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GOULBURN RIVER SOLAR FARM

Amendment Report

FINAL

December 2023

lightsource bp

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Amendment Report

FINAL

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

Project Director:	Malinda Facey
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Environmental & Social Consultants

APPROVED COMPANY ISO 9001
QMS Certification Services

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
V0	J Henderson- Wilson	05/12/2023	M Facey	06/12/2023
V1	J Henderson-Wilson	11/12/2023	M Facey	12/12/2023

Executive Summary

Goulburn River Solar Farm is a large-scale renewable energy project proposed by Lightsource bp Development Services Australia Pty Ltd to generate solar renewable energy to supply New South Wales. The Project is located within the Upper Hunter Local Government Area of NSW, approximately 28 kilometres southwest of the township of Merriwa.

The Project is located on an agricultural property which is surrounded by the Goulburn River National Park. The Project Area comprises of two freehold properties that span across multiple lots, covering an area of approximately 2,000 ha, with the Development Footprint occupying 792.19 ha.

An Environmental Impact Statement was prepared for the Project and placed on public exhibition by the Department of Planning and Environment from Tuesday 13 June to Monday 10 July 2023. During the public exhibition period 56 unique submissions made by the public as well as submissions from two local councils and 11 government agencies were received. A detailed response to the issues raised during the public exhibition period is provided in the Response to Submissions Report (December 2023).

Since submission of the Environmental Impact Statement, Lightsource bp Development Services Australia Pty Ltd has conducted a thorough review of the layout and optimized the Project design to enhance its efficiency while minimizing associated environmental and social impacts. This Amendment Report proposes project changes to address government agency and community submissions and to encompass the findings of the layout review and design optimisation process. This amended project design is hereafter referred to as the Amended Project.

The Amended Project modifies the Environmental Impact Statement Project to refine transport routes and include public road upgrades, increase Battery Energy Storage System capacity and provide the option for a decentralised Battery Energy Storage System, incorporate construction of an additional transmission tower and reflect minor changes to the Development Footprint. The Amended Project also proposes a more detailed approach for workforce accommodation.

Revised technical assessments have been undertaken to address the potential impacts associated with the Amended Project, including clarification on how these differ from the Environmental Impact Statement Project. Assessments have been undertaken for potential impacts associated with Traffic and Transport, Biodiversity, Aquatic Ecology, Social (Accommodation and Employment), Noise and Vibration, Hazards, Water, Visual, and Aboriginal Heritage.

This Amendment Report is provided in two parts. Part A comprises all the assessments except for Biodiversity. Part B of this Amendment Report will include the Assessment of Impacts for Biodiversity, and must be read in conjunction with this part of the Amendment Report, Part A. Both parts of the Amendment Report should also be read in conjunction with the Response to Submissions Report.

The Amended Project represents a Project that will form an essential part of the energy transition, with a fully optimised constructible design. This Amendment Report confirms that, while there are some unavoidable impacts from the Amended Project, the extent of such impacts have been minimised through the design process and will be minimised through implementation of management measures to the extent practicable.

The proposed amendments to the Environmental Impact Statement Project outlined in this Amendment Report are consistent with the relevant objectives of the *Environmental Planning and Assessment Act 1979* and the principles of ecologically sustainable development and do not significantly change the nature of the Project originally proposed. The potential impacts can be avoided or managed and mitigated appropriately. Further management and mitigation measures as a result of the Amended Project are discussed in further detail within this report.

Abbreviations

Term/Abbreviation	Definition
ACHAR	Aboriginal Cultural Heritage Assessment Report
AEMO	Australian Energy Market Operator
AES	Accommodation and Employment Strategy
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
CTMP	Construction Traffic Management Plan
EIS	Environmental Impact Statement
km	kilometres
kV	kilovolt
LGA	Local Government Area
Lightsource bp/LSbp	Lightsource Development Services Australia Pty Ltd
m	metres
NEM	National Electricity Market
OSOM	Oversize Overmass
PHA	Preliminary hazard analysis
PV	Photovoltaic
REZ	Renewable Energy Zone
RtS	Response to submissions
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SISD	Safe Intersection Sight Distance
TfNSW	Transport for NSW
TSR	Travelling Stock Reserve
TTIA	Traffic and Transport Impact Assessment
UHSC	Upper Hunter Shire Council
VPA	Voluntary Planning Agreement

Key Terms

Project-Specific Term	Description
Amended Project	The Amended Project includes the elements of the Project as described in the EIS as well as changes which have been made in response to submissions on the EIS. These include: Project site access/egress amendments, upgrades to additional sections of Wollara Road and Ringwood Road, increased BESS capacity and an option of a decentralised BESS, minor Project layout modifications, construction of an additional transmission tower and a revised approach for workforce accommodation.
Amendment Report	The purpose of an amendment report is to assess the economic, environmental, and social impacts of the amended project and to help the community, councils, government agencies and the consent authority to get a better understanding of the proposed amendments and their impacts so they can make informed submissions (if the report is exhibited) or decisions on the merits of the amended project (DPE, 2022).
Access route	The proposed route for transporting material and equipment via Ringwood and Wollara Road off the Golden Highway to the Project Area during construction. Note: the Amended Project includes a revised access route for egress with a left turn at the Ringwood Road/Golden Highway intersection and use of a turnaround facility at Barnett Street, Merriwa.
Battery Energy Storage System (BESS)	The entire battery system comprising of a power conversion system (battery storage units and inverters), either centralised or distributed (i.e. decentralised) throughout the solar farm site. The BESS is housed in a series of outdoor containers. Note: the Amended Project details the amendments to the proposed BESS arrangements, including increasing the capacity of the centralised BESS to 450 MWp, and the addition ofa decentralised 580 MWp BESS, plus the option for both BESS configurations.
Development Footprint	The maximum extent of ground disturbance associated with construction and operation of the Goulburn River Solar Farm as presented in the EIS and subsequently the Amendment Report. Note: the Amended Project has an amended Development Footprint.
Emergency access points	Proposed at two locations along Wollara Road to facilitate emergency access and National Parks and Wildlife Services vehicle access, these access points would not be utilised for the construction of the Project.
Involved dwelling	Dwelling located on land owned by landholders involved in the Project.
Primary access point	The Project's main access from Wollara Road, located on the southern portion of the Project Area.
Project Area	The total area investigated during various specialist studies and the broader property the Development Footprint will be located on. The Project Area covers approximately 2,000 ha and includes the Solar Farm Site, the BESS development area and ancillary infrastructure. This includes a 10 m set back (i.e., APZ) from the perimeter of the Site boundary. This does not include road upgrades and repairs on Wollara Road and Ringwood Road. It also comprises the proposed Biodiversity Stewardship Site.
Proponent	Lightsource Development Services Australia Pty Ltd (Lightsource bp).

Project-Specific Term	Description
The EIS Project	The proposed Goulburn River Solar Farm. The Project includes the construction, operation and decommissioning of a solar farm with capacity of up to 550 MW, BESS and associated infrastructure. Including the various road repairs and upgrades to Ringwood Road.
Road Repairs and Upgrades	Road repairs including resealing, regrading and re-sheeting various sections along Ringwood Road, upgrade of the intersection of the Golden Highway and Ringwood Road as well as upgrades to parts of Wollara Road and Ringwood Road. Note: the Amended Project includes additional road repairs and upgrades.
Road Repairs and Upgrades Area	The total area which forms the road repairs proposed in the EIS and subsequently the Amendment Report.
Sensitive receiver	Non-host landholders' dwellings in proximity to the Project Area that may be sensitive to noise, vibration, visual, traffic and other impacts. Potential impacts to sensitive receivers were investigated in the EIS and the Amendment Report.
Site	The property(ies) in which the Project Area is located.
Transmission line	The existing 500 kV overhead transmission line located in the south-eastern corner of the Project Area that would connect the solar farm to the grid connection point into the National Energy Market network. Note: the Amended Project includes an additional Transmission Tower within the easement to accommodate the connection to the transmission network.

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1.0 Introduction

Lightsource Development Services Australia Pty Ltd (LSbp) is proposing to develop the Goulburn River Solar Farm (the Project: SSD 33964533) to generate solar renewable energy to supply New South Wales (NSW). An Environmental Impact Statement (EIS) was submitted to the Department of Planning and Environment (DPE) and publicly exhibited for 28 days.

The Project, as exhibited in the EIS, included the construction, operation, maintenance and decommissioning of approximately 550 megawatt peak (MWp) of solar photovoltaic (PV) generation along with a Battery Energy Storage System (BESS) with 280 MWp and 570 megawatt hour (MWh) capacity. The Project also comprised supporting infrastructure including a substation and connection to an existing 500 kilovolt (kV) transmission line and road upgrades to parts of Ringwood Road including two culverts, one at Bow River and one at Killoe Creek.

Following public exhibition of the EIS, LSbp has continued to consult with landholders and stakeholders. Ongoing consultation and consideration of the submissions received has resulted in a number of proposed amendments to the Project. Amendments to the Project are described and assessed within this Amendment Report which should be read in conjunction with the Response to Submissions Report (RtS) prepared for the Project.

This Amendment Report is provided in two parts. Part A comprises all the assessments except for Biodiversity. Part B of this Amendment Report will include the Assessment of Impacts for Biodiversity, and must be read in conjunction with this part of the Amendment Report, Part A. Both parts of the Amendment Report should also be read in conjunction with the RtS Report.

1.1 Background

The Project Area is located between Merriwa (to the north-east) and Coggan (to the south-east) NSW, surrounded by the Goulburn River National Park as shown in **Figure 1.1**. The Project Area comprises two freehold properties that span across multiple lots, covering an area of approximately 2,000 ha with the amended Development Footprint occupying approximately 792.19 ha, refer to **Figure 1.2**. The Project Area is located on freehold land.

The Project is a State Significant Development (SSD) under the State Environmental Planning Policy (Planning Systems) 2021, being a development for the purposes of electricity generating works and with a capital investment value of over $30 million. The EIS for the Project was submitted to DPE in May 2023.

Public exhibition of the EIS took place between 13 June 2023 and 10 July 2023 with 56 unique submissions made by the public as well as submissions from two local councils and 11 government agencies. A summary of the comments received during public exhibition of the EIS and a detailed response to these are provided in the RtS Report.

Since submission of the EIS, LSbp has conducted a thorough review of the layout and optimized the Project design to enhance its efficiency while minimizing associated environmental and social impacts. This Amendment Report proposes project changes to address government agency and community submissions as well as the findings of the layout review and design optimisation process. This amended project design is hereafter referred to as the Amended Project.

The proposed amendments further enhance the alignment of the Project with the renewable energy strategies of both the State and Federal governments. It is widely acknowledged that the National Electricity Market (NEM) needs to rapidly transition to renewable energy to support Government commitments to net zero including the NSW Climate Change Policy Framework, and the Commonwealth Government's commitments under the Paris Agreement. At present, additional renewable energy capacity is being added to the NEM at a lower rate than what the Australian Energy Market Operator (AEMO) has identified as required to achieve the transition to renewable energy (Parkinson, Renew Economy, 2023).

The Project will materially assist in addressing this shortfall by delivering approximately 550 MWp of renewable energy capacity to the NEM to help replace the generation capacity which will be lost when NSW's largest power station, Eraring, closes in 2025.

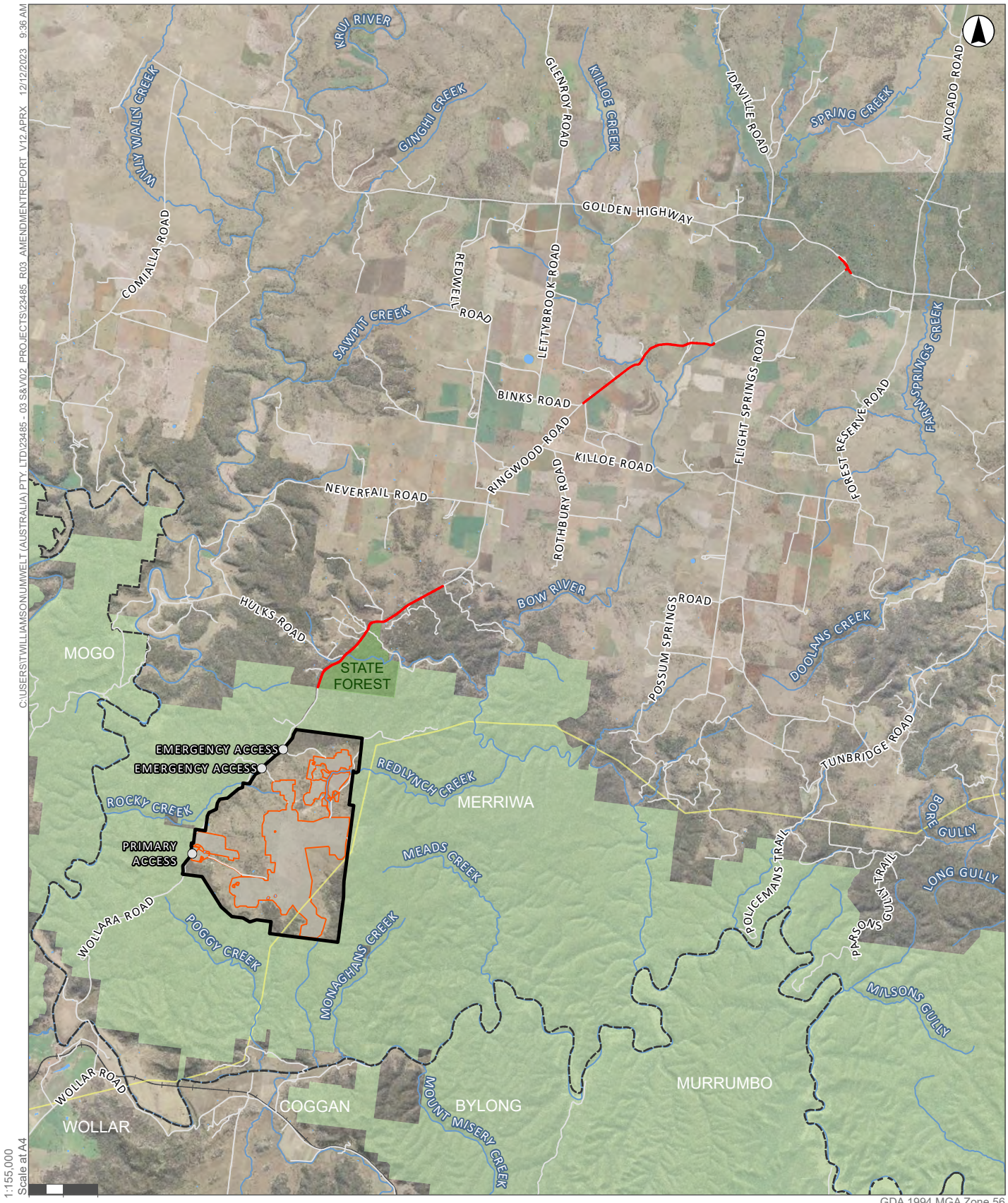


FIGURE 1.1

Regional Locality Map

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

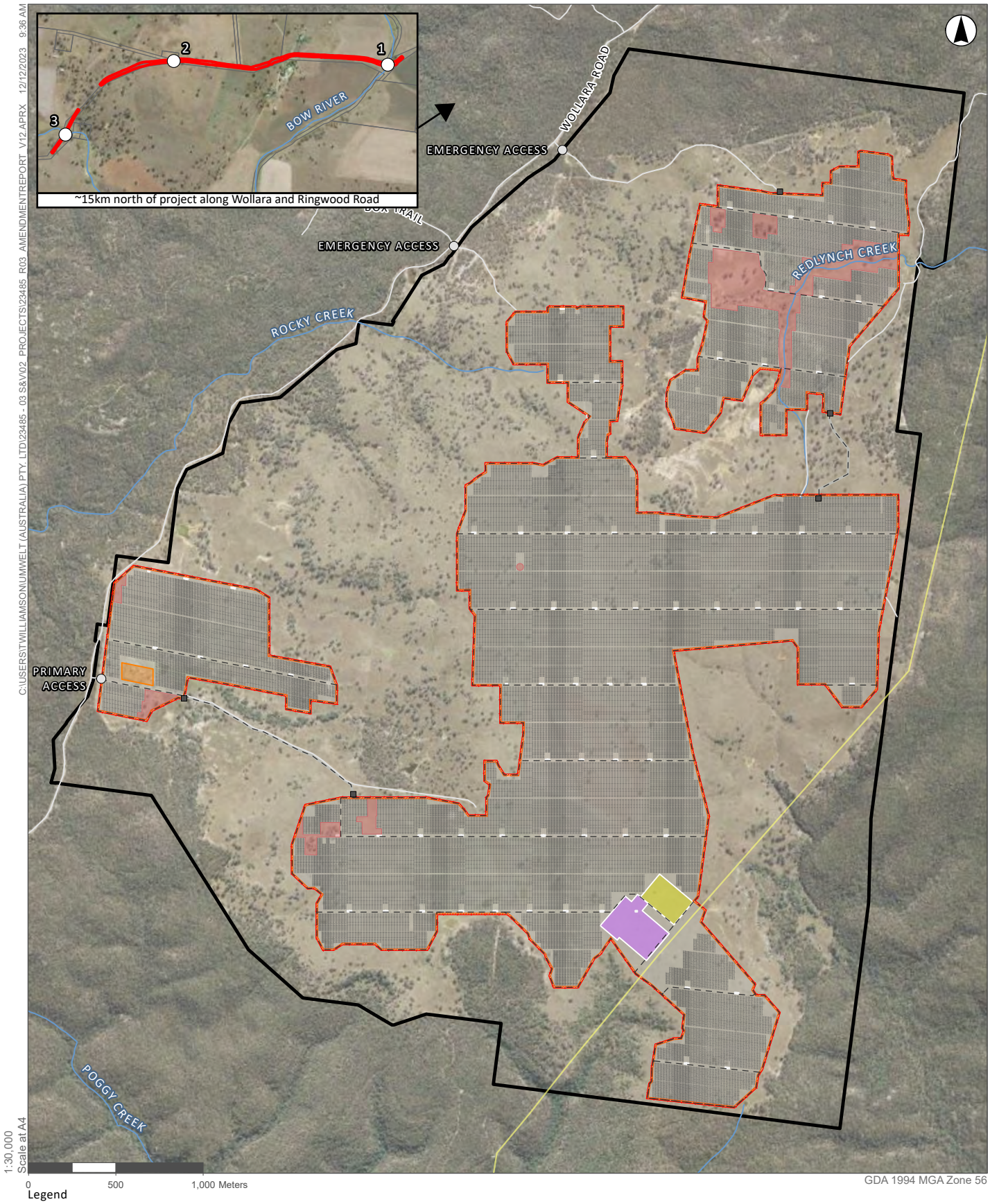


FIGURE 1.2

EIS Project - Development Footprint and Internal Layout

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

1.2 The EIS Project

The Project as proposed in the EIS (hereafter referred to as the "EIS Project") included the construction, operation, maintenance, and decommissioning of a PV solar farm with a capacity of approximately 550 MWp, which will supply electricity to the national electricity grid. The Project also included a BESS with a proposed capacity of 570 MWh and an electrical substation to connect the solar farm to the existing 500 kV transmission line that runs through the Project Area and Development Footprint. In addition to this the Project will include road repair and upgrades along Ringwood Road.

The key components of the EIS Project are shown in **Figure 1.2** and include:

- Approximately 1 million bifacial solar PV modules in an east-west single-axis tracking arrangement with an approximate height of 3 metres (m) with a maximum of 4 m to accommodate undulating topography above ground level.
- A BESS with an approximate 280 MWp and 570 MWh capacity, housed in a series of outdoor containers, aggregated in one central location adjacent to the substation and switchyard.
- Onsite 550 kV switchyard and substation, with underground electrical conduits and cabling leading into the yard and overhead lines reaching above to the existing transmission line.
- Telecommunications tower, up to 30 m high, providing communications, radio and cellular services to the site and the wider region.
- Internal and perimeter gravel access roads allowing for site maintenance.
- Temporary construction facilities.
- Permanent site office and operations and maintenance building with parking for the operations team.
- Primary access point from the existing driveway off Wollara Road, with two additional emergency access points proposed along the north-western boundary of the Project Area.
- Upgrades to culverts at Bow River and Killoe Creek located on Ringwood Road.
- Widening and resealing of 1.8 kilometres (km) of Ringwood Road between Bow River and Killoe Creek including 8 m bitumen-sealed formation with a minimum of 500 mm unsealed shoulders.
- Drainage line crossings (two within the part of Redlynch Creek that is in the Project Area), if and where required, to manage existing surface water flows.
- Project Area perimeter security fencing as well as across the Development Footprint.
- The Project is expected to operate for 40 years or more. After the initial 40-year operating period, the solar farm would either be decommissioned, removing all above ground infrastructure, and returning the site to Its existing land capability, or repurposed with new PV equipment subject to technical feasibility and planning consents.

1.3 Proposed Amendments

Following review of public and agency submissions received during the exhibition period, along with detailed technical design advancements, several amendments are proposed for the Project.
These proposed amendments are summarised below and elaborated on in **Section 3.0**. These amendments are all design refinements and do not materially change the nature of the Project.

A summary of the key proposed amendments to the EIS Project are provided in **Table 3.2**, with an overview map provided in **Figure 1.3** below. The proposed amendments are described in detail in **Section 3.0.**

Table 1.1 Proposed Amendments

No.	Description
1	**Transport route amendments –** Transport route amendments to include the use of Barnett Street, and upgrade of the intersection of the Golden Highway and Ringwood Road.
2	**Wollara Road and Ringwood Road Upgrades** – Upgrades to additional parts of Wollara Road and Ringwood Road.
3	**BESS Design Amendments** – Increased centralised BESS capacity and option of a decentralised BESS as well as the option to host both centralised and decentralised BESS units.
4	**Development Footprint Modifications** – Minor modifications to the Development Footprint and internal layout including and depicted in **Figure 1.4**: • Removal of travelling stock reserve (TSR) 4481 from within the Project Area, although site access will continue to cross the TSR using the existing track. • Relocation and/or removal of solar arrays within the Development Footprint to avoid Regent Honeyeater habitat, scattered trees and Box Gum Woodland. • Increased width of selected internal access roads to accommodate subterranean power cables. • Realignment of the northern internal access road to avoid Regent Honeyeater habitat and Box Gum woodland.
5	**Additional Transmission Tower** – Construction of an additional transmission tower adjacent to the BESS/substation.
6	**Workforce Accommodation** – Revised approach for workforce accommodation.

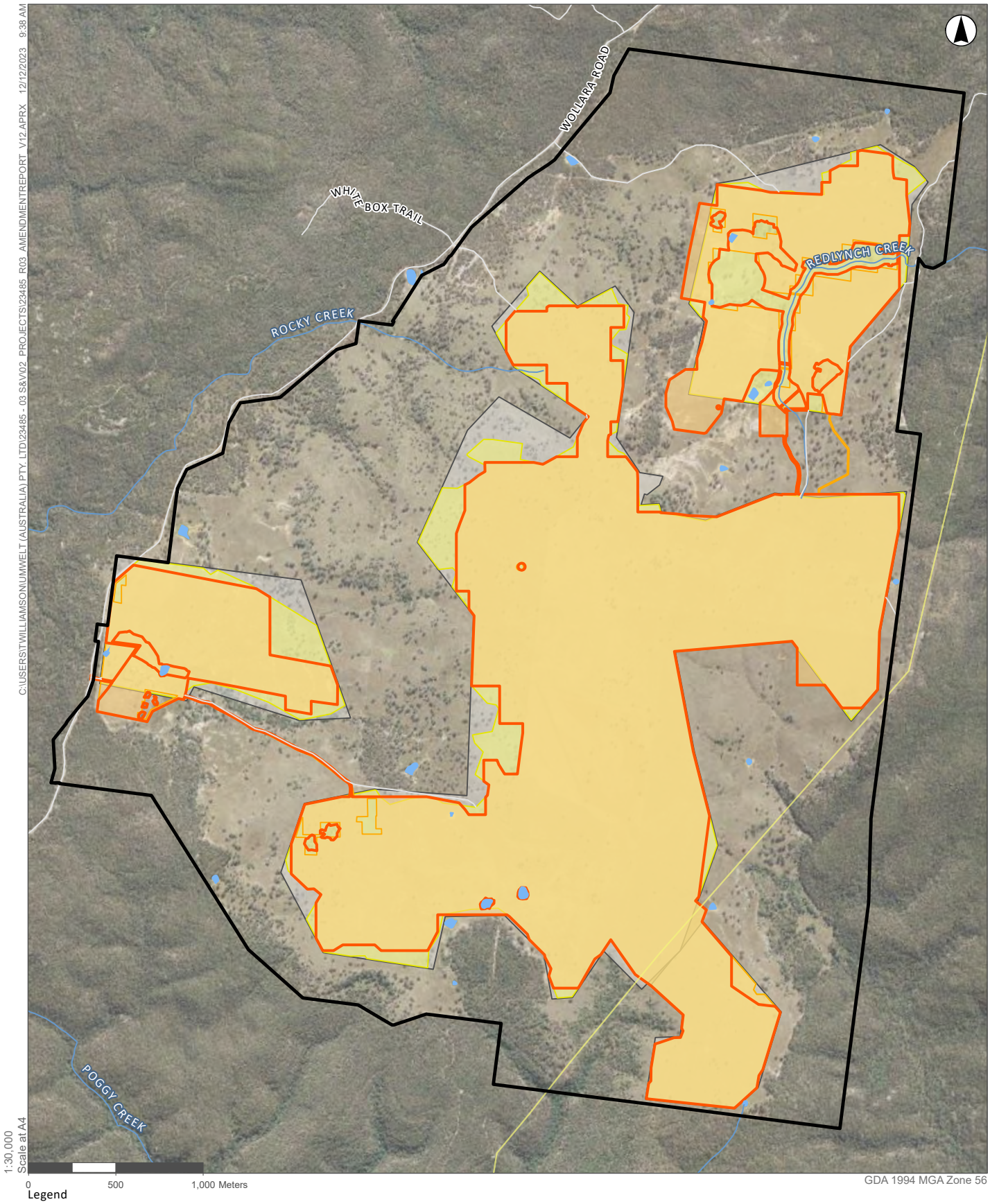


FIGURE 1.3

Design Refinements

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

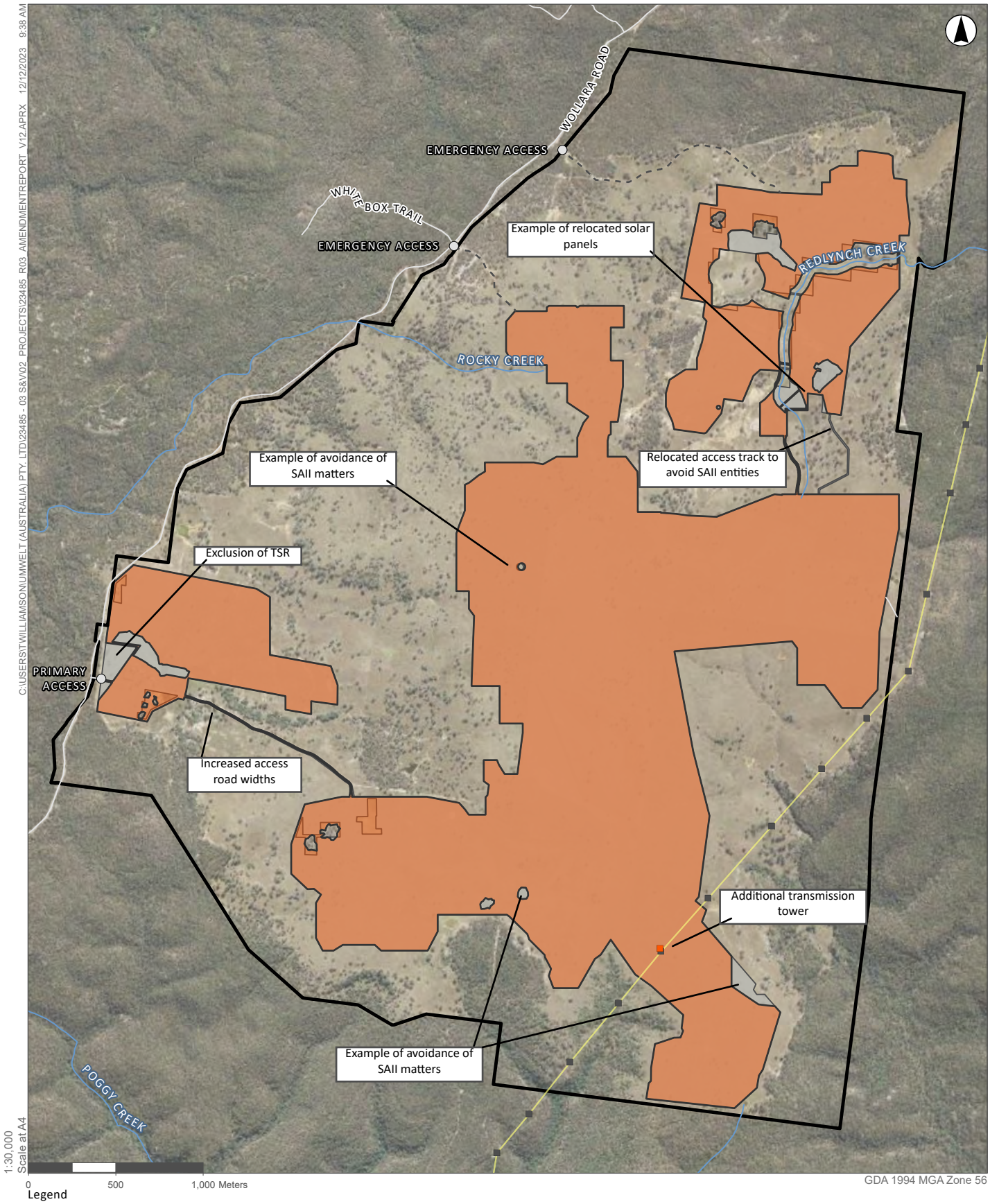


FIGURE 1.4

Summary of the Proposed Amendments to Development Footprint

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

1.4 Structure of this Report

This Amendment Report is structured in accordance with the DPIE Guideline (2022) as presented in **Table 1.2**. In consultation with DPE, the Amendment Report (Part A) will be submitted prior to the BDAR (Part B).

Table 1.2 Report structure

Section	Description
Part A	
Section 1.0	Introduces the EIS Project and a summary the proposed amendments.
Section 2.0	Identifies any changes to the strategic context relevant to the Amended Project.
Section 3.0	Describes the proposed amendments to the EIS Project.
Section 4.0	Identifies any changes to the statutory requirements as a result of the proposed amendments to the EIS Project.
Section 5.0	Summarises the stakeholder engagement that has been undertaken during the development of the Project Amendments.
Section 6.0	Provides a detailed summary of any changes in impacts resulting from the proposed amendments to the EIS Project.
Section 7.0	Provides an updated justification of the amended EIS Project.
Section 8.0	Provides a list of references used during the preparation of this report.
Appendices	Information and technical reports supporting the main document.
Part B	
Section 1.0	Introduces the BDARs supporting Part A
Solar Farm BDAR	Information and technical report supporting Part A
Road Upgrade BDAR	Information and technical report supporting Part A

1.5 Assessment Undertaken

Amendments to the following assessments have been undertaken to assess the Amended Project design:

Part A (this document):

- Traffic and Transport Impact Assessment (TTIA), summarised in **Section 7.1** and appended to this Amendment Report as **Appendix D**.
- Aquatic Assessment, summarised in Section 7.2 and appended to this Amendment Report as **Appendix E.**
- An Accommodation and Employment Strategy (AES), summarised in **Section 7.3.1** and appended to this Amendment Report as **Appendix F**.
- Noise and Vibration Impact Assessment (NVIA), summarised in **Section 7.4** and appended to this Amendment Report as **Appendix G**.

- Preliminary Hazard Analysis (PHA), summarised in **Section 7.5** and appended to this Amendment Report as **Appendix H**.
- Landscape Character and Visual Impact Assessment (LCVIA), summarised in **Section 7.7** and appended to this Amendment Report as **Appendix I**.
- Aboriginal Cultural Heritage Assessment Report (ACHAR), summarised in **Section 7.8** and appended to this Amendment Report as **Appendix J**.
- Water Resource Impact Assessment (WRIA), summarised in **Section 7.6** and appended to this Amendment Report as **Appendix K**.

Part B (separate document):

- Biodiversity Development Assessment Reports (BDAR), for each of the Solar Farm and the Public Road and Culvert Upgrades, are summarised in and appended to this report as Part B.

A summary of which amendments have required updates to, or revised assessment has been summarised below.

Table 1.3 Summary of assessment by amendments

Amendment	TTIA	Aquatic Assessment	AES	NVIA	PHA	WRIA	LCVIA	ACHAR	BDAR
Transport Route Amendments	Assessed	Not applicable	Assessed	Assessed	Not Applicable	Assessed	Assessed	Assessed	Assessed
Wollara Road and Ringwood Road Upgrades	Assessed	Not Applicable	No change to or additional impacts	Assessed	Not Applicable	Assessed	Assessed	Assessed	Assessed
BESS Design Amendments	Not Applicable	No additional impacts	No change to or additional impacts	Assessed	Assessed	No change to or additional impacts	Assessed	No change to or additional impacts	No additional impacts
Development Footprint Modifications - Minor	Not Applicable	Assessed	No change to or additional impacts	Assessed	Assessed	Assessed	Assessed	No change to or additional impact	Assessed
Additional Transmission Tower	Not Applicable	No change to or additional impacts	No change to or additional impacts	No change to or additional impacts	No change to or additional impacts	No change to or additional impacts	Assessed	No change to or additional impacts	No change to or additional impacts
Workforce Accommodation	Assessed	Not Applicable	Assessed	Assessed	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

2.0 Strategic Context

The strategic context as described in Section 2.0 of the EIS remains relevant for the Amended Project. The Project is aligned with the NSW and Commonwealth governments' energy and climate policies and will make a meaningful contribution to achieving the goal of net zero emissions by 2050.

2.1 Strategic Context for Project amendments

The Amended Project, described in **Section 3.0**, generally consists of layout refinements and minor modifications and does not change the overall strategic context. The justifications for the proposed amendments are outlined in **Section 8.0**.

An overview of the strategic context for the Amended Project is provided below, where it differs from that relevant to the EIS Project.

2.1.1 Renewable Energy Market

The development of the Project aligns with global, Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies.

NSW is currently in a transition to build a reliable, affordable, and sustainable electricity future to support a growing economy (NSW Government, 2023a). Key to this goal is the timely and organised retirement of the states four major coal generators. Liddell Power Station was closed in April 2023, while Bayswater, Eraring, Mount Piper and Vales Point B are closing in 2033, 2025, 2040 and 2033 respectively (AEMO, 2023). These power stations currently provide approximately three quarters of NSW's electricity supply and two thirds of the firm capacity required during peak demand periods. To achieve the retirement schedule, the commissioning of renewable energy generation and storage projects must be delivered to provide ample generation and capacity to fill the void from the retirement of the coal generators (AEMO, 2023).

The NSW Government has indicated that Renewable Energy Zones (REZs) will play a vital role in delivering affordable energy generation to help prepare the State for the expected retirement of thermal power stations over the coming decades. Despite the coordinated approach of the REZs, they have been hit with delays, as well as technical and social challenges. These delays place a greater importance on projects like Goulburn River, which propose to connect to existing infrastructure. Whilst outside of a REZ, the Project is strategically located along one of the key power transmission arteries in NSW that can deliver large amounts of renewable energy to the consumer.

