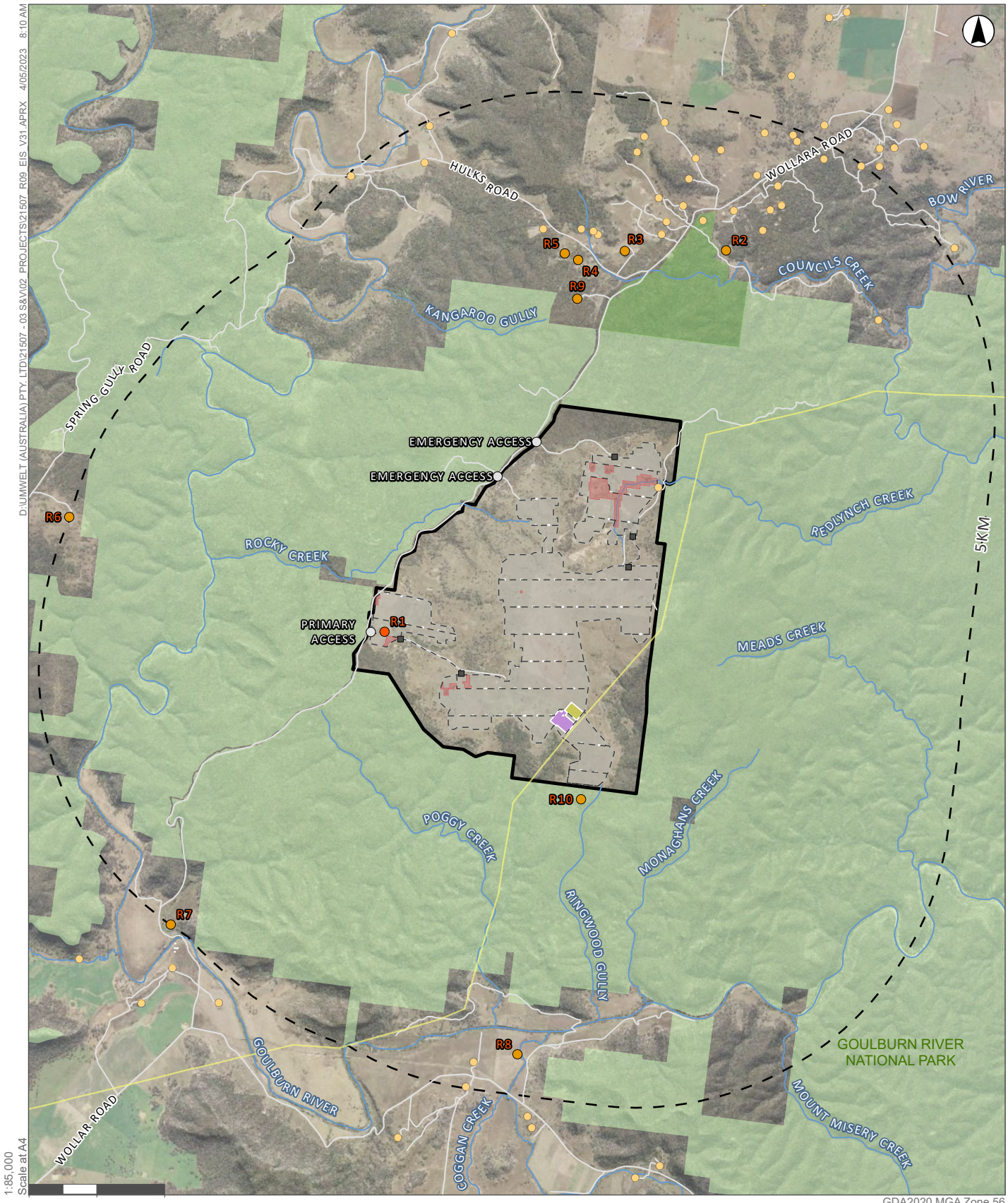


Legend

- Host Receiver
- Sensitive Receiver (within 5km, identified in Noise Assessment)
- 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
- Substation
- Inverters
- NSW National Parks
- NSW State Forests
- Development Footprint

FIGURE 6.17

Sensitive Receivers (Noise)

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)

6.8.2 Noise and Vibration Criteria

6.8.2.1 Construction Noise

Assessment levels for noise from construction activities, excluding noise from construction-related traffic on public roads, are defined in the ICNG (refer to **Table 6.17**). The Construction Noise Management Levels (NMLs) for sensitive receivers, which are based on the adopted minimum background noise levels, are summarised in **Table 6.17**.

Table 6.17 Construction Noise Management Levels

Receiver	Noise Management Levels (NML), dB(A) – Standard Hours of Construction[4]: Noise Affected $L_{Aeq(15\ min)}$	Noise Management Levels (NML), dB(A) – Standard Hours of Construction[4]: Highly Noise Affected $L_{Aeq(15\ min)}$	Noise Management Levels (NML), dB(A) – Outside Standard Hours[4]: Noise Affected $L_{Aeq(15\ min)}$
All Residences[5]	45	75	40 (day) 35 (night)
Passive Recreation	60	-[6]	60

6.8.2.2 Construction Vibration

Criteria for vibration impacts on building structures recommended in the DEC's *Assessing Vibration: A Technical Guideline* (the vibration guideline) are based on British Standard *BS7385 (1993) Part 2 Evaluation and measurement of vibration in buildings* (BS7385). The criteria in BS7385 are given in terms of peak component vibration velocity values from transient (impulsive) vibration events. The criteria for continuous vibration are recommended to be 50% lower than for impulsive vibration.

Historic heritage assessments have confirmed that there are no listed heritage items within, or in close proximity to, the Project Area, therefore the vibration criteria for the protection of structures and buildings from cosmetic damage (e.g. hairline cracks in drywalls, etc.) are applicable (rather than more stringent criteria for heritage buildings) (refer to **Table 6.18** below). Due to the large separation distances between the Project Area and the nearest sensitive receivers (i.e. approximately 3 km), human annoyance from vibration-inducing construction equipment/activities is anticipated to be negligible and is not addressed further in the NVIA.

The original Slab Hut identified in the Historical Heritage Assessment (refer to **Section 6.7**) was assessed as a heritage structure that can be more sensitive to vibration impacts than modern structures. The minimum distance of proposed infrastructure and machinery is 20 m from the original Slab Hut.

[4] ICNG recommended standard construction hours: Monday to Friday 7.00 am–6.00 pm; Saturday 8.00 am–1.00 pm.
[5] Residential receiver R01 is an 'involved' residence and the NMLs are not applicable.
[6] Highly noise affected criteria not applicable for non-residential receivers.

Table 6.18 BS 7385 Vibration Criteria for Cosmetic Damage to Structures

Type of Structure	Peak Component Particle Velocity (mm/s): 4 Hz–15 Hz	Peak Component Particle Velocity (mm/s): 15 Hz–40 Hz	Peak Component Particle Velocity (mm/s): 40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 (transient (impulsive) vibration) 25 (continuous vibration)	50 (transient (impulsive) vibration) 25 (continuous vibration)	50 (transient (impulsive) vibration) 25 (continuous vibration)
Un-reinforced or light framed structures Residential or light commercial type buildings	15–20 (transient (impulsive) vibration) 7.5–10 (continuous vibration)	20–50 (transient (impulsive) vibration) 10–25 (continuous vibration)	50 (transient (impulsive) vibration) 25 (continuous vibration)

6.8.2.3 Operational Noise

The operational noise criteria applicable to the Project have been derived in accordance with the NPfI, based on adopted background noise levels presented in **Section 6.8.1**.

The NPfI sets out two noise criteria to assess the potential noise impacts resulting from industrial activity. The first is used to control short-term intrusive noise and its impacts on residences whilst the second is used to protect against cumulative noise impacts and maintain noise level amenity for particular land uses including residences.

The Project Noise Trigger Levels (PNTLs) derived in accordance with the NPfI are the lower (that is, the more stringent) values of the Project Intrusiveness Noise Level (PINL) and Project Amenity Noise Level (PANL) in terms of $L_{Aeq(15\ minute)}$ noise levels. Applying the more stringent of the two as the PNTL ensures that intrusive noise is limited, and amenity is protected and that no single industry can unacceptably change the noise level of an area.

The PNTLs provide a benchmark or objective for assessing a proposal or site. They are not intended for use as a mandatory requirement. The PNTL is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The PNTL, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. The PNTLs are shown in **Table 6.19**.

Table 6.19 Project Noise Trigger Levels – Residential Receivers, $L_{Aeq(15\ minute)}$, dB(A)

Receiver	Time of day[7]	PINL	PANL	PNTL
All residential receivers[8]	Day	40	53	**40**
All residential receivers[8]	Evening	35	48	**35**
All residential receivers[8]	Night	35	43	**35**
Passive recreation area	When in use	-	53	**53**

[7] 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.

[8] Residential receiver R01 is an 'involved' residence and the PNTLs are not applicable.

6.8.2.4 Road Traffic Noise Criteria

An assessment for potential noise levels from Project related traffic on Ringwood/Wollara Road is required. The NSW *Road Noise Policy* (RNP) (DECCW, 2011) sets out criteria for road traffic noise through the provision of a framework that addresses traffic noise issues associated with new developments, new or upgraded road developments, or planned building developments. Based on functionality, Ringwood Road/Wollara Road is classified as a sub-arterial road. **Table 6.20** outlines the road traffic noise criteria for residential land uses along Ringwood Road/Wollara Road.

Table 6.20 Road Traffic Noise Assessment Criteria for Residential Land Uses

Road Category	Type of Project/Land Use	Assessment Criteria dB(A): Day 7 am to 10 pm	Assessment Criteria dB(A): Night 10 pm to 7 am
Freeway/ arterial/ sub-arterial road	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	LAeq,(15 hour) 60 (external)	LAeq,(9 hour) 55 (external)

6.8.3 Methodology

Prediction of the construction and operational noise levels was undertaken with the proprietary computer noise modelling software CadnaA (Version 2021 MR 2), using the CONCAWE noise prediction algorithms.

The CadnaA software is approved for use by the DPE and EPA. The software utilises terrain data, source and receptor locations and heights, source sound power levels (in octave or 1/3 octave frequency bands) and input meteorological conditions to predict noise levels. The CONCAWE prediction method accounts for the influence of noise propagation from atmospheric temperature, atmospheric relative humidity, wind speed, wind direction and Atmospheric Pasquill Stability Class (for defining the presence and strength of temperature inversions).

Construction noise impacts were predicted based on several construction activity scenarios and associated plant and equipment. Operational noise impacts were predicted based on indicative sound power level data provided by Lightsource bp for the proposed equipment.

The construction activities will broadly include the following scenarios:

1. Site establishment and civil works.
2. Piling and foundations.
3. Assembly of all equipment (trackers, inverters, modules, balance of system).
4. Underground cabling.
5. Commissioning.
6. Site rehabilitation, removal of temporary construction facilities.

Noting that it is likely that some of these activities may occur simultaneously through the progression of the construction program. Further details for all modelling scenarios, including indicative equipment quantities and sound power levels, are provided in the NVIA in **Appendix 14**.

6.8.4 Assessment of Impacts

6.8.4.1 Construction Noise

Construction noise levels have been predicted for six indicative construction scenarios under default worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed) in accordance with the NPfI (refer to the NVIA in **Appendix 14** for detailed equipment schedules). The predictions are conservative and assume all equipment associated with each scenario is operating simultaneously at the closest point within the Development Footprint to the respective residential receiver location. 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 precise location on site.

Results for each construction scenario (1 to 6) for the identified receivers are presented in **Table 6.21**. The predicted noise level contours for the worst-case scenario (Scenario 1) are presented graphically in **Figure 6.19**.

Table 6.21 Predicted Construction Noise Levels, dB(A)[9]

Receiver ID	Noise Management Level, LAeq(15 min): Standard Hours	Noise Management Level, LAeq(15 min): Outside Standard Hours	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 1	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 2	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 3	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 4	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 5	Construction Scenario Noise Prediction, LAeq(15 min): Scenario 6
R01[10]	-	-	61	59	57	54	54	54
R02	45	40	<20	<20	<20	<20	<20	<20
R03	45	40	31	29	27	24	24	24
R04	45	40	31	29	27	24	24	24
R05	45	40	30	28	26	23	23	23
R06	45	40	24	22	20	<20	<20	<20
R07	45	40	<20	<20	<20	<20	<20	<20
R08	45	40	<20	<20	<20	<20	<20	<20
R09	45	40	27	25	23	<20	<20	<20
R10	60	30	52	50	48	45	45	45

[9] Predictions below 20 dB(A) have been presented as <20.
[10] Residential receiver R01 is an 'involved' residence and the Noise Management Levels are not applicable.

The construction noise levels are predicted to comply with the daytime noise management levels at all sensitive receivers not involved with the Project. Nevertheless, reasonable and feasible noise mitigation and management strategies have been provided in **Section 6.8.6**. Whilst it is not essential to adopt these measures, in accordance with the ICNG, it is considered best practice to minimise construction noise as much as possible.

6.8.4.2 Construction Vibration

Construction vibration impacts have been assessed with reference to the criteria provided in **Table 6.18**, and using the recommended safe working distances provided in Table 2 of the NSW Construction Noise and Vibration Guideline (CNVG) (RMS, 2016) as a guide (refer to Table 5.3 in the NVIA in **Appendix 14**). Due to the large separation distances between the Project and the involved sensitive receivers (i.e. approximately 3 km), vibration impacts from construction activities are anticipated to be negligible.

6.8.4.3 Road Upgrades Construction Noise and Vibration Assessment

Road Upgrades are proposed outside of the Project Area, the following works are proposed:

- **Work Area 1** – Culvert upgrade along Ringwood Road at Bow River.
- **Work Area 2** – Road repairs along Ringwood Road – 1.8 km section to be widened and resealed between Bow River and Killoe Creek.
- **Work Area 3** – Culvert upgrades along Ringwood Road at Killoe Creek.

Construction noise levels have been predicted for five construction scenarios under default worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed) in accordance with the NPfI (refer to the NVIA in **Appendix 14** for detailed equipment schedules). Results for each construction scenario (7 to 11) for the identified receivers are presented in **Table 6.25**.

The construction noise levels are predicted to exceed the noise management levels 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)) including:

- For work Area 1 exceedances were predicted at R11 and R15 of up to 8 dB(A).
- For work Area 2, exceedances of up to 28 dB(A), 15 dB(A) and 27 dB(A) were respectively predicted at R11, R14 and R15.
- For work Area 3, exceedances of up to 10 dB(A) were predicted at R14.

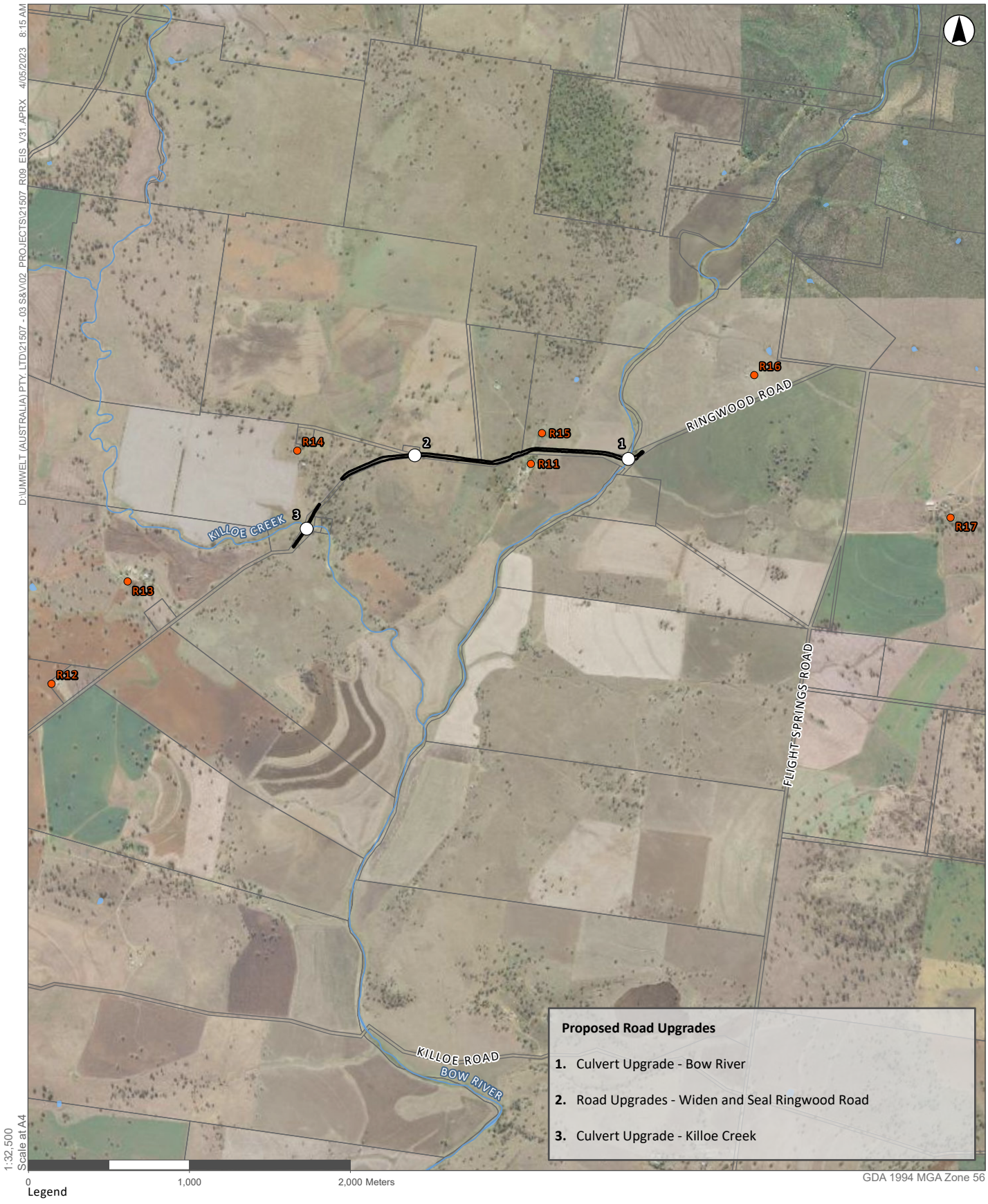


FIGURE 6.18

Road Upgrade Work Areas and Sensitive Receivers

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

Table 6.22 Predicted Construction Noise Levels, dB(a)[11]

Receiver ID	Noise Management Level LAeq(15 min): Standard Hours	Construction Scenario Noise Prediction LAeq(15 min): Work Area 1 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 1 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 1 – Sc.11	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.11	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.11
R11	45	47	44	43	**67**	n/a	**63**	<20	<20	<20
R12	45	<20	<20	<20	29	n/a	25	24	21	20
R13	45	<20	<20	<20	37	n/a	33	35	32	31
R14	45	<20	<20	<20	**54**	n/a	**50**	**49**	**46**	45
R15	45	**47**	44	43	**66**	n/a	**62**	<20	<20	<20
R16	45	33	30	29	36	n/a	32	<20	<20	<20
R17	45	20	<20	<20	21	n/a	<20	<20	<20	<20

[11] Predictions below 20 dB(A) have been presented as <20, Receivers outside of the assessment area have been excluded from this table.

Table 6.23 Predicted Construction Noise Levels, dB(a)[11] Includes high noise emitting plant (i.e., tub grinder, chainsaw, rock hammers, jackhammer and concrete saws

Receiver ID	Noise Management Level LAeq(15 min): Standard Hours	Construction Scenario Noise Prediction LAeq(15 min): Work Area 1 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 1 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 1 – Sc.11	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 2 – Sc.11	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.7, 8 & 10	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.9	Construction Scenario Noise Prediction, LAeq(15 min): Work Area 3 – Sc.11
R11	45	**53**[12]	**49**	n/a	**73**	n/a	n/a	24	20	n/a
R12	45	21	<20	n/a	35	n/a	n/a	30	26	n/a
R13	45	21	<20	n/a	43	n/a	n/a	41	37	n/a
R14	45	23	<20	n/a	**60**	n/a	n/a	**55**	**51**	n/a
R15	45	53	**49**	n/a	**72**	n/a	n/a	24	20	n/a
R16	45	39	35	n/a	42	n/a	n/a	<20	<20	n/a
R17	45	26	22	n/a	27	n/a	n/a	20	<20	n/a

[12] Predicted exceedances are in **bold**.

6.8.4.4 Operational Noise

Operational noise levels were 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 would be operating concurrently at 100% capacity.

The predicted operational noise levels at the identified receivers are presented in **Table 6.24** and shown graphically as noise contours in **Figure 6.20**.

Table 6.24 Predicted Operational Noise Levels, dB(A)[13]

Receiver ID	Night-time PNTL, LAeq(15 min)	Predicted Noise Level, LAeq(15 min)
R01 [14]	-	46
R02	35	<20
R03	35	<20
R04	35	<20
R05	35	<20
R06	35	<20
R07	35	<20
R08	35	<20
R09	35	<20
R10 [15]	53	38

The operational noise levels are predicted to comply with the day, evening and night-time noise limits at all nearby sensitive receivers not involved with the Project. Therefore, no additional noise mitigation is anticipated to be required for the operation of the Project.

[13] Predictions below 20 dB(A) have been presented as <20.
[14] Residential receiver R01 is an 'involved' residence and the PNTLs are not applicable.
[15] This is a worst-case representative location for passive recreational users of the National Park.

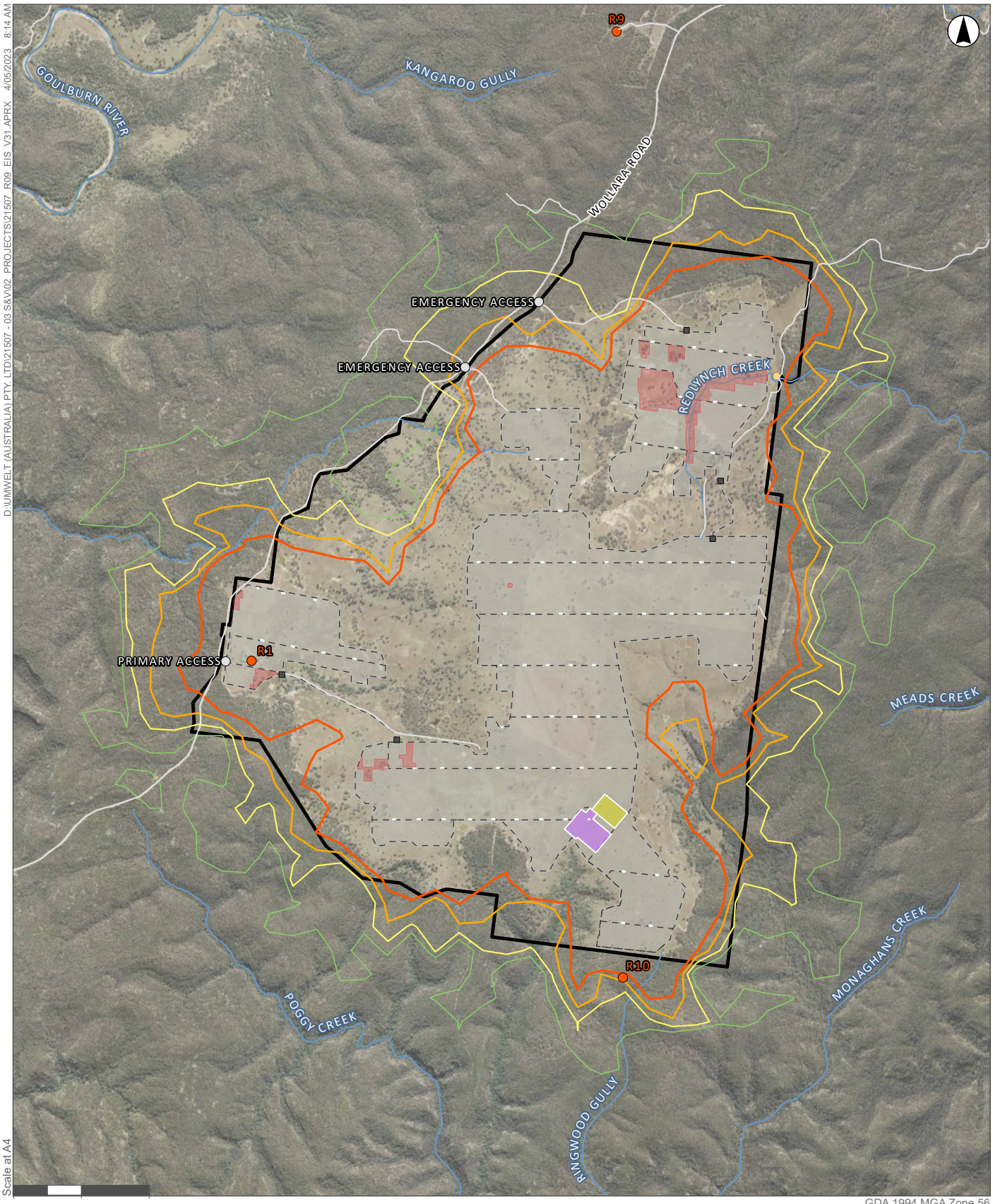
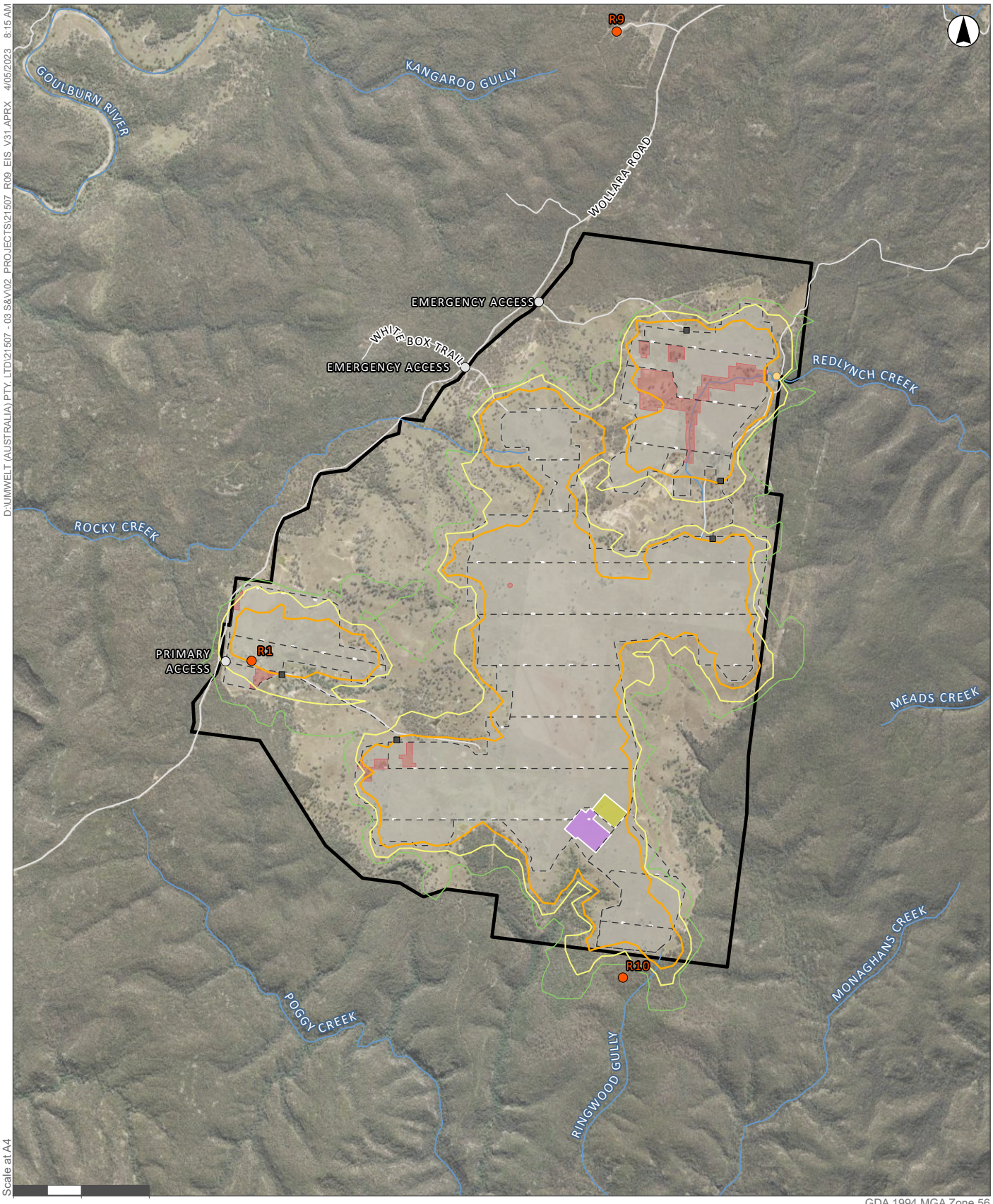


FIGURE 6.19

Predicted Construction Noise Levels - Scenario 1

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



Legend

- Dwelling (abandoned)
- Sensitive Receivers
- Gate
- Access Points
- Proposed Access Tracks
- Roads and Tracks
- Watercourse

Predicted Noise Levels

- Noise Contour Level 35 dB(A)
- Noise Contour Level 40 dB(A)
- Noise Contour Level 45 dB(A)

- Project Area
- Exclusion Zones - Environmentally Sensitive Areas
- Battery Energy Storage System
- Substation
- Inverters
- Development Footprint

FIGURE 6.20

Predicted Operational Noise Levels

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

6.8.4.5 Road Traffic Noise

Construction material and equipment would typically be transported by road from the Port of Newcastle, via the Golden Highway and Ringwood Road/Wollara Road to the Project Area. The nearest and potentially most affected receiver for road traffic noise has been identified as 549 Ringwood Road (R11) which is located approximately 70 metres from the carriageway of Ringwood Rd/Wollara Rd.

Road traffic noise calculations were performed with CadnaA (Version 2021 MR 2), using the Calculation of Road Traffic Noise (CoRTN) algorithms. Based upon the traffic volumes and assumptions provided in the Traffic and Transport assessment in **Section 6.9**, the predicted traffic noise levels for the nearest receiver are shown in **Table 6.25**.

Table 6.25 Predicted Traffic Noise levels 549 Ringwood Road, L_{Aeq}, dB(A)

Time Period	RNP criteria	Existing traffic noise levels	Combined traffic noise levels	Noise Level Change	Comply/ Exceed
Day LAeq(15 hour) (7.00 am–10.00 pm)	60	45	50	N/A[16]	Complies
Night LAeq(9 hour) (10.00 pm–7.00 am)	55	34	44	N/A[16]	Complies

As shown in **Table 6.25**, the construction traffic noise levels associated with the Project 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.

Operational traffic movements are expected to be minimal (up to 10 two-way vehicle trips per day), therefore road traffic noise from operational traffic is anticipated to be negligible and was not further assessed.

6.8.5 Cumulative Noise Impacts

There are three open cut coal mines and 14 existing and proposed renewable energy projects located within the vicinity of the Project Area. There are also 14 existing and proposed renewable energy projects located within the vicinity of the Project Area. Wollar Solar Farm and Wilpinjong Mine are the closest, located approximately 16 km south-west of the Project Area. Others include Merriwa Solar Farm located 25 km east of the Project Area (also known as Merriwa Energy Hub), Stubbo Solar Farm, Beryl Solar Farm, Tallawang Solar Farm, Barneys Reef Wind Farm, Birrawa Solar Farm and Dunedoo Solar Farm but these are located greater than 45 km west of the Project Area.

The significant separation distances mean that these other projects and operations would not contribute acoustically to the established noise criteria and noise management levels of the sensitive receivers in proximity to the Project Area.

[16] Change in noise level assessment is not applicable if the predicted noise level is below the noise limit.

Furthermore, in regard to operational noise, as specified in the NPfI, where a PANL which is set 5 dB below the recommended amenity noise level can be met, no additional consideration of cumulative industrial noise is required. Based on the noise predictions in **Table 6.24**, the Project can readily achieve the PANL minus 5 dB.

Therefore, no cumulative noise impact is anticipated due to the construction and operation of the Project and any surrounding developments.

6.8.6 Management and Mitigation Measures

The construction noise levels for the road upgrades on Ringwood Road are predicted to exceed the nominated noise management levels (R11, R14 and R15). A draft Construction Noise and Vibration Management Plan for the road upgrades has been prepared and is provided in **Appendix 14**.

The construction noise levels for the Solar Farm and BESS are predicted to comply with the nominated noise management levels. Whilst it is not essential to adopt the below measures, in accordance with the ICNG, it is considered best practice to minimise construction noise as much as possible. The vibration measures should be considered for identified structures within the Project Area.

6.8.6.1 Construction Noise

A draft Construction Noise and Vibration Management Plan for the road upgrades has been prepared and is provided in **Appendix 14**. This will be updated (as required) prior to commencement of construction and form part of the CEMP for the Project.

A Noise and Vibration Management Plan (NVMP) for the Solar Farm will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the ICNG and identify:

- All potential significant noise and vibration generating activities associated with the Project.
- Feasible and reasonable mitigation measures to be implemented.
- A monitoring program to assess performance against relevant noise and vibration criteria.
- Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures.
- Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.
- All sensitive receivers likely to be affected should be notified at least 7 days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact.
  The notification should include:
  - Details of the Project.
  - The construction period and construction hours.
  - Contact information for project management staff.
  - Complaint and incident reporting.
  - How to obtain further information.

- All employees, contractors and subcontractors are to receive an environmental induction. The induction must include at a minimum, all applicable mitigation measures; hours of works; any limitations on high noise-generating activities; location of nearest sensitive receivers; designated parking areas; relevant approval conditions and incident procedures.
- Contractors should keep noise to a minimum, including limiting the use of loud stereos/radios, shouting on site and car door slams.
- Where practical, no dropping of materials from height or throwing of metal items.
- The noise levels of plant and equipment should have operating sound power levels consistent with those nominated in the NVIA.
- Noise emitting plant to be directed away from sensitive receivers and to be throttled down or shut down when not in use.
- Non-tonal reversing beepers could be fitted and used on construction vehicles and mobile plant used regularly on site and for any out of hours work.
- Limit the use of engine compression brakes.
- Where feasible and reasonable, work generating high noise and/or vibration should be scheduled during less sensitive time periods.

6.8.6.2 Construction Vibration

- In the unlikely event that any vibration-generating equipment would be used within the recommended safe working distances nominated in **Table 6.18**, the following is recommended:

- An independent specific structural assessment is undertaken on the structure to ascertain the structural integrity and its ability to withstand vibration, and establishment of an appropriate vibration criterion.
- A dilapidation survey is undertaken on the structure prior to works commencing, and regular inspection of the structure throughout the construction activities.
- Site specific vibration minimum working distances are established for the nominated equipment on site.
- Where appropriate, continuous vibration monitoring is conducted on the structure for the duration of the period of construction while vibration generating equipment is used. The vibration logger should be equipped with the facility to remotely alert the site to reduce or cease construction activities if vibration levels are approaching the criterion threshold.

6.9 Traffic and Transport

A Traffic and Transport Impact Assessment (TTIA) (2023, refer to **Appendix 15**) has been prepared for the Project by Turnbull Engineering Pty Ltd (Turnbull) to assess the existing transport network conditions and the anticipated Project impacts during construction and operation. The TTIA addresses the requirements of the SEARs with respect to traffic and transport, as listed below:

- An assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation.
- An assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance.
- A cumulative impact assessment of traffic from nearby developments.
- Details of measures to mitigate and/or manage potential impacts including a schedule of all required road repairs, road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities.

The TTIA also addresses the additional requirements of Transport for NSW (TfNSW), as detailed in correspondence with DPE dated 19 January 2022, refer to **Appendix 15**.

A copy of the TTIA is provided in **Appendix 15** with key outcomes summarised in the sections below.

6.9.1 Existing Transport Network

6.9.1.1 Roads

Project access routes for light and heavy vehicles include the Golden Highway, Ringwood Road, Wollara Road and Wollar Road (refer to **Figure 6.21**). Heavy and oversized vehicles would be limited to accessing the site from the north while light vehicles and shuttle buses would access the site from both the north and south from surrounding regional towns with a preference of entering from the north.

