



FINAL

Gundary Solar Farm

ENVIRONMENTAL IMPACT STATEMENT

October 2024



GUNDARY SOLAR FARM

Environmental Impact Statement

FINAL

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

Project Director: Malinda Facey
Project Manager Marion O'Neil
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Date: October 2024



QMS Certification Services

This report was prepared using Umwelt's
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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.

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Document Status

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Final	Malinda Facey	14/10/2024	Malinda Facey	14/10/2024

Executive Summary

Lightsource Development Services Australia Pty Ltd (Lightsource bp) is proposing to develop the Gundry Solar Farm (the Project) to generate solar renewable energy to supply the people of New South Wales (NSW). The Project is located within the Southern Tablelands region of NSW, approximately 10 kilometres (km) southeast of Goulburn within the Goulburn Mulwaree Local Government Area (LGA). Refer to **Figure ES.1** for the Project location and regional context.

The Project

The Project includes the construction, operation, maintenance and decommissioning of an approximate 400 Megawatt peak (MWp) (DC) solar photovoltaic (PV) generation facility with a Battery Energy Storage System (BESS) of up to 555 MWp / 1,570 Megawatt hour (MWh) capacity. The Project further includes ancillary infrastructure, an onsite substation/switching station and connection to an existing 330 kilovolt (kV) transmission line. The Project's conceptual layout is provided in **Figure ES.2**.

The Project Area covers approximately 702 hectares (ha), within which the Development Footprint (the area which would contain the solar arrays and associated infrastructure) occupies approximately 512 ha. Exclusion zones and setback buffers are provided around the Development Footprint to protect watercourses, areas prone to flooding, areas that provide habitat for threatened flora and fauna and to provide asset protection zones for bushfire safety.

Project Objectives

The key objectives of the Project include:

- deliver affordable and sustainable renewable energy to businesses and communities within NSW
- provide renewable energy that would contribute to the reduction of greenhouse gases across NSW, avoiding up to 670,000 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.

Environmental Approval Process

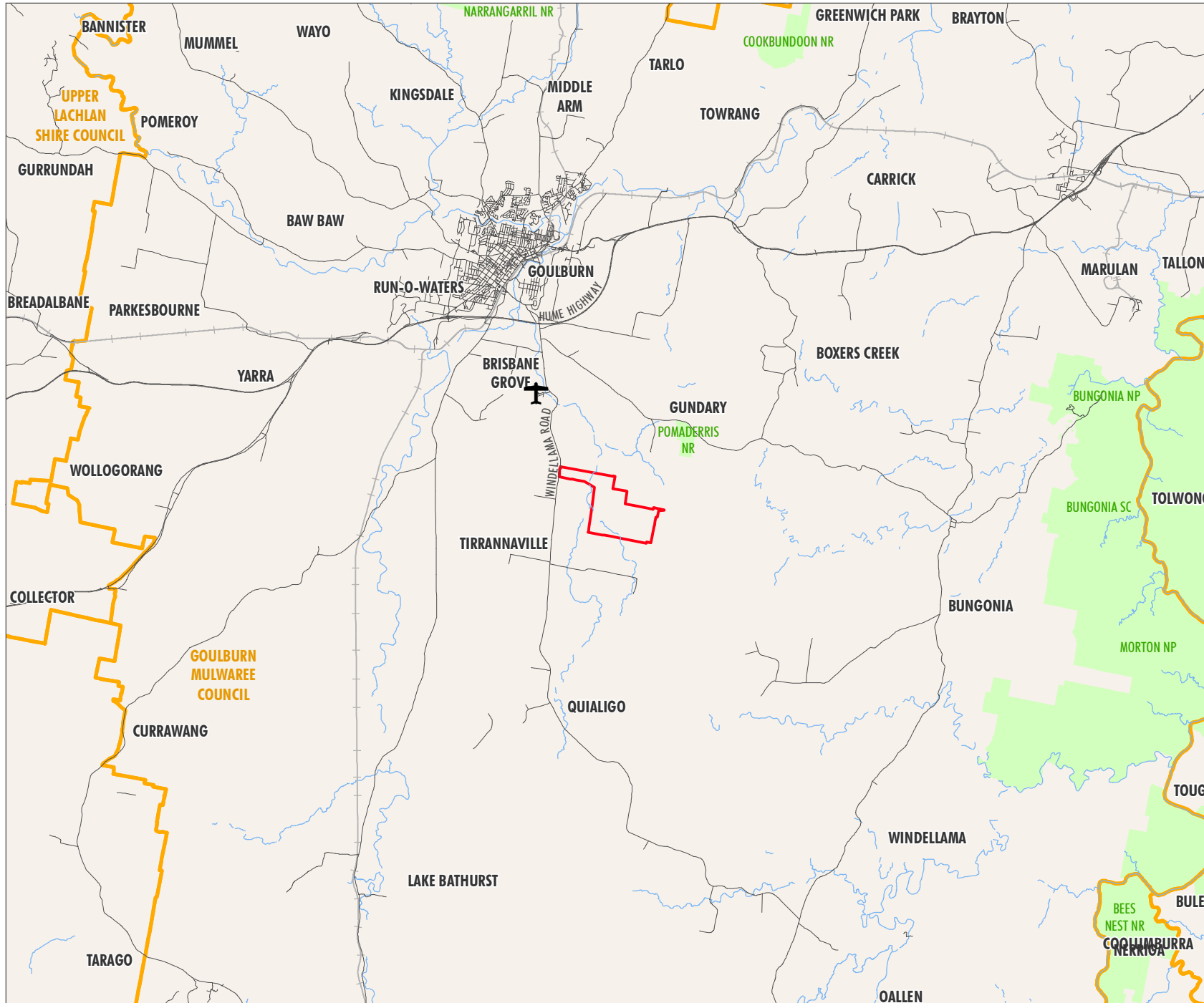
The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) establishes the planning and approvals process in NSW. The EP&A Act provides for the making of Environmental Planning Instruments (EPI), including Local Environmental Plans (LEPs) and State Environmental Planning Policies (SEPPs), which set out requirements for particular localities and/or particular types of development.

FIGURE ES.1

Locality and Regional Context

Legend

- ▭ Project Area
-  Goulburn Airport
- ▭ Local Government Area
- ▭ NPWS Estate
- Roads
- Railway
- Watercourses



Kilometers

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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FIGURE ES.2
Project Conceptual Layout

Legend

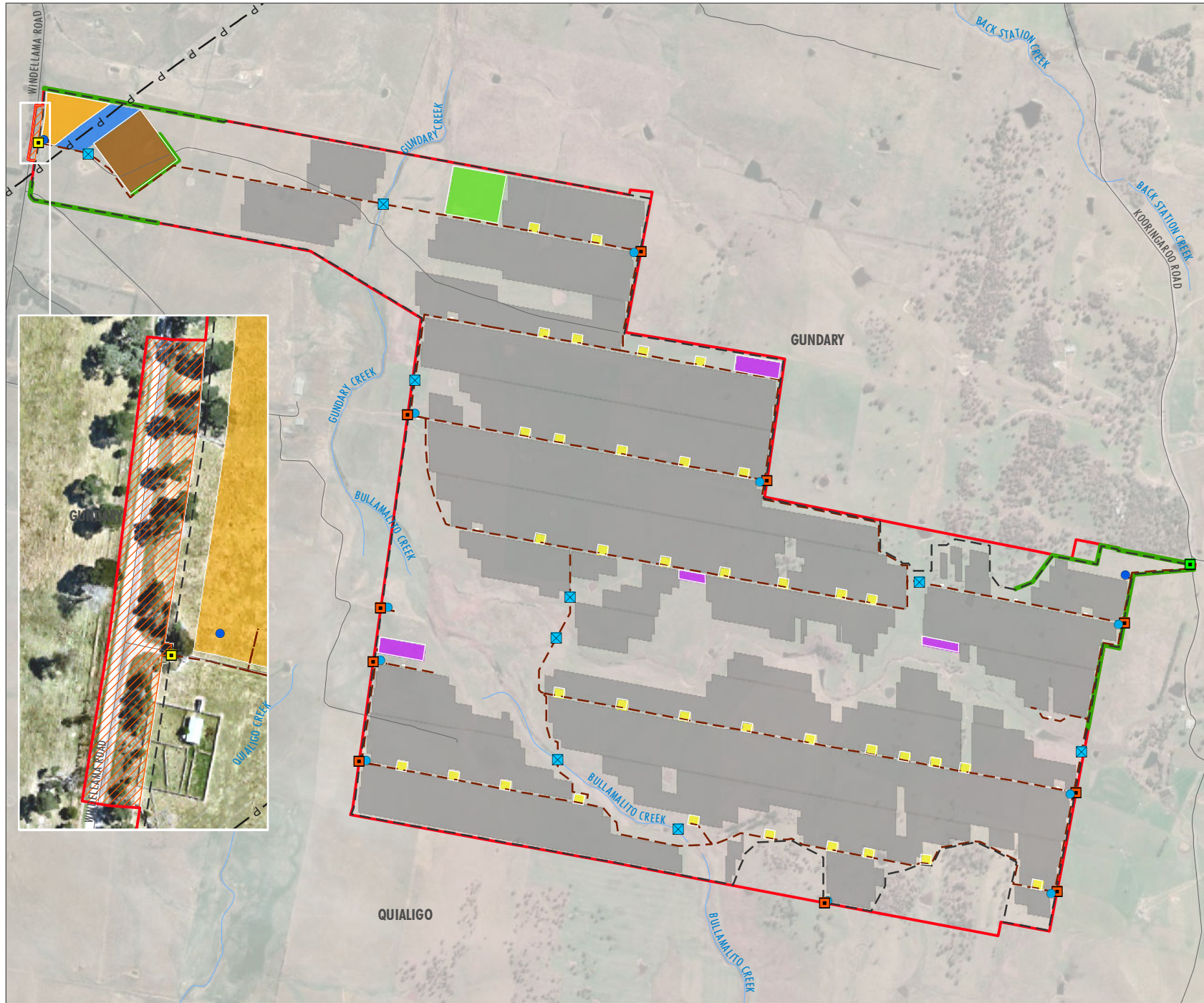
- Access Roads
- - Security Fence
- P Existing Transmission Line
- Roads
- Watercourses
- ⊠ Watercourse / Bed Level Crossing
- Water Tank (40,000L)
- Water Tank (10,000L)
- Primary Access
- Emergency Access
- Emergency Gate
- ▭ Project Area
- ▨ Proposed Road Upgrade
- Solar Panels
- Landscaping Buffer (5m)
- Transgrid Line Works
- Centralised AC
- Substation and O&M Facility Area
- Construction Compound Area
- Decentralised DC BESS
- Temporary Laydown Area



0 500 1,000
Metres

Scale: 1:0 at A4
GDA2020 MGA Zone 55

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The Project is a State Significant Development (SSD) under the *State Environmental Planning Policy (Planning Systems) 2021* as the Project is development for the purposes of electric generating works and the capital investment value of the Project is over \$30 million. A Development Application (DA) for the Project is required to be submitted under Part 4 of the EP&A Act.

A Scoping Report was prepared to provide a preliminary review of the Project including key environmental, social, economic and cultural constraints and opportunities as well as initial community views. The Scoping Report was submitted to the then Department of Planning and Environment (DPE) (now the Department of Planning, Housing and Infrastructure (DPHI)) in September 2022, who, after engagement with relevant government agencies, issued the Secretary's Environmental Assessment Requirements (SEARs) on 10 November 2022.

The SEARs and supported documentation set out the matters of consideration and assessment required in the Environmental Impact Statement (EIS). This includes a full description of the Project, justification for the Project, relevant approvals required, and an assessment of the likely potential impacts of the Project and mitigation on the environment including consideration of the following key issues:

- Goulburn, as a Regional City.
- Biodiversity.
- Heritage – including Aboriginal cultural heritage and historical heritage.
- Land use and land resources.
- Landscape and Visual.
- Glint and Glare.
- Noise and Vibration.
- Traffic and Transport.
- Water Resources.
- Hazards and Risks – including bushfire and electromagnetic field (EMF) exposure.
- Social.
- Economic.
- Waste Management.

The SEARs also require that consultation be undertaken with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence holders and mineral title holders.

The EIS has been prepared in accordance with the requirements of the EP&A Act and the form and content requirements specified in Schedule 2 of the EPA Regulation, including the SEARs for the Project.

Assessment of Environmental and Social Impacts

The EIS includes a detailed assessment of the potential environmental, social and economic outcomes of the Project and identifies the management and mitigation measures that will be implemented. A summary of the key findings of the EIS is provided in **Table ES.1**.

Table ES.1 Summary of Environmental and Social Findings

Key Issue	Overview of Key Findings
Regional City	- A portion of the Project Area falls within the Goulburn Regional Cities Map, and as such additional assessment was undertaken to determine any potential impacts on Goulburn's capacity for growth, its scenic quality and landscape character. - The Project's distance from the city (approximately 10 km), combined with the relatively low-profile height and dark, visually recessive colour of the solar modules result in a low potential impact to the regional city's scenic quality and landscape character, as experienced from Goulburn's urban precincts, growth fringe precincts, heritage conservation areas and heritage items. The Project would not be visible from the majority of key scenic viewpoints within the city although some distant secondary views may be possible to the south with solar modules affecting a very small part of the available view. - Visual impacts to road users on Windellama Road (one of several secondary approaches to the city which is not identified as a scenic or tourist drive) were assessed as low, and a commitment by Lightsource bp to undertake infill planting along this road will further reduce views of the substation and other infrastructure. - Overall, the Project is not expected to create any significant conflict with existing or approved residential or commercial uses of surrounding land, nor will it impact on future development opportunities for the city as most of the identified urban growth areas lie to the west, north and east of Goulburn from where the Project would not be visible.
Biodiversity	- The biodiversity assessment commenced early in the Project design stage to inform the Project layout with the aim of reducing impacts, particularly in areas of high biodiversity value. - The Project avoids 27.89 ha of NSW listed threatened ecological communities and 37.96 ha of Commonwealth listed ecological communities, and strategically locating the majority of the Development Footprint (97%) within Category 1 exempt land. - Whilst Lightsource bp has strived to avoid and minimise impacts on biodiversity through the design process, not all impact could be avoided. The Project will require the disturbance of approximately 14.02 ha native vegetation (consisting of native pasture, low condition primary grassland and paddock trees) from within the 702 ha of the Project Area. - No potential impacts on Matters of National Environmental Significance (MNES) are anticipated from the Project. - Following the application of appropriate avoidance and mitigation measures, the biodiversity assessment concluded that there is no requirement for biodiversity credits to offset the impacts from the Project, however Lightsource bp remains committed to the implementation of specific control measures (via a Construction Environmental Management Plan) to further minimise any biodiversity impacts: - workforce education and training - implementation of vegetation protection zones for areas to be retained - ecologist pre-clearance surveys and supervision of works

Key Issue	Overview of Key Findings
	- erosion and sediment control measures - weed management - fencing, access control and fauna exclusion measures.
Aboriginal Cultural Heritage	- The Project Area is located within the traditional homelands of the Ngunnawal people and falls within the Pejar Local Aboriginal Land Council (LALC) area. - Archaeological investigations undertaken for the Project included both desktop and field surveys and a test excavation program, in consultation with Registered Aboriginal Parties (RAPs). As a result, 19 Aboriginal sites, comprising both surface and subsurface stone artefacts, were identified within the Project Area. The Project will avoid three sites, partially impact seven sites and completely impact nine sites. - The assessment determined that the majority of the sites recorded within the Project Area have a low scientific significance as they are either isolated finds, in disturbed contexts or not particularly rare (in terms of type and cultural material). All but three of these sites would be subject to surface collection of artefacts. Two sites are relatively uncommon and were assessed as having moderate scientific significance and will therefore be subject to staged salvage excavation. This allows archaeologists to gather a representative sample of the local archaeological record for analysis, interpretation, and to benefit the local Aboriginal community as a cultural values education tool. The RAPs have confirmed that with the implementation of these mitigation measures, they would be supportive of the Project proceeding. - An Aboriginal Cultural Heritage Management Plan will be prepared to detail the staged salvage excavation methodology, Aboriginal consultation protocols, community collection, on-site inductions, and protocols for unexpected finds.
Historical Heritage	- A Historical Heritage Impact Assessment was undertaken for the Project and found that no impacts will occur on historical heritage. - Desktop and field inspections determined that the Project Area does not contain any World, Commonwealth, State or local listed heritage items. Due to the land use history of the site, any archaeological remains within the Project Area are likely to be fragmented or previously disturbed and would be unlikely to have research significance. - The nearest listed heritage item to the Project Area is Pelican Homestead, located about 3.4 km to the west. The Project will not require any works within the curtilage of this locally listed heritage item and would not impact on any significant views or vistas here or at any other nearby heritage item. - The assessment determined that the Project would have no physical impacts to the listed heritage items in the vicinity. Furthermore, the Project would not remove any evidence of the historical development of the region, a contributory element to the significance of heritage conservation areas. No indirect (visual) impacts to the heritage significance of the listed heritage items in the vicinity would result from the Project.
Land Resources and Land Use	- A Soil, Land Use and Agriculture Impact Assessment was undertaken and determined that impacts to soils are expected to be minimal and impacts to the regional agricultural industry are unlikely to occur. - The Project Area consists of 702 ha of mostly poor to moderate condition agricultural land in the form of open paddocks, the majority of which have been subject to cultivation over a long history of cattle and sheep grazing. Lightsources bp has an agreement in place with the host landholder to lease the Project Area for the duration of the Project, during which time current agricultural use will cease, resulting in temporary impacts to agricultural production with the region.

Key Issue	Overview of Key Findings
	• The Project will not affect agricultural productivity outside the Development Footprint and will have a negligible impact on local and regional agricultural support services. • Impacts to soils as a result of direct disturbance is anticipated to be minimal and temporary. • Due to the minor surface works across the Development Footprint, the Project will have minor impacts to Land and Soil Capability. • A Land Use Compatibility and Risk Assessment was undertaken which identified potential 41 risk items although 36 were considered minor once mitigation measures and controls were implemented. There are no high-risk potential conflicts, however 7 moderate potential for land use conflicts were identified and can be managed effectively through mitigation and management measures. • Mitigation and Management measures proposed include but are not limited to: ○ An Erosion and Sediment Control Plan (ESCP). ○ An OEMP will be developed in consultation with DPI Agriculture. ○ A biosecurity management plan. • Once construction is complete, the establishment of sheep grazing may be used to offset this loss of agricultural production. The dual use of the land for agricultural production and energy generation will be managed through an Operational Environmental Management Plan and Sheep Grazing Vegetation Management Plan, developed in consultation with the landholder and Department of Primary Industries (DPI).
Landscape and Visual	• A landscape and visual impact assessment was undertaken to assess in detail the potential impacts to public and private viewpoints, and to the regional city of Goulburn. Of the 52 viewpoints assessed, only one was found to have a moderate visual impact rating, with the remainder having a low or very low visual impact rating. Photomontages have been prepared from viewpoints where access to properties were possible to illustrate the potential visual impacts associated with the Project. • Under the DPE <i>Large-Scale Solar Energy Guideline 2022</i> and the accompanying <i>Technical Supplement – Landscape and Visual Impact Assessment</i> no mitigation is required for receivers with low or very low visual impact. Consultation with the landowner at the location with moderate visual impact and all affected landowners within 1 km of the Project has been undertaken by Lightsource bp to discuss potential visual impact mitigation options which may include landscape screening or other agreed measures. • The Project would not be lit at night, except in emergency or security situations therefore the Project would not significantly change the appearance of night lighting within the Gundary Plains landscape. • Cumulative visual assessment with the proposed Merino Solar Farm (to be located within 4 km of the Project) found that seven residential viewpoints could potentially view both projects however the views were secondary from most viewpoints (limited by dense vegetation and/or buildings) and no viewpoint would see both solar farms within the same field of view. Proposed landscaping along Windellama Road would reduce potential cumulative visual impacts for drivers.

Key Issue	Overview of Key Findings
Glint and Glare	• A glint and glare assessment was prepared to determine the potential for glint and glare to impact upon public and private receivers. • Based on a worst-case solar glare hazard analysis, which evaluated glare based on proximity to receivers, orientation and specifications of the photovoltaic modules, glare exposure for private residential receivers is below acceptable thresholds and no additional mitigation is required. • Koorringaroo Road users were identified as likely to experience glare from the Project in excess of the acceptable threshold of 10 hours per year. Lightsource bp has committed to screen planting along the eastern and north-eastern boundary, to mitigate these potential glare impacts. • No glare impacts were identified for a nearby landing strip or any associated flight paths.
Noise and Vibration	• A Noise and Vibration Impact Assessment was undertaken to assess the potential noise and vibration impacts associated with the Project. There would be instances where predicted noise levels may exceed the nominated noise limits and reasonable and feasible general noise controls are proposed to mitigate such impacts. • Construction noise may impact 21 non-associated receivers however no receivers will be 'highly noise affected' (i.e. exposed to noise levels greater than 75 dB(A)). • The Project is predicted to comply with all applicable noise limits at all receivers during operations, with proposed noise attenuation (strategically located noise barriers around parts of the substation and some decentralised BESS units). • Road traffic noise may impact one receiver along Windellama Road. • Due to large distances between the Development Footprint and sensitive receivers', vibration impacts from construction activities are anticipated to be negligible. • Mitigation and Management measures proposed include but are not limited to: ○ A Noise and Vibration Management Plan. ○ Notification to receivers prior to commencement of works. ○ Verification monitoring of noise and/or vibration levels.
Traffic and Transport	• A Traffic Impact Assessment was prepared to identify impacts to the road network to be used for the Project including any upgrades required to facilitate safe movement of vehicles. • Major solar and BESS components would be delivered to either Port Botany in Sydney or Port Kembla south of Wollongong and transported to the Project Area by truck via the Hume Highway. • Two potential transportation routes from the Hume Highway to the Project Area were investigated i.e. Option 1 and Option 2. The assessment determined that both routes can satisfactorily accommodate the swept path movements of the general heavy vehicle types (19 m semi-trailers) without the need to adjust road infrastructure or intersection layouts. • However, Option 2 has been identified by Council as the preferred route. This is due to it passing mainly through rural and industrial land uses. Option 1 will provide an alternative route (outside school zone times) for delivery of large battery and substation components as it is a designated Oversize Over Mass (OSOM) route.

Key Issue	Overview of Key Findings
	- Swept path analysis of the largest OSOM vehicle (low loader trailer with an overall vehicle length of up to 50 m) indicated that minor temporary works at Braidwood Road / Bungonia Road intersection and traffic control will be required to accommodate the OSOM vehicles. These may include temporary removal of street furniture and/or medians. - The road network has sufficient capacity to accommodate the peak construction traffic generation of the Project without affecting the Level of Service at any key intersections along either route option. The road network also has sufficient capacity to accommodate the concurrent movement of construction traffic from the proposed Merino Solar Farm, should this be required. - Vehicle access to the Project will be via an existing driveway on Windellama Road which will be upgraded to accommodate the movement of heavy vehicles. An additional emergency access point will also be provided on Kooringaroo Road. - A Construction Traffic Management Plan will be prepared prior to construction to outline proposed management measures which will minimise the impacts of additional Project traffic on the local road network.
Water Resources	- The Project Area is located within the Gundry Creek catchment which is part of the Mulwaree River sub-catchment within the Hawkesbury-Nepean River system and is part of the Sydney drinking water catchment. Gundry Creek is formed at the confluence of the 5th order Quialigo Creek (perennial) and Bullamalito Creek, immediately to the west of the Project Area, and drains in a northerly direction through the northern portion of the Project Area. Bullamalito Creek (perennial) and an unnamed 4th order tributary of Bullamalito Creek (non-perennial) drain from east to west across the southern portion of the Project Area. Two unnamed 3rd order streams are also present in the Project Area. - Assessments were undertaken to investigate the potential impacts of the Project in relation to surface water quality, flooding, stream stability, water availability, groundwater and aquatic habitat impacts, and all impacts can be appropriately mitigated. - During construction, erosion and sediment controls will be established to divert clean water around the site and prevent the movement of sediment offsite. Ground disturbance will be minimised as much as possible and works near watercourses will be scheduled to avoid periods of high rainfall. While the Project layout has been designed to avoid works on waterfront land, and the Project layout incorporates riparian buffers of approximately 20 m to 40 m around all second order and higher streams, some watercourse crossings will be required to facilitate access across the Project Area. These will be designed to minimise impacts on stream stability and fish passage in accordance with relevant guidelines. - As the Project is located within the Sydney drinking water catchment, modelling of pre- and post-development water quality was undertaken to identify whether the neutral or beneficial effect (NorBE) criteria can be achieved. The modelling predicted reductions in all pollutants for the post-development scenario due to the implementation of stormwater treatment measures (e.g., vegetated swales and bioretention basins), however further reductions in total phosphorus concentrations may be required when modelling is repeated at the detailed design stage in order to meet Water NSW improvement criteria. This could require the inclusion of additional treatment measures such as filtration systems, sediment basins and/or gross pollutant traps.

Key Issue	Overview of Key Findings
	- Flood modelling results confirmed that all solar panels and infrastructure are located outside areas of major flood hazard and although peak discharge volumes may increase slightly due to the increase in impervious surfaces across the Project Area, potential impacts to drainage features and downstream watercourses would be minimal. - Water required for the Project will be sourced under agreement with the landholder (either from farm dams or the existing groundwater bore in accordance with licence conditions) and no impacts to surface water or groundwater availability in the vicinity of the Project are anticipated. No additional interaction with the groundwater table is anticipated and no impacts to groundwater dependent ecosystems are expected.
Hazards and Risks – Preliminary Hazard Analysis	- A Preliminary Hazard Assessment was prepared for the Project in accordance with the relevant guidelines and policies. - The assessment indicated that all potentially hazardous components of the Project are located at distances greater than the impact range of any credible hazard event from the nearest non-associated residences. - The highest potential for a contamination event to occur within the Development Footprint is during the construction phase. There is minimal potential that construction activities including potential hazardous materials spills will interact with groundwater. - The Project will implement a range of risk mitigation and management measures, including rigorous design and maintenance practices to reduce the likelihood of any hazardous events occurring. - A Final Hazard Analysis, Fire Safety Study and Emergency Plan will be developed as the Project design progresses toward completion.
Hazards and Risks – Bushfire Threat Assessment	- A bushfire threat assessment was undertaken in accordance with Rural Fire Service (RFS) guidelines and evaluated the vegetation, topography and environmental features of the Project Area. The assessment indicated that the bushfire threat for the Project is considered low as the landscape is predominantly grazed, which reduces grassland fuel loads and bushfire potential. - Following advice from RFS and FRNSW, the Project incorporates a 10 m Asset Protection Zone (APZ), dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the site, supplementary access via Koorringaroo Road (for emergencies only) with emergency access points (via gates) along the security fence and access tracks with turning bays across the site to allow for safe movement by emergency services personnel. - A Bushfire Emergency Management and Operations Plan will be developed and implemented to identify all relevant risks, mitigation measures and procedures.
Hazards and Risks – Electromagnetic Fields (EMF)	- The design, selection and procurement of the electrical equipment for the Project would comply with relevant international and Australian standards for generation of and exposure to EMF. - The required electrical safety standards and codes (including provision of fencing, enclosures, and physical distance) would mitigate the risk of potential EMF exposure to the general public from these sources. - Additionally, the Project layout has been designed to ensure adequate separation distances between sensitive receivers and Project infrastructure.

Key Issue	Overview of Key Findings
Social	• A Social Impact Assessment was prepared supported by community and stakeholder engagement and identified both positive and negative impacts on local and regional stakeholders. • The main positive impacts of the Project include the generation of local employment and procurement opportunities, livelihood enhancement associated with hosting Project infrastructure, and intergenerational equity and improved liveability due to the contribution of the Project to renewable energy generation. • The main negative impacts include the potential change in sense of place due to loss of visual amenity, stress and anxiety associated with project uncertainties and cumulative impacts, and perceived inability of local community to inform Project planning. • Mitigation and Management measures proposed include but are not limited to: ○ Social Impact Management Plan. ○ ongoing implementation of the Community and Stakeholder Engagement Plan. ○ continued implementation of a Community Benefits Sharing Strategy and Neighbourhood Benefit Sharing Program. ○ implementation of the Accommodation and Employment Strategy developed as part of the EIS.
Economic	• An Economic Impact Assessment was undertaken and demonstrated that Project will have a positive impact on investment in regional businesses including accommodation suppliers and businesses that support the construction industry as well increasing in local employment opportunities. • The Project will involve a capital investment of approximately \$650 million, of which approximately \$98 million (15%) will be retained within the regional economy. • A target of 5% local workforce will be in place during the construction phase of the Project. • During the peak construction period, the accommodation requirement of the Project is likely to be met by existing accommodation in the region. • The Project will contribute the following economic outcomes for the region: ○ 155 direct and 245 indirect jobs during construction, totalling 400 FTE total jobs nationally (over 18–24 months during construction), including 60 FTE jobs for the region ○ 14 FTE total jobs (4 FTE direct and 10 FTE indirect) nationally during operations, including 6 FTE jobs for the region ○ ongoing economic stimulus of approximately \$114 million over 40 years (CPI adjusted) relating to operational wage stimulus, community/neighbour payments, increased Council land tax returns ○ construction workers relocating to the region would be expected to inject approximately \$11 million (2024 AUD) in new spending into the economy over the construction phase, supporting approximately 28 FTE jobs in the service sector in the region over this time.
Waste Management	• An assessment of waste was undertaken to assess the potential risks associated with waste management of the Project. Waste streams are within the capacity of local waste management facilities and for potential exceedances, additional services will be consulted to avoid negative impacts on local waste services. • Most of the Project waste would be generated during the construction and decommissioning stage with minor quantities of waste to be generated by the day-to-day operation of the Project.

Key Issue	Overview of Key Findings
	- Suitable facilities for the management of waste have been identified within the EIS. - A draft Waste Management Plan has been prepared as part of the EIS and will be implemented should the Project be approved.
Air Quality	- The main air emissions during construction of the Project would be dust and air borne particles generated from construction activities, including vegetation clearing and site preparation, as well as vehicle and equipment exhaust emissions. These emission sources would be localised and temporary in nature for the duration of the construction and decommissioning phases. During operations minor emissions would arise from vehicle use on internal unsealed roads. - Mitigation measures to reduce air emissions will be incorporated into the Construction Environmental Management Plan and will include the use of water suppression on unsealed roads and stockpile areas as required, modification of activities during periods of dry and windy weather, vehicle maintenance and operation protocols, and timely rehabilitation of exposed areas.

Cumulative Impacts

The specialist assessments also considered the cumulative impacts associated with other development and projects within the surrounding area. Whilst the Project is located outside of the five REZs identified in NSW, there are currently 23 approved and proposed projects within a 100 km radius from the Project (at the time of finalising this EIS). Each of these renewable energy projects is at different stages of the environmental and planning approval process so assessment has been informed by information as currently available.

Key aspects with the potential to have cumulative impacts include:

- Agriculture.
- Biodiversity.
- Traffic and Transport.
- Visual.
- Noise and Vibration.
- Social and Economic.
- Waste.

Where possible these potential cumulative impacts have been avoided through design and minimised through the mitigation and management measures identified in each of the impact assessments.

Consultation

Lightsource bp has undertaken, and is continuing, a comprehensive program of community and stakeholder consultation for the Project. Specific activities have included:

- establishment of a dedicated Project website and email address
- distribution of printed information sheets/postcards and personalised letterbox drops
- formal briefings, individual meetings/interviews, phone calls and emails with relevant stakeholders
- community drop-in sessions and information stalls
- online and telephone surveys.

A stakeholder identification process was undertaken for the Project to support the planning and delivery of community and stakeholder consultation to inform the SIA and the Environmental Impact Statement (EIS). Concerns raised during the engagement process have been recorded and have informed investigations undertaken as part of the EIS and the ongoing development of the Project.

Table ES.2 provides a summary of the key community concerns raised during the engagement process and how these have been responded to during the EIS phase.

Table ES.2 Community and Landholder Concerns

Stakeholder Group	Consultation Summary	Key Outcomes
Community including: • Neighbouring and proximal landholders (< 5 km). • Local community, special interest groups (< 10 km). • Broader Community (> 10 km to 100 km).	Key issues raised by community during consultation included concerns related to: • Landscape and visual amenity. • Property Values. • Bushfire risk. • Noise and dust emissions. • Water quality and quantity impacts, including flooding. • Mental health. • Agricultural land. • Biodiversity. • Roads. • Traffic and Transport. • Waste generation and decommissioning. • Cumulative impacts. • Glint and glare impacts. • Land use conflict. Additionally, community identified potential positive impacts associated with • Employment opportunities. • Benefit sharing. • Net zero. • Participation in the process.	Issues raised by the community were considered during the design refinement process including the following design changes: • Removal of approximately 50 ha of solar arrays in the north-west corner of the Project Area to reduce visual and noise impacts. • Relocation of the centralised BESS approximately 1.2 km to the east, away from sensitive receivers on the north-west. • Removal of 20 decentralised BESS units located nearest to sensitive receivers. • Further refinement of solar arrays to avoid impacts specifically to <i>Eucalyptus macarthurii</i>. • Inclusion of a secondary access point via Koorringaroo Road as well as additional emergency access points along the perimeter fencing via gates for emergency access and egress. • Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek. • Solar panels designed with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event. • Inclusion of dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area. • Strategically located noise attenuation (noise barriers) around loudest Project infrastructure. • Strategically located landscape screening. • Implementing setback distances i.e. ○ a 10 m APZ around the perimeter of the Project, within the security fencing and ○ approximately 20 m to 40 m setbacks around second order and higher streams, where these have biodiversity value. • Implementing exclusion zones i.e. ○ Areas with TECs and habitat for threatened species. ○ Areas prone to flooding (1% Annual Exceedance Probability (AEP)).

Stakeholder Group	Consultation Summary	Key Outcomes
		Mitigation measures were also developed with consideration of community feedback including: • Commitment to a Community Benefit Fund. • Engagement with residents to discuss issues and neighbour agreements – benefit sharing. • Development of post-approval management plans in consultation with key stakeholders and communication of commitments. • Continued implementation of the Community and Stakeholder Engagement Plan (CSEP). • Continued proactive engagement with community. • Implementation of the Accommodation and Employment Strategy (AES) to maximise local benefits.
Local businesses and industry groups (> 10 km to 100 km).	Key issues raised included: • Accommodation availability in the LGA. • Mechanisms to support local business service the workforce. • Enhancing outcomes for local communities.	Mitigation measures were developed with consideration of local business and industry feedback including: • Preparation and implementation of a Social Impact Management Plan. • Implementation of the AES, CSEP, Community Shared Benefit Strategy.

Consultation will continue following the submission of the EIS, which will include public exhibition of the EIS for a minimum of 28 days. Lightsource bp will undertake a range of direct stakeholder engagement activities on an ongoing basis. Subject to approval of the Project, RES will maintain communication activities in the lead up to, and during construction and operation.

Project Justification and Need

The Project aligns with both Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australia.

The Project will contribute to the implementation of the NSW Electricity Strategy, which seeks to establish a reliable, affordable and sustainable electricity future for NSW. The location of the Project including the design, technology, layout and size of the Project have been developed through consideration of several alternatives by the Proponent to ensure the Project would result in maximum benefits for the locality and region in the long term, whilst minimising impacts to the environment and to Aboriginal cultural heritage during all phases of the Project.

The Project is considered to be justified and in the public interest because:

- it is suitably located in a region with ideal climatic and physical conditions for large-scale solar energy generation where co-located use for livestock grazing is anticipated
- it is within proximity of an existing transmission line with adequate capacity to receive the energy proposed to be generated
- it is situated adjacent to agricultural land uses that are compatible with large-scale solar energy generation
- it would not result in significant biophysical, social or economic impacts
- it would create employment opportunities and benefits to the local and regional economy.

Lightsource bp is committed to the long-term environmental management of the land within the development footprint. At the end of the Project's investment and operational life, the development footprint would be returned to its pre-existing agricultural land use or another land use as agreed by the host landholders at that time and in accordance with any legislative requirements or restrictions.

The consequences of not proceeding with the Project would result in:

- loss of additional renewable energy supply to assist Australia in reaching the Large-scale Renewable Energy Target
- loss of opportunity to reduce greenhouse gas emissions and move towards cleaner electricity generation
- loss of increased energy security and supply into the Australian grid
- loss of significant social and economic benefits created through capital investment and provision of direct and indirect employment opportunities during the construction and operation of the Project.

Conclusion

Lightsource bp has applied an iterative approach through the development of this EIS responding to environmental, social and cultural heritage constraints and community concerns through refinement of the layout and the overall Project approach.

Through the implementation of best practice, the potential environmental and cultural heritage impacts associated with the Project can be appropriately avoided or managed, which will also address the community concerns and associated social impacts identified during the stakeholder engagement process. Given the net benefit and commitment from Lightsource bp to appropriately manage the potential environmental impacts associated with the Project, it is considered the Project would result in a net benefit to the region and broader NSW community.

EIS Declaration

Project Details

Required Information	Details
Project Name	Gundry Solar Farm
Application Number	SSD-48225958
Address of the Land in Respect of Which the Application is Made	Windellama Road, Gundry NSW

Applicant Details

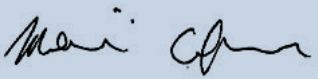
Applicant Name	Applicant Address
Lightsource Development Services Australia Pty Ltd (Lightsource bp) (ABN 26 623 301 799)	Level 29, 420 George Street Sydney NSW 2000

Details of Person by Whom this EIS was Prepared

Required Information	Details
Name	Marion O'Neil
Address	Umwelt (Australia) Pty Limited, 75 York St, Teralba NSW 2284
Professional Qualifications	- Bachelor of Science (Natural Sciences). - Master of Environmental Management.

Declaration by Registered Environmental Assessment Practitioner

Required Information	Details
Name	Malinda Facey
Registration Number	R80048
Organisation registered with	Environmental Institute Australia and New Zealand (EIANZ)
Declaration	The undersigned declares that this EIS: - has been prepared by suitably qualified environmental consultants and technical specialists, and reviewed by a Registered Environmental Assessment Practitioner, as detailed in Appendix 1; - has been prepared in accordance with Part 8, Division 5 of the <i>Environmental Planning and Assessment Regulation 2021</i>; - contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates; - does not contain information that is false or misleading; - addresses the Planning Secretary's environmental assessment requirements (SEARs) for the Project, as detailed in Appendix 1;

Required Information	Details
	- identifies and addresses the relevant statutory requirements for the Project, including any relevant matters for consideration in environmental planning instruments, as detailed in Appendix 5; - has been prepared having regard to the Department's State Significant Development Guidelines – Preparing an Environmental Impact Statement; - contains a simple and easy to understand summary of the Project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; - contains a consolidated description of the project in a single chapter of the EIS; - contains an accurate summary of the findings of any community engagement; and - contains an accurate summary of the detailed technical assessment of the impacts of the Project as a whole.
Signature	
Date	24 October 2024

Abbreviations

Term/Abbreviation	Definition
°C	Degrees Celsius
AC	Alternating Current
ACT	Australian Capital Territory
AEP	Annual Exceedance Probability
APZ	Asset Protection Zones
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
AQI	Air Quality Index
BAM	Biodiversity Assessment Methodology
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BCF	Biodiversity Conservation Fund
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BOS	Biodiversity Offset Strategy
BSAL	Biophysical Strategic Agricultural Land
CASA	Civil Aviation Safety Authority
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CPA	Connection Processes Agreement
CSBS	Community Shared Benefit Strategy
CSES	Community and Stakeholder Engagement Strategy
CSWMP	Construction Soil and Water Management Plan
CTMP	Construction Traffic Management Plan
DA	Development Application
DC	Direct current
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment (former)
DPHI	NSW Department of Planning, Housing and Infrastructure (current)
DPI	NSW Department of Primary Industries
DPIE	NSW Department of Planning, Industry and Environment (former)
DREMP	Decommissioning and Rehabilitation Environmental Management Plan
EIA	Economic Impact Assessment
EIS	Environmental Impact Statement
ELF	Extremely Low Frequency
EMF	Electromagnetic field
EP	Emergency Plan
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>

Term/Abbreviation	Definition
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	NSW Environmental Planning and Assessment Regulation 2021
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development
FTE	Full Time Equivalent
GW	Gigawatt (unit of power equivalent to 1 billion watts)
GWh	Gigawatt-hour (unit of energy)
ha	hectare
HHIA	Historical Heritage Impact Assessment
IAP2	International Association of Public Participation
ICNG	Interim Construction Noise Guidelines
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IPC	Independent Planning Commission
KFH	Key Fish Habitat
km	kilometres
kV	kilovolt
LEMC	Local Emergency Management Committee
LEP	Local Environmental Plan
LGA	Local Government Area
Lightsource bp	Lightsource Development Services Australia Pty Ltd
LIBs	Lithium-ion Batteries
LLS	Local Land Services
LUCRA	Land Use Conflict Risk Analysis
LSC	Land and Soil Capability
M	Metres
MI	Megalitres
MW	Megawatt (unit of power equivalent to 1 million watts)
MWh	Megawatt-hour (unit of energy)
MWp	Megawatt-peak (solar farm output at theoretical optimal performance)
MNES	Matter of National Environmental Significance
NPI	National Pollution Index
NPWS	NSW National Parks and Wildlife Service
NRAR	NSW Natural Resources Access Regulator
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
NML	Noise Management Levels
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
OEMP	Operational Environmental Management Plan
O&M	Operation and Maintenance Facility
PAD	Potential Archaeological Deposits

Term/Abbreviation	Definition
PBP 2019	Planning for Bushfire Protection
PCT	Plant community type
PHA	Preliminary hazard analysis
Planning Systems SEPP	NSW State Environmental Planning Policy (Planning Systems) 2021
PNTL	Project Noise Trigger Level
PINL	Project Intrusiveness Noise Levels
POEO Act	NSW <i>Protection of the Environment Operations Act 1997</i>
PMF	Probably Maximum Flood
PV	Photovoltaic
REAP	Renewable Energy Action Plan
RET	Renewable Energy Target
RFS	NSW Rural Fire Service
RNP	NSW Road Noise Policy
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SISD	Safe Intersection Sight Distance
SGVMP	Sheep Grazing Vegetation Management Plan
Solar Guideline	Large-Scale Solar Energy Guideline 2022
SRD SEPP	NSW State Environmental Planning Policy (State and Regional Development) 2011
SRLUP	Strategic Regional Land Use Plan
SSD	State Significant Development
TEC	Threatened ecological community
VP	Viewpoint
VPA	Voluntary Benefit Agreement
WARR Act	NSW Waste Avoidance & Resource Recovery
WRIA	Water Resources Impact Assessment
WSP	Water Sharing Plan
WM Act	NSW <i>Water Management Act 2000</i>
ZTV	Zone of Theoretical Visibility
TIA	Transport Impact Assessment
LVIA	Landscape and Visual Impact Assessment

Glossary

Project Specific Glossary of Terms	Description
Associated landholder / residence	Privately-owned land, including the associated residence, where the owner has reached an agreement with the proponent in relation to the Project and management of impacts.
Agrivoltaics	The simultaneous use of areas of land for both solar photovoltaic power generation and agriculture. Also referred to as 'agri-solar' or 'dual-use solar'.
Development footprint	The maximum extent of ground disturbance associated with construction and operation of the Gundry Solar Farm. The development footprint would cover an area of approximately 512 ha within the wider Project Area.
Host landholder / residence	Privately-owned land, including the residence, where the owner has entered into an agreement with the proponent to have Project infrastructure located on it.
Non-associated landholder / residence	Privately-owned land, including the residence, where the owner has not reached an agreement with the proponent in relation to the Project.
Primary Project access point	The Project's main access point directly off Windellama Road.
Project Area	The total area of the parcels of land on which the Project would be developed, encompassing five freehold lots measuring approximately 702 ha.
The Proponent	Lightsource Development Services Australia Pty Ltd (Lightsource bp) was formed in 2018 as a joint venture between the European solar farm developer, Lightsource and global energy company, bp. Lightsource bp has developed over 8.4 gigawatts of solar projects to date, and currently has a 60+ GW development pipeline across 19 countries.
The Project	The proposed Gundry Solar Farm, involving the construction, operation, maintenance and decommissioning of an approximately 400 Megawatt peak (MWp) solar farm, up to 555 MWp BESS and associated infrastructure to connect the Project to the grid.

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Appendix No. Appendix Name

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1.0 Introduction

Lightsource Development Services Australia Pty Ltd (Lightsource bp) is seeking to develop the Gundry Solar Farm in the Southern Tablelands region of New South Wales (NSW), approximately 10 kilometres (km) southeast of Goulburn within the Goulburn Mulwaree Local Government Area (LGA).

The proposed Gundry Solar Farm includes the construction, operation, maintenance and decommissioning of an approximate 400 Megawatt peak (MWp) (DC) solar photovoltaic (PV) generation facility with a Battery Energy Storage System (BESS) of up to 555 MWp and 1,570 Megawatt hour (MWh) capacity (the Project). The Project further includes ancillary infrastructure, an onsite substation/switching station and connection to an existing 330 kilovolt (kV) transmission line (Yass to Marulan). The location of the Project and its regional context is presented in **Figure 1.1**.

1.1 Background

The Project Area is in the rural locality of Gundry, near Goulburn in NSW, as shown on **Figure 1.1**. The Project Area comprises five freehold lots and a small portion of Windellama Road, including the Council Road reserve (refer to **Figure 2.3**), covering an area of approximately 702 ha. The Project infrastructure would be entirely contained within the Project's Development Footprint, which will extend over approximately 512 ha.

The Project will supply electricity to the National Electricity Market (NEM) via an onsite grid connection to the existing 330 kV transmission line (Yass to Marulan), owned and operated by TransGrid, that traverses the north-west corner of the Project Area. The Project will generate enough clean energy for about 133,000 homes and reduce carbon emissions by 670,000 tonnes. The BESS will have capacity to store up to 1,570 MWh of on-demand energy for supply to the grid.

Project access will be via the existing driveway at 961 Windellama Road via the Hume Highway. Intersection works on Windellama Road are proposed as part of the Project to upgrade the Project access to accommodate heavy vehicles. Further detail regarding the key components of the Project is provided in **Section 3.0**.

It is expected that up to 400 Full Time Equivalent (FTE) jobs will be generated during construction with a peak of 250 construction personnel on site at any given time. Up to four FTE jobs is expected during the operation and maintenance of the Project. The Project would have an operational lifespan of approximately 40 years. After its operational life, the Project would either be decommissioned (by removing all infrastructure and returning the site to its existing land capability) or repurposed with new PV equipment subject to technical feasibility and planning consents.

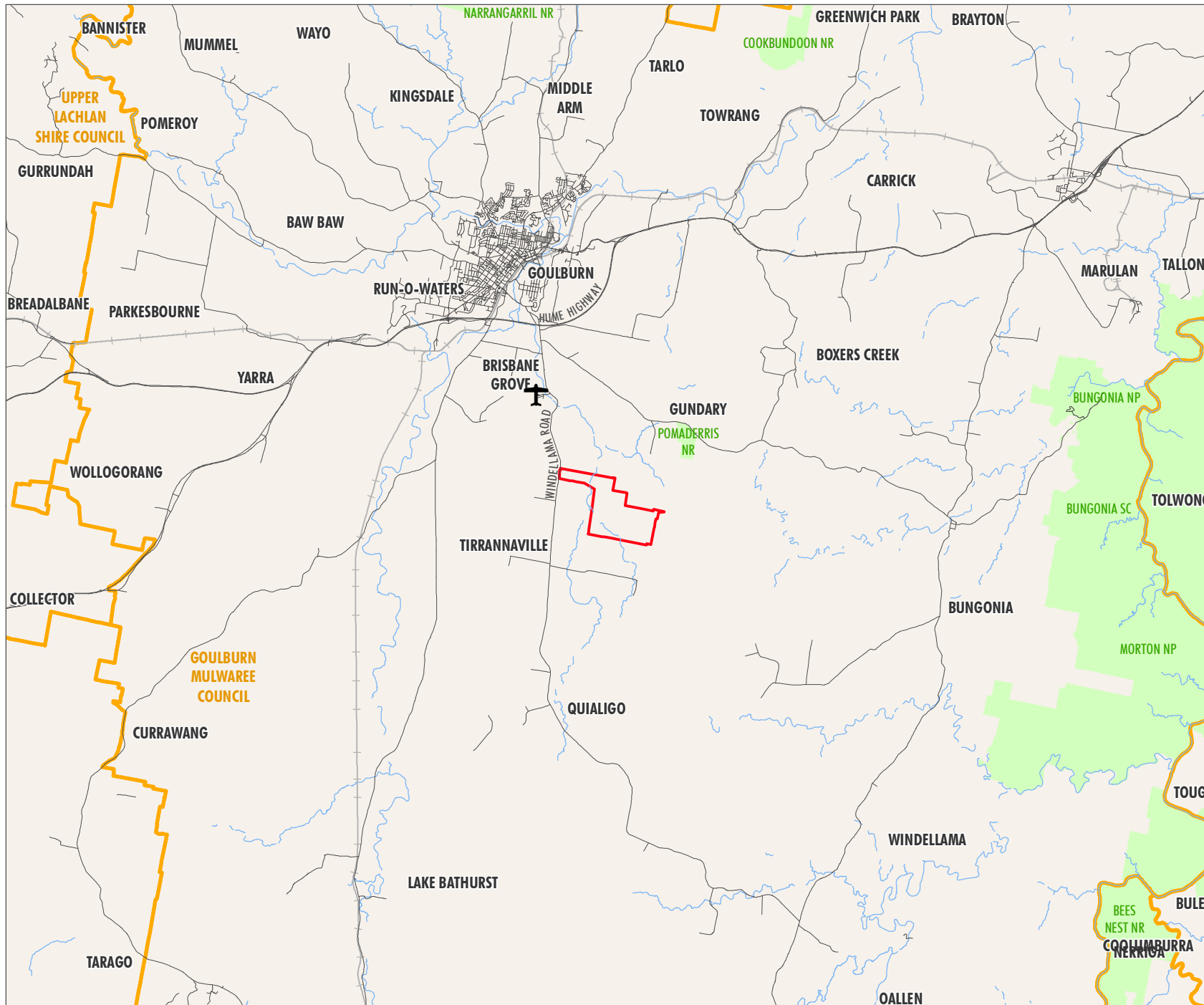
The Project is a State Significant Development (SSD) under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP), as the Project is development for the purposes of electricity generating works and the capital investment value of the Project is over \$30 million. A development application (DA) for the Project is required to be submitted under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

FIGURE 1.1

Locality and Regional Context

Legend

- Project Area
-  Goulburn Airport
- Local Government Area
- NPWS Estate
- Roads
- Railway
- Watercourses



Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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This Environmental Impact Statement (EIS) assesses the potential impacts associated with the Project in accordance with the Secretary’s Environmental Assessment Requirements (SEARs), issued on 10 November 2022, and has been prepared in line with the following guidelines, and:

- *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPE, 2022a) (EIS Guidelines).
- *Large-Scale Solar Energy Guidelines* (DPE, 2022b) (Solar Guideline).
- *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPE, 2022c) (CIA Guidelines).
- *Social Impact Assessment Guideline for State Significant Projects* (DPE, 2023a) (SIA Guidelines).
- *Undertaking Engagement Guidelines for State Significant Projects* (DPE, 2022d) (Engagement Guidelines).

Appendix 1 provides an outline of the SEARs and where these have been addressed in the EIS.

1.2 Proponent

The Proponent for the SSD Application for the Gundry Solar Farm is presented in **Table 1.1**.

Table 1.1 Proponent Details

Requirement	Details
Full Name/s	Lightsource Development Services Australia Pty Ltd (Lightsource bp)
Address	Level 29, 420 George Street, Sydney NSW 2000
ABN	26 623 301 799
Nominated Contact	Kelsi Bolstad
Contact Details	kelsi.bolstad@lightsourcebp.com

Lightsource and bp first entered into partnership in 2017. Most recently, bp has announced the intention to fully acquire Lightsource bp, which currently operates as a 50/50 joint venture with bp.

Lightsource bp is a global leader in the development and management of solar energy projects. Lightsource bp’s purpose is to deliver affordable and sustainable solar power for businesses and communities across Australia, and the world.

Lightsource bp has developed over 300 solar projects across the globe to date, equating to a total of 8.4 gigawatts (GW), and currently has a 60+ GW development pipeline across 19 countries.

Lightsource bp entered the Australian market in 2018 and has developed over 1.1 GW of solar across five projects in Victoria, Queensland and NSW.

Several more solar projects are currently under development across Australia. Lightsource bp’s project portfolio is listed in **Table 1.2** below.

Table 1.2 Lightsource bp Solar Project Pipeline

Site Name	Region	MW	Stage
Wellington	NSW	200	Operation
West Wyalong	NSW	107	Operation
Wellington North	NSW	425	Construction
Wunghnu	VIC	90	Construction
Woolooga	QLD	210	Operation
Goulburn River	NSW	550	Planning application
Sandy Creek	NSW	840	Planning application
West Mokoan	VIC	364	Planning application
Lower Wonga	QLD	320	Approved, construction late 2024

1.3 Project Overview

Subject to final design, the Project would comprise the following key elements:

- Approximately 660,000 bifacial flat plate solar PV modules in single-axis tracking arrangement with a maximum height of 3 metres (m) above ground level, occasionally reaching up to 4 m depending on the topography.¹
- A lithium-ion BESS to store energy generated by the Project, comprising one of the following options:
 - 325 MWp/650 MWh centralised alternating current (AC) BESS.
 - 230 MWp/920 MWh decentralised direct current (DC) BESS.
 - combined centralised AC and decentralised DC BESS with a total capacity of 555 MWp/1,570 MWh.
- Onsite 33/330 kV substation and switching station, to be managed by TransGrid, with underground electrical conduits and cabling leading from the solar panels into the substation yard, and overhead lines reaching above to the existing 330 kV transmission line.
- Internal gravel access tracks, including several watercourse crossings (via culverts and bed level crossings) within the Project Area, where required, to manage existing surface water flows.
- Temporary ancillary facilities, including a construction compound (including office amenities, parking and storage) and laydown areas.
- Permanent site office, operations and maintenance building with parking for the operations team.
- Primary access point from the existing driveway off Windellama Road, with proposed intersection works on Windellama Road to upgrade the Project access to accommodate heavy vehicles.

¹ Assessments presented in this EIS based on a maximum panel height of 3 m as the occasional 4 m high panels will typically be limited to lower lying areas, thus generally keeping the overall height of panels across the Project Area at 3 m.

- Emergency access point via the existing entrance off Kooringaroo Road proposed on the east (for emergencies only).
- Perimeter security fencing with emergency access points (via gates), a 10 m Asset Protection Zone (APZ) and dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area.

