monitoring as described in Section 9.

In addition, the most appropriate reasonable and feasible management measures will be determined based on the predicted noise and vibration levels and in accordance with the ICNG. This will include implementation of additional mitigation measures defined below, as required. These are guided by the Construction Noise and Vibration Guideline (CNVG) in accordance with UMM NV4 where feasible and reasonable and would be implemented for impacts as detailed in Table 6-1 and Table 6-2.

Notification: The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification will be provided to potentially affected receivers seven business days prior to the start of works. Given that the affected sensitive receivers are also likely to be affected landholders for the project, phone call and email will be favoured for these notifications.

Respite: Where out-of-hours construction noise is proposed to occur during OOHW period 1 (evening) or OOHW period 2 (night) the following will apply:

- For OOHW period 1 (evening) where work occurs for three or more consecutive evenings, respite will occur; or
- For OOHW period 2 (night) where work occurs for two or more consecutive nights, respite will occur.

Duration Respite: Respite periods may be counterproductive in reducing the impact on the community for longer duration projects. In these instances, where it can be agreed by affected residents, it may be beneficial to increase the work duration, number of evenings or nights worked through duration respite so that the project can be completed more quickly. The project will engage with affected receivers to determine support for duration respite. Where possible, negotiated agreements are the preferred project approach in lieu of duration respite.

Verification: Verification of construction noise and vibration levels will occur to ensure the actual impacts are consistent with the predicted levels.

Alternative Accommodation: Alternate accommodation options (i.e. accommodation in motels away from the worksite) may be provided to residents living in close proximity to works that are likely to incur noise levels substantially above the applicable level across two or more consecutive sleep periods.

Table 6-1: Additional mitigation measures- noise

Predicted airborne LAeq(15min) noise level at receiver		**OOHW Period 1: Additional mitigation measures**	**OOHW Period 2: Additional mitigation measures**
Perception	**dB(A) above NML**		
Noticeable	<5	N/A	N
Clearly audible	5-15	N	N
Moderately intrusive	15-25	N, V, R3	N, V, R2, DR
Highly intrusive	>25	N, V, R3, DR	N, V, R2, DR, AA

Notes: N = Notification, RO = Short term respite offer, R4 = Respite offered when impacts occur over four or more consecutive nights, R3 = Respite offered when impacts occur over three or more consecutive nights, DR = Duration respite, V = Verification, AA = Alternative accommodation.

Table 6-2: Additional mitigation measures- vibration

Predicted ground-borne vibration level at receiver	**OOHW Period 1: Additional mitigation measures**	**OOHW Period 2: Additional mitigation measures**
Predicted Vibration Exceeds Human Comfort Screening Levels	N, V, R3	AA, V, N, R2
Predicted Vibration Exceeds Structural Damage Screening Levels	V, Alternative Construction Methodology	V, Alternative Construction Methodology

Note: If structural damage screening levels are predicted to be exceeded and alternative construction methodology will be investigated by the Project team. AA = Alternative accommodation

It should also be noted that sensitive receivers may have individual circumstances, meaning that the standard approach to specific additional mitigation measures may not be suitable. The Environment Manager and the Communications and Stakeholder Manager have the authority to amend the approach for specific sensitive receivers by considering the individual circumstances that may apply.

7 Approval process

The OOHW Approval process is outlined in Section 5 and identifies the following risk categories for the Project:

- Negligible Risk
- Low Risk
- High Risk.

The relevant approval authority for each risk category is outlined in Table 7-1. The risk categories are defined in Table 7-2.

Once the risk level has been determined, based on the noise assessment and duration of the proposed works, the OOHW permit and supporting assessment will be provided to the relevant authority for approval.

Table 7-1: OOHW approval authority

Risk level	**Approval authority**
Negligible	Environmental Manager
Low	Environmental Representative
High	Planning Secretary

Following approval, the OOHW Permit will be provided to the construction team by the Environment Manager.

Table 7-2: OOHW Approval pathways

Risk level	Approval authority	Item no.	OOHW period	Activities or circumstances
The below activities <u>are not subject</u> to the OOHW Protocol process:				
Permitted	Not applicable	1	Any	The below activities are not subject to this OOHW Protocol: • The delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons • Emergency work to avoid the loss of life, property or prevent material harm to the environment • Works carried out in accordance with the hours and noise limits specified in any negotiated agreements with sensitive receivers (owners and occupiers), provided the negotiated agreements are in writing and finalised before the commencement of works • Activities that do not result in noise affected sensitive receivers, as defined in Interim Construction Noise Guidelines (DECC, 2009) (or its latest version) • Road upgrades required by the relevant road authority to be undertaken outside the standard construction hours • Where a rail authority requires a rail possession for the activities to be performed outside of standard construction hours • Activities that require a network outage on another utility, distribution or transmission network, and the operator of the network requires the outage and associated works outside standard construction hours • Where different hours are permitted or required under an EPL in force in respect of the CSSI. These works may proceed without any further approvals detailed within the OOHW Protocol.
Activities <u>subject</u> to the OOHW Protocol process as follows:				
Negligible	Environmental Manager	2a	Extended (day) working hours	Activities which result in noise levels which are <u>higher than NML (audible) but no more than 10dBA above NML</u>
		2b	Evening and night works	Activities which result in noise levels <u>equal to or less than 5 dBA above NML</u>

Risk level	Approval authority	Item no.	OOHW period	Activities or circumstances
Low	Environmental Representative	3a	Any OOHW period (including extended day)	Any activity which is not negligible in risk, and is one of the following activities: • Works required to occur on or adjacent to a road and the relevant road authority requires the works to be undertaken outside the standard construction hours (i.e., Road Occupancy Licence restrictions). This does not include road upgrade works as Condition B2 permits road upgrades to occur outside of the hours detailed within Condition B1 • Activities (e.g., concrete pours) that must occur continuously for quality reasons • Where the out of hours works are agreed to by a majority of receivers impacted by more than 10 dBA above NML, but not all receivers (refer to Section 8.3) • Where transmission line connections to the substations are required to occur during a power outage • Works that would not exceed the human comfort vibration criteria • Any other activity which is not negligible in risk, and the Environmental Representative determines can be assessed as low risk.
		3b	Evening and night periods	Any activity which is not negligible in risk and is not an activity within row 3a, the following noise levels must be met for the activity to be determined low risk: • Works which are between 5dBA above the NML to 10 dBA above the NML, are carried out for no more than two (2) consecutive evening or nights per week and a maximum of three (3) total evening or nights per week, and have appropriate justification.

Risk level	Approval authority	Item no.	OOHW period	Activities or circumstances
High	Planning Secretary	4	Any OOHW period	Any activity which is not considered to be permitted (Item. No 1), is not considered to be negligible risk, is not considered to be low risk and meets any of the following is determined to be high risk: • Works that are more than 10 dBA above the NML for more than two consecutive evenings or nights per week, and more than three evenings or nights per week • The following activities if proposed to occur during extended (day) working hours, evenings or night periods – Rock drilling – Jackhammering, rock hammering or rock breaking – Impact piling • Activities where the Environmental Representative is of the opinion that the proposed work is high risk.

8 Consultation and Notification

8.1 Consultation

The Community Engagement & Stakeholder Team will use a range of communication tools to provide clear, effective and timely information to the predicted affected sensitive receivers and stakeholders. The method of communication will be chosen based on the nature of works and the potential impacts. All community and stakeholder consultation would be carried out in accordance with the Project Community Stakeholder Engagement Management Plan and as required by this Protocol.

Where exceedances of noise management levels are predicted for OOHW, consultation will be undertaken with affected receivers to understand their preferences for mitigation and management measures (in accordance with UMM NV4) and any individual circumstances that may be relevant. The results of this consultation may be applied in similar subsequent OOHW activities.

8.2 Notification requirements

Notifications of OOHW events will be issued to potentially affected sensitive receivers at least five days prior to the OOHW commencing. Notification would be provided to relevant councils seven business days prior to any OOHW.

8.3 Community Agreement

Variation to working hours may occur following negotiated agreements with affected landholders and sensitive receivers as identified in the EIS. If such negotiated agreements can be made the overall duration of construction works may be reduced. Where proposed OOHW are identified that may provide benefit to the community with an accelerated program, the contractor may engage with and seek agreement from the noise affected community to conduct the works through this accelerated program.

Where agreement can be obtained by a substantial majority (>75%) of receivers affected by noise levels greater than 10 dBA above the NML is obtained, the implementation of this OOHW Protocol is not required. Where agreement can be obtained by a lesser majority (50-75%) of affected receivers (affected by greater than 10 dBA above NML), this Protocol would be implemented, and approval sought in accordance with Section 7.

8.4 Complaints management

Section 6.2 of the HumeLink Environmental Management Strategy (EMS) summarises the Project complaints management process, which will be implemented for any OOHW carried out under this protocol. In addition to the complaints management process outlined in the EMS, should a complaint be received that relates to noise associated with out of hours work, the complaint will be reviewed by the Environment Manager (or delegate) to ensure that appropriate mitigation measures were implemented as per the approved out of hours work permit.

OOHW complaints will be included in the Project's complaints register which will be made available on the Project website and updated monthly.

9 Monitoring

Noise monitoring will be conducted at the commencement of a new OOHW activity where exceedance of an NML is predicted to occur at the nearest sensitive receiver. Noise monitoring of OOHW may also be required where identified on the OOHW Permit or in response to a complaint.

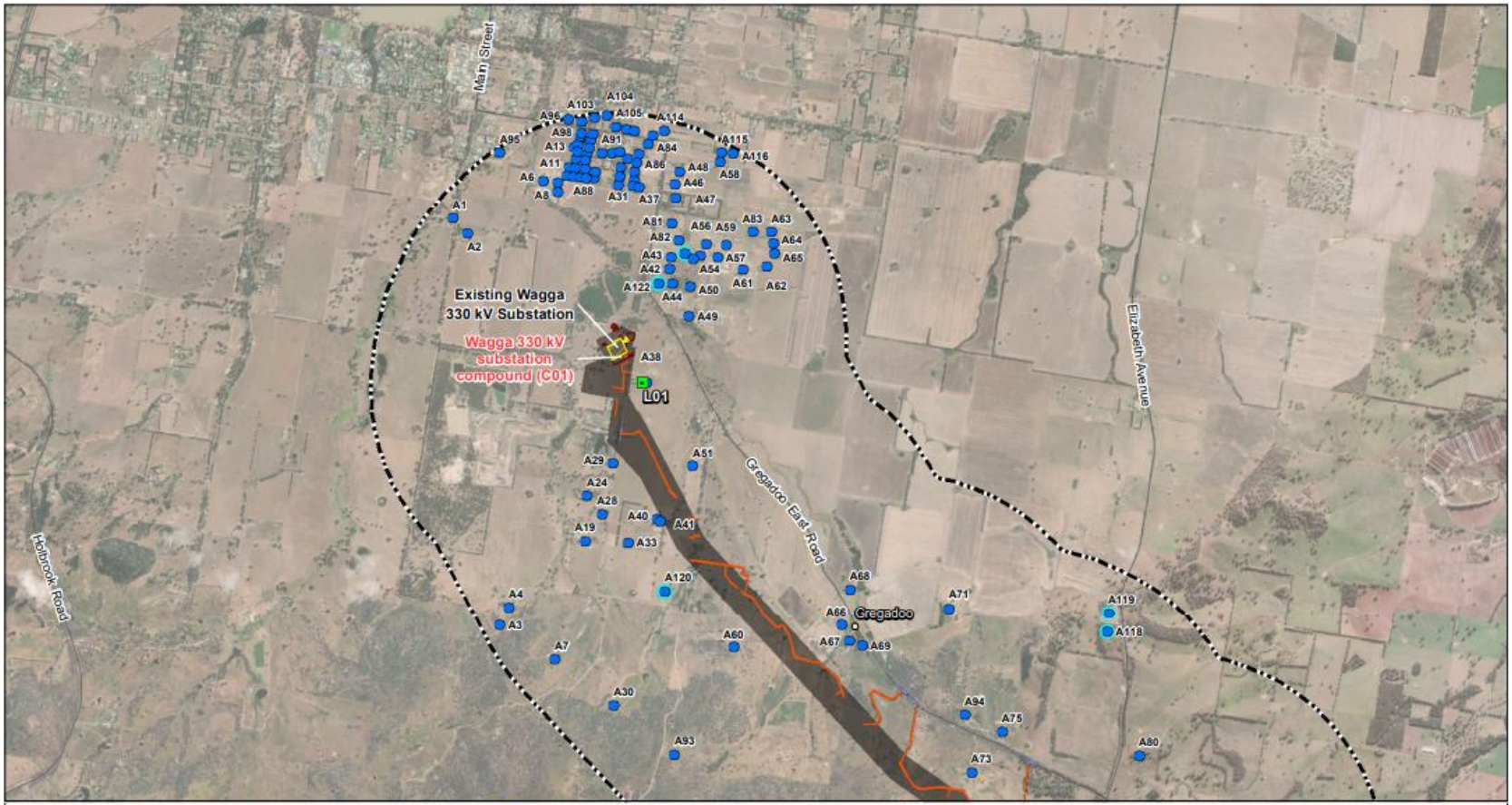
Where monitored noise levels are found to be above predictions, the following actions will be undertaken:

- Confirm monitored levels are not being impacted by other noise or vibration sources.
- Confirm all mitigation measures required by the OOHW Permit are being implemented.
- Confirm that the modelling reflects the actual activity being undertaken.
- Review whether any additional feasible and reasonable mitigation measures can be applied and implement these where appropriate.
- Determine if alternative equipment, plant, construction methodologies or mitigation measures can be adopted for the activity.
- Continue work where impacts can be reduced or if the exceedance is deemed minor i.e. does not trigger additional community mitigation measures to be implemented.
- Refine the noise modelling assessment process based on the learnings. For example, if noise or vibration predictions are lower/higher than expected, noise modelling would take this into consideration to more accurately predict impacts for future works.
- Communicate lessons learnt to relevant personnel.
- Should the permit be deemed insufficient by the investigation, a new permit may be required to be produced and approved, and additional mitigation measures may need to be applied.

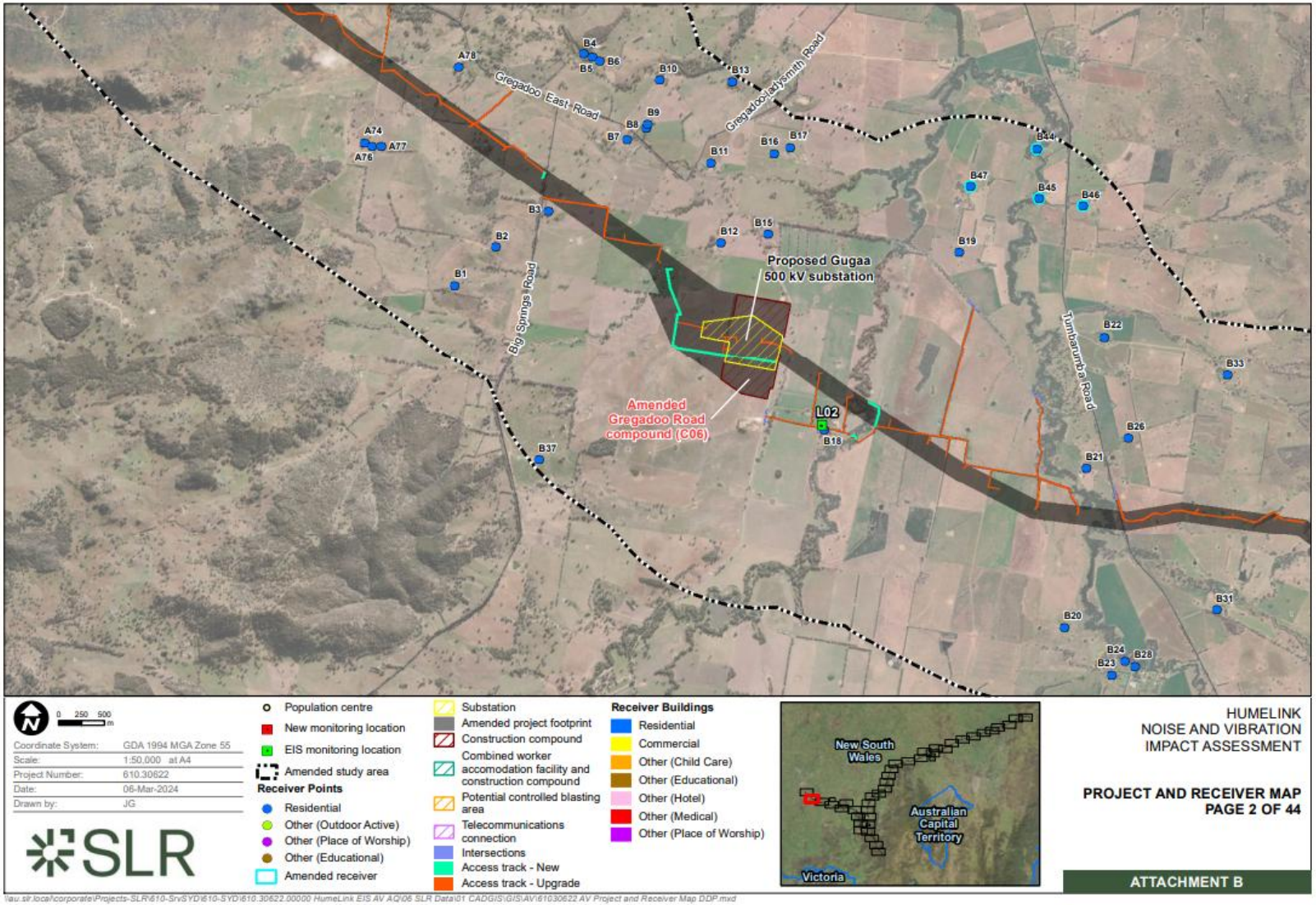
The Project will review monitoring data and lessons learnt to help inform future OOHW activities and mitigation measures and minimise impacts. The outcome of the investigation would be shared with the ER.

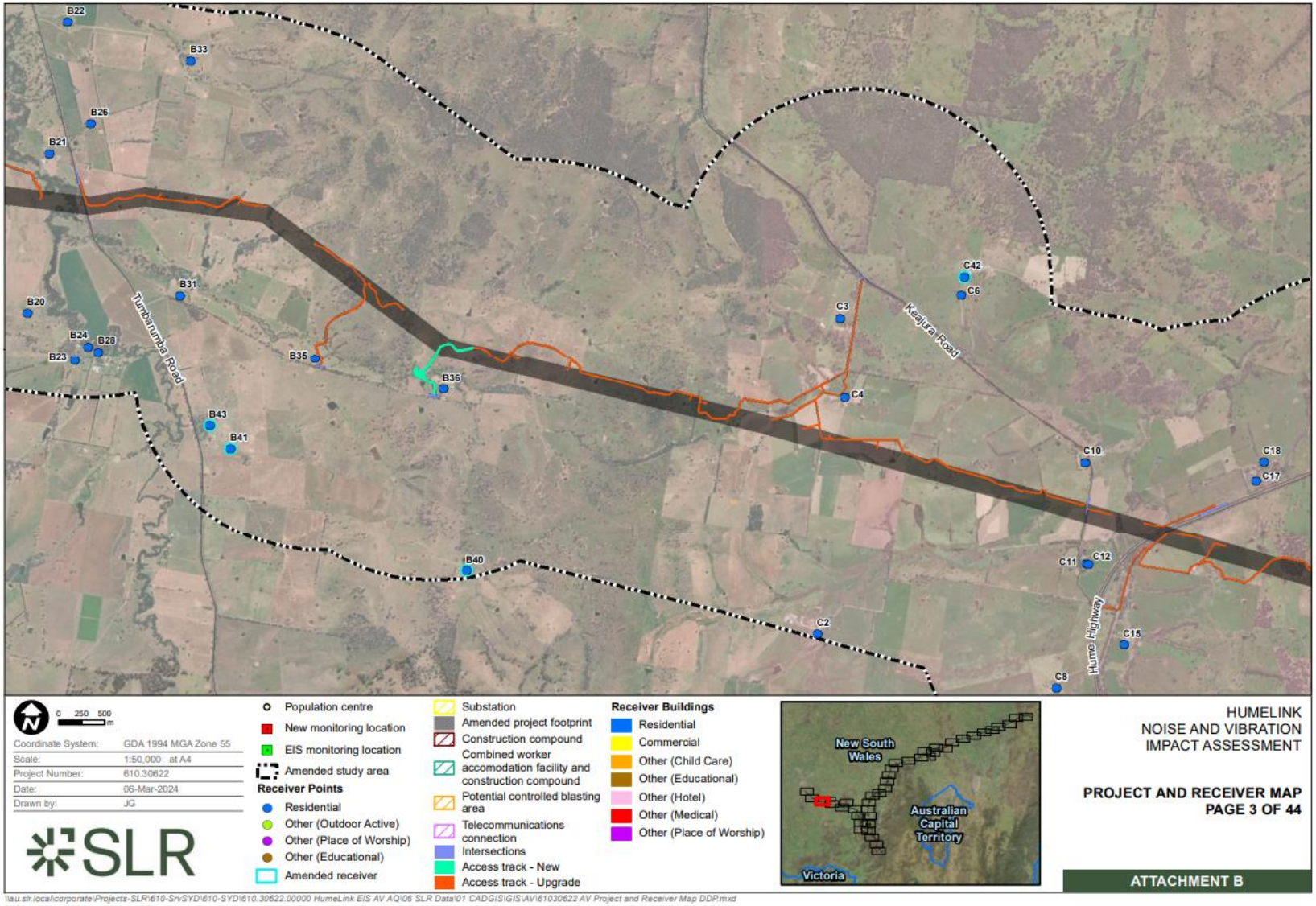
Annexure B. Management Plan Consultation (separate report not included here)

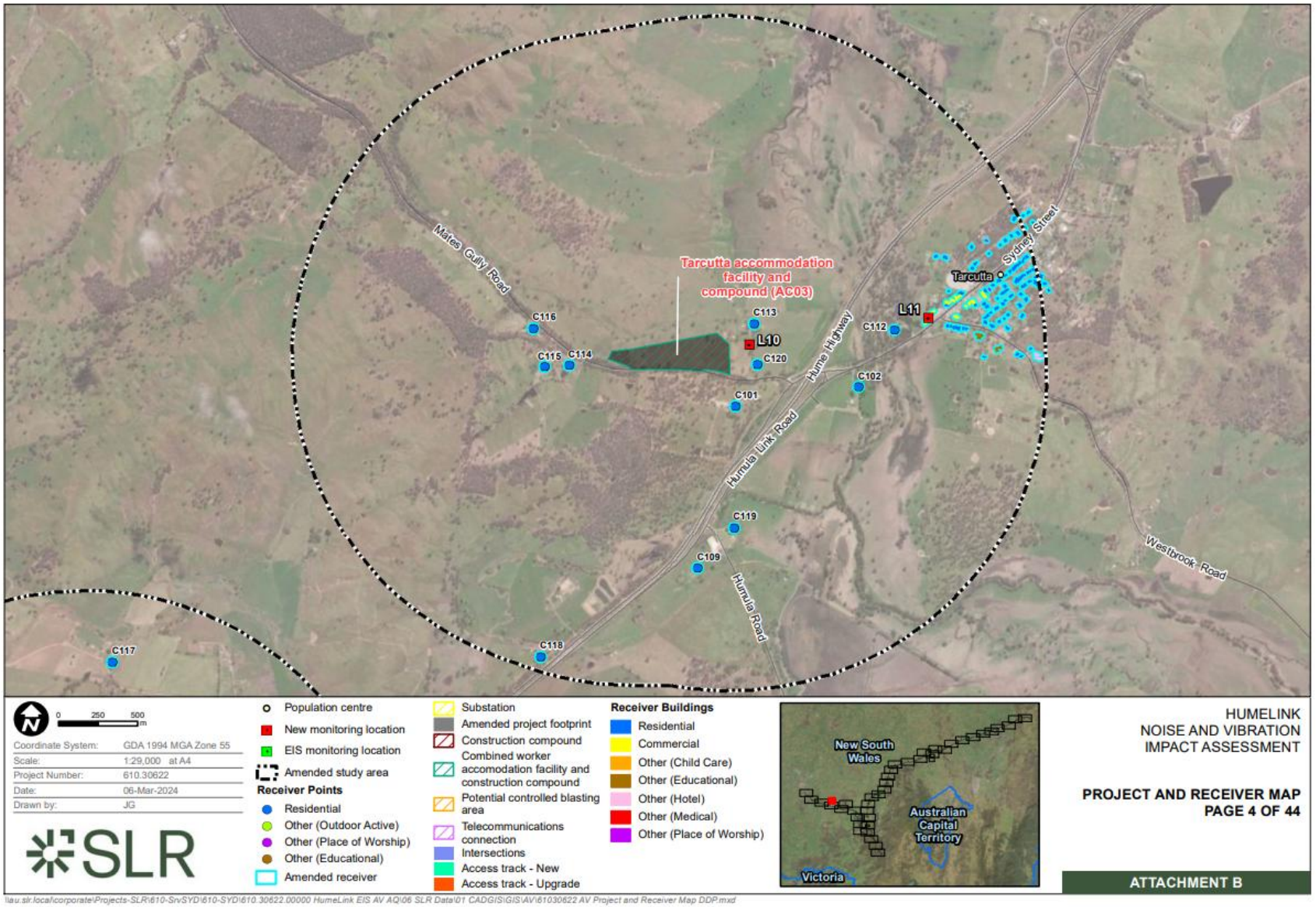
Annexure C. Sensitive Receiver Maps

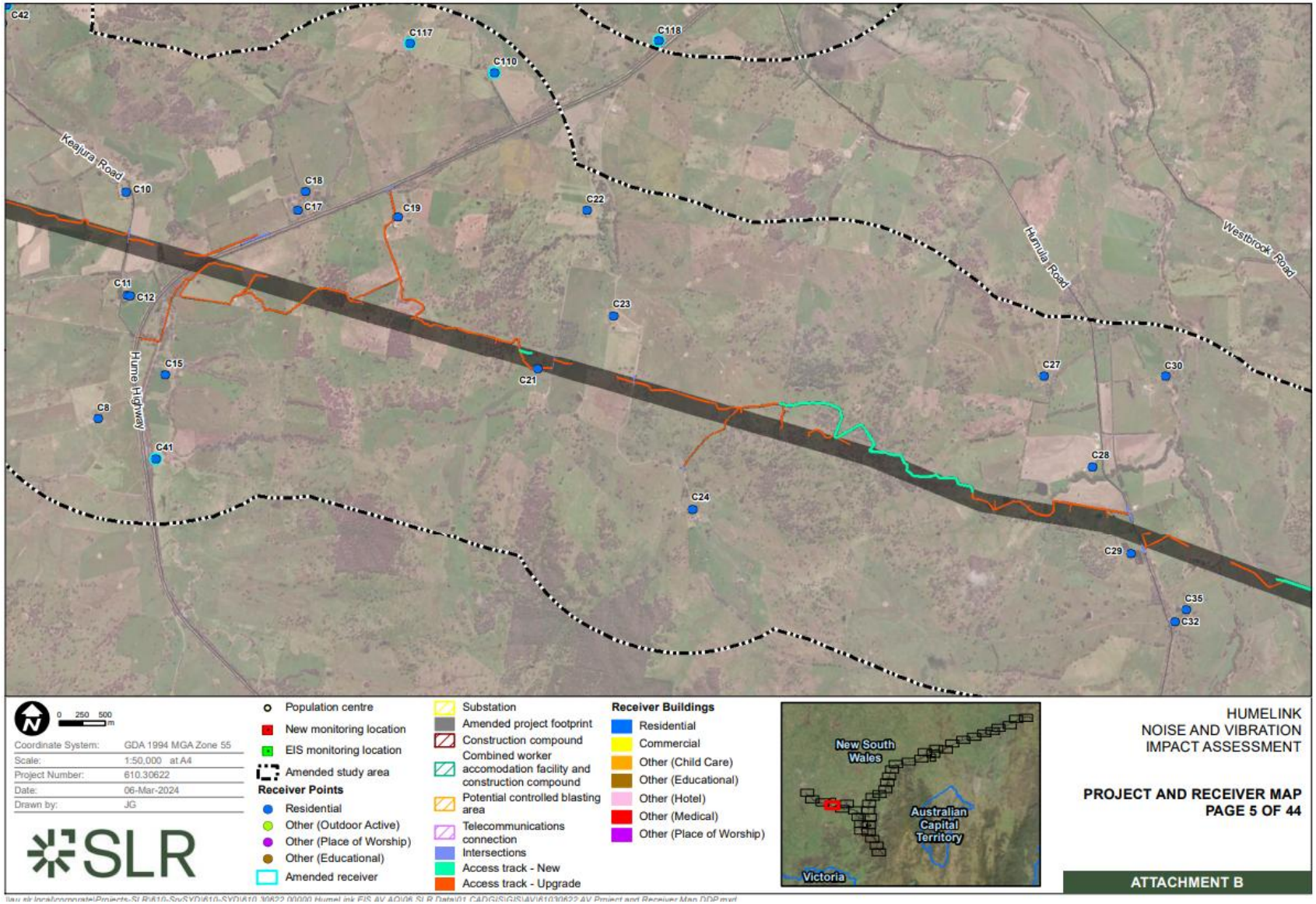


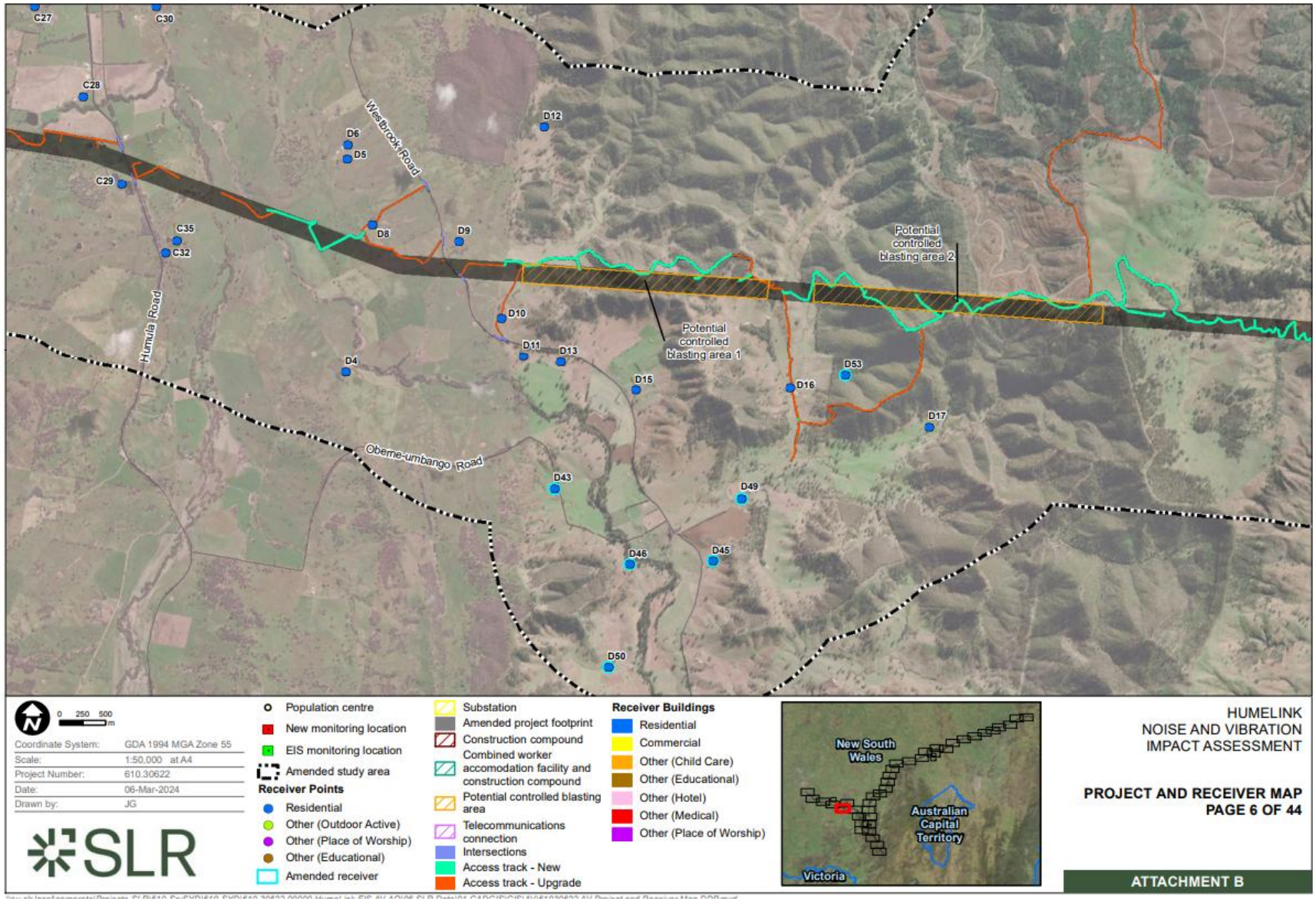
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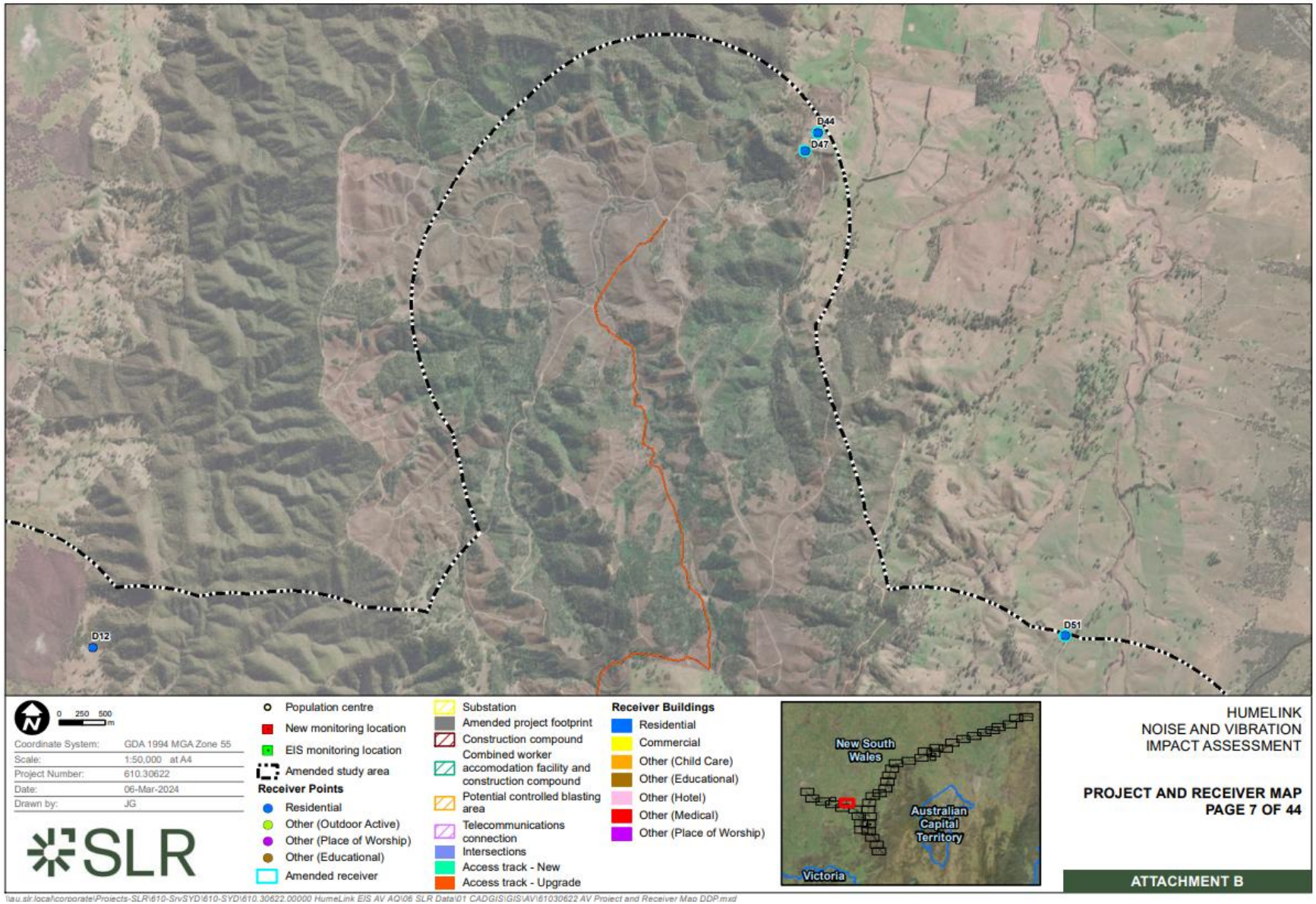

Gregadoo East Road
Gregadoo-Ladysmith Road
Big Springs Road
Tumbarumba Road
Proposed Gugaa 500 kV substation
Amended Gregadoo Road compound (C06)
L02
A78
A74
A76
A77
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
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B47
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
Receiver Buildings
Residential
Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
New South Wales
Australian Capital Territory
Victoria
HUMELINK
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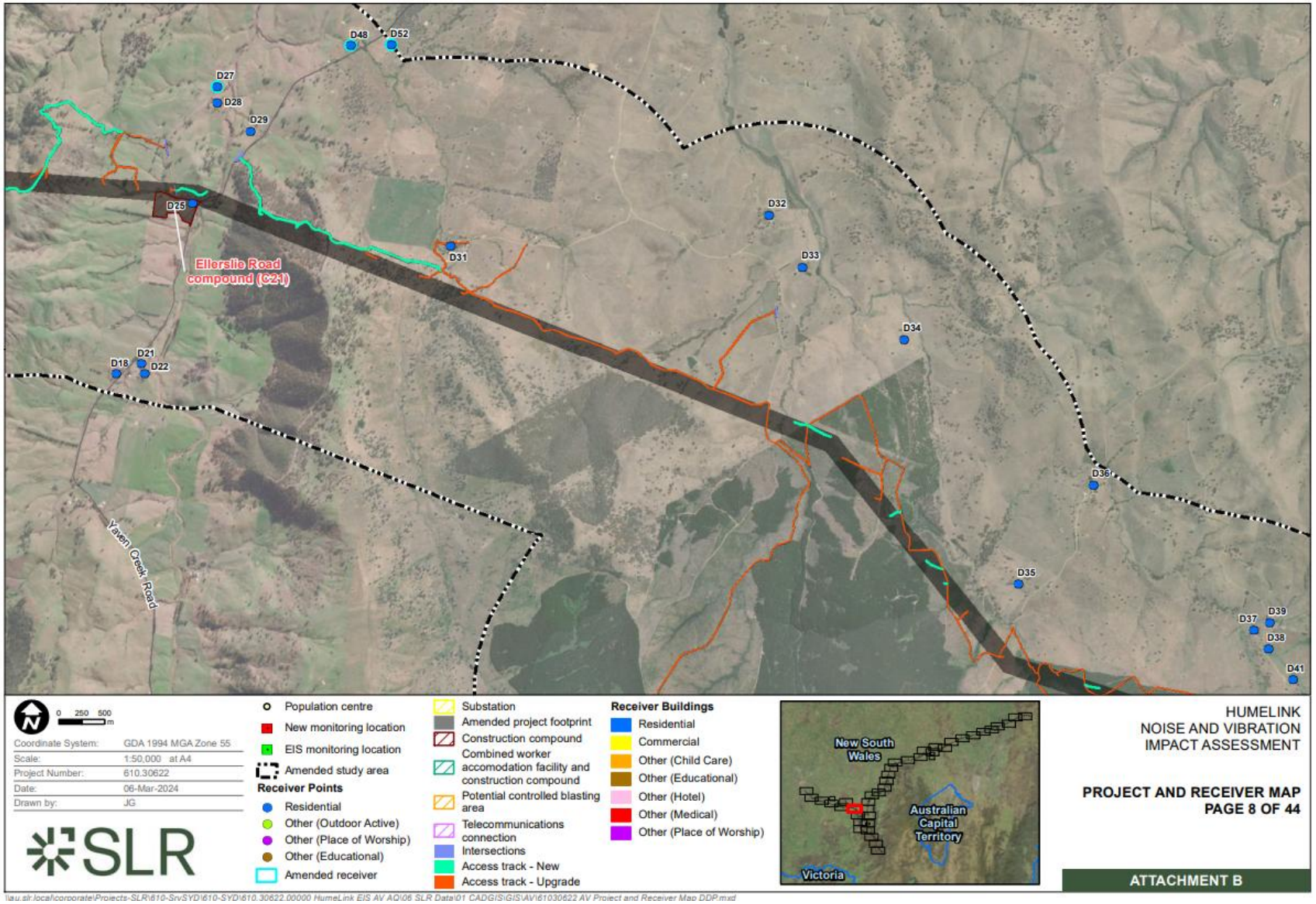