Major solar and battery components would be delivered to the site by truck via the Hunter Expressway, New England Highway, Golden Highway, Ringwood Road and Wollara Road. Three site access points are proposed on Wollara Road as shown **Figure 6.21**, with the southern access point providing the primary site access and the northern two providing emergency access only.

Classifications and descriptions of key access roads are provided in **Table 6.26** below.

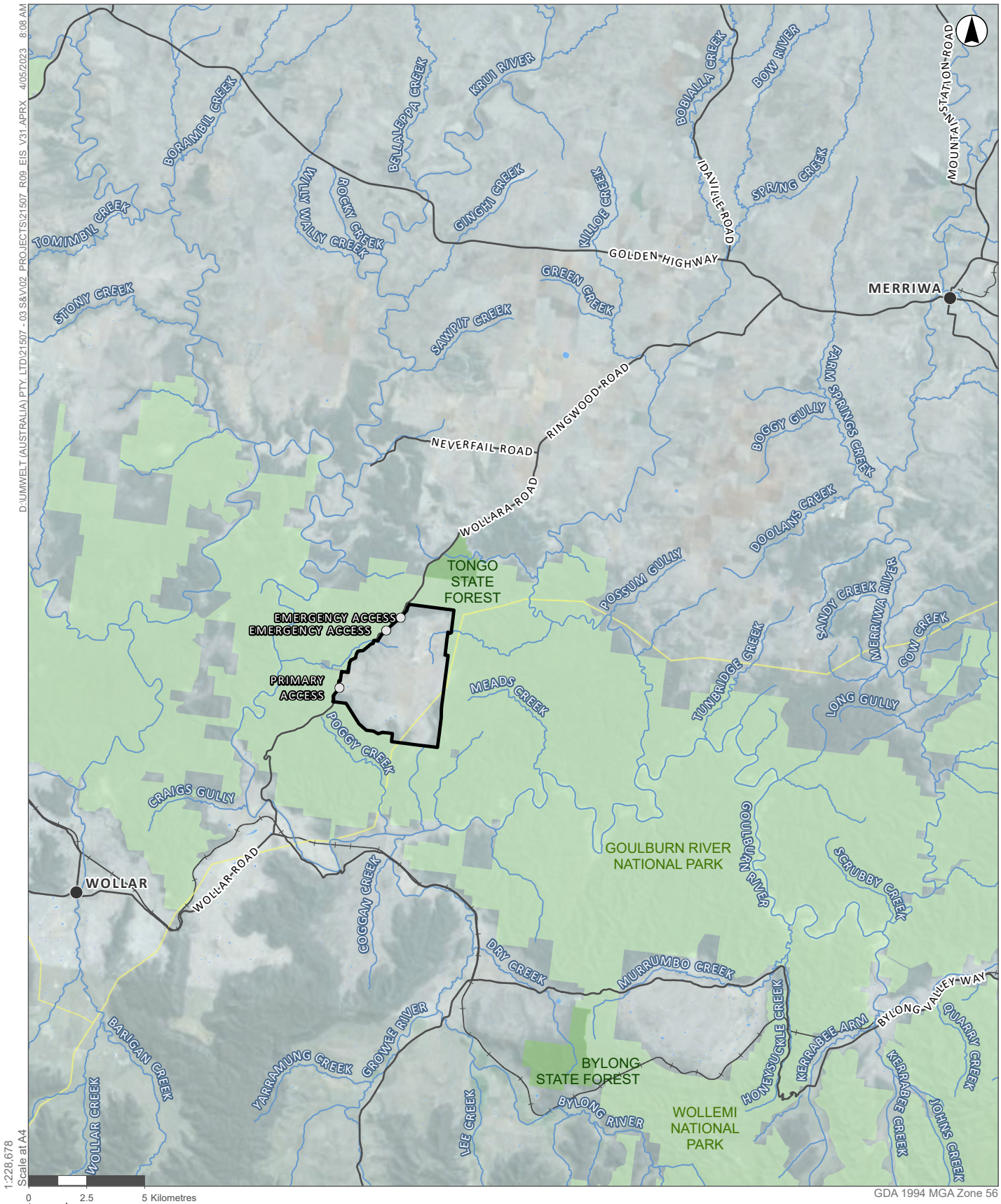


FIGURE 6.21

Road Network and Site Access

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

Table 6.26 Key Roads

Road Name	Classification	Description
Golden Highway	State Road (B84)	• Key east-west arterial connector linking the New England Highway (between Branxton and Singleton) to the Newell Highway at Dubbo, passing through Denman, Merriwa and Dunedoo. • Two-lane, undivided sealed road with varying shoulder widths and formations. • Posted speed limit of 100 km/h. • Approved B-double route subject to a long-term package of upgrades to facilitate the movement of heavy vehicles.
Ringwood Road	Local Road	• Forms part of a continuous north-south road corridor with Wollara Road between the Golden Highway in the north and Wollar Road in the south. Ringwood Road is divided into two sections in this corridor, with the northern section running between the Golden Highway and Neverfail Road, and the southern section running between the Goulburn River crossing and Wollar Road (refer to **Figure 6.21**). • Sealed road which is generally flat with low vertical grades. • Unsealed road between the Goulburn River crossing and Wollar Road. • Operates under a default speed limit of 100 km/h as there were no regulatory speed signs observed during site inspection, however advisory speed signs (35, 65 and 85 km/h) were observed at bends along the alignment.
Wollara Road	Local Road	• Forms part of a continuous north-south road corridor with Ringwood Road between the Golden Highway in the north and Wollar Road in the south. The Wollara Road section runs between Neverfail Road and the Goulburn River crossing (refer to **Figure 6.21**). • Provides direct access to the Project Area. • Comprises a combination of sealed and unsealed sections north of the site, and unsealed sections south of the site. • Operates under a default speed limit of 100 km/h as there were no regulatory or advisory speed signs observed during site inspection.
Wollar Road	Regional Road	• East-west connector between Bylong (at its junction with Bylong Valley Way) and Budgee Budgee (at its junction with Ulan Road). • Sealed road with posted speed limit of 100 km/h. • Approved B-double route but includes an 80 km/h B-double speed limit and may only be used by B-doubles outside of school bus operation times.

6.9.1.2 Intersections

Key intersections assessed in the TTIA are described in **Table 6.27** below.

Table 6.27 Key Intersections

Intersection	Layout/Geometry	Existing AM Peak	Existing PM Peak
Golden Highway – Ringwood Road	Priority controlled intersection (Give Way signage from Ringwood Road). Basic left turn and right turn treatments. Auxiliary left turn lane on Golden Highway westbound approach.	0715 to 0815	1500 to 1600
Wollar Road – Ringwood Road	Priority controlled intersection (Stop signage from Ringwood Road). Basic left turn and right turn treatments.	0600 to 0700	1730 to 1830

At the Golden Highway – Ringwood Road intersection, evening peak hour volumes are generally higher than morning peak volumes. In addition, traffic volumes turning into and out of Ringwood Road are low, with Golden Highway eastbound and westbound through vehicles as the major movements at the intersection. At the Wollara – Ringwood Road intersection, traffic volumes are low during both peak hours.

The Safe Intersection Sight Distance (SISD) was calculated for the Golden Highway – Ringwood Road intersection as it is proposed as the main site access point for heavy vehicles, based on Table 5.2 of the *Guide to Road Design Part 3: Geometric Design* (Austroads, 2021). Assuming a design vehicle speed of 100 km/h and a driver reaction time of 2.5 seconds, a SISD of 262 m is required. Site investigations and a review of aerial imagery indicates that the sight distance may be slightly deficient for existing vehicles. However, given that adequate warning signage notifying motorists on the Golden Highway that trucks are turning into and out of Ringwood Road is already installed near the intersection, no additional repairs would be required.

An assessment of intersection performance based on criteria outlined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002) and using SIDRA Intersection modelling software indicates that both intersections currently operate at a Level of Service (LOS) 'A' with spare capacity, low average delays and minimal queues on all approaches during both the morning and evening peak periods.

6.9.1.3 Parking

There are no formal parking facilities located near the site. A heavy vehicle rest area is located on the northern side of the Golden Highway, approximately 300 m west of the Golden Highway– Ringwood Road intersection. The closest formal parking facilities are located in the towns of Merriwa and Wollar, some 20 to 30 km from the site.

6.9.1.4 Public Transport

Private bus services operate on weekdays between Merriwa and Scone, with an additional service between Merriwa and Singleton operating once per month. These private bus services connect Merriwa to the NSW rail network at Aberdeen, Scone, Muswellbrook and Singleton. An additional private bus service between Newcastle and Dubbo via Merriwa operates three days per week. A school bus route runs on Wollar Road between Mudgee and Wollar, with one service provided on school days in each direction, corresponding to school start and finish times. There are no bus services operating along Wollara Road and Ringwood Road.

The Sandy Hollow – Gulgong rail line, primarily used to transport coal from the Ulan mines passes through Wollar (refer to **Figure 6.21**). The rail line has numerous level crossings on Ulan Road, Wollar Road and Ringwood Road, south of the Project Area. Another rail line between Merriwa and Sandy Hollow is part of the Country Regional Network, however this line is currently non-operational.

6.9.1.5 Active Transport

The pedestrian and cycle network surrounding the Project Area is limited. There are no formal pedestrian or cycle facilities provided on the Golden Highway, Ringwood Road, Wollara Road or Wollar Road.

Sections of the Golden Highway, at locations where the road shoulder is wide enough to facilitate cyclists, are defined as moderate or high difficulty cycle routes by TfNSW. Bicycle NSW also identifies a scenic cycle route between Bylong and Merriwa, which travels directly past the Project Area via the Golden Highway, Forest Reserve Road, Killoe Road, Ringwood Road, Wollara Road, Wollar Road and Bylong Valley Way.

6.9.1.6 Road Safety

Crash data from TfNSW's Centre for Road Safety indicates that in the five-year period from 2016 to 2020, a total of 32 crashes were recorded on roads in proximity to the Project Area. Three crashes occurred near the Wollar Road – Ringwood Road intersection, with these crashes resulting in moderate or serious injuries. Two crashes occurred on Wollara Road and Ringwood Road, resulting in moderate injuries. Crashes along the Golden Highway were generally dispersed with increased occurrences in and around the Merriwa town centre.

6.9.1.7 Road Upgrades

Proposed road upgrades on Ringwood Road would include a 1.8 km section to be widened and resealed between Bow River and Killoe Creek. These repairs will include 8 m bitumen-sealed formation with a minimum of 500 mm unsealed shoulders. The horizontal and vertical alignment of the proposed road will ensure safe sight distance, safe movement of longer vehicles, and an improved road network for the users.

Additional warning signs (such as 'Narrow Bridge', 'Road Narrows', 'Steep Climb' and 'Symbolic Truck') are recommended along sections of Ringwood Road and Wollara Road where the road narrows and near the site access points (refer to **Appendix B** of the TTIA [**Appendix 15**] for further details).

6.9.2 Methodology

The TTIA considered the following:

- Existing traffic and transport within the study area including a review of:
    - The road network.
    - Parking provision.
    - Public transport.
    - Pedestrians and bicycle users.
    - Road safety.

- Construction traffic and transport associated with the Project.
- Operational traffic and transport associated with the Project.
- Potential mitigation measure that may be implemented to minimise traffic and transport impacts associated.

6.9.3 Assessment of Impacts

Traffic and transport impacts associated with the Project would primarily occur during the construction phase as a result of the increase in traffic movements associated with workforce mobilisation and delivery of materials and equipment. Impacts during the operational phase would be minimal due to the low volume of traffic generated and the provision of parking on-site.

The Project would generate approximately 350 direct jobs with an average of 250 workers required during the peak months of the construction period. Actual onsite workforce numbers would vary from month to month, depending on the intensity of the proposed works at the time. During peak construction, the following traffic movements are anticipated to be generated by the Project:

- Light vehicles – 60 two-way trips per day.
- Shuttle buses – 15 two-way trips per day.
- Heavy vehicles – 55 two-way trips per day.
- Water Trucks – at least one on site at all times.

In addition, 6 to 12 oversized loads are expected throughout the construction period, with a maximum of two oversized loads on any day.

During operation, it is likely that up to 10 staff would be on-site concurrently. Staff travelling to and from the site during operation of the Project would generate on average 10 two-way trips per day.

6.9.3.1 Swept Path Analysis

Swept paths along the proposed heavy vehicle route were assessed and details are provided in Appendix B of the TTIA in **Appendix 15**. The swept path analysis concluded that:

- At the Golden Highway – Ringwood Road intersection, semi-trailers performing a right turn from Ringwood Road onto the Golden Highway would have to cross a small portion of the solid dividing line when merging onto the Golden Highway. Due to existing road signage warning motorists of turning heavy vehicles from side streets as well as low traffic volumes, this would not present any safety issues.
- A narrow bridge is located on the northern end of Ringwood Road and can only safely accommodate one vehicle crossing at any given time due to limited road width and poor road condition. Additional 'Narrow Bridge' warning signs are recommended to notify drivers of the limited road space and the need to potentially give way to oncoming traffic. Upgrades to this narrow bridge are proposed as apart of the Road Repairs and Upgrades).
- The primary site access point in its current configuration may only be able to accommodate one vehicle entry/exit at a time due to the density of surrounding vegetation. To avoid impacts on the surrounding

vegetation traffic management would be used to control vehicle movements at the site access. No vegetation removal is required for single movements. Traffic management measures would be outlined in a Construction Traffic Management Plan (CTMP) to be prepared prior to the commencement of construction.

- The two emergency access points would be used for emergency and National Parks and Wildlife Service access only, and not for construction access.

6.9.3.2 Oversize Overmass vehicle routes

The transportation of large Project infrastructure would require Oversize Overmass (OSOM) vehicles exceeding the regulatory limits of standard vehicle dimensions of 19 m in length, 2.5 m in width, 4.3 t in weight (depending on axle group). OSOM vehicles would likely be transported to the site from Port of Newcastle via Industrial Drive, Pacific Highway, Newcastle Inner City Bypass, Newcastle Road, Hunter Expressway, New England Highway and Golden Highway. These are all approved B-double roads and would be suitable for OSOM.

A high-level review of the indicative OSOM vehicle route was undertaken by Turnbull Engineering (2023). Locations that may require traffic management measures are described in **Table 6.28**.

Table 6.28 Oversize Overmass Vehicle Route Area Requiring Potential Traffic Management

Location	Matter Requiring Management
Pacific Highway/Newcastle Inner City Bypass	Due to the intersection geometry, traffic management may be required so that OSOM vehicles can negotiate the left turn from Pacific Highway onto Newcastle Inner City Bypass.
Newcastle Inner City Bypass in Sandgate and Jesmond	Due to vertical limitations at four overpasses along the Bypass, OSOM vehicle loads may need to be lowered to ensure enough clearance is provided.
New England Highway / Golden Highway	The NSW Government is currently upgrading this intersection as part of the New England Highway Upgrade between Belford and Golden Highway, which is scheduled for completion in late 2024. A review of available public information shows that the existing and proposed intersection design could accommodate OSOM vehicles. As part of the detailed OSOM route assessment, the progress of the New England Highway Upgrade project would be checked to determine if traffic management measures are required.
Golden Highway / Putty Road / Mount Thorley Road intersection	Due to the intersection geometry, traffic management may be required so that OSOM vehicles can negotiate the right turn from Golden Highway/Putty Road onto Golden Highway/Mount Thorley Road.
Golden Highway near Ogilvies Hill and Winery Hill	Due to some steep grades, additional pull trucks may be required to assist OSOM vehicle movements through this area.
Golden Highway at Denman Bridge	Due to vertical and horizontal limitations at the Denman Bridge truss structure, OSOM vehicle loads may need to be lowered to ensure enough clearance is provided.

Location	Matter Requiring Management
Golden Highway / Ringwood Road intersection	Due to the intersection geometry, traffic management may be required so that OSOM vehicles can turn into and out of Ringwood Road.
Ringwood Road and Wollara Road	The causeways at Bow River and Killoe Creek were identified as inadequate to accommodate OSOM vehicles. Hence, culvert upgrades are proposed and would be designed and constructed to be able to accommodate the OSOM vehicles generated by the Project.

6.9.3.3 Road Repairs, Signage and Culvert Upgrades

Review of the roads forming part of the construction vehicle routes based on visual inspection identified sections of Ringwood Road and Wollara Road has poor pavement condition and poor condition. The Upper Hunter Shire Council were contacted to determine the existing pavement profile of these road and if any works had been carried out on these roads with available design drawings. Based on the visual inspection and information received from Council, Ringwood Road would require various repairs and upgrades to support the required vehicles and traffic for the Project. **Table 6.29** provides a summary of the schedule of road repairs, these works are anticipated to occur prior to construction and take approximately 3 months to complete.

Table 6.29 Schedule of Road Repairs, Signage and Culvert Upgrades

Item	Works	Timing
1	Repairs of Ringwood Road between Killoe and Bow River including a 1.8 km section to be widened and resealed between Bow River and Killoe Creek.	Prior to the Construction of the Project
2	Additional signage along Ringwood Road and Wollara Road (Refer to Appendix B of the TTIA in **Appendix 15**).	Prior to the Construction of the Project
3	Installation of a Culvert on Ringwood Road at Bow River.	Prior to the Construction of the Project
4	Installation of a Culvert on Ringwood Road at Killoe Creek.	Prior to the Construction of the Project

Impacts from construction traffic associated with the road and culvert upgrades are anticipated to be minor given the low volume of traffic using these roads. Furthermore, the number of construction vehicles generated during the road and culvert upgrades would be lower than the number of construction vehicles generated during construction of the Project. The community would be notified of any works proposed and changed road conditions so that impacted road users can plan their trips well in advance of the proposed changes.

6.9.3.4 Impacts on Road Network

The peak construction year assessed in the TTIA is 2025, representing a worst-case scenario when background traffic volumes and construction volumes are at their highest. A two per cent per year background traffic growth rate was applied to the 2022 traffic volumes collected, based on corridor growths outlined in the *Golden Highway Corridor Strategy* (Transport for NSW, 2016).

Peak hour construction volumes were determined by applying the following assumptions to the daily construction volumes outlined above:

- All light vehicle and shuttle bus trips were assumed to travel inbound during the morning peak hour and outbound during the evening peak hour to represent a worst-case scenario. In reality, the majority of light vehicle and shuttle bus trips would likely occur before the morning peak hour and after the evening peak hour.
- Light vehicle and shuttle bus trips were evenly distributed on the road network, with equal proportions travelling to and from the Project Area from the north and south.
- Ten percent of daily heavy vehicle trips were assumed to occur during the peak periods.
- Inbound and outbound heavy vehicle trips were assumed to occur during both peak periods.
- Oversized vehicle trips would not occur during the peak periods.
- Shuttle buses have been classified as heavy vehicles for modelling purposes.

Modelled intersection performance with the addition of Project construction traffic is predicted to result in a marginal increase in average travel time of up to one second, with the LOS at both intersections remaining at 'A'. Both intersections would continue to operate with spare capacity, low average delays and minimal queues during the morning and evening peak periods. Therefore, overall impacts on road network performance during construction are anticipated to be minor.

The *Guide to Road Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (Austroads, 2020) specifies warrants for additional turning bays at intersections, based on a combination of peak hour through and turning traffic movements. Calculations for the Golden Highway – Ringwood Road intersection (traffic from the north of the Project Area) and the Ringwood Road – Wollar Road intersection (traffic from the south of the Project Area) are provided in **Appendix 15** and conclude that additional turn treatments would not be required at either intersection during construction. This is supported by the 2025 intersection performance results where both intersections would operate with spare capacity and at a good Level of Service (LOS) (a traffic grading system used to asses performance of transport infrastructure) during construction.

6.9.3.5 Impacts on Public and Active Transport

Minimal impacts are anticipated on bus services that travel on the Golden Highway or Wollar Road given the infrequency of these bus services, the low volume of peak hour construction traffic generated by the Project, and the ample spare capacity available on the road network. Furthermore, construction vehicles on Wollar Road approaching the Project Area from the south would comprise of light vehicle and shuttle buses. These trips would generally occur prior to school start and end times. Hence, it is unlikely that the school bus service operating on Wollar Road would interact with construction traffic.

Similarly, given the infrequency of train services, impacts on the rail network due to the Project are expected to be minimal. Level rail crossings located on Ulan Road, Wollar Road and Ringwood Road would be traversed by construction light vehicles and shuttle buses travelling to and from the Project Area from the south. Given the infrequent number of trains using this line, minimal impacts are anticipated on the rail network.

No impacts on the pedestrian network are anticipated during construction, given the limited pedestrian infrastructure in the study area. Similarly, the overall impact on cyclists is anticipated to be minor, given the low cyclist volumes on the Golden Highway, Ringwood Road and Wollara Road.

6.9.4 Cumulative Traffic Impacts

Approved and proposed projects within proximity to the Project that have construction programs that overlap with construction of this Project may present cumulative impacts relating to the combined increased demand on local infrastructure, transport and services. Projects that were considered for the cumulative construction traffic impact assessment are:

- Stubbo Solar Farm
- Wollar Solar Farm
- Dunedoo Solar Farm
- Liverpool Range Wind Farm
- Valley of the Winds Wind Farm
- Bowdens Silver Project
- Barneys Reef Wind Farm
- Tallawang Solar Farm
- Birriwa Solar Farm
- Merriwa Solar Farm (Merriwa Energy Hub)
- Spicers Creek Wind Farm
- Sandy Creek Wind Farm
- Cobbora Solar Farm.

Figure 6.22 shows the location of these projects in relation to the Project Area.

Projects were assessed based on their proposed vehicle routes, construction timing and anticipated traffic generation rates, where available (refer to Section 4.1.5 of **Appendix 15** for further detail). The assessment concluded that cumulative impacts are anticipated to be minor given that the Golden Highway is the only common construction vehicle route for the majority of nearby relevant projects and has spare capacity to accommodate cumulative construction vehicle volumes. In addition, peak construction of some projects would not coincide with peak construction of this Project. During non-peak construction of other projects, the surrounding road network would be able to accommodate the additional construction volumes due to spare capacity available.

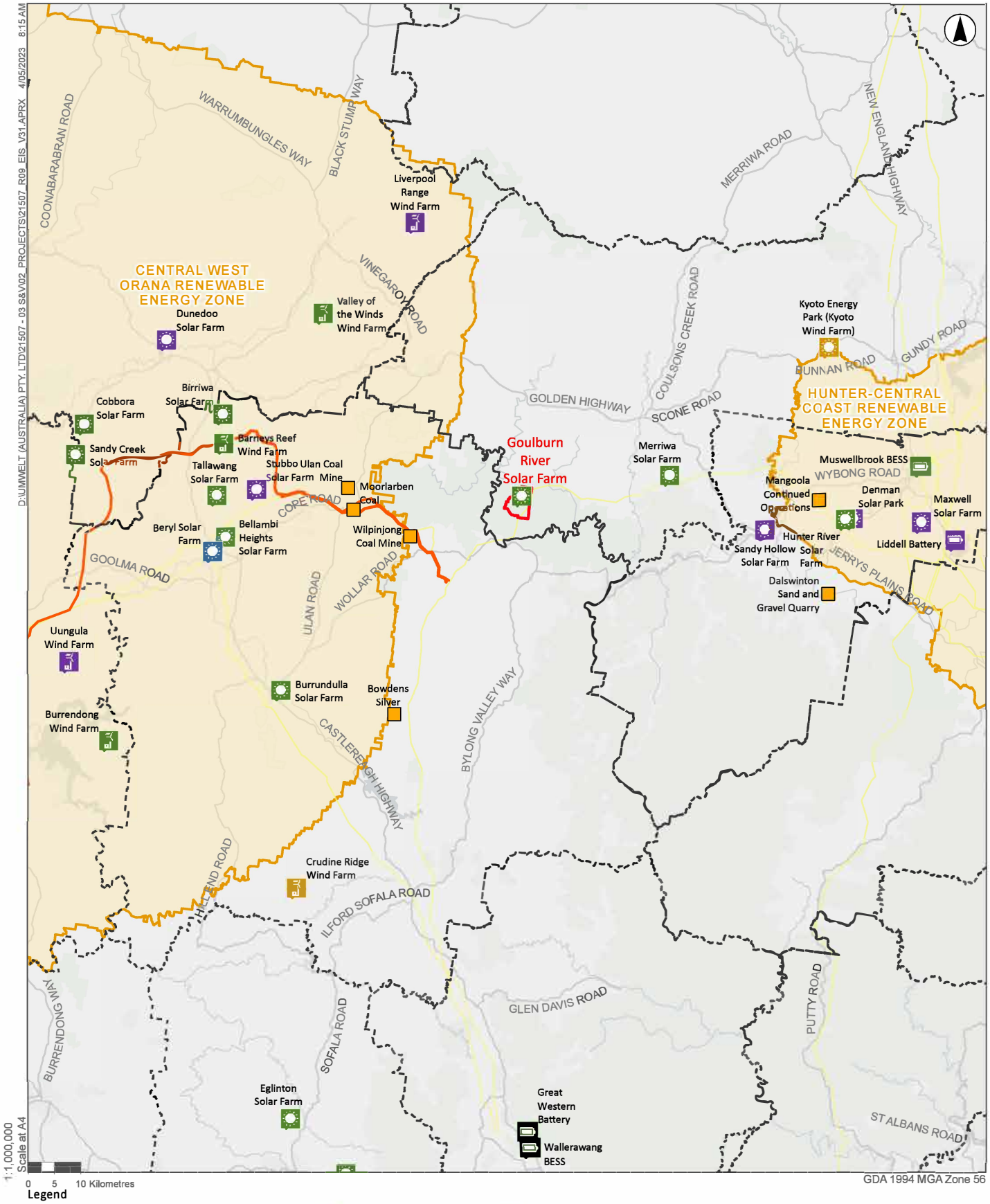


FIGURE 6.22

Nearby Projects for Cumulative Impact Assessment

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

6.9.5 Management and Mitigation Measures

The following mitigation and management measures are recommended to minimise traffic and transport impacts during construction and/or operation of the Project:

- Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared in accordance with relevant guidelines and in consultation with TfNSW, Upper Hunter Shire Council, National Parks and Wildlife Service and any other relevant stakeholders. The CTMP would outline how construction activities would avoid, mitigate and manage risks involving construction activities, users of the traffic and transport network and residents.
- Deliveries to the Project Area (excluding OSOM) would be carried out by 19 m semi-trailers to comply with heavy vehicle restrictions on Wollara Road and Ringwood Road.
- A detailed OSOM route assessment would be undertaken by the construction contractor and detailed in a CTMP when OSOM vehicle dimensions and loadings are confirmed to determine traffic management requirements.
- The community would be notified in advance of proposed road and transport network changes through appropriate media and other forms of community liaison.
- Where relevant, Road Occupancy Licences (ROLs) and crane permits would be submitted and approved prior to the closure of any roads.
- Construction workers would be encouraged to carpool or use the shuttle buses to travel to and from the construction site.
- Parking requirements for the Project during construction and operation would be provided on-site, and parking would not be provided on public roads adjacent to the Project Area.
- Additional warning signs are recommended along sections of Ringwood Road and Wollara Road where the road narrows and near the site access points.
- Upper Hunter Shire Council will continue to be consulted on repairs required to parts of Ringwood Road.

6.10 Water Resources

A Water Resources Impact Assessment (WRIA) has been prepared by Umwelt (2023, refer to **Appendix 16**) to assess the potential impacts of the Project on flooding, groundwater levels, erosion and sedimentation, water quality, water users and water sourcing and licensing. The WRIA addresses the requirements of the SEARs with respect to water, as listed below:

- An assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts.
- Details of water requirements and supply arrangements for construction and operation.
- A description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom 2004).

It is noted that the SEARs also require identification of likely impacts to waterfront land and an assessment of activities with regard to DPI guidelines, and these aspects are discussed in the Aquatic Biodiversity assessment in **Section 6.3.2**.

A copy of the WRIA is provided in **Appendix 16** with key outcomes summarised in the sections below.

6.10.1 Existing Environment

As discussed in **Section 2.3.2**, the Project Area is located within the Hunter River catchment, within the Goulburn River sub-catchment. The majority of the watercourses in the Project Area are first and second order streams, with sections of Redlynch Creek, Rocky Creek and Monaghans Creek also becoming third order watercourses within the Project Area. All watercourses within the Project Area eventually flow into the Goulburn River (refer to **Figure 6.23**). The identified watercourse alignments within their corresponding Strahler stream order are also shown in **Figure 6.23**.

The topography of the Project area varies, with the majority of the Project Area lying between elevations of 400 m AHD and 440 m AHD. As the Project Area is located on top of a ridge, watercourses and unnamed flow paths within the Project Area are located towards the boundary. There are approximately 20 to 30 small man-made farm dams present within the Project Area where water pooling occurs for extended periods.

Groundwater within the Project Area is managed under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources* (DPE, 2022). Areas to the south-west and north-west of the Project Area, surrounding the Goulburn River are mapped in the Upper Hunter LEP as areas of 'Groundwater Vulnerability'. There are no identified areas of groundwater vulnerability within the Project Area.

There are no registered groundwater bores within the Project Area. The closest groundwater bore is approximately 3 km north-west of the Project Area and is used for stock and domestic water supply purposes. The last recorded groundwater depth at this location was 41 m below ground level in June 2014 (WaterNSW, 2021). Three bores approximately 4 km south of the Project Area located along the Goulburn River are used for either monitoring or water supply purposes.

The Goulburn River supports a number of identified moderate and low priority groundwater dependent ecosystems (GDEs) within the area surrounding the Project Area. Moderate potential aquatic GDEs were identified along significant reach lengths of the Goulburn River, west and south of the Project Area. Low potential terrestrial GDEs were identified within the Project Area, with some isolated small areas of medium and high potential terrestrial GDEs located well downstream of the Project Area along the natural surface water drainage paths (Bureau of Meteorology, 2017).

6.10.1.1 Water Licensing Requirements

The Project Area is subject to the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2022. Licensed surface water use in the Upper Goulburn River Water Source is primarily for agriculture (irrigation) use.

Approximately 20–30 small man-made farm dams located within the Project Area and are currently used for livestock water points.

The existing dams within the Project Area are unlikely to be licensed as they capture water under a harvestable right. The total capacity of all dams on a property allowed under the harvestable right is called the Maximum Harvestable Right Dam Capacity which has been calculated for the Project Area as 130 megalitres (based on a Project Area of 2,000 ha) (WaterNSW, 2022b). No change in licensing is expected to be required, however this will be confirmed prior to construction.

No change to the natural surface waterway outlets from the Project Area is being proposed and no water discharge is proposed as part of the Project.

6.10.1.2 Proposed Water Supply and Use

During construction, non-potable water would primarily be used for plant establishment, dust suppression and site ablutions. The associated water demand for the 27-month construction period is estimated to peak at 11.26 ML/month.

During operations, non-potable water would be required for occasional maintenance activities such as washing of the PV solar panels, amenities and potable water would be required by operational staff as well as for stock. Washing of the panels would not require any detergent or cleaning agents. It is expected that this water demand would be minimal. Average water use will be 3,000 L used onsite each day at the O&M facility, water for livestock is approximately 8–16,000 L per day and 8 ML per year for panel cleaning. In addition to this 2 ML per year is estimated for onsite works like road maintenance.

Potable water demands for both the construction and operational phases of the Project will be primarily sourced from rainfall stored in on-site water tanks at the O&M facility and augmented by water trucks if required. Potable water storages will be routinely tested to ensure water quality meets the requirements of the Australian Drinking Water Guidelines (ADWG) and an appropriate maintenance regime will be implemented to ensure ADWG water quality standards are maintained.

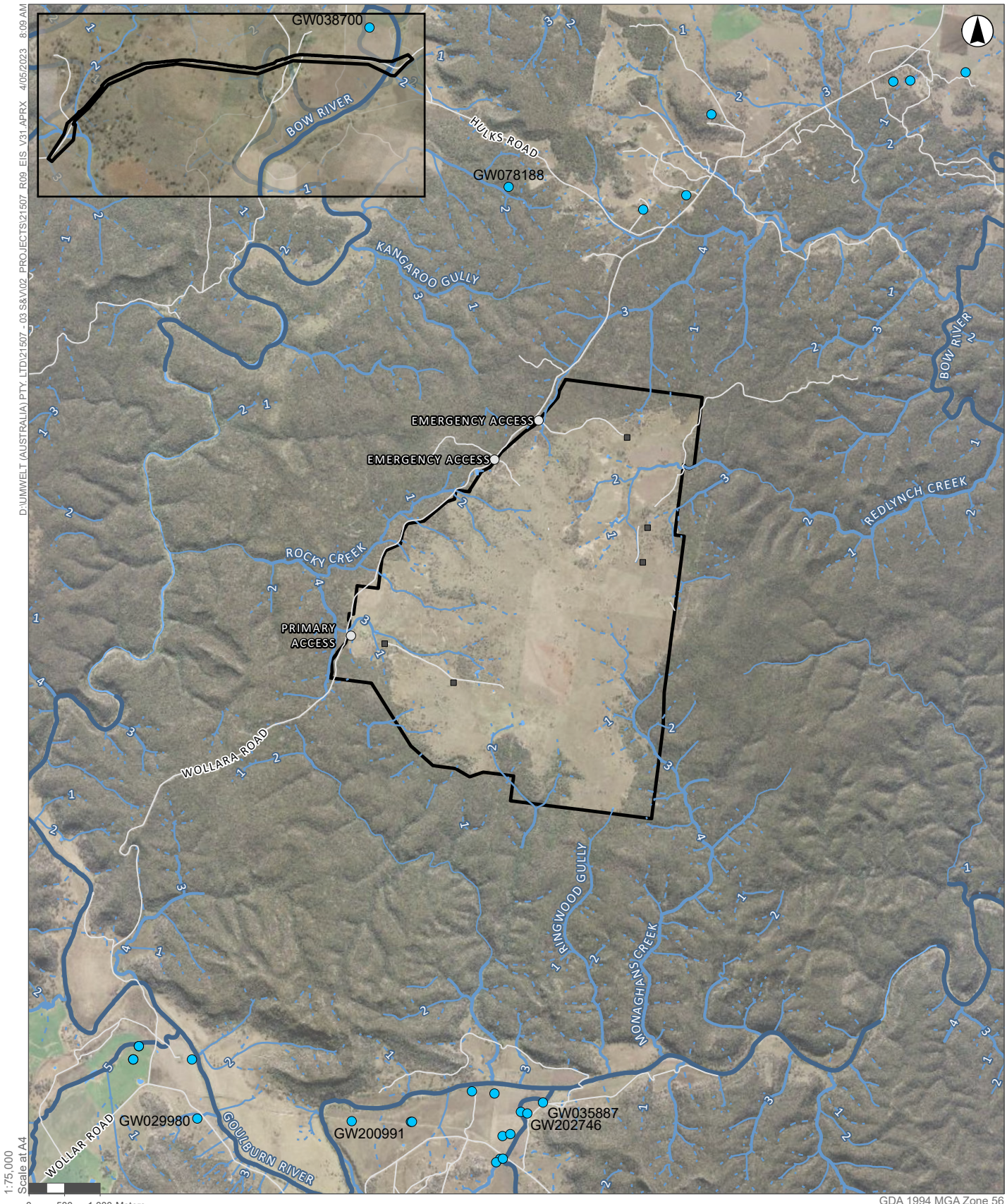


FIGURE 6.23

Hydrological Context

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

6.10.2 Assessment Methodology

The hydrological assessment was undertaken in accordance with Australian Rainfall and Runoff (Ball et al., 2019) and with consideration of the relevant provisions of the NSW Floodplain Development Manual (2005). There are no specific floodplain risk management plans prepared by Upper Hunter Shire Council that cover the Project Area. There are also no rural floodplain management plans covering the Project Area, but the analysis and reporting undertaken in the WRIA is consistent with the expectations of a Rural Floodplain Management Plan.

A flood 164nvestingation was undertaken for 10%, 1%, 0.5% and 0.2% Annual Exceedance Probability (AEP) events and the Probably Maximum Flood (PMF). AEP is a measure of the likelihood a flood level or flow will be equalled or exceeded in any given year. The PMF is the largest flood that could be conceivably expected to occur at a particular location.