The Project's conceptual layout is illustrated in **Figure 3.1** with a detailed description of the Project provided in **Section 3.0**.

Subdivision of land is proposed as part of the Project, as further detailed in **Section 3.2.1**.

The Project is expected to operate for approximately 40 years. After its operational life, the Project would either be decommissioned (by removing all infrastructure and returning the site to its existing land capability) or repurposed with new PV equipment subject to technical feasibility and planning consents. It is noted that solar panels may be replaced/repowered during the expected 40-year operational life of the Project, within the Development Footprint.

1.4 Project Objectives

The objectives of the Project and how these will be achieved are outlined in **Table 1.3**.

Table 1.3 Objectives of the Gundry Solar Farm

Objective	How will the proposal achieve this objective?
Deliver affordable and sustainable renewable energy to businesses and communities within NSW	The selected site has favourable solar irradiation and will deliver clean, reliable, and affordable energy. The Project is well aligned with the objectives of the current Federal and State commitments to combat climate change and to provide affordable renewable energy to the community and businesses.
Provide renewable energy that would contribute to the reduction of greenhouse gases across NSW, avoiding up to 670,000 tonnes per annum of carbon dioxide	The Project would provide enough clean, renewable energy for about 133,000 average NSW homes while displacing approximately 670,000 metric tonnes of carbon dioxide.
Support the local regional economy by preferencing local workers and businesses in the development, construction, and operation of the Project	Employment generation creating approximately 400 FTE jobs during the peak of the construction phase with up to four direct jobs during the operational phase. It is estimated that the peak number of personnel on site at any given time would be 250. The Project Area could also continue to support livestock, subsequent further consultation with the landholder and government agencies, with approximately 1,000 sheep expected to be able graze the Development Footprint (secured by security fencing and managed through a Sheep Grazing Management Plan and Vegetation Management Plan). This would ensure ongoing agricultural use of the Project Area and will assist in limiting biomass and bushfire risk.

Objective	How will the proposal achieve this objective?
Facilitate community engagement and participation in the design, development, and operation of the Project	As detailed in Section 5.0 , extensive community engagement have been undertaken during the design and planning of the Project to inform and consult the community and capture feedback to minimise potential environmental, cultural and social impacts whilst maximising State and local benefits. As a result, the Project design and layout has been refined throughout the detailed assessment phase, as outlined in Section 1.5 and Section 5.3 , to address the changes that have been made through this iterative design process.
Minimise environmental and heritage impacts to the Project Area through adaptive design	As discussed in Section 1.5 , the Project design and layout has been considered in relation to the site's key environmental constraints and community feedback, considering: • biodiversity values • Aboriginal cultural heritage values • surface water (including water quality, flooding and presence of watercourses) • location of sensitive receivers • operational noise • changes to visual landscape and visual amenity • bushfire risk.

1.5 Impact Avoidance and Mitigation

Avoidance and mitigation measures have been implemented throughout the development of the Project starting from site selection (as detailed in **Section 8.1.1**) and the early design phase.

The Project will have an onsite grid connection via connection to the overhead transmission line which traverses the Project Area. This avoids the need to construct additional connection infrastructure outside of the Project Area, such as high voltage (HV) transmission lines and substations. As such, the Project's ability to have an onsite grid connection would avoid any additional environmental, social and cultural impacts to several neighbouring landholders associated with the construction of grid connection infrastructure.

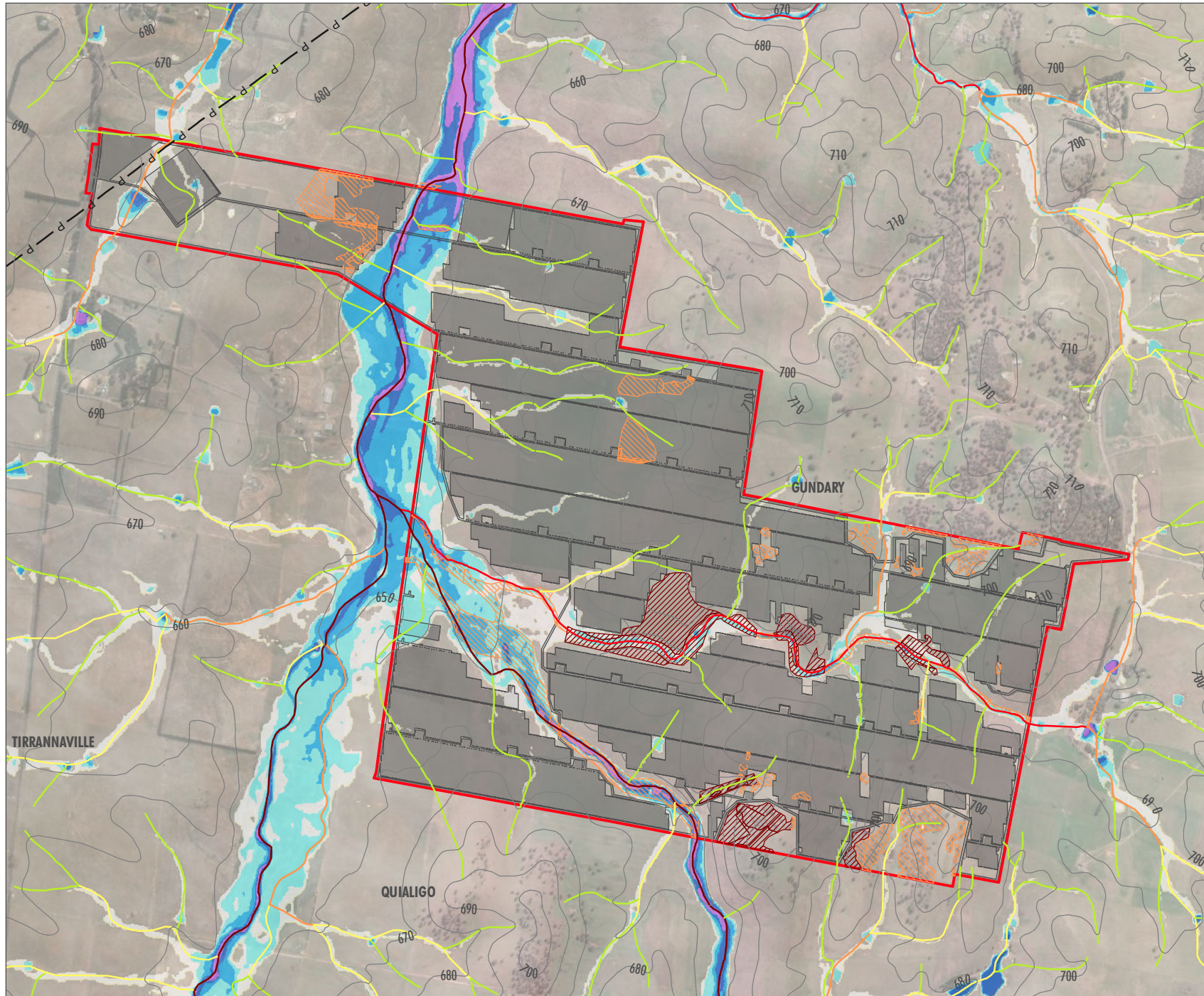
A comprehensive constraints analysis was conducted across the Project Area during the Project's early design phase, as detailed in the Scoping Report (Umwelt, 2022), to identify key environmental and social constraints on the site. The Project's design and layout at the time was designed to avoid impacts to main watercourses traversing through the Project Area (namely Gundry Creek and Bullamalito Creek) and high-quality biodiversity values (such as Threatened Ecological Communities (TECs) and habitat for threatened species) as illustrated in **Figure 1.2**. Furthermore, the layout has maintained appropriate setbacks (of approximately 20 m to 40 m) in accordance with the *Guidelines for Riparian Corridors on Waterfront Land* (DPE, 2012a) around smaller watercourses within the Project Area where there are biodiversity constraints and considered flooding constraints. To view how the Project design has considered the key environmental constraints identified during the early design and detailed assessment phases, refer to **Figure 1.2** for a constraints map overlain with the Project's Development Footprint.

Following the lodgement of the Scoping Report to the then Department of Planning and Environment (DPE) (now the Department of Planning, Housing and Infrastructure (DPHI)) in September 2022, several refinements were incorporated into the Project design and layout to further avoid and minimise impacts to sensitive environmental features and sensitive receivers (refer **Figure 2.5**). These refinements have been implemented as an outcome of ongoing consultation with sensitive receivers, targeted ecological surveys conducted across the Project Area, the findings of the detailed environmental assessments for the EIS and in response to community and stakeholder feedback during the preparation of the EIS.

These refinements include:

- Removal of approximately 50 ha of solar arrays in the north-west corner of the Project Area, to reduce potential noise and visual impacts to sensitive receivers.
- Relocation of the centralised BESS approximately 1.2 km to the east, away from sensitive receivers on the north-west, to reduce potential noise and visual impacts.
- Removal of 20 decentralised BESS units located nearest to sensitive receivers, to reduce potential noise and visual impacts.
- Further refinement of solar arrays to avoid impacts specifically to *Eucalyptus macarthurii*.
- Inclusion of a secondary access point via Kooringaroo Road as well as additional emergency access points along the perimeter fencing via gates for emergency access and egress.
- Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek.
- Solar panels have been designed with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event.
- Inclusion of dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area.
- Strategically located noise attenuation, as detailed in **Section 6.10**, to reduce operational noise impacts.
- Strategically located landscape screening, to reduce glint and glare and visual impacts.
- Standard environmental mitigation measures are also included in the Project design and are further detailed throughout **Section 6.0** and **Appendix 2**.

FIGURE 1.2
Constraints Map



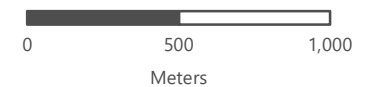
- Project Area
- Development Footprint
- 10m Contours
- P Existing Transmission Line
- Strahler Stream Ordering**
- 1
- 2
- 3
- 4
- ≥ 5

Ecological Constraint

- High
- Moderate

Depth of Predicted Flood Water (m) (1% AEP)

- < 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0



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1.6 Related Development

Lightsource bp has consulted with TransGrid regarding the development of the Project connection to the existing transmission line through the TransGrid network. In August 2022, Lightsource bp formally initiated the connection application process by executing the Connection Processes Agreement (CPA) with TransGrid. Initial assessments confirmed that there is sufficient capacity to support the Project. The connection agreement will occur through the offer to connect, which will allow for the Project to connect to the NEM. The offer to connect is expected to be finalised in late 2024.

1.7 Restrictions

An existing 330 kV transmission line easement (approximately 60 m wide) is present in the north-western corner of the Project Area. Additional cabling work as described in **Section 3.3.3** will be required within this easement as a part of the connection works to connect the Project to the NEM and is proposed as part of the Project. There is a Crown Land paper road directly north of the Project Area as shown in **Figure 2.3**. However, the road falls outside the Project Area and will not be directly impacted by the Project. There are no other restrictions or known covenants.

2.0 Strategic Context

2.1 Justification for the Project

The development of solar energy projects aligns with both 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. The State's existing four coal fired power stations are planned to be progressively closed over the coming years, with the Liddell Power Station closed in April 2023. The closure of the Eraring Power Station has been extended from the end of 2025 to August 2027. These power stations currently provide around three quarters of NSW's electricity supply and two thirds of the capacity required during peak demand periods such as during summer heat waves. In NSW, all four of the remaining operational coal-fired power stations are scheduled to retire by 2043 (AEMO, 2019). The NSW Government is taking action to lead investment in new renewable generation to ensure an orderly transition away from coal (EnergyCo, 2022). The Project will contribute to meeting the NSW Government objectives of providing a secure electricity supply for the people of NSW.

In Australia in 2020–2021, 71% of the total electricity was generated using fossil fuels, including coal (51%), gas (18%) and oil (2%). The share of coal in the electricity sector has declined since the beginning of the century when coal's share of electricity generation exceeded 80%. The contribution of renewable energy to the total national electricity generation increased from 21% in 2019 to 29% in 2020–2021 (DCCEE, 2022a). In 2022, renewables accounted for 34.8% of Australia's electricity supply (Stockhead, 2023). The share of renewables such as wind and solar in Australia's energy mix is anticipated to continue to increase over the coming years.

NSW has a strong pipeline of renewable energy projects which will contribute to achieving the current transition targets. This, however, requires significant investment from the private sector to achieve sufficient renewable energy supply to support NSW's transition to renewable energy and the retirement of the existing fossil fuel supply. The Project fits within the current strategic direction of NSW and Australian energy generation market and assist in achieving the planned transition to an increased contribution of renewable energy to Australia's energy needs. The Project provides for cleaner, more reliable electricity generation while reducing greenhouse gas emissions and the impacts of climate change.

Further, the Project will contribute to regional capital investment, diversify local economies, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project and deliver additional income to the host landholder and associated landowners.

Additional community benefit mechanisms that are being considered by Lightsource bp include:

- A Voluntary Planning Agreement (VPA) with Council, incorporating a Community Benefit Fund, which looks to allocate funds to local sporting, cultural and educational organisations, fund traineeships and generally support the local community.
- Neighbouring Benefit Sharing Program with non-associated landholders (within 1 km from the Project Area boundary).
- Partnerships with local training and education organisations.

2.1.1 Government Strategies, Policies and Plans

2.1.1.1 National and International Commitments

UN Climate Change Paris Agreement and COP28

Australia is one of the 193 Parties (192 countries plus the European Union) from around the world participating in the international climate change agreement (the Paris Agreement) (United Nations, n.d.). The Paris Agreement aims to:

- Hold the increase in the global average temperature to below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- Increase the ability (of nations) to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.
- Make finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.

The Paris Agreement seeks to meet its objectives by developing programs and mechanisms that:

- Require participating Parties to prepare and communicate greenhouse gas mitigation contributions. Parties were expected to set mitigation targets for 2020, and then develop new targets every five years. Each successive target is expected to represent a larger mitigation effort than the previous target.
- Promote climate change resilience and adaptation.
- Provide mitigation and adaptation funding to developing countries.
- Foster mitigation and adaptation technology transfer between Parties.
- Require participating Parties to report progress towards their mitigation contributions on an annual basis.

Australia signed the Paris Agreement on 22 April 2016. Obligations under the Paris Agreement are driving national greenhouse gas policy and Australia's commitments to the Paris Agreement include reducing greenhouse gas emissions by 43% below 2005 levels, by 2030 (DCCEEW, 2022b).

In 2022, the Commonwealth Government stated its ambition to put the country on track to achieve net zero emissions by 2050 (McAllister & Albanese, 2022). Australia's Nationally Determined Contribution (NDC) prescribes an unconditional economy-wide target to reduce greenhouse gas emissions, and states that future policies will target emissions generated from energy use, industrial processes, agriculture, land-use, land-use change and forestry and waste.

In late 2023, the 28th UN Climate Change Conference (or COP28) was held in Dubai with over 150 countries represented. It marked the conclusion of the first 'global stocktake' of the world's efforts to address climate change under the Paris Agreement.

Having shown that progress was too slow across all areas of climate action, from reducing greenhouse gas emissions, to strengthening resilience to a changing climate, to getting the financial and technological support to vulnerable nations, countries responded with a decision on how to accelerate action across all areas by 2030. This included a call on governments to speed up the transition away from fossil fuels to renewables (such as wind and solar power) in their next round of climate commitments, with the overarching aim to keep the global temperature limit of 1.5°C within reach.

The Project, as a large-scale renewable energy project, will contribute to achieving Australia's greenhouse gas emission reduction targets through avoiding up to 670,000 tonnes per annum of carbon dioxide, reducing emissions from energy production in NSW.

Australian Renewable Energy Target (RET)

To reduce the emissions of greenhouse gases generated by the electricity sector, and to encourage additional generation of electricity from suitable and renewable resources, the Australian Government introduced the Renewable Energy Target (RET) in 2009. The RET consists of 2 certificate schemes, the Large-scale Renewable Energy Target (LRET) and Small-scale Renewable Energy Scheme (SRES). The LRET incentivises the development of renewable energy power stations in Australia through a Renewable Energy Certificate Market for the creation and sale of certificates called large-scale generation certificates (LGCs).

In January 2021, the RET of 33,000 gigawatt hours (GWh) of additional renewable energy was met on a 12-month rolling basis.

In December 2023, 202 MW of capacity was approved for LGC generation in December, bringing the total approved in 2023 to 2,205.9 MW.

The Project would generate approximately 400 MW of electricity annually, which would contribute to the RET meeting its objectives. The Project would not generate greenhouse gas emissions through the process of energy generation and would contribute to energy diversity.

Australian Energy Market Operator's 2022 Integrated System Plan

The Australian Energy Market Operator's 2022 Integrated System Plan notes that, in the absence of coal fired generation, significant investment is needed to meet increased electricity demand, requiring a nine-fold increase in large-scale variable renewable energy generation. It also noted that firming and energy storage is required to support this growth, as well as ensuring a mix of complementary renewable energy technologies to smooth the generation profile of the network.

2.1.1.2 NSW Commitments

NSW Climate Change Policy Framework

The NSW Government has developed its *NSW Climate Change Policy Framework*, which aims to deliver net zero emissions by 2050, and a State that is more resilient and responsive to climate change (OEH, 2016). The targets in the *Climate Change (Net Zero Future) Act 2023* are 50% reduction on 2005 levels by 2030, with 70% reduction on 2005 levels by 2035.

Under the NSW Climate Change Policy Framework, NSW has committed to follow the Paris Agreement and to work to complement national action.

The policy framework is being delivered through:

- the Climate Change Fund
- developing an economic appraisal methodology to value greenhouse gas emissions mitigation
- embedding climate change mitigation and adaptation across government operations
- building on NSW's expansion of renewable energy
- developing action plans and strategies.

In 2013, the NSW Government released the *Renewable Energy Action Plan (REAP)* (NSW Government, 2013) and the *NSW Energy Efficiency Action Plan (EEAP)* (OEH, 2018). The three core goals of the REAP were to attract renewable energy investment, build community support for renewable energy and attract and grow expertise in renewable energy. Based on the implementation of the REAP, renewable energy is now well-placed to play a leading role in meeting NSW's energy needs into the future and has resulted in solar- and wind-generated electricity tripling during the five years since the REAP was implemented.

The Project Area is mapped as having 15–18 megajoules per square metre of average daily solar exposure under the NSW REAP mapping (refer to **Figure 2.1**). This is considered a moderate solar exposure. The available solar resources, combined with proximity to the transmission line and the current land use make the location suitable for a productive solar farm.

NSW Electricity Strategy and Electricity Infrastructure Roadmap

Current and future electricity development in NSW is supported through the *NSW Electricity Strategy* (NSW Government, 2020a) and the *NSW Electricity Infrastructure Roadmap* (NSW Government, 2020b) which builds on the framework set out in the Electricity Strategy taking 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, in aiming to provide large-scale renewable electricity generation that is affordable and reliable.

2.2 Large-Scale Solar Energy Guidelines

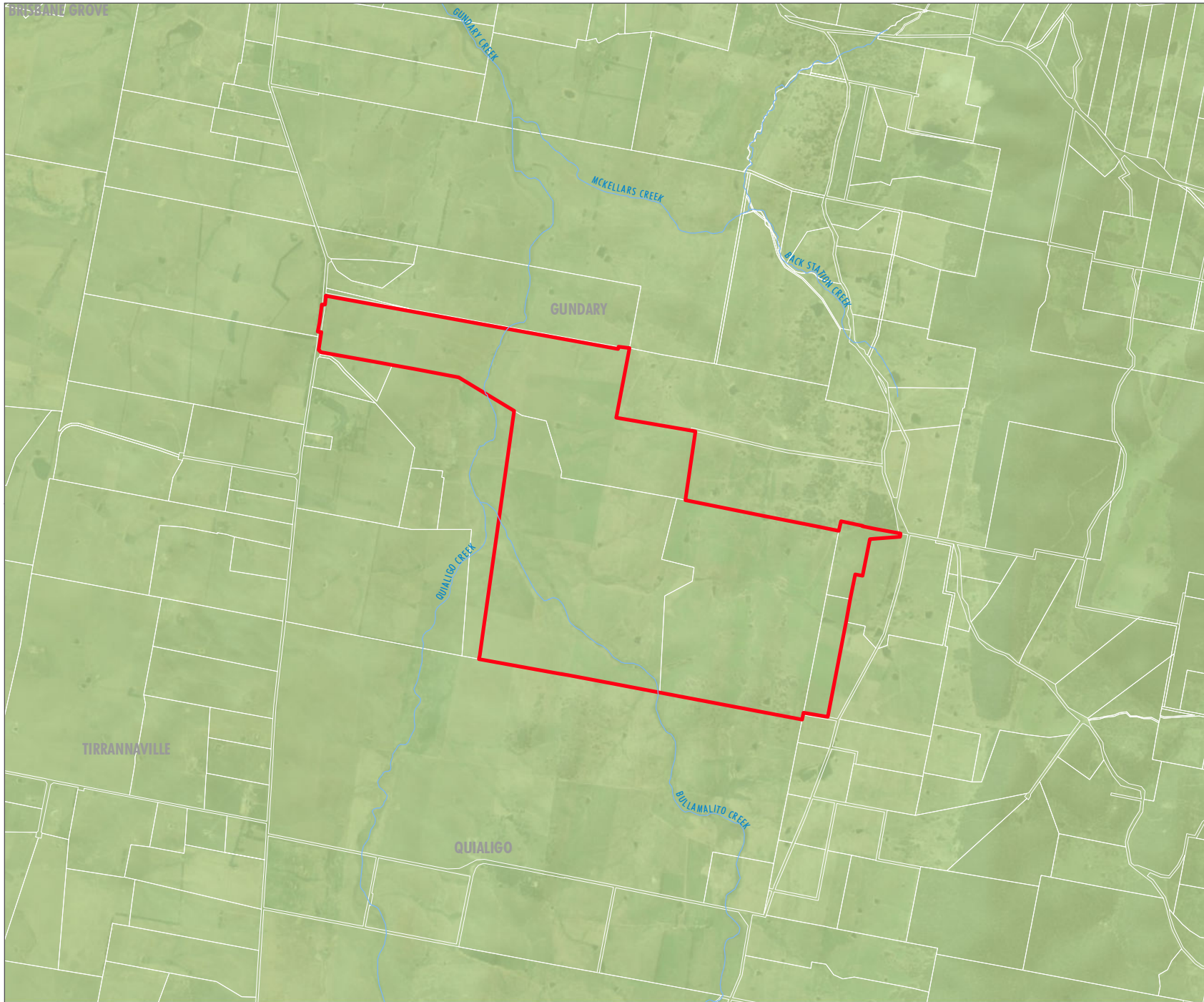
The *Large-Scale Solar Energy Guidelines* (DPE, 2022b) (Solar Guidelines) provides the community, industry, applicants and regulators with guidance on the planning framework for the assessment of large-scale solar energy projects under the EP&A Act. The Solar Guidelines is supported by a technical supplement for landscape and visual impact assessment which provides additional guidance and tools for assessing, evaluating, and mitigating visual and landscape impacts. The Solar Guidelines was developed to assist with delivering the NSW Government's commitment outlined in the NSW Renewable Energy Action Plan (NSW Government, 2013). This EIS, including any relevant technical assessments, has been prepared in accordance with the Solar Guidelines.

It is noted parts of the Solar Guidelines are proposed to be updated to align with the draft Energy Policy Framework (such as the Benefit Sharing Guidelines), which were placed on exhibition from late 2023 to 29 January 2024.

FIGURE 2.1

Average Daily Solar Exposure

- Project
- Cadastre Boundaries
- Watercourses
- Annual Average Daily Solar Exposure**
- 15 - 18MJ/m2



0 500 1,000
Meters

Scale: 1:0 at A4
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2.3 State Environmental Planning Policy (Transport and Infrastructure) 2021 – “Regional Cities”

The NSW Government (DPIE, 2021) has recognised that:

Whilst there is relatively broad public support and social licence in NSW for the adoption of renewable, low emission energy generation, the increasing number of utility-scale solar and wind energy projects required to support the transition to renewable energy generation has the potential to create and exacerbate land use conflicts with land surrounding some of the State’s regional cities. Solar and wind energy developments also have unique visual characteristics that can impact on the scenic qualities of an area.

‘Regional cities’ are identified as being strategically important to the ongoing growth and development of regional NSW. These cities also underpin the regional economies providing a wide range of retail and business activity and they offer a wide variety of employment opportunities. They also support diverse visitor and tourist economies (DPIE, 2021).

Section 2.42 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) seeks to manage the potential land use conflicts associated with utility-scale solar and wind energy developments, by imposing specific mandatory considerations for the assessment of utility-scale solar and wind energy development near certain regional cities.

The mandatory considerations under section 2.42 apply to all land within 10 km of land zoned B3 – Commercial Core, and within 5 kilometres of any residential land zoned R1 – General Residential, R2 – Low Density Residential and R3 – Medium Density Residential. The original regional cities identified under this section (as of 2021) included Albury, Dubbo, Tamworth, Armidale, Griffith, Wagga Wagga, Bathurst and Orange. The Regional Cities Map was subsequently updated on 16 December 2022 under *Mid-Western Regional Local Environmental Plan (Transport and Infrastructure) (Map Amendment No 1)* to include Goulburn as well as other regional cities not originally subject to section 2.42 of the T&I SEPP (refer to **Figure 2.2**).

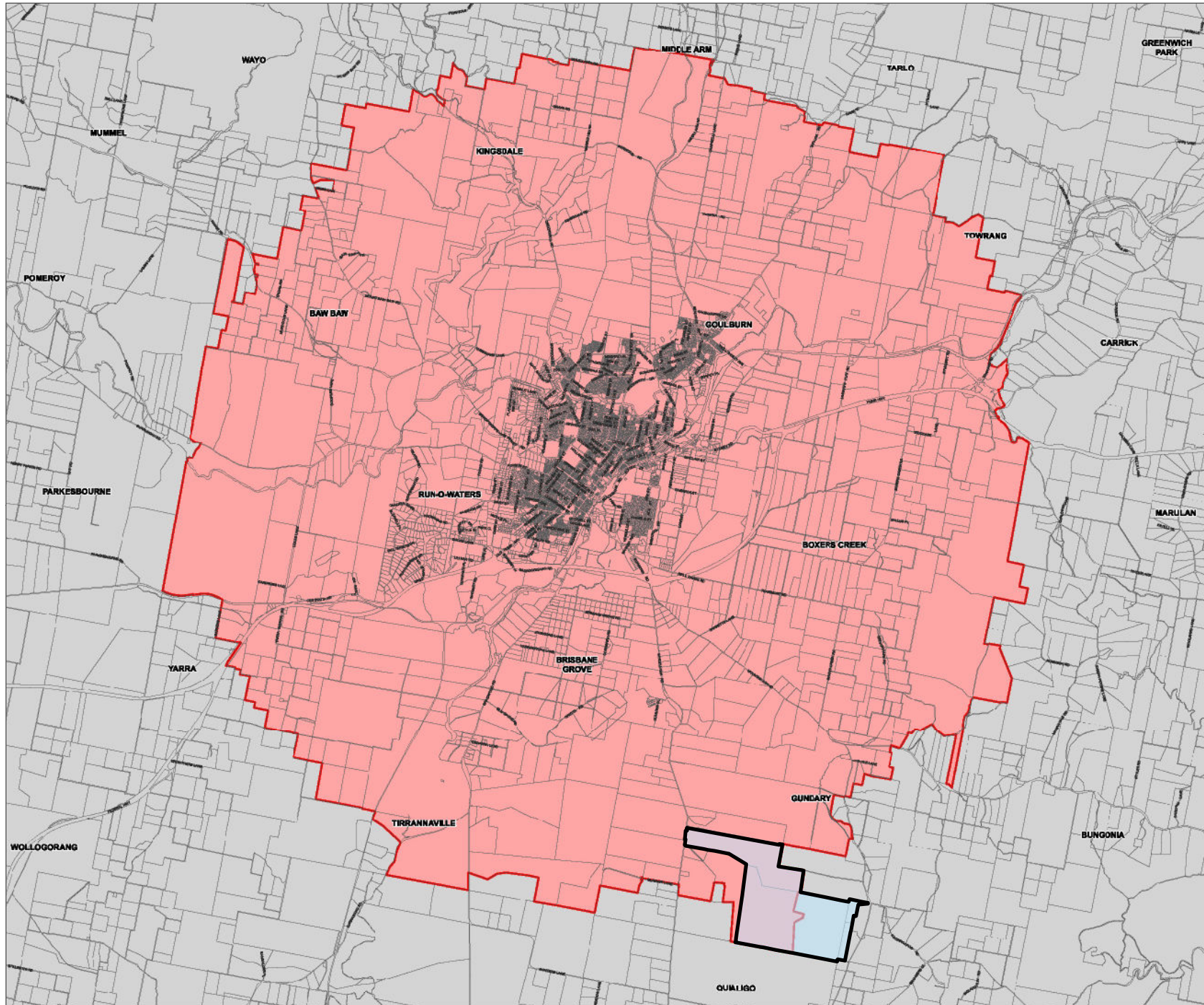
It is important to note that section 2.42 does not prohibit all large-scale solar or wind development on land identified on the Regional Cities Map. Rather, the section creates mandatory considerations for the consent authority when deciding whether consent should be granted for such projects.

Section 2.42 of the T&I SEPP applies to the Project as a portion of the Project Area (i.e. Lot 12 DP1016332 and part of Lot 3 DP1238347) is identified as within the ‘subject land’ on the Goulburn Regional Cities Map (refer to **Figure 2.2**). Therefore, under section 2.42(2), the development consent must not be granted unless the consent authority is satisfied that the Project is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the Project and is unlikely to have a significant adverse impact on the regional city’s (being Goulburn’s) capacity for growth, or scenic quality and landscape character. A regional cities assessment has been completed as part of the EIS and is presented in **Section 6.3**.

FIGURE 2.2
Regional Cities

Legend

-  Project Area
-  Regional Cities - subject land
-  Cadastre



0 2.5 5
Kilometers

Scale: 1:0 at A4
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Table 2.1 outlines the relevant considerations of section 2.42 and how these matters have been addressed within this EIS.

Table 2.1 Regional Cities Considerations (T&I SEPP, section 2.42)

Requirement	Where addressed in this EIS
1. This section applies to development in a regional city for the purposes of electricity generating works using a solar or wind energy source that is— a. State significant development, or	Refer Section 2.3 and Section 6.3
b. regionally significant development.	Not applicable
2. Development consent must not be granted unless the consent authority is satisfied that the development— a. is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development, and	Refer to Section 6.3
b. is unlikely to have a significant adverse impact on the regional city's— i. capacity for growth, or	Refer to Section 6.3
ii. scenic quality and landscape character.	Refer to Section 6.3
3. In determining whether to grant development consent, the consent authority must consider measures proposed to be included in the development to avoid or mitigate conflicts referred to in subsection (2)(a) or adverse impacts referred to in subsection (2)(b).	Refer to Section 6.3
4. In this section— 5. <i>Regional Cities Map</i> means the <i>State Environmental Planning Policy (Infrastructure) 2007 Regional Cities Map</i> . 6. <i>regional city</i> means an area of land identified as “subject land” on the <i>Regional Cities Map</i> .	<i>State Environmental Planning Policy (Infrastructure) 2007 Regional Cities Map – Goulburn</i> (16 December 2022) is shown in Figure 2.2 .

2.4 Regional Strategic Planning Context

2.4.1 Draft South East and Tablelands Regional Plan 2041

The *Draft South East and Tablelands Regional Plan 2041* (the draft Regional Plan) is an update of the 2036 Regional Plan released by the NSW Government in July 2017 (DPE, 2022f). The draft Regional Plan identifies five key themes in achieving its vision for the South East and Tablelands as ‘*a borderless region in Australia’s most geographically diverse natural environment with the nation’s capital at its heart*’. These themes are:

- Recognising Country, people and place.
- Enhancing sustainable and resilient environments.
- Leveraging diverse economic identities.
- Planning for fit for purpose housing and services.
- Supporting a connected and active region.

The draft Regional Plan is a 20-year strategic planning blueprint that aims to strengthen the region's diverse regional economy, address future needs for housing, jobs and infrastructure, promote a healthy environment and connect local communities. In particular, the draft Regional Plan acknowledges that renewable energy is a key industry worth investing in for the region.

The Project aligns with several objectives identified in the draft Regional Plan. As shown in **Table 2.2**, the Project will increase renewable energy generation in the region and contribute to achieving net-zero emissions by 2050, while also protecting and managing important environmental, heritage and Aboriginal cultural assets as far as reasonably practicable, throughout all stages of the Project, including design, construction, operation and decommissioning.

Table 2.2 Alignment of the Project with Objectives in the Draft South East and Tablelands Regional Plan 2041 (adapted from DPE, 2022f)

Objective	Project alignment with objective
1. Build capacity for shared knowledge about Aboriginal culture in land use planning	Consultation with Aboriginal parties is an integral part of identifying and assessing the significance of Aboriginal objects and/or places and determining and carrying out appropriate strategies to mitigate impacts upon Aboriginal heritage. Local Aboriginal stakeholders have been engaged as part of the Aboriginal Cultural Heritage Assessment (ACHA) undertaken for the Project, including the Pejar Local Aboriginal Land Council (LALC) and Aboriginal service providers. Additionally, the proposed ACHA assessment methods and consultation process was reviewed by Registered Aboriginal Parties (RAPs) engaged for the Project, as well as the results of a preliminary desktop assessment and details about gathering cultural information. The ACHA report is provided in Appendix 8 with the findings summarised in Section 6.5. Management plans to be implemented during construction and operation will include an unexpected finds protocol and continued engagement with RAPs.
4. Preserve the heritage and character of the region's towns and villages	The Project location avoids impacts to heritage and character of the South East and Tablelands region's towns and villages. A Historical Heritage Impact Assessment (HHIA) has been prepared for the Project, which is attached as Appendix 9 and summarised in Section 6.6. This assessment determined that there are no listed heritage items within the Project Area. The nearest local heritage item is 'Pelican' Homestead (Item I599 on the Goulburn Mulwaree Local Environmental Plan 2009), which is located approximately 3.4 km west of the Project Area. The Project will not require any intervention or works within the curtilages of this heritage item. Goulburn is the nearest regional city to the Project, located approximately 10 km northwest of the Project boundary. Due to the distance, the Project will not impact on the heritage character of Goulburn through changes to the visual landscape. Landscape and visual impacts for the Project is assessed in the Landscape and Visual Impact Assessment (LVIA) attached as Appendix 11 and summarised in Section 6.8.
5. Protect important environmental assets	The South East and Tablelands region includes a variety of landscapes from the Snowy Mountains, the only wilderness coastline in NSW, rural landscapes and national parks. Avoiding the impacts on important terrestrial and aquatic habitats and on water quality is a necessary part of land use planning for urban development and other activities, including the Project.

Objective	Project alignment with objective
	This EIS includes identification and assessment of important environmental assets in the Project Area, such as Threatened Ecological Communities (TECs), habitat for threatened species, groundwater dependent ecosystems (GDE), aquatic habitats, and national parks and reserves. Refer to Section 6.4. The Project has been strategically designed to protect nearby important environmental assets by avoiding impacts as far as reasonably practicable. Where impacts are unavoidable, the Project will mitigate and manage those impacts throughout construction, operation, and decommissioning. Key avoidance and mitigation measures undertaken to date are summarised in Section 1.5. A Biodiversity Development and Assessment Report (BDAR) has been undertaken for the Project in accordance with the Biodiversity Assessment Method (BAM) and is provided in full in Appendix 7, with the findings summarised in Section 6.4.
7. Build resilient places and communities	Effective management of natural hazards and chronic stresses that threaten a place, community or local environment can build resilience in the region. Natural hazards are sudden, short-term events such as heatwaves, bushfires, flooding, storms or infrastructure failure, while chronic stresses are slower moving challenges, including air and noise pollution, land contamination, food or water shortages, economic downturn, or technological transition, lack of affordable housing, sea level rise and pandemics. As highlighted throughout this EIS, the Project has been designed to avoid areas prone to flooding within the Project Area. An assessment of the natural hazards and chronic stresses applicable to the Project (including flooding, bushfire, fire and explosion risks, electromagnetic fields) is provided in Section 6.0, including assessment of potential impacts as a result of the Project and proposed mitigation measures to avoid or reduce the risk of these impacts. The implementation of these mitigation measures will assist in building the resilience of the Project Area and surrounds.
8. Plan for a net zero region by 2050	The NSW Government is committed to achieving a 70% emissions reduction by 2035 and net zero emissions by 2050. Currently, electricity generation and the agriculture and transport sectors contribute the bulk of emissions in the region. As such, the draft Regional Plan supports renewable energy initiatives with a particular focus on reducing emissions from agriculture and transport. The Project would provide enough clean, renewable energy for about 133,000 average NSW homes while displacing approximately 670,000 tonnes metric tonnes of carbon dioxide. As such, the Project would contribute to reducing emissions and improving resilience in the region.
12. Realise economic benefits from a connected regional economy	The South East and Tablelands region's diverse economy is underpinned by connections to Canberra and Sydney and is a hub for renewable energy generation and nature-based tourism. Major projects like the Hume Link and Energy Connect will increase the capacity of energy generating infrastructure in the region to support increased renewable energy. Existing 330 kV overhead powerlines, owned and operated by TransGrid, transect the northwest corner of the Project Area and would provide the connection point for the Project to the wider NEM for distribution across NSW. This maximises the use of existing infrastructure providing benefits to the region without NSW government investment.

2.4.2 Goulburn Mulwaree Council Local Strategic Planning Statement

Adopted by Goulburn Mulwaree Council in 2020, the *Goulburn Mulwaree Local Strategic Planning Statement* (LSPS) sets out the 20-year vision for land-use planning in the Goulburn Mulwaree LGA. Planning themes and priorities outlined in the LSPS are around infrastructure, community services and wellbeing, economy, environment and sustainability. Importantly, Goulburn Mulwaree Council aims to promote renewable energy projects, particularly in areas not identified as being of prime crop and pasture potential, to diversify the regional economy and promote a sustainable future (Goulburn Mulwaree Council, 2020).

The LSPS is underpinned by 10 planning priorities, each of which identifies the existing situation, relevant challenges for land use, and proposed planning principles and actions to address these challenges.

The following planning priorities, and associated challenges for land use and planning principals, are relevant to the Project as set out in **Table 2.3**.

Table 2.3 LSPS Planning Priorities

Planning Priority No.	Planning Principles	Challenges for Land Use
5: Primary Industry	Promote renewable energy projects. The co-location of renewable projects should occur where possible, to maximise infrastructure, including corridors with access to the electricity network.	N/A
7: Sustainability	N/A	Supporting increased take up of renewable energy generation and use.
8: Natural Hazards	Local hazard risk assessments inform land use planning decisions to not increase the population at risk or the demand on emergency services.	N/A
9: Heritage	Ensure the preservation of Aboriginal heritage and culture at both strategic and development assessment stages of planning.	Protection of Aboriginal and European cultural heritage. Identification of cultural heritage on isolated rural properties. Assessment of cultural heritage landscapes.
10: Natural Environment	Preserve and maintain natural environments. Identify and enhance biodiversity connections. Protect watercourses and catchments. Maintain a balance between growth, development and environmental protection.	Watercourses management. Soil erosion. Land clearing. Rural residential development and associated impacts.

The Project is consistent with the above planning priorities, as it is:

- Located in an area with good available solar resource (as shown on **Figure 2.1**), with a strong point of connection to the existing transmission network available, making it an ideal site for increasing generation capacity on with minimal requirements for additional transmission infrastructure. Moreover, the proximity of load centres means that less energy is lost in the transportation of the generated energy.
- Within proximity to high population and electrical load (demand) centres of Canberra, Sydney, Goulburn and other towns in the region.
- Compatible with agricultural land use, whilst at the same time the Project Area has not been identified as Biophysical Strategic Agricultural Land (BSAL), State Significant Agricultural Land or Class 1 or 2 under the Land and Soil Capability (LSC) Mapping for NSW. A small area of mapped Class 3 LSC is present within the Project Area, however, impacts on LSC are expected to be minor (as discussed in **Section 6.7**). The existing land use within and surrounding the Project Area further provides the opportunity to implement agrivoltaics².
- Avoids and minimises impacts to sensitive environmental features within the Project Area (such as watercourses, high quality biodiversity values, cultural heritage values, natural hazards including flooding and bushfire threat) and sensitive receivers, through refinement of the Project layout, as further detailed in **Section 1.5**. These refinements have been implemented as an outcome of ongoing consultation with landholders, targeted ecological surveys conducted across the Project Area, the findings of the detailed environmental and cultural heritage assessments for the EIS and in response to community and stakeholder feedback during the preparation of the EIS.
- Results in acceptable impacts for other land resources, including soils, biosecurity, water and air quality (refer to **Section 6.7**).

2.4.3 Tablelands Regional Community Strategic Plan 2016–2036

The *Tablelands Regional Community Strategic Plan 2016–2036* (the Strategic Plan) is an integrated planning document that aims to identify the main priorities and future aspirations of the tableland's region, which includes the Goulburn Mulwaree, Upper Lachlan Shire and Yass Valley LGAs. The Strategic Plan identifies the vision for the region is “to build and maintain sustainable communities while retaining the region's natural beauty.” The Strategic Plan is underpinned by five strategic pillars and 28 strategic priorities (DPE, 2022f).

The strategic priorities outlined in **Table 2.4** are relevant to the Project.

Table 2.4 Tablelands Regional Community Strategic Plan 2016–2036: Strategic Priorities

Strategic Pillar	Strategic Priority	Relevance to the Project
Our Environment	EN4: Maintain a balance between growth, development and environmental protection through sensible planning.	The Project will contribute to the development of renewable energy generation infrastructure in the region, which will be a key industry for the future of the region that supports population and economic growth (through employment opportunities) and affordable energy to power homes.

² Agrivoltaics, agrisolar, or dual-use solar is the simultaneous use of areas of land for both solar photovoltaic power generation and agriculture.

Strategic Pillar	Strategic Priority	Relevance to the Project
Our Environment	EN5: To investigate and implement approaches to reduce our carbon footprint.	The Project will assist in the reduction of the region's carbon footprint by providing an alternative source of electricity to the traditional coal-fired power stations, which is low emission, reliable and affordable.
Our Economy	EC1: Capitalise on the region's proximity to Canberra and its position as a convenient location to attract industry and investment.	The Project capitalises on the region's convenient location, as it is situated in proximity to the Hume Highway, a major transport corridor between Sydney and Canberra. As such, the Project's location provides access to accommodation and other services within Canberra during construction and operation.
Our Economy	EC4: Foster and develop a diverse, adaptive, and innovative agricultural industry.	The Project will diversify the land use to Energy Generation whilst still being available for modified sheep grazing.
Our Economy	EC5: Encourage collaboration between businesses, government, and training providers to develop employment and training opportunities for young people in the region.	The construction of the Project brings opportunities for local employment, including training programs and apprenticeships in the region.

2.5 Environmental and Social Context

2.5.1 Local and Regional Setting

The Project is in the locality of Gundary, having a population of 306 residents of median age of 45, and 91 households (ABS, 2021). Other small localities in the vicinity are:

- Brisbane Grove, approximately 7 km northwest.
- Boxers Creek, approximately 9.3 km northeast.
- Tirrannaville, approximately 6.3 km west.
- Qualigo, approximately 9 km south.
- Bungonia, approximately 13.5 km east.

Goulburn is approximately 10 km northwest of the Project Area and provides the above-mentioned localities with their primary access to services and facilities. The Hume Highway is approximately 7 km north of the Project Area and acts as the primary connection between Sydney and Canberra.

The Project Area is bounded by Windellama Road on the west, for approximately 500 m, with Koorringaroo Road bordering the northeast corner of the Project Area. The Project will have a primary access point at the existing driveway on Windellama Road via the Hume Highway.

2.5.2 Land Use, Ownership and Residential Receivers

The Project Area comprises five freehold lots and a small portion of Windellama Road (including the road reserve), with most of the land surrounding the Project Area in private ownership, as shown in **Figure 2.3**. The freehold lots within the Project Area are currently being grazed by sheep and cattle. As illustrated in **Figure 2.4**, no residences exist within the Project Area, with the host landholder's residence (R89) approximately 520 m southwest of the Project Area. Additionally, an existing 330 kV transmission line with an approximately 60 m wide easement traverses through the north-western corner of the Project Area.

Land within and surrounding the Project Area has predominantly been subject to agricultural land uses (including sheep and cattle grazing) associated with rural residential properties. A total of 109 private residences have been identified within a 4 km radius from the Project Area (refer to **Figure 2.4** and **Appendix 3**), with one being the host landholder's residence (R89). The closest non-associated residence (R9) is approximately 137 m north of the Project Area and approximately 272 m from the nearest Project infrastructure (solar panels).

In addition, the property directly south of the Project Area has been approved for a rural residential subdivision (referred to hereafter as the Rosedale subdivision). Development consent was originally granted for a 24-lot subdivision (DA/0568/2004) in September 2005. DA/0568/2004 was subsequently modified in September 2010 and February 2017. The Rosedale subdivision (as modified) is a 22-lot subdivision, with lots ranging in size from approximately 12 ha to more than 70 ha. Umwelt understands that while DA/0568/2004 has been physically commenced, and therefore will not lapse, the subdivision has not been registered and the engineering works necessary to enable registration, including construction of a new public road, rights of way and access points, have not been substantially progressed. It is noted that before development consent could be granted for any potential future dwellings on the lots, the proponent would need to:

- Demonstrate to Goulburn Mulwaree Council that all relevant conditions of consent have been satisfied. These conditions cover a range of matters, including construction of access, provision of electricity supply, fencing of no-go areas (including salinity rehabilitation areas, riparian areas and remnant vegetation areas).
- Register a plan of subdivision.

For the purposes of the EIS, the potential location of 21 future residences within the Rosedale subdivision has been identified as 'future receivers'. These have been identified as FR1 to FR21, shown on **Figure 2.4**. There is also an existing residence on one of the subdivision lots (Lot 19) and this residence has been identified as an existing receiver, namely R1. The location of the future receivers were based on the nominated Effluent Management Areas (EMAs) under DA/0568/2004. Importantly, these EMA locations are indicative and the conditions of DA/0568/2004 (as modified) do not prevent an alternative location being approved as part of a future development application for a residence, provided that an EMA can be appropriately sited in that alternative location, having regard to key site constraints (such as proximity to watercourses).³

³ Condition 5.6 of DA/0568/2004 (as modified) does not tie effluent disposal to the nominated EMA and instead provides that the 'On-Site Sewage Management Facility area' for each lot is defined as 'the area outside stream buffers and road setbacks and restrictions'.

2.5.3 Natural, Cultural and Built Features

The Goulburn Airport is approximately 4 km northwest of the Project Area as shown on **Figure 2.3**. Pomaderris Nature Reserve is the closest State Park, located approximately 3.5 km northeast of the Project Area. Bungonia State Conservation Area is the closest State Conservation Area, located approximately 18 km to the east, with Morton National Park as the closest National Park, approximately 17 km to the southeast. The location of the Project Area in relation to these areas are shown on **Figure 2.3**.

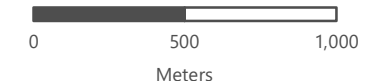
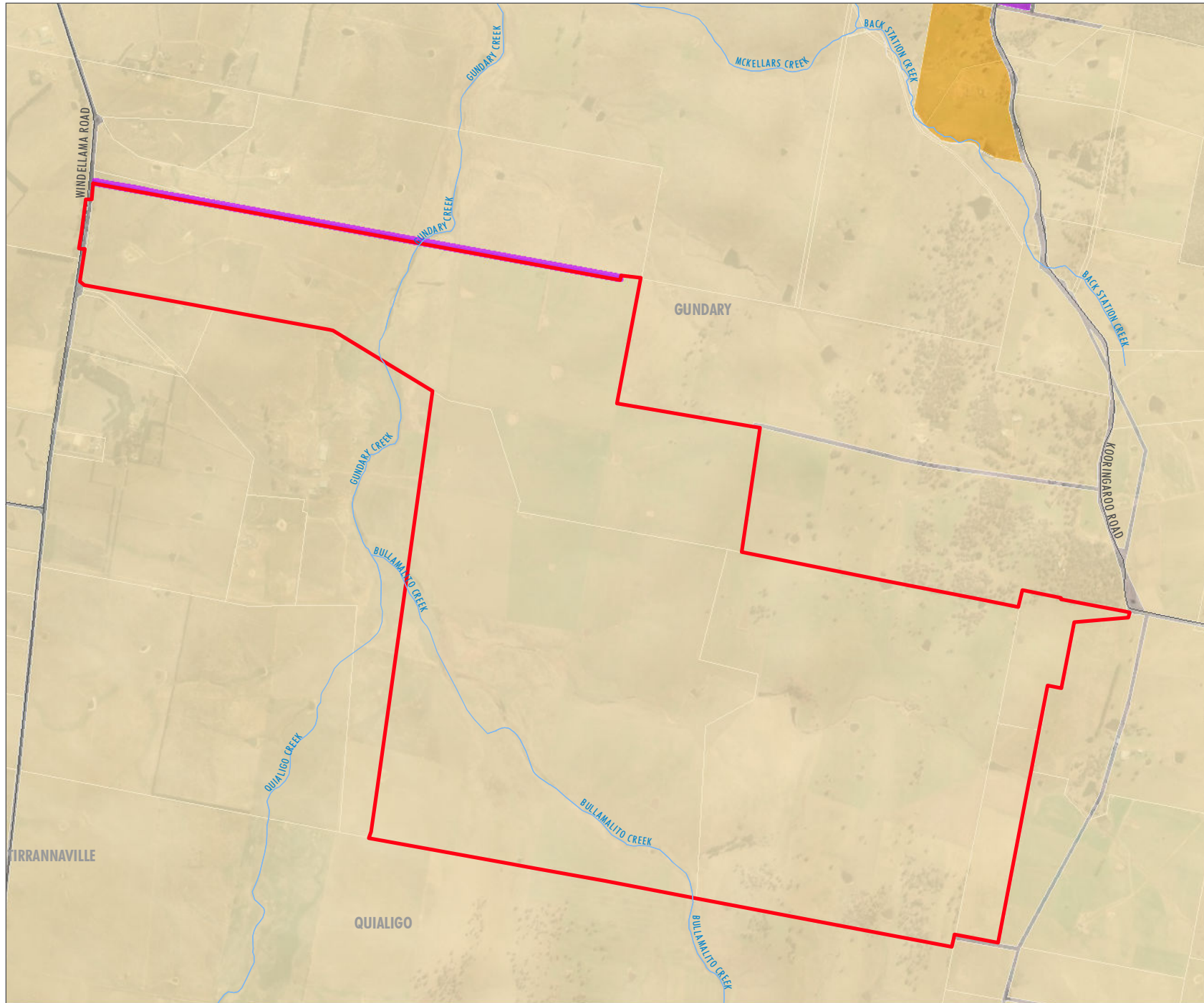
The Project Area falls within the Hawkesbury-Nepean catchment which is within the Sydney drinking water catchment. On a local scale, the Project Area is located within the Gundry Creek catchment. Gundry Creek is a tributary of the Mulwaree River and traverses through the western part of the Project Area, flowing in a northerly direction towards Goulburn as shown on **Figure 1.2**. The Bullamalito Creek and Quialigo Creek convergence is located just outside the Project Area (to the west), becoming Gundry Creek from this confluence. Bullamalito Creek traverses through the southwestern part of the Project Area. The Project Area has a ground surface elevation ranging from 645 m Australian Height Datum (AHD) to 710 m AHD, comprised of hills and ridgelines with intervening valleys.

The existing 330 kV TransGrid transmission line along the north-western corner of the Project Area will allow the Project to have an onsite grid connection.

FIGURE 2.3

Land Tenure

- Project
- Cadastre Boundaries
- Roads
- Watercourses
- Land Tenure**
- Freehold
- Crown
- Local Government



Scale: 1:0 at A4
GDA 1994 MGA Zone 55

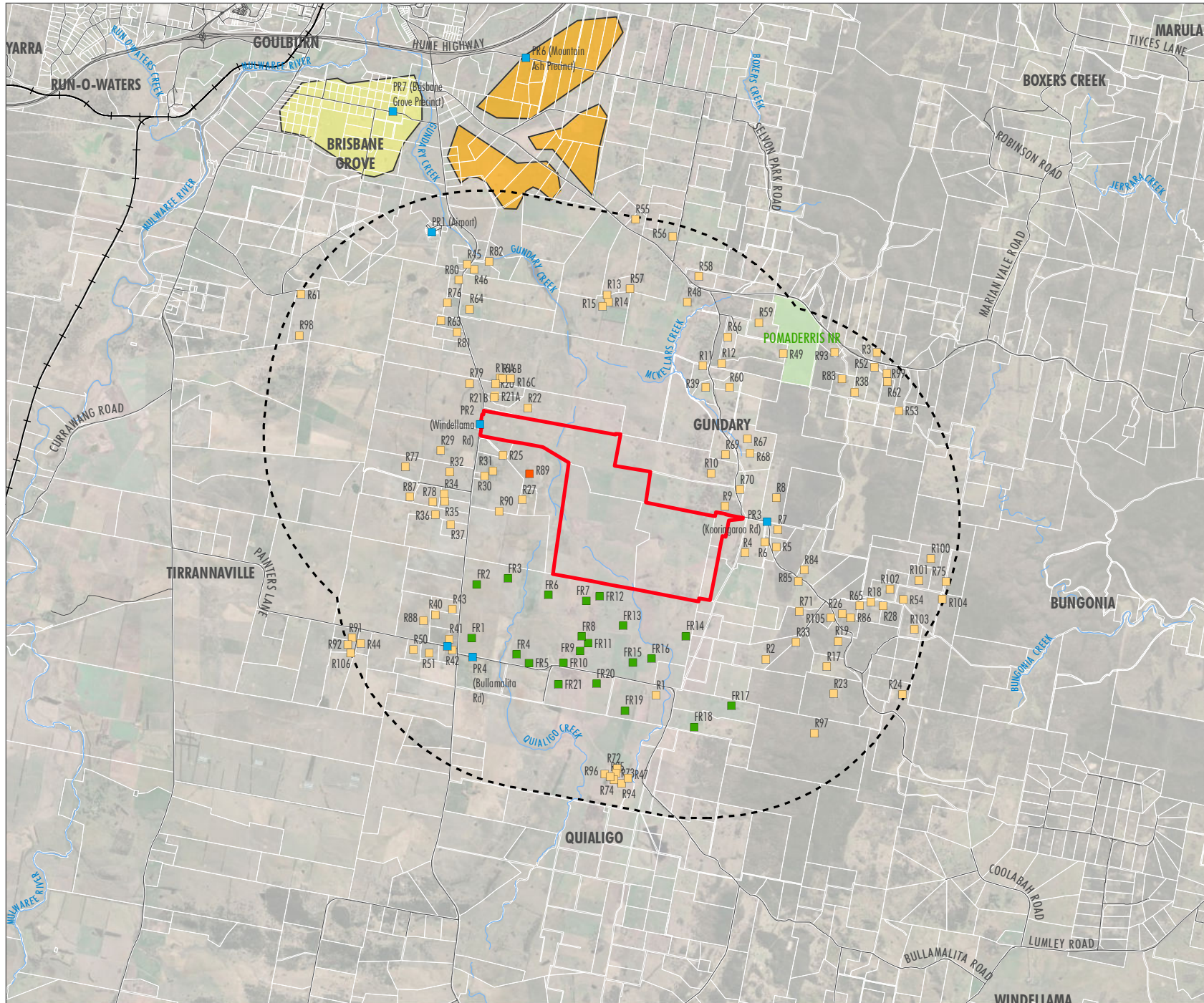
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FIGURE 2.4

Receivers

- Project Area
- Project Area (4km buffer)
- Brisbane Grove Precinct
- Mountain Ash
- Cadastre Boundaries
- Roads
- Railway
- Watercourses
- Non-associated Residences
- Associated / Host Residence
- Public Receivers
- Potential Future Residences (Rosedale Subdivision)



0 1,000 2,000
Meters

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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2.5.4 Key Risks or Hazards

The Project Area is not:

- identified as containing contaminated land
- within land considered to be prone to mine subsidence
- subject to an existing mineral exploration licence, mining or production lease
- mapped as Biophysical Strategic Agricultural Land (BSAL) or State Significant Agricultural Land
- located within a coastal zone.

