Noise and Vibration Management Plan

HLE-AGJ-ENV-ALE-PLN-0000-00027
HumeLink East

Transgrid
Revision: 03 (Issued for Use)
Date: 14/10/2025

HumeLink East

acciona | GENUS

Noise and Vibration Management Plan

HLE-AGJ-MGT-ALE-PLN-0000-00027 | Rev 03

I. APPROVALS

	Name	Signature	Date
Author:	[redacted]		3/10/25
Sponsor:			3/10/25
Project Director:			3/10/25

The authorised use of this document shall only be once approved by way of presence of signatories under the above table.

II. DOCUMENT CONTROL – REVISION HISTORY

Rev	Date	Pages	Revised By	Description
A	30/11/2023	All	[redacted]	For submission to Transgrid
B	28/02/2024	All	[redacted]	Update to incorporate Amendment Report changes and address Transgrid comments
C	3/04/2024	Section 5.3 and 6.4.4	[redacted]	Update to address Transgrid comments
D	22/05/2024	Various	[redacted]	Updated to align with Amendment Report
E	31/05/2024	28	[redacted]	Updated to address Transgrid comments
00	25/06/2024	Nil	[redacted]	Final for submission to Transgrid. IFU.
01.1	12/11/2024	50	[redacted]	Updated with final Conditions of Approval and Stakeholder comments
01.1	15/11/2024	Section 3.3	[redacted]	Updated with final Conditions of Approval
01.2	12/12/24	Various	[redacted]	Updated to address ER comments
01.3	29/1/25	Various	[redacted]	Updated to address remaining ER comments and at close OOHW Protocol consultation period
01.4	14/04/2025	Various	[redacted]	Update to Address DPHI comments
02	15/09/2025	Nil		Issued for Use
02.1	2/10/2025	28 and Appendix B	[redacted]	Update for Adjungbilly batch plant and other minor admin edits
02.2	3/10/2025	8, 28 and Appendix B	[redacted]	Update to address TG and ER comments
03	14/10/2025	Nil		Issued for Use

GENERAL REQUIREMENTS

The Project Director is responsible for the distribution of this Management Plan. The controlled master version of this document is available for distribution as appropriate and maintained on RIB | CX. All circulated hard copies of this document are deemed to be uncontrolled. The implementation of this Management Plan is under the authority of AGJV and the Project Director. All personnel employed on

the Project will perform their duties in accordance with the requirements of this Management Plan, supporting management plans, and related procedures.

TERMS AND DEFINITIONS

Term or Acronym	Definition
AAAC	Association of Australian Acoustical Consultants
AGJV	Acciona Genus Joint Venture
Ambient noise	The all-encompassing noise associated with a given environment at a given time, usually composed of sound from all sources near and far.
ANZECC	Australian and New Zealand Environment and Conservation Council
AS/NZ	Australian Standard/New Zealand Standard
Attenuation	The reduction in the level of sound or vibration
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CNVG	*Construction Noise and Vibration Guideline (Roads)* (Transport for NSW, 2023)
CNVIA	Construction Noise and Vibration Impact Assessment
CoA	Ministers Conditions of Approval
CSSI	Critical State significant infrastructure
dB	Decibel
dBA	Decibel (A-weighted)
DEC	(former) Department of Environment and Conservation
DECC	(former) Department of Environment and Climate Change
DECCW	(former) Department of Environment, Climate Change and Water
DPHI or Department (Formerly DPE)	NSW Department of Planning Housing and Infrastructure (formerly Department of Planning and Environment)
EIS	*Environmental Impact Statement HumeLink*
EPL	Environment Protection Licence
UMM	Updated Environmental Mitigation Measure set out in the HumeLink Amendment Report
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/NSZ ISO 14001:2015 as a detailed performance requirement, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
ER	Environmental Representative
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to the engineering considerations and what is practical to build. Reasonable related to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.
HNA	Highly noise affected. The HNA level represents the point above which there may be strong community reaction to noise.
Highly noise intensive works	Works on the surface which are defined as annoying under the Interim Construction Noise Guideline (DECC, 2009) 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;

Term or Acronym	Definition
	d) Line drilling; e) Vibratory rolling; f) Bitumen milling or profiling; jackhammering, rock hammering or rock breaking; g) Impact piling.
ICNG, the	*Interim Construction Noise Guideline* (Department of Environment and Climate Change 2009)
LAeq (15min)	The A-weighted equivalent continuous (energy average) A-weighted sound pressure level of the construction works under consideration over a 15-min period and excludes other noise sources such as from industry, road, rail and the community
LA (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.
LA1 (1min)	The A-weighted noise level from the construction works under consideration, measured using the fast time weighting on a sound level meter, which is exceeded for more than 1% of the 1 minute measurement period.
LA90 (15min)	The A-weighted noise level excluding the construction works under consideration, measured using the fast time weighting on a sound level meter, which is exceeded for more than 90% of the 15 minute measurement period.
NML	Noise management level
Noise Mitigation	Feasible and reasonable measures that would minimise or avoid noise impacts
NPfI	*Noise Policy for Industry* (EPA 2017)
NVMP	Noise and Vibration Management Plan
OOHW	Out of hours work
PIN	Penalty Infringement Notice
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
POEO Act	*Protection of the Environment Operations Act 1997*
PPV	Peak particle velocity
Project, the	HumeLink East
RBL	Rating Background Level
RNE	Register of the National Estate
RNP	NSW Road Noise Policy, Department of Environment, Climate Change and Water (DECCW), 2011
Sensitive land user(s) / Sensitive receiver(s)	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres and passive recreation areas (including outdoor grounds used for teaching). 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, restaurants, office premises, and retail spaces) and industrial premises as identified by the Planning Secretary
Standard construction hours	Hours during which construction work is permitted by the CoA.

1. INTRODUCTION

1.1 CONTEXT

This Noise and Vibration Management Plan (NVMP or this plan) forms part of the Construction Environmental Management Plan (CEMP) for HumeLink East (the Project).

This plan has been prepared to manage noise and vibration impacts during Construction activities undertaken for HumeLink East.

1.2 BACKGROUND AND PROJECT DESCRIPTION

The overall HumeLink project includes the construction and operation of around 365 kilometres of new double circuit 500 kilovolt (kV) electricity transmission lines, substations, permanent and temporary access tracks and roads, and ancillary facilities. The project is being delivered under two separate Contract Packages - HumeLink East and HumeLink West. HumeLink East and HumeLink West will join and integrate together to form HumeLink, and enable the overall project to operate safely, reliably and efficiently as part of Transgrid's network and the National Electricity Market as a whole.

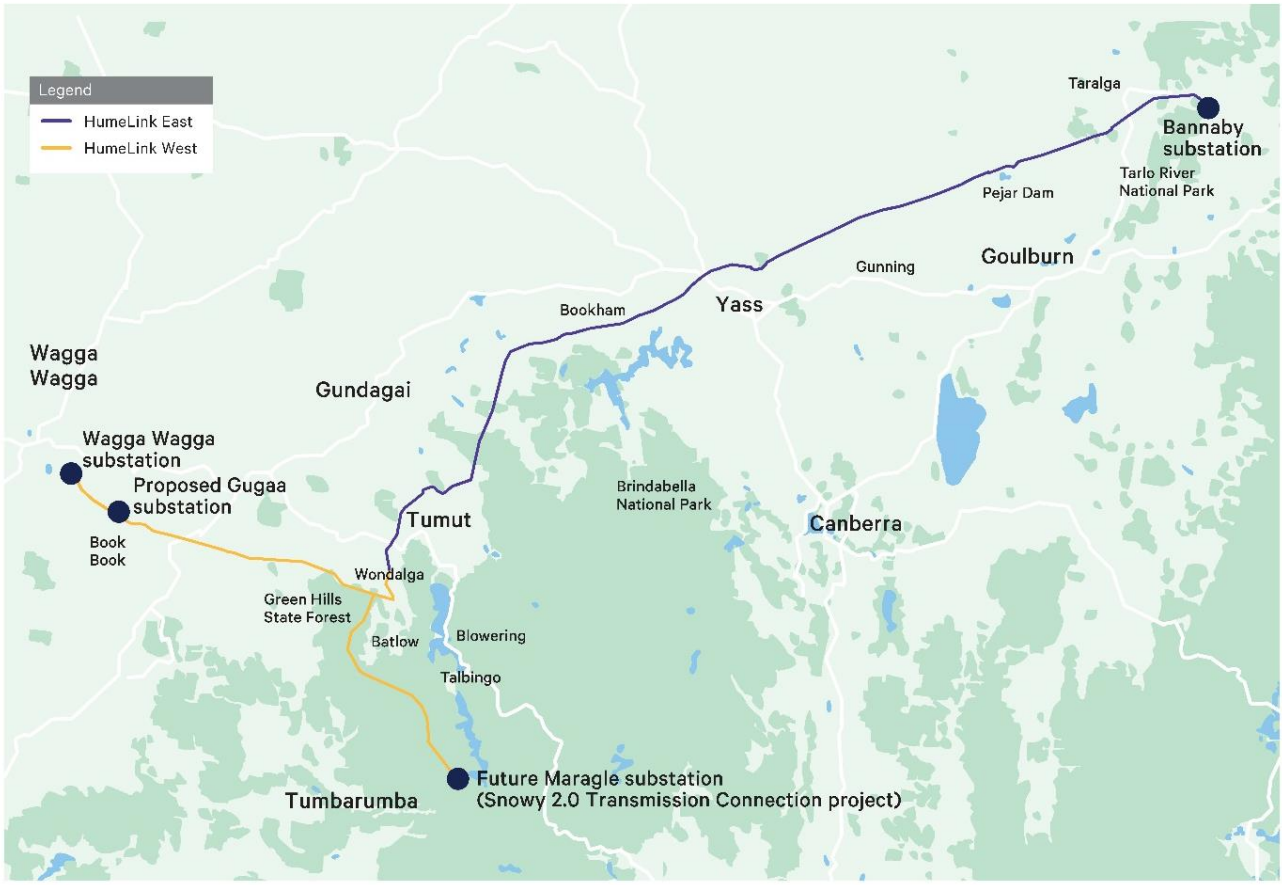

Figure 1 Indicative High-Level Scope of HumeLink East and HumeLink West

The project includes the following key components:

- Construction and operation of around 365 kilometres of new double circuit 500 kV transmission lines and associated infrastructure between Wagga Wagga, Bannaby and Maragle
- Construction of a new 500/330 kV substation at Gregadoo (Gugaa 500 kV substation) approximately 11 kilometres south-east of the existing Wagga 330/132 kV substation (Wagga 330 kV substation)
- Demolition and rebuild of a section of Line 51 (around two kilometres in length) as a double circuit 330 kV transmission line connecting into the Wagga 330 kV substation
- Modification of the existing Wagga 330 kV substation and Bannaby 500/330 kV substation (Bannaby 500 kV substation) to accommodate the new transmission line connections

- Connection of transmission lines to the future Maragle 500/330 kV substation (Maragle 500 kV substation, approved under the Snowy 2.0 Transmission Connection Project (SSI-9717))
- Telecommunications connections to existing substations
- Establishment of new and/or upgraded temporary and permanent access tracks
- Ancillary works required for construction of the project including but not limited to construction compounds, worker accommodation facilities, utility connections and/or relocations, brake and winch sites, and helipad/helicopter support facilities.

Acciona Genus Joint Venture (AGJV) have been appointed to deliver the construction of HumeLink East / the Project.

1.3 SCOPE AND STAGING

The Minister's Conditions of Approval (CoA) for the Project permit staging of any plans required by the CoA. 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 AGJV will manage potential noise and vibration impacts during construction of the Project. It does not address operational impacts and does not address the decommissioning phase of the Project. A separate NVMP is being developed for the HumeLink West project.

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 Project's Environmental Management System. The Environmental Management System overview is described in Section 3.1 of the CEMP.

The key documents that interface with this Plan are outlined in Table 1. Documents that are addressing requirements of the Infrastructure Approval (SSI-36656827) are identified in Table 1.

In accordance with CoA B67, at the conclusion of the enabling works stage any remaining enabling works activities (and the operation of construction compounds and sites) will be managed via the CEMP and this NVMP.

Table 1 Key interfaces with this document

Plan	Interface
Construction Environmental Management Plan	• Provides the overall environmental management framework for construction of the Project • Provides details on overall Project staging, interactions between Sub-Plans of the CEMP, and management of cumulative impacts • 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
Heritage Management Plan (CoA B33)	• Details how impacts on Aboriginal and non-Aboriginal heritage will be managed during construction of the Project
Blast Management Plan (UMM NV3)	• A Blast Management Plan will be prepared prior to any blasting • The plan will detail the manner in which any blasting required will be undertaken so that it will not generate unacceptable noise and vibration impacts or pose a significant risk to nearby structures and sensitive receivers
Community Communication Strategy (CoA A24)	• Describes how community and stakeholder engagement will be managed and facilitates communication about construction of the project with the community as well as relevant councils and agencies • Specifies the process for receiving, addressing, resolving and recording complaints as well as outlines the process required in the escalation of a complaint to an independent mediator

2. PURPOSE AND OBJECTIVES

2.1 PURPOSE

The purpose of this NVMP is to describe how the Contractor will manage potential noise and vibration impacts during construction of the Project.

This NVMP has been prepared to address applicable statutory requirements and aims to ensure that the commitments in the planning approval are met with regard to impacts to noise and vibration.

2.2 OBJECTIVES AND TARGETS

The primary objective of the NVMP is to avoid and minimise potential noise and vibration impacts where practicable by ensuring all relevant mitigation and management measures are implemented throughout the construction phase. Noise and vibration performance objectives and targets are described in Table 2.

Table 2 Noise and vibration performance objectives and targets

Performance objective	Targets	Performance indicators
Compliance with legislation, statutory approvals and the Infrastructure Approval	• Full compliance with statutory approvals. • No regulatory infringements (penalty infringement notices (PINs) or prosecutions) or formal regulatory warnings.	• Audit findings, environmental inspection records, monitoring records. • Number of regulatory infringements (PINs or prosecutions), formal regulatory warnings.
Implement and comply with the NVMP	Zero non-compliances identified during each compliance audit of NVMP.	Audit findings, environmental inspection records, monitoring records.
Provide regular project updates and other information to keep the community informed of the project, including out of hours works.	All project updates provided within the timeframes specified within the Community Stakeholder and Engagement Management Plan.	Notification records including out of hours works (OOHW) notifications.
Record and respond to noise and vibration complaints, within a timely manner	All complaints are reviewed within the timeframes specified within the Community Stakeholder and Engagement Management Plan.	Timeliness of response to complaints as identified in complaints register.
Provide adequate training to ensure construction activities are undertaken safely and with minimal risk to the environment.	Regular environmental training that focuses on the specific project activities and associated noise and vibration risks	Records of inductions, toolbox talks and daily pre-start meetings with noise and vibration focus.

3. ENVIRONMENTAL REQUIREMENTS

3.1 LEGISLATION

Legislation relevant to the management of noise and vibration includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act); and
- *Protection of the Environment Operation Act 1997* (POEO Act).

Relevant provisions of the above legislation are detailed within the register of legal and other requirements included in Appendix C of the CEMP.

3.2 GUIDELINES AND STANDARDS

The main guidelines, specifications and policy documents relevant to this plan are outlined in Table 3 below.

Table 3 Guidelines and standards

Guideline/Policy name	Where guideline is used
Construction Noise and Vibration Guidelines, Transport for NSW, (2023)	Assessment and mitigation of construction noise, ground borne noise, and vibration impacts.
ICNG, Department of Environment and Climate Change (DECC), 2009	Assessment of construction airborne noise and ground-borne noise impacts on sensitive receivers
Assessing Vibration: a Technical Guideline, Department of Environment and Conservation (DEC), 2006	Assessment of construction vibration impacts on sensitive receivers
NSW Road Noise Policy (RNP), Department of Environment, Climate Change and Water (DECCW), 2011	Assessment of construction traffic impacts
BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2, BSI, 1993	Screening assessment of construction vibration impacts (cosmetic damage) to sensitive buildings and structures
DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures, Deutsches Institute fur Normung, 2016	Screening assessment of construction vibration impacts (cosmetic damage) to vibration sensitive heritage buildings and structures, where the structure is found to be unsound
Noise Policy for Industry (NPfI), Environmental Protection Authority (EPA), 2017	Assessment of operational noise impacts, ambient noise monitoring and analysis procedures, and assessment of sleep disturbance
Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration, Australian and New Zealand Environmental Conservation Council (ANZECC), 1990	Assessment of vibration and overpressure from blasting
AS 2187.2-2006 Explosives – Storage and use, Part 2: Use of explosives	Assessment of vibration and overpressure from blasting

3.3 MINISTER'S CONDITIONS OF APPROVAL

The CoA relevant to this Plan are listed in Table 4. A cross reference is also included to indicate where and how the conditions are addressed in this Plan or other Project management documents.

Table 4 Minister's conditions of approval

CoA no.	Requirement	Where addressed	How addressed
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	Section 4	Consultation with local council is required for the preparation of the OOHW Protocol.

CoA no.	Requirement	Where addressed	How addressed
	(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.		Details of this consultation will be submitted to DPHI along with this NVMP in accordance with this condition.
A21	All plant and equipment used on site, or in connection with the development, must be: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Section 8	Mitigation measure N2 in Table 18.
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 c) no time on Sundays and NSW public holidays Unless the Planning Secretary agrees otherwise	Section 6.1.1	The standard construction hours for the Project are outlined in Section 6.1.1
B2	The following activities may be carried out 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;	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(b) emergency work to avoid the loss of life, property or to prevent material harm to the environment;	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(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;	Section 4.3 Section 6.1.2	Details surrounding requirements of negotiated agreements are outlined in Section 4.3 The permitted variations to the standard construction hours are identified in Section 6.1.2
	(d) activities that do not result in noise affected sensitive receivers, as defined in Interim Construction Noise Guidelines (DECC, 2009) (or its latest version);	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(e) road upgrades required by the relevant roads authority to be undertaken outside the standard construction hours;	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(f) where a rail authority requires a rail possession for the activities to be performed outside of standard construction hours;	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2

CoA no.	Requirement	Where addressed	How addressed
	(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;	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(h) where different hours are permitted or required under an EPL in force in respect of the CSSI; or	Section 6.1.2	The permitted variations to the standard construction hours are identified in Section 6.1.2
	(i) works carried out in accordance with an Out-of-Hours Work Protocol approved in accordance with condition B16.	Section 6.2 Appendix A	The scope of the OOHW Protocol is outlined in Section 6.1.3. An OOHW Protocol has been prepared and is included in Appendix A.
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 6.1.1	The standard construction hours for the Project including Helicopter use are outlined in Section 6.1.1
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 8.2	Section 8.2 provides the management measures to minimise noise impacts on sensitive receivers.
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) (or its latest version).	Section 6.4	The nominated noise criteria is described in Section 6.4. Refer to Section 8 for control measures.
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 6.6	The nominated road traffic noise criteria is described in Section 6.6. Refer to Section 8.2 for control measures.
B8	The Proponent must comply with the following vibration limits at any residence or sensitive receiver: (a) vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure);	Section 6.5	The nominated vibration criteria is described in Section 6.5. Refer to Section 8.2 for control measures.

CoA no.	Requirement	Where addressed	How addressed
	(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).		
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. *Note: Mitigation measures may include path barrier controls, at-property treatment, or a combination of path controls and at-property treatment.*	Section 6.4.4 Section 8.1 Section 8.2	Construction 'noise affected' management levels are described as project 'noise management levels' throughout this NVMP and have been established in accordance with the Interim Construction Noise Guideline (ICNG) as identified in Section 6.4.4. In line with the ICNG, where predicted or measured noise levels exceed the noise management level feasible and reasonable work practices will be identified and implemented, such as those included in Section 8.2.
B10	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.*	Section 6.4.4 Section 8.1 Section 8.2	Construction 'highly noise affected' management levels are described as project 'noise management levels' throughout this NVMP and have been established in accordance with the Interim Construction Noise Guideline (ICNG) as identified in Section 6.4.4. In line with the ICNG, where predicted or measured noise levels exceed the noise management level feasible and reasonable work practices will be identified and implemented, such as those included in Section 8.2.
B11	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.	Section 6.1.1	Standard construction hours including hours blasting is permitted are outlined in Section 6.1.1
B12	The Proponent must ensure that any blasting carried out on site does not exceed the criteria in Table 2.	Section 6.7	Criteria related to blasting are outlined in Section 6.7. Refer to Section 8.2 for control measures.

Location	Airblast overpressure (dB(Lin Peak)	Ground vibration (mm/s)	Allowable exceedance
	120	10	0%

CoA no.	Requirement				Where addressed	How addressed
	Any residential receiver	115	5	5% of the total number of blasts or events over a rolling period of 12 months		
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:				This NVMP	The preparation of this NVMP.
	(a) ensure the requirements in conditions B1 to B14 are complied with;				Section 9	Section 9 identifies how compliance will be managed on the Project. Conditions B13 and 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 8.2	Management and mitigation measures implemented to minimise noise and vibration impacts of the project are included in Section 8.2.
	(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 8.2	Management and mitigation measures implemented to minimise noise and vibration impacts of the project are included in Section 8.2.
	(d) include a detailed description of the noise and vibration management system for the development;				Section 8.2	The noise and vibration management system is described throughout this NVMP and in particular, in Sections 8, 9 and 10.
	(e) include a protocol for the identification, notification and management of works that exceed the noise management levels;				Section 7.2.1 and 8.1.1	A protocol for the management of activities that could result in noise levels that exceed the noise management levels at sensitive receivers is identified in Section 7.2.1. The requirements for notification of works that could exceed noise management levels are described in Section 8.1.1.
	(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 9.3 and 9.4	The effectiveness of the management measures identified in Section 8 of this NVMP will be monitored and reported through the program provided in Sections 9.3 and 9.4.
	(g) include a monitoring program that evaluates and reports on the operational noise performance of the				Not applicable to the	Not applicable to the Construction stage of the Project.

CoA no.	Requirement	Where addressed	How addressed
	development and the effectiveness of operational noise mitigation measures; and	Construction stage of the Project.	
	(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 9.3.1	Section 9.3.1 identifies the actions that would be undertaken following the identification of exceedances during monitoring.
	(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.	Appendix A	An OOHW Protocol has been prepared and is included in Appendix A.
	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.*		Noted

3.4 UPDATED MITIGATION MEASURES

Relevant Updated Mitigation Measures (UMMs), as identified in Appendix B of the Amendment Report, are listed in Table 5. A cross reference is also included to indicate where and how the conditions are addressed in this NVMP or other Project management documents.

Table 5 Updated mitigation measures

Reference	Revised Environmental Management Measure	Where addressed	How addressed
NV1	Where receivers are predicted to be noise affected and near construction compounds or fixed work sites with long durations (ie 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 8.2	Mitigation measure N6 in Table 18
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:	Appendix A – OOHW Protocol	Appendix A – OOHW Protocol Mitigation measure N13 in Table 18.

Reference	Revised Environmental Management Measure	Where addressed	How addressed
	• 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.		
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 controlled 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 8.2	Mitigation measure N18 in Table 18
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:	Section 8.2	Mitigation measure N1, N2, N3, N4, N5 and N15 in Table 18
	• 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		

Reference	Revised Environmental Management Measure	Where addressed	How addressed
	• 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 manufacture'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.		
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 8.2	Mitigation measure N7 in Table 18 and monitoring in Section 9.3
NV6	All construction vehicle movements will adhere to the following measures:	Section 8.28.2	Mitigation measure N9 in Table 18

Reference	Revised Environmental Management Measure	Where addressed	How addressed
	• 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.		
NV7	Where vibration intensive work is required within the recommended minimum working distances and is considered likely to exceed the cosmetic damage criteria:	Section 8.2	Mitigation measure N10 in Table 18
	• 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		
NV10	Management measures will be implemented to minimise aircraft noise at sensitive receivers where practicable and appropriate. Measures will include (but are not limited to):	Section 8.2	Mitigation measure N20 in Table 18
	• Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include scheduled 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 potential helipad locations at the construction compounds and combined worker accommodation facilities and construction compounds with the maximum distance offset from sensitive receivers.		