Hydraulic modelling of the Project Area was completed using a two-dimensional (2D) TUFLOW flood model. TUFLOW software is one of the most widely used hydraulic modelling software packages in Australia and is considered an appropriate modelling tool for modelling riverine and local overland flooding.

The model provided estimates of flood levels, depth, velocities, and flood hazard for each of the modelled design events. The hydraulic model was run for both existing and climate change conditions. Climate change modelling was undertaken using the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood-producing rainfall events due to climate change.

6.10.3 Assessment of Impacts

The WRIA discusses potential impacts to water resources as a result of the Project in relation to:

- Impacts to surface water quality of receiving and downstream waterways.
- Impacts to flooding, including flow rates, velocities and depths.
- Impacts on water supply.
- Impacts to groundwater, including impacts to downstream users and GDEs.

6.10.3.1 Water Quality Impacts

Water quality impacts are most likely to be experienced during construction and decommissioning of the Project, when soils would be subject to disturbance due to vegetation removal, excavation works and stockpiling of materials, which can potentially lead to sediments and/or pollutants mobilising in runoff and entering local waterways. The key factor influencing the extent of sediment runoff and stormwater pollution is likely to be weather events. The occurrence of a major storm event at a critical phase of the construction period could potentially result in higher levels of turbid runoff. With the implementation of erosion and sediment control measures (outlined in **Section 6.10.5**) potential construction-related erosion and sedimentation impacts would be appropriately managed and are expected to be minor.

Water quality impacts during the operational phase are expected to be minimal as the day-to-day activities during this phase would be limited to routine maintenance and monitoring. There is potential however for stormwater runoff from impervious surfaces, accidental spills or discharge through use and storage of chemicals such as fuel as well as the use of herbicides for vegetation control. With the implementation of operational management measures outlined in **Section 6.10.5** water quality impacts are expected to be negligible.

Road upgrades along Ringwood Road are expected to have minimal impacts during construction and with the implementation of erosion and sediment control measures, and the design of appropriate erosion and scour protection, potential construction-related erosion and sedimentation impacts would be appropriately managed. The potential operational impacts are mitigated through detailed design being undertaken in line with relevant guidelines prior to any works commencing. With the implementation of management measures outlined in **Section 6.10.5** water quality impacts from road upgrades are expected to be minimal.

6.10.3.2 Impact on Stream Stability, Riparian Health and Fish Passage

There are several ephemeral and perennial streams traversing the Project Area, while design has sought to avoid works in or near these areas, several waterway crossings will be required for site access, internal roads and electrical cabling. Project crossings will be designed to minimise impacts on stream stability and fish passage with reference to relevant and current guidelines and standards.

Works on waterfront land defined as within 40 m of top of bank of defined 3rd order stream, i.e. the lower reaches of Redlynch Creek, Rocky Creek, Monaghans Creek and Road Repairs and Upgrades at Bow River and Killoe Creek) will be managed through measured outlined in the Soil and Water Management Plan, detailed in **Section 6.10.5** and will be incorporated into the design of the works.

6.10.3.3 Flooding Impacts

The Project Area was found to present a low risk of flooding under both the existing and climate change conditions modelled. Detailed flood modelling results are provided in Appendix C of the WRIA (refer to **Appendix 16**) and summarised below for each event.

10% AEP Modelling Results

The 10% AEP modelling results show there is generally no widespread flooding within the Project Area, with active flowpaths typically confined within the watercourses and local depressions. The flood hazard within the site for this flood event is mostly characterised as H1: 'Generally safe for vehicles, people and buildings', with isolated areas of higher flood hazard (H5 and higher) predicted in the north-eastern and southern areas of the Project Area, however these areas are well confined to the waterways and defined drainage lines (which will be avoided).

1% AEP Modelling Results

The 1% AEP event represents the principal flood planning event for the Project. The general flood inundation patterns and extents are similar to the 10% AEP event, albeit with increasing depths and velocities associated with the higher flows. The Project Area is typically located over the upper catchments of the minor watercourses that flow through the Project Area, and this provides for the 1% AEP flood inundation to be largely confined to narrow corridors along the watercourse alignments.

Flood depths remain generally less than 0.3 m along overland flow paths and local depressions, with depths of flow along the minor watercourses within the Project Area typically up to 1 m with some localised higher depths along the reaches. A similar flood depth range is observed for farm dams. The mainstream flooding of the creek adjacent to the Project Area is still relatively confined.

High velocities up to approximately 4.5 m/s are predicted within the north-east and western channels. Review of aerial imagery shows existing evidence of erosion and sedimentation (due to higher flow velocities and steeper areas).

The flood hazard within the Project Area for this flood event is mostly characterised as H1: 'Generally safe for vehicles, people and buildings', and only reaches above this in the waterways and defined drainage lines. Within some of the watercourse alignments, flood hazard classes H5 and H6 are attained and accordingly would represent areas where infrastructure should be avoided.

Climate Change Modelling Results

The flood inundation patterns and extents are generally similar to the 1% AEP design results (as discussed above). The modelling shows no activation of additional flow paths or extended inundation areas that materially impact on the proposed development.

Flood depth remains generally less than 0.3 m for overland flow areas with flood depths up to 2 m along the well-defined mapping extents of the larger watercourses.

The 0.5% and 0.2% AEP climate change flood depths are only marginally larger than that of 1% AEP existing conditions. Higher AEP events show similar results indicating the inundation impact of climate change is not anticipated to be a significant issue for the Project. The results suggest the Project Area is able to drain effectively without a significant increase in floodplain area which could hold water at high depths for extended periods of time.

PMF Modelling Results

Under the modelled PMF event, flood extents along the defined watercourses and overland flow paths have generally increased with broader areas of overland sheet flow (up to 0.5 m depth) as a result of extreme rainfall intensity, but are still typically confined to the general watercourse alignments albeit with increasing flood depth. The watercourses within the Project Area have flood depths up to 4 m in the lower reaches with a similar flood depth range observed within the Project Area's dams under the PMF event.

Corresponding to the increase in the flood depth distribution across the Project Area, flow velocities are increased for the PMF event. Within defined watercourses, velocities reach between 5.0 and 6.0 m/s. Review of aerial imagery shows evidence of erosion and sedimentation due to higher flow velocities and steeper areas.

The flood hazard within the Project Area is mostly characterised as H1: 'Generally safe for vehicles, people and buildings' and only reaches above this in the waterways and defined drainage lines. Within some of the watercourse alignments, flood hazard classes H5 and H6 are attained and accordingly would represent areas where infrastructure should be avoided.

A comparison of the 1% AEP and PMF inundation extents is shown on **Figure 6.24**.

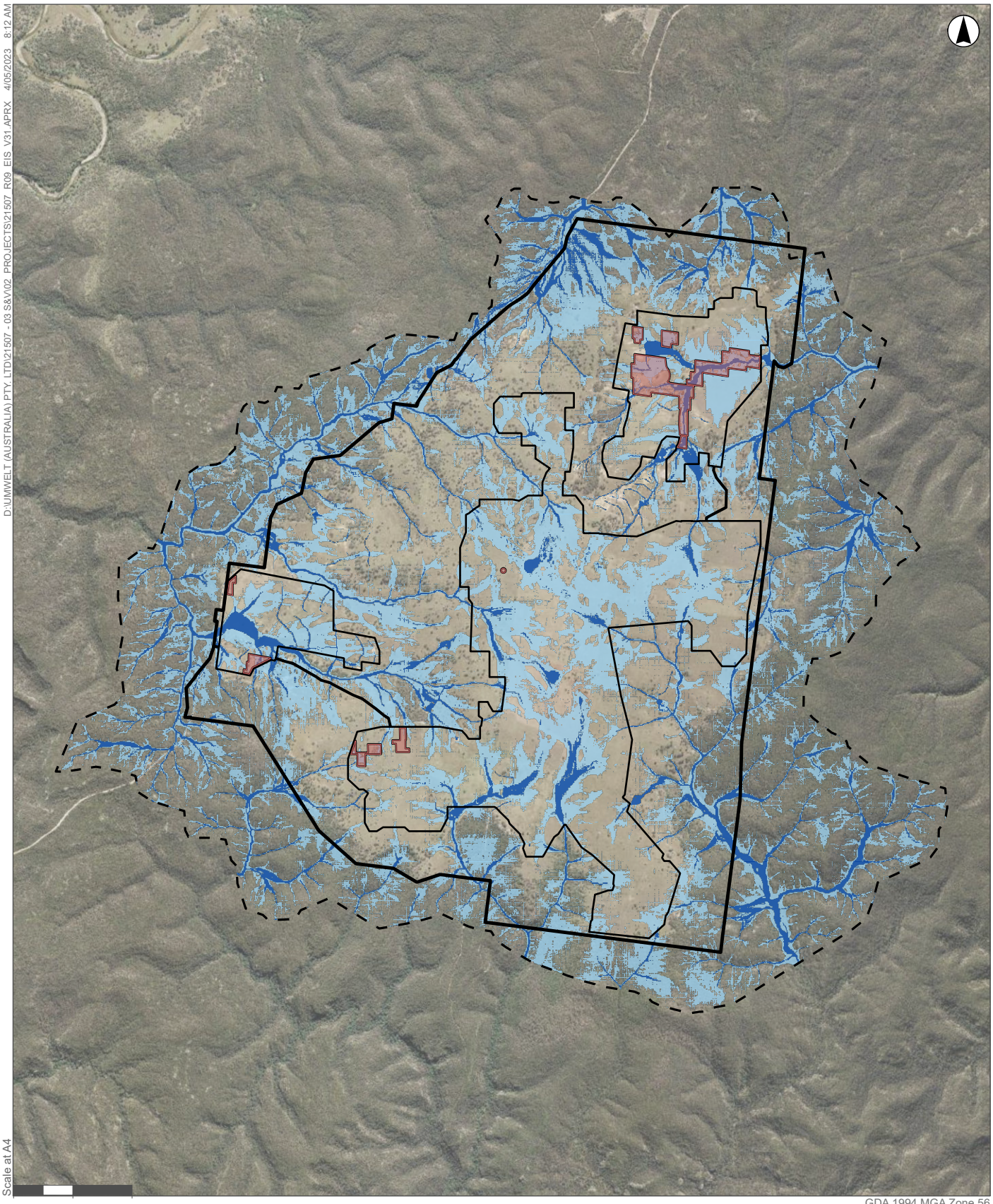


FIGURE 6.24

Flood Extents

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

6.10.3.4 Water Supply Impacts

Water for construction would be sourced from commercial suppliers in the nearby region (via water trucks) and farm dams located within the Project Area. Water sources would be determined prior to the commencement of construction in consultation with suppliers and landholders, subject to availability. A water sourcing strategy would be developed to ensure there are no water supply impacts to adjacent landowners or other stakeholders. The use of any farm dams would be agreed with the landholder, water usage for the Project construction and operation is described in **Section 3.7**.

Water requirements beyond existing water rights would be sourced from commercial suppliers and delivered to the Project Area by water tanker. Based on the above, it is anticipated that the Project's proposed water use during construction and decommissioning would not have a negative impact on water supply to the Project Area and the region.

During operations, a minimal water demand would be required for ongoing maintenance activities washing PV panels, amenities, and potable purposes by operational staff as well as for stock. Potable water demands for both the construction and operational phases of the Project will be primarily sourced from rainfall stored in on-site water tanks at the O&M facility and augmented by water trucks if required.

6.10.3.5 Groundwater Impacts

Impacts to groundwater resources, including GDEs, are not expected as the groundwater table is unlikely to be intercepted during Project construction, operation or decommissioning. Groundwater is not proposed to be used to supply water to the Project and the depth to groundwater within the Project Area (based on available information) means that groundwater quality impacts are also unlikely.

6.10.4 Cumulative Water Impacts

Cumulative impacts are considered to be negligible as the Project is located in the upper reaches of the catchment (mainly 1st and 2nd order streams) and other projects do not occur in these areas. Culvert upgrades at Killoe Creek and Bow River (4th and 5th order steams) will temporarily impact these watercourses. The culvert works are not anticipated to lead to long term or cumulative impacts on the streams as regular flow regimes will be restored following construction.

6.10.5 Management and Mitigation Measures

The following mitigation and management measures are recommended to minimise water impacts during construction and/or operation of the Project:

- Solar panels will be designed to provide a minimum of 300 mm freeboard for the lowest edge above the maximum 1% AEP flood level.
- Solar panel piles will be designed to withstand the 1% AEP flood velocities expected in the Project Area.
- No sensitive infrastructure (e.g., substation, BESS, etc.) will be placed within 20 m of any Strahler 3 or above order streams.
- All waterway crossings will be designed and constructed in compliance with DPI Water Guidelines, including:

- Guidelines for Controlled Activities on Waterfront Land (the CAA Guidelines) (Department of Planning, Industry and Environment (DPIE) Water, 2018).
- Why Do Fish Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Department of Primary Industries (DPI) Fisheries, 2003).
- Fisheries NSW Policy and guidelines for fish habitat conservation and management, (NSW DPI, 2013).

- Further flood investigations will be carried out where required during detailed design to confirm the flood immunity objectives and design criteria for the Project are met.
- A Construction Soil and Water Management Plan (CSWMP) will be prepared to outline measures to manage soil and water impacts associated with the construction works.
- Debris will be cleared from fencing following flood events.
- An OEMP will be developed for the Project to address potentially adverse impacts on the receiving environment surface water quality during the operational phase. This will include the development and appropriate maintenance of suitable ground cover around solar panels, and grassed table drains near access tracks to minimise the potential for erosion and export of sediment. Additional measures for the treatment of stormwater quality are not considered necessary.
- Water sources would be confirmed during the detailed design phase and in consultation with suppliers and landholders and be subject to availability.
- Post-construction, disturbed areas will be stabilised by the establishment and maintenance of a vegetated ground cover consisting of low-growing grasses.
- Proposed road repairs and culvert upgrades at Ringwood Rod would have:
  - Appropriate scour protection designed for the upgrades.
  - Be designed to minimise afflux at an acceptable level.
  - Be designed to accommodate a 5% AEP event.
  - Be constructed at existing invert levels or similar to maintain existing flow conveyance in channel.

6.11 Hazard, Risk and Bushfire Threat

Regarding hazard and risk, the SEARs require the EIS to include:

- A preliminary risk screening completed in accordance with *State Environmental Planning Policy– Resilience and Hazards 2021 (*Resilience and Hazards SEPP) (formerly SEPP 33).
- A Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (DoP, 2011) *and Multi-Level Risk Assessment* (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with Hazardous Industry Advisory Paper No. 4, '*Risk Criteria for Land Use Safety Planning*' (DoP, 2011).

- An assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electric and magnetic fields or the proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric and Magnetic Fields.

The hazard and risk assessments to address the SEARs are provided in the following sections.

6.11.1 Existing Environment

The Project Area is relatively isolated and there are no direct residential neighbours, however several rural properties occur within a 10 km radius of the Project Area. The closest residents are within 3 km and there is one dwelling (host landholder) located within the Project Area (refer to **Figure 2.2**).

Land within the Project Area has been subject to extensive clearing associated with historic agricultural land use, with areas of scattered woodland vegetation. It is physically isolated from nearby residential receivers by the surrounding forest vegetation associated with the Goulburn River National Park and Tongo State Forest, which represent a potential bushfire threat to the site due to high fuel loads (refer to **Section 6.11.3** below). The Project Area is traversed by an existing 500 kV transmission line which crosses the south-east portion of the site.

6.11.2 Preliminary Hazard Analysis

A Preliminary Hazard Analysis (PHA) was prepared by Umwelt (2023) in accordance with the SEARs for the Project and relevant guidelines and legislative requirements. The following section contains a summary of the key outcomes of the PHA, while a full copy of the report is provided in **Appendix 17**.

6.11.2.1 Methodology

The PHA considered the hazards and risks posed to off-site receivers and involved dwellings associated with the transport, storage and use of hazardous materials for the Project and has been prepared generally in accordance with:

- Resilience and Hazards SEPP.
- Applying SEPP 33: Hazardous and Offensive Development Application Guidelines (NSW Department of Planning, 2011).
- Multi-Level Risk Assessment (NSW Department of Planning, 2011).
- Hazardous Industry Planning and Advisory Paper 4 – Risk Criteria for Land Use Safety Planning (HIPAP 4) (NSW Department of Planning, 2011).
- Hazardous Industry Planning and Advisory Paper 6 – Hazard Analysis (HIPAP 6) (NSW Department of Planning, 2011).
- Manual for Classification of Risks due to Major Accidents in Process and Related Industries (International Atomic Energy Agency, 1996).

The detailed methodology and calculations used to identify and assess the potential hazards and respective failure scenarios that have the potential for off-site impacts are outlined in **Appendix 17** with results detailed in the sections below.

6.11.2.2 Preliminary Risk Screening

The hazardous materials to be stored/used/transported for the Project are:

- Lithium-ion batteries (LIBs), a Class 9 miscellaneous dangerous good.
- Electrical transformer insulating oil, which is not classified as a dangerous good.

Neither of these hazardous material types has a relevant screening threshold in the Resilience and Hazards SEPP. However, with the rapid proliferation of LIBs in portable devices, electric vehicles, energy storage systems and a range of other applications in recent years, the potential hazards associated with LIBs have become evident. It is known that LIBs may present fire, explosion and toxic gas release hazards as a result of manufacturing faults or a range of battery abuse scenarios. Therefore, given the large scale of the Project BESS, the limited global experience with large capacity grid connected LIB BESSs, and to maintain a conservative approach with respect to the assessment of hazards and risk, further assessment was considered appropriate.

Based on the very low frequency of hazardous materials being transported to the Project Area and the use of suitably accredited freight companies, no further assessment of transport risks (e.g. a transport route analysis) was considered necessary.

6.11.2.3 Risk Assessment

The PHA identified a number of hazard events involving LIBs and electrical transformers with the potential for harmful off-site impacts. It was determined using the Multi-Level Risk Assessment (2011) risk classification and prioritisation process that a Level 2 semi-quantitative risk assessment would be required to demonstrate that the Project can comply with relevant criteria.

Fire, explosion and toxic gas release events were modelled to determine the required distance that LIB units should be distanced from the site boundary and involved dwellings to ensure the risk criteria provided in HIPAP 4 are met.

The semi quantitative analysis undertaken estimated that the greatest distance from a LIB cell (Gridstack Fluence Cube) at which an individual could be subject to injurious impact is 68 m as a consequence of a BESS explosion scenario at a frequency of less than 10^{-5} events per year. Given Lightsource bp will locate all Gridstack Fluence Cubes at least 68 m from the site boundary and involved dwellings, no off-site impacts with the potential to cause injury or fatality are predicted.

A risk assessment considering the results of the consequence modelling and the estimated likelihood of a LIB fire/thermal runaway scenario resulting in either a fire, explosion or toxic gas release indicated that the Project would comply with HIPAP 4 risk criteria for land use planning provided adequate separation distances between Gridstack Fluence Cubes and the site boundary/involved dwellings are maintained.

6.11.2.4 Risk Management and Mitigation Measures

Lightsource bp will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices. Compliance with HIPAP 4 criteria is conditional on these technical and non-technical risk mitigation and management measures being implemented.

It is considered that the fire and explosion risks associated with the substation can be adequately managed provided electrical transformers are designed, installed, operated and maintained in accordance with relevant Australian Standards. Lightsource bp is committed to ensuring that this is achieved.

A Final Hazard Analysis, Fire Safety Study and Emergency Plan will be developed as the Project design progresses toward completion to ensure the final Project design adheres to the risk management measures outlined in the PHA and that the separation distances to the site boundary/involved dwellings are appropriate for the specific battery cell type (i.e. chemistry and capacity) to be used.

6.11.3 Bushfire Risk

The Project Area is identified as bushfire prone land by the NSW Rural Fire Service (RFS) bushfire prone land mapping (NSW RFS, 2021) and the SEARs require an assessment of hazards and risk associated with bushfire.

Land within the Project Area has been subject to extensive clearing associated with historic agricultural land use, with areas of scattered woodland vegetation remaining. The property is surrounded by forest vegetation associated with the Goulburn River National Park which represents the potential bushfire threat to the Project Area. Land within the Project Area is mapped as Category 2 vegetation which is generally considered lower risk vegetation. It is characterised by remnant vegetation and represents a lower bushfire risk to surrounding development. The Goulburn River National Park is mapped as Category 1 vegetation which is characterised by areas of forest with high fuel loads.

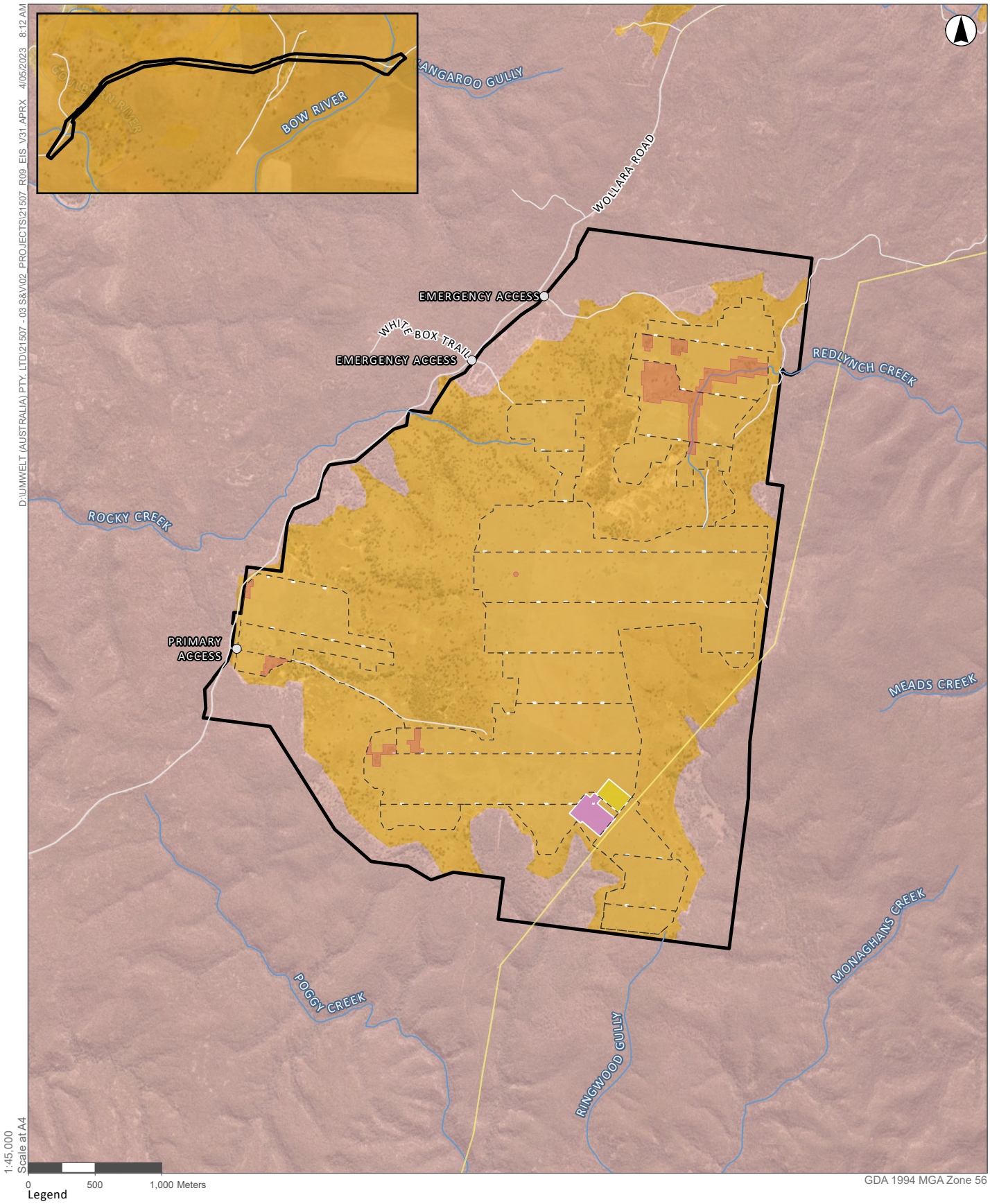


FIGURE 6.25

Bushfire Prone Land

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

6.11.3.1 Methodology

This section provides a bushfire threat assessment in accordance with *Planning for Bushfire Projection 2019* (PBP 2019) and the SEARs, including an assessment of potential bushfire hazards applicable to the Project Area and the proposed bushfire management for the Project.

It is noted that consultation with NSW RFS and Fire and Rescue NSW (FRNSW) has also been undertaken for the Project. This is further discussed in **Section 6.12**.

6.11.3.2 Bushfire Assessment

Planning for Bushfire Protection (PBP 2019) (NSW Rural Fire Service, 2019) requires solar farms to have adequate clearances to combustible vegetation as well as firefighting access and water. At a minimum, a 10 m Asset Protection Zone (APZ) is required for the structures and associated buildings/infrastructure (with the APZ being maintained to the standard of an Inner Protection Area) for the life of the Project. Essential equipment for solar farms should be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies. It should also be designed and maintained so that it will not serve as a bush fire risk to surrounding land.

As discussed in **Section 6.11.2**, the PHA indicates that appropriate risk management measures can be applied to the Project to meet HIPAP 4 risk criteria for individual fatality, injury and propagation. Appropriate hazard safeguards and controls have been identified to be applied to the Project through the development and implementation of the Emergency Plan which will assist with the management of bushfire (refer to Section 7.3 of the PHA in **Appendix 17**).

Through the development and implementation of relevant bushfire management measures and identified hazard safeguards and controls, it is considered that potential hazards associated with the Project including bushfire, can be appropriately managed.

6.11.3.3 Bushfire Management and Mitigation Measures

Asset Protection Zones

The design of the solar farm will include a minimum 10 m setback around the perimeter of the Development Footprint. The proposed layout will also include 4 m wide access tracks around the perimeter of the proposed infrastructure within the 10 m setback, assisting with separating the infrastructure from adjacent vegetation within the Project Area. These setbacks provide for sufficient separation distances to limit the spread of bushfire and to provide an adequate defendable space for firefighting. The solar farm will be appropriately maintained over the life of the Project and all vegetation maintenance and management will be undertaken in accordance with relevant requirements set out in the proposed Bushfire Management Plan.

Access

As discussed in **Section 3.3.4,** three access points are to be provided along the western boundary of the Project Area, off Wollara Road as shown in **Figure 3.1**. The two northern-most access points would provide emergency access only, with primary access provided through the southern access point.

Internal access roads consisting of compacted gravel, approximately 4 m wide, would be constructed to accommodate construction and operational traffic movements and emergency access throughout the Project Area. The indicative location of the access roads is illustrated on **Figure 1.4**. Roads will be maintained throughout the Project life to allow for safe and accessible travel of emergency vehicles (if required).

Water Supply

An appropriate dedicated water supply for bushfire protection will be provided. Water supply for the Project would likely be sourced from commercial suppliers in the nearby region (via water trucks), rain water collected from onsite rainwater tanks (at O&M facility) or farm dams within the Project Area (subject to availability).

Emergency Plan

An Emergency Plan (EP) will be developed and implemented for the Project in accordance with PBP 2019 and *Hazardous Industry Planning and Advisory Paper No. 1 – Emergency Planning* (HIPAP 1) (DoP, 2011b) in consultation with relevant emergency services organisations (i.e. Fire and Rescue NSW (FRNSW), NSW Rural Fire Service (RFS), NSW Ambulance) and the Local Emergency Management Committee (LEMC). The EP will detail the management measures to minimise the risk of hazardous events as well as emergency response procedures including an evacuation plan for site personnel, nearby dwellings and surrounding premises (refer to Section 7.3 of the PHA in **Appendix 15** for further detail).

6.11.4 Electromagnetic Fields

In accordance with the SEARs, a qualitative assessment of the risks associated with potential electromagnetic fields (EMF) and the proposed grid connection infrastructure has been undertaken, and suitable safeguards and mitigation measures have been proposed to reduce any potential risks.

6.11.4.1 Background and Guidelines

Electric and magnetic fields (EMF)occur wherever electricity is produced, transmitted or used, and so are found commonly in everyday life. Many of the fundamental components of a solar farm (including power conversion (inverter) units, substations and powerlines) inherently produce varying levels of EMF emissions. The solar PV arrays themselves do not emit EMF. EMF is only present once the inverter stations convert the electricity produced into an alternating current (AC). In Australia, electrical devices and infrastructure such as transmission lines and substations, operate at a frequency of 50 Hz which falls within the Extremely Low Frequency (ELF) range of EMF between 0 and 300 Hz.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is the Commonwealth Government's primary authority on radiation protection and nuclear safety. The ARPANSA website notes that "*exposure to ELF (extremely low frequency) EMF at high levels can affect the functioning of the nervous system*" but that "*most of the research indicates that ELF EMF exposure normally encountered in the environment, including in the vicinity of powerlines, does not pose a risk to human health*". Generally, distances beyond 50 m from a high voltage powerline are not expected to have higher than typical EMF and for substations EMF levels at distances of 5 to 10 m away are no higher than background levels in a typical home.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) published *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)* in 1998. The guidelines were updated in 2010, specific to the low-frequency range of the electromagnetic spectrum, i.e. from 1 Hz to 100 kHz with the objective of establishing guidelines for limiting EMF exposure that would provide protection against known adverse health effects.

To prevent health-related interactions with ELF EMF, ICNIRP recommends limiting exposure so that the threshold at which adverse effects due to interactions between the body and the external EMF is never reached. The reference levels for occupational and general public exposure for EMF at 50 Hz are shown in **Table 6.30**. The guideline adopts more stringent exposure restrictions for the general public compared to occupational exposures, recognising that in many cases general public are unaware of their exposure to EMF.

Table 6.30 ICNIRP EMF Reference Levels at 50 Hz

Exposure Characteristic	Electric Field Strength kilovolts per metre (kV/m)	Magnetic flux density microteslas (µT)
Occupational	10	1,000
General public	5	200

Source: ICNIRP, 2010.

Human responses to EMFs depend on the field strength, ambient environmental conditions, and individual sensitivity. The strengths of EMFs decrease rapidly with increasing distance from operating electrical equipment and can also be reduced by shielding. Trees, tall fences, buildings and most other large structures provide shielding from some electric fields.

6.11.4.2 EMF Sources

EMF would potentially be generated during the construction and operational phases of the Project from a number of EMF sources including inverters, BESS, overhead transmission lines, substation as well as cabling (underground) and collection circuits. Potential EMF produced by these components are discussed below.

Solar Arrays and Inverters

Research into EMF produced by commercial solar PV electricity-generating installations in Porterville and San Bernadino, California (Tell et al. 2015), identified that static magnetic fields were very small compared to exposure limits established by ICNIRP. The highest 60-Hz[17] magnetic fields were measured adjacent to transformers and inverters. The magnetic fields measured complied in every case with ICNIRP occupational exposure limits. In all cases, electric fields were negligible compared to ICNIRP limits. Specific findings were as follows:

- There was no evidence of magnetic fields created from the PV modules.
- The highest AC and DC magnetic fields were measured adjacent to the inverter and transformer and both were lower than ICNIRP's occupational exposure limit.

[17] Note that US power supply operates at 60 Hz frequency, compared to 50 Hz in Australia.

- The strength of the magnetic fields attenuated rapidly with distance (i.e. within 2-3 m the fields dropped to background levels).
- Electric fields were negligible to non-detectable, most likely due to the enclosures provided for the electricity generating equipment.

BESS

EMF is considered in the safety design process for any BESS site. The magnetic field associated with a BESS will vary depending on several factors including configuration, capacity and type of housing. When there is no current flowing, there is no magnetic field generated, meaning that for BESS operations, magnetic fields will only be generated during the charging or discharging cycle. Assuming that the BESS will be designed in accordance with electrical safety standards and codes, the general public would be excluded from any exposures from these sources.

Overhead Transmission Lines

The magnetic field from transmission lines varies with configuration, phasing and load, however typical magnetic fields near high voltage overhead transmission lines are estimated by ARPANSA to be between 1 µT and 20 µT (directly underneath) and 0.2 µT and 5 µT (at the edge of easement).

Substations

The highest sources of magnetic fields associated with a large transmission substation would generally occur at the boundary from the incoming and outgoing transmission lines. Generally, the application of electrical safety standards and codes (e.g. fence, enclosure, distance) will result in exclusion of general public exposures from these sources. This is consistent with the measurement of typical magnetic field reported by ARPANSA of between 1 µT and 8 µT at a substation fence.

Underground Cabling

Underground networks typically have no electric fields as these are effectively screened by ground cover while magnetic fields at the centreline are higher, but disperse much more rapidly, than for overhead networks (Energy Networks Association, 2016).

6.11.4.3 Assessment

The design, selection and procurement of the electrical equipment for the Project would comply with relevant international and Australian standards for generation of and exposure to EMF. The required electrical safety standards and codes (including provision of fencing, enclosures, and physical distance) would be utilised to eliminate EMF exposure to the general public from these sources.

A number of residential receivers are located on the northern, southern and western sides of the Goulburn River National Park, however the nearest non-involved sensitive receiver is located approximately 3 km north of the Project infrastructure. There are no other sensitive land uses (such as schools or places of worship) within or surrounding the Project Area. The Project Area is therefore suitably removed from the nearest sensitive receiver. EMF decrease rapidly from the source. Public access to the Project Area would be restricted via security fencing and appropriate buffer distances provided between EMF sources and the closest areas of public access (Wollara Road and Goulburn River National Park).

Staff involved in the construction and decommissioning of the Project would be exposed to EMF for the duration of the works. However, the inherently low EMF levels produced by the proposed infrastructure combined with the temporary nature of the construction and decommissioning phases mean that exposure levels will be below the recommendations for general public and occupational exposure. It is therefore concluded that there will be low to negligible potential for EMF impacts upon human health throughout the construction, operation and decommissioning phases of the Project.

With the implementation of management measures outlined in **Section 6.11.4.4**, it is considered that the EMF exposure risk of the Project can be appropriately managed in all stages.

6.11.4.4 Management and Mitigation Measures

The layout of the Project has been designed considering buffer distances between the EMF sources and sensitive receivers, road and National Park users and the general public. In addition, the design, selection and procurement of electrical equipment for the Project would comply with relevant international and Australian standards for generation of and exposure to EMF.

The following measures will be implemented to manage any EMF risks:

- All project infrastructure will be designed in accordance with relevant industry standards.
- All relevant procedures in relation to a high voltage installation will be adhered to throughout the life of the Project.
- Public access will be restricted throughout the life of the Project.

6.12 Social Amenity

The SEARs require the EIS to include an 'assessment of the social and economic impacts in accordance with the *Social Impact Assessment Guidelines* (DPE, February 2023)'. The Social Impact Assessment (SIA) has been prepared by Umwelt, in line with the key principles and resources outlined in the NSW Government's Social Impact Assessment Guidelines for State Significant Projects (SIA Guidelines) (2023) to address the SEARs. The SIA further took consideration of the Undertaking Engagement Guidelines for State Significant Projects (2022) and the Large-Scale Solar Energy Guidelines 2022.

A key component of the SIA is the process of gaining an understanding from a local community and business perspective of the issues, values and uses associated with the assessment area. More specifically the process aids the identification of issues of concern and potential opportunities associated with the Project. These matters are assessed to predict any significant social impacts in relation to the Project which may require mitigation or enhancement.

The outcomes of the SIA are summarised in **Section 5.0** as well as in the following sections with the full SIA report contained in **Appendix 18**.

6.12.1 Methodology

Concerns and feedback relating to the Project identified throughout the engagement undertaken by Lightsource bp and Umwelt, have been considered by the Project team, and have been used to inform the refinement of the Project design and the development of this EIS including proposed management and mitigation measures.

As illustrated in **Figure 6.26**, and consistent with the SIA guidelines, the SIA process involved three key phases. **Figure 6.27** shows the social locality, which shows the area that describes the social baseline profile of communities including the geographical and spatial governance, development context, community capital/assets, key community values, issues and concerns, as well as the policy setting for renewable energy development. Full details regarding the SIA methodology are provided in **Appendix 18**.