Furthermore, the iterative design process and the assessments undertaken for this EIS have supported the Project design to, wherever possible, avoid, minimise and mitigate potential risks and hazards.

Although existing flood mapping for the Goulburn Mulwaree LGA does not extend to the Project Area, flooding risks to the Project Area have been identified through preliminary flood modelling. As outlined in **Section 1.5**, the flooding risks have been considered in the design and layout of the Project.

The Project Area is identified by the NSW Rural Fire Service (RFS) bushfire prone land mapping (RFS, 2021) as predominately Category 3 (Low risk) bushfire prone land with a small area (approximately 11 ha; 1.6% of the Project Area) being Category 1 (High risk). With the presence of remnant vegetation and grasses both on the Project Area and to the north-east, bushfire presents a potential hazard for the Project. Bushfire controls considered for the Project are outlined in **Section 6.13.2**. In addition, the Project Area will be appropriately maintained over the life of the Project including vegetation and site maintenance required to maintain Asset Protection Zones (APZs).

Relevant risks and hazards, as well as the associated management and mitigation measures, have been considered and are described in detail throughout **Section 6.0**. In accordance with the SEARs, relevant assessments have been completed relating to hazards and risks associated with the Project, including:

- hazards and risks involving lithium-ion batteries (LIBs) and electrical transformers with the potential for harmful off-site impacts such as spontaneous ignition
- bushfire threat
- electric and magnetic fields (EMF).

Where a hazard or risk was unable to be avoided entirely, Lightsource bp has implemented a range of reasonable and feasible management and mitigation measures to further minimise the risk, refer to **Section 6.13**.

2.6 Cumulative Impact Considerations

The Solar Guidelines and the CIA Guidelines require the consideration of a project together with the impacts of other relevant future and existing projects to determine the potential cumulative impacts.

Whilst the Project Area is not located within a Renewable Energy Zone (REZ), there are currently 23 other renewable energy projects currently under development or proposed to be developed within a 100 km radius from the Project (at the time of finalising this EIS). The Project Area is also located near several extractive industries (quarry) sites and mining projects. A cumulative impact assessment was prepared for the Project in accordance with the SEARs, Solar Guidelines and CIA Guidelines. The assessment has predominately focused on the relevant proposed projects currently under assessment as outlined in **Table 6.37**. The outcomes of the cumulative impact assessment, including the methodology for determining which projects are relevant for consideration in the cumulative impact assessment, is presented in **Section 6.18** and **Appendix 21** of this EIS.

2.7 Planning and Other Agreements

Through the development of the Project design and the stakeholder engagement process, Lightsource bp has developed and implemented several project related agreements which are summarised below.

2.7.1 Host Landholder Agreement

As discussed in **Section 2.5.2**, there is one host landholder involved in the Project. Lightsource bp has entered into or is in the process of entering into, an option to lease agreement with the host landholder to grant propriety rights over the respective properties that make up the Project Area. Should the Project obtain planning approval, the option to lease agreement will be exercised.

2.7.2 Neighbour Agreement

One non-associated neighbouring landholder has been assessed as potentially being subject to visual impacts from the Project (refer **Section 6.8**) in the Landscape and Visual Impact Assessment (LVIA). Lightsource bp is currently seeking to enter an agreement with this landholder in line with the Solar Guidelines and will continue to consult with them after the lodgement of the EIS with the view of entering the agreement prior to project approval. Once the agreement has been finalised, this landholder will be considered an associated landholder. The extent of impact and proposed mitigation in this regard is further discussed in **Section 6.8**.

2.7.3 Community Benefit Sharing Initiatives

Lightsource bp is currently developing a Community Benefit Sharing Strategy for the Project. This is proposed to include:

- Annual financial contributions throughout the life of the Project via a Voluntary Planning Agreement (VPA) with the Goulburn Mulwaree Council. Note: the VPA has been submitted to the Goulburn Mulwaree Council and is currently progressing through approval processes within Council.
- Funding local community programs.

- Neighbourhood Benefit Sharing Program to ensure those residents living closest to the project can share in its direct financial benefits. The Program will commence should the Project be approved, and construction commences. Under the Program, residents within 1 km of the Project boundary will be eligible to participate in the Construction Neighbourhood Benefit Sharing Program. Residents within 500 m of the Project boundary will be eligible to participate in both the Construction and the Operation Neighbourhood Benefit Sharing Program. The Program has been benchmarked against industry standards and considers the nature of the landscape surrounding the project.

2.8 Project Benefits

The expansion of renewable energy generation aligns with both Federal and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies. Lightsource bp is committed to delivering the Project to achieve clean, reliable, and affordable energy in alignment with the objectives of the current Federal and State Government strategies. By developing the Project, Lightsource bp aims to provide cleaner reliable energy generation to assist with meeting current load demand while simultaneously reducing greenhouse gas emissions and the impacts of climate change.

More specifically, the Project would:

- Generate approximately 780,000 MWh of renewable electricity per year.
- Reduce greenhouse gas emissions by approximately 670,000 tonnes of CO₂ equivalent per annum. This is roughly equivalent to removing approximately 278,000 cars from the road.
- Generate a capital investment of approximately \$650 million.
- Create up to 400 FTE employment opportunities during the construction phase with up to four FTE employment opportunities during the operational phase.
- Generate enough electricity to supply approximately 133,000⁴ households on an annual basis in NSW.
- Establish indirect benefits to local services through the construction and operation phases.
- Diversify land use and economic activity in regional NSW.
- Provide the landholder with additional income (year on year) to supplement their agricultural practices.
- Provide ongoing financial assistance through the community shared benefit scheme (including both the neighbour agreement and the VPA) to ensure direct benefit from the Project to the local community.

2.9 Alternatives

Lightsource bp has considered a range of alternative options for the Project throughout the design process to date, with the aim of minimising environmental and social impacts while maximising the potential for electricity generation. As the Project design and environment assessment progresses, the Project will continue to be delivered to meet these goals.

⁴ The representative consumer in NSW is a two-person household using mains gas along with electricity and on a market offer power bill (with total annual consumption level of 4,215/kWh) (Australian Energy Market Commission, 2020).

2.9.1 ‘Do Nothing’ Option

The Project Area is currently used for livestock (sheep and cattle) grazing. The ‘do nothing option’ would allow for the continued use of the Project Area solely for agricultural purposes. The ‘do nothing option’ would also imply that the Project is not developed and would therefore forego the Project’s identified benefits, namely:

- The provision of additional renewable energy supply to assist in reaching both State and Commonwealth renewable energy targets.
- Assistance in the transition towards cleaner electricity generation and a reduction in greenhouse gas emissions.
- Increased energy security and supply into the Australian grid.
- Significant social and economic benefits created through capital investment and provision of direct and indirect employment opportunities during the construction and operation of the Project.

The ‘do nothing option’ would avoid the environmental and social impacts associated with the construction, operation, and decommissioning of the Project, such as biodiversity impacts, construction noise, traffic and dust, social amenity impacts and visual impacts. However, these impacts are manageable through the implementation of the management and mitigation measures outlined throughout **Section 6.0** and would not result in a significant impact to the environment and local communities.

Considering the benefits of the Project, the ‘do nothing option’ is not considered to be a preferred option.

2.9.2 Alternative Locations

Throughout the site selection and design process, Lightsource bp has considered alternative site locations based on proximity to the NSW electricity grid (existing and proposed) and the solar generation potential of the region. This included a broad site exploration activity across the State, as well as investigation of alternative site locations within the Gundry Plains area, and more specifically to the south of the Project Area. However, these were discarded due to denser bushland with higher biodiversity values, higher bushfire risk, flooding constraints, and greater distance from the point of connection.

Managing environmental constraints and social aspects, improving infrastructure efficiency and matching localised energy demands were major considerations in the evaluation of alternatives. The Project Area was therefore considered to be the most suitable as it provides the optimal combination of:

- A strong electricity network with multiple high voltage (HV) transmission lines passing through the area, providing good system strength. A strong point of connection to the existing transmission network is available, making it an ideal site for increasing generation capacity on NEM with minimal requirements for additional transmission infrastructure. Moreover, the proximity of load centres means that less energy is lost in the transportation of the generated energy so more can be used rather than wasted.
- The availability of renewable resources, including solar and wind.
- Availability of land of a suitable scale for a viable commercial-scale solar farm, with one host landholder.

- Proximity to high population and electrical load (demand) centres of Canberra, Sydney, Goulburn and other towns in the region.
- Existing agricultural land use within and surrounding the Project Area, which is compatible with large scale solar energy generation, and potential to implement sheep grazing.
- The Project Area is not mapped as either Biophysical Strategic Agricultural Land (BSAL), State Significant Agricultural Land or Class 1 or 2 under the LSC Mapping for NSW. A small area of mapped Class 3 LSC is present within the Project Area, however, impacts on LSC are expected to be minor (as discussed in **Section 6.7**).
- The Project Area has been cultivated for agricultural production and is relatively flat minimising land clearing and earthworks through construction.
- Detailed environmental assessment confirmed environmental constraints present within the Project Area can be avoided by the Project design and layout, and with the implementation of the proposed management and mitigation measures, residual impacts can be acceptably managed.
- The Project Area has access from Windellama Road via the Hume Highway.

For these reasons, the Project Area was considered suitable for the proposed solar farm development.

2.9.3 Alternative Technologies

Alternative Project layouts based on different solar farm designs using mature technology with a proven track record of large-scale implementation, have been investigated including:

- Fixed versus tracking options for PV module mounting: A single axis tracking system was chosen for the Project as it allows for more efficient electricity generation than fixed tilt options, leading to more efficient land use. Tracking systems also have a lower visual impact as they minimise glare from the sun, which can occur when the sun is at low angles in the sky and the PV modules are not facing the sun.
- Single-sided versus bifacial PV modules: Bifacial PV modules were selected for the Project as they allow for more efficient electricity generation than traditional single-sided PV modules, leading to more efficient land use. The distance between the rows of modules is also larger for bifacial modules, which helps to minimise environmental and visual impacts of the Project and facilitate grazing.
- One-in-portrait (1P) tracker versus Two-in-portrait (2P): Originally 2P trackers with a maximum panel height of 5 m were proposed for the Project, however in response to community concern regarding the visual impact of the panels, Lightsource bp is now proposing to implement 1P trackers of up to 3 m high, with an occasional height of up to 4 m (depending on topography).

2.9.4 Alternative Project Layouts

As discussed in **Section 1.5**, the environmental, cultural and social constraints of the locality have been considered during the early design stages of the Project to ultimately avoid and minimise the potential impacts of the Project. Further refinements were incorporated into the Project design and layout following the Scoping Report, as outlined in **Section 1.5** and illustrated on **Figure 2.5**.

These refinements include:

- Consideration of environmental and social constraints, namely:
 - Avoiding 27.89 ha NSW listed threatened ecological communities and 37.96 ha Commonwealth listed ecological communities by altering the solar array layout in the central and southern parts to avoid habitat for threatened species identified during targeted surveys, and strategically locating the majority of the Development Footprint (97%) within Category 1 exempt land.
 - Removal of approximately 50 ha of solar array in the north-west corner of the Project Area, to minimise noise and visual impacts to sensitive receivers.
 - Relocation of the centralised BESS approximately 1.2 km to the east, and away from sensitive receivers located on the northwest, to reduce noise and visual impacts.
 - Removal of 20 decentralised BESS units located nearest to sensitive receivers, to reduce noise and visual impacts.
 - Strategically locating noise attenuation around noisy equipment to reduce operational noise impacts.
 - Strategically located landscape screening to minimise glint and glare and visual impacts.
 - Avoiding placement of project infrastructure within flood prone areas and designing solar panels with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event.
 - Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek.
 - Inclusion of a secondary access point via Kooringaroo Road as well as additional emergency access points along the perimeter fencing via gates for emergency access and egress.
 - Inclusion of dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area.
- Implementing setback distances, namely:
 - 10 m APZ around the perimeter of the Project, within the security fencing.
 - Approximately 20 m to 40 m setbacks around second order and higher streams, in particular where these have biodiversity value.
- Implementing exclusion zones, including:
 - Areas with TECs and habitat for threatened species, as identified in **Section 6.4**.
 - Areas prone to flooding (1% Annual Exceedance Probability (AEP)), as identified in **Section 6.12**.

The refinements that have been incorporated into the Project are illustrated on **Figure 2.5** below.

FIGURE 2.5

Project Refinements Following the Scoping Report

Scoping Report to Environmental Impact Statement - Changes

- 1 - Removal of solar panels
- 2 - Relocation of the centralised BESS
- 3 - Removal of decentralised BESS units
- 4 - Avoidance of Eucalyptus macarthurii trees
- 5 - Koorringaroo Road emergency access
- 6 - Water tanks for fire fighting
- 7 - Emergency Gate
- 8 - Landscape Screening

Environmental Impact Statement Layout (current)

- Internal Access Tracks
- Security Fence
- Existing Transmission Line
- Watercourse / Bed Level Crossing
- Water Tank
- Primary Site Access
- Emergency Access
- Emergency Gate
- Project Area
- Proposed Road Upgrade
- Solar Panels
- Landscape Screening
- Transgrid Line Works
- BESS Option 2 (Centralised)
- Substation and O&M Facility Area
- Construction Compound Area
- Inverter Stations and BESS Option 1 (Decentralised)
- Temporary Laydown Areas

Scoping Report Layout (previous)

- Primary Access
- Internal Access Tracks
- Security Fence
- Existing Transmission Line
- Project Area
- Inverter Stations and BESS Option 1 (Decentralised)
- BESS Option 2 (Centralised)
- Substation and O&M Facility Area
- Solar Panels

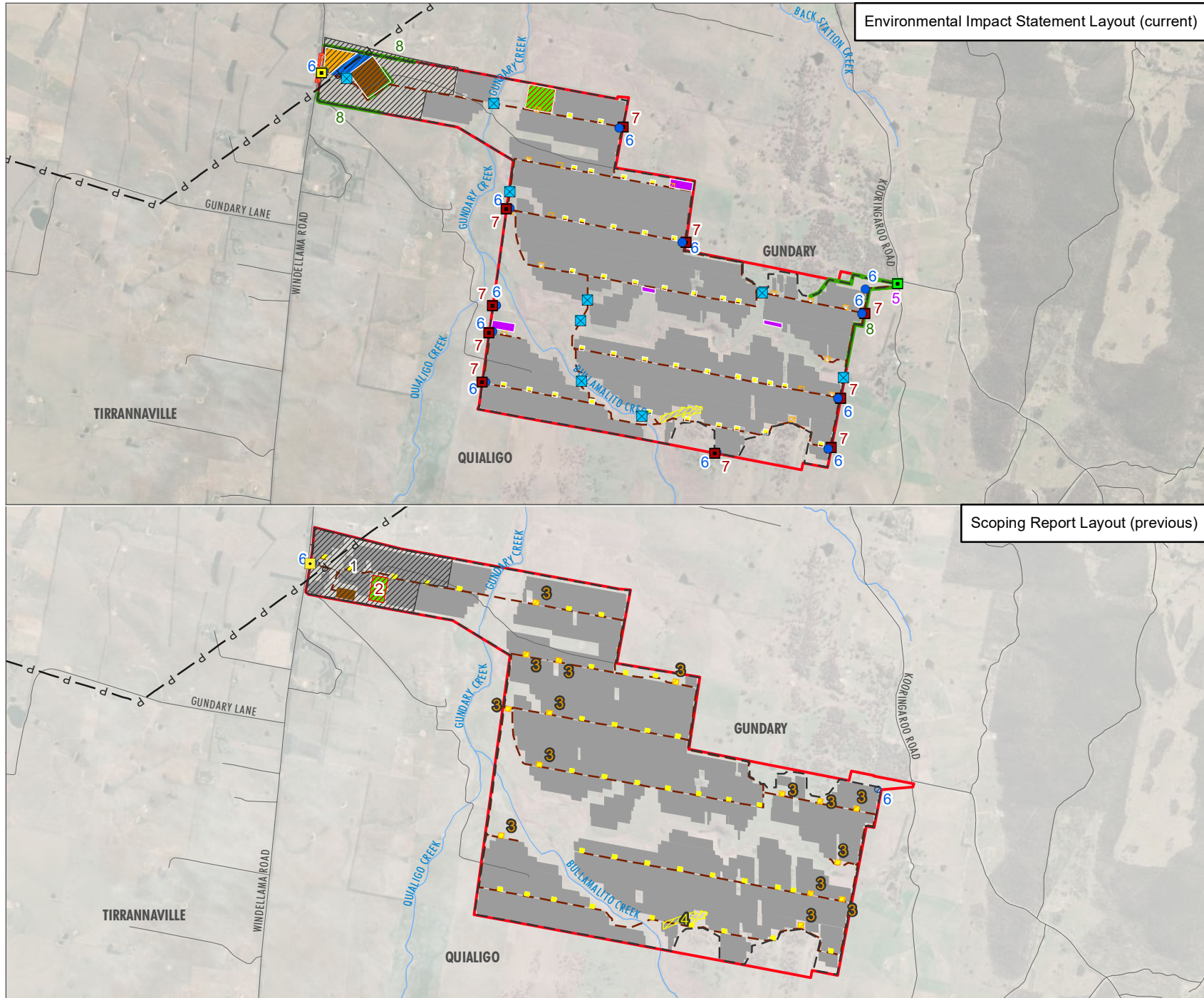
0 500 1,000

Metres

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3.0 Project Description

3.1 Project Summary

The proposed Gundry Solar Farm includes the construction, operation, maintenance and decommissioning of an approximate 400 MWp solar farm with a 325 MWp/650 MWh centralised BESS, a 230 MWp/920 MWh decentralised BESS or a combined centralised and decentralised BESS with a total capacity of 555 MWp/1,570 MWh and associated infrastructure in the Southern Tablelands region of NSW. Associated infrastructure would include internal access tracks and associated watercourse crossings (via culverts and bed level crossings), an operational and maintenance (O&M) facility, civil works (such as an intersection upgrade on Windellama Road) and onsite electrical infrastructure (including a substation/switching station) required to connect to the existing 330 kV transmission line (Yass to Marulan).

The conceptual layout for the Project (refer to **Figure 3.1**) has been designed to maximise solar efficiency whilst avoiding impacts on areas of high biodiversity value and minimising impacts to proximal landholders in regard to noise and visibility, surface water resources (including flooding) and cultural heritage constraints.

A summary of the Project, listing details of the proposed development for which approval is sought, is provided in **Table 3.1**.

Table 3.1 Project Summary

Project Element	Description
SSD Application Number	SSD-48225958
Solar generation capacity	Approximately 400 MWp (DC)
Project area footprint	Approximately 702 ha
Development Footprint	Approximately 512 ha
Subdivision	Subdivision of land is required as part of the Project (refer Section 3.2.1)
Exclusion zones and setback buffers	Setbacks include: 10 m Asset Protection Zone (APZ) around the perimeter of the Project 5 m landscaping buffer, strategically located outside the APZ and the security fencing - approximately 20 m to 40 m setbacks around second order and higher streams, including some farm dams. Exclusion zones include: - Areas prone to flooding (1% AEP). - Areas with TECs and habitat for threatened fauna and flora species.
Solar arrays	Panels – approximately 660,000 bifacial flat plate solar photovoltaic (PV) modules. Panel dimensions and area – approximately 2.38 m x 1.3 m totalling approximately 3 m² per panel. Row spacing – up to 5 m.

Project Element	Description
	Maximum height – 3 m at full tilt with an occasional height of up to 4 m (depending on topography).⁵
Battery Storage	Capacity – up to 555 MWp and 1,570 Megawatt hour (MWh) capacity. Configuration – subject to detailed design, up to 89 battery stations will be housed in a series of outdoor containers, either distributed across the site (Option 1 – decentralised DC-coupled) and/or aggregated in one central location (Option 2 – centralised AC-coupled), as illustrated on Figure 3.1. Maximum height – approximately 3 m.
Electrical infrastructure	Substation/Switching station: - Onsite connection to the existing 330 kV overhead powerline via a proposed 33/330 kV substation and switching station including ancillary infrastructure to connect to the existing transmission line, which has a 60 m easement. - Area – approximately 6.3 ha. - Maximum height – approximately 3.5 m with taller ancillary components such as busbar at 14 m high, gantry and lightning arrestors up to 22 m high. Power conversion station (PCS) – consisting of up to 128 inverters as well as medium voltage transformers and requisite infrastructure.
Project access	- Transport via road from Port Botany in Sydney or Port Kembla south of Wollongong, to the Project Area via the public road network with two access route options proposed (refer to Figure 3.4). - Project's primary access via the existing driveway on Windellama Road, with intersection works proposed to upgrade the Project access to accommodate heavy vehicles. - Alternate access via Koorringaroo Road for emergencies only.
Internal access tracks	Approximately 4 m wide tracks with turning bays for emergency vehicles, consisting of compacted gravel, with a main access track of 6 m wide to the substation to allow for the safe delivery, unloading and installation of key components, including some watercourse crossings (via culverts and bed level crossings), as shown on Figure 3.1.
Security fence, lighting and CCTV	Perimeter security fencing consisting of chain wire including three strings of barbed wire on top, to a height of approximately 2.3 m plus motion detecting security lighting.
Operation and Maintenance (O&M) facilities	Location – two small O&M facilities will be established, one within the construction compound area in the northwest corner of the Project Area and the other next to substation, as shown on Figure 3.1. - Facilities to include an office with staff amenities (kitchenette, toilets, showers), car park and workshop/shed.
Temporary ancillary facilities	Location – proposed compacted gravel areas within the development footprint, as shown on Figure 3.1. - Main construction site compound to include office amenities, parking, storage, and associated facilities, with laydown areas suitable for storing plant and equipment, solar panels and cable drums, and areas to support waste management activities.

⁵ The environmental assessment was based on a maximum 3 m high panel as the overall height of panels across the site will not exceed 3 m. The occasional panel height of 4 m will be typically limited to lower lying areas.

Project Element	Description
Workforce	• Construction – Approximately 400 full time equivalent (FTE) jobs with approximately 250 personnel on site during peak construction. • Operation – Up to four FTE jobs.
Construction hours	• Typical standard construction i.e.: ○ 7 am to 6 pm Monday to Friday. ○ 8 am to 1 pm on Saturdays. ○ No works on Sunday or public holidays. Lightsource bp proposes to carry out works outside of these hours which are inaudible at non-associated residences, emergency work, and deliveries and dispatches where requires by authorities for safety reasons.
Construction timing	Approximately 18 to 24 months (commencing in Q4 2025/Q1 2026).
Commencement of operations	Anticipated Q1 2028.
Operation period lifespan	Approximately 40 years. Operating 24/7, 365 days a year.
Capital investment	Approximately \$650 million.

3.2 Project Area

The Project Area covers approximately 702 ha and comprises five lots listed in **Table 3.2**. The Project Area further includes a small section of Windellama Road (including the road reserve) at the Project's primary access point. An overview of the Project Area is provided in **Figure 3.1** showing the Project area boundaries, legal description, surrounding road network and proposed access point.

Table 3.2 Schedule of Land

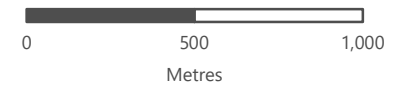
Lot and Deposited Plan (DP)	Ownership
Part of Lot 3 DP 1238347	Freehold
Lot 12 DP 1016332	Freehold
Lot 1 DP 870101	Freehold
Lot 2 DP 1187724	Freehold
Lot 80 DP 750018	Freehold
Windellama Road including road reserve (i.e. approximately 0.6 ha) for establishing the Project's primary access	Local Government (i.e. Goulburn Mulwaree Council)

FIGURE 3.1

Project Conceptual Layout

Legend

- Access Roads
- - Security Fence
- P Existing Transmission Line
- Roads
- Watercourses
- ☒ Watercourse / Bed Level Crossing
- Water Tank (40,000L)
- Water Tank (10,000L)
- Primary Access
- Emergency Access
- Emergency Gate
- ▭ Project Area
- ▨ Proposed Road Upgrade
- Solar Panels
- Landscaping Buffer (5m)
- Transgrid Line Works
- Centralised AC BESS
- Substation and O&M Facility Area
- Construction Compound Area
- Decentralised DC BESS
- Temporary Laydown Area



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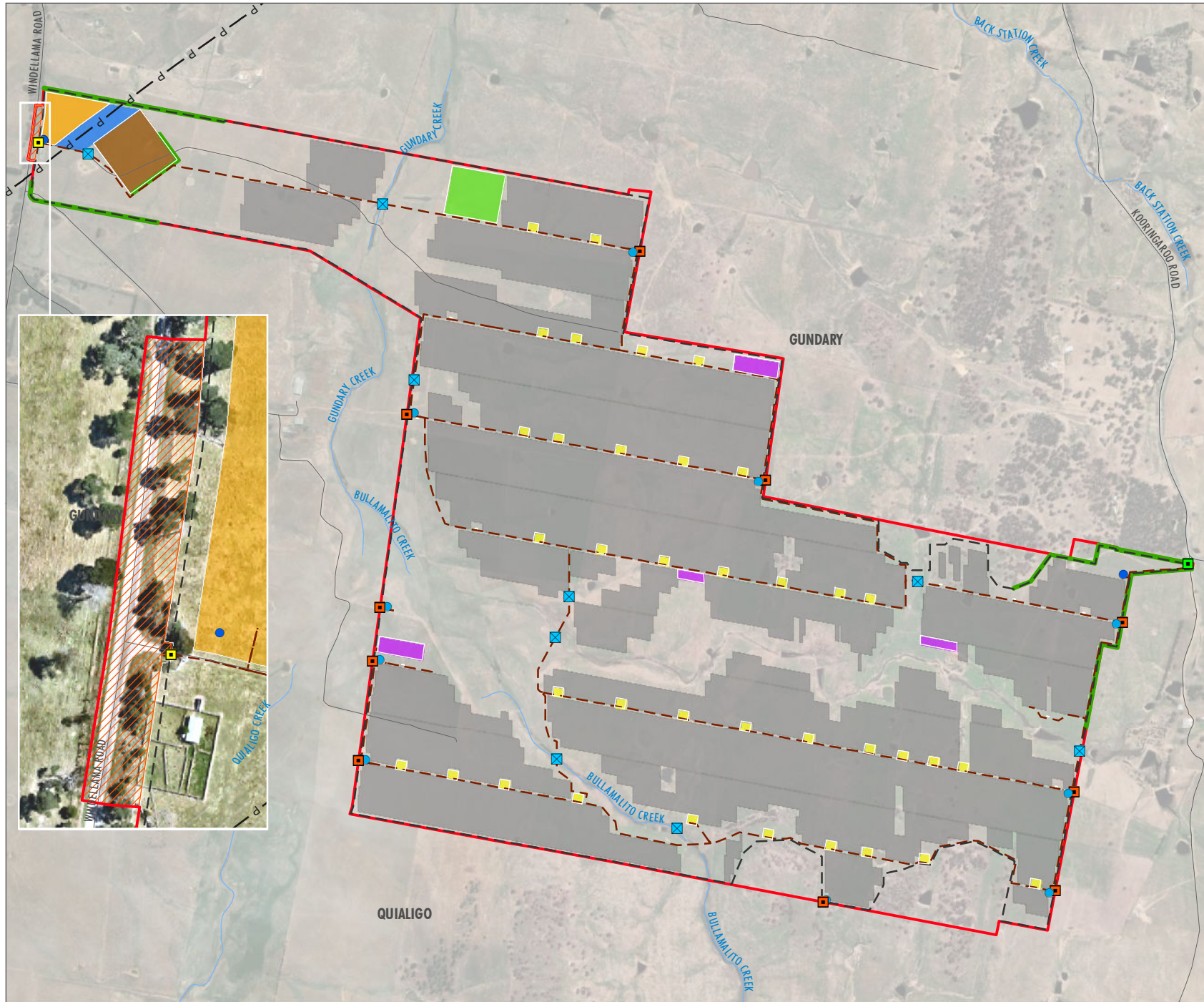
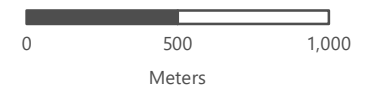


FIGURE 3.2

Project Area

Legend

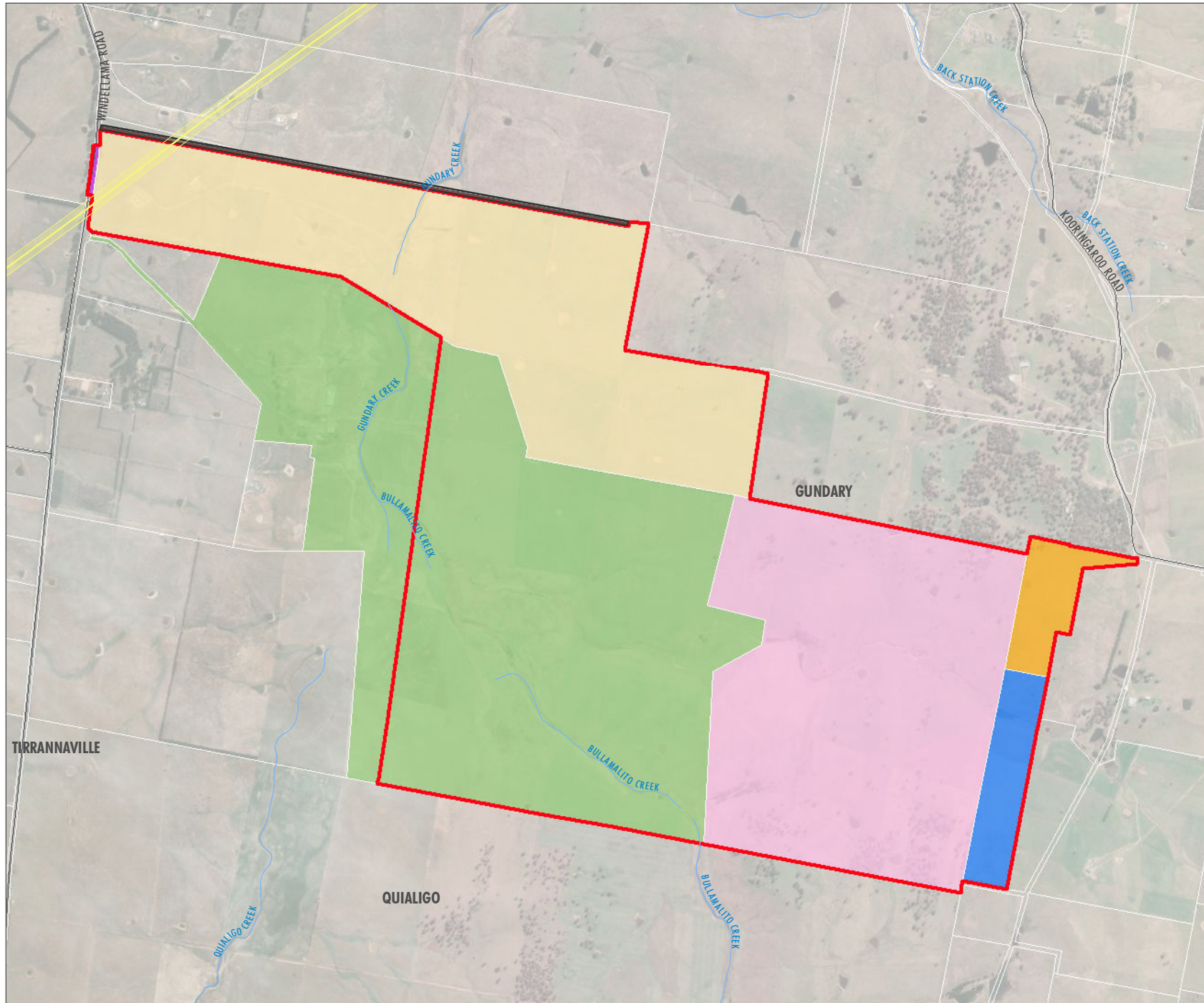
- Project Area
 - Cadastre Boundaries
 - Roads
 - Watercourses
 - Existing Transmission Line
 - Indicative Overhead Line Easement
 - Crown Land
- Lots Identified within the Project Area**
- 1/DP870101
 - 12/DP1016332
 - 2/DP1187724
 - 80/DP750018
 - Lot 3/DP1238347
 - Project Area within Road Reserve



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The Project Area is zoned RU1 Primary Production under the Goulburn Mulwaree LEP (as shown in **Figure 3.1**). The freehold land within the Project Area has been subject to agricultural activities such as grazing (sheep and cattle). The layout of the solar arrays and associated infrastructure would be entirely contained within the Project's development footprint, which is approximately 512 ha.

An existing 330 kV transmission line easement (approximately 60 m wide) is present in the north-western corner of the Project Area. There is a 20 m wide paper road along the northern boundary of Lot 12 DP1016332, owned by Crown Land, as shown on **Figure 3.2**. However, this has been excluded from the Project Area and the Development Footprint.

The Project Area is bounded by Windellama Road on the west, for approximately 500 m, with Kooringaroo Road bordering the northeast corner of the Project Area. Properties directly north, east, west and south of the Project Area are privately owned rural residential properties with agricultural land use.

3.2.1 Subdivision of Land

TransGrid requires freehold title to the switching station lot to proceed with the construction of the grid connection point. A new title in a subdivision of Lot 12 DP 1016332 will be required to enable land ownership of the switching station asset to be transferred to TransGrid. The indicative area for the required switching station lot is approximately 6 ha as shown on **Figure 3.3**. The size and outline of the required subdivision are indicative and subject to further detailed design and further consultation with TransGrid, the landholder and Goulburn Mulwaree Council.

The Project may further require the subdivision of Lot 3 DP 1238347 as illustrated on **Figure 3.3**, including indicative areas of existing and proposed subdivided lots. The residual lot will remain separate from the Project Area.

At the end of the operational life of the Project, the infrastructure on the subdivided lot(s) will be decommissioned as detailed in **Section 3.6**. The subdivided lot(s) may be reconsolidated back into the residual lot, subject to further consultation with the landholder, TransGrid and the Goulburn Mulwaree Council.

3.3 Project Layout and Design

3.3.1 Photovoltaic Modules

The Project would involve the installation of approximately 660,000 bifacial flat plate solar photovoltaic (PV) modules. Modules may generate up to approximately 610 watt each (W) and on average reach between 2.6 m to 3 m above ground level at full tilt (with an occasional maximum height of 4 m above ground level, depending on topography) (refer to **Photo 3.1**). The panel elevation has been designed with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event ⁶.

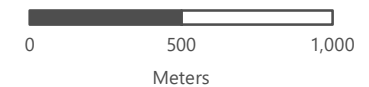
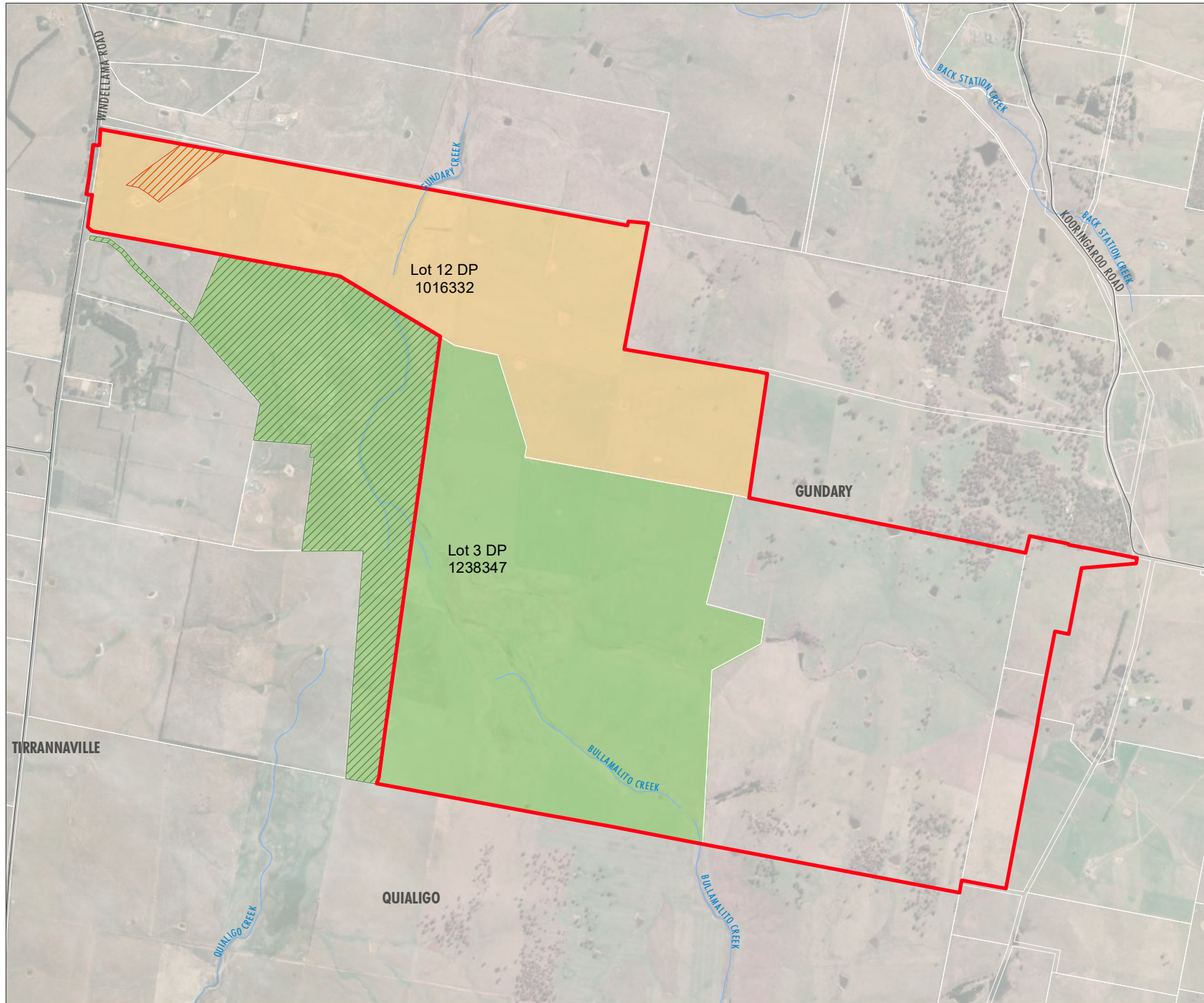
⁶ Freeboard is the height above a defined flood level, typically used to provide a factor of safety in, for example, the setting of floor levels and levee crest levels (i.e. design flood event).

FIGURE 3.3

Indicative Subdivision of Land

Legend

- Project Area
- Roads
- Watercourses
- Subdivision of Lot 12 DP 1016332
- Subdivision of Lot 3 DP 1238347
- Lot 12 DP1016332
- Lot 3 DP1238347



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Photo 3.1 Typical solar panel configuration



Photo 3.2 Example of Typical Single Axis Tracking System

The panels would be arranged in a series of rows positioned to maximise the solar resources available. The solar arrays would be installed through pile driving on ground-mounted single axis tracking framing (refer to **Photo 3.2**), 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 2.38 m by 1.3 m, which provides a surface area of approximately 3 m² per PV solar panel. PV solar panels are designed for maximum light absorptivity and constructed of solar glass with anti-reflective surface treatment.

3.3.2 Battery Energy Storage System (BESS)

The Project would involve the installation of a lithium-ion BESS to store energy generated by the Project. Lightsource bp is considering two BESS options with a duration of 2–4 hours i.e. Option 1 – a decentralised DC-coupled BESS, and Option 2 – a centralised AC-coupled BESS. Consent is being sought for either one, or both options to be implemented.

3.3.2.1 Decentralised BESS (DC Coupled)

This will involve a BESS with a proposed capacity of 230 MWp / 920 MWh, with no additional inverters or transformers required. This BESS will have a combined area greater than the centralised option, due to being distributed across the Project Area and to allow for spacing between key items i.e. BESS containers/modules.

The proposed decentralised DC-coupled BESS will include:

- 37 battery stations with a maximum of 6 battery storage units per station, and each station approximately 6 m long, 2.4 metres wide and 3 m high.
- A manufacturer's specified energy storage capacity of 3.686 MWh per battery cabinet.
- A total nominated aggregate operational energy storage capacity for approximately 222 battery cabinets of 920 MWh.
- Cabinets installed with a space between facing battery storage units of up to 4.5 m.
- A hardstand area for each battery station of approximately 25 m by 30 m to allow for a separation distance between combustible vegetation and battery storage units of at least 3 m.
- A buffer zone between each battery station and the solar panels of approximately 5 m or greater.
- Each battery station compound would have a footprint of approximately 750 m². Based on a maximum 'faceplate' battery station capacity of 22 MWh capacity, the approximate stored energy density of the of a battery station would be 30 kWh/m².

3.3.2.2 Centralised BESS (AC Coupled)

This will involve a BESS with a proposed capacity of 325 MWp / 650 MWh. The centralised 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 proposed centralised AC-coupled BESS will include:

- 52 battery stations with a maximum of 4 battery storage units per station, and each station approximately 6 m long, 2.4 metres wide and 3 m high.
- A manufacture's specified energy storage capacity of 3.686 MWh per battery cabinet.

- A total nominated aggregate operational energy storage capacity for approximately 208 battery storage cabinets of 650 MWh.
- Cabinets installed with a space between facing battery storage units of up to 4.5 m.
- A hardstand area for the BESS of approximately 250 m by 170 m to allow for a separation distance between combustible vegetation and battery storage units of at least 3 m in accordance.
- An asset protection zone (APZ) around the BESS compound of 10 m or greater.
- Access roads running between the PCSs within the BESS area.
- An AC-coupled BESS compound with a footprint of approximately 4 ha. Based on a maximum 'faceplate' storage capacity of 650 MWh, the approximate stored energy density of the centralised AC coupled BESS would be 16 kWh/m².

3.3.2.3 Combined Centralised and Decentralised BESS

This would involve a BESS with a combined capacity of 555 MWp / 1,570 MWh. This configuration would encompass the greatest area for placement of BESS infrastructure. However, all infrastructure is proposed to reside entirely within the Development Footprint, as assessed under the EIS.

3.3.3 Onsite Electrical Reticulation and Substation

The solar array would be connected to the onsite substation via a network of underground cables which are initially connected into combiner boxes and from there buried in trenches (up to 1 m deep and 0.5 m wide) that typically follow the alignment of the site access tracks. The electricity generated by the Project would be directed via these cables to inverters. The number of inverters would be dependent on the detailed design; however, it is estimated that up to 128 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, 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 owned and operated by TransGrid, located near the existing 330 kV transmission line (Yass to Marulan) that crosses through the north-western corner of the Project Area (refer to **Figure 3.1**). The substation would include a range of electrical equipment to manage and control the supply of electricity (up to 14 m in height) and a lightning mast up to 22 m in height. The substation would include an elevated busbar, switch room, lightning protection system up to about 22 m in height, circuit breakers, disconnectors, current transformers, voltage transformers, and two 330 kV transformers. The anticipated footprint of the substation is approximately 6 ha. The connection would involve replacement of two existing towers (i.e., 189 & 190) either side of the proposed substation location with a QSF (i.e. steel) pole structure.

The substation would then connect to a 330 kV switching station and to the existing 330 kV transmission line which is owned and operated by TransGrid via a short section of overhead/underground 330 kV powerline. As outlined in **Section 3.2.1**, subdivision of land is required for the switching station on Lot 12 DP 1016332 to enable ownership of the asset by TransGrid. The land will be subleased or transferred to TransGrid.

Underground cabling would be installed in accordance with *Australian Standards: AS/NZS 3000:2018, Electrical installations* and would be at a depth of at least 600 millimetres below ground.

3.3.4 Access, Parking and Security Fencing

The Project's primary access would be via the existing driveway at 961 Windellama Road, as shown in **Figure 3.1**. Intersection works are proposed on Windellama Road, as further discussed in **Section 3.4.2**, to upgrade the primary access point to accommodate heavy vehicles. Major solar and BESS components would be delivered to either Port Botany in Sydney or Port Kembla south of Wollongong and transported to the Project Area by truck via the Hume Highway.

Two transport routes via the Hume Highway to the Project Area (as shown on **Figure 3.4**) have been considered and assessed in this EIS, and include:

- Option 1: Hume Highway – Sydney Road – Reynolds Street – Grafton Street – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road.
- Option 2: Hume Highway – Hume Street – Garroorigang Road – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road.

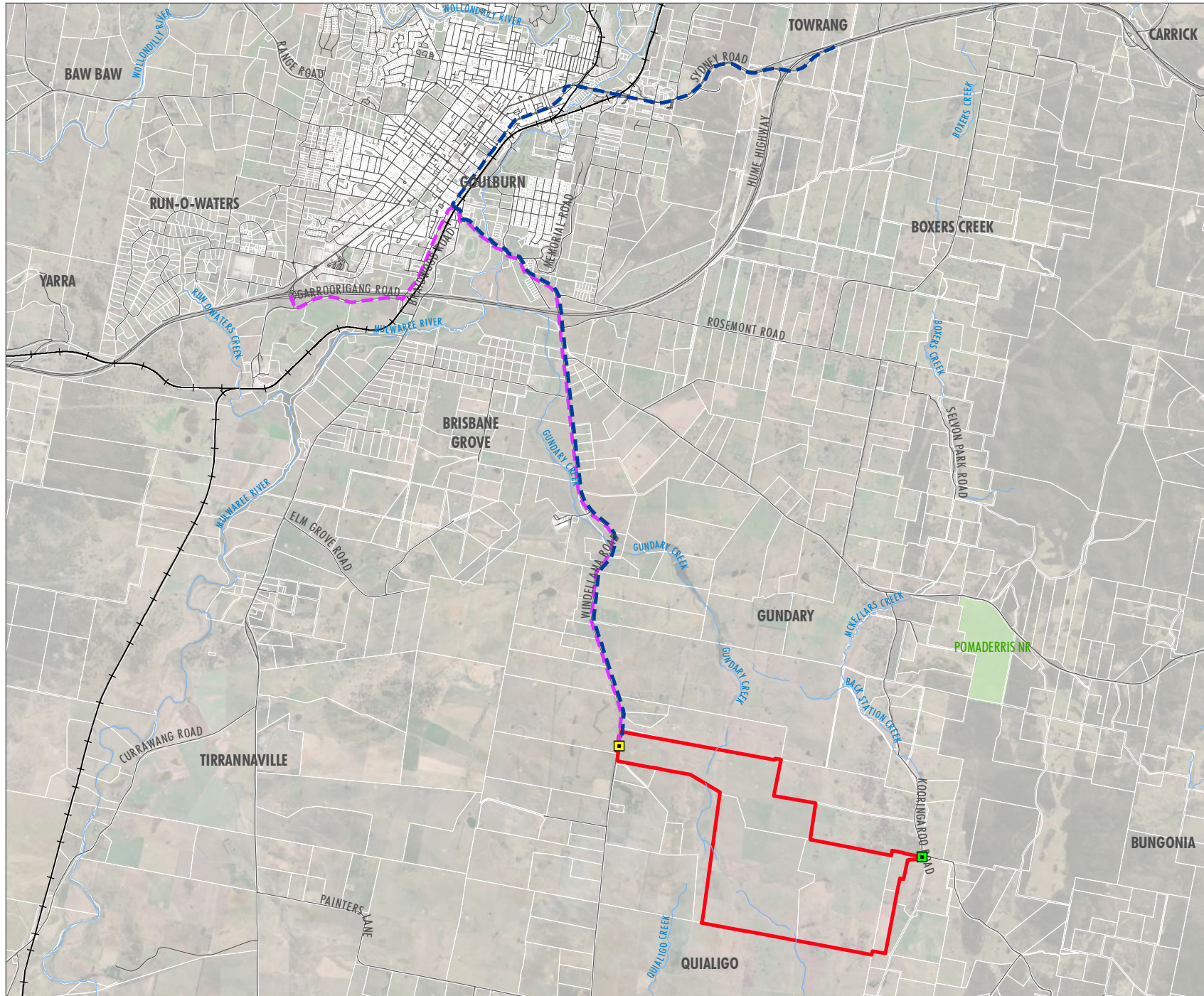
There would be an emergency access point on the eastern side of the Project Area via the existing access at 400 Koorringaroo Road. This access would only be used for emergencies.

Approximately 20 km of internal all weather access tracks would be constructed within the Project's development footprint to provide access to the various areas of the site for construction as well as on-going operations and maintenance. The concept layout of the proposed internal access tracks is shown in **Figure 3.1**.

The access tracks, comprising of compacted gravel, would be approximately 4 m wide with turning bays for emergency vehicles, and a main access track of 6 m wide to the substation/switching station to allow for the safe delivery, unloading and installation of key components.

During the construction phase, there would be a requirement to construct watercourse crossings (in the form of culverts and bed level crossings) to allow for access across creek lines within the Project Area. The proposed locations of these are illustrated on **Figure 3.1**. In particular, the watercourse crossings over Gundary Creek and Bullamalito Creek would involve installing culverts designed to accommodate heavy vehicles, including 19 m semi-trailer vehicles and various farm machinery.

FIGURE 3.4
Transport Route Options

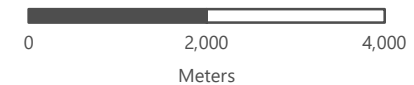


Legend

- Primary Access
- Emergency Access
- Project Area
- Cadastre Boundaries
- Roads
- Railway
- Watercourses

Proposed Access Route

- Option 1: Hume Hwy – Sydney Road – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road
- Option 2: Hume Hwy – Hume Street – Garroorigang Road – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road



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Detailed design and construction requirements of the watercourse crossings will be undertaken in consideration of:

- *Managing Urban Stormwater: Soils and Construction.*
- *Policy and Guidelines for Fish Friendly Waterway Crossings.*
- *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.*

During construction, a suitable number of parking spaces will be available at the main construction compound in the north-western corner of the Project Area, as shown in **Figure 3.1**.

The perimeter of the Project's development footprint would be enclosed by security fencing with CCTV, approximately 2.3 m high, subject to final design. The security fencing would involve casting concrete footings for posts and installing fencing mesh (consisting of chain wire including three strings of barbed wire on top). Fencing will restrict public access to the Development Footprint and is required under *Australian Standard (AS) 1725.2010 Parts 1–5*. Motion-sensitive security lighting would also be provided around the onsite substation, maintenance buildings and offices.

For locations where the security fence will traverse a watercourse, a flood permeable configuration will be utilised to ensure low afflux. The selection of security fencing arrangement reduces the likelihood that debris will be captured and will ensure upstream water levels are not raised. The proposed design is called a latched tubes waterway crossing and an indicative configuration is shown in **Photo 3.3**. The fence will also have gates (acting as emergency access points) at strategic locations (as shown in **Figure 3.1**).

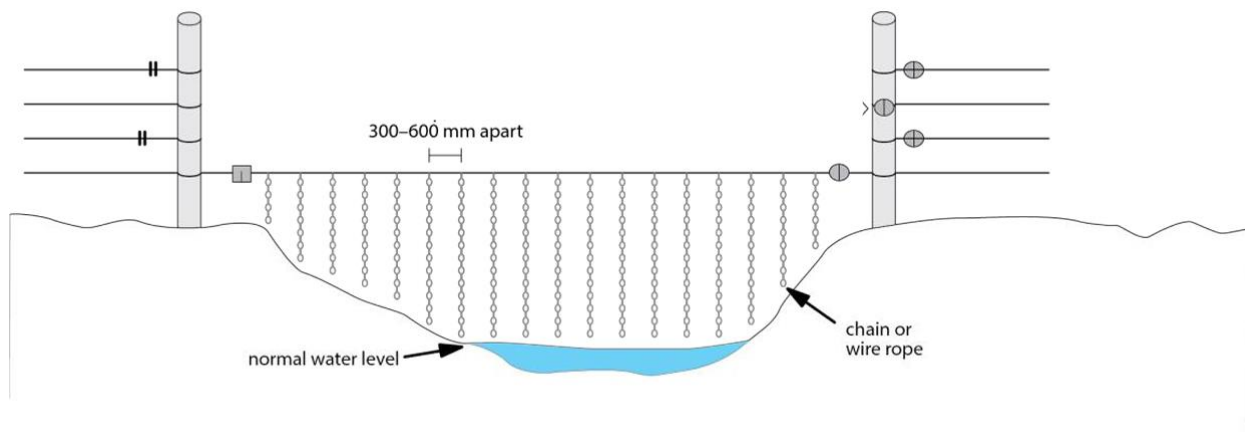


Photo 3.3 Indicative Configuration of Latched Tubes Waterway Crossing

3.3.5 Operations and Maintenance (O&M) Facilities

Two operations and maintenance (O&M) facilities would be constructed as part of the project to support the ongoing operation of the solar farm, including maintenance and repair activities and the TransGrid substation.

One O&M facility, to be owned and operated by TransGrid, would be situated within or alongside the development footprint for the substation in the northwest corner of the Project Area and the other O&M facility would be located within the proposed compound area at the Primary Project access (as shown on **Figure 3.1**).

Each O&M facility would include an office with staff amenities (kitchenette, toilets, showers), car park and workshop/shed.

