



## **GOULBURN RIVER SOLAR FARM**

Noise and Vibration Impact Assessment  
Addendum Report

**FINAL**

December 2023

# GOULBURN RIVER SOLAR FARM

## Noise and Vibration Impact Assessment Addendum Report

### FINAL

Prepared by  
**Umwelt (Australia) Pty Limited**  
on behalf of  
**Lightsource bp**

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## **Document Status**

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# 1.0 Introduction

Lightsource bp is proposing to develop the Goulburn River Solar Farm (the Project) to generate solar renewable energy to supply New South Wales (NSW).

The proposed Goulburn River Solar Farm (the Project), as described in the Environmental Impact Statement (EIS) (Umwelt, 2023) includes the construction, operation, maintenance and decommissioning of approximately 550 megawatt peak (MWp) of solar photovoltaic (PV) generation with a Battery Energy Storage System (BESS) with 280 MWp and 570 megawatt hour (MWh) capacity. The Project will also include supporting infrastructure, a substation and connection to an existing 500 kilovolt (kV) transmission line. Parts of Ringwood Road will be upgraded including two culverts at Bow River and Killoe Creek.

A number of amendments to the Project are proposed in response to public and agency submissions received following the public exhibition of the EIS and progression of the detailed design. This Noise and Vibration Impact Assessment addendum report (NVIA Addendum) is supplementary to the previously prepared Umwelt report, *Goulburn River Solar Farm Noise and Vibration Impact Assessment, Final*, dated April 2023 (EIS NVIA 2023).

This report has been prepared to address the amendments to the Project outlined in **Section 2.0**.

## 2.0 Description of Amendments

The proposed amendments to the Project are summarised below and addressed further in the subsequent sections of this addendum report.

- Transport route amendments, including:
  - A revised transport access/egress route, including the diversion of construction vehicles egress west at the Golden Highway and Ringwood Road intersection to a vehicle turning area on Barnett Street, Merriwa.
  - An upgrade of the intersection of the Golden Highway and Ringwood Road to support these movements.
- Upgrades to an additional 4.7 km section of Wollara Road and 1.6 km of Ringwood Road.
- Increased centralised BESS capacity and the additional option of a decentralised BESS.
- Minor Project layout modifications, including:
  - A re-alignment of the Project Area to avoid Travelling Stock Route (TSR) 44841.
  - Relocation or removal of solar arrays within the Development Footprint to further avoid significant and irreversible impacts (SAIL) to important habitat, including Regent Honeyeater habitat and Box Gum Woodland.
  - An increase in the width of two (2) internal access roads which connect the western and northern portions of the site from 6 m (as originally proposed in the Project EIS) to 10 m, to allow for subterranean transmission corridors as part of the internal reticulation network, rather than overhead transmission cables.
  - As a result of these modifications, the development footprint is 792.5 ha (a reduction of 7.07 Ha).
- Construction of an additional transmission tower within the existing easement of the 500 kV transmission line adjacent to the BESS/substation.
- Additional assessment and revised approach for workforce accommodation.

The areas subject to the Amended Project are illustrated in **Figure 2.1**.

This NVIA Addendum addresses:

- Construction noise and vibration associated with the road upgrades,
- Operational noise from the site, and
- Traffic noise from the Barnett Street Vehicle Turning Area (**Figure 5.1**).

The above amendments do not necessitate an amendment to the EIS Solar Farm and BESS Construction and Vibration Assessment contained in Section 5 of the EIS NVIA 2023 or the Traffic Noise Assessment contained in Section 7 of the EIS NVIA 2023.

**FIGURE 2.1**

**Summary of Proposed Amendments**

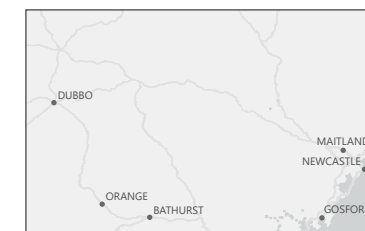
**Legend**

- Watercourse
- Lot Boundary
- Road Upgrade Extent
- Waterbodies



**Proposed Road Upgrades**

1. Proposed Amendment - Road Upgrade - Golden Highway / Ringwood Road Intersection
2. Culvert Upgrade - Bow River
3. Culvert Upgrade - Kiloe Creek
4. Road Upgrade - Bow River to Kiloe Creek (1.8km)
5. Proposed Amendment - Road Upgrade - Kiloe Creek to Binks Road (1.6km)
6. Proposed Amendment - Road Sealing - Wollara Road Adjacent Tongo State Forest



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## 3.0 Construction Noise and Vibration Assessment

### 3.1 Road Upgrades

#### 3.1.1 Description of Works

Road repairs and upgrades are proposed outside of the Project Area as part of the amendments to the Project. The following works are proposed:

- **Work Area 1 – Golden Highway and Ringwood Road Intersection** – Pruning and removal of vegetation and trees, construction of a merge lane, extension of deceleration lane and formalisation of two (2) bus stops either side of Ringwood Road.
- **Work Area 2 – Ringwood Road** – Realignment, widening and sealing of an additional 1.6 km section of Ringwood Road between Killoe Creek and Binks Road.
- **Work Area 3 – Wollara Road** – Realignment, widening and sealing a 4.7 km unpaved section of Wollara Road between the Goulburn River National Park boundary and 1621 Wollara Road.

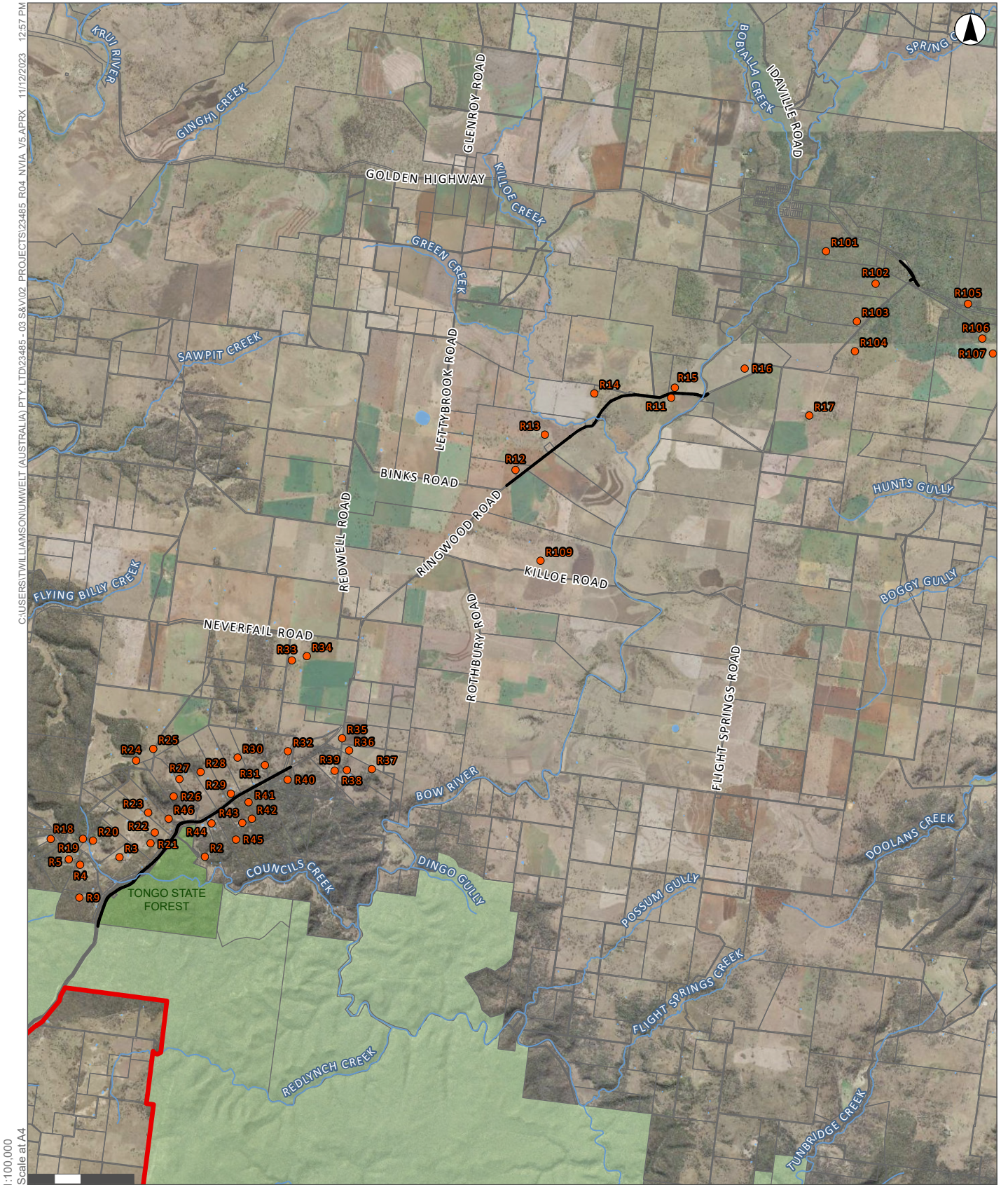
The location of the works areas are shown in **Figure 3.1**.