B22
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B31
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B40
C42
C6
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C2
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C8
Tumbarumba Road
Keajura Road
Hume Highway
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Scale: 1:50,000 at A4
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Amended project footprint
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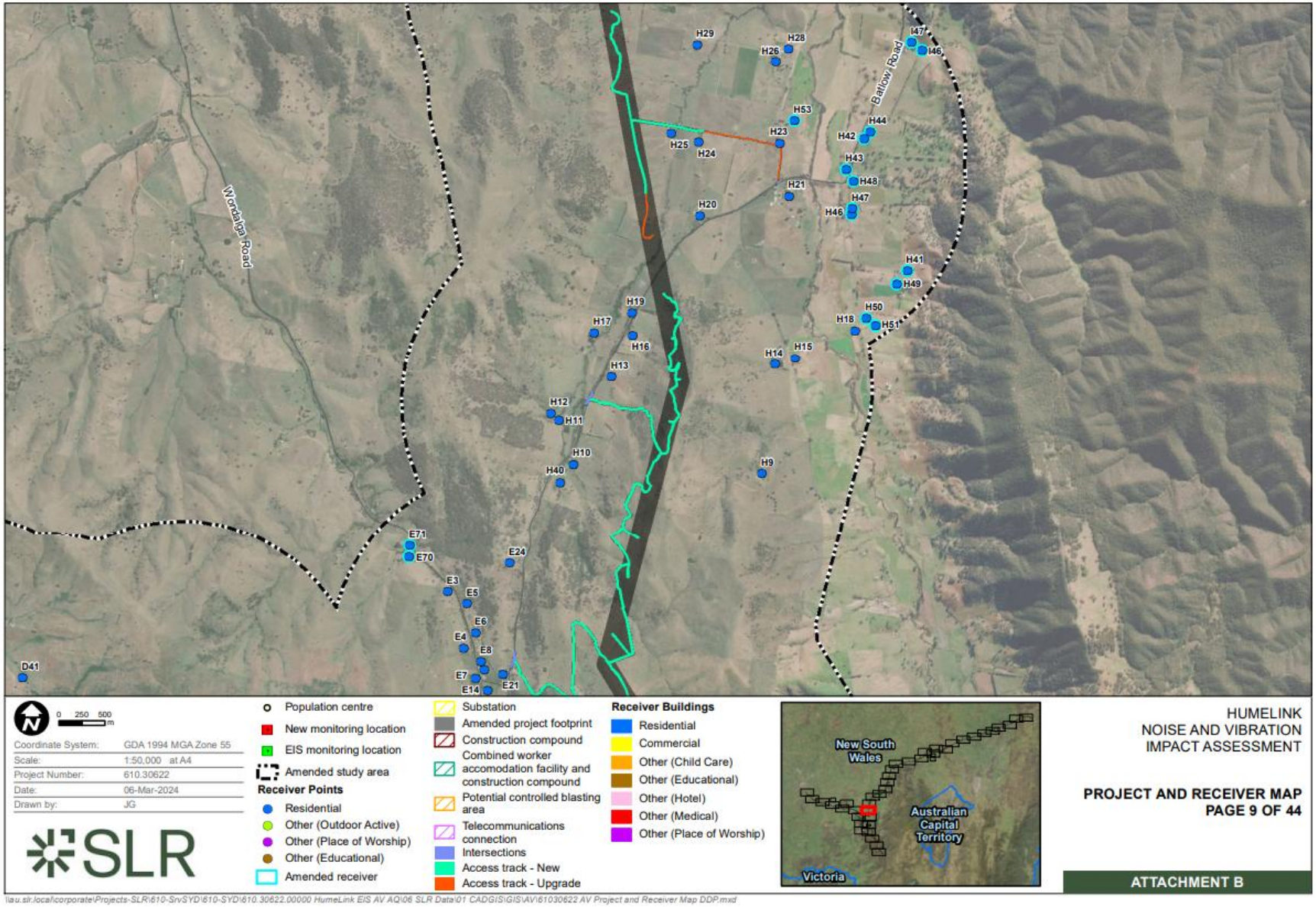

Mates Gully Road
Tarcutta accommodation facility and compound (AC03)
Sydney Street
Tarcutta
L11
L10
C116
C113
C112
C115
C114
C120
Hume Highway
C102
C101
Humula Link Road
C119
C109
Humula Road
Westbrook Road
C117
C118
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Coordinate System: GDA 1994 MGA Zone 55
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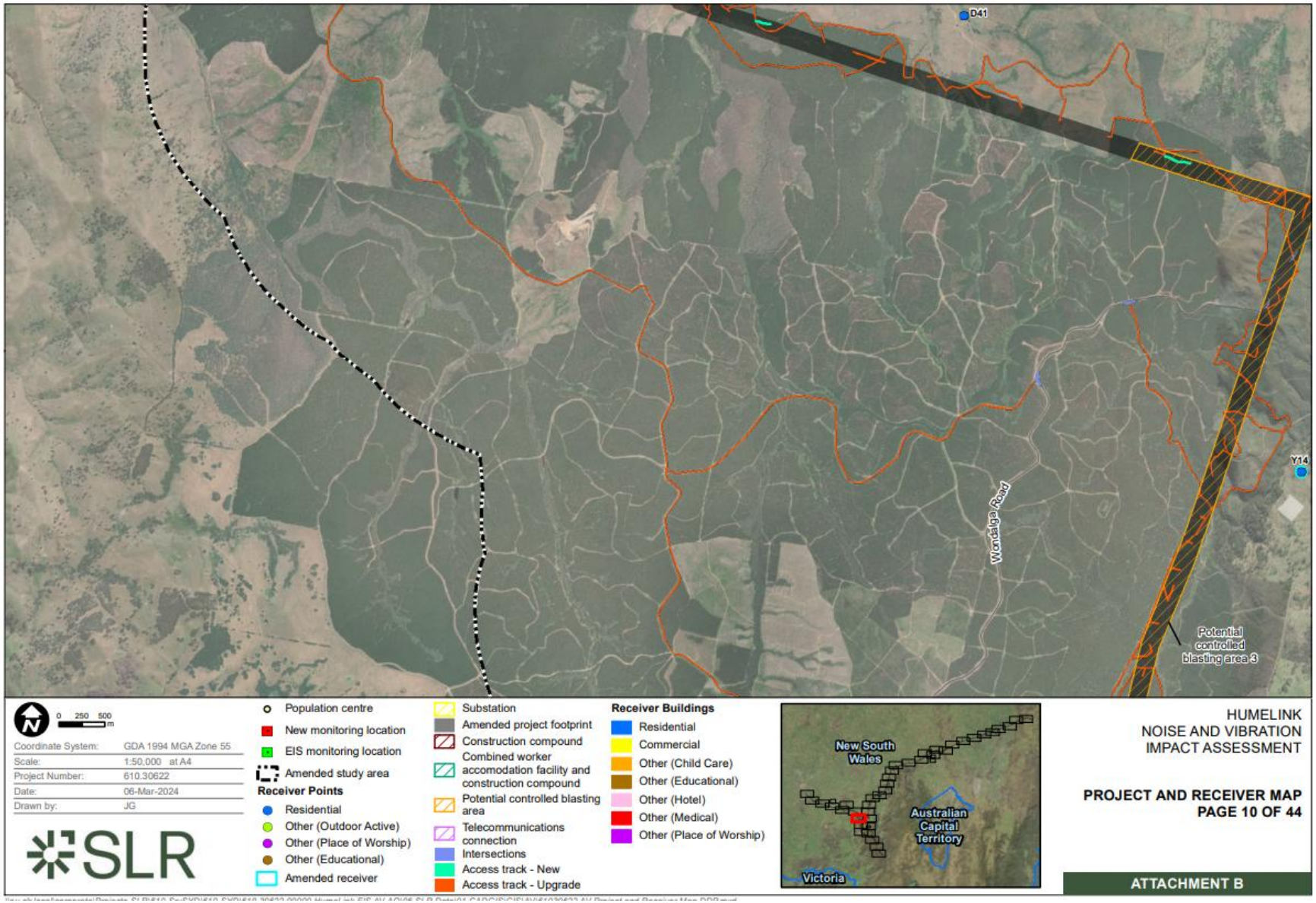

C42
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Humula Road
Westbrook Road
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Hume Highway
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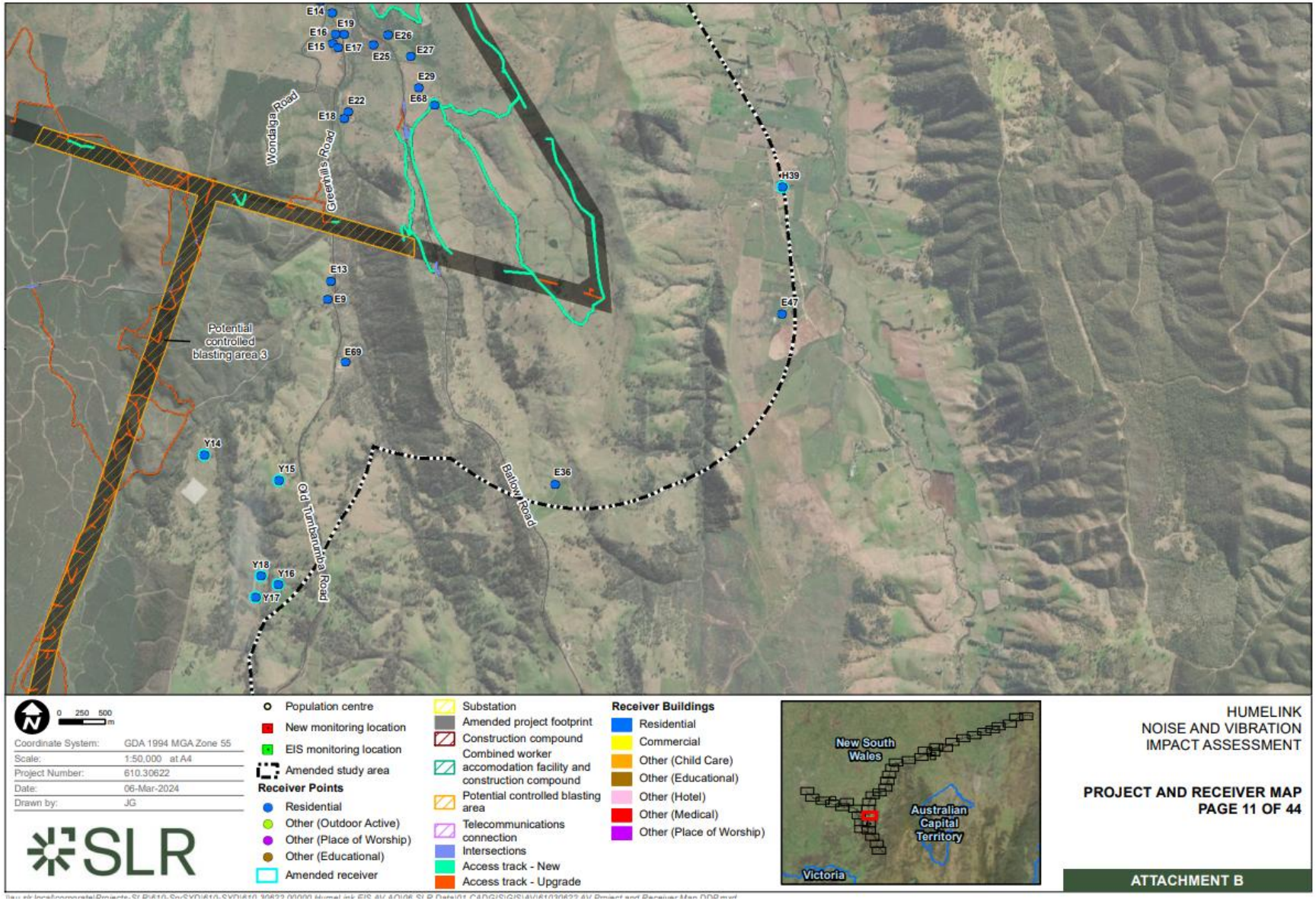

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Humula Road
Westbrook Road
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Potential controlled blasting area 2
Potential controlled blasting area 1
Oberne-umbango Road
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Construction compound
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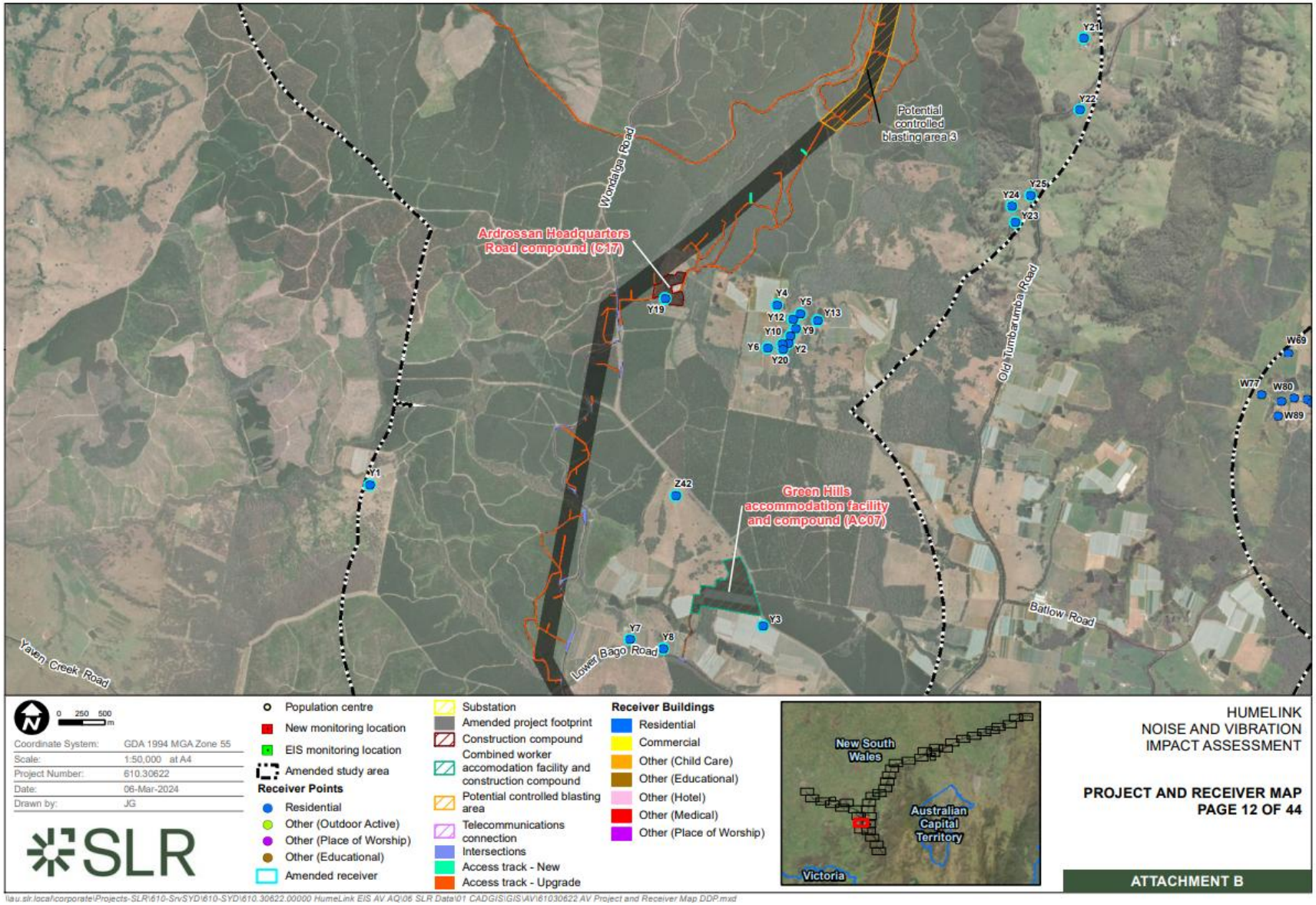

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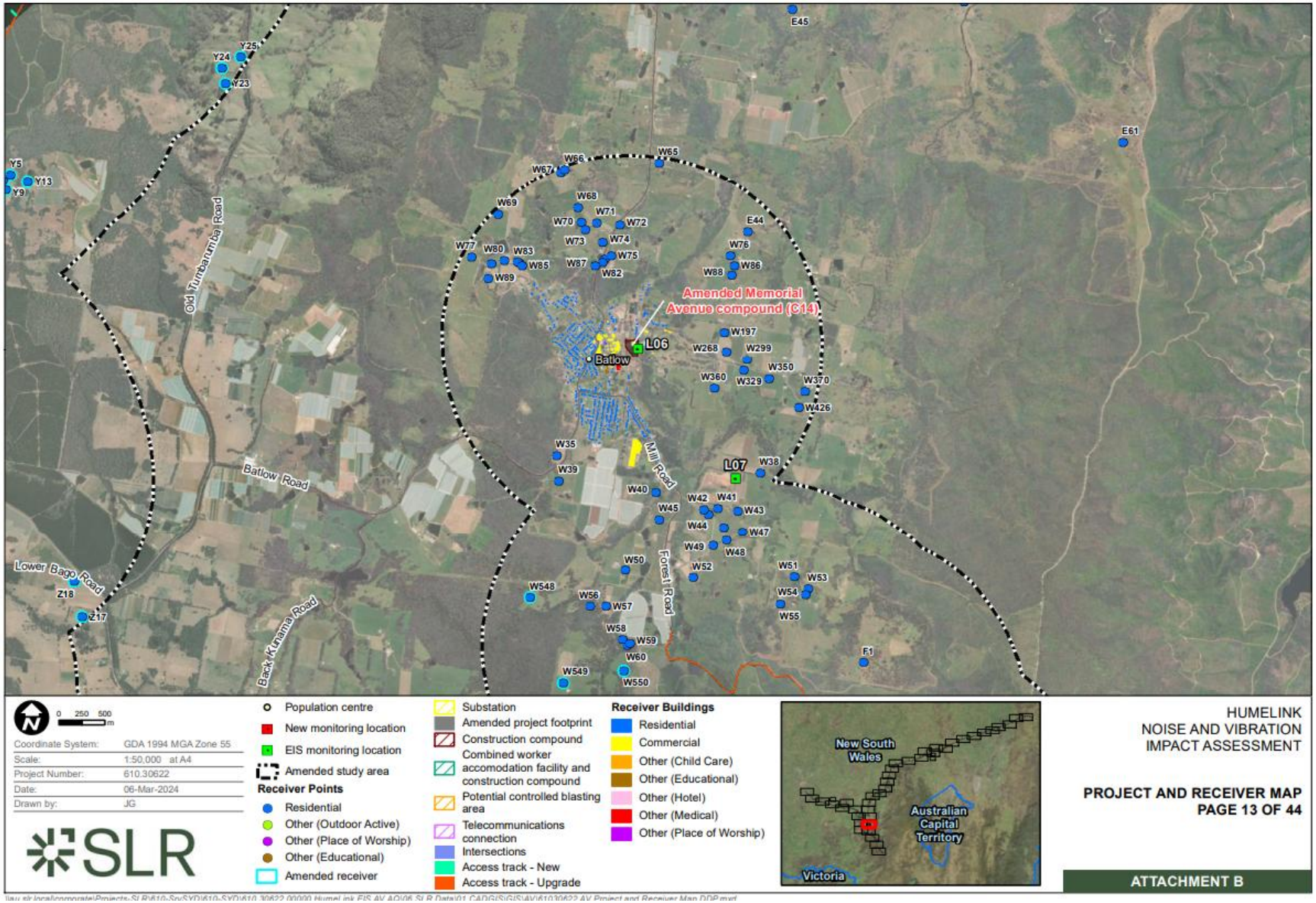

D48
D52
D27
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D25
Ellerslie Road compound (C21)
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D22
Yaven Creek Road
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D39
D38
D41
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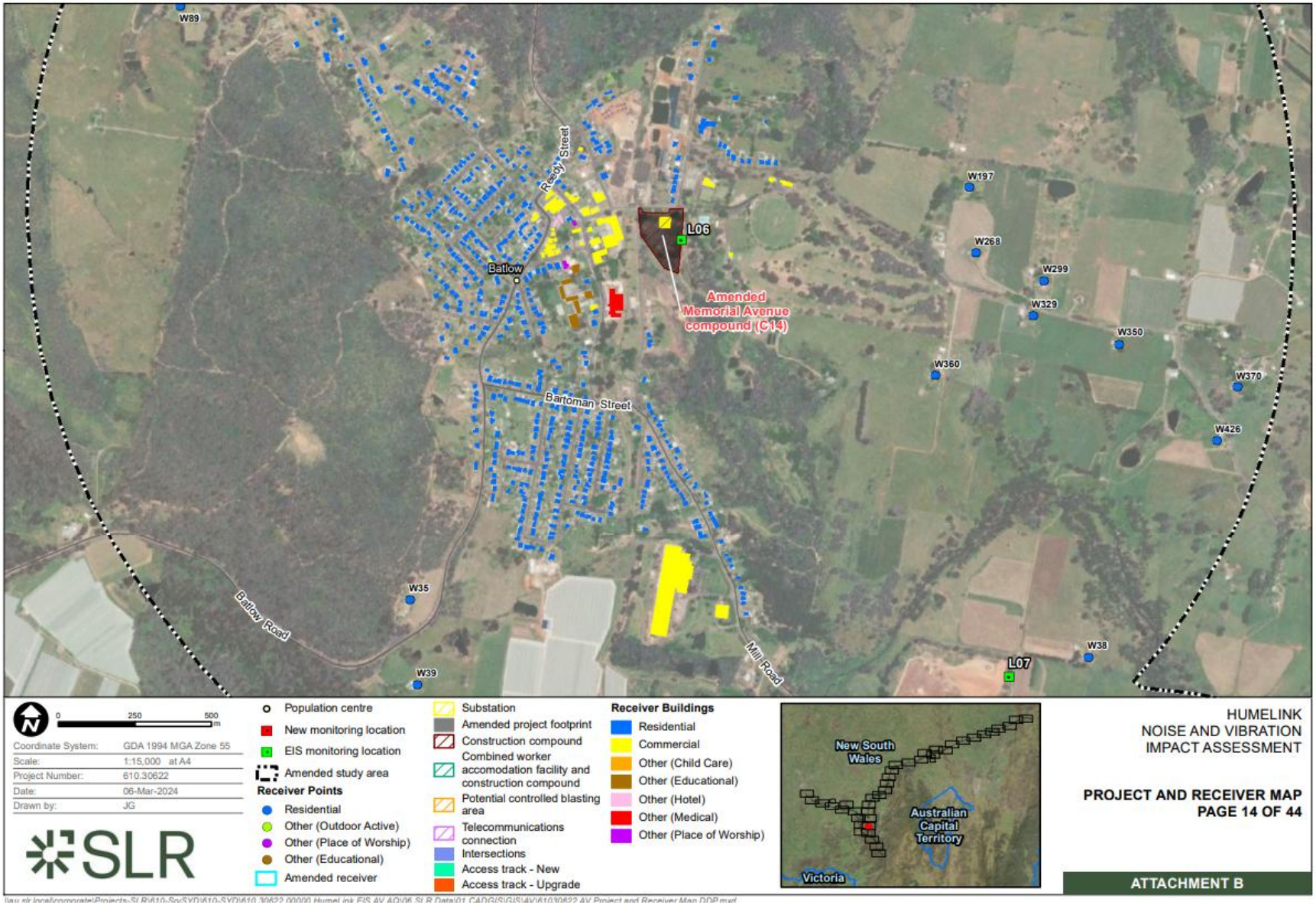

Wondalga Road
Batlow Road
H29
H28
H26
I47
I46
H53
H44
H23
H42
H25
H24
H43
H48
H21
H47
H20
H46
H41
H49
H19
H50
H17
H18
H51
H16
H14
H15
H13
H12
H11
H10
H9
H40
E71
E70
E24
E3
E5
E6
E4
E8
E7
E14
E21
D41
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
Receiver Buildings
Residential
Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
New South Wales
Australian Capital Territory
Victoria
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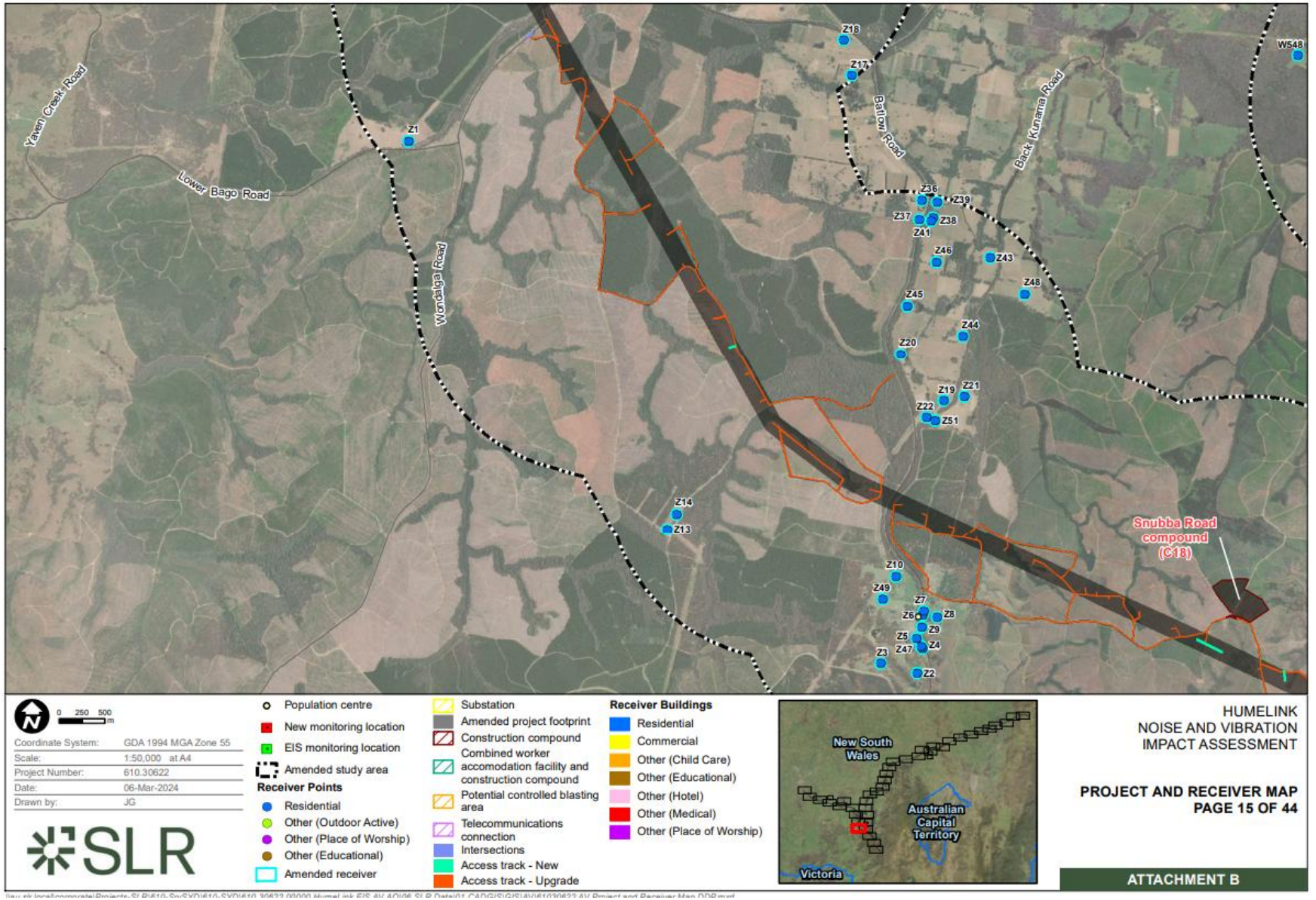

D41
Y14
Wondalga Road
Potential controlled blasting area 3
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
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Other (Place of Worship)
New South Wales
Australian Capital Territory
Victoria
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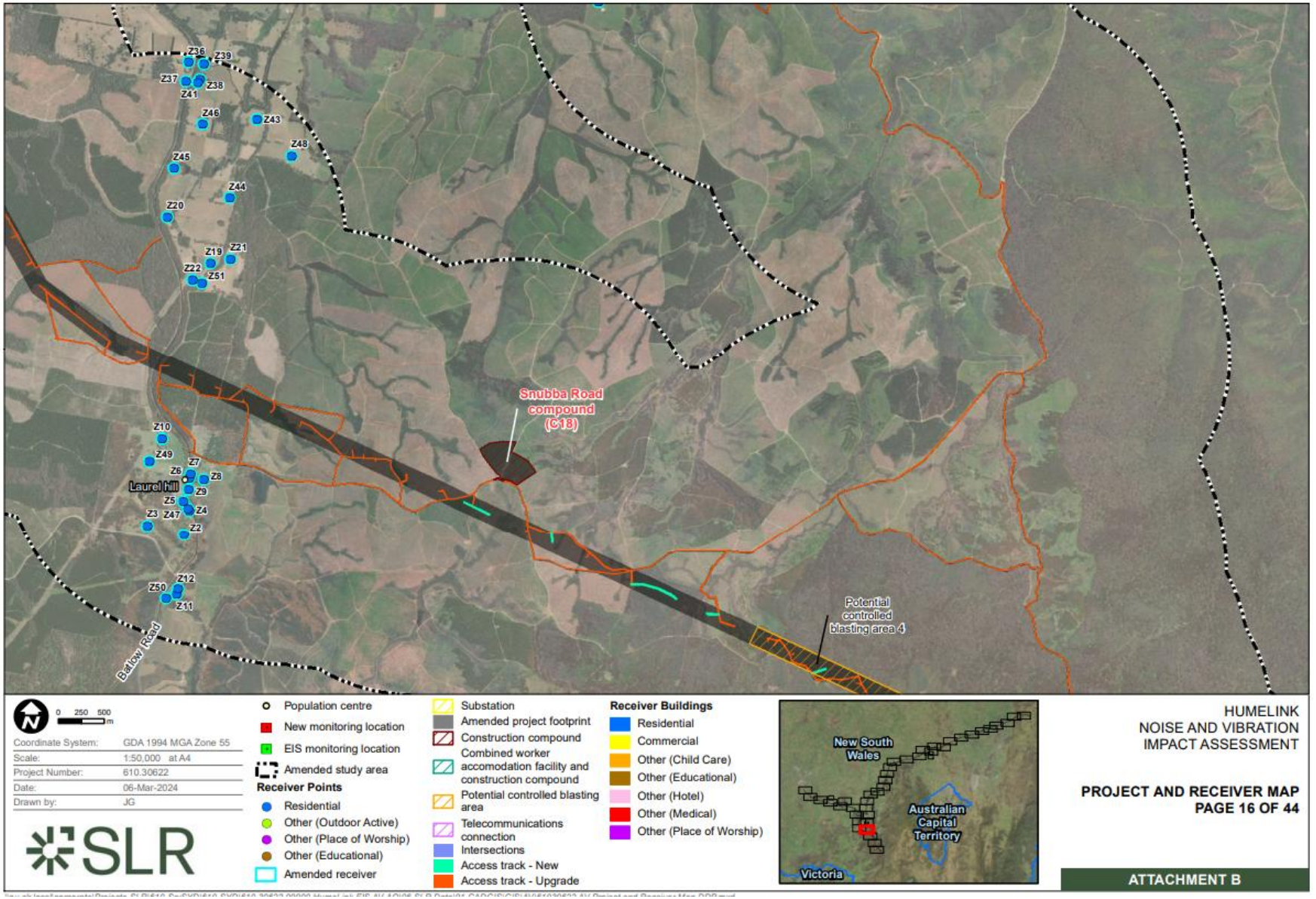

E14
E19
E16
E26
E15
E17
E25
E27
E29
E68
E22
E18
Wondalga Road
Greenhills Road
H39
E13
E9
E47
Potential controlled blasting area 3
E69
Y14
Y15
Old Tumbarumba Road
Ballow Road
E36
Y18
Y16
Y17
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
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Other (Educational)
Amended receiver
Substation
Amended project footprint
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Combined worker accomodation facility and construction compound
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Commercial
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Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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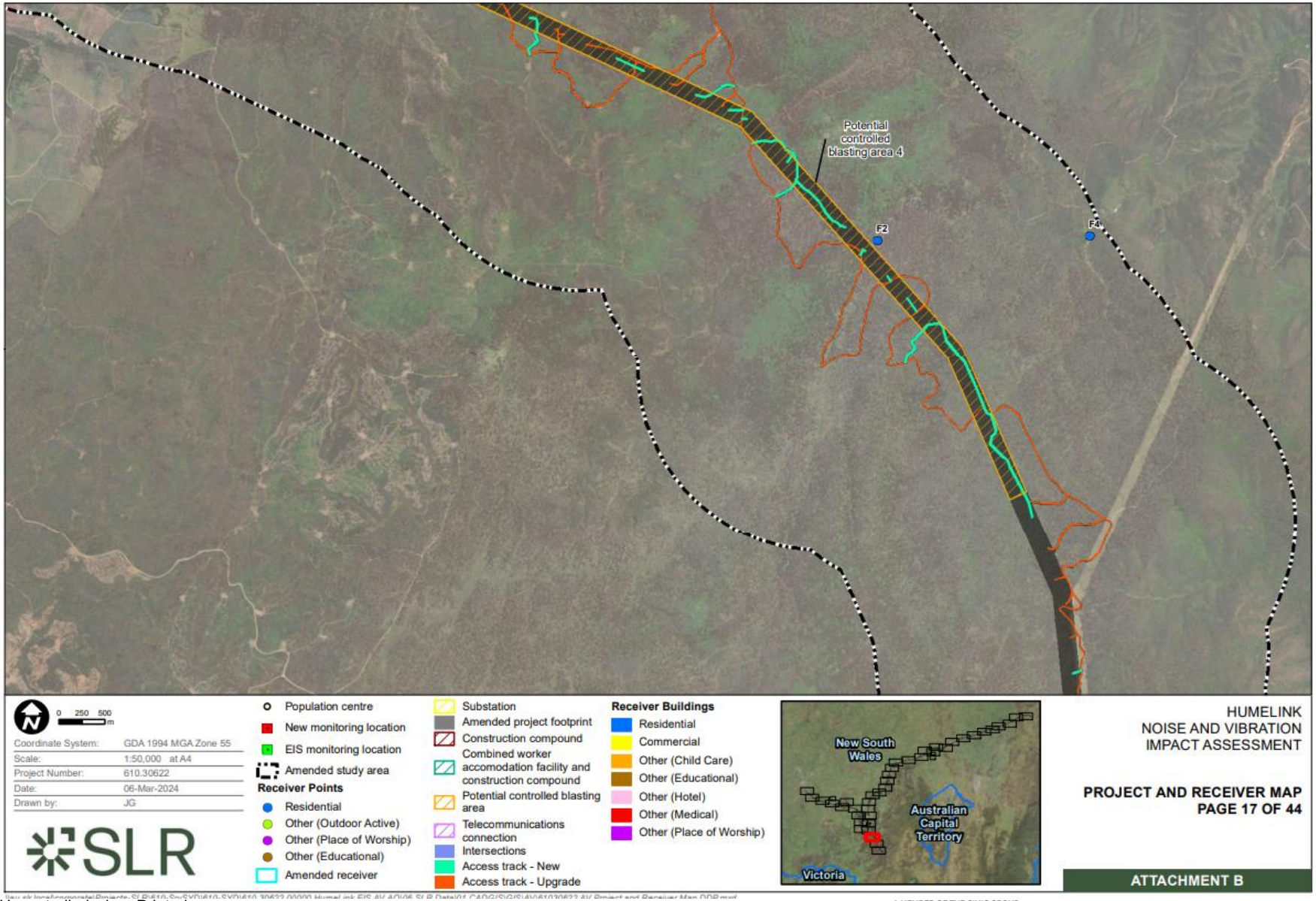

Potential controlled blasting area 3
Wondalga Road
Ardrossan Headquarters Road compound (C17)
Old Tumbarumba Road
Green Hills accommodation facility and compound (AC07)
Batlow Road
Yaven Creek Road
Lower Bago Road
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
Y10
Y12
Y13
Y19
Y20
Y21
Y22
Y23
Y24
Y25
Z42
W69
W77
W80
W89
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
Population centre
New monitoring location
EIS monitoring location
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Receiver Points
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Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
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Combined worker accomodation facility and construction compound
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Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
New South Wales
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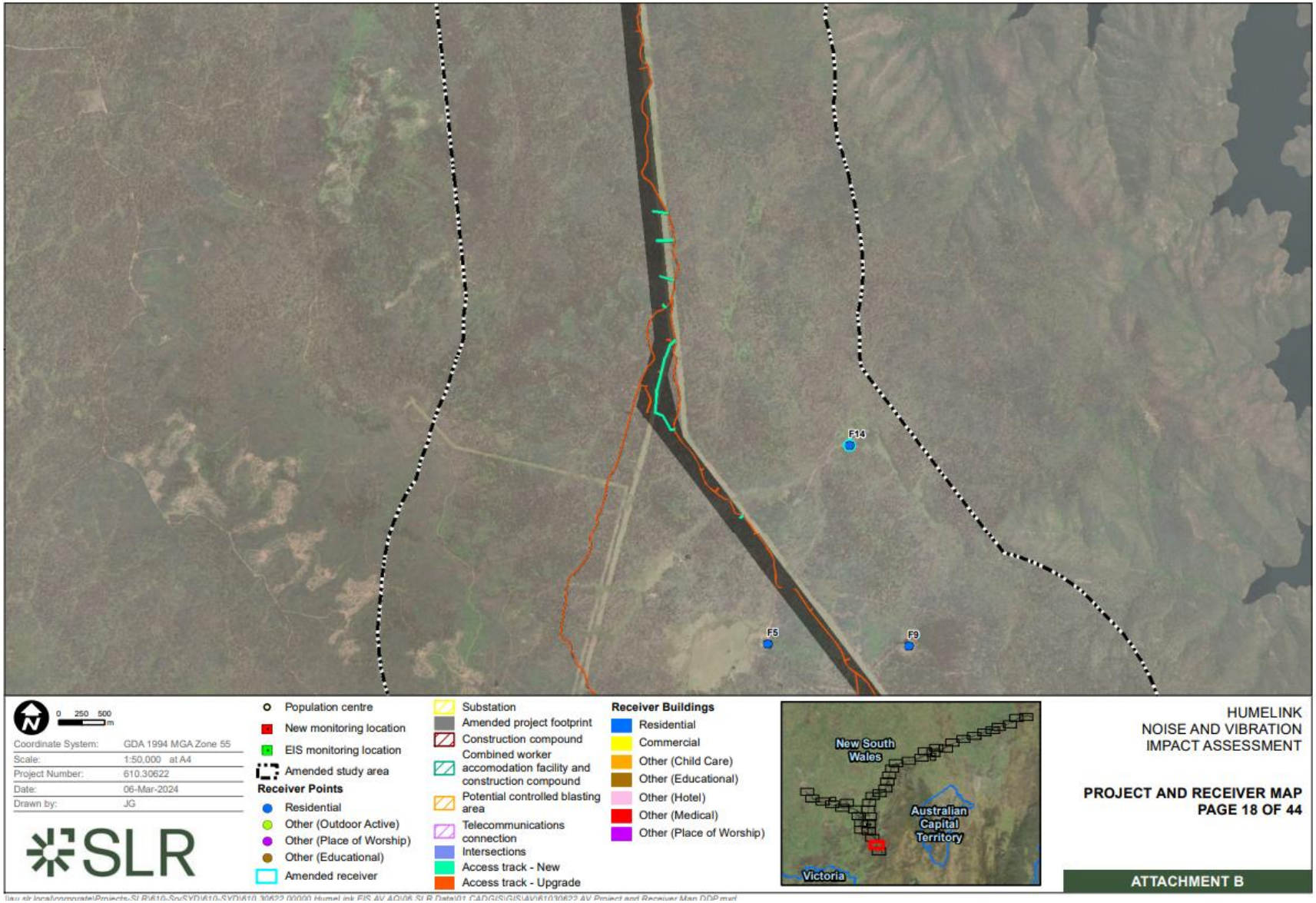

E45
Y25
Y24
Y23
Y5
Y13
Y9
E61
W66
W65
W67
W68
W69
W71
W70
W72
E44
W73
W74
W77
W80
W83
W76
W75
W85
W87
W86
W82
W88
W89
Old Tumbarumba Road
Amended Memorial Avenue compound (C14)
L06
W197
W268
W299
Batlow
W350
W360
W329
W370
W426
W35
W39
Mill Road
L07
W38
Batlow Road
W40
W42
W41
W45
W43
W44
W47
W49
W48
W50
W52
W51
W53
Forest Road
W548
W56
W57
W54
W55
W58
W59
W60
F1
Lower Bago Road
Z18
Z17
Back Kunama Road
W549
W550
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
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Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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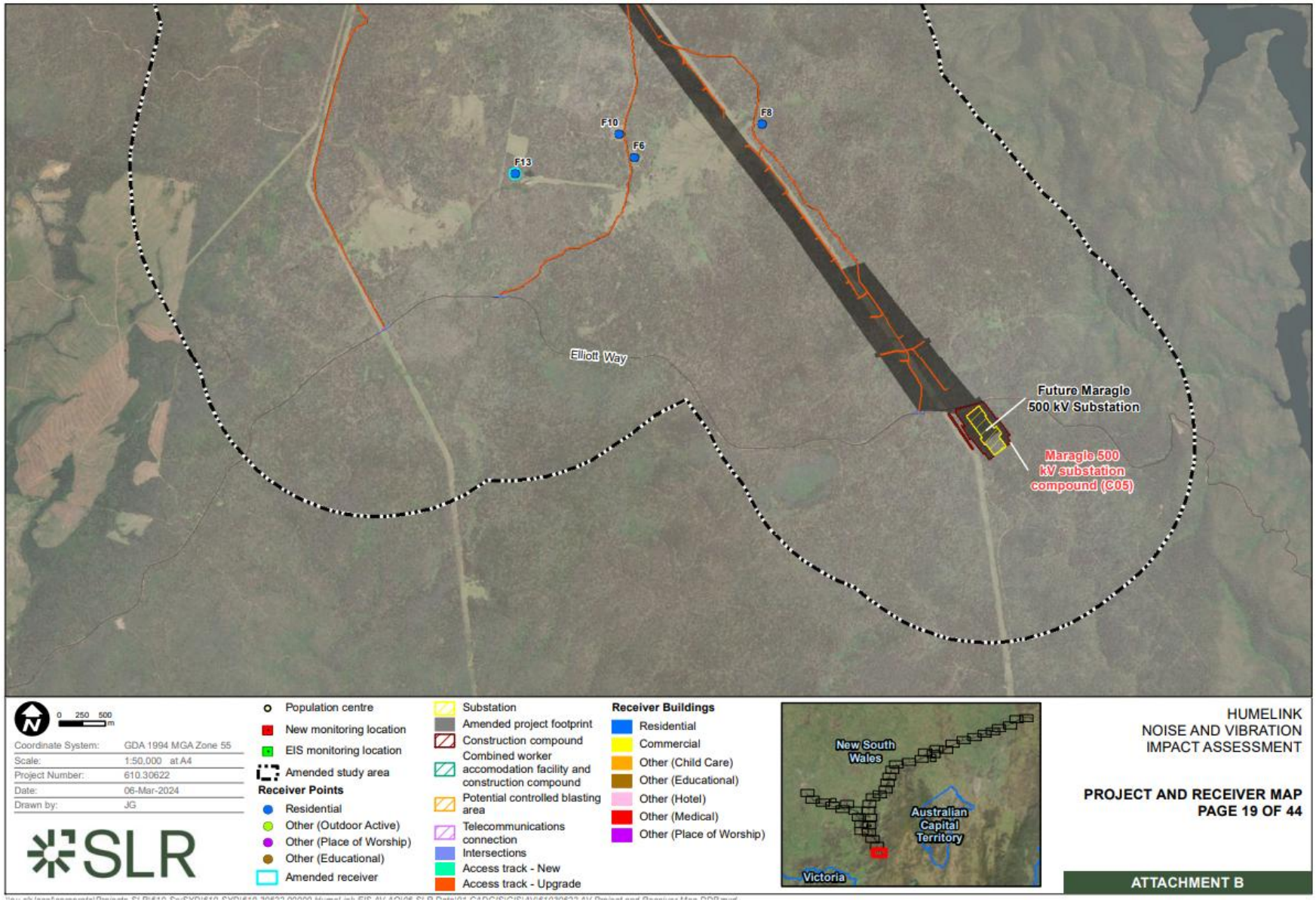

W89
Reedy Street
L06
W197
W268
W299
Batlow
Amended Memorial Avenue compound (C14)
W329
W350
W360
W370
Bartoman Street
W426
W35
Batlow Road
Mill Road
W38
L07
W39
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:15,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
Receiver Buildings
Residential
Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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Yaven Creek Road
Lower Bago Road
Wondalga Road
Batlow Road
Back Kunama Road
Z1
Z18
Z17
W548
Z36
Z39
Z37
Z38
Z41
Z46
Z43
Z48
Z45
Z44
Z20
Z19
Z21
Z22
Z51
Z14
Z13
Z10
Z49
Z7
Z6
Z8
Z9
Z5
Z4
Z47
Z3
Z2
Snubba Road compound (C18)
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
Receiver Buildings
Residential
Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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Z36
Z39
Z37
Z38
Z41
Z46
Z43
Z48
Z45
Z44
Z20
Z19
Z21
Z22
Z51
Snubba Road compound (C18)
Z10
Z49
Z7
Z6
Z8
Laurel hill
Z9
Z5
Z4
Z3
Z47
Z2
Z12
Z50
Z11
Bellow Road
Potential controlled blasting area 4
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
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Construction compound
Combined worker accomodation facility and construction compound
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Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
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Potential controlled blasting area 4
F2
F4
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
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Other (Place of Worship)
Other (Educational)
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Substation
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Access track - Upgrade
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Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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F14
F5
F9
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
Population centre
New monitoring location
EIS monitoring location
Amended study area
Receiver Points
Residential
Other (Outdoor Active)
Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
Amended project footprint
Construction compound
Combined worker accomodation facility and construction compound
Potential controlled blasting area
Telecommunications connection
Intersections
Access track - New
Access track - Upgrade
Receiver Buildings
Residential
Commercial
Other (Child Care)
Other (Educational)
Other (Hotel)
Other (Medical)
Other (Place of Worship)
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F10
F6
F8
F13
Elliott Way
Future Maragle
500 kV Substation
Maragle 500
kV substation
compound (C05)
0 250 500 m
Coordinate System: GDA 1994 MGA Zone 55
Scale: 1:50,000 at A4
Project Number: 610.30622
Date: 06-Mar-2024
Drawn by: JG
SLR
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Receiver Points
Residential
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Other (Place of Worship)
Other (Educational)
Amended receiver
Substation
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Commercial
Other (Child Care)
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Other (Hotel)
Other (Medical)
Other (Place of Worship)
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Annexure D Helicopter CNVIS

RENZO TONIN & ASSOCIATES
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Acoustics
Vibration
Structural Dynamics

HUMELINK WEST PROJECT

Construction Noise and Vibration Impact Statement - Helicopter Assessment

20 October 2026

UGL Limited and CPB Contractors Joint Venture

TN422-01-07F01 Helicopter Assessment CNVIS (r3)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

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01.04.2026	Report revised to address comments	-	2			
20.10.2026	Report revised to address minor comments	-	3			

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The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian/New Zealand Standard AS/NZS ISO 9001.