3.4 Construction

3.4.1 Construction Workforce

The Project would generate up to 400 Full Time Equivalent (FTE) employment opportunities during construction with approximately 250 personnel on site during peak construction with a range of different skills required.

Lightsource bp will engage an Engineering, Procurement and Construction (EPC) Contractor to construct the Project. Based on the recommendations from the Accommodation and Employment Strategy (AES), completed as part of the SIA, the EPC Contractor will aim to engage a minimum of 5% local labour for construction and source local sub-contractors and suppliers, where possible and subject to local constraints. Furthermore, Lightsource bp is proposing to partner with the local TAFE and other education providers to facilitate training in renewable energy employment opportunities.

3.4.2 Site Access Upgrade on Windellama Road

Intersection works are proposed on Windellama Road at the existing access to the Project Area which will consist of a three-way intersection, with a connecting internal access road extending into the Project Area. The proposed intersection upgrade would provide an auxiliary and/or protected (channelised) turn lane intersection treatment to accommodate the swept path turning movement by the largest vehicle (low loader trailer with overall length of up to 50 m) requiring access to the Project Area. Concept drawings for the proposed works are provided in **Appendix 4**.

As outlined in **Section 5.0**, Goulburn Mulwaree Council and Transport for NSW were consulted regarding the proposed access intersection requirements. Lightsource bp will continue to consult with Council and Transport for NSW regarding the detailed design requirements for the intersection works prior to construction and for the purposes of securing approval under the Roads Act.

3.4.3 Site Preparation and Earthworks

The first stages of construction 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 watercourse crossings (i.e. culverts and bed level crossings).
- Installation of permanent perimeter fencing and plus motion detecting security lighting.
- Establishment of temporary construction compounds, site facilities and laydown areas for construction materials and equipment (refer to **Section 3.4.4**).
- 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.

3.4.4 Temporary Ancillary Facilities

To facilitate construction of the Project, a range of temporary ancillary facilities, as illustrated on **Figure 3.1**, would be required and would typically involve:

- Site compound – the compound area, measuring approximately 4.5 ha, and would include staff office and meeting room, control room, lunchroom and first aid room, ablution facilities, canteen, water tanks, covered walkways, covered storage areas, associated data, water and electrical reticulation, and car parking.
- Construction laydown areas – distributed throughout the site suitable for temporarily storing plant and equipment.

These facilities would be compacted with gravel to allow for all weather access and would be located within the Project's development footprint. Once construction is complete, these areas would be rehabilitated to their previous condition.

3.4.5 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.
- Preparation of foundations for the permanent buildings, inverter stations, BESS and on-site substation.
- Installation of underground cabling (trenching and installation of PCS).
- Construction of site operations and maintenance facility.
- Establishment of the BESS (centralised and/or decentralised).

- Construction of the onsite substation and associated grid connection infrastructure.
- 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 array would be sited above the ground and existing ground cover would be maintained underneath, minimising ground disturbance and facilitating potential agrivoltaics practices during operation with sheep grazing across the site.

3.4.6 Construction Hours, Staging and Duration

Construction activities would be undertaken during standard daytime construction hours consistent with the *Interim Construction Noise Guideline* (DECC, 2009) (ICNG) as follows:

- 7 am to 6 pm Monday to Friday.
- 8 am to 1 pm on Saturdays.
- No works on Sunday or public holidays.

In general, no construction activities would occur on Sundays or public holidays. Exceptions to these hours would be limited to activities with low noise generation where practicable, emergency works or where required for deliveries or dispatches by an authority due to safety reasons. The Goulburn Mulwaree Council and surrounding landholders would be notified of any foreseeable exceptions. In relation to low noise generation activities, this would include justifying why works are required outside the standard hours and outlining the timing, duration and potentially expected noise levels.

Construction and commissioning of the Project will take approximately 18 to 24 months, with a peak period of approximately 9 months towards the middle of the construction period. Site preparation and Project construction is planned to commence in early 2026, pending environmental approvals, licensing and completion of design and procurement processes.

3.4.7 Construction Traffic

The predicted daily traffic generated for workforce during peak construction is estimated at:

- Up to 250 light vehicle movements (meaning a two-way trip i.e. in and out) primarily for supervisors, engineers, specialist contractors and support staff.
- Up to 60 shuttle bus movements (in and out), for the transport of approximately 80% of the 250 personnel working on site (peak workforce) from nearby population centres to the Project Area.

Although many of the shuttle buses and light vehicle traffic would travel to the Project Area from the north, some movement of personnel from the south is also anticipated.

Heavy vehicle transportation would be restricted to accessing the Project Area from the north via Windellama Road. It is anticipated that up to 140 heavy vehicle movements (in and out) per day would be required during the peak construction period. Trucks would predominantly be 19 m semi-trailers and flat bed trucks, with some single unit trucks.

Up to 10 oversize/overmass (OSOM) vehicle movements (in and out) are expected for the full duration of the construction phase to deliver the battery and substation components to the Project Area. It is anticipated that OSOM vehicles would be a low loader trailer with overall length of up to 50 m.

Mobilisation 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 and 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 4 to 12 (18) 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, BESS, etc.
- Trucks for removal of waste.

Following mechanical completion, the Project will move into a commissioning phase estimated to occur during months 13 (19) to 18 (24) 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.

A detailed assessment on the traffic movements and transport routes is provided in **Section 6.11**.

3.4.8 Temporary Road Works

Minor temporary works will be required at one intersection along the proposed transport route to accommodate the largest OSOM vehicle of up to 50 m long. These works may include temporary removal of street furniture (such as signage), streetlights and/or medians at Braidwood Road / Bungonia Road. Swept path drawings for 50 m OSOM vehicles are provided in **Appendix 4** and show the extent of temporary works that may be required. Lightsource bp has sought to consult with Council and will continue to consult with Council regarding the need for temporary road works along the transport route through Goulburn.

3.5 Operation and Maintenance

The operational lifespan of the Project is expected to be approximately 40 years, with operations commencing in approximately Q4 2027/Q1 2028 (assuming an 18–24 month construction period). It is anticipated that up to four FTE jobs would be required during operations.

Throughout operations, ongoing maintenance of the Project Area and infrastructure will be required. The operation of the Project would be largely automatically controlled by the SCADA system with inputs from the meteorology stations and other equipment. Planned maintenance activities would likely 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 operations regular lightweight vehicle access will be required with occasional heavy vehicles access (i.e. replacing inverters, transformers or components of the BESS).

3.6 Decommissioning

Decommissioning of the Project will occur at the end of its operational life. A decommissioning plan for the Project and associated infrastructure will be prepared in advance of decommissioning in consultation with the relevant regulatory authorities and landholders. The basis of the plan will be that the Project and associated infrastructure are to be decommissioned in line with the applicable legislative requirements and best practice guidelines existing at that time. Should the Project be approved, the development consent for the Project will include standard conditions regarding the cessation of operations, decommissioning and rehabilitation of the Project Area. Lightsource bp or its contractors will seek to recycle all dismantled and decommissioned infrastructure and equipment, where feasible and practicable.

Vehicle movements and personnel requirements during the decommissioning phase are expected to be similar or less than with the construction phase of the Project.

3.7 Service and Utility Supply Arrangements

3.7.1 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-standing areas (linking to compaction requirements) and dust suppression. The associated water demand would likely be in the order of 12.26 megalitres (ML) for the 18–24 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, approximately 3 ML of water per year would be required for ongoing maintenance activities such as firefighting, amenities and potable purposes by operational staff, and washing of the PV solar panels, if required. Washing of the panels would not require any detergent or cleaning agents. A static water supply (comprising a total of 180,000 litres) would also be established and maintained for fire protection. The location of the water tanks is provided on **Figure 3.1**. Water for the operation of the Project would be sourced either from existing onsite bores, with appropriate water access licences, and/or purchased from Council and trucked to the Project Area.

3.7.2 Electricity

Access to electricity during operational activities would be via a dedicated low voltage feeder from the substation, and battery backup would be provided for essential services at the 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. Lighting would only be used during operating hours and the only external lights to be used outside of standard operating hours would be motion sensor security lights at the substation. 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.

3.7.3 Sewer

There is no sewer access in the Project Area. For the construction phase, an on-site amenities sewer disposal system will be provided, which would be collected in a tank and removed by a licensed waste contractor to the nearest sewage treatment facility, or as agreed with Goulburn Mulwaree Council.

Lightsource bp or its contractors would consult with Goulburn Mulwaree Council prior to commencement of construction to reach an agreement. 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 Goulburn Mulwaree Council requirements.

3.8 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 of all components of the Project. 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, responsibility, 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 construction, operation and environmental performance of the Project.
- Establish procedures for handling of complaints, disputes, non-compliances and emergency response.

Appendix 2 provides a consolidated summary of the management measures that will be implemented during the construction and operation of the Project to manage, mitigate and/or monitor potential impacts identified within this EIS.

3.9 Design Flexibility

The large-scale BESS sector is rapidly changing, primarily being driven by improved design and testing standards being adopted by industry. Improvements in battery technology include higher energy densities, longer lifespans, and faster charging capabilities. This makes it difficult to predict the specific BESS design and technology (AC vs DC) for the Project. Consequently, Lightsource bp is seeking approval to implement both AC and DC BESSs and conducted the environmental assessment considering both technologies.

Furthermore, the Project includes a slightly larger Development Footprint than the area required for the Project infrastructure to allow for some flexibility in the final placement of solar panels, access tracks and other associated infrastructure without having to update the biodiversity and archaeological assessments.

4.0 Statutory Context

The statutory provisions applying to the Project with respect to environmental assessment and planning approval at Federal, State and local level, as well as the roles that these play in the Project's assessment and determination are outlined in **Table 4.1** below. In addition, details on the relevant statutory requirements for the Project and where these have been addressed in the EIS are provided in **Appendix 5**.

Table 4.1 Statutory Provisions Applicable to the Project

Approval Category	Discussion
Power to grant approval – Environmental Planning and Assessment Act 1979 (EP&A Act)	Section 4.36 of the EP&A Act provides for the declaration of a project as SSD. Under the EP&A Act, the declaration of a project as SSD can be made by a State Environmental Planning Policy (SEPP) or by the Minister for Planning and is generally based on the scale, nature, location and strategic importance of the development to the State.
Power to grant approval – State Environmental Planning Policy (Planning Systems) 2021	Section 20 of Schedule 1 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) prescribes that development for the purpose of ‘electricity generating works’ that has a capital investment value of more than \$30 million is SSD. The Project has a capital investment value of greater than \$30 million. Therefore, the Project is declared as SSD and the development application for the Project will be subject to the requirements of Division 4.7 of the EP&A Act. The development application will be lodged with the Planning Secretary of the DPHI. The Minister for Planning is the consent authority for SSD projects. Section 4.5(1) of the EP&A Act also provides that the Independent Planning Commission (IPC) is the consent authority for SSD where it is declared to be the consent authority under an Environmental Planning Instrument (EPI). The Minister for Planning has issued a general delegation of the consent authority function for SSD projects to the IPC in instances where more than 50 public objections are received on the application, where the applicant has made a reportable political donations disclosure and/or where the Local Council (in this case the Goulburn Mulwaree Council) objects to the Project.
Permissibility – Goulburn Mulwaree Local Environment Plan 2009 (LEP)	The Project is located within the Goulburn Mulwaree LGA; hence the Goulburn Mulwaree Local Environment Plan 2009 (LEP) is relevant to the permissibility of the Project. The Project Area is wholly located within land zoned as RU1 Primary Production as illustrated in Figure 4.1. Under the LEP, ‘<i>electricity generating works</i>’ are not listed as prohibited within the RU1 zoning and therefore, under the provisions of the LEP, the Project is permissible with consent. Consideration of the LEP zoning provisions applying to the land are discussed in Appendix 5. <u>Subdivision of land</u> Subdivision of land is required for the Project, as discussed in Section 3.2.1. Subdivision of land is permissible within the RU1 zone pursuant to clause 2.6 of the LEP, subject to satisfying the applicable minimum lot size, pursuant to LEP clause 4.2. In this instance, the minimum lot size is 100 hectares. The subdivided lots for Lot 3 DP 1238347 would be larger than 100 ha and would therefore comply with the LEP provisions. The subdivision of Lot 12 DP 1016332 for the onsite switching station would however result in a lot size of approximately 6 ha, which would be less than the minimum lot size under the LEP. Notwithstanding, in accordance with the provisions of section 4.38 of the EP&A Act, the subdivision would be permissible subject to the approval of the Minister for Planning or their delegate.

Approval Category	Discussion
Permissibility – State Environmental Planning Policy (Transport and Infrastructure) 2021	Section 2.36(1) of the T&I SEPP also provides that development for the purposes of ‘<i>electricity generating works</i>’ (which includes battery storage) may be carried out by any person with development consent on a prescribed rural zone, which includes land zoned RU1. The Project, being located on land zoned as RU1 Primary Production, is therefore permissible with consent. Goulburn is declared a regional city for the purposes of the T&I SEPP. Section 2.42 of the T&I SEPP applies to the Project as a portion of the Project Area (i.e. Lot 12 DP1016332 and part of Lot 3 DP1238347) is identified as within the ‘subject land’ on the Goulburn Regional Cities Map. The consent authority is required to consider whether the Project is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the Project and is unlikely to have a significant adverse impact on Goulburn’s capacity for growth, or scenic quality and landscape character. A regional cities assessment has been completed as part of the EIS (refer to Section 6.3) and draws from the findings of the Landscape and Visual Impact Assessment (LVIA), the Economic Impact Assessment (EIA) and the Social Impact Assessment (SIA). Consultation with Council has also been undertaken in this regard during the preparation of the EIS, as further discussed in Appendix 6. Furthermore, section 2.48 of the T&I SEPP requires that for a development application which involves certain works related to or near electricity infrastructure, the consent authority must give written notice to the electricity supply authority for the area in which the development is carried out, inviting comments about potential safety risks. Consultation with TransGrid has also been undertaken during the preparation of the EIS, as further discussed in Appendix 6.
Consistent approvals (section 4.42 of the EP&A Act) – Roads Act 1993	Consent is required under section 138 of the Roads Act for works or structures that disturb the surface of a public road or connect a road to a classified road. However, section 4.42(f) of the EP&A Act applies to SSD projects and requires that consent must not be refused if the works are necessary for carrying out an approved project. The Project will require intersection upgrade works on Windellama Road and hence a permit under section 138 of the Roads Act will be required. This was examined in the Transport Impact Assessment (TIA) undertaken for the Project, as provided in full in Appendix 14 and summarised in Section 6.11 of the EIS.
Approvals not required	Section 4.41 of the EP&A Act specifies authorisations which are not required for approved SSD. Those are listed below: • <i>Fisheries Management Act 1994</i> – A permit under section 201, 205 or 219. Potential impacts on aquatic ecology, including Key Fish Habitat, have been assessed in the Biodiversity Development Application Report (BDAR) (refer to Section 6.4 and Appendix 7) and the Water Resources Impact Assessment (refer to Section 6.12 and Appendix 15). • <i>National Parks and Wildlife Act 1974</i> – An Aboriginal heritage impact permit under section 90. An ACHA has been completed for the Project, as provided in full in Appendix 8 with the outcomes of the ACHA summarised in Section 6.5 and ensures compliance with the NPW Act. • <i>Heritage Act 1977</i> – An approval under Part 4, or an excavation permit under section 139. An assessment of heritage issues has been completed for the Project. The HHIA is provided in Appendix 9 and a summary of the findings of the assessment is provided in Section 6.6 of the EIS.

Approval Category	Discussion
	• <i>Rural Fires Act 1997</i> – A bushfire safety authority under section 100B. A bushfire threat assessment has been completed for the Project in accordance with the requirements of the <i>RFS Planning for Bush Fire Protection (2019)</i> as summarised in Section 6.13 with the full report provided in Appendix 17. • <i>Water Management Act 2000</i> – A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91.
Other Approvals – Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act), a referral is required to be submitted to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for any ‘action’ that is considered likely to have a significant impact on any Matter of National Environmental Significance (MNES). If DCCEEW determines the action to be a controlled activity, under Part 9 of the EPBC Act, approval is required from the Commonwealth Minister for the Environment and Water. A search of the Commonwealth Protected Matters Search Tool undertaken in January 2023 indicated that the Project Area is not within a world heritage property or national heritage place, is not in proximity to wetlands of international importance, is not within either a Commonwealth marine area or the Great Barrier Reef Marine Park, and does not relate to a nuclear action, coal seam gas or coal mining development. Preliminary ecological investigations have identified two TECs in the Project Area, namely White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland and Natural Temperate Grassland of the South Eastern Highlands. Furthermore, 20 individuals of the Paddy’s River Box, Camden Woollybutt (<i>Eucalyptus macarthurii</i>) and one individual Key’s Matchstick Grasshopper (<i>Keyacris scurra</i>) have been identified during further surveys to occur within the Project Area. The Proposed Action will avoid impacts to both TECs, all individuals of <i>Eucalyptus macarthurii</i> and habitat areas for <i>Keyacris scurra</i> through Project redesign. A referral was submitted to the DCCEEW on 13 March 2023. On 13 September 2023, the DCCEEW issued the EPBC Referral decision that the Project is Not a Controlled Action.
Other Approvals – Native Title Act 1993	Searches of the National Native Title Register, the Register of Native Title Claims, and Native Title Applications Registration Decisions and Determinations, has not identified the Project Area as within a registered or determined native title claim. An ACHA has been prepared for the Project (refer to Section 6.5 and Appendix 8), including an archaeology field survey to identify indigenous archaeological sites and areas of Potential Archaeological Deposits (PADs) within and around the Project Area. Management and mitigation measures will be implemented as part of the Project to ensure protection of any un-expected Indigenous heritage finds.
Pre-conditions – State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 3 Koala Habitat Protection	Chapter 3 of the Biodiversity and Conservation SEPP applies to the extent that the Project Area is located within an LGA to which Chapter 3 of the SEPP applies. The consent authority is restricted from granting development consent for proposals on land identified as core koala habitat without the preparation of a plan of management. Potential impacts on koala habitat have been assessed in the BDAR (refer to Section 6.4 and Appendix 7). Consultation with the NSW Biodiversity, Conservation and Science (BCS) Division has also been undertaken during the preparation of the EIS, as further discussed in Appendix 7.

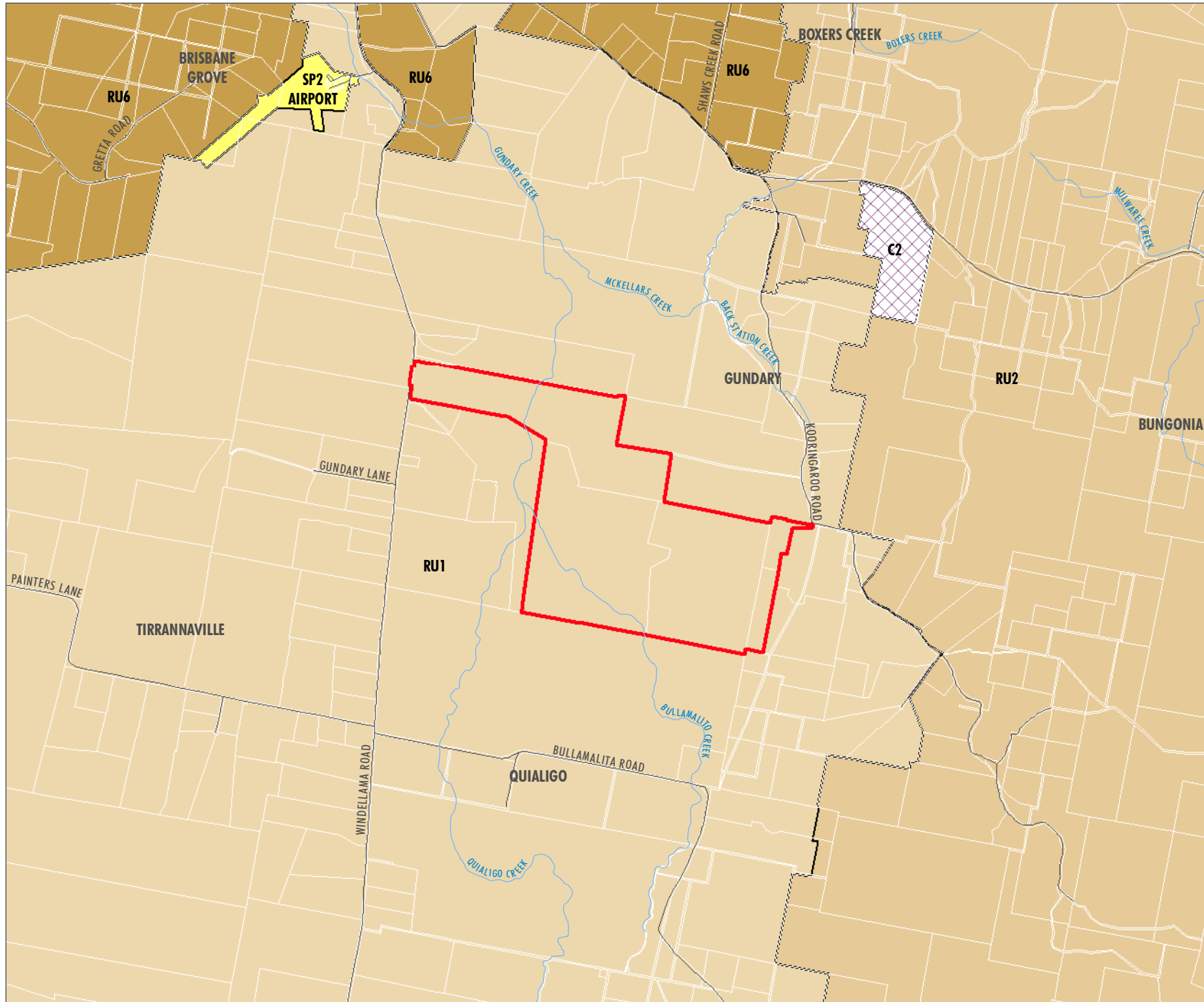
Approval Category	Discussion
Pre-conditions – State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 8 Sydney drinking water catchment	Chapter 8 of the Biodiversity and Conservation SEPP is applicable to the Project as it falls within the Sydney drinking water catchment. The consent authority is restricted from granting development consent unless it is satisfied that the Project will have a neutral or beneficial impact on water quality and will support the maintenance or achievement of the water quality objectives (WQO) for the Sydney drinking water catchment. Potential water quality impacts and WQO for the Sydney drinking water catchment have been assessed in the Water Resources Impact Assessment (WRIA) (refer to Section 6.12 and Appendix 15). Consultation with DPHI Water and Water NSW have also been undertaken during the preparation of the EIS, as further discussed in Appendix 6.
Pre-conditions – Neutral or Beneficial Effect on Water Quality Assessment Guideline (NBEWQAG) (WaterNSW, 2022)	This guideline provides a framework for addressing the requirement under the Biodiversity and Conservation SEPP for all development in the Sydney drinking water catchment to have a neutral or beneficial effect (NorBE) on water quality, including the use of the NorBE Tool. A WRIA has been undertaken as part of the EIS and includes a NorBE assessment on water quality, which is attached as Appendix 14 and summarised in Section 6.12. Consultation with DPHI Water and Water NSW have also been undertaken during the preparation of this EIS, which is summarised in Appendix 6.
Pre-conditions – State Environmental Planning Policy (Resilience and Hazards) 2021 – Chapter 3 Hazardous and Offensive Development	Chapter 3 of the Resilience and Hazards SEPP requires a consent authority to consider whether an industrial development is a potentially hazardous or potentially offensive industry. A hazard assessment is completed for potentially hazardous developments to assist the consent authority to determine acceptability. A preliminary hazard analysis (PHA) has been prepared for the Project (refer to Section 6.13 and Appendix 16). Consultation with DPHI Hazards has been undertaken during the preparation of the EIS, as further discussed in Appendix 6.
Pre-conditions – Biodiversity Conservation Act 2016	Under the <i>Biodiversity Conservation Act 2016</i> (BC Act), biodiversity assessment in accordance with the Biodiversity Assessment Method (BAM) is required for any SSD project. A BDAR has been prepared for the Project in accordance with the BAM (refer to Section 6.4 and Appendix 7). Consultation with BSC has also been undertaken as part of the preparation of the EIS, as further discussed in Appendix 6.
Mandatory matters for consideration	Section 1.3 of the EP&A Act (see Section 8.4). Section 4.15(1) of the EP&A Act (see Appendix 5). Section 192 of the EP&A Regulation (see Appendix 5).
Appendix 8	<i>Biosecurity Act 2015</i> <i>Contaminated Land Management Act 1997</i> <i>Local Land Service Act 2013</i> <i>Aboriginal Land Rights Act 1983</i> <i>Waste Avoidance and Resource Recovery Act 2001</i>

FIGURE 4.1

LEP Land Zoning

Legend

- Project Area
- Cadastre Boundaries
- Roads
- Watercourses
- Local Environmental Plan Zoning**
- C2 Environmental Conservation
- RU1 Primary Production
- RU2 Rural Landscape
- RU6 Transition
- SP2 Infrastructure



0 500 1,000
Meters

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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5.0 Engagement

Lightsource bp recognises that early and meaningful engagement with the local community and key stakeholders is fundamental to obtain feedback that can be incorporated into the design and implementation of the Project.

Lightsource bp is also a signatory to the Clean Energy Council's Community Engagement Best Practice Charter for Renewable Energy Developments. This involves a voluntary set of commitments that are upheld when developing and operating renewable energy projects, including to engage respectfully with the communities in which they plan and operate projects, to be sensitive to environmental and cultural values, and to make a positive contribution to the regions in which they operate.

Lightsource bp has been engaging with the local and broader community since April 2022, seeking to build relationships and understand stakeholder perspectives and needs in the region through meetings with proximal and neighbouring landholders, community / interest groups, service providers, Aboriginal stakeholder groups, Goulburn Mulwaree Council and relevant local, state and Federal government agencies. This ongoing engagement has resulted in significant changes to the Project design (refer to **Section 1.5**) and has assisted in development of management and mitigation measures proposed for the Project. In addition, engagement has been undertaken with the broader community, neighbouring Councils, functional stakeholders (e.g. education, accommodation and employment providers), businesses and various non-government organisations and interest groups. This engagement has further informed the design of the Project and has been ongoing throughout the assessment process, and if the Project is approved, the engagement will be ongoing during the life of the Project.

Engagement has been undertaken as part of the Social Impact Assessment (SIA) undertaken by Umwelt for the Project following the requirements of the NSW Government guidelines and assessment standards including, but not limited to, the NSW *Social Impact Assessment Guideline for State Significant Projects* (2023) (SIA Guidelines), the *Undertaking Engagement Guidelines for State Significant Projects* (DPE, 2022d) (Engagement Guidelines) and the SEARs. The stakeholder engagement process has therefore afforded opportunities for Lightsource bp to effectively assess and integrate social outcomes within the Project planning, design and assessment phases.

This section provides an overview of the stakeholder engagement program including stakeholder identification, engagement undertaken to date, the outcomes of the consultation process and proposed future engagement. Further detail is provided in the SIA (refer to **Appendix 18**).

5.1 Stakeholder Engagement Plan

A Community and Stakeholder Engagement Plan (CSEP) was developed during April 2022 in accordance with the SIA Guidelines, the Solar Guidelines and Engagement Guidelines. A copy of the CSEP is available as an appendix to the SIA included in **Appendix 18**.

The CSEP documented the objectives of engagement, identification of relevant stakeholders, as well as the community and potential concerns associated with the Project. The CSEP also included an implementation plan which was updated as required through the duration of the community and stakeholder engagement. Table 1 from the CSEP outlines the implementation plan, which has been the guiding document used throughout stakeholder engagement.

5.1.1 Stakeholder Identification

Effective engagement involves the participation and collaboration of all stakeholders who have an interest in, or those that are affected by, a project. Stakeholders may be affected groups or individuals that:

- live, work or recreate near the Project
- have an interest in the proposed action or change
- use or value a resource associated with the Project
- are affected by the Project e.g., may be required to relocate because of the Project (Burdge, 2004).

A stakeholder identification process was undertaken during the scoping phase of the Project to support the planning and delivery of community consultation and stakeholder engagement. This process involved identifying stakeholders with an interest in the Project, or those directly and indirectly affected by the Project to identify potential concerns or opportunities.

An overview of the key stakeholders that were consulted are presented in **Figure 5.1**. This was used to guide engagement planning throughout the EIS Phase as per the 'Level of Engagement' indicated, which was guided by the International Association of Public Participation (IAP2) Public Participation Spectrum. Further definition of the stakeholder identification process is outlined in the Community and Stakeholder Engagement Plan (refer to **Appendix 18**).

5.1.2 Engagement Undertaken

The engagement program was implemented in two phases, with the initial round of engagement during early to mid 2022 while the Scoping Report was developed, and the second round during late 2022 to early 2024 while the technical assessments for the EIS were underway. This allowed for community engagement to be undertaken during two key stages of the assessment process; during the Project design phase to allow for scoping of key concerns and impacts, and during the draft environmental assessment to inform the technical studies and appropriate strategies to seek to further avoid or minimise / manage the environment and community impacts.

Lightsource bp has also extensively consulted with Government agencies throughout the EIS process, as outlined in **Appendix 6**, to understand and meet their assessment requirements. Consultation included Project briefings, discussion of the scope of the specialist assessments and SEARs requirements and reporting of results of the specialist assessments. A detailed engagement record is provided in **Appendix 6**.

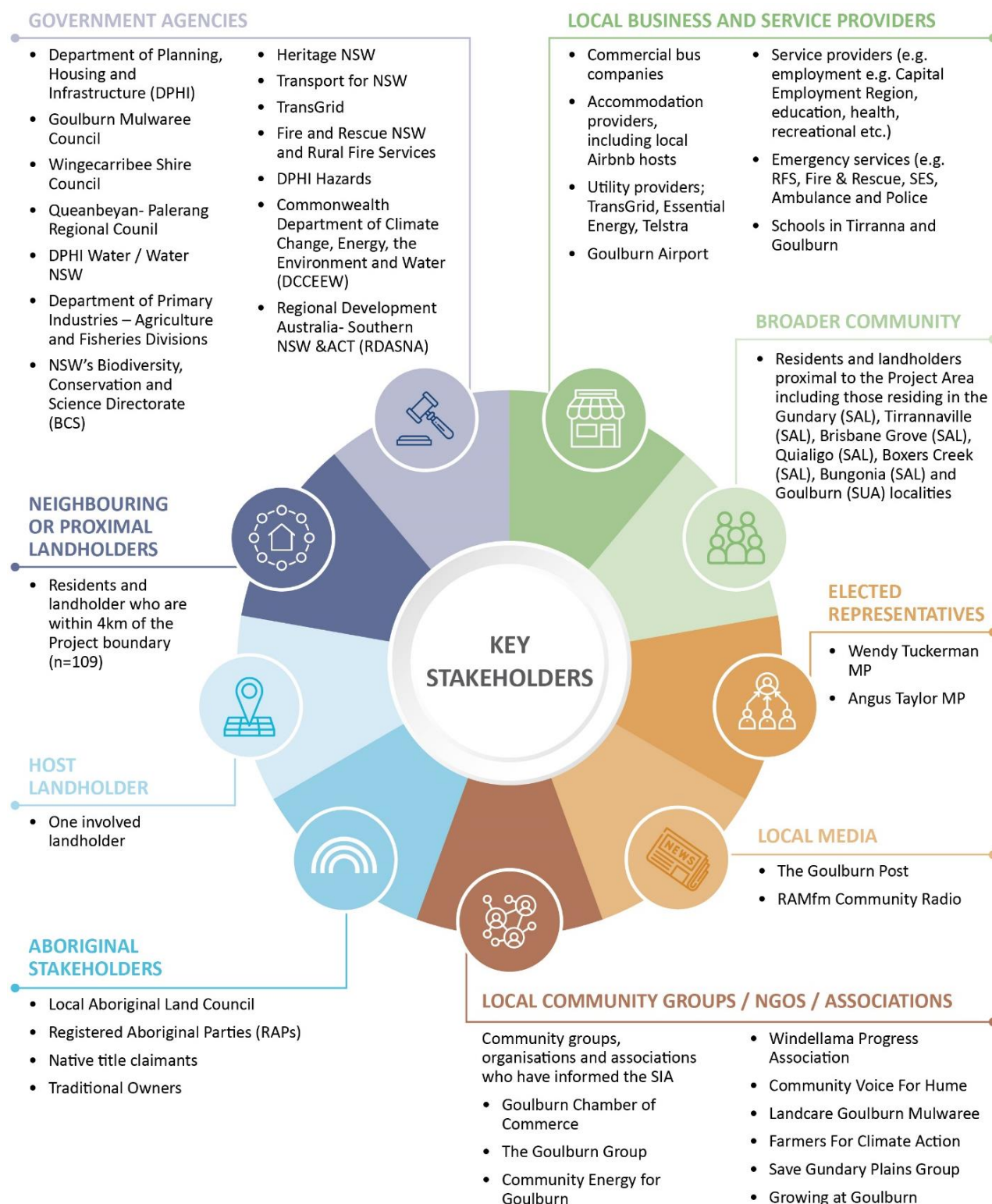


Figure 5.1 Key Stakeholders

A summary of the consultation activities undertaken during the stakeholder engagement program is presented in **Table 5.1**, with key community concerns and where these have been addressed in this EIS outlined in **Section 5.3**.

Table 5.1 Engagement Tools

Mechanism	Engagement Type	Target Stakeholder	Description
Project website	Inform	Near neighbours / landholders Wider community	Dedicated project website page publicly available since April 2022 to provide Project information and updates to the broader community.
Project phone number / email	Consult	Near neighbours / landholders Wider community	Dedicated project email address available since April 2022, and generic Lightsource bp phone number available for stakeholders to contact the Project team for information, or to provide feedback through the EIS process. 'Contact us' form and updates provided on the Project website.
Printed information sheets	Inform	Near neighbours / landholders Wider community	Project information sheets distributed via Australia Post to mailboxes during: April 2022 – a Community Information Sheet was posted via unaddressed mail to 3,525 residents in surrounding areas. July 2022 – a Frequently Asked Questions (FAQ) sheet posted via unaddressed mail to 12,420 residents in surrounding areas. The sheet was designed to answer key questions that had arisen during initial consultation with community members. October 2022 – 109 personalised postcards were sent to residents who reside in the Gundry locality, inviting them to the November 2022 community drop-in sessions. March 2024 – a Community Information Sheet was posted (via unaddressed mail) to 12,500 residents in the area.
Project email updates	Inform	Near neighbours / landholders Wider community	Email Project updates were provided to all stakeholders subscribed to receive the updates. As of June 2024, there were 266 email addresses recording on the project database. September 2022 – Project update, outlining engagement to date, project design adjustments, local employment and economic benefits, community benefit fund. October 2022 – Invitation to November 2022 Community Information Drop-in Sessions. November 2022 – Reminder and thank you to those who attended drop-in sessions with links to further project information.

Mechanism	Engagement Type	Target Stakeholder	Description
			December 2022 – Project update on drop-in sessions, Landscape and Visual Impact Assessment (LVIA and State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021 updates. March 2023 – FAQ Information sheet. May 2023 – Project update, including Project layout update map. August 2023 – Project Status Update, including notification of EPBC referral. January 2024 – Project Status Update.
Personalised letter box drops	Inform	Near neighbours / landholders	A letter box drop was conducted between 8 to 12 May 2023 to residents living near the Project as part of the Landscape and Visual Impact Assessment (LVIA). Thirty-one (31) of the residents within 4 km from the Project were identified as being potentially visually impacted by the Project as defined in the LVIA. The letter requested a meeting to discuss the Visual and/or Social impact assessment. Of these residences: - Three (3) were identified as sheds and not residences, therefore not needing to be assessed for the LVIA. - Five (5) residences did not have a letter box and had a locked gate. 23 residences received a letter requesting to meet with them to contribute to the Visual Impact Assessment, and to discuss the Social Impacts of the Project. 25 residences received a letter requesting to meet with them to discuss only the Social Impacts of the Project, as they were not identified to have visual impact from their property.
Government project briefings	Consult	Local and State government agencies Elected Representatives	Formal briefings to key stakeholders and government agencies were held regularly, with a slide presentation utilised to formally introduce or provide updates on the Project. Letters and emails offering meetings to discuss the Project were provided to Elected Representatives, along with the Project newsletters and other electronic updates. Project briefings were held with Angus Taylor, Federal Member for Hume, and with Wendy Tuckerman Member of the New South Wales Legislative Assembly, representing Goulburn for the Liberal Party. Numerous Project briefings were held with Local and State government agencies. Meetings with Goulburn Mulwaree Council were held on several occasions, including both Council staff and the Councillors.

Mechanism	Engagement Type	Target Stakeholder	Description
Individual meetings / interviews	Collaborate	Near neighbours / landholders	Face to face meetings, phone calls and emails have been undertaken with near neighbours and other interested stakeholders. Meetings were held over the periods of: March to August 2022 – Individual meetings, emails, phone calls with near neighbours (23 households). Key stakeholder group interviews online and in-person were held with community groups and associations (15 groups), training and education providers (2 organisations) and Aboriginal organisations (3 groups, 10 participants) to hear community perspectives and obtain feedback on the proposed Project. April 2022 – In person neighbour group meeting held in proximal landholder residence with 11 attendees to provide project information, hear community perspectives and obtain feedback on the proposed Project. Three (3) Lightsource bp representatives, two (2) Umwelt social team members, one (1) Envisage representative and 10 neighbours were in attendance. June 2022 – Personal one on one meetings with six (6) proximal landholders to provide Project updates and gather neighbour feedback. Conducted by Umwelt and Lightsource bp. May 2023 – Personal one-on-one meetings with nine (9) near neighbours (within 4 km) of the Project boundary, aligning with the LVIA.
Accommodation and employment related interviews and emails	Consult	Business and Service Providers	Online interviews were held with the Goulburn Mulwaree Council, neighbouring councils, key regional development and employment stakeholder and accommodation providers. These meetings occurred during: April 2024: Online meetings with two (2) local councils, two (2) key stakeholders. March–April 2024: In person and phone interviews with 35 short-term accommodation providers. An email exchange between Wingecarribee Shire Council and the Umwelt Social Team included qualitative housing capabilities for the LGA. Interviews and emails allowed for local councils, key stakeholders and accommodation providers to give insight into the regions current housing and accommodation capabilities.
Project relevant emails with Umwelt Social Team	Consult	Near neighbours / landholders	Since April 2022, Lightsource bp has engaged extensively with proximal landholders / residents via email to provide Project updates and responses to queries and concerns that were sent to the Project email address from the community.

Mechanism	Engagement Type	Target Stakeholder	Description
Service provider interviews	Involve	Business and Service Providers	To inform the AES, the following mechanisms were utilised: - Online interviews with Goulburn Mulwaree Council, Queanbeyan Palerang Regional Council, key regional development and employment stakeholder and accommodation providers. These meetings occurred over: - April 2024: Online meetings with two councils, two key stakeholders. - March–April 2024: In person and phone interviews with 35 short-term accommodation providers. - An email correspondence with Wingecarribee Shire Council regarding qualitative housing capabilities for the LGA. Therefore, overall semi-structured phone discussions with 46 service providers and local businesses in the area occurred to understand capacity and demand for the SIA and AES. Semi-structured phone discussions with service providers and local businesses in the area to understand capacity and demand.
Community Drop-in Session	Involve	Near neighbours / landholders Wider community	Community Drop-in Sessions were held in 2022 and 2024 to enable community residents the opportunity to learn more about the project and provide their perspectives and feedback. Key assessment outcomes were also shared at these sessions. The sessions were held on: 14 and 15 November 2022. Drop-in sessions were hosted from 8 am–10 am and 4 pm–7 pm on both days, at the Workspace Goulburn. A total of 30 people attended across all the sessions. 25 and 26 March 2024. Drop-in sessions were hosted at the Country Women’s Association Hall Goulburn from 2 pm–6 pm Monday 25 March and 8 am–12 pm on Tuesday 26 March. The sessions were attended by 56 individuals, with 8 individuals attending both sessions. The drop-in sessions allowed for community members to engage with members of the project and assessment team, to discuss individual concerns, interests, concerns and gather feedback to validate impacts and opportunities, including potential mitigation / enhancement strategies.
Community Information Stalls at local markets	Involve	Near neighbours / landholders Wider community	The Project team attended the Bungonia and Goulburn markets, to provide an opportunity for the wide Goulburn community to have a say on the Project. 28 April 2022 – Bungonia Markets. 14 May 2022 – Goulburn Market.

Mechanism	Engagement Type	Target Stakeholder	Description
Online surveys	Involve	Near neighbours / landholders Wider community Business and Service Providers	Two online surveys were available for all stakeholders to complete, i.e.: March to August 2022 – administered in the scoping phase of the project with 53 completed surveys obtained. August 2022 to December 2023 – administered to further inform the SIA with 32 completed surveys obtained. Survey questions related to: - Knowledge and awareness of the project. - Ranking and identification of potential positive and negative impacts of the Project. - Suggested mechanisms to mitigate or enhance impacts. - Levels of acceptance of the Project and renewable energy. - Information sharing and engagement preferences. The survey was distributed via a variety of channels, including: - Links to the online survey and paper surveys were shared at drop-in sessions and market stalls. - The survey was available on the Gundry Solar Farm website. Links to the survey were provided in project emails and printed newsletters.
Targeted Telephone survey (random sample)	Collaborate	Near neighbours / landholders Wider community	The views of residents in the local and wider community were also assessed through a random telephone survey, completed by Taverner. The survey obtained 200 responses from a random sample of mobile and landline numbers of people residing within the Goulburn Mulwaree LGA, specifically within the Gundry SAL and Goulburn SAL. The survey aimed to proportionally over-sample people who lived within 5 km of the Project Area to ensure representation of those residents living in closest proximity to the Project.

Table 5.2 provides a breakdown of the stakeholder and community groups that have participated in the Project's planning and assessment process to date through the engagement mechanisms outlined in **Table 5.1**, and whose feedback and input has informed the SIA and EIS processes.

Quantitative and qualitative information collected through consultation and engagement activities has been analysed to inform the identification and analysis of social impacts associated with the Project, as outlined in **Section 5.3** and **Appendix 18**.

Table 5.2 Stakeholders Consulted

Stakeholder Group	Phase 1 – Scoping No. Participants Engaged	Phase 2 – SIA/EIS No. Participants Engaged
Aboriginal stakeholder groups	10	3
Local, State and Federal Government Departments or representatives ⁷	10	16
Proximal landholders	55 ⁸	67 ⁹
Local and broader community	30	231 (i.e. 200 via telephone survey & 31 via SIA Engagement team)
Community & Special Interest Group Members	30	23
Education Providers	1	1
Employment Providers	0	2
Health and Emergency ⁷	2	2
Local businesses	3	4
Accommodation providers	0	37
Media	0	1

5.2 Aboriginal Community Engagement

In addition to engagement with Aboriginal stakeholders as part of the SIA (outlined in **Section 5.1.2**), a comprehensive engagement process was undertaken with the Aboriginal community in regard to the Project in accordance with the relevant guidelines and policies, as outlined in **Section 6.5**. Throughout the course of the Project, consultation was undertaken with 18 Registered Aboriginal Parties (RAPs) who registered an interest in the Project. Further discussion regarding the consultation process with the RAPs for the Project is included in **Section 6.5.2**. As noted in **Table 5.2** and **Table 5.3**, engagement with Indigenous groups and service providers in the LGA were also undertaken as part of the SIA for the Project and outcomes of this consultation are included in **Section 6.14** and **Appendix 18**.

⁷ Refers to number of entities i.e. Councils, Government Agencies. Multiple meetings have been held with representatives throughout the planning and assessment phase.

⁸ Refers to total households, not counting multiple people who may have been engaged from single households.

⁹ Refers to individuals, with multiple individuals who may live in the same household and/or address.

5.3 Agency Consultation

Lightsource bp has undertaken ongoing engagement with local, State and Commonwealth agencies throughout the planning and environmental assessment process for the Project. A summary of agency consultation undertaken as part of the EIS development is provided in **Appendix 6**.

5.4 Community Views

As discussed in **Section 5.1**, targeted engagement was undertaken with key stakeholders, including:

- proximal and local landholders (< 5 km)
- community and special interest group representatives, local business owners, service providers, Aboriginal organisations, local government (< 10 km)
- broader community residents residing within the social locality (> 10 km to 100 km).

Issues raised during the engagement process have been recorded and have informed investigations undertaken as part of this EIS and the ongoing development of the Project. Perceived positive and negative views from these stakeholder groups are illustrated in **Figure 5.2** and **Figure 5.3** respectively.

The most frequently raised issue in targeted stakeholder engagement was the perceived positive impact of the Project associated with employment generation, procurement and training opportunities for local people (n=78). This issue was raised more frequently than perceived negative impacts. The next most frequently raised issues were the perceived negative impacts related to:

- change in sense of place due to loss of visual amenity as a result of industrialisation of the landscape (n=76)
- livelihood impacts due to a perceived decrease in property values and the inability to sell proximal properties (n=66)
- heightened levels of community outrage associated with a perceived inability to inform the Project planning and decision-making process (n=61).

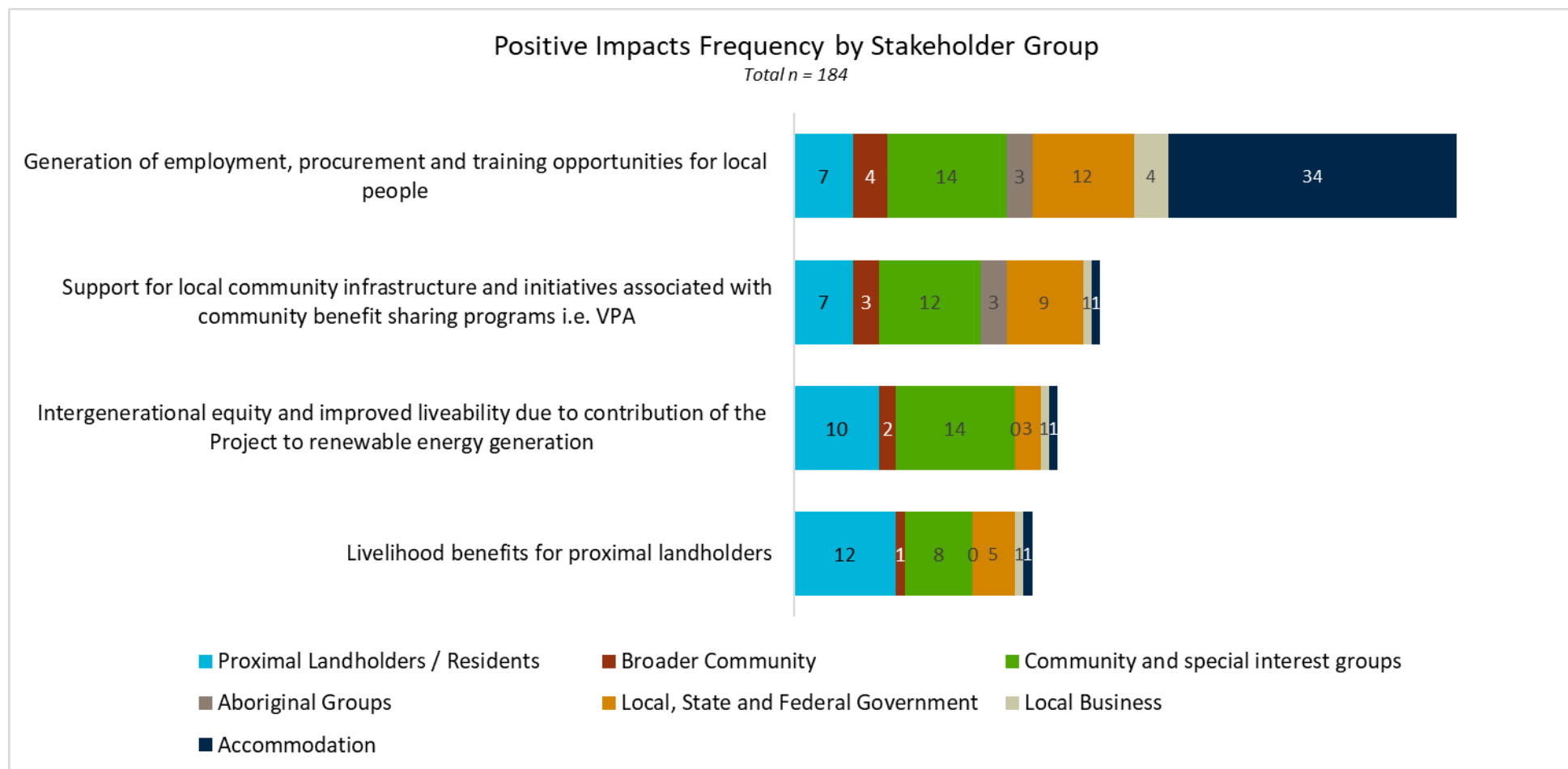


Figure 5.2 Perceived Positive Community Views – Frequency by Stakeholder Group

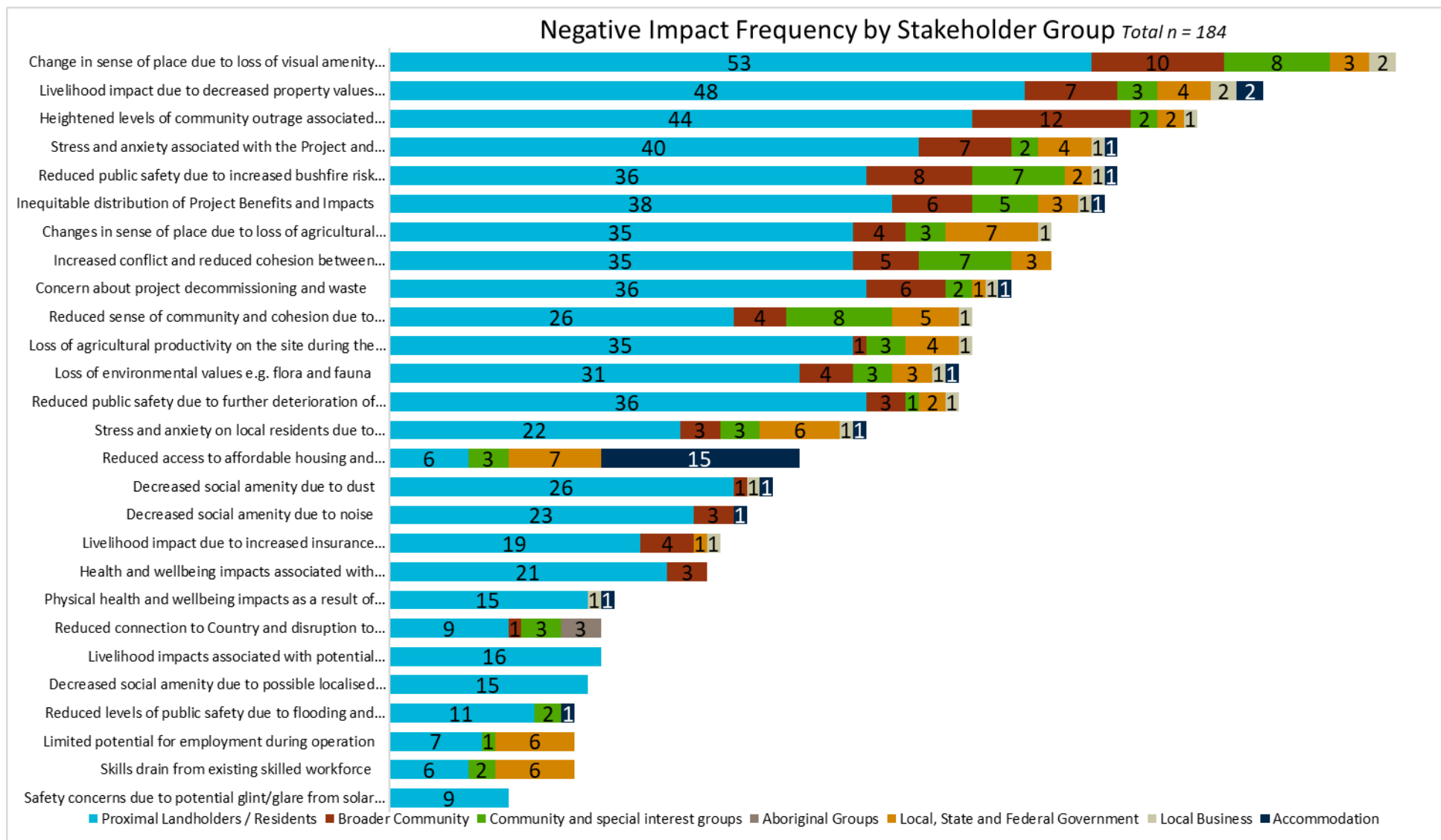


Figure 5.3 Perceived Negative Community Views – Frequency by Stakeholder Group

Most of the stakeholder engagement undertaken to date has focused on the community within the Project locality and surrounding suburbs (within 10 km) and then expanding to the greater LGA area. Other than State and Commonwealth government agencies, there has been minimal interest in the Project beyond the regional scale to date.

Differences in the levels of acceptance for the Project highlight the distributive inequity of how impacts and benefits are perceived and experienced within the community. This can be seen in the key concerns for residents residing in Gundry (< 5 km) and surrounding suburbs (< 10 km), in comparison to those residing further afield from the Project in Goulburn (> 5 km to 100 km). Residents in Gundry were more concerned about impacts on the visual amenity and natural landscape values in the locality and a potential decline in property values. While residents in Goulburn were also concerned about visual amenity, they also focused on the reduction in the area of land currently used for agricultural purposes and the potential for increased traffic during construction. Similarly, there are key differences in the recognition of Project benefits across the social locality, with a larger number of respondents in Goulburn acknowledging the benefits of the Project compared to those in Gundry. Interestingly, just under a third of respondents from Gundry raised the Project's contribution to renewable energy provision in the region as a key benefit of the Project, compared to over half of the respondents in Goulburn raising local employment opportunities as the top benefit of the Project.

The SIA (refer to **Appendix 18** and **Section 6.14**) expands on the perceived positive and negative impacts raised during consultation and through assessment of the Project, linking them to the social impact categories of livelihoods, accessibility, way of life, surroundings, social amenity, engagement and decision making, community, health and well-being and culture outlined in the SIA Guidelines.

Table 5.3 summarises the key community views and how these have been addressed in the Project design and preparation of this EIS.