Renewable energy sources accounted for 35.9% of the total electricity generation in 2021, up from 32.5% in 2020 (Clean Energy Council, 2022). Coal's share of electricity generation continued to decline, reaching 47% in 2021, down from 51% in 2020 (Clean Energy Council, 2022). Gas and oil remained stable at 19 % and 2% respectively. Among the renewable energy sources, solar was the largest contributor with 14%, followed by wind with 11% and hydro with 6%. Battery storage and hydrogen also made significant progress, with several large-scale projects announced or completed in 2021. (DCCEEW, 2022a). That said, additional renewable energy capacity is being added to the NEM at a lower rate than what AEMO has identified as required to achieve the transition to renewable energy (Parkinson, Renew Economy, 2020). The Amended Project will assist in addressing this energy shortfall by delivering approximately 550 MWp of renewable energy capacity to the NEM. This contribution will help to replace the generation capacity lost when NSW's largest power station, Eraring, closes in 2025.

The Amended Project aligns with the current strategic direction of the NSW and Australian energy generation market and assists in achieving the planned transition to an increased contribution of renewable energy to Australia's energy needs. As an existing renewable energy operator in Australia, LSbp has a track record of delivering large-scale renewable energy projects.

2.1.2 Climate Change Act 2022

The Climate Change Bill 2022 was introduced by the Australian federal government on 27 July 2022 and passed both Houses of Parliament on 8 September 2022 becoming the *Climate Change Act 2022* (CC Act). The ambition of the CC Act is to set Australia's greenhouse gas emissions reduction targets in law. The new reduction targets include a net zero target by 2050 and a reduction to 43% of 2005 levels by 2030. It also requires the Minister for Climate Change to present a summary of the country's progress toward these targets, as well as actions to be taken to achieve them.

2.1.3 NSW Electricity Strategy

Current and future electricity development in NSW is supported though the NSW Government's Electricity Strategy (NSW Government, 2023a) and the NSW Electricity Infrastructure Roadmap. These take an integrated approach to all demand and supply options, including action by households and small businesses, demand management and investment in large-scale, affordable and reliable generation. The Project is consistent with the objectives of the Electricity Strategy and Infrastructure Road Map, by aiming to provide large-scale renewable electricity generation that is affordable and reliable.

2.1.3.1 Draft Energy Policy Framework

The Draft Energy Policy Framework for State Significant Development (NSW Government, 2023) currently on exhibition (as of December 2023) provides the community, industry, applicants, and regulators with information on the planning framework for the assessment and approval of State significant energy projects. Specifically for Solar Farms it proposes additional guidance for the establishment of benefit sharing and provides a decommissioning calculator. As this is currently on exhibition it has not been formally considered in the preparation of the Amendment Report.

The Large Scale Solar Energy Guideline (2022) was developed to assist with delivering the NSW Government's commitment outlined in the NSW Registered Environmental Assessment Practitioner. The Amended Project has been assessed in accordance with the 2022 Guideline. Although not specified in the Secretary's Environmental Assessment Requirements (SEARs), both the EIS and this Amendment Report have considered the Solar Energy Guidelines.

3.0 Description of the Amendments

Proposed amendments to the Project are summarised in **Table 3.1** and addressed further in the subsequent sections of this chapter.

Table 3.1 Project Amendments

Amendment Number	Description	Detailed Description
1.	Transport Route Amendments	Amendments to the transport route as outlined in **Section 3.2**, including: • A revised transport access/egress route to improve road safety, including the diversion of construction vehicles egress west at the Golden Highway and Ringwood Road intersection to a vehicle turning area on Barnett Street, Merriwa. • An upgrade of the intersection of the Golden Highway and Ringwood Road with an acceleration lane added and the formulation of two bus stops on Ringwood Rd to support these movements.
2.	Wollara Road and Ringwood Road Upgrades	• Additional upgrades to 4.7 km of Wollara Road and 1.6 km of Ringwood Road, as outlined in **Section 3.3**.
3.	BESS Design Amendments	• Increased centralised BESS capacity and option of a decentralised BESS including the option to host both centralised and decentralised BESS units, as outlined in **Section 3.4**.
4.	Development Footprint Modifications – Minor	Modifications to the Development Footprint and internal layout as outlined in **Section 3.5**, including: • A re-alignment of the Development Footprint to avoid TSR 44841, noting that existing access will be maintained across TSR 44841. • Relocation or removal of solar arrays within the Development Footprint to further avoid serious and irreversible impacts (SAII) to important habitat for the Regent Honeyeater and Box Gum Woodland. • Relocation of the access road connecting the northern portions of the site to cover a shorter distance and further avoid SAII to important habitat for the Regent Honeyeater and Box Gum Woodland. • An increase in the width of two (2) internal access roads which connect the western and northern portions of the site from 6 m (as originally proposed in the Project EIS) to <10 m, to allow for underground transmission corridors as part of the internal reticulation network, rather than overhead transmission cables. • Reduction of the development footprint to 792.19 ha as a result of the above modifications.
5.	Additional Transmission Tower	• Construction of an additional transmission tower within the existing easement of the 500 kV transmission line adjacent the BESS/substation, as outlined in **Section 3.6**.
6.	Workforce Accommodation	• Additional assessment and revised approach for workforce accommodation, as outlined in **Section 7.3.1**.

3.1 Summary of Amendments

A comparison of proposed amendments to the Project to that assessed in the Project EIS (Umwelt, 2023a) is provided in **Table 3.2** below.

Table 3.2 Comparison of proposed amendments to the Project to that assessed in the Project EIS

Project Stage	EIS Project	Amended Project	Difference between EIS Project and Amended Project
Project Component			
Transport and Road – comprising Amendment 1: Transport Route Amendments and Wollara Road and Ringwood Road Upgrades			
Transport route to and from the Site	Proposed to utilise the Golden Highway, Ringwood Road, and Wollara Road from the north, and Wollar Road from the south. It is noted that a small number of light vehicles for workers who reside to the south may use Wollar Road.	Amendments to transport route to restrict construction vehicles to a left in and left out movement at the Golden Highway and Ringwood Road intersection. Amendment to distribution of trips with a larger proportion utilising the northern (and preferred) route. It is noted that a small number of light vehicles for workers who reside to the south may use Wollar Road. Note: 6-12 oversize overmass (OSOM) vehicle movements will still use a right turn movement onto Golden Highway, as they will be under traffic management.	Specifying that a larger proportion of project-related transport will utilise the northern (and preferred) route. No option for Project construction traffic for a right turn in or a right turn out between Golden Highway and Ringwood Road. Change to the traffic and social impacts associated with the accommodation of workforce and transport to Site.
Wollara Road	Use of 4.7 km of unsealed road network.	Realignment, widening and sealing a 4.7 km section of Wollara Road prior to use.	Realignment, widening and sealing a 4.7 km section of Wollara Road prior to use by Project traffic.
Ringwood Road	1.8 km of existing sealed road network and upgrade of two (2) culvert bridges.	Realignment, widening and sealing of 3.4 km of Ringwood Road across two sections and upgrade of two (2) culvert bridges.	An additional 1.6 km of Ringwood Road will now be widened and sealed.
Golden Highway and Ringwood Rd	No works proposed in EIS.	Improvements to safe intersection sight distance (SISD) for left turn movements into and out of Ringwood Road from the Golden Highway. • Vegetation removal and minor lane widening works on the eastern side of the intersection.	Upgrade works are proposed at the intersection to improve SISD.

Project Stage	EIS Project	Amended Project	Difference between EIS Project and Amended Project
		• Addition of an acceleration lane on the western side of the intersection including tree removal. • Formalisation of the bus stop pullover area.	
Barnett Street	No works proposed in EIS.	Diversion of construction vehicle egress west at the Golden Highway and Ringwood Road intersection to a vehicle turning area on Barnett Street, Merriwa. Note: 6-12 Oversize Overmass (OSOM) vehicles will still use a right turn movement onto Golden Highway as they will be under traffic management.	Use of the Barnett Street vehicle turning area to allow the safe movement of construction-related vehicles (up to 19 m) and facilitate the left in/left out traffic route during construction.
BESS – comprising Amendment 3: BESS Design Amendments			
BESS Configuration	Centralised BESS option proposed.	Centralised and decentralised BESS options proposed.	Addition of a decentralised BESS option or a combined centralised and decentralised combined BESS option. Project will be delivered with one of the three options permitted.
Centralised BESS capacity (MWp)	280 MWp	450 MWp	+170 MWp
Centralised BESS capacity (MWh)	570 MWh	900 MWh	+330 MWh
Decentralised BESS capacity (MWp)	Not proposed in EIS.	580 MWp	+580 MWp
Decentralised BESS capacity (MWh)	Not proposed in EIS.	1,160 MWh	+1,160 MWh
Centralised and Decentralised BESS capacity (MWp)	Not proposed in EIS.	1,030 MWp	+750 MWp
Centralised and Decentralised BESS capacity (MWh)	Not proposed in EIS.	2,060 MWh	+1,490 MWh
Transformers	4	4	No change.

Project Stage	EIS Project	Amended Project	Difference between EIS Project and Amended Project
Inverters (PCS)	104	140	+36
Project Layout – Comprising Amendment 4: Development Footprint Modifications			
Project Area	Approximately 2,000 ha	Approximately 1,996.5 ha	Reduced following the amendments to the Project Area to avoid further development on TSR 44841.
Development Footprint (ha)	Approximately 799.5 ha.	Approximately 792.19 ha.	7.31 ha reduction, following the relocation of solar arrays, access road and infrastructure away from Box Gum Woodland and Regent Honeyeater habitat, and TSR 44841.
Internal Access Road width (m)	Four (4) m, with a six (6) m access road leading to the substation.	8 to 10 m at selected locations between Project areas to accommodate the proposed buried cable easements. Relocation of the access road connecting the northern portions of the site to cover a shorter distance.	Increase up to ten (10) m at selected locations to accommodate the proposed buried cable easements. Relocation of the access road connecting the northern portions of the site to further reduce impacts on Box Gum Woodland and Regent Honeyeater habitat.
Development Footprint – Comprising Amendment 4: Development Footprint Modifications			
Development Footprint (physical relocation description)	Solar arrays located within the Development Footprint as per Figure 3.1 of the EIS.	Relocation and removal of solar arrays within the Development Footprint. Removal of TSR4481 from the Development Footprint and Project Area including panels, fencing and landscaping.	Modifications to the internal layout within the Development Footprint. Reduction in total size of the Development Footprint Reduced area of impact on Regent Honeyeater important habitat and Box Gum Woodland.
Transmission Network – Comprising Amendment 5: Additional Transmission Tower			
Transmission tower	Not included in EIS.	Transmission tower to be constructed within south-eastern portion of the Project Area, within the existing transmission line easement.	One (1) additional transmission tower.
Accommodation – Comprising Amendment 6: Workforce Accommodation			
Location of Accommodation	Dispersed across nearby towns within the Upper Hunter and Mid-Western Local Government Areas (LGAs).	Largely consolidated to Merriwa Workers Accommodation (proposed development by third party).	A large proportion of the workforce will be accommodated in a central location approximately 31 km from the Site in Merriwa. Change to the traffic and social impacts associated with the accommodation of workforce and transport to Site.

3.2 Transport Route Amendments

3.2.1 Access/Egress Movements

A revised transport access/egress route is proposed at the Golden Highway and Ringwood Road intersection. LSbp propose to limit construction vehicle movements to a left in, left out arrangement. To facilitate the onward journey for left out vehicles, a vehicle turning area on Barnett Street, Merriwa is proposed to be used to allow all construction-related vehicles (up to 19 m) to safely turn around and return east along the Golden Highway towards Merriwa. No upgrades are required at Barnett Street to accommodate the safe movement of construction-related vehicles.

The revised transport route including vehicle turning area is illustrated on **Figure 3.1** below. Swept path analysis for this facility is provided in **Appendix D**. Consents have been received from Upper Hunter Shire Council (UHSC) as the road authority, as well as the adjacent private landowner, for the intended use of the turning area and are included in **Appendix B**.

The revised transport route, including use of the vehicle turning area, was discussed with Transport for NSW (TfNSW) in response to TfNSW's submission on the Project EIS. The outcomes of consultation with TfNSW and other agencies are provided in **Section 6.0**.

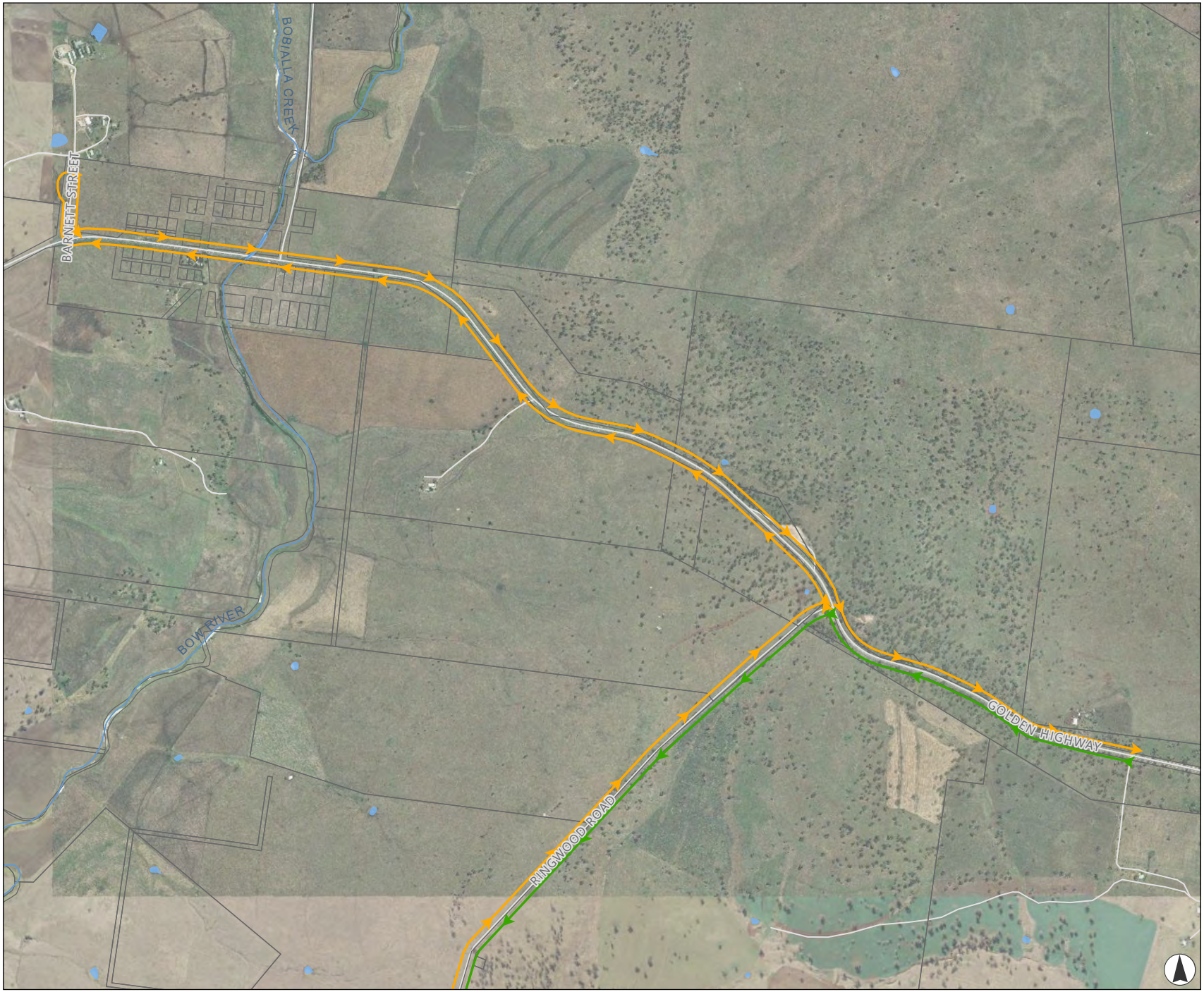


FIGURE 3.1

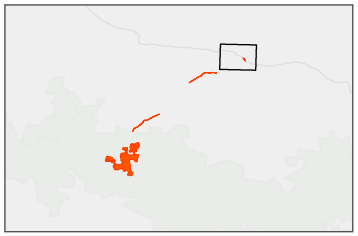
Amended Project - Transport Route including Barnett Street Vehicle Turning Area

Legend

- Watercourse
- Waterbodies
- Lot Boundary

Transport Routes

- Project Traffic Egress
- Project Traffic Ingress



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Meters

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GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

3.2.2 Golden Highway and Ringwood Road Upgrades

LSbp propose upgrades to the intersection of the Golden Highway and Ringwood Road in line with Austroads SISD standards. The designs are provided in **Appendix D**.

These upgrades would include:

- Pruning and removal of vegetation and select trees on the western side of the intersection on Lot 1 DP34496. Currently estimated at six (6) established trees.
- The construction of a 325 m acceleration/merge lane to allow vehicles to safely turn left onto the Golden Highway from Ringwood Road (Lot 1 DP34496).
- Realignment of the existing low voltage power line to provide clearance to the acceleration lane (if required and subject to detailed design).
- Extension of the existing Golden Highway westbound and Ringwood Road left-in deceleration lane taper to 30 m and widening of the intersection.
- Pruning of vegetation on the eastern side of the intersection wholly within the road reserve.
- Formalisation of the informal bus stop on Ringwood Road at the intersection with Golden Highway (Lot 7303/DP 1146691).

Landowners consent for the proposed upgrades is provided in **Appendix B**.

The proposed Golden Highway and Ringwood Road upgrades are illustrated on **Figure 3.2** below.

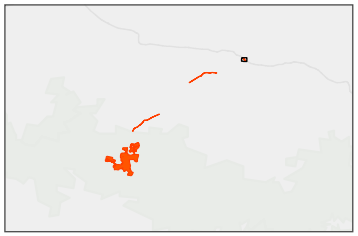
FIGURE 3.2

Amended Project - Golden Highway and Ringwood Road Intersection Upgrade

Legend

- Lot Boundary
- Waterbodies
- Road Upgrade Development Footprint

NOTE: Development Footprint comprises ground disturbance works within the road reserve and vegetation clearing/pruning on adjacent land



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Meters

Scale: 1:0 at A4
GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

3.3 Wollara Road and Ringwood Road Upgrades

Upgrades to Wollara and Ringwood Roads were proposed by LSbp in the Project EIS (refer to **Figure 3.3**), including:

- Upgrades to culverts at the existing road crossings of Bow River and Killoe Creek located on Ringwood Road.
- Widening and resealing of 1.8 km of Ringwood Road between Bow River and Killoe Creek.

As described in the TTIA (Appendix 15 of the Project EIS) the existing conditions of these roads comprises:

- Ringwood Road – a local road that is sealed and generally flat with low vertical grades and varying road width and a maximum road width of approximately 5 m along the alignment.
- Wollara Road – a local road that comprises a combination of sealed and unsealed sections north of the site and unsealed sections south of the site. The road width varies along the length of the road.

LSbp are now proposing additional road upgrades as community benefits under the Voluntary Planning Agreement (VPA) with the UHSC. These works would also facilitate further improvements to enable the safe movement of heavy vehicles. The proposed road upgrades include:

- Realignment, widening and sealing an additional 1.6 km section of Ringwood Road between Killoe Creek and Binks Road.
- Realignment, widening and sealing a 4.7 km unpaved section of Wollara Road between the Goulburn River National Park boundary and 1621 Wollara Road. No upgrades are proposed in the portion of Wollara Road within the Goulburn River National Park.
- These upgrades will include eight (8) m bitumen-sealed formation with a minimum of 500 millimetre (mm) unsealed shoulders. The horizontal and vertical alignment of the proposed road will ensure safe sight distance and an improved road network for the users.

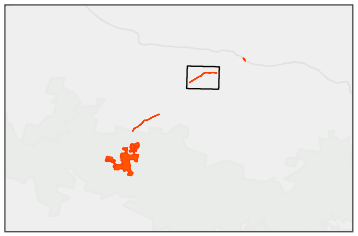
Landowners consent for the proposed works is provided in **Appendix B**. The proposed Wollara Road and Ringwood Road upgrades are illustrated on **Figure 3.3** below.

FIGURE 3.3

Amended Project - Wollara Road and Ringwood Road Upgrades

Legend

- Watercourse
- Lot Boundary
- Waterbodies
- Road Upgrade Development Footprint



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Meters

Scale: 1:0 at A4
GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

3.4 BESS Design Amendments

LSbp is proposing to amend the centralised BESS design as documented in the EIS to allow for increased capacity. The capacity of the centralised BESS is proposed to increase to 450 MWp/900 MWh from 280 MWp/570 MWh (as per the Project EIS) to allow for greater energy storage capacity, required to safely and cost effectively decarbonise Australia's energy network.

LSbp is also seeking to amend the Project EIS to include the option of a decentralised BESS, to allow for greater flexibility in the design of the final BESS facility. The decentralised BESS option involves 560 individual 6.1 m (i.e., 20 foot) battery containers and DC-DC converters, and associated infrastructure being situated next to the PV inverter stations located throughout the solar arrays, rather than in a centralised location as proposed in the EIS. The layout of the centralised and decentralised options is shown in **Figure 3.4** and **Figure 3.5.**

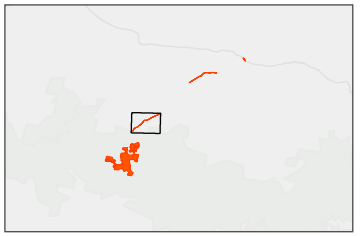
A third option is also proposed, in which both centralised and decentralised BESS units are selected for the Project.

FIGURE 3.4

Proposed Section of Road Sealing along Wollara Road

Legend

- Watercourse
- Lot Boundary
- NSW National Parks
- NSW State Forests
- Waterbodies
- Road Upgrade Development Footprint



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Meters

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Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

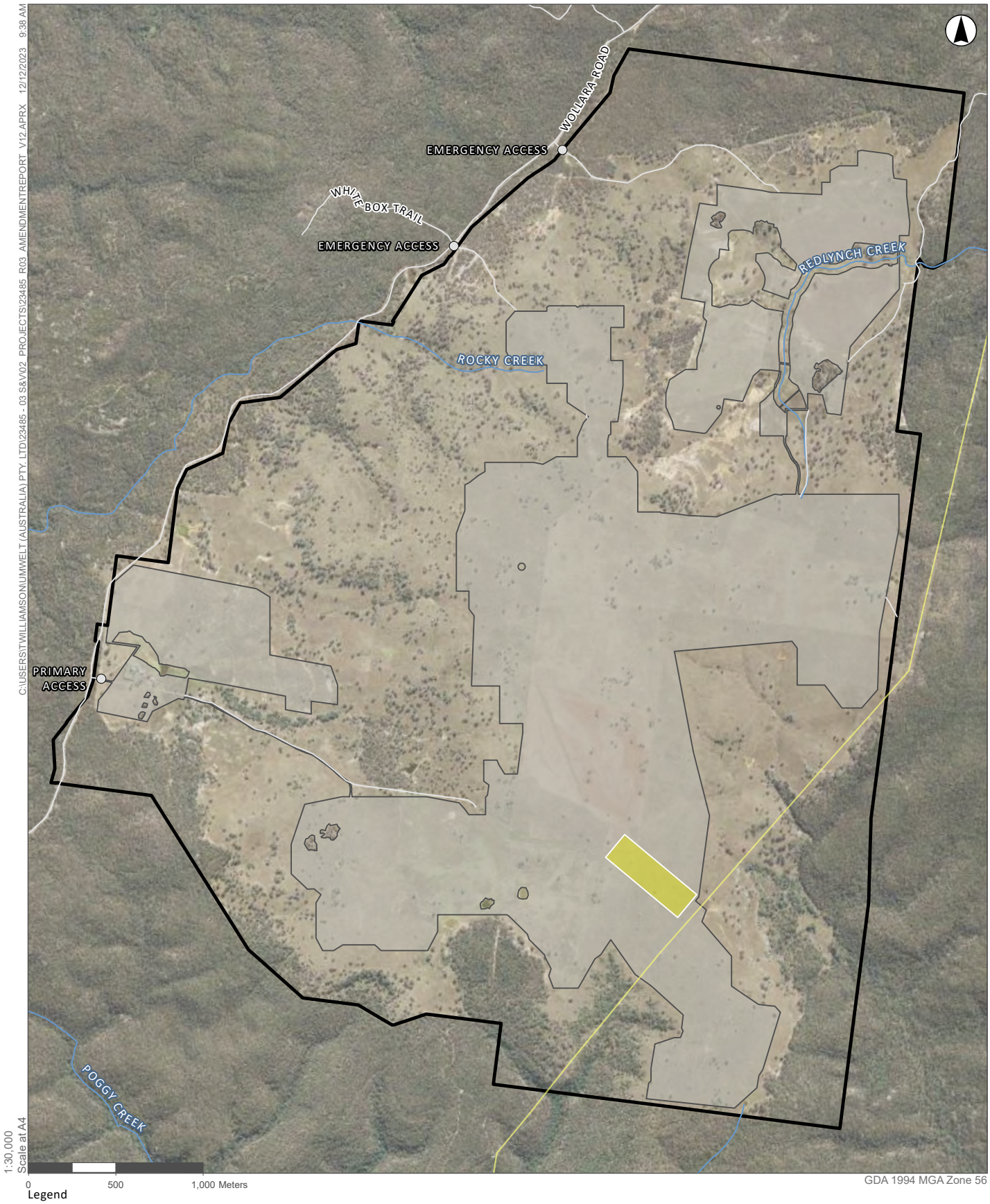

FIGURE 3.5

Proposed Centralised BESS Layout

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

The capacity of the proposed decentralised BESS option is 580 MWp/1160 MWh. No additional inverters or transformers would be required. The Project is now proposed to have the option of a combined BESS capacity of 1,030 MWp/2,060 MWh.

The decentralised BESS option has a combined area greater than the centralised option, due to the distribution of equipment and infrastructure across the Project Area and spacing between key items e.g., BESS containers/modules. The option to utilise both centralised and decentralised BESS options would encompass the greatest area for placement of BESS infrastructure. However, all infrastructure is proposed to reside entirely within the existing Project Area and Development Footprint, as assessed under the EIS.

3.5 Development Footprint Modifications

A number of modifications are proposed to the Development Footprint as outlined in **Figure 3.6** and described further below**.**

3.5.1 Exclusion of Travelling Stock Reserve

Further consultation with DPE – Crown Lands following public exhibition of the Project EIS has resulted in a minor realignment of the Development Footprint to avoid overlapping with TSR 44841. The western extent of the Project Area is now proposed to extend towards the east and will avoid TSR 44841. The revised Project Area and Development Footprint is outlined on **Figure 3.6** below. TSR 44841 will remain as a site access point, utilising the existing access track.

3.5.2 Relocated Solar Panels and Access Track

The positioning of solar panels and other Project infrastructure has been amended in response to comments received during the EIS exhibition stage and further consultation with NSW Biodiversity and Conservation Division (BCD) during the RtS phase.

Solar panels within the EIS Project Development Footprint have been relocated to previously unused areas within the Project Area to increase avoidance of PCTs and threatened species habitat, with a focus on reducing impacts to SAII entities. The access track between the central and north eastern areas of solar panel arrays has also been realigned, to minimise clearing within mapped important habitat for Regent Honeyeater and Box Gum Woodland.

3.5.3 Increased Internal Access Road Widths

An increase in the width of the internal access road corridors is proposed to accommodate the revised design of the internal reticulation network. It is now proposed that subterranean (underground) transmission corridors would be used as part of the internal reticulation network, which are proposed to travel parallel to the internal access roads, in turn increasing the width of the internal access road corridors. The proposed expansion of the internal road corridors will be to a maximum width of 10 m. The expanded internal access roads are illustrated on **Figure 3.9** below.

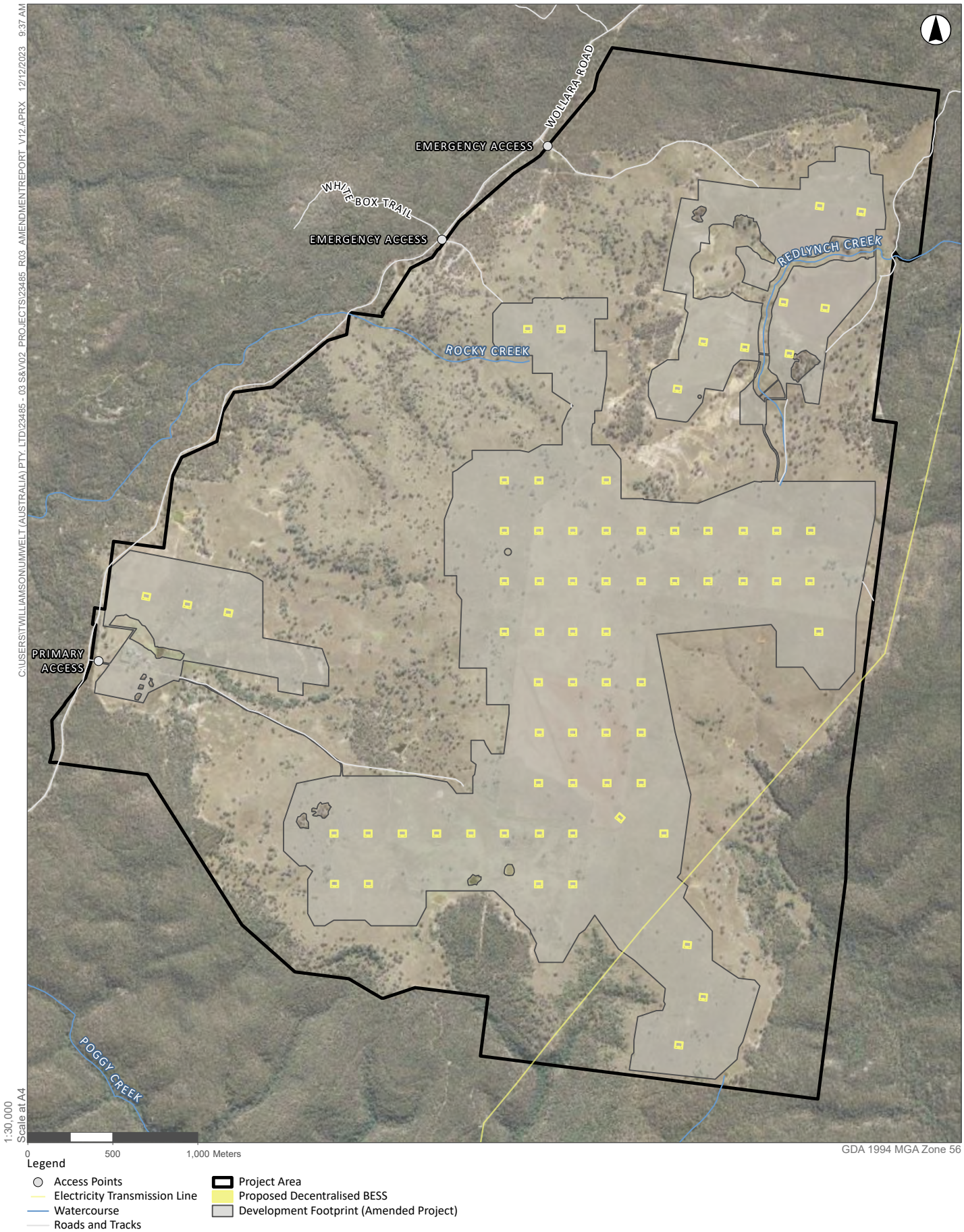

FIGURE 3.6

Proposed Decentralised BESS Layout

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

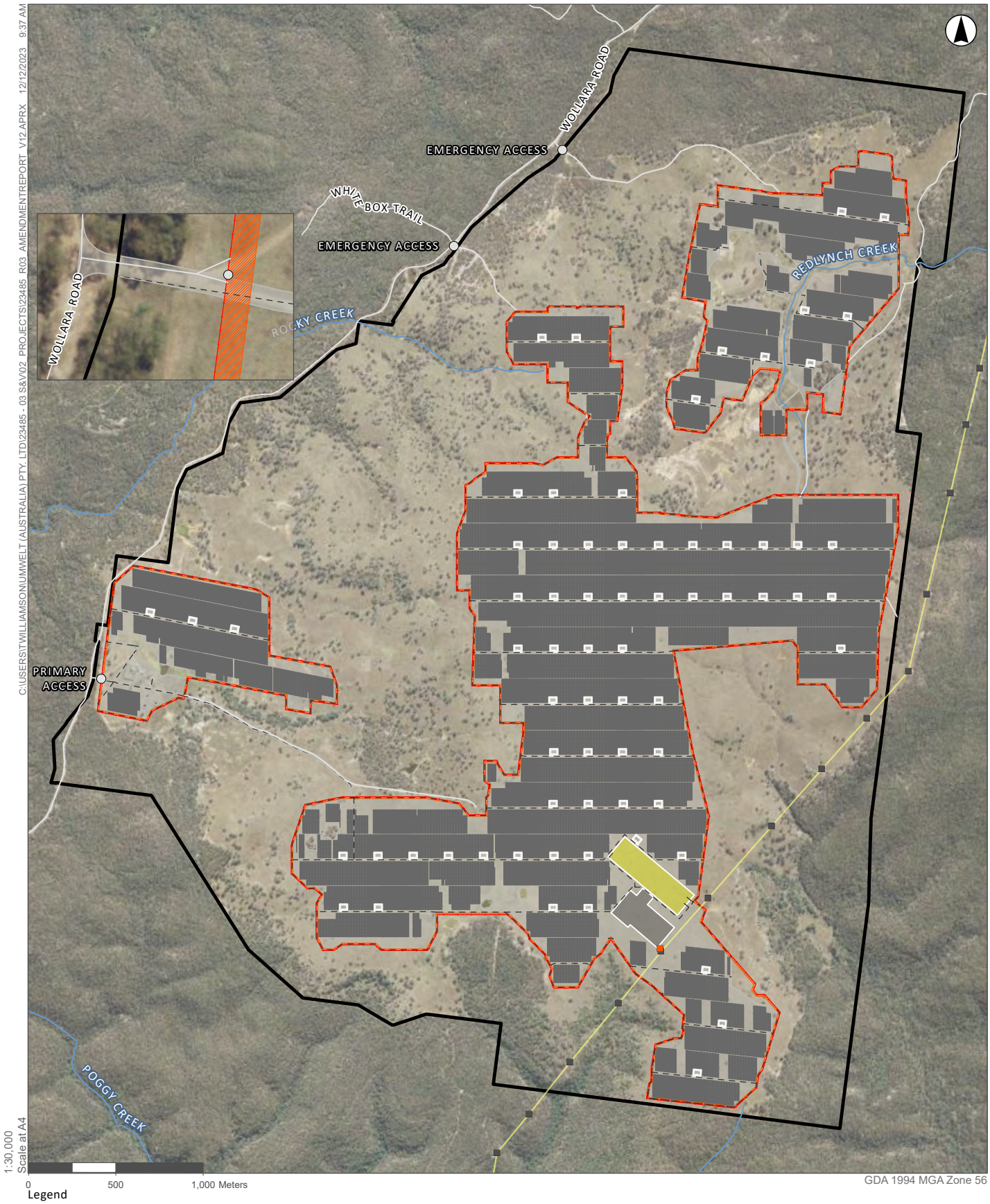

FIGURE 3.7

Amended Project – Development Footprint & Internal Layout

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

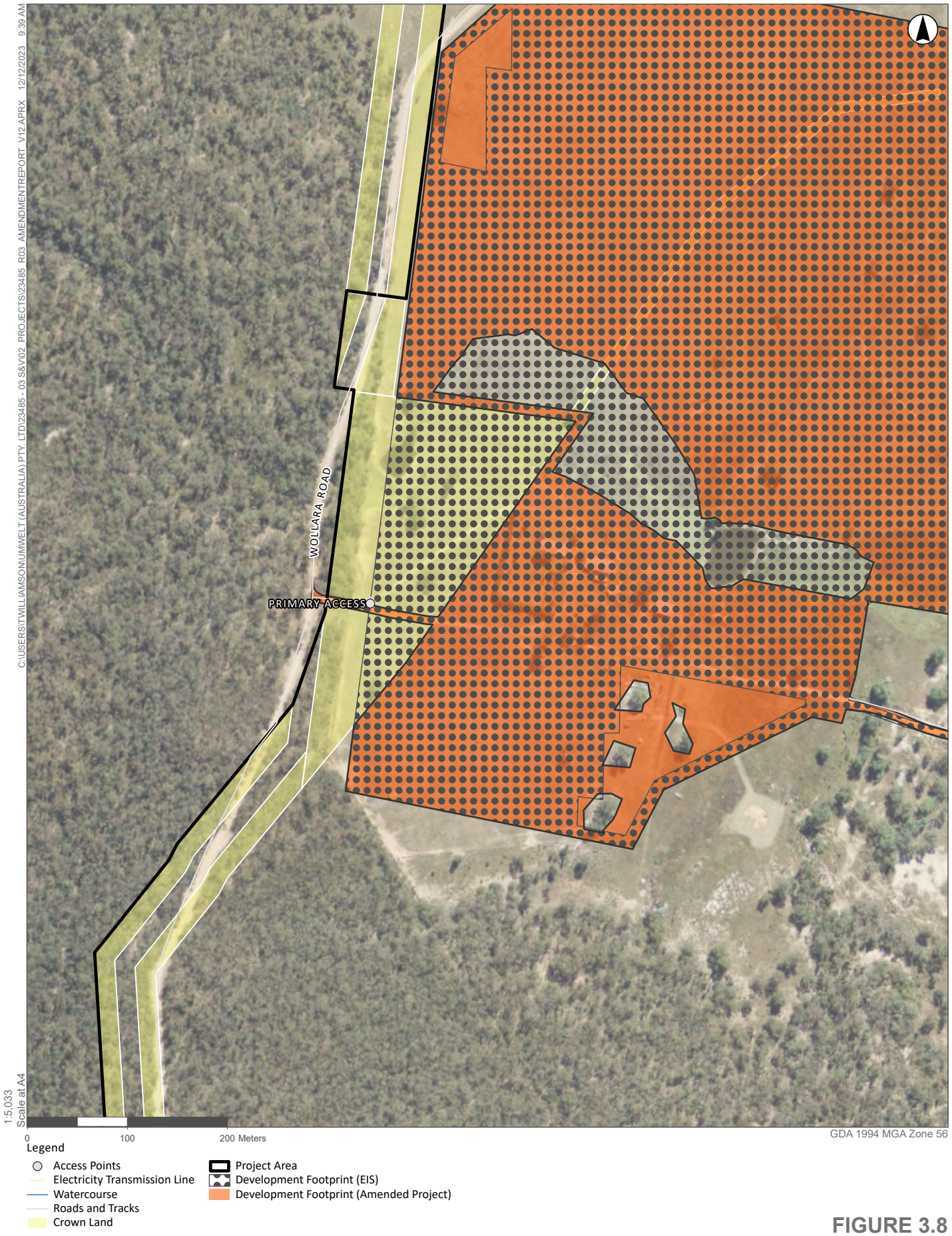

FIGURE 3.8

Amended Project - Revised Western Extent of the Project Layout to Avoid TSR 44841