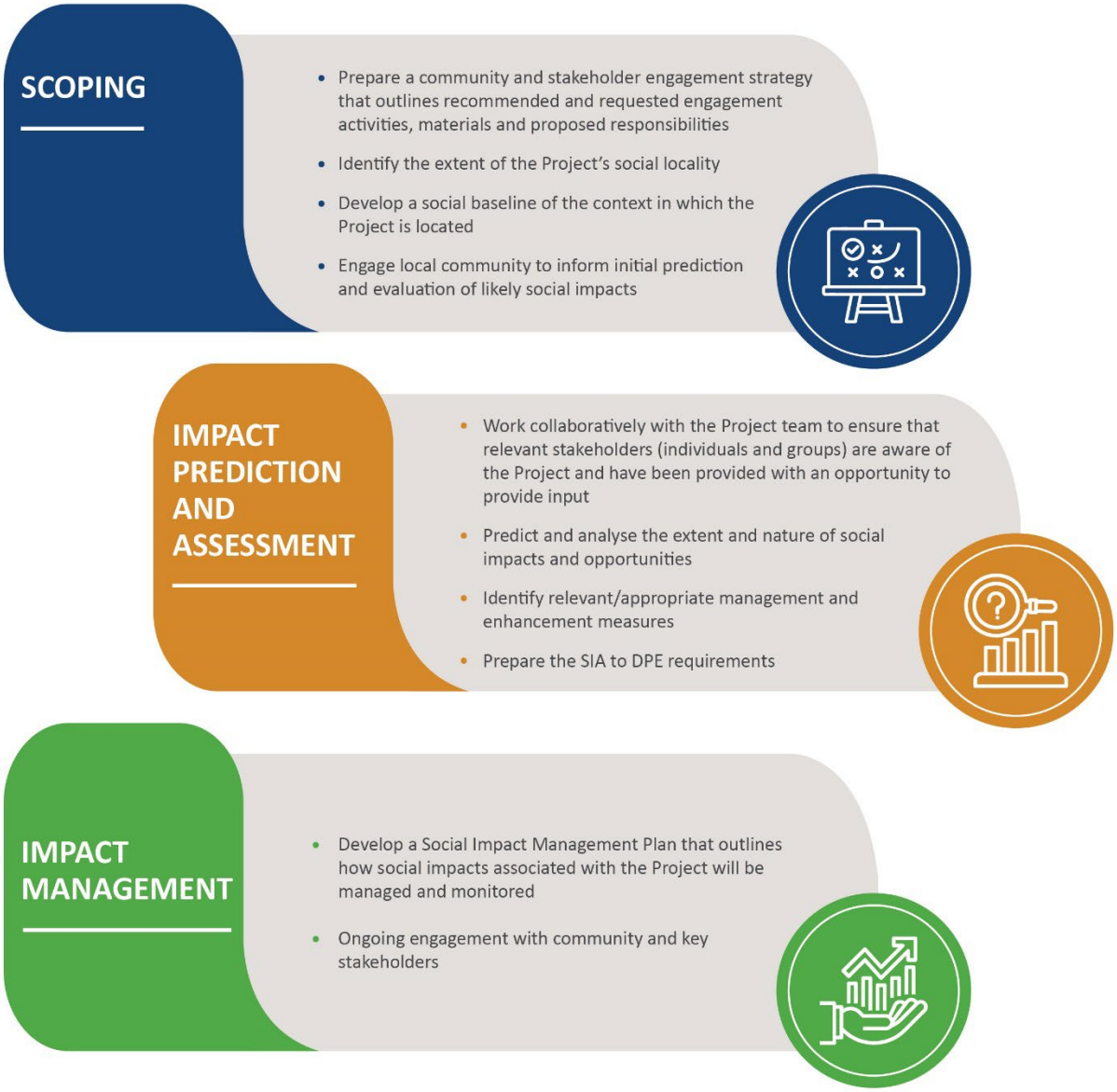


Figure 6.26 SIA Program Phases

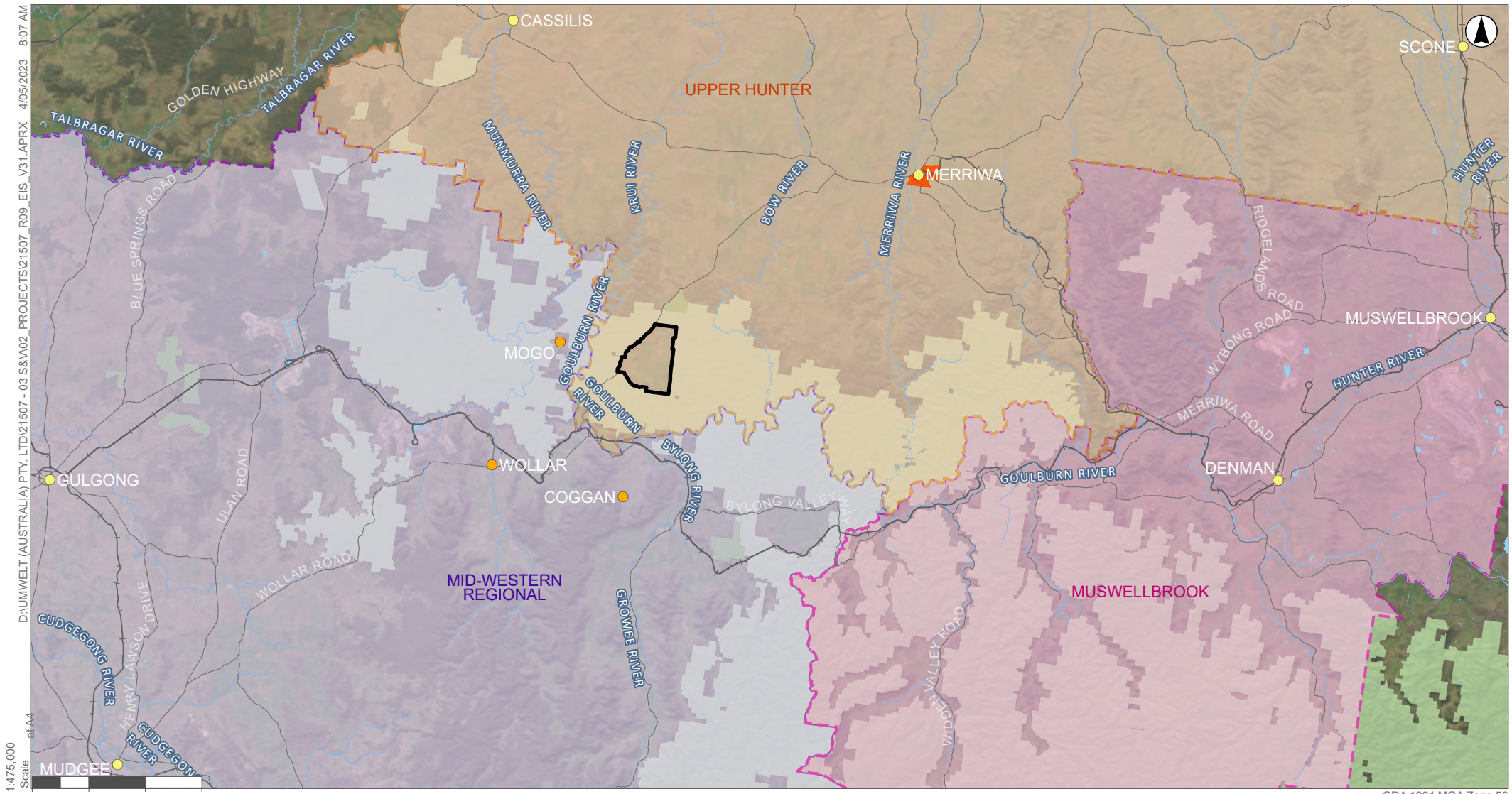


FIGURE 6.27
Social Locality

Image Source: ESRI Basemap (2021) **Data source:** NSW LPI (2021), NSW DSFI (2021); NPWS Estate (2019); Lightsource BP (2022)

6.12.2 Stakeholder Engagement

Throughout the development of the Project various stakeholders have been engaged, to understand their views and opinion on the Project. A summary of the stakeholders contacted throughout the EIS phase is provided in **Table 6.31**.

Table 6.31 Stakeholders Consulted During the EIS Phase

Stakeholder Group	Number of Stakeholders Contacted	Number of Participants
Accommodation provider	16	4
Broader community member (those living within the social locality)	9	3
Community group/association	34	16
Education service provider	2	-
Health and emergency service providers	15	8
Host/proximal landholders (includes all residences along Wollara Road & Ringwood Road)	17	17
Local Aboriginal Land Council &/or Registered Aboriginal Parties	5	3
Local business	14	5
Total	**112**	**56**

6.12.3 Social Baseline

The Project's 'area of social influence' (or social impact assessment study area) comprises of the Upper Hunter LGA (as host LGA), Mid-Western Regional LGA (neighbouring LGA) and Muswellbrook LGA (neighbouring LGA). Rural localities within these LGA's include Merriwa, Cassilis, Mudgee, Gulgong, Rylstone, Denman, Muswellbrook and Scone.

The Project Area is surrounded by the Goulburn River National Park as well as being near the catchment of the Goulburn River. Rural industries represent the dominant land use across the Upper Hunter LGA, with key economic sectors including the equine industry, agricultural production (predominately beef, viticulture, and dairying), coal and other mineral mining, and tourism. Challenges for the Upper Hunter region revolve around maintaining and developing agricultural productivity while supporting the development of other industries, this includes the benefits and risks associated with mining, coal seam gas, and continued urban expansion. In addition to this the area is also vulnerable to natural disasters including drought, flooding, and bushfires. The changing climatic conditions have included up until recently insistent drought conditions as well as reducing winter rainfall, leading to harsher fires. These have impacted agricultural conditions in recent years.

The Project is located on land traditionally occupied by the Wonnarua Nation, with the Wonnarua Nation being the traditional owners of what is today the Upper Hunter Region. The Project Area is represented by the Wannaruah Local Aboriginal Land Council (LALC) and is proximate to land represented by the Mudgee LALC. At a local government level, the Project sits within the Upper Hunter Shire LGA. At the State and Federal level, the Project falls in the Upper Hunter Region, and the New England division respectively.

The Upper Hunter LGA has a decreasing population and over time (from 2021) is expected to reduce by approximately 10% by 2041. There is a proportionally higher Aboriginal population within Merriwa (7.5%) and in the Upper Hunter LGA (7%) when compared to wider NSW (3.4%) (ABS, 2021). Merriwa and the Muswellbrook LGA have the highest proportion of Aboriginal residents across the social locality with 7.5% and 11.7% of their populations identifying as Aboriginal in 2021. Rates of avoidable deaths are higher in the Mid-Western and Upper Hunter LGAs (147.9 and 139.9 per 100,000 people) compared to the State average (118.1 per 100,000 people) and regional and rural NSW (146.6 per 100,000 people). Rates of death from all avoidable causes were significantly higher in Muswellbrook LGA at 191.5 avoidable deaths per year per 100,000 residents (ABS, 2021).

As identified in the Goulburn River National Park Plan of Management, 347 Aboriginal sites have been recorded in the National Park which surrounds the Project. The State Heritage Register lists one heritage item of State significance in Merriwa (approximately 28 km) and twenty-three items of local significance within the Merriwa township (Upper Hunter Local Environmental Plan). As such there are strong connections to local Aboriginal and European heritage. There are strong cultural ties to regular events and festivals such as the Festival of the Fleeces.

There are strong social connections and volunteerism as the proportion of the LGA's population who participated in voluntary work through an organisation or group in the last 12 months was above the State proportion at 16% and 13% respectively (ABS, 2021).

The agriculture, forestry, and fishing sectors are central to livelihoods across the social locality and are the top industries of employment in the Upper Hunter LGA (ABS, 2021). These industries provide significant employment in Merriwa, and the Mid-Western LGA (ABS, 2021). Mining is also a significant contributor to the share of industries by employment, particularly in the Mid-Western and Muswellbrook LGAs, where it is a top industry of employment (ABS, 2021). Merriwa residents experience considerably higher levels of economic disadvantage as compared to their surrounding communities and the State's population (ABS, 2021). Upper Hunter LGA residents have greater economic advantage (score 7) relative to Muswellbrook and Mid-Western LGA residents (score 4 & 6 respectively). Interestingly, residents in Merriwa experience considerably higher levels of economic disadvantage, ranking in the lowest 20% of all locations across the State (score 2) (SEIFA, 2016).

The availability of short-stay accommodation in towns most proximal to the Project is limited, however a range of options exist in nearby regional centres. Most accommodation options are within a 60 minute drive of the Project and are located in the towns of Mudgee and Scone, however, there are also options in smaller townships located closer to the Project Area, including Gulgong, Rylstone, Denman and nearby Merriwa. Health care challenges within the Upper Hunter and Mid-Western Regional LGAs is identified as a key issue as there are is limited access for the rural communities to general practitioners and specialists than compared with the state average. The closest large hospital is Muswellbrook Hospital, which is 104 km and a 1 hour and 20-minute drive from the Project Area.

6.12.4 Assessment of Social Impacts

Potential road safety impacts were identified as the most frequently raised issue of concern for the community during the consultation process. This is in relation to the low quality of Wollara and Ringwood Road, of which the Project would use to access the Project Area. Many of the residents alongside the road raised that road repairs that could occur as a result of the Project would improve personal use of the road and accessibility around the local area, which would lead to broader improvement to their way of life.

Social impacts to the Project Area were also raised, regarding how the Project may affect local community values associated with the natural environment and agriculture, with many stakeholders noting that the continued management of wild dogs in the immediate Project Area may become challenging due to the Project's establishment, as well as the changes in land-use from agricultural to solar panels that the Project would cause, resulting in a reduction in land-based livelihoods in the community.

Throughout the Project design development particularly during the early design stages of development, Lightsource bp considered the environmental, cultural and social constraints of the locality to minimise the potential impacts of the Project. Stakeholder consultation indicated that the design refinements identified through specialist studies aligned with the concerns raised about the Project. **Table 6.32** provides a summary of the significance of the Project's social impacts, following implementation of the proposed management and enhancement strategies detailed in **Section 6.14.5**.

Further detail in relation to the issues raised and relevant perceived social impacts is provided in the SIA included in **Appendix 16**. It is important to note that unlike other technical studies undertaken for this EIS, there are no quantitative thresholds in social impact assessment and the assessment heavily relies on a qualitative assessment. Therefore, the social risk assessment is also informed by the socio-economic baseline data, outcomes of literature reviews, experience with other projects and outcomes of consultation that reflect the felt or lived experiences of consulted stakeholders and findings of technical studies.

An important component of the SIA has been the integration of technical studies with the risk rating of a Project factor or impact as identified by consulted stakeholders i.e. the sensitivity / susceptibility / vulnerability of people to adverse changes caused by the impact and/or the importance placed on the relevant social matter. Consequently, stakeholder ratings of risk were determined by assessing impacts identified through the consultation process. The resulting ranking (i.e. low, moderate and high) was determined by the frequency that an issue was raised by a particular stakeholder group in the engagement process. These views have been presented in **Table 6.32** as stakeholder perceived significance.

In line with the SIA Guideline, to assess the overall social risk, the magnitude is cross-referenced with the likelihood to determine an overall risk assessment rating (i.e. low, moderate, high, or very high). In the case of some impacts, this risk assessment has involved reference to the relevant technical reports of the EIS (e.g. traffic, noise, air quality etc.), however, the associated social impacts have been assessed through the social risking process. It should be noted that the residual social risk ratings represent the risk post implementation of mitigation measures with the majority of residual social impact rated low.

Table 6.32 Evaluation of Social Impacts

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation)[19]	Mitigation or Enhancement	Residual Significance Rating
Surroundings	Project establishment	Decreased road safety due to further deterioration and speeding along Wollara and Ringwood Road, due to heavy vehicle traffic to and from the Golden Highway through Merriwa Town	Proximal residents & all road users	Construction phase Decommissioning	High	High	Undertake road repairs and upgrades. Prepare a roads repair, upgrades and maintenance plan ahead of construction and communicate it to the community. Implementation of a road safety management plan and Construction Traffic Management Plan (CTMP).	Low
Surroundings	Project establishment and construction	Decreased road safety for cars and the local traffic due to the combination of fast-growing grass along Wollara and Ringwood Road, affecting the level of visibility, in combination with the addition traffic of heavy vehicles	Proximal residents & all road users	Construction phase Decommissioning	High	High	Prepare a roads repair, upgrades and maintenance plan ahead of construction and communicate it to the community. Implementation of a road safety management plan and Construction Traffic Management Plan (CTMP).	Low

[18] Level of concern or interest from the perspective of the affected party: L = Low; M = Medium; H = High, VH = Very High.
[19] Significance rating (L: Low, M: Medium, H: High, VH: Very High).

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Surroundings	Project establishment and construction	Lack of trust from the community relating to the developer's commitment to preserve/protect local environmental values, such as fast-growing weeds in the Project Area spreading to nearby properties	Proximal residents	Construction and Operation phase	Medium	Medium	Proactive, thorough and transparent consultation process throughout Project planning, assessment and development. Preparation and implementation of the Construction Environment Management Plan (CEMP), Operational Environment Management Plan (OEMP) and landscape management plan. Provide community with information of the complaint procedure during construction (through CEMP) and operations (through OEMP).	Low
Surroundings	Project establishment and operation	Fears of increased presence of wild dogs in and around the Project Area due to proposed sheep grazing on site, placing danger to the local community and other animals (pets and livestock)	Proximal residents	Operation phase	High	High	Collaboration with the Wild Dog Association to support a Wild Dog Management Plan as part of the broader Community Benefit Sharing Strategy.	Low

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
							Formulate plans for Agrisolar initiatives to support other innovative forms of dual land use, including a plan to support mitigation measures related to the wild dogs, ahead of Project construction in consultation with host and neighbouring landholders, as well as community organisations. Wild Dog Management Plan as part of the OEMP.	
Surroundings	Project establishment and operation	Loss of community sense of place due to change in the land-use from agricultural to solar panels	Proximal residents	Construction and Operation phase	Low	Low	Proactive, thorough and transparent consultation process throughout Project planning, assessment and development. Proactive and ongoing information sharing about the benefits of renewable energy in the area and Agrisolar initiatives. Community Benefit Sharing Strategy to consider initiatives that focus on increasing social wellbeing and community participation.	Low

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Surroundings	Project Decommissioning	Concerns regarding the relatively short lifespan of the Project relating to waste creation and future land use, which could decrease community support for the project	Broader community	Operation and decommissioning phase	Low	Low	Prepare a Waste Management Plan as part of the CEMP that is based on the waste hierarchy. Prepare a decommissioning strategy that explores options and formulate plans for future land use post-decommissioning and consideration of project life expansion. Proactive, thorough and transparent consultation process throughout the Project lifespan. Select a designated recycler for the solar panels and plan for future costings, Lightsource bp has a Memorandum of Understanding with Lotus Energy to recycle the solar panels from the Project.	Low
Surroundings	Project Construction	Increased noise and dust due to heavy vehicle traffic at Wollara and Ringwood Road causing disturbance to nearby residents	Proximal residents	Construction phase	Medium	Medium	Implementation of a road safety management plan and Construction Traffic Management Plan (CTMP).	Low

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
							Prepare a roads repair, upgrades and maintenance plan ahead of construction and communicate it to the community. Limit construction activities to standard working daylight hours. Keep the local community informed around the construction hours and any subsequent changes.	
Surroundings	Project establishment, construction and operation	Loss of community sense of place due to changes in the visual landscape due to the Project development	Proximal residents	Construction and Operation phase	Low	Low	Consider visual screening from public viewpoints.	Low
Surroundings & Accessibility	Project establishment	Decreased accessibility between towns and services due to deterioration of Wollara and Ringwood Road as a result of the additional traffic.	Proximal residents & all road users	Construction phase	High	Medium	Prepare a roads repair and maintenance plan ahead of construction and communicate it to the community. Implementation of a road safety management plan and Construction Traffic Management Plan (CTMP).	Low

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Surroundings & Accessibility	Project establishment and operation	Increased community anxiety regarding potential delay of emergency/bushfire responses due to the lack of public access to the site, which could reduce safety of local residents and ability to protect private properties in the event of a bushfire	Proximal residents, broader community and service providers	Construction and Operation phase	Medium	High	Communicate Bushfire Management Plan to community through consultation process and implement mitigation measures, including working with local Aboriginal community to engage in cultural cool burns on the site. Implementation of the Asset Protection Zone (APZ) and have on site water carts. Providing training and site tours for local emergency services (VRA, RFS and Fire and Rescue) to familiarise them with the access points and procedures and to also provide solar farm specific bushfire skills.	Medium
Way of life, Community, Culture & Health and Wellbeing	Construction workforce influx	Potential decrease to levels of social cohesion in local communities due to influx of construction workers	Broader community	Construction phase	Medium	Medium	Proactive, thorough, and transparent consultation process throughout Project planning, assessment and development. Accommodation, Employment and Procurement Strategy to be in place ahead of construction.	Medium

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
							Community Benefit Sharing Strategy to consider initiatives that focus on increasing social wellbeing and cohesion in local communities. Clear communication and information sharing with the workforce regarding the area and incentivise a respectful day to day behaviour in accordance with the local community way of living.	
Way of life, Community, Culture & Health and Wellbeing	Project operation	Increased social wellbeing due to community hosting project that contributes to a more sustainable region by reducing reliance on carbon intensive industries	Proximal residents, Local and broader community	Planning, construction and operation phases	Medium	Medium	Clear communication and information sharing with the local community regarding the benefits of the renewable energy industry. Community Benefit Sharing Strategy to consider initiatives that focus on increasing social wellbeing and community participation.	High

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Way of life, Community, Culture & Health and Wellbeing	Project establishment and operation	Project being built in proximity of significant Aboriginal and European Heritage and cultural values causing concern over preservation and valuing of family and community histories	Traditional owners, RAPs, LALC, Aboriginal Groups and host landholders	Planning, construction, and operation phases	Low	Medium	Implementation of Aboriginal Cultural Heritage Management Plan in consultation with Registered Aboriginal Parties and local residents.	Low
Engagement and Decision-Making Systems	Project determination and establishment	Opportunity for the local community to participate meaningfully and influence project decision making due to existing high-level awareness of project and activities in community	Broader community	Planning phase	Medium	Medium	Ongoing Community Engagement Strategy, implemented in a way that increases opportunities for the community to work together with Lightsource bp during the project development. Community Benefit Sharing Strategy to consider initiatives that focus on increasing social wellbeing and community participation.	High

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Livelihoods	Project establishment and construction	Opportunity to stimulate a growing industry and to upskill local workers through project workforce requirements, which in turn can increase human and economic capital across social locality	Local and broader community, local business owners	Construction phase	Medium	High	Accommodation, Employment and Procurement Strategy to include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as through job-ready training (i.e., apprenticeships), up-skilling and capacity building supports, in collaboration with local stakeholders and training providers, to improve job-readiness in the pre-construction phase of the Project.	High

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
Livelihoods	Project establishment and construction	Increased economic and human capital across social locality due to project procurement opportunities	Local and broader community, local business owners	Construction phase	Medium	High	Accommodation, Employment and Procurement Strategy to include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as through job-ready training (i.e., apprenticeships), up-skilling and capacity building supports, in collaboration with local stakeholders and training providers, to improve job-readiness in the pre-construction phase of the Project.	High
Livelihoods	Project construction workforce	Increased spending in local towns bringing about positive growth for local businesses and services	Local and broader community, local business owners	Construction phase	Medium	High	Accommodation, Employment and Procurement Strategy to include targeted and proactive initiatives to maximise the capacity and use of local businesses, and to be developed in collaboration with local business providers.	High

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation)[19]	Mitigation or Enhancement	Residual Significance Rating
Accessibility	Project construction	Strain on local accommodation and housing sector due to the influx of workforce, including potential cumulative impacts associated with other nearby developments.	Accommodation providers Local residents Service providers Local government	Construction phase	High	High	Accommodation, Employment and Procurement Strategy to be in place ahead of construction and to be developed in collaboration with local Council and stakeholders. Proactive, thorough, and transparent consultation process throughout Project planning, assessment and development.	Medium
Accessibility	Project construction	Strain on local health care and emergency services due to the influx of new population combined with the existing shortage of emergency services and healthcare workers, including potential cumulative	Emergency service providers,	Construction phase	Medium	High	Accommodation, Employment and Procurement Strategy to be in place ahead of construction and to be developed in collaboration with local Council and stakeholders. Consideration given to workforce volunteering commitment, providing training and site tours for local and new emergency service workers to familiarise them with the access points and procedures.	Medium

Impact Category	Project Aspect	Impact Description	Extent / Affected Parties	Duration	Perceived Significance [18]	Significance Rating (before mitigation) [19]	Mitigation or Enhancement	Residual Significance Rating
							Proactive, thorough, and transparent consultation process throughout Project planning, assessment and development.	
Accessibility	Project establishment	Improved access to telecommunication services	Emergency service providers, proximal residents	Construction and operation phases	Medium	Medium	Ongoing Community Engagement Strategy, implemented in a way to increase opportunities for the community to work with the Project during development. Ensure plans to install telecommunications services onsite is cognisant of local community and service provider access needs and integrates infrastructure provision with community benefit sharing program where feasible.	High

6.12.5 Management and Mitigation Measures

There are a number of elements of the Project proposed, that provide positive elements to the community, including installation of a shared telecommunications tower and Road Repairs and Upgrades (that have been assessed in previously in **Section 3.4.2** and **Section 3.7.3**).

To minimise potential negative social impacts and enhance social benefits for the community; there have been a number of Project design changes and a range of management measures developed for the Project, these include:

A range of social mitigation and management measures outlined in detail in the SIA (refer to **Appendix 16**), including:

- A Social Impact Management Plan (SIMP) will be prepared for the Project to manage and enhance social impacts through each stage of the Project.
- A Community Engagement Strategy will be prepared for the Project to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development.
- A Community Benefit Sharing Strategy will be developed in consultation with local stakeholders to target investment to local needs and priorities, cognisant of activities/efforts of adjacent projects.
- Accommodation, Employment and Procurement Strategy (AEPS) will be developed in collaboration with local councils and stakeholders. The AEPS will include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as training, up-skilling and capacity building support, in collaboration and with local stakeholders and training providers.

6.12.6 Cumulative Social Impacts

The SIA (refer to Section 3.3 in **Appendix 18**) discussed both the positive and negative impacts of the projected population influx on the region. Local businesses and service providers have the opportunity to realise commercial benefits from accommodating and servicing the workforce while, at the same time, accessibility issues may occur for other user groups potentially affecting affordability and availability of accommodation and community services. This would particularly be the case when considering the cumulative effect of population influx between multiple projects with potential concurrent development programs, in the context of the REZ's and multiple development projects in planning nearby. When considered cumulatively, the potential strain on local accommodation and other township services could result in a high social impact. **Appendix 22** provides a detailed cumulative impact assessment for all aspects considered as a part of the EIS, in addition to the mitigation measures outlined in **Section 6.12.5** Lightsource bp will monitor nearby developments as the Project progresses assess and upcoming or ongoing cumulative impacts.

6.13 Economics

An Economic Impact Assessment (EIA) for the Project was prepared by Ethos Urban Pty Ltd (2023), in accordance with the SEARs, to address the economic benefits and impacts of the Project for the region and the State as a whole.

During the stakeholder engagement program, community responses regarding the economic impacts of the Project most frequently identified positive economic impacts, particularly relating to benefits to local livelihoods through opportunities for local employment and procurement and the sharing of Project benefits at the local community level (refer to **Section 5.3**). However, there were also some community concerns raised in relation to negative economic impacts including potential strain on local services due to an influx of construction workforce and the cumulative effects on local infrastructure and services due to workforce influx across regional projects. These impacts and economic-related concerns are addressed in the EIA, with results summarised in the sections below with further detail provided in **Appendix 19**.

6.13.1 Methodology

The EIA defined its Study Area in terms of the following LGAs:

- Upper Hunter Shire (in which the Project is to be located).
- Mid-Western Regional.
- Muswellbrook Shire.

The main regional cities/townships/settlements in the EIA Study Area are all located within a 60-minute drive of the Project Area.

The EIA undertook a baseline analysis of population, labour markets, and occupational and business structures for the Study Area and NSW to allow an assessment of the:

- Capacity and opportunities of townships in the Study Area to participate and service the Project.
- Potential for retention of Project investment in the Study Area.
- Direct and indirect Project employment.
- Business and industry participation opportunities, with reference to baseline analysis outcomes regarding workforce size and skills composition and procurement activities.
- Agricultural impacts including employment and production impacts through land consumption and disruption to activities, and benefits to host landowners from new incomes and improved on-site infrastructure.
- Accommodation and housing impacts with reference to the baseline analysis and the estimated number of construction workers that may require accommodation at the Project's peak.
- Cumulative impacts relating to the potential concurrent construction of major infrastructure projects within 100 km of the Project Area, particularly in relation to the nearby CWO and Hunter-Central Coast REZ.
- Economic stimulus impacts including project wages and spending, uplift in Council rates revenues, and Proponent's Community Shared Benefits Strategy payments.

Based on this assessment, mitigation measures relating to accommodation, workforce and procurement and community benefit sharing were proposed.

6.13.2 Baseline Regional Economic Profile

6.13.2.1 Population

The population of the Study Area totalled 55,930 persons as of June 2021 (ABS Estimated Resident Population, 2021). Over the period 2022-2036, annual population growth in the Study Area is expected to be +0.4% pa (or +230 persons per annum over 14 years) compared to the NSW growth rate of +1.0% p.a. The Upper Hunter LGA is projected to experience population decline over the coming years. In this regard local investment projects (such as the proposed Project) can generate new employment opportunities for residents, workers transitioning from the mining sector as well as more diverse income streams for local farmers. These factors may contribute to retaining, and potentially expanding, population levels within this area.

6.13.2.2 Labour Force, Occupational and Business Structure

As of March 2022 (latest available), the Study Area had an unemployment rate of 3.1%, which is significantly lower than the rate for NSW (4.6%). The Project is likely to require 250 workers on average over the construction phase (or 350 workers at the Project's construction peak), with potentially 35% of these workers (87–122 workers) sourced locally or from within the Study Area, providing new opportunities for unemployed job seekers (subject to appropriate skills match).

The latest available employment related census data (ABS Census 2016) shows 45.9% of employed residents in the Study Area were occupied in activities generally associated with the types of skills required for the construction of a solar farm (e.g., technicians and trades workers, machinery operators and drivers, and labourers). The Study Area's representation in these occupations is well above the State average of 27.8%, indicating a generally suitable occupational base for the proposed Project is present in the region.

The Study Area's occupational and business structures indicate a good base exists to service the needs of the Project.

6.13.2.3 Township Services

Current accommodation data reflects a constrained rental market in the Study Area with vacancy rates generally below 1.0%. At the same time data shows that 13.7% of Study Area dwellings (3,360 dwellings) were unoccupied at the 2021 Census, which is notably higher than the average for NSW (9.4%). Mid-Western Regional LGA had a significant share of unoccupied dwellings (15.0%) or 1,700 dwellings, which is likely related to a large number of holiday homes in this well touristed area. Shared private housing accommodation is one potential option for Project workers, with some of the Study Area's unoccupied dwellings having the potential to enter the housing market to support the construction phase of the Project.

Large renewable energy projects, such as the Project, tend to harness the local rental market with the majority of longer-term workers living in shared accommodation (reflecting both convenience and cost). As a result, the local rental markets tend to reach or almost reach full utilisation and may require further supply to be brought to the market. It is possible this situation might occur during the construction phase of the Project based on the current constrained nature of the local rental market and the relatively high share of unoccupied dwellings (including holiday homes) located in the Study Area.

The major regional townships of Mudgee and Scone have the capacity and labour force to service many aspects of the Project, with smaller settlements such as Merriwa, Gulgong, Denman and Rylstone, also likely to provide labour, accommodation and other general services to the Project.

6.13.3 Assessment of Economic Impacts

The net economic impacts of the Project, as presented in the EIA, are shown in **Table 6.33**.

Table 6.33 Net Economic Outcomes

Factor	Value
Negative Economic Outcome: Temporary loss of agricultural land (40 years)	799.5 ha
Negative Economic Outcome: Loss of employment (direct and indirect)	0 jobs
Positive Economic Outcome: Capital investment	Approximately $880 million
Positive Economic Outcome: Study Area investment (including wage stimulus)	+$130 million (assumes 15% of total investment)
Positive Economic Outcome: Construction employment (direct and indirect)	350 direct and 560 indirect jobs, 910 FTE total jobs nationally (over 27 months), including Study Area jobs (125 FTE direct on-site, 110 FTE indirect off-site)
Positive Economic Outcome: Operational employment (direct and indirect)	40 FTE total jobs (10 FTE direct and 30 FTE indirect), including Study Area jobs (10 FTE direct on-site, 3 FTE indirect off-site)
Operational Economic Stimulus: Total net local economic stimulus (operational wage stimulus, community/neighbour payments, increased Council land tax returns)	+$120 million (over 40 years)
Total Economic Benefits	**+$250 million (Construction period PLUS 40 years operation)**

6.13.3.1 Project Investment and Employment Impacts

Overall, the Project will involve approximately $880 million in investment during the construction phase (of which approximately $130 million will be retained in the Study Area during construction) and will support 910 Full Time Equivalent (FTE) positions in the national economy over the 27-month construction period (350 direct FTE jobs and 560 indirect FTE jobs). Once operational, 40 FTE jobs will be supported nationally by the Project (10 direct FTE jobs and 30 indirect FTE jobs). Of this national total, the Study Area is expected to benefit from 350 FTE construction jobs and 13 FTE ongoing jobs associated with the Project.

The Study Area has moderate capacity in terms of construction-related workers and businesses to manage both the requirements of the Project, and concurrent regional infrastructure projects if required. The Project will provide new participation opportunities for businesses and workers located in the Study Area, having regard for the good match of skills and resources available.

6.13.3.2 Accommodation and Local Wage Spending Stimulus Impacts

The 'external' Project labour requirement would be expected to generate an accommodation need for 350 workers at the peak of the Project construction. This represents 36% of total commercial accommodation rooms/cabins within a 60-minute drive of the Project Area. However, further capacity is available in caravan parks (powered sites), private rentals (e.g. long-term houses/units, short-term Airbnb), and potentially unoccupied dwellings – some of which may become available to the market to support the Project.
The Project will generate new revenues for commercial accommodation providers and also private property owners over the construction phase (especially in off-peak seasons) including in small townships such as Rylstone, Gulgong and Merriwa.

While accommodation data indicates that reasonable capacity currently exists in the Study Area to accommodate the number of non-local workers expected at the peak of the Project; increased demand from concurrent regional infrastructure projects and seasonal accommodation demands (tourism, agricultural and mining activities etc) also need to be considered. An Accommodation Employment and Procurement Strategy (AEPS) construction workforce strategy/plan would form part of pre-construction planning (refer to **Section 6.13.4**) to minimise impacts on the local community.

Construction workers relocating to the region would be expected to inject approximately $30.1 million (2022 dollars) in new spending into the economy over the construction phase, supporting approximately 150 FTE jobs in the service sector in the Study Area over this time.

6.13.3.3 Agricultural and Tourism Impacts

Once operational the Project has been designed to be compatible with agricultural activity through the ability for continued use of the Project Area to occur through sheep grazing. No loss of employment associated with the existing agricultural land use of the Project Area is anticipated as a result of the Project as the new mixed-use arrangement is likely to require a similar number of employees as the present set up.

Operation of the Project could also potentially support small-scale tourism and educational opportunities in the future, especially in light of the significant development of the renewable energy sector in the nearby CWO and Hunter Central Coast REZ over the coming years.

6.13.3.4 Ongoing Economic Stimulus

Ongoing economic stimulus associated with the operation of the Project is estimated at approximately $120 million (over 40 years, CPI adjusted) relating to, operational wage stimulus, Community Benefits Fund and net land tax revenue to Council. Further details on each of these elements are provided in the EIA in **Appendix 19**.

6.13.3.5 National Grid Supply Benefits

With an operational capacity of 550 MW, the Project has the potential to provide sufficient renewable energy to support the annual electricity needs of the equivalent of approximately 156,000 NSW households, representing over ten times the annual electricity requirements of the Study Area and highlighting the importance of the facility from a renewable energy generation perspective.

The Project will also contribute to the reduction of greenhouse gas emissions across NSW, avoiding the production of up to 705,000 tonnes per annum.