Reference	Revised Environmental Management Measure	Where addressed	How addressed
	• 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.		

4. CONSULTATION

4.1 DEVELOPMENT OF THE OUT OF HOURS WORK PROTOCOL

In accordance with CoA B16 i) of the Infrastructure Approval, the OOHW Protocol (Appendix A), which is required to form part of this NVMP, has been prepared in consultation with relevant councils:

- Snowy Valleys Council,
- Cootamundra-Gundagai Regional Council,
- Upper Lachlan Shire Council,
- Yass Valley Council, and
- Goulburn Mulwaree Council.

The OOHW Protocol applies to the entire construction phase and all associated activities required outside of standard construction hours. The OOHW Protocol was issued to the relevant councils for review and comment. Details of all consultation with the above councils will be submitted to DPHI along with the submission of this plan.

4.2 ONGOING CONSULTATION

The Contractor will use a range of tools in accordance with the CCS to facilitate ongoing consultation and communication with the community and stakeholders (including government agencies where necessary) regarding the project. Communication tools include, but are not limited to, stakeholder briefings, project website, community drop-in sessions, door knocks and project factsheets. Notifications will be issued for, but not limited to the following commencement of construction, significant milestones and changes to the scope of work. Refer to the CCS for further information.

In accordance with CoA C15 a) of the Infrastructure Approval, project documents including the EIS, approved strategies, plans or programs required under the CoA and independent reports will be publicly available on the project website.

In accordance with REMM NV10, ongoing consultation will occur to notify nearby sensitive receivers of upcoming work involving aircraft. This will include scheduled 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.

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 NEGOTIATED AGREEMENTS

In accordance with CoA B2 c) of the Infrastructure Approval, an agreement with sensitive receivers (owners and occupiers) may be negotiated to carry out works in accordance with the hours and noise limits specified in the agreement.

Where multiple receivers are affected by the proposed works, a majority of the affected receivers must agree to the specified hours and noise limits proposed by the project. Further details are provided in the OOHW Protocol in Appendix A.

All negotiated agreements will be in writing and will be finalised before the commencement of relevant works.

4.4 COMPLAINTS

The Project CCS details the process for managing complaints for the Project including response timeframes. The CCS includes the requirement to maintain a complaints register which will record the details of all complaints relating to the Project, including the following as a minimum:

- Date and time of the complaint
- Method by which the complaint was made

- Any personal details of the stakeholder
- Number of people affected in relation to a complaint
- Nature of the complaint
- Action taken in relation to the complaint, means by which the complaint was addressed and any follow up
- Whether resolution was reached, with or without mediation
- If no action taken, reasons why
- The status of resolution of the complaint.

Records of complaints will be published to the Project website monthly in accordance with CoA C15.

If investigation identifies Project activities being undertaken as the likely source of the complaint, the relevant contractor will initiate an investigation.

5. EXISTING ENVIRONMENT

This section summarises the existing noise and vibration environment within and adjacent to the Project as assessed during the EIS and Amendment Report. The key reference documents include:

- Chapter 15 of the EIS
- Technical report 9 of the EIS (Noise and vibration impact assessment)
- Chapter 6.9 of the Amendment Report, and
- EIS Technical Report 9 Addendum (part of the Amendment Report).

Existing noise levels within the noise and vibration study area are typical of rural areas and dominated by natural sources such as wildlife and weather. However urban noise sources were noted to influence the background environment at some locations including:

- Road traffic noise at Tarcutta, Gilmore and Yass
- Industrial noise at Gilmore and north of Yass
- Occasional aircraft noise at Tumut, Adjungbilly and Bannaby.

Existing substations, including Yass substation and Bannaby 500 kV substation, also generate noise from their operation.

5.1 MEASURED NOISE LEVELS

Ambient noise monitoring was undertaken as part of the EIS, this consisted of both attended and unattended monitoring events. Attended monitoring allowed for the contributions of various noise sources at each location to be determined. Attended measurements were generally found to be consistent with unattended monitoring and confirmed that the existing noise environment is generally controlled by natural sources such as wildlife and weather.

The EIS and Amendment Report noise monitoring locations and identified rating background noise levels (RBL) for the Project areas are summarised in Table 6. Refer to Table 5-2 of the EIS Technical Report 9 Addendum (Amendment Report) for further details.

Table 6 EIS ambient noise monitoring results

Location ID	Address	Background Noise (RBL)[1]		
		Day (dBA)	Evening (dBA)	Night (dBA)[2]
L04[3]	1428 Adjungbilly Road, Adjungbilly	39	39[4]	38
L05	Hanworth Road, Bannaby	26	26[4]	<25
L08	Perry Street, Yass	38	38[4]	34
L12	Faulder Avenue, Yass	37	37[4]	37
L13	Wargeila Road, Yass	36	36[4]	34

Note 1: The RBL has been determined with reference to the procedures in the NPfI.

Note 2: Day-time is 7am to 6pm, evening is 6pm to 10pm and night-time is 10pm to 7am.

Note 3: The ambient noise environment at these locations was found to be influenced by extraneous noise (likely mechanical plant/equipment in the vicinity of the monitor) and is not considered representative of the surrounding area.

Note 4: The monitored evening level was found to be higher than the day-time. In this situation the NPfI requires that the level be reduced to match the day-time, which is provided in the table. Refer to Table 5-2 in Technical Report 9 Addendum (part of the Amendment Report) for further details.

5.2 SENSITIVE RECEIVERS

Sensitive receivers within the noise and vibration study area have been categorised as residential buildings, commercial/industrial buildings or 'other sensitive' land uses (eg places of worship, active recreation areas, etc). Most sensitive receivers surrounding the project are residential. The 'other sensitive' receivers in the noise and vibration study area are mainly located in the town of Yass.

The location of sensitive receivers in proximity to the Project are shown in Appendix B: Sensitive receiver maps.

5.3 ABORIGINAL AND HISTORIC HERITAGE

Technical Report 2 of the EIS and Technical Report 2 of the Amendment Report considered Aboriginal Cultural Heritage items that are identified within a one kilometre buffer of the Project area. A significant number of Aboriginal Cultural Heritage items, including artefacts and potential archaeological deposits have been identified within this buffer area. The identified Aboriginal Cultural Heritage items (trees, middens or scattered artefact finds) typically consist of non-vibration sensitive items and as such no vibration sensitive objects are assumed to be within the safe working distances during construction.

Technical Report 3 of the EIS and Technical Report 3 of the Amendment Report considered Non-Aboriginal Historic Heritage items located within one kilometre of the Project area. A conservative approach was taken to identify heritage listed buildings and structures within and near the project footprint that are potentially sensitive to vibration. Heritage items located within and in close proximity to the Project footprint are identified in Table 7. The EIS technical report noted there would be no impact to the significance of either of these heritage items from the Project.

Kiley's Run and Coolalie Limestone Kilns and Quarry are the only heritage items identified that would be potentially sensitive to vibration as the sites consist of historic buildings/structures. The nearest heritage structure to the Project Alignment is around 180 metres. Technical Report 9 of the Amendment Report noted that as the closest heritage structure is beyond the recommend minimum working distance for vibration impacts are unlikely to occur.

Table 7 Non-Aboriginal heritage listed items

Item name	Address	Significance	Heritage listing	Item sensitive to vibration	Distance to nearest heritage structure
Kiley's Run	Red Hill State Forest	Indicative on Register of National Estate (RNE)	RNE – ID 16005	Yes	240 m
Derringullen Creek Fossil Area	Derringullen Creek Area	Registered on the RNE	RNE – ID Stand 1078	Unlikely	N/A
Coolalie Limestone Kilns and Quarry	879 Cooks Hill Road, Bango	Local	A297		180 m

6. NOISE AND VIBRATION CRITERIA

The EPA recommends management levels and goals when assessing construction noise and vibration. These are outlined in:

- The ICNG (DECC, 2009); and
- Assessing Vibration: a technical guideline (DEC, 2006)
- German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures (for structural damage)
- NSW Road Noise Policy (DECCW, 2011).

Relevant elements of these documents are summarised in the sections below.

6.1 CONSTRUCTION HOURS

6.1.1 STANDARD CONSTRUCTION HOURS

In accordance with CoA B1, and in line with the ICNG standard construction hours for road upgrades, construction, upgrading or demobilisationmay only be undertaken between:

- 7am to 6pm – Monday to Friday;
- 8am to 1pm – Saturdays; and
- At no time on Sundays and NSW public holidays; unless the Planning Secretary agrees otherwise.

In accordance with CoA 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, unless approved in accordance with CoA B11.

Additionally, in accordance with CoA B4 Helicopter use associated with development may only be carried out between 9 am and 5 pm Monday to Friday and between 9 am to 1 pm on Saturday. No helicopter use is allowed on Sundays or public holidays. This would only not apply if different hours are permitted or required under an EPL in force in respect of the CSSI or the Planning Secretary agrees otherwise, consistent with CoA B4.

6.1.2 VARIATION TO STANDARD CONSTRUCTION HOURS

The following construction, upgrading and demobilisation activities may be carried out outside the hours specified above, as permitted in CoA B2:

- 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 to 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 roads authority to be undertaken outside the standard construction hours, or
- 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; or
- Works carried out in accordance with an OOHW Protocol approved in accordance with CoA B16.

Construction work is proposed to occur during standard construction hours, with potential extension to these hours, subject to additional environmental assessment (refer Section 4.6.2 of the EIS). Additional work hours would enable an overall reduction in the duration of construction and are being considered

due to the limited number of nearby sensitive receivers and the proposed shift arrangements of the workforce. Any works proposed to be undertaken outside of the standard construction hours, except those otherwise allowed under CoA B2, will be undertaken subject to the requirements of the OOHW Protocol (Appendix A).

6.2 OUT OF HOURS WORK PROTOCOL

An OOHW Protocol (required in accordance with CoA B16 i)) is provided in Appendix A to identify the process for the consideration, management and approval of works to be undertaken outside the hours defined in CoA B1, and B11 (which details blasting hours) of the Infrastructure Approval. Works that are otherwise permitted under CoA B2 are not required to be undertaken in accordance with the processes outlined in the OOHW Protocol.

Operation of the accommodation camps will not be subject to the OOHW Protocol as UMM NV2 excludes the operation of accommodation camps from the OOHW protocol. The operation of the accommodation camps will be undertaken in accordance with the Accommodation Camp Management Plan required under CoA B59. Noise impacts related to the operation of Accommodation Camps will be managed in accordance CoA B9, refer to Section 8.1.

6.3 CONSTRUCTION NOISE AND ASSESSMENT OBJECTIVES

The ICNG provides guidelines for the assessment and management of 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 project implementation stage
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

6.4 QUANTITATIVE NOISE ASSESSMENT CRITERIA

Construction noise assessment goals presented in the ICNG are referred to as noise management levels (NMLs) for residential, sensitive land uses and commercial/industrial premises.

6.4.1 RESIDENTIAL PREMISES

Table 8 (reproduced from Table 2 of the ICNG) sets out the external noise management levels for construction noise at residences. The RBL is used when determining the management level. 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 RBL is described in detail in the NPfI (EPA, 2017). As a guide, the difference between the internal noise level and the external noise level is typically 10dB with windows open for adequate ventilation.

Table 8 External noise management levels for construction noise at residences (ICNG Table 2)

Time of day	Noise Management Level ($L_{Aeq(15min)}$)*	How to apply
Standard construction hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays	Noise affected Rating Background Level (RBL) + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured average noise level for 15 minutes (Laeq(15minute)) 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.

Time of day	Noise Management Level ($L_{Aeq(15min)}$)*	How to apply
	Highly noise affected 75 dBA	The highly noise affected (HNA) 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 restructuring 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 standard construction hours	Noise affected RBL + 5dB	A strong justification would typically be required for work 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 above the noise affected level, the proponent should negotiate with the community.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

6.4.2 OTHER LAND USES (NON-RESIDENTIAL)

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, such as hotels, are derived from AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors and the Association of Australian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment (2013). The noise management levels from AS2107 are the upper range levels to account for the variable and short-term nature of construction noise.

Table 9 presents noise management levels for other non-residential land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed. The noise management levels apply when the premises are in use during any assessment period.

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.

A conservative estimate of the difference between internal and external noise levels is 10dB for buildings other than residences. Some buildings may achieve greater performance, such as where windows are fixed (that is, cannot be opened).

Table 9 Noise management levels for other non-residential land uses

Sensitive receiver type	NML applicable when in use, $LA_{eq,\ 15\ min}$
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Childcare centres • sleeping areas • play areas	 Internal noise level 45 dB(A) External noise level 65 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)

Sensitive receiver type	NML applicable when in use, $LA_{eq,\ 15\ min}$
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dB(A)
Community centres	Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

6.4.3 SLEEP DISTURBANCE CRITERIA

Where construction 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.

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.

6.4.4 PROJECT NOISE MANAGEMENT LEVELS FOR RESIDENTIAL RECEIVERS

The Project noise management levels have been determined using the results from the unattended and attended ambient noise monitoring, refer to HumeLink Noise and Vibration Impact Assessment Addendum Technical Report, SLR, May 2024.

Table 10 Project noise management levels

Location	Representative background monitoring location	NML ($L_{Aeq(15minute)}$- dBA)				Sleep disturbance screening criteria (52 dBA or RBL +15 dB whichever is higher)
		Standard construction (RBL +10dB)	Out of hours (RBL + 5dB)			
		Day-time	Day-time	Evening	Night-time	
Yass (south of Yass River)	L08	48	43	43	39	52
Yass (north of Yass River)	L13	46	41	41	39	52
All other receivers	L05	45	40	35	35	52

6.5 VIBRATION CRITERIA

Effects of ground vibration on buildings resulting from construction may be segregated into the following 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 contents – vibration where the building contents may be affected
- Effects on building structures – vibration in which the integrity of the building or structure itself may be prejudiced.

6.5.1 HUMAN COMFORT

Vibration criteria relating to human comfort that are applicable to this project are taken from the DEC (2006) document *Assessing Vibration – A Technical Guideline* and include the following.

- Continuous vibration – from uninterrupted sources (Table 11)
- Impulsive vibration – up to three instances of sudden impact eg dropping heavy items, per monitoring period (Table 12)
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously (Table 13). All proposed vibration intensive activities are considered intermittent.

Table 11 Human comfort - continuous vibration acceleration criteria (m/s2) 1-80Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
		0.04	0.029	0.080	0.058
Workshops	Day or night-time	0.04	0.029	0.080	0.058

Table 12 Human comfort - impulsive vibration acceleration criteria (m/s2) 1-80Hz

Location	Assessment period	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

Table 13 Intermittent vibration impacts criteria (m/s1.75) 1-80Hz

Location	Daytime		Night-time	
	Preferred values	Maximumn values	Preferred values	Maximum values
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

Location	Daytime		Night-time	
	Preferred values	Maximumn values	Preferred values	Maximum values
Workshops	0.80	1.60	0.80	1.60

6.5.2 STRUCTURAL DAMAGE

Two standards by which building damage from construction-induced vibration are commonly assessed include:

- British Standard 7385: Part 2-1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993); and
- German DIN 4150: Part 3 – 2016 Effects of Vibration on Structures (DIN 2016).

The German standard provides the most stringent criteria and will be used in this NVMP. The DIN guideline values for peak particle velocity (mm/s) measured at the foundation of the building are summarised in Table 14. The criteria are frequency dependent and specific to particular categories of structure.

Table 14 structural damage criteria

Type of structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz*	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

*For frequencies above 100Hz, at least the values specified in this column shall be applied

6.5.3 MINIMUM WORKING DISTANCES

The EIS (Table 3-9 of Technical Paper 9 of the EIS) identified minimum working distances for typical items of vibration intensive equipment to minimise potential for vibration related impacts. These are reproduced in Table 15.

Where vibration intensive equipment such as vibratory rollers, hydraulic hammers or bored piling rigs are used at a greater distance from sensitive receivers than the specified minimum working distance, there is negligible risk of structural damage or impacts on human comfort. Where recommended minimum working distances are not met, more detailed consideration of potential vibration impacts and the construction approach would occur during detailed design.

Table 15 Minimum working distances for vibration intensive plant

Equipment	Rating/Description	Minimum working distance (m)		
		Human response (DEC, 2006)	Cosmetic damage to non-heritage structures (BSI, 1993)	Damage to heritage structures (DIN 4150-3:2016-02)
Vibratory roller	<50 kN (typically 1-2t)	15 – 20	5	11
	<100kN (typically 2-4t)	20	6	16
	<200kN (typically 4-6t)	40	12	25
	<300kN (typically 7-13t)	100	15	31
	>300kN (typically 13-18t)	100	20	54
Small hydraulic hammer	300kg (5 to 12t excavator)	7	2	5
Medium hydraulic hammer	900kg (12 to 18t excavator)	23	7	15
Large hydraulic hammer	1600kg (18 to 34t excavator)	73	22	44
Vibratory Pile Driver	Sheet piles	20	2 – 20	5 – 40
Piling rig – bored	≤800mm	4	2 (nominal)	5
Jackhammer	Hand held	2	1 (nominal)	3

6.6 CONSTRUCTION ROAD TRAFFIC NOISE

Technical Paper 9 of the EIS notes that traffic impacts associated with construction vehicles are assessed using guidance from the *Road Noise Policy* (RNP). The RNP provides guidance on the assessment of noise impacts on sensitive receivers from additional road traffic generated by the proposal operating on a public road network.

The RNP makes a distinction between the assessment of freeway/arterial/sub-arterial roads and local roads. Freeway/arterial/sub-arterial roads are assessed over day (7am to 10pm) and night (10pm to 7am) periods.

Table 16 presents a summary of applicable road traffic criteria for residential receivers identified in Table 3 of the RNP.

Table 16 Road traffic noise criteria for receivers on existing roads affected by the additional traffic from the project

Road type	External road traffic noise criteria[1]	
	Day 7am – 10pm	Night 10pm – 7am
Freeway/arterial/sub-arterial roads	60 dBA $L_{Aeq(15hour)}$	55 dBA $L_{Aeq(9hour)}$
Local roads	55 dBA $L_{Aeq(1hour)}$	50 dBA $L_{Aeq(1hour)}$

If the road traffic noise levels increase by more than 2dB as a result of the proposed construction traffic, and the criteria outlined in Table 4.9 are exceeded, mitigation options should be investigated.

6.7 BLASTING CRITERIA

Blasting events have the potential to result in brief ground vibration and air overpressure impacts at nearby receivers. Blasting work for the project would generally be associated with special or difficult

foundation work. There could also be some potential areas of difficult or steep terrain where an access track is required and blasting work in a small area of the track may be the most appropriate construction approach. Blasting also has the benefit of substantially reducing the duration of noise and vibration impacts when compared to traditional earthwork methods.

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. Consistent with CoA B12, the ANZECC criteria recommends the following vibration and overpressure limits:

- **Vibration Peak Particle Velocity (PPV): 5 mm/s -** The PPV level of 5 mm/s may be exceeded on up to 5 per cent of the total number of blasts over a period of 12 months. The level should not exceed 10 mm/s at any time.

- **Airblast overpressure: 115 dBL-** The level of 115 dBL may be exceeded on up to 5 per cent of the total number of blasts over a period of 12 months. The level should not exceed 120 dBL at any time.

7. ENVIRONMENTAL ASPECTS AND IMPACTS

The following sections summarise the potential impacts pertaining to noise and vibration for the purpose of construction of the Project.

The key reference documents include:

- Chapter 15 of the EIS
- Technical report 9 of the EIS (Noise and vibration impact assessment)
- Chapter 6.9 of the Amendment Report, and
- EIS Technical report 9 Addendum (part of the Amendment Report).

7.1 CONSTRUCTION ACTIVITIES

The assessment undertaken for the EIS and Amendment Report utilised 'realistic worst-case' scenarios to predict the potential airborne noise impacts from the noisiest 15-minute period for each work scenario, as required by the ICNG.

The assessed representative construction scenarios are listed below:

Substations

- Site establishment
- Earthworks and vegetation clearance
- Civil and building work
- Instillation of high voltage equipment and associated structures
- Pre-commissioning activities
- Demobilisation and rehabilitation
- Tie-in work.

Transmission lines

- Site establishment and deliveries
- Access tracks
- Earthwork and clearing
- Construction of structures
- Brake and winch sites
- Overhead stringing of conductors and earth wires
- Telecommunications hut construction.

Construction compounds and worker accommodation facility

- Site establishment
- Construction compound operation
- Accommodation facility operation.

Subject to a Blast Management Plan prepared in accordance with NV3, blasting (and associated rock crushing) may also be undertaken during construction.

7.1.1 TYPICAL OOHW

Technical Report 9 of the EIS outlined typical OOHW expected for the Project, which include:

- Substations – installation of high voltage equipment and associated structures
- Transmission lines – overhead stringing of conductors and earth wires
- Worker accommodation facility – facility operation.

7.1.2 CONSTRUCTION COMPOUND SITES

A total of five construction support sites and accommodation camps are proposed to be used as part of the Project. These sites, their uses and proximity to the nearest sensitive receivers are outlined in Table 17.

Table 17 Construction compounds and accommodation camps

Compound Number	Location	Purpose	Approximate distance to the nearest sensitive receiver
AC04	Adjungbilly accommodation facility and compound	• Plant servicing workshop • Stockpile, laydown and equipment storage • Secondary offices • Amenities • Car park • Accommodation • Concrete batch plant	200 metres west- residential
AC05	Yass compound	• Plant servicing workshop • Stockpile, laydown and equipment storage • Main offices • Amenities • Car park	100 metres northeast- residential
AC05B	Yass Valley Way accommodation facility	• Plant servicing workshop • Stockpile, laydown and equipment storage • Secondary offices • Amenities • Car park • Accommodation	300 metres northeast - commercial
AC06	Crookwell compound	• Plant servicing workshop • Stockpile, laydown and equipment storage • Secondary offices • Amenities • Car park	1.5 km north – residential
C12	Amended Bannaby 500Kv substation compound	• Plant servicing workshop • Stockpile, laydown and equipment storage • Secondary offices • Amenities • Car park	1.4 km northeast – residential
C19	Gadara Road compound	• Plant servicing workshop • Stockpile, laydown and equipment storage • Secondary offices • Amenities • Car park	660m west – residential

7.2 POTENTIAL IMPACTS ARISING FROM CONSTRUCTION

7.2.1 CONSTRUCTION NOISE IMPACTS

A construction noise and vibration assessment has been undertaken for the whole HumeLink Project as part of the EIS. The Technical Report notes that the scenarios assessed may not necessarily be the final methodology adopted to construct the Project. Revised noise assessments specifically for HumeLink East will be prepared once the final methodology, plant and equipment is determined and prior to commencement of the relevant construction activity.

A project-specific construction noise and vibration management tool will be developed to calculate the potential noise and vibration impacts for construction activities. The tool will also estimate whether any sensitive receivers are within minimum working distances from the proposed construction activities. The tool will:

- Consider the location of the proposed activities
- Consider the noise and vibration generating activities that will take place and determine if they are low/moderate or high risk activities
- Assess the predicted noise and vibration levels against the relevant management levels, and
- Identify feasible and reasonable mitigation and management measures in accordance with the ICNG.