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

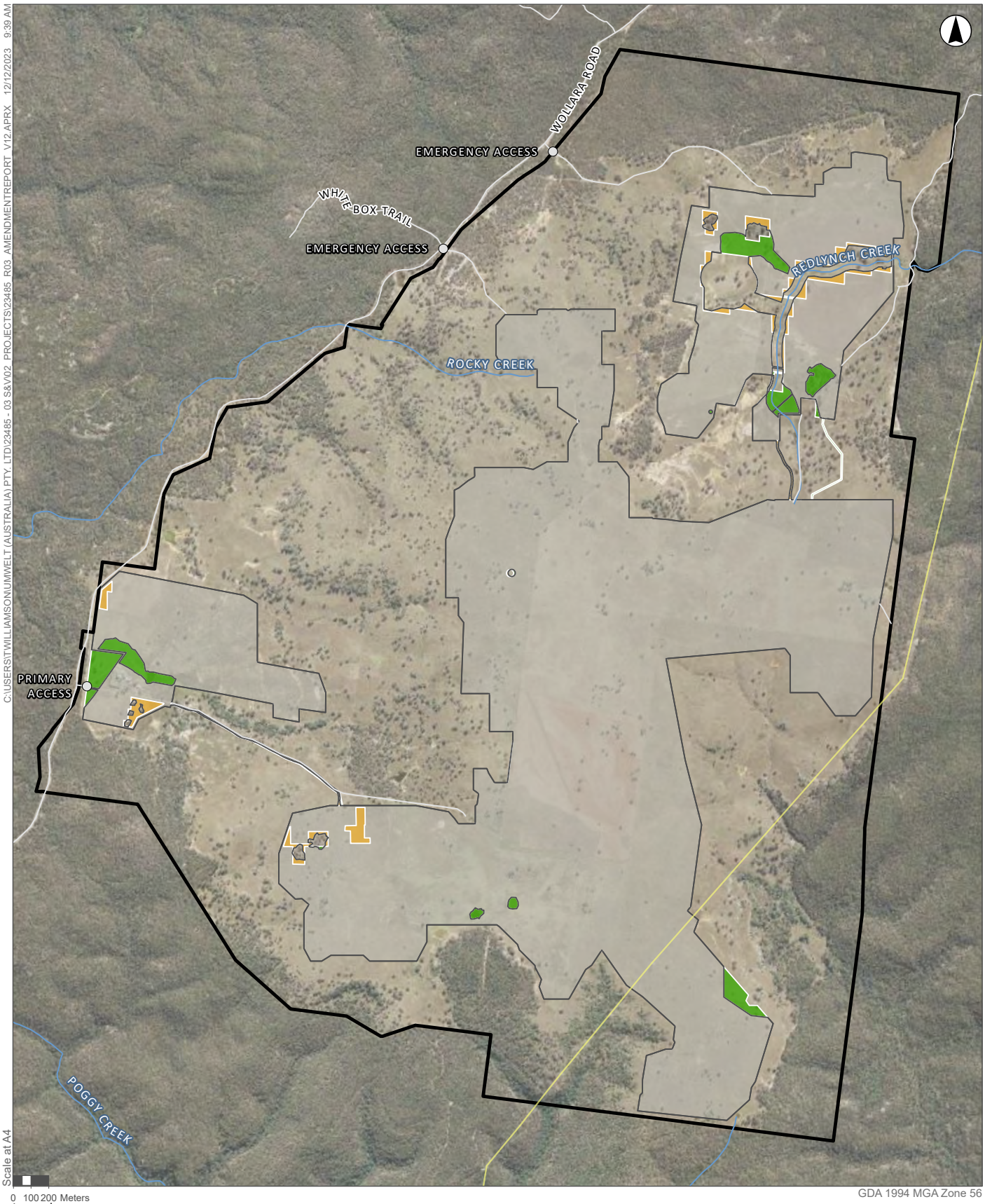

FIGURE 3.9

Amended Project - Areas removed from Development Footprint

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

3.6 Additional Transmission Tower

Section 3.2 of the EIS (Umwelt, 2023) identified that an additional transmission tower may be required on the current transmission line to accommodate the connection of the Project to the NEM. Further consultation undertaken with Transgrid during exhibition of the Project EIS has determined that the additional tower would now form part of the Amended Project. The installation of this transmission tower will occur within the southeastern portion of Project Area as depicted in **Figure 1.4** adjacent to the existing 500 kV transmission line easement. The transmission tower would be constructed at a height of approximately 65 m, in line with existing transmission towers within the Project Area.

3.7 Workforce Accommodation

Section 6.12 of the Project EIS proposed that the construction workforce would be accommodated within existing accommodation of surrounding towns and villages within the Upper Hunter and Mid-Western LGAs. Since submission of the EIS, LSbp have been approached by a private developer who is proposing to construct a 500-bed workforce accommodation camp on private land in Merriwa, NSW. It is noted that this workforce accommodation site will operate as a commercial business separate to the Goulburn River Solar Farm development and will accommodate workers across a range of projects and industries in the Upper Hunter. The development is subject to a Development Application with UHSC and is expected to be operating in time for the ramp up of the solar farm workforce.

LSbp has negotiated an option for up to 300 personnel to be accommodated at the proposed Merriwa workforce accommodation camp, with potential to increase the number of rooms if required.

An AES has been prepared to provide an overview of the baseline economic, social and housing context surrounding the Amended Project and to outline LSbp's proposed approach to managing, enhancing or mitigating key employment and accommodation impacts of the Project, inclusive of the changes to workforce accommodation detailed above. A number of feasible alternatives and complimentary options to the proposed workforce camp at Merriwa have also been identified within the AES.

The AES is summarised in **Section 7.3.1** and included in this Amendment Report as **Appendix F**.

4.0 Impact Avoidance and Mitigation

Similar to previous design revisions as described in Section 1.4 of the EIS, the design has continued to consider the environmental, economic, social, engineering and cultural opportunities and constraints of the Project. Avoiding impacts of significant environmental and cultural elements has continued to be a focus of design revision, followed by implementation of mitigation measures.

This Amendment Report presents Design Revision D, the Amended Project, which has been prepared following exhibition of the EIS and receipt of submissions. The Development Footprint revisions can be seen in **Figure 1.3.** A summary of the changes made to further avoid impacts between Design Revision C (the EIS Project) and D include:

- Reduction of the development footprint from 799.5 ha to 792.19 ha comprising:
    - Realignment of the Project Area and Development Footprint to avoid TSR 44841.
    - Relocation and/or removal of solar arrays within the Development Footprint to further avoid SAII to important habitat, including removal of 3.3 ha of Regent Honeyeater important habitat from the Development Footprint and a 0.57 ha reduction of impacts on Box Gum Woodland.
    - Extension of the riparian buffer around Redlynch Creek, including removal of solar panels.
- Replacement of the standard security fencing (top strand barbed) with an alternative design (no barbed wire) to minimise potential impacts on wildlife.
- Avoidance of an Aboriginal heritage site, 37-1-1027 (Redlynch Creek IF1), previously impacted by the EIS Project.
- Identification of local workers accommodation in Merriwa to reduce impacts on accommodation providers and other services.
- Sealing of 4.7 km of Wollara Road to reduce impacts of traffic movements on unsealed road.

In addition to the above, the Amended Project comprises other changes which are assessed in this Amendment Report but have not resulted in further avoidance of impacts.

LSbp has continued to strike a balance between maintaining a viable capacity of the Project while avoiding (where possible) and otherwise minimising impacts. Previously identified and new mitigation measures are included in **Appendix C**. LSbp has also continued to consult with UHSC and the local community on the Project, its potential impacts and benefit sharing, as described in **Section 6.0**.

LSbp are progressing with a Biodiversity Stewardship Agreement (BSA) application for the remaining 1,200 ha within the Project Area that is outside of the Development Footprint. Engagement with National Parks and Wildlife Service (NPWS) has been undertaken and is ongoing to explore the option of gifting this land to NPWS for inclusion within the Goulburn River National Park. Regardless of future ownership of the BSA, on-going management commitments across the BSA would be met long term, supporting connectivity and conservation outcomes and conservation longevity for 60% of the Project Area. The BSA site contains significantly more habitat diversity and areas of higher ecological value than the Development Footprint. For example, there is 817 ha of Regent Honeyeater Important Habitat within the BSA, compared to 41.66 ha in the Development Footprint. Further details regarding avoidance specific to biodiversity is contained in Part B.

5.0 Statutory Context

Since exhibition of the EIS there has not been any significant changes to the statutory context for the Project. A summary of the status of the NSW and Commonwealth approvals processes is provided below.

5.1 NSW Assessment and Approval Process

The statutory context has not changed from the original application, as documented in the EIS. The EIS is yet to be determined.

Following submission of the EIS to DPE it was placed on public exhibition from 13 June 2023 to 10 July 2023. A RtS has been prepared to address submissions received during public exhibition.

Additionally, this Amendment Report has been prepared in accordance with clause 113 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) which states that an application may, with the approval of the Planning Secretary, be amended at any time before the application is determined.

The Planning Secretary has been advised LSbp's intention to amend the Project with this Amendment Report describing the proposed Project amendments and assessing the associated impacts.

5.2 Commonwealth Assessment and Approval Process

On 2 February 2022, the Project was determined to be a Controlled Action requiring approval under the *Environment Protection and Biodiversity Conservation Act 1999* by the Commonwealth Minister for the Environment due to its potential impact on listed threatened species and ecological communities.

The assessment path for the Project is under the bilateral agreement between the Commonwealth and NSW Government. The Department of Climate Change, Energy the Environment and Water (DCCEEW) determined it a controlled action on 2 February 2022 and issued assessment requirements which were issued as Supplementary SEARs for the Project (refer to Appendix 1 of the EIS). A summary of the assessment findings related to MNES is included in Section 7.0 of the EIS and Part B of the Amendment Report.

The controlled action decision (EPBC 2021/ 9102) relates to the Solar Farm Project. The proponent is applying for a variation to the action to also include the road upgrades. This application is being done in parallel to the Amendment Report assessment, with timing determined in consultation with DPE and DCCEEW. The Road Upgrades BDAR includes the assessment of potential impacts to MNES associated with the road improvements.

6.0 Stakeholder Engagement

This section outlines community and stakeholder engagement carried out during and following exhibition of the Project EIS.

6.1 Consultation to Support the EIS Project Public Exhibition

The Project EIS was placed on public exhibition by DPE from 13 June to 10 July 2023. The exhibition period provided stakeholders with an opportunity to review the EIS and make a submission to DPE.

The EIS was publicly available on DPE's Major Projects website, and the following communication materials continued to be available during the EIS exhibition period.

- project website – https://lightsourcebp.com/project/goulburn-river-solar/
- project email address – Goulburnriversolar@lightsourcebp.com
- LSbp free call contact number – 1300 873 575
- project fact sheets – all downloadable via the website.

6.2 Consultation During Development of the Amendments

6.2.1 Consultation Following Exhibition

Following exhibition of the EIS, consultation and engagement activities were undertaken with a range of stakeholders including directly impacted land holders, government authorities, local councils and utility owners. Details of the consultation and key items of discussion are presented in **Section 6.2.1** and **Section 6.3**.

As part of the development of the AES, a variety of stakeholders were consulted. Further details of consultation undertaken as part of the AES is provided in **Appendix F**. Further consultation with the local community will be undertaken to coincide with the release of the Amendment Report, to inform them of the changes proposed.

6.3 Ongoing Consultation

Consultation with the community and key stakeholders is ongoing and will continue prior to and during construction and operation of the Project. Ongoing consultation activities will aim to provide the community and stakeholders with awareness of construction processes and activities, updates on the proposed timing of construction and opportunities for ongoing feedback and input throughout construction and operations.

The Project website, email address and free call number will continue to be available prior to and during construction and operations. Targeted consultation methods, such as newsletters, notifications, signage and face-to-face communications, will also continue to occur.

A Stakeholder and Community Engagement Plan (SCEP) has been developed and will continue to be implemented throughout future stages of construction, operation and decommissioning. The SCEP is dynamic and is updated as required during each phase. Engagement during operations will focus on maintaining regular communications with the community including reporting back to the community on compliance obligations, operations and generation updates, benefit sharing programs and promotion of community initiatives or events.

Environmental Management Plan(s) will address the procedures for receiving, evaluating and responding to complaints, environmental incidents and non-conformance during the construction and operation of the Project.

6.4 Benefit Sharing

The proposed VPA with UHSC was ratified on 13th June, 2023. This included the addition of further road upgrades as agreed with Council and as described and assessed within this Amendment Report. The VPA is due to go on exhibition in January 2024 and will be signed following development approval of the Goulburn River Solar Farm.

7.0 Assessment of Impacts

This section provides a summary of the revised assessments undertaken to assess the potential construction and operational impacts associated with the Amended Project. The impacts associated with decommissioning remain the same as presented in the EIS and as such have not been further outlined in this Amendment Report.

Where required, additional or revised mitigation measures have been proposed. A consolidated summary of all proposed commitments identified in the EIS, RtS, and any changes made through this Amendment Report, is presented in Appendix C**.**

This Amendment Report and associated appendices have been prepared in consideration of the *State Significant Infrastructure Guidelines – Preparing an Amendment Report* (DPE, 2021). An overview of the revised assessments required to determine the impacts of the Amended Project and a reference to their location in this report is provided in **Table 7.1**. Technical assessments undertaken to support this Amendment Report are provided in **Appendix A** to **Appendix K**.

A number of technical assessments contained within the EIS did not require amendment or a revised assessment as a result of the Amended Project including:

- Economic Impact Assessment (EIA) – none of the amendments proposed in the Amended Project change or alter the components of the Project description used to prepare the EIA.
- Soils, Land Use and Agricultural Impact Assessment (SLUAIA) – none of the amendments proposed in the Amended Project change or alter the components of the Project description used to prepare the SLUAIA or result in impacts to new areas not already addressed within the EIS SLUAIA.
- Historic Heritage Impact Assessment (HHA) – none of the amendments proposed in the Amended Project change or alter the components of the Project description used to prepare the HHA or result in impacts in proximity to new heritage items.

Table 7.1 Additional Studies and Assessment Approach

Environmental aspect	Assessment approach	Reference
Traffic and Transport	Revised assessment has been undertaken to address submissions, determine the potential traffic and transport impacts associated with the Amended Project as well as identifying the required road upgrades to facilitate safe access. The assessment is set out in the amended Transport and Traffic Impact Assessment (Turnbull Engineering, 2023).	**Section 7.1**
Aquatic Assessment	Revision of the aquatic assessment has been undertaken to determine the potential impacts associated with the Amended Project. The assessment is set out in the amended Aquatic Impact Assessment (Coast Ecology, 2023).	**Section 7.2**
Social and Economic Impacts	Assessment of social and economic impacts have been summarised in **Section 7.3** of this Amendment Report. Additionally, an AES (Umwelt,2023) identifying options and considerations for the construction workforce has been prepared.	**Section 7.3**

Environmental aspect	Assessment approach	Reference
Noise	Revised assessment has been undertaken to determine the potential impacts of the Amended Project including increased BESS capacity, additional road upgrades and the potential impacts of the new transport route. The assessment is set out in the Addendum Noise and Vibration Impact Assessment (Umwelt, 2023).	**Section 7.4**
Hazards and Risk	Revised assessment has been undertaken to determine the potential impacts of the Amended Project including the increased BESS capacity, inclusion of the DC BESS option and the combination of both options. The assessment is set out in the Addendum Preliminary Hazard Assessment (Umwelt, 2023).	**Section 7.5**
Water	Revised assessment has been undertaken to determine the potential impacts of the Amended Project in particular the modification to the Development Footprint. The assessment is set out in the amended Water Resource Impact Assessment (Umwelt,2023).	**Section 7.6**
Visual Impact	Revised assessment has been undertaken in the RtS and to determine the potential impacts of the Amended Project. The assessment is set out in the Addendum Landscape and Visual Impact Assessment (Envisage, 2023).	**Section 7.7**
Aboriginal Heritage	Revised assessment has been undertaken in the RtS and to determine the potential impacts of the Amended Project, in particular, the additional road upgrades. The assessment is set out in the Addendum Aboriginal Cultural Heritage Report (OzArk, 2023).	**Section 7.8**
Biodiversity	Additional biodiversity surveys have been undertaken to address submissions and determine the potential impacts associated with the Amended Project. Impacts have been assessed via the revision of the Solar Farm BDAR and Public Road & Culvert Upgrade BDAR as presented in the EIS. These are addressed within Part B of the Amendment Report.	**Part B**

7.1 Traffic and Transport

The TTIA for the EIS Project was prepared by Turnbull Engineering Pty Ltd (Turnbull) in May 2023.
An update to this TTIA has been prepared by Turnbull to respond to submissions and assess the traffic and transport impacts associated with the Amended Project. The amended TTIA (Turnbull, 2023) is provided in **Appendix D**.

The amendments to the Project with the potential to influence the TTIA are outlined in **Table 7.2**.

Table 7.2 Amendments that influence the TTIA

Amendment Number	Amendment Description	Potential to influence TTIA
1	Transport route	Yes – Refer to **Section 7.1.2.1**.
2	Wollara Road and Ringwood Road Upgrades	Yes – Refer to **Section 7.1.2.1**.
3	BESS Design Modification	Nil – No change to or additional transport impacts.
4	Development Footprint Modification	Nil – No change to or additional transport impacts.
5	Additional Transmission Tower	Nil – No change to or additional transport impacts.
6	Workforce Accommodation	Yes - Refer to **Section 7.1.2.1**.

7.1.1 Existing Environment

The Project EIS and original TTIA accounted for some road and culvert upgrades at Wollara and Ringwood Roads and considered access via Golden Highway. The Amended Project now comprises additional public road repair and upgrade areas and a revised transport route to those assessed in the EIS:

- Revised Project construction transport route limited to left in and left out movements at the Golden Highway and Ringwood Road intersection.
- Use of a vehicle turning area on Barnett Street to facilitate traffic returning east from the Project site in a safe and controlled environment.
- Upgrades at the intersection of the Golden Highway and Ringwood Road intersection to improve safety.
- Additional road upgrades at Wollara Road and Ringwood Road to improve safety and accommodate construction traffic.

Barnett Street was not described in the Project EIS/TTIA. Barnett Street is a north-south unsealed access road located approximately 3.8 km west of the Golden Highway/Ringwood Road intersection.

A speed survey on the Golden Highway approximately 70 m east of Ringwood Road was carried out over a one-week period from Tuesday, 31 October 2022, to Monday, 6 November 2023. During the survey period, the 85th percentile speed on the Golden Highway was found to be 98.8 km/hr in the eastbound direction and 99.9 km/hr in the westbound direction. Speed survey results have informed the SISD for the proposed Golden Highway and Ringwood Road intersection upgrade.

The amended TTIA has used revised road network data and guidelines to inform the updated assessment.

Intersection Layout and Geometry

The Amended Project assessments were revised and/or undertaken for key intersections comprising Golden Highway/Ringwood Road and Golden Highway/Barnett Street.

These intersections are priority controlled and include basic left turn and right turn treatments, except at the treatments detailed below in **Table 7.3**. Under traffic management, 6–12 OSOM vehicles will still use a right turn movement onto Golden Highway.

Table 7.3 Intersection Treatments

Intersection	Treatment
Golden Highway/Ringwood Road	Existing auxiliary left turn lane on the Golden Highway in the westbound direction.
Golden Highway/Barnett Street	Existing auxiliary right turn lane on the Golden Highway in the westbound direction.

Safe Intersection sight distance

The SISD is the minimum sight distance which should be provided on the major road at any intersection.

In the Amended Project, SISD assessments were revised and/or undertaken for key intersections comprising Golden Highway/Ringwood Road and Golden Highway/Barnett Street, as shown in **Table 7.4**.

These intersections will be used for heavy vehicles, light vehicles and shuttle buses travelling to and from the Project. Further information about this assessment is detailed in **Appendix D**.

Table 7.4 Transport Route Safe Intersection Sight Distance Assessment

Intersection	Posted Speed (km/hr)	Design Speed (km/hr)	Reaction Time (sec)	Grade (%)	Required SISD (m)
Golden Highway/ Ringwood Road	100	110	2*	2 (Golden Highway westbound) -2 (Golden Highway eastbound)	277 m looking east from Ringwood Road 292 m looking west from Ringwood Road
Golden Highway/ Barnett Street	100	110	2.5	1 (Golden Highway westbound) -4 (Golden Highway eastbound)	296 m looking east from Barnett Street 316 m looking west from Barnett Street

**A two second reaction time has been applied, given that drivers would be alert near the intersection due to the road alignment, additional signage located on approach to the intersection and taking into account the speed survey results.*

All SISD checks under current road conditions were achieved, except for a vehicle on Ringwood Road looking east along the Golden Highway. The required SISD of 277 m is not achieved. Ringwood Road looking east has a current sight distance that is deficient by 97 m (i.e., 180 m) and makes the right-out turn onto Golden Highway non-compliant.

7.1.1.1 Proposed Transport Route

Following consultation with TfNSW and as a result of a revised assessment undertaken by Turnbull, the proposed transport route for all construction vehicles is proposed to be amended. This amendment considers the existing sight distance issues for vehicles turning right out of Ringwood Road onto the Golden Highway.

The amendments are summarised as follows:

- Ingress to the site for all construction vehicles will be from the north via the Golden Highway, Ringwood Road, Wollara Road.
- Egress from the site for all construction vehicles will be via a left turn at the Ringwood Rd and Golden Highway intersection and the subsequent use of the existing turnaround facility on Barnett Street to continue on the Golden Highway in the eastbound direction.
- All Project vehicles (excluding OSOM) during construction will be restricted to performing a left-in and left-out turn at the Golden Highway/Ringwood Road intersection.

The EIS Project also included a proportion of light vehicles travelling from the south via Wollar Road, Ringwood Road and Wollara Road. This has changed as the workforce is now proposed to originate from accommodation in and around Merriwa (See **Section 7.3.1**) and therefore almost all construction vehicle movements will originate from the north.

- The access route from the south is not suitable for heavy vehicles due to:
- potential flooding issues at the Ringwood Road and Wollara Road junction over the Goulburn River
- steep grades and tight turning curves on Wollara road through the National Park.
- Movement to the Site from the south is only anticipated if a worker lives within the Mid-Western Regional LGA. Movement from the south was assessed in the EIS and reiterated in **Appendix D**, to address this less likely direction of travel.

7.1.1.2 School Bus Routes and Bus Stops

An informal bus stop is in use at on Ringwood Road near the intersection with the Golden Highway. This bus stop is used by one school bus route, with one service in the morning and one in the afternoon during school pick up and drop off.

As part of the proposed intersection upgrade works, LSbp propose to formalise this bus stop to improve safety and provide beneficial infrastructure to the local community.

7.1.1.3 Cycle Network

Review of the cycle network was required due to updates to the NSW's Definitions of an existing cycle network. Figure 2.17 of the updated TTIA (**Appendix D**) show the cycle network surrounding the site. An additional four scenic cycle routes were identified through this review. However, these routes travel away from Merriwa and the Project site to the east and do not utilise Ringwood and Wollara Roads.

7.1.1.4 Crash Data

A review of updated crash data on roads surrounding the Project Area for the most recent five-years (available from 2016 – 2022) from *Transport for NSW's Centre for Road Safety* was reviewed. In the five-year period from 2018 to 2022, a total of 70 crashes were recorded on roads surrounding the Project Area. Road incidents are further detailed in Figure 2.18 of the **Appendix D**. Of the updated crash figures, five crashes occurred on the Golden Highway between Ringwood Road and Barnett Street, one crash occurred at the Wollar Road and Ringwood Road intersection resulting in a serious injury and 26 crashes in Merriwa resulted in an injury and three crashes resulted in a fatality.

7.1.2 Impact Assessment

The Amended TTIA has assessed the potential traffic and transport impacts associated with the Amended Project as well as identifying the required road and intersection upgrades and repair treatments required to facilitate safe access as detailed in **Section 3.0**.

7.1.2.1 Construction Impacts

Traffic Volumes

There is no change to the peak construction traffic as a result of the Amended Project, anticipated to occur in 2025. An appropriate background traffic growth rate has been applied to the 2022 traffic volumes collected since the EIS assessment. A two per cent per year background traffic growth rate has been applied to the 2022 traffic volumes collected, based on corridor growths outlined in the Golden Highway Corridor Strategy (Transport for NSW, 2017).

In addition to background traffic, anticipated peak hour vehicle movements generated by nearby projects are also included in the assessment. Planning documents used in the EIS assessment to determine traffic generated by nearby projects that will use the Golden Highway still apply. In addition to these projects, traffic volumes from Stubbo Solar Farm, Dunedoo Solar Farm and Bowdens Silver Project were included in the Amended TTIA.

The 2025, peak hour cumulative volumes (at both morning and evening peak hour) on Golden Highway are anticipated to be 85 light vehicles and 97 heavy vehicles.

Intersection Performance

The performance of the Golden Highway and Ringwood Road intersection was assessed using the intersection modelling software SIDRA. Intersection impacts were assessed with and without project construction vehicles for the anticipated peak traffic period in 2025. Cumulative construction impacts at the Golden Highway and Ringwood Road intersection are detailed below in **Table 7.5**.

Table 7.5 Intersection performance during construction (cumulative) – Golden Highway and Ringwood Road intersection

Approach and peak period	2025 cumulative base				2025 cumulative construction			
	DOS*	Average delay (sec/veh)	LOS**	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:15 am to 8:15 am)								
Golden Highway eastbound	0.15	9	A	<5	0.15	10	A	<5
Golden Highway westbound	0.19	9	A	<5	0.19	9	A	<5
Ringwood Road northbound	0.03	12	A	<5	0.04	13	A	<5
Overall intersection	0.19	9	A	<5	0.19	13	A	<5

Approach and peak period	2025 cumulative base				2025 cumulative construction			
	DOS*	Average delay (sec/veh)	LOS**	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday evening peak (3:00 pm to 4:00 pm)								
Golden Highway eastbound	0.21	8	A	<5	0.26	8	A	<5
Golden Highway westbound	0.16	9	A	<5	0.16	10	A	<5
Ringwood Road northbound	0.01	12	A	<5	0.07	15	B	<5
Overall intersection	0.21	12	A	<5	0.26	15	B	<5

** DOS (Degree of Saturation).*

*** LOS (Level of Service).*

As shown in **Table 7.5,** the Project construction traffic combined with the cumulative traffic on the network would result in minor increases in the average delay at the Golden Highway and Ringwood Road intersection. The increase in delay is calculated to be 4 seconds during the morning peak hour and 3 seconds during the evening peak hour. Light vehicles (unrelated to the Project) turning right from Ringwood Road onto the Golden Highway would wait one to three seconds longer at the intersection.

It is assessed that the increase in construction related vehicles due to the Amended Project would result in a slight increase in the average delay. However, the intersection would still operate with spare capacity. The overall impacts to the Golden Highway and Ringwood Road intersection are expected to be minor.

Warrants for intersection improvements

Approach traffic volumes at the Golden Highway and Ringwood Road intersection in 2025 with Amended Project construction traffic is shown in **Table 7.6**. The peak hour volumes in **Table 7.6** include those generated by other projects, as outlined in Table 4.1 of **Appendix D**. The major road volume on the Golden Highway that influences the right turn treatment required, increases due to other project traffic and the Project construction traffic.

Table 7.6 Traffic volumes for turn treatments analysis (cumulative) – Golden Highway and Ringwood Road

Movement	2025 Base		2025 Construction	
	Morning peak hour	Evening peak hour	Morning peak hour	Evening peak hour
Major road traffic volume (Q_M) for left turn	246	198	246	198
Major road traffic volume (Q_M) for right turn	424	490	511	577
Left turn volume (Q_L)	24	7	95	13
Right turn volume (Q_R)	5	1	5	1

The turn warrants assessment for the Amended Project, inclusive of cumulative totals at the Golden Highway and Ringwood Road intersection, is shown in **Appendix D**, Figure 4.6 and Figure 4.7.

The assessment found that an auxiliary left turn lane (full or short) is required and a channelised right turn lane (short) may be required to meet the turn warrants assessment for the morning peak hour. A basic left turn lane and right turn lane is required to meet the turn warrants assessment for the evening peak hour. The intersection currently has an auxiliary left turn lane (short) and a basic right turn lane. All construction traffic will make a left turn onto the Golden Highway toward the Barnett Street turning area.

The turn warrants assessment with cumulative construction traffic is marginally above the threshold for a full auxiliary left turn lane however the cumulative volumes used in the assessment are a worst-case scenario. The likely volumes would be lower and within the threshold for a short auxiliary left turn lane. Further detail regarding the basis for this conclusion can be found in Section 4.1.1 of **Appendix D**.

Due to the likely lower cumulative volumes and existing site constraints, a short auxiliary left-turn lane has been deemed appropriate for the Golden Highway on approach to Ringwood Road. This has been incorporated into the design of the proposed intersection upgrade and would require an extension to the existing taper to be compliant. This is discussed further in Section 3.2.5 of **Appendix D**.

Impact to the Bus Network

The school bus route that operates on Ringwood Road towards Merriwa and Scone would experience minor impacts due to the additional construction traffic using this road and the increase in left-in and left-out movements at the Golden Highway and Ringwood Road intersection. As part of the proposed intersection upgrade of Golden Highway and Ringwood Road, the existing informal bus stop on Ringwood Road would be formalised. The formalisation of this bus stop would improve this amenity for school students and parents/carers that use this bus stop. The proposed acceleration lane on the Golden Highway would also be to the benefit of the school bus and parents/carers.

Impact to the Cycle Network

Cyclist volumes on the Golden Highway, Ringwood Road and Wollara Road would likely be low and hence, the overall impact on cyclists is anticipated to be minor.

Cumulative Construction Traffic Impacts

A list of projects that have been considered for the cumulative construction impact assessment are shown in Table 4.6 of **Appendix D**. For the purposes of the amended TTIA, changes to the assessed cumulative impacts since the EIS are detailed in Section 4.1.5 of **Appendix D**.

Dunedoo Solar Farm, Stubbo Solar Farm and Bowdens Silver Project are the only additional developments assessed in the cumulative impact assessment since the EIS TTIA. The Golden Highway is the main route for construction vehicles shared by developments with similar construction timelines as the Project. Many of the developments considered in the assessment will not have peak construction traffic which coincides with the peak construction period of the Project. The only developments with a peak construction time that aligns with the Project are expected to be Wollar Solar Farm and Dunedoo Solar Farm.

During peak construction of the Project and non-peak construction of other projects, the surrounding road network would be able to accommodate the additional construction vehicle volumes, due to the spare capacity available as shown in Section 4.11 of **Appendix D**.

The result of the assessment demonstrates that the Golden Highway has sufficient capacity to accommodate the construction vehicles generated by these projects along with Project-related traffic.

7.1.2.2 Operational Impacts

No additional operational transport and traffic impacts are anticipated due to the amendments to the Project.

7.1.3 Mitigation and Management Measures

Additional mitigation measures required due to the Amendments outlined in **Section 3.0** include:

- As part of the Construction Traffic Management Plan (CTMP) to be prepared post-approval, a Vehicle Movement Plan will be included that clearly shows the construction vehicle routes and permitted movements, including restriction at the Ringwood Road/Golden Highway intersection (left in/left out movement permitted). The CTMP will also encompass a Drivers Code of Conduct that all construction phase vehicle drivers (including of light vehicles) would need to read and sign to confirm their responsibilities and reinforce correct behaviour. Further details on how traffic routes will be managed during construction are included in the TTIA (**Appendix D**).
- Osborn's Transport, Merriwa Pre School, Scone Grammar School and Scone High School would be consulted on the proposed formalisation of the bus stop on Ringwood Road at the Golden Highway intersection and informed of the additional construction traffic that would be generated by the Project.
- Additional signage and line marking is recommended at the Golden Highway and Barnett Street intersection and installation of warning signs ("Symbolic Truck") are recommended near the primary site access point.

7.2 Aquatic Assessment

The Aquatic Assessment was amended to assess the impact of the Amended Project on aquatic ecology and the likelihood of impacting threatened species, populations and endangered ecological communities (EECs).

The amendments to the Project with the potential to influence the aquatic assessment are outlined in **Table 7.7**.