This document is issued subject to review and authorisation by the suitably qualified and experienced person named in the last column above. If no name appears, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

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We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

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1 Introduction

This Construction Noise and Vibration Impact Statement (CNVIS) has been prepared on behalf of UGL Limited and CPB Contractors Joint Venture (HLWJV) in accordance with the Construction Noise and Vibration Management Sub-Plan (CNVMP) (HLW-HLJV-PRW-ENM-PLN-000008) [1] for the HumeLink West project (HLW) works (the Project).

Attachment 1 contains a glossary of acoustic terms used in this report.

1.1 Relevant requirements and purpose of this CNVIS

This CNVIS provides a noise impact assessment for the proposed helicopter use for stringing works associated with the Project. The helicopter noise assessment covers:

- Helicopter arrivals and departures within Gugaa, Ellerslie, Tarcutta Concrete Batch Plant (CBP), Snubba, Lower Bago, Kunama
- Flight within Project alignment
    - Stringing works along the Project alignment
    - Helicopter arrivals and departures within break and winch sites

In accordance with Minister's Condition of Approval [2] (MCoA) B16, HLW Construction Noise and Vibration Management Plan must include a description of the measures that would be implemented to minimise aircraft noise at sensitive receivers, including measures relating to the number and timing of trips, flight paths and consultation with affected receivers. The aim of this assessment is to identify noise sensitive receivers that would be affected by the proposed helicopter works during different construction time periods and provide noise mitigation and management measures to minimise the aircraft noise.

RTA also understand that HLWJV may be seeking to extend the helicopter use approved hours, which is defined in MCoA B4. It is noted that different helicopter hours are only permitted under an EPL in force in respect of the CSSI or under further approved by the Planning Secretary.

Given the proposed helicopter use is not a vibration generating activity, vibration impact assessment is not required and is not further addressed in this CNVIS.

1.2 Quality assurance

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Attachment 1 contains a glossary of acoustic terms used in this report.

2 Description of construction works and hours

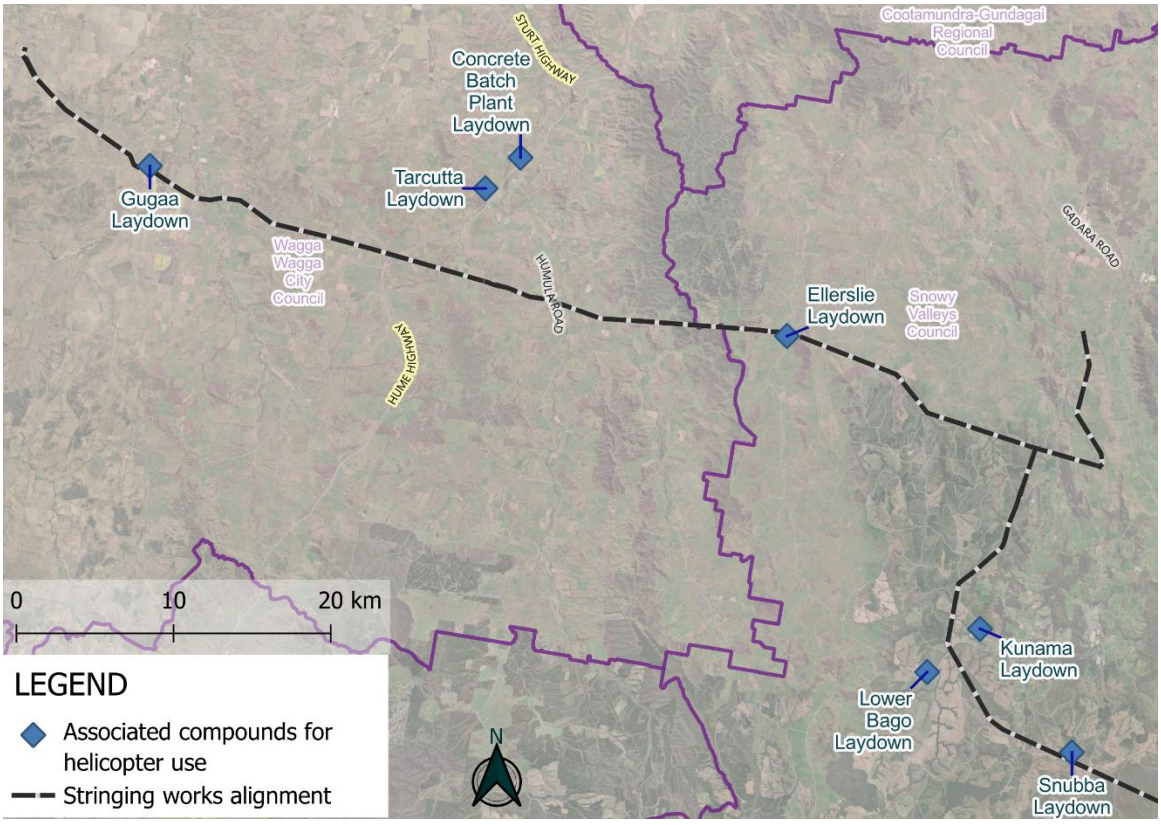
2.1 Summary of works addressed in this CNVIS

This CNVIS assesses the potential impact of construction noise associated with the following helicopter use:

- Helicopter arrivals and departures within Gugaa, Ellerslie, Tarcutta Concrete Batch Plant (CBP), Snubba, Lower Bago, Kunama
- Flight within Project alignment
    - Stringing works along the Project alignment
    - Helicopter arrivals and departures within break and winch sites

The locations of the proposed helicopter use are shown in Figure 2-1.

Figure 2-1: HLW proposed helicopter use footprint



The stringing works are anticipated to be completed in 12 months, commencing in April 2026 and expected to finish in April 2027.

2.2 Construction hours – Helicopter use (MCoA B4)

In accordance with the MCoA B4, Figure 2-2 presents the helicopter use approved hours for the Project.

Figure 2-2: Helicopter use approved hours for the Project

Helicopter activities

B4. Helicopter use associated with the development may only be carried out:
(a) between 9 am to 5 pm Monday to Friday;
(b) between 9 am to 1 pm on Saturday; and
(c) no helicopter use is allowed on Sunday or NSW public holidays;

unless different hours are permitted or required under an EPL in force in respect of the CSSI or the Planning Secretary agrees otherwise.

The proposed helicopter use hours for the Project's stringing works are

- Between 7am and 6pm Monday to Friday
- Between 8am and 6pm Saturday and Sunday
- Between 8am and 6pm Public Holidays
- Night works (6pm to 7am Monday to Sunday and 7-8am Saturday and Sunday) are not planned or expected, however may be required if directed by a network operator

Noise modelling has been undertaken to cover helicopter works between the following time periods

- Day (standard): Between 7am and 6pm Monday to Friday, Between 8am and 6pm Saturday and Sunday and Between 8am and 6pm Public Holidays
- Night: 6pm to 7am Monday to Sunday and 7-8am Saturday and Sunday. (are not planned or expected, however may be required if directed by a network operator)

2.3 The following work periods have been assessed: Justification for OOHW

On ground stringing typically involves the use of bulldozers to pull conductor cables along the ground before lifting them into pre-installed insulator blocks. This methodology tends to require extensive site access for equipment setup. Helicopter use for the stringing works is proposed as an alternative to conventional ground-based stringing methods. Helicopter use is anticipated to provide significant benefits to landholders, the community and the environment, including:

- shorter construction duration for each property
- less ground disturbance to properties and state forests
- fewer project staff and access required on properties
- less impact to ground cover and reduced need for paddock clearing
- significantly less vehicle traffic, meaning less deterioration to local roads.

3 Nearest sensitive receivers

3.1 Closest receivers

The location of the nearest residential receivers to the proposed construction compounds associated with the helicopter use are listed in Table 3-1. A detailed map showing the location of noise sensitive receivers relative to the proposed stringing works alignment are presented in Attachment 2.

Table 3-1: Closest receivers to associated construction compounds

Address	Receiver type	Approximate distance from helicopter departure/arrival site, m
Tarcutta Laydown		
15 Mates Gulley Road, Tarcutta	Residential	470
Tarcutta Concrete Batch Plant Laydown		
4236 Hume Highway, Tarcutta	Residential	200
Kunama Laydown		
323 Green Hills Access Road, Kunama	Residential	1040
Lower Bago Laydown		
318 Lower Bago Road, Kunama	Residential	3000
Ellerslie Laydown		
1226 Yaven Creek Road, Ellerslie	Residential	555
Gugga Laydown		
1070 Livingstone Gully Road, Gregadoo	Residential	945
Snubba Laydown		
2286 Batlow Road, Laurel Hill	Residential	3400

4 Construction noise objectives

4.1 HLW construction airborne noise objectives

The following construction noise objectives applies to the proposed helicopter use.

4.1.1 Residential receivers

The construction noise management levels (NMLs) presented in Table 4-1 are based on the existing background noise levels established in the HumeLink Environmental Impact Statement (EIS) [3] and the HumeLink EIS addendum [4] and are determined in accordance with the ICNG [5]. An additional noise monitoring location for residential receivers along Mates Gully Road west of the Tarcutta site has been undertaken and shaded green in Table 4-1.

Table 4-1 - Noise management levels for residential receivers

Location	Noise management level $L_{Aeq(15\ minute)}$ – dB(A)				Sleep disturbance L_{AFmax} – dB(A)	
	Standard Hours[1] (RBL + 10dB)	Out of hours work (OOHW)[2] (RBL + 5dB)			Screening (RBL + 15dB)	Awakening
	Day	Day (OOHW)	Evening	Night	Night	Night
Batlow	45	40	40	37	52	65
Tarcutta-1[3]	49	44	44	44	54	65
Tarcutta-2[4]	45	40	35	35	52	65
All other receivers	45	40	35	35	52	65

Notes:

1. ICNG standard construction hours are defined as Monday – Friday: 7am – 6pm, Saturday: 8am – 1pm with no work on Sundays or public holidays.
2. Out of hours work time periods are defined as:
   Day: 7am to 8am Saturday, 1pm to 6pm Saturday and 8am to 6pm on Sunday and public holidays
   Evening: 6pm to 10pm Monday to Sunday
   Night: 10pm to 7am Monday to Saturday, 10pm to 8am Sunday
3. The NMLs established in the HumeLink EIS addendum for Tarcutta
4. Additional noise monitoring location for residential receivers along Mates Gully Road west of the Tarcutta site

4.1.2 Other land uses (non-residential)

Section 5.3.1.4 of the NVMP presents noise management levels for other non-residential land uses, which is reproduced in Table 4-2.

Table 4-2: Adopted NMLs for other sensitive land uses

Landuse	NML $L_{Aeq(15min)}$ (internal/ indoor)	Where NML applies	Referenced from:	Assumed facade loss (conservative)	External equivalent NML - LAeq(15min)
Hotel (Sleeping areas: Hotels near major roads)	40 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	60 dB(A)

Landuse	NML $L_{Aeq(15min)}$ (internal/ indoor)	Where NML applies	Referenced from:	Assumed facade loss (conservative)	External equivalent NML - LAeq(15min)
Classrooms at schools and other educational institutions	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)
Childcare centre (sleeping areas)	40 dB(A)	Internal noise level	AAAC - guideline for Child Care Centre Acoustic Assessment	10 dB(A)	50 dB(A)
Hospital wards and operating theatres	45 dB(A)	Internal noise level	ICNG	20 dB(A)	65 dB(A)
Places of worship	45 dB(A)	Internal noise level	ICNG	10 dB(A)	55 dB(A)
Hotel (bars and lounges)	50 dB(A)	Internal noise level	AS2107 'maximum'	20 dB(A)	70 dB(A)
Community centres – Municipal Buildings	50 dB(A)	Internal noise level	AS2107 'maximum'	10 dB(A)	60 dB(A)
Passive recreation (e.g. area used for reading, meditation)	60 dB(A)	External noise level	ICNG	-	60 dB(A)
Active recreation (e.g. sports fields)	65 dB(A)	External noise level	ICNG	-	65 dB(A)
Commercial premises (including offices and retail outlets)	70 dB(A)	External noise level	ICNG	-	70 dB(A)
Industrial premises	75 dB(A)	External noise level	ICNG	-	75 dB(A)

5 Helicopter noise assessment

5.1 Noise prediction methodology

5.1.1 Modelling assumptions

Assessment of airborne noise impacts from the proposed helicopter use were determined by modelling the noise source, receiver locations, and topographical features using a Cadna-A computer noise model developed for the Project.

The noise prediction model consider:

- Only one helicopter will be used for the proposed stringing works.
- The specific helicopter model on which this assessment is based on is the AS350 [Squirrel] which is a single-engine light helicopter.
- Helicopter arrival and departure may occur in any direction (i.e. assessment is representative of the maximum noise from helicopter movements in all directions).
- Helicopter is climbing to or descending from a height of 95m above ground.
- Maximum total number of helicopter arrival or departure within a 15-minute period is 1.
- Flight path within the Project alignment (stringing activities) have been modelled 150m from either side of the project alignment centreline.
- Receiver points at 1.5m above ground level.
- Height of sources and receivers referenced to one metre digital ground contours for the site area and surrounding area.
- Separation distances between sources and receivers.
- Ground factors between sources and receivers.
- Attenuation from topography.

Key details regarding the proposed helicopter use such as departure and arrival locations, flight height, helicopter model and helicopter scenarios were informed by the construction and environment teams. This information formed the basis for all modelling assumptions used in this assessment. The helicopter activities have been grouped into the following sub-categories:

- Helicopter arrivals and departures within associated construction compounds
    - Typical scenario: a typical helicopter arrival or departure event last only about 10 to 30 seconds. In this scenario, the helicopter arrival or departure event is modelled for a 30 second duration within a 15-minute period.

- Worst-case scenario: In this scenario, the helicopter arrival or departure event is modelled for a 5-minute duration within a 15-minute period.

- Flight within Project alignment
  - In this scenario, the helicopter stringing activities is modelled for the entire 15 minutes (the helicopter is anticipated to be in use for the entire 15-minute period when undertaking stringing activities).

The following sections present a summary of the predicted noise impacts in terms of compliance with the NMLs. The colours in the table indicate whether receivers in the NCA comply with the NML and, where exceedance of the NML occurs, the perceived impact of the exceedance.

The noise predictions presented in this CNVIS represent a worst-case scenario when helicopter use is close to residences and other sensitive receivers. At each receiver, noise levels will vary during the construction period based on the location of the helicopter, the distance to the receiver and the activities being undertaken.

5.2 Predicted noise levels

Noise impacts during helicopter use have been predicted and compared to the NMLs.

A receiver is construction noise affected when the predicted construction noise level is above the NML. The tables are colour coded to indicate how much the predicted noise level is above the NML and the corresponding perceived noise impact as noted in Table 5-1.

Table 5-1: Key to the predicted construction noise results tables

Assessment	Time of day	Key			
$L_{Aeq(15min)}$	Standard construction hours	0-10 dB(A) over NML (light blue) Clearly audible	11-20 dB(A) over NML (mid blue) Moderately intrusive		>20 dB(A) above NML (dark blue) Highly intrusive
$L_{Aeq(15min)}$	Outside standard hours	0-5 dB(A) above NML (green)	6-15 dB(A) above NML (yellow)	16-25 dB(A) above NML (orange)	>25 dB(A) above NML (purple)

Table 5-2 summarises the number of construction noise affected receivers (i.e. receivers where predicted noise levels are above the NML) and the likely perceived noise impact for residential receivers. Table 5-3 summarises the number of construction noise affected receivers and the likely perceived noise impact for other sensitive receivers. The predicted noise levels for each receiver are included in Attachment 3.

Table 5-2: Number of residential receivers above the noise management level (all NCAs)

Construction activity	Assessment reference	HNA[2] L_{Aeq}	Day (standard hours) L_{Aeq}			Day (outside standard hours) L_{Aeq}				Evening L_{Aeq}				Night L_{Aeq}				Sleep disturbance L_{Amax}	
		> 75 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	> 20 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	1 – 5 dB(A)	6 – 15 dB(A)	16 – 25 dB(A)	> 25 dB(A)	Screening	Awakening
Helicopter arrivals and departures within construction compounds Typical scenario	S1-T	0	0	0	0	1	0	0	0	-[1]	-[1]	-[1]	-[1]	2	0	0	0	0	0
Helicopter arrivals and departures within construction compounds Worst-case scenario	S1-W	0	2	0	0	10	2	0	0	-[1]	-[1]	-[1]	-[1]	17	6	0	0	4	0
Flight within Project alignment (stringing works)	S2	0	94	23	9	81	94	23	9	-[1]	-[1]	-[1]	-[1]	145	250	90	30	10	36

Notes:

1. No helicopter use is proposed during evening period.
2. HNA = Highly noise affected applies, as per the CNVG.

Table 5-3: Number of other sensitive receivers (non-residential) over the airborne noise management levels (all NCAs)

Construction activity	Assessment reference	Commercial[1,2]				Educational[1,2]				Places of worship[1,2]				Hotel/Motel/ Hostel[1]			
		1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)	1 – 10 dB(A)	11 – 20 dB(A)	21-30 dB(A)	> 30 dB(A)
Helicopter arrivals and departures within construction compounds Typical scenario	S1-T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Helicopter arrivals and departures within construction compounds Worst-case scenario	S1-W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flight within Project alignment (stringing works)	S2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

Highly noise affected does not apply to OSRs, as per the ICNG

1. Other sensitive receivers have been assessed against the respective NMLs
2. Impacts only applicable when facility is in use.

5.2.1 Construction noise impact

5.2.1.1 Standard construction hours

During standard construction hours:

- Typical helicopter arrivals and departures within construction compounds (30 second event) are predicted to comply with the NMLs for all residential receivers.
- Worst-case helicopter arrivals and departures within construction compounds (5-minute event) are predicted to exceed the NMLs for 2 residential receivers.
  - 1 residential receiver adjacent to Tarcutta CBP Laydown
  - 1 residential receiver adjacent to Ellerslie Laydown
- Up to 126 residential receivers are predicted to exceed the NML during stringing works along the whole Project alignment.
- No residential receivers are predicted to experience construction noise levels above 75 dB(A) [no residential receivers are highly noise affected].

Other sensitive receivers are predicted to experience construction noise levels below the corresponding NMLs.

5.2.1.2 Outside standard construction hours (Day OOH)

During Day OOH period:

- Typical helicopter arrivals and departures within construction compounds (30 second event) are predicted to exceed the NMLs for 1 residential receiver.
  - 1 residential receiver adjacent to Tarcutta CBP Laydown
- Worst-case helicopter arrivals and departures within construction compounds (5-minute event) are predicted to exceed the NMLs for 12 residential receivers.
  - 2 residential receivers within proximity to Gugaa Laydown
  - 5 residential receivers within proximity to Tarcutta Laydown
  - 4 residential receivers within proximity to Tarcutta CBP Laydown
  - 1 residential receiver adjacent to Ellerslie Laydown
- Up to 207 residential receivers are predicted to exceed the NML during stringing works along the whole Project alignment.

5.2.1.3 Outside standard construction hours (Night)

During the night period:

- Typical helicopter arrivals and departures within construction compounds (30 second event) are predicted to exceed the NMLs for 2 residential receivers.
  - 1 residential receiver adjacent to Tarcutta CBP Laydown
  - 1 residential receiver adjacent to Ellerslie Laydown
- Worst-case helicopter arrivals and departures within construction compounds (5-minute event) are predicted to exceed the NMLs for 23 residential receivers.
  - 5 residential receivers within proximity to Gugaa Laydown
  - 6 residential receivers within proximity to Tarcutta Laydown
  - 4 residential receivers within proximity to Tarcutta CBP Laydown
  - 4 residential receivers within proximity to Ellerslie Laydown
  - 4 residential receivers within proximity to Kunama Laydown
- Up to 516 residential receivers are predicted to exceed the NML during stringing works along the whole Project alignment.
- Up to 4 residential receivers are predicted to exceed the sleep disturbance screening criterion during worst-case helicopter arrivals and departures.
- Up to 10 residential receivers are predicted to exceed the sleep disturbance screening criterion during stringing works, with 36 residential receivers predicted to exceed the sleep disturbance awakening criterion.

It is noted that the applicable night period during the proposed helicopter hours is Sunday 7am-8am. Noise mitigation and management measures discussed in Section 5.3 shall be considered to reduce the potential helicopter noise impacts to receivers.

5.3 Helicopter noise mitigation and management measures

5.3.1 Recommended noise control practices for AS350 helicopters

The key to minimising the potential aircraft noise depends on the ability of the pilot to operate the helicopter in a noise-aware manner. The recommended noise control practices by "Helicopter Association International" to limit noise during the typical operation of the AS350 helicopters are shown in Figure 5-1.

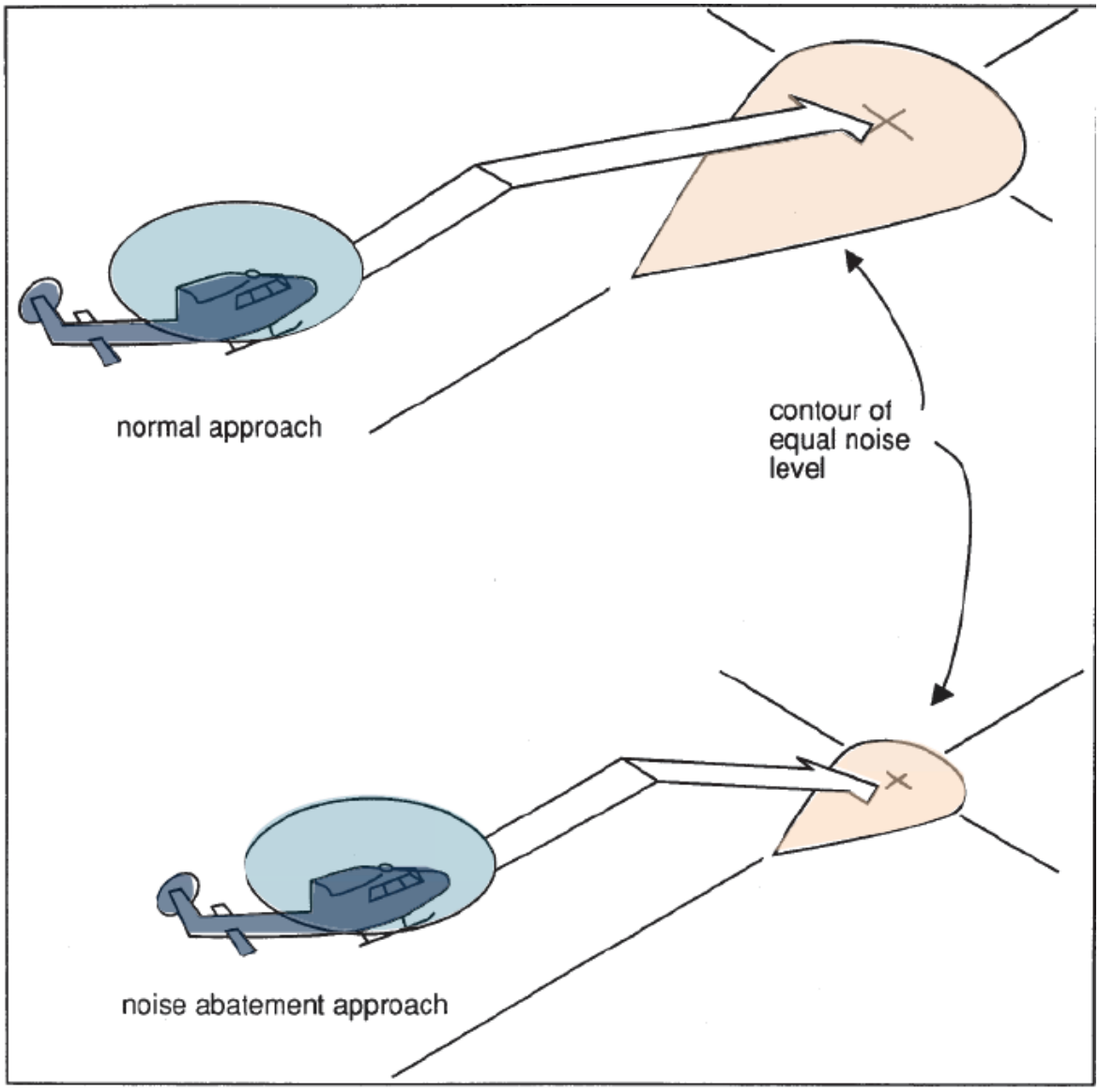
Figure 5-1: Noise control practices recommended by "Helicopter Associated International"

Manufacturer	**Eurocopter (formerly Aerospatiale.)**
Model(s)	**AS350, AS365, and AS332**
Issue Date	Feb 1993
Issue Number	1
General	Maximum distance and altitude separation from noise-sensitive areas are the most effective means of noise abatement. Control movement should be gradual and smooth. Noise exposure is lower in front of than behind the helicopter.
Ground Operations	No Available Information
Hover Hover-Taxi Ground-Taxi	No Available Information
Takeoff and Climb	Climb at the best rate of climb in order to reach altitude as soon as possible
Enroute and Cruise Flyover	Where possible, maintain a minimum altitude of 500 feet above ground level.
Turns	No Available Information
Descent/ Approach and Landing	Approach and descend as steeply as possible.
Comments	

5.3.2 Helicopter arrival and departure abatement technique

The potential aircraft noise during arrival and departure can be minimised by careful control of the rate of descent/ascend. As shown in Figure 5-2, helicopter arrivals on a long glide slope will result in unnecessary noise on the ground in the vicinity of the land area and is recommended to be avoided. The technique shown in Figure 5-2 will assist in reducing the potential blade slap and minimise noise on the ground during arrival. Similarly for helicopter departures, a relatively steep take-off with a shallower trajectory once 30m to 60m above ground level will assist in reducing helicopter noise on the ground during departures.

Figure 5-2: Helicopter arrival and departure abatement technique



5.3.3 Noise control and management measures

Noise mitigation and management measures to reduce potential noise impacts will be implemented during the proposed helicopter use, where reasonable and feasible. In accordance with the ICNG and consistent with the NVMP, feasible noise mitigation measures are those work practices or measures to reduce noise that are capable of being put into practice or of being engineered and are practical to build given project constraints such as safety and maintenance requirements. Reasonable noise mitigation measures are those feasible noise mitigation measures that are considered reasonable in the circumstances, based on a judgement that the overall noise benefits outweigh the overall adverse social economic and environmental effects, including the cost of measure. To make such a judgement, consideration is to be given to noise level impacts, noise mitigation benefits, cost effectiveness of noise mitigation and community views. Table 5-5 outlines site noise control measures that would be implemented during the stringing works, where feasible and reasonable.

Furthermore, NV10 of the HumeLink EIS addendum specifies the following measures to be implemented to minimise aircraft noise at sensitive receivers where practicable and appropriate. NV10 compliance table is presented in Table 5-4.

- Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include use of helipads within construction compounds and combined worker accommodation facilities and construction compounds, flight paths outside of the project footprint and stringing or other work within the transmission line corridor. Notification will include scheduled dates, locations, indicative hours and a description of the proposed work.
- Prioritising use of helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers.
  - This will only happen at Gugaa, Ellerslie, Tarcutta CBP, Snubba, Lower Bago, Kunama. These locations will only be used for long term parking (2+ days) for security reasons. No landing and take offs will occour within the same day at these locations. Majority of landings and take offs will occur at break and winch sites.
- Varying flight paths between helipads and the transmission line corridor to avoid repeated helicopter noise at sensitive receivers.
  - Where flight paths within the alignment travels directly over a receiver, the helicopter will change its flight path to avoid directly flying over a receiver and reduce potential noise impacts, where feasible.
- Operating aircraft in accordance with Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.

- Where feasible, all helicopter activities will take place in accordance with ASA with Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide.
- Avoid noise-sensitive areas altogether
- When possible, follow high ambient noise routes such as highways
- When possible, follow less populated or unpopulated routes such as industrial areas or waterways
- If it is necessary to fly near noise-sensitive areas, whenever possible:
    - Use a steep take-off profile, then
    - Maintain an altitude as high as possible and consistent with flight safety, ATC and other environmental and operational constraints/requirements,
    - Fly normal cruising speed or slower,
    - Avoid sharp and aggressive manoeuvres,
    - Vary the route, since repetition contributes to annoyance, and
    - Using a low-noise speed and descent profile in accordance with available model specific noise abatement guidance during landing.

To further reduce potential impacts on residents, livestock and animals:

- Helicopter operations will be limited to daylight hours
- Flights will be planned to minimise flight noise near communities
- Noisy activities will be scheduled for the middle of the day when impacts are the lowest
- Activities will be coordinated so that multiple noise tasks don't occur at once.

Table 5-4: NV10 compliance table

NV10 compliance table	Where addressed
Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include use of helipads within construction compounds and combined worker accommodation facilities and construction compounds, flight paths outside of the project footprint and stringing or other work within the transmission line corridor. Notification will include scheduled dates, locations, indicative hours and a description of the proposed work	CCS Table 6
Prioritising use of helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers.	Section 5.3.3
Varying flight paths between helipads and the transmission line corridor to avoid repeated helicopter noise at sensitive receivers.	Section 5.3.3
Operating aircraft in accordance with Airservices Australia (ASA) Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise (2002) and the Helicopter Association International (HAI) Fly Neighbourly Guide	Section 5.3.3

Table 5-5: Noise mitigation and management measures

Control measure	Description of the control measure	Feasible mitigation test	Deemed feasible?	Reasonable mitigation test	Deemed reasonable?	Adopted?	Justification and commentary
At source control measures							
Helicopter selection	The AS350 (also known as the squirrel) is a single-engine helicopter which is quieter alternative when compared to a twin-engine helicopter.	This measure could be feasibly implemented.	Yes	- Significant noise reduction could be achieved at receivers. - Deemed to be cost effective. - Outweighs the identified social, economic and environmental effects.	Yes	Yes	The AS350 single engine helicopter will be used for the proposed stringing works.
Site planning and layout	Locate helicopter departure and arrival sites away from sensitive receivers as much as practicable.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Deemed to be cost effective. - Outweighs the identified social, economic and environmental effects.	Yes	Yes	Helicopter departure and arrival sites should be located away from sensitive receivers as much as practicable.
Limit equipment in use	Only the equipment necessary during each stage of the works will be used.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Outweighs the identified social, economic and environmental effects. Cost effectiveness to be determined on a case-by-case basis.	Yes	Yes	Excess equipment will be avoided where it is not needed for the works and where it is reasonable to do without it.
Timing of equipment in use	Not using the helicopter between 6pm and 7am	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Deemed to be cost effective. - Outweighs the identified social, economic and environmental effects.	Yes	Yes	Propose helicopter use is 7am – 6pm Monday to Sunday. Prohibiting helicopter use between 6pm and 7am will reduce the noise impacts during more sensitive periods.
Limit activity duration	Any equipment not in use for extended periods shall be switched off. For example, helicopter should switch engines off when not in use.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Deemed to be cost effective. - Outweighs the identified social, economic and environmental effects.	Yes	Yes	When the helicopter is not in use/no longer needed, it will be switched off.
Path mitigation measures							
Noise barriers or use of storage sheds to reduce noisier activities	Construction of barriers or partial enclosure to contain key noise-generating activities and/or items.	This measure could be feasibly implemented.	No	- Negligible noise reduction as the noise source is well above ground level.	No	No	Negligible noise reduction as the noise source is well above ground level.

Control measure	Description of the control measure	Feasible mitigation test	Deemed feasible?	Reasonable mitigation test	Deemed reasonable?	Adopted?	Justification and commentary
Noise management measures							
Site inductions & Toolbox Talks	All employees, contractors and subcontractors will receive Project induction. The environmental component may be covered in toolboxes and should include (but is not limited to): • location of nearest sensitive receivers • relevant project specific and standard noise and vibration mitigation measures; • permitted hours of work;	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Routine task for project team.	Yes	Yes	Inductions and toolbox talks will continue to be conducted for the project.
Community consultation - disseminating information	Provide information to community of construction activity and potential impacts.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. Routine task for project team.	Yes	Yes	Updates will be distributed regularly for the duration of the project.
Community consultation - active communication with nearby sensitive receivers	Seek feedback from community to identify more sensitive times of the day, or particularly sensitive days.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. Routine task for project team.	Yes	Yes	Project team shall proactively contact nearby sensitive receivers, particularly those which may have special requirements (e.g. accommodation).
Noise monitoring	Noise monitoring to be conducted at key locations to quantify noise impacts at sensitive receivers.	This measure could be feasibly implemented.	Yes	- Sufficient noise reduction could be achieved at enough receivers. - Deemed to be cost effective. - Outweighs the identified social, economic and environmental effects.	Yes	Yes	Noise monitoring shall be carried out as detailed in this assessment.

5.3.4 Additional noise mitigation measures

If all reasonable and feasible mitigation measures described in Section 5.3.1, 5.3.2, and 5.3.3 have been implemented, and predicted or measured noise levels are still above the relevant NMLs, additional mitigation measures shown in Table 5-6 (from Section 7.4.4 of the NVMP) shall be implemented. The additional noise management measures for each affected receiver are shown in Attachment 2.

Table 5-6: Additional airborne noise mitigation measures

Predicted airborne LAeq(15min) noise level at receiver		Additional mitigation measures
Perception	dBA above NML	
Standard hours		
Clearly audible	≤10	-
Moderately Intrusive	>10 to 20	V
Highly Intrusive	>20	V
OOHW Period 1		
Noticeable	<5	N, V
Clearly audible	5-15	N, V
Moderately intrusive	15-25	N, V, R3
Highly intrusive	>25	N, V, R3, DR
OOHW Period 2		
Noticeable	<5	N, V
Clearly audible	5-15	N, V
Moderately intrusive	15-25	N, V, R2, DR
Highly intrusive	>25	N, V, R2, DR, AA

Notes: N = Notification, RO = Short term respite offer, R2 = Respite offered when impacts occur over two or more consecutive nights, R3 = Respite offered when impacts occur over three or more consecutive nights, DR = Duration respite, V = Verification, AA = Alternative accommodation.

5.3.5 Attended noise monitoring

Attended noise monitoring is to be undertaken to verify that noise levels resulting from helicopter works are in accordance with the levels predicted in this report, subject to obtaining the property owner/occupier's consent to access the property (where required). Noise monitoring should be completed within 30m from the residential property. Table 5-7 present a list of nominated verification monitoring locations for each compound. Alternative noise monitoring locations may be required if access to the property listed in Table 5-7 is not permitted.

Table 5-7: Nominated verification monitoring locations

Type of monitoring	Nominated receiver address
Attended	15 Mates Gully Road, Tarcutta
Attended	4236 Hume Highway, Tarcutta
Attended	170 Wilds Road, Tarcutta
Attended	83 Ashfords Road, Gregadoo
Attended	1070 Livingstone Gully Road, Gregadoo
Attended	1226 Yaven Creek Road, Darlow
Attended	442 Ardrossan Road, Batlow
Attended	303 East Bago Powerline Road, Nurenmerenmong

Noise monitoring shall follow the procedures outlined in Section 8.3.1 of the NVMP.

5.3.6 Complaints handling

Noise complaints received and responded to will be managed in accordance with Section 4.2 of the NVMP.

6 Conclusion

In conclusion, works associated with the proposed helicopter use for the Project's stringing works have been identified and described in this report. The potentially affected sensitive receivers and relevant noise objectives have been identified and discussed to allow the assessment of potential noise impacts.

Construction noise

During standard construction hours, residential receivers within proximity to the associated construction compounds and the Project/stringing alignment are predicted to experience construction noise levels above the NMLs. No residential receivers are predicted to experience construction noise levels above 75 dB(A). Other sensitive receivers are predicted to experience construction noise levels below the corresponding NMLs during the proposed works.

During Day OOH period, up to 12 residential receivers are predicted to experience construction noise levels above the NMLs during worst-case helicopter arrivals and departures within construction compounds. Up to 207 residential receivers are predicted to exceed the NML during stringing works along the whole project alignment.

During the night period, up to 23 residential receivers are predicted to experience construction noise levels above the NMLs during worst-case helicopter arrivals and departures within construction compounds. Up to 516 residential receivers are predicted to exceed the NML during stringing works along the whole project alignment. Furthermore, up to 46 residential receivers are predicted to exceed the sleep disturbance criteria. Note that all of the night time exceedances can be avoided if the helicopter use on Sundays is scheduled to commence from 8am (as opposed to 7am).

Carrying out consultation to notify nearby sensitive receivers of upcoming helicopter use will be key to managing the potential noise impacts. Notification shall include scheduled dates, locations, indicative hours and a description of the proposed work.

Noise mitigation and management measures described in Section 5.3 shall be considered to reduce the potential helicopter noise impacts to receivers.