#### 3.1.2 Receivers

Residences within approximately 2 km of the work areas have been identified and are shown in **Figure 3.1**. The nearest two (2) receivers to each of the work areas are shown in **Table 3.1**.

**Table 3.1 Nearest Residential Receivers**

Work Area	Receiver ID	Address / Description	Approximate Distance (m) from works
Work Area 1	R102	5993 Golden Highway, Merriwa	650 m
	R105	5706 Golden Highway, Merriwa	750 m
Work Area 2	R11	549 Ringwood Road, Merriwa	50 m
	R12	990 Ringwood Road, Merriwa	40 m
Work Area 3	R29	1752 Wollara Road, Merriwa	105 m
	R44	1803 Wollara Road, Merriwa	115 m



**FIGURE 3.1**

**Work Areas and Sensitive Receivers**

### 3.1.3 Construction Hours and Noise Management Levels

Construction hours for the road upgrades are proposed to be undertaken during standard construction hours specified in the Interim Construction Noise Guideline (ICNG). The proposed construction hours are as follows:

- Monday to Friday: 7.00 am–6.00 pm.
- Saturday: 8.00 am–1.00 pm.
- Sunday and public holidays: No work.

The adopted construction noise management levels for standard construction hours are consistent with the EIS NVIA 2023 and shown within **Table 3.2**.

**Table 3.2 Project Construction Noise Management Levels**

Receiver	Noise Management Levels (NML), dB(A)			
	Standard hours of Construction <sup>1</sup>		Outside Standard hours of Construction <sup>1</sup>	
	Noise Affected LAeq(15 min)	Highly Noise Affected LAeq(15 min)	Noise Affected LAeq(15 min)	
			Day	Evening & Night
All Residences	45	75	40	35

Note: <sup>1</sup> Recommended standard hours: Monday to Friday 7.00 am–6.00 pm; Saturday 8.00 am–1.00 pm.

### 3.1.4 Equipment

The typical construction activities (Scenarios 1 to 4) and associated equipment and respective sound power levels (SWLs) of equipment are outlined in **Table 3.3**. Typical sound power levels have been sourced from the Roads and Maritime Construction Noise Estimator Tool and Umwelt’s noise source library.

**Table 3.3 Indicative Construction Scenarios, Equipment and Sound Power Levels**

Construction Stages / Scenarios	Activity description	Equipment	Sound Power Levels LAeq(15 min) dB(A)/ unit	Combined Sound Power Level LAeq(15 min) dB(A)	
				All equipment	All equipment without high noise emitting plant <sup>2</sup>
Sc.1	Vegetation Clearing	Tub Grinder	121 <sup>2</sup>	123	117
		Chainsaw	115 <sup>2</sup>		
		Dozer	110		
		Truck	108		
		Excavator	106		
Sc.2	Bulk earthworks	Excavator w/ hammer	122 (117 + 5) <sup>1,2</sup>	123	117
		Grader	113		
		Dozer	110		
		Roller	109		

Construction Stages / Scenarios	Activity description	Equipment	Sound Power Levels LAeq(15 min) dB(A)/ unit	Combined Sound Power Level LAeq(15 min) dB(A)	
				All equipment	All equipment without high noise emitting plant <sup>2</sup>
		Truck	108		
		Water truck	107		
		Excavator	106		
Sc.3	Paving / asphaltting (including concrete saw)	Concrete saw	122 (117 + 5) <sup>1,2</sup>	123	117
		Asphalt paver	114		
		Roller	109		
		Trucks	108		
		Trencher	106		
		Bobcat	104		
Sc.4	Road furniture installation / bus stop	Power hand tools	110	113	113
		Line marking truck	108		
		Truck	98		
		Mobile crane / telehandler	98		
		Scissor Lift	98		

Notes: <sup>1</sup> Includes a +5 dB penalty for impulsiveness characteristics.

<sup>2</sup> For this assessment high noise emitting plant considered to be tub grinder, chainsaw, rock hammers, jackhammers and concrete saws.

### 3.1.5 Construction Noise Levels

Prediction of the construction noise levels was undertaken with CadnaA under worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed).

Construction noise levels have been predicted for the four (4) indicative construction scenarios described in **Table 3.3**. The predictions are conservative and assume all equipment associated with each scenario is operating simultaneously at the closest point to the receiver. In reality, a receiver would experience a range of construction noise levels, dependent upon the number of plant items operating at any one time and their location as the works progress along the roadway.

For each work area, the results for each construction scenario (Sc.1 to Sc.4) for the identified receivers are presented in **Table 3.4**. Two circumstances have been presented:

- High impact (H), which includes high noise emitting plant (i.e., tub grinder, chainsaw, rock hammers, jackhammers and concrete saws).
- Low impact (L), which excludes high noise emitting plant (i.e., tub grinder, chainsaw, rock hammers, jackhammers and concrete saws).

For each work area, the predicted noise level contours for the worst-case scenario(s) with all equipment operating (Sc. 1, Sc. 2 and Sc. 3) are presented graphically in **Figure 3.2** to **Figure 3.4**. Construction scenario 4 was not represented visually as the potential impacts are less than the presented worst-case scenarios.

The construction noise levels are predicted to exceed the noise management levels (i.e. **Table 3.2**) at some receivers for some of the work areas and scenarios. However, no receivers are predicted to be highly noise affected (i.e., exposed to construction noise levels greater than 75 dB(A)).

Reasonable and feasible noise mitigation and management strategies were provided in Section 5.4 of the EIS NVIA 2023.