These construction noise and vibration impact assessments (CNVIA) will be undertaken progressively as construction continues.

Noise and vibration monitoring data will be collected throughout the delivery of the project construction works in accordance with Noise and Vibration Monitoring requirements outlined in Section 9.3 and the CNVIA. This will allow for ongoing review and verification of the predictive model.

The following process for assessing construction noise and vibration will be implemented during preparation of each assessment:

1. **Determine noise and vibration objectives for each key construction area:**
   - Identify noise and vibration sensitive receivers
   - Determine relevant noise and vibration objectives, with reference to Section 6.
2. **Identify construction stages for each key construction area:**
   - Identify construction aspects of the proposed Activities, including:
     - Site location
     - Times of operation
     - Activities involved
     - Plant and equipment (including size/type)
   - Identify construction works in the vicinity of the project. Liaise with the Utilities and other construction projects in the vicinity of the works to ensure cumulative noise and vibration impacts are managed, in particular for OOHW.
3. **Predict noise and vibration impacts.**

Airborne construction noise

- Determine LAeq(15 minute) sound power levels for plant and equipment based on operating scenarios for input to noise model
- Establish noise model for construction activity. The noise model should include the location of sources and receivers
- Calculate the LAeq(15 minute) noise levels (external and internal) from the proposed construction activities and compare these with the construction noise objectives
- For night-time activities, calculate the maximum (L_{Amax}) noise levels and compare with the sleep disturbance criterion (RBL +15 dBA or 52 dBA), applied at the external façade and determine whether the 'awakening reaction' level of L_{Amax} 65 dB(A) (external) would be exceeded.

Construction vibration

- Determine the location of each plant or equipment item in relation to each receiver

- Where vibration intensive equipment could potentially be operating in proximity to receivers, determine whether this is within the minimum working distances. Note that minimum working distances may differ for heritage items
- Where plant and equipment may operate within minimum working distances, or for heritage items:
    - Use vibration levels versus distance prediction curves for each plant item
    - Determine the vibration likely to occur at each building location
    - For highly sensitive, equipment, assessment may need to incorporate structural response of building and particular sensitivities of equipment.

4. **Assess noise and vibration impacts. Where predicted noise and vibration exceeds the objectives identified in Step 1:**
    - Identify key hours of impact for affected sensitive receivers (refer to Section 6.1)
    - Implement appropriate reasonable/feasible standard mitigation measures
    - Consider additional mitigation measures and apply as appropriate.

7.2.2 CONSTRUCTION TRAFFIC NOISE

Construction road traffic management and vehicle movements associated with the Project have been assessed in the EIS and Amendment Report. These assessments are based on the worst-case scenario when the peak construction workforce mobilises in night-time period.

Technical Report 9 of the EIS noted the following potential worst case impacts:

- 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 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.

As the assessment carried out in the EIS was for the worst-case scenario, it is likely that there will be times during construction when less vehicle movements are required and/or the construction peak occurs during the day-time period, resulting in reduced road traffic noise impacts. The mitigation measures outlined in Section 8 will be implemented to further avoid and minimise these impacts where practicable.

7.2.3 CONSTRUCTION AIRCRAFT NOISE

Construction aircraft noise associated with the Project has been assessed in the Amendment Report. Whilst not currently proposed, a number of the construction compounds and combined worker accommodation facility and construction compounds may include a helipad to enable helicopter use during construction. Most aircraft use within the transmission line corridor would be for stringing work via either helicopter or drone. Aircraft may also be used to install final components such as conductor spacers on the newly installed transmission lines.

Impacts associated with helicopters would be intermittent and typically only occur during helicopter arrival and departure at the helipad. Construction using aircraft would generally be progressive in nature, so the worst-case noise levels at any sensitive receiver would only be noticeable for a short duration as the work passes.

8. ENVIRONMENTAL CONTROL MEASURES

8.1 EXCEEDANCE OF NOISE MANAGEMENT LEVELS

If construction activities are identified that could generate noise levels that are likely to exceed the relevant noise management levels at any sensitive receivers, additional reasonable and feasible measures would be implemented in accordance with this plan and in particular the measures specified in Table 18. Works likely to generate noise levels that exceed applicable noise management levels at sensitive receivers would be scheduled during standard construction hours, wherever practicable, or in accordance with the OOHW Protocol (Appendix A).

Where an exceedance of noise management level is predicted to occur as a result of the construction and/or operation of a camp or compound (ie as per CoA B9), or where a highly noise affected impact is predicted to occur as a result of project activities (as per CoA B10), the following measures will be considered with the aim of reducing predicted noise impacts below the relevant noise management level:

- Identify if any alternate plant or equipment with lower noise levels can be used
- Identify any site layout changes or orientation of equipment that maximises shielding of noisy items or activities
- Identify if any scheduling of activities can be implemented to minimise concurrent use of noisy plant/equipment
- Identify if any reasonable and feasible path control measures can be implemented (eg noise barriers or shielding).

Where the above measures do not reduce predicted noise impacts below the relevant noise management level or cannot be feasibly implemented and the impact is predicted for short term or intermittent impacts only (e.g. during the establishment phase), affected receivers will be notified as outlined below. Where the impact is predicted to occur over longer durations (e.g. for the duration of operation of a camp/compound), consultation will be undertaken with the affected receiver to identify any further measures that may be applied.

8.1.1 NOTIFICATION OF WORKS

Where exceedances of noise management or vibration levels are predicted, residents/sensitive receivers will be notified of construction activities that are likely to affect their noise and vibration amenity in accordance with the requirements of the CCS.

This proactive communication will include:

- The types of activities to be undertaken and equipment used
- The timing of activities including expected start and finish
- The location of activities
- Likely impacts of the activities and applicable mitigation measures
- Details of the community information line and how to make an enquiry and/or a complaint.

Notification of OOHW will also be undertaken in accordance with the notification requirements of the OOHW Protocol (Appendix A).

As outlined in the CCS, a range of tools will be utilised to communicate with the community and stakeholders and will include community and stakeholder notifications, email, community drop-in sessions and door knocks.

Monitoring will be undertaken as described in Section 9.3.

8.2 MANAGEMENT AND MITIGATION MEASURES

Management and mitigation measures relevant to the Project are outlined in the table below. These will be implemented to minimise impacts from 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 CoA and commitments of the UMMs.

Table 18 Noise and Vibration management and mitigation measures

ID	Measure/Requirement	When to implement	Responsibility	Reference
General				
N1.	Training and awareness programs will be delivered to project personnel, including relevant sub- contractors on noise and vibration requirements (including operating hours) through inductions, toolboxes and targeted training.	Pre-construction and construction	Environmental Advisor Environmental Manager Environment Team	Good practice UMM NV4
Construction noise				
N2.	Plant and equipment used on site will maintained in a proper and efficient condition and operated in a proper and efficient manner to avoid the generation of excessive noise.	Pre-construction and construction	Environment Team	POEO Act UMM NV4 CoA A21
N3.	Plant and machinery will be operated in an appropriate manner to reduce noise impact, this would include: • Reducing occurrence of maximum noise level events, such as excavator bucket impacts, material drop heights, steel on steel impacts and dragging materials across hard surfaces • Turn off machinery when not in use	Construction	Supervisors Construction Manager Environmental Manager	UMM NV4
N4.	All construction plant and equipment used on site where practicable and appropriate must: • Use non-tonal reversing alarms in place of traditional beeper reversing alarms during out of hours where noise impacts are predicted • Use noise source controls, such as residential class mufflers, to reduce noise from all regularly used plant including cranes, excavators and trucks	Construction	Supervisors Construction Manager Environmental Manager	UMM NV4
N5.	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: • Install screens or use barriers to mitigate noise from stationary noise sources • Plan and schedule concurrent noisy activities to minimise the number of items of noisy plant operating at one time and cumulative noise levels • Select quieter plant and equipment and use alternative construction methods to minimise noise levels • Maximise the offset distance between noisy plant and sensitive receivers • Orient noisy plant and equipment away from sensitive receivers • Notify and consult with potentially noise affected receivers about upcoming noisy activities	Construction	Supervisors Construction Manager Environmental Manager	UMM NV4 CNVG

ID	Measure/Requirement	When to implement	Responsibility	Reference
	• 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.			
N6.	Where an exceedance of noise management level is predicted to occur as a result of the construction and/or operation of a camp or compound, or where a highly noise affected impact is predicted to occur as a result of project activities, the following measures will be considered with the aim of reducing predicted noise impacts below the relevant noise management level: • Identify if any alternate plant or equipment with lower noise levels can be used • Identify any site layout changes or orientation of equipment that maximises shielding of noisy items or activities • Identify if any scheduling of activities can be implemented to minimise concurrent use of noisy plant/equipment • Identify if any reasonable and feasible path control measures can be implemented (eg noise barriers or shielding) Activities that would exceed the 'noise affected' noise management level or sleep disturbance criteria during construction or operation of these facilities or activities that would exceed the 'highly noise affected' noise management level during construction must not commence until the measures identified above have been implemented, unless otherwise agreed with the Planning Secretary. However, this does not apply if AGJV has an agreement with the relevant owner/s of these receivers to generate higher noise levels, and AGJV has advised the Department in writing of the terms of this agreement.	Pre-construction and construction	Supervisors Construction Manager Environmental Manager	CoA B9 CoA B10 UMM NV1
Monitoring and reporting				
N7.	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.	Construction	Environmental Manager Environmental Advisor	UMM NV5
N8.	Noise and vibration monitoring will be undertaken in accordance with Section 9.3.	Construction	Environmental Manager Environmental Advisor	CoA B16 (f)
Construction Traffic				
N9.	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	Construction	Supervisors Construction Manager	UMM NV6

ID	Measure/Requirement	When to implement	Responsibility	Reference
	• 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.		Environmental Manager Engagement Manager All project-related vehicle drivers	
Vibration				
N10.	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.	Pre-construction and construction	Supervisors Construction Manager Environmental Manager	UMM NV7
Working Hours				
N11.	Road upgrades, construction, upgrading and decommissioning may only be undertaken between: • 7am to 6 pm Monday to Friday; • 8am to 1 pm Saturdays; and • at no time on Sundays and NSW public holidays; unless in accordance with mitigation measure N12 or with the agreement of the Planning Secretary.	Construction	Supervisors Construction Manager Environmental Manager	CoA B1
N12.	The following construction works may be undertaken outside of the hours specified in measure N11 above: • 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;	Construction	Supervisors Construction Manager Environmental Manager	CoA B2

ID	Measure/Requirement	When to implement	Responsibility	Reference
	• 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; or • works carried out in accordance with an Out-of-Hours Work Protocol in accordance with condition B16.			
N13.	Any works outside of the hours defined in CoA B1, or B11 will be undertaken in accordance with the Out of Hours Work Protocol in Appendix A.	Construction	Supervisors Construction Manager Environmental Manager	CoA B2 CoA B16 (i) UMM NV2
N14.	Works may be undertaken in accordance with the hours and noise limits specified in negotiated agreements with affected sensitive receivers. Where multiple receivers are affected by works, a majority of the affected receivers must agree to the specified hours and noise limits proposed by the project. Negotiated agreements must be in writing and finalised prior to the relevant works	Pre-construction and Construction	Supervisors Construction Manager Environmental Manager	CoA B2
Consultation and complaints management				
N15.	Where exceedances of noise and vibration management levels are predicted, residents/sensitive receivers will be notified of construction activities that are likely to affect their noise and vibration amenity in accordance with the CCS. This proactive communication will include: • The types of activities to be undertaken; • The timing of activities including expected start and finish; • The location of activities; • Details of the community information line and how to make an enquiry and/or complaint.	Construction	Engagement Manager	Good Practice UMM NV4
N16.	Investigate any complaints regarding construction noise and vibration to determine if actual noise and vibration levels are as predicted and that appropriate mitigation measures have been implemented. Where required, identify and implement appropriate additional mitigation measures.	Construction	Engagement Manager Environmental Manager	Good Practice
N17.	All complaints received will be managed in accordance with the CCS.	Construction	Engagement Manager	Good Practice
Blasting				

ID	Measure/Requirement	When to implement	Responsibility	Reference
N18.	If blasting is required, a Blast Management Plan will be developed prior to blasting to minimise the potential for airblast overpressure and vibration impacts. Maximum instantaneous charge calculations will be undertaken for specific locations within the potential controlled 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.	Prior to blasting During blasting	Engineers Environmental Manager	UMM NV3
N19.	Blasting may only be carried out on the site between: • 9 am and 5 pm Monday to Friday • 9 am to 1 pm on Saturday. • No blasting is allowed on Sundays or public holidays Unless different hours are approved through the Out Of Hours Works Protocol.	During blasting	Engineers Environmental Manager	CoA B11
Aircraft noise				
N20.	Management measures will be implemented to minimise aircraft noise at sensitive receivers where practicable and appropriate. Measures will include (but are not limited to): • Carrying out consultation to notify nearby sensitive receivers of upcoming work involving aircraft. This will include scheduled 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 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.	Construction	Engagement Manager Construction Manager Environmental Manager	UMM NV10
N21.	Helicopter use associated with development may only be carried out between: • 9 am and 5 pm Monday to Friday • 9 am to 1 pm on Saturday	Construction	Supervisors Construction Manager	CoA B4

ID	Measure/Requirement	When to implement	Responsibility	Reference
	• No helicopter use is allowed on Sundays or 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.		Environmental Manager	

9. COMPLIANCE MANAGEMENT

9.1 ROLES AND RESPONSIBILITIES

The Contractors organisational structure and overall roles and responsibilities are outlined in Section 3.5 of the CEMP. The project environmental management structure incorporates the following site personnel:

- Environment and Sustainability Manager responsible for overall management of the CEMP and CEMP sub-plans, including this NVMP
- Environmental Manager/Advisors/Coordinators to assist in implementing and monitoring measures in the CEMP and CEMP sub-plans, including this NVMP.

The AGJV Project Director, in consultation with functional managers, will ensure that appropriate resources are available to effectively manage the implementation of the CEMP and CEMP sub-plans during delivery of the project. All contractor staff, subcontractors and visitors are required to operate in accordance with this NVMP and related environmental management plans during construction.

Specialist consultants and subcontractors will be engaged for environmental support roles, as required, such as noise and vibration specialists for noise modelling (as required) and ongoing advice throughout construction. Specific responsibilities for the implementation of mitigation measures are detailed in Section 8 of this NVMP.

9.2 TRAINING

All site personnel will undergo the site induction prior to the personnel participating in on-site construction activities. The induction training addresses elements related to noise and vibration management including, but not limited to:

- Complying with the conditions of the Infrastructure Approval
- The environmental management system, including the CEMP
- Sensitive receivers in close proximity to project locations
- Management measures that are necessary to comply with to minimise and manage potential impacts to those sensitive receivers
- The OOHW Protocol.

Targeted training in the form of toolbox talks or specific training will also be delivered to personnel with a key role in noise and vibration management. Examples of training topics include:

- Vibration awareness in the vicinity of Aboriginal heritage features
- Noise monitoring.

Records of training, including attendance, will be retained by AGJV.

9.3 MONITORING

The impacts and environmental performance of the project relevant to noise and vibration, and the effectiveness of the management measures will be monitored through the monitoring program outlined in Table 19.

Table 19 Noise and vibration monitoring requirements

Item	Scope	Frequency	Equipment	Responsibility	Records/ reporting
Daily monitoring: Site Hive	Site Hives will accompany work fronts and accommodation camps at select locations/occasions which are determined based on risk (refer to Section 7.2.1), considering factors such as the type of activity being undertaken and the proximity of sensitive receivers.	Daily as required based on risk	Calibrated SiteHive monitoring device	Site Supervisor Environmental Advisor	SiteHive Enviro software would maintain monitoring records.
Noise monitoring: commencement of new activities	At the commencement of a new OOHW activity or a new activity during standard hours where exceedance of the noise management level is predicted to occur at the most affected receiver (refer to Section 7.2.1). This will be at select locations/occasions which are determined based on risk, considering factors such as the type of activity being undertaken and the proximity of sensitive receivers..	As required and determined by risk assessment.	Calibrated noise monitor	Environmental Advisor	Noise monitoring records
Vibration monitoring: commencement of new activity near structures/ receivers within minimum vibration working distances	Attended vibration measurements would be undertaken at the start of a new activity and/or location to determine actual vibration levels at the structure and/or sensitive receiver.	As required when works are planned within minimum working distances.	Vibration monitor	Environmental Advisor	Vibration monitoring records
Complaint-based noise and vibration monitoring	Where complaints are received, noise and/or vibration monitoring may be undertaken at sensitive receivers to determine if the actual construction noise generated exceeds the predicted 'worst case' construction noise levels identified in this plan or to confirm predicted vibration levels.	As required	Calibrated noise monitor; Vibration monitor	Environmental Manager, Environmental Advisor	Noise / Vibration monitoring records

Item	Scope	Frequency	Equipment	Responsibility	Records/ reporting
Weekly inspections	Inspection of the environmental controls and implementation of the noise and vibration mitigation measures outlined in Table 18.	Weekly	Not applicable	Environmental Advisor Supervisors	Weekly Environmental Inspection Checklist

9.3.1 ACTIONS FROM MONITORING EXCEEDANCES

Where monitored noise or vibration levels are found to be above the relevant objective and/or predicted levels, the following actions will be undertaken:

At the time of becoming aware of exceedance:

- Confirm the monitored levels are not being impacted by other noise or vibration sources.
- Confirm the measures implemented are as planned or described in the applicable NVMP/CNVIS/EWMS.
- Confirm if the exceedance is due to an uncharacteristically noisy or vibration-intensive piece of equipment.
- Confirm that predictive modelling reflects the actual activity being undertaken
- Implement other feasible and reasonable measures which may include reducing plant type or size, modifying time of works, changing operational settings (such as turning off the vibratory function of the machine), utilising alternative construction methodology or a combination of these. To be implemented at the time of becoming aware of exceedance where possible. Other feasible and reasonable measures to be implemented as soon as is reasonably practicable and the timeframes for implementation will be determined at the time based on relevant impact.
- Where the mitigation measures do not result in an improvement in noise scenarios, seek advice from an acoustic consultant.
- Ensure that the learnings from the above are fed back into the noise modelling assessment process for fine-tuning.
- Continue work where impacts can be reduced,
- Where noise cannot be reduced for this activity, re-assess the extent of impacts based on new information (e.g. revised equipment sound power level) and implement appropriate mitigation and management measures.
- Undertake further consultation / notification of affected receivers where necessary
- Communicate lessons learnt to relevant personnel. AGJV will review the activity and where possible, modify the work or activity to prevent any recurrence. Lessons learnt will be communicated to personnel in toolbox talks.

9.4 INSPECTIONS

Weekly inspections will be performed by the Environment and Sustainability Manager (or delegate) and documented in a weekly environmental checklist. The inspections will check the implementation and effectiveness of the management measures identified in Section 8 and the environmental performance of the project relevant to noise and vibration. Visual inspection of any noise controls, e.g. hoarding or noise barriers will be undertaken.

9.5 AUDITING

Audits will be undertaken to assess the effectiveness of the management measures and overall compliance with this plan, and other relevant approvals, licences and guidelines. Audit requirements are detailed in Section 3.9 of the CEMP.

In line with CoA C13, independent audits will be undertaken in accordance with the *Independent Audit Post Approval Requirements (2020).*

9.6 INCIDENTS AND NON-COMPLIANCES

All incidents will be managed in accordance with Section 3.8 of the CEMP. The definition of incident is included in Section 3.8.5 of the CEMP.

All non-compliances will be managed in accordance with Section 3.9 of the CEMP. The definition of non-compliance is included in Section 3.9.4 of the CEMP.

9.7 REPORTING

Reporting to be undertaken in accordance with the NVMP is summarised within Table 20.

Table 20 Noise and vibration reporting requirements

Item	Scope	Frequency	Responsibility	Recipient
Monthly reporting	All monitoring undertaken within the month including daily SiteHive monitoring would be summarized for incorporation in Project Monthly Reports.	Monthly	Environmental Manager	ER Transgrid
Monitoring reporting	Monitoring reports will include the results of monitoring undertaken during the reporting period. The monitoring results will be evaluated in relation to the relevant predictions and criteria, resulting in an assessment of the effectiveness of the noise and vibration management system. Reporting of noise and vibration matters on the project website in accordance with CoA C15.	Annual	Environmental Manager	ER Transgrid Public (via project website)
Audit reports	Independent audits undertaken in accordance with the Infrastructure Approval will include audits of noise and vibration management measures (based on the Independent Auditor's program). Audit reports will be prepared. Further detail in relation to auditing is provided within Section 9.5 of the CEMP.	An initial independent audit will be undertaken within 12 weeks from the commencement of construction and then at intervals no greater than 26 weeks, or as otherwise agreed by the Secretary. Audit reports will be submitted to DPE within 2 months of completion of the audit.	Environmental Manager / Independent Auditor	ER Transgrid DPHI

9.8 CONTINGENCY PLAN

Although the project has been assessed through the environmental impact assessment process and potential impacts identified, unpredicted impacts may occur as the project progresses. In the event that unexpected impacts are identified, the action or cause will be categorised and as required will be managed as:

- An emergency or environmental incident in accordance with Section 3.8 of the CEMP; and/or
- A non-compliance or non-conformance in accordance with Section 3.9 of the CEMP.

Reporting of the unpredicted impacts would be in line with the above processes and as described in Section 3.9 of the CEMP.

The need for corrective and preventative actions may arise from incidents, audits, management reviews or other sources. The actions will be managed in accordance with the Project's environmental management system to ensure that the required actions are tracked and closed out in a timely manner. The completion of the required actions will be recorded, and will include details on the source of the action (e.g. audit, inspection or other), the action required, target close out date, actual close out date and the person responsible.

The following steps will occur for corrective and/or preventative actions as relevant:

a) determine the relevant impact assessment criterion/criteria, below which the impact should be reduced, consistent with the requirements of this NVMP;

b) identify options to reduce the unexpected impacts to below the relevant criterion/criteria and appropriate timeframe for implementation;

c) implement the selected measure(s) to reduce the unexpected impacts; and

d) identify and implement an appropriate monitoring program to determine the effectiveness of the selected measure(s) to reduce the unexpected impact.

If monitoring identifies that the unexpected impacts have not been reduced to below the nominated criterion/criteria, items b) to d) of the contingency process will be repeated.

10. REVIEW AND IMPROVEMENT

10.1 CONTINUOUS IMPROVEMENT

As outlined in Section 3.11 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 project team members and stakeholders. Continuous improvement of this NVMP 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 other issues.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and other issues.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Continue to assess performance against objectives and targets outlined in Section 2.2of this Plan.

10.2 PLAN UPDATE AND AMENDMENT

This NVMP will be reviewed at least annually and updated, if required, in accordance with Section 3.11 of the CEMP. This includes the review and, if necessary, revision of this NVMP in accordance with CoA C2 within three months of the following:

- Submission of an incident report under CoA A20/C10 of the Infrastructure Approval
- Submission of an audit report under CoA C14 of the Infrastructure Approval, or
- Any modifications to the Infrastructure Approval.
- The issue of a direction of the Planning Secretary under condition A3 which requires a review

Any updates to the NVMP will be approved as described in Section 3.11 of the CEMP.

APPENDIX A: OUT OF HOURS WORK PROTOCOL

Refer to document number: HLE-AGJ-ENV-ALE-PRD-0000-00001

Out Of Hours Works Protocol

HumeLink

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Contents

Tables

Figures

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 Condition of Approval (CoA) B16(i) 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 OOHW Protocol is applicable only to the works that are proposed outside the hours defined in CoA B1 and B11. Works that comply with the hours defined in CoA B1 and B11 or works that comply with activities defined in CoA B2 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.