References

[1] Construction Noise and Vibration Management Sub-Plan – HumeLink West [HLW-HLJV-PRW-ENM-PLN-000008], REV 06 dated 3 June 2025

[2] HumeLink Infrastructure Approval SSI 36656827

[3] Transgrid HumeLink Environmental Impact Statement Technical paper 9 – Noise and vibration impact assessment, May 2023

[4] Transgrid HumeLink Environmental Impact Statement Technical paper 9 – Noise and vibration impact assessment addendum, 31 January 2024

[5] NSW Department of Environment and Climate Change 2009, Interim Construction Noise Guideline (ICNG), 2009

Attachment 1 Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:

threshold of hearing	0 dB	The faintest sound we can hear
	10 dB	Human breathing
almost silent	20 dB	
	30 dB	Quiet bedroom or in a quiet national park location
generally quiet	40 dB	Library
	50 dB	Typical office space or ambience in the city at night
moderately loud	60 dB	CBD mall at lunch time
	70 dB	The sound of a car passing on the street
loud	80 dB	Loud music played at home
	90 dB	The sound of a truck passing on the street
very loud	100 dB	Indoor rock band concert
	110 dB	Operating a chainsaw or jackhammer
extremely loud	120 dB	Jet plane take-off at 100m away
threshold of pain	130 dB	
	140 dB	Military jet take-off at 25m away

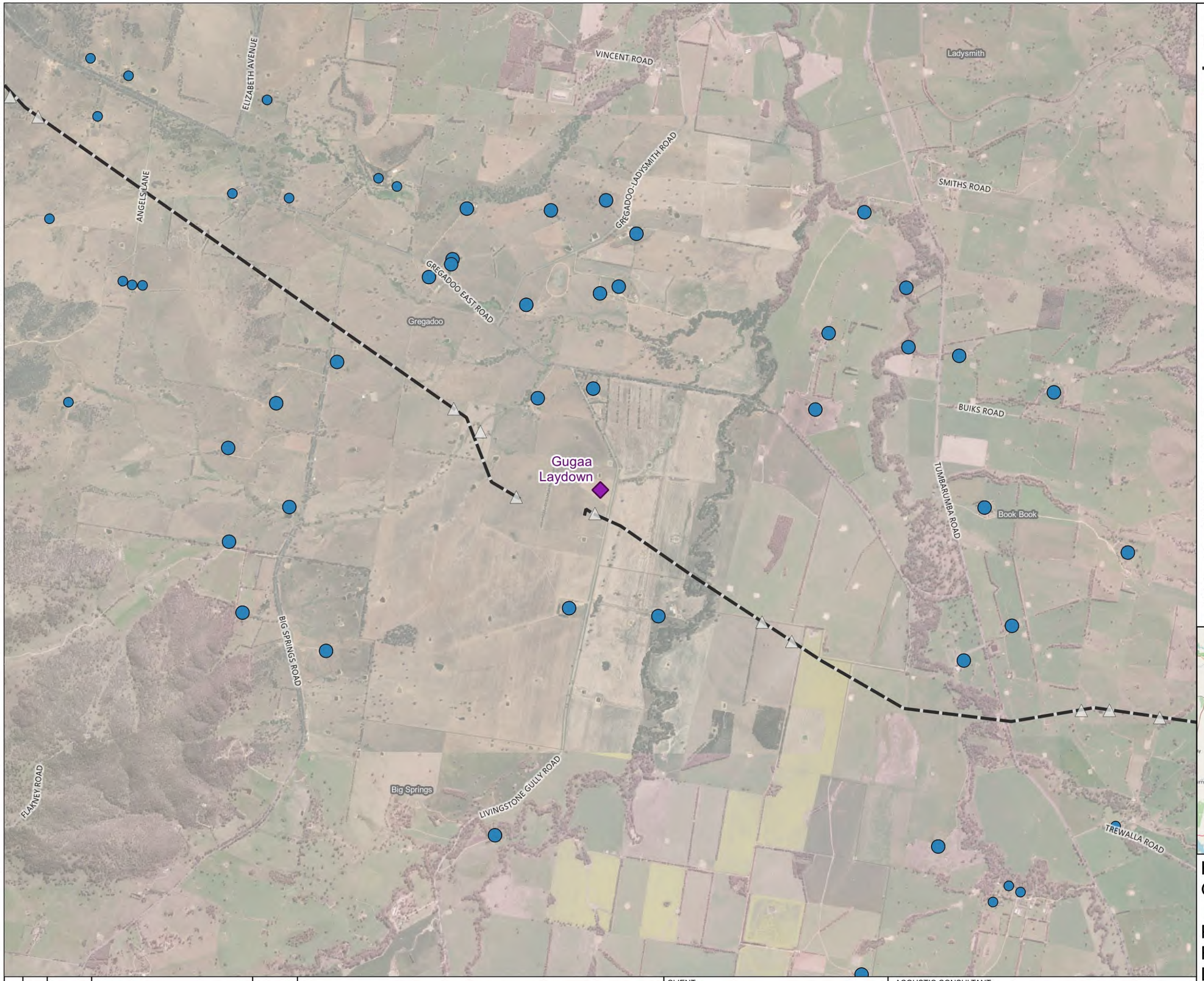
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

Attachment 2 Sensitive receivers

Plot Date: 11/02/26 - 12:04 Layout: TN422 Helicopter laydown lmax day s

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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML
- > 20 dB above NML

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

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FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

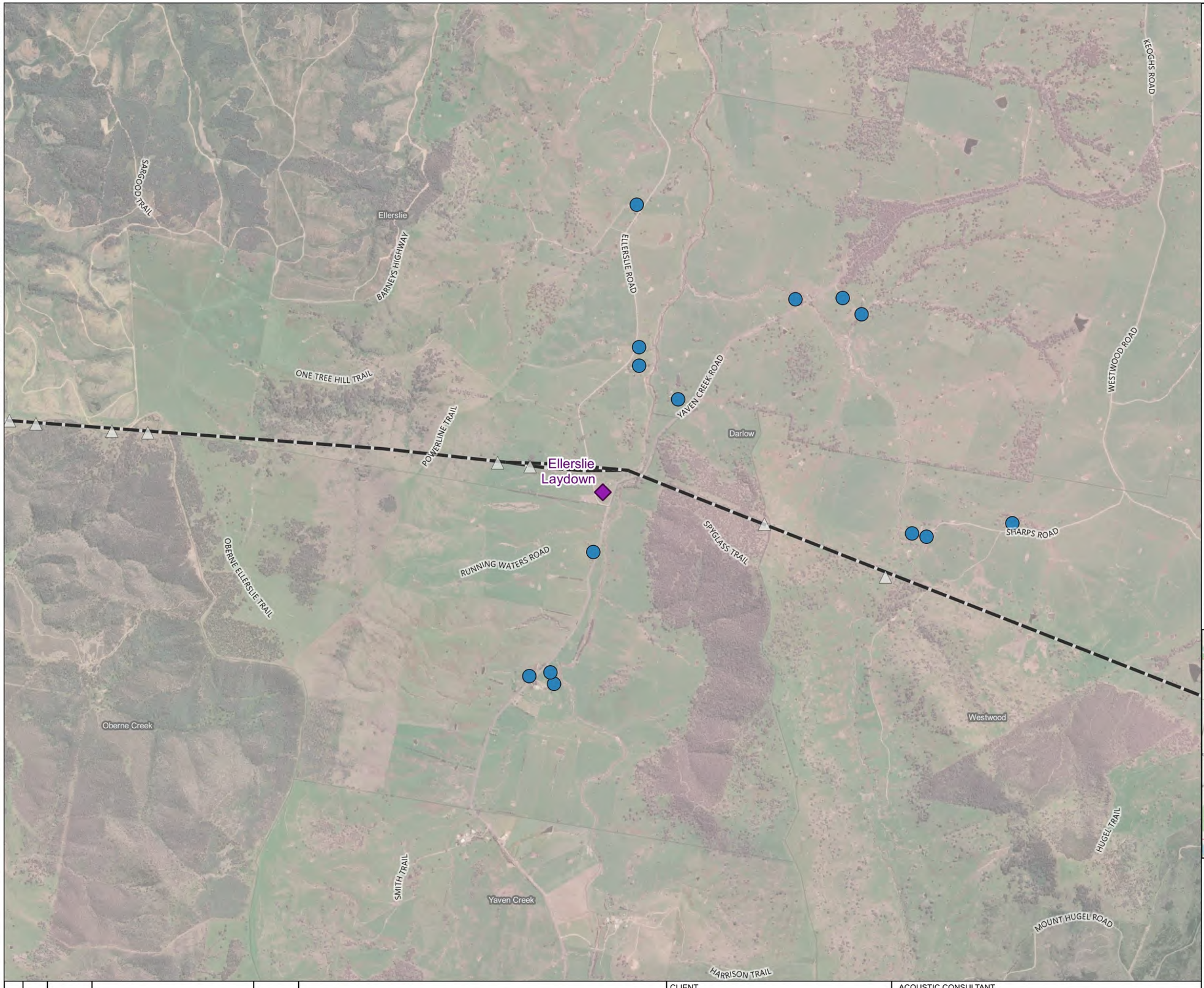
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 11/02/26 - 12:04 Layout: TN422 Helicopter laydown lmax day s

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS.qgz



LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

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HUMELINK WEST
Ellerslie Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

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1:35,000

FULL SIZE A3

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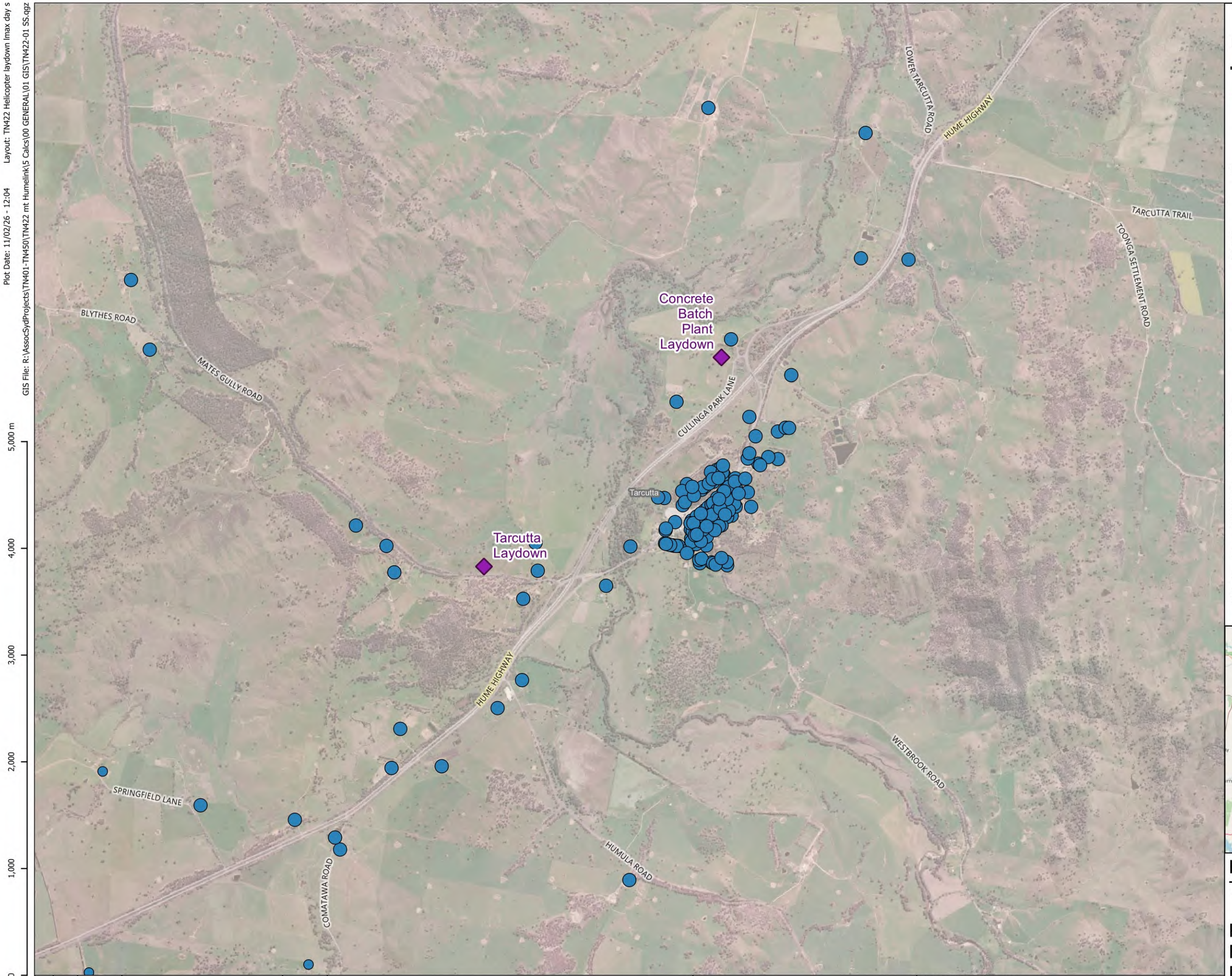
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ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

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Plot Date: 11/02/26 - 12:04 Layout: TN422 Helicopter laydown lmax day s

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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
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- > 20 dB above NML

Assesment periods

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HUMELINK WEST
Tarcutta Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

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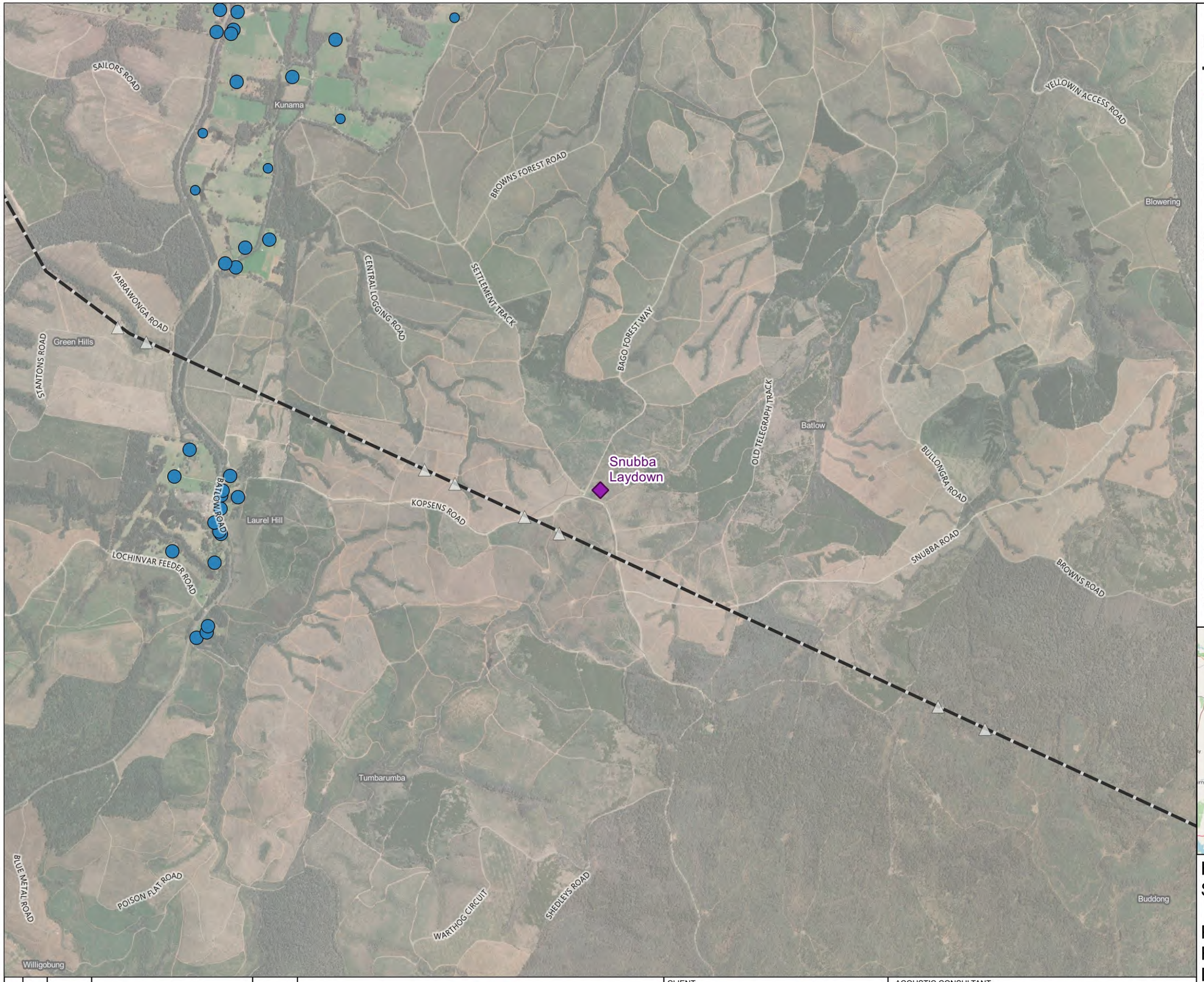
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0 1,000 2,000 3,000 4,000 5,000 m

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML
- > 20 dB above NML

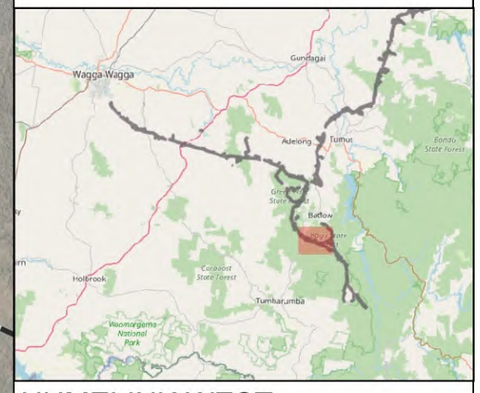
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HUMELINK WEST
Snubba Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
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1:35,000

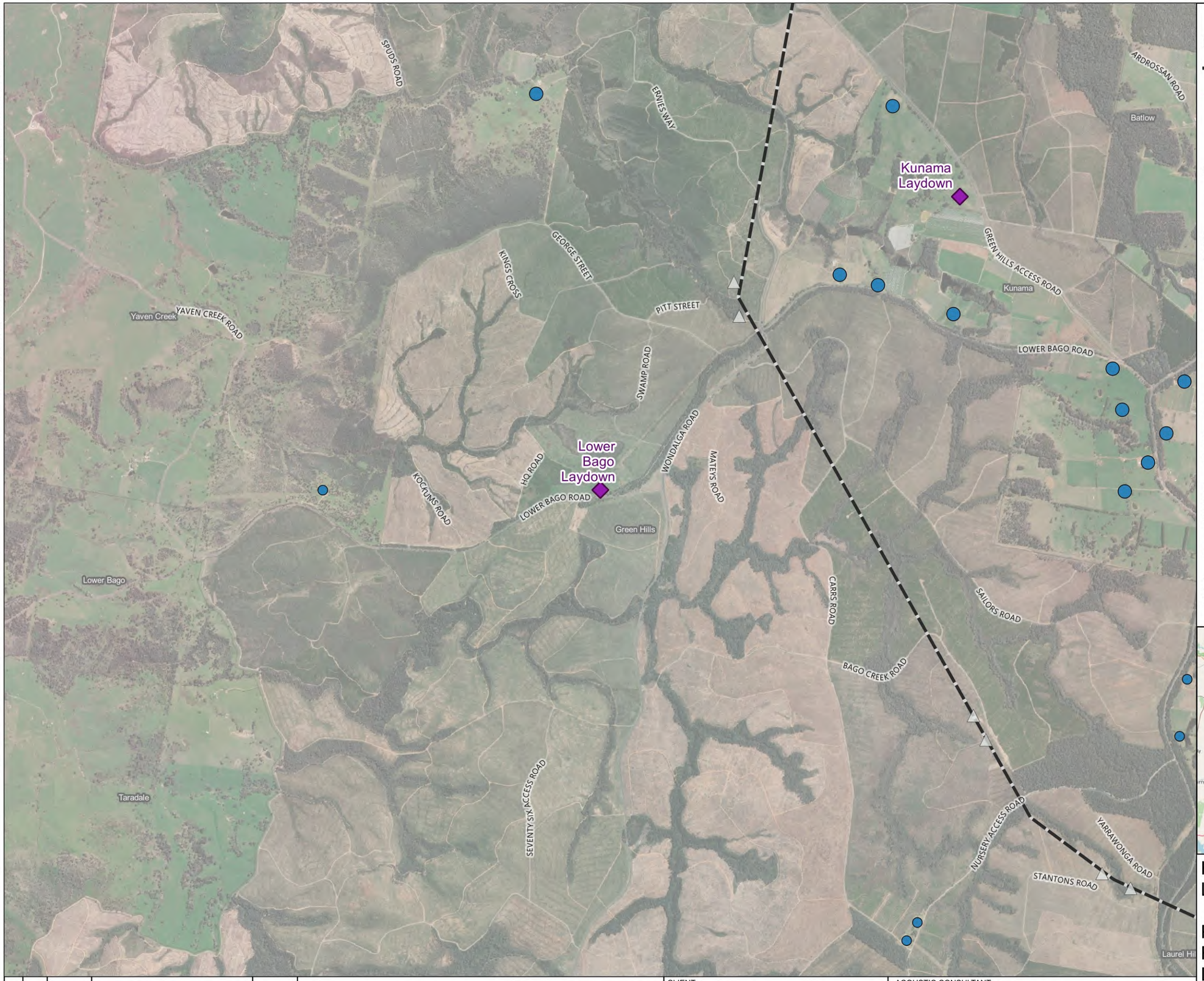
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
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- > 20 dB above NML

Assesment periods

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HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
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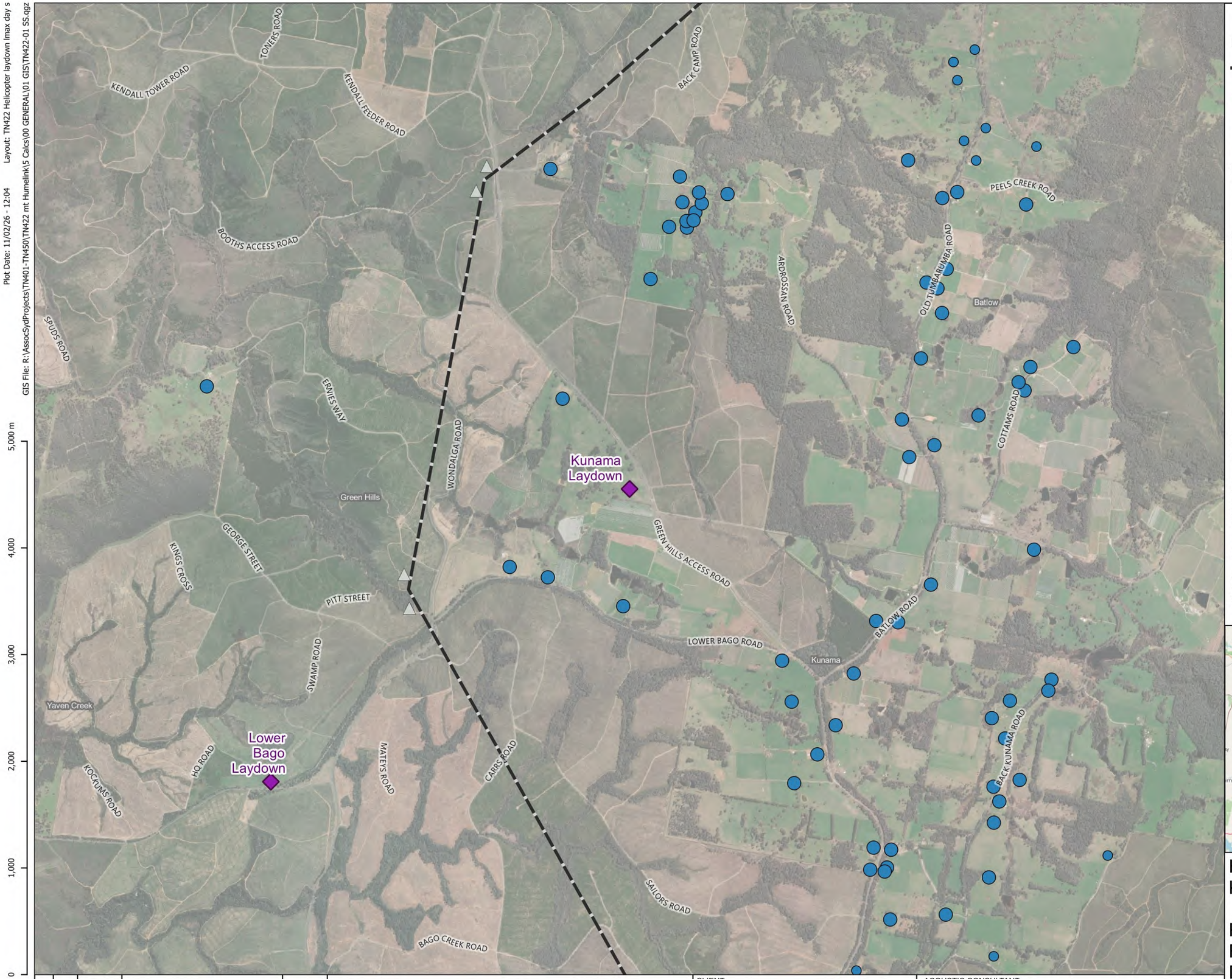
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML
- > 20 dB above NML

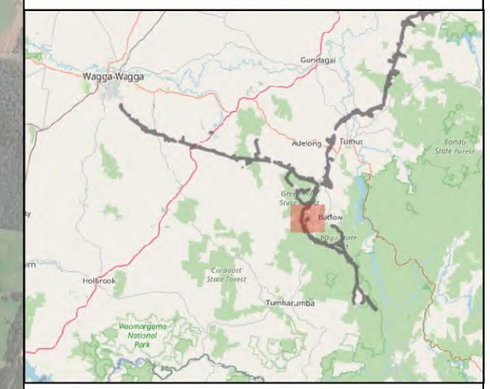
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HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	11/02/26	Prepare figures	RZ/MT

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1:35,000

FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

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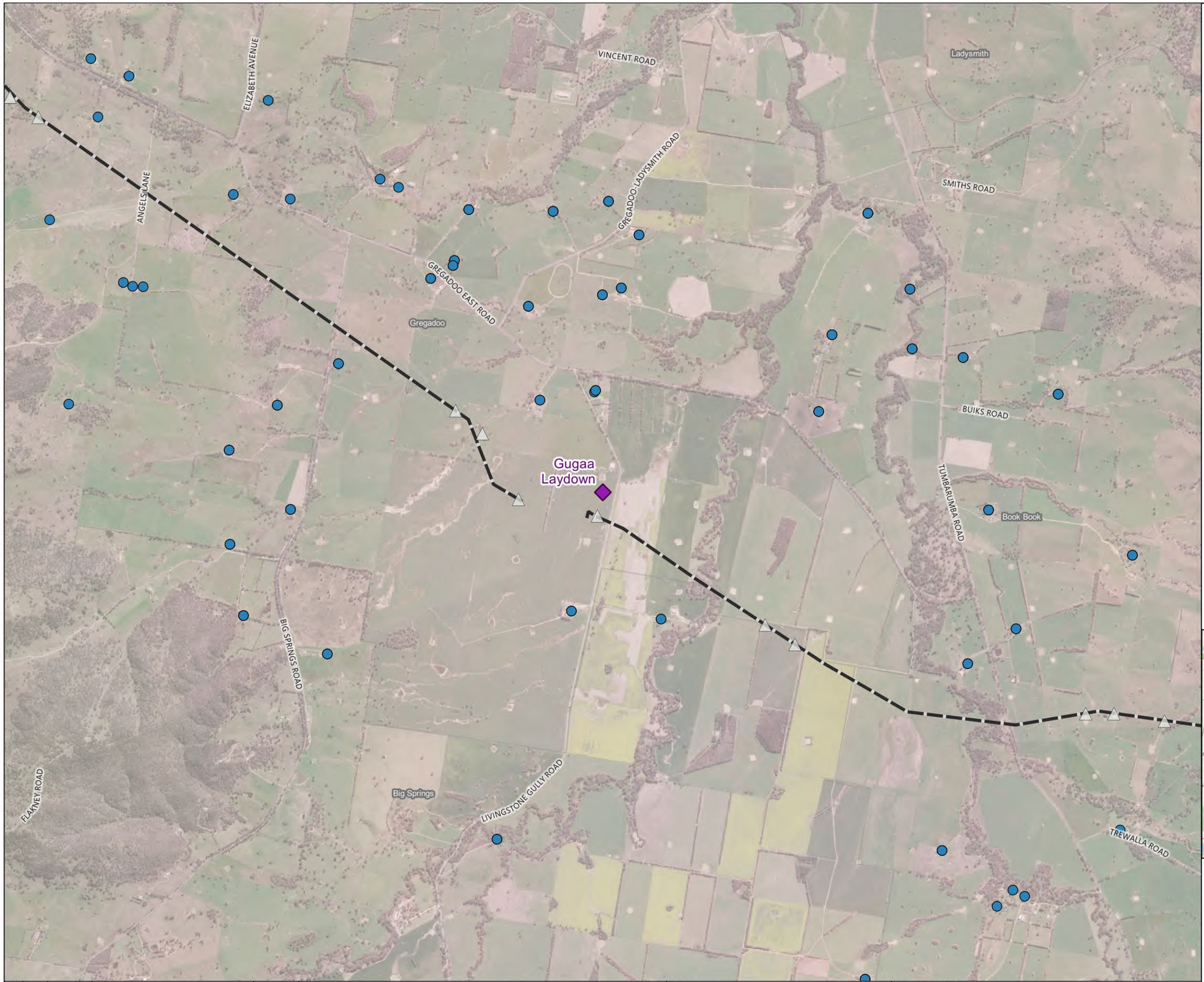
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Plot Date: 12/02/26 - 14:25 Layout: TN422 Helicopter laydown lmax day ooh

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



5,000 m
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

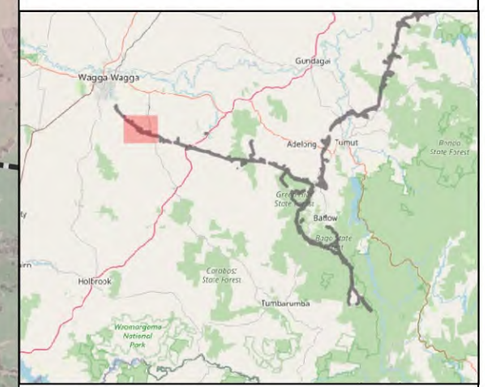
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
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HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to typical Helicopter arrival and departure within construction compounds

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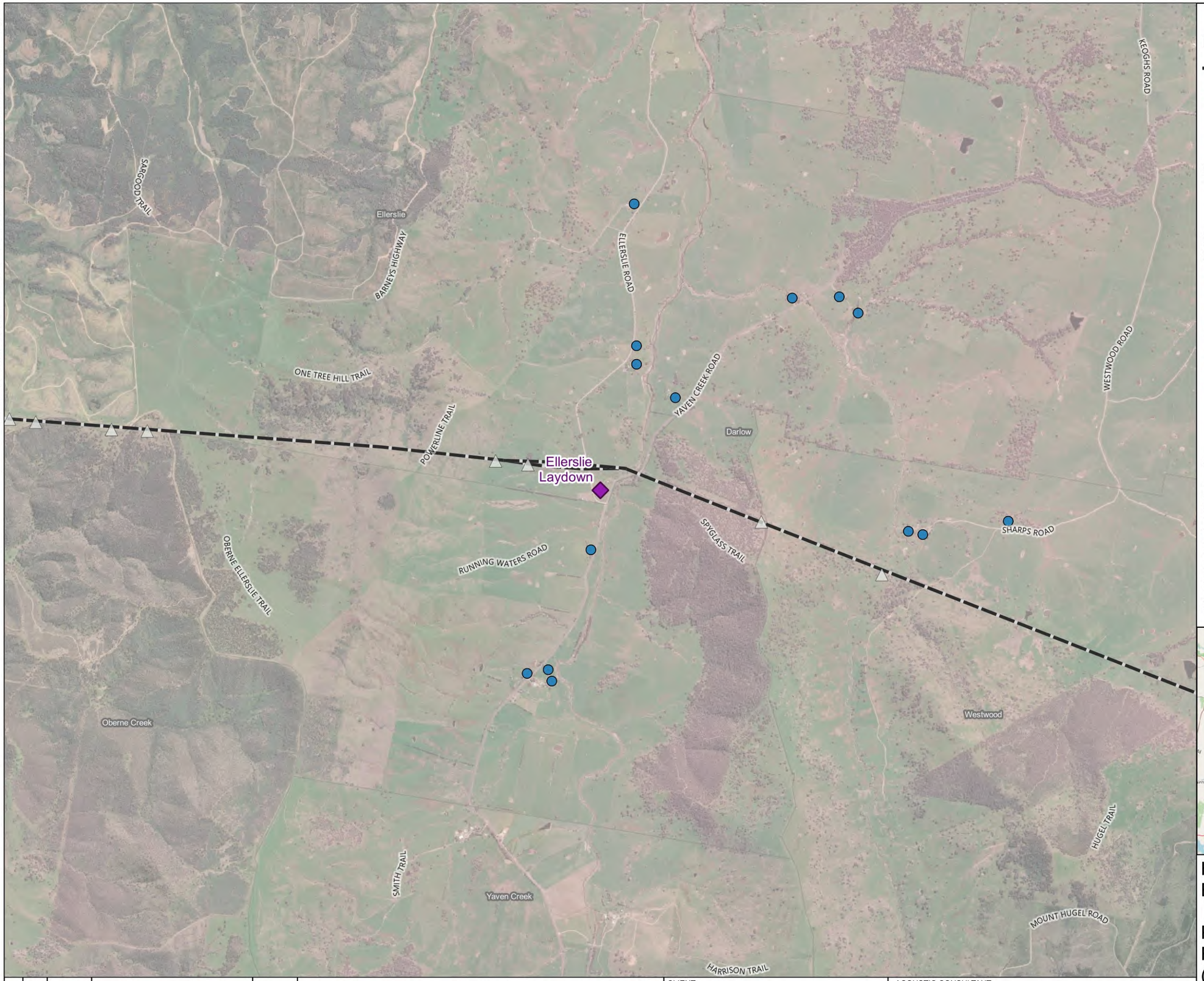
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Sheet 1 of 6

Plot Date: 12/02/26 - 14:25 Layout: TN422 Helicopter laydown lmax day ooh

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5,000 m
4,000
3,000
2,000
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0

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
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- 25+ dB above NML (N, V, R3, DR)

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HUMELINK WEST
Ellerslie Laydown

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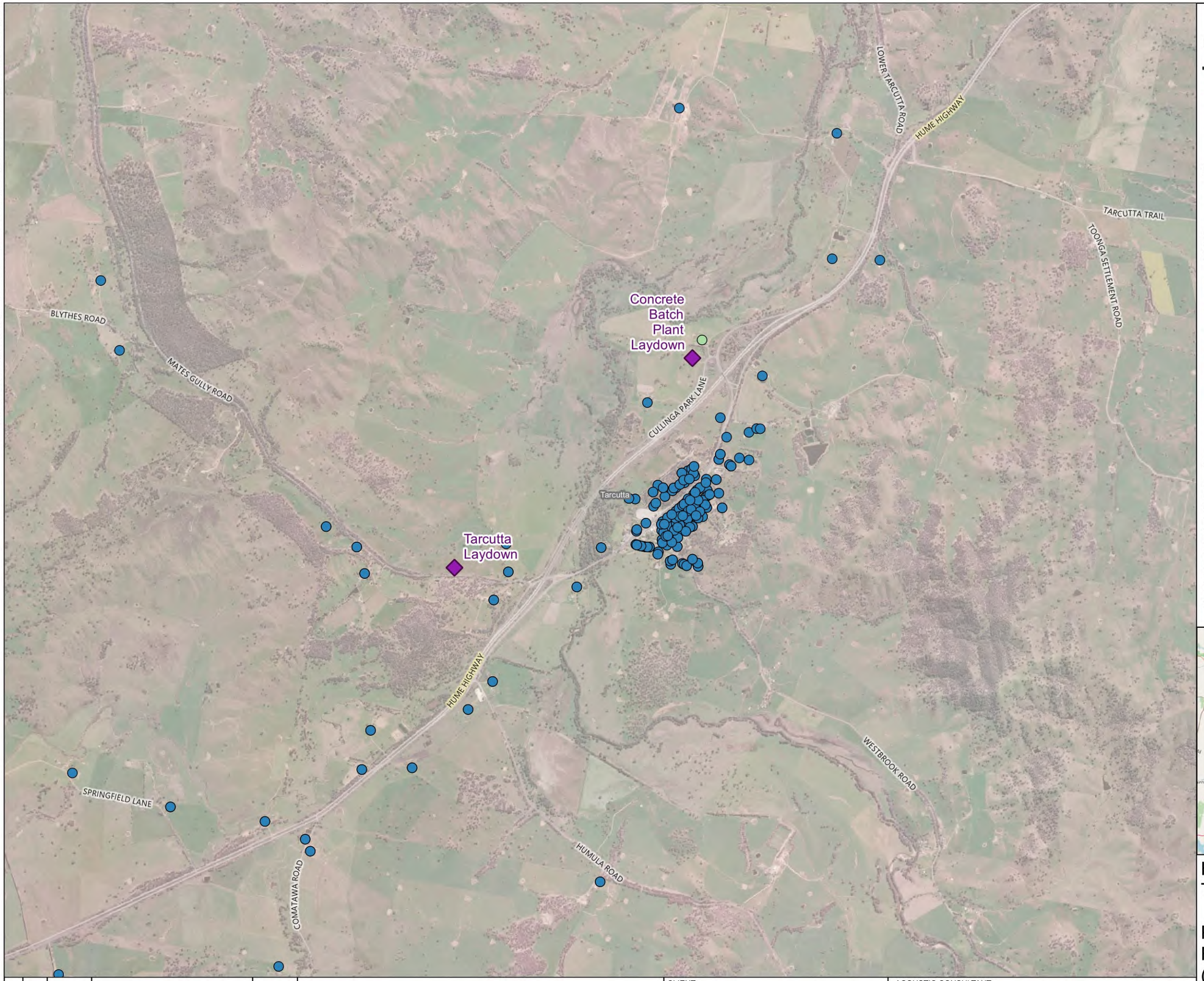
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

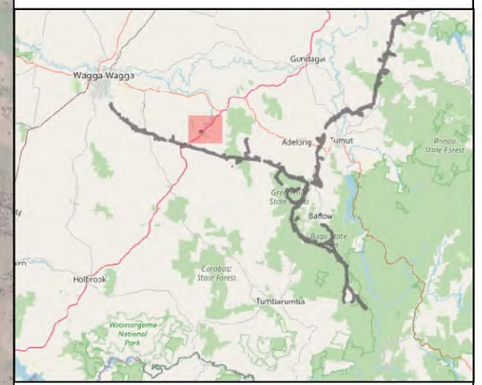
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- Compliant
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HUMELINK WEST
Tarcutta Laydown

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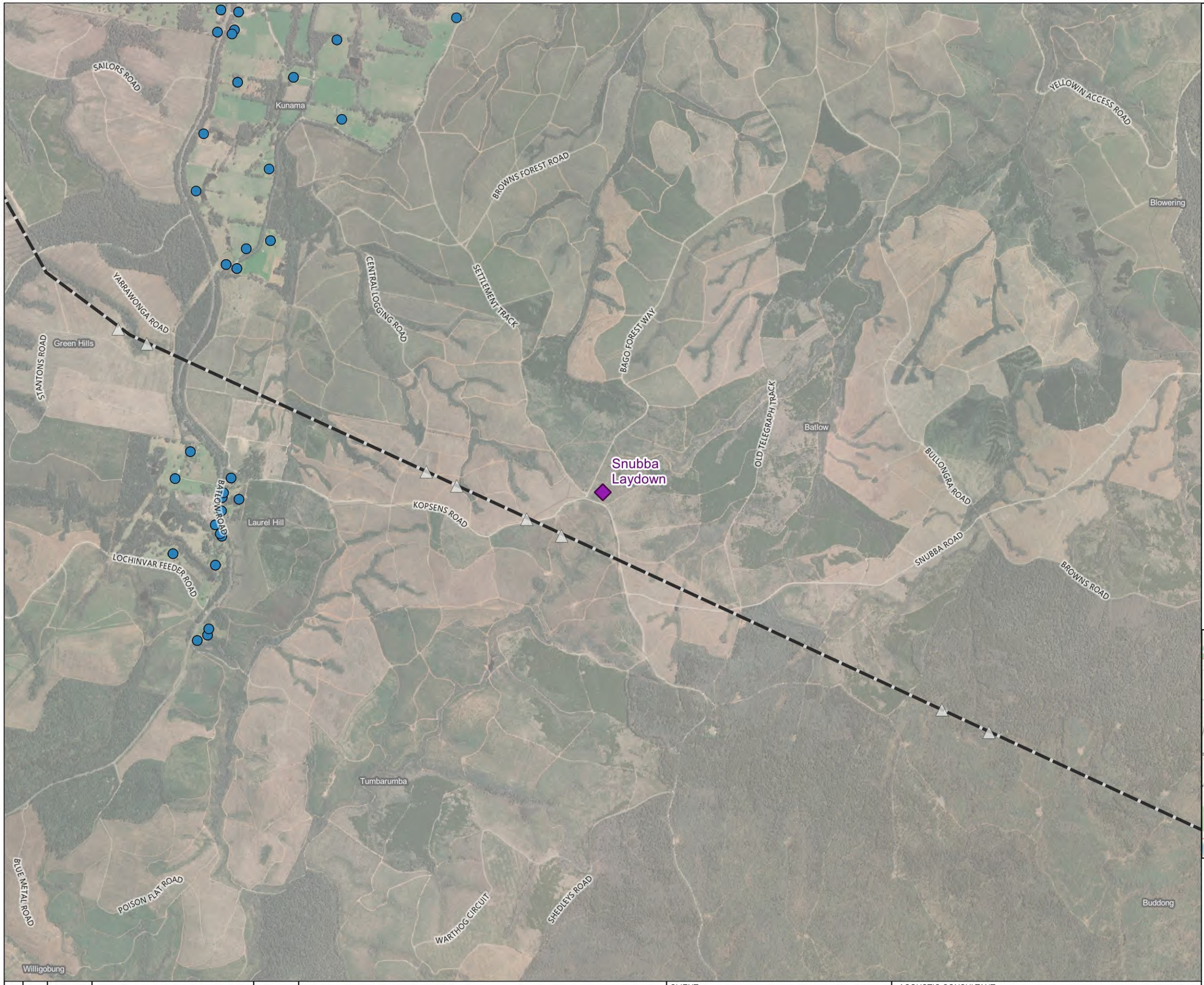
A3 Original | Co-ordinate System: MGA Zone 56

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1:35,000
FULL SIZE A3
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CLIENT
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5,000 m
4,000
3,000
2,000
1,000
0

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

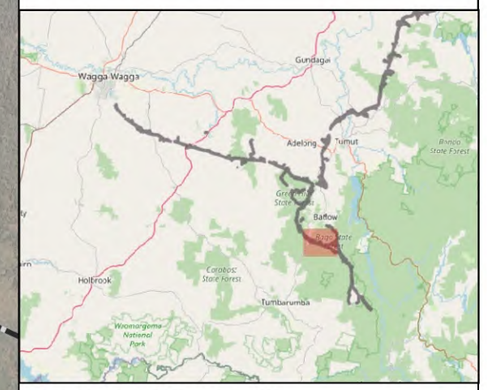
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HUMELINK WEST
Snubba Laydown