Table 5.3 Summary of Community Engagement Outcomes

Stakeholder Group	Consultation Summary	Key Outcomes
Host Landholder	Ongoing consultation regarding design of the solar farm and host landholder agreements.	Host landholder agreement as outlined in Section 2.7.1 .
Community including: Neighbouring and proximal landholders (< 5 km). Local community, special interest groups (< 10 km). Broader Community (> 10 km to 100 km).	Key issues raised by community during consultation included concerns related to: - Landscape and visual amenity. - Property Values. - Bushfire risk. - Noise and dust emissions. - Water quality and quantity impacts, including flooding. - Mental health. - Agricultural land. - Biodiversity. - Roads. - Traffic and Transport. - Waste generation and decommissioning. - Cumulative impacts. - Glint and glare impacts. - Land use conflict. Additionally, community identified potential positive impacts associated with - Employment opportunities. - Benefit sharing. - Net zero. - Participation in the process.	Issues raised by the community were considered during the design refinement process including the following design changes: - Removal of approximately 50 ha of solar arrays in the north-west corner of the Project Area to reduce visual and noise impacts. - Relocation of the centralised BESS approximately 1.2 km to the east, away from sensitive receivers on the north-west. - Removal of 20 decentralised BESS units located nearest to sensitive receivers. - Further refinement of solar arrays to avoid impacts specifically to <i>Eucalyptus macarthurii</i>. - Inclusion of a secondary access point via Kooringaroo Road as well as additional emergency access points along the perimeter fencing via gates for emergency access and egress. - Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek. - Solar panels designed with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event. - Inclusion of dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area. - Strategically located noise attenuation (noise barriers) around loudest Project infrastructure. - Strategically located landscape screening. - Implementing setback distances i.e.: - a 10 m APZ around the perimeter of the Project, within the security fencing - approximately 20 m to 40 m setbacks around second order and higher streams, in particular where these have biodiversity value.

Stakeholder Group	Consultation Summary	Key Outcomes
		- Implementing exclusion zones i.e.: - Areas with TECs and habitat for threatened species. - Areas prone to flooding (1% Annual Exceedance Probability (AEP)). - These are detailed further in Section 1.5 and Section 2.9.4. Mitigation measures were also developed with consideration of community feedback including: - Commitment to a Community Benefit Fund as detailed in Section 2.7.3. - Engagement with residents to discuss issues and neighbour agreements – benefit sharing. This is detailed further in Section 2.7.3. - Development of post-approval management plans in consultation with key stakeholders and communication of commitments. - Continued implementation of the Community and Stakeholder Engagement Plan (CSEP). - Continued proactive engagement with community. - Implementation of the Accommodation and Employment Strategy (AES) to maximise local benefits.
Local businesses and industry groups (> 10 km to 100 km).	Key issues raised included: - Accommodation availability in the LGA. - Mechanisms to support local business service the workforce. - Enhancing outcomes for local communities.	Mitigation measures were developed with consideration of local business and industry feedback including: - Preparation and implementation of a Social Impact Management Plan. - Implementation of the AES, CSEP and Community Shared Benefit Strategy.

5.5 Ongoing Engagement

Throughout the assessment, construction, operation and decommissioning phases of the Project, Lightsource bp will continue to engage with community stakeholders according to the Engagement Guidelines. Stakeholders will include all relevant groups and individuals outlined in **Section 5.1**, plus any additional stakeholders identified during the development process with an interest in the Project.

Ongoing engagement will be undertaken in line with the CSEP and consistent with engagement activities undertaken to date, as outlined in **Section 5.1**. Ongoing engagement will include:

- maintaining a website for the Project and providing regular updates on the progress, performance and compliance of the Project
- distribution of information sheets, fact sheets and/or FAQs to the local community
- face-to-face meetings and Project briefings
- regular community surveys
- operation of a community enquiry line/complaints line and the provision of timely responses to feedback, enquiries and complaints by Lightsource bp.

6.0 Assessment of Impacts

This section provides a description of the key environmental, social, and economic impacts associated with the Project and presents a detailed summary of the results from the specialist assessments. Furthermore, it describes the proposed management and mitigation measures to be implemented as part of the Project to manage and minimise these impacts.

6.1 Identification of Key Environmental and Community Issues

The key environmental, social, and economic impacts associated with the Project requiring detailed investigation as part of the EIS were identified through consideration of:

- the strategic, environmental and social context for the locality (refer to **Section 2.0**)
- Project SEARs, dated 10 November 2022, and supporting Agency advice (refer to **Appendix 1**)
- the preliminary risk assessment of potential environmental and social impacts associated with the Project (refer to **Section 6.2**)
- specialist studies completed as part of the preparation of the EIS (refer to **Section 6.3 to Section 6.18**).

The stakeholder engagement and SIA process undertaken for the Project identified the issues which stakeholders considered to be the key issues for the Project that require assessment as part of the EIS (refer to **Section 5.3, Section 6.14 and Appendix 18**).

6.2 Preliminary Environmental Risk Assessment

A preliminary environmental risk analysis was undertaken to identify the key issues requiring detailed assessment as part of the EIS process. The outcomes of the preliminary environmental risk analysis are provided in **Table 6.1**. The following sections provide a detailed assessment of the key issues associated with the Project.

Table 6.1 Preliminary Environmental Risk Assessment

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
Regional City	The Project Area has been identified as being within the ‘subject land’ on the Goulburn Regional Cities Map (refer Figure 2.2). An assessment of impacts to the regional city of Goulburn has been completed and is presented in Section 6.3. Overall, the Project is not expected to create any significant conflict with existing or approved residential or commercial uses of surrounding land, nor will it impact on future development opportunities for the city as most of the identified urban growth areas lie to the west, north and east of Goulburn from where the Project would not be visible. Further growth or intensification of development within the two closest fringe precincts, Mountain Ash and Brisbane Grove, is unlikely to occur due to significant constraints which have been identified in Goulburn’s Urban and Fringe Housing Strategy.	Yes, refer to Section 6.3
Biodiversity, including Aquatic Habitat	Since early Project design, Lightsource bp has endeavoured to avoid all areas of high biodiversity value to reduce the impacts to remnant vegetation and any species or communities listed under either Commonwealth or the State legislation. Of note, the Project will avoid 27.89 ha of NSW listed threatened ecological communities and 37.96 ha of Commonwealth listed ecological communities by altering the solar array layout in the central and southern parts to avoid habitat for threatened species identified during targeted surveys. Following the application of appropriate avoidance and mitigation measures, the Biodiversity Assessment Method (BAM) assessment identified there are no biodiversity credits required to offset the biodiversity impacts of the Project. The Project would result in the disturbance of 14.02 ha native vegetation (consisting of native pasture, low condition primary grassland and paddock trees). Aquatic habitats within the Project Area are predominantly associated with Gundary Creek and Bullamalito Creek, including their unnamed ephemeral tributaries and farm dams across the Project Area. The creeks throughout the Project Area are degraded as a result of the historical and current agricultural practices and potential impacts to aquatic habit is expected to be limited. A Biodiversity Development Assessment Report (BDAR) was completed in accordance with the BAM. The key outcomes of the BDAR are summarised in Section 6.4 with the full report available in Appendix 7.	Yes, refer to Section 6.4 Appendix 7
Aboriginal Cultural Heritage	The Project Area is located within the traditional homelands of the Ngunnawal people and falls within the Pejar LALC area. At the time of writing this EIS, there were no Native Title claims made for the Project Area. An Aboriginal Cultural Heritage Assessment (ACHA) was undertaken for the Project in consultation with the Registered Aboriginal Parties (RAPs) to assess the Aboriginal heritage values (cultural and archaeological) of the Project Area and surrounds. The ACHA included field surveys and test excavations to identify and assess Aboriginal cultural heritage constraints relevant to the Project. As a result, 19 Aboriginal sites, comprising both surface and subsurface stone artefacts, were identified within the Project Area. The Project will avoid three sites, partially impact seven sites and completely impact nine sites.	Yes, refer to Section 6.5 Appendix 8

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
	The assessment determined that the majority of the sites recorded during within the Project Area have a low scientific significance as they are either isolated finds, in disturbed contexts or not particularly rare (in terms of type and cultural material). All but three of these sites would be subject to surface collection of artefacts. Two sites are relatively uncommon and were assessed as having moderate scientific significance and will therefore be subject to staged salvage excavation. The RAPs have confirmed that with the implementation of these mitigation measures, they would be supportive of the Project proceeding. The outcomes of the ACHA and consultation with RAPs are discussed in further detail in Section 6.5 with the full report available in Appendix 8.	
Historical Heritage	No listed items of historical heritage were identified within or in proximity to Project Area. This includes items listed on the World, National and Commonwealth Heritage Lists, in addition to items listed on the State Heritage Inventory (OEH, 2006) and Goulburn Mulwaree LEP. The nearest listed heritage item to the Project Area is ‘Pelican’ Homestead, which is approximately 3.4 km to the west. Nonetheless, a detailed Historical Heritage Impact Assessment (HHIA) was prepared for the Project. The key outcomes of the HHIA are summarised in Section 6.6 with the full report available in Appendix 9. The assessment determined that the Project would have no physical impacts to the listed heritage items in the vicinity. Furthermore, the Project would not remove any evidence of the historical development of the region, a contributory element to the significance of heritage conservation areas. No indirect (visual) impacts to the heritage significance of the listed heritage items in the vicinity would result from the Project.	Yes, refer to Section 6.6 Appendix 9
Land Resources and Land Use	The Project Area is located on agricultural land that has been subject to a long history of cattle and sheep grazing. The Project has the potential to interact with surrounding land uses and impact on agricultural productivity for the area. Land within the Project Area is predominantly mapped as land soil capability Class 5 and Class 6, with smaller areas of land mapped as Class 3 and Class 4. Class 5 and Class 6 land has high limitations for high-impact land uses, which restricts the land to grazing, forestry and nature conservation. An assessment of impacts on agricultural activities (including a Land Use Conflict Risk Assessment (LUCRA)) has been undertaken as part of the Soil and Agriculture Impact Assessment and is summarised in Section 6.7. The full report is included in Appendix 10. The assessment determined that the Project Area consists of mostly poor to moderate condition agricultural land in the form of open paddocks, the majority of which have been subject to cultivation over a long history of cattle and sheep grazing. Once construction is complete, the establishment of sheep grazing may be used to offset the loss of agricultural production. The dual use of the land for agricultural production and energy generation will be managed through an Operational Environmental Management Plan and Sheep Grazing Vegetation Management Plan, developed in consultation with the landholder and Department of Primary Industries (DPI).	Yes, refer to Section 6.7 Appendix 10

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
	The LUCRA determined that the Project would be compatible to coexist with the primarily agricultural land uses within the surrounding area and would not affect agricultural productivity in adjacent areas. Due to the presence of sodic and dispersive soils within the Project Area, excavation of soils and disturbance of groundcover during construction will be limited as much as possible. A range of erosion and sediment control measures will be implemented during construction to avoid soil loss and sediment transfer.	
Landscape and Visual	The Project Area is located in the Gundry Plains, a landscape characterised by undulating, cultivated, agricultural pastures, and neighbouring rugged, densely forested Towrang Ranges to the east. The landscape includes homesteads set back from local roads on large lots; vegetated wind breaks (commonly pines) along fence lines, road reserves and around homes; linear infrastructure (transmission towers/lines and local roads); and distant views of vegetated slopes and ridgelines. The community feel strongly about the landscape, its scenic qualities, its amenity value, and its positive contribution to peoples' lives. A detailed Landscape Character and Visual Impact Assessment (LVIA) was prepared for the Project and is summarised in Section 6.8 with the full report available in Appendix 11. A total of the 52 viewpoints were assessed in the LVIA, which included public roads, private residences and representative locations for potential future dwellings within 4 km of the Project. Only one viewpoint was found to have a moderate visual impact rating, with the remainder having a low or very low visual impact rating. Photomontages have been prepared from viewpoints where access to properties were possible to illustrate the potential visual impacts associated with the Project. Consultation with the landowner at the location with moderate visual impact and all affected landowners within 1 km of the Project has been undertaken by Lightsource bp to discuss potential visual impact mitigation options which may include landscape screening or other agreed measures.	Yes, refer to Section 6.8 Appendix 11
Glint and Glare	The Project has the potential to generate glint and glare impacts for public, private, road, rail and aviation receivers. A Glint and Glare Assessment (GGA) was completed for the Project which is provided in full in Appendix 12 with the outcomes of the assessment summarised in Section 6.9. Based on a worst-case solar glare hazard analysis, which evaluated glare based on proximity to receivers, orientation and specifications of the photovoltaic modules, glare exposure for private residential receivers is below acceptable thresholds and no additional mitigation is required. Koorringaroo Road users were identified as likely to experience glare from the Project in excess of the acceptable threshold of 10 hours per year, and Lightsource bp has committed to screen planting along the eastern and north-eastern boundary, to mitigate these potential glare impacts. No glare impacts were identified for a nearby landing strip or any associated flight paths.	Yes, refer to Section 6.9 Appendix 12

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
Noise and Vibration	Potential noise impacts associated with the Project will be primarily associated with construction activities (including cumulative construction activities) and will have the potential to affect rural properties located within the vicinity of the Project Area. A Noise and Vibration Assessment (NVA) was undertaken for the Project and is included in Appendix 13 with a summary of the assessment provided in Section 6.10. The assessment determined that the Project is predicted to comply with all applicable noise limits at nearby existing sensitive receivers during operations, with the incorporation of noise control measures (such as strategically located noise barriers around part of the substation and some decentralised BESS units). Noise impacts are predicted to occur at the nearest surrounding receivers during some stages of the construction, but no receiver was predicted to be ‘highly noise affected’ (i.e. exposed to noise levels greater than 75 dB(A)). Noise mitigation measures will be implemented during construction and will include, but not be limited to, the use of non-tonal reversing beepers, the placement of plant away from sensitive receivers, inductions for all workers with information on minimising potential noise impacts and consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures. Road traffic noise during worst-case peak construction periods may affect one receiver, which is located within 30 m of the road edge, however additional road traffic noise is likely to be negligible for most sensitive receivers in the area.	Yes, refer to Section 6.10 Appendix 13
Traffic and Transport	The Project will gain access directly from Windellama Road. Intersection works are proposed to upgrade the existing driveway at the Project Area to accommodate the construction vehicle movements in and out of the Project Area. During the construction phase of the Project, there will be an increase in traffic movements to the Project Area, involving lightweight vehicles transporting construction personnel and heavy vehicles transporting materials and equipment. Some Project components will be delivered via road from either Port Botany or Port Kembla, through the Hume Highway and to Goulburn. Traffic increases associated with the operational phase of the Project will be minimal and will generally only involve the movement of light vehicles transporting operational staff around the site intermittently. The Transport Impact Assessment (TIA) completed for the Project is provided in full in Appendix 14 with the outcomes of the assessment summarised in Section 6.11. Two transport route options for the transport of materials from the Hume Highway to the Project Area were assessed. The TIA determined that minor temporary works (removal of street furniture, streetlighting and/or medians) will be required at Braidwood Road / Bungonia Road intersection to accommodate the swept path movements of the largest vehicle types (up to 50 m long). Option 2 has been identified by Council as the preferred route.	Yes, refer to Section 6.11 Appendix 14

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
	The road network has sufficient capacity to accommodate the peak construction traffic generation of the Project without affecting the Level of Service at any key intersections along either route option. The road network also has sufficient capacity to accommodate the concurrent movement of construction traffic from the proposed Merino Solar Farm, should this be required.	
Water Resources, including Flooding	The Project Area is located within the Gundry Creek catchment which is within the Hawkesbury-Nepean catchment, part of the Sydney drinking water catchment. Elevations within the Project Area range between 710 m AHD from the ranges along the eastern boundary, to approximately 645 m AHD on the Gundry Creek floodplain at the northern boundary. There are a number of mapped creeks traversing the Project Area, including Gundry Creek (a 6th order stream), Bullamalito Creek (a 5th order stream), as well as several unnamed watercourses. The sections of Gundry Creek and Bullamalito Creek located within the Project Area are identified as high potential aquatic groundwater dependent ecosystems (GDEs). If not adequately managed, the Project has the potential to impact on soil resources, receiving surface water and groundwater quality, flood regimes including flow rates, velocities and depths, available water supply to existing and downstream users, aquatic habitat and GDEs. The Water Resources Impact Assessment (WRIA) completed for the Project is provided in full in Appendix 15 with the outcomes of the assessment summarised in Section 6.12. A range of management and mitigation measures are proposed in the WRIA to mitigate any potential impacts on water resources. Based on the Project design (including setback buffers around second order and higher streams, avoiding flood prone areas and panels designed with 500 mm freeboard) including the management and mitigation measures proposed in the WRIA, the potential impacts of the Project on water resources, including the Sydney drinking water catchment, downstream watercourses and water users, are expected to be minimal.	Yes, refer to Section 6.12 Appendix 15
Hazards and Risks, including Bushfire and EMF	In accordance with the SEARs, a Preliminary Hazard Analysis (PHA) has been completed for the Project and is included in Appendix 16 , with a summary of the results in Section 6.13 . The key outcome of the analysis was that all potentially hazardous components of the Project are located at distances greater than the impact range of any credible hazard event from the nearest non-associated residences. The Project will implement a range of risk mitigation and management measures, including rigorous design and maintenance practices to reduce the likelihood of any hazardous events occurring. A Final Hazard Analysis, Fire Safety Study and Emergency Plan will be developed as the Project design progresses toward completion.	Yes, refer to Section 6.13 Appendix 16 and Appendix 17

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
	In addition, a bushfire threat assessment was completed and is provided in Appendix 17 with the key findings summarised in Section 6.13.2. The assessment indicated that the bushfire threat for the Project is considered low as the landscape is predominantly grazed, which reduces grassland fuel loads and bushfire potential. Following advice from RFS and FRNSW, the Project incorporates a 10 m Asset Protection Zone (APZ)s, dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area, supplementary emergency access point via Koorringaroo Road (for emergencies only) with emergency access points (via gates) along the security fence and access tracks with turning bays across the site to allow for safe movement by emergency services personnel. A Bushfire Emergency Management and Operations Plan will be developed and implemented to identify all relevant risks, mitigation measures and procedures. A review and consideration of electromagnetic fields (EMFs) is provided in Section 6.13.3, concluding that with the implementation of recommended management and mitigation measures, the risk of impacts from EMF generated by the Project would be limited.	
Social Impacts	Impacts on social amenity have been frequently raised by the community as a key issue. The potential impacts of the Project on the social locality of the Project have been assessed and methods used to engage the local community in the Project planning and impact assessment processes have been documented in accordance with current DPE guidelines. A detailed SIA was undertaken for the Project and is provided in full in Appendix 18, with the key outcomes summarised in Section 6.14. The social impacts that were identified as being most significant included both negative and positive impacts: Negative: • change in sense of place due to loss of visual amenity as a result of industrialisation of the landscape • stress and anxiety associated with Project uncertainties and the cumulative impact of concurrent project development in the locality • perceived inability of local community to inform Project planning and decision-making processes. Positive: • generation of local employment and procurement opportunities • livelihood enhancement associated with hosting of Project infrastructure • improved social capital for local community infrastructure and initiatives associated with community benefit sharing programs • intergenerational equity and improved liveability due to contribution of the Project to renewable energy generation.	Yes, refer to Section 6.14 Appendix 18

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
	A range of strategies are proposed in Section 6.14 to manage and mitigate potential social impacts associated with the Project.	
Economic	The Project has the potential to result in both positive and negative economic impacts due to the employment generation, use of local services and the potential accommodation requirements for the construction workforce in the region. The potential impacts of the Project on the local, regional and State economy have been assessed in accordance with current DPIE guidelines, with the results summarised in Section 6.15. The full report is provided as Appendix 19. The assessment indicated that with the implementation of management and mitigation measures, the potential impact on accommodation, services and labour force availability within the region can be managed with the economic benefits associated with the Project enhanced.	Yes, refer to Section 6.15 Appendix 19
Waste Management	The Project will produce a number of waste streams during the construction and decommissioning phases. Minor quantities of waste will also continue to be generated by the day-to-day operation of the Project. The likely waste streams to be generated during construction and operation of the Project are classified and quantified in Section 6.16, which also provides measures to manage, reuse, recycle and dispose of this waste in accordance with relevant guidelines. A draft Waste Management Plan was prepared for the Project and is provided in Appendix 20. Measures outlined in Section 6.16.4 and Appendix 20 would be implemented during the construction of the Project to suitably manage potential waste impacts.	No, refer to Section 6.16 Appendix 20
Air Quality	Emissions to air as a result of the Project would include dust generation and exhaust emissions during construction and demolition activities. These emission sources would be localised and temporary in nature for the duration of the construction and decommissioning phases. During operations minor emissions would arise from vehicle use on internal unsealed roads The potential air quality impacts from the construction of the Project are assessed in Section 6.17 in accordance with relevant NSW guidelines. Mitigation measures to reduce air emissions will be incorporated into the Construction Environmental Management Plan and will include the use of water suppression on unsealed roads and stockpile areas as required, modification of activities during periods of dry and windy weather, vehicle maintenance and operation protocols, and timely rehabilitation of exposed areas.	No, refer to Section 6.17

Aspect	Preliminary Environmental Assessment	Detailed Assessment required?
Cumulative Impacts	Whilst the Project Area is not located within a Renewable Energy Zone (REZ), there are currently 23 other renewable energy projects currently under development or proposed to be developed within a 100 km from the Project. The Project Area is also located near several extractive industry (quarry) sites and mining projects. The SEARs require the EIS to include an assessment of the likely impacts of all stages of development, including any cumulative impacts of the Project and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice. The potential cumulative impacts have been assessed in accordance with the Solar Guidelines and the CIA Guidelines, with the results summarised in Section 6.18. The full report is provided as Appendix 21.	Yes, refer to Section 6.18 Appendix 21

6.3 Regional City Assessment

The Project Area is within the ‘subject land’ on the Goulburn Regional Cities Map (refer **Figure 2.2**). Concerns regarding the Project’s impact to the future growth potential of Goulburn and Goulburn as a regional city were raised by the community during the stakeholder engagement program.

An assessment of the impacts to the regional city of Goulburn has been undertaken as part of the EIS and is presented in this section. It is noted that whilst there are no current guidelines for proponents outlining how the requirements of section 2.42 of the T&I SEPP of the should be addressed, this section addresses the NSW Government’s *Proposed Infrastructure SEPP Amendments: Renewable Energy and Regional Cities, Explanation of Intended Effect* (EIE) (DPIE, 2021) to provide context where appropriate.

6.3.1 Methodology

The assessment has also been undertaken having regard to *Council’s Urban and Fringe Housing Strategy, Goulburn and Marulan* (UFH Strategy) (Elton Consulting, 2020). **Figure 6.1** shows the 20 urban and fringe precincts of Goulburn, as identified under the UFH Strategy. The red line (which has been added for clarity) represents an approximate 10 km radius, measured from the Project Area.

6.3.1.1 Approach for Assessment of Visual Impacts

The assessment of visual impacts to the regional city of Goulburn was undertaken as part of the Landscape and Visual Impact Assessment (LVIA), as further discussed in **Section 6.8**.

The first step in assessing the Project’s potential visual impacts to existing and approved residential and commercial uses, was to overlay the Regional Cities Map with the Project’s Zone of Theoretical Visibility (ZTV) (projected over a 10 km distance) identified as part of the LVIA. The purpose of the ZTV is to identify areas of Goulburn City from which the Project may be ‘theoretically’ visible (i.e. the Project’s ‘viewshed’ as shown hatched). The viewshed accounts for topography and line of sight, however, it does not account for intervening elements such as vegetation or buildings which could obstruct views. Therefore, the projected direct line of sight is ‘theoretical’ and must be confirmed on site. The results of this initial viewshed analysis are presented in **Figure 6.2**.

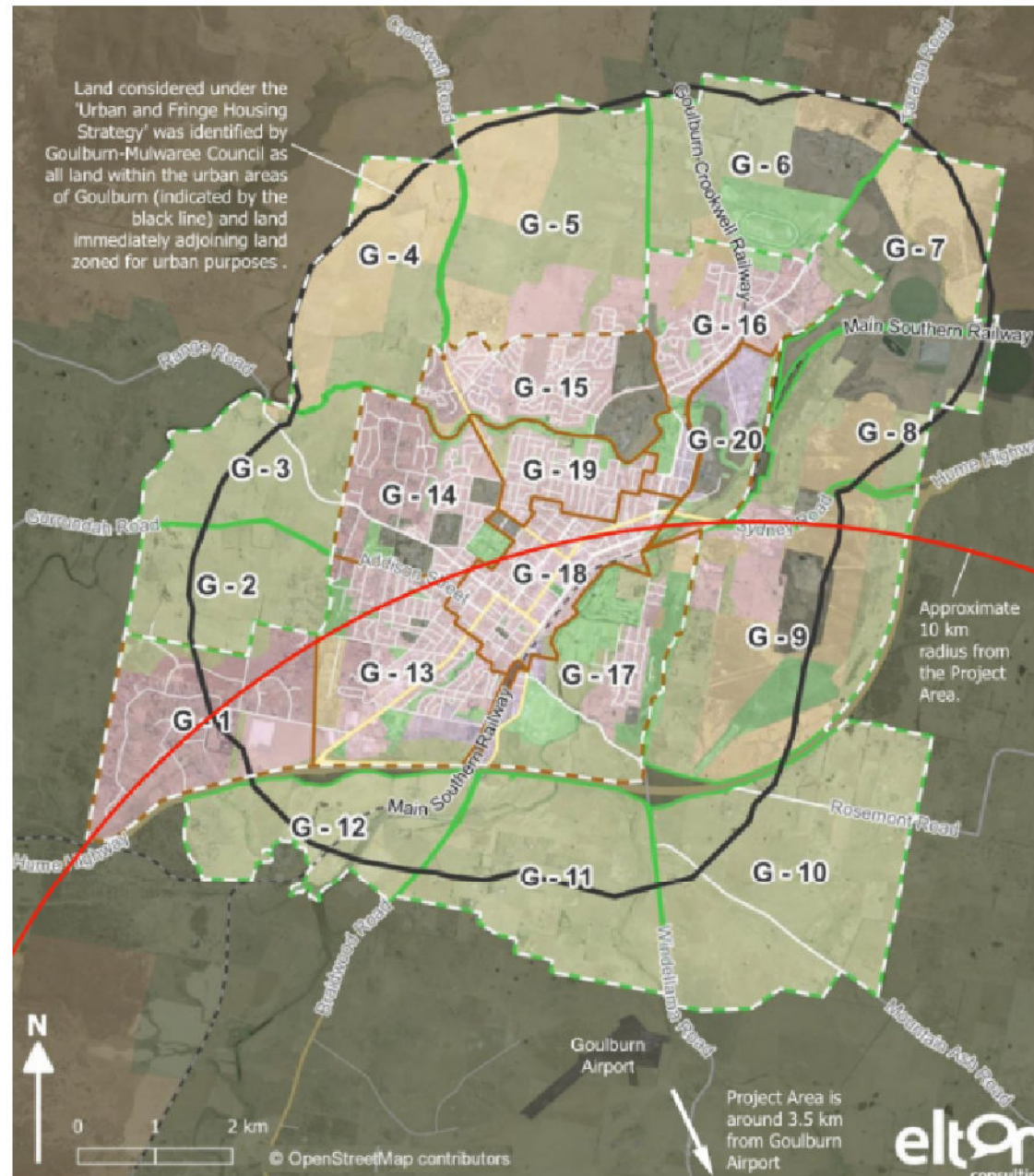
The second step was to visually inspect theoretically visible areas within Goulburn City and its fringes during the preparation of the LVIA. Visibility was generally very limited, with the Project Area not visible from most publicly accessible streets within the city’s urban areas (the view was obstructed by buildings and vegetation), and only visible from very few, elevated locations.

Within the theoretically visible areas, eight key viewpoints were identified for further assessment and visual inspection. These viewpoints points are shown in **Figure 6.2** and described in **Table 6.2**.

An assessment was then undertaken for each of the viewpoints identified, based the visual sensitivity of each viewpoint location and the magnitude of change resulting from the Project, in accordance with the *Technical Supplement – Landscape and Visual Impact Assessment* (DPE, 2022g) which supports the Solar Guidelines.

FIGURE 6.1

Urban and Fringe Precincts of Goulburn



Legend

Precincts

Urban

Fringe

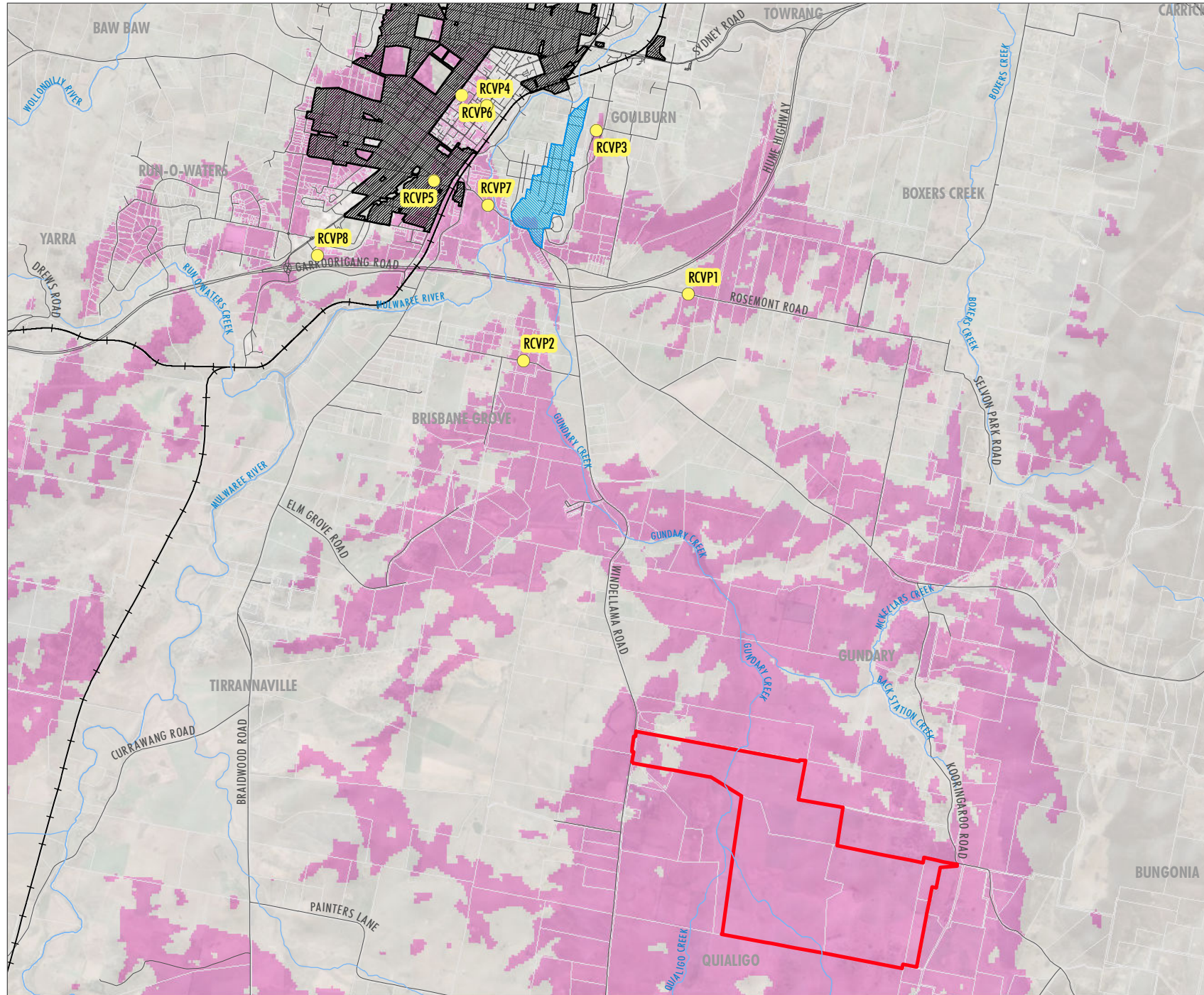
- G - 1 Run 'O' Waters (existing)
- G - 2 Run 'O' Waters (rural north)
- G - 3 Baw Baw
- G - 4 Sooley
- G - 5 Middle Arm West
- G - 6 Middle Arm East
- G - 7 Kenmore
- G - 8 Gorman Rd
- G - 9 Mt Gray
- G - 10 Mountain Ash
- G - 11 Brisbane Grove
- G - 12 Abattoir
- G - 13 Garfield
- G - 14 West Victoria Park
- G - 15 Marys Mount
- G - 16 Bradfordville
- G - 17 Eastgrove
- G - 18 Central Goulburn
- G - 19 Ifield
- G - 20 Correctional Centre

Not To Scale

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FIGURE 6.2
Regional City Viewpoints



- Project Area
- View Shed
- Cadastre Boundaries
- Roads
- Watercourses
- View Point Location
- Local Environmental Plan Zoning**
- R1 General Residential
- R2 Low Density Residential



Kilometers
Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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6.3.1.2 Approach for Assessment of Other Impacts

The assessment has focussed primarily on potential visual impacts to the regional city, on the basis that these are the most likely impacts associated with large-scale solar development. However, this EIS provides a comprehensive assessment of all amenity impacts with the potential to impact the urban areas of the regional city, as summarised in **Table 6.3**.

6.3.2 Assessment of Impacts

6.3.2.1 Scenic Quality and Landscape Character Impact

The Project's impact to Goulburn's landscape character has been assessed as low. Given the Project's distance from the city, combined with the relative low-profile height and dark visually recessive colour of the solar modules, it is not anticipated that the Project would affect the regional city's scenic quality or landscape character as experienced from the city's urban precincts, growth fringe precincts, heritage conservation areas or heritage items.

The visual analysis in **Figure 6.2** and **Table 6.2** indicates that the Project would not be visible from the majority of key scenic viewpoints within the city. The Project would not be visible from the viewing platform at Rocky Hill War Memorial and Museum, which is oriented away from the Project and captures views of the city to the east and north.

However, some distant secondary views may be possible to the south, as shown in **Photo 6.1** below. The solar modules would be relatively inconspicuous and affect a very small proportion of the view available from this location.



Photo 6.1 View of Project Location from secondary viewpoint at Rocky Hill War Memorial and Museum (RCVP 3)

While not explicitly stated under the T&I SEPP, the EIE (DPIE, 2021) indicates that section 2.42(2)(b)(ii) was intended to consider:

- *whether the proposed development would significantly impact the scenic quality and landscape character of a regional city, including on any approaches to the city, taking into consideration any values identified by the community and Council.*

Goulburn's primary approaches by road are via the Hume Highway, to the south and the east of the city. Given the distance between the Hume Highway and the Project Area (approximately 10 km), impacts to the primary approaches of Goulburn are not anticipated and were therefore not assessed. Windellama Road forms one of several secondary approaches to the city via a regional road. Due to its linear view towards the Project Area, Windellama Road is the only secondary approach that may experience visual impacts as a result of the Project. There are no specific planning controls or landscape values identified under Council's planning framework with respect to these secondary approaches. Additionally, it is noted that Windellama Road is not identified as a scenic or tourist drive (Goulburn Australia, 2024).

The LVIA includes an assessment of visual impacts to public road users on Windellama Road (refer **Section 6.8**). Two representative viewpoints were selected to represent the changing linear view from Windellama Road, being:

- PR2a – adjacent and north-west of the Project and represents views of road users travelling south on Windellama Road
- PR2b – adjacent and south-west of the Project and represents views of road users travelling north on Windellama Road.

Impacts at these public viewpoints were assessed as low and very low, respectively. Lightsource bp has also committed to undertake infill planting along Windellama Road to further reduce views of the substation, O&M facility and water tanks for Windellama Road users. With the proposed infill planting established (approximately five years after operations commence), the residual visual impact rating for both PR2a and PR2b are assessed as very low.

6.3.2.2 Impact on Views

The impacts to viewpoints identified for the regional cities assessment are summarised in **Table 6.2**.

Table 6.2 Regional Cities Assessment Viewpoints

Viewpoint	Location	Reason For Selection	Summary of Impact	Visual Impact Rating
RCVP 1	Mountain Ash Precinct	This precinct has been identified as potentially suitable for large lot residential development under Goulburn's Urban and Fringe Housing Strategy. This location is relevant for assessing impacts to Goulburn's capacity for growth.	The highest parts of the Project would be just visible, over 5 km from the closest viewers. The Project would occupy a very small proportion of the total view available. There would be very little change to the view, and the outlook onto rural pastures would remain the focus. The dark colour of the solar modules would not be conspicuous at this distance.	Very low
RCVP 2	Brisbane Grove Precinct	This precinct has been identified as potentially suitable for large lot residential development under Goulburn's Urban and Fringe Housing Strategy. This location is relevant for assessing impacts to Goulburn's capacity for growth.	The highest parts of the Project would be in view, over 6.5 km from the viewer. The Project would occupy a very small proportion of the total view available. There would be very little change to the view, and the outlook onto rural pastures would remain the focus. The dark colour of the solar modules would not be conspicuous at this distance.	Very low
RCVP 3	Rocky Hill War Memorial	Rocky Hill was identified by the community as the most significant lookout in the area. This location is relevant for assessing impacts to scenic quality and landscape character.	The Project Area is not visible from the viewing platform which is oriented towards the city (to the east and north). Visibility toward the Project Area is restricted to a narrow field of view from the southern side of the platform, and the Project Area occupies a small proportion within the narrow field of view. From this secondary viewpoint, the solar modules would be relatively inconspicuous, and affect a very small proportion of the view available. The dark colour of the solar modules would camouflage against dark rows of vegetation in the mid-ground and background, visually receding (with distance) into the landscape.	Low

Viewpoint	Location	Reason For Selection	Summary of Impact	Visual Impact Rating
RCVP 4	Auburn Street, overlooking Belmore Park	This viewpoint is situated on the main street, overlooking the town's central green space (Belmore Park), and in the heart of the city's commercial core. This location is relevant for assessing conflicts with existing commercial development and impacts to scenic quality and landscape character .	The site inspection determined that the Project Area was not visible, and the Project would not be visible, from Auburn Street, or from Belmore Park, due to existing vegetation and existing buildings.	No visual impact
RCVP 5	Eldon Street, near (former) St Johns Orphanage site	This location was identified by the community as a key vantage point for the city. This location is relevant for assessing conflicts with existing or approved residential development and impacts to scenic quality and landscape character.	There would be little recognisable difference in the view. The Project would occupy a very small proportion of the view.	Very low
RCVP 6	Montague Street, overlooking the Anglican Cathedral	This viewpoint was identified due its location within the local Heritage Conservation Area and expansive views of the Cathedral and wider landscape in the direction of the Project Area. This location is relevant for assessing conflicts to existing residential development and impacts to scenic quality and landscape character .	There would be little perceptible visual change, if any. The Project would occupy a very small proportion of the view, if visible.	Negligible
RCVP 7	Goulburn Brewery	This location was identified due to its heritage significance (being a State and local listed heritage item) and its proximity to the Project Area. This location is relevant for assessing impacts to scenic quality and landscape character .	The site inspection determined that the Project Area was not visible, and that the Project would not be visible from Goulburn Brewery, due to existing vegetation.	No visual impact
RCVP 8	South Goulburn McDonalds carpark	This location was chosen as a key tourist viewing point, due to its proximity to the Big Merino, fast food restaurants and visitor accommodation and expansive views of the Southern Tablelands in the direction of the Project Area. This location is relevant for assessing conflicts with existing commercial development and impacts to scenic quality and landscape character .	The Project's solar modules may just be visible over 9 km away, however they would be very difficult to see at that distance and not a visual focus.	Negligible

Photomontages of the existing, and likely future view from the two future growth areas (RCVP1 and RCVP2) appear in **Appendix 11**, along with photographs of the existing view from regional city viewpoints (RCVP3 to RCVP8).

6.3.2.3 Other Impacts

Other impacts assessed for potential to impact the urban areas of Goulburn as a regional city are summarised in **Table 6.3**.

Table 6.3 Summary of Other Impacts to Regional City

Aspect	Summary of Likely Impact	Where requirement is addressed in this EIS
Glint and glare	The Project Area is located more than 8 km from residential land (zoned R1, R2 or R3) within the regional city. Due to the significant setback distance and intervening topography and vegetation, no glint or glare impacts are anticipated within the regional city. A detailed Glint and Glare Assessment was undertaken for closer rural-residential receivers within 3 km, road and rail receivers within 1 km, and aviation receivers within 5 km of the Project Area.	Section 6.9 and Appendix 12
Noise	Noise generated by the construction, operation and decommissioning of the Project is not expected to be audible within any urban areas of the city (zoned residential or commercial) (approximately 8 km away), or within the Brisbane Grove or Mountain Ash Precincts (approximately 4 km away). Noise impacts predicted for closer rural-residential receivers associated with the Project were assessed in a detailed Noise and Vibration Impact Assessment (NVIA), which are described further in Section 6.10. For reference, the NVIA note that receiver R55 is located 4 km north of the Project Area and predicted operational and construction noise levels, respectively shown in Appendix E and Appendix F of the NVIA (Appendix 13) are at least 15 dB below the respective criterion. Road traffic noise impacts within urban areas of Goulburn (between the Hume Highway and Sloane Street) are not anticipated due to the following: - existing traffic volumes along these roads are substantially higher than Windellama Road (at least double) - heavy vehicle movements may be split between the two transport routes - light vehicles and shuttle buses will travel through Goulburn from multiple directions. Along Windellama Road, Bungonia Road and Braidwood Road some exceedances of night time noise limits have been conservatively predicted during peak construction for receivers located within 30 m of the road edge, though most dwellings are setback more than 30 m (refer to Section 6.10).	Section 6.10 and Appendix 13

Aspect	Summary of Likely Impact	Where requirement is addressed in this EIS
Traffic	The Project is proposing to utilise local roads through the city of Goulburn as part of its proposed transport route. Two transport route options from the Hume Highway to the Project Area (refer Figure 3.4) have been considered, and are: - Option 1: Hume Highway – Sydney Road – Reynolds Street – Grafton Street – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road - Option 2: Hume Highway – Hume Street – Garroorigang Road – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road. Vehicle access to the Project will be via an existing driveway on Windellama Road which will be upgraded to accommodate the movement of heavy vehicles. An additional emergency access point will also be provided on Kooringaroo Road. Traffic and transport related impacts associated with the Project were assessed through a detailed Transport Impact Assessment (TIA), including SIDRA modelling of key intersections and swept path analysis for the largest vehicle (up to 50 m long) (refer to Section 6.11 and Appendix 14). The assessment determined that both routes can satisfactorily accommodate the swept path movements of the proposed construction general heavy vehicle types (19 m semi-trailers) without the need to adjust road infrastructure or intersection layouts. However, Option 2 has been identified by Council as the preferred route. This is due to it passing mainly through rural and industrial land uses. Option 1 will provide an alternative route (outside school zone times) for delivery of large battery and substation components as it is a designated Oversize Over Mass (OSOM) route. Swept path analysis of the largest OSOM vehicle (low loader trailer with an overall vehicle length of up to 50 m) indicated that minor temporary works at one intersection (i.e. Braidwood Road / Bungonia Road) and traffic control will be required to accommodate the OSOM vehicles. These may include temporary removal of street furniture and/or medians. The road network has sufficient capacity to accommodate the peak construction traffic generation of the Project without affecting the Level of Service at any key intersections along either route option. The road network also has sufficient capacity to accommodate the concurrent movement of construction traffic from the proposed Merino Solar Farm, should this be required. A Construction Traffic Management Plan will be prepared prior to construction to outline proposed management measures which will minimise the impacts of additional Project traffic on the local road network.	Section 6.11 and Appendix 14
Flooding	Flooding risks and impacts to the city of Goulburn including the future growth areas as a result of the Project are expected to be minor. This is based on flood modelling that show that the Project would result in minor impacts on flooding, including flow rates, velocities and depths. A Flood Impact and Risk Assessment was completed for the Project to assess the impacts on flood depth, velocity and hazard for the 10%, 1%, 0.5%, 0.2%, and 0.05% AEP events and PMF event.	Section 6.12 and Appendix 15

Aspect	Summary of Likely Impact	Where requirement is addressed in this EIS
	The results of the flood assessment show that the infrastructure and solar panels within the Project Area are located outside areas of major flood hazard. Potential impacts to drainage features and downstream watercourses are predicted to be minimal due to the relative size of the Project Area in relation to the size of the receiving catchments, and the distributed nature of minor impacts. The flood assessment further confirms that flood evacuation routes are realistically achievable for the Project, without placing additional burden on emergency services.	
Hazards	As noted above, the Project Area is located more than 8 km from residential land (zoned R1, R2 or R3) within the regional city and approximately 4 km from the future growth areas south of the Hume Highway. Due to the significant setback distance, no hazards and risks related impacts (including bushfire risk and electromagnetic field (EMF) exposure) are anticipated within the regional city. A Preliminary Hazard Analysis (PHA), Bushfire Assessment and EMF assessment were undertaken for closer rural-residential receivers within proximity to the Project Area. The results of these assessments are presented in Section 6.13, with the full PHA provided in Appendix 16 and the full bushfire assessment in Appendix 17.	Section 6.13, Appendix 16 and Appendix 17
Social	Increased demand for local housing supply and essential services during the construction period would be managed through the implementation of an Accommodation and Employment Strategy (AES). The Project will also provide a wide range of social benefits to Goulburn through proposed local employment and training initiatives, as well as the continued implementation of the Community Benefit Sharing and Community Wellbeing strategies.	Section 6.14 and Appendix 18
Economic	Ongoing economic stimulus associated with the operation of the Project is estimated at approximately \$113.8 million (over 40 years, CPI adjusted) relating to, operational wage stimulus, community fund payments (to be finalised) landowner leases and net land tax revenue to Council. The Project will provide new participation opportunities for businesses and workers located in the Study Area, having regard for the good match of skills and resources available; and specific procurement activities proposed by Lightsource bp.	Section 6.15 and Appendix 19
Air Quality	Air emissions (such dust and exhaust fumes) generated by the construction, operation and decommissioning of the Project would be temporary and localised and can be effectively managed through the implementation of suitable controls. Air emissions generated by the Project are therefore not expected to impact any urban areas of the city (zoned residential or commercial) (approximately 8 km away), or the Brisbane Grove or Mountain Ash Precincts (approximately 4 km away) due to the significant separation distances to the Project. Air quality impacts predicted for closer rural-residential receivers were assessed as part of the EIS and is presented in Section 6.17. With the implementation of air quality controls and mitigation measures proposed in Section 6.17, it is expected that the construction and decommissioning activities would have a negligible impact on local air quality for surrounding receivers.	Section 6.17

6.3.2.4 Potential Conflict with Residential or Commercial Uses of Land

Section 2.42(2)(a) of the T&I SEPP requires that large/utility-scale solar and wind development is ‘located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development.’

Impacts to Proximal Residential and Commercial Development

Visual impacts to existing and potential rural residential dwellings have been comprehensively assessed in the LVIA in accordance with the Solar Guidelines and Technical Supplement (DPE, 2022g). The LVIA findings are summarised in **Section 6.8**.

The LVIA included detailed assessment of 31 private viewpoints (existing dwellings) and 18 potential future viewpoints associated with an approved 22 lot subdivision directly south of the Project Area (Rosedale subdivision). Potential impacts in relation to the Rosedale subdivision as a result of the Project are confined to low or very low visual impacts and potential but manageable noise impacts. These impacts are discussed further in **Section 6.7.4.8**.

Following the implementation of mitigation measures outlined in **Section 6.8.5**, the LVIA predicted the following residual visual impacts will be experienced by existing and potential future residences as a result of the Project:

- Moderate impact to one private viewpoint (R27).
- Low impact to 22 existing private viewpoints (R2, R4, R5, R6, R7, R8, R9, R16B, R16C, R20, R21B, R22, R25, R30, R31, R35, R36, R37, R43, R77, R78 and R90) and 4 potential future viewpoints (FR Rosedale A, FR22, FR32 and FR 90).
- Very low impact to all remaining viewpoints – from these viewpoints the Project would be barely visible and have little overall effect on the view.
- No viewpoints were rated high.

Lightsource bp is currently seeking to enter an agreement with the owner of R27, which is predicted to be moderately impacted in line with the Solar Guidelines. Visual impacts to all other private viewpoints are expected to be appropriately managed through the implementation of mitigation measures outlined in **Section 6.8.5**, including strategic screen planting.

Additionally, the LVIA indicates that potential cumulative visual impacts associated with the development of the Project and the proposed Merino Solar Farm are likely to be minimal, with the assessed impact at all private viewpoints with a theoretical view of both Projects being low or very low.

The Goulburn Airport is located approximately 3 km north west of the Project Area. As discussed in **Section 6.3.2.5** below, the Airport’s existing flight paths are not expected to be impacted by glint and glare associated with the Project. No other significant conflicts between the Project and airport operations are anticipated.

Potential conflicts with surrounding agricultural land uses are discussed in **Section 6.7**. In summary, it is concluded that the Project will not negatively impact any existing agricultural enterprise outside of the Project Area.

Overall, subject to the implementation of proposed management and mitigations measures (refer to **Section 6.3.3**) it is considered that the Project avoids significant conflict with existing and approved residential and commercial land uses surrounding the Project Area as the Project will not have any significant adverse impacts that could foreseeably affect or restrict any of those uses.

Impacts to Urban Areas

The visual analysis in **Figure 6.2** and **Table 6.2** indicates that the Project would not be visible from the majority of residential and commercial land from Goulburn, including the city's commercial core. There may be some elevated locations, such as the former St John's Orphanage (RCVP 5) and Montage Street (RCVP 6), where distant glimpses of the Project Area may be possible, where not fully screened by vegetation, topography and existing buildings. In those elevated locations, the Project would occupy a very small proportion of the views and changes to the landscape are likely to be imperceptible (refer to **Photo 6.1** and **Photo 6.2** below).

In summary, the Project is not expected to create any significant conflict with existing or approved residential or commercial uses of land within and immediately surrounding Goulburn.



Photo 6.2 Estimated Location of the Project Area from Former St John's Orphanage (RCVP 5)

Source: Envisage, 2024.

6.3.2.5 Capacity for Growth

The EIE (DPIE, 2021) states that:

‘The NSW Government’s regional plans identify the need to avoid conflict between existing and potential future uses and require buffers to separate incompatible uses. Consequently, it is important to preserve land on the outskirts of regional cities from potentially incompatible development, such as solar and wind farms, that could preclude growth and development of these cities in the future.’



Photo 6.3 Estimated Location of the Project Area from Montague Street (RCVP6)

Table 6.4 below provides an overview of relevant regional and local strategic plans which seek to guide future growth in the Project locality.

Table 6.4 Consideration of Relevant Regional and Local Strategic Plans

Plan	Relevance to Project
Draft South-East and Tablelands Regional Plan 2041 (Draft Regional Plan)	The Draft Regional Plan is a high level 20-year strategic planning blueprint for the South East and Tablelands region. The Regional Plan provides limited guidance for the regional cities assessment and is discussed in Section 2.4.1 below.
South East and Tablelands Regional Plan 2036 (Regional Plan)	The Regional Plan is a high level 20-year strategic planning blueprint for the South East and Tablelands region. The Regional Plan provides limited guidance for the regional cities assessment and is discussed in Section 2.4.2 below.

Plan	Relevance to Project
Goulburn Mulwaree Local Strategic Planning Statement (LSPS)	The LSPS is a high level statement of Council's key planning priorities and plans for implementation. The LSPS provides limited guidance for the regional cities assessment and is discussed in Section 2.4.3 below.
Urban and Fringe Housing Strategy (UFH Strategy)	This assessment has sought to integrate the findings of the UFH Strategy. A summary of relevant aspects of the UFH Strategy is provided below.

Urban and Fringe Housing Strategy

An overview of Goulburn's future development opportunities, as identified in the UFH Strategy, is presented in **Figure 6.3**.

The UFH Strategy indicates that Goulburn's future urban growth is likely to be concentrated to the west, north west, north and north east of the city, where 3,853 potential dwellings/lots could be established within the city's fringe precincts of Run 'O' Waters, Sooley, Middle Arm West, Middle Arm East, Bradfordville and Kenmore. Beyond 2036, the UFH indicates that a further 3,490 dwellings/lots could be established within the Urban Release Areas (URAs) of Baw Baw and Middle Arm. This would equate to a combined total of 7,343 dwellings/lots which would account for housing supplies for at least the next 50 years. This suggests that the majority of the city's future urban growth during the life of the Project is likely to move away from the Project Area, rather than toward it.

Limited growth potential is identified to the south and east of the city, where approximately 350 new large residential lots (two ha minimum lot size) may be developed across the fringe precincts of Mt Gray, Gorman Road, Mountain Ash and Brisbane Grove collectively. The closest of these fringe precincts, Mountain Ash and Brisbane Grove, are located approximately 3.7 and 4.7 km from the Project Area, respectively.

The UFH Strategy indicates that development within the Mountain Ash and Brisbane Grove Precincts is likely to be constrained by a number of challenges including flood risk as well as proximity to the Goulburn Airport and Wakefield Park and associated potential land use conflicts. Additionally, the UFH Strategy suggests that further intensification of development (i.e. smaller lot subdivision) in these precincts is unlikely due to a lack of essential infrastructure including roads and utilities connections, as well the distance to nearby services such as shops, schools and community facilities (Elton Consulting, 2020).

Visual impacts to the Mountain Ash and Brisbane Grove Precincts have been assessed as very low (refer to **Table 6.2**). Some potential future dwellings in elevated areas of these precincts may have distant views toward the Project Area. In these elevated locations, the Project development footprint would remain at least 4 km to 5 km away) and there would be very little change to the overall view, with the outlook onto rural pastures remaining the focus. Photomontages of the Project, as viewed from these Precincts, are presented in **Photo 6.4** and **Photo 6.5**.