1.1 Document consultation

Consistent with CoA B16(i)(i), this protocol has been provided to the following Councils for review and comment:

a) Cootamundra–Gundagai Regional Council

b) Goulburn–Mulwaree Council

c) Snowy Valleys Council

d) Upper Lachlan Shire Council

e) Yass Valley Council

Details of issues raised during consultation will be included with submission of the Noise and Vibration Management Plan (NVMP).

2 Construction Hours

2.1 Standard construction hours

In accordance with CoA B1, and in line with the ICNG standard construction hours for road upgrades, construction, upgrading or decommissioning may only be undertaken between:

a) 7am to 6pm – Monday to Friday;

b) 8am to 1pm – Saturdays; and

c) At no time on Sundays and NSW public holidays; unless the Planning Secretary agrees otherwise.

Additionally, CoA B4 and B11 state that if required, helicopter activities and blasting, respectively, are permitted also as per the ICNG as follows:

d) 9:00am to 5:00pm Mondays to Fridays

e) 9:00am to 1:00pm Saturdays

f) 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 CoA 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 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) (or its latest version);

e. road upgrades required by the relevant road 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 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.

3 Purpose and Scope

OOHW has the potential to exceed 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 CoA C16(i) and UMM NV2.

CoAs relevant to this OOHW Protocol are provided in Table 3-2.

Table 3-1 CoAs relevant to this Protocol

CoA	Requirement	Where addressed
B16(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:	
	• be prepared in consultation with the relevant Council;	Section 1.1
	• identify low risk activities that can be undertaken without the approval of the Planning Secretary and with the approval of the ER;	Section 7

CoA	Requirement	Where addressed
	• identify high risk activities that must be approved by the Planning Secretary; and	Section 7
	• identify Department, Council and community notification arrangements for approved out of hours work.	Section 8.2

UMMs relevant to this OOHW Protocol are provided in Table 3-2.

Table 3-2 UMMs relevant to this Protocol.

UMM	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:	This protocol
	• 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	Section 6
	• notify and engage with potentially noise affected receivers about upcoming work outside standard construction hours and address any associated complaints.	Section 8
	• identify appropriate respite for noise affected receivers (where required).	Section 6.4
	The out-of-hours work protocol will not apply to the operation of the worker accommodation facilities.	Note

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, CoA B16(i) and in accordance with UMM NV2.

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

a) To sustain the operational integrity of the wider associated transmission network.

b) Where disruption to essential services and/or considerations of worker safety do not allow work within standard hours

c) Where out of hours works shorten the length of construction and are supported by the affected community.

d) Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours

e) 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 Section 2.2 or would be in accordance with the relevant conditions of an EPL.

Where construction activities can occur outside of the standard construction hours listed in 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 will be prepared by the team requesting the works, detailing:

(a) A summary of the proposed activity (including plant and equipment required).
(b) Duration of the proposed activity within and across OOHW periods (including start and finish times).
(c) Location of the proposed activity (including a diagram or figure).
(d) Justification for the need to carry out the specific work as OOHW, in accordance with Section 4.1.
(e) The OOHW application 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).
(f) Determine risk level based upon noise and vibration predictions (risk levels are defined in Section 7).
(g) 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 Communication Strategy (CCS) and Section 8 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 and/or where similar activities will be undertaken for an extended period.

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.

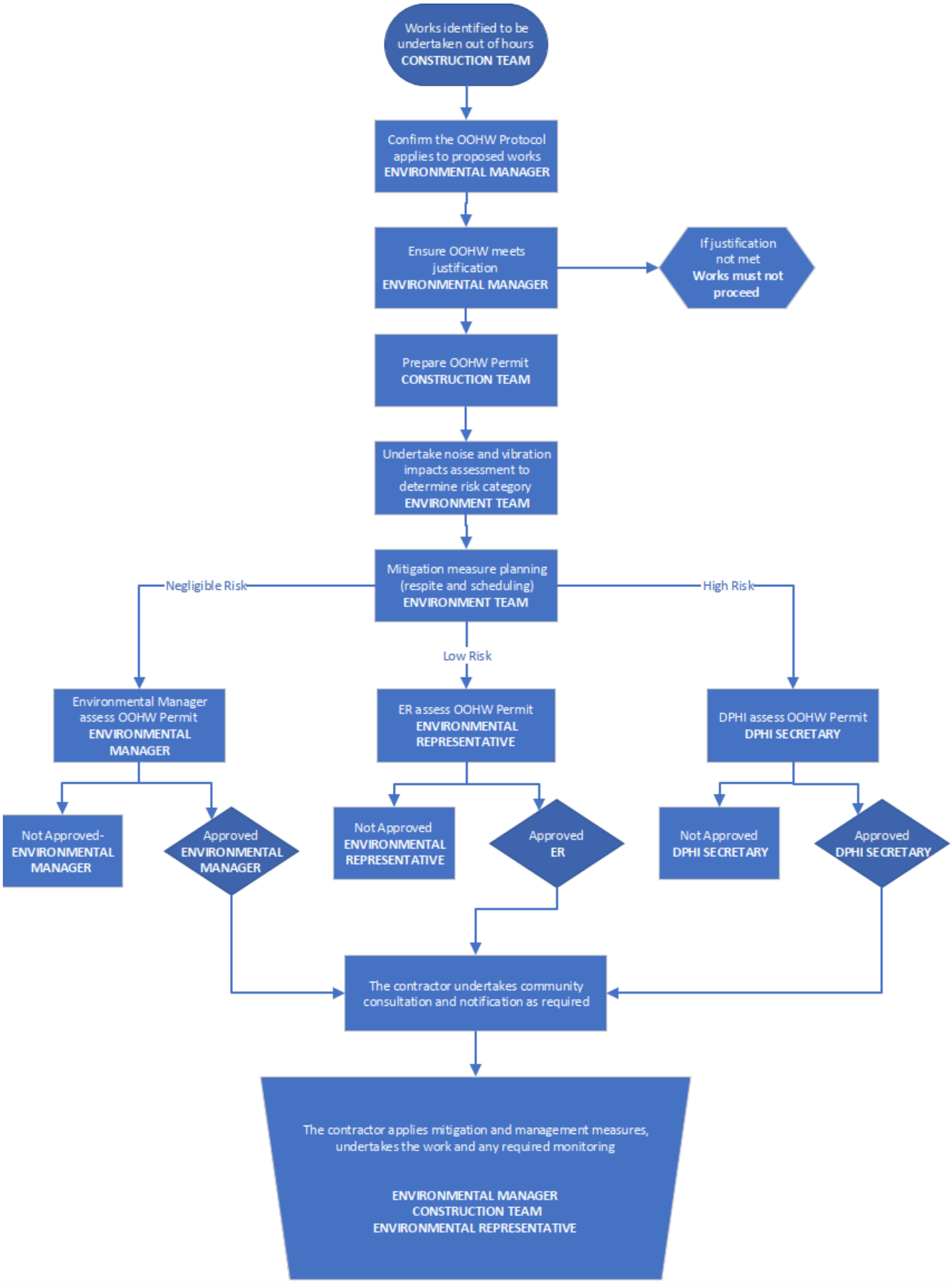


Figure 5-1 Approval process for OOHW subject to this Protocol

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.

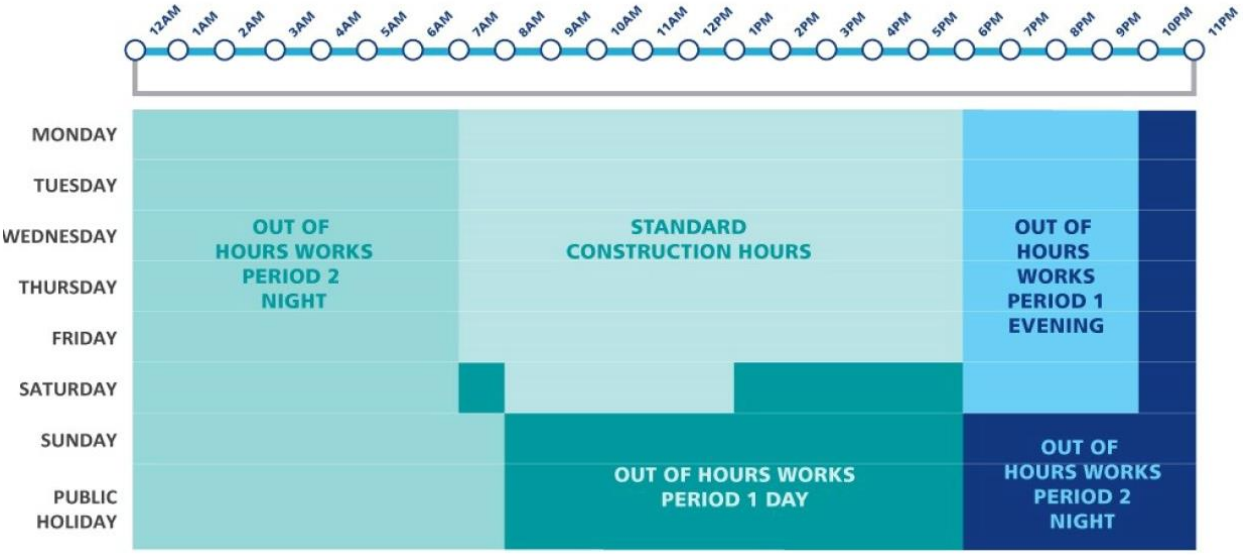
OOHW categorisation periods are as follows:

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.



Note 1: Figure extracted from Technical Report 9 Noise and Vibration from the EIS

Note 2: Taken from the Construction Noise and Vibration Strategy (TfNSW, 2019)

Figure 6-1 OOHW Periods

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 OOHW 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).

Project-specific NMLs have been calculated for each Noise Catchment Area (NCA) within the Project area. These are summarised in Section 6.4 of the NVMP. Recommended minimum working distances from vibration intensive equipment that have been adopted for the project are summarised in Table 15 of the NVMP.

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.

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.

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)

- [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)

- 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.

6.4 Mitigation

All reasonable and feasible measures for noise mitigation and management described in the NVMP 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 midnight 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, where an exceedance of noise management level or sleep disturbance criteria is predicted to occur as a result of the construction and/or operation of a compound (i.e., as per CoA B9), or where a highly noise affected impact is predicted to occur as a result of project activities (as per CoA B10), the following measures will be considered with the aim of reducing predicted noise impacts below the relevant noise management level:

- Identify if any alternate plant or equipment with lower noise levels can be used
- Identify any site layout changes or orientation of equipment that maximises shielding of noisy items or activities
- Identify if any scheduling of activities can be implemented to minimise concurrent use of noisy plant/equipment
- Identify if any reasonable and feasible path control measures can be implemented (e.g. noise barriers or shielding)

Where the above measures do not reduce predicted noise impacts below the relevant noise management level or cannot be feasibly implemented and the impact is predicted for short term or intermittent impacts only (e.g. during the establishment phase), affected receivers will be notified as outlined below. Where the impact is predicted to occur over longer durations (e.g. for the duration of operation of a compound), consultation will be undertaken with the affected receiver to identify any further measures that may be applied.

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 consideration of additional mitigation measures defined below. 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 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 four or more consecutive evenings, respite should occur; or
- For OOHW period 2 (night) where work occurs for three or more consecutive nights, respite should 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 should 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, RO	N, V, R4, DR
Highly intrusive	>25	N, V, R4, DR	N, V, R3, 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, R4	AA, V, N, R3
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 should be investigated by the Project team.

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>
Low	Environmental Representative	3a	Any OOHW period	Any activity which is <u>not negligible</u> in risk, and is one of the following activities: • Works required to occur on or adjacent to a road (i.e., stringing activities) 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 exceed the human comfort vibration criteria • Works that are more than 25dBA above the NML however will be short in duration (such as 1-2 hours) and notification to the affected receivers will occur • Any other activity which is not negligible in risk, and the Environmental Representative determines can be assessed as low risk.
		3b	Extended (day) working hours	Any activity which is <u>not negligible</u> in risk, is <u>not an activity within row 3a or 4</u>.
		3c	Evening and night periods	Any activity which is <u>not negligible</u> in risk and is <u>not an activity within row 3a</u>, 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) consecutive evening or nights per week and have appropriate justification.
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 consecutive 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. Communication tools may include but are not limited to notifications, community updates, emails and phone calls. The method of communication will be chosen based on the nature of works and the potential impacts. All community consultation would be carried out in accordance with the Project CCS 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 CoA B9, B10 and 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 seven days prior to the OOHW commencing. Notification will be provided to relevant councils seven business days prior to any OOHW. Notification will also be provided to the Department of Planning, Housing and Infrastructure seven business days prior to any high-risk OOHW commencing.

8.3 Community Agreement

Variation to working hours may occur following negotiated agreements with affected community. 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.

Negotiated agreements made where 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 3.7.4 of the CEMP 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 CEMP, 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:

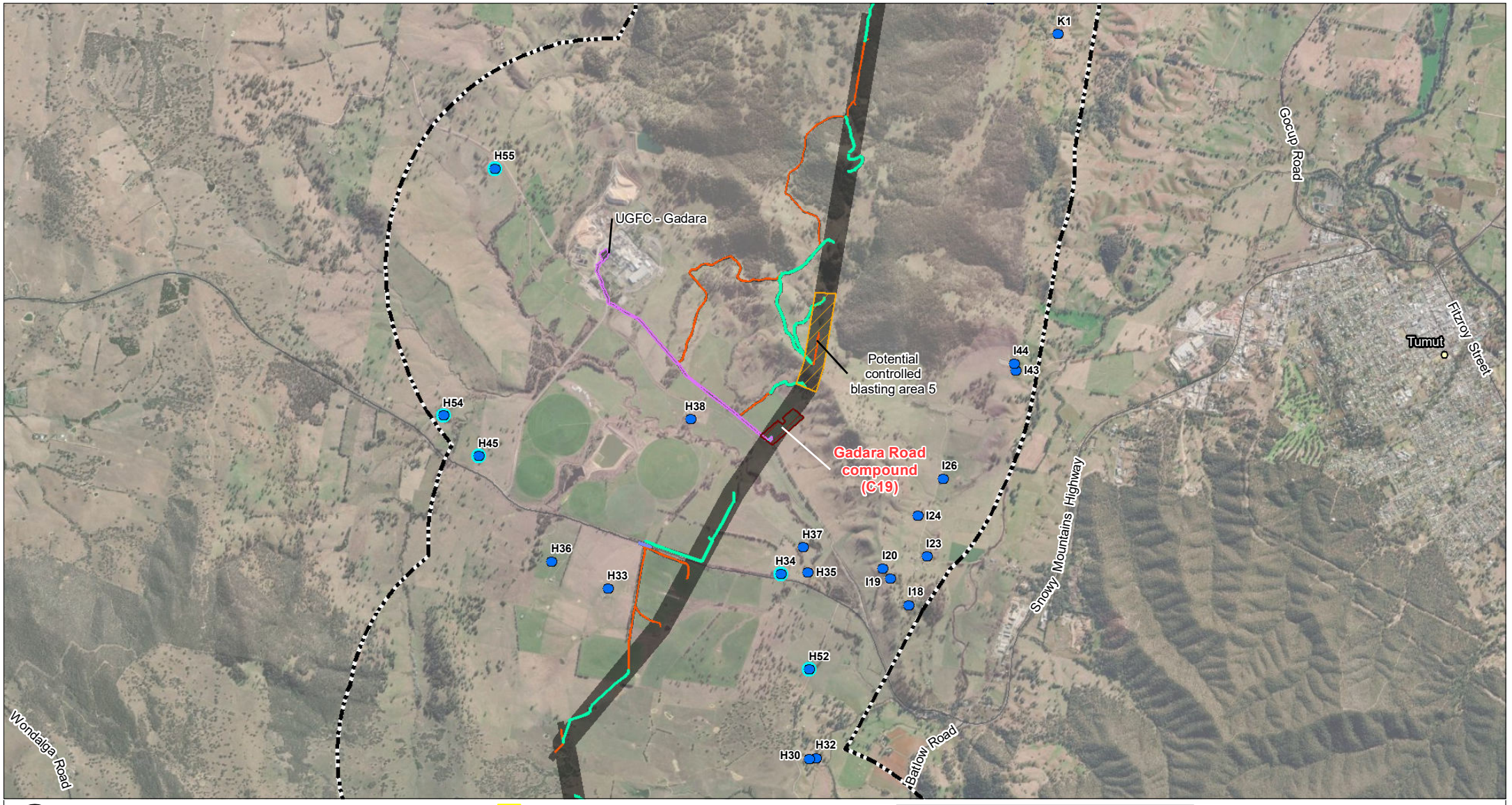
- Confirm monitored levels are not being impacted by other noise or vibration sources.
- Confirm all mitigation measures required by the OOHW Permit are being implemented.
- Confirm that the modelling reflects the actual activity being undertaken.
- Review whether any additional feasible and reasonable 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.

APPENDIX B: SENSITIVE RECEIVER MAPS

The following sensitive receiver maps are extracted from the Humelink Noise and Vibration Impact Assessment Addendum Technical Report 9 (part of the Amendment Report, Transgrid 2024) (Appendix B1) and the Yass Valley Way Accommodation Facility Consistency Assessment (Appendix B2).

Appendix B1: Noise and Vibration Impact Assessment Addendum Technical Report 9 sensitive receiver maps



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

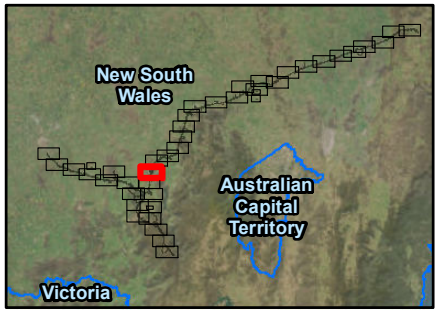
Receiver Points

- 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)



HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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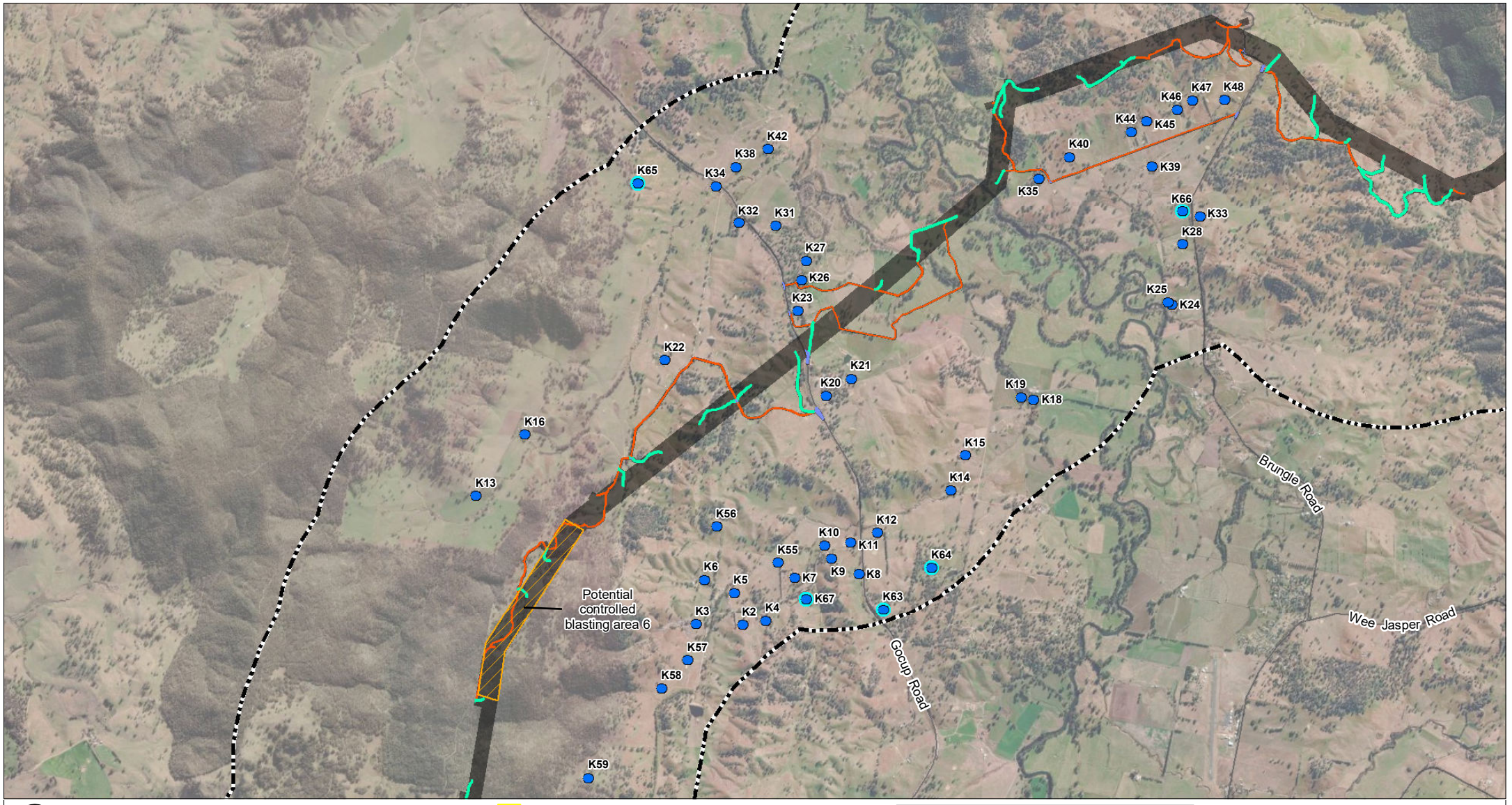


0 250 500 m

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

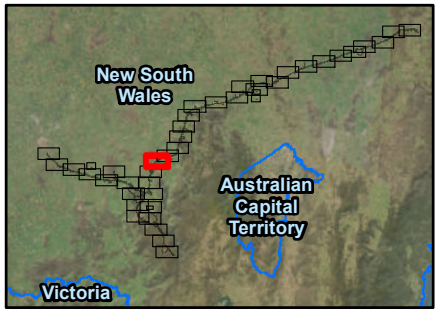
Receiver Points

- 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)



HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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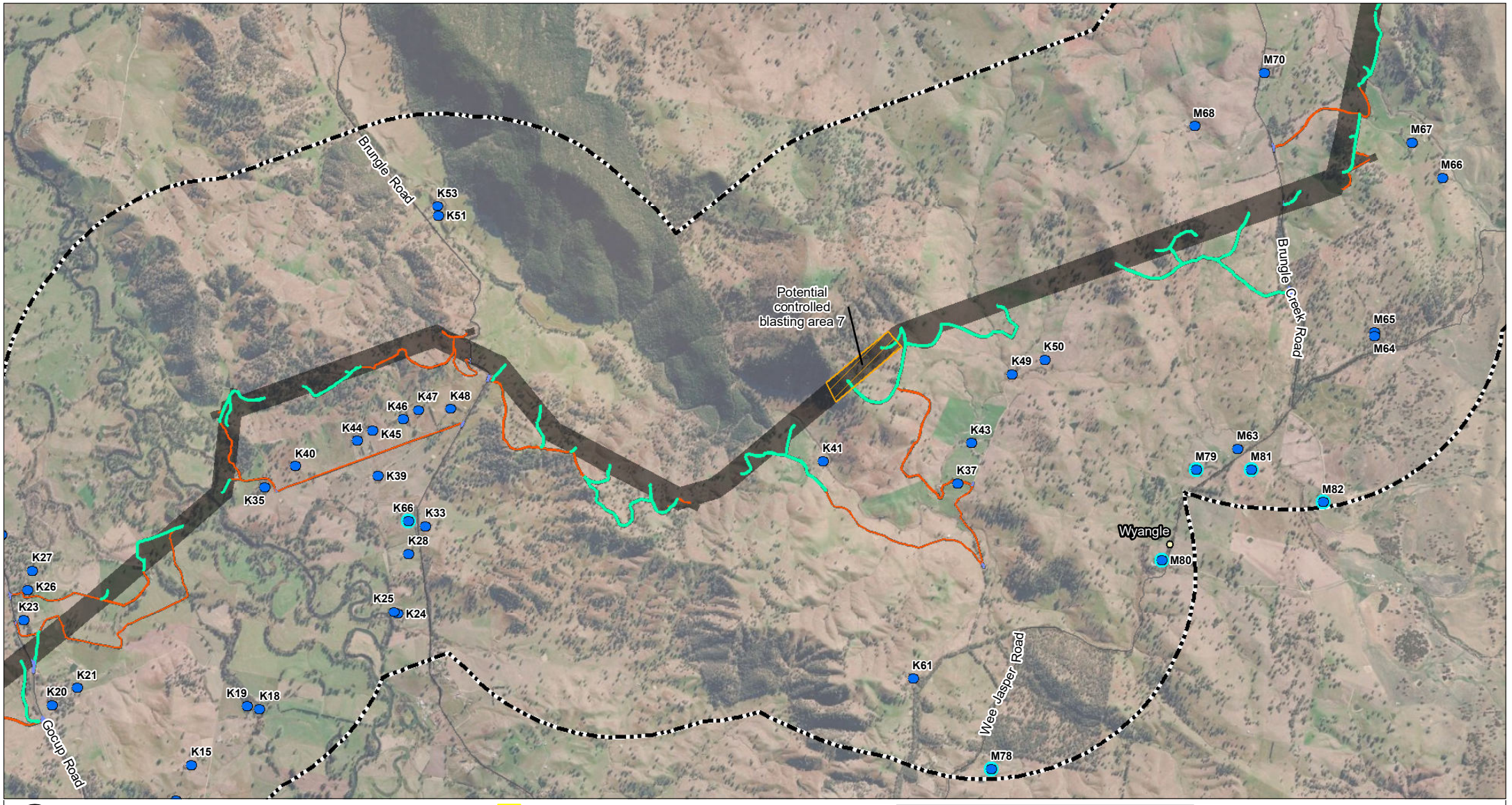
ATTACHMENT B

\\au.slr.local\corporate\Projects-SLR\610-SrvSYD\610-SYD\610.30622.00000 HumeLink EIS AV AQ\06 SLR Data\01 CADGIS\GIS\AV\61030622 AV Project and Receiver Map DDP.mxd



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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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Receiver Buildings

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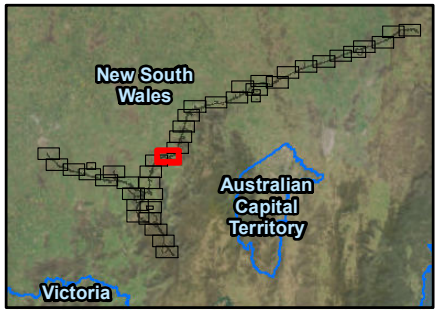
- Other (Medical)
- Other (Place of Worship)



HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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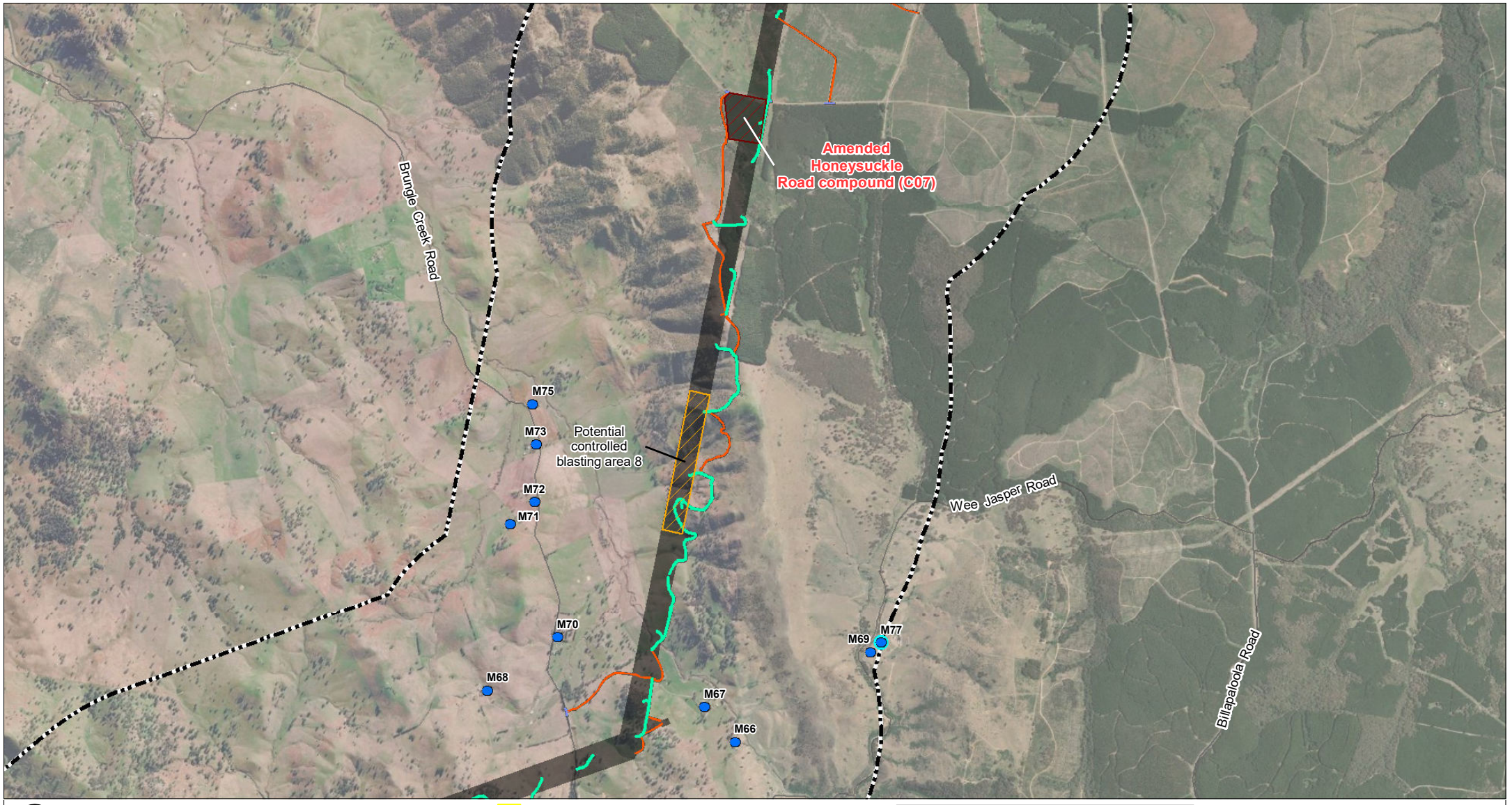

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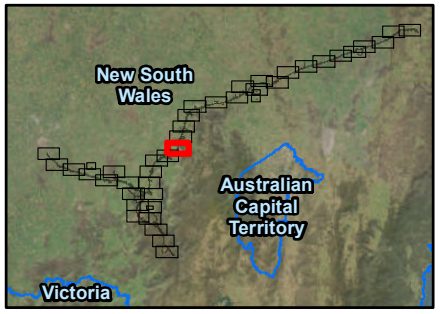

HUMELINK
NOISE AND VIBRATION
IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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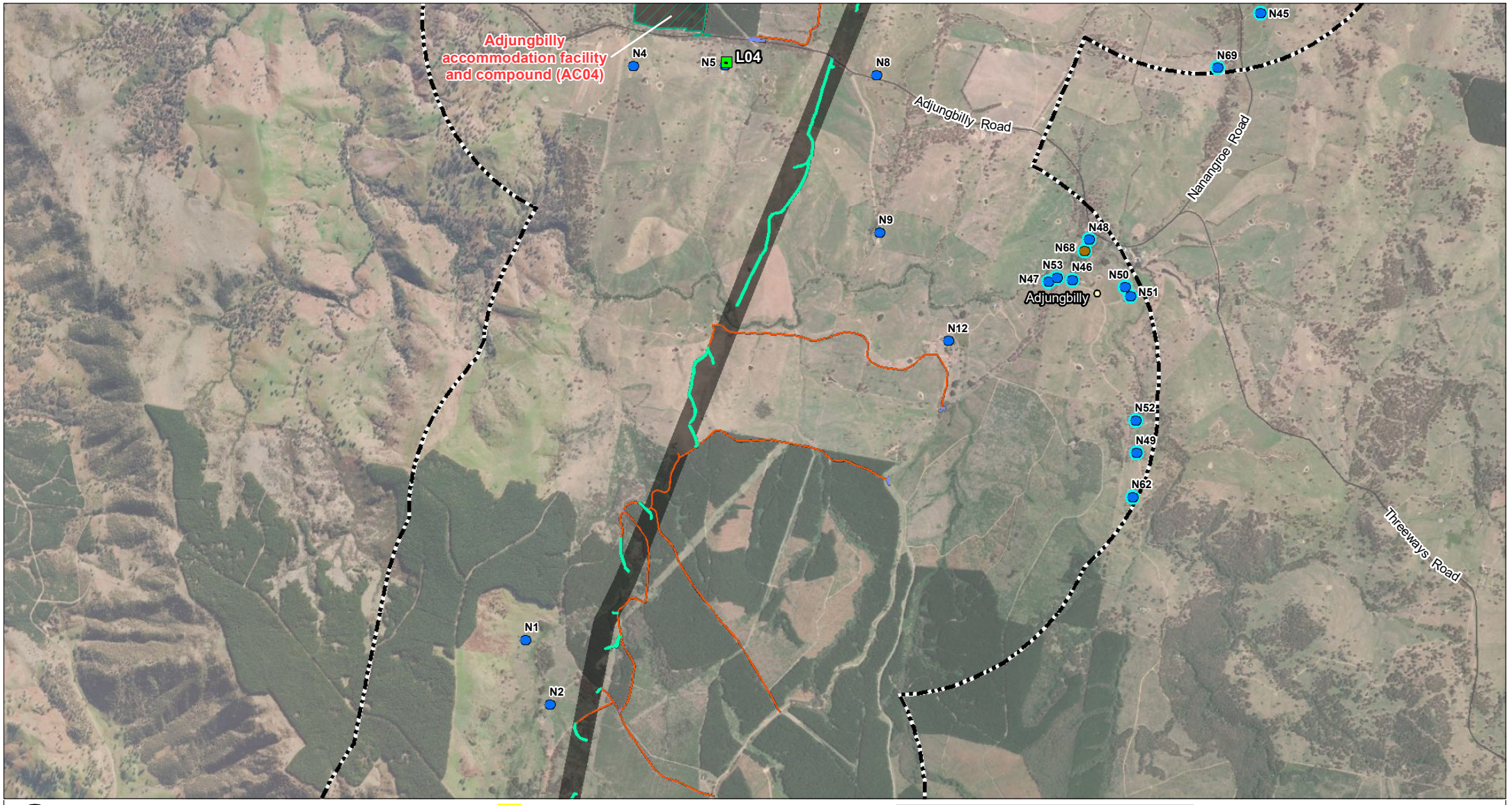
ATTACHMENT B

\\au.slr.local\corporate\Projects-SLR\610-SrvSYD\610-SYD\610.30622.00000 HumeLink EIS AV AQ\06 SLR Data\01 CADGIS\GIS\AV\61030622 AV Project and Receiver Map DDP.mxd



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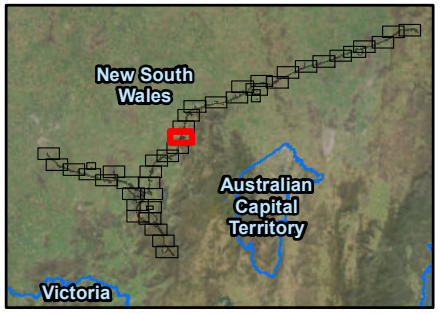

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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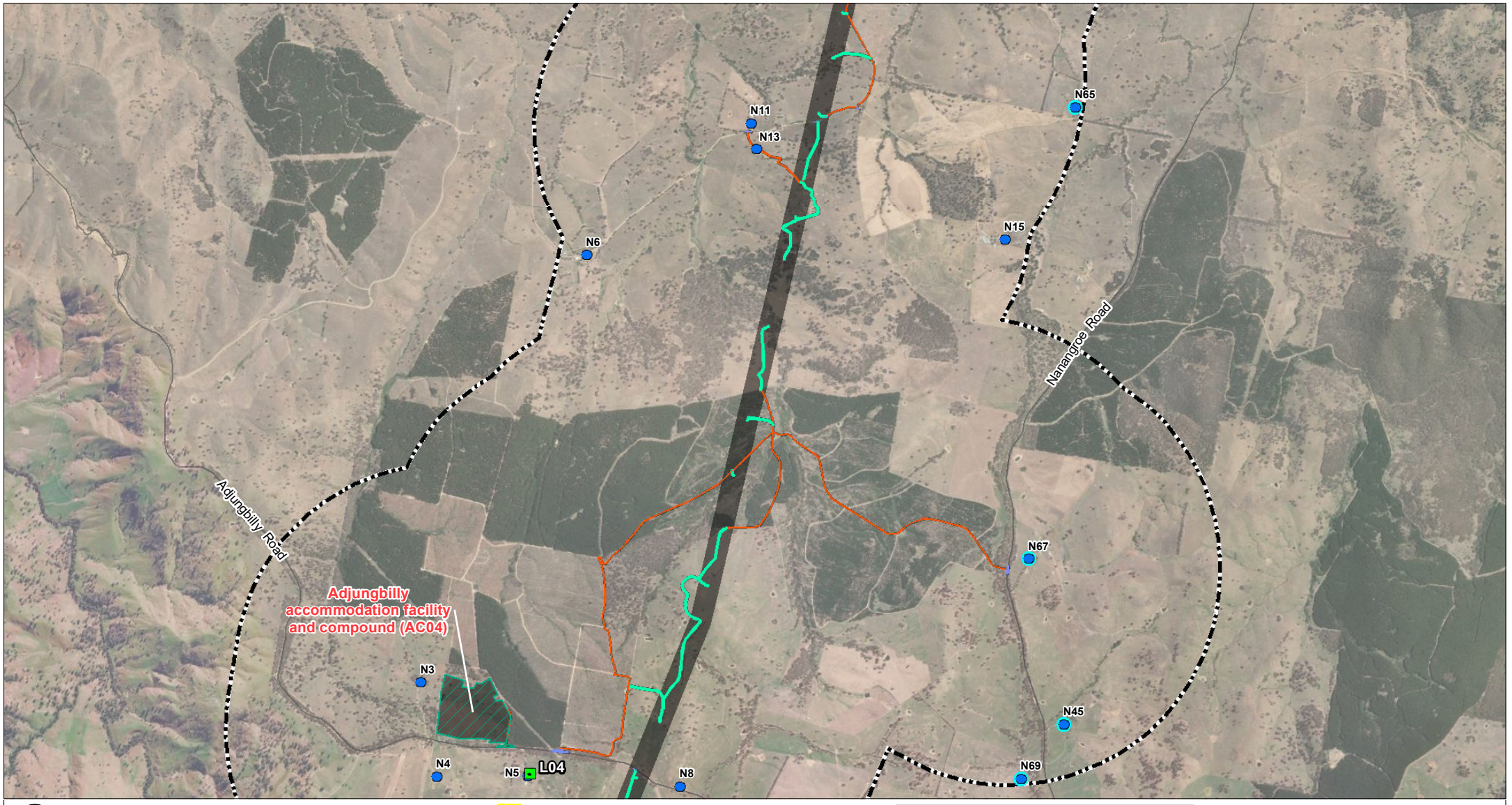

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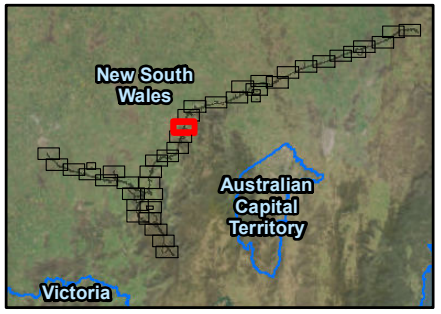

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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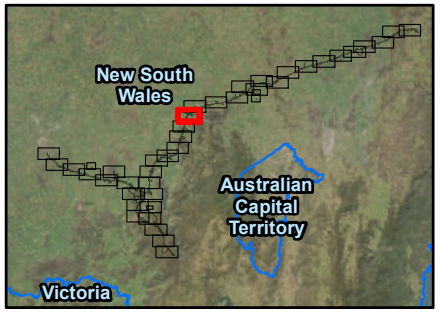

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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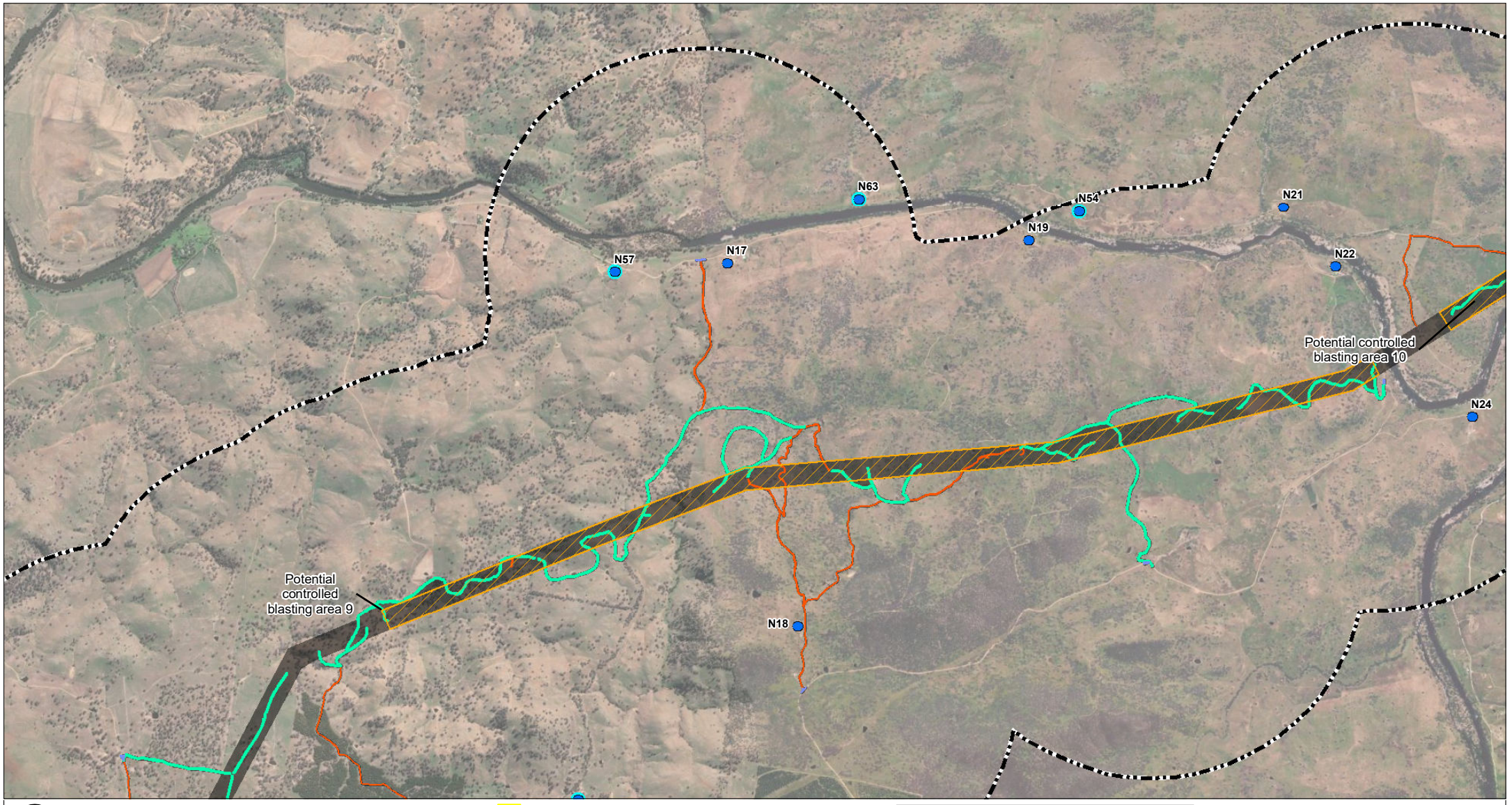

0 250 500 m

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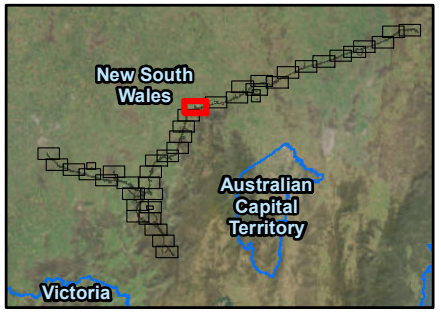

HUMELINK
NOISE AND VIBRATION
IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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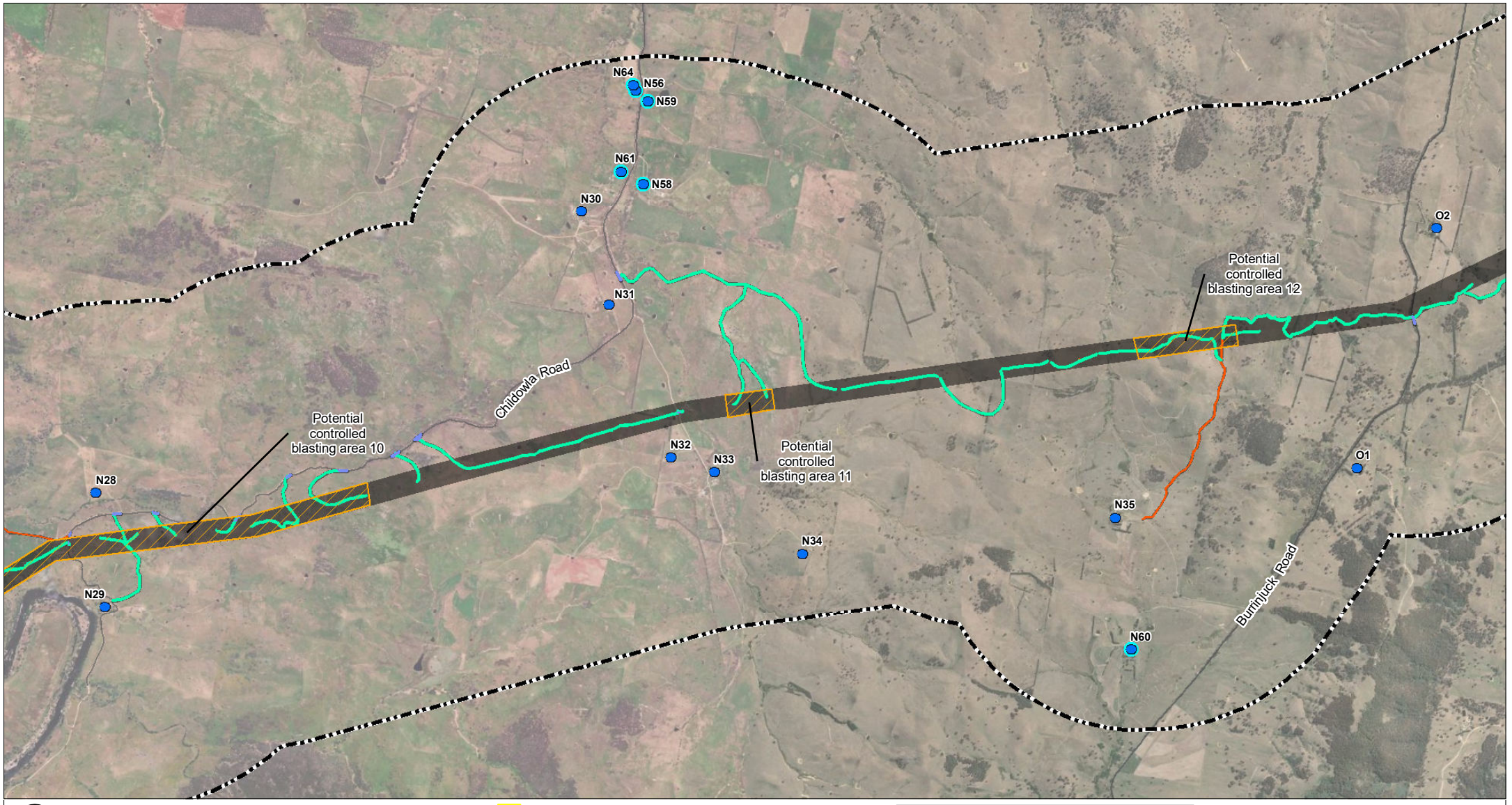