6.13.4 Management and Mitigation Measures

To minimise potential Project impacts and maximise Project benefits, the following mitigation measures are recommended by the EIA:

- Prior to commencing construction, it is recommended the Proponent prepare an Accommodation, Procurement and Employment Strategy (APES) for the Project in consultation with relevant stakeholders, including:
    - Measures to ensure there is sufficient accommodation for the workforce associated with the construction phase of the Project.
    - Measures to address any specific cumulative impacts arising associated with other State significant development projects in the area.
    - Measure to prioritise the employment of local workers and the procurement of local businesses for the construction and operation of the Project.
    - A program to monitor and review the effectiveness of the strategy over the life of the Project.
- To ensure the broader community benefits from the construction and operation of the Project, it is recommended the Proponent develop a Community Shared Benefit Strategy (CSBS) including a Community Fund to be available to the wider community.

6.13.5 Cumulative Economic Impacts

Cumulative economic impacts were assessed in the EIA (refer to **Appendix 19**) and are associated with significant development of major renewable energy projects in the CWO REZ and Hunter Central Coast REZ in the coming years combined with ongoing demand from the tourism, agriculture and mining sectors. Competition for labour and accommodation are the primary cumulative impacts of relevance from an economic perspective. It is understood that concerns about workers accommodation and potential impacts on housing availability was a key theme from community feedback in stakeholder consultations.

The EIA also acknowledged potential impacts due to insufficient accommodation and workers to service the Project and concurrent demands. In this regard, the EIA recommended strategies to manage accommodation demand, and local procurement and employment in the region.

Lightsource bp has committed to the preparation of an Accommodation, Procurement and Employment Strategy (AEPS) in consultation with relevant stakeholders, and a Community Shared Benefit Strategy (CSBS).

6.14 Waste Management

The SEARs require the EIS to quantify and classify the likely waste streams to be generated by the Project, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. A qualitative waste assessment was undertaken for the Project, as presented in this section, which involved:

- Initial classification of wastes generated by the Project, to identify wastes which may be recycled, require landfilling and/or may be classified as hazardous and require special arrangements (or cannot be disposed of locally).
- Review of the capacity of, and acceptable wastes that can be received by, waste management facilities in the surrounding LGAs.

Management of waste streams will be guided by the principles of the waste hierarchy, where emphasis is placed upon reducing, reusing, and recycling prior to disposal of wastes. Appropriate and best-practice waste management will be implemented as part of the Project in accordance with the following legislation and guidelines:

- DPE *Large Scale Solar Energy Guideline 2022*.
- NSW *Protection of the Environment Operations Act 1997* (POEO Act).
- NSW Protection of the Environment Operations (Waste) Regulation 2014.
- NSW *Waste Avoidance and Resource Recovery Act 2001* (WARR Act).
- Commonwealth *Recycling and Waste Reduction Act 2020*.

The DPE Large Scale Solar Guideline 2022 (NSW DPE, 2022) addresses some of the common issues for large scale solar developments and outlines the requirements for several of these issues. Requirements for waste management include:

- Identification of waste types (including the appropriate waste classification) and estimates of waste expected to be generated at each stage of the project.
- Identification of end markets for waste materials generated at each stage of the project.
- Evidence from local councils or facilities that the identified waste classifications and volume can be accepted at the appropriate stage of the project's life cycle.
- Consideration of circular design principles and strategies to mitigate impacts and reduce waste generation throughout all stages of the project (such as using recycled, reusable and low-impact raw materials where possible).
- End-of-life reuse, refurbishment and recycling strategies for PV panels and associated equipment that maximise high recovery methods.

The *NSW Waste Avoidance and Resource Recovery Strategy* (EPA, 2014a) outlines the requirements for best practice waste management, which combines the principles of ecologically sustainable development with the implementation of resource management hierarchy principles as specified in the WARR Act (refer to **Figure 6.28**), which include:

- Avoidance of unnecessary resource consumption.
- Resource recovery (including reuse, reprocessing, recycling, and energy recovery consistent with the most efficient use of the recovered resources).
- Disposal, including management of all disposal options in the most environmentally responsible manner in accordance with the *Waste Avoidance and Resource Recovery Strategy 2014–2021* (EPA, 2014a).

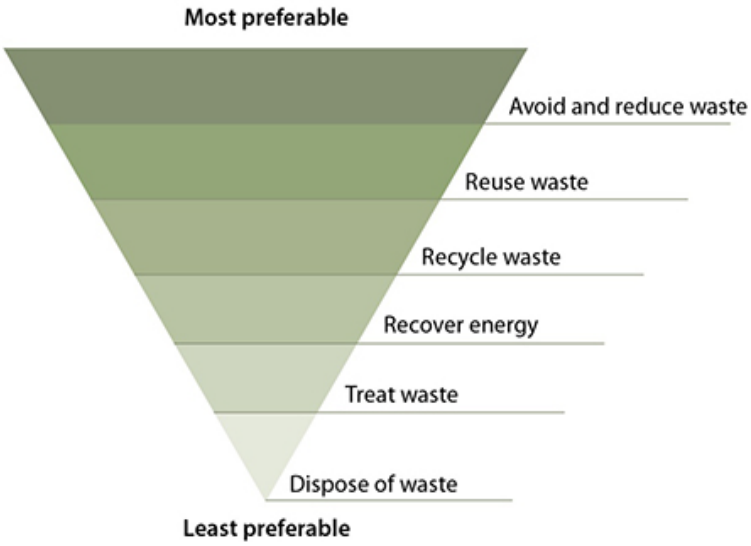


Figure 6.28 NSW EPA Waste Hierarchy (EPA, 2017)

6.14.1 Existing Environment

Waste generated by the Project that cannot be reused or recycled would be disposed of at suitable waste management facilities within the Upper Hunter, Muswellbrook or Mid-Western LGA. The Project Area is located close to the border of the Upper Hunter LGA and the Mid-Western LGA, and Muswellbrook LGA is also in close proximity and so use of waste facilities within these three LGAs would be considered. A review of operating waste management facilities within these LGAs was undertaken to determine suitability to accept waste generated by the Project. The facilities located closest to the Project are:

- Upper Hunter LGA Facilities:
    - Scone Landfill (approximately 77 km east of the Project) – waste accepted at this facility includes mixed waste, green waste, recycling, scrap metal, e-waste, tyres, dead animals (by appointment).
    - Murrurundi Waste Management Facility (approximately 86 km north-east of the Project) – waste accepted at this facility includes mixed waste, recycling, scrap metal, e-waste, tyres and green waste.
    - Merriwa Waste Management Facility (approximate 24 km north-east of the Project) – waste accepted at this facility includes mixed waste, recycling, scrap metal, e-waste, tyres and green waste.
    - Aberdeen Waste Management Facility (approximately 77 km east of the Project) – waste accepted at this facility includes mixed waste, green waste, recycling, scrap metal, e waste, tyres, dead animals (by appointment) and asbestos (by appointment).
- Mid-Western LGA Facilities:
    - Gulgong Waste Facility (approximately 50 km south-west of the Project)- waste accepted at this facility includes general waste, recycling, green waste, scrap metal and e-waste.

- Mudgee Waste Facility (approximately 57 km south-west of the Project) is the LGAs primary facility for receiving commercial and building waste – other waste accepted at this facility includes general waste, recycling, green waste, scrap metal, e-waste, tyres, mine waste, dead animals (by appointment) and asbestos (by appointment).
- Kandos Waste Facility (approximately 60 km south-east of the Project) – waste accepted at this facility includes general waste, recycling, green waste, scrap metal and e-waste.

- Muswellbrook LGA Facilities (nearby):
  - Muswellbrook Waste and Recycling Facility (approximately 48 km east of the Project Area) – waste accepted at this facility includes household waste and hazardous material, cars and other vehicles, chemicals and liquids, construction and demolition materials, electrical equipment, food and beverage packaging, furniture and fittings, lighting, metals, paper and cardboard and rubber.

Lightsource bp will consult with local councils prior to the commencement of construction to identify suitable waste disposal locations.

6.14.2 Predicted Waste Streams

Under the *Waste Classification Guidelines – Part 1: Classifying wastes* (EPA, 2014b), waste can be classified into six different classes based on risks to the environment and human health. These are:

- Special waste – asbestos, waste tyres and clinical wastes.
- Liquid waste – wastewater effluent, fuels and lubricants.
- Hazardous waste – contaminated soils.
- Restricted solid waste.
- General solid waste (putrescible) – food waste, organics and animal wastes.
- General solid waste (non-putrescible) – glass, plastic, rubber, bricks, concrete, metal, paper, cardboard and other domestic waste.

Identified waste types expected to be generated by the Project during the construction, operation and decommissioning phases are included in **Table 6.34**, assessed in the context of the above guidelines.

Table 6.34 Potential Waste Classification, Estimates, End Use and Processing Facilities

Phase	Waste Type	Estimated Volume (m^3)	End Market/Facility
Construction	Green Waste	0 m^3 All green waste processed onsite	Processed onsite.
Construction	Hazardous Waste	5,000 L of oil, lubricants and liquids	Muswellbrook waste & Recycling Facility.
Construction	Liquid Waste	8,981 m^3	Cleanaway Kooragang TTS Liquid Waste Services.

Phase	Waste Type	Estimated Volume (m^3)	End Market/Facility
Construction	General Solid Waste (Non-Putrescible) – Mixed	3,020 m^3	Muswellbrook waste & Recycling Facility. Otherwise, Newcastle waste management facilities.
Construction	General Solid Waste (Non-Putrescible) – Office	8,282 m^3	Muswellbrook waste & Recycling Facility.
Construction	General Solid Waste (Non-Putrescible) – Cardboard	900 m^3	Muswellbrook waste & Recycling Facility. Newcastle waste management facilities.
Construction	General Solid Waste (Non-Putrescible) – Steel	580 m^3	Muswellbrook waste & Recycling Facility.
Construction	General Solid Waste (Non-Putrescible) – Timber	600 m^3	Muswellbrook waste & Recycling Facility. Newcastle waste management facilities.
Operation	Green Waste	0 m^3 p.a.	N/A.
Operation	Hazardous Waste	1,000 L p.a.	Muswellbrook waste & Recycling Facility
Operation	Liquid Waste	255 m^3 p.a.	Trucked to licensed facility.
Operation	General Solid Waste (Non-Putrescible) – Mixed	1.22 m^3 p.a.	Muswellbrook waste & Recycling Facility.
Operation	General Solid Waste (Non-Putrescible) – Office	3.36 m^3 p.a.	Muswellbrook waste & Recycling Facility.
Operation	General Solid Waste (Non-Putrescible) – Cardboard	0.36 m^3 p.a.	Muswellbrook waste & Recycling Facility.
Operation	General Solid Waste (Non-Putrescible) – Steel	0.23 m^3 p.a.	Muswellbrook waste & Recycling Facility.
Operation	General Solid Waste (Non-Putrescible) – Timber	0.24 m^3 p.a.	Muswellbrook waste & Recycling Facility.
Decommissioning	Green Waste	0 m^3	N/A.
Decommissioning	Hazardous Waste	464 m^3	Muswellbrook waste & Recycling Facility
Decommissioning	Liquid Waste	255 m^3	Trucked to licensed facility.
Decommissioning	General Solid Waste (Non-Putrescible) – Mixed	23,000 tonnes of panels	Lotus Energy licensed panel recycling, Melbourne
Decommissioning	General Solid Waste (Non-Putrescible) – Office	800 Tonnes	Muswellbrook waste & Recycling Facility.
Decommissioning	General Solid Waste (Non-Putrescible) – Cardboard	None	

Phase	Waste Type	Estimated Volume (m^3)	End Market/Facility
Decommissioning	General Solid Waste (Non-Putrescible) – Steel	40,000 tonnes of steel 15,000 tonnes of copper wiring	JJ's Waste & Recycling – Newcastle.
Decommissioning	General Solid Waste (Non-Putrescible) – Timber	None	

6.14.3 Impact Assessment

The majority of Project waste would be generated during the construction and decommissioning stages with minor quantities of waste to be generated by the day-to-day operation of the Project. If not appropriately stored and managed, waste generated by the Project could have a range of environmental and health impacts, including:

- Reduction in aesthetic quality and visual amenity of the locality.
- Impacts to water quality.
- Degradation of ecosystems and loss of habitat.
- Spread of pest species.
- Human health impacts.
- Contamination of soils and water.
- Reduction in local landfill capacity due to additional waste volumes, particularly in relation to cumulative impacts which may arise where multiple developments are utilising the same local landfill facility.

Measures outlined in **Section 6.14.5** would be implemented during the construction of the Project to suitably manage these waste impacts.

6.14.4 Cumulative Waste Impacts

- Several renewable projects are proposed within the region, it is anticipated that these projects will generate similar or more waste quantities and streams. The capacity of waste recycling facilities within the region as mentioned in **Section 6.14.1** are time sensitive and as such unable to be confirmed at this stage. Prior to and during construction, Lightsource bp will contact relevant Councils and organise to ensure waste is transported to a facility which has capacity to process waste.

6.14.5 Management and Mitigation Measures

6.14.5.1 Construction

As part of the detailed design and construction phase a Waste Management Plan would be prepared including a detailed breakdown of the waste types and quantities in accordance with relevant legislation and guidelines. Lightsource bp is committed to ensuring waste generated by the Project is able to be reused and recycled in accordance with the waste management hierarchy.

Lightsource bp is currently trialling a circular design principle that provides sustainable packaging solutions for most products that contribute a bulk amount of waste during the construction phase. Upon successful trial results, this circular design principle will be implemented into this project. Some wastes may need to be disposed of to landfill, and in this case the proponent will liaise with the relevant local authorities to avoid any cumulative impacts that may result from the waste disposal needs of multiple developments in the region.

The Waste Management Plan will include the following measures:

- A summary of the waste types, classification and estimated annual quantities of wastes produced during the construction of the Project.
- Measures to manage waste disposal in accordance with the principles of the waste hierarchy, with emphasis on reducing, reusing and recycling wastes prior to disposal.
- The procedure for assessing, classifying and storing waste in accordance with EPA guidelines.
- Procedures for storage, transport and disposal of waste.
- Monitoring, record keeping and reporting, including the use of waste tracking data to demonstrate the lawful disposal of contaminated products, waste or residues generated by the Project (if any).

6.14.5.2 Operation

Waste generated during the operational phase of the Project will be limited to those generated by operational maintenance activities and operational staff. Volumes are anticipated to be significantly less than those produced during construction and decommissioning, and management will occur through a Waste Management Plan as part of the OEMP.

6.14.5.3 Decommissioning

A Decommissioning and Rehabilitation Management Framework has been prepared for the Project by Umwelt (refer to **Appendix 21**). This Framework has been developed to demonstrate a commitment to ensuring appropriate environmental management is undertaken during the decommissioning and rehabilitation phase of the Project in accordance with legislative requirements, conditions of consent, stakeholder interest and industry best practice.

The Framework is a working document and as such it is expected that updates may be required post-approval to reflect the specific conditions or management measures outlined in the conditions of consent, and prior to the end of the operational life of the solar farm to include consideration of circumstances which may have changed during operations.

Lightsource bp has a partnership with Lotus Energy to manage the recycling of solar panels, including throughout the life of the Project if panels are damaged during construction or operations, and in the decommissioning stage. Other solar farm infrastructure (i.e., electrical cabling, steel posts, metal) will be recycled at appropriate waste management facilities.

6.15 Air Quality

A qualitative assessment of the Project's potential air quality impacts has been undertaken to assess potential impacts associated with dust generated during construction. This involved:

- Identification of sensitive receivers that may potentially be impacted.
- Understanding the existing air quality catchment and current sources of air emissions.
- Identification and assessment of potential sources of air emissions.
- Recommending management and mitigation measures to reduce air emissions because of the Project.

6.15.1 Existing Air Quality

The main sources of existing particulate matter emissions in the area surrounding the Project include:

- Dust and vehicle and machinery exhaust emissions associated with agricultural production.
- Vehicle emissions from traveling on Wollara Road and Golden Highway, particularly the unsealed part of Wollara Road.
- Bushfires.

The NSW DPE operates a comprehensive air quality monitoring network to provide the community of NSW with accurate and up-to-date information about air quality. Data from the monitoring network is presented online as ambient concentrations and Air Quality Index (AQI) values which are updated hourly and stored in a database.

The closest located air quality monitoring station is approximately 8 km north-east of Merriwa, on the Merriwa Scone Road (coordinates 32°7'6"S, 150°26'26"E), about 33.5 km northeast of the Project Area. This station is situated within a rural setting, approximately 170 m away from Scone Road, this monitoring station is similar in location and rural setting to the Project Area and is therefore considered representative. The following air pollutants are measured at Merriwa (DPIE, 2022):

- Larger particles (less than 10 microns in diameter).
- Smaller particles (less than 2.5 microns in diameter).
- Nitrogen dioxide (NO_2).
- Sulphur dioxide (SO_2).
- Ammonia (NH_3).

A search of the most recent air quality concentration data – updated hourly – on 14 November 2022 for Merriwa stated that the air quality was 'good' (DPIE, 2022).

A review of the National Pollution Inventory (NPI) (Department of Climate Change, Energy, the Environment and Water , 2022) identified two scheduled facilities that operate within the vicinity of the Project (30 km radius):

- Ulan Coal Mine at Ulan Road, Ulan (approximately 30 km west).
- Merriwa Petroleum Depot, Merriwa (approximately 30 km northeast).

6.15.2 Assessment of Impacts

6.15.2.1 Construction and Decommissioning

The main source of emissions to the air during construction would involve dust and air borne particles generated from traffic accessing the Project Area alongside Wollara Road (unsealed) and other construction activities including road repairs and culvert upgrades (along Ringwood Road), site preparations (construction) or demolition work and vehicle, plant and equipment and exhaust emissions. These emission sources are temporary in nature as the road repairs and upgrades package which will occur before construction of the rest of the Project. These upgrades will significantly reduce the dust emissions potentially generated in the construction phase and the high movement of construction vehicles.

Exhaust emissions from vehicles and machinery have the potential to impact on human health as well as contribute to greenhouse emissions and leave residues on private properties. The use of heavy vehicles, equipment and machinery would be largely limited to the construction period and emissions would be localised. Given the buffer provided by the Goulburn River National Park between the Project Area and any nearby sensitive receivers, any impacts from exhaust emissions are expected to be minimal and temporary in nature. Further, Lightsource bp has committed to implementing road repairs to Ringwood Road that would likely result in reduced dust disturbance. This is further discussed in **Section 6.9**.

The nearest sensitive receiver (not associated with the Project) is approximately 3 km away from the Project Area off Wollara Road with substantial set back from Wollara Road (closest point is 70 m). Given the temporary nature of the construction activities, the physical distance between the receiver and the Project, and Wollara Road, it is expected that any impacts from dust and exhaust emissions would be minimal.

With the implementation of air quality controls and mitigation measures proposed in **Section 6.15.3** it is expected that the construction and decommissioning activities would have a negligible impact on local air quality.

6.15.2.2 Operation

The Project has been designed to be compatible with up to 2,000 sheep grazing across the property, within the fenced Development Footprint. In addition to this, ongoing maintenance of the Project Area and infrastructure will be required, as outlined in **Section 3.5**. The infrastructure maintenance activities would result in minor, localised vehicle emissions and generation of dust from vehicles travelling along the internal, unsealed access roads.

With the implementation of the management and mitigation measures proposed in **Section 6.15.3**, the predicted air quality impacts during the operation of the Project can be adequately managed.

6.15.3 Management and Mitigation Measures

Measures outlined below would be implemented as part of the Project to efficiently manage air quality impacts:

- As part of the CEMP, develop and implement protocols to minimise the air emissions during the construction, including:
    - Water suppression on all exposed areas, unsealed roads and stockpile areas when required (i.e. if visible dust emissions are observed).
    - The location and scale of activities which generate dust emissions would be modified and limited during periods of dry and windy weather.
    - Engines to switch off when not in use for prolonged periods.
    - Development of a complaint procedure to identify and respond to complaints.
- Areas within the Project Area which have been temporarily disturbed by construction and operational activities will be rehabilitated.
- Once construction has been completed, establish and maintain ground cover in accordance with the OEMP.

7.0 Matters of National Environmental Significance

On the 2 February 2022, the DCCEEW confirmed the Goulburn River Solar Farm (EPBC 2021/9102) (referred to in this section as the proposed action) constitutes a controlled action under Section 75 of the EPBC Act. The Road Repairs and Upgrades were not a part of the controlled action decision by DCCEEW, a self-assessment for these works has been completed. This assessment determined the Road Repairs and Upgrade works would not have a significant impact on MNES, details of this assessment is provided in **Section 7.1,** with the assessment conducted in **Appendix 7**. As the Road Repairs and Upgrades were determined not a significant impact this was not referred.

For the Project Area the controlling provisions under the EPBC Act for the Project are:

- Listed threatened species and communities (sections 18 and 18A).

DCCEEW species records and habitat mapping indicates that there is likely to be potential impacts to the following:

- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered.
- Regent Honeyeater (*Anthochaera phygia*) – Critically Endangered.

Additionally, there is some risk that there may be significant impacts on the following communities and species and further assessment is required to determine their presence in the Project Area and any potential impacts of the Project:

- Central Hunter Valley Eucalypt Forest and Woodland – Critically Endangered.
- Swift Parrot (*Lathamus discolor*) – Critically Endangered.
- Painted Honeyeater (*Grantiella picta*) – Vulnerable.
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – Vulnerable.
- Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable.
- Pink tailed Worm-lizard (*Aprasia parapulchella*) – Vulnerable.
- Bluegrass (*Dichanthium setosum*) – Vulnerable.
- *Homoranthus darwinioides* – Vulnerable.

Further consideration for several threatened species and ecological communities have been identified as priority management species following the 2019-2020 bushfires. This includes the species likely to be impacted as mentioned above. The following species may also be impacted by the Project:

- Koala (*Phascolarctos cinereus*) (Combined Population of QLD, NSW and the ACT) – Vulnerable.
- Greater Glider (*Petauroides volans*) – Vulnerable.

- Brush tailed Rock wallaby (*Petrogale penicillata*) – Vulnerable.
- Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus* (South-east mainland population)) – Endangered.
- New Holland Mouse, Pookila (*Pseudomys novaehollandiae*) – Vulnerable.
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable.

The assessment path for the Project is in accordance with the *Amending Agreement of No. 1 to the Bilateral Agreement* under Section 45 of the EPBC Act relating to environmental assessment between the Commonwealth and NSW Governments. DCCEEW has issued its assessment requirements which have been incorporated into the SEARs for the Project (refer to **Appendix 1** of this EIS).

The assessment of Matters of National Environmental Significance (MNES) including the additional information outlined above is provided in both of the Biodiversity Assessment Development Report s(BDAR) for the Project (provided in **Appendix 6 and Appendix 7**) and should be read in conjunction with the BDAR. **Section 7.2** below provides a summary of the Key findings of the assessment of MNES.

7.1 Road Repairs and Upgrades Self-Assessment

One MNES, White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland, was found to be present within the Road Repairs and Upgrades Area. Impacts to this CEEC have been avoided with none of the CEEC to be directly impacted by the Road Repairs and Upgrade works. No other MNES were identified within the Road Repairs and Upgrades Area. **Table 7.1** provides a summary of the impacts to MNES as a result of the Road Repairs and Upgrades.

Table 7.1 Impact to EPBC Act Threatened Species and Communities

Name of EPBC Act listed entity	Nature & consequence of impact (direct and indirect)	Duration of impact (e.g. construction, operation, life of the Project)	Quantum of impact (ha)	Consequence of impact (local, state & national scales)	Impact requires offsetting? (significant or not)
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Nil	N/A	0.09	N/A	Not significant (for impacts associated with the public road and culvert upgrades)

An assessment of significance was conducted for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (refer to **Appendix 7**). The assessment considered the criteria set out in the *Matters of National Environmental Significance Impact Guidelines 1.1* – Critically Endangered Ecological Communities, significant impact criteria (DE, 2013). This assessment concluded that Road Repairs and Upgrade works are considered unlikely to have a significant adverse impact on the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grasslands.

7.2 Summary of MNES Impact

The direct impacts of the Project, as they relate to the clearing of EPBC Act-listed CEEC and threatened species habitat, as summarised in **Table 7.2**, are predicted to be long-term or permanent. Further avoidance and minimisation measures are proposed, and a detailed BOS, will be prepared as part of the Project prior to construction commencing in order to compensate for the residual impacts of habitat loss that cannot be adequately avoided or minimised.

Table 7.2 Predicted Impacts from the Project on EPBC Act listed species and communities

Impact Type	MNES	Description	Nature of Impact	Direct Impact Area (ha)	Offsetting required?
Direct	White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands	Loss of 496.11 ha of woodland through clearing. Scattered trees condition zone = 19.26 ha Derived native grassland moderate condition zone = 168.48 ha Derived native grassland moderate to low condition zone = 308.37 ha	Permanent	496.11	Yes, see **Table 7.3**
Direct	Regent Honeyeater	Loss of 45.09 mapped important habitat through clearing.	Permanent	45.09	Yes, see **Table 7.3**

7.3 Impact Avoidance Strategies

Several Project refinements have been incorporated into the design and layout of the Project since the preparation of the initial Scoping Report and the completion of biodiversity surveys, to avoid and/or minimise impacts to sensitive environmental features. These refinements have been implemented as an outcome of ongoing consultation with landholders, refining the engineering design and targeted ecological surveys conducted across the Project Area. This has resulted in three main iterations to the Development Footprint to achieve the current Development Footprint, refer to **Section 1.4.2**.

The Project has been designed to take advantage of the most disturbed parts of the Project Area and is centered on the areas Assessed as Category 1 Land and areas of derived native grassland and scattered trees which have been subject to historical clearing and are currently managed for livestock grazing. Most of the areas of intact vegetation were avoided during the design of the Development Footprint in the iterative design process.

The Project has been designed to retain wildlife corridors between each of the three distinct solar array areas. The retained habitats incorporate the higher quality habitats present within the Project Area.

The reduction in the initial Development Footprint was particularly focused on avoiding areas of mapped Important Habitat for the Regent Honeyeater and the higher quality areas of the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community, refer to **Figure 2.4**.

7.4 Proposed Biodiversity Offset Strategy

A comprehensive BOS will be developed for the Project in accordance with relevant NSW state legislation and/or policies, in accordance with the *Biodiversity Conservation Act 2016*. Accordingly, the offset strategy for the Project will be developed in consultation with the Department of Planning and Environment (DPE) and DCCEEW.

To meet offsets required for Commonwealth listed entities for controlled actions under the NSW Biodiversity Offset Scheme, Lightsource bp retains the ability to:

- Retire biodiversity credits based on the like-for-like provisions in the Biodiversity Conservation Regulation 2017.
- Fund biodiversity conservation action listed in the Ancillary rules: Biodiversity conservation action and directly benefit the threatened entity impacted.
- Pay into the Biodiversity Conservation Fund, noting it is the proponent's responsibility to notify the Biodiversity Trust that their payment is for a controlled action.
- Retain residual areas within the Project Area for a future Biodiversity Stewardship Agreement to provide offsets as part of the Project.

The Biodiversity Conservation Trust is required to meet the Commonwealth offset requirement component in a like-for-like manner. This is by retiring like-for-like credits, by funding conservation actions that are listed in the Ancillary rules: Biodiversity conservation actions and benefits the threatened entity impacted or by funding other conservation measures approved by the NSW Minister for Energy and Environment that directly benefit the entity impacted. **Table 7.3** outlines the credit requirements for the relevant habitat areas for impacted MNES outlined in **Section 7.2**, as calculated by the BAM.

Table 7.3 Ecosystem Credits Relevant for Impacted TEC MNES

MNES	PCTs and Habitats	Credits Required
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	483 Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper hunter valley (*Includes areas which does not correspond to EPBC Act Listed CEEC, however included in purposes for offset calculations*)	4,642
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	**Total Ecosystem Credits**	**4,642**

Table 7.4 Species Credits Relevant for Impacted MNES

MNES	Credits Required
Regent Honeyeater (*Anthochaera phrygis*)	1,546
Total Species Credits	**1,506**

The MNES that were determined by DCCEEW to be significantly impacted by the Project are included in the credit liability for ecosystems required to be offset.

The Biodiversity Offset Strategy will be developed with the consideration of the need to compensate for residual significant impacts to White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland EEC and Regent Honeyeater with the aim to maintain or improve the biodiversity values of the surrounding region in the medium to long term. This aim will be delivered through the securing of in-perpetuity 'like-for-like' land-based offsets and in conjunction with the various impact mitigation and offset strategies that are proposed to be employed as part of the Project. Further details regarding the proposed biodiversity offset strategy is discussed in **Section 6.3.1.7**.

8.0 Environmental Management and Mitigation Measures

The SEARs for the Project required a consolidated summary of all proposed environmental management and monitoring measures, highlighting all of the commitments included in the assessment be provided. If development consent for the Project is granted, Lightsource bp will commit to the environmental management measures outlined below.

8.1 Environmental Management Framework

The environmental impacts associated with the Project would be managed through the implementation of a project specific suite of management measures detailed in **Section 6.0** and summarised below. This is through the implementation of a Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) which will also monitor compliance for the Project. A DRMF, refer to **Appendix 21** has been prepared to guide the Decommissioning Management Plan which will be prepared closer to the closing of operations.

The following standalone subplans would be incorporated into the CEMP and OEMP:

- Biodiversity Management Plan.
- Cultural Heritage Management Plan (Aboriginal and Historic Heritage).
- Soil and Water Management Plan, including:
    - Erosion Sediment Control Plan.
- Sheep Grazing Vegetation Management Plan.
- Wild Dog Management Plan.
- Landscape Management Plan.
- Noise and Vibration Management Plan.
- Weed and Pest Management Plan.
- Construction Traffic Management Plan.
- Emergency Management Plan, including Bushfire and Hazards.
- Social Impact Management Plan, including:
    - Community Engagement Strategy.
    - Community Shared Benefit Strategy.
    - Accommodation, Employment and Procurement Strategy.
- Waste Management Plan.

Prior to decommissioning a Decommissioning and Rehabilitation Environmental Management Plan.

(DREMP) will be prepared in accordance with the Decommissioning and Rehabilitation Management Framework. This will include:

- A DREMP will be prepared prior to the commencement of the decommissioning phase of the Project to manage environmental risks. The Decommissioning and Rehabilitation Management Framework will support the development of the management plan in the decommissioning phase.

8.2 Summary of Management Measures

A consolidated summary of management measures is provided in **Appendix 5**.

9.0 Justification of the Project

The SEARs require the EIS to provide both a *'strategic justification for the development focusing on site selection and suitability of the proposed site'*. This section addresses this requirement and provides a conclusion discussing the justification for the Project (**Section 9.1**), taking into consideration the suitability of the Project Area (**Section 9.2**), design refinement process (**Section 9.3**) and the biophysical, social and economic impacts (**Section 9.4**).

Section 9.5 discusses the principals of Ecologically Sustainable Development (ESD) as defined in Division 5, Section 193 (1) of the EP&A Regulation 2021, and in **Section 9.6** the Project is considered in the context of the objects of the EP&A Act.

9.1 Project Justification

As discussed in **Section 2.1**, the Project is a direct response to the NSW Government's commitment to transition to renewable electricity generation.

The Project would provide a number of benefits at Federal, State, regional and local levels, including:

- Generating enough electricity to supply approximately 156,000 households on an annual basis in NSW.
- Generating enough energy to meet 4% of the average NSW demand at peak output.
- Avoiding 705,000 tonnes of CO_2 emissions each year.
- Designing the Project for dual land use operation with approximately 2,000 sheep to be retained onsite while the Project is operational (sheep grazing will be trialled in the Development Footprint), plus additional cattle grazing outside the Development Footprint.
- Diversifying land use and economic activity in regional NSW.
- Generating a capital investment of approximately $880 million, including $130 million in local investment during construction and $120 milion during operations over the course of the 40 year operating life.
- Providing 350 direct jobs during the construction phase and 10 direct jobs nationally during the operational phase.

The Project is justified and of interest to the public as:

- It is suitably located in a region with ideal climatic and physical conditions for large-scale solar energy generation.
- Contains suitable terrain and topography to support large-scale solar energy infrastructure.
- The Project Area has access to existing transmission line infrastructure that has capacity to transport the electricity to the grid. This minimises the need for construction works and disturbance associated with additional infrastructure often required to connect large-scale renewable energy projects to the electricity market.

- It would not result in significant biophysical, social, cultural or economic impacts.
- It would result in minimal visual impacts as the Project Area is screened by the Goulburn River National Park.
- The large, isolated Project Area (2000 ha) provides flexibility in design (within limits) to prioritise avoidance of high value biodiversity areas. This includes the possibility of the remaining areas as an offset site (currently being investigated).
- Potential to create employment opportunities and benefits to the local and regional economy.

Lightsource bp is committed to reducing environmental and ecological impacts on the land within the Project Area. The consequences of not proceeding with the Project would result in:

- Loss of opportunity to move towards cleaner electricity generation.
- Loss of increased energy security and supply to the Australian grid.
- Loss of significant social and economic benefits created through capital investment and provision of direct and indirect employment opportunities during the construction and operation of the Project. A Community Shared Benefit Strategy will also be developed for the Project.

9.2 Suitability of the Site

In preliminary phases of the Project, Lightsource bp undertook a site constraints and opportunities analysis to identify the most appropriate site. This analysis involved the following considerations for site suitability:

- Current land use.
- Land available to purchase.
- Capability to connect to the electricity grid and access to transmission line network.
- Environmental and social constraints, including biodiversity and heritage.
- High quality solar irradiation levels.
- Land suitability (i.e. topography) to support a utility solar farm.

Specifically, this Project Area was identified as suitable due to the following:

- The Project Area is strategically located to connect to the existing transmission infrastructure and in an area with high solar energy potential.
- The Project Area has two landholders and was available for purchase by Lightsource bp.
- The Project Area has been disturbed and/or historically cleared for agricultural land use practices, primarily cattle grazing and some cropping.

- The Project Area is isolated from sensitive receptors which minimises environmental and social impacts. The Project Area is surrounded by a buffer of at least 2 km of native vegetation associated with the Goulburn River National Park and as such there are minimal sensitive receptors to the project for visual impacts and noise and vibration. The closest non-involved dwelling is located approximately 3 km north of the Project Area, in addition to this there are no other sensitive land uses (such as schools or places of worship near the Project Area). The Project Area is therefore suitably removed from the nearest sensitive receiver.

- There is no need for additional easement works outside the Project Area to connect the Project to the electricity network. There is a high capacity 500 kV transmission line that runs through south eastern corner of the Project Area. The location of this transmission line allows for connection to the national electricity grid with minimal works required. Often the location of a high-quality renewable resource (high solar irradiance and wind energy resources) and transmission line infrastructure does not align and similar size renewable energy projects would require significant works to connect to the national electricity grid.

9.3 Design Refinement

The conceptual layout of the Project Infrastrucutre has been developed to maximise the use of existing disturbed areas and avoid and minimise impact to identified biodiversity and heritage values on the Project Area.

The location of the Project including the design, technology, layout and size have been developed through consideration of a number of alternatives (refer to **Section 2.6**) and an iterative design process. This has ensured that the Project maximises benefits for the locality and region in the long term, while avoiding and minimising the potential impacts to heritage and the environment. Key features of the iterative design process include:

- Reducing the Project's Development Footprint subsequent to the lodgement of the Scoping Report from 2,000 ha to 1,249 ha, then to 882 ha and further to 799.5 ha in order to minimise impacts to biodiversity and maintain connectivity between the Project Area and surrounding Goulburn River National Park.

- Designing the Project to minimise impacts on areas of mapped Regent Honeyeater (*Anthochaera Phrygia)* important habitat.

- Alterations to the Project to reduce impacts to suitable breeding habitat for Barking Owl (*Ninox connivens*).

- Alterations to the Project to avoid impact to habitat for the Large-eared Pied bat (*Chalinolobus dwyeri*) and the Eastern Cave Bat (*Vespadelus troughtoni*).

- Reduction in the area occupied by the Project to avoid areas of White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community (CEEC) observed to be in moderate-good condition, resulting in only impacts to areas of scattered trees and derived native grassland condition zones.

- Establishment of exclusion zones within the Development Footprint to minimise impacts on biodiversity, avoid Redlynch Creek which crosses the Project Area, and the Slab Hut remains.