Table 7.7 Amendments that influence the Aquatic Assessment

Amendment Number	Amendment Description	Potential to influence Aquatic Assessment
1	Transport route	Nil - Aquatic assessment included with Road Upgrades BDAR (Part B).
2	Wollara Road and Ringwood Road Upgrades	Nil – Aquatic assessment included with Road Upgrades BDAR (Part B).
3	BESS Design Modification	Nil – No change to or additional aquatic impacts.
4	Development Footprint Modification	Yes – Refer to **Section 7.2.1**.
5	Additional Transmission Tower	Nil – No change to or additional aquatic impacts.
6	Workforce Accommodation	Nil – Not related to on ground works with potential to impact aquatic environments.

7.2.1 Impact Assessment

7.2.1.1 Key Fish Habitat

Watercourses within the Development Footprint are mapped by DPI (2007) as Key Fish Habitat (KFH), however the Aquatic Assessment identified they met the definition of Type 3 minimally sensitive KFH due to their highly ephemeral nature and lack of important habitat features.

During design refinements for the Amended Project, KFH was generally excluded from the Development Footprint. No additional impacts to watercourses or KFH were identified during the update to the Aquatic Assessment in comparison to the Project as assessed during the EIS phase.

7.2.1.2 Other Waterbodies

The Amended Project results in minimal changes to water resources and thus additional impacts have not been identified. The Amended Project does not elevate the potential impact to aquatic ecology as assessed in the EIS.

7.2.2 Cumulative Impacts

Consistent with Section 5.7 of the EIS Aquatic Assessment, cumulative impacts from existing and approved projects within the Goulburn River catchment are unlikely to be significant. No additional cumulative impacts are anticipated from the Amended Project.

7.2.3 Management and Mitigation Measures

No additional management and mitigation measures for the protection of aquatic ecology are required for the Amended Project.

7.3 Social Impact

The type and scope of social impacts anticipated for the Amended Project remain consistent with the impacts and benefits identified within the EIS including the additional road and intersection upgrades, the revised transport route and the formalisation of the bus stop on Ringwood Rd. No additional social impacts associated with the Amened Project are predicted to occur.

The EIS Project identified management measures for potential social impacts including the preparation and implementation of an AES following approval and prior to construction. In response to submissions, it was determined that timing for the AES be brought forward, to provide detailed assessment and support the RtS and this Amendment Report. The AES is summarised in **Section 7.3.1** and provided in full at **Appendix F**.

The amendments to the Project with the potential to influence the Social Impact Assessment (SIA) are outlined in **Table 7.8**.

Table 7.8 Amendments that Influence the Social Assessment

Amendment Number	Amendments	Potential to influence Social Assessment
1	Transport route	Nil - No change to or additional social impacts.
2	Wollara Road and Ringwood Road Upgrades	Nil – No change to or additional social impacts.
3	BESS Design Modification	Nil – No change to or additional social impacts.
4	Development Footprint Modification	Nil – No change to or additional social impacts.
5	Additional Transmission Tower	Nil – No change to or additional social impacts.
6	Workforce Accommodation	Yes – refer to **Section 7.3.1**.

7.3.1 Accommodation and Employment Strategy

The AES has been prepared in direct response to the findings and recommendations identified in the Social Impact Assessment for the EIS Project. Formal submissions while the EIS Project was on exhibition highlighted concerns regarding the limited accommodation in the region, along with local employment levels. These are addressed in the AES, presented in **Appendix F**.

The AES has been developed to meet the following objectives:

- Ensure there is sufficient accommodation for the required workforce, taking into consideration the cumulative impacts associated with other developments in the region within the same timeframe.
- Reduce the strain on the local accommodation and housing sector during the influx of workforces.
- Maximise the capacity for Lightsource bp to generate local benefits through local procurement and employment outcomes.
- Identify options for the effective and appropriate accommodation of workforce associated with the Amended Project.
- Respond to the community, council and agency concerns in relation to temporary workforce accommodation and local employment opportunities.
- Detail the consultation and analysis undertaken to-date to support consideration of accommodation and employment and procurement opportunities associated with the Amended Project.

The AES comprises a combination of desktop analysis of existing databases and engagement with key stakeholders to inform an evaluation of accommodation and employment options and opportunities. **Appendix F** details engagement with key stakeholders undertaken for the AES.

7.3.1.1 Accommodation Framework

The AES presents an Accommodation Framework which aims to provide evidence-based recommendations to manage social opportunities and impacts associated with housing the temporary construction workforces required for the Amended Project. In developing the framework and profile, a range of accommodation types have been considered.

Table 7.9 provides an overview of accommodation availability and likely distribution based on the accommodation profiling conducted for the Amended Project. It reflects accommodation composition at a peak workforce of 350, with accommodation compositions changing over the course of construction to reflect fluctuations in on-site workforce. Accommodation modelling has been based on conservative estimates and assumes all proposed proximal projects will progress and at the times indicated in their EIS or website documentation. Access to accommodation may differ depending on changing timelines and local conditions and is likely to be higher than the data modelled in **Table 7.9**.

It is predicted that approximately 35 workers will live locally and remain in their own homes. Further, approximately 14 rooms of existing short-term accommodation and 40 rooms of new short-term accommodation are likely to be available to the construction workforce during peak construction, without materially infringing on short-term accommodation access for other users. Up to three rental homes are likely to be available to the construction workforce.

The remaining workers during the peak construction phase are proposed to be housed in a Temporary Workforce Accommodation Facility (TWA Facility). As of December 2023, Lightsource bp has signed a Memorandum of Understanding with a local developer who are proposing the development of 500 fully furnished, self-contained ensuite units within the township of Merriwa. Lightsource bp has an option in place to rent up to 300 rooms during the construction period of the Project, with potential to increase the number of rooms if required. The commencement of this facility is being coordinated between the two parties to align with the ramp up of workforce numbers onsite at Goulburn River.

Appendix F provides information regarding the accommodation types that have been considered and their availability in detail.

Table 7.9 Accommodation Option Breakdown at Peak Workforce

Accommodation Components (assumes peak workforce of 350)	Number of Workers Housed	Housing Form
Local workforce	Approximately 35	Existing homes
Existing short-term accommodation	14	14 rooms
New short-term accommodation	40	40 rooms
Rental accommodation	9	3 rented rooms
Subtotal	**Up to 100**	
Custom-built Temporary Workforce Accommodation Facility	Up to 300	Temporary Workforce Accommodation Facility
Total	**Up to 350**	

7.3.1.2 Employment and Procurement Framework

An Employment and Procurement Framework was developed within the AES to provide evidence- based recommendations to manage the local employment and procurement opportunities associated with the Project.

An effective local employment and procurement strategy ensures that local entities have full, fair, and reasonable opportunity to bid for the supply of key goods or services for the Amended Project. Therefore, the desired outcomes for the Project for an effective local employment and procurement strategy include:

- Creation of training and employment opportunities through procurement processes, clauses, and specifications in contracts. It is important to note that these opportunities may lag, and trainees may not have the opportunity to benefit from the Amended Project but will have the opportunity to benefit from future projects.
- Directly targeting harder to- reach or more vulnerable and marginalised groups when creating employment and procurement opportunities.
- Encouragement of local economic development and growth.
- Engagement of local small- to medium enterprises (SMEs) and social benefit suppliers, providing them with the same opportunities as other larger businesses, including the ability to engage in procurement processes.
- An analysis of existing Construction and Manufacturing businesses within the study area indicated that Mid-Western Regional LGA has the largest number of businesses with likely capability to service the Amended Project. Both Muswellbrook and Upper Hunter Shire LGAs are significantly smaller in terms of population and their Construction and Manufacturing capacity. While Muswellbrook may benefit from strong regional strengths in mining and related industries, Upper Hunter's existing reliance on agriculture may indicate lower capability to benefit from the Amended Project procurement opportunities.

The key objectives of the employment framework for the Project are to:

- Implement strategies to target minimum of 35 construction phase workers (representing 10% of the workforce) sourced locally (i.e., from neighbouring LGAs).
- Meet the baseline requirements and implement strategies to support achievement of the stretch goals of Merit Criteria 8 of the AEMO Tender Guidelines for regional economic development. This includes a goal of 40% of supply chain inputs coming from Australia and New Zealand during the development phase, 51% during the operations and maintenance phase and 10% of steel products and components using locally milled steel.
- Implement strategies and procurement weightings to maximise the number of sub- contractors and suppliers sourced locally.
- Generate lasting training and skills development opportunities for the region.
- Pro-actively generate opportunities for under- represented communities, including First Nations people, women, and unemployed and under- employed people.
- Transparently communicate employment and procurement opportunities to the local community and provide updates in whether objectives are achieved.
- These objectives inform the proposed actions and mitigation strategies **Section 7.3.3**.

7.3.2 Cumulative Impacts

The AES assessed the potential for SSD projects within a 100 km radius of the Amended Project. Cumulative impacts may arise if the construction periods of these projects coincide with the construction period of the current development. The assessment identifies SSDs in the CWO REZ and identifies whether their construction timeframes are likely to overlap with the Project in question. **Table 7.10** details projects which are likely or highly likely to contribute to the cumulative impact of an increased workforce in the CWO REZ. The cumulative impact assessment considers factors such as the distance between projects, the size of project workforces, proximity to larger-order townships providing accommodation and services and expected construction timelines.

The impact of the Project has also been considered, with additional analysis to assess cumulative impacts of concurrent SSD projects proposed nearby. The assessment of cumulative projects has identified existing regional strengths, including regional expertise in mining and construction sectors and access to land with the capacity to host a temporary workforce accommodation facility for workers.

Table 7.10 Cumulative Impact of Proximal Developments

State Significant Development	LGA	Description	Indicative Construction Timeline (where available)	Location and Distance from the Project	Approximate Workforce Numbers	Likelihood of cumulative impact	Cumulative Impact
Barneys Reef Wind Farm **SSD-24106966**	Mid-Western Regional LGA	350 MW wind farm, up to 63 wind turbines.	2025–2027	Castlereagh Highway, 16 km north of Gulgong (50 km) Located within CWO REZ	340 jobs during the construction phase and approximately 10 jobs during the operational phase.	Cumulative impact on housing, employment and access to services is **likely** given proximity of projects.	Construction timeframes may overlap later in the Project's construction phase.
Merriwa Solar Farm **SSD-30913035**	Upper Hunter Shire LGA	Development of a 550 MW solar farm and a BESS.	Construction to be completed in 2027	Merriwa (30 km)	500 jobs during construction.	Cumulative impact on housing, employment and access to services is **likely** given proximity between projects. However, timing suggests that Projects peak construction will be completed before Merriwa Solar Farm commences.	Construction timeframes may overlap later in the Project's construction phase.
Bellambi Heights Solar Farm **SSD-33344237**	Mid-Western Regional LGA	A 200 MW Battery (built in 2x 100 MW stages), connecting to existing 330 kV transmission line.	2025–2026	Castlereagh Highway and Puggoon Road, Beryl (54 km)	Employment generation would include approximately 70–100 people for battery per stage.	Cumulative impact on housing, employment and access to services is **likely** given proximity between projects and overlapping development phases.	Construction timeframes may overlap later in the Project's construction phase.

State Significant Development	LGA	Description	Indicative Construction Timeline (where available)	Location and Distance from the Project	Approximate Workforce Numbers	Likelihood of cumulative impact	Cumulative Impact
CWO REZ Transmission Infrastructure SSI-48323210	-	Development of new twin double circuit 500 kV transmission lines between Wollar and the proposed substations at Merotherie and Elong Elong.	2024–2027	25 km	Peak workforce of 650, with a construction period of 36 months.	Cumulative impact on employment and access to services is **highly likely** given proximity between projects and differences in development phases. Impacts to housing are mitigated by plans for a temporary workforce accommodation camp.	Construction timeframes may overlap throughout the Project's construction phase
Moolarben OC3 Extension Project SSD-33083358	Mid-Western Regional LGA	Extension of open cut mining at OC3 to the south.	Construction to be completed in 2025	Ulan Rd, Ulan (48 km)	Not Available.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects.	Construction timeframes may overlap earlier in the Project's construction phase.
Valley of the Winds Wind Farm SSD-10461	Warrumbungle Shire LGA	800 MW wind farm, up to 175 wind turbines.	2025–2027	Coolah (57 km) Located within CWO REZ	400 peak construction workforce.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects and overlapping construction time frames.	Construction timeframes may overlap later in the Project's construction phase.

State Significant Development	LGA	Description	Indicative Construction Timeline (where available)	Location and Distance from the Project	Approximate Workforce Numbers	Likelihood of cumulative impact	Cumulative Impact
Tallawang Solar Farm **SSD-23700028**	Mid-Western Regional Council	Development of a 500 MW solar farm with 200 MW battery energy storage system and associated infrastructure.	2025–2027	Puggoon Rd (50 km) Located within CWO REZ	380 full time equivalent (FTE) jobs during construction (with a peak of 420), and 10 FTE jobs during operation.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects and overlapping construction timeframes.	Construction timeframes may overlap later in the Project's construction phase.
Birriwa Solar Farm **SSD-29508870**	Mid-Western Regional LGA	600 MW solar farm with 1000 MW BESS.	2025–2027	Barneys Reef Rd, Birriwa (60 km) Located within CWO REZ	Peak construction workforce of 800. 20 full time equivalent jobs throughout operations, 28-month construction period.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects and overlapping timeframes.	Construction timeframes may overlap throughout in the Project's construction phase.
Wollar Solar Farm **SSD-9254**	Mid-Western Regional LGA	290 MW solar farm.	2024	Mudgee (22 km)	Construction workforce of up to 300 over a two-year period.	Cumulative impact on housing, employment and access to services is **highly likely** given proximity between projects.	Construction timeframes may overlap throughout the Project's construction phase.

State Significant Development	LGA	Description	Indicative Construction Timeline (where available)	Location and Distance from the Project	Approximate Workforce Numbers	Likelihood of cumulative impact	Cumulative Impact
Stubbo Solar Farm **SSD-10452**	Mid-Western Regional LGA	400 MW solar farm with energy storage.	2025–2026	Blue Springs Rd, Stubbo (48 km) Located within CWO REZ	Employment generation would include approximately 400 people during construction over 2 years.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects.	Construction timeframes may overlap throughout the Project's construction phase.
Liverpool Range Wind Farm **SSD-6696**	Warrumbungle Shire LGA, Upper Hunter Shire LGA & Mid-Western Regional LGA	Up to 1,000 MW wind farm with up to 267 wind turbines.	2025–2027	Coolah (55 km) Located within CWO REZ	Up to 800 construction workers and 47 roles during operations. 550 peak workforce, approx. 24–36 months for construction.	Cumulative impact on housing, employment and access to services is **likely** given distance between projects.	Construction timeframes may overlap throughout the Project's construction phase.

7.3.3 Management and Mitigation Measures

Section 7.3.1.1 and **Section 7.3.1.2** provides evidence- based measures to manage workforce accommodation and local employment and procurement opportunities, as well as other social opportunities and impacts associated with the Amended Project.

Measures to enhance positive social outcomes and mitigate negative social outcomes for the Project include:

- Limiting the number of existing short- term accommodation beds accessed to no more than 14 existing short term accommodation beds across the study area on any given night. This is designed to avoid 'crowding out' effects on other accommodation users. This figure could be re-assessed if substantial reductions in local occupancy rates are identified and recorded in the social locality.
- Limit the use of existing rental accommodation as a housing source for the Amended Project by ensuring sufficient access to custom- built temporary workforce accommodation.
- Work with the local accommodation providers to provide advanced notice of accommodation requirements and anticipate timing of key tourism events.
- Consider partnering with or funding existing local accommodation providers to expand their accommodation capacity.
- Establish, review, and maintain a LSbp Goods and Services Register database and make this available to head contractors to support local procurement.
- Utilise Project newsletters, website, and media releases at key milestones throughout the Project development, construction and operation timeline to promote information on how local suppliers may become involved in the Project.
- Promote and fund Apprenticeships and Traineeships as a key employment strategy and work with regional employment agencies, Training Services NSW, education providers and Group Training Organisations to develop strategies to enable apprentices to access experience across different infrastructure projects.
- There are sufficient opportunities to house the anticipated construction and operational workforces, employ local workers, and procure local goods and services while also maximising social benefits to communities and reducing potential negative impacts. Proactive management and monitoring of outcomes will be achieved through post- approval management strategies and mechanisms.

7.4 Noise and Vibration

The Noise and Vibration Impact Assessment (NVIA) (Umwelt, 2023) prepared for the EIS has been revised after consideration of public and agency submissions received following exhibition of the EIS Project, as well as other further detailed design of the technical aspects of the EIS Project. The NVIA Addendum report (**Appendix G**) is supplementary to the previously prepared NVIA (Umwelt, 2023). The amendments to the Project with the potential to influence the NVIA are outlined in **Table 7.11**.

Table 7.11 Amendments that influence the NVIA

Amendment Number	Amendment Description	Potential to influence NVIA
1	Transport route	Yes – Amendments assessed in **Section 7.4.1**.
2	Wollara Road and Ringwood Road Upgrades	Yes – Amendments assessed in **Section 7.4.1**.
3	BESS Design Modification	Yes – Amendments assessed in **Section 7.4.1**.
4	Development Footprint Modification	Nil – No change to or additional noise impacts.
5	Additional Transmission Tower	Nil – No change to or additional noise impacts.
6	Workforce Accommodation	Nil – No change to or additional noise impacts.

7.4.1 Construction Noise Assessment

The Amended Project includes additional areas of road repairs and upgrades which have been assessed via an additional construction noise assessment. The construction noise assessment covers the following works areas:

- Work Area 1 – Golden Highway and Ringwood Road Intersection - Pruning and removal of vegetation and trees, construction of a merge lane, extension of deceleration lane and formalisation of two (2) bus stops either side of Ringwood Road.
- Work Area 2 – Ringwood Road - Realignment, widening and sealing of an additional 1.6 km section of Ringwood Road between Killoe Creek and Binks Road.
- Work Area 3 – Wollara Road - Realignment, widening and sealing a 4.7 km unpaved section of Wollara Road between the Goulburn River National Park boundary and 1621 Wollara Road.
- Noise levels have been predicted for four indicative construction scenarios, as well as the predicted noise contours for the worst- case scenario(s) with all equipment operating described and presented in **Appendix G**.

Prediction of the construction noise levels was undertaken under worst- case noise- enhancing meteorological conditions (D-class with 3 m/s windspeed). The predictions are conservative and assume all equipment associated with each scenario is operating simultaneously at the closest point to the receiver. In reality, a receiver would only experience a range of construction noise levels, dependent upon the number of plant items operating at any one time and their location as the works progress along the roadway. The assessment of construction noise therefore represents a conservative approach. As required under the Interim Construction Noise Guideline (DECC, 2009) (the ICN Guideline), the predictions included a 5 dB(A) penalty for the noise character of the construction activities.

The construction noise levels are predicted to exceed the noise management levels (NMLs) at some receivers adjacent to the road upgrade corridors on Ringwood and Wollara Road under some scenarios. However, no receivers are predicted to be highly noise affected (i.e., exposed to construction noise levels greater than 75 dB(A)). Further details regarding the construction noise impacts are available in Table 3.4 of **Appendix G**.

The construction noise levels are not predicted to be exceeded at other receivers. Reasonable and feasible noise mitigation and management strategies were provided in Section 5.4 of the EIS NVIA 2023 that are still consistent with these findings.

7.4.2 Construction Vibration Levels

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

Consistent with the EIS NVIA 2023, other than receivers R11, R12 and R15, all the identified residential dwellings fall outside of the minimum working distances. For Work Area 2, receiver R11, R12, and R15 fall within the minimum working distance for human response for some plant items. (i.e., vibratory roller >7 tonnes and large hydraulic hammer >18 tonnes). However, given the transient nature of the works, human disturbance impacts are anticipated to be low.

Construction vibration mitigation strategies were provided in Section 5.4 of the EIS NVIA 2023, and are relevant to the Amended Project, including for road upgrades where no additional management and mitigation strategies are necessary.

7.4.3 Operational Noise Assessment

The Amended Project includes amendments to the type and location of noise generating infrastructure, specifically the BESS. The nearest sensitive receivers are consistent with the EIS Project, and operational Project Noise Trigger Levels as outlined within the EIS NVIA 2023. The noise levels have been predicted under default worst- case meteorological conditions (D- class with 3 m/s windspeed or F- class with 2 m/s windspeed) in accordance with the *Noise Policy for Industry* (NPfI 2017). For a conservative assessment against the nighttime noise goal, it was assumed that all plant and equipment within the development footprint would be operating concurrently at 100% capacity.

The predicted operational noise levels at the identified receivers for scenarios are presented below. Predicted operational noise levels have been undertaken for the following scenarios:

1. Decentralised BESS (1,160 MWh).
2. Centralised BESS (900 MWh).
3. Decentralised plus centralised BESS (2,060 MWh).

This assessment found that the Amended Project is expected to comply with the applicable day, evening, and night- time noise limits at nearby sensitive receivers not involved with the Project. Therefore, no additional noise mitigation is anticipated to be required for the operation of the Project.

7.4.4 Road Traffic Noise

The original EIS Project noise assessment established the construction traffic noise criterion of 60 dB(A) during the hours of 7.00 am to 10.00 pm, and 55 dB(A) between the hours of 10.00 pm and 7.00 am. The NSW Road Noise Policy (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.

The following assumptions in relation to traffic movements were made during the Amended NVIA:

- No Project related construction vehicles are anticipated to utilise Barnett Street turning area during the night period (i.e., prior to 6.00 am and after 10.00 pm).
- The majority of daily Project-related light-vehicle movements and shuttle buses will utilise the Barnett Street turning area when egressing the site (i.e., 5.30 pm to 6.30 pm), with a worst-case assumption that 50% of the daily movements would occur during any given hour. The shuttle buses for construction workers have been assessed as heavy vehicles.
- Daily Project-related heavy-vehicle movements will be spread evenly throughout the day (i.e., averaged on an hourly basis).
- There are negligible existing traffic movements along Barnett Street that are not associated with the operations of Receiver R110.
- For the purposes of this assessment, Barnett Street has been classified as a local road with a daytime assessment criterion of 55 LAeq(1hr).
- A Barnett Street traffic speed of 40 km/h has been adopted.

7.4.5 Cumulative Impacts

Consistent with Section 8 of the EIS NVIA 2023, cumulative noise and vibration impacts from existing and approved projects in the area are not anticipated due to large separation distances and therefore comply with the NPfl requirements.

7.4.6 Management and Mitigation Measures

No additional management and mitigation measures for noise and vibration are required for the Project.

7.5 Preliminary Hazard Analysis

An addendum to the EIS PHA (Umwelt, 2023) has been prepared to assess the Amended Project. The Addendum PHA (Umwelt, 2023) is provided in **Appendix H**. The Addendum PHA is supplementary to the previously prepared EIS PHA (2023) and should be read in conjunction.

The PHA Addendum was undertaken to address the increased BESS capacity and option of a decentralised BESS, and the choice to host both centralised and decentralised BESS units.

The amendments to the Project with the potential to influence the PHA are outlined in **Table 7.12**.

Table 7.12 Amendments that influence the PHA

Amendment Number	Amendment Description	Potential to influence PHA
1	Transport route	Nil - No change to or additional hazards.
2	Wollara Road and Ringwood Road Upgrades	Nil – No change to or additional hazards.
3	BESS Design Modification	Yes – Amendments assessed in **Section 7.5**.

Amendment Number	Amendment Description	Potential to influence PHA
4	Development Footprint Modification	Nil – No change to or additional hazard impacts.
5	Additional Transmission Tower	Nil – No change to or additional hazard impacts.
6	Workforce Accommodation	Nil – No change to or additional hazard impacts.

7.5.1 Impact Assessment

The conceptual layout of the proposed AC Couple (Centralised) BESS and the proposed DC Coupled (Decentralised) BESS are shown in **Figure 3.4** and **Figure 3.5** respectively. Further detailed conceptual layouts of both the AC Coupled (Centralised) and DC Coupled (Decentralised) BESS units are found in **Appendix H**. The risk control strategies detailed in the *Goulburn River Solar Farm Preliminary Hazard Analysis* (2023) remain applicable to the Amended Project.

In summary, the EIS PHA identified maximum distances to fatal impacts and injury impacts for thermal radiation, explosion overpressure and toxic gas dispersion and found these impacts were contained within the Project Area, and that the potential for adverse impacts was associated with first responders attending a hazardous event.

The impacts as a result of a hazard event associated with the Amended Project as described in **Section 3.0**, will be no greater than the impact as defined in the EIS.

7.5.2 Cumulative Impacts

There are no additional cumulative impacts associated with the Amended Project, when compared to the EIS Project.

7.5.3 Management and Mitigation Measures

The PHA (Umwelt, 2023) prepared for the EIS details a comprehensive description of the risk control strategies that are to be implemented as part of the Project. In response to agency submissions, LSbp has identified their commitment to the development and documentation of site- specific plans and procedure designed to manage the residual risk presented by the EIS Project following the implementation of technical and non- technical controls described in the EIS PHA.

In response to agency submissions, LSbp is committing to a Fire Safety Study (FSS), which will be prepared in accordance with HIPAP 2 prior to commencing construction of the BESS. The FSS will consider:

- the operational capability of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety independence
- fire propagation and a worst-case scenario
- the requirements of the Fire Management Plan (FMP) that would be prepared in consultation with NSW Rural Fire Service.

It is noted the FSS will also inform the requirements of the FMP including:

- The methods and resources needed to manage and extinguish lithium battery fires
- The management of a defendable Asset Protection Zone (APZ) as described in Planning for Bush Fire Protection 2019.

The FSS will inform the requirements of an Emergency Response Plan (ERP) that will be prepared in accordance with HIPAP 2 prior to commencing construction of the BESS. The ERP will inform the requirements of an Emergency Services Information Package (ESIP) that would be prepared in accordance with FRNSW fire safety guideline – Emergency services information package and tactical fire plans. Both the ERP and the ESIP will:

- Inform first responders of site-specific features and safety measures required to ensure they are able to undertake their duties effectively.
- Include agency specific Standard Operational Guidelines.

7.6 Water

An addendum to the EIS Project Water Resource Impact Assessment (WRIA) (Umwelt, 2023) has been prepared to assess the Amended Project. The Addendum WRIA (Umwelt, 2023) is provided in **Appendix K** and assesses the potential impacts of the Project on water resources in the vicinity of the Amended Project Area as well as addressing relevant submissions made during the public exhibition of the EIS.

The amendments to the Project with the potential to influence the WRIA are outlined in **Table 7.13**.

Table 7.13 Amendments that influence the WRIA

Amendment Number	Amendments	Potential to influence WRIA
1	Transport route	Nil – No change to or additional water resource impacts.
2	Wollara Road and Ringwood Road Upgrades	Yes – Refer to Section **7.6**.
3	BESS Design Modification	No – No change to or additional water resource impacts.
4	Development Footprint Modification	Yes - Refer to Section **7.6**.
5	Additional Transmission Tower	Nil – No change to or additional water resource impacts.
6	Workforce Accommodation	Nil – No change to or additional water resource impacts.

The potential impacts of this Amendment to the Project include surface water quality due to erosion and sedimentation during construction. These impacts can sufficiently be mitigated through erosion and sediment control measures in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water, 2008b), commonly referred to as the "Blue Book". There are no new or increased impacts on water resources as a result of the Amended Project.

7.6.1 Cumulative Impacts

Consistent with Section 6.10 of the EIS, cumulative impacts are considered to be negligible as the Project is in the upper reaches of the catchment area and other projects do not occur in these areas.

7.7 Landscape and Visual

An addendum to the EIS Project Landscape and Visual Impact Assessment (LVIA) (Envisage, 2022) has been prepared to assess the potential changes in visual impact associated with the Amended Project compared to the EIS Project in accordance with all relevant guidelines within the *Technical Supplement – Landscape and Visual Impact Assessment* which accompanies the NSW.. The Addendum LVIA (Envisage, 2023) is provided in **Appendix I**. The amendments to the Project with the potential to influence the LVIA are outlined in **Table 7.14**.

Table 7.14 Amendments assessed in the LVIA

Amendment Number	Amendments	Potential to influence LVIA
1	Transport route	Yes – Amendments assessed in **Section 7.7**.
2	Wollara Road and Ringwood Road Upgrades	Yes – Amendments assessed in **Section 7.7**.
3	BESS Design Modification	Yes – Amendments assessed in **Section 7.7**.
4	Development Footprint Modification	Nil – No change to or additional landscape and visual impacts.
5	Additional Transmission Tower	Nil – No change to or additional landscape and visual impacts.
6	Workforce Accommodation	Nil – No change to or additional landscape or visual impacts.

Impact was determined by combining sensitivity to change, with the magnitude of change that would result from the Project. The possible level of impact ranges from 'high' to 'very low' as shown in **Table 7.15.**

Table 7.15 Matrix of Impact

	High Visual Sensitivity	Moderate Visual Sensitivity	Low Visual Sensitivity	Very Low Sensitivity
Very High Magnitude	High	High	Moderate	Moderate
High Magnitude	High	Moderate	Moderate	Low
Moderate Magnitude	Moderate	Moderate	Low	Low
Low Magnitude	Moderate	Low	Low	Very Low
Very Low Magnitude	Low	Low	Very Low	Very Low

An additional site inspection was conducted 1 September 2023 to view locations affected by the proposed amendments. Private property was not required to be accessed, with viewpoints assessed from the nearest publicly accessible locations.

7.7.1 Landscape Character Impacts of the Amendments

As part of the Amended Project, the proposed Wollara Road upgrade would be located within the dense forested landscape character zone, however the proposed Golden Highway intersection upgrade is located beyond the two originally described landscape character areas.

As a result, a revised landscape character zone has been added to the assessment. This landscape character zone is typified by the two- lane sealed highway, which carries comparatively higher- speed, greater volume, heavier traffic than other roads of the study area. The terrain at the intersection is undulating, with cut and fill embankments. Individual tall native trees occur either side of the road within a grassed verge, and there are areas of dense shrubs and trees. For the purposes of this report, this character zone is called the 'Golden Highway' landscape character zone.

The assessment of impacts to landscape character to the Amended Project are shown in **Table 7.16** and further detailed is provided in Appendix I.

Table 7.16 Assessment of Landscape Character Impacts

Landscape Character Zone	Sensitivity of existing landscape character to the Amended Project	Magnitude of change to landscape character		Landscape Character Impact	
		Original Assessment	Amended Project	Original Assessment	Amended Project
Dense forested landscape	Low (As determined in the original assessment).	Very Low	Moderate	Very Low	Low
Golden Highway landscape	Low	N/A	Low	N/A	Low

7.7.2 Visual Impacts of the Amendments

The LVIA for the EIS Project focused on detailed assessment of five residences (R3, R5, R9, R21, R46) and one public road (Wollara Road) within a 4 km radius of the Project. Initially, viewpoints R9 and R21 were excluded due to obstructed views caused by vegetation. However, with the Amended Project involving tree removal between R9 and R21 and the Project Area, a re-examination was conducted. **Table 7.17** provides a summary of the changes to the visual impact to public and residential viewpoints in proximity to the Project. Further information regarding these findings can be found in **Appendix I**. All changes to visual impacts result in either a low or very low assessment rating at all viewpoints assessed in the Amended LVIA.

Table 7.17 Updated Visual Impact Assessment

Viewpoint		Visual sensitivity rating		Visual magnitude rating		Visual impact rating		Residual impact rating	
		Original assessment	Amended Project	Original assessment	Amended Project	Original assessment	Amended Project	Original assessment	Amended Project
Residence	R9	N/A	Low	N/A	Low	N/A	Low	N/A	Low
	R22	N/A	Low	N/A	Low	N/A	Low	N/A	Low
	R29	N/A	Low	N/A	Low	N/A	Low	N/A	Low
	R32	N/A	Low	N/A	Low	N/A	Low	N/A	Low
	R39	N/A	Low	N/A	Low	N/A	Low	N/A	Low
	R44	N/A	Low	N/A	Low	N/A	Low	N/A	Low
Public Roads	Golden Highway/ Ringwood Road intersection	N/A	Very low	N/A	Low	N/A	Very Low	N/A	Very Low

7.7.3 Cumulative Impacts

There are no additional cumulative impacts associated with the Amended Project compared to the Project presented in the EIS.

7.7.4 Management and Mitigation Measures

Additional mitigation measures to address impacts associated with the Amended Project are detailed below.

- Subsequent to Project approval, refine the landscape plan to encompass the Amended Project. The aim of the detailed landscape plan is to establish a quick growing, dense screen to reduce public views of the solar panels from Wollara Road, as well as providing additional ecological benefits.
- The detailed landscape plan is to be prepared prior to landscape implementation and, be guided by ongoing consultation with NP&WS and TfNSW (particularly regarding plant species, spacing, and whether soil improvement is required and road safety measures/tree clearance zones and TFNSW relevant policy).
- Progressively stabilise surfaces as construction is completed.
- Monitor road upgrades to ensure the stabilisation of verges.
- Implement correctional measures if erosion occurs or dust is an issue.
- Include retention of trees where possible within/near the road upgrade construction zone.
- Include protection of trees within/near the road upgrade construction zone. Monitor disturbed trees that have been heavily impacted within their root zone for stability and longevity.

7.8 Aboriginal Heritage

An Addendum ACHAR has been prepared by OzArk (2023) to assess the potential Aboriginal heritage impacts of the Amended Project. The Addendum ACHAR is provided in **Appendix J** and should be read in conjunction with the ACHAR prepared for the EIS. The amendments to the Project with the potential to influence the ACHAR are outlined in **Table 7.18**.

Table 7.18 Amendments that influence the ACHAR

Amendment Number	Amendments	Potential to influence ACHAR
1	Transport route	Yes – Refer to **Section 7.8.2**.
2	Wollara Road and Ringwood Road Upgrades	Yes – Refer to **Section 7.8.2**.
3	BESS Design Modification	No – No change to or additional Aboriginal cultural heritage impacts.
4	Development Footprint Modification	Yes – Refer to **Section 7.8.2**.
5	Additional Transmission Tower	Nil – No change to or additional Aboriginal cultural heritage impacts.
6	Workforce Accommodation	Nil – No change to or additional Aboriginal cultural heritage impacts.

7.8.1 Consultation

A letter was sent to all Registered Aboriginal Parties (RAPs) on 29 August 2023 summarising the status of the Project and providing notification that further assessment for amendments to the Project would be undertaken, noting the amendments were all proposed within the existing surveyed areas or areas in close proximity with the same landforms.

No specific cultural values were identified by the RAPs regarding the Amended Project, however the strong cultural values of Aboriginal communities towards landscapes and cultural heritage sites continue to be recognised.

Full detail of the consultation undertaken as part of the Addendum ACHAR including the update letter are provided in **Appendix J**.

7.8.2 Impact Assessment

An additional desktop study was conducted on 16 October 2023 for the Addendum ACHAR.

No further field survey was required or undertaken given the amendments proposed are within areas previously surveyed for the ACHAR in August 2022 or comprise areas in close proximity with the same landform.

An Aboriginal Heritage Information Management System (AHIMS) search was conducted on 16 October 2023. The search returned 117 entries which is 11 entries higher than the previous searches conducted for the ACHAR. The additional 11 sites correlate to the 11 sites identified during previous surveys for the ACHAR complete for the EIS Project which were subsequently recorded and registered to AHIMS.

One previously identified site, 37-1-1033 (Killoe Creek GG1) is located in proximity of the road upgrades however the Amended Project will not result in harm to this site.

The realignment of the Development Footprint has resulted in the avoidance of harm to 37-1-1027 (Redlynch Creek IF1) and is illustrated in Figure 7.1 of **Appendix J**. This site was previously identified as impacted by the Project and was identified to be salvaged. It will no longer be harmed.

7.8.3 Cumulative Impacts

There are no additional cumulative impacts associated with the Amended Project compared to the Project presented in the EIS.