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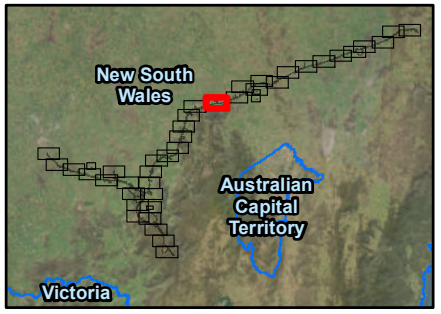

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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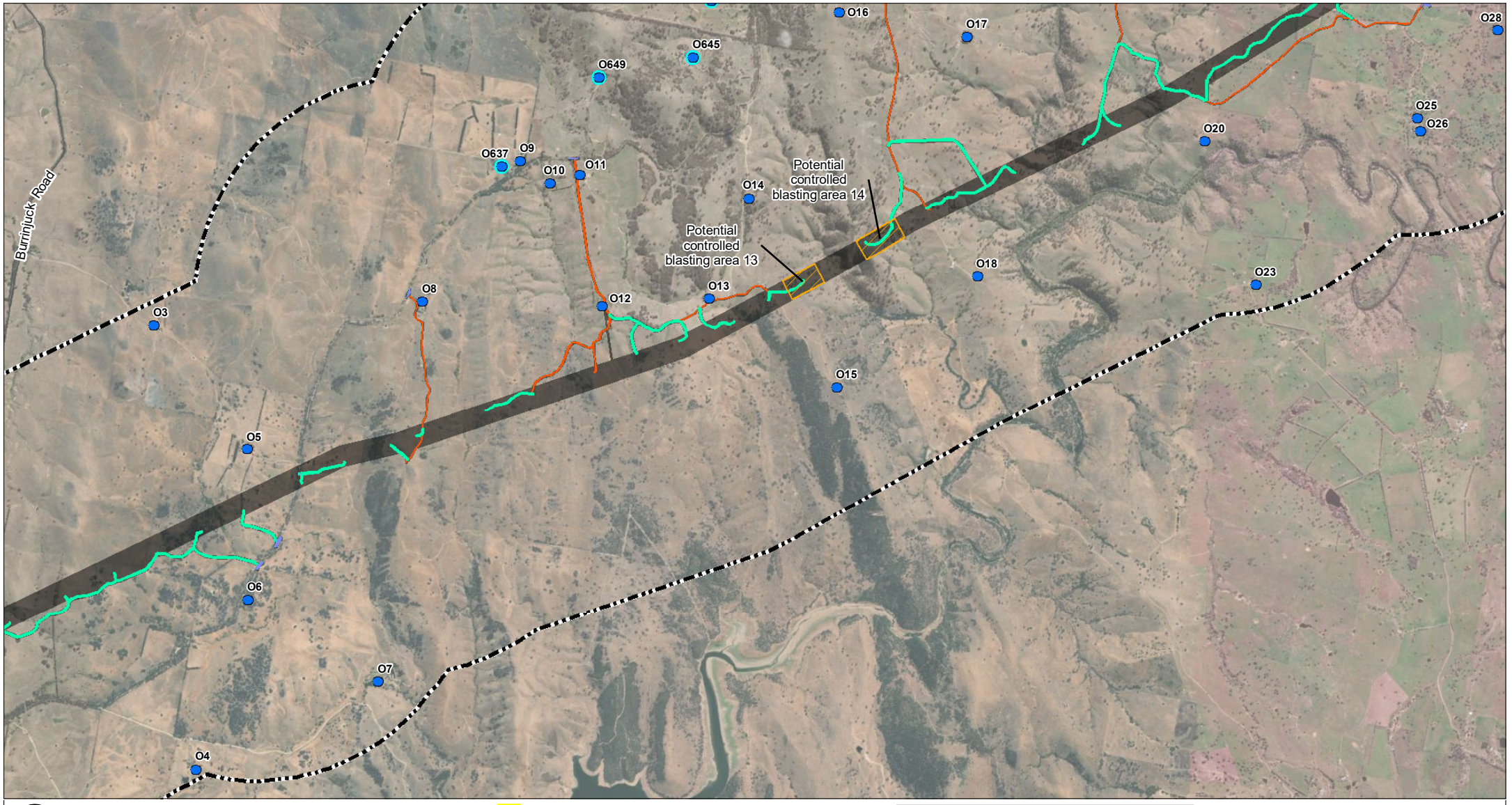

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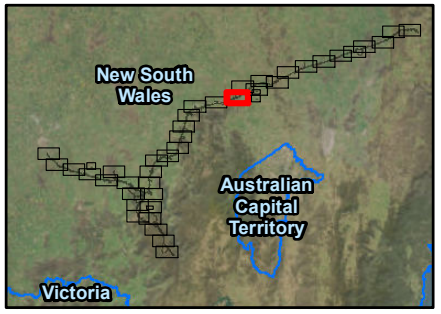

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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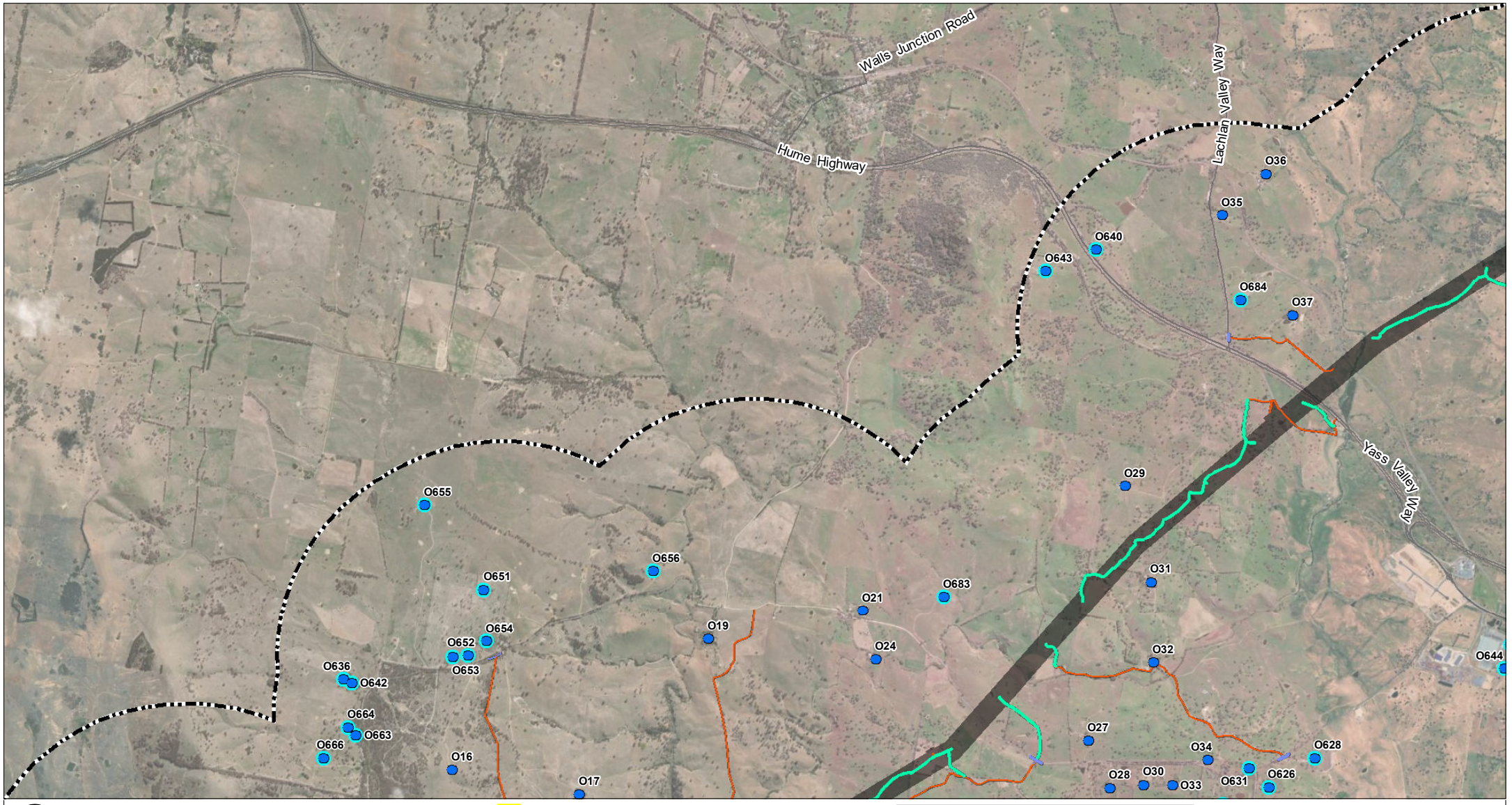

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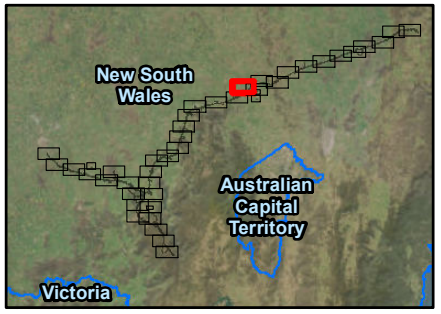
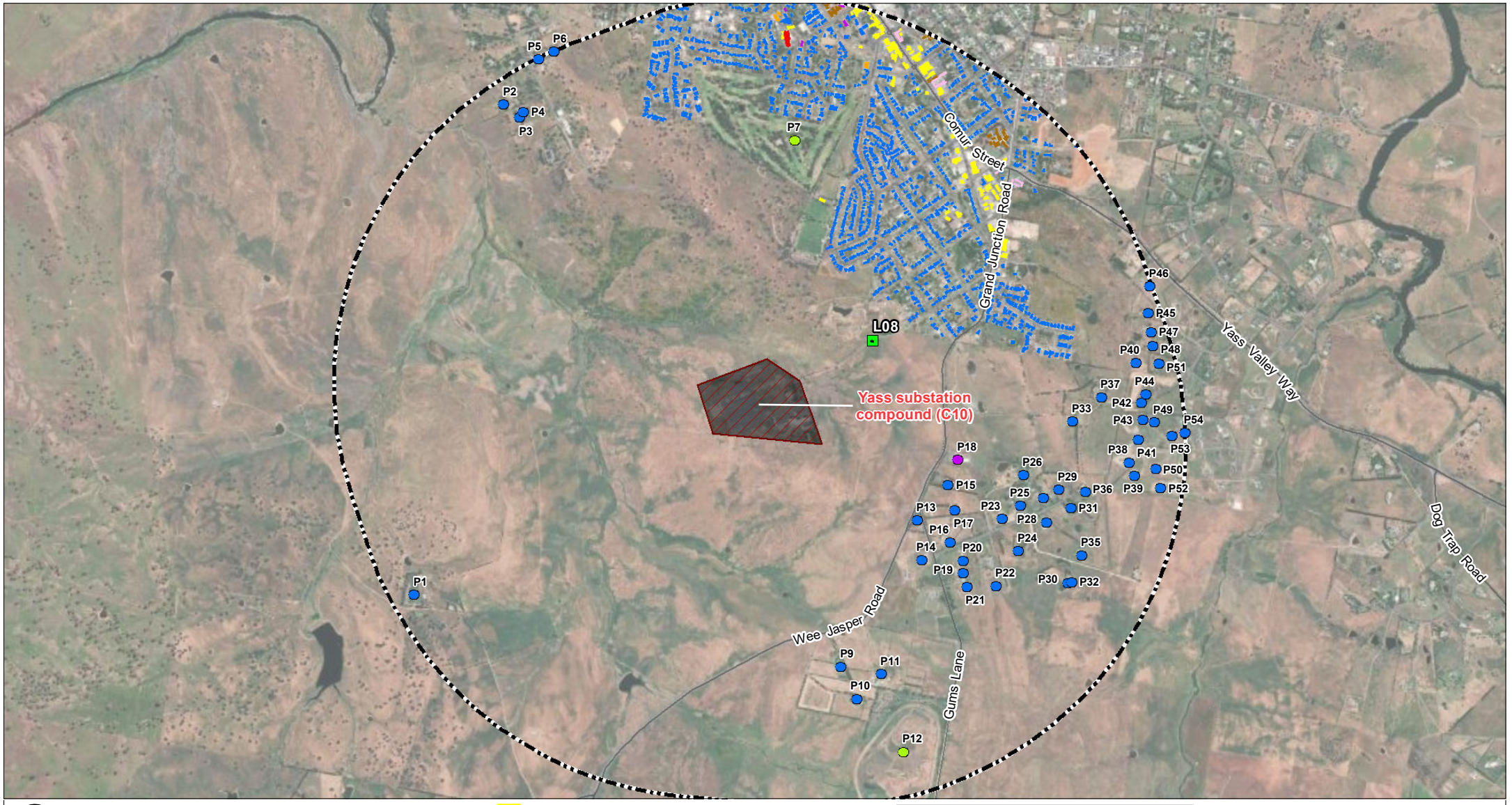


HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
PAGE 30 OF 44

ATTACHMENT B

\\au.slr.local\corporate\Projects-SLR\610-SrvSYD\610-SYD\610.30622.00000 HumeLink EIS AV AQ\06 SLR Data\01 CADGIS\GIS\AV\61030622 AV Project and Receiver Map DDP.mxd



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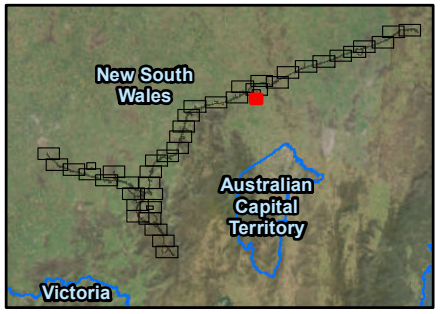

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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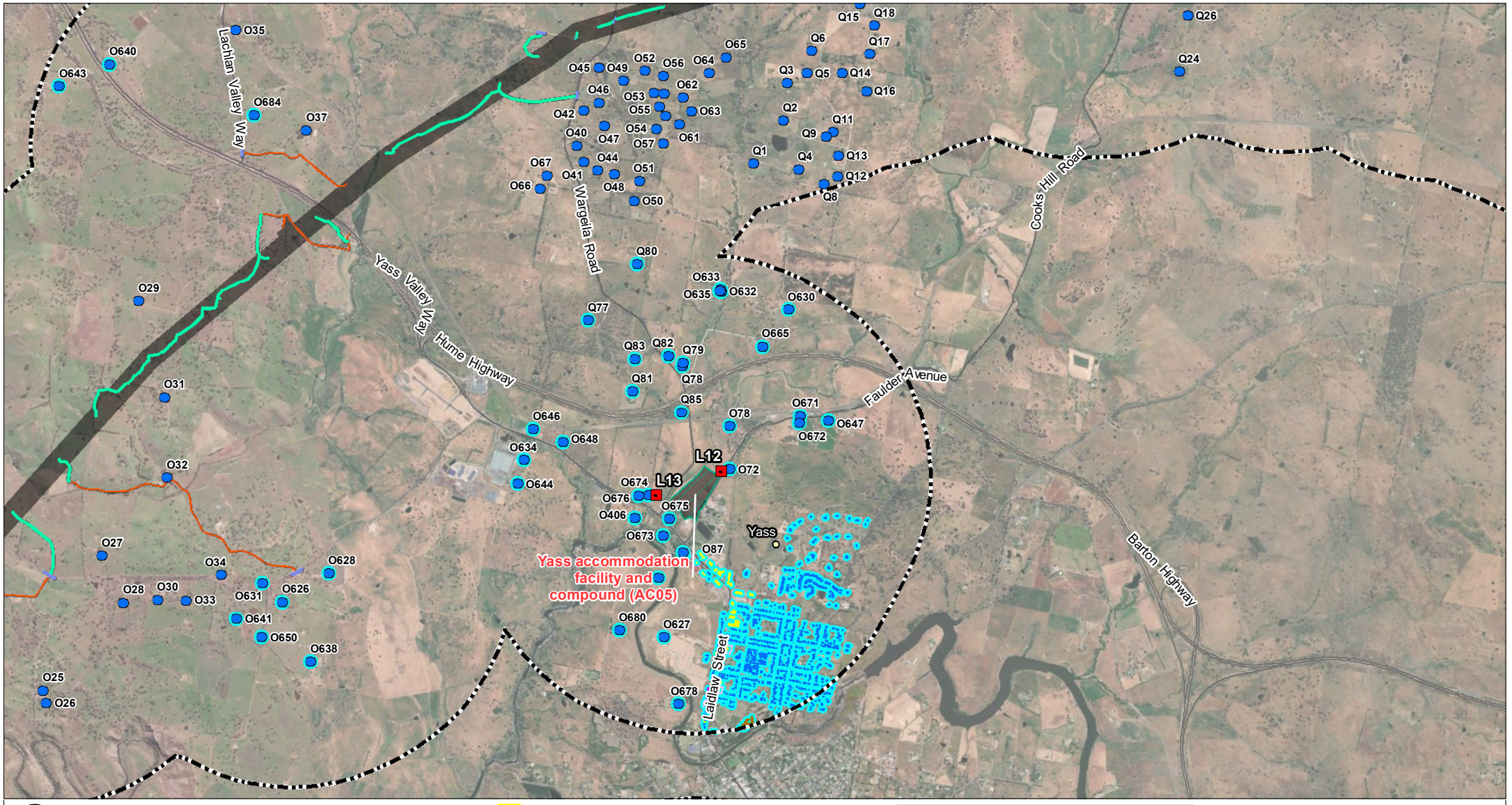

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HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP

ATTACHMENT B

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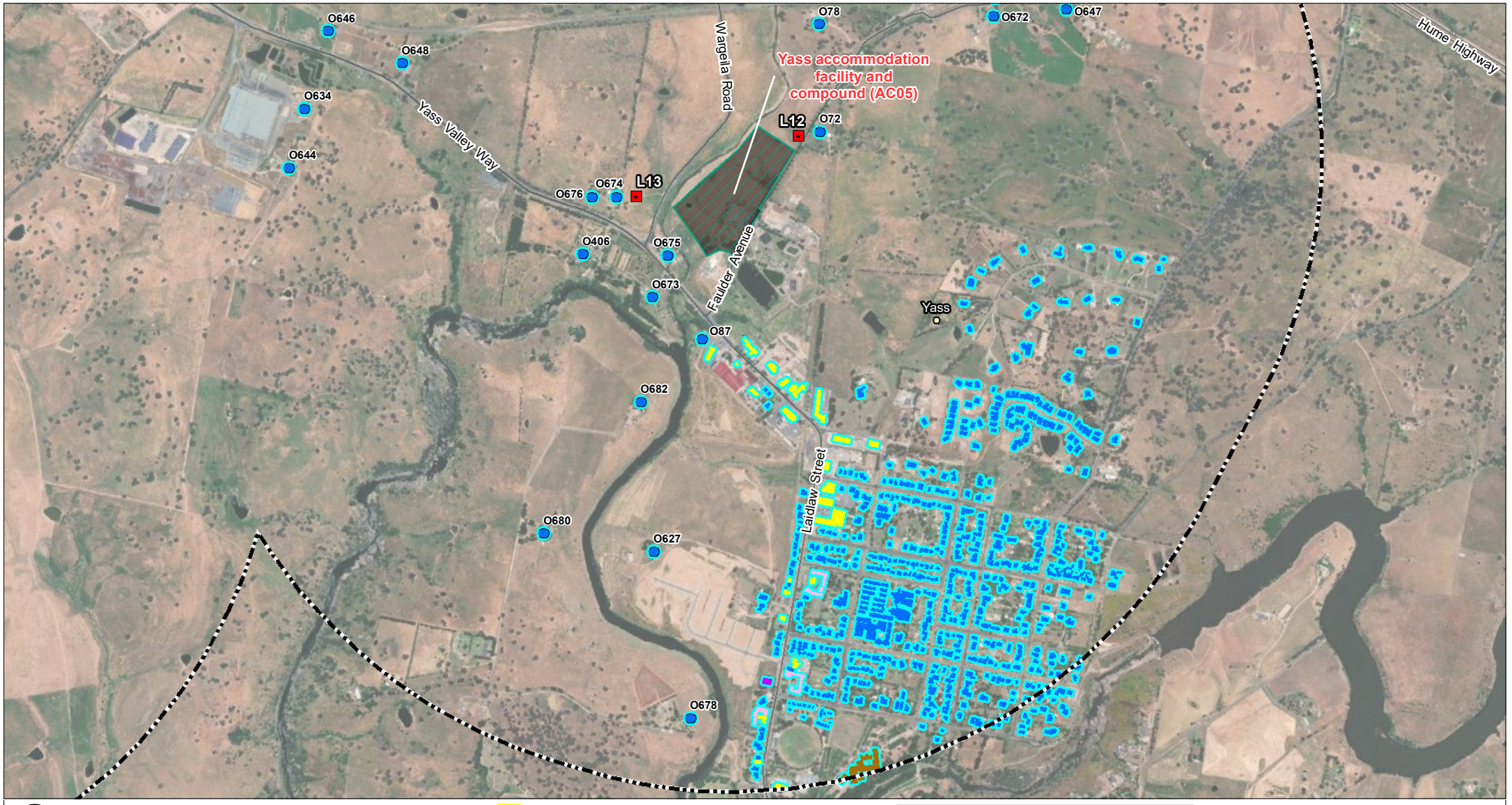

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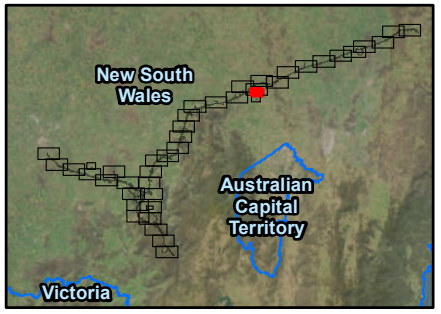