FIGURE 6.3

Goulburn Development Opportunities

Legend

Precincts

Urban

Fringe

Opportunity area

Serviced Urban Residential

Large Lot Residential

Urban Release Area Long Term

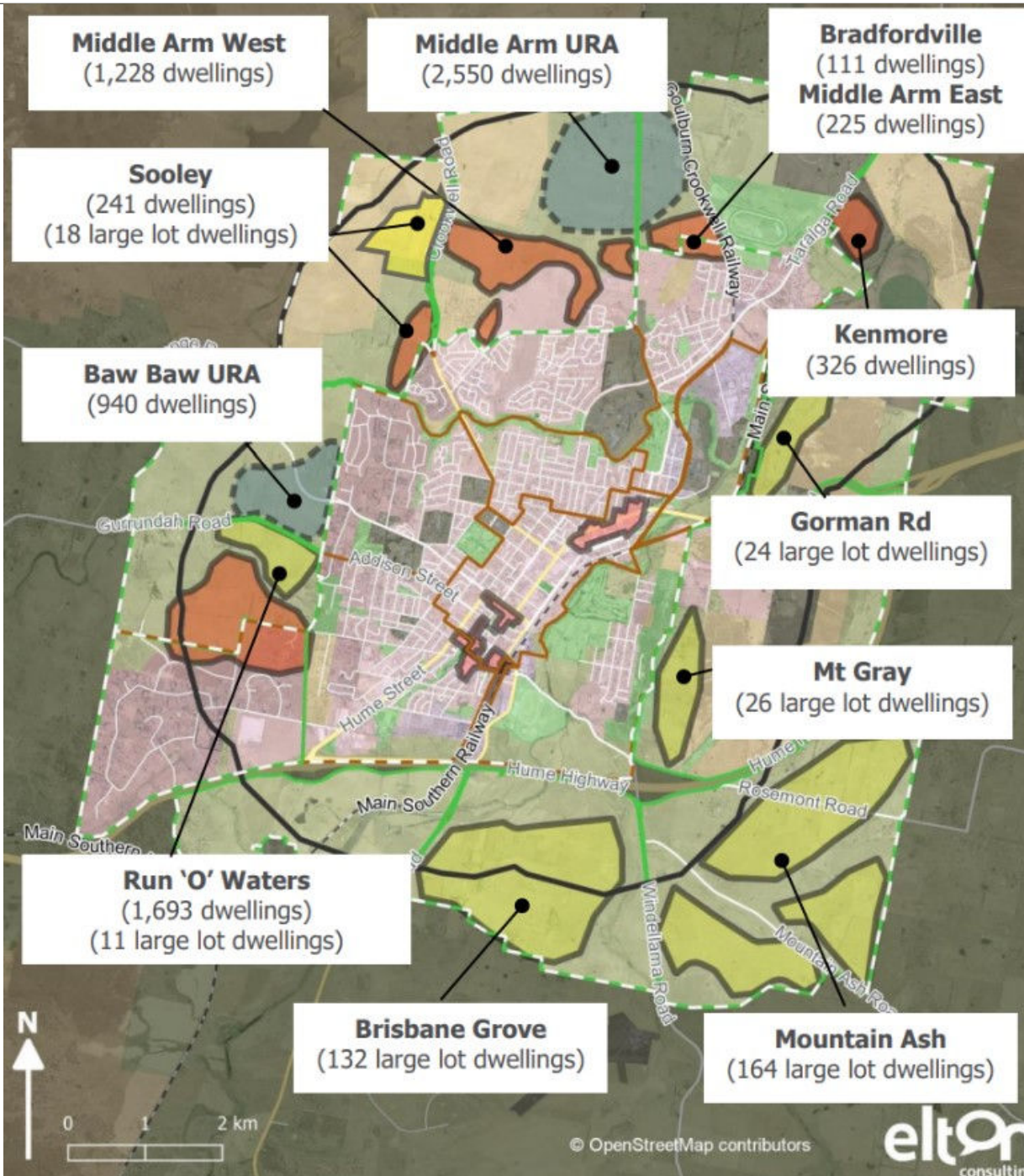
Existing Residential Zone

- G - 1 Run 'O' Waters (existing)
- G - 2 Run 'O' Waters (rural north)
- G - 3 Baw Baw
- G - 4 Sooley
- G - 5 Middle Arm West
- G - 6 Middle Arm East
- G - 7 Kenmore
- G - 8 Gorman Rd
- G - 9 Mt Gray
- G - 10 Mountain Ash
- G - 11 Brisbane Grove
- G - 12 Abattoir
- G - 13 Garfield
- G - 14 West Victoria Park
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- G - 20 Correctional Centre

Not To Scale

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GUNDARY SOLAR FARM | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Commentary
This photograph was captured on a full frame Digital single-lens reflex (DSLR) camera using a 50mm focal length. It has been derived from stitched portrait panoramic photography representing a 180° horizontal field of view (HFOV) and a 39.6° vertical field of view (VFOV) and was subsequently cropped to represent a single frame representing 39.6° HFOV and 27° VFOV.

This specification is regarded as providing a depth of field that is closest to human eyesight, albeit that we typically have wider peripheral vision.

Accurate representation of this photograph or photomontage is achieved when printed at A3 size or by viewing at 100% zoom on a 20 inch monitor at a distance of approximately 400mm.

* Due to page frame constraints, the top of this photograph has been cropped by 2" resulting in a residual 39.6° HFOV and a 25° VFOV.



Photo 6.4 Mountain Ash Precinct (PR6) – 40° Single Frame Photomontage

GUNDARY SOLAR FARM | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Commentary
This photograph was captured on a full frame Digital single-lens reflex (DSLR) camera using a 50mm focal length. It has been derived from stitched portrait panoramic photography representing a 180° horizontal field of view (HFOV) and a 39.6° vertical field of view (VFOV) and was subsequently cropped to represent a single frame representing 39.6° HFOV and 27° VFOV.

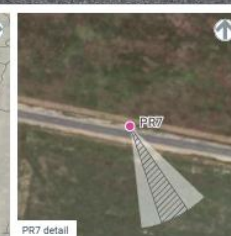
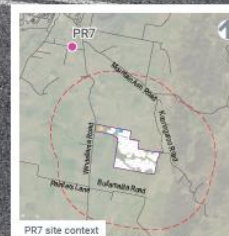
This specification is regarded as providing a depth of field that is closest to human eyesight, albeit that we typically have wider peripheral vision.

Accurate representation of this photograph or photomontage is achieved when printed at A3 size or by viewing at 100% zoom on a 28 inch monitor at a distance of approximately 400mm.

* Due to page frame constraints, the top of this photograph has been cropped by 2" resulting in a residual 39.6° HFOV and a 25° VFOV.



DISCLAIMER: This photomontage is a representation of the proposed development and is not a guarantee of the final outcome. It is intended to provide a visual context for the project and is not to be used for any other purpose. The photomontage is based on the best available information and is subject to change without notice. The photomontage is not a substitute for a professional assessment and should not be used for any other purpose.



Date	12/05/23
Time	12:14
Camera level	645.3m AHD
Camera coordinates	749442m E, 6147085m N
Camera	Canon EOS 6D Mark II (full frame DSLR)
Panorama type	50mm FL landscape
Camera bearing	154°
Vertical field of view	27° (cropped to 25°)
Horizontal field of view	39.6°
Project horizontal field of view	17°
Projected coordinate system	GDA2020 MGA Zone 55
Photography	Envisage Consulting
Distance to development	5.9km

Photo 6.5 Brisbane Grove (PR7) – 40° Single Frame Photomontage

Therefore, in summary, the Project is considered to have a negligible impact on future development opportunities and capacity for growth for the regional city, on the basis that:

- The majority of urban growth is planned to occur on the west, north and eastern fringes of the city, where the Project would not be visible.
- The Project is assessed as having a very low visual impact within the two closest fringe precincts, Mountain Ash and Brisbane Grove.
- There is a very low likelihood of further growth or intensification of development within the Mountain Ash and Brisbane Grove precincts due to the significant constraints which are identified in the UFH Strategy. As such, further encroachment of urban development around the Project Area during the life of the Project is very unlikely.

Additionally, as noted above, the Project Area is located approximately 3 km south east of the Goulburn Airport. It is understood that this facility, which is privately-owned, was placed on the market as of March 2024 (Goulburn Post, 2024). There are no known plans for redevelopment or expansion of the airport facility at the time this EIS was prepared.

However, the risk of potential conflicts with any future airport development is considered low on the basis that:

- The Project Area is physically separated from the Airport by Windellama Road and would not restrict future expansion.
- The Glint and Glare Assessment provided in **Appendix 12** included an assessment of the two flight paths originating from Goulburn Airport. This assessment found that these flight paths are not impacted by glare from the Project and no mitigation measures are required.

6.3.3 Management and Mitigation Measures

A comprehensive range of measures has been provided to manage and mitigate environmental impacts of the Project, as detailed throughout **Section 6.0** and **Appendix 2**.

Measures which will further minimise any potential negative impacts to the regional city include:

- Implementation of a Landscaping Strategy, including infill screen planting along Windellama Road.
- The Project would not be lit at night. External low-level lighting associated with the Project would only be used for safety or emergency purposes and would comply with measures to reduce lighting impacts. There would be no changes to the night-time appearance of the vicinity, in terms of lighting, due to the Project.
- Preparation and implementation of a Social Impact Management Plan, including implementation of the AES, CSEP and Community Shared Benefit Strategy.

6.4 Biodiversity

A detailed assessment of the biodiversity impacts of the Project has been completed and a Biodiversity Development Assessment Report (BDAR) has been prepared by Umwelt (2024). During the stakeholder engagement process, impacts to biodiversity were raised as a key concern by the community (refer to **Section 5.3**). In particular, concerns regarding impacts to the natural environmental values of the area, such as the loss of native vegetation and trees within the Project Area and disturbance of fauna and flora present on the Project Area and surrounds.

Lightsource bp has sought to avoid and minimise biodiversity impacts from an early stage and has preferentially sited the Project's Development Footprint within 'Category 1 – Exempt Land' instead of impacting areas of remnant vegetation. Category 1 – Exempt Land includes rural land where native vegetation clearing can occur without clearing approval and the provision of biodiversity offsets, in accordance with the *Land Services Act 2013* (LLS Act). Furthermore, the Project layout has been designed to avoid and minimise impacts to the parts of Gundary Creek and Bullamalito Creek within the Project Area, including their floodplains. Second order and higher watercourses within the Project Area that also have biodiversity value, have been avoided and suitable setbacks (ranging from approximately 20 m to 40 m) around these areas have also been considered in the Project layout in accordance with the *Guidelines for Riparian Corridors on Waterfront Land* (DPE, 2012a). Lightsource bp is committed to managing biodiversity impacts during the construction and operation phase of the Project, through the implementation of management plans that will include controls to minimise impacts on biodiversity.

Following the application of the avoidance strategy outlined in **Section 6.4.3.4**, a total of 27.89 ha of NSW listed threatened ecological communities and 37.96 ha of Commonwealth listed ecological communities will be avoided by the Project. Whilst Lightsource bp has strived to avoid and minimise impacts on biodiversity through the design process, not all impact could be avoided. The Project will require the disturbance of approximately 14.02 ha native vegetation (consisting of native pasture, low condition primary grassland and paddock trees) from within the 702 ha of the Project Area. Residual biodiversity impacts are therefore limited to the highly degraded grasslands within the Project Area which, albeit still contain some native plant diversity are largely agricultural remnants and are in such a degraded state that they fail to meet the BAM defined value thresholds that generate biodiversity credits.

The BDAR has been prepared in accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act) and the SEARs, which require:

- An assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with section 7.9 of the BC Act, the *Biodiversity Assessment Method (BAM) 2020* and documented in a BDAR, including a detailed description of the proposed regime for avoiding, minimising, managing and reporting on the biodiversity impacts of the development over time, and a strategy to offset any residual impacts of the development in accordance with the BC Act.
- An assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts, including impacts to Gundary Creek, and Bullamalito Creek.
- If an offset is required, details of the measures proposed to address the offset obligations.

On 13 September 2023, a delegate of the Minister for the Environment determined that the Project is **Not a Controlled Action** under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The findings of the BDAR, including proposed mitigation, are summarised in the following sections with the full report provided in **Appendix 7**.

6.4.1 Existing Environment

The Project is located in the South East Highlands IBRA Bioregion and dominantly within the Bungonia IBRA subregion. The Project Area is primarily composed of cleared, open paddocks that have been heavily grazed by cattle and sheep (both historically and currently). The topography of the Project Area is characterised by the rolling hills and open grassland plains landscape and mapped as Breadalbane Swamps and Lagoons and Gundry Plains (DCCEWW, 2018).

6.4.2 Methodology

The BDAR included desktop review of relevant databases, detailed biodiversity field surveys and native vegetation mapping. The Development Footprint (also referred to as 'Subject land' in the BDAR) was used as the study area to reduce the field survey effort required, which includes the total area that will be disturbed by the construction of the Project. The Development Footprint area is approximately 512 ha, or 73% of the Project Area.

Targeted and opportunistic surveys for threatened species were undertaken across the Project Area during 2022 to 2023. **Table 6.5** outlines the dates, methods and species targeted during the surveys.

Table 6.5 Biodiversity Survey Overview

Survey Method	Dates	Details
BAM floristic plots	31 March 2022 3–4 November 2022 22 November 2022 13 December 2022 23 May 2023	- Eight floristic plots were sampled within the Development Footprint by Umwelt ecologists using a 20 x 20 m floristic plot nested within each 20 x 50 m vegetation integrity plot assessed. The locations of the plots sampled are mapped to scale and shown as 'BAM Plots' in Figure 2.1 of the BDAR (refer to Appendix 7). - Ten floristic plots were sampled within the Project to assist with providing validation and evidence of avoidance and higher quality vegetation within the Project Area, but not in the Development Footprint. - Nine floristic plots were sampled to verify areas identified as Category 1 – Exempt Land.
Targeted floristic searches	31 October 2022 3–4 November 2022 11 November 2022	- Threatened flora species were surveyed using parallel field traverse searches with an approximately 10 m separation width, as shown in Figure 2.2 of the BDAR (refer to Appendix 7). These included: - Flockton Wattle (<i>Acacia flocktoniae</i>) - Thick Lip Spider Orchid (<i>Caladenia tessellate</i>) - Dwarf Kerrawang (<i>Commersonia prostrata</i>) - Michelago Parrot-pea (<i>Dillwynia glauca</i>) - Buttercup Doubletail (<i>Diuris aequalis</i>)

Survey Method	Dates	Details
		- Black Gum (<i>Eucalyptus aggregate</i>) - Paddys River Box, Camden Woollybutt (<i>Eucalyptus macarthurii</i>) - Hoary Sunray (<i>Leucochrysum albicans</i> var. <i>tricolor</i>) - Matted Bush-pea (<i>Pultenaea pedunculata</i>) - Swainsona sericea (<i>Silky Swainson-pea</i>) - Austral Toadflax (<i>Thesium austral</i>).
Striped Legless Lizard (<i>Delma impar</i>)	12 September–13 December 2022	Surveys were completed using the Commonwealth <i>Survey Guidelines for Threatened Reptiles</i> as a guide and included the establishment of 10 tile arrays, each of 50 tiles. A total of 13 checks over 14 weeks were completed between September to December 2022. Figure 1.8 in Attachment A of the BDAR (Appendix 7) shows the tile array for surveys completed.
Key's Matchstick Grasshopper (<i>Keyacris scurra</i>)	3–4 November 2022 16 March 2023	Surveys were completed by 10 m parallel transects in areas of PCT 1330.
Koala (<i>Phascolarctos cinereus</i>)	23 November 2022 12, 19 and 31 January 2023	Surveys included nocturnal spotlighting, call playback and scat searches during November 2022 to January 2023.
Southern Myotis (<i>Myotis macropus</i>)	4–23 November 2022	Acoustic recording for 19 nights during November 2022.

Native vegetation mapping involved review of publicly available data and desktop mapping of Plant Community Types (PCTs) using aerial imagery, which was ground-truthed during biodiversity field surveys. The results of the biodiversity field surveys, and native vegetation mapping were used by Lightsource bp to inform the Project design and minimise impacts on biodiversity, as discussed in **Section 6.4.3.4**.

Further detail regarding the methodology is included in the BDAR, including detailed biodiversity field survey information (refer to **Appendix 7**).

6.4.3 Biodiversity Assessment Results

6.4.3.1 Excluded Impacts

Section 6.8 (3) of the BC Act specifies that the BAM is to exclude the assessment of impacts due to any clearing of native vegetation and loss of habitat on Category 1 – Exempt Land (as defined in Part 5A of the LLS ACT), other than prescribed impacts (as defined in section 6.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation)).

The BDAR determined the presence of 498 ha of Category 1 – Exempt Land within the Development Footprint, as shown in **Figure 6.4**. The areas assessed as Category 1 – Exempt Land contain highly disturbed non-woody vegetation utilised for agricultural purposes including cattle grazing.

6.4.3.2 Native Vegetation

The Development Footprint contains 14.02 ha of native vegetation made up of four PCTs and areas of planted native trees, as identified in **Table 6.6** and illustrated on **Figure 6.4**. The four PCTs make up 10.98 ha of the total native vegetation within five distinct vegetation zones.

Table 6.6 PCTs Within the Development Footprint

PCT ID	PCT Name	Area within Development Footprint (ha)
PCT 888	Inland Scribbly Gum – Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion	0.29
PCT 1191	Snow Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	0.36
PCT 1289	Wallaby Grass – Red-grass – Tall Speargrass – Kangaroo Grass dry tussock grassland of the North-western and Eastern Southern Tablelands in the South Eastern Highlands Bioregion	4.49
PCT 1330	Yellow Box – Blakely’s Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	5.58
NA	Planted native trees	3.02

The area of planted native trees comprises the remaining 3.02 ha of native vegetation within the Development Footprint, which does not align to any PCT. In one fenced off area containing planted *Pinus radiata*, there is also a threatened flora species present, being the *Eucalyptus macarthurii*.

The Project design avoids this specific area as to not impact the threatened flora species. The understory of this planted corridor contains mainly exotic agricultural grasses and exotic forbs, such as *Phalaris aquatica*, *Dactylis glomerata* and *Cirsium arvensis*.

Three PCTs in the Development Footprint have associations with critically endangered ecological communities (CEECs) listed under the BC Act and EPBC Act, being PCT 1191, PCT 1289 and PCT 1330, which are identified in **Table 6.7** below.

Table 6.7 TEC Associations

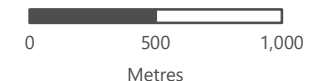
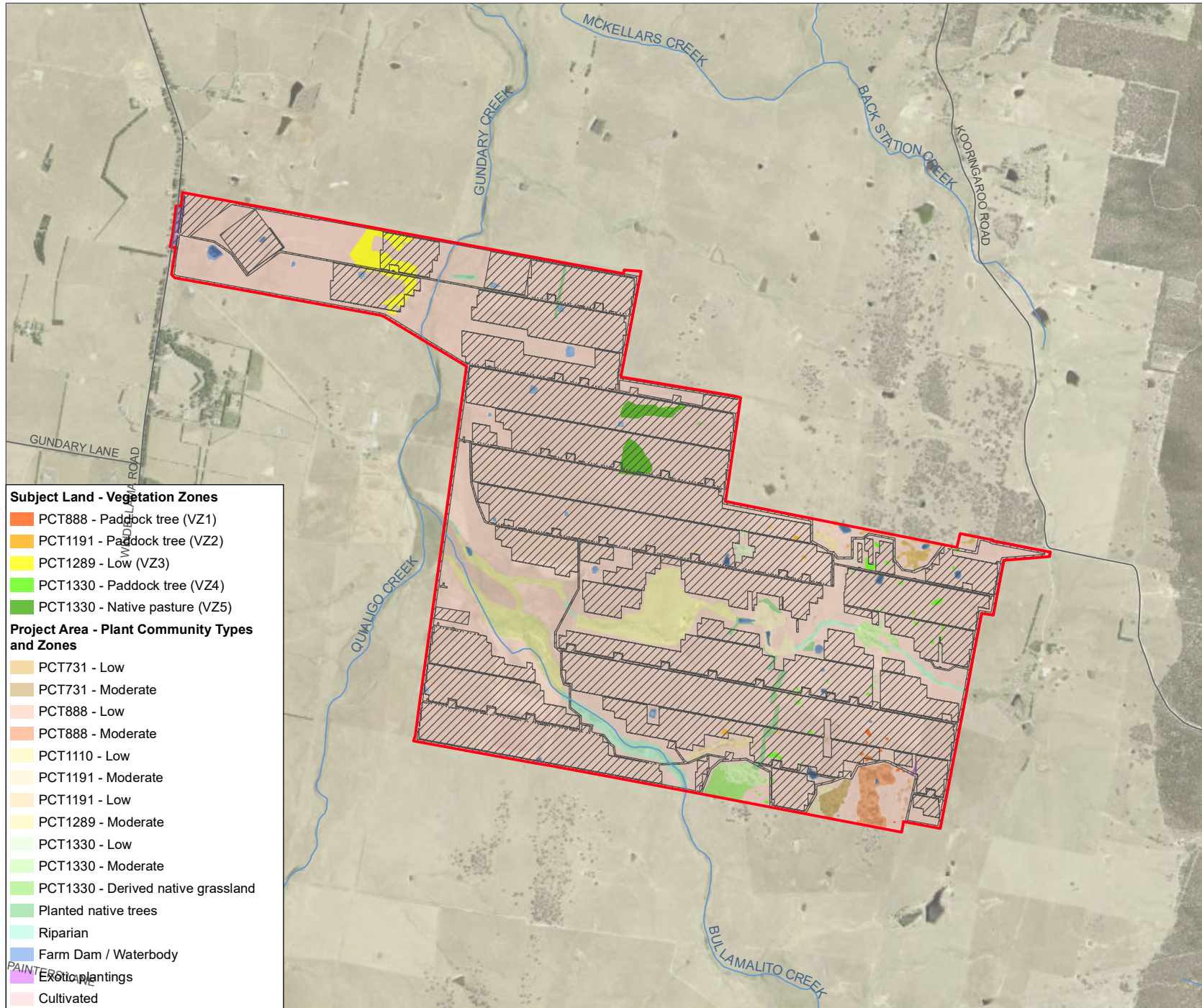
PCT ID	TEC Association Under BC Act	TEC Association Under EPBC Act
PCT 1191	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion (CEEC)	NA
PCT 1191	Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions (CEEC)	NA
PCT 1289	NA	Natural Temperate Grassland of the South Eastern Highlands (CEEC)
PCT 1330	White Box - Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (CEEC)	White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (CEEC)

FIGURE 6.4

Plant Community Types and Vegetation Zones

Legend

- Project Area
- Development Footprint
- Road
- Watercourse



Scale: 1:0 at A4
GDA2020 MGA Zone 55

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The condition of these PCTs was assessed as part of the biodiversity field surveys, which determined that the condition thresholds were met for three TECs listed under the BC Act, as identified in **Table 6.8** and illustrated on **Figure 6.5**. These TECs are located within vegetation zones VZ2, VZ4 and VZ5. No native vegetation within the Development Footprint met the condition thresholds for any TECs listed under the EPBC Act.

Table 6.8 TECs within the Development Footprint

PCT ID	TEC Name	BC Act Listing	EPBC Act Listing	Associated Vegetation Zone	Area (ha)
PCT 1191	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	CEEC	Not listed	VZ2	0.36
PCT 1191	Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	CEEC	Not listed	VZ2	0.36
PCT 1289	Natural Temperate Grassland of the South Eastern Highlands	Not listed	Not listed	VZ3 <i>Note: due to high degradation, vegetation within this zone does not meet the criteria for TEC listing under the EPBC Act</i>	0
PCT 1330	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CEEC	Not listed	VZ4 and VZ5 <i>Note: due to high degradation, vegetation within these zones do not meet the criteria for TEC listing under the EPBC Act</i>	5.84

6.4.3.3 Threatened Species

The NSW BAM categorises threatened species as either 'ecosystem-credit' species or 'species-credit' species. Credits are required for impacts on species-credit species, but not for ecosystem-credit species as they are considered to be already covered by credits generated for impacts on native vegetation. The BAM calculator used for the BDAR predicts the species-credit species that may occur and requires consideration of these species in the assessment.

A full list of the ecosystem-credit species and the species-credit species predicted to occur by the BAM Calculator and/or the literature review and consideration of their likelihood of occurrence in the vegetation zones within the Project Area is provided in the BDAR (as provided in **Appendix 7**). Targeted surveys were undertaken for all candidate threatened flora and fauna species across the Project Area.

The biodiversity field surveys undertaken as part of the BDAR identified one threatened flora and two threatened fauna species within the Development Footprint, which are identified in **Table 6.9**.

Table 6.9 Threatened Species within the Development Footprint

Species Type	Species Name	BC Act Listing	EPBC Act Listing
Flora	Paddys River Box, Camden Woollybutt (<i>Eucalyptus macarthurii</i>)	Endangered	Endangered
Fauna	Key's Matchstick Grasshopper (<i>Keyacris scurra</i>)	Endangered	Endangered
Fauna	White-fronted Chat (<i>Epthianura albifrons</i>)	Vulnerable	Not listed

As highlighted throughout this EIS, the Project design has sought to avoid and minimise impacts to the above threatened species. Additionally, the biodiversity field surveys did not identify any habitat for any threatened species listed under the BC Act or EPBC Act within the Development Footprint.

FIGURE 6.5

Threatened Ecological Communities

Legend

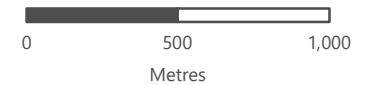
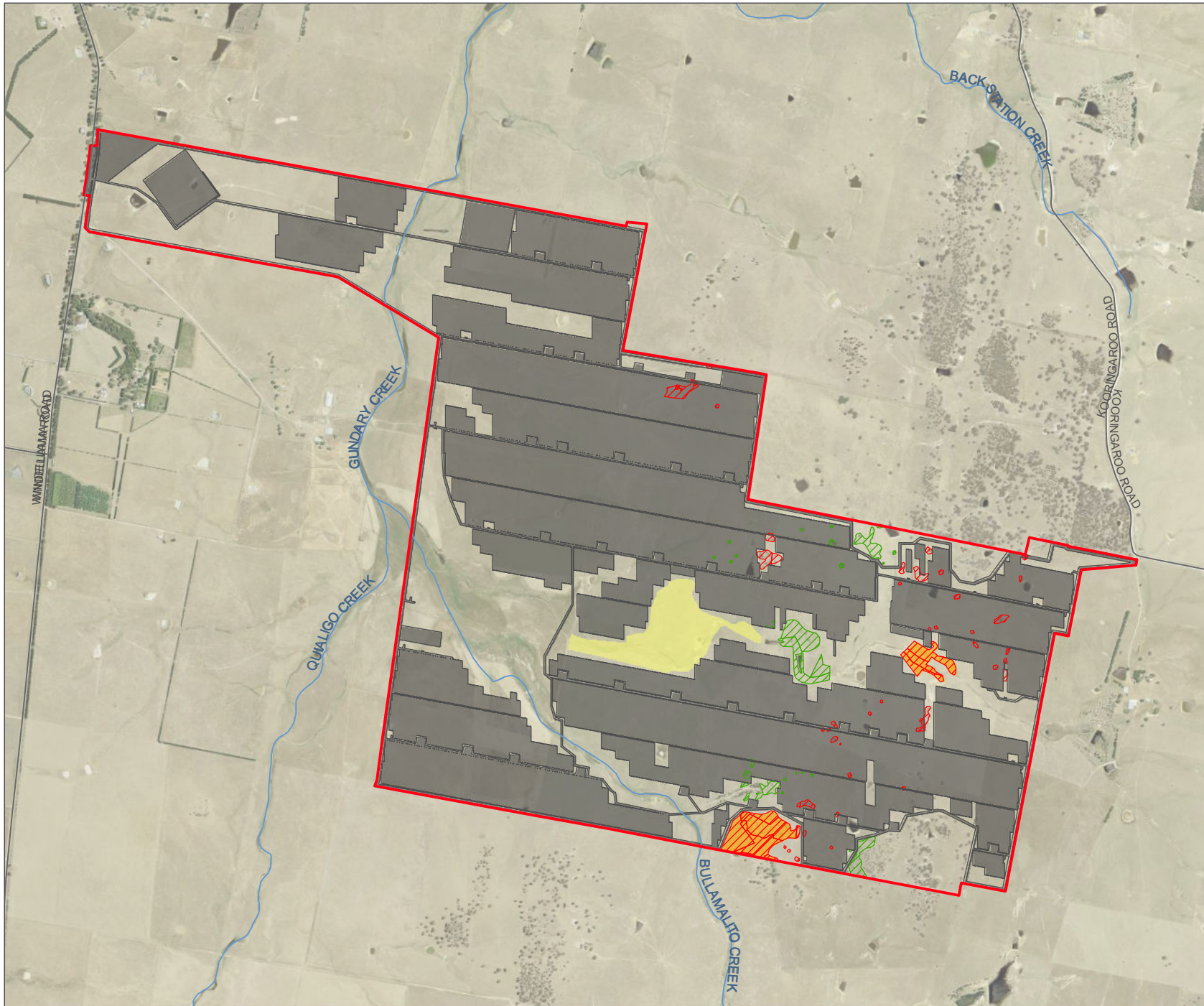
- Project Area
- Subject Land
- Road
- Watercourse

Threatened Ecological Community - NSW

- Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions (1191)
- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (1330)

Threatened Ecological Community - Commonwealth

- Natural Temperate Grassland of the South Eastern Highlands (1289)
- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (1330)



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GDA2020 MGA Zone 55

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6.4.3.4 Aquatic Habitats

Gundry Creek (6th order perennial) and Bullamalito Creek (5th order perennial) are both mapped as Key Fish Habitat, with the fish status for Gundry Creek indicated as 'poor' on the Fisheries NSW Spatial Data Portal (DPI, 2024). Whilst both creeks including their associated floodplains are being avoided by the Project layout, watercourse crossings are proposed over these creeks to facilitate access across the Project Area. Other aquatic habitats within the Project Area are manmade farm dams that have an association with unnamed ephemeral tributaries of Gundry Creek and Bullamalito Creek. These creek lines are degraded as a result of the historical and current agricultural practices. The existing condition of watercourses traversing through Project Area are further discussed in **Section 6.12.1**.

6.4.4 Avoidance and Mitigation of Biodiversity Impacts

The biodiversity assessment commenced during the early Project design stage to inform the Project's design and layout to reduce biodiversity impacts, particularly in areas with high biodiversity value. Of note, the Development Footprint was refined early in the planning process to avoid areas containing remnant intact vegetation.

The Project has therefore been designed to take advantage of the most disturbed areas of the Project Area, including land assessed as Category 1 – Exempt Land, which has undergone extensive cultivation and are currently managed for livestock grazing. These areas have lower biodiversity values.

Remnant vegetation along the northern and southern boundaries of the Project Area is being retained, which improves connectivity with areas of remnant vegetation located adjacent to the Project Area. Similarly, the Project design incorporates setback buffers of approximately 20 m to 40 m around all second and higher watercourses within the Project Area, where they provide biodiversity value, which will continue to provide some form of habitat corridor (however degraded they may be).

Overall, the Project layout and design has resulted in the avoidance of 27.89 ha of NSW listed threatened ecological communities and 37.96 ha of Commonwealth listed ecological communities. Furthermore, two threatened species were detected within the Project Area during targeted surveys. These include one individual of Key's Matchstick Grasshopper (*Keyacris scurra*) and 20 individuals of *Eucalyptus macarthurii*. All threatened species locations and habitat areas have been avoided in the Project layout and design.

Lightsource bp has committed to the implementation of the following specific control measures to further 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.

Each of these mitigation measures will be included within the CEMP, OEMP and DREMP.

6.4.5 Assessment of Impacts

6.4.5.1 Residual Direct Impacts

While the Project has been designed to avoid areas of biodiversity value, there will still be residual direct impacts to biodiversity.

As a result of clearing works during construction, the Project would directly impact one TEC listed as a CEEC under the BC Act, being the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland, which is located within VZ4 and VZ5. The extent of impact is detailed in **Table 6.10**.

Table 6.10 Summary of Residual Direct Impacts

PCT	BC Act Listing	EPBC Act Listing	Extent of Impact
PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	CEEC	Not listed: due to high degradation, vegetation within VZ4 and VZ5 does not meet the criteria for TEC listing under the EPBC Act	Direct impacts to BC Act listed TEC: - Native pasture = 4.67 ha. - Paddock trees = 1.17 ha. Total impact = 5.84 ha.

The biodiversity field surveys determined that the 5.84 ha of TEC within VZ4 and VZ5 is highly disturbed and of low quality. This TEC has experienced degradation over a relatively long time period by agricultural management, including clearing of trees and understorey vegetation, grazing and pasture improvement.

The Project will not fragment any areas of high-quality TEC, due to the existing fragmentation of remnant vegetation from historical and current agricultural land use in the Project Area and surrounds. Any fragmentation associated with the Project will occur through the removal of areas of highly degraded native pasture vegetation and scattered trees. The retained areas will remain connected to other vegetation communities, both within the Project Area and the adjoining landscape.

6.4.5.2 Indirect Impacts

Potential indirect impacts on biodiversity are likely to occur primarily through the construction phase of the Project, hence many would be considered temporary and/or short-term. Indirect impacts on biodiversity are anticipated as a result of:

- Increased site occupation and human visitation resulting in reduced habitat suitability for threatened fauna.
- Reduced connectivity of habitat.
- Light spill impacts which may occur intermittently and only in the case of an emergency, with consequences likely to be negligible.
- Construction noise which may result in a short-term reduction in the suitability of retained and adjoining habitats during construction works for sensitive fauna species.
- Impacts on air quality which have a low potential to occur if appropriate dust suppression measures are undertaken but which may result in physical injury to fauna species and short-term reduced photosynthetic capacity for impacted flora.

- Water availability impacts due to loss of existing watercourses within the site and altered hydrology and sedimentation of downstream environments.
- Weed and pest invasion.

The risk of indirect impacts to biodiversity as a result of the Project would be minimised through the implementation of mitigation measures outlined in **Section 6.4.3.4**.

6.4.5.3 Prescribed Impacts

Prescribed impacts include impacts on biodiversity values which are not related to native vegetation clearing and habitat loss. All prescribed impacts have been assessed for the Project, as listed within the BC Regulation.

The prescribed impacts considered relevant to the Project are associated with non-native vegetation, loss of habitat connectivity, waterbodies and vehicle strike. Prescribed impacts to these features are expected to be minimal, due to the following reasons:

- **Non-native vegetation:** there is approximately 498 ha of non-native pasture within the Development Footprint (consisting primarily of exotic species common to grazing paddocks) which has been assigned as Category-1 land. The White-fronted Chat has been observed within the Category-1 land and is known to sometimes utilise several prickly non-native species as breeding habitat. The Project would reduce the extent of available habitat to the white-fronted chat and other potential mobile threatened species which are capable of utilising highly disturbed terrestrial agricultural environments. If thistles and other prickly non-native shrubs (common hawthorn (*Crataegus monogyna*), african boxthorn (*Lycium ferocissimum*)) within the Development Footprint are being utilised by the white-fronted chats, it may be possible to slowly remove thistles during construction, in non-breeding season (outside of September), while replacing them with native vegetation (e.g., *Poa spp. tussocks*) near the water along Gundry Creek or Bullamalito Creek. This would encourage the white-fronted chats to move out of the Development Footprint, though this should only be done in the off-season to minimise any impacts to breeding.
- **Habitat connectivity:** there will be clearing of native vegetation including canopy trees, however these are mainly isolated and scattered trees, areas of derived native grassland and highly disturbed agricultural land assessed as Category-1 land. The White-fronted Chat is a highly mobile species and is not likely to be dependent on habitat connectivity within the Development Footprint. The Key's Matchstick Grasshopper is restricted to high quality grasslands containing kangaroo grass (*Themeda australis*) and could move from within the Project Area to outside of the security perimeter fencing and outside the Project Area on adjacent land to the south.
- **Waterbodies, water quality and hydrological processes:** the Project will require dewatering of several farm dams and construction of watercourse crossings, however no threatened entities were observed using or are likely to use any of the existing farm dams or watercourse crossings.
- **Vehicle strike:** while the construction and operation of the Project will require the use of access tracks within the Project Area, no threatened entities are likely to be affected by vehicle strikes as vehicle movements will be at low speed.

6.4.5.4 Serious and Irreversible Impacts (SAII)

Under the BC Act, a determination of whether an impact is serious and irreversible must be made in accordance with the principles prescribed in the BC Regulation. The principles have been designed to capture those impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community.

The BDAR provided further assessment for one entity considered at risk of a SAII (White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland CEEC) (refer to Section 9.0 of the BDAR in **Appendix 7**). The Project will impact approximately 5.84 ha of this CEEC including approximately 1.17 ha of vegetation which is described as scattered trees and 4.67 ha which is described as a native pasture, all of which is too disturbed and in a low quality to require biodiversity offsetting under the BAM. The patches do not meet the condition thresholds established under the EPBC Act for the Commonwealth box gum woodland community.

The best available information on the current geographic extent of this CEEC across its range is estimated from the Seed Vegetation Type Map (SVTM) as between 1,267,603 ha and 1,639,571 ha within NSW. The Project will impact between 0.0004% and 0.0003% of the geographic extent of this CEEC mapped in the SVTM. It is considered that the actual proportional impact is likely to be much lower due to the presence of large areas of highly degraded derived native grassland vegetation which are not captured in the SVTM.

6.4.5.5 Aquatic Impacts

Whilst second order and higher watercourses are being avoided by the Project layout, watercourse crossings are proposed to facilitate access across the Project Area. The watercourse crossings will be designed to minimise impacts on stream stability and fish passage and will be designed with reference to the following documents in addition to the NSW *Guidelines for Controlled Activities on Waterfront Land*:

- *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.*
- *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management.*

Other aquatic habitats within the Project Area that have potential to be impacted by the Project include manmade farm dams that have an association with unnamed ephemeral tributaries of Gundry Creek and Bullamalito Creek. These creek lines are degraded as a result of the historical and current agricultural practices. Under the fish habitat classes and types in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management*, the habitat associated with these creek lines have been assessed as Type 3, Class 3 (minimal key fish habitat) due to being ephemeral tributaries with intermittent flow and sporadic refuge for aquatic fauna.

Considering the above, it is expected that the Project would not impact the passage of fish nor obstruct the movement of fish or other aquatic species over the long term.

Furthermore, the Project layout incorporates riparian buffers of approximately 20 m to 40 m around all second order and higher watercourses to avoid and minimise impacts to riparian zone and limit water quality impacts to aquatic habitats within and near the Project Area. The surface water and groundwater impacts associated with the Project (refer to **Section 6.12**) are not expected to result in an adverse impact on threatened aquatic species, endangered populations or ecological communities listed under the FM Act.

In addition to impact avoidance by design, Lightsource bp is committed to implementing measures outlined in **Section 6.4.3.4** to further mitigate and manage any impacts to aquatic habitats, including aquatic fauna and flora.

6.4.6 Biodiversity Credit Impact Summary

The NSW BAM requires the use of an online calculator and project specific survey and impact data to calculate the number of biodiversity credits that account for the impact of a project on biodiversity. The proponent must offset these credits as part of progressing the development if it is approved.

The emphasis on avoidance and minimisation, as highlighted above, means that all areas of high value biodiversity value habitats have been excluded from the Development Footprint and impacts to these areas have been avoided. Residual biodiversity impacts are therefore limited to the highly degraded grasslands within the Project Area which, albeit still contain some native plant diversity, are largely agricultural remnants and are in such a degraded state that they fail to meet the BAM defined value thresholds that generate biodiversity credits.

In light of this, the BAM assessment identified there are no biodiversity credits required to offset the biodiversity impacts of the Project.

6.5 Aboriginal Cultural Heritage

The Project Area is located within the traditional homelands of the Ngunnawal people and falls within the Pejar LALC area.

An Aboriginal Cultural Heritage Assessment (ACHA) has been prepared for the Project by Umwelt (2024) to investigate the presence of Aboriginal objects within the Project Area. The ACHA was used to consult with the Registered Aboriginal Parties (RAPs) to determine whether there are intangible cultural values within the Project Area, assess the potential harm to any identified heritage values and provide mitigation and management measures to manage or prevent harm associated with the Project. The full ACHA is included in **Appendix 8** and key findings are summarised in the sections below.

The ACHA was prepared in accordance with the SEARs, as set out in **Appendix 1**.

6.5.1 Existing Environment

A detailed review of the Aboriginal cultural context of the Project Area and surrounds was undertaken to gain an understanding of the potential Aboriginal cultural values that may occur within and surrounding the Project Area. A full description of the Aboriginal cultural context of the Project Area is included in **Appendix 8** with a summary provided below.

Goulburn is understood to be a boundary and meeting place between two different, but linguistically closely related, language groups: Ngunnawal and Gundungarra. There is evidence that the Gundungarra groups had interactions with Ngunnawal Groups. Ngunnawal connections to Gunday can be linked to the present-day RAPs that were involved in fieldwork undertaken as part of the ACHA.

The earliest archaeological evidence of occupation from the Goulburn region is the Birrigai rock shelter in the northern foothills of the Australian Alps, approximately 80 km south-east of the Project Area.

Radiocarbon dates obtained from charcoal deposits at the site have established that Aboriginal people have lived in this region for at least 21,000 years (Flood, 1996).

Previously recorded sites within the Goulburn-Mulwaree region generally occur in the vicinity of watercourses, in elevated areas and in areas with suitable geology or mature vegetation. Gundry Creek and Bullamalito Creek are perennial fifth order watercourses that traverse the Project Area, which likely provided a reliable water resource for Aboriginal people in the past (except for in periods of droughts). Additionally, many first to fourth order watercourses intersect the Project Area. This abundance of water resources would have likely made the Project Area suitable for long-term habitation by Aboriginal people.

The area south of Goulburn, including the Project Area, were subject to land grants in 1831 and 1834 that were subdivided into dairy, agricultural and pastoral farms. This area passed through several hands since that time. Modifications to the land included substantial plantings of trees (including pines), shrubs and orchards. The Gundry Plains property was successful in the breeding of merino sheep (The Australasian, 1930).

Historical aerial imagery from 1974 shows the Project Area as almost completely devoid of trees and divided into agricultural lots, which has been used for sheep and cattle grazing. This is in sharp contrast to land further to the east that still contains natural vegetation.

Based on the provided information, it is considered that the entire Project Area has been impacted by ungulate grazing. Sheep and cattle would have traversed the Project Area for approximately 200 years.

6.5.2 Consultation

The main aim of the ACHA was to identify any cultural values within the landscape in which the Project is located, so that those values can be recognised and incorporated into the Project's avoidance, mitigation and management recommendations. The consultation for the Project followed the Consultation Requirements (DECCW, 2010a) and a log and copies of correspondence with Aboriginal community stakeholders is presented in Appendix A of the ACHA (refer to **Appendix 8**).

Consultation was undertaken in four main stages:

- **Stage 1 – Notification and Registration of Interest:** Individual targeted letters were sent during May 2022 to RAPs and government agencies to identify, notify and register Aboriginal people who hold cultural knowledge relevant to the Project Area. In addition, a public advertisement was placed in the Goulburn Post on 1 June 2022. As a result of the Project notification process, 18 RAPs registered an interest in the Project and were part of an active consultation process for identifying and assessing the significance of the Aboriginal cultural heritage values/Aboriginal objects and/or places and determining and carrying out appropriate strategies to mitigate impacts upon Aboriginal heritage.
- **Stage 2 – Presentation of Information:** Information regarding the Project, proposed consultation process and assessment methodology was provided to the RAPs for comment in September 2022. The letter included an overview of the project, the proposed assessment methods (including upcoming site survey) and the consultation process, as well as the results of a preliminary desktop assessment and details about gathering cultural information. A second letter was sent out on 30 March 2023, and detailed the test excavation methodology. Both letters detailed an application process for paid engagement in the site survey and test excavation as Aboriginal Site Officers.

- **Stage 3 – Gathering Information about Cultural Significance:** Information about Aboriginal cultural values was gathered through RAP consultation and field work (which involved field survey in December 2022 and text excavations conducted over 2 weeks in April and May 2023).
- **Stage 4 – Review of the Draft ACHA:** A copy of the draft ACHA was provided to all RAPs with an invitation to review and comment on all aspects of the document, which was incorporated into the final ACHA (refer to **Appendix 8**).

Throughout all stages of the assessment process, the RAPs were invited to identify how they would like to participate in the Project's ACHA process, including what cultural information they wanted to share to inform the assessment process and what information (if any) should remain non-disclosed in the assessment and reporting process.

6.5.3 Methodology

The approach taken acknowledged and respected the rights of Aboriginal people to directly participate in matters that may affect their heritage, as well as the rights to maintain culture, language, knowledge and identity.

The archaeological assessment followed the requirements of the National Parks and Wildlife Regulation 2019 (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011), with all consultation undertaken in accordance with section 60 of NPW Regulation and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) (the Consultation Requirements). The ACHA incorporates required archaeological technical information in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) (the Code of Practice).

6.5.3.1 Field Survey Strategy

An archaeological field survey was undertaken by Umwelt archaeologists and representatives of seven RAPs over the period of 7 to 9 December 2022. The field survey was aimed at locating Aboriginal objects. An assessment was also made of landscape, prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the archaeological sensitivity of the land.

The Project Area was divided into five landform units. The survey focused on the portions of the Project Area most likely to feature Aboriginal sites (i.e. areas of high archaeological sensitivity), while also gathering a representative sample of landforms less likely to feature Aboriginal sites to confirm predictions of low archaeological sensitivity.

Following the identification of areas of Potential Archaeological Deposits (PADs) (i.e. areas with the potential to contain subsurface artefacts), test excavation was also undertaken with a team of the RAP representatives and Umwelt archaeologists to confirm the predictive model for the Project Area. The excavation program was divided into two stages, being 17 to 21 April 2023 and 1 to 5 May 2023. Further detail regarding the test excavation methodology and approach is provided in **Appendix 8**.

6.5.4 Results

Searches of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) database was conducted for the Project Area with a 5 km to 20 km buffer in November 2022, May 2023 and April 2024.

A total of 68 valid sites were recorded within the search area, including one site (AHIMS ID 51-6-0912) within the Project Area for which information is restricted. Subsequent consultation with Heritage NSW identified that this site is not within the Project Area. The most common site type within the region is Open Artefact Sites (n=62), with one culturally modified tree, one set of grinding grooves and one stone quarry with associated artefacts also present within the search area.

The field survey program identified the following newly recorded sites within the Project Area:

- Eleven (11) open artefact sites.
- Four (4) PADs.

PADs were associated with non-perennial creek lines and consisted of stone artefacts. A total of 70 stone artefacts were identified on the ground surface. Although mature trees were inspected for signs of cultural scarring, none were identified. The results of the survey fed directly into the test excavation methodology.

As a result of the test excavation, the final number of Aboriginal sites identified across the Project Area is nineteen (19) (refer to **Figure 6.6**) and a total of 295 stone artefacts were recovered. None of these sites had been recorded from previous studies. All these sites have been registered on the AHIMS.

6.5.5 Assessment of Significance and Impacts

The ACHA determined that the majority of the sites recorded during the survey have a low scientific significance as they are either isolated finds, in disturbed contexts or not particularly rare (in terms of type and cultural material). Two sites (GSF-UMW-6 and GSF-UMW-9) are relatively uncommon and have been assessed as having moderate scientific significance.

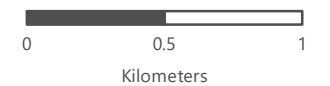
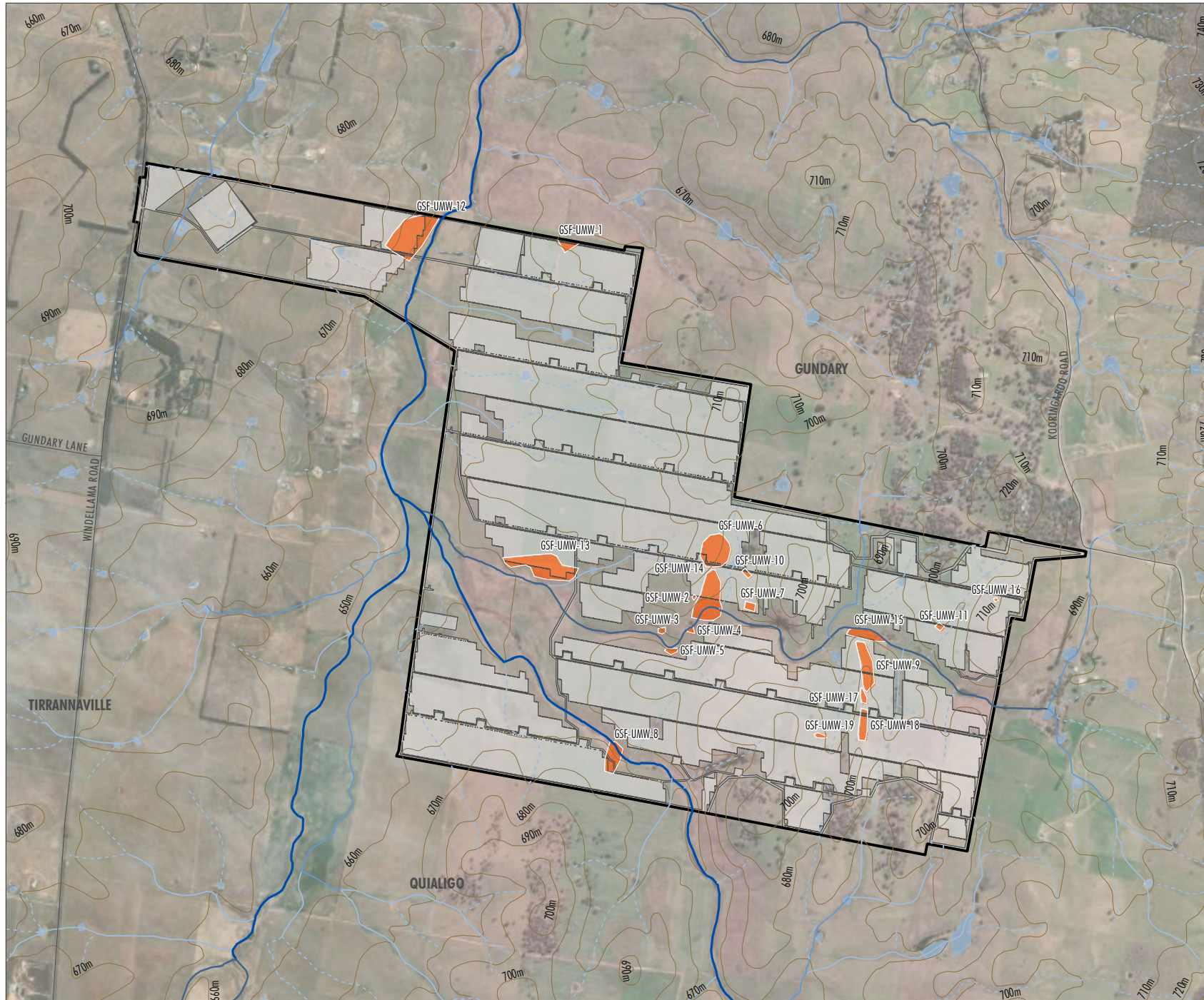
As identified in **Table 6.11**, the Project would avoid impacts to three sites (GSF-UMW-3, GSF-UMW-4, GSF-UMW-5), with the remainder of the sites being partially or totally impacted. Strategies to further manage and mitigate the extent of impact to these sites are proposed in **Section 6.5.6** and include a staged salvage excavation of sites GSF-UMW-6 and GSF-UMW-9 with additional surface collection at the remaining sites within the Development Footprint.

Table 6.11 Overview of Sites Being Impacted by the Project

Sites avoided by Project	Sites partially impacted by Project	Sites totally impacted by Project
GSF-UMW-3	GSF-UMW-1	GSF-UMW-6
GSF-UMW-4	GSF-UMW-2	GSF-UMW-7
GSF-UMW-5	GSF-UMW-8	GSF-UMW-9
	GSF-UMW-12	GSF-UMW-10
	GSF-UMW-13	GSF-UMW-11
	GSF-UMW-14	GSF-UMW-16
	GSF-UMW-15	GSF-UMW-17
		GSF-UMW-18
		GSF-UMW-19

FIGURE 6.6
Development Footprint and
Known Archaeological Sites

- Legend**
- Road
 - Contours (10m)
 - ▭ Project Area
 - Waterbody
 - All Archaeological Sites in Project Area
 - Development Footprint
- Strahler Stream Order**
- 1st Order Stream
 - 2nd Order Stream
 - 3rd Order Stream
 - 4th Order Stream
 - 5th Order Stream or Higher



Scale: 1:0 at A4
GDA2020 MGA Zone 55

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6.5.6 Management and Mitigation Measures

Lightsource bp is committed to the implementation of a range of management and mitigation measures for Aboriginal sites located within the Development Footprint. These include:

- Following development consent, Lightsource bp will develop an Aboriginal Cultural Heritage Management Plan (ACHMP) in consultation with the RAPs and DPHI (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.
- Aboriginal sites GSF-UMW-3, GSF-UMW-4 and GSF-UMW-5 to be fenced off prior to construction commencing.
- Staged salvage excavation to occur prior to the construction of the Project for GSF-UMW-6 and GSF-UMW-9, in accordance with the methodology outlined in Section 8.1.1 of the ACHA (refer to **Appendix 8**).
- All sites with surface stone artefacts within the Development Footprint to be collected from the ground surface (including sites that will be subject to salvage excavation) by qualified archaeologists and RAP representatives, in accordance with the methodology outlined in Section 8.1.1 of the ACHA (refer to **Appendix 8**).
- In the event of discovery of new Aboriginal sites in the Project Area during construction, all work in the potentially affected area (within 20 m of the site) will halt and an archaeologist and designated RAP representatives will be contacted to determine the significance of the object(s). Any new sites will also be registered in the AHIMS database. Objects will be managed in a manner consistent with the management measures outlined in the ACHA and finalised in the ACHMP, including appropriate forms of salvage collection.
- If known or suspected human remains are encountered during the Project's construction, the unexpected finds procedure in the ACHA will be followed as soon as the suspected remains are discovered.

6.6 Historical Heritage

A Historical Heritage Impact Assessment (HHIA) has been undertaken by Umwelt (2024). As outlined in **Appendix 9**, the SEARs require the EIS to '*assess the impact to historical heritage having regard to the NSW Heritage Manual*' (OEH, 1996).

The HHIA has been undertaken in accordance with guidelines set out in the *NSW Heritage Manual 1996* and includes the identification and assessment of:

- listed heritage items located within or in proximity to the Project Area
- items, buildings, structures, or other elements of potential historical heritage significance (i.e. those which are not listed) located within or in proximity to the Project Area
- any areas of historical archaeological potential within or in proximity to the Project Area

- the likelihood, extent, and nature of potential impacts to any listed or unlisted items of heritage significance located within or in proximity to the Project Area
- appropriate measures to avoid, manage and/or mitigate any identified impacts.

A summary of the key findings of the HHIA is provided below with the full report available in **Appendix 9**.

6.6.1 Existing Environment

A detailed review of the historical context of the Project Area and surrounds was undertaken to gain an understanding of the potential historical resource that may occur within and surrounding the Project Area. A full description of the historical context of the Project is included in **Appendix 9** with a summary included below.