7.8.4 Management and Mitigation Measures

As a result of the Amended Project, the recommendations of the ACHAR have been revised as follows:

- ACHAR Recommendation 2 now reads: Four known Aboriginal sites, 37-1-1027 (Redlynch Creek IF1), 37-1-1032 (Ringwood Gully IF6), 37-1-1033 (Killoe Creek GG1), and 37-1-1037 (Rocky Creek Gully OS4) will not be harmed by the Project as they are located outside the Access route and the Development Footprint.

- ACHAR Recommendation 3 now reads: Seven known Aboriginal sites, 37-1-1028 (Rocky Creek Slope IF2), 37-1-1029 (Wollara Road IF3), 37-1-1030 (Monaghans Creek IF4), 37-1-1031 (Rocky Creek Gully IF5), 37-1-1034 (Redlynch Creek OS2), 37-1-1035 (Redlynch Creek OS1), and 37-1-1036 (Redlynch Creek OS3) will be salvaged by a surface collection of visible artefacts. The recommended methodology for the salvage will be set out in the ACHMP and will include the measures outlined in Section 9.2.1 of the ACHAR.

The following recommendations concerning Aboriginal cultural values for the Amended Project build upon those provided in the ACHAR.

- Following development consent of the Project, the proponent will develop an ACHMP which is to be agreed to by the RAPs and the Department of Planning and Environment (with input from Heritage NSW). The ACHMP will include an unanticipated finds protocol, unanticipated skeletal remains protocol, protocols related to heritage inductions for work crews, and long-term management of any Aboriginal sites being impacted.
- 37-1-1033 (Killoe Creek GG1) will not be harmed by the Addendum proposal as it is located outside the impact area.
- Further recording and investigation of the grinding groove site (Killoe Creek GG1) will be conducted. The methodology of this investigation will be set out in the ACHMP but will include detailed mapping and photography of the site.
- All land-disturbing activities must be confined to within the Addendum study area. Should the parameters of the proposed work extend beyond this, then further archaeological assessment will be required.

8.0 Justification of the Amended Project

This section provides a justification of the Amended Project, taking into consideration the environmental, social and economic impacts, as compared to the EIS Project, as well as considering the strategic context and suitability of the Project site. The Amended Project is also considered in the context of the principles of ecologically sustainable development (ESD) as defined in Schedule 2 of the EP&A Regulation.

8.1 Environmental, Economic and Social Impacts

The changes proposed by the Amended Project were developed in response to ongoing consultation with agencies, progression of detailed design, and submissions received during the EIS exhibition period. LSbp, in consultation with landowners and agencies, has sought to progress the design and reduce environmental impacts wherever possible.

Key changes from the EIS Project to the Amended Project include an upgrade to the intersection of the Golden Highway and Ringwood Road, additional road upgrades to Wollara Road and Ringwood Road, increased BESS capacity and the option of a decentralised BESS, reduction in the development footprint, relocation of solar arrays and an increased width of some internal access road corridors, construction of an additional transmission tower adjacent to the BESS and substation and a revised approach to the workforce accommodation strategy. These design changes have been assessed and will not result in any unacceptable impacts. The Project can comply with statutory requirements and relevant standards, policies and guidelines.

For most environmental aspects there would be no substantial change to impacts and/or a positive outcome as a result of the Amended Project, when compared with the EIS Project.

8.2 Strategic Context

NSW is in a transition to build a reliable, affordable and sustainable electricity future with the NSW Government taking action to deliver cheap, reliable, and clean electricity for homes and businesses in NSW (EnergyCo, 2023a). The REZs were formally declared under the *Electricity Infrastructure Investment Act 2020* with the Project located 20 km from the Central-West Orana REZ and 50 km from the Hunter Central Coast REZ. The NSW Government has indicated that REZs will play a vital role in delivering affordable energy generation to help prepare the State for the retirement of thermal power stations over the coming decades. Recent delays in the CWO REZ, including the 6 month delay to Access Rights, highlights the complexity and risk of relying on REZ's for near term decarbonisation targets. Goulburn River, connecting to existing transmission infrastructure, presents a project capable of delivering to the grid without the need for transmission upgrades.

The increase in BESS capacity is in response to developments in the Australian Energy Market over the past year, including the release of long duration storage contracts by EnergyCo, capacity contracts by AEMO, network support contracts by Transgrid and the recent announcement of 9GW of storage contracts under the Capacity Investment Scheme by the Federal Government. The increased demand for battery services to support the network as it shifts to a low emissions network is evident, thus the increased BESS capacity is in a response to these contracts.

The Project is aligned with the strategic direction of the NSW and Australian energy generation market and will assist in achieving the planned transition to an increased contribution of renewable energy to Australia's energy needs. Located near the CWO REZ, the Project is in proximity to a defined area planned for renewable energy development by the NSW Government. LSbp, as an existing renewable energy operator in Australia with a track record of delivering large-scale renewable energy projects, is well placed to progress the delivery of the Project.

8.3 Suitability of the Site

The focus of the amendments within the Project Area have been on developing a design that is constructable and allows for further reduction in environmental and social impacts where possible. The Amended Project incorporates additional road upgrades and amendments to the Development Footprint to avoid Regent Honeyeater habitat, Box Gum Woodland, and TSR 44841. The Amended Project has considered these aspects through consultation with landowners, including crown, lands as to how the Project could best be accommodated within their individual landholdings. As such, it is considered that site suitability has been progressed and improved from that identified by the EIS Project.

The site itself remains suitable for large scale renewable energy generation. The location of cleared agricultural land adjacent to the 500 kV network is a rarity. LSbp assessed several sites along the 225 km 500 kV transmission line running from Bayswater Power Station to Mt Piper Power Station, finding only two prospective sites with suitable area to house sufficient capacity (550 MW) to justify the cut-in to the transmission line. Additional sites were ruled out due to biodiversity constraints, mine-site tenements, insufficient acreage, high value agricultural land, topography, or the need to run new transmission lines several km to connect to the existing network.

The Project Site was chosen due to its relative isolation from neighbours, direct access to the overhead transmission line, sufficient cleared land and fewer biodiversity constraints (relative to other sites assessed).

The transmission line running from Bayswater Power Station to Mount Piper Power Station was the target for site investigations due to its high capacity, low curtailment levels and high Marginal Loss Factor Coefficient. These factors minimise the generation lost during transmission and ultimately reduce the cost of electricity for the consumers. They also support the market operator's (AEMO) aim of managing a stable power network by placing renewable generation sources in parts of the network design to handle high power flows. The selection of the Bayswater to Mt Piper 500 kV transmission line has been validated with the announcement of EnergyCo's plans to connect the Central West Orana REZ to the same transmission line.

In summary, the selection of the Project Site was assessed across several categories mentioned above and was deemed the most appropriate site for utility-scale solar and BESS development.

8.4 Ecologically Sustainable Development (ESD)

To justify the Amended Project with regard to the principles of ESD, the benefits of the Amended 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.

An assessment of the Amended Project against the principles of ESD is provided in the sections below.

8.4.1 The Precautionary Principle

The EP&A Regulation defines the precautionary principle as:

'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 the application of the precautionary principle, public and private decisions should be guided by:

- *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment*
- *an assessment of the risk-weighted consequences of various options.'*

LSbp have delivered 6.1GW of renewable energy globally since 2010, predominantly from developing solar farms. LSbp have taken three solar farms through to operation stage in Australia, two of which are in NSW. Another two are under construction currently, including one in NSW. Their approach to developing and operating solar farms is proven and means that risks can be qualified and quantified with a relatively high level of certainty.

The technical specialists who have completed assessments have all worked in solar and renewable projects providing experience to ensure the successful implementation and operation of the Project. Umwelt, as the EIS lead consultant, have worked numerous projects in NSW/Hunter, navigating regulatory frameworks and environmental considerations.

The precautionary principal has been applied in a number of ways. This is particularly the case with biodiversity, where fundamentally, a 'worst case' scenario has been considered, with an assumption that all native flora and fauna will be removed from within the development footprint. In reality, the derived native grassland which is present across the majority of the development footprint is expected to regenerate following construction. There is also potential for regenerated Box Gum Woodland grassland to improve condition from its current state, with reduced grazing pressure, shading, and increased moisture under and around the panel arrays.

In order to achieve a level of scientific certainty in relation to potential impacts associated with the proposed amendments to the EIS Project, extensive evaluation of all the key components of the Project have been undertaken. Detailed assessment of all key issues and the identification of management measures has been undertaken and are comprehensively documented in this Amendment Report.

The assessment process has involved detailed studies of the existing environment, and where applicable the use of scientific modelling to assess and determine potential impacts as a result of the Amended Project. To this end, there has been careful evaluation to avoid and minimise the risk of irreversible damage to the environment, wherever possible.

The decision-making process for the design, impact assessment and development of management processes has been transparent through the consultation process with both government authorities, landowners and the community.

Consistent with the precautionary principle, the environmental assessment of the Project has sought to minimise environmental impact through the avoidance of impacts and a range of mitigation measures are proposed to address and identified residual impacts.

8.4.2 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 Amended Project is considered to be consistent with the principle of intergenerational equity as it can be carried out in a way that would maintain the health, diversity and productivity of the environment now and into the future. The key benefit of the Amended Project will be Project's strong contribution to energy capacity, reliability and security in the transition away from coal-fired power generation to renewables. The amendments proposed to the EIS Project enable more electricity storage capacity with minor adjustments to the layout and design of the EIS Project.

The Project as a whole is designed to contribute to the net zero emissions targets that Australia and the state of New South Wales has committed to. This target is in support of greater intergenerational equity and ensuring that future generations inherit a liveable planet.

The addition of 1,200 ha of biodiversity offsets adjacent to and surrounding the Development Footprint, in combination with the biodiversity enhancement measures, will further contribute to intergenerational equity by increasing the area of land under conservation. Repairs and upgrades to the local road network will improve safety for all road users and improve condition of infrastructure to support the local community.

8.4.3 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. A summary is provided here and further detail is available in Part B of the Amendment Report.

The Amended Project includes measures to increase avoidance of PCTs and threatened species habitat, including the relocation and removal of solar arrays. This measure is on top of the measures already implemented in the EIS Project aimed at conservation of biological diversity. All environmental components, ecosystems and habitat values potentially affected by the Amended Project have been assessed in the BDARs (Part B) which include detailed measures to avoid and minimise impacts to biodiversity.

The outer edge of the BSA abuts Goulburn River National Park on all sides. Establishing the Goulburn River BSA will bolster the existing protected area estate (regardless of the ultimate land tenure) and improve wildlife connectivity. Actively managing an additional 1,200 ha for conservation will reduce edge effects on the national park, such as the weed incursion and pest animal predation/competition which currently occur. The Goulburn River BSA will benefit threatened species and a diversity of non-threatened native species which are known or likely to occur. Further details regarding avoidance specific to biodiversity is contained in Part B.

8.4.4 Valuation Principle

The goal of improved valuation of natural capital is 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.

LSbp has intrinsically valued the environmental resources by designing the Amended Project to avoid and minimise potential environmental and social impacts as much as practicable. The Amended Project is considered to be consistent with the valuation principle of ESD as LSbp will be required to pay the full costs associated with:

- Ensuring the Project is designed and implemented in accordance with the relevant standards.
- Offsetting residual impacts to biodiversity in accordance with State and Commonwealth guidelines.
- Management measures to minimise potential environmental and social impacts.

Implementing the mitigation measures for the Amended Project would impose an economic cost on LSbp, increasing both the capital and operating costs of the Project so as to provide sound environmental outcomes. In this manner, environmental resources have been given appropriate valuation.

The Project is considered ecologically sustainable, due to the social, economic and environmental benefits discussed, and the mitigation measures put in place to protect from adverse impacts on the environment.

8.5 Conclusion

The Project is a direct response to the NSW and Commonwealth Governments' commitments to transition to renewable electricity generation. The changes that make up the Amended Project enhance the strategic context of the EIS Project by increasing the energy storage capacity in the NEM. The NEM needs to rapidly transition to renewable energy to support the NSW Climate Change Policy Framework, as well as the Commonwealth Government's commitments under the Paris Agreement. At present, additional renewable energy capacity is being added to the NEM at a lower rate than what the AEMO has identified as required to achieve the transition to renewable energy (Parkinson, Renew Economy, 2023). The Amended Project will materially assist in addressing this shortfall by delivering 550 MWp of renewable energy capacity and up to 1035 MW of energy storage to the NEM to help replace the generation capacity which will be lost when NSW's largest power station, Eraring, closes in 2026.

Further, as outlined in **Section 8.4**, the Amended Project is consistent with the principles of ESD.
The Project will also contribute significant capital investment within the region, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project (e.g. indirect employment creation in local and regional economies would include jobs supported through transportation, trade supplies, services, accommodation, catering, retail services, etc.), and provide benefits to the local community through legacy infrastructure such as road upgrades, the implementation of the proposed Benefit Sharing Program and planning agreement with UHSC.

The assessment findings indicate that while there will be environmental and social impacts associated with the Amended Project, the impacts are able to be managed with the implementation of the identified management measures. Furthermore, a number of amendments centred around road upgrades will improves road safety for all users and upgrade existing infrastructure. The extent of the impacts has been minimised through the design process where possible and where impacts are predicted, LSbp has committed to management, mitigation and offset measures to address these impacts. The assessment findings indicate that while there will be environmental and social impacts associated with the Amended Project, these are generally comparable to the EIS Project.

In conclusion, the Project will provide long-term, strategic benefits to the State of NSW, including:

- Providing a significant boost in renewable generation and energy storage to assist with fulfilling the current obligations under State and Commonwealth renewable energy targets and reduce the need to prolong coal generators retirement dates.
- Providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- Providing regional investment in the NSW renewable energy sector.
- Contribute to the NEM electricity storage capacity and offer grid stability during the energy transmission.
- Delivery critical infrastructure such as road upgrades that will serve to benefit the community for decades to come.

- Delivering long term multi-use infrastructure in the form of road upgrades to the local community.
- Supporting community investment through the 40 year VPA with Upper Hunter Shire Council.

With the implementation of the management, mitigation and offset measures proposed by LSbp, it is considered that the Amended Project would result in a net benefit to the local and regional NSW community.

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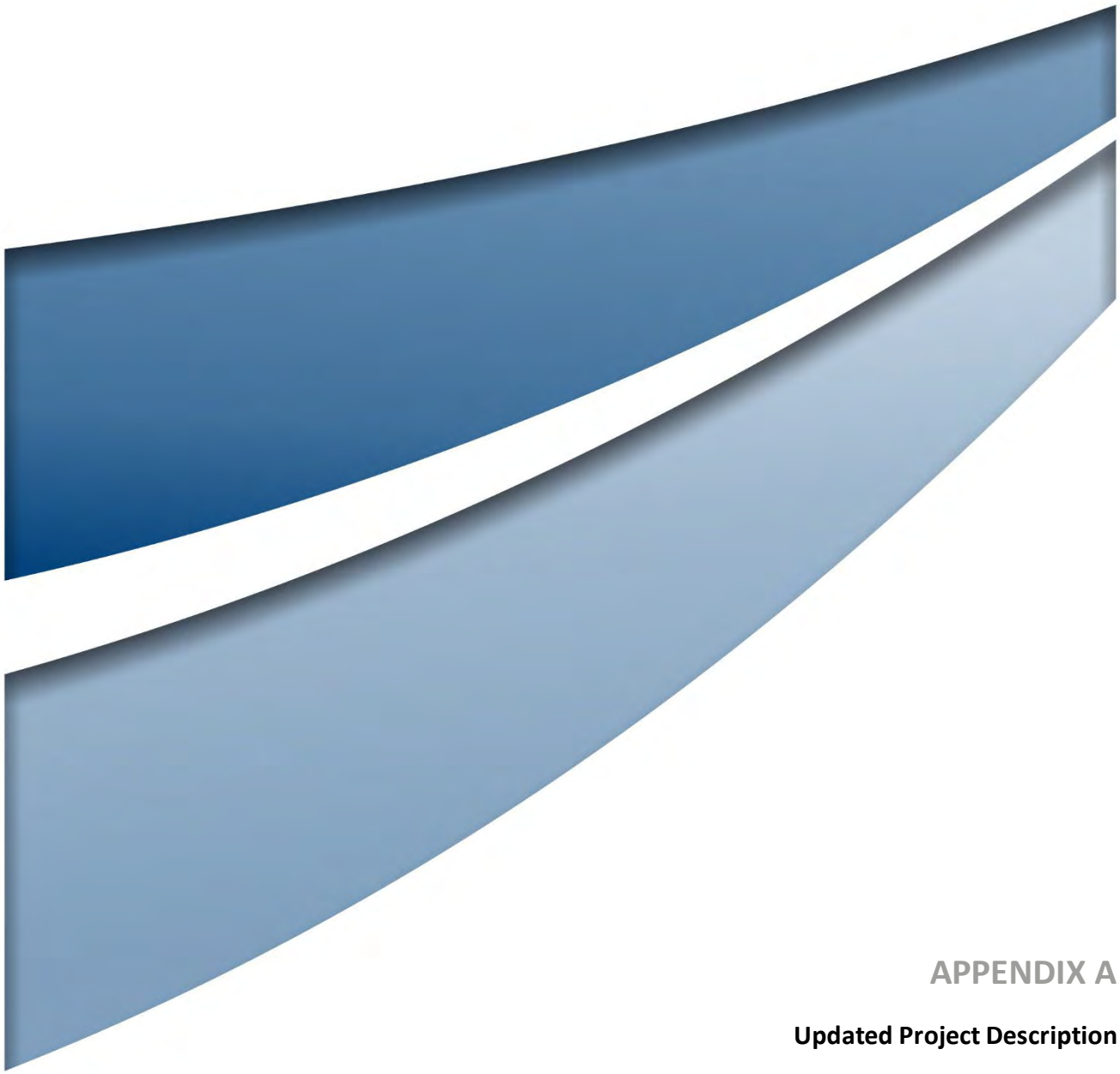

APPENDIX A

Updated Project Description

umwelt
Environmental & Social Consultants

lightsource bp

Goulburn River Solar Farm

Updated Project Description

FINAL

December 2023

lightsource bp

GOULBURN RIVER SOLAR FARM

Updated Project Description

FINAL

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

Project Director:	Malinda Facey
Project Manager	Jessica Henderson-Wilson
Report No.:	23485/R03/Appendix A
Date:	December 2023

umwelt
Environmental & Social Consultants

APPROVED COMPANY ISO 9001
QMS Certification Services

This report was prepared using Umwelt's
ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Disclaimer

Document Status

Rev No.	Reviewer Name	Review Date	Approved for Issue Name	Approved for Issue Date
V1	J Henderson-Wilson	22/11/2022	M Facey	22/11/2022
V2	J Henderson-Wilson	12/12/2023	M Facey	12/12/2023

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1.0 Project Description

1.1 Project Overview

The Project involves the construction, operation and decommissioning of approximately 550 megawatt peak (MWp) of solar photovoltaic (PV) generation as well as a Battery Energy Storage System (BESS) with a maximum 1,030 MWp/2,060 megawatt hour (MWh) capacity. The Project will include a substation and connection to an existing 500 kilovolt (kV) transmission line which passes through the Project Area. The Project will include various associated infrastructure, including road repairs and upgrades to Ringwood Road, Wollara Road, and the Golden Highway intersection, temporary construction facilities, operation and maintenance buildings, internal access roads, civil works and electrical infrastructure to connect the Project to the existing transmission line.

The conceptual layout of the solar arrays (refer to Figure 1.2 of the Amendment Report (copied here in **Appendix 1**)) has been designed to maximise solar efficiency while also considering ecological, heritage and other site constraints.

Table 1.1 provides a summary of the key components of the Project.

Table 1.1 Project Summary

Project Element	Summary of the Project
Project Application Number	SSD-33964533
Project Description	The Project includes the construction, operation, and decommissioning of the proposed 550 MWp solar farm, maximum 1,030 MWp/2,060 MWh capacity BESS, road repairs and upgrades and associated infrastructure (such as operations and maintenance buildings, temporary construction compound, security fencing), civil works (such as regrading, re-sheeting and culvert upgrades) and electrical infrastructure (including a new onsite substation and underground and overhead cabling) required to connect to the electricity transmission network. A 30 m telecommunications tower is also proposed. No subdivision is required for the Project as part of this development application, however the Project Area is intended to be subdivided to facilitate a biodiversity stewardship area (BSA). The Project's conceptual layout is provided to Figure 1.2 of the Amendment Report (copied here in **Appendix 1**).
Project Location	2335 Wollara Road, Merriwa NSW, approximately 28 km south-west of Merriwa, within the Upper Hunter Local Government Area.
Project Area – Solar Farm Area	Approximately 1,996.5 ha.
Development Footprint	Approximately 792.19 ha and 8.1 km of road repairs and upgrades.
Schedule of Lands	Refer to Appendix 4 of the EIS.

Project Element	Summary of the Project
Solar Arrays	Approximately 1 million bifacial solar panels on ground-mounted single axis tracking framework Row spacing: Maximum 5 m apart, depending on tracker configuration. Height: Average height approximately 3.1 m at full tilt, with a maximum of 4 m in some areas due to undulating site topography.
Battery Storage	The option to construct and operate a 450 MWp/900 MWh centralised BESS, a 580 MWp/1160 MWh decentralised BESS or a combined centralised and decentralised BESS with a total capacity of 1,030 MWp/2,060 MWh. Each proposed option has a discharge duration of two hours. There will be a 50 m APZ surrounding the centralised BESS facility security fencing.
Electrical Reticulation	Connection to existing 500 kV transmission line in south-eastern corner of Project Area. Additional cabling may also be required along the existing transmission line, connecting the site to the substation in Wollar. This would involve access along the existing easement and potential aerial cable instalment via helicopter. If any works to the existing transmission line between Wollar and the Project Area are required, this would be undertaken by Transgrid and is separate to this EIS. Power conversion units consisting of approximately 67 inverters. On-site substation covering approximately 4 ha, enclosed by security fencing.
Telecommunications Tower	Up to 30 m high, providing a secondary communications channel between the Project and Wollar and Bayswater substation. This will be capable of radio communications, located in the substation compound area.
Temporary Construction Facilities	Main construction site compound to include office amenities, parking, storage, and associated facilities. Laydown areas suitable for storing plant and equipment, solar panels and cable drums, and areas to support waste management activities. A temporary helipad for emergency response purposes during construction.
Permanent Operational Facilities	This would include the system control building, switch room and storage facilities, and car parking.
Security Fencing, Lighting and CCTV	Perimeter security fencing around the Development Footprint to a height of approximately 2.3 m plus CCTV and security lighting.
Road repairs and Upgrades	• Road upgrades are required for the safe transportation of materials and personnel to the Project Area including. • Upgrades to culverts at the existing road crossings of Bow River and Killoe Creek located on Ringwood Road. • Realignment, widening and sealing of a 4.7 km section of Wollara Road. • Realignment, widening and sealing of 3.4 km of Ringwood Road, across two sections. • Upgrades at the Golden Highway and Ringwood Road intersection including vegetation removal, minor lane widening, addition of an acceleration lane and formalisation of the bus stop pullover area.

Project Element	Summary of the Project
Project Access	Major solar components would be delivered via the Port of Newcastle, New England Highway, Golden Highway, Ringwood Road and Wollara Road from the north. Light vehicle access would generally occur from the north via Merriwa. Three access points to be provided along the western boundary of the Project Area, off Wollara Road. One point will be a permanent site access and the remaining two are emergency access points.
Internal Access Tracks	Approximately 49 km of unsealed access tracks of approximately 4 m width. A single main access road footprint of between 8 and 10 m width will connect Project areas and accommodate the proposed buried cable easements.
Workforce	Construction: Up to 350 direct jobs at the peak of construction with an average 250 jobs, aspirational target of 10% (35 jobs) sourced locally. Operation: Approximately 10 direct jobs. Aspirational target of all permanent roles based locally.
Construction Hours	Construction hours: • Monday to Friday 6:00 am to 6:00 pm. • Saturday 6:00 am to 6:00 pm. • No works on Sundays or Public Holidays. Approval is also sought to undertake activities which are inaudible at non-involved dwellings, emergency work, and deliveries and dispatches (where required by authorities for safety reasons) outside of standard construction hours. Road upgrades on Ringwood Road are proposed to be undertaken within standard construction hours.
Operational Hours	24/7.
Construction Period	27 months.
Operational Period	40 years.
Capital Investment Value	Estimated $880 million.

1.2 Project Area

The Project Area covers approximately 1,996.5 ha with a Development Footprint of approximately 792.19 ha, as shown in Figure 1.2 of the Amendment Report (copied here in **Appendix 1**). Access to the Development Footprint will be off Wollara Road via the existing driveway towards the southern end of the property's western boundary. Two secondary access points, also off Wollara Road, will be available towards the north of the property's western boundary for emergency use.

Emergency services and NPWS access will be maintained through the Project Area, to be used for emergencies only or on request.

The layout of the solar arrays and associated infrastructure would be entirely contained within the Development Footprint. The Project also includes road repairs which are located outside of the Project Area. These encompass parts of Ringwood Road (including culverts at two waterway crossings), Wollara Road and the intersection of Golden Highway and Ringwood Road. Works on the two culverts and the intersection are required to support Project construction traffic, whilst other road improvements are in response to feedback and represent part of a community benefit offered by the Project. All road upgrades will improve safety outcomes for both the Project and the broader community.

The works on Wollara Rd and Ringwood Road are contained to the road reserve and landowners' consent from Upper Hunter Shire Council has been obtained, refer to Appendix B of the Amendment Report.
The upgrades to the intersection of the Golden Highway and Ringwood Road require works which will be largely contained within the road reserve, but which will encroach into the cadastral boundary of Lot 1 DP34496 (outside of the existing fence-line). The formalisation of the bus stop on Ringwood Road at the intersection with Golden Highway will be contained within Lot 7303 DP 1146691; refer to Appendix D of the Amendment report.

The Project Area has been subject to land clearing, grazing, cropping and pasture improvement, and as such, the Development Footprint supports a mosaic of exotic vegetation. Despite these long-running land management practices, the Project Area still supports areas of biodiversity value, including derived native grasslands in a range of conditions, scattered paddock trees, areas of thinned woodland and forest, and areas of intact woodland and forest, providing habitat for threatened vegetation communities and species. The presence of these biodiversity values has been a key driver for the design of the Development Footprint in order to maximise the avoidance of impacts (refer to Section 6.2 of the EIS and Part B of the Amendment Report). The presence of one Aboriginal heritage item, seven potential culturally significant trees (four outside of the Development Footprint) and historic heritage feature (Slab Hut) have also contributed to the placement of the final Development Footprint. Key heritage constraints are shown in Figure 1.7 of the Addendum Aboriginal Cultural Heritage Assessment. Dams, waterways and flooding potential were another key consideration for Project design.

The Project has been designed through a comprehensive process that incorporates community and other stakeholder feedback to maximise positive social, economic and environmental outcomes, while minimising environmental and social impacts.

1.3 Physical Layout and Design

1.3.1 Solar Arrays

The Project would involve the installation of approximately one million bifacial PV solar panels across the Project Area, providing an estimated 550 MWp capacity. The panels would be arranged in a series of rows approximately 5 m apart, positioned to maximise the solar resources available. The solar arrays would be installed through pile driving on ground-mounted single axis tracking framing, in rows configured in a north-south direction. The panels would move throughout the day from east to west, tracking the sun. The tracking system is estimated to have a tracking range of 120 degrees, or ≤ 60 degrees from the horizontal position.

The standard dimensions of PV solar panels are up to 2.4 m tall by 1.3 m wide, which provides a surface area of approximately 3 m^2 per PV solar panel. PV solar panels are designed for maximum light absorptivity and constructed of solar glass with anti-reflective surface treatment. The PV modules would have a height of approximately 3.1 m at full tilt, with a maximum of 4 m in some areas due to undulating topography throughout the Project Area.

Photo 1.1 Example of Solar Panels (Umwelt, 2021)

Photo 1.2 Example of Typical Single Axis Tracking System

1.3.2 Onsite Electrical Reticulation and Substation

The solar arrays would be connected to the onsite substation via a network of underground cables which are buried in trenches (up to one metre deep and 0.3 m wide). The electricity generated by the Project would be directed via these cables to the inverters. The number of inverters would be dependent on the final detailed design; however, it is estimated that approximately 140 inverters grouped in blocks of two would be required. The inverters change the direct current (DC) electricity generated into alternating current (AC), so that it is in a useable form to transport across the grid. In addition to this, power transformers would be required to step up voltage to the solar farm reticulation voltage, medium voltage switchgear and communication and ancillary equipment.

The Project would include an onsite substation, to be in the south-eastern corner of the Project Area (refer to Figure 1.2 of the Amendment Report (copied here in **Appendix 1**). The substation would include a range of electrical equipment to manage and control the supply of electricity (up to 10 m in height) and a lightning rod up to 18 m in height. The substation would include an elevated busbar, switch room, lightning protection system, circuit breakers, disconnectors, current transformers, voltage transformers, and a 500 kV transformer. The anticipated footprint of the substation is approximately 4 ha.

The substation would connect via overhead lines to the existing 500 kV transmission line that passes through the south-eastern corner of the Project Area. This transmission line is owned and operated by Transgrid, and the Project will connect directly to the national grid through this transmission line.

A transmission tower will be installed in the southeastern portion of Project Area as depicted in Figure 1.4 of the Amendment Report (copied here in **Appendix 1**), adjacent to the existing 500 kV transmission line easement. The transmission tower would be constructed at a height of approximately 65 m, in line with existing transmission towers within the Project Area.

1.3.3 Battery Energy Storage System (BESS)

The Project is considering three BESS options including a centralised BESS, a decentralised BESS or the option for both a centralised and decentralised BESS system combined.

The centralised system would include a BESS with a capacity of up to 450 MWp/900 MWh. The BESS would most likely comprise of a lithium phosphate iron battery system, to be housed in a series of outdoor containers, aggregated in one central location. The BESS would be located adjacent the substation in the south-eastern corner of the Project Area.

The decentralised system would include a BESS with a capacity of up to 580 MWp/1160 MWh. The decentralised BESS option involves 560 individual 6.1 m (i.e., 20 foot) battery containers and DC-DC converters, and associated infrastructure situated next to the PV inverter stations located throughout the solar arrays. The layout of the centralised and decentralised options is shown in Figure 3.5 and Figure 3.6 respectively of the Amendment Report (copied here in **Appendix 1**).

The third option would include both centralised and decentralised BESS units, with a combined BESS capacity of 1,030 MWp/2,060 MWh.

1.3.4 Access, Parking and Security Fencing

Three access points are to be provided along the western boundary of the Project Area off Wollara Road, as shown in Figure 1.2 of the Amendment Report (copied here in **Appendix 1**). The two northern-most access points would be provided for emergency access only, with primary access provided through the southernmost point (the existing access point for the property).

Major solar components would be delivered to the Port of Newcastle and transported to the Project Area by truck via the New England Highway and through to the Golden Highway, Ringwood Road and Wollara Road. All vehicles will travel from the north and enter the Project Area from the southern entrance off Wollara Road through the primary access point. Construction vehicles would be restricted to a left in and left out movement at the Golden Highway and Ringwood Road intersection, facilitated by the use of an existing vehicle turning area on Barnett Street which will allow for return traffic towards Merriwa.

Landowners consent has been obtained refer Appendix B of the Amendment Report.

Approximately 49 km of internal wet weather access roads would be constructed to provide access to the various areas of the site for construction as well as to facilitate on-going operations and maintenance.

Internal access roads would be constructed of compacted gravel and predominantly 4 m wide. The main access track footprint will be 8 to 10 m wide in order to accommodate transformer delivery to the substation, allow for the safe delivery, unloading and installation of key components, and allow for the subterranean transmission corridors which will be used as part of the internal reticulation network. These subterranean transmission corridors will travel parallel to selected internal access roads.

During construction, a suitable number of parking spaces will be available within the temporary laydown areas. The indicative location of laydown areas is illustrated in Figure 1.2 of the Amendment Report (copied here in **Appendix 1**).

The perimeter of the Development Footprint would be enclosed by security fencing (no security fencing is proposed around the Project Area boundary), approximately 2.3 m high, subject to final design. The Project is committing to avoid use of barbed wire, to minimise the risk of harm to wildlife. The security fencing would involve casting concrete footings for posts and installing fencing mesh. Fencing will restrict public access to the Development Footprint and is required under *Australian Standard (AS) 1725.2010 Parts 1-5.* CCTV cameras and security lighting would also be provided around the onsite substation, maintenance buildings and offices and the full length of the perimeter of the Development Footprint.

1.3.5 Operations and Maintenance Facility

A permanent operations monitoring and maintenance facility would be constructed to support the ongoing operation of the solar farm. The operation and maintenance facility would be used on an ongoing basis to support maintenance and repair activities. This would include an office with staff amenities (kitchenette, toilets, showers), car park, workshop/shed and laydown/temporary storage area. The facility would have a footprint of approximately 10 ha (refer to Figure 1.2 of the Amendment Report (copied here in **Appendix 1**)).

1.3.6 Construction Workforce

The Project would generate approximately 350 jobs during the peak months of the construction period. Onsite workforce numbers would vary from month to month, depending on the intensity of the proposed works at the time. The workforce would include licensed electrical trade personnel, mechanical and electrical trades assistants, machinery operators, riggers, and labourers.

Lightsource bp aims to hire 10% (or 35 FTE positions) local labour for construction, and source local sub-contractors and suppliers. It is envisaged that the majority of the local workforce would be residing in towns within one hour's drive from the site (i.e., Merriwa, Mudgee, Gulgong and Rylstone). The majority of the non-local workforce during the peak construction phase are proposed to be housed in a temporary workforce accommodation facility in Merriwa.

1.3.7 Road Repairs and Upgrades

The Project would require road repairs and upgrades on Ringwood Road, Wollara Road and the intersection of Golden Highway and Ringwood Road, which are located outside the Project Area. Roadworks will be completed prior to the commencement of construction of the solar farm. The location of these road repairs and upgrades are provided in Figure 3.2, Figure 3.3 and Figure 3.4 of the Amendment Report (copied here in **Appendix 1**) and the detailed designs are provided in Appendix D of the Amendment Report.

Upgrades to culverts at existing road crossings of Bow River and Killoe Creek located on Ringwood Road. The culvert upgrades will include:

- Installing culverts designed to accommodate two-way heavy vehicles, including B doubles and various farm machinery.

- Culvert width 7 m (3.5 m lane width) sealed carriageway with suitable guardrail and signage and associated drainage works.
- Stockpile site to be located on disturbed land within the road reserve in consultation with the Upper Hunter Shire Council.
- Temporary side track at both locations to facilitate access during construction (also within road reserve).

Upgrades to Wollara and Ringwood Roads including:

- Upgrades to culverts at the existing road crossings of Bow River and Killoe Creek located on Ringwood Road.
- Widening and resealing of 1.8 km of Ringwood Road between Bow River and Killoe Creek.
- Realignment, widening and sealing 1.6 km section of Ringwood Road between Killoe Creek and Binks Road
- Realignment, widening and sealing a 4.7 km unpaved section of Wollara Road between the Goulburn River National Park boundary and 1621 Wollara Road. No upgrades are proposed in the portion of Wollara Road within the Goulburn River National Park.
- These upgrades will include eight (8) m bitumen-sealed formation with a minimum of 500 millimetre (mm) unsealed shoulders. The horizontal and vertical alignment of the proposed road will ensure safe sight distance and an improved road network for the users.
- The proposed Wollara Road and Ringwood Road upgrades are illustrated on Figure 3.3 of the Amendment Report (copied here in **Appendix 1**) below.