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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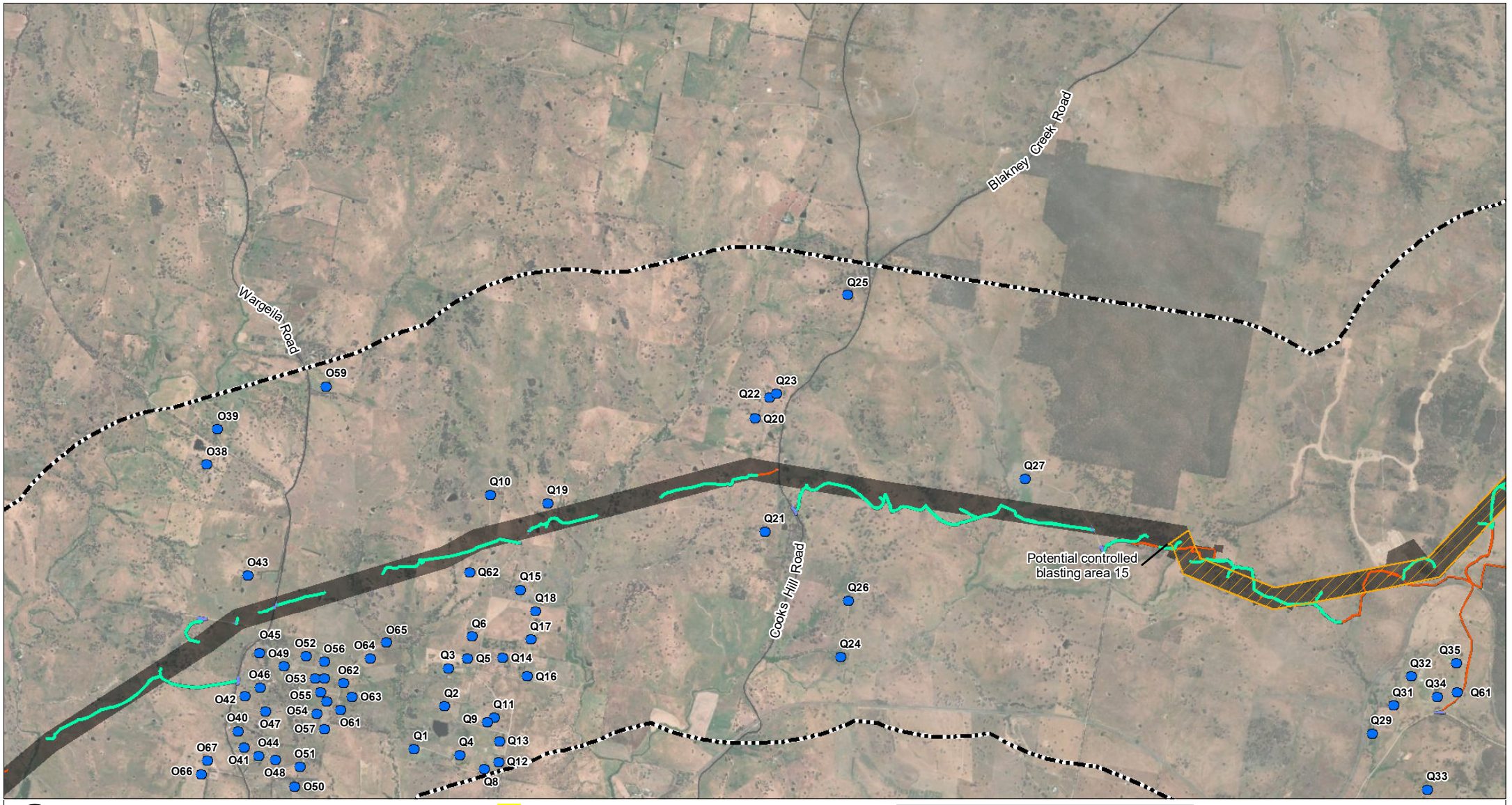

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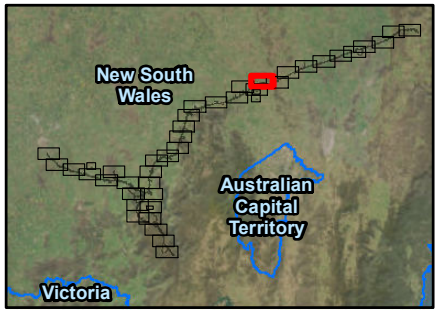

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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ATTACHMENT B

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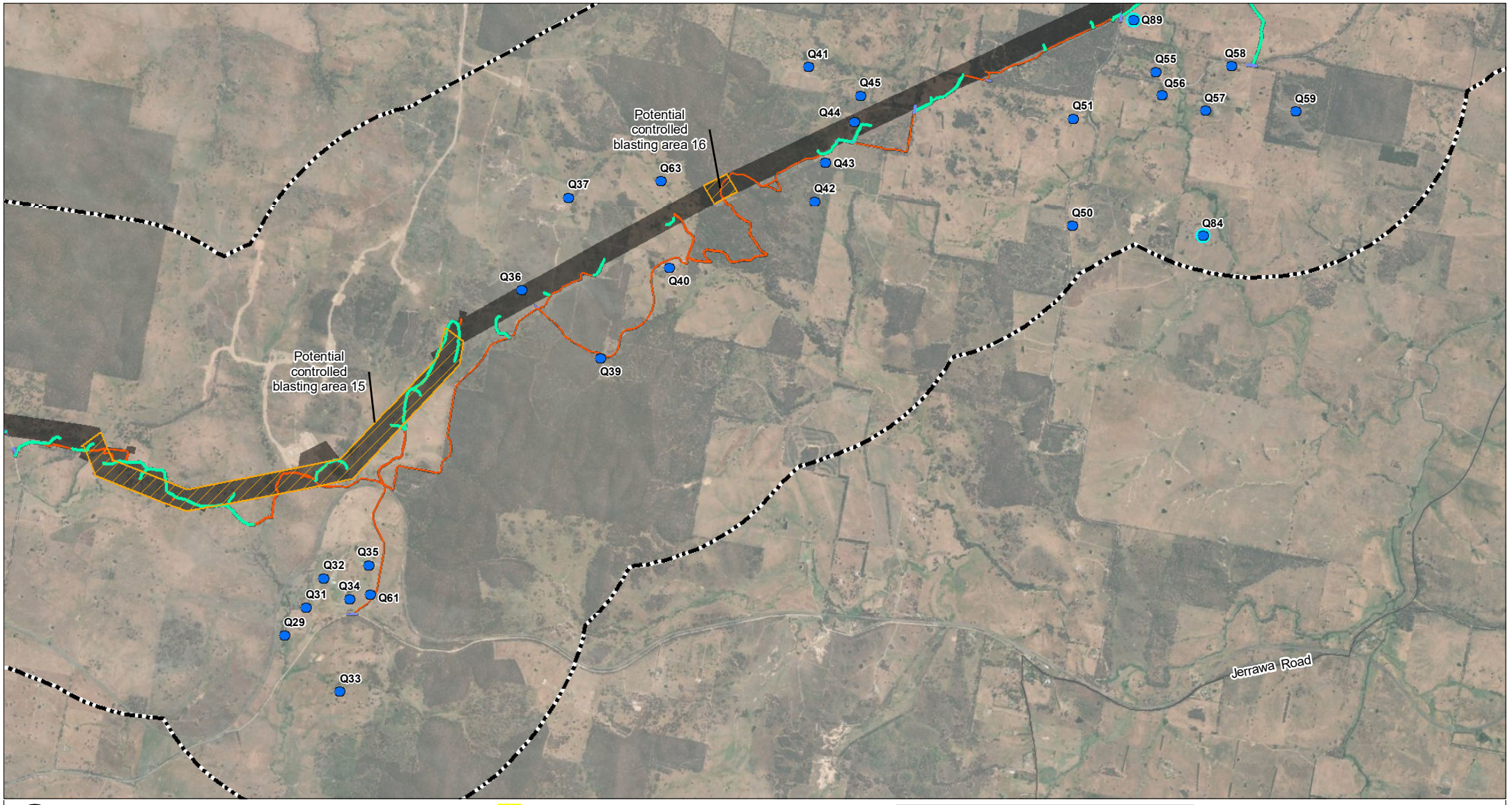

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Project Number:	610.30622
Date:	06-Mar-2024
Drawn by:	JG

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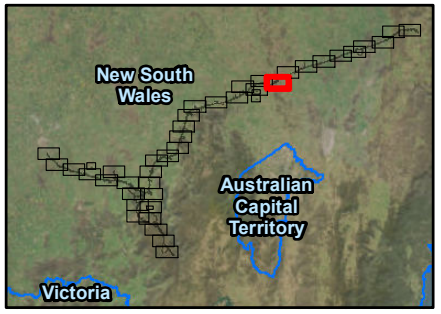

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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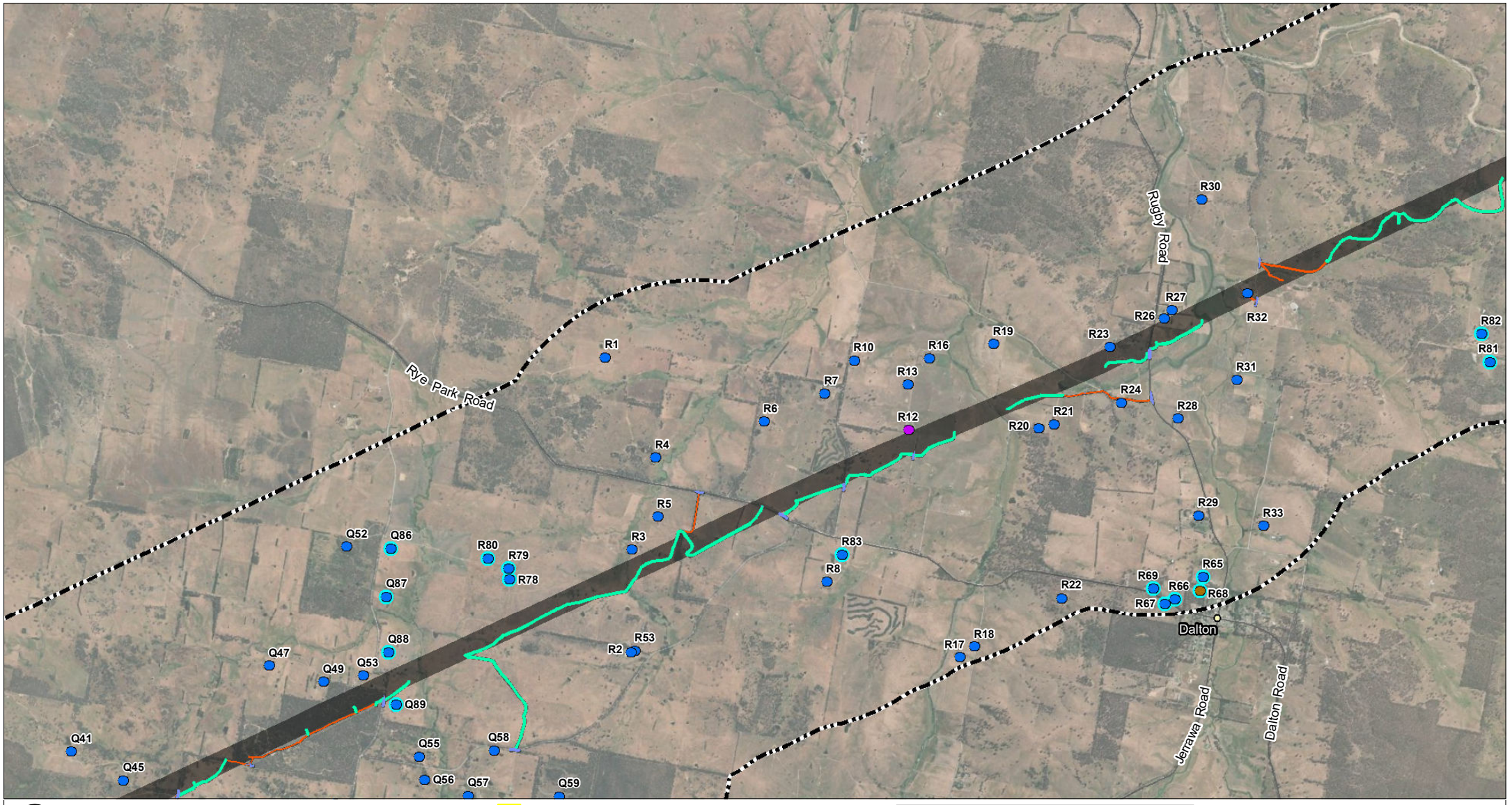

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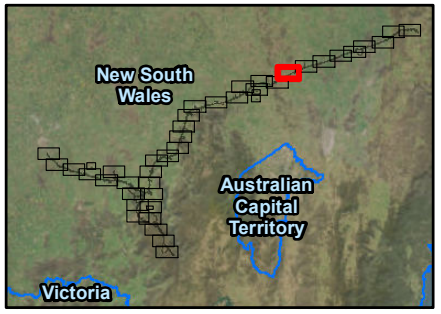

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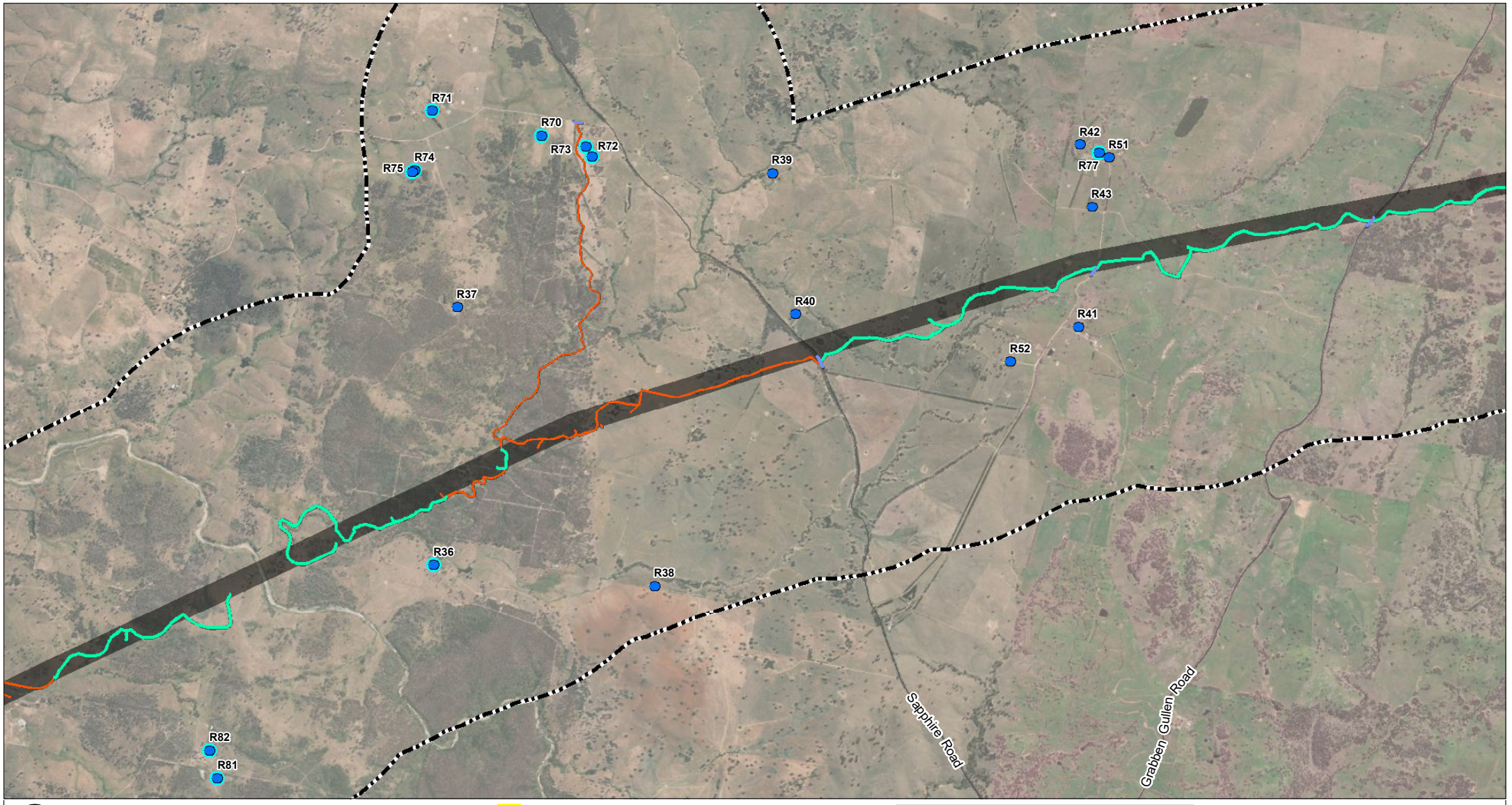

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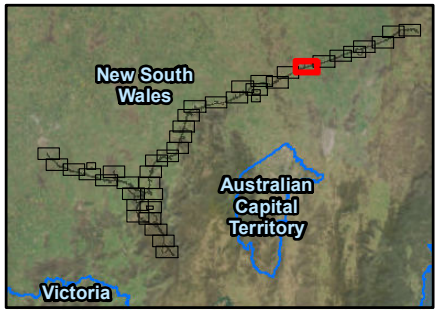

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

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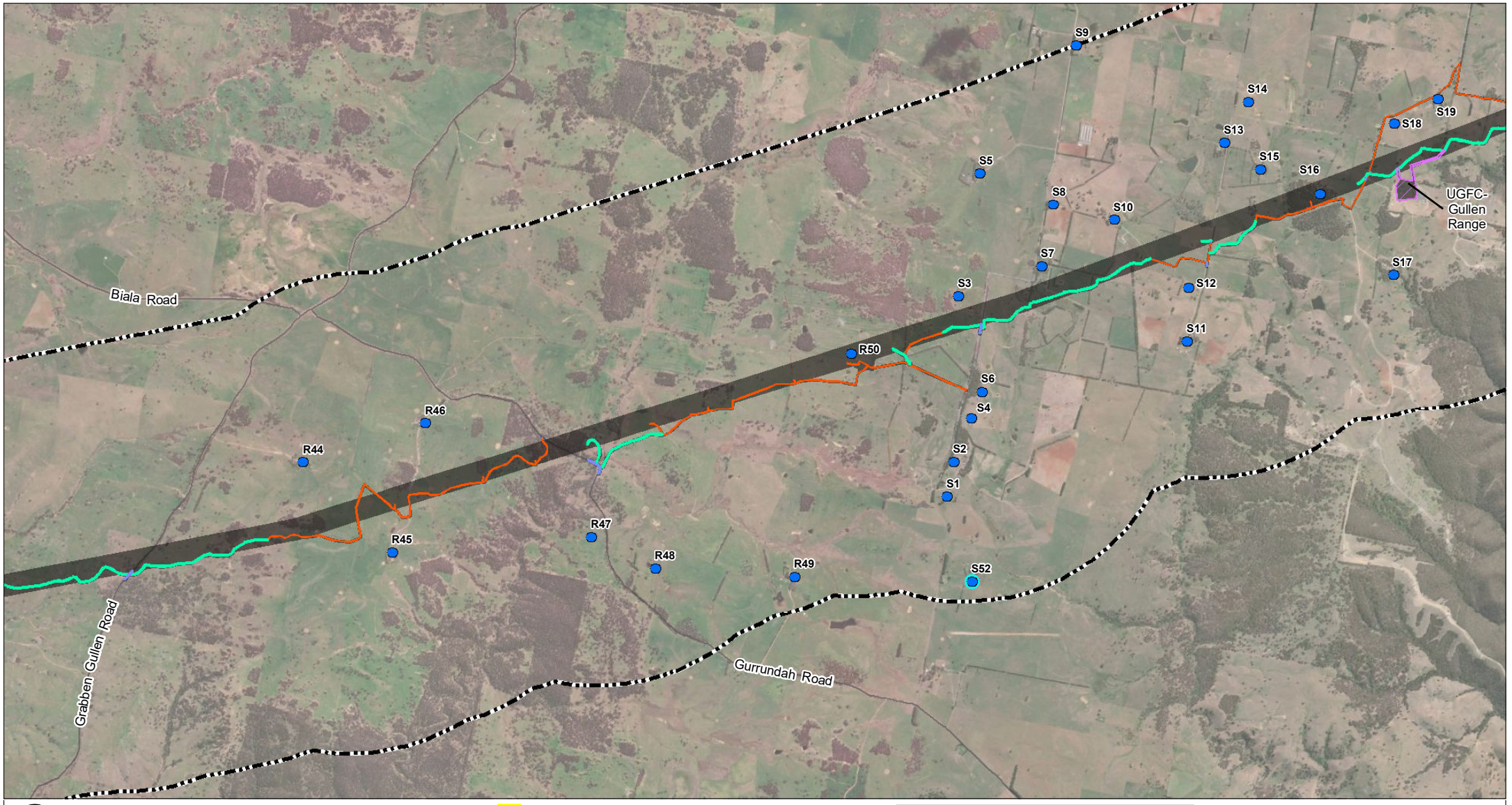

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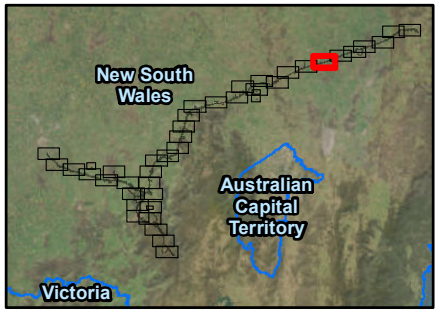

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

PROJECT AND RECEIVER MAP
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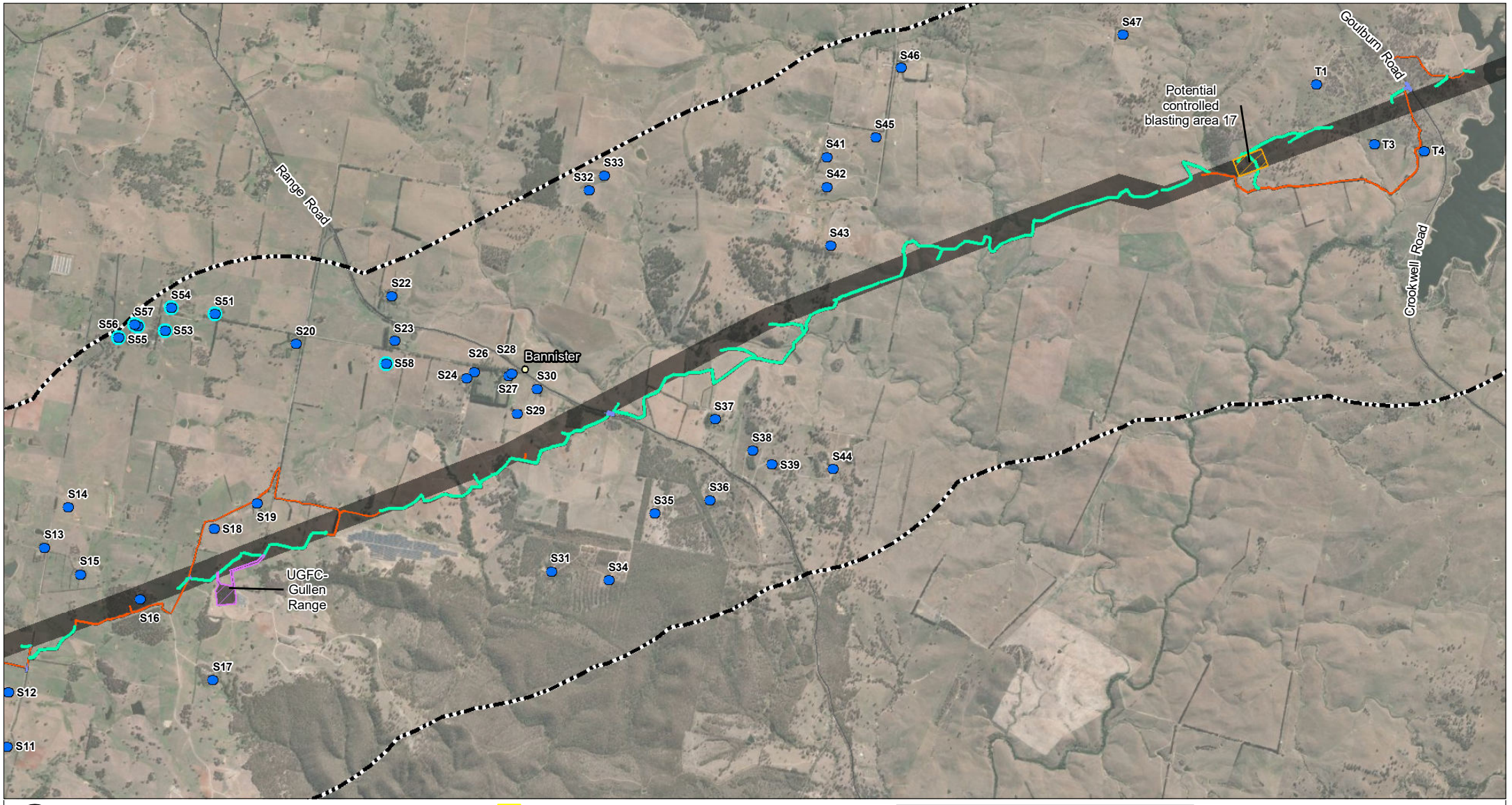