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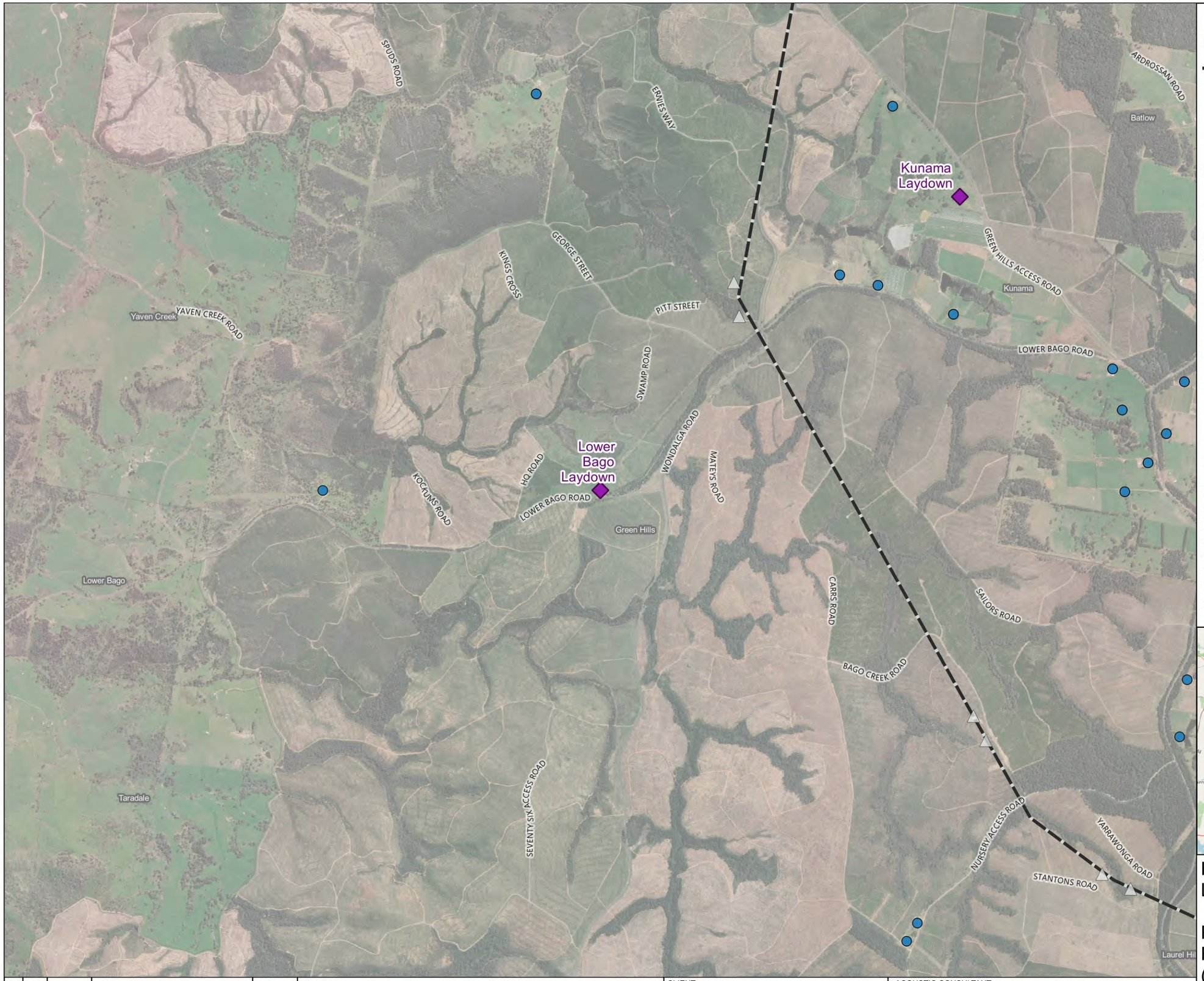
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:25 Layout: TN422 Helicopter laydown lmax day ooh

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



5,000 m
4,000
3,000
2,000
1,000
0

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

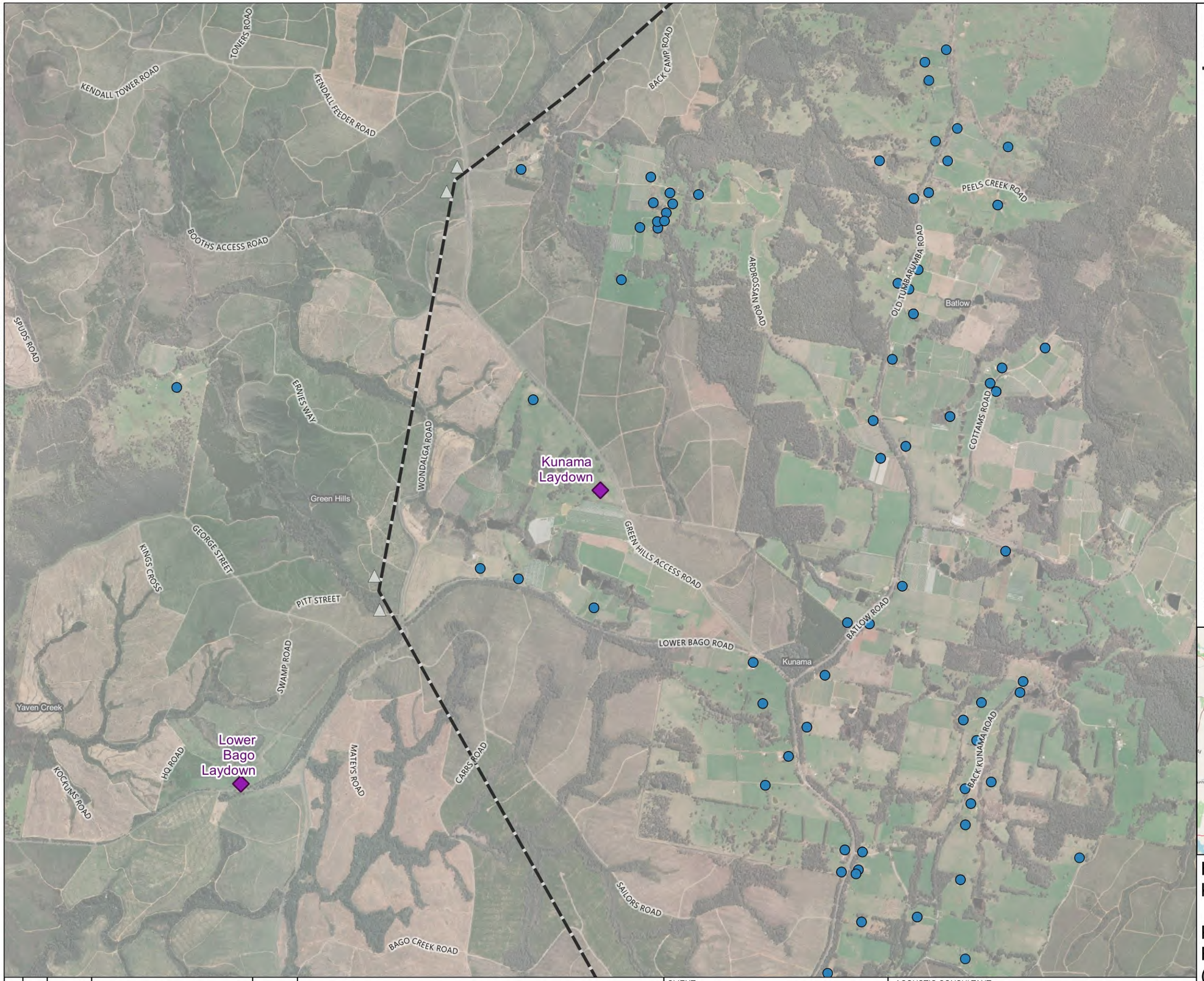
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1:35,000
FULL SIZE A3
NOTE: Do not scale from this drawing.

CLIENT
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT
RENZO TONIN & ASSOCIATES
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

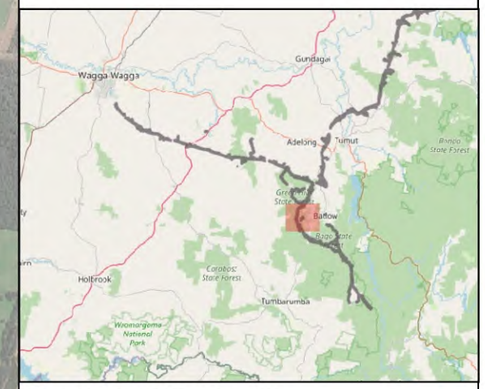
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

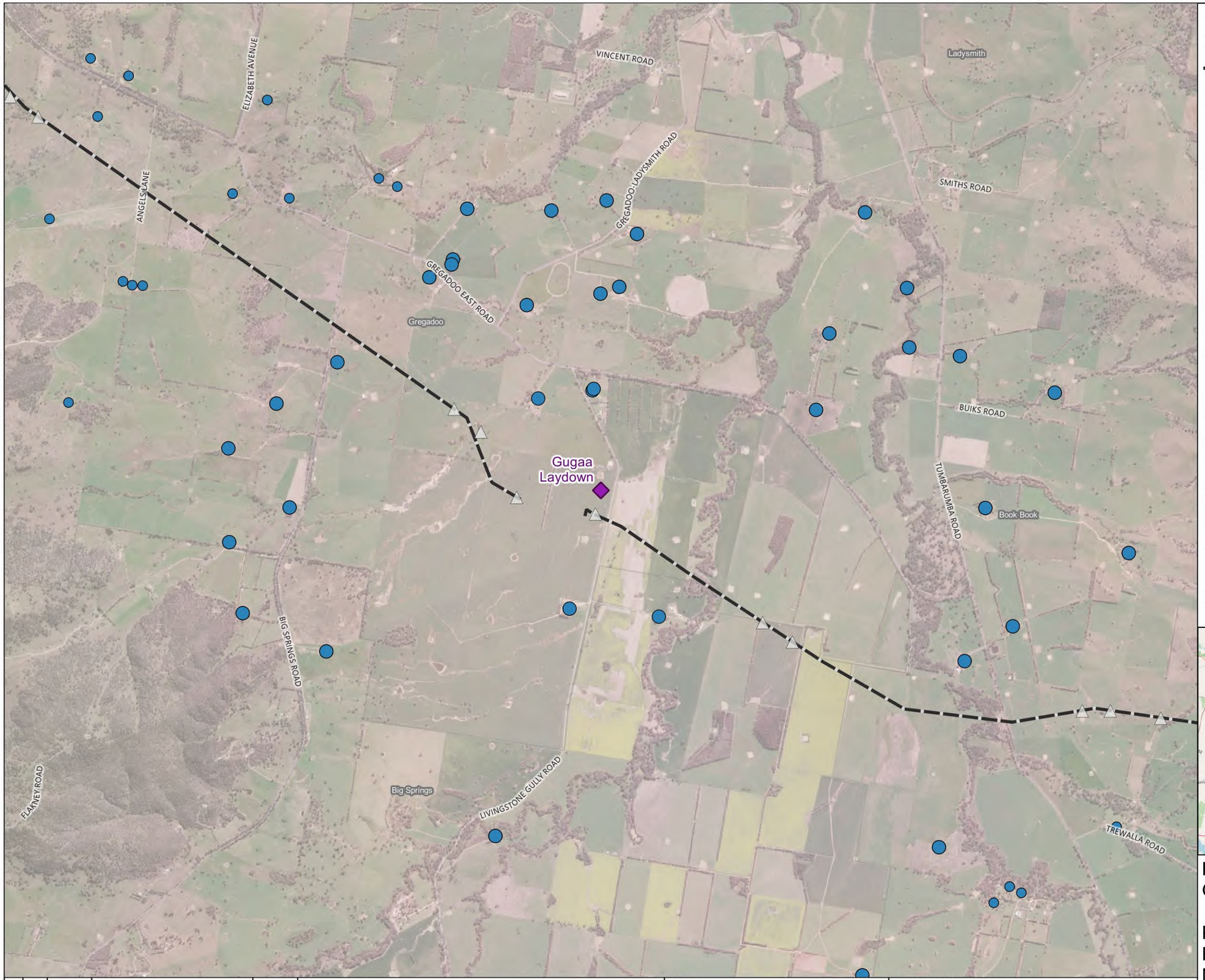
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

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inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:33 Layout: TN422 Helicopter laydown lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

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HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

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1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

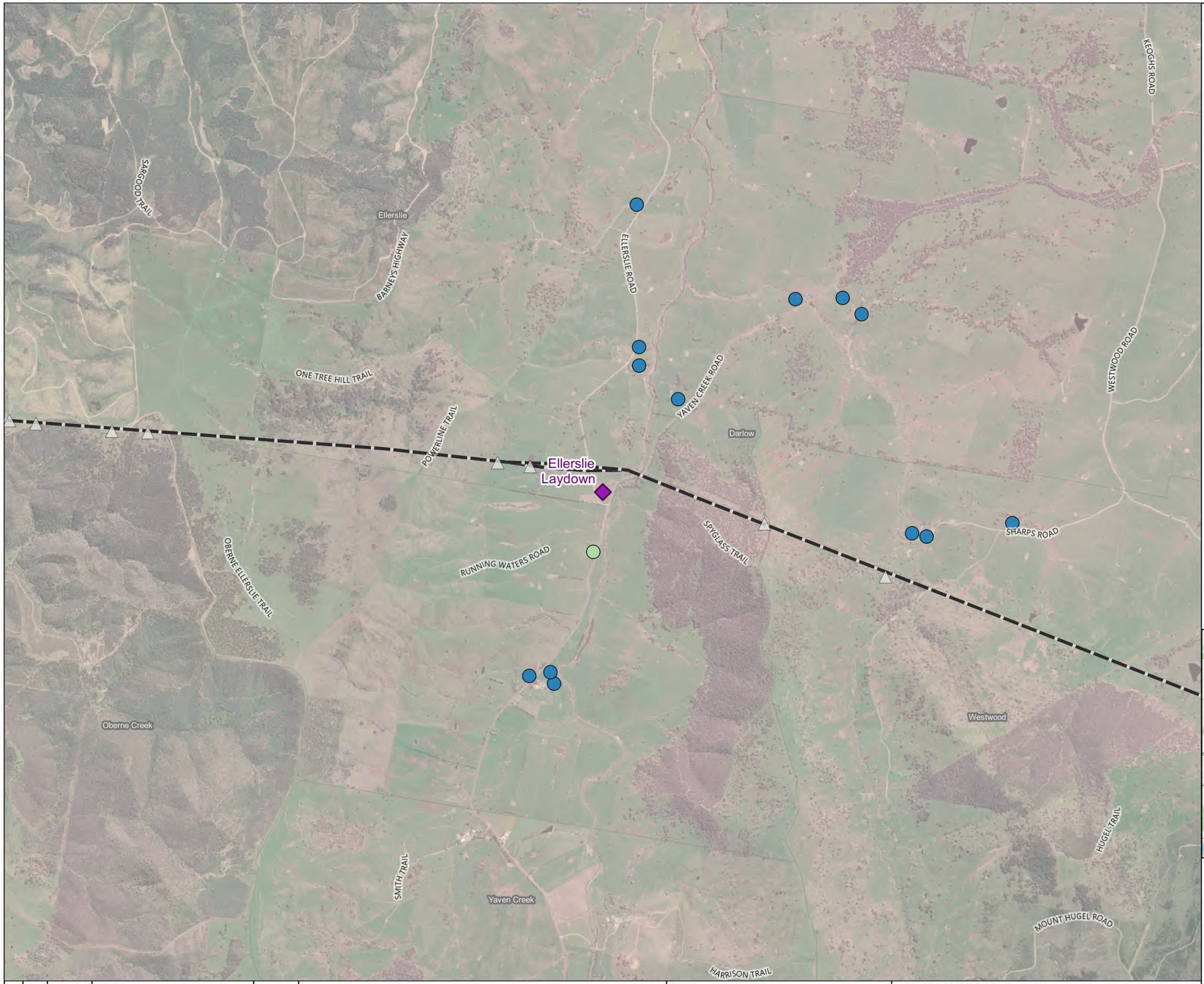
CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

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Plot Date: 12/02/26 - 14:33 Layout: TN422 Helicopter laydown lmax night

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LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
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HUMELINK WEST
Ellerslie Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

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1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

CPB CONTRACTORS UGL

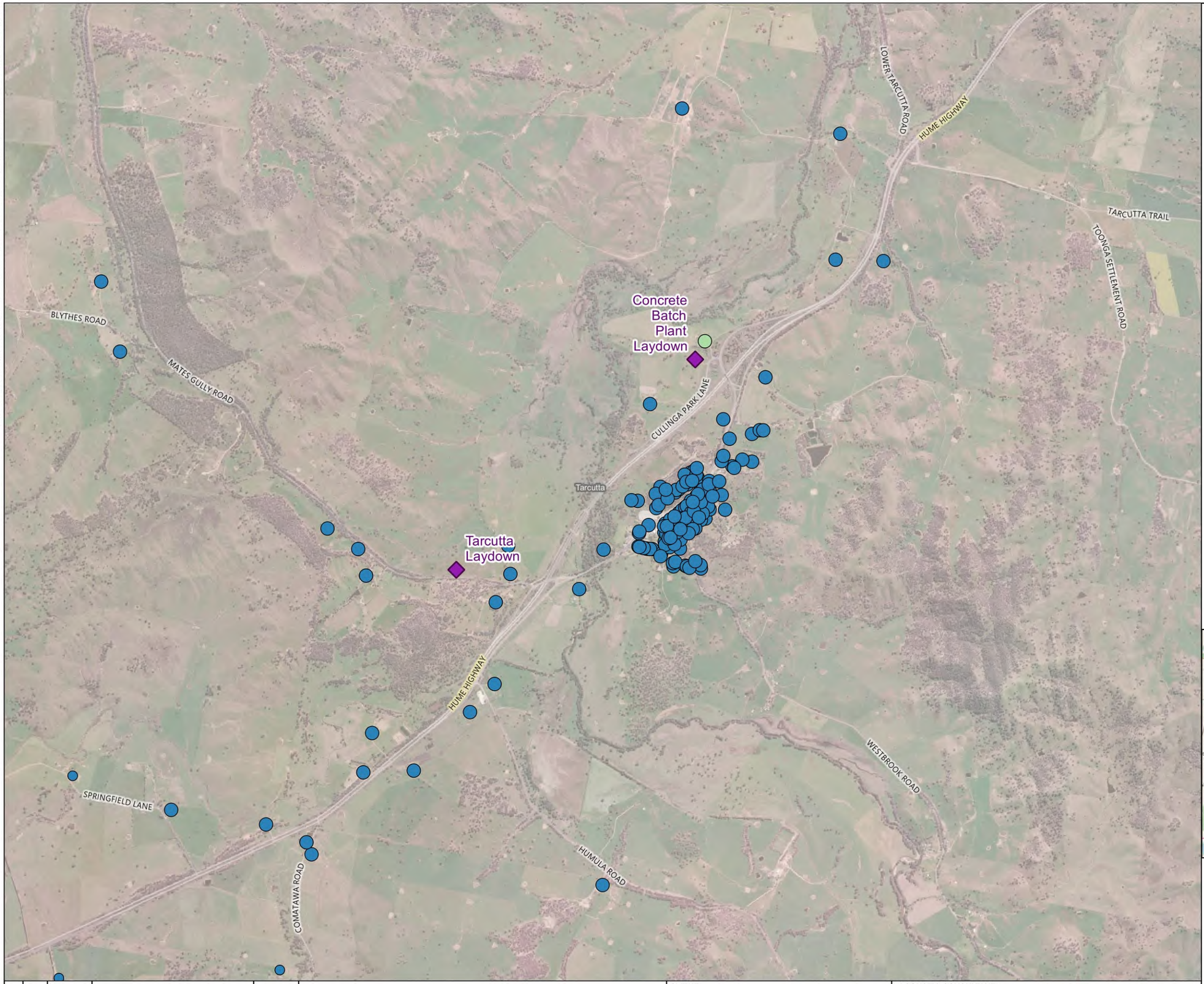
ACOUSTIC CONSULTANT

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Plot Date: 12/02/26 - 14:33 Layout: TN422 Helicopter laydown lmax night

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5,000 m



0 1,000 2,000 3,000 4,000

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

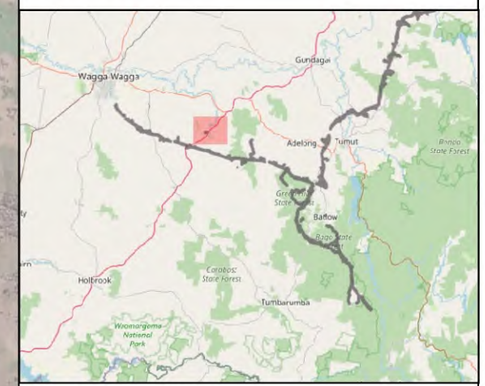
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HUMELINK WEST
Tarcutta Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

CPB CONTRACTORS UGL

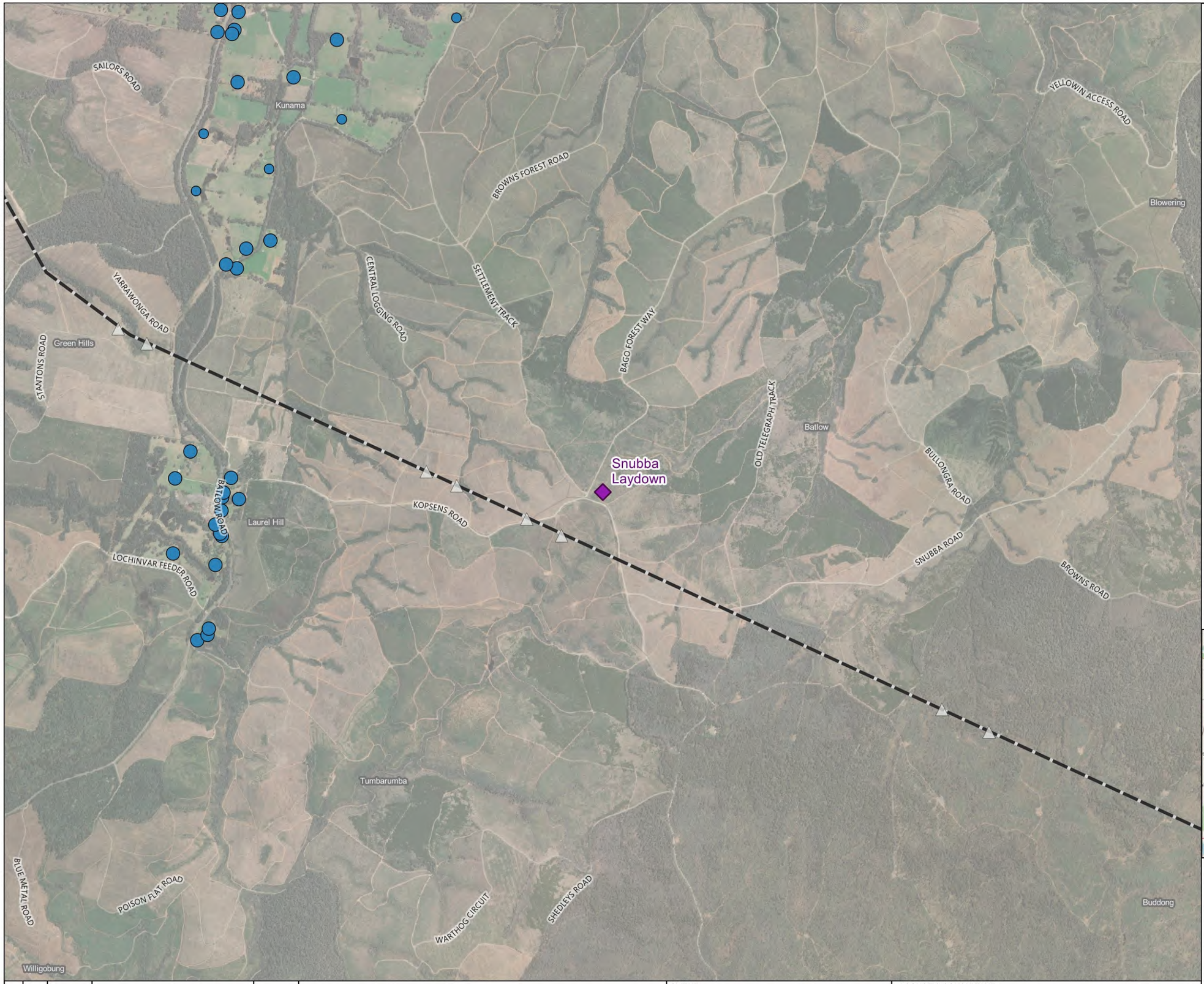
ACOUSTIC CONSULTANT

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Layout: TN422 Helicopter laydown lmax night

Plot Date: 12/02/26 - 14:33

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5,000 m

4,000

3,000

2,000

1,000

0

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

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- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

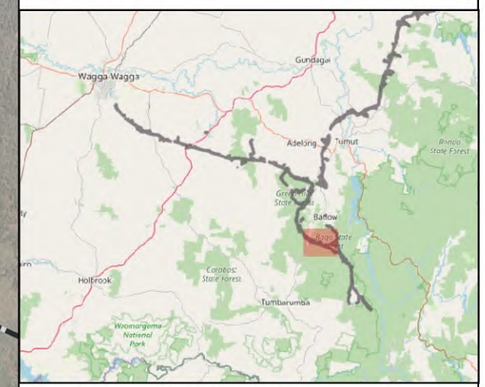
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HUMELINK WEST
Snubba Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original

Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES

inspired to achieve

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Plot Date: 12/02/26 - 14:33 Layout: TN422 Helicopter laydown lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz

5,000 m

0 1,000 2,000 3,000 4,000

SPUDS ROAD
ERNIES WAY
ARDROSSAN ROAD
Batlow
Kunama Laydown
GEORGE STREET
KINGS CROSS
GREEN HILLS ACCESS ROAD
Kunama
Yaven Creek
YAVEN CREEK ROAD
PITT STREET
LOWER BAGO ROAD
SWAMP ROAD
WONDALGA ROAD
MATEYS ROAD
Lower Bago Laydown
HQ ROAD
KOCKUMS ROAD
LOWER BAGO ROAD
Green Hills
Lower Bago
CARRS ROAD
SAILORS ROAD
BAGO CREEK ROAD
SEVENTY SIX ACCESS ROAD
Taradale
NURSERY ACCESS ROAD
YARRAWONGA ROAD
STANTONS ROAD
Laurel Hil

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

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- 6 - 15 dB above NML (N, V)
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- 25+ dB above NML (N, V, R2, DR, AA)

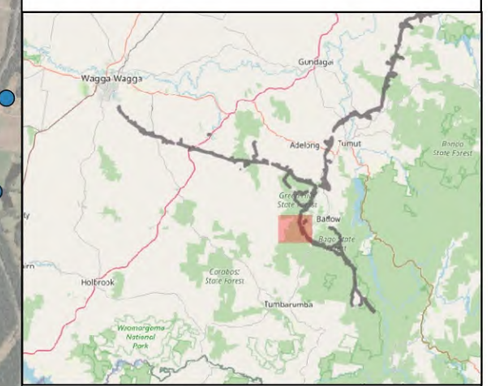
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Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

NOTE: Do not scale from this drawing.

CLIENT

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5,000 m

0 1,000 2,000 3,000 4,000

KENDALL TOWER ROAD
TONERS ROAD
KENDALL FEEDER ROAD
BACK CAMP ROAD
BOOTHS ACCESS ROAD
PEELS CREEK ROAD
OLD TUMBARUMBA ROAD
ARDROSSAN ROAD
Batlow
SPUDS ROAD
ERNIES WAY
WONDALGA ROAD
COTTAMS ROAD
Kunama Laydown
Green Hills
GEORGE STREET
KINGS CROSS
GREEN HILLS ACCESS ROAD
PITT STREET
BATLOW ROAD
LOWER BAGO ROAD
Kunama
SWAMP ROAD
Yaven Creek
Lower Bago Laydown
HQ ROAD
MATEYS ROAD
CARRS ROAD
BACK KUNAMA ROAD
KOCKUMS ROAD
SAILORS ROAD
BAGO CREEK ROAD

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
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Assesment periods

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HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Night NML due to typical Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

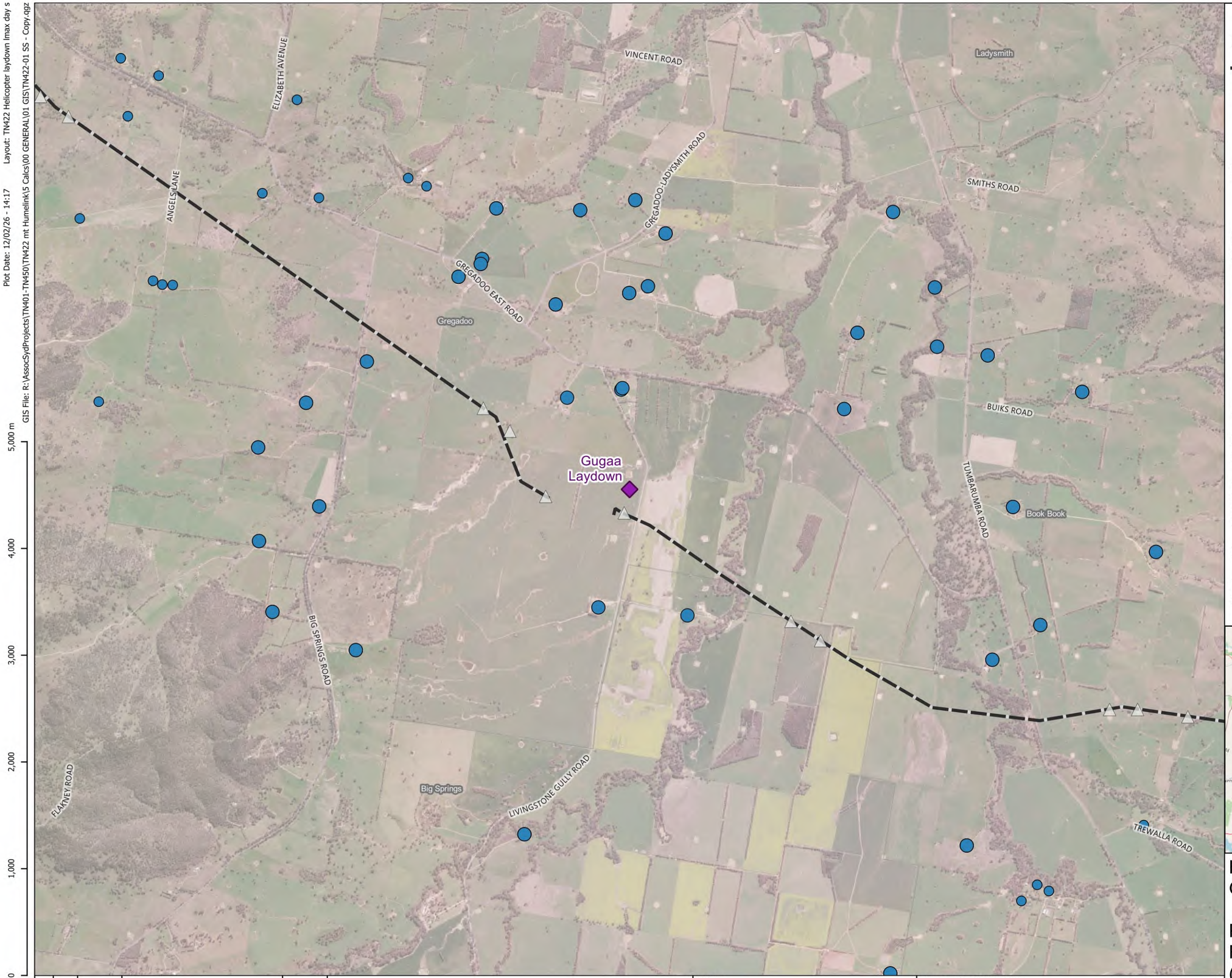
CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:17 Layout: TN422 Helicopter laydown lmax day s

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

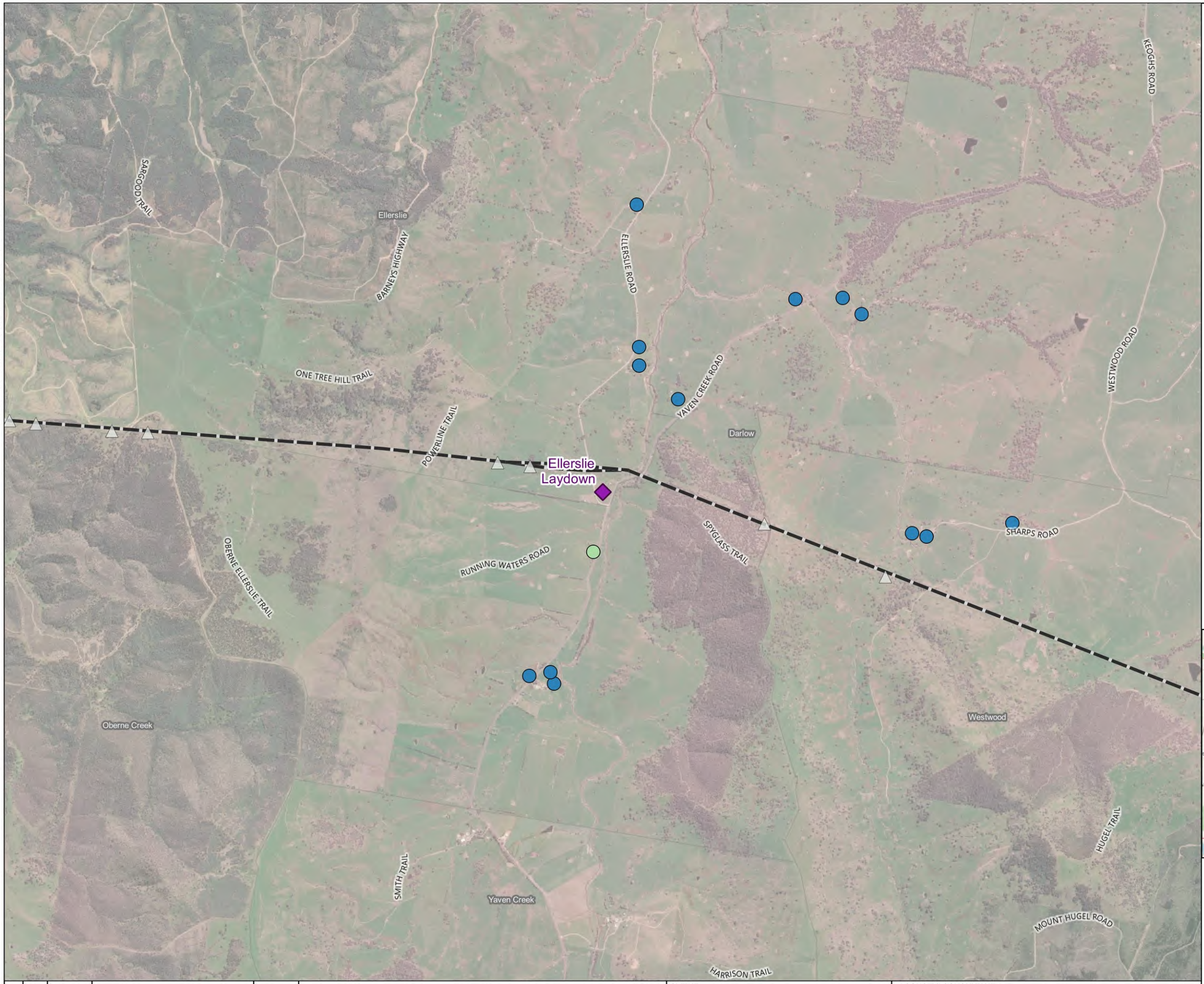
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
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HUMELINK WEST
Ellerslie Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

NOTE: Do not scale from this drawing.

CLIENT

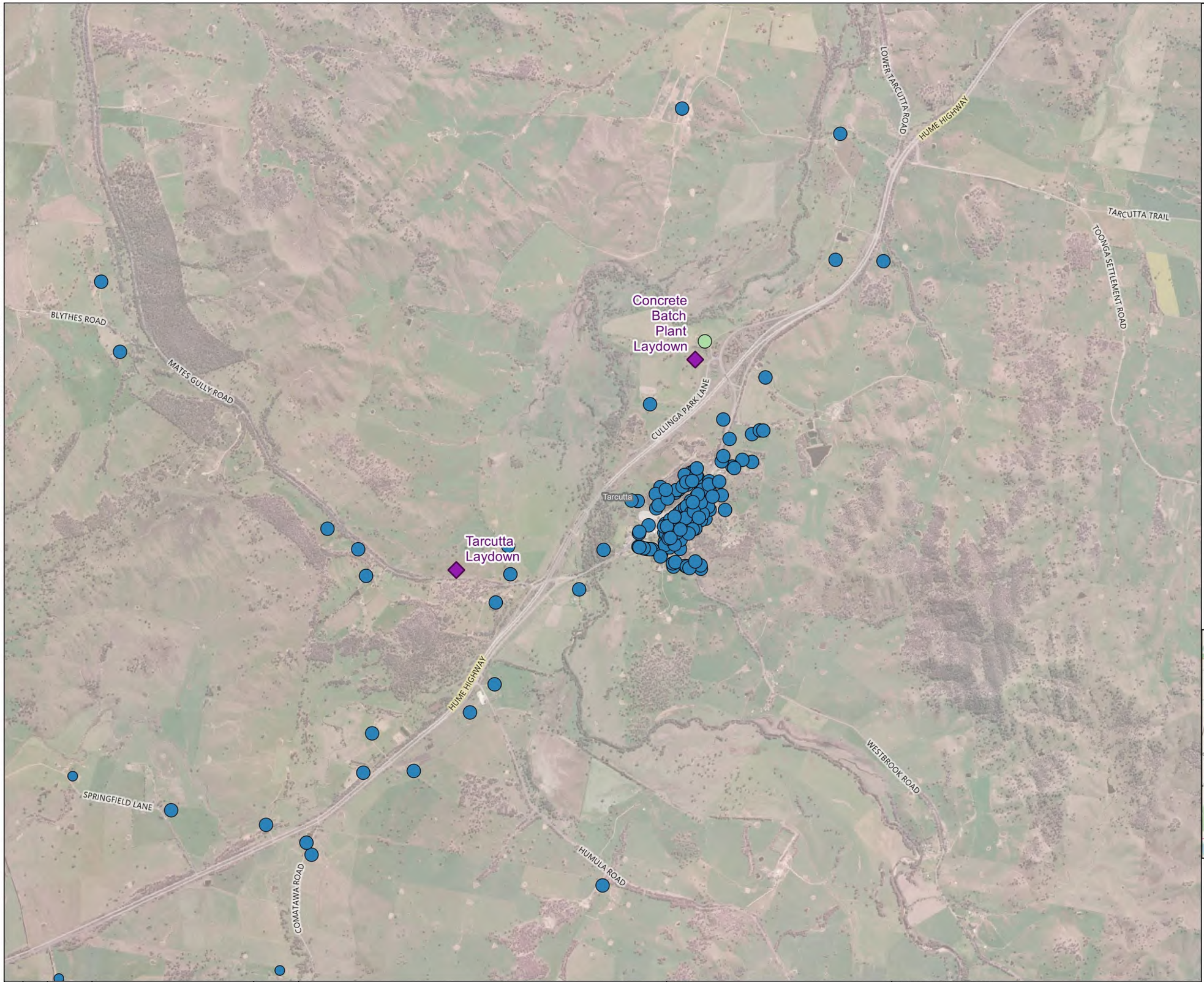
CPB CONTRACTORS UGL

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5,000 m

0 1,000 2,000 3,000 4,000

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

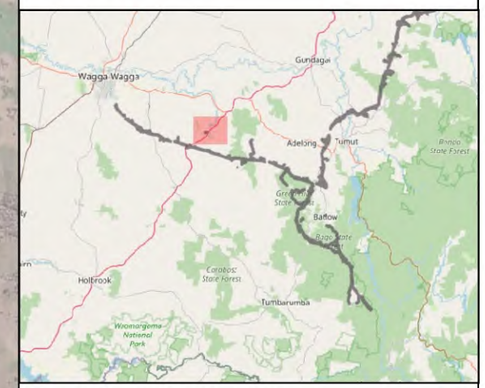
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HUMELINK WEST
Tarcutta Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

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CLIENT

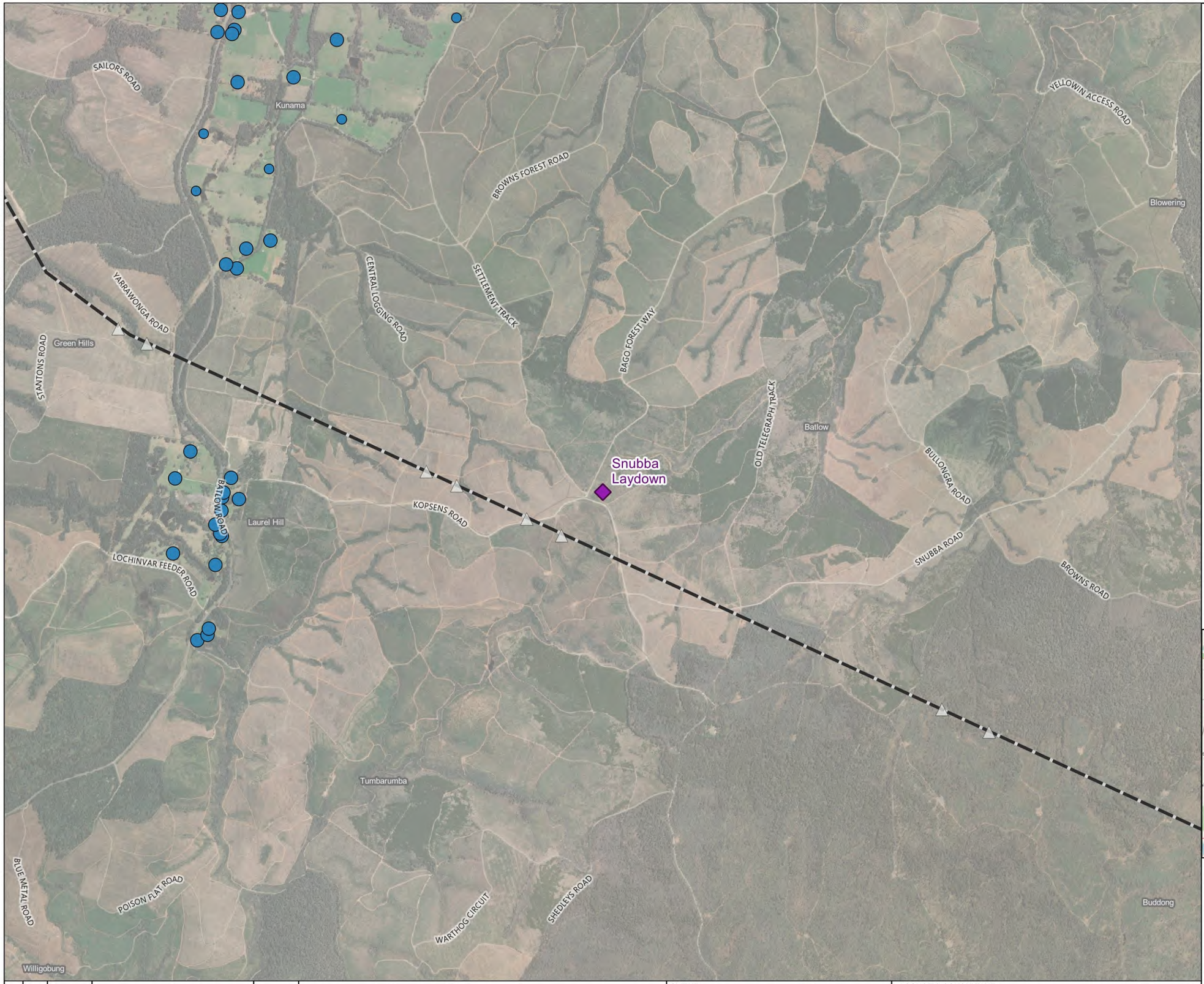
CPB CONTRACTORS UGL

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5,000 m
4,000
3,000
2,000
1,000
0