**Table 3.4 Predicted Construction Noise Levels, dB(A)**

Receiver ID	Noise Management Level, LAeq(15 min)	Construction Scenario Noise Prediction, LAeq(15 min)			
	Standard Hours	Sc.1, 2 & 3		Sc.4	
		H	L	H	L
<b>Work Area 1</b>					
R101	45	21	<20	n/a	<20
R102	45	49	43	n/a	39
R103	45	38	32	n/a	28
R104	45	40	34	n/a	30
R105	45	40	34	n/a	30
R106	45	43	37	n/a	33
R107	45	40	34	n/a	30
R108	45	40	34	n/a	30
<b>Work Area 2</b>					
R11	45	73	67	n/a	63
R12	45	70	64	n/a	60
R13	45	60	54	n/a	50
R14	45	60	54	n/a	50
R15	45	72	66	n/a	62
R16	45	42	36	n/a	32
R17	45	27	21	n/a	<20
R109	45	37	31	n/a	27
<b>Work Area 3</b>					
R2	45	45	39	n/a	35
R3	45	50	44	n/a	40
R4	45	49	43	n/a	39

Receiver ID	Noise Management Level, LAeq(15 min) Standard Hours	Construction Scenario Noise Prediction, LAeq(15 min)			
		Sc.1, 2 & 3		Sc.4	
		H	L	H	L
R5	45	47	41	n/a	37
R9	45	51	45	n/a	41
R18	45	33	27	n/a	23
R19	45	45	39	n/a	35
R20	45	46	40	n/a	36
R21	45	61	55	n/a	51
R22	45	58	52	n/a	48
R23	45	53	47	n/a	43
R24	45	40	34	n/a	30
R25	45	35	29	n/a	25
R26	45	49	43	n/a	39
R27	45	47	41	n/a	37
R28	45	50	44	n/a	40
R29	45	72	66	n/a	62
R30	45	52	46	n/a	42
R31	45	61	55	n/a	51
R32	45	54	48	n/a	44
R33	45	41	35	n/a	31
R34	45	38	32	n/a	28
R35	45	67	61	n/a	57
R36	45	52	46	n/a	42
R37	45	47	41	n/a	37
R38	45	39	33	n/a	29

Receiver ID	Noise Management Level, LAeq(15 min) Standard Hours	Construction Scenario Noise Prediction, LAeq(15 min)			
		Sc.1, 2 & 3		Sc.4	
		H	L	H	L
R39	45	55	49	n/a	45
R40	45	66	60	n/a	56
R41	45	62	56	n/a	52
R42	45	55	49	n/a	45
R43	45	55	49	n/a	45
R44	45	69	63	n/a	59
R45	45	51	45	n/a	41
R46	45	64	58	n/a	54

Notes:

<sup>1</sup> Predictions below 20 dB(A) have been presented as <20.

<sup>2</sup> Scenario not applicable for work area.

<sup>3</sup> Receivers outside of assessment area for work area.

<sup>4</sup> H – Includes high noise emitting plant (i.e., tub grinder, chainsaw, rock hammers, jackhammers and concrete saws).

<sup>5</sup> L – Excludes high noise emitting plant (i.e., tub grinder, chainsaw, rock hammers, jackhammers and concrete saws).

<sup>6</sup> Predicted exceedances are in **Red**.





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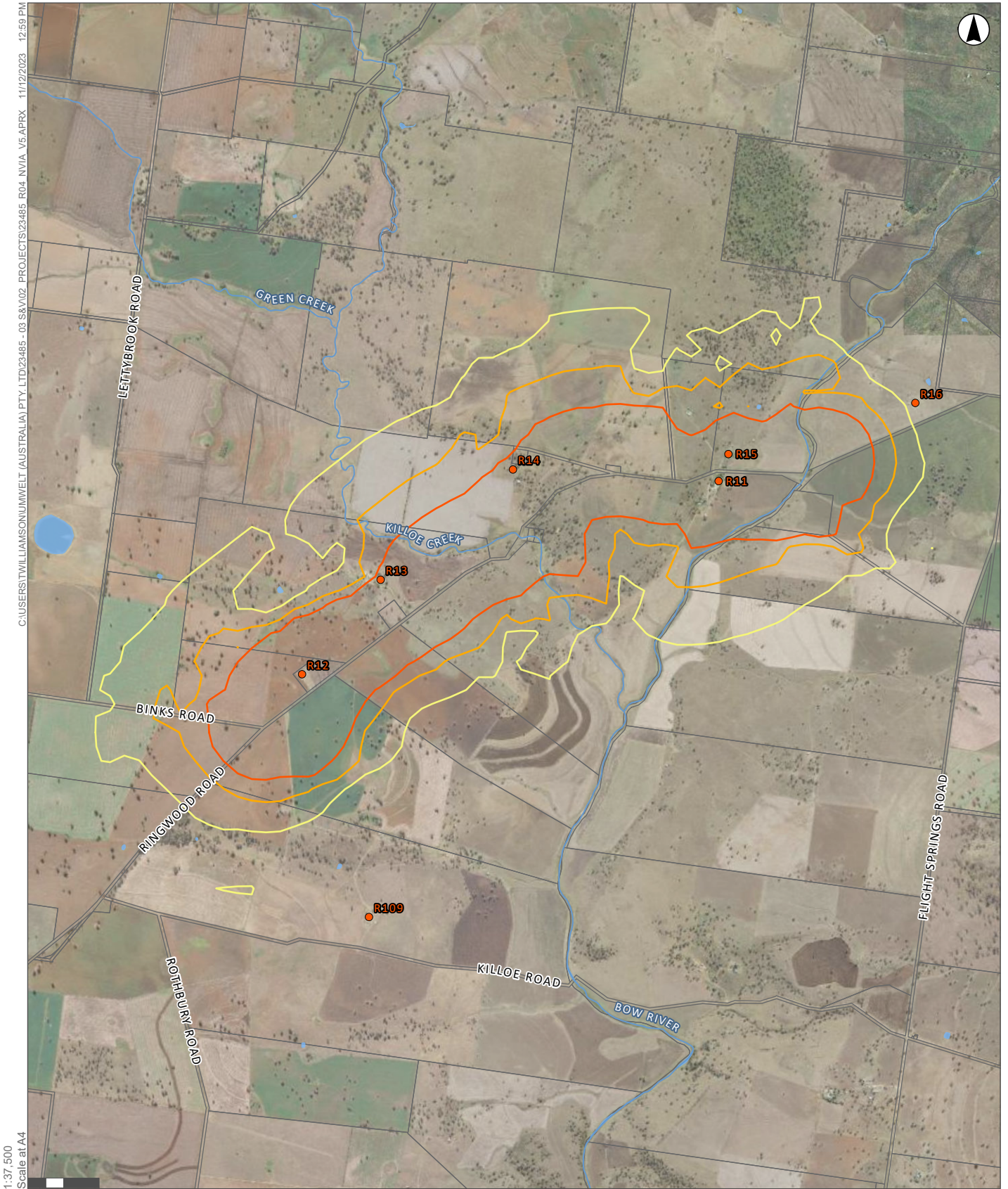
**Legend**

- Sensitive Receivers
- Lot Boundary
- Predicted Noise Levels**
- 45 dB(A)
- 50 dB(A)
- 55 dB(A)