Upgrades to the intersection of the Golden Highway and Ringwood Road in line with Austroads Safe Intersection Site Distance (SISD) standards. These upgrades would include:

- Pruning and removal of vegetation and select trees on the western side of the intersection on Lot 1 DP34496. Currently estimated at six (6) established trees.
- The construction of a 325 m acceleration/merge lane to allow vehicles to safely turn left onto the Golden Highway from Ringwood Road.
- Realignment of the existing low voltage power line to provide clearance to the acceleration lane (if required and subject to detailed design).
- Extension of the existing Golden Highway westbound and Ringwood Road left-in deceleration lane taper to 30 m and widening of the intersection.
- Pruning of vegetation on the eastern side of the intersection, wholly within the road reserve.
- Formalisation of the informal bus stop on Ringwood Road at the intersection with Golden Highway (Lot 7303 DP1146691).
- The proposed Golden Highway and Ringwood Road upgrades are illustrated on Figure 3.2 and Figure 3.3 of the Amendment Report below (copied here in **Appendix 1**).

1.3.8 Site Preparation and Earthworks

The first stages of construction within the Development Footprint would include:

- Site survey, based on initial geotechnical investigations and LIDAR data, to confirm infrastructure positioning and placement.
- Ongoing geotechnical investigations to confirm the ground conditions.
- Biosecurity controls (e.g., weed spraying) prior to ground disturbance commencing.
- Construction of internal access tracks for accessing the site from the local road network and car parking, including creek crossings (i.e., small culverts and bed level crossings).
- Installation of temporary construction fencing around work areas and boundary fencing.
- Establishment of temporary construction compounds, site facilities and laydown areas for construction materials and equipment (refer to Section 1.4.4 of the EIS).
- Preliminary earthworks and installation of environmental controls including erosion and sediment control structures.
- Identification and establishment of no-go zones around sensitive biodiversity and heritage features as required.

The need for heavy earthworks and compaction will be minimised as much as practicable, although some grading and levelling is likely to be required for the substation and BESS.

1.3.9 Temporary Construction Facilities

To facilitate construction of the Project, a range of temporary buildings and facilities will be required within the compound area. Temporary staff amenities would be designed to accommodate the number of workers at the peak of the construction period, and include:

- Car parking.
- Staff offices.
- Control room.
- Lunchroom and first aid room.
- Toilet and shower facilities.
- Water tanks.
- Covered walkways.
- Covered storage area.
- Associated data, water, and electrical reticulation.
- Emergency helipad (as part of site compound).

1.3.10 Infrastructure Installation

The construction and commissioning phase of the Project is anticipated to involve the following works:

- Installation of steel posts and framing system to support the solar panels, which would be driven or screwed into the ground to a depth of approximately 1.5 to 2.4 m depending on geotechnical conditions.
- Installation of PV panels.
- Installation of permanent fencing and security.
- Preparation of foundations for the permanent buildings, BESS and on-site substation.
- Installation of underground cabling (trenching and installation of power conversion stations).
- Construction of site operations and maintenance facility.
- Establishment of the BESS.
- Construction of the onsite substation and associated grid connection infrastructure.
- Construction of the Project transmission tower.
- Testing and commissioning of infrastructure.
- Removal of temporary construction facilities.
- Revegetation of disturbed areas.

It is expected that some of these construction tasks would occur concurrently. It is noted that the solar arrays would be sited above the ground and existing ground cover would be maintained underneath, to facilitate potential sheep grazing across the site and maintain biodiversity values.

1.3.11 Construction Hours

The construction phase is expected to be undertaken over approximately 27 months from the commencement of site establishment works. It is anticipated that construction works would commence in mid-2024.

1.3.11.1 Solar Farm Site Construction Hours

It is anticipated that construction works would be undertaken both during and outside standard construction hours (as defined by the Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change, 2009). Proposed construction hours are:

- 6:00 am to 6:00 pm – Monday to Friday.
- 6:00 am to 6:00 pm – Saturday.
- Sunday and Public Holidays – no works to be completed.

Exceptions to these hours may occur, however would be limited to activities with low noise generation, where practicable, which would be assessed on a case-by-case basis prior to commencement of those activities.

An indicative timeline for the Project phases is outlined in **Table 1.2**.

Table 1.2 Indicative Timing

Phase	Approximate Commencement	Approximate Duration
Construction & Commissioning	2024	27 months
Operation	2026	40 years
Decommissioning[1]	2064	8 months

1.3.11.2 Road Repairs and Upgrades Construction Hours

Construction hours for the road repairs and upgrades will be undertaken within the ICNG standard hours as there are sensitive receivers closer to these works than that of the solar farm site. Proposed construction hours are:

- 7:00 am to 6:00 pm – Monday to Friday.
- 8:00 am to 1:00 pm – Saturday.
- Sunday and Public Holidays – no works to be completed.

The construction of the road repairs and upgrades package is estimated to require three (3) months to be delivered prior to primary construction works commencing on the Solar Farm. Road repairs and upgrades are anticipated to occur in 2024 and are accounted for within the 27 months of the construction period.

1.3.12 Construction Traffic

During the peak of the construction period, the majority of personnel would travel to the Project Area on a daily basis via shuttle buses to be provided from a temporary workforce accommodation facility in Merriwa, requiring approximately 15 two-way shuttle bus trips per day. Assuming some of the other personnel would carpool (at a rate of 1.2 people per private vehicle) there would also be approximately 60 two-way light vehicle trips per day. Although many of the shuttle buses and light vehicle traffic would travel to the site from the north, some movement of locally-based personnel via light vehicles from the south is also anticipated.

Heavy vehicle transportation would be restricted to accessing the site from the north. It is anticipated that 55 two-way heavy vehicle trips per day would be required during the peak construction period. There are expected to be approximately six (6) oversize overmass vehicle movements during the construction period, which will be under traffic management.

[1] After the operational period the solar farm would either be decommissioned, removing all infrastructure, and returning the site to its existing pre-solar agricultural land capability, or repurposed with new PV equipment subject to additional technical feasibility and planning consents.

As noted in Section 1.3.4 of the EIS, all Project construction vehicles will be limited to a left in left out manoeuvre at the intersection of Ringwood Road and Golden Highway. Construction vehicles will be diverted to a privately owned vehicle turning area on Barnett Street.

Mobilisation to site would be expected to occur for the first three months of the Project delivery timeframe and heavy vehicle movements during this period are anticipated to include:

- Delivery of infrastructure including temporary offices and associated equipment, power generation equipment, ablutions.
- Delivery of equipment and machinery for civil construction, clearing (if required) and general site establishment.
- Delivery of structural components and some PV equipment.

More intense construction would be expected to follow during months 3 to 20, to achieve mechanical completion with the following heavy vehicle movements:

- Delivery of equipment and machinery for structural, electrical, and civil construction activities.
- Ongoing delivery of PV and electrical equipment including deliveries of major equipment such as inverters, switchgear, transformers etc.
- Trucks for removal of waste.

Following mechanical completion, the site will move into a commissioning phase estimated to occur during months 20 to 27 where both equipment deliveries and the workforce would be significantly reduced. During commissioning, most of the traffic would be expected to be light vehicles for personnel movement.

Construction traffic generated during the road repairs and upgrades along Ringwood Road, Wollara Road and the Golden Highway and Ringwood Road intersection upgrade are anticipated to be lower than the number of vehicles generated during the construction of the Solar Farm site. Impacts from these works in general are considered low, given the low volume of traffic on this road.

A detailed assessment of traffic movements and transport routes is provided in Section 6.9 of the EIS and Section 7.1 of the Amendment Report.

1.4 Operations and Maintenance

Once fully operational, activities will include:

- Routine visual inspections, general maintenance and cleaning operations of the solar arrays and substation, as required.
- Vegetation management including potential sheep grazing and the use of seeding or armouring (i.e., jute mesh) to avoid erosion.
- 24-hour site security response.
- Replacement of equipment and infrastructure, as required.

- Pest and vermin control.
- Livestock operations.

During the operational phase of the Project, it is anticipated that a workforce of up to 10 FTE personnel would be required, and traffic movements would be restricted to light vehicles for routine operations and maintenance.

1.5 Decommissioning

The Project is expected to operate for 40 years or more. After the initial 40-year operating period, the solar farm would either be decommissioned, removing all infrastructure, and returning the site to its existing pre-solar agricultural land capability, or repurposed with new PV equipment subject to additional technical feasibility and planning consents.

At the end of the useful life of the asset, decommissioning would involve the mobilisation of a workforce and additional temporary facilities, and the subsequent removal of equipment and infrastructure. At this time, it is expected that significant movements of light vehicles and trucks for transporting waste would occur. The decommissioning phase would be expected to last less than eight months.

During decommissioning, works would include:

- Removal of solar arrays, including the foundation posts, and sorting and packaging of all materials for removal from the site and recycling and/or reuse.
- Removal of all site amenities and equipment, and recycling and/or reuse of materials wherever practicable.
- Removal and recycling of posts and cabling and removal of security fencing including small concrete footings, unless otherwise useable for livestock operations.

1.6 Services and Utility Supply

1.6.1 Water

The Project would require a water supply during the construction, operational and decommissioning phases.

During construction, water would primarily be used for the establishment of hard-stand areas and dust suppression. The associated water demand would likely be in the order of 11.26 megalitres (ML) for the 27-month construction period. 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. Town water supplies will be generally avoided for use in construction but may be used where appropriate and available. It is anticipated that during construction 3,000 L would be used on site daily at the operations and maintenance facility.

During operations, it is expected that approximately 3 ML of water per year would be required for ongoing maintenance activities such as fire mitigation and for livestock grazing within the Development Footprint.

Panel cleaning is expected to require 8 ML per year noting washing of the panels would not require any detergent or cleaning agents. Road maintenance works that require water usage are anticipated to require 2 ML per year.

Potable water supplies would be required for staff amenities. Rainwater would be collected onsite through tanks across the Project Area with supply supplemented by water trucks.

1.6.2 Electricity

Access to electricity during operational activities would be via a dedicated low voltage feeder from the substation, battery backup is provided for essential services at the Operation and Maintenance Facility (O&M Facility). During construction electricity access would be via the local distribution network or alternatively a diesel generator when required.

Electricity requirements during operation would include lighting at ancillary infrastructure (office, workshop, amenities, and parking), power for internal office facilities and appliances, and onsite security systems. Electricity generated by the solar farm would be used for most activities during operations via a dedicated low voltage feeder from the substation, except for maintenance of the inverters during the night which would involve a small amount of auxiliary load being supplied from the grid.

1.6.3 Telecommunications

A telecommunications tower (approximately 30 m in height) would be installed within the Project Area in the substation compound area to support the Project and to facilitate communications between the solar farm site and nearby Transgrid substation. In addition, the telecommunications tower would provide radio communications coverage to the Project Area and wider region.

1.6.4 Sewer

There is no sewer access in the Project Area. Therefore, construction amenity facilities would be pumped out via tanker and delivered to the nearest sewage treatment facility, or as agreed with Upper Hunter Shire Council during construction.

It is likely that a septic system would be installed for the operational amenities. This would be constructed and managed in accordance with the relevant Council requirements. This would be in accordance with the Upper Hunter Shire Council Liquid Trade Waste Regulation Policy 2016.

1.7 Environmental Management

Lightsource bp would develop and implement an Environmental Management Strategy (EMS) as part of the Project to provide the strategic framework for environmental management. The EMS would:

- Incorporate a Construction Environmental Management Plan (CEMP), Operational Environmental Management Plan (OEMP) and Decommissioning and Rehabilitation Environmental Management Plan (DREMP), including all required sub-plans, protocols, management, and mitigation measures proposed in this EIS.
- Identify all relevant statutory approvals.

- Establish roles, responsibilities, authority, and accountability of all key personnel involved in the environmental management of the Project.
- Establish procedures for consulting with the local community and relevant agencies about the operation and environmental performance of the Project.
- Establish procedures for handling of complaints, disputes, non-compliances, and emergency response.

Appendix C of the Amendment Report provides a consolidated summary of the management measures that would be implemented during the construction and operation of the Project to manage, mitigate and/or monitor potential impacts identified within this EIS.

APPENDIX 1

Figures from EIS and Amendment Report

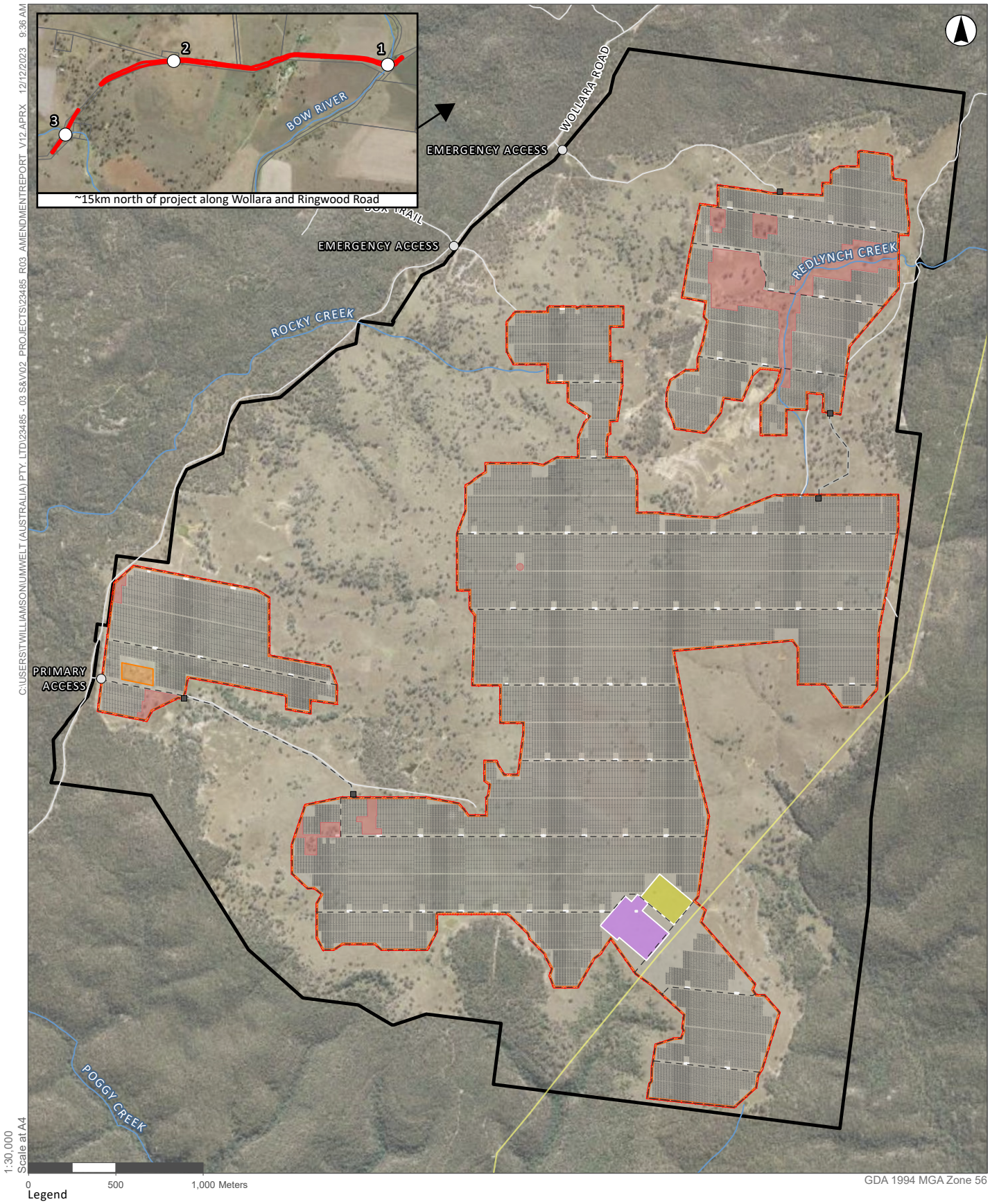


FIGURE 1.2

EIS Project - Development Footprint and Internal Layout

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

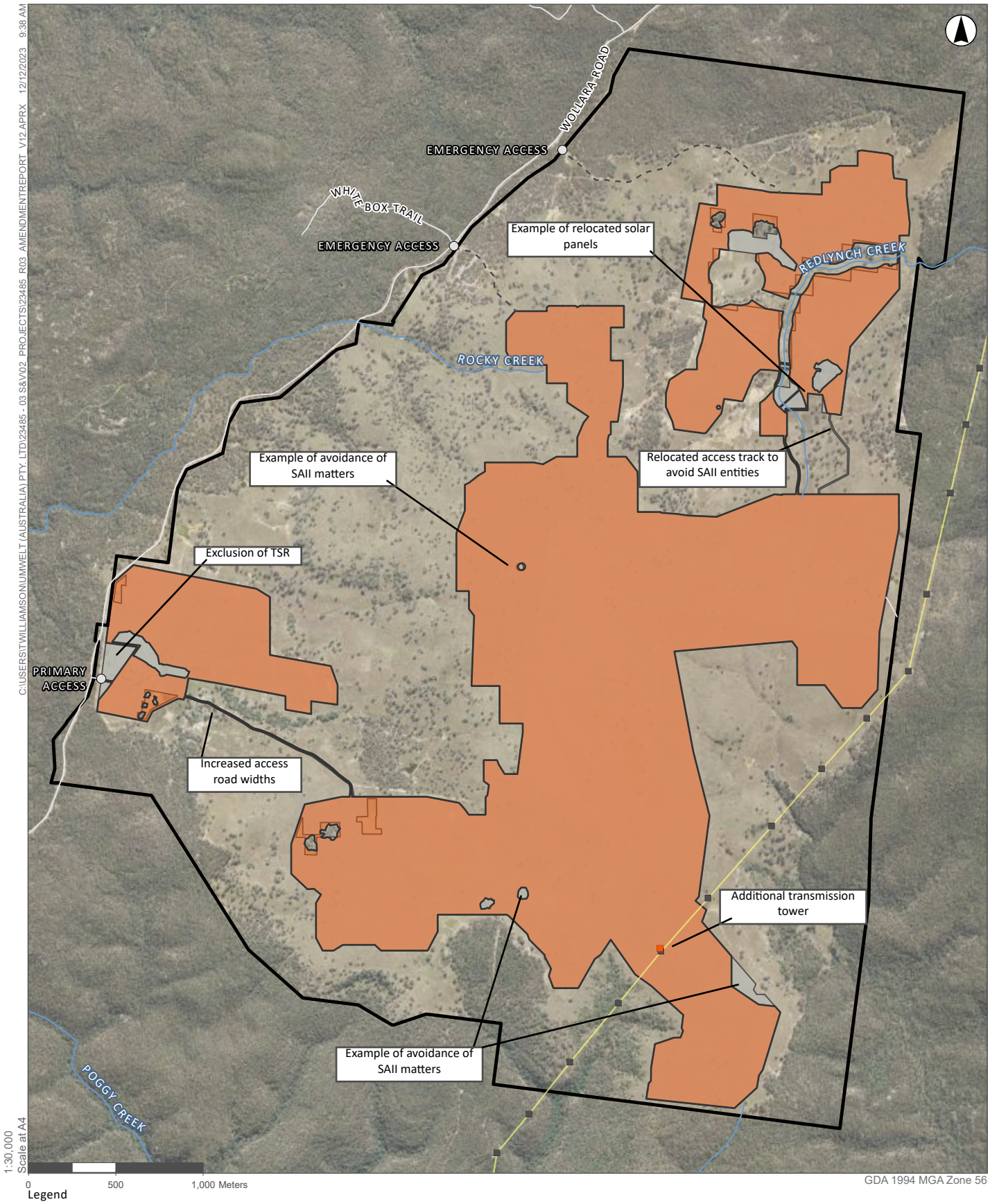


FIGURE 1.4

Summary of the Proposed Amendments to Development Footprint

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

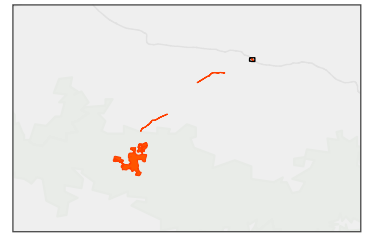
FIGURE 3.2

Amended Project - Golden Highway and Ringwood Road Intersection Upgrade

Legend

- Lot Boundary
- Waterbodies
- Road Upgrade Development Footprint

NOTE: Development Footprint comprises ground disturbance works within the road reserve and vegetation clearing/pruning on adjacent land



0 150

Meters

Scale: 1:0 at A4
GDA2020 MGA Zone 56

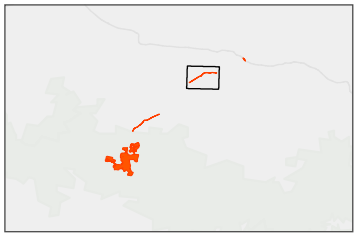
Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

FIGURE 3.3

Amended Project - Wollara Road and Ringwood Road Upgrades

Legend

- Watercourse
- Lot Boundary
- Waterbodies
- Road Upgrade Development Footprint



0 500

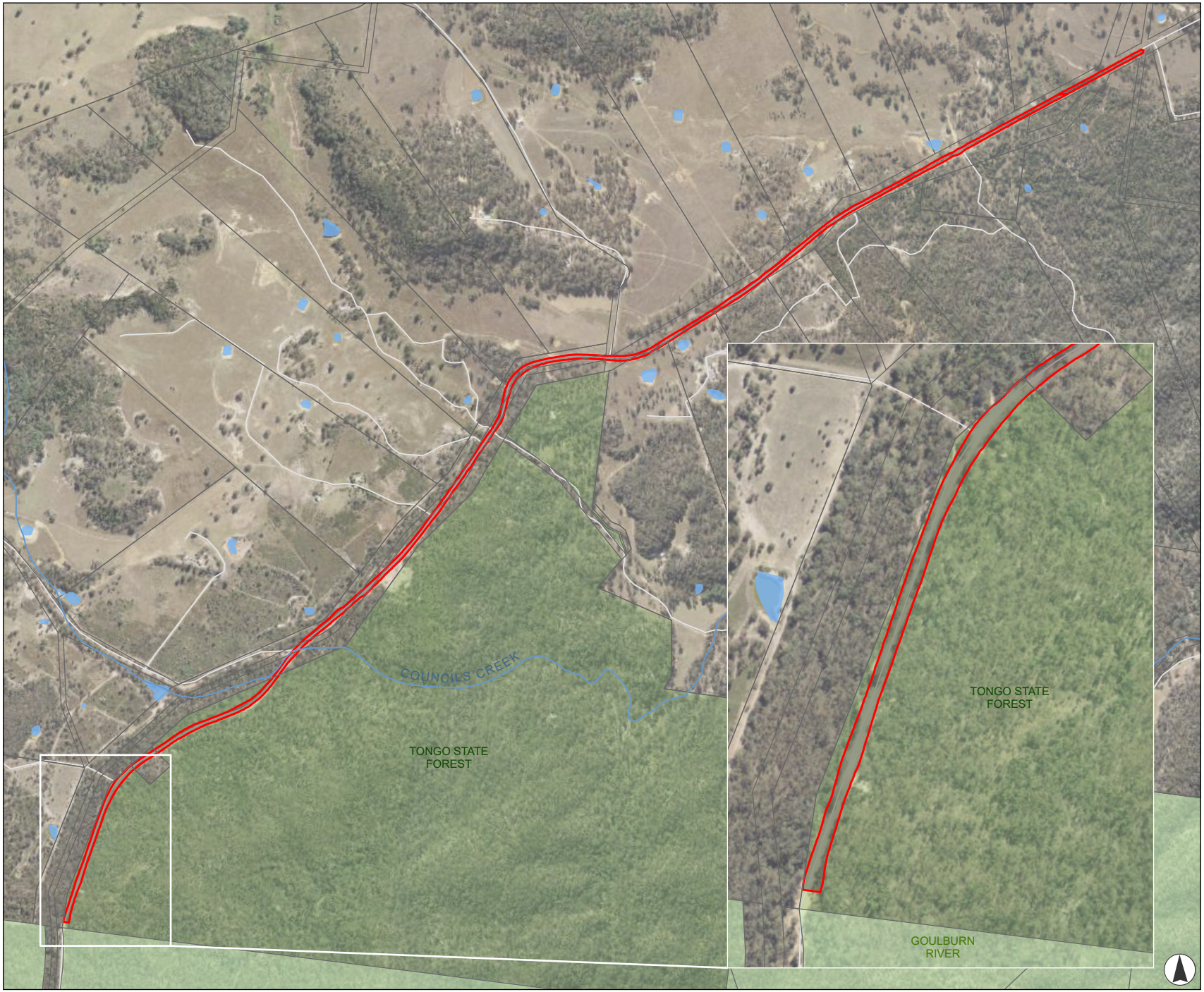
Meters

Scale: 1:0 at A4
GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

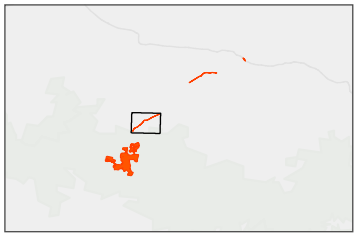
FIGURE 3.4

Proposed Section of Road Sealing along Wollara Road



Legend

- Watercourse
- Lot Boundary
- NSW National Parks
- NSW State Forests
- Waterbodies
- Road Upgrade Development Footprint



0 500

Meters

Scale: 1:0 at A4
GDA2020 MGA Zone 56

Image Source: ESRI Basemap (2022) | **Data Source:** NSW DFSI (2022)

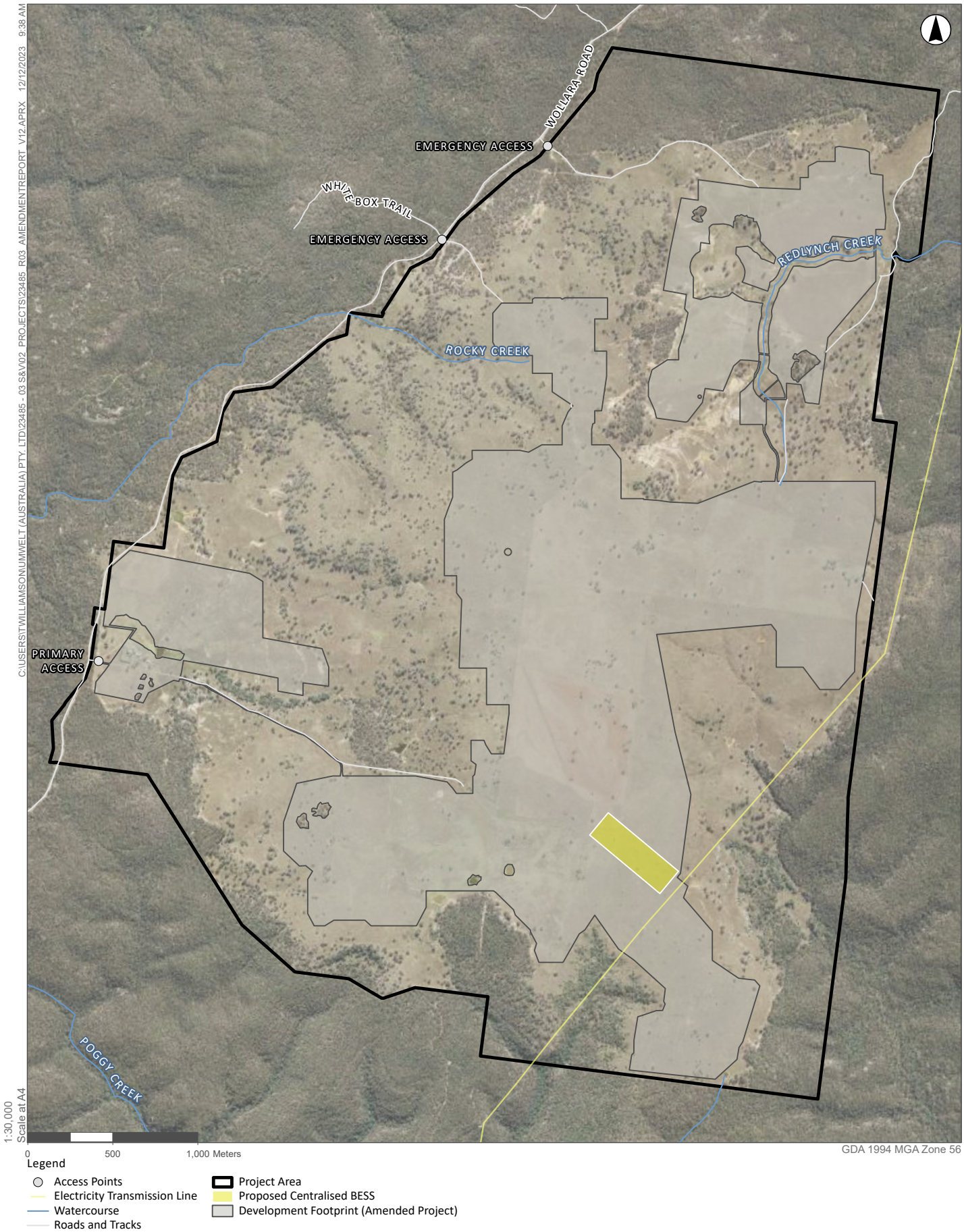


FIGURE 3.5

Proposed Centralised BESS Layout

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

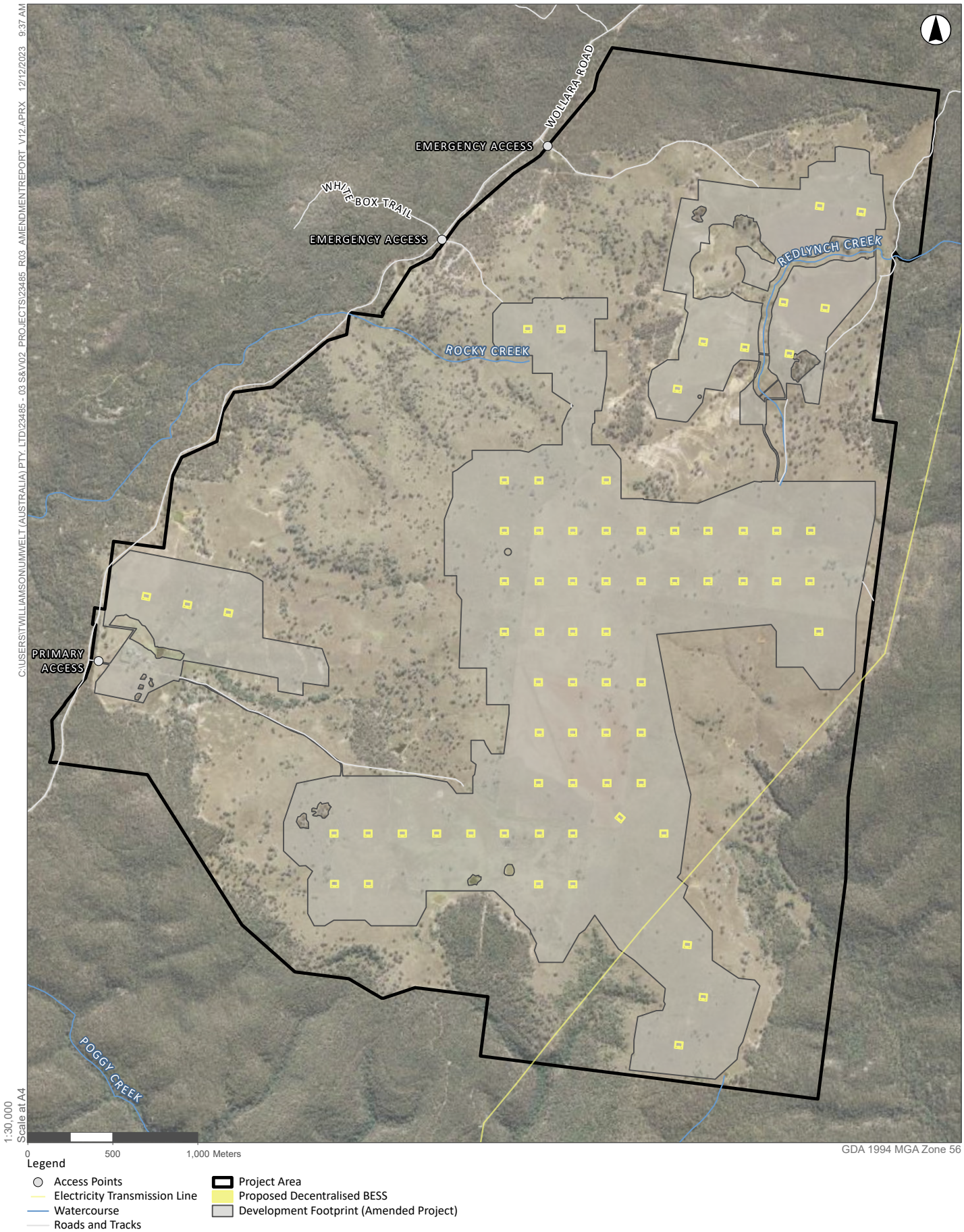


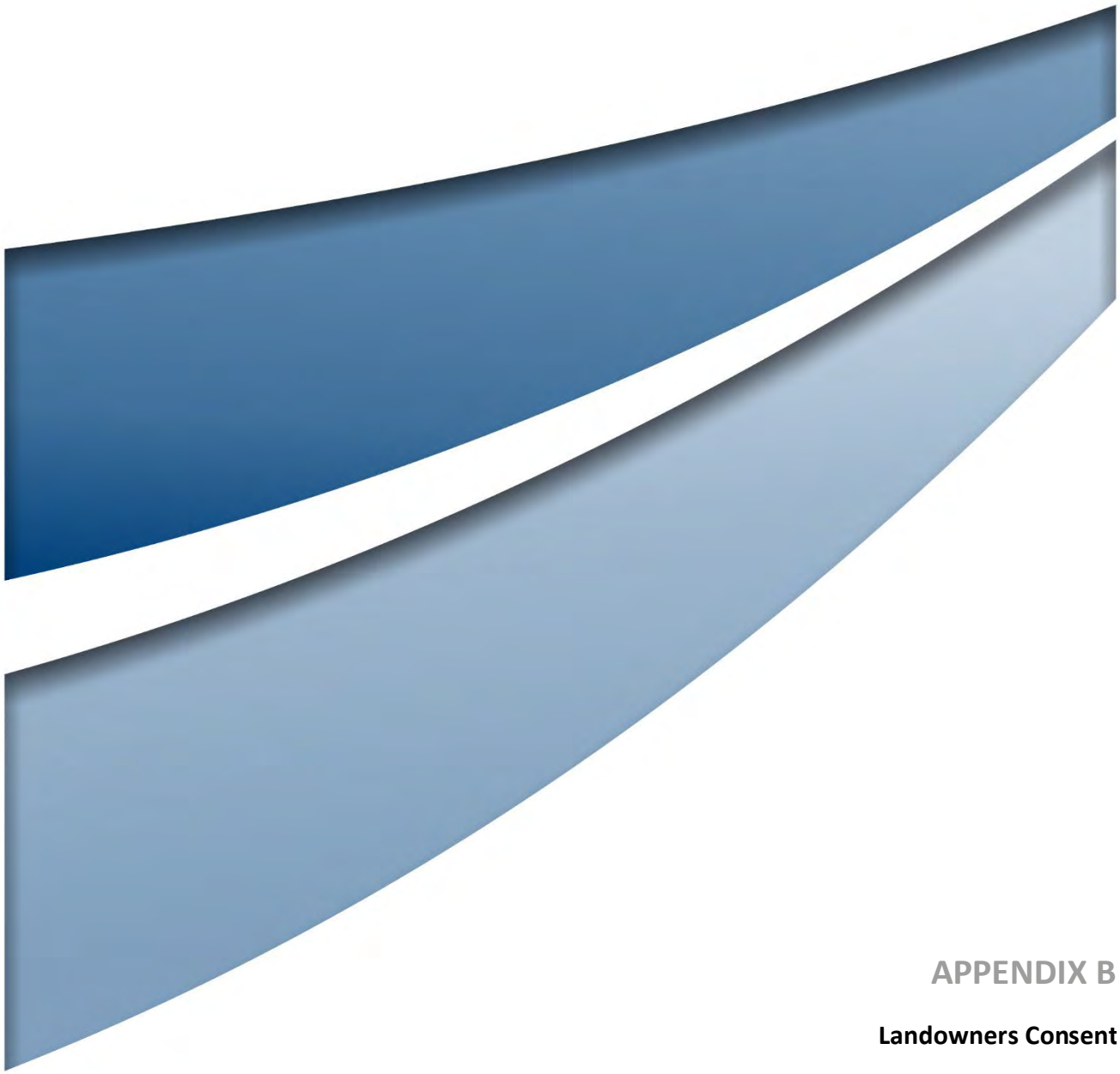
FIGURE 3.6

Proposed Decentralised BESS Layout

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

umwelt
Environmental & Social
Consultants

Umwelt (Australia) Pty Limited
T| 1300 793 267 E| info@umwelt.com.au www.umwelt.com.au



APPENDIX B

Landowners Consent

lightsource bp

Lightsource Development Services Australia Pty Ltd
'CBW' Level 19, 181 William St
Melbourne
Vic 3000
Australia

Telephone 1300 873 575
www.lightsourcebp.com/au

27 September 2023

Ewan Davies,
Director, Energy Assessments
NSW Department of Planning and Environment
4 Parramatta Square
12 Darcy St.
Parramatta NSW 2150

Dear Ewan,

Forestry Corporation of NSW, being the owner of the Tongo State Forrest under the following titles references:

- Lot 78, DP 750956
- Lot 7005, DP1027957

Provide consent to the applicant,

Lightsource Development Services Australia Pty Limited ABN 26 623 301 799 of Level 29, 420 George Street, Sydney, NSW, 2000,

to apply to a consent authority under section 4.12 of the Environmental Planning and Assessment Act 1979 (NSW) for consent to carry out development, known as Goulburn River Solar Farm, under development application number SSD 33964533,

which is to be carried out on the land described above and includes the widening and sealing of Wollara road adjacent to, and on top of the title listed above.