- The Project has also been designed to be compatible with sheep grazing to facilitate ongoing agricultural land use. This will be trialled across the Development Footprint.

9.4 Environmental, Cumulative, Social and Economic Impacts

As identified throughout the EIS and in **Section 9.1** the Project has undergone an iterative design process. The conceptual layout for the solar arrays, connection to existing transmission line corridor, internal access tracks and other supporting infrastructure has been subject to ongoing refinement with the aim of minimising associated environmental, cumulative, social and economic impacts.

The various environmental, cumulative, social and economic impacts of the Project have been identified and were subject to a detailed environmental assessment as summarised in **Section 6.0**. This has been based on:

- Assessment of the site characteristics (existing environment).
- Consultation with relevant government agencies.
- Engagement with local community and other stakeholders.
- Environmental and social risk analysis.
- Application of the principles of ESD, including the precautionary principle, intergenerational equity, conservation of biological diversity and valuation and pricing of resources.
- Expert technical assessment.

The key issues identified, including those specified in the SEARs, were subject to comprehensive specialist assessment to identify the potential impacts of the Project on the existing environment. These assessments are detailed in **Section 6.0** and the appendices to this EIS.

Lightsource bp has utilised the findings of detailed assessment of environmental, cultural, social and economic impacts to refine the Project. This has enabled the impacts of the Project to be minimised by:

- Obtaining a detailed understanding of the issues and impacts by scientific evaluation and stakeholder engagement.
- Undertaking detailed Project planning considering the environmental, social and cultural constraints of the locality and investigation of various project alternatives which resulted in changes to the Project that reduced impacts.
- Active engagement with key stakeholders, including proximal landholders, to identify key concerns and issues and to allow these to be considered in the Project design process.
- Commitment to proactive and appropriate strategies to avoid, minimise, mitigate, offset or manage a range of potential environmental impacts (refer to **Section 6.0** and **Section 8.0**).

- Consideration of potential cumulative impact associated with the Project and its interaction with other similar developments (type and scale) within the region. Consideration of cumulative impacts has been undertaken in specialist assessments for biodiversity, land, visual amenity, noise and vibration, traffic and transport, social amenity and economic matters. The cumulative impacts of waste management have been assessed through a qualitative assessment.

- Cumulative impacts have been considered in accordance with the Cumulative Impact Assessment Guidelines for State Significant Projects (CIA Guidelines) (DPIE, 2021). Further details on cumulative impacts are provided in **Appendix 20**.

As outlined in **Section 6.0**, the potential environmental, cultural, social and economic impacts associated with the Project can be appropriately managed through the implementation of appropriate management, mitigation and monitoring measures. A consolidated list of the proposed management and mitigation measures is provided in **Section 8.0.**

9.5 Ecologically Sustainable Development

An object of the EP&A Act is to encourage ESD within NSW. As noted in **Section 4.0**, the Project is classified as SSD in accordance with the Planning Systems SEPP and has been subject to an environmental impact assessment under Part 4, section 4.2 (8) of the EP&A Act.

To justify the Project with regard to the principles of ESD, the benefits of the Project in an environmental and socio-economic context should outweigh any negative impacts. The principles of ESD encompass the following:

- the precautionary principle
- intergenerational equity
- conservation of biological diversity
- valuation, pricing and incentive mechanisms.

9.5.1 The Precautionary Principle

The EP&A Reg defines the precautionary principle as:

> *i. if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

In order to achieve a level of scientific certainty in relation to potential impacts associated with the Project, the EIS includes an extensive evaluation of all the key components of the Project. Detailed assessment of all key issues and necessary management procedures has been conducted and is comprehensively documented in this EIS.

The EIS and assessment process has involved a detailed study of the existing environment and where applicable the use of scientific modelling and surveys to assess and determine potential impacts as a result of the Project. To this end, there has been careful evaluation as part of the project design and assessment process to avoid where possible, irreversible damage to the environment. Specialist studies have been undertaken to provide accurate information to assist with evaluation and development of the Project. Mitigation measures are provided in **Section 8.0**.

ii. The decision-making process for the design, impact assessment and development and development of management process has been transparent in the following:

- Government authorities, landholders potentially affected by the Project, the local community, the Aboriginal community and other stakeholders were consulted during preparation of this EIS (refer to **Section 5.0**). This enabled comment and discussion regarding potential environmental impacts and proposed environmental management procedures.

- The community has been engaged throughout the development and assessment of the Project through a range of mechanisms including one-on-one meetings, community information sessions to inform project design and management of key issues, and community information sheets, amongst other mechanisms (refer to **Section 5.0**) which provided landholders and stakeholders with both information and the opportunity to influence Project outcomes (refer to **Section 2.6.4**).

- Lightsource bp will develop and implement a CEMP, OEMP and DREMP, which will implement best practice management and will incorporate all identified mitigation and management measures identified in this EIS. Additionally, the Project will be subject to an independent auditing and verification process consistent with relevant requirements for SSD projects. The CEMP, OEMP and DREMP will incorporate the additional controls committed to in this EIS (refer to **Section 8.0**).

9.5.2 Intergenerational Equity

The EP&A Regulation defines the principle of intergenerational equity as:

> *...that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

Intergenerational equity refers to equality between generations. It requires that the needs and requirements of today's generations do not compromise the needs and requirements of future generations in terms of health, biodiversity and productivity.

The objectives of the Project are outlined in **Section 1.5** and in relation to intergenerational equity, they include to:

- Implement the Project in an environmentally responsible manner to minimise project specific and cumulative environmental and social impacts.

- Minimise additional disturbance by maximising the use of disturbed area (due to historical and current and grazing activities) within the Project Area.

- Generate local and regional employment opportunities as well as potential for training and upskilling opportunities.
- Develop comprehensive mitigation and management strategies to mitigate and offset predicted impacts associated with the Project.

Further to the Project objectives, a range of environmental management measures discussed in **Section 6.0** and **Section 8.0** have been developed and evaluated to minimise the impact on the environment to the greatest extent reasonably possible.

The Project would benefit future generations by reducing the reliance on energy sources derived from non-renewable resources, which produce greenhouse gas emissions. During the operation both sheep grazing and solar energy will operate in conjunction of each other, both of which would provide benefits for future generations. Once decommissioned, the land within the development footprint will continue to be used for sheep grazing if deemed viable.

The EP&A Act requires consent authority to consider matters of relevance to the public interest. Matters of public interest have been held to include intergenerational equity.

9.5.3 Conservation of Biological Diversity

The EP&A Regulation identifies that the principle of conservation of biological diversity and ecological integrity should be a fundamental consideration in the decision-making process. The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. All environmental components, ecosystems and habitat values potentially affected by the Project have been assessed in the BDAR (refer to **Appendix 6**). Potential biodiversity related impacts are outlined in this EIS (refer to **Section 6.2**) and measures to ameliorate any negative impact are outlined in **Section 8.0**.

The layout of the solar arrays across the Project Area has been developed to minimise disturbance to areas of high biodiversity value and ensure ecological connectivity. Following the application of avoidance and mitigation measures, the BAM assessment has identified the biodiversity credit requirement to offset the impacts of the residual impacts of the Project and the required management and mitigation measures to be implemented. The principle of Conservation of Biological Diversity is considered to be satisfied.

9.5.4 Valuation Principle

The goal of improved valuation of natural capital has been included in Agenda 21 of Australia's Intergovernmental Agreement on the Environment. The principle has been defined in the EP&A Regulation as follows:

- *that environmental factors should be included in the valuation of assets and services, such as:*
    - *(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;*
    - *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and*

(iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The environmental consequences of the Project have been assessed in this EIS (refer to **Section 6.0**) and mitigation measures identified for factors with potential for adverse impact (**Section 8.0**). Implementing the mitigation measures would impose an economic cost on the proponent, increasing both the capital and operating costs of the Project. This signifies those environmental resources have been given appropriate valuation.

The Project has been developed and designed with the objective of minimising potential impacts on the environment. This indicates that the design of the Project has been developed with the environmental objective in mind.

The aims, structure and content of this EIS have incorporated these ESD principles. The mitigation measures in **Section 8.0** provide an auditable environmental management commitment to these parameters. The Project aligns with the principals of ESD and is considered to be satisfied, due to the social, economic and environmental benefits provided in **Section 1.5**, and the mitigation measures put in place to protect from adverse impacts on the environment.

9.6 Objects of the EP&A Act

The objects of the EP&A Act, and how these are addressed in relation to the Project, are presented in **Table 9.1**. It shows that the Project is justified on the basis of its consistency with the EP&A Act.

Table 9.1 Objects of the EP&A Act

Object	Response
To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	Project would result in the loss of cropping within the small amount of agricultural land currently used for this purpose. This activity would be restricted for a period of approximately 40 years (35 lifetime of the Project years and 4 years of construction and decommissioning activities) however in the meantime, the Project Area can be used for grazing agriculture (sheep) (cattle grazing could potentially continue, in BSA site) and can be returned to cropping agricultural use upon decommissioning. The Project would not result in the sterilisation of natural resources including mineral resources. There are no existing exploration or mineral licences in the Project Area. The Project has been designed and located to avoid native vegetation, heritage items and sensitive environments (i.e. waterways) as much as possible and to minimise the use of natural and artificial resources while considering the social and economic welfare of the local community.
To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is considered in **Section 9.5**.

Object	Response
To promote the orderly and economic use and development of land.	The Project aims to promote the orderly and economic use of the land through the diversification of agricultural land with renewable electricity generation. The Project is also connecting into existing transmission infrastructure, maximising the economic potential of the infrastructure.
To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The Project's planning and design process has considered environmental impacts and has incorporated several mitigation and management measures to reduce further impacts.
To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The Project will not impact upon any significant or listed areas of built and cultural heritage (including Aboriginal heritage). However, an Unexpected (heritage) Finds Protocol will be developed prior to construction.
To provide increased opportunity for community participation in environmental planning and assessment.	Engagement activities undertaken during the development of the EIS are outlined in **Section 5.0** Lightsource bp would continue to consult with the local community and key stakeholders during the Project's development.

9.7 Conclusion

As outlined in **Section 9.5**, the Project has been assessed against the principles of ESD as required by the EP&A Act and EP&A Regulation. This assessment has indicated that while the Project, would have some impacts, these impacts can be effectively managed, mitigated and offset and the development will result in significant economic benefits. The assessment therefore concludes that the Project is consistent with the principles of ESD. The Project will provide long-term, strategic benefits to the State of NSW, including:

- Renewable energy supply to assist with fulfilling the current obligations under State and Federal renewable energy targets.
- Providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- The Project will also provide direct financial benefits to the regional and local community, including: a capital investment of approximately $880 million of which approximately $250 million will be retained in the region over the life of the Project.
- Employment generation creating up to 350 direct and 560 indirect jobs during the 27 month construction phase with around 13 FTE jobs (10 FTE direct and 3 FTE indirect) created during the operational phase.
- Indirect benefits to local services through the construction and operation phases.
- Community Benefit Fund payments and increased Council land tax returns from the Project Area. It is considered this economic stimulus will also assist with supporting the ongoing agricultural land use within the Region.

Lightsource bp has applied an iterative approach through the development of this EIS responding to both environmental and cultural heritage constraints and community concerns through refinement of the layout and the overall Project approach. Through the implementation of best practice management, the potential environmental and cultural heritage impacts associated with the Project can be appropriately avoided or managed, which will also address the community concerns and associated social impacts identified during the stakeholder engagement process. Given the net benefit and commitment from Lightsource bp to appropriately manage the potential environmental impacts associated with the Project, it is considered the Project would result in a net benefit to the region and broader NSW community. The Project aligns with the principals of ESD and is considered to be satisfied, due to the social, economic and environmental benefits.

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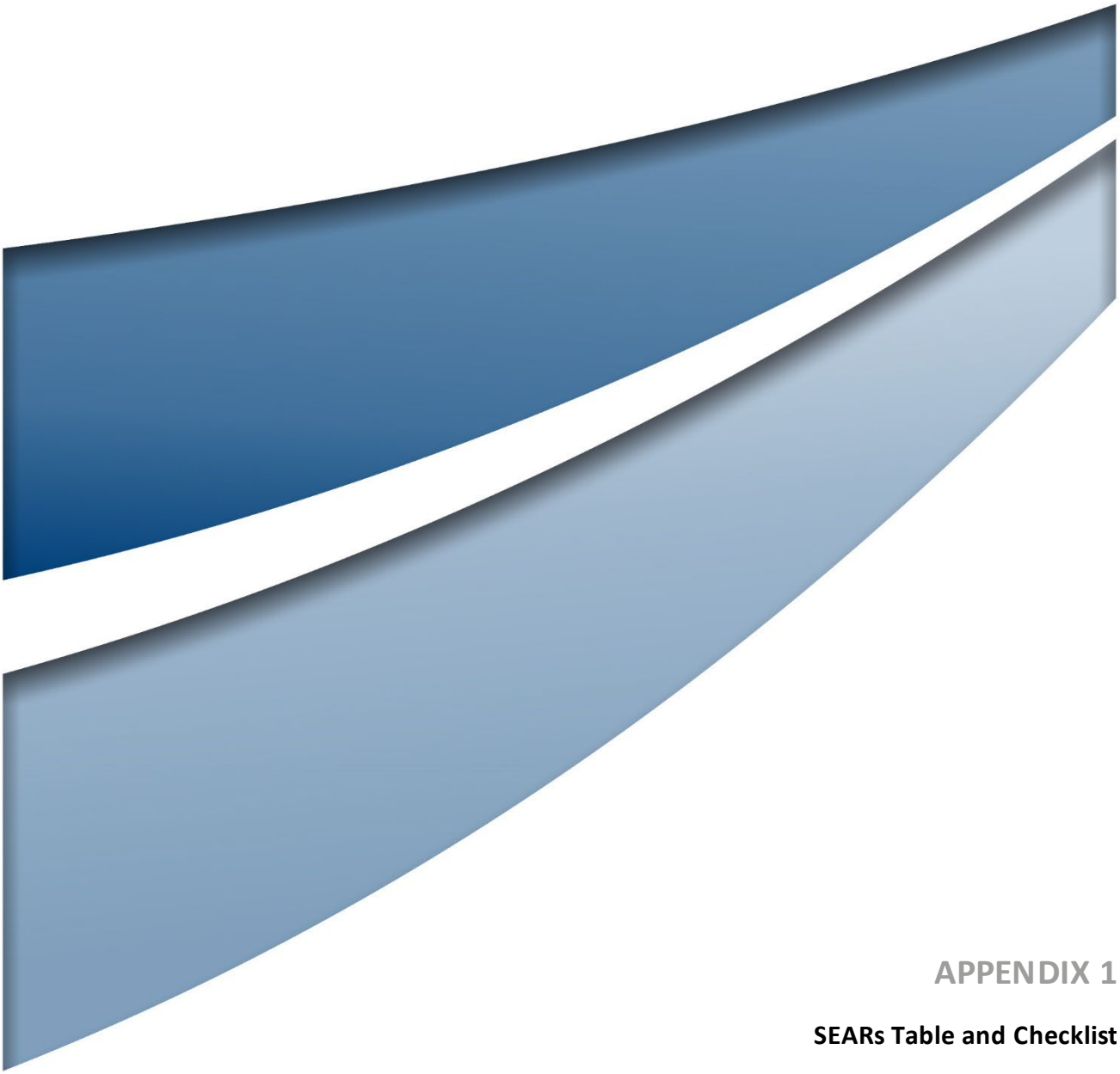


APPENDIX 1

SEARs Table and Checklist

Planning, Industry & Environment

Mrs Diana Mitchell
Principal Environmental Planner
LIGHTSOURCE DEVELOPMENT SERVICES AUSTRALIA PTY LTD
717 Bourke Street
Docklands Victoria 3008

01/02/2022

Dear Mrs Mitchell

Goulburn River Solar Farm (SSD-33964533)
Planning Secretary's Environmental Assessment Requirements

Please find attached a copy of the Planning Secretary's environmental assessment requirements (SEARs) for the preparation of an environmental impact statement (EIS) for the Goulburn River Solar Farm (see Attachment 1).

The SEARs have been prepared in consultation with relevant public authorities, based on the information you have provided. A copy of the advice from the public authorities is attached for your information (see Attachment 2). Any additional comments from National Parks and Wildlife Service, Rural Fire Service NSW and Transgrid will be forwarded at a later date.

Where relevant, the Planning Secretary may modify the SEARs to ensure the environmental assessment of the project covers all relevant matters and is consistent with contemporary assessment practice.

From 1 July 2021, all SEARs will expire two years from the date of issue (or the date they were last modified) unless the Planning Secretary has granted an extension. If you would like to seek an extension, you should contact the Department at least three months prior to the expiry date.

If your Development Application (DA) and EIS is not submitted within two years (or by the agreed extension date), you will need to make a new application for SEARs to progress your project.

Preparing your EIS

The Department wishes to emphasise the importance of effective and genuine community consultation. A comprehensive open and transparent community consultation engagement process must be undertaken during the preparation of the EIS. This process must ensure that the community is provided with a good understanding of what is proposed, description of any potential impacts and they are actively engaged in issues of concern to them.

If your environmental impact statement (EIS) is submitted after 1 April 2022, it must be prepared having regard to the Department's new *State Significant Development Guidelines – Preparing an Environmental Impact Statement.* These guidelines and other relevant guides, including the *Undertaking Engagement Guidelines for State Significant Projects* are available at www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework.

Note - If you submit your EIS after 31 December 2022, a Registered Environmental Assessment Practitioner (REAP) will need to declare that your EIS meets certain standards in relation to compliance, completeness, accuracy and legibility.

Lodging your development application (DA)
Once you submit your EIS, we will check it for completeness to confirm it addresses the requirements in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. We will also notify you of the DA fee for your project.

Please note that **your DA is not taken to be lodged until the DA fee has been paid**.

To minimise lodgement delays, please contact the Department at least two weeks before you submit your DA and EIS to confirm DA fee payment arrangements. This will give us sufficient time to ensure your fees can be determined quickly.

Information needed to determine the DA fee
Your application will need to be accompanied by a Quantity Surveyor's Report supporting the estimated cost of works for your project. You must ensure that the information in the report is consistent with the information provided in your DA form.

If your project involves any subdivision of land, you must also ensure that your report includes a breakdown of estimated costs for any other component of your project.

Public exhibition requirements
When you contact us, regarding the applicable DA fee, we will also advise whether hard and/or electronic copies of the DA and EIS will be required for public exhibition.

Matters of National Environmental Significance
Any development likely to have a significant impact on matters of National Environmental Significance will require approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to approvals required under NSW legislation.

It is your responsibility to contact the Commonwealth Department of Agriculture, Water and the Environment to determine if you need approval under the EPBC Act (http://www.environment.gov.au or 6274 1111).

Your assigned planning officer is Kurtis Wathen. If you have any questions, please contact Kurtis Wathen on 02 8289 6981 or at kurtis.wathen@dpie.nsw.gov.au

Yours sincerely,

Nicole Brewer
Director
Energy Assessments
As delegate for the Planning Secretary

Attachment 1 – Planning Secretary's Environmental Assessment Requirements
Attachment 2 – Agency Advice

Guidelines for preparing assessment documentation relevant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) for proposals being assessed under the NSW Assessment Bilateral

Goulburn River Solar Farm (EPBC 2021/9102)

Introduction

1. On 2 February 2022, a delegate of the Federal Minister for the Department of Agriculture, Water and the Environment (formerly Department of Environment and Energy) determined Goulburn River Solar Farm was a controlled action under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act controlling provisions for the proposed actions are:

    i. listed threatened species and communities (sections 18 and 18A)

2. The proposed action will be assessed in accordance with the bilateral assessment agreement Amending Agreement No. 1, and as such, is required to be assessed in the manner specified in Schedule 1 to that Agreement, including, addressing the matters outlined in Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations).

3. The proponent must undertake an assessment of all protected matters that may be impacted by the development under the controlling provision identified in paragraph 1. The Commonwealth Department of Agriculture, Water and the Environment considers that the proposed action is likely to have a significant impact on threatened species and communities and migratory species listed in **Appendix A**.

4. The proponent must consider each of the protected matters under the triggered controlling provisions that may be impacted by the action. Note that this may not be a complete list and it is the responsibility of the proponent to undertake an analysis of the relevant impacts and ensure all protected matters that are likely to be impacted are assessed for the Commonwealth Minister's consideration.

General Requirements

Relevant Regulations

5. The Environmental Impact Statement (EIS) must address all matters outlined in Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000 (*Cth) and all matters outlined below in relation to the controlling provisions.

Project Description

6. The title of the action, background to the action and current status.

7. The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on MNES.

8. How the action relates to any other actions that have been, or are being taken in the region affected by the action.

9. How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.

Impacts

10. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including:

    i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;

    ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

    iii. analysis of the significance of the relevant impacts; and

    iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

Avoidance, mitigation and offsetting

11. For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including:

    i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures,

    ii. any statutory policy basis for the mitigation measures;

    iii. the cost of the mitigation measures;

    iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;

    v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

12. Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.

13. For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any:

    i. conservation advice or recovery plan for the species or community;

    ii. relevant threat abatement plan for the species or community;

    iii. wildlife conservation plan for the species; and

    iv. any strategic assessment.

Note: the relevant guidelines and policy statements for each species and community are available from the Department of the Environment Species Profiles and Threats Database. http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl]

14. In addition to the general requirements described above, specific information is required with respect to each of the determined controlling provisions. These requirements are outlined in paragraphs 15-17.

Key Issues

Biodiversity (threatened species and communities and migratory species)

Assessment Requirements

15. The EIS must identify each EPBC Act listed threatened species and community and migratory species likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.
16. For each of the EPBC Act listed threatened species and communities and migratory species likely to be impacted by the action the EIS must provide a separate:

    a. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans;

    b. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements;

    c. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; and

    d. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action;

    e. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account;

    f. a description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established.

    g. details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts; and

    h. details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites.

Note: For the purposes of approval under the EPBC Act, it is a requirement that offsets directly contribute to the ongoing viability of the specific protected matter impacted by a proposed action and deliver an overall conservation outcome that improves or maintains the viability of the MNES i.e. 'like for like'. In applying the BAM, residual impacts on EPBC Act listed threatened ecological communities must be offset with Plant Community Type(s) (PCT) that are ascribed to the specific EPBC listed ecological community. PCTs from a different vegetation class will not generally be acceptable as offsets for EPBC listed communities.

17. Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.

Other approvals and conditions

18. Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations 2000.

Environmental Record of person proposing to take the action

19. Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations 2000.

Information Sources

20. For information given in an EIS, the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.

REFERENCES

- *Environment Protection and Biodiversity Conservation Act 1999* - section 51-55, section 96A(3)(a)(b), 101A(3)(a)(b), section 136, section 527E
- *Environment Protection and Biodiversity Conservation Regulations 2000* Schedule 4
- Amending Agreement No. 1 (2020) - Item 18.1, Item 18.5, Schedule 1
- *Matters of National Environmental Significance - Significant impact guidelines 1.1* (2013) EPBC Act
- *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy October 2012

Appendix A

Protected matters relevant to the Goulburn River Solar Farm (EPBC 2021/9102) project

Based on the information in the referral documentation, the location of the action, species records and likely habitat present in the area, there are likely to be significant impacts to:

- White Box-Yellow Box-Blakley's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered
- Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered

Additionally, there is some risk that there may be significant impacts on the following matters and further assessment to determine if the communities and species listed below are present in the proposed action area and, if so, the extent to which they may be impacted by the proposed action, is required:

- Central Hunter Valley Eucalypt Forest and Woodland – Critically Endangered
- Swift Parrot (*Lathamus discolor*) – Critically Endangered
- Painted Honeyeater (*Grantiella picta*) – Vulnerable
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – Vulnerable
- Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable
- Pink tailed Worm-lizard (*Aprasia parapulchella*) – Vulnerable
- Bluegrass (*Dichanthium setosum*) – Vulnerable
- *Homoranthus darwinioides* – Vulnerable

Several threatened species and ecological communities have been identified as priority management species following the 2019-20 bushfires. This includes the White Box-Yellow Box-Blakley's Red Gum Grassy Woodland and Derived Native Grassland threatened ecological community and the Regent Honeyeater (as discussed above), and the following listed species that may be impacted by the proposed action:

- Koala (*Phascolarctos cinereus*) (Combined Population of QLD, NSW and the ACT) – Vulnerable
- Greater Glider (*Petauroides Volans*) – Vulnerable
- Brush tailed Rock wallaby (*Petrogale penicillata*) – Vulnerable
- Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus* (South-east mainland population)) – Endangered
- New Holland Mouse, Pookila (*Pseudomys novaehollandiae*) – Vulnerable
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable

Further analysis of the impacts of the fires on those species and communities identified above should be undertaken during the assessment.

Note: uncertainty around the extent and number of protected matters that may be impacted will need to be resolved through the assessment process once final alignment and construction plans have been completed.

Note: this may not be a complete list and it is the responsibility of the proponent to ensure any protected matters under these controlling provisions are assessed for the Commonwealth decision-maker's consideration.

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*

Schedule 2 of the Environmental Planning and Assessment Regulation 2000

Application Number	SSD-33951458
Project Name	Goulburn River Solar Farm which includes: • the construction, operation and decommissioning of a solar photovoltaic (PV) energy generating facility with an estimated capacity up to 520 MW; and • associated infrastructure, including battery storage of up to 260 MW / 520 MWh
Location	2335 Wollara Road, Merriwa, approximately 28 km south of Merriwa township within the Upper Hunter Shire Council Local Government Area
Applicant	Lightsource Development Services Australia Pty Ltd
Date of Issue	01/02/2022
General Requirements	The environmental impact statement (EIS) must meet the minimum form and content requirements as prescribed by Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and must have regard to the *State Significant Development Guidelines*. In particular, the EIS must include: • stand-alone executive summary; • a full description of the development, including: - details of construction, operation and decommissioning; - a high quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process); - a high quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development; • a strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including existing land use, other proposed or approved solar and major projects, rural/residential development, Crown lands within and adjacent to the project site, National Parks and Wildlife Service land and subdivision potential); • an assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including: - a description of the existing environment likely to be affected by the

	development using sufficient baseline data; - an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the *Large-scale Solar Energy Guideline* (DPIE 2018, subject to revision) and *Cumulative Impact Assessment Guideline* (DPIE, July 2021); - a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and - a description of the measures that would be implemented to monitor and report on the environmental performance of the development; • a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; • a detailed evaluation of the merits of the project as a whole having regard to: - the requirements in Section 4.15 of the *Environmental Planning and Assessment Act 1979*, including the objects of the Act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development; - the suitability of the site with respect to potential land use conflicts with - existing and future surrounding land uses; and - feasible alternatives to the development and its key components (including opportunities for shared infrastructure with proposed developments in the region), and the consequences of not carrying out the development; • a detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter; and • a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading. The EIS must also be accompanied by: • a report from a suitably qualified person providing a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; • an estimate of the jobs that will be created during the construction and operational phases of the proposed project; and • certification that the information provided is accurate at the date of preparation. The development application must be accompanied by the consent of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).
Key issues	The EIS must address the following specific matters: • **Biodiversity** – including: - an assessment of the biodiversity values and the likely biodiversity

impacts of the project in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (NSW), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), unless BCS and DPIE determine the proposed development is not likely to have any significant impacts on biodiversity values;
- the BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM;
- an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts, and
- if an offset is required, details of the measures proposed to address the offset obligations.

- **Heritage** – including:
  - an assessment of the impact to Aboriginal cultural heritage items (cultural and archaeological) in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the Code of Practice for the *Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010);
  - evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010); and
  - assess the impact to historic heritage having regard to the NSW Heritage Manual.
- **Land** – including:
  - a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints;
  - an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including:
    - flood prone land, Crown lands, mining, quarries, mineral or petroleum rights;
    - a soil survey to determine the soil characteristics and consider the potential for erosion to occur; and
    - a cumulative impact assessment of nearby developments;
  - an assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including:
    - consideration of the zoning provisions applying to the land, including subdivision (if required);
    - completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide;* and
  - a detailed assessment of the impact on agricultural resources and agricultural productivity, including:
    - an agricultural impact statement;
    - consideration of potential mitigation measures which may reduce

project impacts on agricultural land;
    - detailed economic assessment of impacts on agricultural land, agricultural production and agricultural supply chains;
    - justification for the project considering other alternatives and site design which may have lesser impacts on agricultural land;

- **Visual** – including:
  - a detailed assessment of the likely visual impacts (including any glare, reflectivity and night lighting) of all components of the project (including arrays, transmission lines, substations, battery storage and any other ancillary infrastructure) on surrounding residences and key locations, scenic or significant vistas and road corridors in the public domain and on the Siding Spring Observatory in accordance with the *Dark Sky Planning Guideline* (2016); and
  - provide details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners);
- **Noise** – including an assessment of the construction noise impacts of the development in accordance with the *Interim Construction Noise Guideline* (ICNG), operational noise impacts in accordance with the *NSW Noise Policy for Industry* (2017), cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria;
- **Transport** – including:
  - an assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation;
  - an assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance;
  - a cumulative impact assessment of traffic from nearby developments; and
  - provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities;
- **Water** – including:
  - an assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts;
  - details of water requirements and supply arrangements for construction and operation; and
  - where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI *Guidelines for Controlled Activities on Waterfront Land* (2018) and (if necessary) *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI 2003), and *Policy & Guidelines for Fish Habitat Conservation & Management* (DPE, 2013); and
  - a description of the erosion and sediment control measures that would be

	implemented to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom 2004); • **Hazards–** including: - a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33* (DoP, 2011); - a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with *Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning* (DoP, 2011); and - an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the *International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields;* • **Social Impact –** including an assessment of the social impacts in accordance with *Social Impact Assessment Guideline* (DPIE, July 2021); • **Economic** –including an assessment of the economic impacts or benefits of the project for the region and the State as a whole, and • **Waste** – identify, quantify and classify the likely waste stream to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.
Plans and Documents	The EIS must include all relevant plans, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.
Legislation, Policies & Guidelines	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. A list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: • https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework/Improving-assessment-guidance • https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines; and • http://www.environment.gov.au/epbc/publications#assessments
Consultation	During the preparation of the EIS, you should consult with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence and/or mineral title holders. In particular, you must undertake detailed consultation with affected landowners surrounding the development, Upper Hunter Shire Council, Crown Lands, NSW

	Aboriginal Land Council and Transport for NSW. The EIS must: • detail how engagement undertaken was consistent with the *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, July 2021); and • describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, an explanation should be provided.
Expiry Date	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.

Our ref: DOC21/1137261-3
Your ref: SSD-33964533

Kurtis Wathen

Environmental Assessment Officer
Energy Resource Assessments
Department of Planning, Industry and Environment
Kurtis.Wathen@dpie.nsw.gov.au

Dear Kurtis

Input into Secretary's Environmental Assessment Requirements – Goulburn River Solar Farm (SSD 33964533) – Upper Hunter Shire LGA

I refer to your Major Projects Portal request on 22 December 2021 seeking input into the Secretary's Environmental Assessment Requirements (SEARs) for the Goulburn River Solar Farm, located at 2335 Wollara Road, Merriwa. This project area stretches across 44 lots and is 2000 hectares in size. The proposed development is within the Upper Hunter Shire local government area.

The Biodiversity Conservation Division (BCD) of the Department of Planning, Industry and Environment (the Department) understands that Lightsource bp are proposing the construction of a solar farm which will include an approximate 520 megawatt peak (MWp) of solar electricity generation with a Battery Energy Storage System with a 260 MWp and 520 megawatt hour capacity. The project will also include supporting infrastructure, such as a substation and connection to an existing 500 kilovolt transmission line which intersects with the property. BCD understands that the proposal is a State Significant Development (SSD-33964533) project under the *Environmental Planning and Assessment Act 1979*.

BCD has reviewed the document '*Goulburn River Solar Farm Scoping Report*' as prepared by Umwelt (Australia) Pty Ltd (dated 17 December 2021) and has prepared Standard SEARs which are presented in **Attachment A**. There are no project-specific SEARs provided for this project (**Attachment B**). Details of guidance documents are provided in **Attachment C**.

If you have any further questions in relation to this matter, please contact Jayme Lennon, Senior Conservation Planning Officer, on 9585 6935 or at huntercentralcoast@environment.nsw.gov.au.

Yours sincerely

STEVEN CRICK
Senior Team Leader Planning
Hunter Central Coast Branch
Biodiversity and Conservation Division

23 December 2021

Enclosure: Attachments A, B, C

Attachment A – Standard Environmental Assessment Requirements

Biodiversity

1. Biodiversity impacts related to the proposed development (SSD-33951458) are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method 2020.
2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020.
3. The BDAR must include details of the measures proposed to address the offset obligation as follows;
    - The total number and classes of biodiversity credits required to be retired for the development/project;
    - The number and classes of like-for-like biodiversity credits proposed to be retired;
    - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;
    - Any proposal to fund a biodiversity conservation action;
    - Any proposal to conduct ecological rehabilitation (if a mining project);
    - Any proposal to make a payment to the Biodiversity Conservation Fund.

If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

4. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.

Water and soils
5. The EIS must map the following features relevant to water and soils including: a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map). b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method). c. Wetlands as described in s4.2 of the Biodiversity Assessment Method. d. Groundwater. e. Groundwater dependent ecosystems. f. Proposed intake and discharge locations.
6. The EIS must describe background conditions for any water resource likely to be affected by the development, including: a. Existing surface and groundwater. b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.
7. The EIS must assess the impacts of the development on water quality, including: a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. b. Identification of proposed monitoring of water quality.

8. The EIS must assess the impact of the development on hydrology, including:
    a. Water balance including quantity, quality and source.
    b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
    c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
    d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.
    f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
    g. Identification of proposed monitoring of hydrological attributes.

Flooding and coastal erosion

9. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    a. Flood prone land.
    b. Flood planning area, the area below the flood planning level.
    c. Hydraulic categorisation (floodways and flood storage areas).

10. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.

11. The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:
    a. Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

12. Modelling in the EIS must consider and document:
    a. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood.
    b. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories.
    c. Relevant provisions of the NSW Floodplain Development Manual 2005.

13. The EIS must assess the impacts on the proposed development on flood behaviour, including:

    a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    b. Consistency with Council floodplain risk management plans.
    c. Compatibility with the flood hazard of the land.
    d. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    e. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    f. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
    g. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council.
    h. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council.
    i. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES.
    j. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

14. The [EIS/EA] must describe the potential effects of coastal processes and hazards (within the meaning of the Coastal Management Act 2016), including sea level rise and climate change:

    a. On the proposed development
    b. Arising from the proposed development.

15. The [EIS/EA] must consider have regard to any certified Coastal Management Program (or Coastal Zone Management Plan) and be consistent with the management objectives described in the Coastal Management Act 2016 and development controls for coastal management areas mapped under the State Environmental Planning Policy (Coastal Management) 2018.

Attachment B – Project specific environmental assessment requirements

Biodiversity - nil
Water and soils - nil
Flooding and coastal erosion - nil

Attachment C – Guidance material

Title	Web address
Relevant legislation	
Biodiversity Conservation Act 2016	https://www.legislation.nsw.gov.au/#/view/act/2016/63/full
Coastal Management Act 2016	https://www.legislation.nsw.gov.au/#/view/act/2016/20/full
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
Marine Parks Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Wilderness Act 1987	http://www.legislation.nsw.gov.au/viewtop/inforce/act+196+1987+FIRST+0+N
Biodiversity	
Biodiversity Assessment Method (OEH, 2020)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-200438.pdf
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	http://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf
Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020)	https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method
NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE 2020)	https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs
'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method
Fisheries NSW policies and guidelines	http://www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals/fish-habitat-conservation
List of national parks	http://www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx
Revocation, recategorisation and road adjustment policy (OEH, 2012)	http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm

Title	Web address
Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010)	http://www.environment.nsw.gov.au/protectedareas/developmntadjoiningdecc.htm
Acid sulphate soils	
Acid Sulfate Soils Planning Maps via Data.NSW	http://data.nsw.gov.au/data/
Acid Sulfate Soils Manual (Stone et al. 1998)	http://www.environment.nsw.gov.au/resources/epa/Acid-Sulfate-Manual-1998.pdf
Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004)	http://www.environment.nsw.gov.au/resources/soils/acid-sulfate-soils-laboratory-methods-guidelines.pdf This replaces Chapter 4 of the Acid Sulfate Soils Manual above.
Flooding and coastal erosion	
Reforms to coastal erosion management	http://www.environment.nsw.gov.au/coasts/coastalerosionmgmt.htm
Floodplain development manual	http://www.environment.nsw.gov.au/floodplains/manual.htm
Guidelines for Preparing Coastal Zone Management Plans	Guidelines for Preparing Coastal Zone Management Plans http://www.environment.nsw.gov.au/resources/coasts/130224CZMPGuide.pdf
NSW Climate Impact Profile	http://climatechange.environment.nsw.gov.au/
Climate Change Impacts and Risk Management	Climate Change Impacts and Risk Management: A Guide for Business and Government, AGIC Guidelines for Climate Change Adaptation
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	www.environment.gov.au/water/publications/quality/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

OUT21/18518

Kurtis Wathen
Planning and Assessment Group
NSW Department of Planning and Environment

kurtis.wathen@planning.nsw.gov.au

Dear Mr Wathen

Goulburn River Solar Farm (SSD-33964533)
Comment on the Secretary's Environmental Assessment Requirements (SEARs)

I refer to your email of 22 December 2021 to the Department of Planning and Environment (DPE) Water and the Natural Resources Access Regulator (NRAR) about the above matter.