GDA 1994 MGA Zone 56

**FIGURE 3.2**

**Work Area 1 - Construction Scenario 1, 2 and 3 – Predicted Noise Levels, LAeq(15 min) dB(A)**



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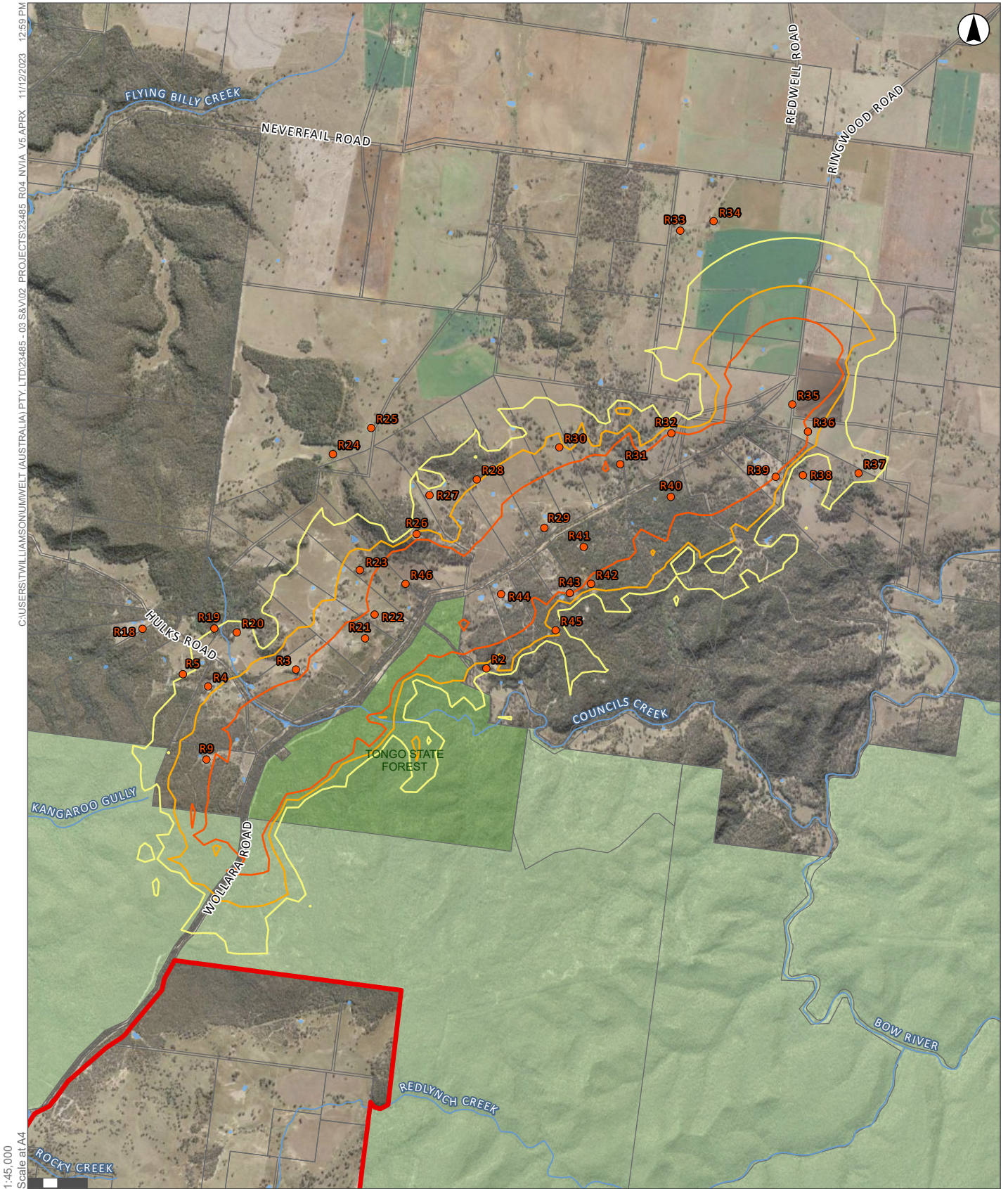
Legend

- Sensitive Receivers
- Watercourse
- Lot Boundary
- Predicted Noise Levels**
- 45 dB(A)
- 50 dB(A)
- 55 dB(A)

GDA 1994 MGA Zone 56

**FIGURE 3.3**

**Work Area 2 - Construction Scenario 1, 2 and 3 – Predicted Noise Levels, LAeq(15 min) dB(A)**



**FIGURE 3.4**

**Work Area 3 - Construction Scenario 1, 2 and 3 – Predicted Noise Levels, LAeq(15 min) dB(A)**

## 3.2 Construction Vibration Levels

The recommended safe working distances for vibration-generating equipment from sensitive receivers (i.e., the receiver building or its occupants) are consistent with the EIS NVIA 2023 and are shown in **Table 3.5**.

**Table 3.5 Recommended Minimum Working Distances for Vibration Generating Plant from a Residential Sensitive Receiver (CNVG Table 2)**

Plant Item	Rating/Description	Minimum Working Distance <sup>1, 2</sup>	
		Cosmetic Damage (Residential Building)	Human Response
<b>Vibratory Roller</b>	< 50 kN (Typically 1–2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2–4 tonnes)	6 m	20 m
	< 200 kN (Typically 4–6 tonnes)	12 m	40 m
	< 300 kN (Typically 7–13 tonnes)	15 m	100 m
	> 300 kN (Typically 13–18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
<b>Small Hydraulic Hammer</b>	300 kg – 5 to 12 t excavator	2 m	7 m
<b>Medium Hydraulic Hammer</b>	900 kg – 12 to 18 t excavator	7 m	23 m
<b>Large Hydraulic Hammer</b>	1600 kg – 18 to 34 t excavator	22 m	73 m
<b>Vibratory Pile Driver</b>	Sheet piles	2 m to 20 m	20 m
<b>Pile Boring</b>	≤ 800 mm	2 m (nominal)	4 m
<b>Jackhammer</b>	Handheld	1 m (nominal)	2 m

Notes: <sup>1</sup> For alternative equipment with higher vibration levels, larger minimum working distances are required.

<sup>2</sup> More stringent conditions may apply to heritage or other sensitive structures.

Except for receiver R11, R12 and R15, all the identified residential dwellings fall outside of the minimum working distances. For Work Area 2, receiver R11, R12 and R15 fall within the minimum working for human response for some plant items (i.e., vibratory roller >7 tonnes and large hydraulic hammer >18 tonnes). However, given the transient nature of the works, human disturbance impacts are anticipated to be low.

Construction vibration mitigation strategies were provided in Section 5.4 of the EIS NVIA 2023 and remain relevant to the Amended Project.

## 4.0 Operational Noise Assessment

### 4.1 Receivers and Criteria

The nearest sensitive receivers and operational Project Noise Trigger Levels (PNTLs) are consistent with the EIS NVIA 2023. The nearest receivers are shown in **Figure 4.1** and the PNTLs are shown in **Table 4.1**.

**Table 4.1 Project Noise Trigger Levels – Residential Receivers, LAeq(15 minute), dB(A)**

Receiver	Time of day <sup>1</sup>	PINL <sup>3</sup>	PANL <sup>4</sup>	PNTL
All residential receivers <sup>2</sup>	Day	40	53	40
	Evening	35	48	35
	Night	35	43	35
Passive recreation area	When in use	-	53	53

Notes:

<sup>1</sup> Day period is 7.00 am–6.00 pm Monday-Saturday and 8.00 am–6.00 pm Sunday and Public Holidays, evening period is 6.00 pm–10.00 pm and night period is 10.00 pm to commencement of day period.

<sup>2</sup> Residential receiver R01 is involved in the Project (host receiver) and the PNTLs are not applicable.

<sup>3</sup> PINL – Project Intrusive Noise Level.