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

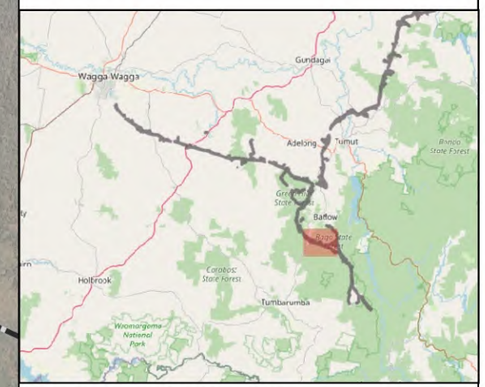
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HUMELINK WEST
Snubba Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 400 800 1,200 1,600 2,000 m

1:35,000

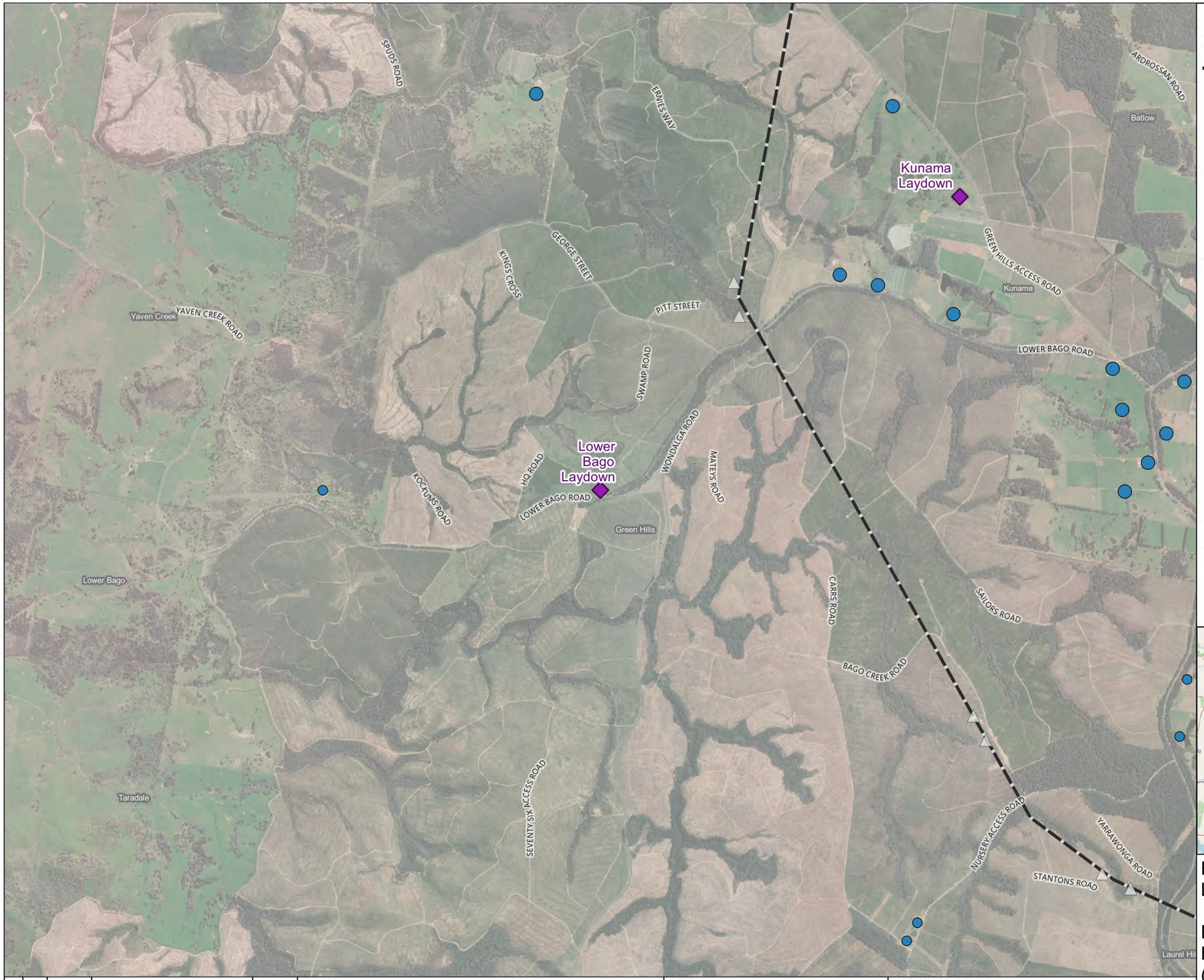
A3 Original | Co-ordinate System: MGA Zone 56 | FULL SIZE A3 | NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS, UGL

ACOUSTIC CONSULTANT
RENZO TONIN & ASSOCIATES
inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:17 Layout: TN422 Helicopter laydown lmax day s

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

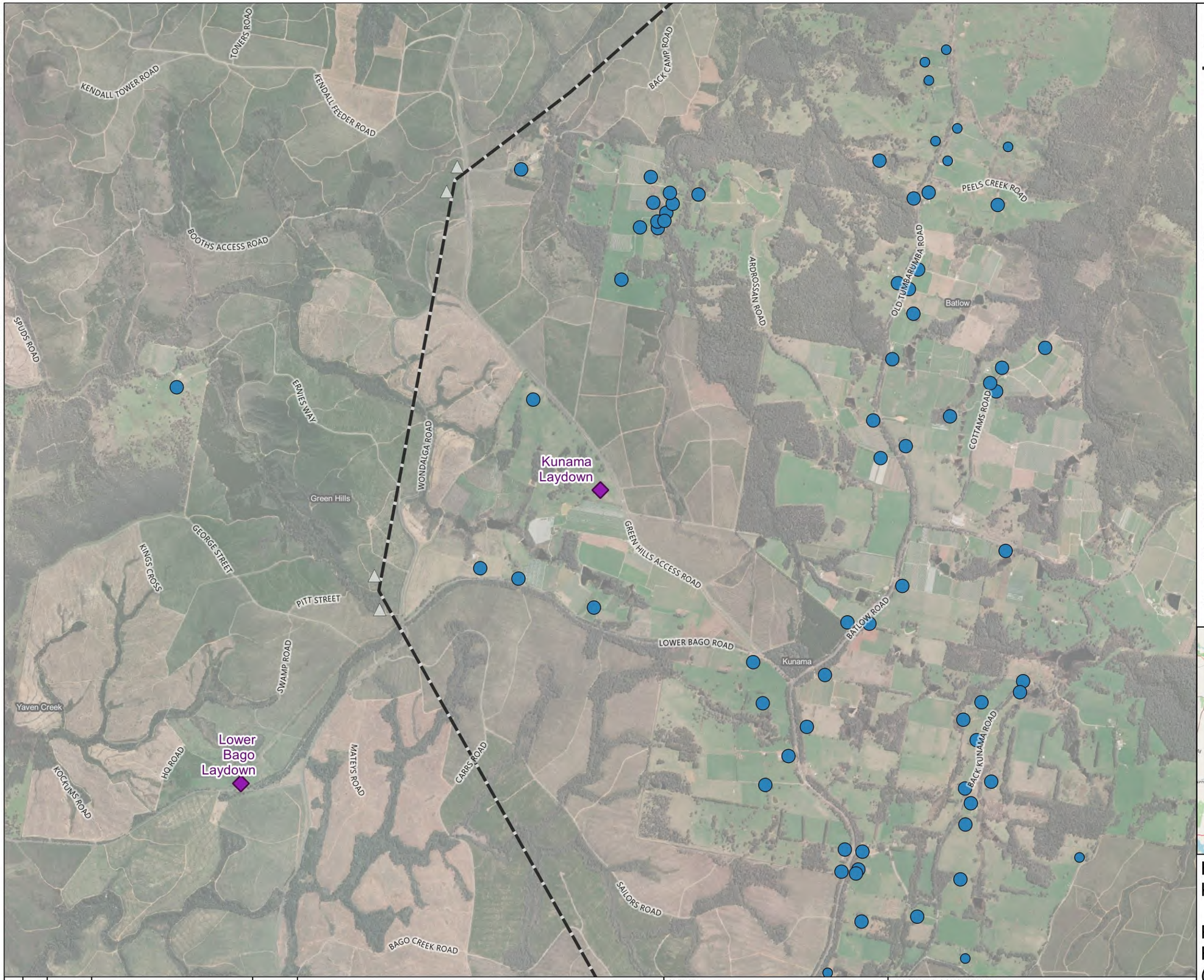
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

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Plot Date: 12/02/26 - 14:17 Layout: TN422 Helicopter laydown lmax day s

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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

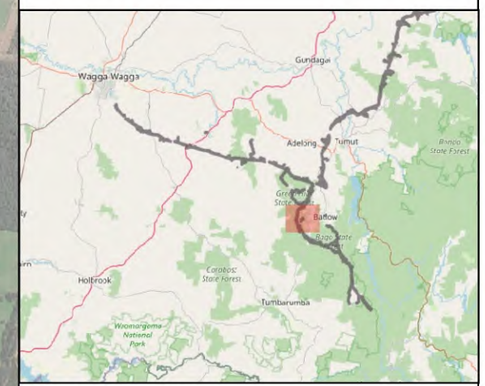
Assesment periods

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Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Day (standard) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

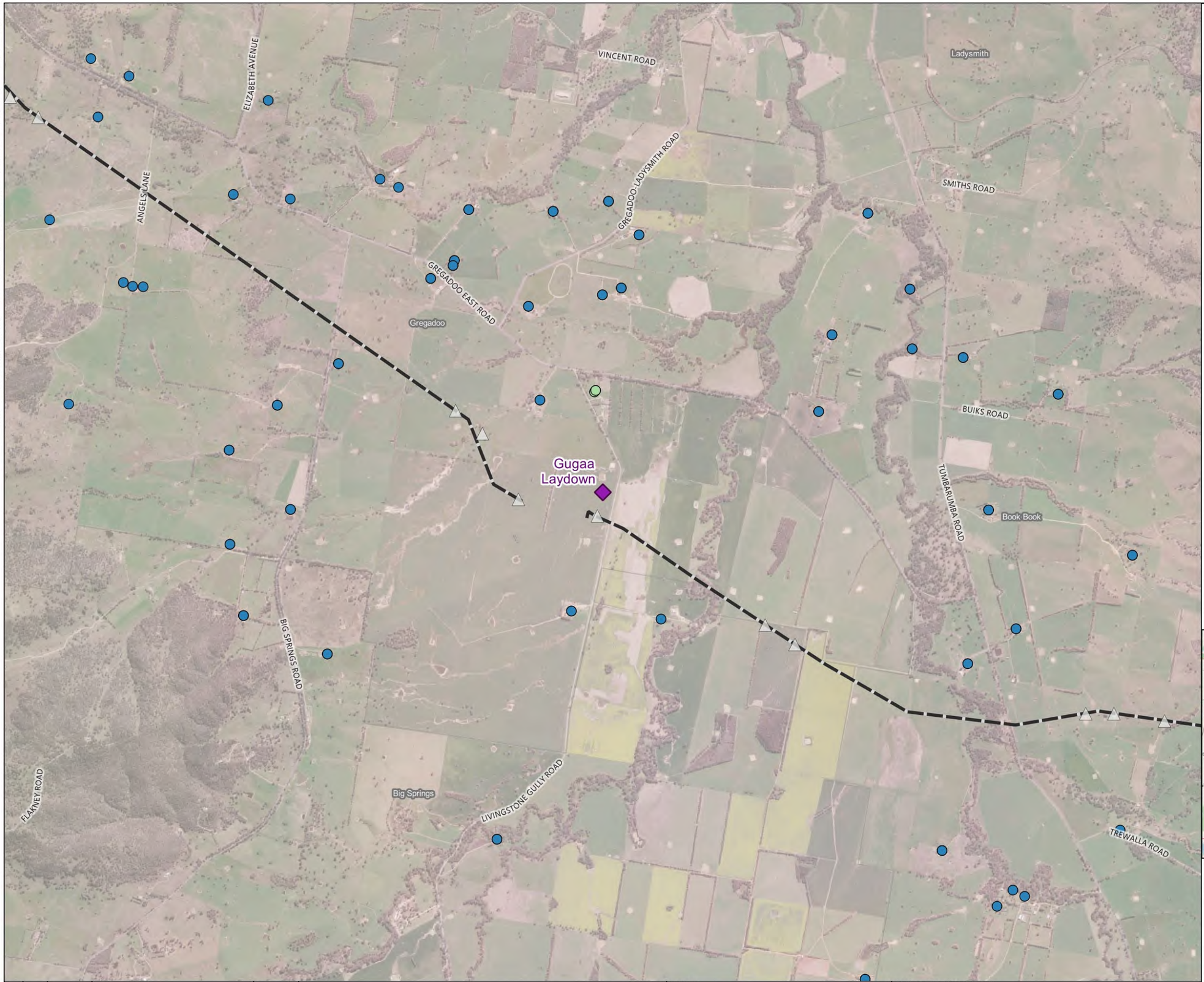
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:22 Layout: TN422 Helicopter laydown lmax day ooh

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

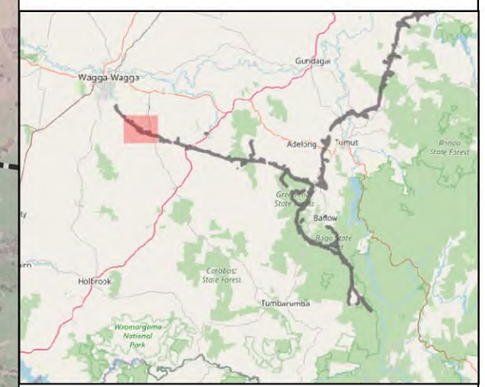
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 400 800 1,200 1,600 2,000 m
1:35,000

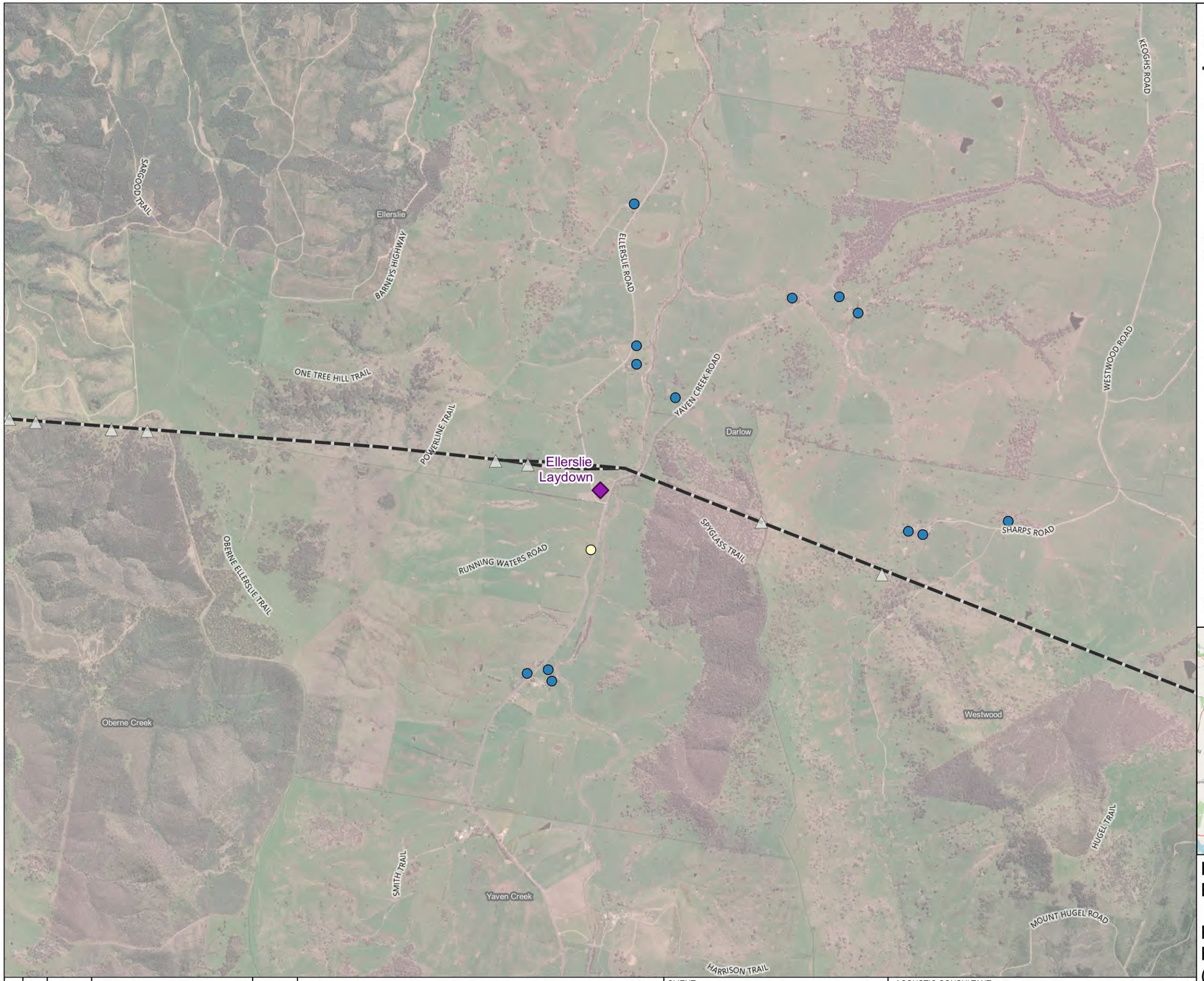
FULL SIZE A3
A3 Original
Co-ordinate System: MGA Zone 56
NOTE: Do not scale from this drawing.

CLIENT
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT
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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Ellerslie Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVED
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

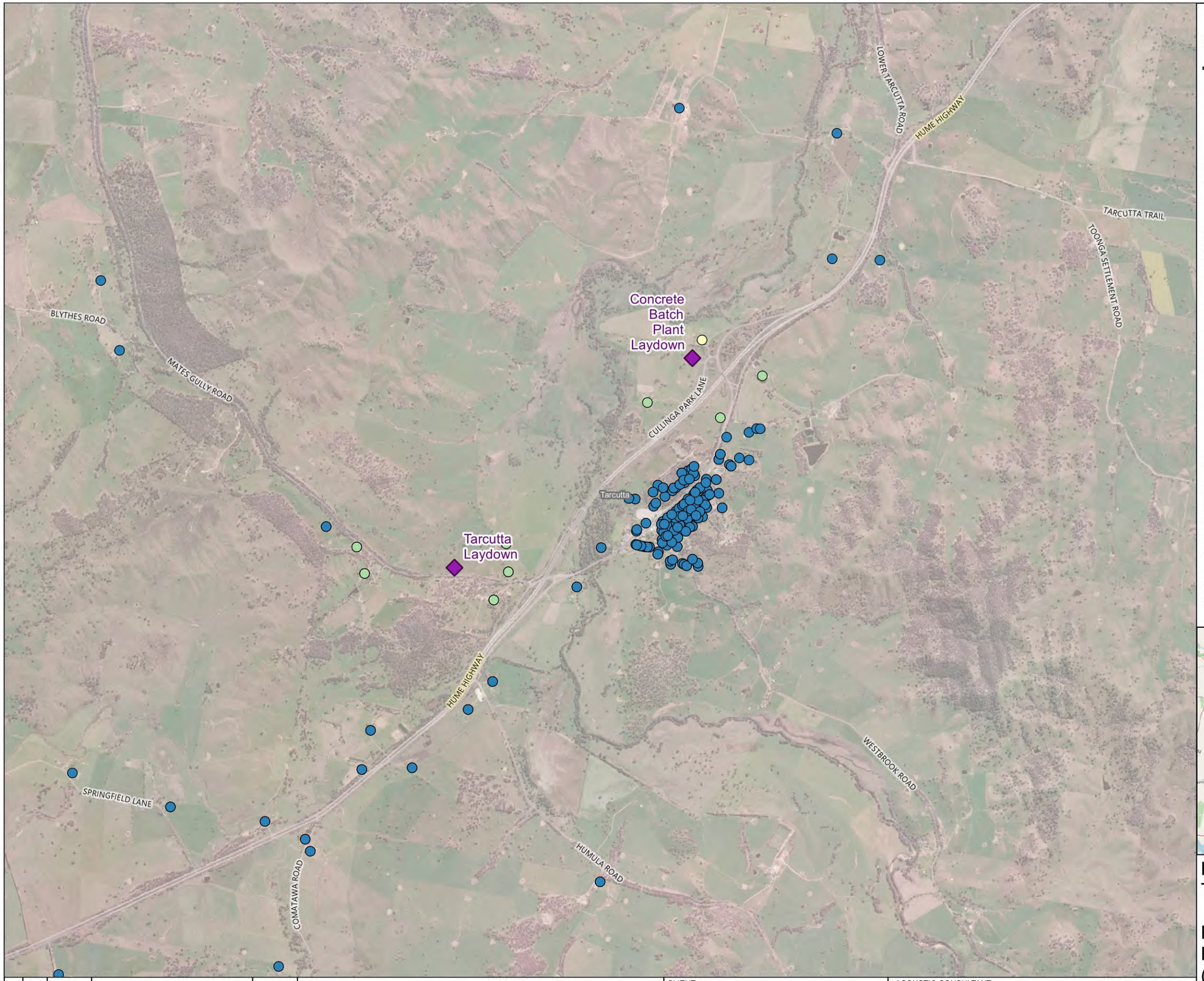
0 400 800 1,200 1,600 2,000 m
1:35,000
FULL SIZE A3
NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:22 Layout: TN422 Helicopter laydown lmax day ooh

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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

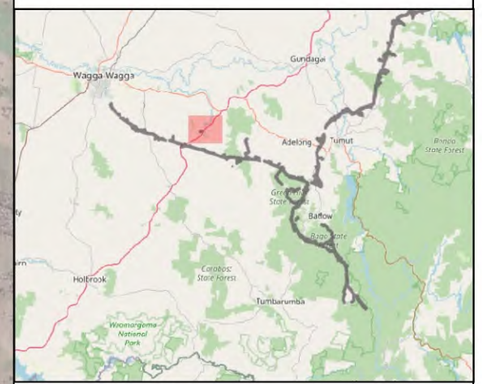
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Tarcutta Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m
1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

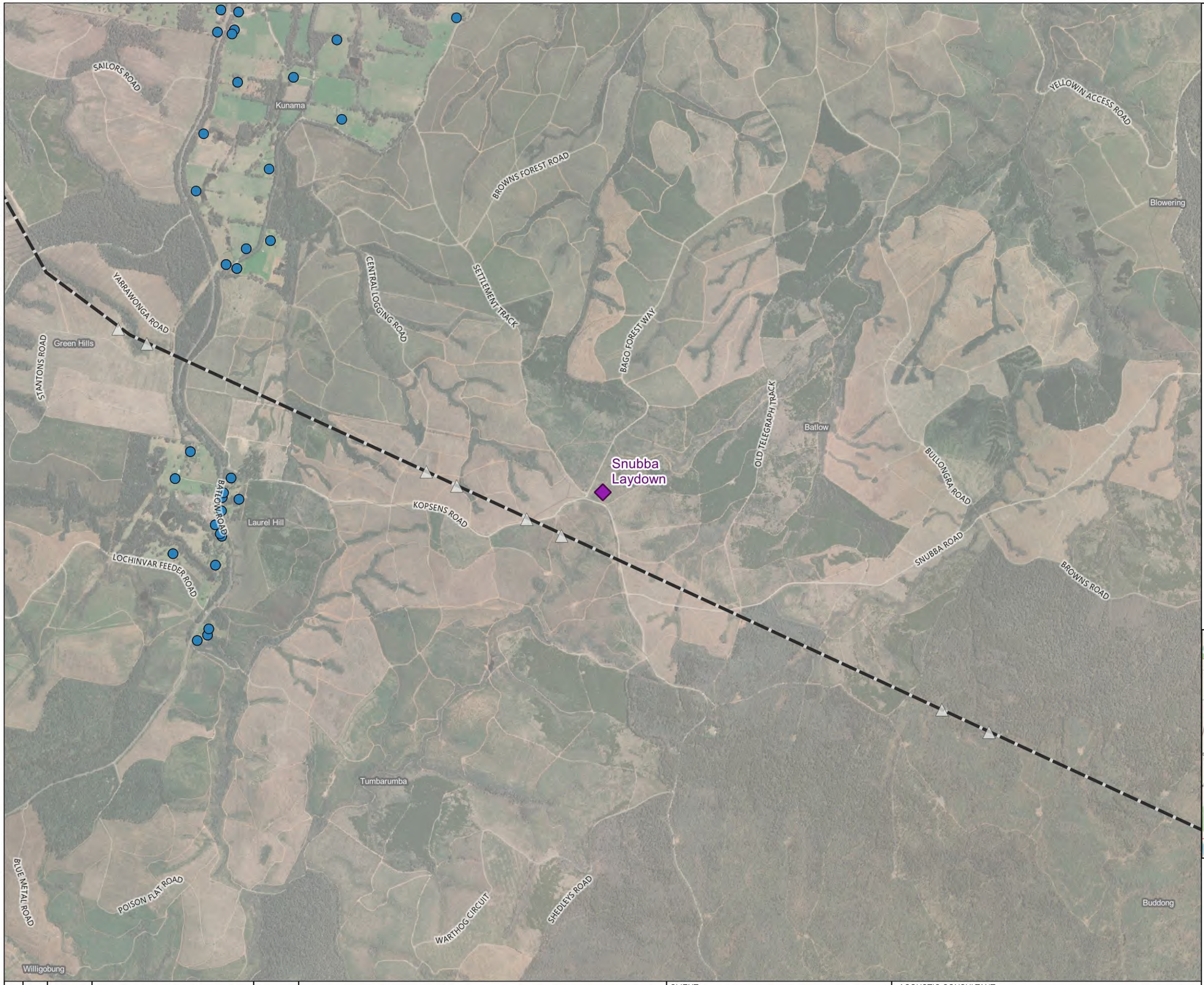
CLIENT

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Plot Date: 12/02/26 - 14:22 Layout: TN422 Helicopter laydown lmax day ooh
GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



0 1,000 2,000 3,000 4,000 5,000 m

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

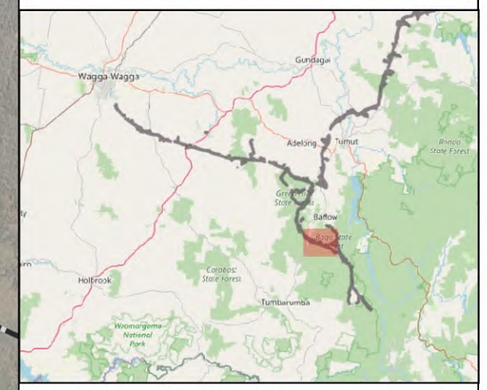
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Snubba Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

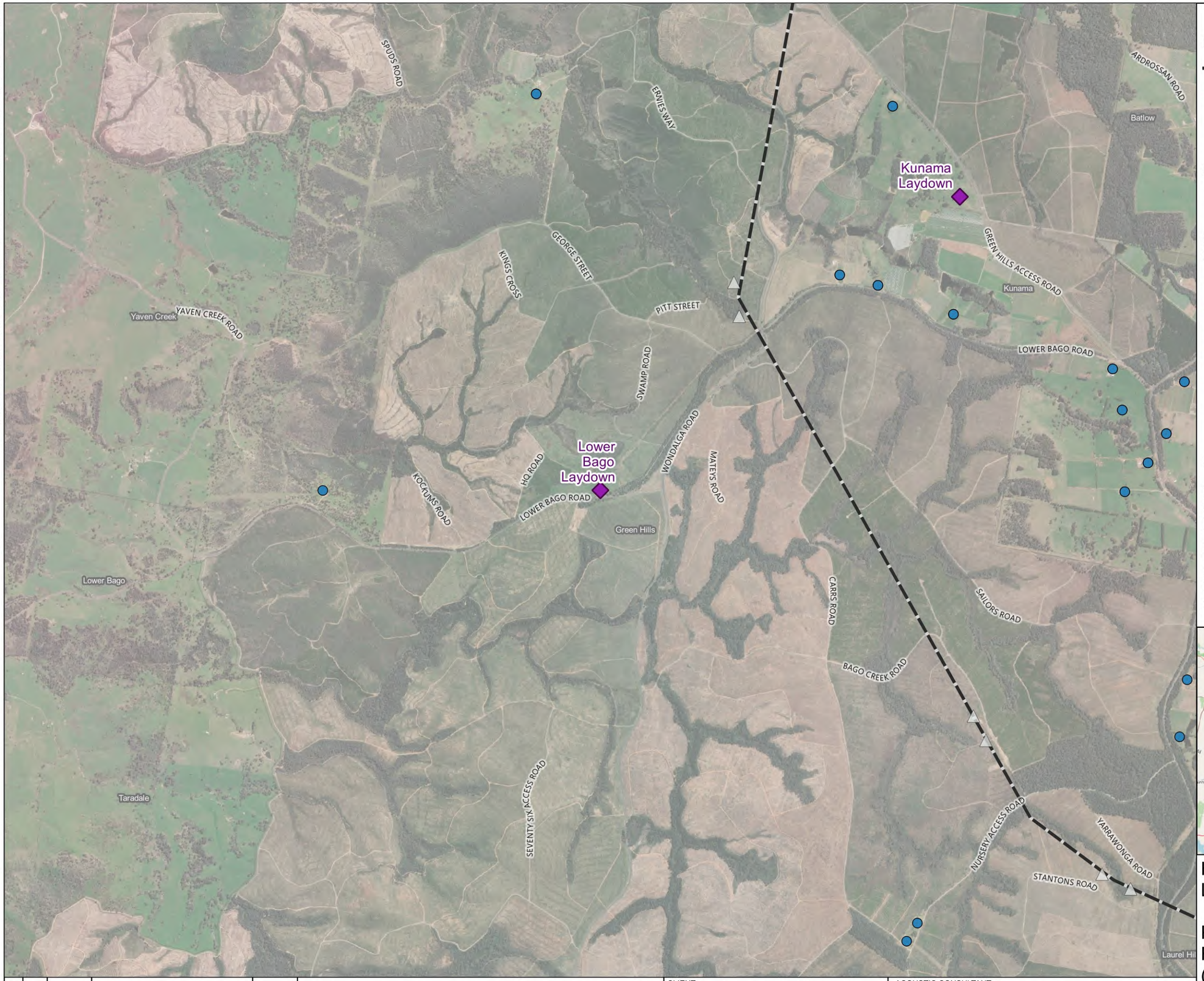
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FULL SIZE A3
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5,000 m
4,000
3,000
2,000
1,000
0

LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
Evening: Monday to Sunday 6pm to 10pm
Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

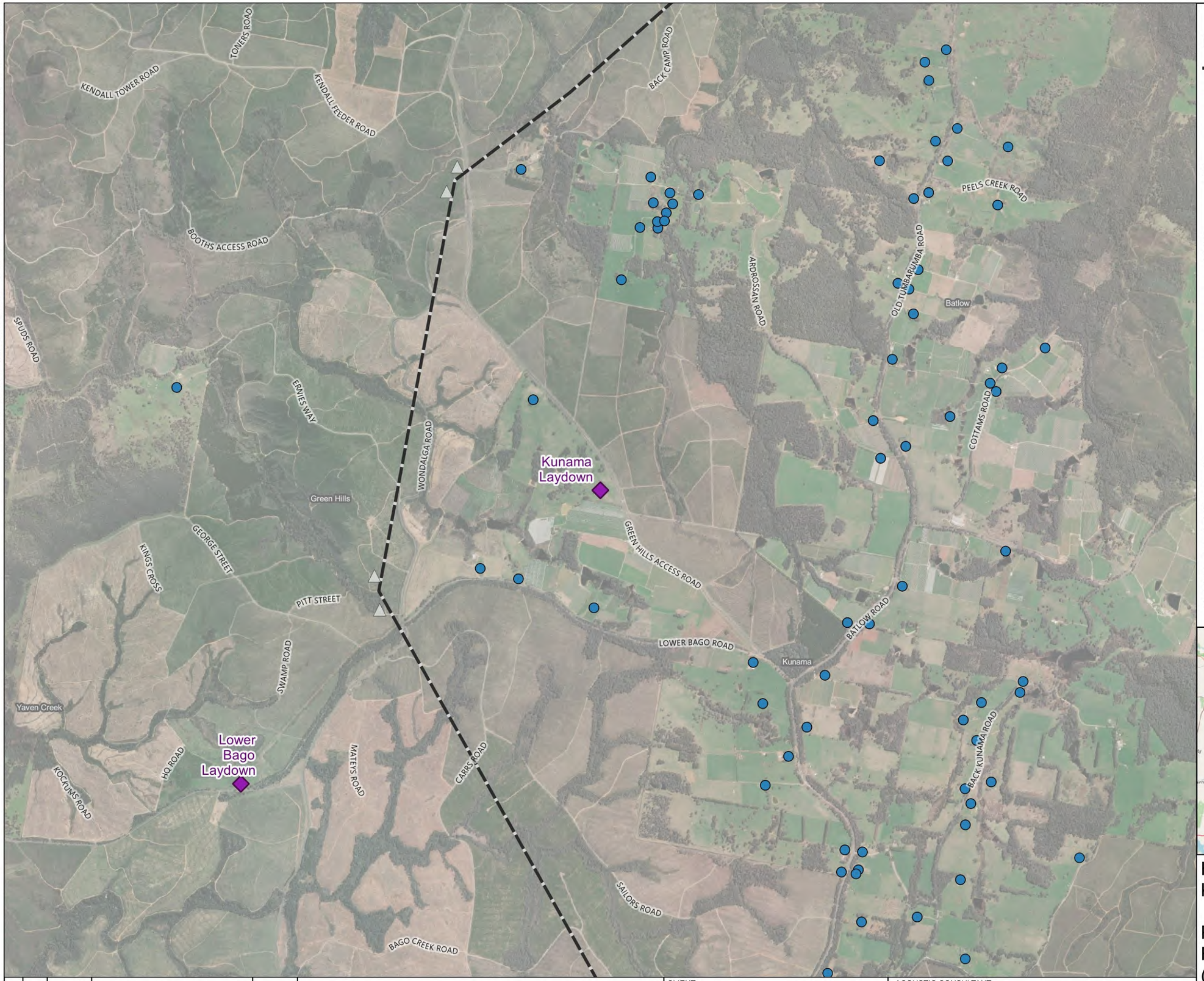
0 400 800 1,200 1,600 2,000 m
1:35,000
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CLIENT
CPB CONTRACTORS UGL

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LEGEND

- Stringing works alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

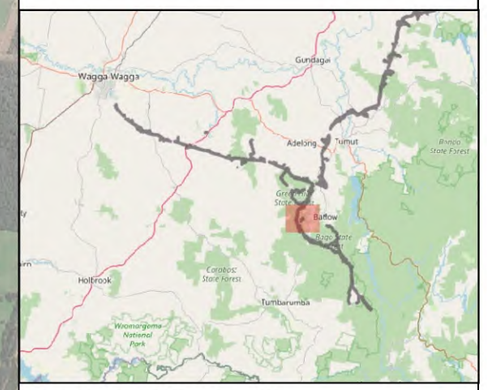
- Potential Residential

Predicted Noise level above Day (OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm
Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm
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HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Day (OOH) NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
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A3 Original | Co-ordinate System: MGA Zone 56

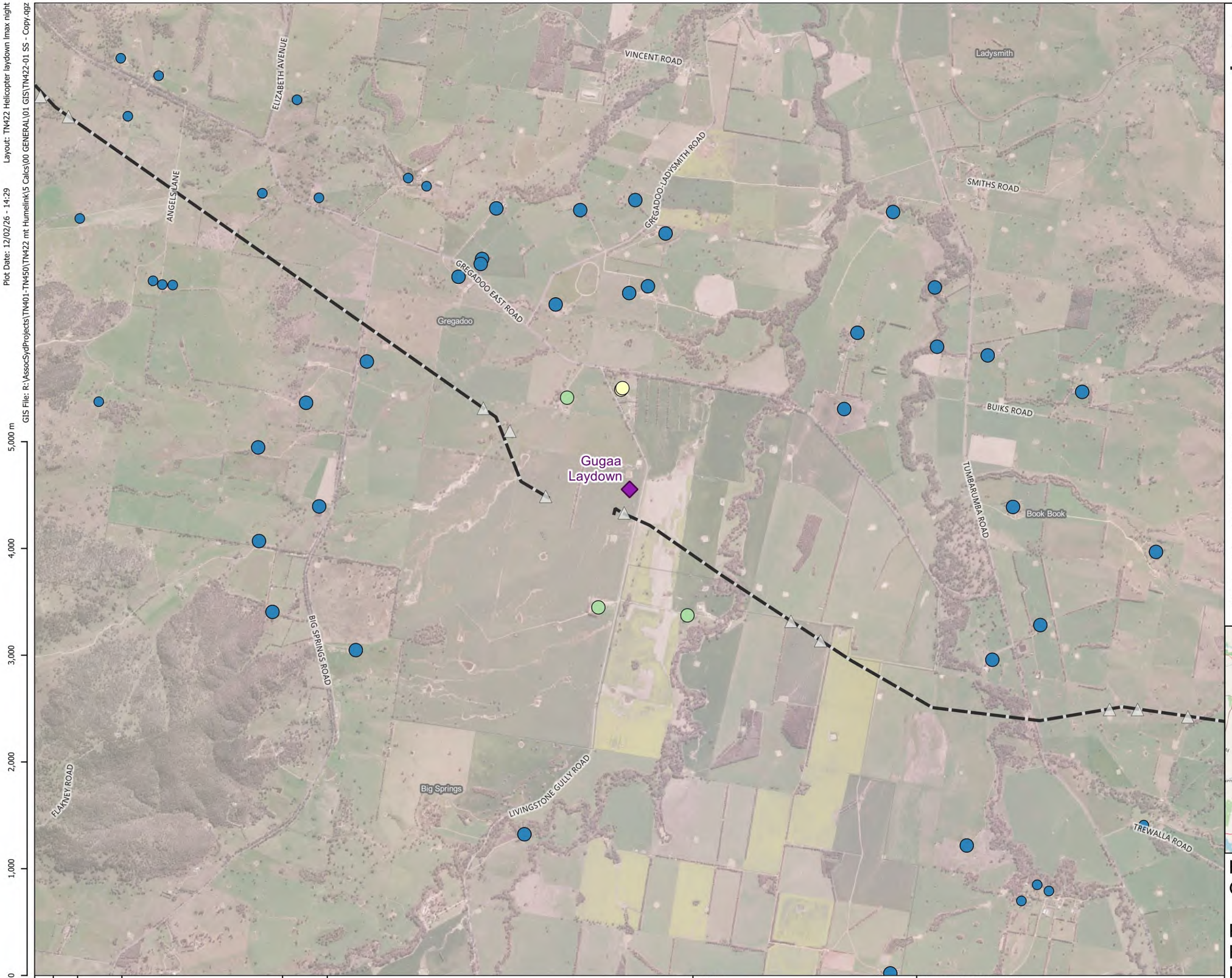
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:29 Layout: TN422 Helicopter laydown lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

Assesment periods

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HUMELINK WEST
Gugaa Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

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1:35,000

FULL SIZE A3

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CLIENT

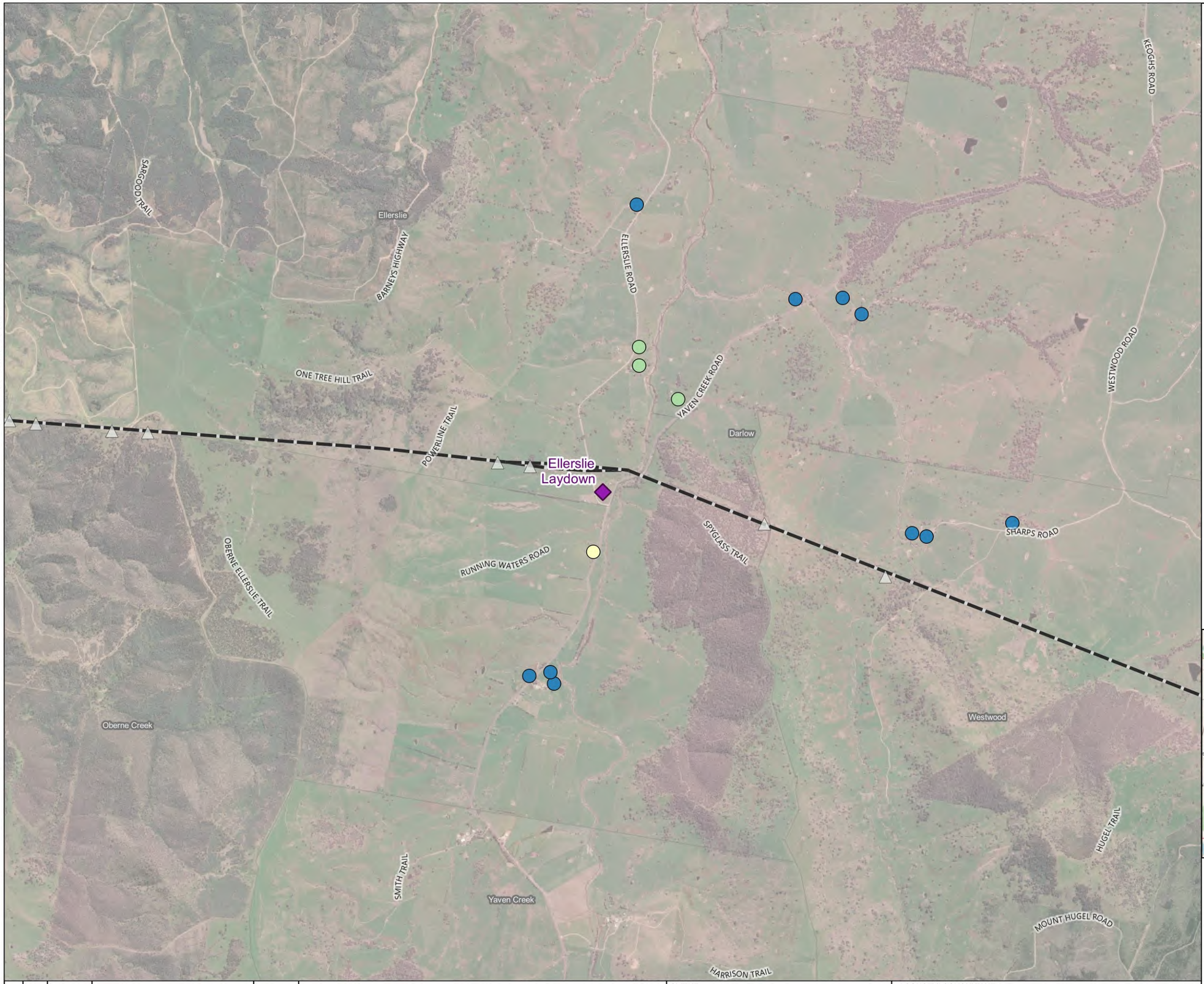
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LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
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Assesment periods