The following advice for you to consider is from DPE Water and NRAR.

The SEARs should include:

- A description of the watercourses located within the vicinity of the development, including Strahler Stream Order as mapped by Spatial Services NS, and appropriate riparian setbacks in accordance with the *Guidelines for riparian corridors on waterfront land.* (https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0008/386207/licensing_approvals_controlled_activities_riparian_corridors.pdf).
- Details of water supply requirements and arrangements for the life of the project (both construction and operation);
- An assessment of the likely impacts (including flooding) on surface water and groundwater resources* and measures proposed to monitor, reduce and mitigate these impacts;
- A description of erosion and sediment control measures to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom 2004);
- The proponent documents and addresses any sedimentation issues, through the development of an Erosion and Sediment Control Plan, in consultation with DPE Water.
- Consideration of any relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy (2012), the Guidelines for Controlled Activities on Waterfront Land (2018) and the relevant Water Sharing Plans (available at https://water.dpie.nsw.gov.au/home).

* These water resources may include local streams/creeks, drainage channels, wetlands, riparian land, farm dams, floodplains, key fish habitat, groundwater dependent ecosystems and acid sulfate soils), related infrastructure, adjacent licensed water users and basic landholder rights.

Any further referrals to DPE Water and NRAR can be sent by email to water.assessments@dpie.nsw.gov.au. or to the following coordinating officer within DPE Water:

Alistair Drew, Project Officer, E: Alistair.drew@dpie.nsw.gov.au

Yours sincerely

Liz Rogers
Manager, Assessments, Knowledge Division
Department of Planning and Environment: Water
11 January 2022

Department of Primary Industries

OUT22/412

Kurtis Wathen
Energy Assessments
Planning & Assessments

C/- Major Projects Portal

Dear Mr Wathen

Secretary's Environmental Assessment Requirements– Goulburn River Solar Farm and Battery, (SSD-33964533) (Upper Hunter Shire Council)

Thank you for your correspondence dated 22 December 2021 requesting Secretary's Environmental Assessment Requirements (SEARs) for the above proposal for our response.

The NSW Department of Primary Industries (NSW DPI) Agriculture is committed to the protection and growth of agricultural industries, and the land and resources upon which these industries depend. Issues of concern in relation to this project are due to the scale and location on highly productive agricultural land, the long-term impacts on agricultural resources and the ability to rehabilitate the land upon cessation of the development. It is important to note that while DPI Agriculture is required to issue SEARs in relation to this matter, it does not change our view that the subject site's highest and best use is continued agricultural production and not the development as proposed.

We have considered the Scoping Report as well as the draft SEARs provided. As the proposal is located on rural land zoned RU1 Primary Production, the following specific inclusions are required to be addressed in the Environmental Impact Statement in addition to the other matters required in the draft SEARs template:

- The site is predominantly cleared land that is developed and has been used for productive agriculture, with the majority of the 2,000ha Project Site being on Land and Soil Capability (LSC) class 2 and 3 land as described in the Scoping Report. Large parts of the site are also mapped as draft State Significant Agricultural Land as available on the DPI website.
- Due to the matters raised above, an Agricultural Impact Statement (AIS) is required. This is a proportionate requirement relative to the proposal's long-term removal of a large amount of LSC classes 2 and 3 from production. The AIS should include an assessment of agriculture on the site and locality, and the changes due to the solar development on agricultural enterprises and production values during construction and operation. The AIS should include an assessment of the state-wide scarcity of highly productive agricultural land and the relative amount of LSC classes 2 and 3 in the Merriwa locality, and address the cumulative impacts of this proposal and other energy generation and transmission infrastructure in the vicinity.
- Alternative site selection in relation to agriculture impacts is not explored in the Scoping Report. We refer to the Department's revised *Large Scale Solar Energy Guidelines*, where it is requested proponents avoid important agricultural land, consider the agricultural capability of the land during the site selection process and are strongly encouraged to select sites which have limited potential for sustained agricultural production. Accordingly,

the agricultural assessment required as part of the EIS should be detailed and substantial, in justifying site selection against the principles set out in the Guidelines.

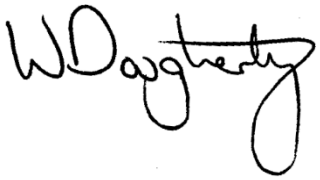
- In the operational and decommissioning plans, consideration should be given to underground cabling on the land. Our recommendation is such cabling be buried to a depth greater than 500 mm for this land use or be completely removed upon decommissioning. This will enable the land to return to full production including cropping.
- The Rehabilitation and Decommissioning/Closure Management Plan should include, but is not limited to, describing the potential design criteria of the final land use and landform, indicators which may be used to guide the return of the land back to agricultural production, along with the expected timeline for the rehabilitation program.
- Biosecurity management issues during and post construction must be assessed in relation to potential agricultural impacts in the EIS.

We note and support the commitment to undertaking a Land Use Conflict Risk Assessment with neighbouring landholdings in the Draft SEARs.

Provided following are recommended SEARs (Attachment 1) and a range of publications to assist consent authorities, community, and proponents in addressing the recommended SEARs (Attachment 2). The main considerations have been highlighted above, however the attached provide additional considerations.

Should you require clarification on any of the information contained in this response, please contact Helen Squires, Agricultural Landuse Planning Officer on 0437 645 719 or by email at landuse.ag@dpi.nsw.gov.au

Yours sincerely



20/01/2022
Warwick Dougherty
A/Group Director, Agricultural Resources

Attachment 1: Environmental Assessment Requirements for Merriwa Solar Farm and Battery

Issue	Environmental Assessment Requirement for Environmental Impact Statement
Site Suitability	• Include a map to scale showing the above operational and infrastructure details including separation distances from sensitive receptors including agricultural land uses.
Consideration of impacts on agricultural resources and land	**Characteristics of Agricultural Land** • Describe the soil, slope, land capability, agricultural productivity, land characteristics and the history of agricultural land uses on the proposed development site. • Describe the current and historical agricultural land uses on surrounding land in the locality including the land capability and agricultural land uses and productivity of the surrounding land. **Impacts on Agricultural Land, Resources and Land Uses** • Detail the potential impacts from the proposed development on agricultural land and agricultural land uses on the site and in the locality. • Detail the location and areas of land to be temporarily/permanently removed from agricultural use, and those areas which are to be returned to agricultural use on completion of the development. • Consider possible cumulative impacts on surrounding agricultural enterprises and landholders. • Assess impacts on agricultural support services, processing and value adding industries. **Measures to mitigate impacts on Agricultural land** • Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated. • Detail the expected life span of the proposed development.
Suitable and secure water supply	• Outline any impacts to water use and access for agriculture and measures to mitigate against these impacts.
Biosecurity	• Detail the design of fencing and its adequacy to manage livestock out. • Undertake a biosecurity risk management plan. A biosecurity risk management plan must detail the considered risks and strategies developed to monitor, prevent, eliminate or minimize the following: - the introduction, presence, spread or increase of a pest or disease of plants - the introduction, presence, spread or increase of a pest animal - the introduction, presence, spread or increase of a weed - the introduction, presence, spread or increase of a pest or disease of animals - animals or animal products becoming chemically affected.

	• Specific weed or pest animals for a region are addressed in the regional plans or strategies issued by NSW Local Lands Services.
Traffic movements	• Detail the volume and route of traffic movements for the proposed development and how potential impacts on surrounding agricultural land uses are proposed to be mitigated (eg noise, dust, volume of traffic). This should include consideration of Travelling Stock Reserves (TSR) and the movement of livestock or farm vehicles along / across the affected roads.
Land stewardship	• Describe the final proposed land use and land form. • Detail the proposed rehabilitation and decommissioning/closure measures to achieve this land use including the expected timeline for the rehabilitation program. Describe the nature of agricultural productivity post rehabilitation. • Outline the monitoring and mitigation measures to be adopted for rehabilitation remedial actions. • Detail the cropping history or capability for cropping of the land and how the proposed rehabilitation works will enable this land to be used for cropping in the future. This detail is expected to require that cables/pipes are to be buried at a depth >500mm to allow greater opportunity for agricultural activities to continue over the top, particularly for non-decommissioning cables/pipes once restoration is complete. • Where the land contains sodic soils detail the proposed management practices which should ensure than any trenching through sodic soils during construction is to include soil amendment with Gypsum at a minimum rate of 10t/ha (actual rates to be determined following soil testing (Clay content, ECEC and EC)).
Community consultation	• Consult with the owners / managers of affected and adjoining neighbours and agricultural operations in a timely and appropriate manner about the proposal, the likely impacts and suitable mitigation measures or compensation.
Emergency Management	• The proposal is to detail contingency plans to enable the operation to deal with emergency situations. The proposal is to detail Emergency Management procedures and responsibilities for responding to bushfire threats and other possible hazardous events.

Attachment 2: Guidelines for assessment

Title	Location
Infrastructure Proposals on Rural Land	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/infrastructure-proposals
Biosecurity Risk Management in Land Use Planning and Development	https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/1271241/managing-biosecurity-risks-in-land-use-planning-and-development-guide.pdf
Agricultural Impact Statements – technical notes	https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/463789/Agricultural-Impact-Statement-technical-notes.pdf
Draft State Significant Agricultural Land mapping	https://nswdpi.mysocialpinpoint.com/ssal
Land Use Conflict Risk Assessment (LUCRA) Guide	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra

Response History

Public Authority Response **Wednesday, 22 December 2021 12:11:11 PM AEDT**

Notes:

The project identifies a Preliminary Development Boundary. There are no Fisheries issues within the identified boundary footprint.

File Ref. No: FRN22/172 BFS22/125 8000019228
TRIM Doc. No: D22/3278
Contact: Station Officer Aaron Ross

19 January 2022

Kurtis Wathen
NSW Department of Planning, Industry and Environment
Locked Bag 5022
PARRAMATTA NSW 5022

Dear Kurtis Wathen

Re: Comment on Secretary's Environmental Assessment Requirements (SEARs) for Goulburn River Solar Farm (SSD-33964533)

Fire & Rescue NSW (FRNSW) acknowledge correspondence received on 22 December 2021, requesting input into the preparation of the SEARs for the Goulburn River Solar Farm (SSD-33964533).

FRNSW have reviewed the SEARS and Scoping Report and make the following recommendations:

FRNSW will not be providing comment at this time as there is currently insufficient information available regarding the fire safety and emergency response management aspects of the project.

We request that we be given the opportunity to review and provide comment once approvals have been granted and the project has progressed such that there is more relevant detailed information available. FRNSW note that a SEPP 33 screening process will be conducted for the proposal.

As additional details become available Fire & Rescue NSW requests to be consulted with respect to the proposed fire and life safety systems and their configuration at the project's preliminary and final design phases.

While there is currently no requirement for a fire safety study, FRNSW may request one be undertaken at a later stage should information be provided such it is deemed that the development poses unique challenges to the response to and management of an incident.

Fire and Rescue NSW **ABN** 12 593 473 110

Community Safety Directorate
Operational Liaison and Special Hazards Unit
Locked Bag 12,
Greenacre NSW 2190
T 02 9742 7434
F 02 9742 7483

www.fire.nsw.gov.au

For further information please contact the Operational Liaison and Special Hazards Unit, referencing FRNSW file number BFS22/125. Please ensure that all correspondence in relation to this matter is submitted electronically to firesafety@fire.nsw.gov.au.

Yours sincerely,

Superintendent John Hawes
Manager
Operational Liaison and Special Hazards Unit

Cc: kurtis.wathen@dpie.nsw.gov.au

Hazards and Risks – A Preliminary Hazard Analysis (PHA), prepared in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* the Department's *Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'* and *Multi-level Risk Assessment* (DoP, 2011). The PHA must:

- Consider the most recent standards and codes such as and not limited to NFPA 855, AS 5139, IEC 62897, UL 9540, FM Global DS 5-33, and UL 9540A test reports when establishing separation distances;
- Demonstrate that the separation distances between BESS to on-site or off-site receptors and the separation distances between BESS sub-units (containers, modules, etc.) prevent fire propagation;
- Verify that the areas designated for BESS are sufficient taking into account separation distances between BESS sub-units; and
- Demonstrate that the fire risks from BESS can comply with the Department's *Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning*

Our reference: DOC21/1135472-1
Date: 23 December 2021

HERITAGE NSW – Aboriginal Cultural Heritage - SEARs

Project Name: Major Projects - New Request for Advice - Goulburn River Solar Farm (SSD-33964533) (Upper Hunter Shire)

1. The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigation in NSW (DECCW 2010), and be guided by the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH 2011).
2. Consultation with Aboriginal people must be undertaken and documented in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.
3. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to Heritage NSW.
4. The assessment of Aboriginal cultural heritage values must include a surface survey undertaken by a qualified archaeologist. The result of the surface survey is to inform the need for targeted test excavation to better assess the integrity, extent, distribution, nature and overall significance of the archaeological record. The results of surface surveys and test excavations are to be documented in the ACHAR.
5. The ACHAR must outline procedures to be followed if Aboriginal objects are found at any stage of the life of the project to formulate appropriate measures to manage unforeseen impacts.
6. The ACHAR must outline procedures to be followed in the event Aboriginal burials or skeletal material is uncovered during construction to formulate appropriate measures to manage the impacts to this material.

NOTE: The process described in the *Due Diligence Code of Practice for the protection of Aboriginal objects in NSW* (DECCW 2010) is not sufficient to assess the impacts on Aboriginal cultural heritage of Major Projects.

Level 6, 10 Valentine Ave Parramatta NSW 2150 ■ Locked Bag 5020 Parramatta NSW 2124
P: 02 9873 8500 ■ E: heritagemailbox@environment.nsw.gov.au

Kurtis Wathen
Environmental Assessment Officer
Energy Resource Assessment
Department of Planning, Industry and Environment
4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

Emailed: via Planning Portal

Our ref: DOC22/18926
Your ref: SSD-33964533

20 January 2022

Dear Mr Wathen

Subject: Goulburn River Solar Farm (SSD-33964533) – Request for Secretary's Environmental Assessment Requirements

Thank you for the opportunity to provide advice on the above matter. This is a response from the NSW Department of Regional NSW – Mining, Exploration and Geoscience (MEG) – Geological Survey of NSW (GSNSW).

MEG-GSNSW has no additional requirements to those in the draft SEARs. We request to be consulted in relation to the proposed location of any biodiversity offset areas (both on and off site) or any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration, or potential for sterilisation of mineral or extractive resources.

Queries regarding the above information should be directed to the GSNSW - Land Use team at landuse.minerals@geoscience.nsw.gov.au.

Yours sincerely,

Steven Palmer
Manager, Land Use Assessment
Geological Survey of NSW – Mining, Exploration & Geoscience.

CR2021/006240
SF2021/331489
KML

19 January 2022

Department of Planning, Industry & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Attention: Kurtis Wathen

SSD 33964533
SEARS REQUEST – GOULBURN RIVER SOLAR FARM, WOLLARA ROAD MERRIWA

I refer to the request by the Department of Planning, Industry and Environment (DPIE) dated 22 December 2021 seeking input from Transport for NSW (TfNSW) to the Secretary's Environmental Assessment Requirements (SEARs) for the abovementioned development proposal.

TfNSW key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the *Future Transport Strategy 2056*.

TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads *Guide to Traffic Management Part 12*, the complementary TfNSW Supplement and *Roads and Maritime Guide to Traffic Generating Developments*.

The TIA should be tailored to the scope of the proposed development and include, but not be limited to, the following:

- A map of the surrounding road network identifying the site access, relevant traffic route/s and connections to the classified (State) road network.
- Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject properties.
- Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.

Transport for NSW
6 Stewart Avenue, Newcastle West NSW 2302
Locked Bag 2030, Newcastle West NSW 2302
T – (02) 4908 7688

Level 1, 76 Victoria Street, Grafton NSW 2460
PO Box 576, Grafton NSW 2460
T – (02) 6640 1362

- The anticipated additional vehicular traffic generated from both the construction and operational stages of the project.

- The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.

- Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during both the construction and operational stages.

- It is noted that within the Central West Orana REZ there are a number of projects Barneys Reef Wind Farm, Tallawang Solar Farm, Birriwa Solar Farm and Wollar Solar Farm that will utilise the Golden Highway and are likely to pass through the Merriwa locality as a part of the OSOM route. Barneys Reef Wind Farm, Tallawang Solar Farm and Birriwa Solar Farm are currently at SEARs stage while Wollar Solar is under construction. Consideration should be given within the TIA to the cumulative impacts on the road network from the surrounding projects.

- The Ringwood Road/Golden Highway intersection from a Google Earth review does not appear to have sufficient SISD or intersection treatments. An assessment of the SISD and intersection treatments potentially required by this development should form part of the TIA.

- It is noted in the scoping report that the workforce may come from Mudgee and will likely use the Ulan Road (Regional Road) or Wollar Road (Regional Road) to then continue onto Ringwood Road. Ulan and Wollar Road are heavily congested with light vehicle and heavy traffic that is associated with the three coal mines Wilpingjong, Moolarben and Ulan and the currently under construction Wollar Solar Farm. As a part of the TIA, consideration should be given to the implications of light and potentially heavy vehicles (if there is haulage from Mudgee for ancillary aspects to the solar farm) utilising this route from Mudgee.

- Haulage routes for the construction of ancillary aspects of the solar farm should be assessed as a part of the TIA.

- An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for relevant intersections along the identified transport route/s, including connections to the classified (State) road network.

- Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development. In this regard, preliminary concept drawings shall be submitted with the EIS for any identified road infrastructure upgrades. However, it should be

noted that any identified road infrastructure upgrades will need to be to the satisfaction of Transport for NSW and Council.

- Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:
  - Current traffic counts and 10 year traffic growth projections
  - With and without development scenarios
  - 95th percentile back of queue lengths
  - Delays and level of service on all legs for the relevant intersections
  - Electronic data for TfNSW review.

- Relevant swept path analysis for the largest design vehicle accessing the site.

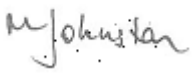
- Any other impacts to the road network including consideration of active transport and public transport facilities.

- Identification of necessary road upgrades that are required to mitigate the impact of the development. Preliminary concept drawings for any road upgrades shall be designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements and be submitted with the EIS. Road upgrades shall be to the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.

- Details of any Traffic Management Plan (TMP) proposed to address the construction phase of the proposed development. The TMP and associated Traffic Control Plans (TCPs) should be prepared by suitably qualified persons in accordance with the *TfNSW Traffic Control at Work Sites Manual*.

Should you require further information please contact Kate Leonard, Development Services Case Officer, on 02 4908 7688 or 0428 260 461 or by emailing development.north@transport.nsw.gov.au.

Yours sincerely



Marg Johnston
Team Leader Development Services
North Region | Community & Place
Regional & Outer Metropolitan

Upper Hunter Shire Council

Thank you for providing Upper Hunter Shire Council with an opportunity to provide input into the Planning Secretaries Environmental Assessment Requirements (SEARs) for the Solar development. I have now reviewed the documentation provided.

Based on the documentation the draft SEARs are considered to provide an adequate coverage of the environmental assessment requirements.

Should you require further information please contact myself in the first instance.

25/01/2022

Record Number: 22/00069#01

Planning Number: SSD-33964533

Goulburn River Solar Farm

The Department of Planning and Environment – Crown Lands has reviewed the Draft SEARs and Scoping Report for the subject proposal.

According to **Figure 4.2** of the **Scoping Report** all three "Potential Access Points" rely on access through a Crown reserve, being TSR 44841 for Travelling Stock, and part of this Crown reserve is also shown as being within the "Preliminary Development Boundary".

Pursuant to clause 49 of the *Environmental Planning and Assessment Regulation 2000* the proponent requires the consent from the Department, as landowner, to lodge the development application, unless the development is designated as a public notification development. The Departments' landowner's consent application form can be found on our website here:
https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/144345/landowners-consent-application-form.pdf

TSR 44841 is managed by the Hunter Local Land Services (LLS) and is subject to the provisions of the *Local Land Services Act 2013*. Parts of the TSR are subject to undetermined Aboriginal Land Claims, made under the *Aboriginal Land Rights Act 1983*.

There are multiple Crown roads within the project area. If the proposal requires the use of these Crown public roads, they must be either closed and purchased, or transferred to Upper Hunter Shire Council so they can be managed within the local road network. Consent from DPE – Crown Lands must also be obtained prior to any works being undertaken on Crown roads. More information on the management of Crown roads can be found on the Department's website here:
https://www.industry.nsw.gov.au/lands/access/roads

Regarding the SEARs, the Environmental Impact Statement (EIS) must include:

- An accurate description of Crown land within the development area, including Crown roads, and for Crown reserves should specify the land owner, reserve purpose, reserve manager, and any third-party interests, including other permit or licence holder(s), easements, aboriginal land claims and native title considerations and relevant legislation.
- A description of any works, including the construction, operation and maintenance activities, and any ancillary construction activities such as transmission lines, pipelines, bores, access, fencing, signage, storage, offsets and buffers, etc. proposed on the Crown land/roads.
- An assessment of the impact of the proposal on Crown land/roads, including any conflicts with the existing land use(s), and compatibility of the proposal with the notified purpose of the Crown land/road.
- A description of approvals or agreements required to authorise any proposed activity and/or use of the Crown land/roads.
- During preparation of the EIS the proponent is to consult with the Department, as an affected landowner, and the Hunter LLS as land manager.

If the proponent requires further information, or has any questions, please contact Mark Grace, NRM Project Officer in Crown Lands, on (02) 4937 9331 or at mark.grace@crownland.nsw.gov.au.

Yours sincerely

Mark Grace
NRM Project Officer
T 02 4937 9331 | **E** mark.grace@crownland.nsw.gov.au

Forestry Corporation of NSW

FCNSW advises that if there is to be disturbance of Tongo State forest as a result of road works on Wollar Road (see image), then authority from FCNSW must be obtained. Such authority may require the payment of compensation for timber and cost recovery for FCNSW staff time. The granting of authority could take 4-6 weeks.

Please advise ASAP whether disturbance is likely so FCNSW may allocate resources to your planning dept application.

SEARs Checklist

Table 1 Secretary's Environmental Assessment Requirements

Requirement	Addressed in EIS
General Requirements	
• stand-alone executive summary	**Executive Summary**
• a full description of the development, including: ○ details of construction, operation and decommissioning; ○ a high quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process); ○ a high quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development;	**Section 3.0** **Figure 3.1** **Figure 3.2**
• a strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including existing land use, other proposed or approved solar and major projects, rural/residential development, Crown lands within and adjacent to the project site, National Parks and Wildlife Service land and subdivision potential);	**Section 2.0** **Section 9.1** **Section 9.2**
• an assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including: ○ a description of the existing environment likely to be affected by the development using sufficient baseline data; ○ an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the *Large-scale Solar Energy Guideline* (DPIE 2018, subject to revision) and Cumulative Impact Assessment Guideline (DPIE, July 2021); ○ a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and ○ a description of the measures that would be implemented to monitor and report on the environmental performance of the development;	**Section 2.3** **Section 6.0**
• a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS;	**Appendix 5**
• a detailed evaluation of the merits of the project as a whole having regard to: ○ the requirements in Section 4.15 of the *Environmental Planning and Assessment Act 1979*, including the objects of the Act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development; ○ the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; and	**Appendix 3** **Section 9.2** **Section 2.6**

Requirement	Addressed in EIS
○ feasible alternatives to the development and its key components (including opportunities for shared infrastructure with proposed developments in the region), and the consequences of not carrying out the development;	
• a detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter; and	**Section 2.1**
• a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading;	**EIS Declaration**
• a report from a suitably qualified person providing a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived;	**Appendix 20**
• an estimate of the jobs that will be created during the construction and operational phases of the proposed project; and • certification that the information provided is accurate at the date of preparation.	**Appendix 20**
• The development application must be accompanied by the consent of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).	**Appendix 4**
Key Issues	
Biodiversity	
• an assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (NSW), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), unless BCS and DPIE determine the proposed development is not likely to have any significant impacts on biodiversity values;	**Section 6.2** **Appendix 6, Appendix 7** and **Appendix 8**
• the BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM;	**Appendix 6, Appendix 7** and **Appendix 8**
• an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts, and	**Section 6.2.2** **Appendix 8**
• if an offset is required, details of the measures proposed to address the offset obligations.	**Section 6.2.1.6** **Section 6.2.1.7** **Appendix 6** and **Appendix 7**
Heritage	
• an assessment of the impact to Aboriginal cultural heritage items (cultural and archaeological) in accordance with the *Guide to Investigating,* Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the *Archaeological Investigation of* Aboriginal Objects in NSW (DECCW, 2010);	**Section 6.3** **Appendix 9**
• evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for *Proponents* (DECCW, 2010); and	**Section 6.3.3** **Appendix 9**

Requirement	Addressed in EIS
• assess the impact to historic heritage having regard to the NSW Heritage Manual.	**Section 6.4** **Appendix 10**
Land	
• a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints;	**Section 6.5** **Appendix 11**
• an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: ○ flood prone land, Crown lands, mining, quarries, mineral or petroleum rights; ○ a soil survey to determine the soil characteristics and consider the potential for erosion to occur; and ○ a cumulative impact assessment of nearby developments;	**Section 6.5** **Appendix 11**
• an assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: ○ consideration of the zoning provisions applying to the land, including subdivision (if required); ○ completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide; and	**Section 6.5** **Appendix 11**
• a detailed assessment of the impact on agricultural resources and agricultural productivity, including: ○ an agricultural impact statement; ○ consideration of potential mitigation measures which may reduce project impacts on agricultural land; ○ detailed economic assessment of impacts on agricultural land, agricultural production and agricultural supply chains; ○ justification for the project considering other alternatives and site design which may have lesser impacts on agricultural land;	**Section 6.5** **Appendix 11**
Visual	
• a detailed assessment of the likely visual impacts (including any glare, reflectivity and night lighting) of all components of the project (including arrays, transmission lines, substations, battery storage and any other ancillary infrastructure) on surrounding residences and key locations, scenic or significant vistas and road corridors in the public domain and on the Siding Spring Observatory in accordance with the Dark Sky Planning Guideline (2016); and	**Section 6.6** **Appendix 12** and **Appendix 13**
• provide details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners);	**Section 6.6** **Appendix 12** and **Appendix 13**
Noise	
• including an assessment of the construction noise impacts of the development in accordance with the Interim Construction Noise Guideline (ICNG), operational noise impacts in accordance with the *NSW Noise Policy for Industry* (2017), cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria;	**Section 6.7** **Appendix 14**

Requirement	Addressed in EIS
Transport	
• an assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation;	**Section 6.8** **Appendix 15**
• an assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance;	**Section 6.8** **Appendix 15**
• a cumulative impact assessment of traffic from nearby developments; and	**Section 6.8.4** **Appendix 15**
• provide details of measures to mitigate and/or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass/over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities;	**Section 6.8.5** **Appendix 15**
Water	
• an assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts;	**Section 6.9** **Appendix 16**
• details of water requirements and supply arrangements for construction and operation; and	**Section 3.7.1** **Section 6.9.3.3**
• where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPE, 2013); and	**Section 6.2.2** **Appendix 6, Appendix 7** and **Appendix 8**
• a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with *Managing Urban* Stormwater: Soils & Construction (Landcom 2004);	**Section 6.5** **Appendix 11**
Hazards	
• a preliminary risk screening completed in accordance with *State* Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011);	**Section 6.10.2** **Appendix 17**
• a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning (DoP, 2011); and	**Section 6.10.2** **Appendix 17**
• an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the *International Commission on* Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields;	**Section 6.10.3** **Section 6.10.4**

Requirement	Addressed in EIS
Social	
• including an assessment of the social impacts in accordance with Social Impact Assessment Guideline (DPIE, July 2021);	**Section 6.11** **Appendix 18**
Economic	
• including an assessment of the economic impacts or benefits of the project for the region and the State as a whole, and	**Section 6.12** **Appendix 19**
Waste	
• identify, quantify and classify the likely waste stream to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	**Section 6.13**
Plans and Documents	
• The EIS must include all relevant plans, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.	Provided
Legislation, Policies and Guidelines	
• The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. • A list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: o https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework/Improving-assessment-guidance o https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines; and o http://www.environment.gov.au/epbc/publications#assessments	**Section 2.0** **Section 6.0** **Appendix 3**
Consultation	
• During the preparation of the EIS, you should consult with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence and/or mineral title holders. • In particular, you must undertake detailed consultation with affected landowners surrounding the development, Upper Hunter Shire Council, Crown Lands, NSW Aboriginal Land Council and Transport for NSW. • The EIS must: o detail how engagement undertaken was consistent with the *Undertaking* Engagement Guidelines for State Significant Projects (DPIE, July 2021); and o describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, an explanation should be provided.	**Section 5.0** **Section 6.11** **Appendix 18**

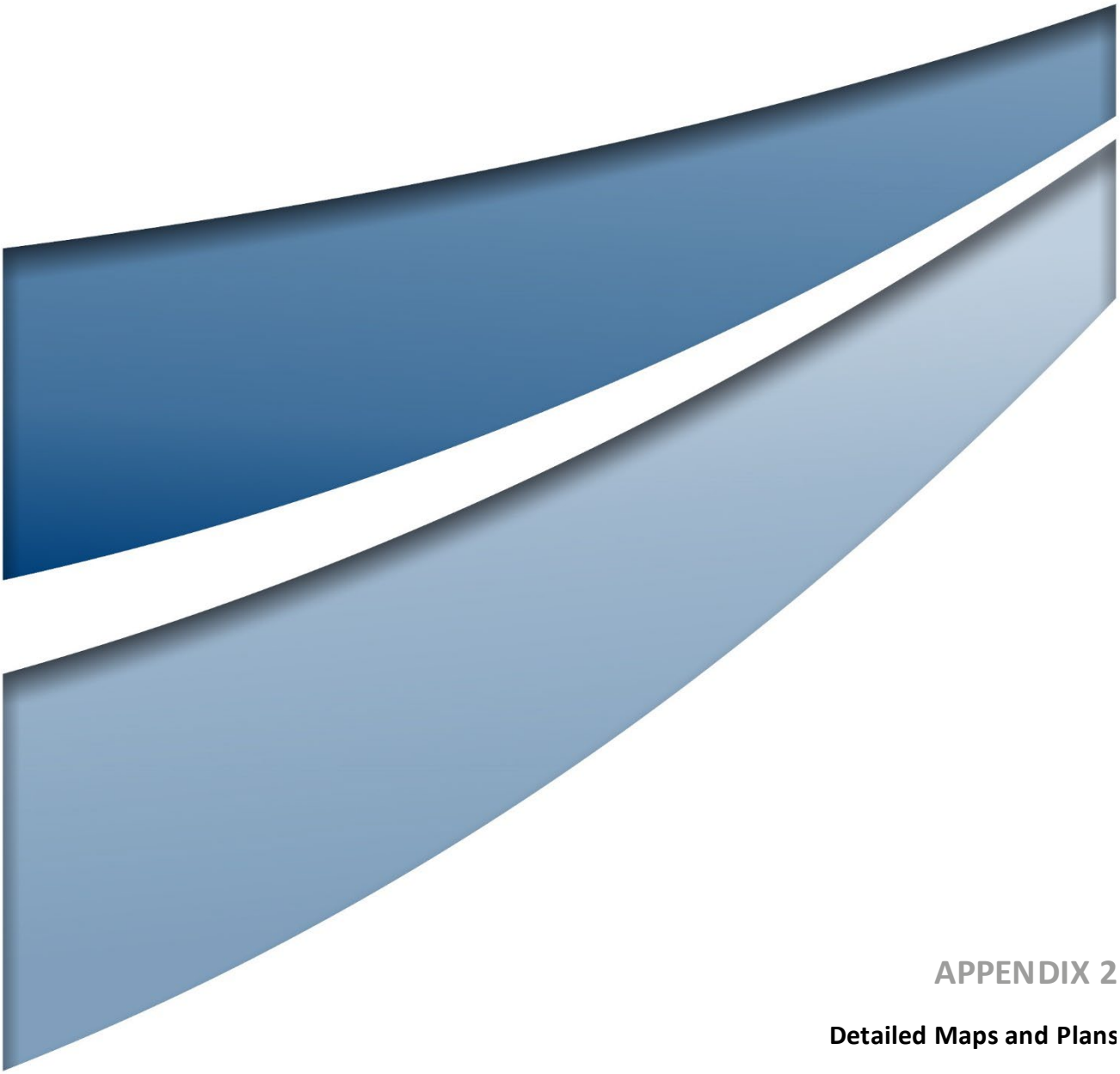
Table 2 Summary of Assessment Requirement (Supplementary SEARs)

Requirement	Addressed in the EIS or BDAR
3. The proponent must undertake an assessment of all protected matters that may be impacted by the development under the controlling provision identified in paragraph 1. The Commonwealth Department of Agriculture, Water and the Environment considers that the proposed action is likely to have a significant impact on threatened species and communities and migratory species listed in **Appendix A**.	
Threatened Species and Communities	
Based on the information in the referral documentation, the location of the action, species records and likely habitat present in the area, there are likely to be significant impacts to:	Appendix C of the Solar Farm Biodiversity Assessment Development Report (BDAR) (**Appendix 6** of the EIS)
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered	
Regent Honeyeater (*Anthochaera Phrygia)* – Critically Endangered	
Additionally, there is some risk that there may be significant impacts on the following matters and further assessment to determine if the communities and species listed below are present in the proposed action area and, if so, the extent to which they may be impacted by the proposed action, is required:	
Central Hunter Valley Eucalypt Forest and Woodland – Critically Endangered	
Swift Parrot (*Lathamus discolor*) – Critically Endangered	
Painted Honeyeater (*Grantiella picta*) – Vulnerable	
Large-eared Pied Bat (*Chalinolobus dwyeri*) – Vulnerable	
Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable	
Pink tailed Worm-lizard (*Aprasia parapulchella*) – Vulnerable	
Bluegrass (*Dichanthium setosum*) – Vulnerable	
Homoranthus darwinioides – Vulnerable	
Several threatened species and ecological communities have been identified as priority management species following the 2019–2020 bushfires. This includes the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland threatened ecological community and the Regent Honeyeater (as discussed above), and the following listed species that may be impacted by the proposed action:	
Koala (*Phascolarctos cinereus*) (Combined Population of QLD, NSW and the ACT) – Vulnerable	Appendix C of the Solar Farm BDAR (**Appendix 6** of the EIS)
Greater Glider (*Petauroides Volans*) – Vulnerable	
Brush tailed Rock wallaby (*Petrogale penicillata*) – Vulnerable	
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus* (South-east mainland population)) – Endangered	
New Holland Mouse, Pookila (*Pseudomys novaehollandiae*) – Vulnerable	
Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable	