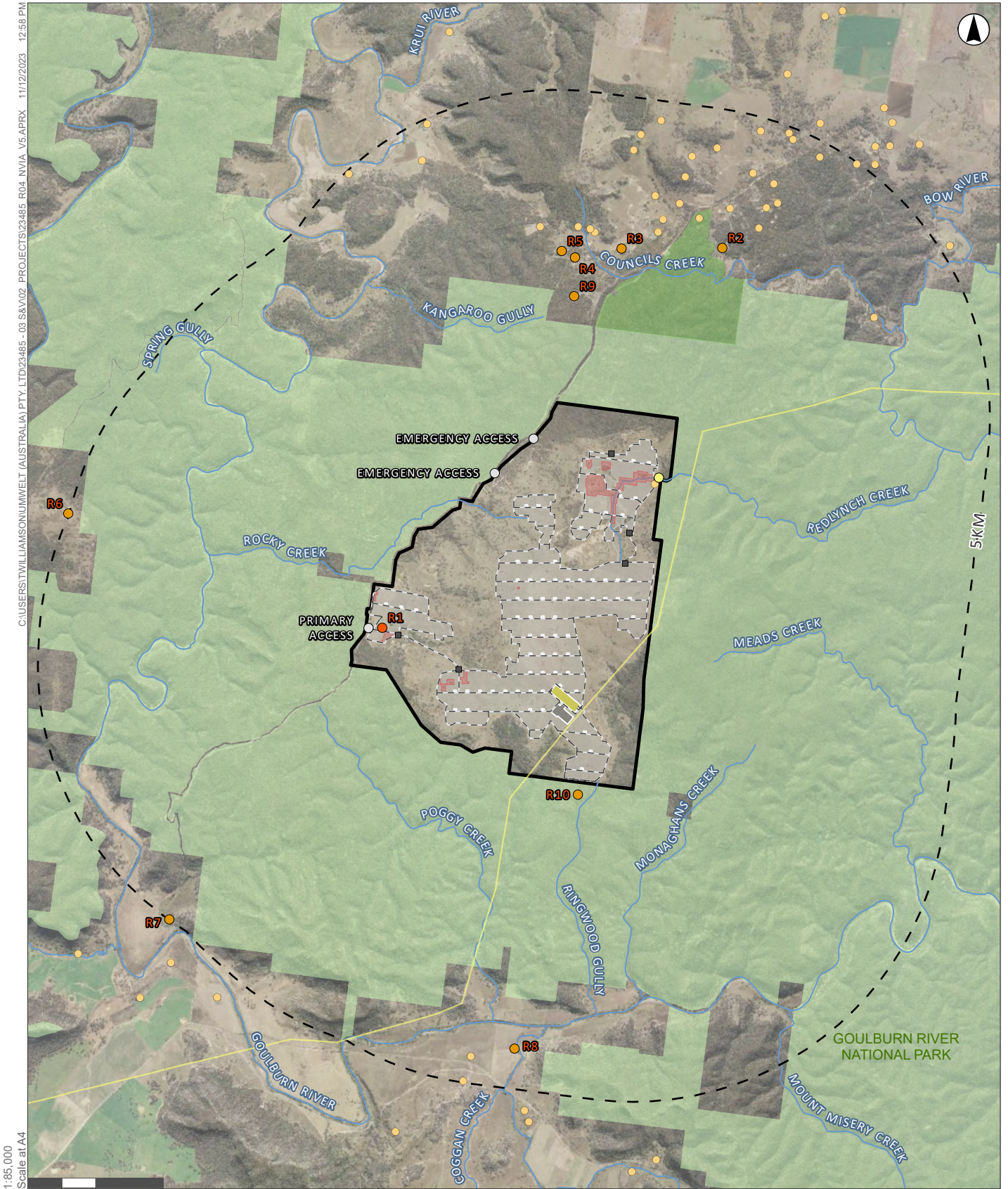
<sup>4</sup> PANL – Project Amenity Noise Level.

### 4.2 Modelling Methodology

Prediction of the operational noise levels was undertaken with the proprietary computer noise modelling software CadnaA (Version 2023), using the CONCAWE noise prediction algorithms. The operational noise model was developed using 3-Dimensional terrain data (10 m contour interval). Ground absorption for the area was modelled as acoustically soft ground.

### 4.3 Noise Source Data

Lightsource bp has provided indicative reference noise data for the proposed equipment/plant to be installed on-site for the Project. This has been supplemented with additional source data from Umwelt's noise source library. The proposed equipment, utilisation, quantities and sound power levels are summarised in **Table 4.2**.



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GDA2020 MGA Zone 56

- Legend**
- Host Receiver
  - Sensitive Receiver
  - Dwelling (abandoned)
  - Dwellings
  - Access Points
  - Gate
  - Proposed Access Tracks
  - Electricity Transmission Line
  - Watercourse
  - Roads and Tracks
  - Project Area (5km buffer)
  - Project Area
  - Exclusion Zones - Environmentally Sensitive Areas
  - Battery Energy Storage System
  - Inverter
  - Substation
  - NSW National Parks
  - NSW State Forests
  - Development Footprint - Amended Project

**FIGURE 4.1**  
**Sensitive Receivers**

For the Goulburn River National Park (R10), given the vastness of the park and available bushwalking area, a receiver point 200 m from the Project Area was adopted for noise prediction purposes.  
For the predictions, the receiver point was located proximity to the substation and BESS (the highest noise emitting source on site)  
Image Source: ESRI Basemap (2022) Data source: NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022); Lightsource BP (2022)

**Table 4.2 Indicative Equipment Quantities and Sound Power Levels**

Plant Item	Quantity	Indicative Sound Power Level per unit, dB(A)	Assumed Utilisation per unit per 15-minute period
<b>Decentralised BESS</b>			
Tracker motor	12,057	74	3% (30 seconds per 15 minutes)
PV Inverters	140	99 (94 dB(A) + 5 dB) <sup>1</sup>	100%
Battery Containers	1120	92	100%
DC BESS Converters	1120	98 (93 dB(A) + 5 dB) <sup>1</sup>	100%
Substation (270 MVA transformer)	2	99 (94 dB(A) + 5 dB) <sup>1</sup>	100%
HVAC (O&M building & control room)	2	70 <sup>2</sup>	100%
Light vehicle	2	89 <sup>2</sup>	100%
<b>Centralised BESS</b>			
Tracker motor	12,057	74	3% (30 seconds per 15 minutes)
PV Inverters	140	99 (94 dB(A) + 5 dB) <sup>1</sup>	100%
Battery Containers	560	92	100%
Substation (270 MVA transformer)	2	99 (94 dB(A) + 5 dB) <sup>1</sup>	100%
HVAC (O&M building & control room)	2	70 <sup>2</sup>	100%
Light vehicle	2	89 <sup>2</sup>	100%

Notes: <sup>1</sup> Includes an assumed +5 dB penalty for tonality.

<sup>2</sup> Assumed sound power level sourced from Umwelt noise source library.

## 4.4 Operational Noise Levels

The noise levels have been predicted under default worst-case meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed) in accordance with the NPfI. For a conservative assessment against the night-time noise goal, it was assumed that all plant and equipment within **Table 4.2**, would be operating concurrently at 100% capacity.

Predicted operational noise levels have been undertaken for the following scenarios:

1. Decentralised BESS (1160 MWh).
2. Centralised BESS (900 MWh).
3. Decentralised plus Centralised BESS (2060 MWh).

The predicted operational noise levels at the identified receivers are presented in **Table 4.3** and shown graphically as noise contours in **Figure 4.2**, **Figure 4.3** and **Figure 4.4**.

**Table 4.3 Predicted Operational Noise Levels, dB(A)**

Rec ID	Predicted Noise Level, LAeq(15 min)			Night-time PNTL, LAeq(15 min)
	Decentralised BESS	Centralised BESS	Decentralised plus Centralised	
<b>R01 (host receiver) <sup>1</sup></b>	52	30	52	-
<b>R02</b>	<20	<20	<20	35
<b>R03</b>	<20	<20	<20	35
<b>R04</b>	<20	<20	<20	35
<b>R05</b>	<20	<20	<20	35
<b>R06</b>	<20	<20	<20	35
<b>R07</b>	<20	<20	<20	35
<b>R08</b>	<20	<20	<20	35
<b>R09</b>	<20	<20	<20	35
<b>R10 <sup>2</sup></b>	36	35	38	53