6.6.1.1 History of the Region

The first European exploration southwest of Sydney was undertaken in 1778. The settlers reached Mount Towrang, approximately 8 km east of Goulburn, before turning back to Sydney. Further exploration into the Goulburn area was undertaken in 1814 and 1818, which opened up a route from Sydney to the Southern Highlands and Southern Tablelands in NSW (EH&A, 2010). Despite reports of arable land within the Goulburn Plains, settlement beyond the Southern Highlands, approximately 50 km northeast of Goulburn, was limited until 1819. During this time, permits were required to move through the Southern Highlands, with the exception of military and civil officers and families who held sheep farms in the area (EH&A, 2010).

The first land around Goulburn was granted in 1824 and new landholders started setting up pastoral stations that were built and run by the convict labour (EH&A 2010). The settlement in the Goulburn Plains resulted in the establishment of roads, villages and towns (EH&A 2010). Although pastoral stations were established from the 1820s, a township in Goulburn was not formed for several years.

In 1929, a town plan was initially approved for the river crossing of the Wollondilly River, however this was eventually relocated away from flood prone land and further south to the Mulwaree Ponds (to where Goulburn regional city is located today). In 1826, this township was described 'a few scattered buildings of brick and others of wood' (EH&A, 2010), however the Goulburn township grew during the 1830s.

The Goulburn township provided a central location for the rich pastures of the south western region and was declared a regional city in the late 1860s. An existing train line was extended to Goulburn in 1869, which provided new impetus for the development of Goulburn, with the new wealth of the colony from the Gold Rush and expanding population.

The town flourished in the twentieth century, serving as a district that continued to produce food and goods to support the growing nation and continues to be a crucial regional town within fertile lands of the Goulburn Plains and surrounding regional district.

The Project Area

The Project Area is located within land grants originally made to Thomas and William Bradley in 1831 and 1834. At this time, the Project Area formed part of the head station of the Bradley family, who were referred to as pioneers with extensive land grants in the district (The Australasian, 1930). The Project Area passed through several hands before being purchased by a syndicate who attempted to subdivide the land by 1882.

In 1902, Mr A.R Maple Brown purchased a large and irregular portion of property. Within several years, Mr A.R Maple Brown negotiated for some adjoining blocks to create 'Gundry Plains', a property of slightly more than 10,000 acres, including the Project Area (The Australasian, 1930). At the time of purchase by A.R Maple Brown, the former station had been allowed to deteriorate with few buildings of note (The Australasian, 1930). The old woolshed (outside the Project Area) was standing, however required substantial modification and alteration to make suitable for use. Other buildings on the property were either scrapped or removed to different stations (The Australasian, 1930).

A homestead was constructed in 1907 (located outside the Project Area) on a site pre-selected and planted by Mr A.R Maple Brown (The Australasian, 1930). This homestead is located to the south and west of the Project Area along Windellama Road, based on aerial imagery and topographic maps.

The Gundry Plains property was progressively subdivided and sold, likely from the 1920s onwards based on dates of subdivision plans and newspaper notifications. Subdivision started with the lands closer to the township of Goulburn and continued until 1952 when the Gundry Plains homestead and an associated 795 acres of land was sold to Mr Phil Wench (The Goulburn Evening Post, 1952).

Since the establishment of pastoral estates in the early to mid-1800s, the Project Area has remained largely undeveloped. The historic agricultural and pastoral land use continues to present day.

6.6.1.2 Statutory Heritage Listings

Statutory heritage registers were reviewed as part of the HHIA and identified the following:

- no heritage items or places listed on the Commonwealth or National Heritage Lists are located within the Project Area
- no State listed heritage items are located within the Project Area
- no items listed on any s170 Heritage and Conservation Registers (NSW State agency heritage registers) are located within the Project Area
- no items listed on Schedule 5 of an LEP are located within the Project Area.

Although the Project Area does not contain any listed heritage items, there are several heritage items in the surrounding region. **Table 6.12** below provides details of these items.

Table 6.12 Heritage Listings in Proximity to the Project Area

Item Details	Listing Details	Distance to Project Area
'Pelican' Homestead (I599)	Goulburn Mulwaree LEP 2009	Approximately 3.4 km west
'Lansdowne' Property (#00132)	State Heritage Inventory (SHI)	Approximately 7.4 km northwest
Goulburn Railway Station, Yard and Moveable Heritage (#01152)	SHI	Approximately 7.6 km northwest
Goulburn Brewery (#00178)	SHI	Approximately 7.9 km northwest

6.6.2 Assessment of Impacts

A visual inspection of the Project Area was undertaken by Umwelt in December 2022 to confirm the setting and context of the Project Area, as well as identify any potential heritage or archaeological items. The field inspection was undertaken concurrently with the site survey that was undertaken to inform the Aboriginal Cultural Heritage Assessment for the Project.

6.6.2.1 Historical Heritage Archaeological Potential

Due to the land use history described in **Section 6.6.1.1**, any archaeological remains within the Project Area are likely to be fragmented or previously disturbed. This includes any evidence of early development of the Project Area as part of the 1831–1902 Bradley family home station and the post-1902 development of the Gundry Plains property.

The archaeological potential of the Project Area is therefore considered to be nil to low. If present within the Project Area, any truncated or fragmented archaeological remains are unlikely to have research potential as they are unlikely to provide new or significant information about the history of the Project Area.

6.6.2.2 Physical Impacts to Heritage Items

There are no listed heritage items within the Project Area. Furthermore, no potential heritage items were identified within the Project Area as part of the HHA. The Project will therefore not result in any physical impacts to heritage items within the Project Area.

The nearest listed heritage item to the Project Area is 'Pelican' Homestead, which is approximately 3.4 km to the west, as identified in **Section 6.6.1.2**. The Project will not require any intervention or works within the curtilages of this heritage item. No other listed heritage items are located within 4 km of the Project Area. As such, the Project will have no physical impacts to the listed heritage items in the vicinity.

6.6.2.3 Visual Impacts to Heritage Items

Review of the SHI citation for the 'Pelican' Homestead indicated that the significance of this pastoral property, although located within a similar rural landscape to the Project Area, stems from the significant historical development of the property as a convict-built property and associations with a locally significant family. No significant views or vistas to or from the Project Area were indicated in the available information. Views to or from this heritage item from Windellama Road are unlikely to be obscured or adversely impacted by the Project based on the distance between the Project Area and the item, as well as the nature of development that is proposed.

Similarly, the cluster of heritage items located within Goulburn regional city (7 km to the north of the Project Area), such as 'Dwelling Coorinyah' and 'Homestead Yattalunga (1860)' do not identify any significant views to or from the heritage items within their citations. As such, views to or from these heritage items are unlikely to be obscured or adversely impacted by the Project.

The LVIA prepared for the Project (as discussed in **Section 6.8** and provided in **Appendix 11**) has identified that overall, the Project would have a low impact on the landscape character of Goulburn. Due to the Project being some distance from Goulburn, the Project's relative low-profile height and dark visually recessive colour, it is not anticipated that the Project would affect Goulburn's scenic quality or landscape character experienced from the city's urban precincts, growth fringe precincts, heritage conservation areas or heritage items.

The LVIA further provides clarity on the level of visibility of the Project from within, and adjacent to, the heritage conservation areas and heritage items in Goulburn and that, while it may be 'theoretically visible' from several heritage items, the Project would not result in any changes to the landscape character, setting and urban nature of Goulburn nor the semi-rural nature of the fringe areas between Goulburn and the Project.

The Project would not remove any evidence of the historical development of the region, a contributory element to the significance of heritage conservation areas. No indirect (visual) impacts to the heritage significance of the listed heritage items in the vicinity would result from the Project.

6.6.2.4 Impacts to Historical Archaeology

The HHIA indicates that the archaeological potential of the Project Area is generally low to nil.

Should any archaeological remains be present within the Project Area, these are anticipated to be fragmented and unlikely to have any identifiable heritage significance due to the land use history of the area. Overall, the Project has little potential to impact on historical archaeological remains.

6.6.3 Management and Mitigation Measures

Based on the findings of the HHIA, no further recommendations for assessment, investigation or recording were made with regards to historical heritage. Lightsource bp will implement the following preventative management as part of the Project:

- An unexpected heritage finds protocol will be developed and included in the environmental management policies for the Project. This should include identification of contact persons within the Proponent team as well clearly identified steps to be implemented.
- All project team members and construction contractors will undertake a heritage-specific induction to support the use of the unexpected heritage finds protocol.
- In the unlikely event that, unexpected historical archaeological material is discovered, all work in the area should cease and suitably qualified archaeologist should be consulted to determine an appropriate course of action. Depending on the extent and significance of the archaeological remains encountered, additional assessment and investigations, and consultation with Heritage NSW may be required prior to the re-commencement of works.

6.7 Land Resources and Land Use

A detailed Soil and Agriculture Assessment, including a Land Use Conflict Risk Analysis (LUCRA), has been prepared by Minesoils (2024) to address the SEARs requirements relating to 'land', as presented in **Appendix 1**. The full reports are provided in **Appendix 10** with the outcomes of the assessments summarised below.

During the stakeholder engagement program, community concerns regarding land use conflict and impacts to agriculture (such as the loss of prime agricultural land) were raised, which are also addressed within this section.

6.7.1 Existing Environment

The topography of the Project Area is characterised by undulating and rolling hills and crests, with broad drainage plains. Rocky outcrop and surface rock fragments are present on upper slopes and crested areas. The elevation of the Project Area ranges from 640 m on drainage plains associated with Gundary Creek to 710 m on crested areas.

The Project Area consists of agricultural land in the form of open paddocks, the majority of which has been subject to cultivation over a long history of cattle and sheep grazing. As a result, the Project Area now supports a mosaic of exotic vegetation, derived native grassland in a range of conditions, isolated paddock trees, areas of thinned woodland forest, and areas of intact woodland and forest around its periphery.

The NSW regional soil mapping indicates the dominant soil types within the Project Area are Sodosols, Kurosols and Natric Kurosols.

6.7.2 Methodology

Full details of the assessment approaches are provided in **Appendix 10**. Broadly, the assessment involved:

- Desktop review of regional mapping accessed using the NSW Government eSPADE information system.
- A soil and land use resource survey was conducted in May 2023. A total of 30 sites were assessed across the Project Area, at irregularly located points (refer to **Figure 6.7**). Soil pits were excavated by soil corer to a depth of 0.7 to 1.0 m. Soil profiles within the Project Area (refer to **Figure 6.7**) were assessed in accordance with the *Australian Soil and Land Survey Field Handbook* soil classification procedures (NCST, 2009). Detailed soil profile descriptions were recorded covering the major parameters specified in Table 9 of **Appendix 10**. Soil profile logging was undertaken in the field using soil data sheets, including GPS recordings and photographs of the landforms and soil profiles. Soils were keyed out in accordance with the *Australian Soil Classification (ASC) Third Edition* (Isbell, R. F., 2021). A total of 45 representative soil samples were selected for laboratory testing, as detailed in Table 10 of **Appendix 10**.
- Land and Soil Capability (LSC) assessment, conducted in accordance with the *Land and Soil Capability Assessment Scheme; Second Approximation* (OEH, 2012) (the LSC Guidelines) to establish the limitations to the land and the likelihood of degradation under eight hazards. Following an assessment of each site and soil profile against the eight identified hazards, the results were used to establish the LSC of each site.

- No Biophysical Strategic Agricultural Land (BSAL), State Significant Agricultural Land or critical industry clusters (CICs) mapped within the Project Area. The nearest BSAL is located approximately 13 km northwest of the Project Area. Given the lack of presence of BSAL across or immediately surrounding the Project Area, a BSAL assessment was not required to be conducted.
- A LUCRA was prepared in accordance with the *Land Use Conflict Risk Assessment Guide* fact sheet provided by the NSW Government (DPI, 2011). The LUCRA is provided in Appendix 1 of the Soil and Agriculture Assessment, included in **Appendix 10** of this EIS.
- Based on the findings of the soil survey, a 'Level 3 Detailed' Agriculture Assessment was conducted in accordance with the Solar Guidelines.
- Consultation with landholders were undertaken as part of the LUCRA. In addition, a meeting was held with the Department of Primary Industry (DPI) – Agriculture on 1 August 2023 to introduce the Project and present the draft outcomes of the assessments.

6.7.3 Results

6.7.3.1 Soil Mapping Units

The soil survey found the Project Area to contain three dominant soil mapping units, as shown on **Figure 6.7** and presented in **Table 6.13**.

Table 6.13 Dominant Soil Units

Soil Unit	Soil Type	Coverage within Project Area	Characteristics
1	Sodosols	570 ha Occurs along lower, mid and upper slopes and crests	Characterised by loam, loamy sand and sandy loam topsoils with weak to moderate structure overlying sodic clay subsoils with moderate to strong structure. pH ranges from moderately acidic in the topsoil to moderately alkaline, usually trending with depth. These soils are largely non saline with some exceptions of slightly to moderately saline topsoils and subsoils respectively. Soil profile drainage ranges from poor to moderate and depth ranges from shallow on crests and upper slopes to deep on mid and lower slopes. The sodic nature of this unit presents an increased management risk.
2	Chromosols	87 ha Occurs in close association with Soil Unit 1; Sodosols, occupying mid and upper sloped areas	Characterised by loam, loamy sand and sandy loam topsoils with weak to moderate structure overlying silty clay, medium clay and heavy clay subsoils with moderate to strong structure. pH ranges from moderately acidic in the topsoil to neutral of moderately acidic at depth. These soils are consistently non-saline and generally non-sodic. Soil profile drainage ranges from poor to moderate and depth is deep.
3	Dermosols	45 ha Occurs along drainage flats	Characterised by silty loam and loam topsoils with moderate structure overlying silty clay loam, loam and sandy loam subsoils with moderate to weak structure. pH ranges from moderately acidic in the topsoil to strongly alkaline at depth. These soils are consistently saline at depth and sodic. Soil profiles are poor to well drained, and depth is anticipated to be very deep.

6.7.3.2 Soil Erodibility

The soil survey determined that there is a minimal erosion and sedimentation risk associated with the topsoils currently present in the Project Area with evidence of minor sheet erosion and minor gully erosion associated with surface disturbance. However, results of soil testing indicate there is moderate to very high potential risk for dispersion of the subsoils for Sodosols, and moderate to high potential risk for dispersion of the subsoils for Dermosols, as well as high levels of sodicity primarily in the clay subsoils associated with Sodosols and Chromosols.

Chromosols present a negligible to moderate potential dispersion risk and is generally non-sodic. However, caution must be taken over the entire Project Area (including areas containing Chromosols) despite the range in chemical and physical properties or landscape location of specific soil test sites.

While sodic soils are generally dispersive, it is important to acknowledge that not all sodic soils disperse, and that not all dispersive soils are sodic. Given the ranges in salinity of the soils tested within the Project Area, all sodic soils should be considered dispersive.

6.7.3.3 Acid Sulfate Soils

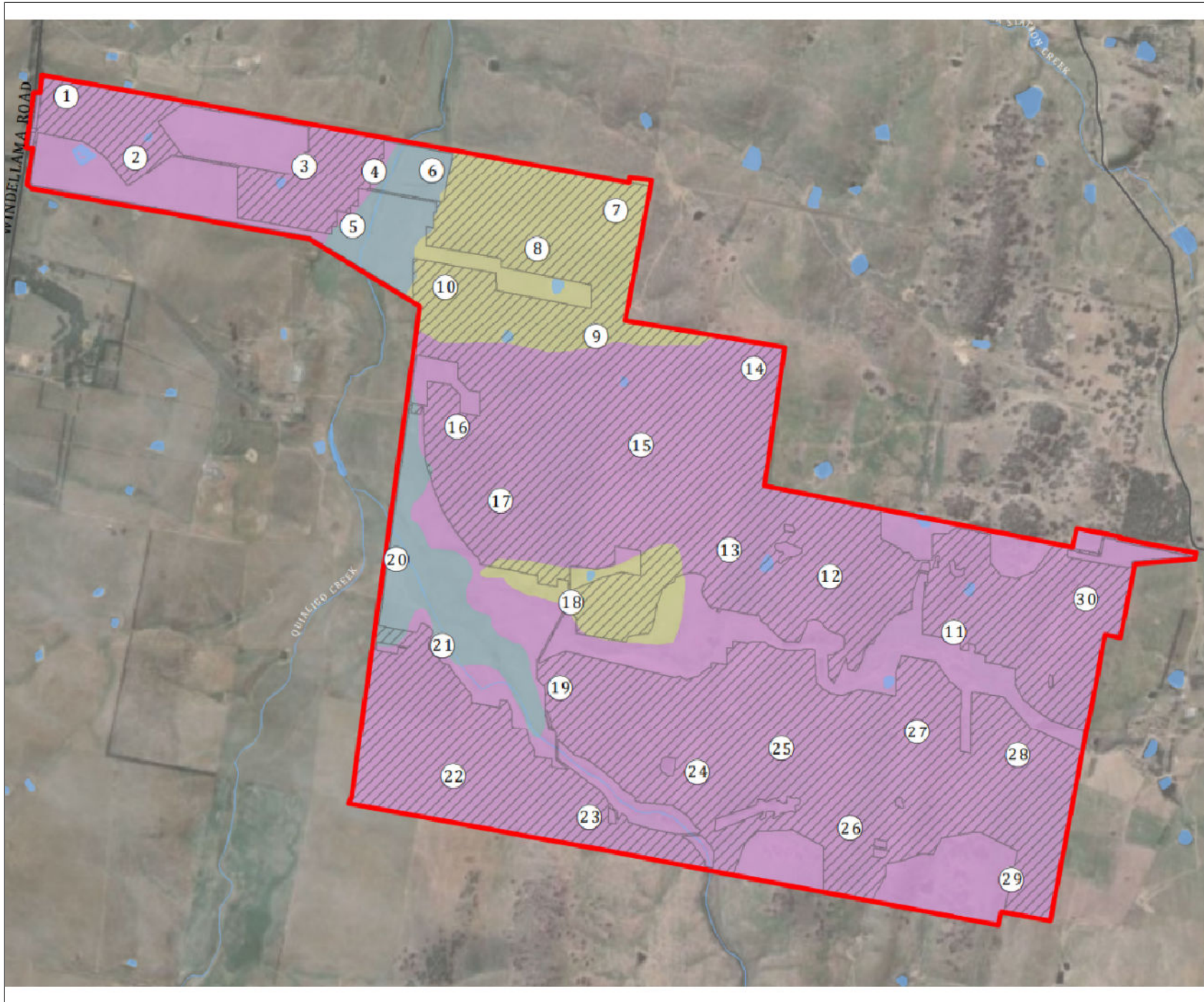
The Project Area is not mapped as containing any acid sulfate soil (ASS). Additionally, when considering the land elevation within the Project Area and distance from the coastline, the potential for ASS is considered a very low risk.

Further, there was no evidence of ASS indicators such as soil gleying, odour, marine sediments and organic materials recorded as part of the soil surveys undertaken for the Project.

FIGURE 6.7

Soil Sampling Locations and Soil Mapping Units

- Legend**
- Site Boundary
 - Development Footprint
 - Water Features
 - Soil Assessment Locations
- Soil Mapping Units**
- Soil Unit 1 - Sodosols
 - Soil Unit 2 - Chromosols
 - Soil Unit 3 - Dermosols



0 500 1,000
Metres

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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6.7.3.4 Land and Soil Capability

The LSC verification assessment outcomes for the soil profiles assessed is presented in **Table 6.14**, with the spatial extent of each LSC class illustrated on **Figure 6.8**.

Table 6.14 Land and Soil Capability

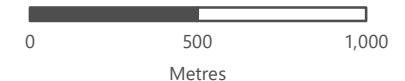
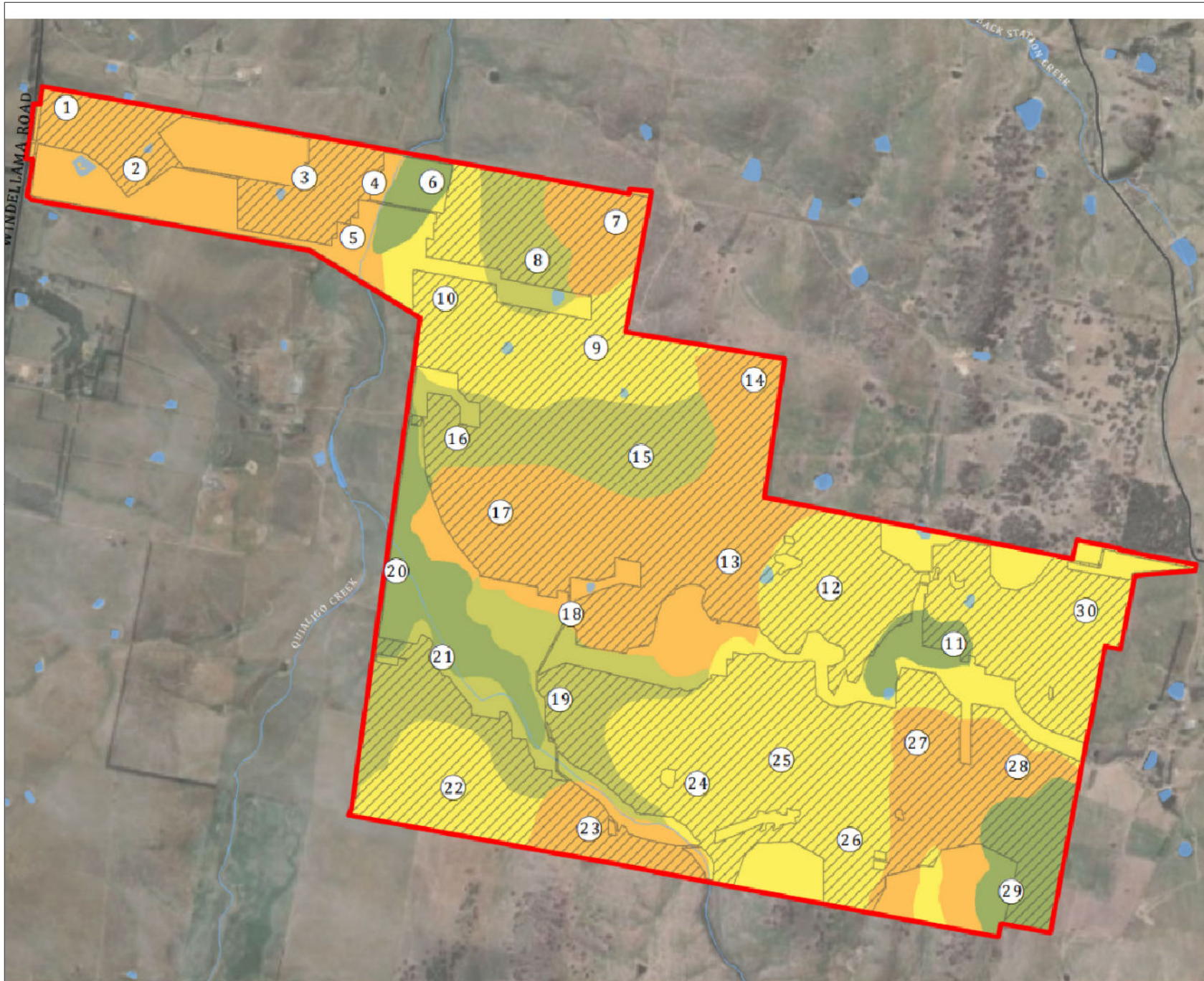
LSC Class	Coverage within Project Area	Description
Class 3	63 ha	Moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation. The key limitations of this class within the Project Area include water erosion, wind erosion, soil structure decline, soil acidity and soil salinity.
Class 4	114 ha	Moderate to high limitations for high-impact land uses that will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology. The key limitation of this class within the Project Area is wind erosion.
Class 5	277 ha	High limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation. The key limitations of this class within the Project Area are water erosion, wind erosion and acidity.
Class 6	248 ha	Associated with Sodosol soils and has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation. The key limitations of this class within the Project Area include soil depth, water-logging and wind erosion.

FIGURE 6.8

Verified Land and Soil Capability

Legend

- Site Boundary
 - Development Footprint
 - Water Features
 - Soil Assessment Locations
- Verified Land and Soil Capability**
- LSC 3
 - LSC 4
 - LSC 5
 - LSC 6



Scale: 1:0 at A4
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6.7.4 Assessment of Impacts

6.7.4.1 Agricultural Land Use and Productivity Impacts

The Project proposes to lease approximately 702 ha of mostly poor to moderate agricultural land from the host landholder for approximately 40 years. During that period, the land use of the Project Area would change from agriculture to electricity generation.

As a result, the Project would have the following temporary impacts to agriculture for the life of the Project:

- Cessation of agricultural land use on 702 ha of land – this represents an estimated 0.6% of agricultural land within the LGA, measured against the LGA's total agricultural land use of 116,771 ha (refer to Section 2.4.1 of **Appendix 10**).
- Reduction of primary productivity within the Project Area of up to \$280,624 per year – this represents an estimated 0.6% of agricultural productivity with the LGA, measured against the LGA's total agricultural commodities gross value of \$51,097,547 (refer to Section 2.4.1 of **Appendix 10**).
- Potential diversification of the land use: the land could be used for both the solar farm and grazing.

Temporary impacts associated with the Project may be mitigated with the establishment of sheep grazing once construction has been completed. However, this is subject to further engagement with the landholder and/or regulatory authorities. Should sheep grazing be established on the Project Area, Lightsource bp will develop measures to manage the co-existence of farming activities and the operation of the Project. Accordingly, an OEMP and Sheep Grazing Vegetation Management Plan will be developed in consultation with the host landholder and DPI Agriculture.

The Project would not result in permanent changes to agricultural land use or productivity of the Project Area, as it is expected that the Project Area would be returned to agriculture following decommissioning (unless otherwise agreed with the landholder and/or regulatory authorities).

Based on the above, impacts to agricultural land use and productivity for the Project Area are therefore considered negligible.

Agricultural land use and productivity of land adjacent to the Project Area and in the broader Goulburn Mulwaree LGA will not be affected by the Project as the associated agricultural resources will not be impacted. Therefore, the Project will not negatively impact any existing agricultural enterprise outside of the Project Area.

6.7.4.2 Agriculture Support Services

The Project will have a negligible impact on local and regional agricultural services. Changes to the supply and viability of agricultural support services in Goulburn are driven by social and market trends far exceeding the scale of the minor reduction in agricultural land use and productivity as a result of the Project.

The reduction in livestock being sold will be a negligible impact on the South Eastern Livestock Exchange, as this reduction is estimated to represents <1% of all livestock sold.

6.7.4.3 Agricultural Resources

Soil

During the construction and decommissioning of the Project, the majority of soils would be subject to minor disturbance (due to vegetation removal and stockpiling of materials) with some areas having higher impact surface disturbance (due to excavation works).

Soil stripping and excavation works would be localised and limited to the Development Footprint. All soil to be disturbed will be stockpiled and re-used from where it was stripped to mitigate long term effects on soil resources during operation. This localised approach would further promote the reinstatement of the soil profile to its original condition.

During the operation of the Project, groundcover would be maintained to promote soil productivity and reduce the risk for soil compaction.

Impacts to soil resources will be managed and mitigated during all phases of the Project by the effective implementation of the CEMP and OEMP (including a Sheep Grazing Vegetation Management Plan if required) as further detailed in **Section 6.7.5** and **Appendix 10**. Accordingly, impacts to soil resources within the Project Area are expected to be minimal and temporary of nature.

There will be no direct or indirect impacts to the soil resources outside the Project Area.

Land and Soil Capability

Approximately 63 ha of the Project Area is verified as LSC Class 3 (refer to **Figure 6.8**), of which 21 ha falls within the Development Footprint, to be covered by solar panels. LSC class 3 is considered important agricultural land as per the LSSE Guidelines.

As described in earlier sections, construction activities would result in localised and sporadic landform modification, associated with minor soil stripping and leveling with limited excavation works. As a result, impacts on LSC are expected to be minor.

During decommissioning of the Project, the Development Footprint will be re-graded (where required), and any minor stockpiles of topsoil and subsoil will be respread over disturbed areas and rehabilitated with either native vegetation or improved pastures (depending on the intended final land use). This strategy, along with good soil management practices as outlined in **Section 6.7.5** and **Appendix 10**, will facilitate the rehabilitation in returning the land to an equivalent LSC class.

Therefore, it is anticipated there will be no permanent impacts on LSC classes within the Project Area as a result of the Project.

Water

The risk of groundwater impacts during construction of the Project is expected to be low, as site levelling will likely require excavation of no more than 0.40 m–0.60 m, and trenches for underground cables are expected to be no greater than 1.0 m to 1.2 m deep. There are no anticipated impacts on groundwater anticipated and any risks to water quality are expected to be readily manageable.

Water use during the construction and operation of the Project will be minimal and water will be brought to site by tanker as required. As such, the current surface and groundwater resources used by local landholders are not anticipated to be impacted by the Project.

Therefore, there is anticipated to be no impact on agricultural water resources within the Project Area or the broader locality.

Water impacts are further discussed in **Section 6.12**.

6.7.4.4 Erosion and Sedimentation

Due to the widespread presence of sodic and dispersive soils within the Project Area, the risk of erosion on site due to construction activities is considered high. Excavation of soils would be localised and limited where possible. Excavated soils would be stockpiled and contained to avoid potential dispersion and sediment transfer. Disturbance to ground cover would be limited where possible. Maintenance of ground cover will also aid in the prevention of topsoil losses from erosive forces (primarily water and wind).

All construction and decommissioning activities for the Project will be undertaken in accordance with an Erosion and Sediment Control Plan (ESCP) as detailed in **Section 6.7.5** and **Appendix 10**. Post approval, a CEMP will be prepared by Lightsource bp that identifies erosion and sediment control mitigation measures prior to works commencing.

Similarly, the operation and decommissioning of the Project would be in accordance with an OEMP or DRMP that will detail measures to limit erosion during the operation of the Project.

6.7.4.5 Agricultural Infrastructure

As further discussed in **Section 6.11**, the Project will have manageable impacts on the local and regional road network that connects the agricultural industry to markets, services and suppliers. Furthermore, where possible, stock fences, dams and access tracks will be retained to be able to accommodate grazing subject to further consultation with the landholder and regulators. Internal access tracks throughout the Project will benefit post-Project agricultural land uses and is considered a positive impact.

Overall, it is considered that that the Project would have a negligible impact on local and regional agricultural infrastructure.

6.7.4.6 Weeds, Pests and Farm Biosecurity

With appropriate mitigation measures in place, there is low potential for weeds and invasive pests to spread or impact neighbouring land. As detailed in **Section 6.7.5**, Lightsource bp will prepare and implement an OEMP, which would outline appropriate measures to manage weeds, pests and farm biosecurity.

6.7.4.7 Compatibility with Existing Land Uses

A LUCRA has been prepared for the Project to identify and assess the potential for land use conflicts with neighbouring land uses and to identify suitable management measures to minimise any potential impacts (refer to **Appendix 10**). The LUCRA considered a total of 41 risk items, with 36 of those risk items identified as minor once mitigation measures and controls were implemented. No high risk potential conflicts were identified, however seven (7) moderate potential for land use conflicts were identified and can be managed effectively through mitigation and management measures. In conclusion, the Project is considered to be compatible to coexist with the existing land uses within and surrounding the Project Area which are primarily agriculture.

A summary of the key findings in relation to zoning provisions and potential for land use conflicts is provided below.

Zoning Provisions

As discussed in **Section 3.2**, the Project Area is wholly located within land zoned as RU1 Primary Production (refer to **Figure 4.1**). Under the Goulburn Mulwaree LEP, '*electricity generating works*' are not listed as prohibited within the RU1 zoning and therefore, under the provisions of the LEP, the Project is permissible with consent. Consideration of the LEP zoning provisions applying to the land are discussed in **Appendix 5**. Furthermore, a discussion of relevant provisions under section 2.42 of the T&I SEPP are discussed in **Section 6.3**.

Land Use Conflict

Land use conflicts may arise as a result of the Project should adequate controls not be in place. A risk identification and ranking process has been undertaken as part of the LUCRA in accordance with *Land Use Conflict Risk Assessment Guide* (DPI, 2011) and presented in detail in **Appendix 10**.

Key risks identified during this process include noise generation, dust generation, erosion control and sediment runoff, increased traffic, impact on visual amenity and bushfire. These issues have been subject to assessment as part of the EIS and appropriate management and mitigation measures have been identified (refer to **Section 7.0** and **Appendix 2**). Lightsource bp has committed to implement these management and mitigation measures as part of the Project. With the implementation of these measures, the potential impact of the extended land use on the surrounding land and land users will be minimal. Additionally, once decommissioned, the Project Area will be remediated to enable agricultural production including cropping and grazing.

Other Land Use Conflicts

The SEARs require an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including flood prone land, Crown land, mining, quarries, mineral or petroleum rights. These are addressed in this section.

Flood Prone Land

The Project Area is not identified as flood prone land under the Goulburn Mulwaree LEP. Based on the outcomes of flood modelling, the Project is predicted to result in minor impacts on flooding, including flow rates, velocities and depths under both the existing and climate change conditions modelled (refer to **Section 6.12.3.3** for further details on flooding impacts).

Crown Land

There is a paper road owned by Crown Land along the northern boundary (outside) of the Project Area as shown in **Figure 2.3**. The Project Area boundary and Project layout has been designed to avoid the paper road. No Project infrastructure will therefore be located within Crown Land, and the Project Area does not traverse Crown Land.

Mining, Quarries, Mineral or Petroleum Rights

No part of the Project Area is subject to a mineral exploration licence, mining or production lease.

6.7.4.8 Compatibility with Future Residential Land Use on Surrounding Land

As discussed in **Section 2.5.2**, there is an approved rural residential subdivision (named 'Rosedale subdivision') directly south of the Project Area. Residences to potentially be developed as part of the Rosedale subdivision has been identified as potential future residences. These are identified as FR1 to FR21 as shown on **Figure 2.4**. As there is an existing residence on one of the subdivision lots (Lot 19), this has been identified as an existing residence (R1).

Impacts to the potential future residential land use of the Rosedale subdivision lots have been considered in the LVIA and NVIA as further discussed in **Section 6.8** and **Section 6.10** respectively. A summary of the findings of these assessments are provided below.

Visual Impacts

Three representative viewpoints within the Rosedale subdivision with the potential to be mostly impacted were identified (i.e. FR Rosedale A, FR Rosedale B and FR Rosedale C) and included in the detailed assessment phase of the LVIA. Based on the results of the LVIA, all three viewpoints have been identified to have a very low to low visual impact rating.

Noise Impacts

Potential operational noise impacts are however predicted for two potential future residences, being FR7 (on Lot 7) and F12 (on Lot 12) as illustrated on **Figure 6.16**. These exceedances are predicted only for the decentralised BESS option and/or combined BESS option.

Other environmental and planning related site constraints are applicable to Lot 7 and Lot 12, that have been identified based on the stamped plans for DA/0568/2004 and section 5.3 of the Goulburn Mulwaree Development Control Plan 2009. These are illustrated on **Figure 6.9** and include:

- 40 m buffer zones around creek lines traversing Lot 7 and Lot 12.
- 20 m wide right of carriageway along the southern boundary of Lot 7 and Lot 12 to provide access to Lot 6 and Lot 13 respectively.
- Salinity rehabilitation area located predominantly on Lot 12 with a small area over Lot 7.

Considering these constraints, the developable areas outside the 35 dB(A) contour for Lot 7 and Lot 12 would be in the order of 11 ha and 7.5 ha respectively. Alternative siting options would therefore be available should the landholder proceed with the subdivision development and wish to locate the residences outside the 35 dB(A) contour. In light of this, no mitigation is proposed for FR7 and FR12 at this stage. However, should the landholder's existing entitlements be affected by the operational noise from the Project, they may be eligible in the future for mitigation should the subdivision proceed, and residences be developed within the 35 dB(A) contour, subject to verification monitoring to confirm noise impacts. Furthermore, should only the centralised BESS option be developed, no operational noise exceedances are predicted to be experienced at any of the Rosedale future receivers based on the assumed locations as assessed in the NVIA. Lightsource bp has consulted with the landholder regarding the predicted operational noise impacts for Lot 7 and Lot 12.

Uncertainty of Operational Noise Impacts

As discussed in **Section 2.5.2**, it is understood that while DA/0568/2004 has been physically commenced, and therefore will not lapse, the subdivision has not been registered and the engineering works necessary to enable registration, including construction of a new public road, rights of way and access points, have not been substantially progressed. It is noted that before development consent could be granted for any potential future dwellings on the lots, the proponent would need to:

- Demonstrate to Goulburn Mulwaree Council that all relevant conditions of consent have been satisfied. These conditions cover a range of matters, including construction of access, provision of electricity supply, fencing of no-go areas (including salinity rehabilitation areas, riparian areas and remnant vegetation areas).
- Register a plan of subdivision.

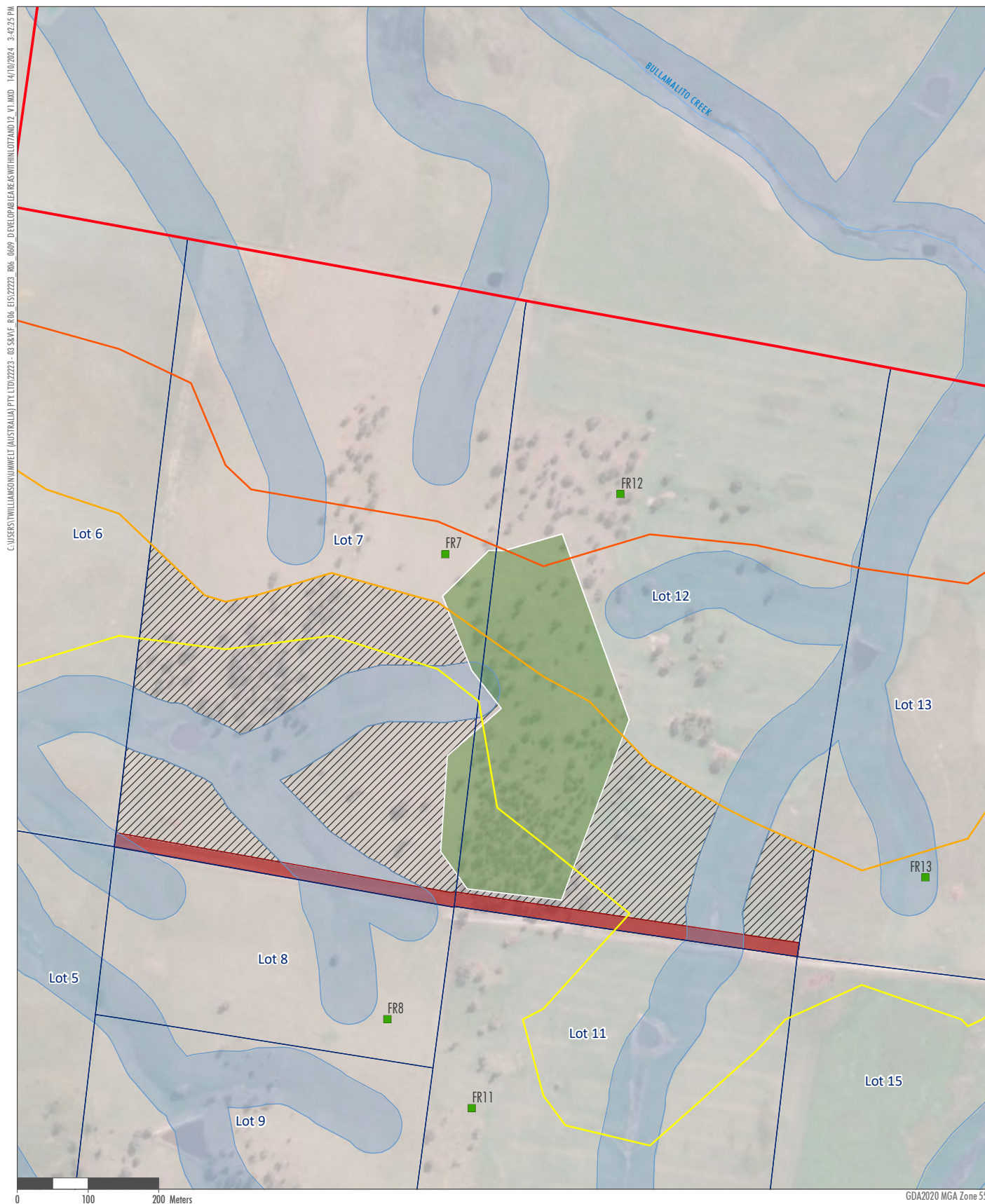
Therefore, in regard to the assessment of operational noise impacts to the Rosedale subdivision, there are a number of uncertainties:

- It is uncertain whether the subdivision will be registered in future.
- The timing of the potential development of the subdivision is unknown.
- The final placement of the dwellings are unknown and will be subject to a separate local DA process, should the subdivision be finalised.
- The final BESS configuration to be developed for the Project is not known at the moment. As no operational noise exceedances are predicted at any Rosedale future receivers with the centralised BESS option, it may be that operational noise impacts would no longer be an issue regardless of the final location of the residences (should they be developed in future).

Proposed Measures Dealing with Uncertainty of Operational Noise Impacts

As discussed earlier, alternative siting options would be available should the landholder proceed with the subdivision development and wish to locate the residences outside the 35 dB(A) contour. Verification monitoring is recommended to confirm operational noise impacts on Lot 7 and Lot 12 should the subdivision proceed.

Should the landholder's existing entitlements be affected by the operational noise from the Project, they may be eligible in the future for mitigation should noise impacts be experienced.



Legend

- Project Area
- Lot
- Rosedale Subdivision
- Watercourses
- Potential Future Residences (Rosedale Subdivision)
- Operational Noise Levels
- 30 dB(A)
- 35 dB(A)
- 40 dB(A)
- Developable Areas
- Environmental / Planning Constraints
- Right of Carriageway
- Salinity Rehabilitation Area
- Creek Buffers (40m either side)

FIGURE 6.9

Developable Areas within Lot 7 and Lot 12

6.7.5 Management and Mitigation Measures

The following management and mitigation measures will be implemented to address key land use issues associated with the Project:

- A CEMP will be prepared by Lightsource bp that identifies erosion and sediment control measures prior to works commencing.
- An ESCP will be developed as part of the CEMP, in accordance with the *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) (i.e. “The Blue Book”). The ESCP will be implemented, and particular consideration of the dispersive soils identified within the Project Area will be considered.
- An OEMP will incorporate a Sheep Grazing Vegetation Management Plan (SGVMP) (if required) that will outline measures for solar grazing in line with the Agrisolar Guide (CEC, 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 by the farmer.
- The OEMP will be developed in consultation with the host landholder and DPI Agriculture and will be implemented post construction.
- 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.
- 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
 - limit vehicle access to the established internal road network.

6.8 Visual Amenity

Visual impacts were raised as a key concern during the stakeholder engagement program, as outlined in **Section 5.3**. A proportion of the community feel strongly about how the visual landscape, its scenic qualities, amenity value, positively contributes to peoples’ lives. In particular, proximal landholders were concern about the change in sense of place due to loss of visual amenity as a result of industrialisation of the landscape. Some community members were also concerned that the Project would detract from tourism and may impact on the views from Goulburn as a regional city, while others felt that seeing the Project could be an attraction.

Throughout the detailed assessment phase, Lightsource bp has sought to avoid and minimise potential visual impacts to nearby residences through Project redesign and layout refinements.

Specifically, the Project has been designed as follow to avoid and minimise visual impacts to the nearby residences:

- removal of approximately 50 ha of solar arrays in the north-west corner of the Project Area
- relocation of the centralised BESS approximately 1.2 km to the east, away from sensitive receivers on the north-west
- removal of 20 decentralised BESS units located nearest to sensitive receivers
- strategically located landscape screening in consultation with neighbouring landholders and Goulburn Mulwaree Council.

A Landscape and Visual Impact Assessment (LVIA) was prepared by Envisage Consulting Pty Ltd (2024) to provide detailed landscape character and visual impact assessments. The LVIA is provided in full in **Appendix 11** and addresses the requirements of the SEARs with respect to landscape and visual impacts, as listed below:

- a landscape and visual impact assessment, prepared in accordance with the Solar Guidelines and the *Technical Supplement – Landscape and Visual Impact Assessment* (the *Technical Supplement*) (DPE, 2022g)
- a detailed assessment of the likely visual impacts (including night lighting) of all components of the Project on surrounding residences (including approved developments, lodged development applications and dwelling entitlements), and key locations, Goulburn Airport operations, scenic or significant vistas and road corridors in the public domain
- and details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners).

6.8.1 Existing Environment

The Project is situated in the Gundary Plains, a landscape characterised by undulating, cultivated, agricultural pastures with the neighbouring rugged, densely forested Towrang Ranges to the east. The landscape comprises agricultural activities associated with rural residential properties, homesteads set back from local roads on large lots with vegetated wind breaks (commonly pines) along fence lines, local roads, some linear infrastructure (transmission towers/lines), and distant views of vegetated slopes and ridgelines.

The varying terrain comprises undulating, rolling hills and ranges in elevation from approximately 646 m to 714 m above sea level (a range of 66 metres). Cleared, elevated hills in some places provide 360-degree distant views. Steeper slopes are covered in stands of native trees with individual trees scattered across open paddocks.

6.8.2 Methodology

In accordance with the Solar Guideline and Technical Supplement, the LVIA includes two components:

- **Landscape character assessment:** to understand the sensitivities of the landscape and to help determine the overall impact of the project on an area's character and sense of place, including what the community think and feel about it.
- **Visual impact assessment:** to understand the likely impacts of the project on people's viewpoints within the private and public domain.

Both assessments require evaluation of an area's 'sensitivity' (that is, how sensitive the existing area, or view, is to change) and the 'magnitude of change' a project would have on an area (that is, its physical scale, how distant it is, and its contrast within the existing landscape or view).

A detailed description of the LVIA methodology is provided in Section 2 of the LVIA (**Appendix 11** of this EIS) with a summary of the key aspects outlined below.

6.8.2.1 Landscape Character Assessment

The first stage of the assessment is baseline analysis of the existing landscape character and its sensitivity. The baseline identifies and describes the physical landscape and key attributes and identified landscape values for the community (including the indigenous community), local council and affected landholders.

The study area for the landscape character assessment is 5 km from the Project Area. If the landscape includes distinct character areas with different qualities, the study area can be divided into different character zones.

The scenic quality of the landscape is also classified. The final stage determines the impact of the proposal on each landscape character zone, by evaluating the sensitivity of the landscape and the magnitude of the project's effects in that area. Sensitivity and magnitude are assigned a rating (low, moderate or high).

6.8.2.2 Visual Impact Assessment

The process for visual impact assessment is broken into two phases:

- A preliminary assessment (part of the Scoping Report)– to identify viewpoints requiring a detailed assessment.
- The detailed assessment (part of the EIS).

Preliminary Assessment

The Technical Supplement's steps to be undertaken for the preliminary assessment are:

1. to identify viewpoints from public roads and rail lines within 2.5 km of the Project
2. to identify other public and private viewpoints within 4 km of the Project
3. to measure the distance from the viewpoints to the nearest Project infrastructure
4. to determine the 'relative height difference' between the Project and each viewpoint

5. to plot the 'vertical field of view' for each viewpoint
6. to measure the 'horizontal field of view' of the Development Footprint at each viewpoint
7. to determine whether detailed assessment is required using the Technical Supplement matrix.

Detailed Assessment

A detailed assessment is undertaken for viewpoints identified in the preliminary assessment. The detailed assessment involves the following stages:

- **Stage 1:** the identified viewpoints are refined by determining whether there is a direct line-of-sight to the Project. Those viewpoints without a line-of-sight do not require further assessment. Those with a line-of-sight are classified to determine whether the view is primary or secondary. In compliance with the Technical Supplement, for residential viewpoints, the assessment must focus only on views from the residence and not from the property boundary or other parts of the property. The view toward the Project from each residence is to be categorised as either the primary viewpoint or secondary viewpoint, with primary considered more important.
- **Stage 2:** The visual magnitude of the Project is then determined by calculating the volume of the horizontal and vertical fields of view occupied by the Project from each viewpoint. This is done by producing a 180-degree photomontage of the view, for those viewpoints where access is possible. For viewpoints where access is not possible, a detailed bare earth render is produced that represents the worst-case visibility of the Project. It is noted that the photomontage or bare earth render is for analytical purposes only and not representative of what a viewer would see as it shows a far wider and visually distorted view. The Technical Supplement's Visual Magnitude Grid Tool is then overlain on each 180-degree panoramic image and the occupied cells are counted. The rating of magnitude is determined by the number of occupied cells.
- **Stage 3:** The visual sensitivity of each viewpoint is then rated (from very low, low, moderate, or high) and combined with the assigned scenic quality category of the area in view.
- **Stage 4:** the overall visual impact of each viewpoint is determined by combining the identified visual magnitude and visual sensitivity.
- **Stage 5:** For viewpoints with a moderate or high rating, it is mandatory to investigate mitigation options to reduce impact.

6.8.2.3 Site Inspection

Site investigations were undertaken in March and November 2022, May and November 2023 and March 2024. In accordance with the Technical Supplement, all reasonable efforts were made to access each private viewpoint identified, and to take panoramic photographs. Where access to private viewpoints were available, photographs were obtained from those viewpoints during the site investigations and photomontages were prepared to comply with the requirements in the Technical Supplement.

6.8.2.4 Consultation

The Technical Supplement notes that community engagement is required to identify and establish the importance of relevant landscape values and characteristics.

The LVIA was informed by community consultation undertaken during the preparation of the Social Impact Assessment (refer to **Section 5.1.2** and **Appendix 18**), as per the approaches and objectives outlined in the Engagement Guidelines. Envisage Consulting informed the development of consultation material, attended a number of meetings with community members and attended the community information sessions.

6.8.2.5 Photography

Unless otherwise noted, all photographs were taken in landscape format using a full frame sensor digital camera with a fixed 50 mm lens and GPS positioning. The 50 mm lens is regarded as being the closest to human eyesight, although it does not illustrate wider (unfocussed) peripheral vision, in accordance with the Technical Supplement.

6.8.2.6 Photomontage

Photomontages illustrate the predicted view of the Project at a momentary point in time. Photomontages, modelled views and spatial views were independently prepared by Cambium Group and comply with the requirements prescribed in the Technical Supplement and are found in Appendix E of the LVIA (**Appendix 11** of this EIS).

To produce the photomontages, photographs were merged and cropped to achieve a 180-degree horizontal field panoramic image, with a 27-degree vertical field of view. A 3D digital elevation model and master 3D Project model (including all elements of the Project) was then overlaid (and calibrated to the 180-degree panoramic image), then proposed materials and finishes were applied to the master 3D project model.

Refer to Appendix E of the LVIA (**Appendix 11** of this EIS) for a detailed methodology of the photomontage development.

6.8.2.7 Bare Earth Render

Bare earth renders are used to determine the visual impact rating in accordance with the Solar Guideline for those private viewpoints unable to be accessed (for example, if the property owner denied access). A detailed bare earth render was produced that represented the worst-case visibility of the Project for 15 existing receivers where properties were not able to be accessed and for all potential future receivers (whose location is speculative).

The image simulates the 180-degree view from the viewpoint and does not consider existing vegetation or other mitigating factors that may filter or screen views and therefore represents a worst case visual scenario of the magnitude of the Project in view. Bare earth renders were independently prepared by Cambium Group and comply with the requirements prescribed in the Technical Supplement and are found in Appendix E of the LVIA (**Appendix 11** of this EIS).

6.8.3 Results

6.8.3.1 Preliminary Assessment

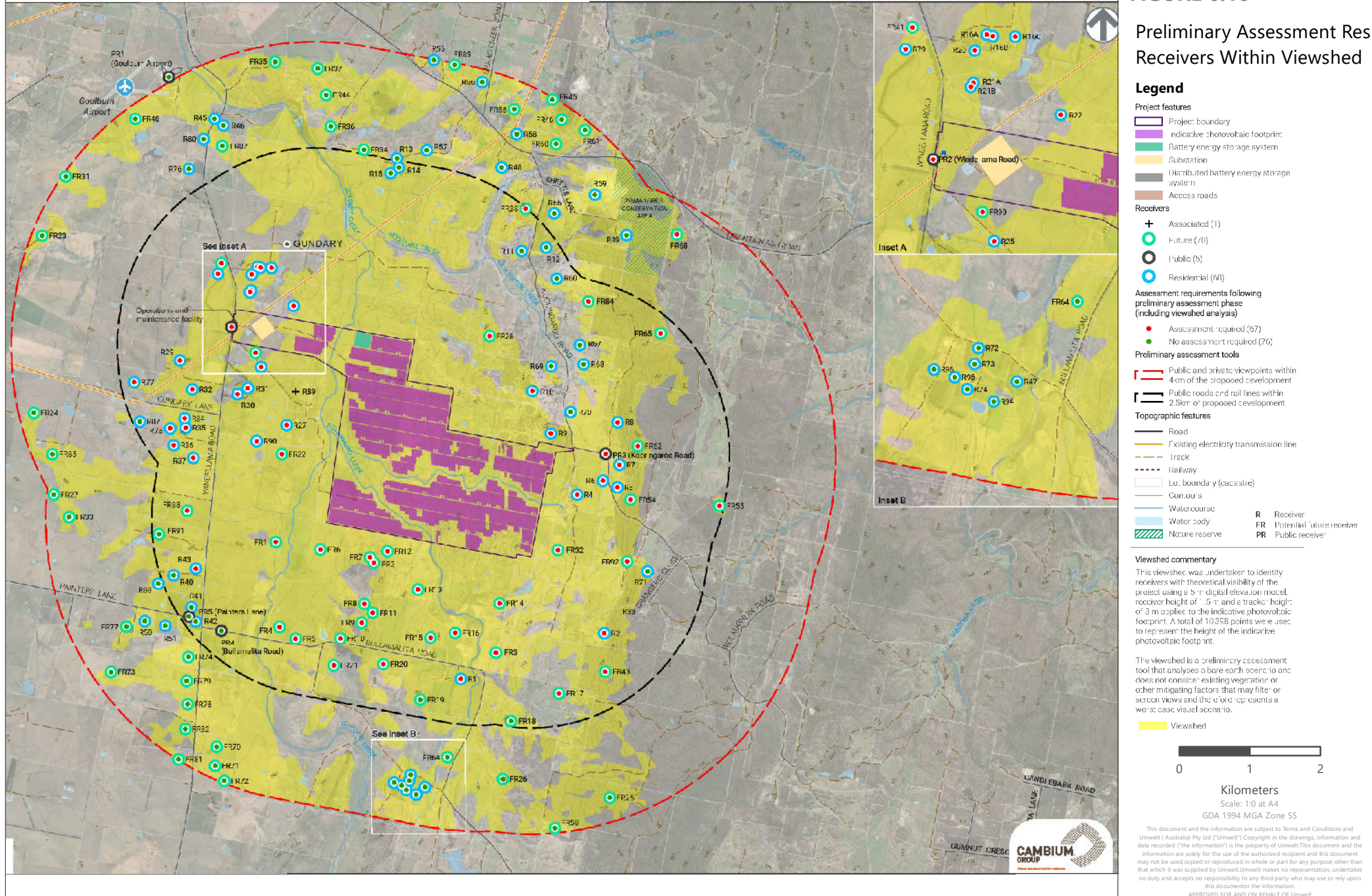
The results of the preliminary assessment determined that 67 receivers would require detailed assessment (refer to **Figure 6.10**).