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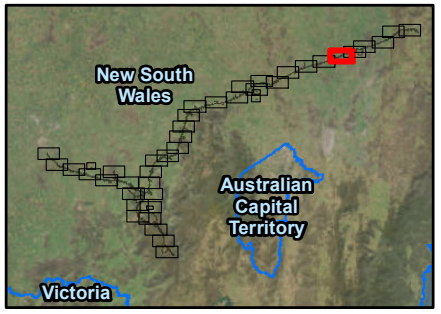

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

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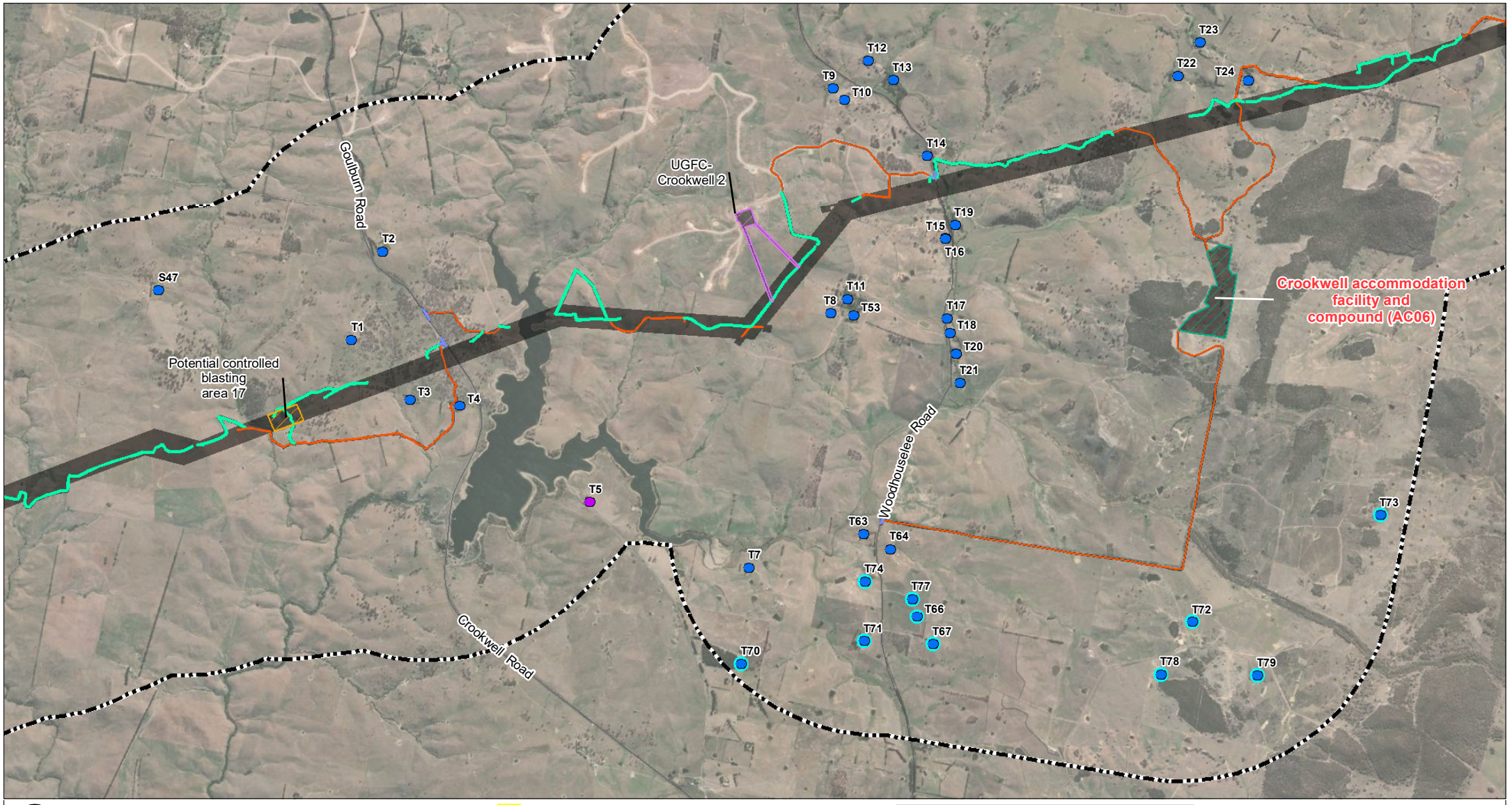

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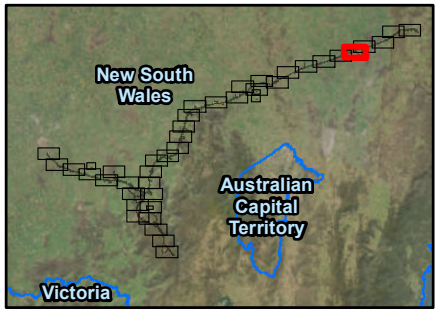

HUMELINK
NOISE AND VIBRATION
IMPACT ASSESSMENT

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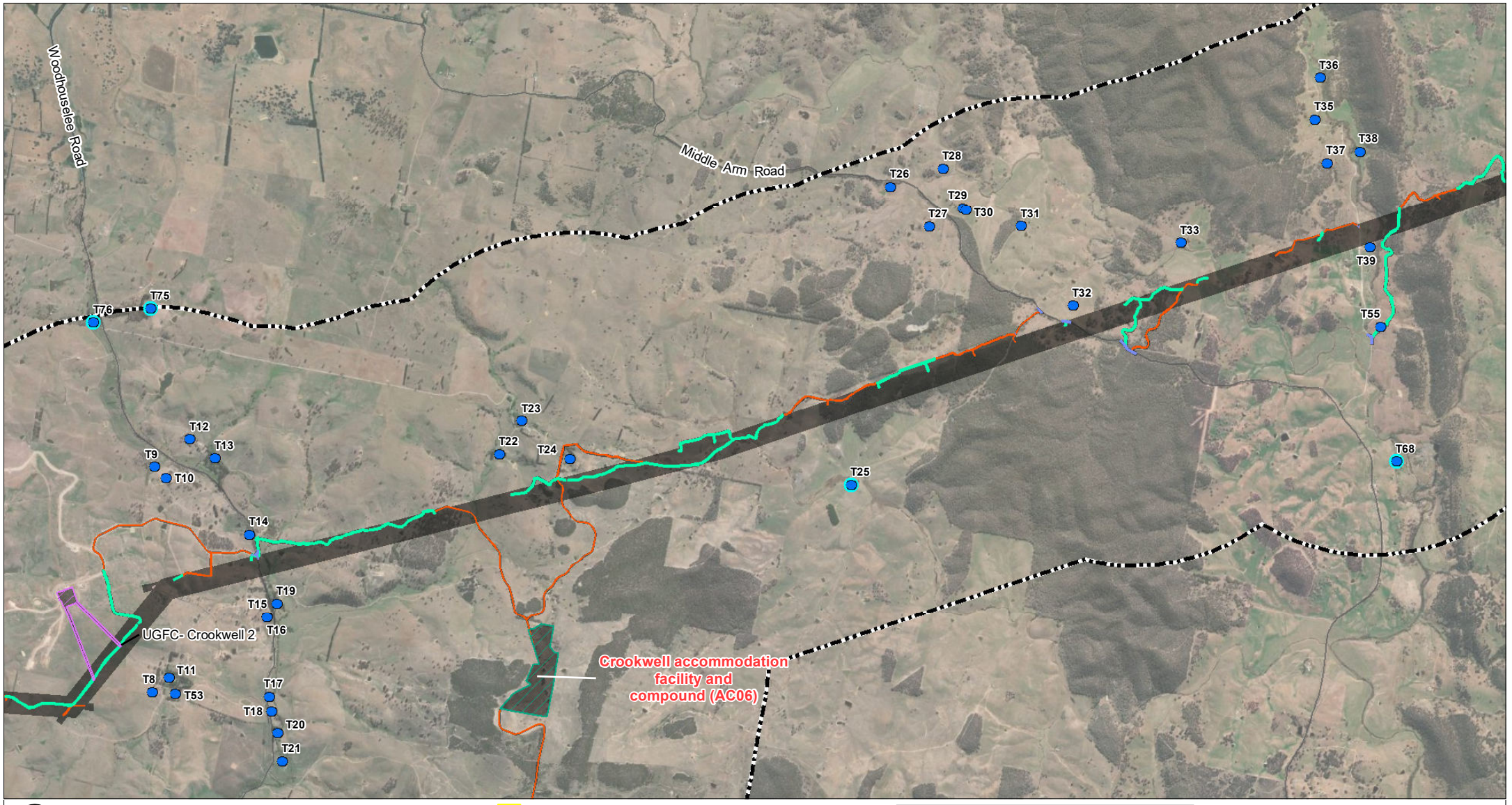

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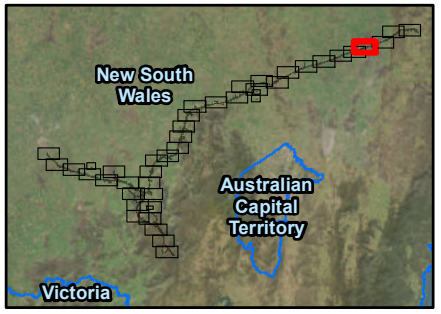

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

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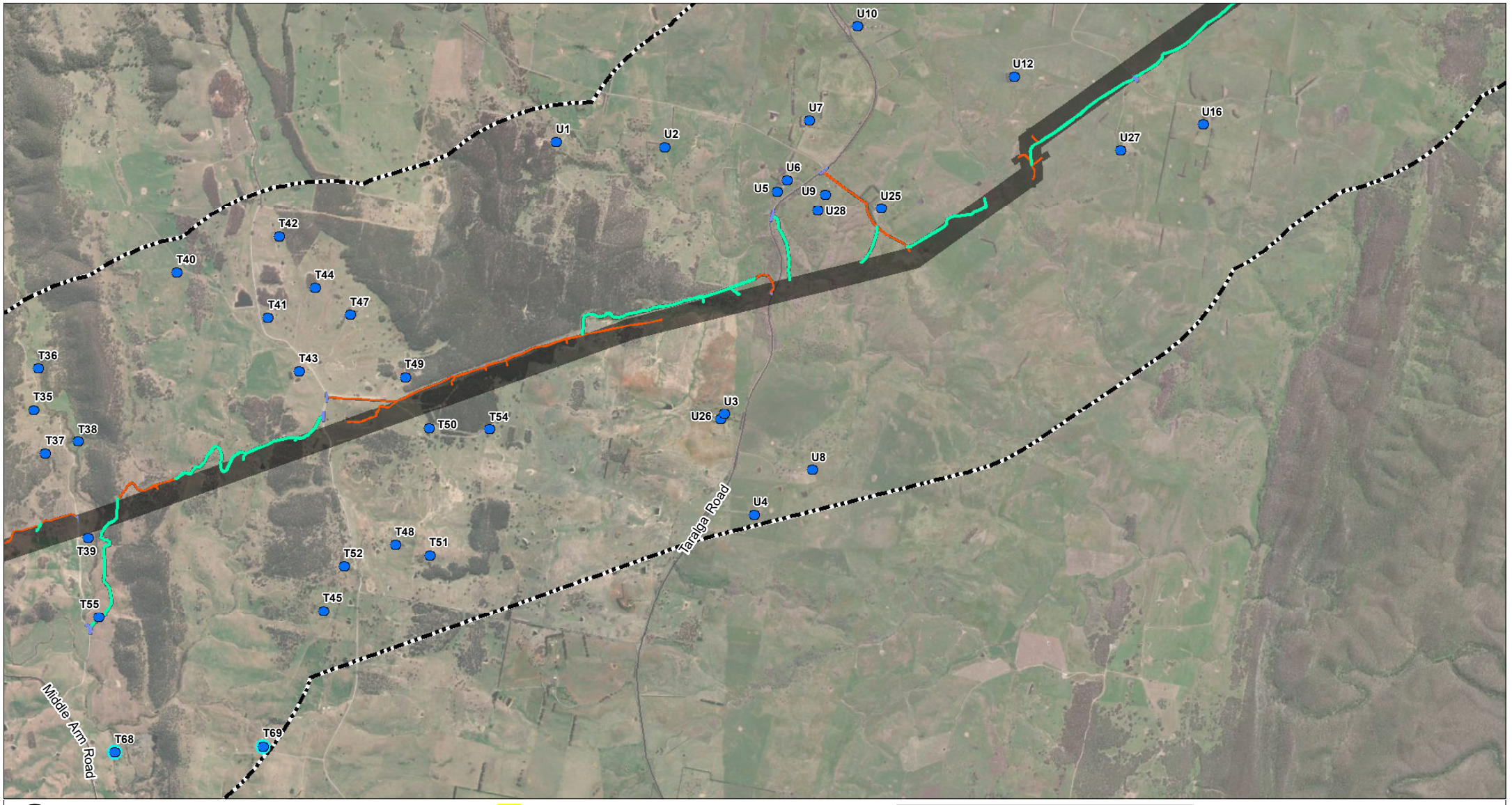

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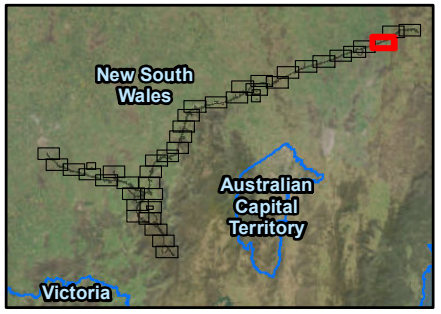

HUMELINK
NOISE AND VIBRATION IMPACT ASSESSMENT

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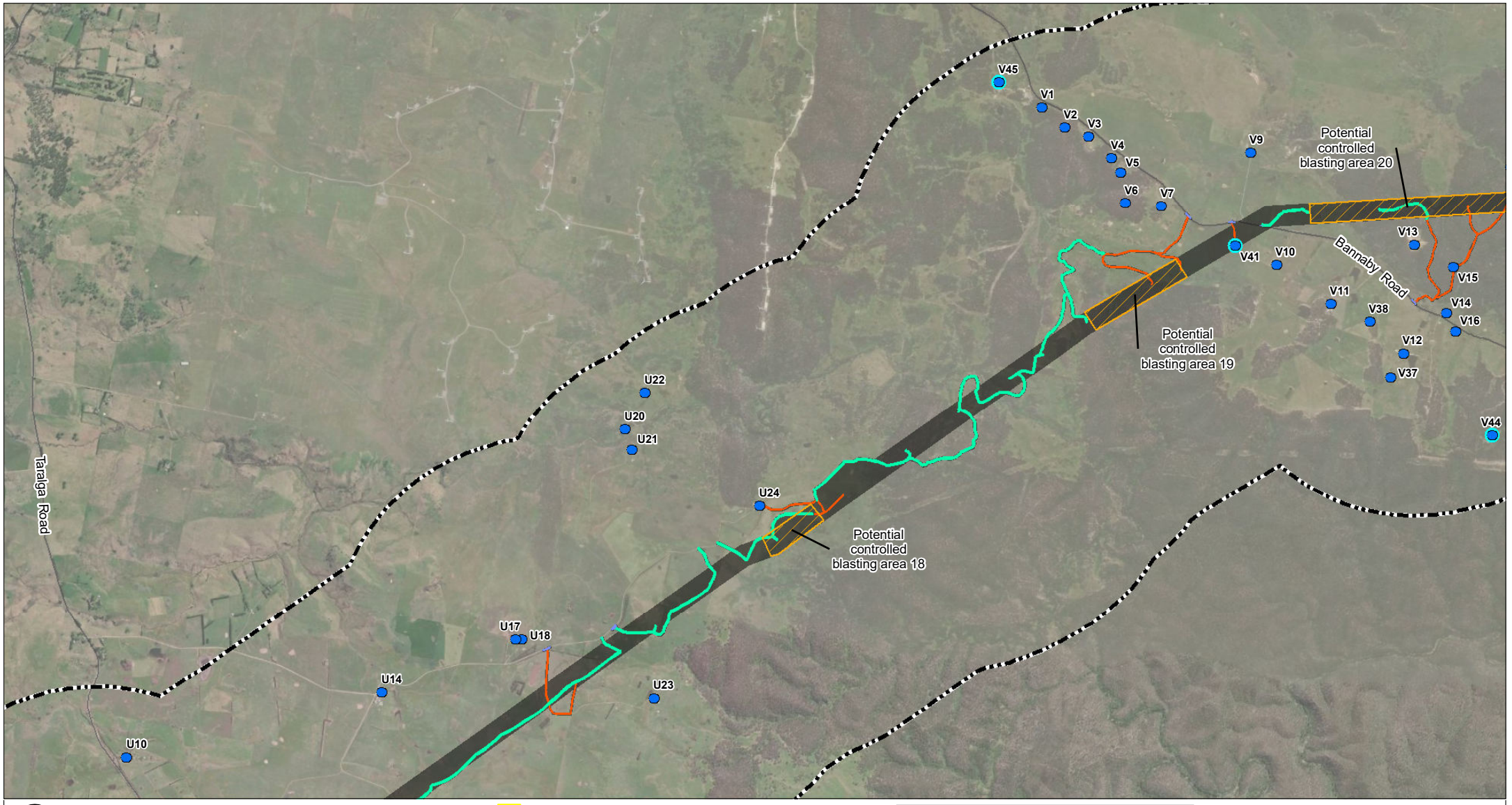

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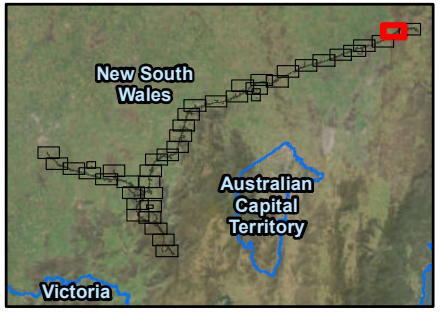

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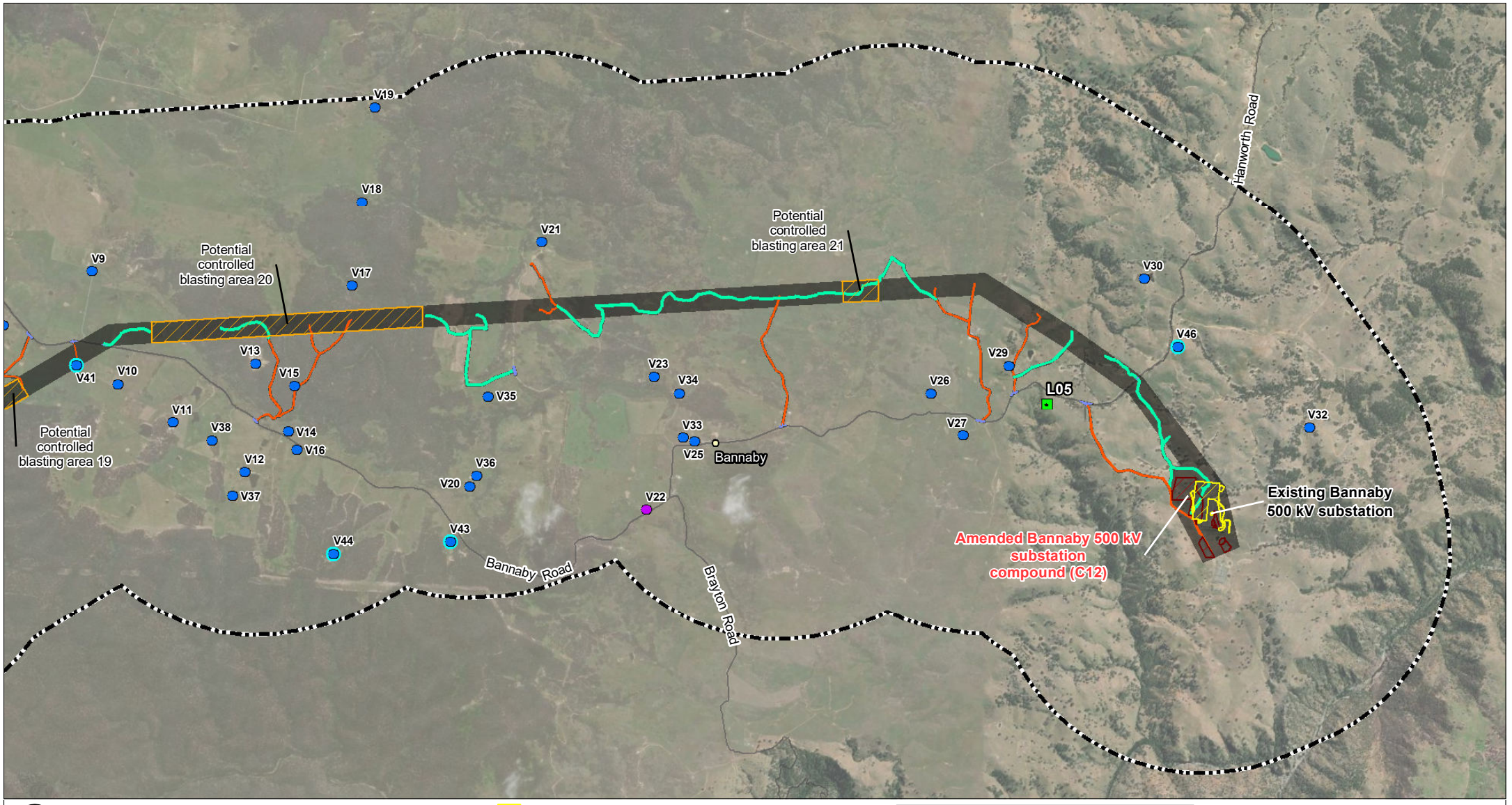

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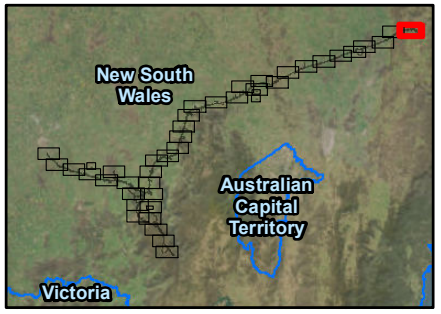

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Appendix B2: Yass Valley Way Accommodation Facility Consistency Assessment sensitive receiver map

Figure 3-1 HumeLink East - Yass Accommodation Overview, Sensitive Receivers, and Background Monitoring Locations