Signature: JDashwood

Name: Jarod Dashwood
Position: Land Access Manager – Western Region
Date: 5 October 2023

Contact Name: Greg McDonald
Contact No: 6540 1126
Our Reference: OUT-8184/23

17 October 2023

~~Nicole Brewer~~ Iwan Davies
Director, Energy Assessments
NSW Department of Planning and Environment
4 Parramatta Square
12 Darcy Street
PARRAMATTA NSW 2150

Dear Nicole

Being the owner of the Council Public Road comprising:

- Ringwood Road, Merriwa;
- Wollara Road, Merriwa; and
- Barnett Street, Merriwa

Upper Hunter Shire Council provides consent to the applicant:

Lightsource Development Services Australia Pty Limited
ABN 26 623 301 799
Level 29, 420 George Street,
Sydney, NSW, 2000

to apply to a consent authority under section 4.12 of the *Environmental Planning and Assessment Act 1979* (NSW) for consent to carry out development, known as Goulburn River Solar Farm, under development application SSD 33964533, which is to be carried out on the land described in Figure 1.2 (Land Ownership). The development includes the following:

- the construction and operation of a photovoltaic generation facility with an estimated capacity of 550 MW;
- a Battery Energy Storage System (BESS) with an estimated capacity of 570 MWh and associated infrastructure including grid connection; and
- various road repairs and upgrades along Ringwood Road and Wollara Road, Merriwa.

Yours sincerely

Greg McDonald
GENERAL MANAGER

Letter to Applicant
Consent Granted
Department of Planning and Environment

Our reference: 23/00144#01
LOC No: 638122

Janet Meyn
janet.meyn@crownland.nsw.gov.au

7 March 2023

Via email: stephen.archer@lightsourcebp.com
diana.mitchell@lightsourcebp.com

Attention: Stephen Archer – Development Manager

Consent for Development Comprising:	Proposed as described below: • State Significant Development (SSD) application 33964533 for the purpose of the Goulburn River Solar Farm at Wollara Road, Merriwa (Refer DOC22/001292). • The Project will involve the construction, operation and decommissioning of a 520 megawatt (MW) solar farm with a Battery Energy Storage System (BESS) of approximately 520 MW-hours and associated infrastructure. The Project will connect to an existing 500 kilovolt (kV) transmission line via a proposed substation to be located in the south-eastern section of the Project Area. • The proposed Goulburn River Solar Farm (the Project) is located approximately 28 km south of Merriwa, New South Wales, off Wollara Road, within the Upper Hunter Local Government Area. The Project encompasses two freehold properties and some sections of Crown land and roads (approximately 21 ha), covering an area of approximately 2000 ha in total. The development footprint for the Project is approximately 882 ha)
Crown Land	Crown Land R44841 for purpose of travelling stock and Crown roads administered under the *Roads Act 1993.* Matters relevant to the Roads Act are central to the considerations for Landowners Consent as set out in the application.
Crown reserve	R44841 for purpose of travelling stock – Lot 7306 DP 1165073 (primary access point) and Lot 7308 DP 1165052 (2 x emergency access points).
Parish	Tongo

County	Brisbane
Applicant	Lightsource Development Services Australia Pty Limited

Consent is granted by the Minister for Lands and Water, to the lodgement of applications for approval under the *Environmental Planning and Assessment Act 1979*, and other associated applications required under other legislation, for the development proposal described above.

The Land Owner Consent is granted conditional to the following:

1. Land Owner Consent will expire after a period of 12 months from the date of this letter if not acted on within that time. Extensions of this consent may be sought.
2. You are required to forward a copy of the DA approval to the NSW Department of Planning and Environment – Crown Lands ("the Department") after approval and prior to commencing works.
3. You are required to ensure that the approval provided is consistent with this Land Owner Consent.
4. The Land Owner Consent is provided for the works detailed on the plans provided by you and retained by the Department as DOC23/002122.

Land Owner Consent is granted in accordance with the following:

- Land Owner Consent is given without prejudice so that consideration of the proposed development may proceed under the *Environmental Planning and Assessment Act 1979* and any other relevant legislation;
- The grant of this Land Owner Consent does not guarantee that any subsequent authority to occupy will be granted;
- Land Owner Consent does not imply the concurrence of the Minister for Lands and Water, for the proposed development and does not provide authorisation under the Crown Lands Act 1989 for this proposal;
- The issue of Land Owner Consent does not prevent the Department from making any submission commenting on, supporting or opposing an application;
- The Minister reserves the right to issue Land Owner Consent for the lodgement of applications for any other development proposals on the subject land concurrent with this Land Owner Consent;
- Any changes made to the proposal, including those imposed by the consent authority, must be consistent with the Land Owner Consent and therefore if modifications are made to the proposed development details must be provided to the Department for approval;
- Land Owner Consent also allows application to any other approval authority necessary for this development proposal.

This letter should be submitted to the relevant consent or approval authority in conjunction with the development application and/or any other application. You are responsible for identifying and obtaining all other consents, approvals and permits required under NSW and Commonwealth laws from other agencies for the proposed development.

It is important that you understand your obligations relating to Condition 3. If any alterations are made to the application (whether in the course of assessment, by

conditions of consent, or otherwise), it is your responsibility to ensure the amended or modified development remains consistent with this Land Owner Consent. If there is any inconsistency or uncertainty you are required to contact the Department before undertaking the development to ensure that the Department consents to the changes. A subsequent LOC application may incur additional application fees.

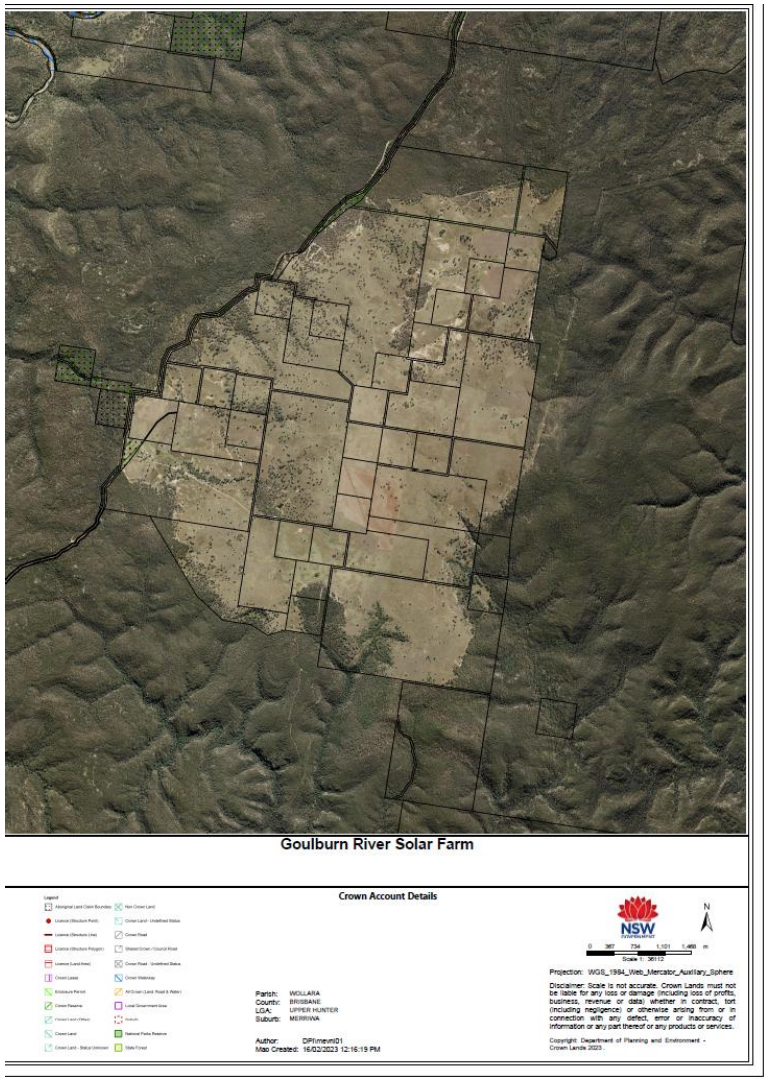
It is advised that the Department will provide the Department a copy of this Land Owner Consent and will request that the Department notify the Department of the subsequent development application, for potential comment, as part of any public notification procedure.

For further information, please contact Janet Meyn.

Yours sincerely

Janet Meyn
Senior Property Management Officer
Department of Planning and Environment - Crown Lands

Attachment A – Location Map



19 July 2023

RESERVE USE PERMIT P23/011

This Permit authorises:

Name of Applicant: Stephen Archer

On behalf of Organisation: Lightsource Development Services Australia Pty LTd

Address: 'CBW' level 19, 181 William St Melbourne VIC 3000

Phone: **Mobile:** 0484683245 **Email:** Stephen.archer@lightsourcebp.com

Proposed Activity: Access through TSR to undergo Possible upgrades of the existing road and driveway. Routine access, and permission to upgrade Wollar Rd and driveway where it is TSR

Date(s) of proposed activity: 1 July 2023 – 30 June 2024

Reserve No/Name: **R44841** - Poggy TSR - **DP 1165073, 7304,7305,7306; DP1165052/7308; DP114853/7309**

Location of Reserve: Ringwood Rd, Merriwa NSW 2329

Fee (including GST) $2000.00

CONDITIONS – As per attached

Additional Conditions that must be followed include:

- The maintenance and upgrades of the road will occur at no cost to LLS and be completed to an accepted standard

Apiarist Registration No: N/A

Insurance Details:

Insurance Company:
AON Chubb Insurance Company Australia

Policy No: 04CI012482 **Amount of Cover:** $20,000,000

Commencement & Expiry Dates: 31 October 2022 to 31 October 2023

I hereby agree to abide by the relevant provisions of the Local Land Services Act 2013 and the fees and conditions relating to this permit.

Signature of Applicant **Date:** 20/07/2023

Signature of Authorised Officer of Hunter LLS **Date:** 24/07/2023

Office Use Only	
Date Received:	
Receipt Number:	
Amount Received:	
Invoice No:	4000525161
Customer No:	10431210

Lightsource Development Services Australia
L29/420 George St
Sydney
2000
Australia

www.lightsourcebp.com

3/10/2022

Iwan Davies
Director, Energy Assessments
NSW Department of Planning and Environment
4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

Dear Iwan,

Being the owner of the land located east of the Ringwood Road / Golden Highway intersection, and the vehicle turning area on Barnett Street, Merriwa 2329, identified as the following title references:

- Lot 1 DP34496 (northwest of the Ringwood Road intersection)
- Lot 1 DP 1108292 (North of Barnett st truck turnaround)
- Lot 167 DP750913 (East of Barnett st truck turnaround)
- Lot 180 DP750913 (West of Barnett st truck turnaround)

provide consent to the applicant:

Lightsource Development Services Australia Pty Limited
ABN 26 623 301 799
Level 29, 420 George Street,
Sydney, NSW, 2000

to apply to the consent authority under section 4.12 of the *Environmental Planning and Assessment Act 1979* (NSW) for consent to carry out development associated the construction of the Goulburn River Solar Farm, development application SSD-33964533.

The construction of the Goulburn River Solar Farm Project would involve upgrades to the existing Ringwood Road and Golden Highway intersection to improve Safe Intersection Sight Distances (SISD) generally in accordance with Ausroad guidelines. The upgrades will involve the removal of vegetation on private property owned by the parties to this letter, and the installation of an acceleration lane within the Golden Hwy Road Reserve.

Further traffic design has also indicated that the use of the privately owned vehicle turning area on or adjacent to Barnett Street (council road), Merriwa, will be required to allow 19m semi's leaving the Project site to safety turn around and return east along the Golden Highway towards Merriwa. Minor ancillary upgrades and repairs may also be required to keep this asset in serviceable order during the construction of the project.

Signed,

As a director of Alexander Downs Pty Ltd

Address

Date:

From: Wat Buddha Dhamma <wbdoffice@gmail.com>
Sent: Thursday, September 7, 2023 9:31 AM
To: Stephen Archer <stephen.archer@lightsourcebp.com>
Subject: Re: road upgrades adjacent to Tongo State Forest

Hi Stephen,

Thanks for the chat and info regarding the upgrades on Wollara Road. It's fine with us. However, we are looking to sell the property in the next six months. I guess the Forestry Dept will have the details of the new owner and will refer them to you in due time.

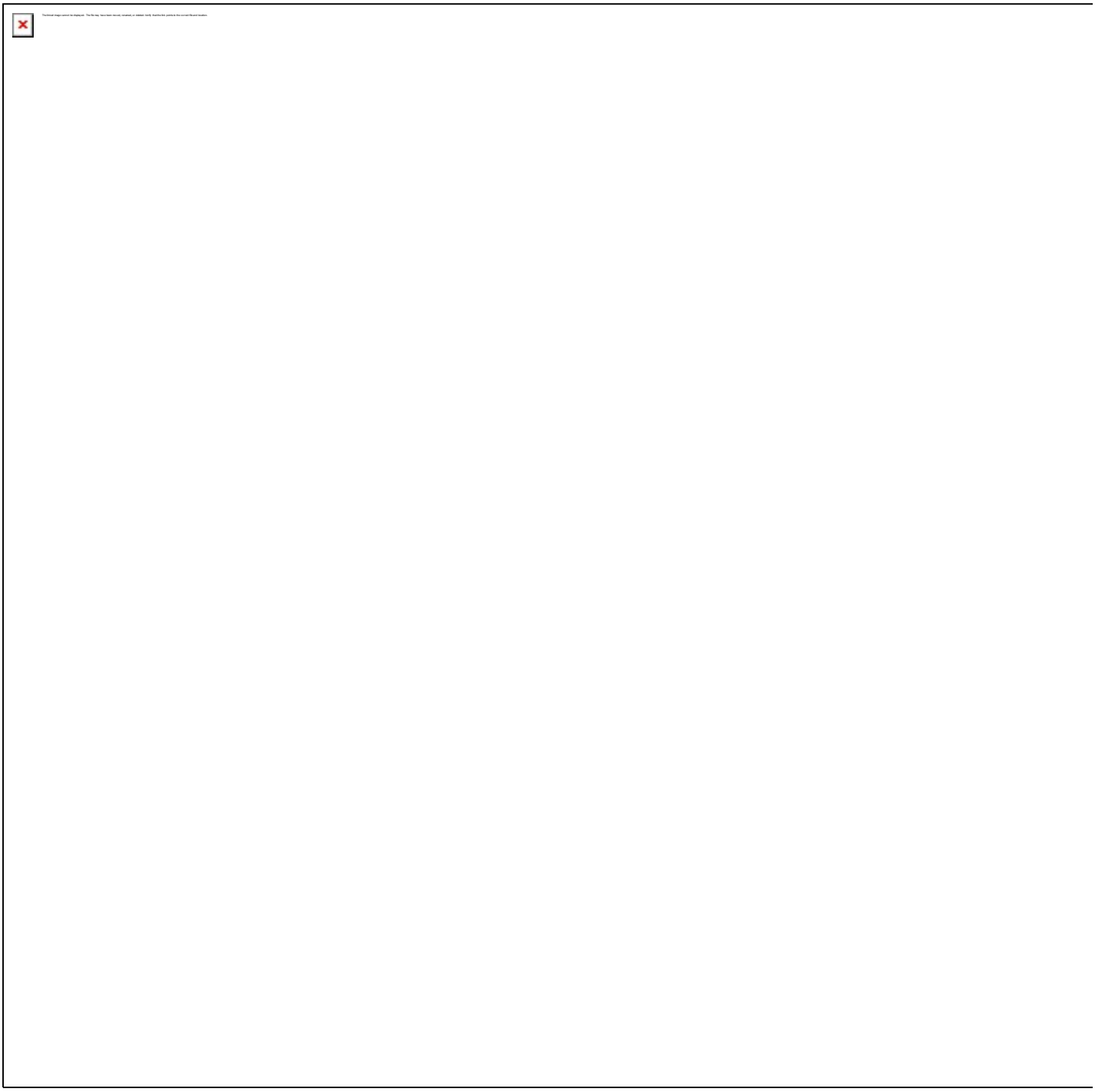
All the best with your project.

Regards,

Ajahn

On Mon, 4 Sept 2023 at 15:04, Stephen Archer <stephen.archer@lightsourcebp.com> wrote:

> Hi Ajahn,
>
> Thanks for speaking to me on the phone about our proposed upgrades to Wollara Rd in support of the Goulburn River Solar Farm at 2771 Wollara rd, Merriwa NSW.
>
> As mentioned, we are looking to widen and seal the gravel road adjacent to the Tongo State Forest, which your group has an interest in.
>
> At times, the road sways away from the road reserve and onto the State Forrest land, as a result some of the trees we remove and the works conducted will be within the State Forest.
>
> We estimate the works will take place between February and April of 2024
>
> The plans attached are for the road upgrades, however the image below shows the area of the road that sways into the State Forrest.
>
> If you can respond with any further questions you have about the works, otherwise an email noting you are aware of the works, it would be greatly appreciated.'
>
> Thanks



Stephen Archer Senior Development Manager | t +61283113058

From: Wat Buddha Dhamma <wbdoffice@gmail.com>
Sent: Thursday, August 31, 2023 11:20 AM
To: Stephen Archer <stephen.archer@lightsourcebp.com>
Subject: Re: road upgrades adjacent to Tongo State Forest

Hi Stephen,

Thanks for the introduction. You can call me 2 - 5 pm today or 8 -11 tomorrow at 0480105070.

Regards

Ajahn

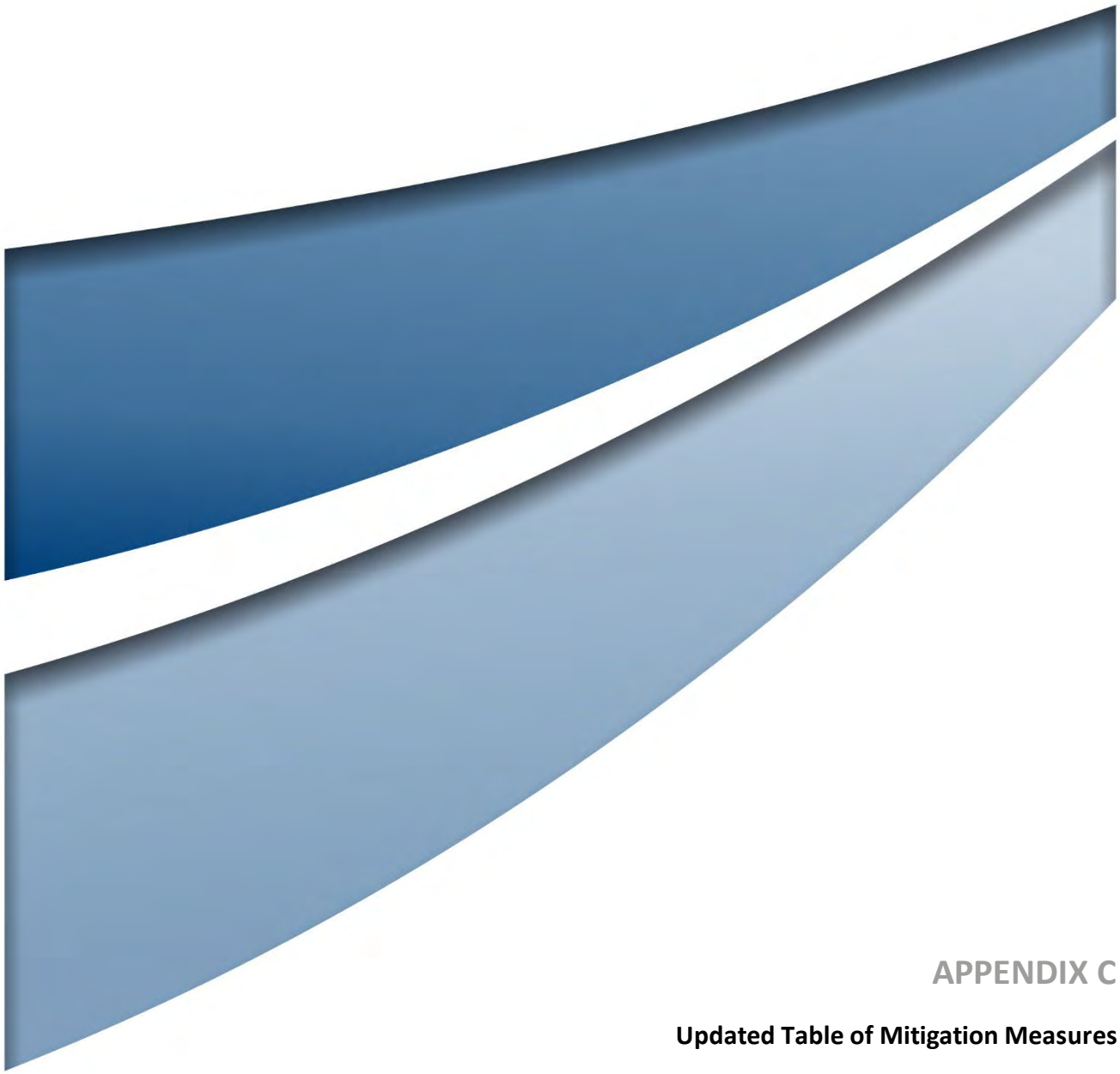
On Wed, 30 Aug 2023, 15:43 Stephen Archer, <stephen.archer@lightsourcebp.com> wrote:

> Hi,
>
> Apologies for reaching out directly, I have been speaking with Jarod Dashwood from TfNSW and he passed me your email as the lessee of Tongo State Forrest.
>
> I was hoping to organize a call to introduce Lightsource bp, we have some proposed works due to commence later this year near Tongo State Forest, and we would like to inform you of the works prior to commencing.
>
> If you can please suggest a few times you are available to discuss it would be greatly appreciated.

Apologies again, Jarod didn't pass on any details apart from your email due to confidentiality.

Thanks

Stephen Archer Senior Development Manager | t +61283113058



APPENDIX C

Updated Table of Mitigation Measures

Appendix C Mitigation and Management Measures

Lightsource bp (LSbp) will be responsible for implementing the management and mitigation measures identified in the EIS. The management and mitigation measures will be implemented through a Construction Environmental Management Plan (CEMP), Operational Environmental Management Plan (OEMP) and Decommissioning Environmental Management Plan (DEMP). These plans will be prepared sequentially, prior to each stage of the Project by LSbp and the relevant contractor, and in consultation with relevant Government Agencies.

Table C.1 provides a comprehensive list of the management and mitigation measures identified through the EIS applicable to the Project, mitigation and management measures added as a result of the RtS and outlined in the Amended Project and the relevant timing for implementation. Mitigation and Management measures added as a result of the RtS and Project review process are *italicised and rows shaded blue.*

Table C.1 Consolidated Management/Mitigation Measures (EIS Project and Amended Project)

Aspect	Management/Mitigation Measure	Timing
Terrestrial biodiversity	Maintain a wildlife corridor across the Project Area through retention of large areas of suitable habitat for the regent honey eater (*Anthochaera phrygia*) and White Box – Yellow Box – Blakely's Red Gum Grassy woodland and derived native grassland.	Life of Project (Construction, Operation and Decommissioning)
	Implement the following specific control measures to minimise the impacts of the Project on biodiversity: • workforce education and training • implementation of vegetation protection zones for areas to be retained • ecologist pre-clearance surveys and supervision of works • erosion and sedimentation control measures • weed management • fencing, access control and fauna exclusion measures.	Life of Project (Construction, Operation and Decommissioning)
	Develop a biodiversity offset strategy (BOS) in consultation with Biodiversity Conservation Division (BCD), DPE and DCCEEW based on the credits required to be retained to offset the impacts of the Project.	Pre-construction

Aspect	Management/Mitigation Measure	Timing
	The Biodiversity Management Plan will include implementation of measures to minimise fauna strike, as follows: • *Speed limits will be enforced on roads within the Project Area during construction and operation, to reduce the risk of fauna strikes.* • *Native fauna encountered along access tracks during construction and operation would be avoided and given an opportunity to move on.*	*Construction/Operation*
Aquatic biodiversity	During construction: • implementation of appropriate erosion and sediment controls • avoidance of waterfront land during construction works • provision of onsite spill kits for construction works within 100 metres of a watercourse • undertaking instream construction works (for access tracks) when watercourses are dry (where practicable) • design of any instream structures using relevant guidelines (to maintain fish passage and minimise impacts to natural flow regimes), particularly on watercourses mapped as Key Fish Habitat KFH • rehabilitation of disturbed bed and banks of watercourses mapped as KFH with stabilising vegetation • implementation of pre-clearance surveys carried out prior to construction, undertaken by a suitably qualified ecologist • implementation of an unexpected species finds protocol.	Construction
	During operation and decommissioning: • routine maintenance of vehicles (to reduce the risk of oil spills etc) • routine maintenance of culverts (to ensure they are clear of debris) • minimal use of herbicides to control exotic species (to reduce pollutants entering downstream watercourses) • re-establishment of native riparian vegetation endemic to the region and aquatic habitat features within and on the banks of any watercourses directly impacted.	Operation and Decommissioning

Aspect	Management/Mitigation Measure	Timing
	Sections of Redlynch Creek and the unnamed tributary of Rocky Creek containing bed and banks, are to be electronically mapped in order to identify Waterfront land. Waterfront land is measured as 40 m from the top of bank and any waterfront land disturbed is to be revegetated following completion of works.	*Pre-construction*
Aboriginal cultural heritage	Following development consent, the proponent will develop an Aboriginal Cultural Heritage Management Plan (ACHMP) which is to be agreed to by the RAPs and DPE (with input from Heritage NSW). The ACHMP will include an unanticipated finds protocol, unanticipated skeletal remains protocol, protocols related to heritage inductions for work crews, and long-term management of any Aboriginal sites being impacted.	Pre-construction
	Eight Aboriginal sites within the Development Footprint will be salvaged by a surface collection of visible artefacts. The recommended methodology for the salvage will be set out in the ACHMP and will include the measures outlined in Section 9.2.1 of the ACHAR.	Pre-construction
	Four of the seven trees of community interest will be retained. The three trees of community of community interest located within the Development Footprint will be removed in accordance with a methodology set out in the ACHMP.	Life of Project (Construction, Operation and Decommissioning)
	The ruins of the O'Brien homestead slab hut will be avoided from all ground disturbing impacts by a 20 metre buffer.	Life of Project (Construction, Operation and Decommissioning)
	The two identified sites of cultural significance that lie outside the Project access route/Development Footprint will be retained. The sites will be included on all applicable construction plans and the locations made known to all work crews working in the vicinity of the site to ensure the sites are not inadvertently harmed.	Pre-construction
	A reassessment and detailed mapping of the AHIMS site #37-1-0053 will be conducted in accordance with the provisions outlined in the ACHMP.	*Pre-construction*
	Four known Aboriginal sites, 37-1-1027 (Redlynch Creek IF1), 37-1-1032 (Ringwood Gully IF6), 37-1-1033 (Killoe Creek GG1), and 37-1-1037 (Rocky Creek Gully OS4) will not be harmed by the Project as they are located outside the Access route and the Development Footprint.	*Pre-construction*

Aspect	Management/Mitigation Measure	Timing
	Seven known Aboriginal sites, 37-1-1028 (Rocky Creek Slope IF2), 37-1-1029 (Wollara Road IF3), 37-1-1030 (Monaghans Creek IF4), 37-1-1031 (Rocky Creek Gully IF5), 37-1-1034 (Redlynch Creek OS2), 37-1-1035 (Redlynch Creek OS1), and 37-1-1036 (Redlynch Creek OS3) will be salvaged by a surface collection of visible artefacts. The recommended methodology for the salvage will be set out in the ACHMP and will include the measures outlined in Section 9.2.1 of the ACHAR.	*Pre-construction*
	Further recording and investigation of the grinding groove site (Killoe Creek GG1) will be conducted. The methodology of this investigation will be set out in the ACHMP but will include detailed mapping and photography of the site.	*Pre-construction*
	All land-disturbing activities must be confined to within the Addendum study area. Should the parameters of the proposed work extend beyond this, then further archaeological assessment will be required.	*Life of Project (Construction, Operation and Decommissioning)*
Historic heritage	Impacts to the areas of high historical archaeological potential should be avoided wherever possible. An exclusion zone of at least 20 m should be established around identified areas of high historical archaeological potential (e.g. slab hut).	Life of Project (Construction, Operation and Decommissioning)
	If impacts to areas of high historical archaeological potential cannot be avoided through design changes, further assessment and investigation would be required prior to the commencement of construction activities. This would include the preparation of an archaeological research design and test excavation methodology to confirm the extent of historical archaeological remains present, and the likely significance level of any historical archaeological remains on the site.	Pre-construction
	All contractors and project team for the Project should be made aware of the archaeological potential and heritage sensitivity of the site, through a heritage-specific induction which outlines their requirements under the *Heritage Act 1977* and the Project Approvals.	Life of Project (Construction, Operation and Decommissioning)
	An unexpected heritage finds protocol should be implemented for the construction works in the unlikely event that historical archaeological remains should be encountered during construction works.	Construction
Land	A CEMP will be prepared by Lightsource bp that identifies erosion and sediment control measures prior to works commencing.	Pre-construction

Aspect	Management/Mitigation Measure	Timing
	An ESCP will be developed as part of the CEMP, in accordance with the Managing Urban Stormwater: Soils and Construction Volume 1 (NSW DPIE, 2004) "The Blue Book". The ESCP will be implemented, and particular consideration of the dispersive soils identified within the Project Area will be considered.	Pre-construction
	Areas outside of the Developmental Footprint but within the Project Area may be established as a Biodiversity Stewardship Site. If determined to be compatible, cattle grazing will be facilitated throughout this area during operation.	Pre-construction
	If a sheep grazing trial is undertaken, the OEMP will incorporate a Sheep Grazing Vegetation Management Plan (SGVMP) that will outline measures for solar grazing in line with the Agrisolar Guide (2021) and other animal and welfare standards and guidelines. This will include measures to manage the stock appropriately, including a requirement to keep the stock in good health, ensuring frequent shearing (to keep wool growth low), ensure mustering is conducted in an agreed safe manner, and that any fatalities are managed. As a part of the OEMP a Wild Dog Management Plan will also be prepared for sheep grazing management.	Operation
	The OEMP will be developed in consultation with the host landholders and DPI Agriculture and will be implemented post construction.	Operation
	The Project Area will be rehabilitated to a condition as close as practicable to the condition that existed prior to construction of the Project and in consultation with the landowner. This will be achieved through the implementation of a Rehabilitation Management Plan as part of the OEMP for the Project.	Decommissioning
	The OEMP will detail the management requirements, including: • inspection of all vehicles and machinery entering the Project Area, and cleaning if applicable to remove weeds including seeds • appropriate weed management practices to be adopted, including regular weed spraying • appropriate pest management practices to be adopted • limit vehicle access to the established internal road network.	Life of Project (Construction, Operation and Decommissioning)

Aspect	Management/Mitigation Measure	Timing
	All areas disturbed by the Project during construction will be rehabilitated to maintain a groundcover (minimum of 70%) to prevent soil erosion following completion of construction and during operation.	*Operation*
	In the event that a sheep grazing trial is conducted, a Sheep Grazing Vegetation Management Plan will be prepared in consultation with DPI Agriculture.	*Operation*
	The local Land Services office will be contacted in the design of the OEMP with regard to the grazing and biosecurity content.	*Operation*
Visual	Retention of as much existing vegetation within the Project Area as possible.	Design
	Setback of the construction compound, vehicle parking and equipment storage areas from Wollara Road by a minimum of 50 m and partially screened from view (from Wollara Road) via existing and new vegetation screening.	Design
	Signage (if required) would be of sufficient size to contain only information sufficient for the basic facility and company identification, for safety, navigation, and delivery purposes.	Construction
	Where soil disturbance is required, wind erosion controls would be implemented including the use of water carts, covering of stockpiles and avoiding ground disturbance during windy conditions.	Construction
	Lighting would be installed in accordance with AS4228-1997 – Control of Obtrusive Effects of Outdoor Lighting and designed and installed to best practice principles identified within the Dark Sky Planning Guidelines.	Construction
	Where possible colour treat ancillary components of the Project.	Construction
	Landscaping in accordance with the draft Landscape Plan (prepared as part of the VIA) to screen views of the Project Area. The plan illustrates proposed tree and shrub planting on-site, along the western perimeter of the Project Area to screen views from Wollara Road.	Construction
	Monitor visual impacts. If social issues experienced, discuss possible remedies.	Operation
	Subsequent to Project approval, refine the landscape plan to encompass the Amended Project. The aim of the detailed landscape plan is to establish a quick growing, dense screen to reduce public views of the solar panels from Wollara Road, as well as providing additional ecological benefits.	*Pre-construction*

Aspect	Management/Mitigation Measure	Timing
	The detailed landscape plan is to be prepared prior to landscape implementation and, be guided by ongoing consultation with NP&WS and TfNSW (particularly regarding plant species, spacing, and whether soil improvement is required and road safety measures/tree clearance zones and TFNSW relevant policy).	*Pre-construction*
	Progressively stabilise surfaces as construction is completed.	*Construction*
	Monitor road upgrades to ensure the stabilisation of verges.	*Construction*
	Implement correctional measures if erosion occurs or dust is an issue.	*Life of Project (Construction, Operation and Decommissioning)*
	Include retention of trees where possible within/near the road upgrade construction zone.	*Construction*
	Include protection of trees within/near the road upgrade construction zone. Monitor disturbed trees that have been heavily impacted within their root zone for stability and longevity.	*Construction*
Noise and vibration	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.	Construction
	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.	Construction
	Contractors should keep noise to a minimum, including limiting the use of loud stereos/radios, shouting on site and car door slams.	Construction
	Where practical, no dropping of materials from height or throwing of metal items.	Construction