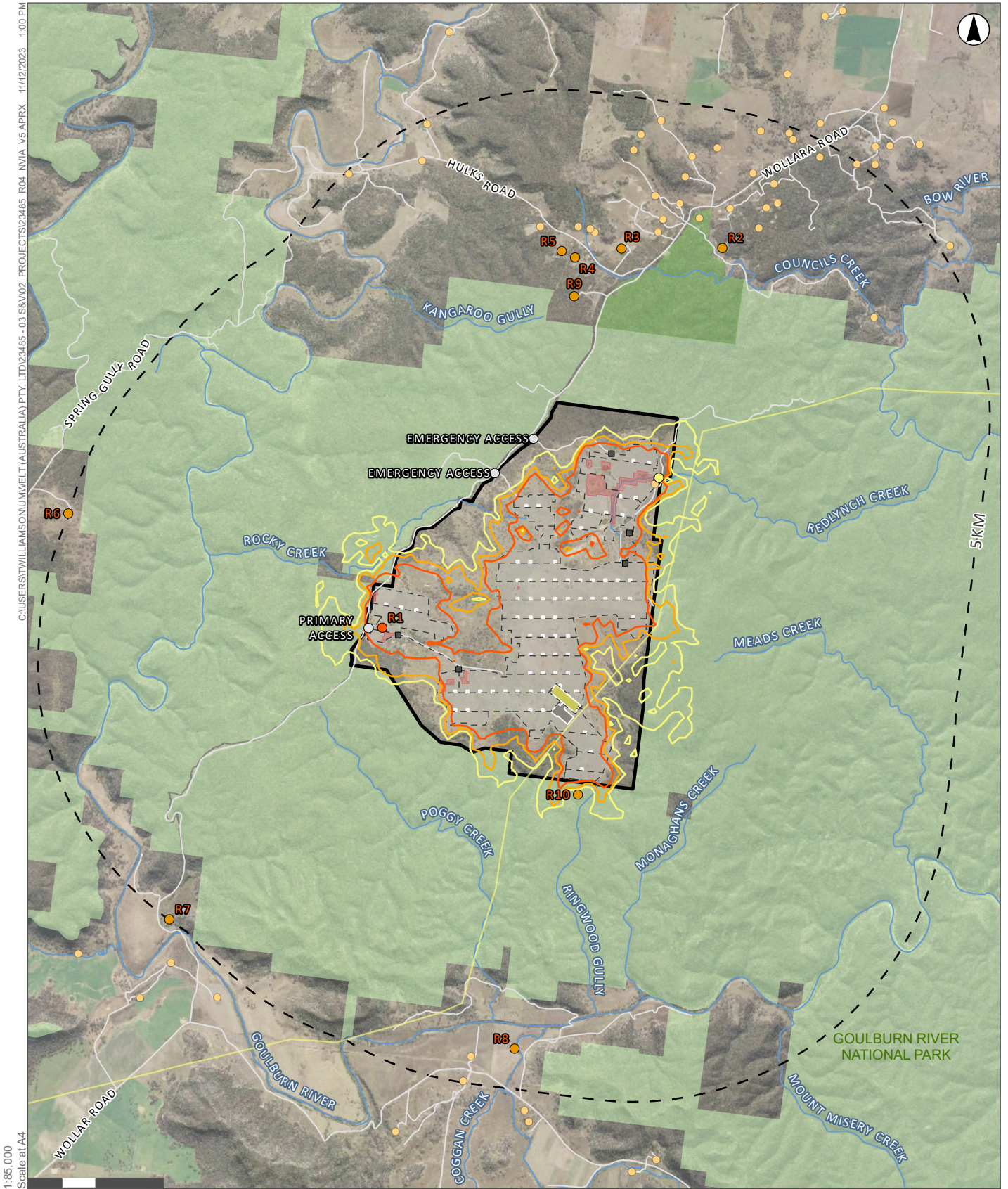
Notes:

<sup>1</sup> Residential receiver R01 is involved in the Project (host receiver) and the PNTLs are not applicable.

<sup>2</sup> This is a worst-case representative location for passive recreational users of the National Park.

<sup>3</sup> Predictions below 20 dB(A) have been presented as <20.





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 Scale at A4

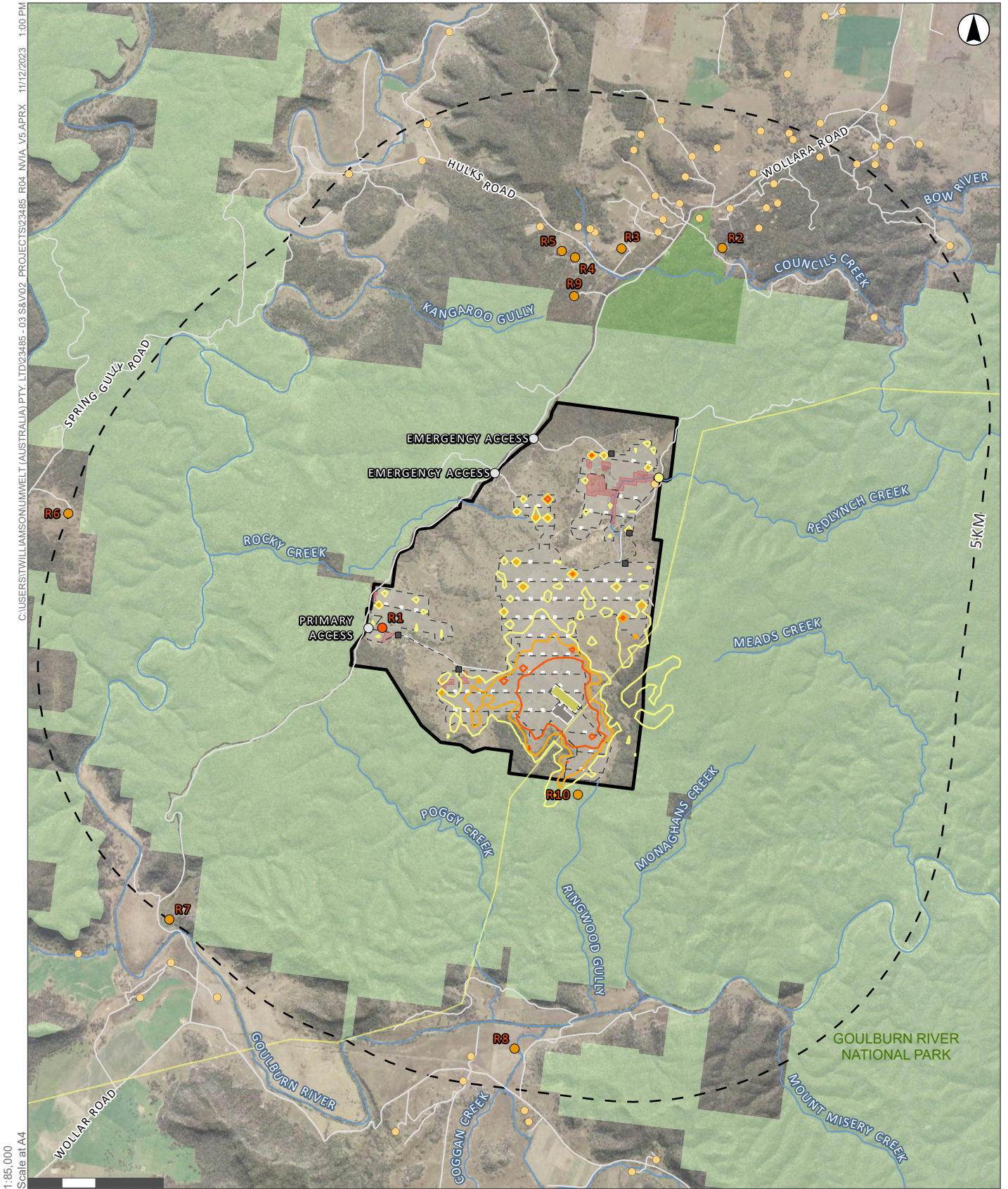
GDA2020 MGA Zone 56

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>● Host Receiver</li> <li>● Sensitive Receiver</li> <li>● Dwelling (abandoned)</li> <li>● Dwellings</li> <li>○ Access Points</li> <li>■ Gate</li> <li>- - Proposed Access Tracks</li> <li>- - Electricity Transmission Line</li> <li>- - Watercourse</li> <li>- - Roads and Tracks</li> </ul> | <ul style="list-style-type: none"> <li>□ Project Area (5km buffer)</li> <li>□ Project Area</li> <li>□ Exclusion Zones - Environmentally Sensitive Areas</li> <li>Name</li> <li>■ BESS - Centralised Option</li> <li>■ Inverter</li> <li>■ Substation</li> <li>■ NSW National Parks</li> <li>■ NSW State Forests</li> <li>■ Development Footprint - Amended Project</li> </ul> | <p><b>Predicted Noise Levels</b></p> <ul style="list-style-type: none"> <li>— 35 dB(A)</li> <li>— 40 dB(A)</li> <li>— 45 dB(A)</li> </ul> |
|---|---|---|