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HUMELINK WEST
Ellerslie Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
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A3 Original | Co-ordinate System: MGA Zone 56

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1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

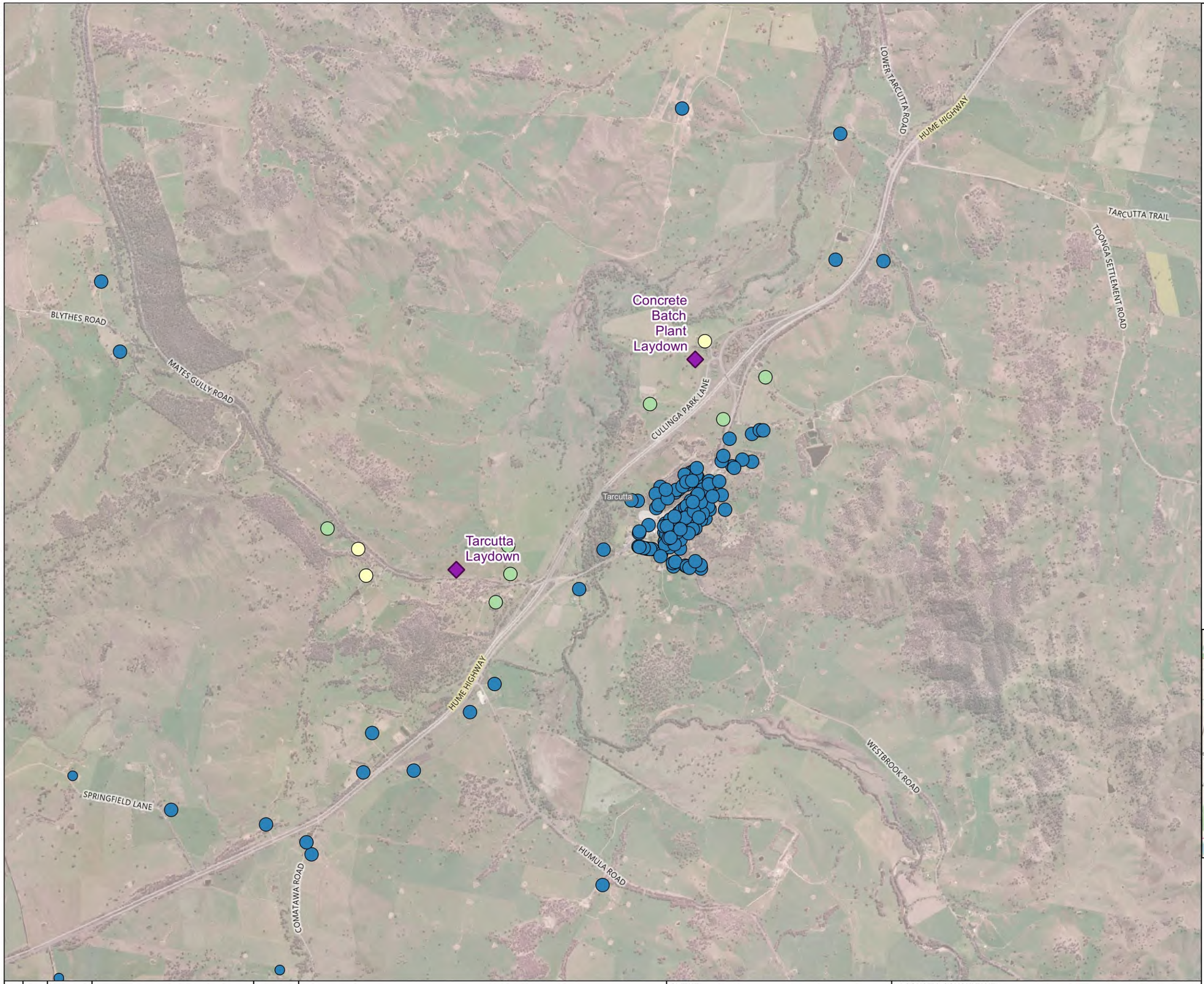
CPB CONTRACTORS UGL

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LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

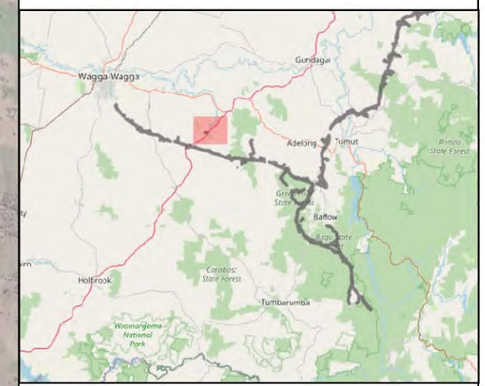
Assesment periods

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HUMELINK WEST
Tarcutta Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

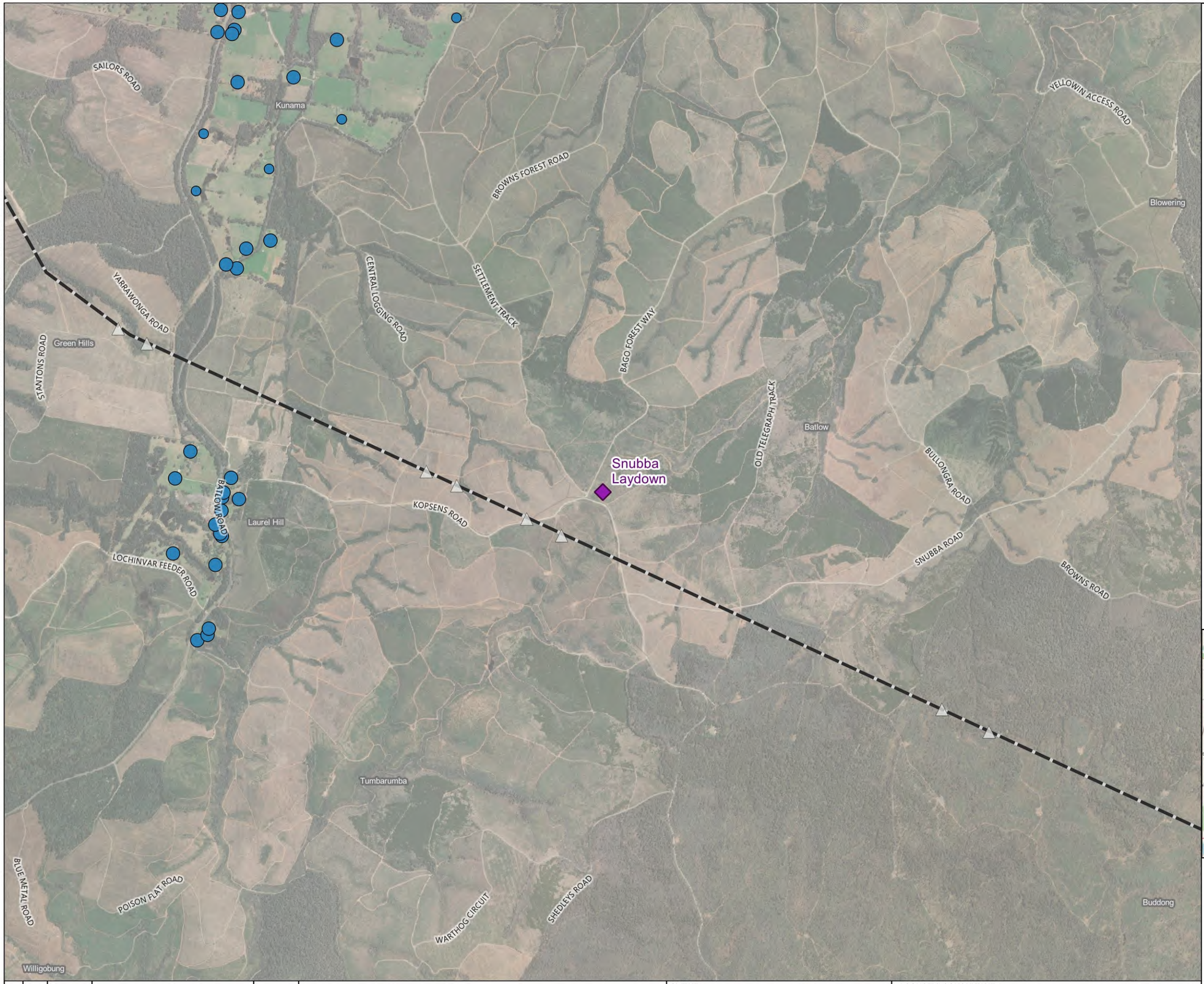
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inspired to achieve

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5,000 m
4,000
3,000
2,000
1,000
0

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

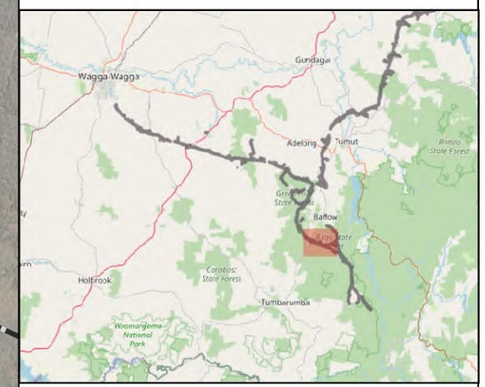
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Snubba Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT
RENZO TONIN & ASSOCIATES
inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:29 Layout: TN422 Helicopter laydown lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz

5,000 m

0 1,000 2,000 3,000 4,000

SPUDS ROAD
ERNIES WAY
ARDROSSAN ROAD
Batlow
Kunama Laydown
GREEN HILLS ACCESS ROAD
Kunama
GEORGE STREET
KINGS CROSS
PITT STREET
Yaven Creek
YAVEN CREEK ROAD
LOWER BAGO ROAD
SWAMP ROAD
WONDALGA ROAD
MATEYS ROAD
Lower Bago Laydown
HQ ROAD
KOCKUMS ROAD
LOWER BAGO ROAD
Green Hills
Lower Bago
CARRS ROAD
SAILORS ROAD
BAGO CREEK ROAD
SEVENTY SIX ACCESS ROAD
Taradale
NURSERY ACCESS ROAD
YARRAWONGA ROAD
STANTONS ROAD
Laurel Hil

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

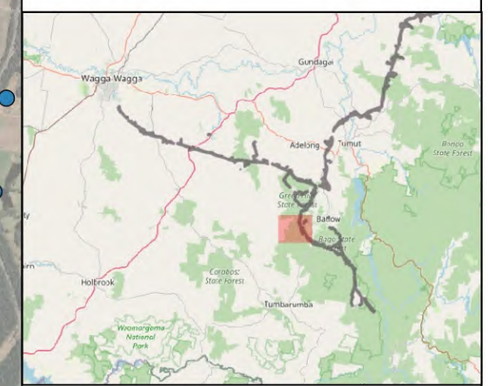
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Lower Bago Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT
RENZO TONIN & ASSOCIATES
inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:29 Layout: TN422 Helicopter laydown lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz

5,000 m

0 1,000 2,000 3,000 4,000

KENDALL TOWER ROAD
TONERS ROAD
KENDALL FEEDER ROAD
BACK CAMP ROAD
BOOTHS ACCESS ROAD
SPUDS ROAD
ERNIES WAY
WONDALGA ROAD
ARDROSSAN ROAD
PEELS CREEK ROAD
OLD TUMBARUMBA ROAD
Batlow
COTTAMS ROAD
Kunama Laydown
Green Hills
GEORGE STREET
KINGS CROSS
PITT STREET
GREEN HILLS ACCESS ROAD
BATLOW ROAD
LOWER BAGO ROAD
Kunama
SWAMP ROAD
Yaven Creek
Lower Bago Laydown
KOCKUMS ROAD
HQ ROAD
MATEYS ROAD
CARRS ROAD
BACK KUNAMA ROAD
SAILORS ROAD
BAGO CREEK ROAD

LEGEND

- Humelink Alignment
- Helicopter arrival and departure site within construction compounds
- Break and winch sites

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R2, DR)
- 25+ dB above NML (N, V, R2, DR, AA)

Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST
Kunama Laydown

Predicted Noise level at Residential Receivers above Night NML due to worst case Helicopter arrival and departure within construction compounds

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 400 800 1,200 1,600 2,000 m

1:35,000

FULL SIZE A3

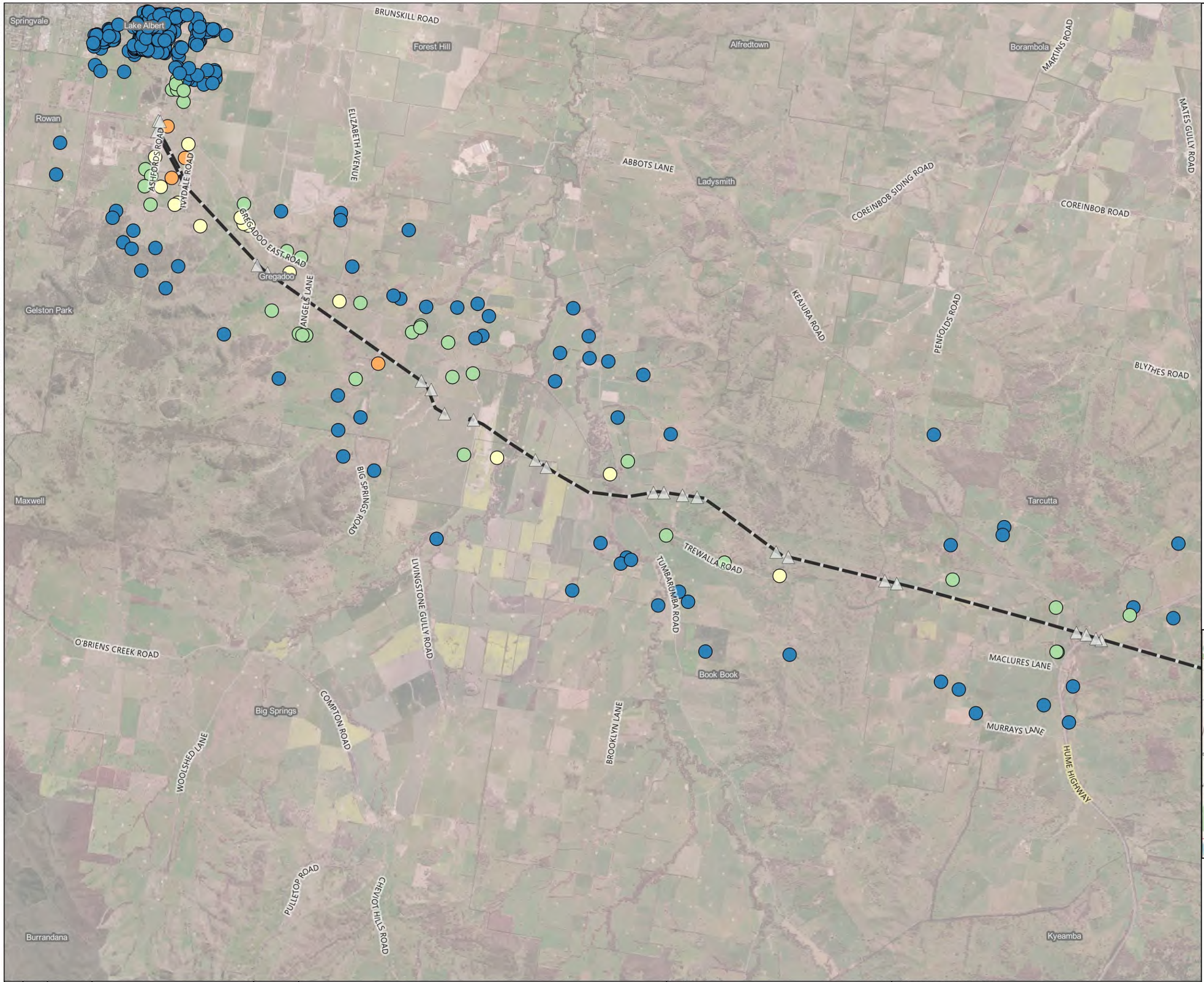
NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:35 Layout: TN422 Helicopter noise track Imax Day s copy

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Day(Standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

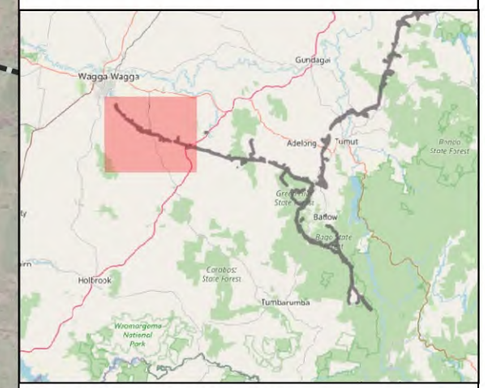
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(Standard) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

A3 Original | Co-ordinate System: MGA Zone 56 | NOTE: Do not scale from this drawing.

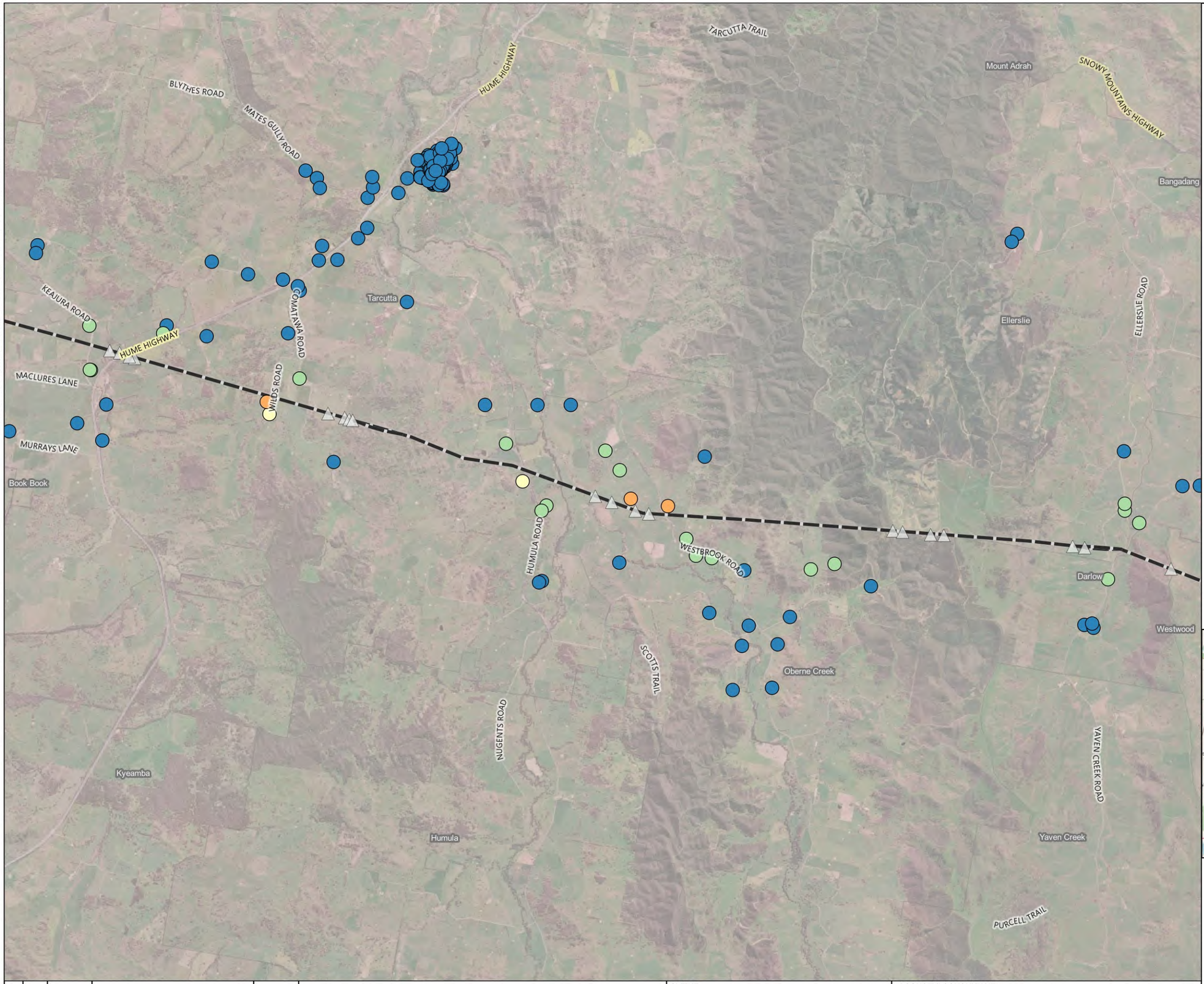
CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:35 Layout: TN422 Helicopter noise track Imax Day s copy

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Day(Standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

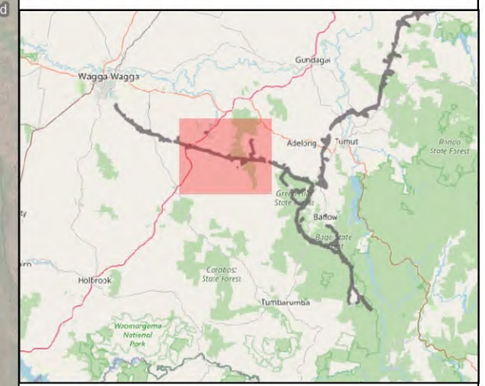
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(Standard) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

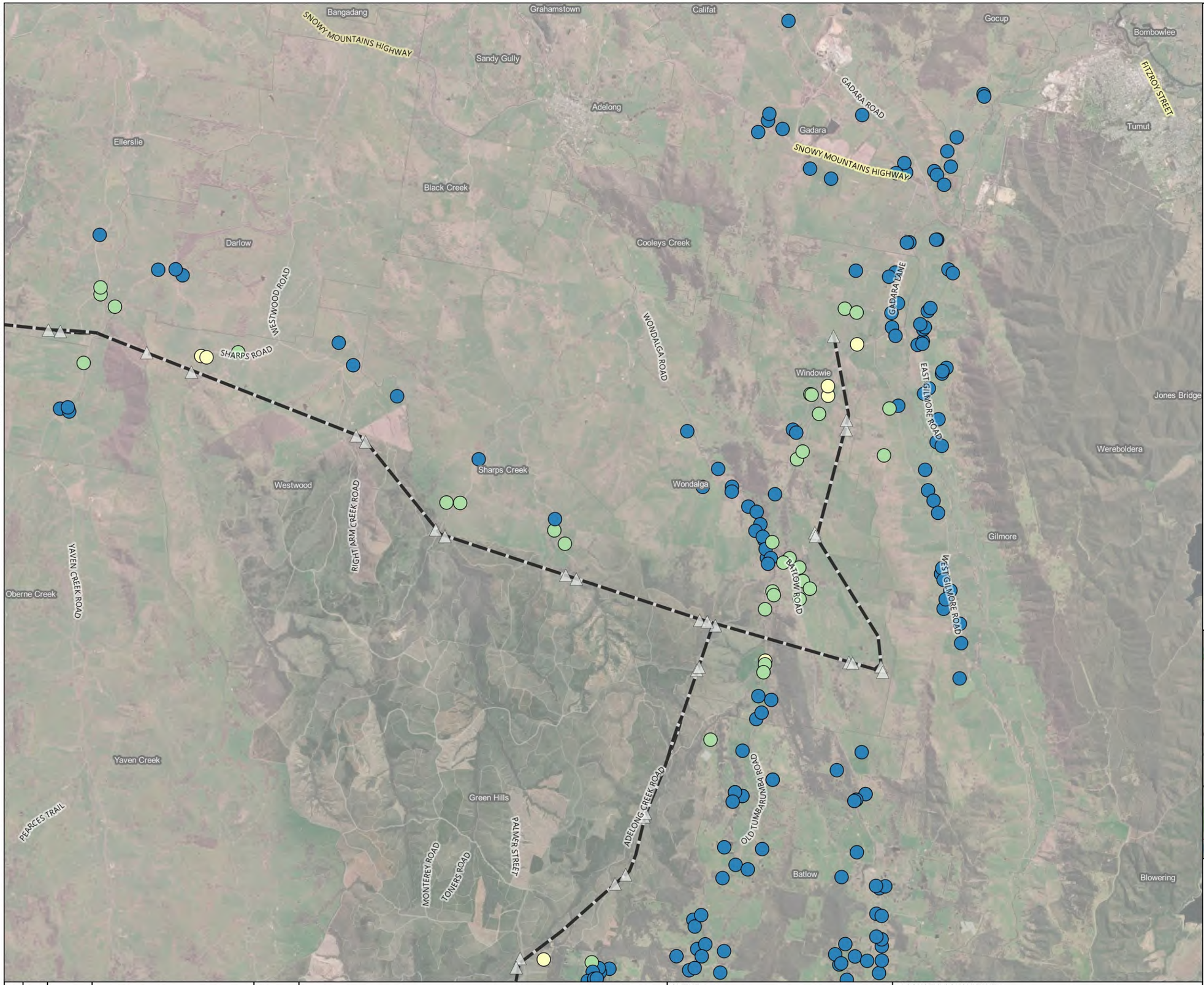
CPB CONTRACTORS UGL

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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:35 Layout: TN422 Helicopter noise track Imax Day s copy

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Day(Standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

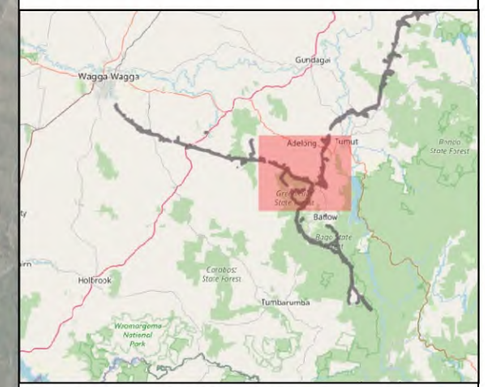
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(Standard) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

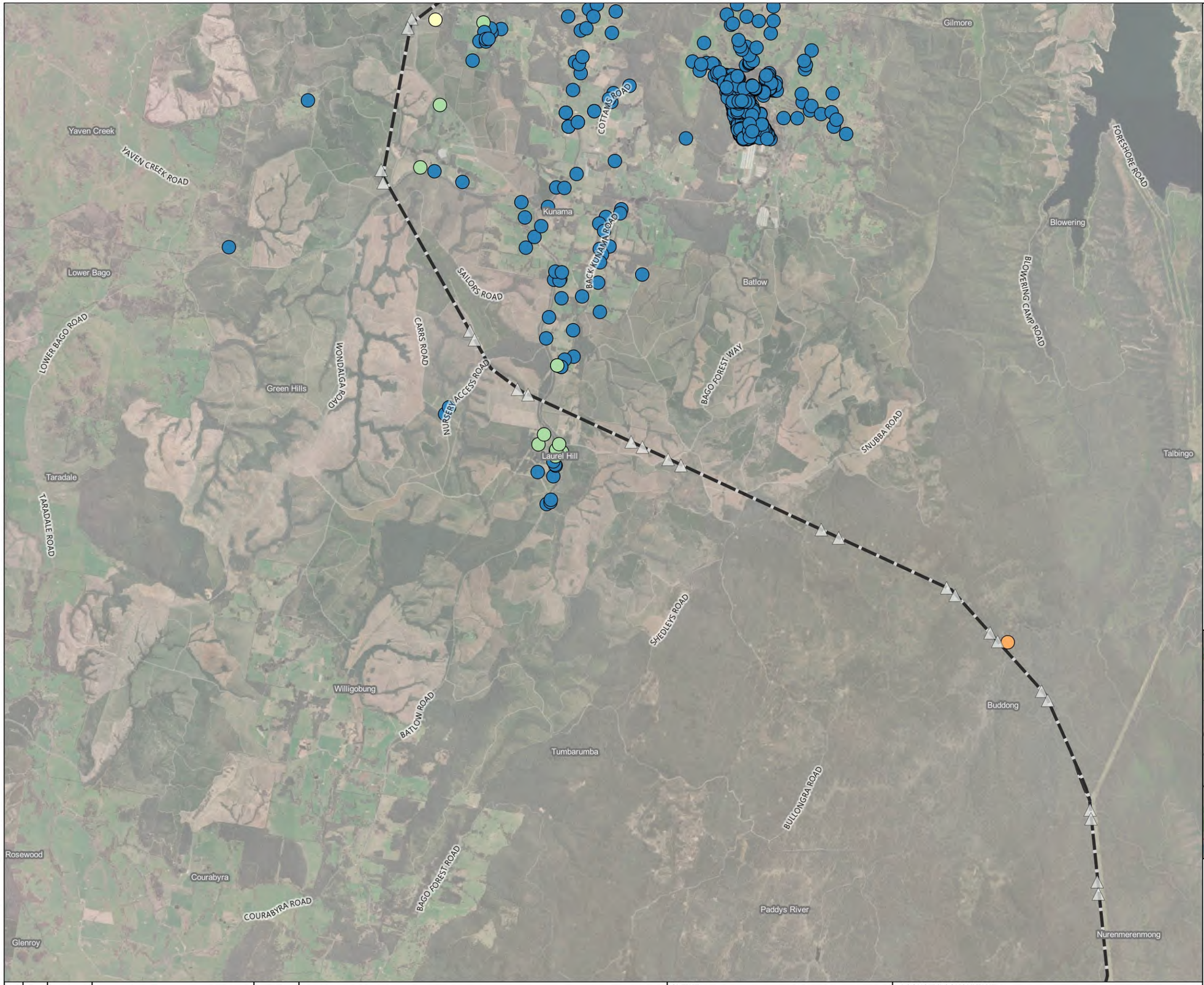
CPB CONTRACTORS UGL

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RENZO TONIN & ASSOCIATES
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:36 Layout: TN422 Helicopter noise track Imax Day s copy

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Day(Standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

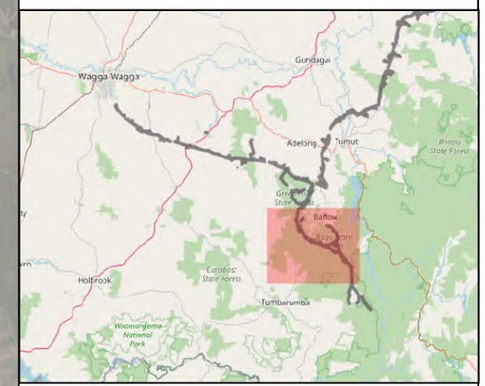
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(Standard) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

NOTE: Do not scale from this drawing.

CLIENT

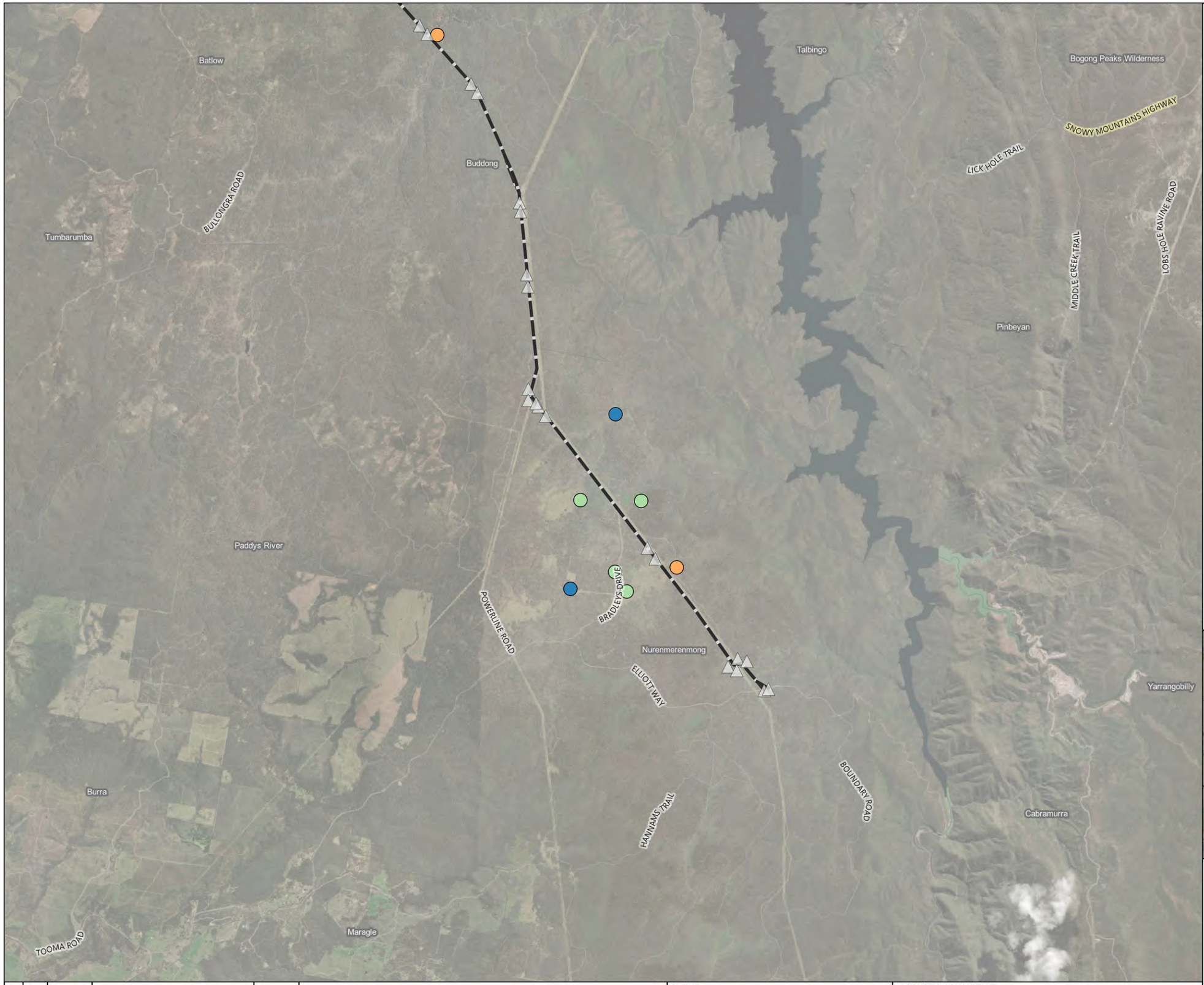
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:36 Layout: TN422 Helicopter noise track Imax Day s copy

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Day(Standard) NML

- Compliant
- 0 - 10 dB above NML
- 11 - 20 dB above NML (V)
- > 20 dB above NML (V)

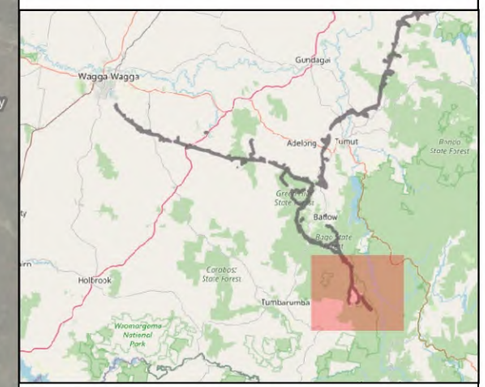
Assesment periods

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Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(Standard) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

NOTE: Do not scale from this drawing.

CLIENT

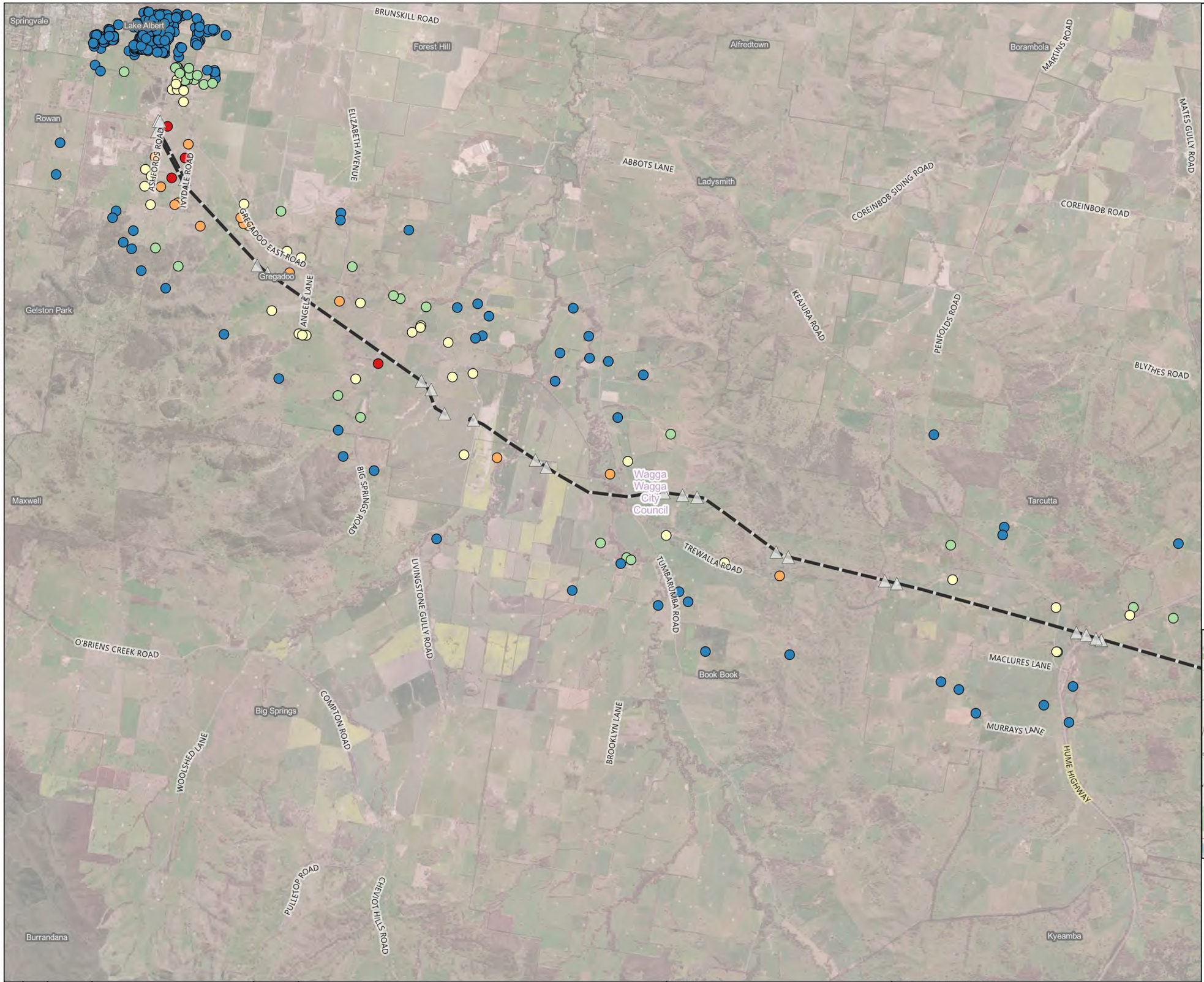
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:38 Layout: TN422 Helicopter noise track Imax Day OOH

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch Site

Receiver type

- Potential Residential

Predicted Noise level above Day(OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

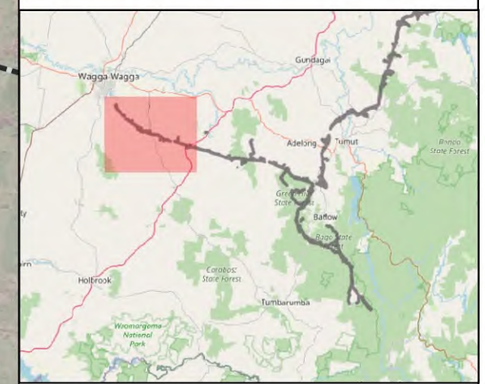
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(OOH) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

A3 Original | Co-ordinate System: MGA Zone 56 | NOTE: Do not scale from this drawing.