Requirement	Addressed in the EIS or BDAR
Further analysis of the impacts of the fires on those species and communities identified above should be undertaken during the assessment.	
4. The proponent must consider each of the protected matters under the triggered controlling provisions that may be impacted by the action. Note that this may not be a complete list and it is the responsibility of the proponent to undertake an analysis of the relevant impacts and ensure all protected matters that are likely to be impacted are assessed for the Commonwealth Minister's consideration.	
Relevant Regulations	
5. The Environmental Impact Statement (EIS) must address all matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) and all matters outlined below in relation to the controlling provisions.	Noted
Project Description	
6. The title of the action, background to the action and current status.	**Section 1.0**
7. The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on MNES.	**Section 3.0**
8. How the action relates to any other actions that have been, or are being taken in the region affected by the action.	**Section 2.0** and **Section 6.5**
9. How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.	**Section 3.0** and **Section 6.2**
Impacts	
10. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including:	
i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;	
iii. analysis of the significance of the relevant impacts; and	
iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	
Avoidance, Mitigation and Offsetting	
11. For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including:	
i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures;	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
ii. any statutory policy basis for the mitigation measures;	
iii. the cost of the mitigation measures;	

Requirement	Addressed in the EIS or BDAR
iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;	
v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.	
12. Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
13. For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any:	
i. conservation advice or recovery plan for the species or community;	**Appendix C** of the Solar Farm BDAR (Appendix 6 of the EIS)
ii. relevant threat abatement plan for the species or community;	
iii. wildlife conservation plan for the species; and	
iv. any strategic assessment.	
14. In addition to the general requirements described above, specific information is required with respect to each of the determined controlling provisions. These requirements are outlined in paragraphs 15–17.	
Key Issues	
Biodiversity	
15. The EIS must identify each EPBC Act listed threatened species and community and migratory species likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
16. For each of the EPBC Act listed threatened species and communities and migratory species likely to be impacted by the action the EIS must provide a separate:	
a. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans;	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
b. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements;	
c. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; and	
d. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action;	

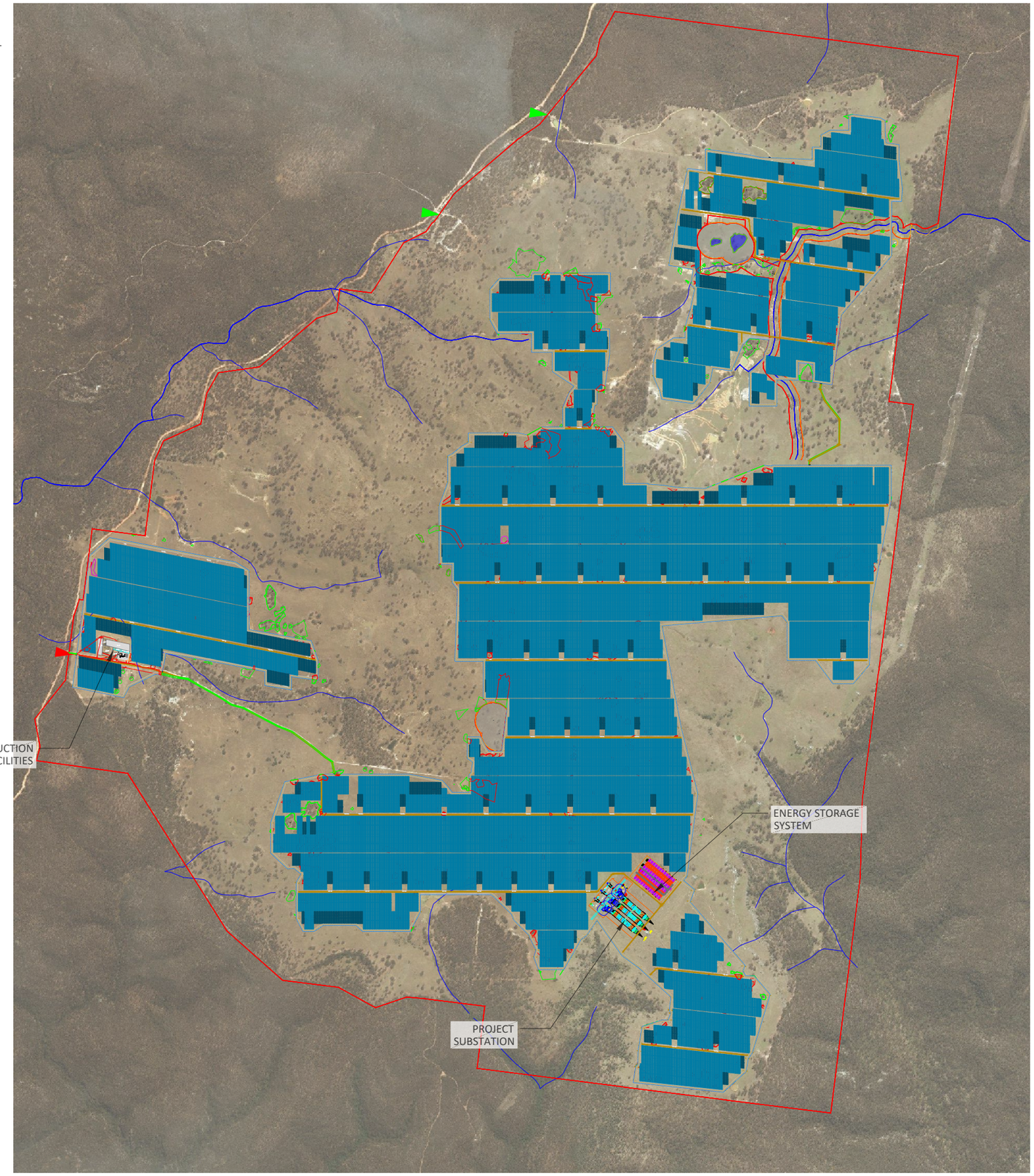
Requirement	Addressed in the EIS or BDAR
e. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account;	
f. a description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established;	
g. details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts; and	
h. details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites.	
17. Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
Other approvals and conditions	
18. Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations 2000.	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)
Environmental Record of person proposing to take the action	
19. Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations 2000.	Submitted as part of the Referral for the Project under the EPBC Act
Information Sources	
20. For information given in an EIS, the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.	**Appendix C** of the Solar Farm BDAR (**Appendix 6** of the EIS)

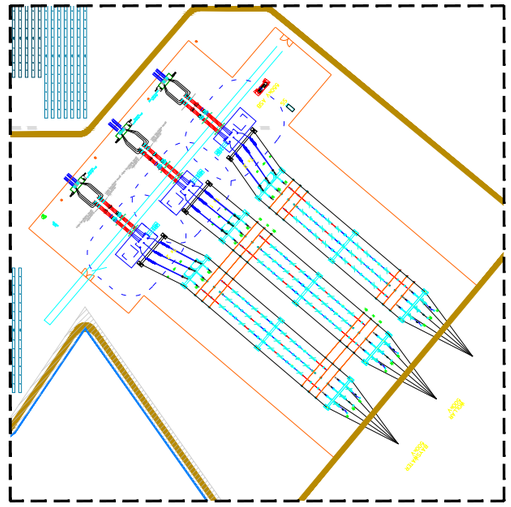


APPENDIX 2

Detailed Maps and Plans

AUS_Goulburn River Solar_LP1-IDL_07





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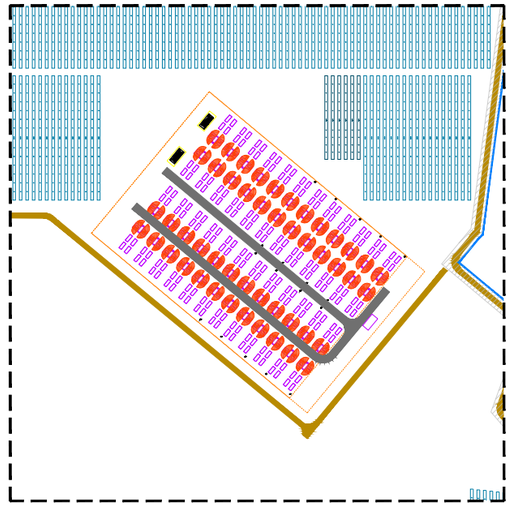

ENERGY STORAGE SYSTEM
1:5000

CONSTRUCTION FACILITIES
1:2500

- Site Boundary
- Site Access
- Secondary Site Access
- Security Fence
- Single Axis Tracker 84 x 1
- Single Axis Tracker 56 x 1
- Inverter & Transformer
- Access Gates
- Fire Break
- Access Road
- Grey box grass woodland
- Barking owl area
- Hydroline: 3rd order streams
- Vegetation to keep
- Vegetation to remove
- Heritage homestead

PV SYSTEM SPECIFICATIONS	
Capacity - DC	551.00 MW_p
Capacity - AC	450.00 MW_{AC}
DC/AC Ratio	1.22
Modules	(1020376) 540 W Bifacial
Mods. per string	28
Pitch	5.3 m
GCR	43.00 %
Mounting structure	(12558) Mono-Line Single Axis Trackers
• Full	11326
• Partial	1232
• Half	----
Inverters	(140) Central Inverter 3900 KVA
• Nominal Power	4200 KVA
Access roads	52805 m
Fenced area	(8297555 m^2) 2050.370 Acres
• Perimeter	30992 m

Revisions:

Rev	Date	Comments	Dwn	Chkd
07	28.03.23	Layout Update	AG	
06	23.03.23	Planning update	AG	
05	23.02.23	Layout update	JI	
04	15.11.22	Constraints update	AGV	
03.2	10.08.22	Layout update after plannings comments	AGV	
03.1	09.08.22	Layout update after comments	AGV	
03	08.08.22	Layout updated (new constraints added)	AGV	
02	13.10.21	West parcel bounday adjusted	AGV	

DRAWN	CHECKED	APPROVED	DATE
AGV			15.11.2022

PROJECT NAME & ADDRESS:
Location:
Goulburn River, Australia

NOTES:
- 540 Wp Bifacial modules
-
-
-

Paper Size:	Scale:	Sheet:
A3	1:25000	1

CAPACITY:
1020376 Modules 551.00 MWp

DRAWING TITLE:
AUS_Goulburn River Solar_LP1-Initial Design Layout_07

DRAWING NUMBER:	STATUS:
LP1-IDL	Preliminary

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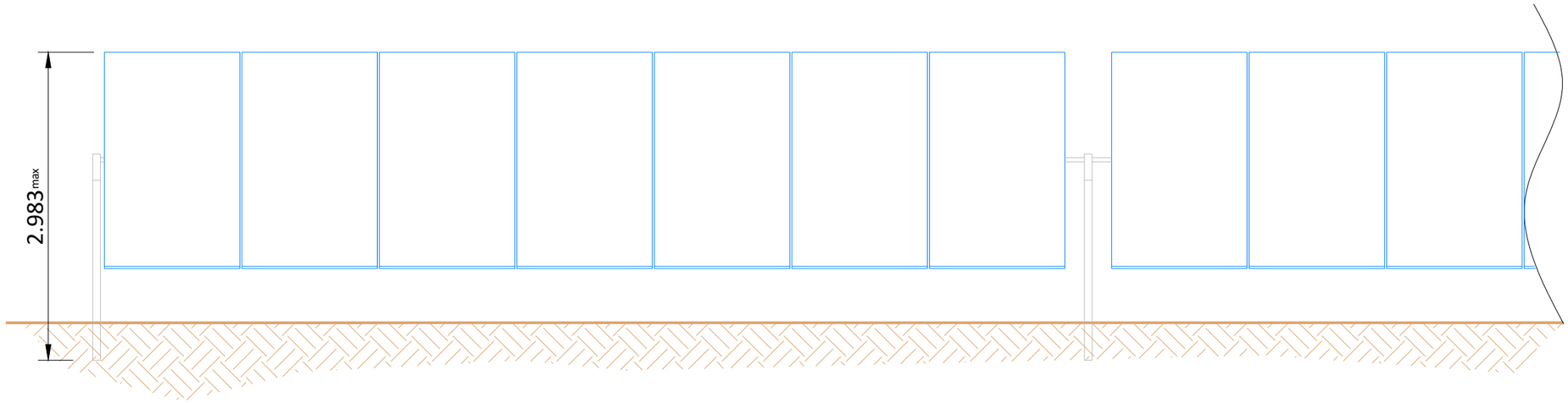
Tracker Elevation



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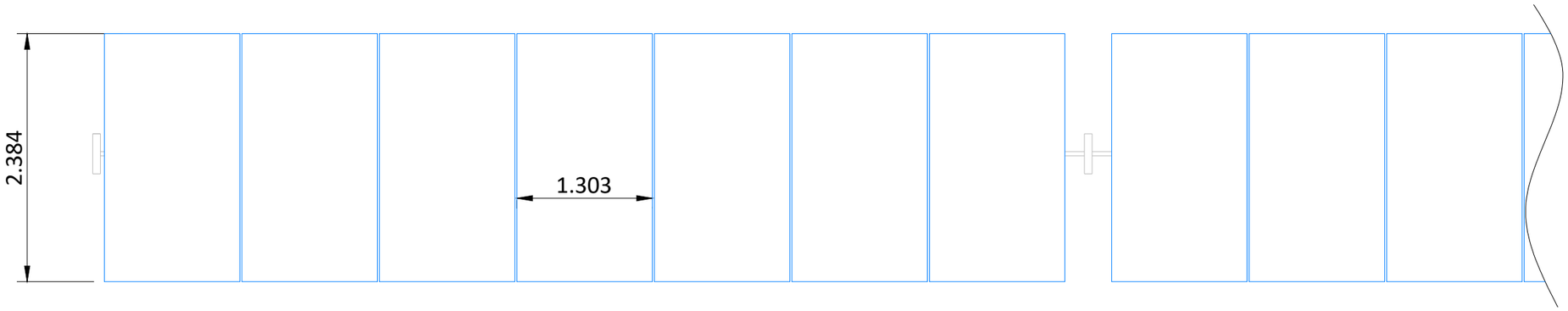
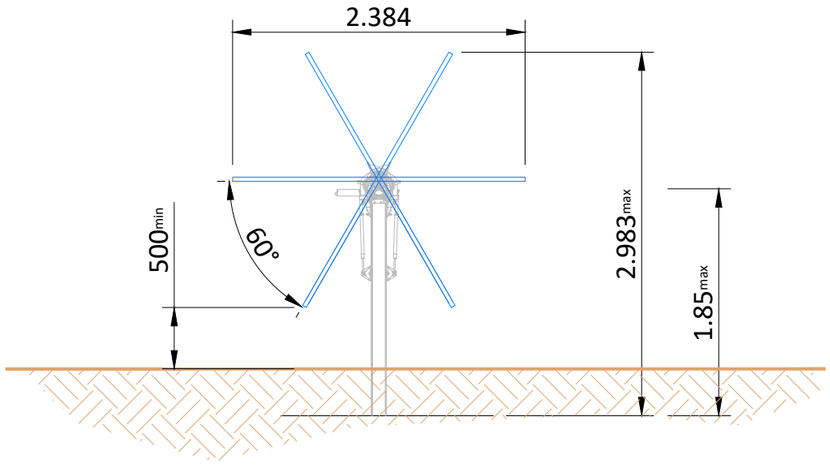


Plan



Typical Section

METERS

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A3 - (420 x 297)mm

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Tracker Elevation			
DA			11.08.20
DRAWN	CHECKED	APPROVED	DATE
Paper Size: A3	Scale: 1:50@A3	Sheet: 1	
DRAWING NUMBER: TR_NXTR	STATUS: Preliminary		

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HARRYAN
ENGINEERING COUNSULTING

CLIENT:
lightsource bp

DATE:	REVISION:	DESCRIPTION:
09.02.2023	0	CLIENT REVIEW

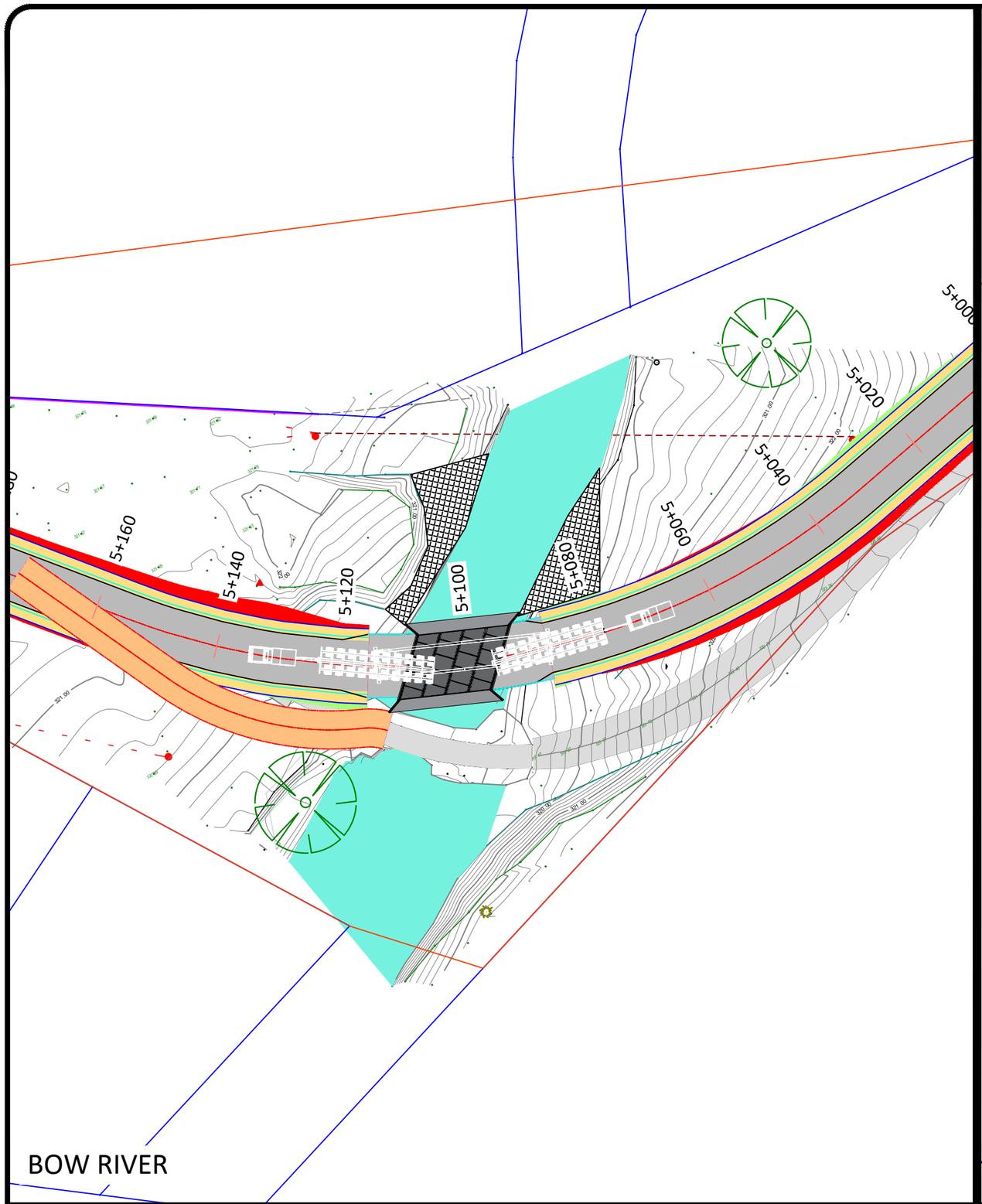
PROJECT:
RINGWOOD ROAD UPGRADE

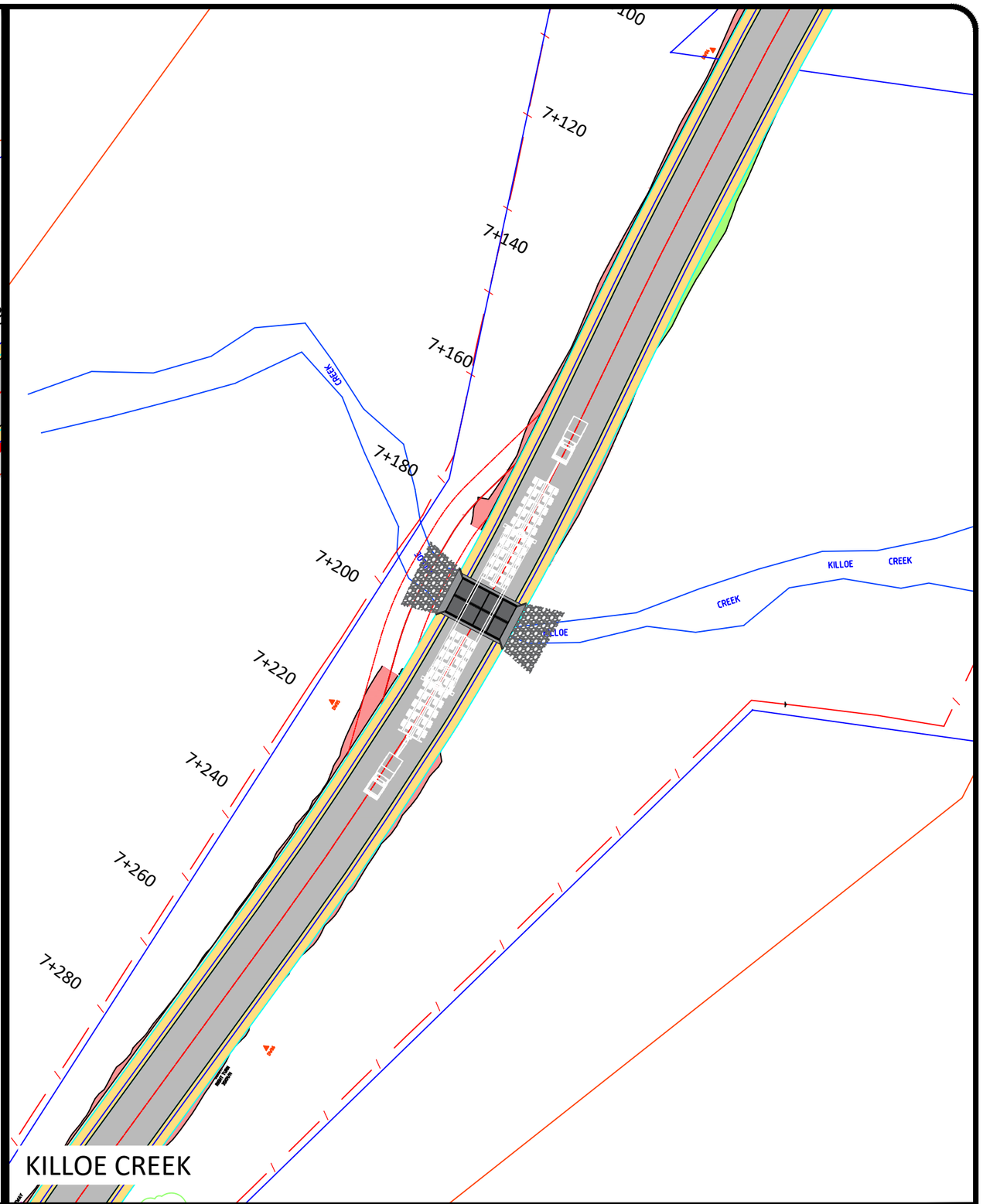
DRAWING TITLE:
SWEPTH PATHS

ISSUE STATUS:
CLIENT REVIEW

SCALE: 1:750 @ A3
DWG No: HEC22_
JOB No: 22Q3J3
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020
DATUM: AHD

SURVEYED: OTHERS
DESIGNED: RS
DRAWN: RJ
SHEET: 1
REV: 0





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CLIENT:
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DATE:	REVISION:	DESCRIPTION:
09.02.2023	0	CLIENT REVIEW

PROJECT:
RINGWOOD ROAD UPGRADE

DRAWING TITLE:
SWEPTH PATHS

ISSUE STATUS:
CLIENT REVIEW

N

SCALE: 1:750 @ A3
DWG No: HEC22_
JOB No: 22Q3J3
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020
DATUM: AHD
SURVEYED: OTHERS
DESIGNED: RS
DRAWN: RJ
SHEET: 2
REV: 0

LEGEND

- CADASTRAL BOUNDARY (DCDB)
- FENCE LINE
- FOG LINE
- CENTRELINE OF ROAD
- EDGE OF BITUMEN
- EDGE OF UNSEALED SHOULDER
- STORMWATER PIPE
- SURVEY CONTROL POINT
- DENOTES TREE
- DENOTES CUT AND FILL

TOWARDS MERRIWA

LOT 16
DP 11212

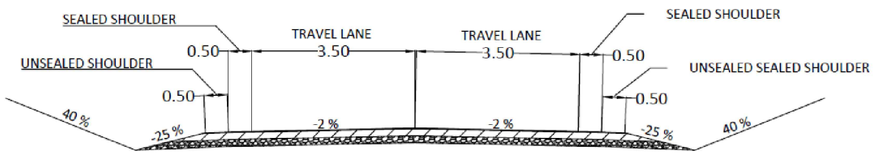
LOT 16
DP 11212

LOT 222
DP 750934

LOT 254
DP 722258

LOT 151
DP 1011943

5+000 5+020 5+040 5+060 5+080 5+100 5+120 5+140 5+160 5+180 5+200 5+220 5+240 5+260 5+280 5+300 5+320 5+340 5+360 5+380 5+400



TYPICAL SECTION
SCALE 1:100

HARRYAN
ENGINEERING COUNSULTING

CLIENT:
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DATE:	REVISION:	DESCRIPTION:
24.01.2023	0	CLIENT REVIEW

PROJECT:
RINGWOOD ROAD UPGRADE

DRAWING TITLE:
Proposed Alignment

ISSUE STATUS:
CONCEPTUAL DESIGN CLIENT REVIEW

SCALE: 1:1000
DWG No: HEC22_
JOB No: 22Q3J3
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020
DATUM: AHD

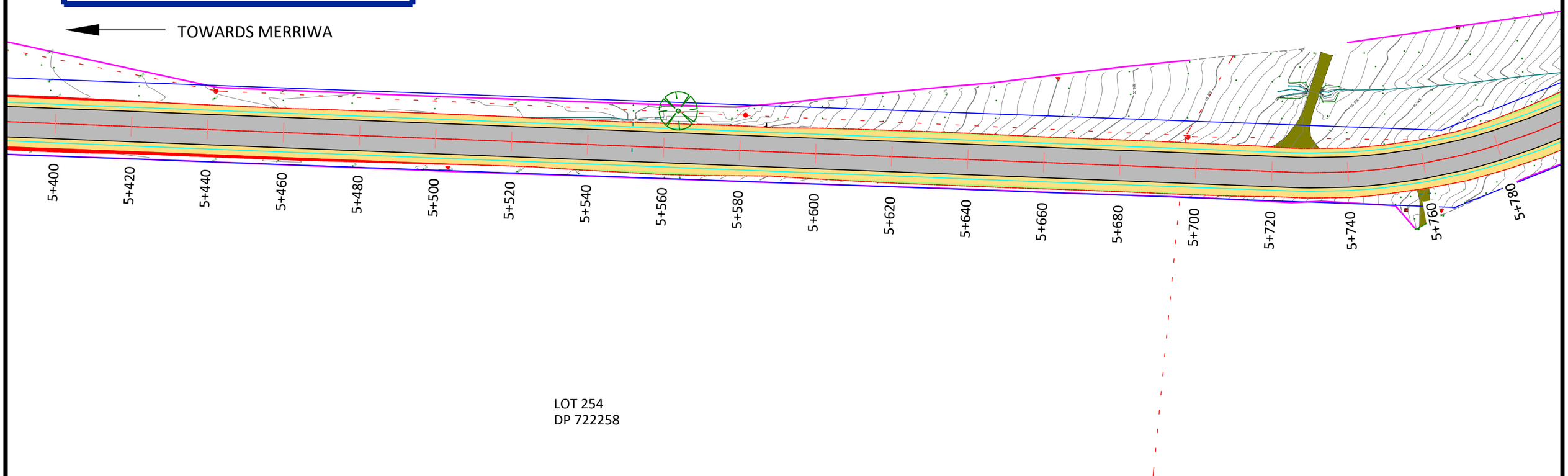
SURVEYED: RAP SURVEYING
DESIGNED: RS
DRAWN: RJ
SHEET: 1
REV: 0

LEGEND

- CADASTRAL BOUNDARY (DCDB)
- FENCE LINE
- FOG LINE
- CENTRELINE OF ROAD
- EDGE OF BITUMEN
- EDGE OF UNSEALED SHOULDER
- STORMWATER PIPE
- SURVEY CONTROL POINT
- DENOTES TREE
- DENOTES CUT AND FILL

TOWARDS MERRIWA

LOT 22
DP 750934



LOT 254
DP 722258

HARRYAN
ENGINEERING COUNSULTING

CLIENT: lightsource bp

DATE:	REVISION:	DESCRIPTION:
24.01.2023	0	CLIENT REVIEW

PROJECT:
RINGWOOD ROAD UPGRADE

DRAWING TITLE:
Proposed Alignment

ISSUE STATUS:
CONCEPTUAL DESIGN CLIENT REVIEW

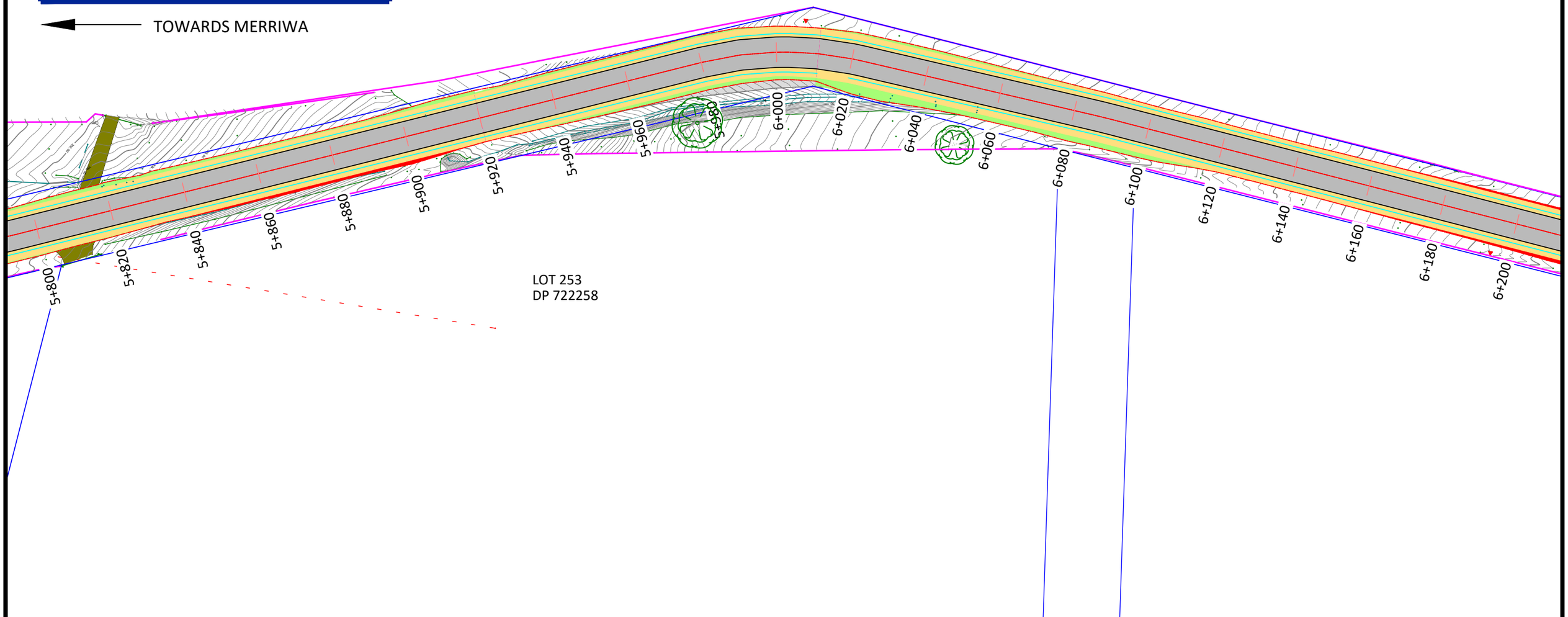
SCALE: 1:1000	SURVEYED: RAP SURVEYING
DWG No: HEC22_	DESIGNED: RS / DRAWN: RJ
JOB No: 22Q3J3	
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020	SHEET: 2 / REV: 0
DATUM: AHD	

LEGEND

- CADASTRAL BOUNDARY (DCDB)
- FENCE LINE
- FOG LINE
- CENTRELINE OF ROAD
- EDGE OF BITUMEN
- EDGE OF UNSEALED SHOULDER
- STORMWATER PIPE
- SURVEY CONTROL POINT
- DENOTES TREE
- DENOTES CUT AND FILL

TOWARDS MERRIWA

LOT 222
DP 750934



LOT 253
DP 722258

HARRYAN
ENGINEERING COUNSULTING

CLIENT: lightsource bp

DATE:	REVISION:	DESCRIPTION:
24.01.2023	0	CLIENT REVIEW

PROJECT:
RINGWOOD ROAD UPGRADE

DRAWING TITLE:
Proposed Alignment

ISSUE STATUS:
CONCEPTUAL DESIGN CLIENT REVIEW

SCALE: 1:1000
DWG No: HEC22_
JOB No: 22Q3J3
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020
DATUM: AHD

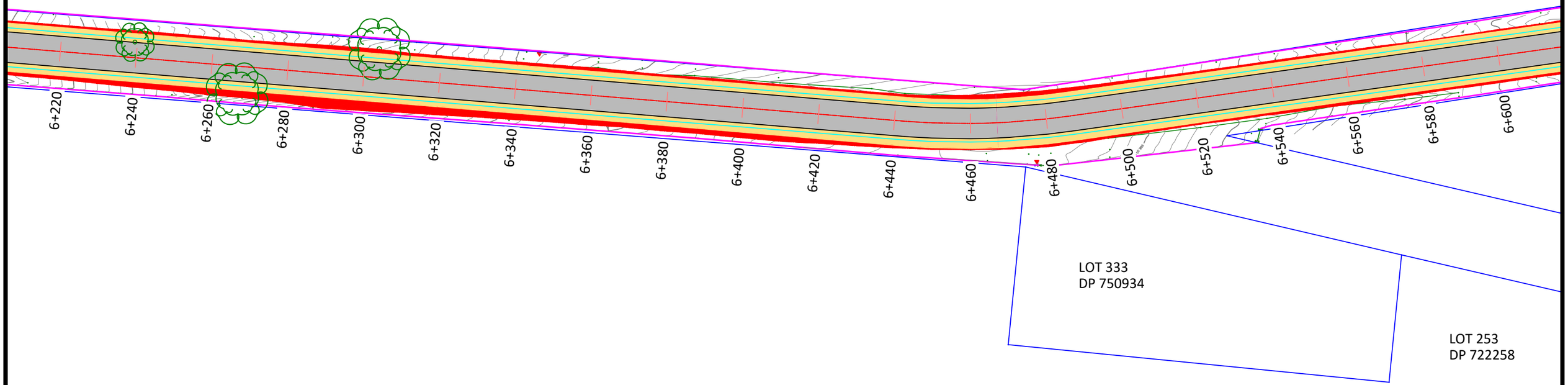
SURVEYED: RAP SURVEYING
DESIGNED: RS
DRAWN: RJ
SHEET: 3
REV: 0

LEGEND

- CADASTRAL BOUNDARY (DCDB)
- FENCE LINE
- FOG LINE
- CENTRELINE OF ROAD
- EDGE OF BITUMEN
- EDGE OF UNSEALED SHOULDER
- STORMWATER PIPE
- SURVEY CONTROL POINT
- DENOTES TREE
- DENOTES CUT AND FILL

TOWARDS MERRIWA

LOT222
DP 750934



HARRYAN ENGINEERING COUNSULTING

CLIENT: lightsource bp

DATE:	REVISION:	DESCRIPTION:
24.01.2023	0	CLIENT REVIEW

PROJECT: RINGWOOD ROAD UPGRADE

DRAWING TITLE: Proposed Alignment

ISSUE STATUS: CONCEPTUAL DESIGN CLIENT REVIEW

SCALE: 1:1000
DWG No: HEC22_
JOB No: 22Q3J3
COORDINATE SYSTEM: MGA ZONE 56 GDA 2020
DATUM: AHD

SURVEYED: RAP SURVEYING
DESIGNED: RS
DRAWN: RJ
SHEET: 4
REV: 0