**FIGURE 4.2**

**Decentralised BESS Predicted Operational Noise Levels, LAeq(15 min) dB(A)**

For the Goulburn River National Park (R10), given the vastness of the park and available bushwalking area, a receiver point 200 m from the Project Area was adopted for noise prediction purposes.  
 For the predictions, the receiver point was located proximity to the substation and BESS (the highest noise emitting source on site)  
 Image Source: ESRI Basemap (2022) Data source: NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022); Lightsource BP (2022)



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 Scale at A4

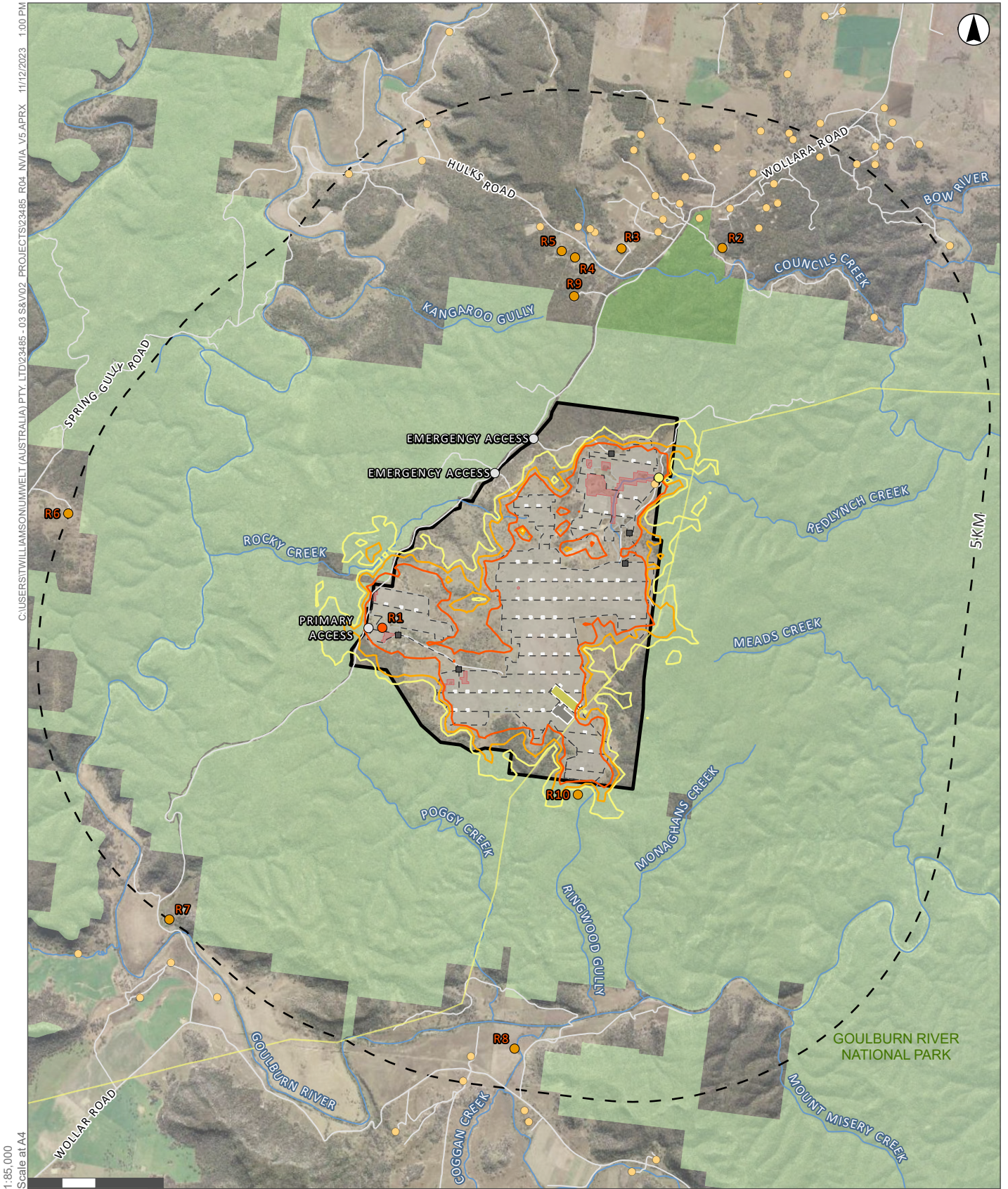
GDA2020 MGA Zone 56

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Host Receiver</li> <li><span style="color: yellow;">●</span> Sensitive Receiver</li> <li><span style="color: orange;">●</span> Dwelling (abandoned)</li> <li><span style="color: yellow;">●</span> Dwellings</li> <li><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Access Points</li> <li><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Gate</li> <li><span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Proposed Access Tracks</li> <li><span style="border-bottom: 1px solid yellow; width: 20px; display: inline-block;"></span> Electricity Transmission Line</li> <li><span style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></span> Watercourse</li> <li><span style="border-bottom: 1px solid grey; width: 20px; display: inline-block;"></span> Roads and Tracks</li> </ul> | <ul style="list-style-type: none"> <li><span style="border: 2px solid black; padding: 2px;"> </span> Project Area (5km buffer)</li> <li><span style="border: 1px solid black; padding: 2px;"> </span> Project Area</li> <li><span style="background-color: #f08080; width: 10px; height: 10px; display: inline-block;"></span> Exclusion Zones - Environmentally Sensitive Areas</li> <li><span style="background-color: #ffff00; width: 10px; height: 10px; display: inline-block;"></span> BESS - Centralised Option</li> <li><span style="background-color: #cccccc; width: 10px; height: 10px; display: inline-block;"></span> Inverter</li> <li><span style="background-color: #808080; width: 10px; height: 10px; display: inline-block;"></span> Substation</li> <li><span style="background-color: #90ee90; width: 10px; height: 10px; display: inline-block;"></span> NSW National Parks</li> <li><span style="background-color: #90ee90; width: 10px; height: 10px; display: inline-block;"></span> NSW State Forests</li> <li><span style="background-color: #cccccc; width: 10px; height: 10px; display: inline-block;"></span> Development Footprint - Amended Project</li> </ul> | <p><b>Predicted Noise Levels</b></p> <ul style="list-style-type: none"> <li><span style="border-bottom: 1px solid yellow; width: 20px; display: inline-block;"></span> 35 dB(A)</li> <li><span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> 40 dB(A)</li> <li><span style="border-bottom: 1px solid red; width: 20px; display: inline-block;"></span> 45 dB(A)</li> </ul> |
|---|--|---|

**FIGURE 4.3**

**Centralised BESS Predicted Operational Noise Levels, LAeq(15 min) dB(A)**

For the Goulburn River National Park (R10), given the vastness of the park and available bushwalking area, a receiver point 200 m from the Project Area was adopted for noise prediction purposes.  
 For the predictions, the receiver point was located proximity to the substation and BESS (the highest noise emitting source on site)  
 Image Source: ESRI Basemap (2022) Data source: NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022); Lightsource BP (2022)