Aspect	Management/Mitigation Measure	Timing
	The noise levels of plant and equipment should have operating sound power levels consistent with those nominated in the NVIA.	Construction
	Noise emitting plant to be directed away from sensitive receivers and to be throttled down or shut down when not in use.	Construction
	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.	Construction
	Limit the use of engine compression brakes.	Construction
	In the unlikely event that any vibration-generating equipment would be used within the recommended safe working distances nominated in Table 6.11 of the EIS, 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.	Construction
	Prior to the commencement of construction, finalise and implement the mitigation measures/controls outlined in the Draft Construction Noise and Vibration Management Plan (DCNVMP), which has been prepared for the management of potential noise and vibration impacts associated with Ringwood Road upgrade works.	Construction

Aspect	Management/Mitigation Measure	Timing
Traffic and Transport	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.	Pre-construction
	As part of the Construction Traffic Management Plan (CTMP) to be prepared post-approval, a Vehicle Movement Plan will be included that clearly shows the construction vehicle routes and permitted movements, including restriction at the Ringwood Road/Golden Highway intersection (left in/left out movement permitted). The CTMP will also encompass a Drivers Code of Conduct that all construction phase vehicle drivers (including of light vehicles) would need to read and sign to confirm their responsibilities and reinforce correct behaviour.	*Pre-construction*
	Osborn's Transport, Merriwa Pre School, Scone Grammar School and Scone High School would be consulted on the proposed formalisation of the bus stop on Ringwood Road at the Golden Highway intersection and informed of the additional construction traffic that would be generated by the Project.	*Pre-construction*
	Additional signage and line marking is recommended at the Golden Highway and Barnett Street intersection and installation of warning signs ("Symbolic Truck") are recommended near the primary site access point.	*Pre-construction*
	The community would be notified in advance of proposed road and transport network changes through appropriate media and other forms of community liaison.	Construction
	Where relevant, Road Occupancy Licences (ROLs) and crane permits would be submitted and approved prior to the closure of any roads.	Construction
	Construction workers would be encouraged to carpool or use the shuttle buses to travel to and from the construction site.	Construction
	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.	Life of Project (Construction, Operation and Decommissioning)
	Additional warning signs are recommended along sections of Ringwood Road and Wollara Road where the road narrows and near the site access points.	Construction

Aspect	Management/Mitigation Measure	Timing
	Swept paths of the proposed site access points with high resolution surveys/aerials would be developed as the project progresses to determine the most appropriate site access arrangements.	Construction
	A detailed Oversized Over Mass (OSOM) vehicle route assessment would be undertaken by the construction contractor and outlined in the Transport Management Plan. The Plan will detail OSOM route, duration, road closures, traffic closures, traffic detours, notifications and any required Traffic Guidance Schemes.	Pre-Construction
Water Resources	Solar panels will be designed to provide a minimum of 300 mm freeboard for the lowest edge above the maximum 1% AEP flood level.	Design
	Solar panel piles will be designed to withstand the 1% AEP flood velocities expected in the Project Area.	Design
	No sensitive infrastructure (e.g., substation, BESS, etc.) will be placed within 20 m of any Strahler 3 or above order streams.	Design
	All waterway crossings will be designed and constructed in compliance with DPI Water Guidelines.	Design and Construction
	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.	Design
	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.	Pre-construction
	Debris will be cleared from fencing following flood events.	Life of Project (Construction, Operation and Decommissioning)
	An Operational Environmental Management Plan (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.	Operation
	Water sources would be confirmed during the detailed design phase and in consultation with suppliers and landholders and be subject to availability.	Design

Aspect	Management/Mitigation Measure	Timing
	Post-construction, disturbed areas will be stabilised by the establishment and maintenance of a vegetated groundcover consisting of low-growing grasses.	Post-construction
	Road repairs and upgrades to Ringwood Road and culvert upgrades will include: • Appropriate scour protection will be designed for the road repairs and culvert upgrades • Road and culvert upgrades will be designed to maximise afflux at an acceptable level • Culverts will be designed to accommodate a 5% AEP event • Culverts will be constructed at existing invert levels or similar to maintain low flow conveyance in channel.	Pre-construction
	Works will be setback from the mapped watercourses in accordance with the Guidelines for Controlled Activities on Waterfront Land – Riparian Corridors (DPE 2022).	*Construction/Operation*
	A Construction Soil and Water Management Plan and an Erosion and Sediment Control Plan will be developed in consultation with and in accordance with industry standards including the guideline, Managing Urban Stormwater: Soils and Construction (Landcom 2004).	*Pre-construction*
	In the event of fish kills within the vicinity of the Project, DPI and the Environment Protection Authority will be contacted. All works other than emergency response procedures will cease until the issue is rectified.	*Life of Project (Construction, Operation and Decommissioning)*
Hazard, Risk and Bushfire Threat	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.	Design
	Electrical transformers to be designed, installed, operated and maintained in accordance with relevant Australian Standards.	Life of Project (Construction, Operation and Decommissioning)
	A Final Hazard Analysis 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.	Pre-construction

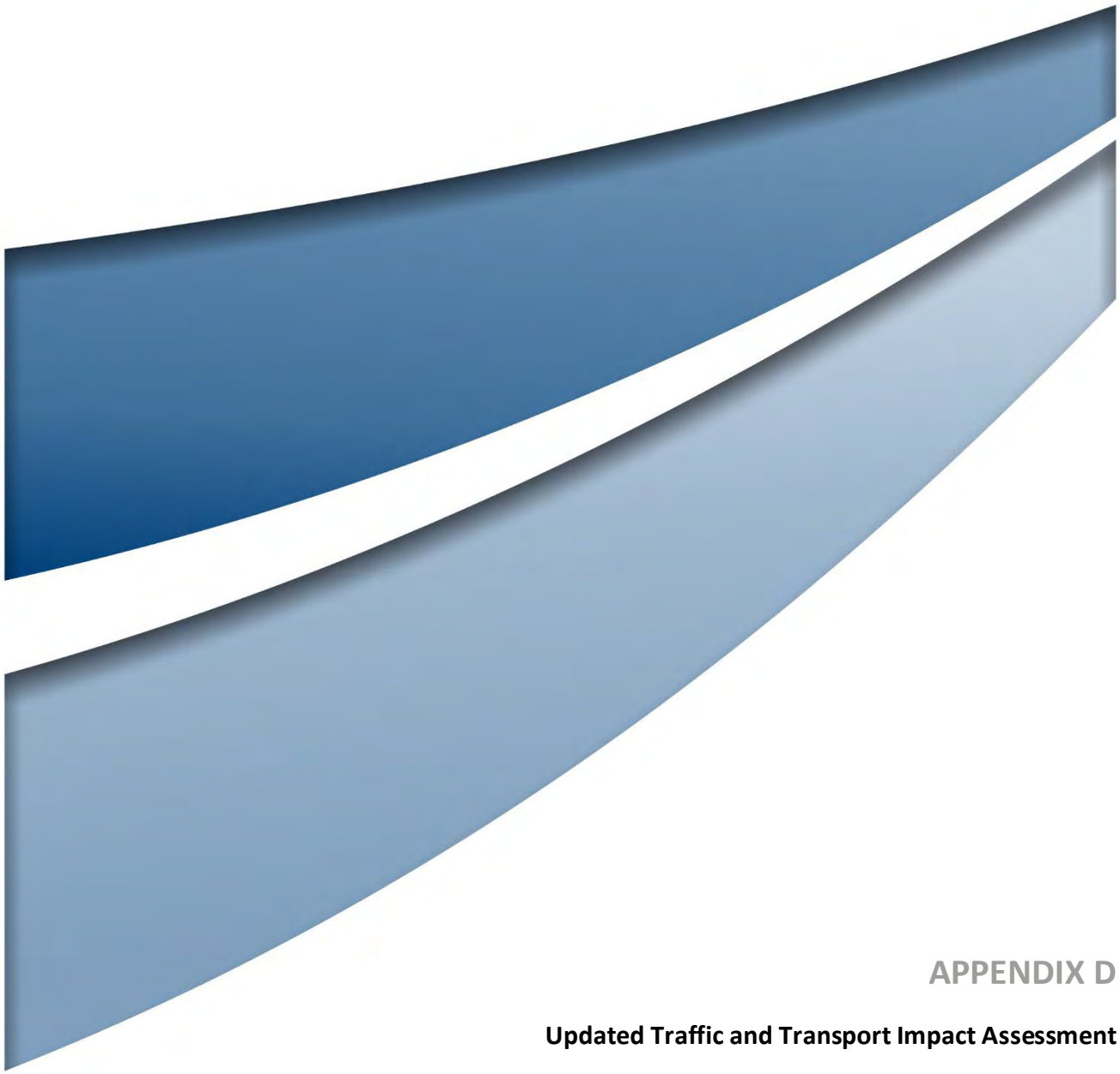
Aspect	Management/Mitigation Measure	Timing
	Asset protection zones will be implemented and maintained for the life of the Project.	Life of Project (Construction, Operation and Decommissioning)
	Roads and access points will be maintained throughout the Project life to allow for safe and accessible travel for emergencies (if required).	Life of Project (Construction, Operation and Decommissioning)
	An appropriate dedicated water supply for bushfire protection will be provided.	Life of Project (Construction, Operation and Decommissioning)
	All project infrastructure will be designed in accordance with relevant industry standards to manage any EMF risks.	Design
	All relevant procedures in relation to a high voltage installation will be adhered to throughout the life of the Project.	Life of Project (Construction, Operation and Decommissioning)
	Public access will be restricted throughout the life of the Project.	Life of Project (Construction, Operation and Decommissioning)
	The solar farm development footprint will be managed as an Asset Protection Zone in accordance with Appendix 4 of 'Planning for Bush Fire Protection 2019'.	*Construction/Operation*
	A dedicated water supply for bushfire protection will include a 10,000 litre water supply (tank) fitted with a 65mm storz fitting.	*Construction/Operation*
	APZ's will be maintained around the perimeter of the solar farm and associated infrastructure. All APZ's / defendable spaces will be in the order of at least 10m.	*Construction/Operation*
	• *The FSS will be developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper (HIPAP) No.2 and will meet the operational requirements of FRNSW.* • *The FSS will consider:* • *The operational capability of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety independence.* • *A worst-case fire scenario including a full BESS unit fire. It will demonstrate no fire propagation within the facility.*	*Pre-construction*

Aspect	Management/Mitigation Measure	Timing
	• *the requirements of the Fire Management Plan (FMP) that would be prepared in consultation with NSW Rural Fire Service.* • *It is noted the FSS will also inform the requirements of the FMP including:* • *the methods and resources needed to manage and extinguish lithium battery fires* • *the management of a defendable Asset Protection Zone (APZ) as described in Planning for Bush Fire Protection 2019.* • *The FSS will inform the requirements of an Emergency Response Plan (ERP) that will be prepared in accordance with HIPAP 2 prior to commencing construction of the BESS. The ERP will inform the requirements of an Emergency Services Information Package (ESIP) that would be prepared in accordance with FRNSW fire safety guideline – Emergency services information package and tactical fire plans. Both the ERP and the ESIP will:* • *inform first responders of site-specific features and safety measures required to ensure they are able to undertake their duties effectively* • *include agency specific Standard Operational Guidelines.*	
	The FSS will consider fire propagation and a worst-case scenario will be considered within the FSS.	*Pre-construction*
	The Emergency Plan will be developed in accordance with the HIPAP No.1 and will be informed by the findings of the PHA.	*Pre-construction*
	An Emergency Services Information Package and an Emergency Responders Induction Package will be prepared for the site prior to construction. • *The Emergency Services Information Package (ESIP) will be prepared in accordance with FRNSW fire safety guideline – Emergency services information package and tactical fire plans.* • *The Emergency Responders Induction Package is developed for the site in consultation with, and to the satisfaction of FRNSW, NSW RFS and NPWS. The package will inform first responders in accordance with agency specific Standard Operational Guidelines.*	*Pre-construction*
Social Amenity	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.	Pre-construction

Aspect	Management/Mitigation Measure	Timing
	A Community Benefit Sharing Strategy will be developed in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects.	Pre-construction
	Measures to enhance positive social outcomes and mitigate negative social outcomes for the Project include: • *Limiting the number of existing short- term accommodation beds accessed to no more than 14 existing short term accommodation beds across the study area on any given night. This is designed to avoid 'crowding out' effects on other accommodation users. This figure could be re-assessed if substantial reductions in local occupancy rates are identified and recorded in the social locality.* • *Limit the use of existing rental accommodation as a housing source for the Amended Project by ensuring sufficient access to custom- built temporary workforce accommodation.* • *Work with the local accommodation providers to provide advanced notice of accommodation requirements and anticipate timing of key tourism events.* • *Consider partnering with or funding existing local accommodation providers to expand their accommodation capacity.* • *Establish, review, and maintain a LSbp Goods and Services Register database and make this available to head contractors to support local procurement.* • *Utilise Project newsletters, website, and media releases at key milestones throughout the Project development, construction and operation timeline to promote information on how local suppliers may become involved in the Project.* • *Promote and fund Apprenticeships and Traineeships as a key employment strategy and work with regional employment agencies, Training Services NSW, education providers and Group Training Organisations to develop strategies to enable apprentices to access experience across different infrastructure projects.*	*Pre-construction*

Aspect	Management/Mitigation Measure	Timing
	• *There are sufficient opportunities to house the anticipated construction and operational workforces, employ local workers, and procure local goods and services while also maximising social benefits to communities and reducing potential negative impacts. Proactive management and monitoring of outcomes will be achieved through post- approval management strategies and mechanisms.*	
Economic	A Community Benefits Sharing Strategy will be developed and implemented for the Project including a VPA with UHSC.	Pre-construction
Waste Management	Lightsource bp will prepare a Waste Management Plan, which will include a detailed breakdown of the waste types and quantities in accordance with relevant legislation and guidelines. Waste will be reused and recycled in accordance with a waste management hierarchy. The waste management plan will include the following: • 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).	Construction
	Management of wastes generated during the operational phase of the Project will occur through a Waste Management Plan as part of the OEMP.	Operation
	A Decommissioning and Rehabilitation Management Framework has been prepared for the Project to demonstrate a commitment to ensuring appropriate environmental management is undertaken during decommissioning and rehabilitation phase in accordance with legislative requirements, conditions of consent, stakeholder interest and industry best practice. The Framework will be updated throughout the life of the Project as appropriate.	Decommissioning

Aspect	Management/Mitigation Measure	Timing
	The Waste Management Plan will be developed in consultation with the Upper Hunter Shire Council and surrounding LGAs including Mid-Western Regional Council.	*Pre-construction*
	A 94% recycling rate by weight will be achieved for the panels during each stage of the Project.	*Life of Project (Construction, Operation and Decommissioning)*
Air Quality	As part of the CEMP, protocols to minimise air emissions during construction will include: • water suppression on all exposed areas, unsealed roads and stockpile area 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 complaints procedure to identify and respond to complaints.	Construction
	Areas within the Project Area which have been temporarily disturbed by construction and operational activities will be rehabilitated.	Life of Project (Construction, Operation and Decommissioning)
	Once construction has been completed, ground cover will be established and maintained in accordance with the OEMP.	Operations



APPENDIX D

Updated Traffic and Transport Impact Assessment

Goulburn River
Solar Farm

Amended Traffic and Transport Impact Assessment

turnbull

Document Information

Document Title	Goulburn River Solar Farm – Traffic and Transport Impact Assessment
Document Number	305GRSF Traffic and Transport Impact Assessment

Document Revisions

Revision	Description	Author	Reviewer	Approver	Date
1.0	Draft report	B. Meng E. Spiller	R. Banzon	D. Lowe	02/06/2022
2.0	Draft report	B. Meng E. Spiller	R. Banzon	D. Lowe	18/10/2022
3.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	31/10/2022
4.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	15/11/2022
5.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	18/11/2022
6.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	14/12/2022
7.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	31/01/2023
8.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	10/02/2023
9.0	Final report	B. Meng E. Spiller	R. Banzon	D. Lowe	01/05/2023
10.0	Amended TTIA – Draft 1	R. Banzon	D. Lowe	D. Lowe	30/11/2023
11.0	Amended TTIA – Draft 2	R. Banzon D. Shirokov	D. Lowe	D. Lowe	08/12/2023
12.0	Amended TTIA – Final	R. Banzon	D. Lowe	D. Lowe	12/12/2023

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Disclaimer

Contents

Definitions and abbreviations

Definitions and abbreviations to be applied to the Traffic and Transport Impact Assessment (TTIA) are listed in the table below.

Abbreviation	Definition
95% back of queue	The length of vehicle queue at an intersection that is not exceeded in 95% of all cycles
Amended Project	The Amended Project includes the elements of the Project as described in the EIS as well as changes which have been made largely in response to submissions on the EIS. These include: Project site access/egress amendments, upgrades to additional sections of Wollara Road and Ringwood Road, increased BESS capacity and an option of a decentralised BESS, minor Project layout modifications, construction of an additional transmission tower and additional assessment and revised approach for workforce accommodation.
ARTC	Australian Rail Track Corporation
Auxiliary lane	A portion of the roadway adjoining the through traffic lanes, used for speed change or for other purposes supplementary to through traffic movement
B-double	A combination consisting of a prime mover towing two semitrailers, with the first semitrailer being attached directly to the prime mover by a fifth wheel coupling and the second semitrailer being mounted on the rear of the first semitrailer by a fifth wheel coupling on the first semitrailer.
BESS	Battery Energy Storage System
CRN	Country Regional Network
CTMP	Construction Traffic Management Plan
CWO REZ	Central West Orana Renewable Energy Zone. A group of new wind and solar power generation in the Central West Orana region so that it can be efficiently stored and transmitted across NSW
DOS	Degree of Saturation
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EIS Project	The proposed Goulburn River Solar Farm. The Project includes the construction, operation and decommissioning of a solar farm with capacity of up to 550 MW, BESS and associated infrastructure. Including the various road repairs and upgrades to Ringwood Road.
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environmental Protection Authority
GAV	General Access Vehicles
Haulage routes	Roads designed for heavy or bulk transport of materials by heavy vehicles.
HML	NSW Combined Higher Mass Limits
km/h	Kilometres per hour
kV	Kilovolt
LOS	Level of Service
MWdc	Megawatt defined conditions
MWh	Megawatt hour
MWp	Megawatt peak
NSW	New South Wales
OSOM vehicle	Oversize Overmass. A vehicle or vehicle combination that exceeds any general access mass or dimension limits
Peak period	The period that has the highest demand volume of traffic and/or number of passengers during the day (peak hour, peak half hour, etc.)

Project construction vehicles	Standard construction vehicles generated by the Project including light vehicles, shuttle buses and heavy vehicles up to 19m semi-trailers.
RAV	Restricted Access Vehicles
ROL	Road Occupancy Licence
RUM	Road User Movement
SISD	Safe Intersection Sight Distance
SSD	State Significant Development
Swept path	The area bounded by lines traced by the extremities of the bodywork of a vehicle while turning.
Tie-in infrastructure	Operations and maintenance buildings, civil works and electrical components
TTIA	Traffic and Transport Impact Assessment
VMP	Vehicle Movement Plan

1. Introduction

1.1. Background

Lightsource Development Services Australia Pty Ltd (Lightsource bp) proposes to develop a solar farm in the Upper Hunter region of New South Wales (NSW), approximately 28 kilometres (km) southwest of Merriwa. The proposed Goulburn River Solar Farm (the Project) would be located on an agricultural parcel of land zoned RU1 – Primary Production (the Project Area), surrounded by the Goulburn River National Park.

The Project would involve the construction, operation and decommissioning of approximately 550-megawatt peak (MWp) of solar photovoltaic (PV) generation as well as a Battery Energy Storage System (BESS) with a combined 1,030 MWp / 2,060 megawatt hour (MWh) capacity. The Project would also include a substation and connection to an existing 500 kilovolt (kV) transmission line. The Project would include various associated infrastructure, including road repairs and upgrades to Ringwood Road and Wollara Road, temporary construction facilities, operation and maintenance buildings, internal access roads, civil works and electrical infrastructure to connect the Project to the existing transmission line which passes through the Project Area.

The Project Area covers an area of approximately 1,996.5 hectares with a development footprint of approximately 792.19 hectares. The Project Area encompasses two freehold properties and sections of Crown Roads.

The Project is considered a State Significant Development (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and State Environmental Planning Policy (Planning Systems) 2021.

The objectives of the Project are to:

- Deliver affordable and sustainable renewable energy to business and communities within NSW
- Provide renewable energy that would contribute to the reduction of greenhouse gases across NSW, avoiding up to 705,000 tonnes per annum of carbon dioxide
- Support the local regional economy by preferencing local workers and businesses in the development, construction and operation of the Project
- Facilitate community engagement and participation in the design, development and operation of the Project
- Minimise environmental and heritage impacts to the Project Area through adaptive design.

Subject to planning approval, construction is proposed to commence in 2024.

1.2. Updates for Amendment Report

This TTIA report was prepared to support the Project Environmental Impact Statement (EIS). It has now been updated in response to the community and stakeholder submissions received on the EIS and to reflect the outcomes of ongoing engagement with the Department of Planning and Environment (DPE), Transport for NSW, Upper Hunter Shire Council and Mid-Western Regional Council throughout and/or post the Project exhibition period.

As a result, the following amendments to this TTIA report has been completed:

- Section 1.2 (this section) has been added to provide a summary of the updates to the document
- Section 2.3 has been added to include details on the proposed transport route
- Section 2.3.1 has been added to include discussion on the initial transport route options assessed
- Section 2.3.3 has been updated to include revised safe intersection sight distance checks at the Golden Highway / Ringwood Road intersection and addition of checks at the Wollar Road / Ringwood Road intersection and Golden Highway / Barnett Street intersection
- Section 2.3.5 has been added to include an analysis of speed surveys collected on the Golden Highway
- Section 2.4 has been added to include discussion on nearby turning areas
- Section 2.6 has been updated to include additional detail on school bus routes and bus stops
- Section 2.7 has been updated to reflect changes to Transport for NSW's definitions of the existing cycle network
- Section 2.8 has been updated to reflect more recent crash data available from the Centre for Road Safety
- Section 3.1 has been updated to include a figure showing the footprint of the Project
- Section 3.2.3 has been updated to reflect the proposed changes to Project construction vehicle routes and trip distribution, including management and mitigation measures required to enforce the proposed routes
- Section 3.2.4 has been updated to include additional detail on Oversize Overmass (OSOM) return routes, pull-over bay / rest area locations and reference to a Traffic Management Plan for a similar project
- Section 3.2.5 has been updated to include additional road upgrades proposed on Ringwood Road and Wollara Road to benefit the community, upgrades proposed at the Golden Highway / Ringwood Road intersection to accommodate construction vehicles, and additional signage and line-marking recommended at the Golden Highway / Barnett Street intersection
- Section 3.2.6 has been moved and updated to include revised or new swept paths tested at the Golden Highway / Ringwood Road intersection, Golden Highway / Barnett Street intersection, and the Barnett Street turnaround facility

- Section 3.3.2 has been updated to clarify the number of construction vehicle movements anticipated per day
- Section 3.3.3 has been updated to clarify the number of operational vehicle movements anticipated per day
- Section 3.4 has been added to include details on the use of the Barnett turnaround facility
- Section 3.6 has been updated to include details of the formalisation of a bus stop near the Golden Highway / Ringwood Road intersection
- Section 4.1.1 has been updated to reflect the inclusion of peak hour traffic volumes generated by other nearby projects in the intersection modelling assessment and turn warrants assessment for the cumulative base and cumulative construction scenario
- Section 4.1.3 has been updated to reflect the impacts on the bus and rail networks due to the change in proposed construction vehicle routes
- Section 4.1.5 has been updated to reflect any new publicly available information on the cumulative projects since the Project exhibition period
- Section 5 has been updated to include any new or revised mitigation and management measures proposed as a result of the changes to the project as described above
- Section 6 has been updated to include any new or revised outcomes of the assessment as a result of the changes to the project as described above
- Appendix A has been added to provide a summary of the submissions received related to traffic and transport and how this report addresses the submissions
- Appendix B has to include the construction assessment of Wollar Road / Ringwood Road, which is not proposed to be used construction vehicles
- Appendix C has been added to show the strategic design of the proposed upgrades at the Golden Highway / Ringwood Road intersection, including swept paths and sight distance checks
- Appendix D has been added to show the safe intersection sight distance checks carried out at the Wollar Road / Ringwood Road intersection
- Appendix E has been moved and updated to reflect more recent crash data available
- Appendix F has been moved and updated to show the specifications of the OSOM vehicles proposed for the Project
- Appendix G has been added to include the Traffic Management Plan for OSOM vehicles for the Avonlea Solar Farm
- Appendix H has been moved and updated to include the additional road upgrades proposed on Ringwood Road and Wollara Road
- Appendix J has been added to show the swept paths carried out at the Golden Highway / Barnett Street intersection and Barnett Street turnaround facility.

This updated report will be appended to the Amendment Report and submitted to DPE for review and planning approval.

Appendix A provides a summary of the submissions received related to the TTIA in the EIS and subsequent consultation with DPE and Transport for NSW, and how they have been addressed in this updated report.

1.3. Scope and objectives of this report

This report assesses the existing transport network conditions as well as the anticipated traffic and transport network impacts during construction and operation. Where feasible, mitigation and management measures to reduce the anticipated impacts of the Project have been identified. This report includes the consideration of the following:

- Existing traffic and transport surrounding the Project Site, 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 measures that may be implemented to minimise traffic and transport impacts associated with the Project.

1.3.1. Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements for the Project were issued on 1 February 2022. The requirements specific to transport, and where these requirements are assessed in this report, are outlined in Table 1-1.

Table 1-1: Secretary's environmental assessment requirements (transport)

Secretary's environmental assessment requirements		Where addressed
a.	An assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation;	Section 3.2, Section 3.3 and Section 4.1.1
b.	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 3.2.3, Section 3.2.4, Section 3.2.5, Section 3.2.6 and Section 4
c.	A cumulative impact assessment of traffic from nearby developments; and	Section 4.1.1 and Section 4.1.5
d.	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 5

1.4. References

In preparing this report, reference has been made to the following:

- *Guide to Road Design Part 3: Geometric Design* (Austroads, 2021)
- *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2021)
- *Guide to Road Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (Austroads, 2020)
- *Austroads Design Vehicles and Turning Path Templates Guide* (Austroads, 2013)
- *Traffic Modelling Guidelines* (Roads and Maritime Services, 2013)
- *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002)
- *Golden Highway Corridor Strategy* (Transport for NSW, 2016)
- *Goulburn River Solar Farm Scoping Report* (Umwelt (Australia) Pty Ltd, 2021).

1.5. Report structure

The report has the following structure:

- Chapter 1 (this chapter) provides an overview of the Project
- Chapter 2 details the existing traffic and transport environment
- Chapter 3 provides a description of the Project
- Chapter 4 provides an assessment of the potential traffic and transport impacts during the construction and operational phase of the Project
- Chapter 5 identifies traffic and transport mitigation and management measures
- Chapter 6 provides a summary of traffic and transport impacts due to the Project.

2. Existing conditions

2.1. Project location

The Project Site is located on Wollara Road, approximately 170 km northwest of Newcastle and is proposed to be constructed on 1,996.5 hectares of freehold land in the locality of Merriwa in the Upper Hunter Region of NSW. The Development Footprint occupies 792.19 hectares of the Project Site.

The Project is bounded by the Goulburn River National Park to the north, east and south, and by Wollara Road to the west. The location of the Project Site and surrounding roads, the rail line and nearby towns are shown in Figure 2-1.

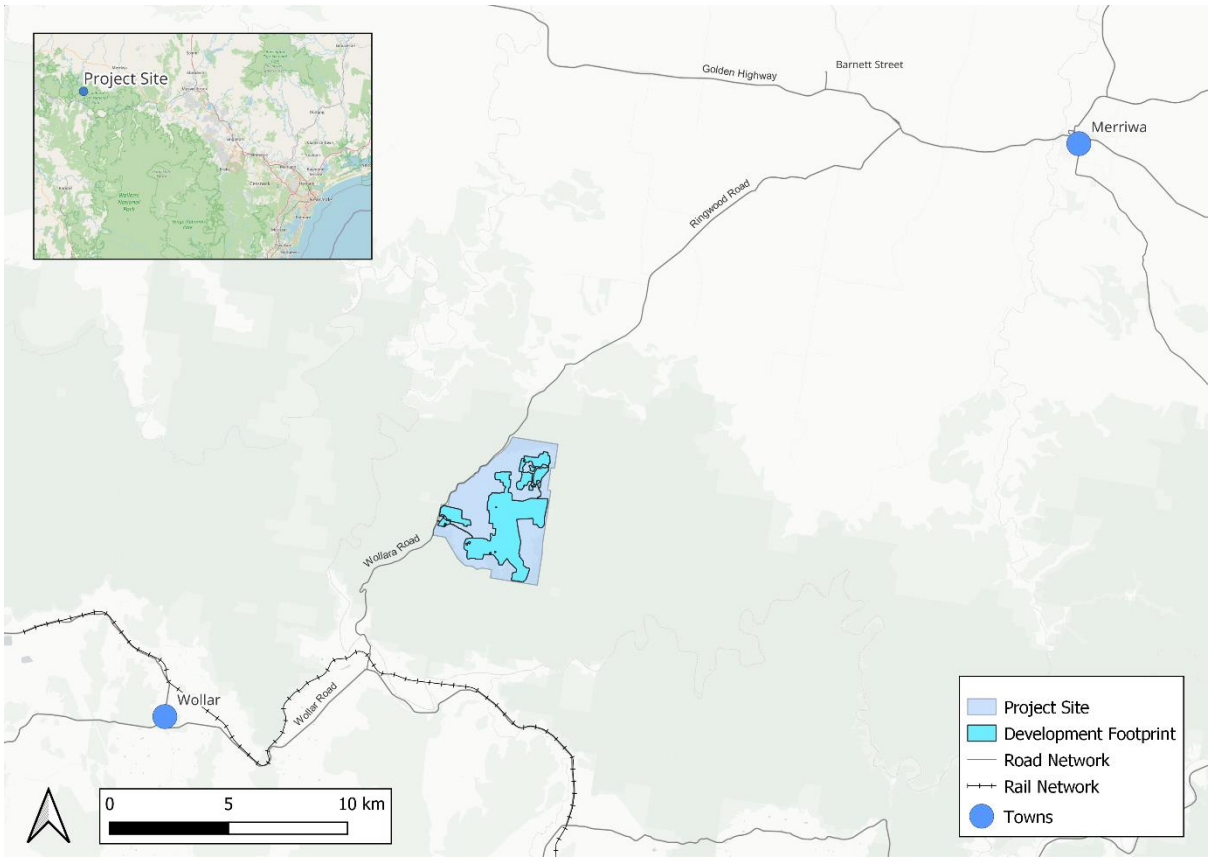

Figure 2-1: Project location

2.2. Road network

The local road network and key intersections for this Project are shown in Figure 2-2. Key roads that would provide access to the Project Site are described below, including Golden Highway, Ringwood Road, Wollar Road, Wollara Road and Barnett Street.

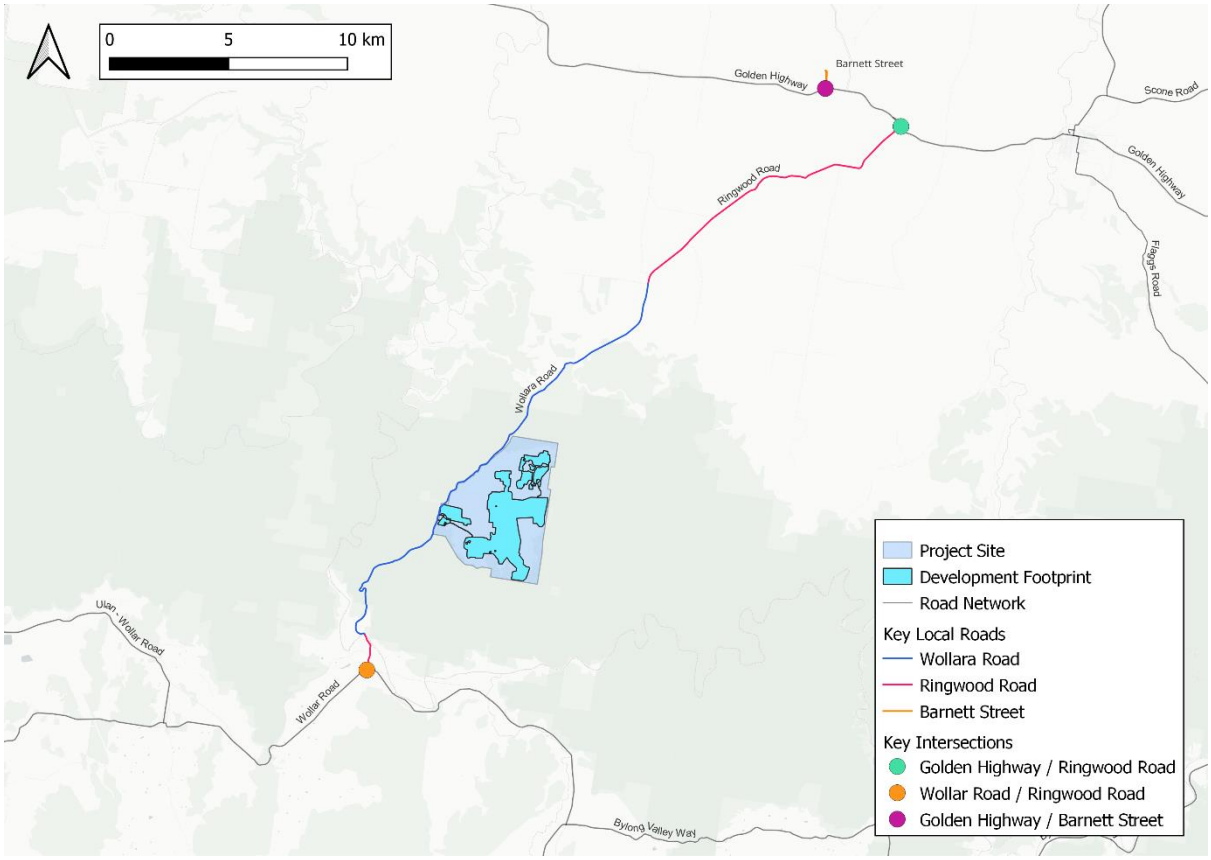

Figure 2-2: Local road network

- **Golden Highway**, which is a key east-west corridor located in the Hunter and Orana regions, connecting Newcastle and Dubbo. The highway is an approved B-double route. The highway is classified as a State road and has a posted speed limit of 100 km/h. Figure 2-3 shows the configuration of the Golden Highway at its intersection with Ringwood Road, as observed during a site visit carried out on 22 September 2021.

Figure 2-3: Golden Highway looking west (left) and east (right)

- **Ringwood Road**, which is a local road forming part of a continuous north-south road corridor with Wollara Road between the Golden Highway and Wollar Road. Ringwood Road is divided into two sections on this corridor, with the northern section running between the Golden Highway and Neverfail Road, and the southern section running between the Goulburn River and Wollar Road. Between these two sections, the road is designated as Wollara Road. Ringwood Road is sealed and generally flat with low vertical grades. The road operates under a default speed limit of 100km/h as there were no regulatory speed signs observed during a site visit carried out on 22 September 2021. However, advisory speed signs (35, 65 and 85km/h) were located at bends along the road alignment. Figure 2-4 shows a typical section of Ringwood Road as observed during the site visit.

Figure 2-4: Ringwood Road looking south (left) and north (right)

- **Wollara Road**, which is a local road forming part of a continuous north-south road corridor with Ringwood Road between the Golden Highway and Wollar Road. The Wollara Road section on this corridor runs between Neverfail Road and the Goulburn River. The road provides direct access to the Project and comprises a combination of sealed and unsealed sections north of the site and