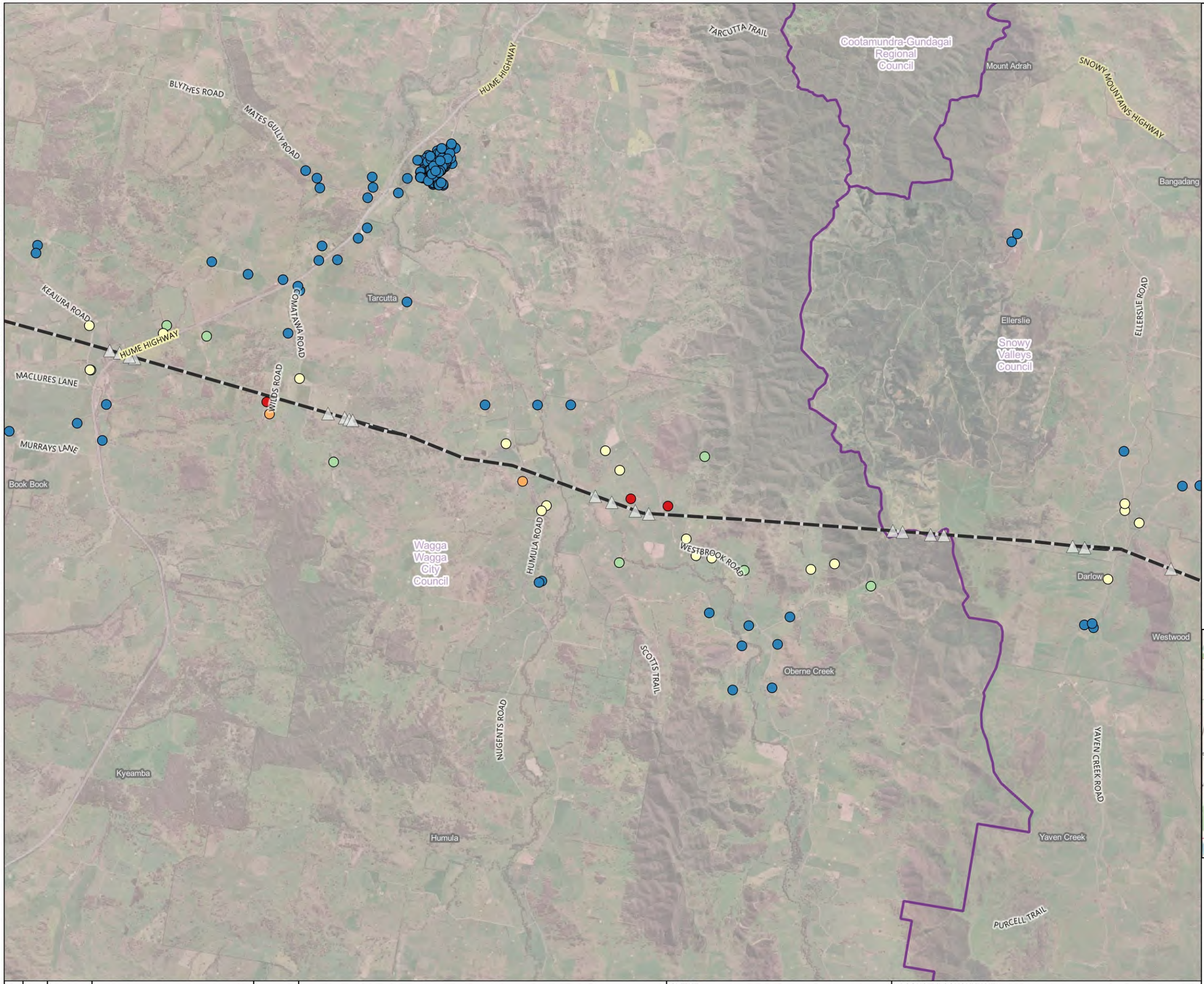
CLIENT: CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:38 Layout: TN422 Helicopter noise track Imax Day OOH

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch Site

Receiver type

- Potential Residential

Predicted Noise level above Day(OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

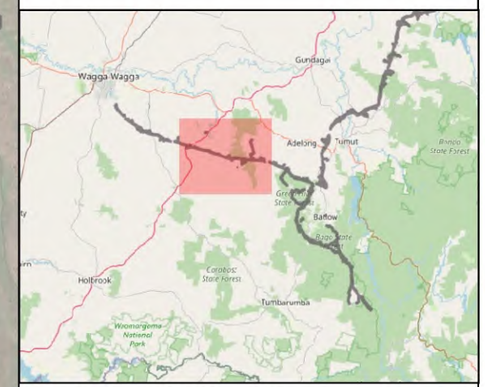
Assesment periods

Day (Standard): Monday to Friday 7am to 6pm, Saturday 8am to 1pm

Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(OOH) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

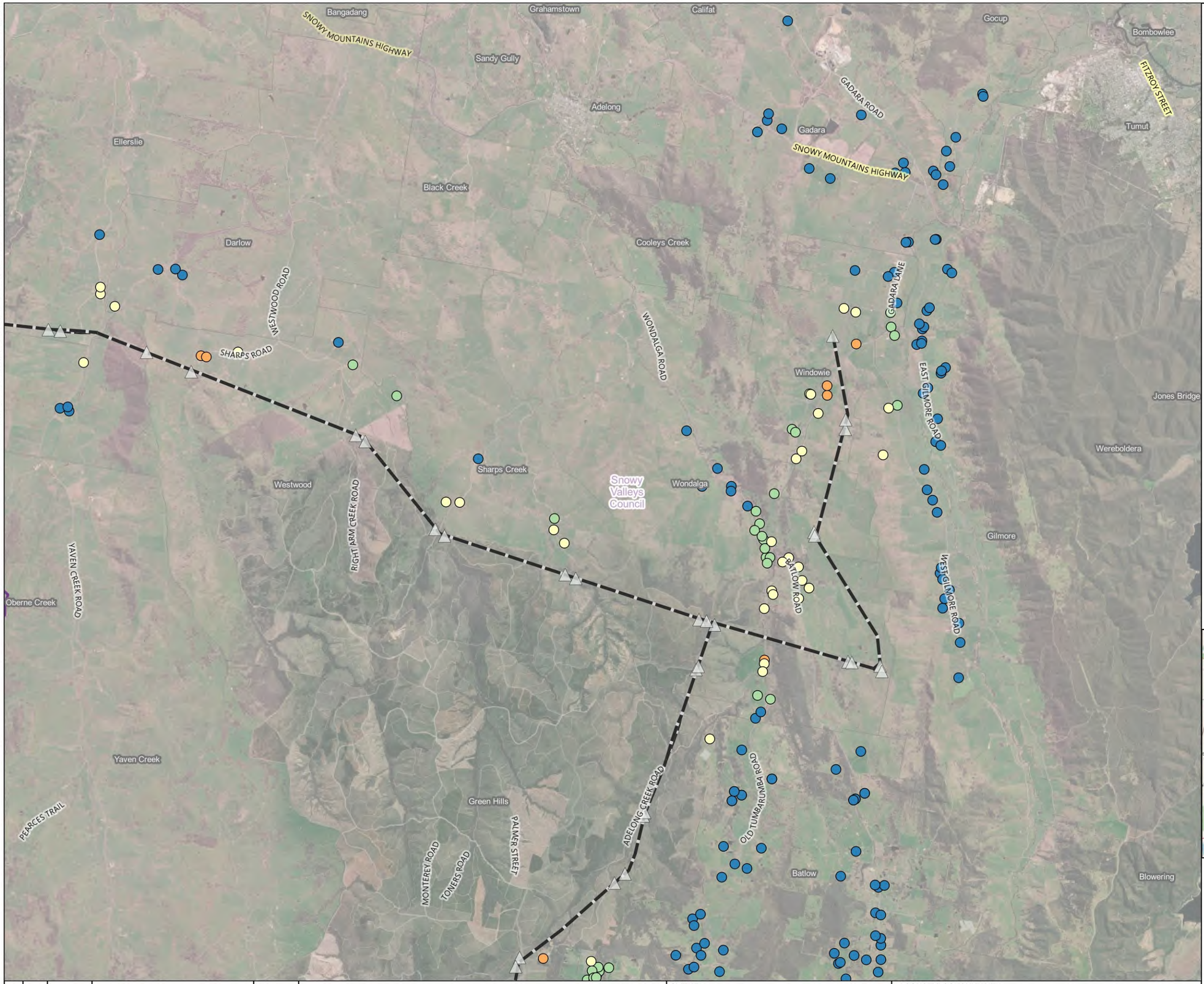
CPB CONTRACTORS UGL

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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:38 Layout: TN422 Helicopter noise track lmax Day OOH

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch Site

Receiver type

- Potential Residential

Predicted Noise level above Day(OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

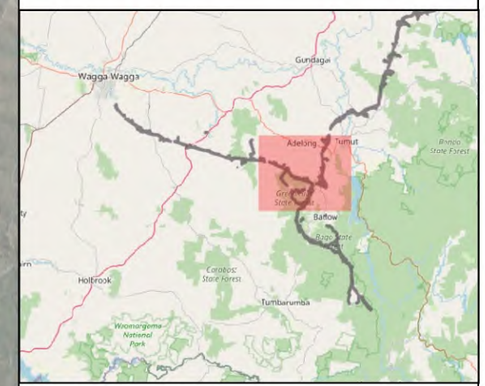
Assesment periods

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Day (OOH): Saturday 7am to 8am, Saturday 1pm to 6pm, Sunday and Public holidays 8am to 6pm

Evening: Monday to Sunday 6pm to 10pm

Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(OOH) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

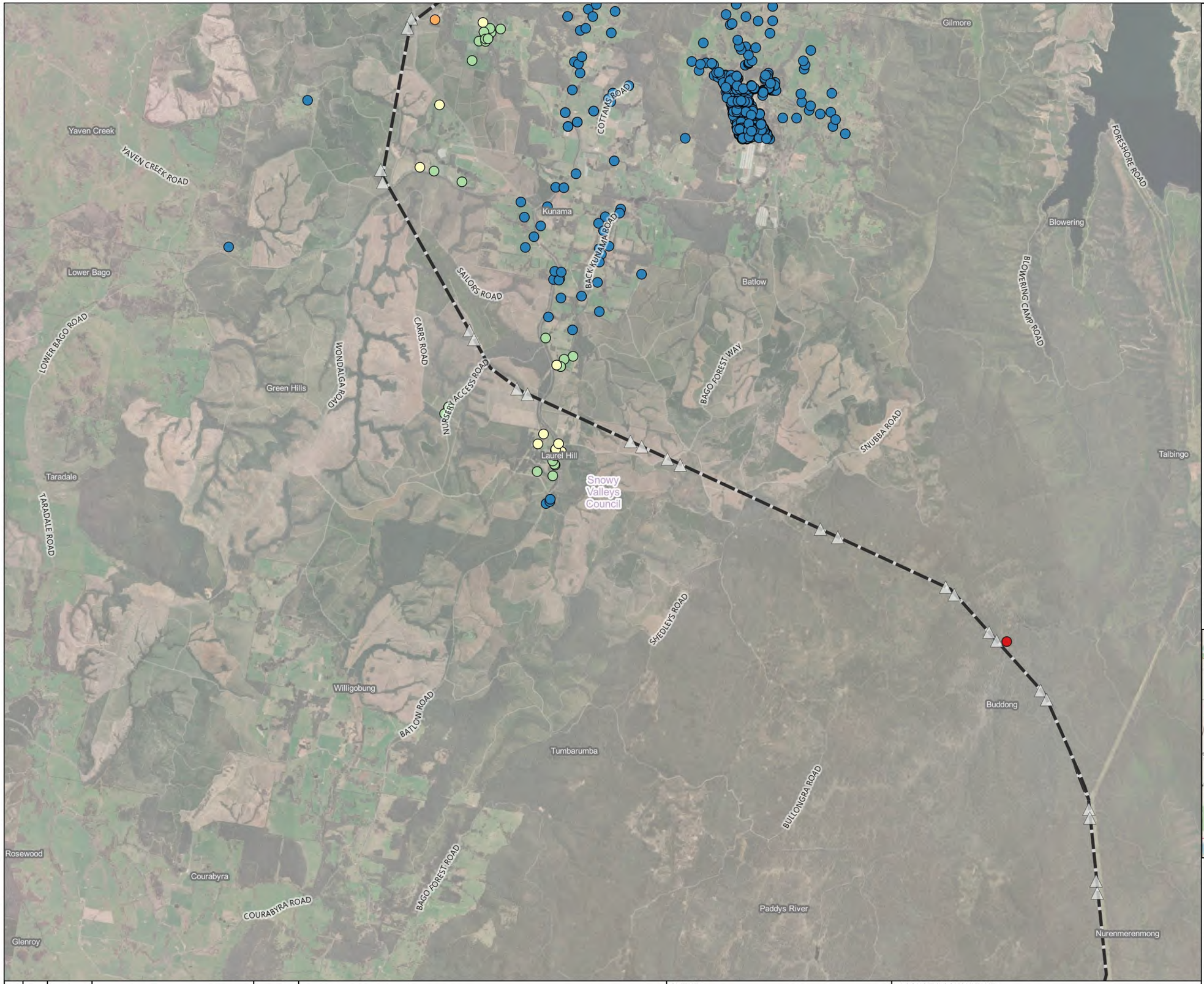
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES
inspired to achieve
Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:38 Layout: TN422 Helicopter noise track lmax Day OOH

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch Site

Receiver type

- Potential Residential

Predicted Noise level above Day(OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

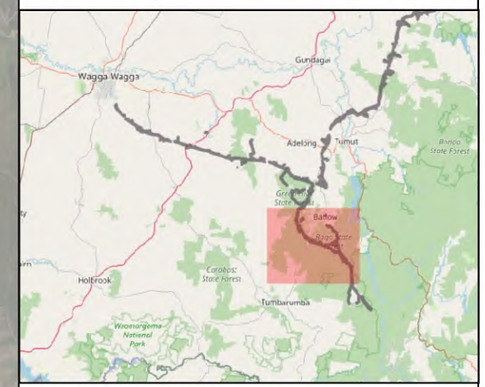
Assesment periods

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Night: Monday to Saturday 10pm to 7am, Sunday 10pm to 8am



HUMELINK WEST

Predicted Noise level at Residential Receivers above Day(OOH) NML due to Helicopter Stringing works.

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	12/02/26	Prepare figures	RZ/MT

A3 Original | Co-ordinate System: MGA Zone 56

0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

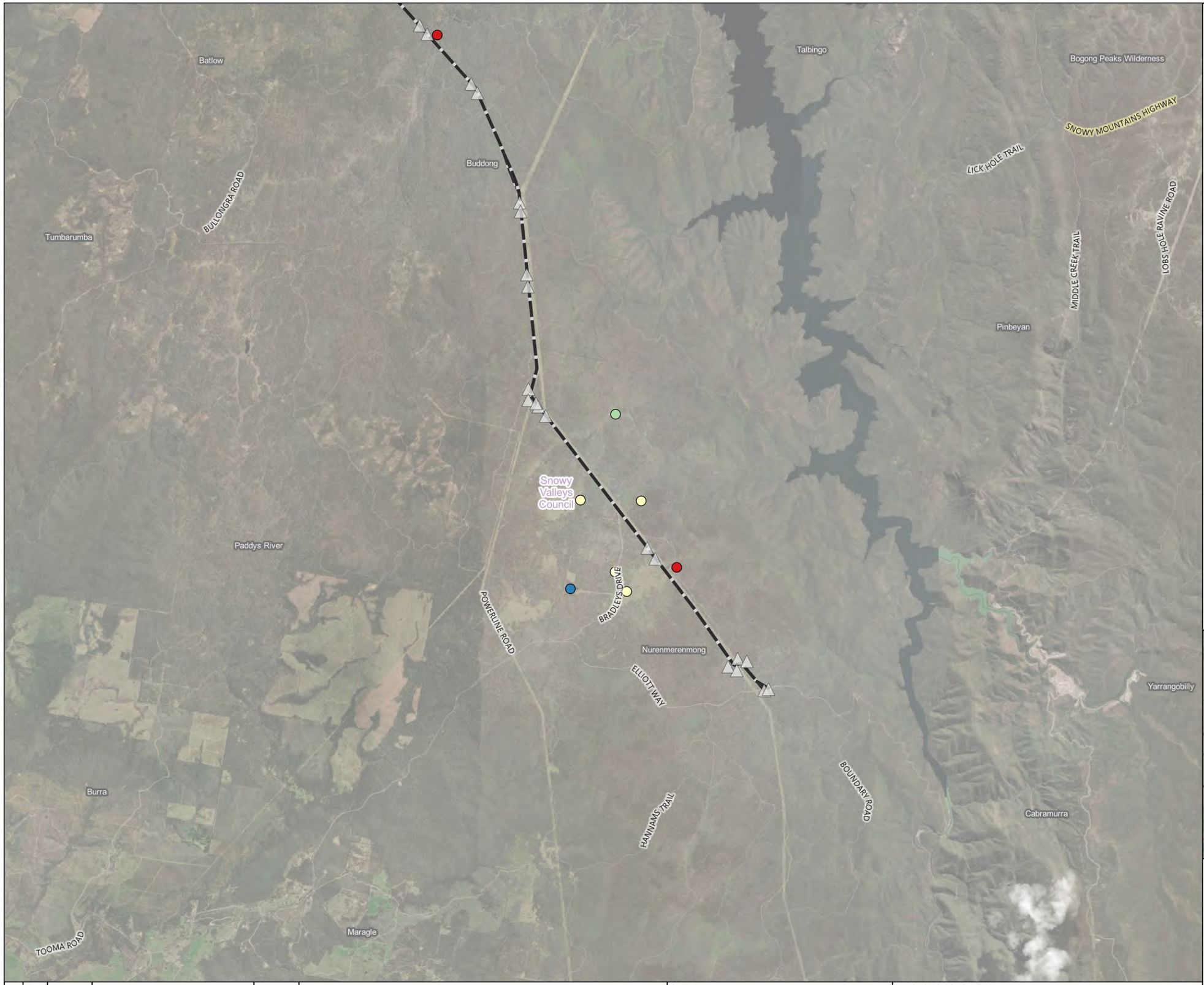
CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:38 Layout: TN422 Helicopter noise track lmax Day OOH

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch Site

Receiver type

- Potential Residential

Predicted Noise level above Day(OOH) NML

- Compliant
- 0 - 5 dB above NML (N, V)
- 6 - 15 dB above NML (N, V)
- 16 - 25 dB above NML (N, V, R3)
- 25+ dB above NML (N, V, R3, DR)

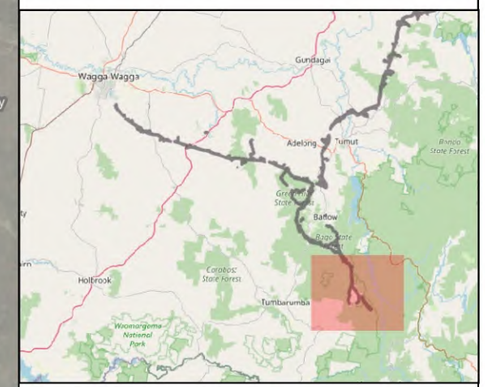
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r0	SS	12/02/26	Prepare figures	RZ/MT

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0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

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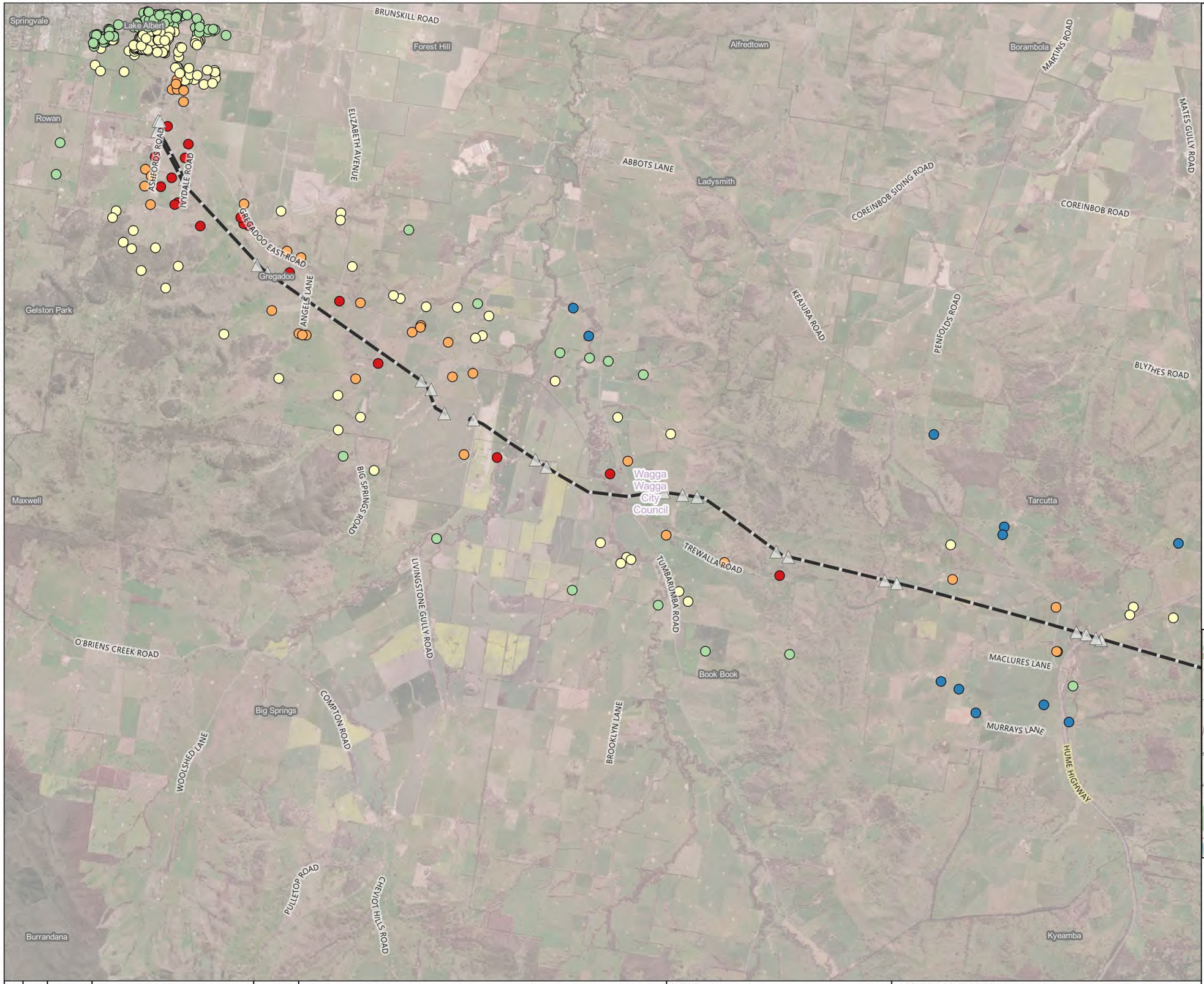
CPB CONTRACTORS UGL

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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:40 Layout: TN422 Helicopter noise track lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

- Potential Residential

Predicted Noise level above Night NML

- Compliant
- 0 - 5 dB above NML (N, V)
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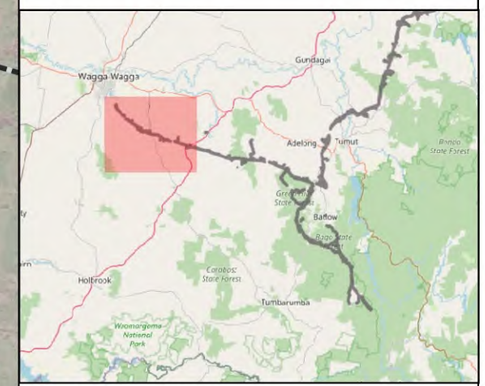
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FULL SIZE A3

A3 Original | Co-ordinate System: MGA Zone 56 | NOTE: Do not scale from this drawing.

CLIENT: CPB CONTRACTORS, UGL

ACOUSTIC CONSULTANT

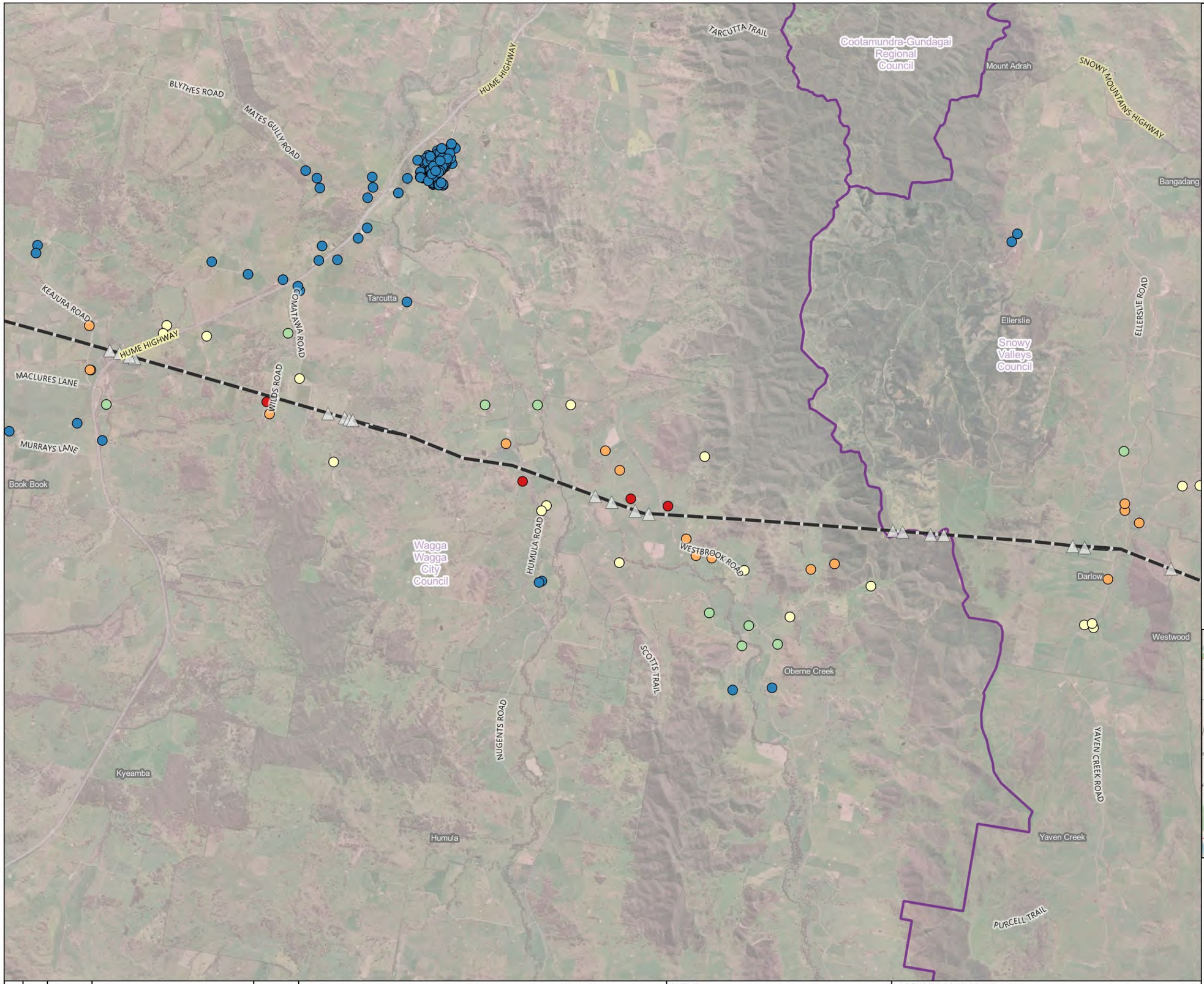
RENZO TONIN & ASSOCIATES

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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:40 Layout: TN422 Helicopter noise track lmax night

GIS File: R:\AssocSydProjects\TN401-TN450\TN422 mt Humelink\5 Calcs\00 GENERAL\01 GIS\TN422-01 SS - Copy.qgz



LEGEND

- Helicopter Stringing works
- Break and Winch site

Receiver type

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Predicted Noise level above Night NML

- Compliant
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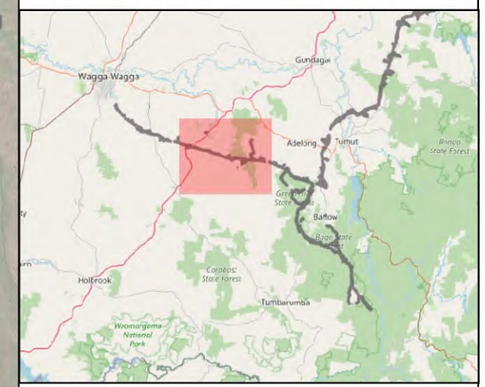
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FULL SIZE A3

A3 Original

Co-ordinate System: MGA Zone 56

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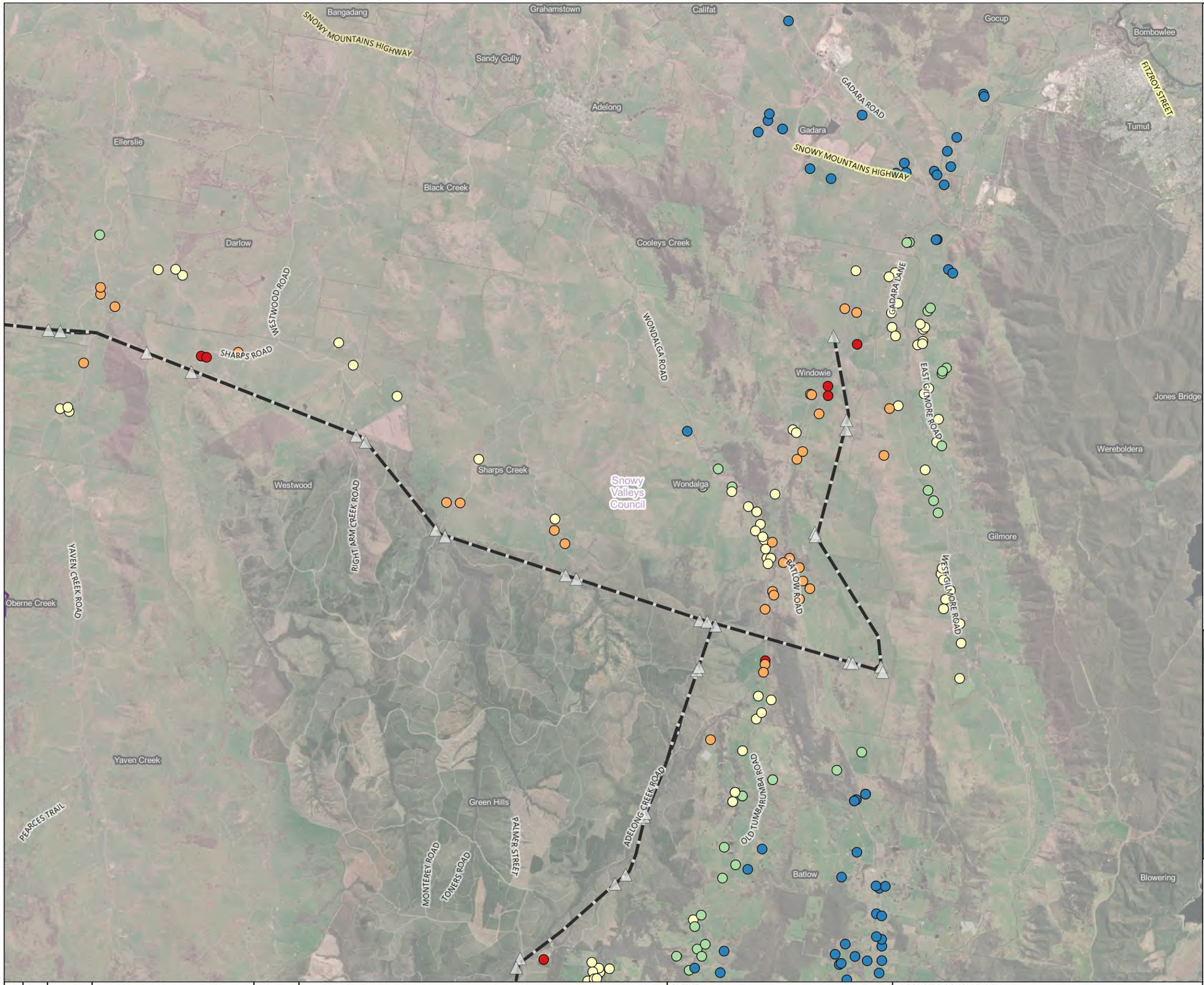
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Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:40 Layout: TN422 Helicopter noise track lmax night

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LEGEND

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- Break and Winch site

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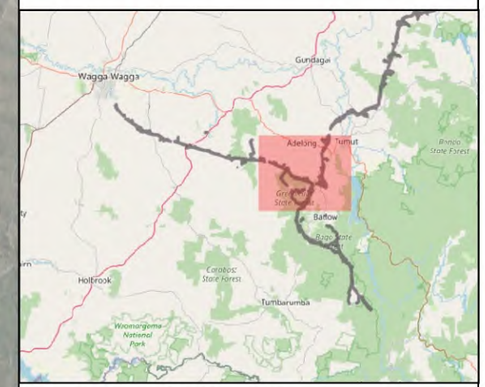
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A3 Original | Co-ordinate System: MGA Zone 56 | NOTE: Do not scale from this drawing.

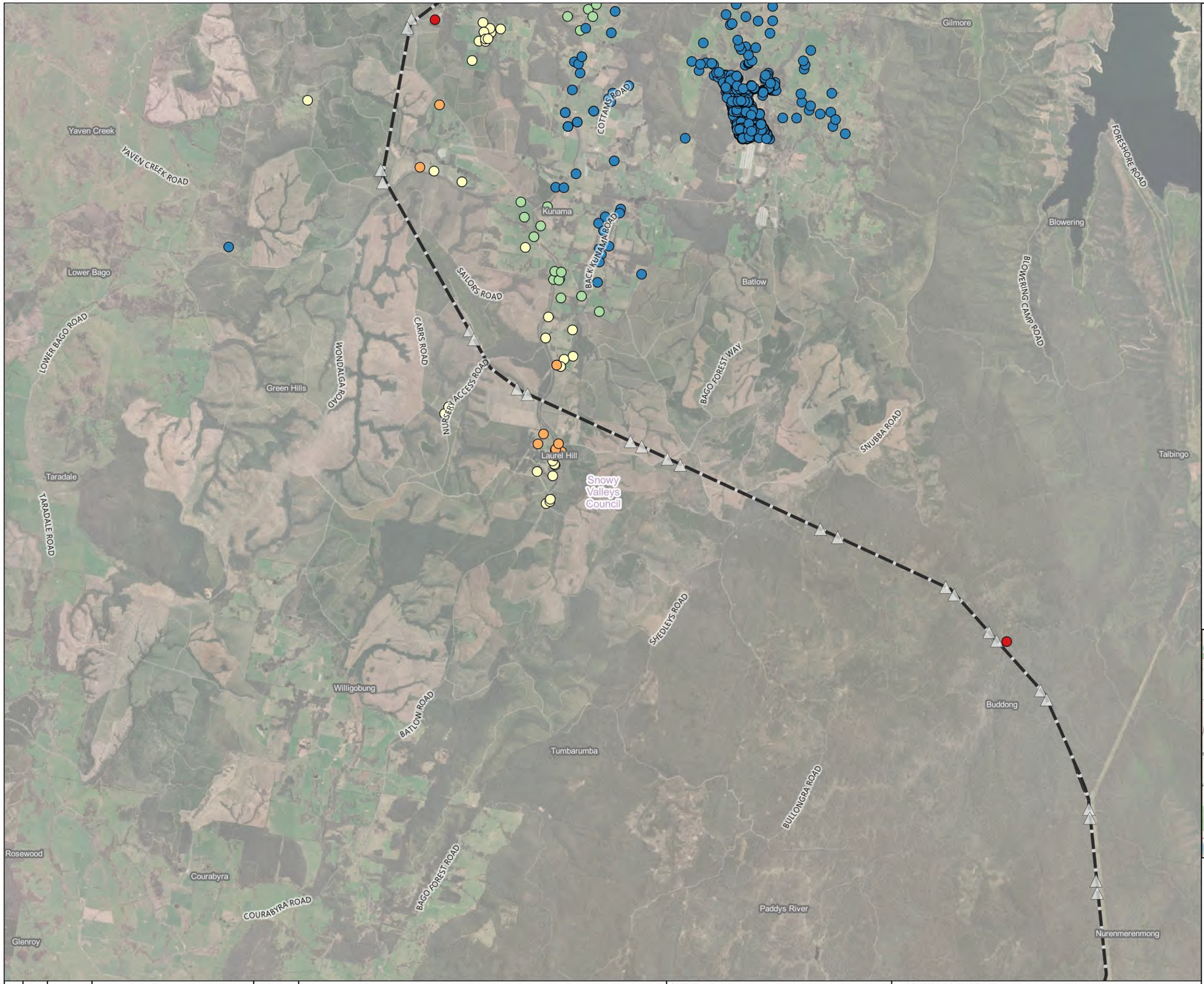
CLIENT: CPB CONTRACTORS, UGL

ACOUSTIC CONSULTANT: RENZO TONIN & ASSOCIATES inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

Plot Date: 12/02/26 - 14:40 Layout: TN422 Helicopter noise track lmax night

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LEGEND

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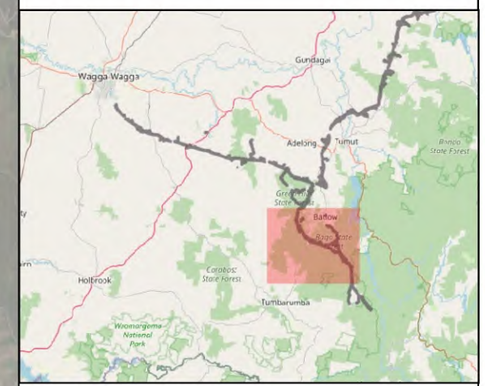
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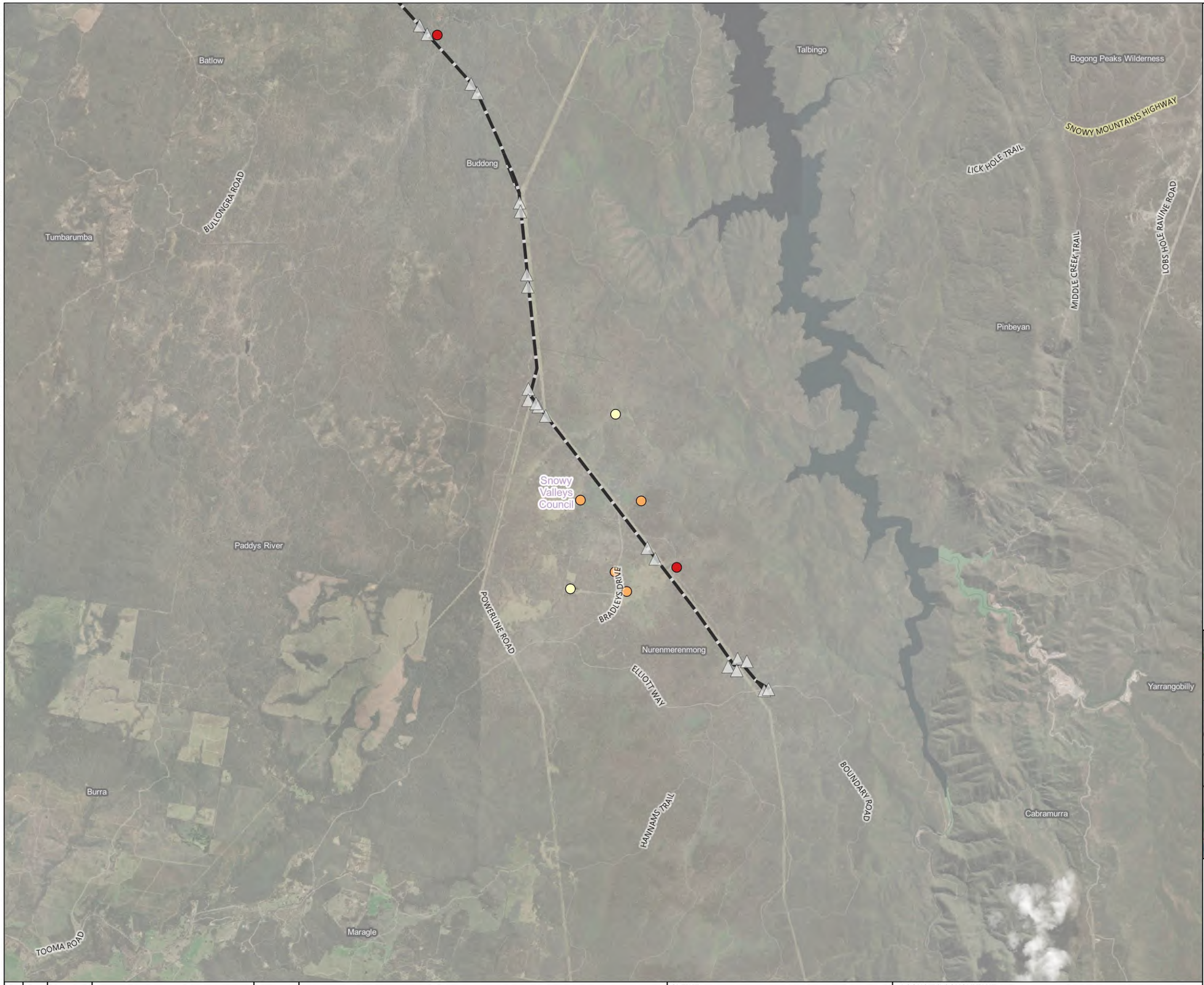
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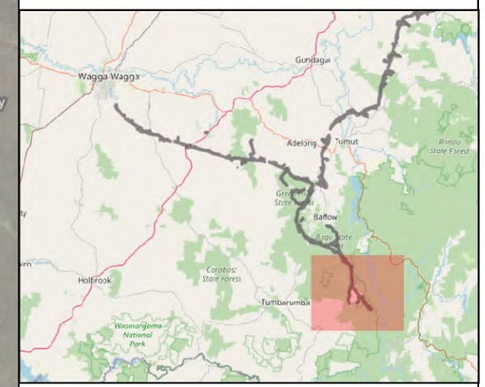
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0 1,000 2,000 3,000 4,000 5,000 m

1:95,000

FULL SIZE A3

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CLIENT

CPB CONTRACTORS UGL

ACOUSTIC CONSULTANT

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Ph (02) 8218 0500 Fax (02) 8218 0501

Attachment 3 Predicted noise levels

The detailed predicted levels have been provided to HLWJV in a spreadsheet table.

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Annexure E Extended Helicopter Work Hours Permit

HumeLink West JV	SSI-36656827
Proposed start date:	Expected duration
Request date:	Requested by:
Public holidays:	Weekends included: Y ☐ N ☐

Proposed Works

Work Activity & Location

Map of work area

Landowner Consent

Impacted properties	Noise Impact	Landowner Consent

Network Operator / Road Authority Approvals

	Yes	No
Are the works occurring as requested by a Network Operator / Road Authority?		
If yes, name of Network Operator / Road Authority		
Do the works require an ROL / Road Closure?		
Do the works require a network outage?		
Have all relevant approvals been granted and attached?		

Mitigation Measures:

Additional Attachments Required to Complete OOHW Permit for approval		
Additional Attachment Title	**Yes**	**No**
Noise Assessment (Attachment 1)	☐	☐
Works Location (Attachment 2)	☐	☐
Community Notification (Attachment 3)	☐	☐
Negotiated Agreement (Attachment 4)	☐	☐
Other: (*Specify)* DPHI B4 Approval (Attachment 5)	☐	☐

Submit for Consideration	Name	Signature	Date

Sign Off

POSITION:	Project Engineer	Area / Construction Manager	Environmental Manager	Community Manager
NAME:				
SIGNATURE				
DATE:				
Has the helicopter pilot been advised of the flight path restrictions relating to non-consenting residents?			Yes ☐	No ☐

Attachment 1. Noise Assessment

Attachment 2. Works Location Map

Attachment 3. Community Notification

Attachment 4. Negotiated Agreement

Attachment 5. DPHI B4 Approval