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- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Host Receiver</li> <li><span style="color: yellow;">●</span> Sensitive Receiver</li> <li><span style="color: orange;">●</span> Dwelling (abandoned)</li> <li><span style="color: yellow;">●</span> Dwellings</li> <li><span style="border: 1px solid black; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> Access Points</li> <li><span style="border: 1px solid black; width: 10px; height: 10px; display: inline-block;"></span> Gate</li> <li><span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Proposed Access Tracks</li> <li><span style="border-bottom: 1px solid yellow; width: 20px; display: inline-block;"></span> Electricity Transmission Line</li> <li><span style="border-bottom: 1px solid blue; width: 20px; display: inline-block;"></span> Watercourse</li> <li><span style="border-bottom: 1px solid grey; width: 20px; display: inline-block;"></span> Roads and Tracks</li> </ul> | <ul style="list-style-type: none"> <li><span style="border: 2px dashed black; width: 20px; height: 20px; display: inline-block;"></span> Project Area (5km buffer)</li> <li><span style="border: 2px solid black; width: 20px; height: 20px; display: inline-block;"></span> Project Area</li> <li><span style="background-color: #f08080; width: 20px; height: 10px; display: inline-block;"></span> Exclusion Zones - Environmentally Sensitive Areas</li> <li>Name</li> <li><span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span> BESS - Centralised Option</li> <li><span style="background-color: grey; width: 20px; height: 10px; display: inline-block;"></span> Inverter</li> <li><span style="background-color: #cccccc; width: 20px; height: 10px; display: inline-block;"></span> Substation</li> <li><span style="background-color: #90ee90; width: 20px; height: 10px; display: inline-block;"></span> NSW National Parks</li> <li><span style="background-color: #90ee90; width: 20px; height: 10px; display: inline-block;"></span> NSW State Forests</li> <li><span style="background-color: #cccccc; width: 20px; height: 10px; display: inline-block;"></span> Development Footprint - Amended Project</li> </ul> | <p><b>Predicted Noise Levels</b></p> <ul style="list-style-type: none"> <li><span style="border-bottom: 1px solid yellow; width: 20px; display: inline-block;"></span> 35 dB(A)</li> <li><span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> 40 dB(A)</li> <li><span style="border-bottom: 1px solid red; width: 20px; display: inline-block;"></span> 45 dB(A)</li> </ul> |
|---|---|---|

**FIGURE 4.4**

**Decentralised plus Centralised BESS  
Predicted Operational Noise Levels,  
L<sub>Aeq</sub>(15 min) dB(A)**

For the Goulburn River National Park (R10), given the vastness of the park and available bushwalking area, a receiver point 200 m from the Project Area was adopted for noise prediction purposes.  
 For the predictions, the receiver point was located proximity to the substation and BESS (the highest noise emitting source on site)

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022); Lightsource BP (2022)

## 5.0 Construction Traffic Noise Assessment

### 5.1 Barnett Street Vehicle Turning Area

The following assumptions have been applied in evaluating the potential traffic noise impacts from the Barnett Street vehicle turning area:

- Given existing traffic volume along the Golden Highway (Average Annual Daily Traffic (AADT) 3,810 vehicles [ref: TfNSW 2007 Station ID 92456]), Project related traffic noise impacts at receivers located along the highway are anticipated to be negligible.
- The existing traffic volumes for Ringwood Road/Wollara Road have been derived from local traffic counts conducted in 2022, as provided in the Traffic Impact Assessment (Turnbull Engineering, 2022).
- According to the Turnbull Engineering traffic report *Goulburn River Solar Farm – Traffic and Transport Impact Assessment, Revision 10* (TTIA), the predicted daily traffic generated during peak construction will be 60 light vehicles (120 movements), 15 shuttle buses (30 movements) and 55 heavy vehicles (110 movements).
- According to the Traffic Impact Assessment, all standard project construction vehicles including light vehicles, shuttle buses and heavy vehicles are anticipated to originate from the Golden Highway east of Ringwood Road.
- The following assumptions in relation to traffic movements have been made:
  - No project related construction vehicles are anticipated to utilise Barnett Street turning area during the night period (i.e., prior to 7.00 am and after 10.00 pm).
  - The majority of daily Project-related light-vehicle movements and shuttle buses will utilise the Barnett Street turning area when egressing the site (i.e., 5.30 pm to 6.30 pm). A with a worst-case assumption that 50% of the daily movements would occur during any given hour. The shuttle buses for construction workers have been assessed as heavy vehicles.
  - Daily Project-related heavy-vehicle movements will be spread evenly throughout the day (i.e., averaged on an hourly basis).
  - There are negligible existing traffic movements along Barnett Street that are not associated with the operations of Receiver R11.
  - For the purposes of this assessment, Barnett Street has been classified as a local road with a daytime assessment criterion of 55 LAeq(1hr).
  - A Barnett Street traffic speed of 40 km/h has been adopted.

The nearest and potentially most affected receiver is Receiver R11 (6210-6212 Golden Highway, Merriwa). The nearest residential building located on this property is located approximately 120 metres from the Barnett Street turning area and is shown on **Figure 5.1**. The Receiver is a private residence and an agricultural operation.



**FIGURE 5.1**  
Sensitive Receiver – Barnett Street Traffic Noise Assessment

Based on the above inputs and assumptions, the indicative construction-related traffic volumes adopted for the noise assessment are presented in **Table 5.1**.

**Table 5.1 Indicative Construction Related Traffic Volumes**

Road	Period	Parameter	Existing traffic volume (without Project) <sup>1</sup>	Project Related traffic volume <sup>2</sup>	Combined traffic volume (Existing + Project)
Barnett Street	Day LAeq(1 hour)	Light Vehicles	0	60	60
		Heavy Vehicles	0	24 <sup>3</sup>	24
		Total	0	84	84

Notes: <sup>1</sup> Assumed to be negligible.

<sup>2</sup> Based on the Traffic Impact Assessment.

<sup>3</sup> The shuttle buses for construction workers have been assessed as heavy vehicles.

Road traffic noise calculations were performed with CadnaA (Version 2023), using the Calculation of Road Traffic Noise (CoRTN) algorithms.

Based upon the traffic volumes in **Table 5.1**, the predicted traffic noise levels for the nearest receiver located along Barnett Street is shown in **Table 5.2**.

**Table 5.2 Predicted Traffic Noise levels, LAeq, dB(A)**

Receiver	Time Period	RNP criteria	Combined traffic noise levels	Comply / Exceed
6210-6212 Golden Highway, Merriwa	Day LAeq(1 hour)	55 <sup>1</sup>	44	Complies

Notes: <sup>1</sup> The road noise from Barnett Street has been assessed against the LAeq,1hour daytime criterion for a Local Road.

As shown in **Table 5.2** the construction traffic noise levels are predicted to comply with the criteria. In accordance with the RNP the Project construction traffic noise is predicted to be acceptable and have minor impact. Further, as indicated in the Amendment Report, consent has been received from the adjacent private landowners for the intended use of the turnaround facility.

## 6.0 Cumulative Assessment

Consistent with Section 8 of the EIS NVIA 2023, cumulative noise impacts from existing and approved projects in the area are not anticipated.

## 7.0 Conclusion

This addendum report to the previously prepared Umwelt report, *Goulburn River Solar Farm Noise and Vibration Impact Assessment, Final*, dated April 2023 (EIS NVIA 2023) was prepared to address the amendments to the Project outlined in **Section 2.0** of the proposed Goulburn River Solar Farm located near Merriwa, NSW.

Potential construction noise and vibration impacts from the road upgrades have been assessed in accordance with the *Interim Construction Noise Guideline* (ICNG, 2009). Construction noise levels were predicted to exceed the established NMLs at some receivers. Noise and vibration mitigation measures and strategies are consistent with that provided in the EIS NVIA 2023.

Potential operational noise levels have been assessed in accordance with the *Noise Policy for Industry* (NPfI, 2017). This addendum found that the Project is expected to comply with the applicable day, evening and night-time noise limits at nearby sensitive receivers not involved with the Project. Therefore, no additional noise mitigation is anticipated to be required for the operation of the Project.

Construction-related road traffic noise associated with the Barnett Street vehicle turning area has been assessed and was found to comply at the nearest most potentially affected dwelling. In accordance with the RNP, the Project construction traffic noise is predicted to be acceptable and have minor impact.

Cumulative noise impacts from existing and approved projects in the area are not anticipated due to large separation distances and therefore comply with the NPfI requirements.