These were:

- 33 existing receivers, comprising:
 - Two (2) public roads: Windellama Road (PR2) and Koorringaroo Road (PR3).
 - 31 private residences (R1, R2, R4, R5, R6, R7, R8, R9, R10, R16A, R16B, R16C, R20, R21A, R21B, R22, R25, R27, R29, R30, R31, R32, R34, R35, R36, R37, R43, R77, R78, R79, R90).
- 34 potential future receivers, comprising:
 - 19 potential future dwelling locations within Rosedale subdivision.
 - 15 potential future dwellings within dwelling entitlements (FR22, FR28, FR32, FR38, FR41, FR43, FR54, FR55, FR62, FR65, FR68, FR84, FR88, FR90 and FR92).

These viewpoints were refined and classified as detailed in **Section 6.8.3.2**.

FIGURE 6.10
Preliminary Assessment Results
Receivers Within Viewshed



6.8.3.2 Detailed Assessment

Stage 1: Refine and Classify Viewpoints

Following the Stage 1 investigations, receivers requiring detailed assessment comprised:

- 34 existing receivers – that is, three (3) public receiver (PR) viewpoints and 31 private residences (R).
- 18 potential future receivers (FR) – that is, three (3) viewpoints representative of the 22-lot Rosedale subdivision, and 15 dwelling entitlement lots.

In compliance with the Technical Supplement, residential viewpoints were further categorised as either a primary viewpoint or secondary viewpoint, depending on the direction of the receiver's view toward the Project. Of the 31 residential viewpoints, 20 were classified as primary viewpoints and the remainder 11 were classified as secondary viewpoints. For further detail regarding the classification of the viewpoints, refer to Section 6.1.2 of the LVIA in **Appendix 11**.

Stage 2: Determine Visual Magnitude (of Change of View)

For the public viewpoints at Windellama Road (PR2) and Kooringaroo Road (PR3), a panoramic photograph and 3D model overlay of the Project was produced. Two representative viewpoints have been selected for Windellama Road, comprising:

- PR2a – adjacent and north-west of the Project, representing views of road users travelling south on Windellama Road.
- PR2b – adjacent and south-west of the Project, representing views of road users travelling north on Windellama Road.

For private properties unable to be accessed (for example, if the property owner denied access), a bare earth render was modelled based on the topography and an outline (wireframe) of the Project was overlain to the image. These images represent a 'worst-case scenario' of the magnitude of the Project in view. Based on these modelled views the number of cells in each was identified and counted, which was then compared to the visual magnitude thresholds. The resulting magnitude is shown in **Table 6.15** below.

Stage 3: Determine Visual Sensitivity

The sensitivity and scenic quality were combined to provide the visual sensitivity ratings of each viewpoint in accordance with the Technical Supplement. The resulting ratings are summarised in **Table 6.15** below.

Access was not available for 15 private viewpoints (R1, R2, R4, R5, R6, R8, R20, R30, R35, R36, R37, R77, R78, R79 and R90). As such scenic quality was determined based on site inspections to nearby properties, aerial photography and the classification for residential zoning.

Stage 4: Visual Impact

The overall impact rating is determined by combining the visual magnitude rating with the visual sensitivity rating, this is shown in **Table 6.15**. Viewpoints with a moderate, or higher impact are assessed against performance objectives.

Table 6.15 Summary Results of Detailed Visual Assessment

Receiver Type	Receiver number	Visual Magnitude Rating	Visual Sensitivity Rating	Visual Impact Rating	Visual Mitigation required?
Public receiver	PR2a	Low	Low	Low	No
Public receiver	PR2b	Very low	Low	Very low	No
Public receiver	PR3	Very low	Very low	Very low	No
Private receiver	R1	Very low	Low	Very low	No
Private receiver	R2	Very low	Moderate	Low	No
Private receiver	R4	Low	Low	Low	No
Private receiver	R5	Very low	Moderate	Low	No
Private receiver	R6	Low	Low	Low	No
Private receiver	R7	Very low	Moderate	Low	No
Private receiver	R8	Very low	Moderate	Low	No
Private receiver	R9	Very low	Moderate	Low	No
Private receiver	R10	Very low	Low	Very low	No
Private receiver	R16A	Nil	Low	Very low	No
Private receiver	R16B	Very low	Moderate	Low	No
Private receiver	R16C	Very low	Moderate	Low	No
Private receiver	R20	Low	Moderate	Low	No
Private receiver	R21A	Nil	Moderate	Very low	No
Private receiver	R21B	Very low	Moderate	Low	No
Private receiver	R22	Very low	Moderate	Low	No
Private receiver	R25	Low	Moderate	Low	No
Private receiver	R27	Moderate	Moderate	Moderate	Yes, refer to Section 6.8.5
Private receiver	R29	Very low	Low	Very low	No
Private receiver	R30	Moderate	Low	Low	No
Private receiver	R31	Very low	Moderate	Low	No
Private receiver	R32	Nil	Moderate	Very low	No
Private receiver	R34	Nil	Low	Very low	No
Private receiver	R35	Low	Moderate	Low	No
Private receiver	R36	Low	Moderate	Low	No
Private receiver	R37	Low	Moderate	Low	No
Private receiver	R43	Very low	Moderate	Low	No
Private receiver	R77	Very low	Moderate	Low	No
Private receiver	R78	Low	Low	Low	No
Private receiver	R79	Very low	Low	Very low	No
Private receiver	R90	Low	Low	Low	No
Representative potential future receiver	FR Rosedale A	Low	Very low	Very low	No

Receiver Type	Receiver number	Visual Magnitude Rating	Visual Sensitivity Rating	Visual Impact Rating	Visual Mitigation required?
Representative potential future receiver	FR Rosedale B	Moderate	Very low	Low	No
Representative potential future receiver	FR Rosedale C	Very low	Very low	Very low	No
Potential future receiver	FR22	Moderate	Very low	Low	No
Potential future receiver	FR28	Low	Very low	Very low	No
Potential future receiver	FR32	Moderate	Very low	Low	No
Potential future receiver	FR38	Very low	Very low	Very low	No
Potential future receiver	FR41	Nil	Very low	Very low	No
Potential future receiver	FR43	Very low	Very low	Very low	No
Potential future receiver	FR54	Low	Very low	Very low	No
Potential future receiver	FR55	Very low	Very low	Very low	No
Potential future receiver	FR62	Low	Very low	Very low	No
Potential future receiver	FR65	Low	Very low	Very low	No
Potential future receiver	FR68	Very low	Very low	Very low	No
Potential future receiver	FR84	Nil	Very low	Very low	No
Potential future receiver	FR88	Very low	Very low	Very low	No
Potential future receiver	FR90	Moderate	Very low	Low	No
Potential future receiver	FR 92	Very low	Very low	Very low	No

From the above table, visual impacts relating to the Project are as follows:

- one private receiver (R27) would have a Moderate visual impact rating
- 27 receivers would have a Low visual impact rating
- 24 receivers would have a Very low visual impact rating.

Stage 5: Performance Objectives and Mitigation

One private receiver (R27) was the only viewpoint with a moderate visual impact and as such is the only viewpoint requiring the mandatory assessment against the 'performance objectives'. The performance objectives for a viewpoint with a moderate visual impact are:

- Visual impact mitigation is required in consultation with the affected landowner and should be proportional to the scale of impact.
- There is no expectation this mitigation should eliminate the view of the development entirely but must reduce the impact to an acceptable level.
- Appropriate mitigation options include vegetation screening or project landscaping to reduce impacts.
- If the available mitigation options would not be effective in reducing impacts or are unsuitable due to the nature of the impact (e.g., screening would result in the obstruction of views), then project redesign and/or neighbour agreement should be considered.

FIGURE 6.11

Detailed Assessment Results Visual Impacts Prior to Mitigation

Legend

Project features

- Project boundary
- Indicative photovoltaic footprint
- Battery energy storage system
- Substation
- Distributed battery energy storage system
- Access roads

Receiver type

- Future (15)
- Public (3)
- Residential (31)

Visual impact rating (prior to mitigation)

- Very low (24)
- Low (27)
- Moderate (1)

Preliminary assessment tools

- Public and private viewpoints within 4km of the proposed development
- Public roads and rail lines within 2.5km of proposed development

Topographic features

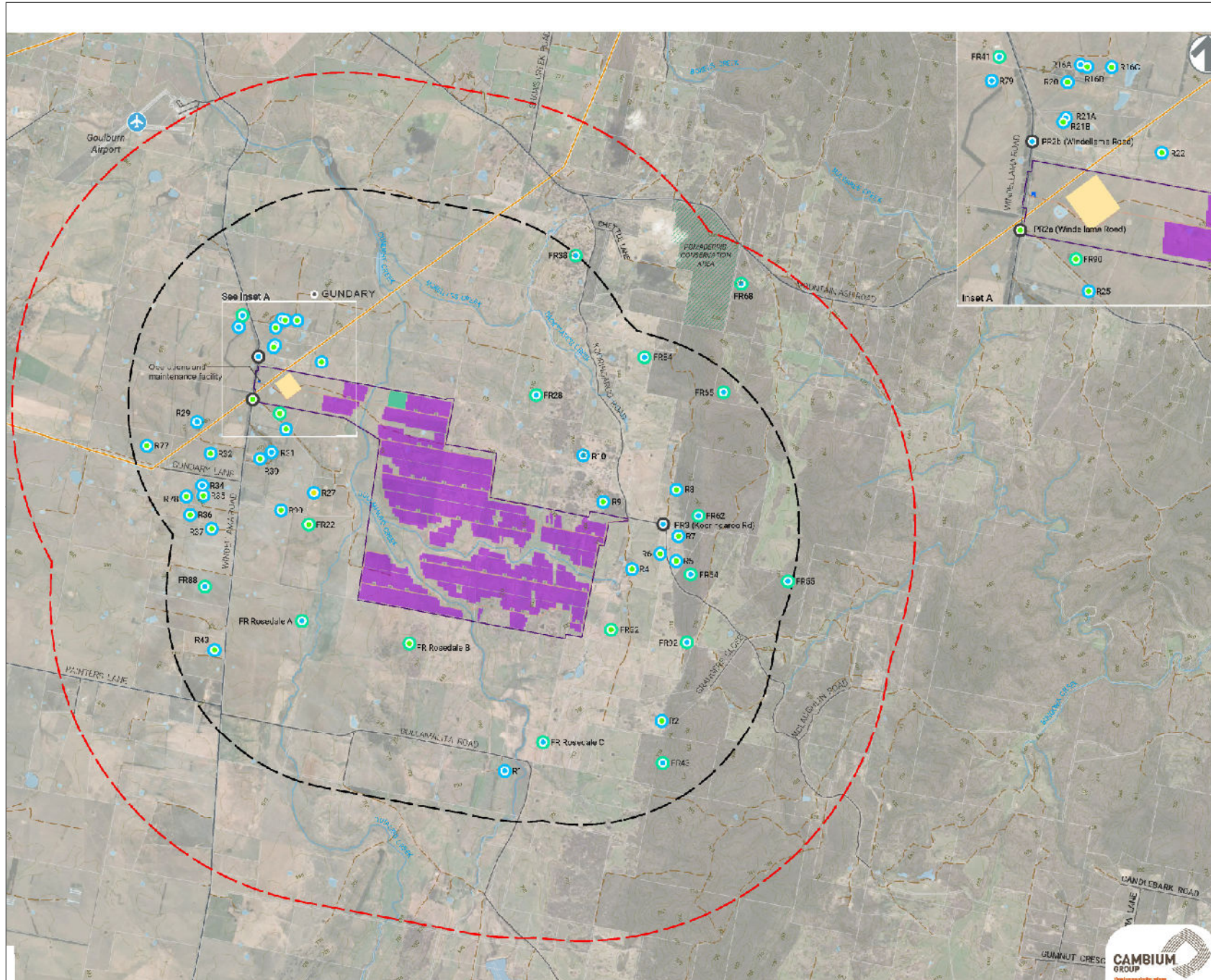
- Road
- Existing electricity transmission line
- Track
- Railway
- Lot boundary (cadastre)
- Contours
- Watercourse
- Water body
- Nature reserve
- R Receiver
- FR Potential future receiver
- PR Public receiver



Kilometers
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Visual Impact and Mitigation Consultation

Consultation with the affected landholder (R27) has been undertaken by Lightsource bp, as discussed in **Section 2.7.2** and **Section 5.1**. This included discussion of potential visual impact mitigation options (such as landscape planting within the property, and perimeter landscape screening within the Project Area closest to the property).

Whilst R27 is the only receiver required to be consulted in accordance with the Technical Supplement, Lightsource bp has consulted all other non-associated landholders within 1 km of the Project. Feedback from these landholders has informed development of the draft landscape plan, described in **Section 6.8.5**.

6.8.3.3 Landscape Character

A landscape character assessment was undertaken in accordance with the *Technical Supplement* as part of the LVIA to describe the physical landscape attributes and the general landscape values of the community. Within the landscape character assessment's study area of 5 km from the Project, two visually distinct landscape character zones were identified:

- the lower-elevated, cultivated, agricultural lands of the Gundry Plains
- the higher-elevated, densely vegetated, rural living areas of the Towrang Ranges.

The Project is located within the Gundry Plains landscape character zone. The relevant landscape character zones are described in **Table 6.16**.

Table 6.16 Landscape Character Zone Visual Characteristics

Landscape Character Zones	Main Visual Characteristics
Gundry Plains	• Cultivated landscape. Mostly cleared, open pastures used for agriculture (grazing and cropping). • Mostly lower-elevated land, including undulating, hilly areas, and some low-lying, swampy areas, and creeks. • Some areas of remnant vegetation (stands of native trees on higher slopes). Mostly planted (introduced) vegetation around homes, along property boundaries/fence lines, along roads and driveways, and scattered within cleared pastures. Pine wind breaks are common. • Homesteads are set back from local roads (sealed and unsealed). • Transmission towers cross open pastures. • Vegetated ridgeline and steep slopes appear in the background of views to the east and west.
Towrang Ranges	• Rugged, elevated landform. • Dense, tall, native vegetation. • Homesteads more sparsely seen, set back from local roads (sealed and unsealed). • Visibility within the landscape is restricted by tall vegetation and landform.

6.8.4 Assessment of Impacts

6.8.4.1 Impact to Viewpoints

A total of 52 viewpoints (i.e. 31 existing private viewpoints, 3 public viewpoints and 18 potential future viewpoints) required detailed assessment as part of the LVIA, taken from varying distances and locations surrounding the Project Area. Photomontages have been prepared from viewpoints where access to properties were possible to illustrate the potential visual impacts associated with the Project, included as Appendix D in the LVIA (provided in **Appendix 11**).

Following the implementation of mitigation measures outlined in **Section 6.8.5**, the LVIA predicted the following residual visual impacts will be experienced as a result of the Project:

- Moderate impact to one private viewpoint (R27).
- Low impact to 22 existing private viewpoints (R2, R4, R5, R6, R7, R8, R9, R16B, R16C, R20, R21B, R22, R25, R30, R31, R35, R36, R37, R43, R77, R78 and R90) and 4 potential future viewpoints (FR Rosedale A, FR22, FR32 and FR 90).
- Very low impact to all remaining viewpoints – from these viewpoints the Project would be barely visible and have little overall effect on the view.
- No viewpoints were rated high.

The assessed residual visual impact of the Project on viewpoints is shown on **Figure 6.12**. Further detail regarding the assessment of visual impacts before and after mitigation to viewpoints is provided in the LVIA (refer to **Appendix 11**).

Measures to reduce the visibility of the Project outlined in **Section 6.8.5** include colour-treating the Project components and landscape screen planting. A draft landscape plan for the Project has been prepared and is further discussed in **Section 6.8.5.1**.

Photomontages with mitigation landscape planting 5 years following construction have been prepared to illustrate the effect of screen planting (refer to Appendix E of the LVIA in **Appendix 11**).

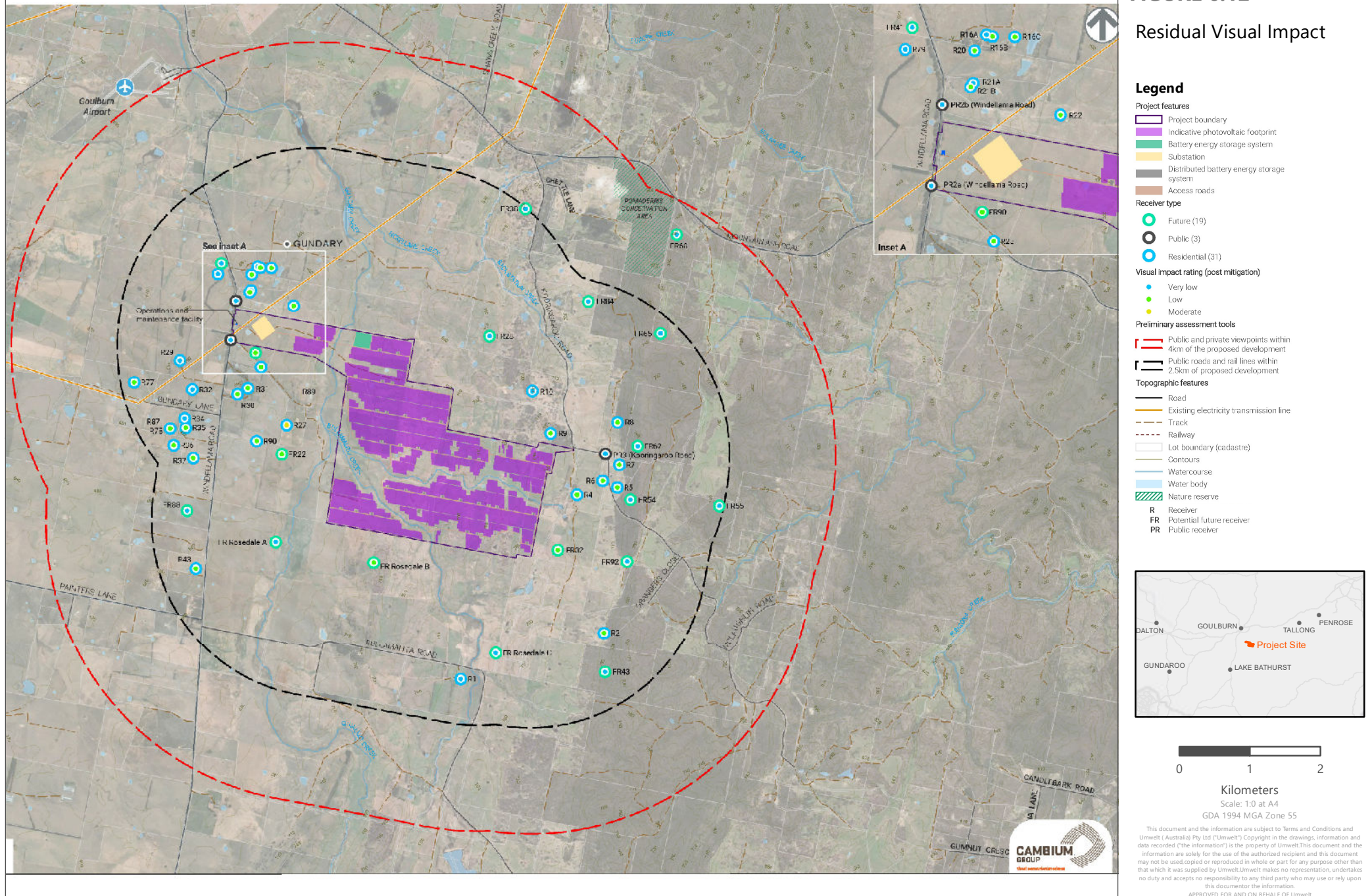
Mitigation photomontages have been prepared for the following viewpoints:

- public viewpoints (PR2a, PRb and PR3c)
- affected residents who would see proposed screening in their view (R7, R9, R16A, R16B, R16C, R21A, R21B, R22, R25 and R31).

6.8.4.2 Visual Impact to Goulburn Airport

Passengers and airport staff are unlikely to have a ground view of the Project due to intervening vegetation. However, aircraft using Goulburn Airport could provide an opportunity to view the Project from above. In addition, there are other small private airstrips in the vicinity, catering to light aircraft which could also provide an aerial view.

FIGURE 6.12
Residual Visual Impact



From a higher elevation, the Project from an aeroplane would appear dark in colour, similar to shadowing and vegetation, increasing the extent of dark surface covering the landform (compared to the existing patchwork of dark woody vegetation and lighter open pasture). From a distance, the Project is likely to appear similar to the dark colour of local vegetated ranges, although it would be significantly smaller in scale. In addition to views of the landscape, aerial views of the Goulburn region include wind turbines, quarries and transmission towers.

The Civil Aviation Safety Authority (CASA) has generally advised that large scale solar farms, such as the proposed Project, are very unlikely to be a hazard to aircraft operations unless they are very close to, and aligned with, an airport's approach or take off paths (within 2 nautical miles).

The Project is not close to (approximately 3.5 km away), or aligned with, approach or take-off paths. Further, there is no movement (visible to the naked eye) that would be associated with the Project. In addition, as discussed in **Section 6.9.3.3**, there would be no glare impacts affecting aviation receivers, and the flight paths would not be impacted by glare from the Project (refer to **Appendix 11**). Therefore, motion and reflectivity would not be a distraction to aviation.

6.8.4.3 Landscape Character Impact

The assessment found that the existing landscape has a moderate level of sensitivity. It is locally important and valued by the local community, however, there are no distinctive or rare features, and is not scenically recognised beyond the local area.

The Project would result in a moderate level of change to landscape character. It would introduce a large area of mostly low-level built structures (with repetitive, linear patterning) across open, undulating, grassed pastures, and the Project is reversible (it could be removed with relatively little residual impact to the landscape).

Therefore, the assessment determined that the Project would have a moderate impact on the landscape character of Gundry Plains.

6.8.4.4 Night Lighting

The Project would not be illuminated at night, except in emergency or security situations. All external, low-level lighting related to the Project would comply with management and mitigation measures to reduce lighting impacts. The Project is not expected to significantly change the night-time appearance of the vicinity.

6.8.5 Management and Mitigation Measures

Measures to manage and mitigate the visual impacts of the Project include:

- Preparation and implementation of a detailed landscape plan which will refine the concepts in the draft landscape plan prepared as part of the LVIA to screen views of the Project through strategic planting. The draft landscape plan is further discussed in **Section 6.8.5.1**.
- In conjunction with the detailed landscape plan, prepare a maintenance plan for proposed landscaping that includes:
 - defined initial establishment period (minimum of 12 months)

- schedule for monitoring planting areas and watering during the establishment period
- ongoing maintenance practices during and post establishment (such as a weeding/mulching regime)
- guidance for replacement planting (for plants that fail to thrive).
- Lightsource bp is seeking to enter into a neighbour agreement with the affected landholder (R27) in order to address the visual impacts specific to their dwelling. Once the agreement has been finalised, this landholder will become an associated landholder. This agreement will be developed in accordance with the Solar Guidelines.
- Lighting will be installed in accordance with *AS4228-1997 – Control of Obtrusive Effects of Outdoor Lighting*. During construction appropriate mitigation will be applied to lighting (including directional lighting and light shields) to reduce any associated impact.
- Colour treat ancillary components of the Project, such as the inverter shelters and office/storage containers, so they are dark in colour and less prominent.

6.8.5.1 Draft Landscape Plan

The draft landscape plan, provided in **Figure 6.13**, indicates general locations for strategic screen planting on-site, a planting strategy and indicative plant species, and has been developed in consultation with Goulburn Mulwaree Council and Landcare.

It is the intent that proposed landscaping is site-appropriate, and that proposed planting species:

- provide effective visual mitigation, screening or reducing views of the Project infrastructure
- are locally native
- provide ecological benefit to the site (such as a food source for birds, habitat)
- are suitable for the site conditions (are hardy)
- include quick growing as well as longer-longevity species.

6.9 Glint and Glare

Glint and glare concerns from the Project were not raised frequently as a key concern during the stakeholder engagement process (refer to **Section 5.5**). Glint and glare impacts are however recognised as a common key issue for solar farms.

A Glint and Glare Assessment (GGA) has been undertaken for the Project by Moir Landscape Architecture (Moir) in accordance with the SEARs (as outlined in **Appendix 1**) and Appendix C of the Solar Guidelines. The full report is provided in **Appendix 12**, with the key outcomes summarised below.

6.9.1 Existing Environment

The desktop viewshed analysis completed as part of the LVIA (refer to **Section 6.8.1**) was utilised to identify receivers with line of sight to the Project.

FIGURE 6.13
Draft Landscape Plan

Gundry Solar Farm
Landscape strategy

The aim of proposed landscaping is to provide a quick growing, dense screen with ecological benefits that would screen and reduce views of the solar farm infrastructure for residents and the public. Plant species have been selected that:

- are mostly locally native
- provide ecological benefit to the site (such as a food source for birds, habitat etc)
- are suitable for the site conditions (are hardy)
- can provide a quick growing screen, as well as longer longevity species.

The draft landscape plan indicates general locations for screen planting on-site and has been prepared with preliminary input from Goulburn Shire Council, and feedback from the community and surrounding land owners.

Subsequent to project approval, a detailed landscape plan would be prepared which would refine the concepts presented in this draft. Final species selection, ratio/rate of planting, and the planting guide may vary depending on future advice, the Project construction program and plant availability at the time.

Draft planting guide

Source plants from a local native nursery using seed collected close to the Project site (if possible). Plant as early as feasible. Plant pot sizes for all plants to be 75 mm tubestock.

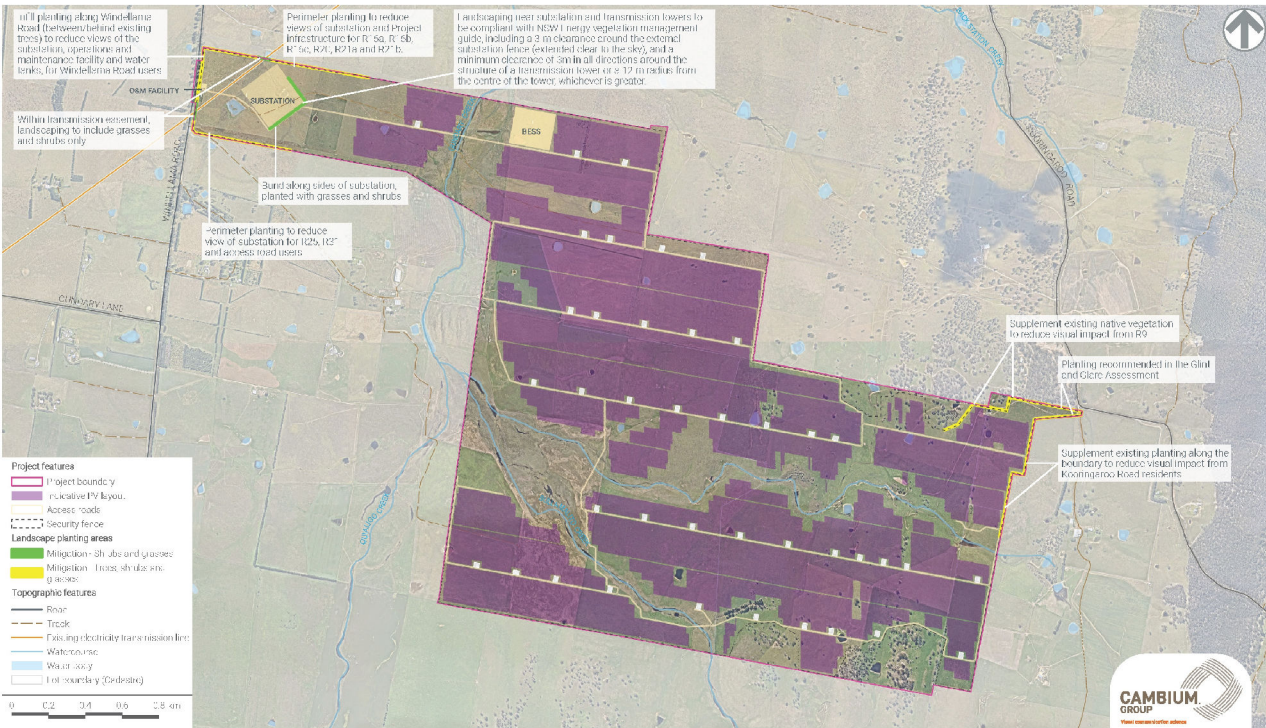
1. Planting areas to be 5 m wide plus a 1 m weed control buffer along each side.
2. Protect trees to be retained within or near the proposed planting areas.
3. Eradicate existing weed and pasture grass species within planting areas (at least one month before planting, with spot removal/treatment prior to planting if required). Carefully apply weed control when in the vicinity of existing trees to be retained.
4. Cultivate the full 5 m width and length of the planting area to a depth of around 300 mm and incorporate soil improver and/or organic fertiliser (if appropriate) following soil testing in a number of locations to determine the appropriate soil conditioning. Do not cultivate near trees to be retained.
5. Avoid planting during harsh weather conditions (i.e. mid-summer and mid-winter).
6. Select species (from the draft planting schedule) in random order to ensure an even mix of species and plant at densities of one plant per m², which equates to around 50 plants for every 10 lineal metres of planting bed.
7. Water plants well at the time of planting.
8. Mulch (to a minimum depth of 75 mm) the full width of the planting areas.
9. Protect plants by installing and securing biodegradable plant guards around each plant (suitable to protect against rabbits if applicable) and stock fencing where necessary.

The detailed landscape plan would also include a maintenance plan that would continue throughout the operational period of the Project, to ensure proposed landscaping achieves, and continues to achieve, intended outcomes. The maintenance plan should include:

- A defined initial establishment period of a minimum of 12 months.
- A schedule for monitoring planting areas and watering during the establishment period.
- Ongoing maintenance practices during and post establishment (such as a weeding/mulching regime).
- Guidance for replacement planting (for plants that fail to thrive).
- Records to keep of maintenance practices, including listing species that have failed and any substituted plant species.



This draft landscape plan has been prepared by registered landscape architect (Stacey Brookfield, RLA #1719) (Australia) in consultation with Landscape Architects. The intent is to achieve most of the ecological screening and landscape goals to suit a compromise of site screening and landscape goals, coming from a local native nursery using seed collected close to the Project site (if possible). A detailed landscape plan will be prepared once the project is approved, to fully document and confirm a planting plan over all plant species.



Draft planting schedule
This draft plant schedule provides an indicative range of site-appropriate species for future use in landscaping the site. The selection of species would be further refined during preparation of the detailed landscape plan.

Plant type	Species ¹		Approximate height in 4-6 years (m)	Approximate mature height (m)
	Scientific name	Common Name		
Trees	<i>Acacia decurrens</i>	Early Black Wattle	2 - 5	3 - 10
	<i>Acacia falciformis</i>	Broad-leaved Hickory Wattle	2 - 5	2 - 10
	<i>Acacia implexa</i>	Hickory Wattle	2 - 5	5 - 10
	<i>Acacia rubida</i>	Red-stem Wattle	2 - 5	2 - 10
	<i>Allocasuarina leucomera</i>	Bellcork	Up to 5	5 - 10
	<i>Allocasuarina littoralis</i>	Black Sheoak	Up to 5	5 - 10
	<i>Allocasuarina verticillata</i>	Drooping Sheoak	Up to 5	4 - 10
	<i>Eucalyptus agglomerata</i>	Blue-leaved Stringbark	3 - 5	Up to 20
	<i>Eucalyptus dives</i>	Broad-leaved Peppermint	3 - 5	Up to 20
	<i>Eucalyptus globulus</i>	White Stringbark	3 - 5	Up to 20
	<i>Eucalyptus gonocalyx</i>	Bandy	3 - 5	Up to 15
	<i>Eucalyptus macarthurii</i>	Paddy's River Box	3 - 5	Up to 20
	<i>Eucalyptus manilensis</i>	Brittle Gum	3 - 5	Up to 20
	<i>Eucalyptus rostrata</i>	Inland Scribbly Gum	3 - 5	Up to 20
	<i>Eucalyptus sieberi</i>	Silvertop Ash	3 - 5	Up to 20

Plant type	Species ¹		Approximate height in 4-6 years (m)	Approximate mature height (m)
	Scientific name	Common Name		
Shrubs and grasses	<i>Acacia boomannii</i>	Snowy River Wattle	1 - 3	1 - 3
	<i>Acacia collinsiana</i>	Kaife-leaf Wattle	2 - 4	Up to 4
	<i>Acacia borbonide</i>	Gossamer Wattle	2 - 4	Up to 4
	<i>Acacia premissa</i>	Wedge-leaf Wattle	2 - 4	Up to 4
	<i>Banksia ericifolia</i>	Heath Banksia	2 - 4	4
	<i>Banksia marginata</i>	Silver Banksia	3 - 4	4
	<i>Banksia spinulosa</i>	Hairpin Banksia	2 - 3	3
	<i>Callistemon ciliatus</i>	Crimson Bottlebrush	1 - 3	1 - 3
	<i>Daviesia mimosoides</i>	Bacon & Eggs Pee Flower	1 - 2	1 - 2
	<i>Hakea sericea</i>	Silky Needlebush	1 - 3	1 - 3
	<i>Jacquinia scoparia</i>	Dogwood	2 - 4	2 - 4
	<i>Kunzea parvifolia</i>	Violet Kunzea	1.5	1.5
	<i>Leptospermum polygalifolium</i>	Tee Tree	2 - 3	3
	<i>Lomandra longifolia</i>	Spry Matrush	1	1

¹ Sourced from Goulburn Shire Council and Goulburn Shire Council's 'Planting Guide' (2024). Species listed are 'Recommended' for planting in the Goulburn Shire Council's 'Planting Guide' (2024). Species listed are 'Recommended' for planting in the Goulburn Shire Council's 'Planting Guide' (2024). Species listed are 'Recommended' for planting in the Goulburn Shire Council's 'Planting Guide' (2024).



Kilometers

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In line with the Solar Guidelines, the receivers assessed in the GGA are:

- **Residential receivers** – 54 non-associated residential receivers within 3 km of the Development Footprint have line of sight to the solar panels.
- **Key public receivers** – three receiver locations within 5 km of the Development Footprint, i.e. Pomaderris Nature Reserve, Adrenaline Skydive and Goulburn Flight Training Centre.
- **Roads** – two road receivers within 1 km of the Development Footprint, i.e. Windellama Road and Kooringaroo Road.
- **Rail** – no rail receivers within 1 km of the Development Footprint.
- **Aviation receiver** – one aviation receiver within 5 km of the Development Footprint, i.e. Goulburn Airport.

More detail regarding the receivers identified in the GGA is available in **Appendix 12**.

6.9.2 Methodology

6.9.2.1 Assessment Approach

The GGA was undertaken utilising the Solar Glare Hazard Analysis Tool (SGHAT) to indicate the nature of glare that can be expected at each receiver. Glare assessment modelling for solar farms is based on the following factors:

- position of the sun over time with respect to the location of the proposed solar farm
- assessment is based on a worst-case scenario assuming clear weather all year round, (i.e. no consideration of cloud coverage)
- tracking axis tilt, tracking axis orientation and properties of the PV modules
- potential to screen the impact by surrounding topography (does not consider intervening elements such as vegetation and built structures).

Glare can broadly be classified into three categories:

- Green Glare: low potential for temporary after-image.
- Yellow Glare: potential for temporary after-image.
- Red Glare: retinal burn, not expected for PV.

Yellow glare was the focus of the assessment. Red glare is not expected for solar projects, and green glare has low potential to cause after-image and deemed negligible.

For further detail on the modelling assumptions and assessment approach for the GGA, refer to **Appendix 12**.

6.9.2.2 Performance Objectives for Glint and Glare Assessment

Residential Receivers

Table 6.17 provides an overview of the assessment approach for residential receivers with performance objectives for the assessment of glint and glare on these receivers outlined in **Table 6.18**. Modelling for residential receivers is calculated on a receiver height of 1.5 m AGL.

Table 6.17 Residential Receiver Assessment Requirements (Source: DPE, 2022b)

Scope	Methodology
All residential receivers within 3 km of the proposed solar array that have a line of sight.	Analysis of the daily and yearly glare impacts in minutes.
Representative viewpoints may be used for residential receivers that are clustered together.	All residential receivers must be assessed at a height of 1.5 m above ground level.

Table 6.18 Residential Receiver Impact Rating and Performance Objectives (Source: DPE, 2022b)

High Glare Impact	Moderate Glare Impact	Low Glare Impact
> 30 minutes per day > 30 hours per year <i>Significant amount of glare that should be avoided.</i>	<30 minutes per day <30 hours per year <i>Implement mitigation measures to reduce impacts as far as practicable.</i>	<10 minutes per day <10 hours per year <i>No mitigation required.</i>

Road and Rail Receivers

Table 6.19 provides an overview of the scope, methodology and performance objectives for the assessment of road and rail receivers.

Table 6.19 Road and Rail Receivers Assessment Requirements (Source: DPE, 2022b)

Scope	Methodology	Performance Objective
All roads and rail lines within 1 km of the proposed solar array.	Solar glare analysis to identify whether glint and glare are geometrically possible within the forward-looking eye-line of motorists and rail operators.	If glare is geometrically possible then measures should be taken to eliminate the occurrence of glare. Alternatively, the applicant must demonstrate that glare would not significantly impede the safe operation of vehicles or the interpretation of signals and signage.

Modelling for road receivers is calculated on a maximum height of 2.4 m AGL, which is representative of the eye level for truck drivers. Modelling for rail lines is based on a representative eye height of 3 m AGL to represent the eye level of train drivers.

Aviation Receivers

Table 6.20 provides an overview of the scope, methodology and performance objectives for the assessment of aviation receivers.

Table 6.20 Aviation Receivers Assessment Requirements

Scope	Methodology	Performance Objective
All air traffic control towers and take off / landing approaches to any runway or landing strip within 5 km of the proposed solar array.	Solar glare analysis is the worst case in all scenarios accounting for all aircraft using the airport (e.g. gliders, helicopters etc).	Any glint and glare should be avoided unless the aerodrome operator agrees that the impact would not be material (e.g. occurs at times when there are no flights or would not pose a safety risk to airport operations).

Modelling for flight path receivers is calculated on a threshold crossing height of 15 m in 3.21 km point ground elevation and the ± 50 degree azimuthal and 30-degree vertical viewing angle representative of the pilot field from cockpit.

6.9.3 Assessment of Impacts

Potential glint and glare impacts discussed below are based on worst case scenario and does not account for variables such as weather conditions or intervening elements such as vegetation and built structures.

6.9.3.1 Private and Public Receivers

A total of 54 private receivers were assessed. No high or moderate potential 'Yellow' glare have been identified for private receivers. Seven (7) private receivers (i.e. R31, R34, R35, R36, R37, R90 and R78) have been assessed to have a low potential for 'Yellow' glare (i.e. exposure is below the acceptable threshold of 10 hours per year). Further analysis showed that existing vegetation surrounding these receivers would mitigate the potential 'Yellow' glare. Detailed information regarding the expected time of day when glare might be experienced by each residential receiver is provided in **Appendix 12**.

Furthermore, the modelling predicted no 'Yellow' glare impacts on the three public receivers that were assessed.

No mitigation measures are deemed necessary for private and public receivers.

6.9.3.2 Road and Rail Receivers

Two road receivers and one rail receiver were assessed. Koorringaroo Road has been assessed as having potential to experience 'Yellow' glare that exceeds the acceptable threshold of 10 hours per year. This glare occurrence is expected during the period from mid-October to March, specifically between 5:50 pm and 7:00 pm. **Table 6.21** provides a comprehensive overview of the annual glare to be experienced along the Windellama and Koorringaroo Roads.

Additional vegetation screening is proposed along areas of Koorringaroo Road, as illustrated on the Project layout, to minimise the potential glare impact.

Table 6.21 Road Receiver Assessment Results

Road Receiver	Approximate Distance to the Project	Elevation	Yellow Glare (Hours per Year)	Existing Screening Factors	Mitigation Recommendations
Kooringaroo Road	0.28 km	698–718 m	16.7	Limited existing scattered vegetation between the road and the Project will partially obscure potential glare from the Project.	Additional screening vegetation along areas of Kooringaroo Road, as illustrated on Figure 3.1 , would mitigate glare from the Project.
Windellama Road	0.29 km	678–681 m	0	Existing scattered vegetation along the road will likely obscure potential view toward the Project.	None required.

6.9.3.3 Aviation Receivers

As outlined in **Table 6.22**, the assessment of the two flight paths at Goulburn Airport (i.e. FP01 and FP02) found that there are no ‘Yellow’ glare impacts affecting aviation receivers.

Table 6.22 Aviation Receiver Assessment Results

Aviation Receiver	Approximate Distance to the Project	Ground Elevation	Yellow Glare (Hours per Year)	Mitigation Recommendations
FP01	4.40 km	636 m	0	Not Required.
FP02	4.30 km	652 m	0	Not Required.

Therefore, these flight paths are not impacted by glare from the Project, and as a result, no mitigation measures are deemed necessary. Refer to **Appendix 12** for detailed impact outputs for each aviation receiver.

6.9.4 Management and Mitigation Measures

The following mitigation measure will be implemented to address glint and glare impacts associated with the Project:

- Additional landscape screening will be established along the north-eastern boundary of the Project to further enhance screening and reduce potential glare towards Kooringaroo Road.

6.10 Noise and Vibration

Noise impacts from the Project were a key concern raised by the community during the stakeholder engagement process, particularly for community members living in close proximity to the Project (refer to **Section 5.5**). Concern was raised regarding construction noise having the ability to impact on amenity creating annoyance and disturbance to their way of life, as well as operational noise from the substation and on-site BESS for those living near the north-west corner of the Project, with landholders and residents raising concerns that this would interrupt their sleep and daily enjoyment of their properties.

Throughout the detailed assessment phase, Lightsource bp has sought to avoid and minimise potential noise impacts to nearby residences through Project redesign and layout refinements. Specifically, the Project has been designed as follow to avoid and minimise noise impacts to the nearby residences:

- the centralised BESS has been relocated approximately 1.2 km to the east, away from non-associated residences on the north-west, as illustrated on **Figure 2.5**
- 20 decentralised BESS units located nearest to non-associated residences have been removed, as illustrated on **Figure 2.5**
- placement of 5.5 metre high noise walls around the loudest Project infrastructure (such as the substation HV transformers), with the inside of the walls to be lined with acoustic absorption
- for some decentralised DC BESS PCS stations, the placement of 3 m high noise walls near the condenser units.

A detailed Noise and Vibration Impact Assessment (NVIA) has been prepared by Umwelt (2024) to assess the potential noise and vibration impacts associated with the Project in accordance with the SEARs (as presented in **Appendix 1**) and to address community concern. The assessment is provided in full in **Appendix 13** with the key outcomes summarised in this section.

In addition, the NVIA considered the SEARs advice provided by the Goulburn Mulwaree Council requesting that noise and vibration be considered in relation to the potential impact on future rural residential areas identified south of the Hume Highway in the Urban and Fringe Housing Strategy (adopted by Council in July 2020).

6.10.1 Existing Noise Environment

6.10.1.1 Sensitive Noise Receivers

The Project Area is located within a rural environment with typically low background noise levels, consisting primarily of rural residential land, zoned RU1 – Primary Production. Several non-associated residences (i.e. sensitive receivers) including one associated residence are distributed throughout the surrounding area. The closest non-associated residence (R9) is approximately 137 m to the north of the Project Area. No other sensitive land use (such as schools or places of worship) is located within or surrounding the Project Area. Refer to **Figure 6.14** and **Appendix 3** for all receivers considered in the NVIA.

The assessment of the existing acoustic environment was based on the grouping of residential receivers into Noise Catchment Areas (NCAs) as described in **Table 6.23** and shown on **Figure 6.14**.

Table 6.23 Noise Catchment Areas

NCA	Description
NCA_1	An area in proximity to Windellama Road and representing the rural areas near the western extent of the Project, south of the Windellama Road Project access point. Background data based on monitoring location L1.
NCA_2	An area in proximity to Windellama Road and representing the rural areas near the western extent of the Project, north of the Windellama Road Project access point. Background data based on monitoring location L2.

NCA	Description
NCA_3	An area representing the rural areas to the north, east and south of the Project, that are located away from Windellama Road. Background data based on monitoring location L3.

6.10.1.2 Existing Background and Ambient Noise

Background noise monitoring was undertaken at three representative locations in and near the Project Area (namely L1, L2 and L3), between April and May 2023. These monitoring locations were selected to be representative of the potentially affected noise receivers within the respective NCAs in **Table 6.23** to adequately categorise the local noise environment.

Unattended Noise Monitoring

Unattended noise monitoring was undertaken at Locations L1, L2 and L3, over a period of 2 weeks during April and May 2023. The results of the noise monitoring are summarised in **Table 6.24**.

Table 6.24 Unattended Noise Monitoring Results¹⁰

Location	Background Noise Level LA90, 15min Day	Background Noise Level LA90, 15min Evening	Background Noise Level LA90, 15min Night	Ambient Noise Level LAeq Day	Ambient Noise Level LAeq Evening	Ambient Noise Level LAeq Night
L1	24	20	17	43	38	35
L2	27	24	22	42	38	37
L3	22	18	17	43	40	39

Attended Noise Monitoring

Attended noise monitoring was undertaken at Locations L1, L2 and L3 to supplement the unattended noise monitoring and get a better understanding of the noise sources that make up the existing noise environment. Measured noise levels were predominantly controlled by natural sources (e.g., insects, birds) with some contribution from aircraft noise.

Measured background noise levels were used to determine appropriate noise criteria for the Project, as discussed in **Section 6.10.2**.

¹⁰ Day period is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sunday and Public Holidays, evening period is 6 pm to 10 pm and night period is 10 pm to commencement of the day period.

In accordance with the NPfl (Section 2.6), ambient noise levels are free-field noise levels (i.e., no correction from façade reflections).

Background noise levels are all below the assumed NPfl minimum Rating Background Levels (RBLs) of 35 dB(A) in the day period and 30 dB(A) in the evening and night periods, therefore the minimum RBLs are to be applied.

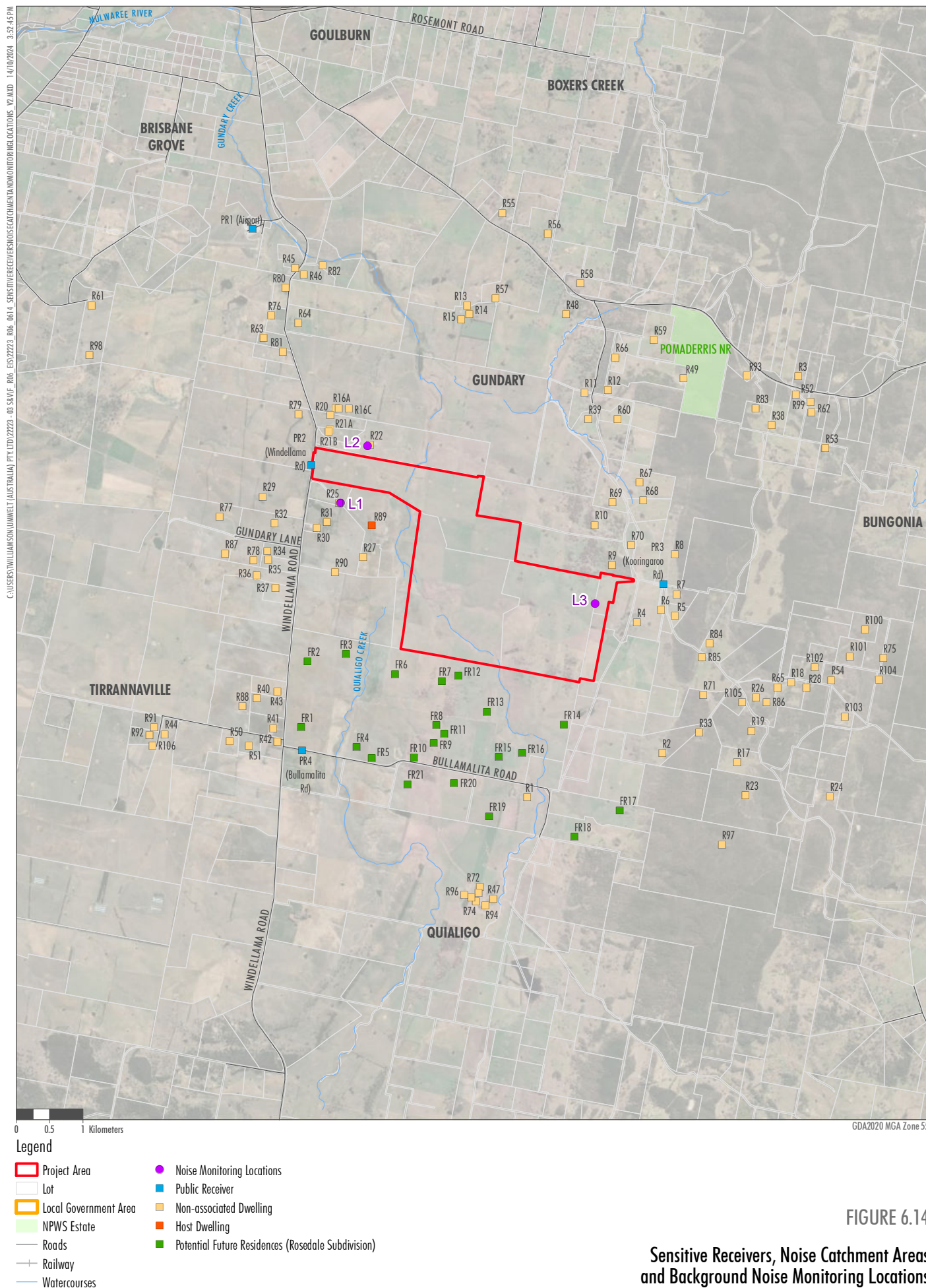


FIGURE 6.14

Sensitive Receivers, Noise Catchment Areas and Background Noise Monitoring Locations

6.10.2 Noise and Vibration Criteria

6.10.2.1 Construction Noise

Assessment levels for noise from construction activities, excluding noise from construction-related traffic on public roads, are defined in the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009).

The construction Noise Management Levels (NMLs) (refer to **Table 6.25**) are intended to guide the need for, and the selection of, feasible and reasonable work practices to minimise construction noise impacts and are based on the adopted minimum background noise levels.

Table 6.25 Construction Noise Management Levels, dB(A)

Receiver Area	Standard Construction hours ¹¹ LAeq(15min)	Highly Noise Affected LAeq(15min)
NCA_1 All residential receivers	45	75
NCA_2 All residential receivers	45	75
NCA_3 All residential receivers	45	75

6.10.2.2 Construction Vibration

Recommended safe working distances for vibration-generating equipment from sensitive receivers (i.e., the receiver building or its occupants) are given in Table 2 of the *Construction Noise and Vibration Guideline* (TfNSW, 2023) reproduced in **Table 6.26**.

Table 6.26 Recommended Minimum Working Distances (m) for Vibration Intensive Plant from Sensitive Receivers

Plant Item	Rating/Description ¹²	Recommended Distances for Residential Building	Recommended Distances for Human Response
Vibratory roller	< 50 kN (Typically 1–2 t)	5	15–20
Vibratory roller	< 100 kN (Typically 2–4 t)	6	20
Vibratory roller	< 200 kN (Typically 4–6 t)	12	40
Vibratory roller	< 300 kN (Typically 7–13 t)	15	100
Vibratory roller	> 300 kN (Typically 13–18 t)	20	100
Vibratory roller	> 300 kN (> 18 t)	25	100
Small hydraulic hammer	300 kg – 5 to 12 t excavator	2	7
Medium hydraulic hammer	900 kg – 12 to 18 t excavator	7	23
Large hydraulic hammer	1,600 kg – 18 to 34 t excavator	22	73
Vibratory pile driver	Sheet piles	2–20	20
Pile boring	≤ 800 mm	2 (nominal)	4
Jackhammer	Hand held	1 (nominal)	2

¹¹ Recommended standard construction hours are Monday to Friday 7 am to 6 pm and Saturday 8 am to 1 pm.

¹² For alternative equipment with higher vibration levels, larger minimum working distances are required. More stringent conditions may apply to heritage or other sensitive structures.

6.10.2.3 Operational Noise

The operational noise criteria applicable to the Project have been derived in accordance with the NSW Environment Protection Authority (EPA) *Noise Policy for Industry* (NPfI) (EPA, 2017) based on measured background noise levels discussed in **Section 6.10.1**.

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

The Project Noise Trigger Levels (PNTLs) derived in accordance with the NPfI are the lower (that is, the more stringent) values of the PINL and PANL in terms of LAeq(15 min) noise levels. Applying the more stringent of the two ensures that intrusive noise is limited, and amenity is protected and that no single industry can unacceptably change the noise level of an area.

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

The PNTL, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. The PNTLs for the Project are shown in **Table 6.27**.

Table 6.27 Project Noise Trigger Levels, LAeq (15 min), dB(A)

Receiver Area	Time of day ¹³	PINL	PANL	PNTL
NCA_1 All residential receivers	Day	40	48	40
NCA_1 All residential receivers	Evening	35	43	35
NCA_1 All residential receivers	Night	35	38	35
NCA_2 All residential receivers	Day	40	48	40
NCA_2 All residential receivers	Evening	35	43	35
NCA_2 All residential receivers	Night	35	38	35
NCA_3 All residential receivers	Day	40	48	40
NCA_3 All residential receivers	Evening	35	43	35
NCA_3 All residential receivers	Night	35	38	35

¹³ Day period is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sunday and Public Holidays, evening period is 6 pm to 10 pm and night period is 10 pm to commencement of the day period.

6.10.2.4 Road Traffic Noise

The *NSW Road Noise Policy* (RNP) (DECCW, 2011) sets out criteria for road traffic noise through the provision of a framework that addresses traffic noise issues associated with new developments, new or upgraded road developments, or planned building developments. Under the road category definitions provided in the RNP, the proposed transport route is classified as a sub-arterial road, with assessment criteria for existing residential land uses on the route being LAeq (15 hour) 60 dB(A) in the day time (7 am to 10 pm) and LAeq (9 hour) 55 dB(A) in the night time (10 pm to 7 am).

6.10.3 Methodology

Prediction of the construction and operational noise levels was undertaken with the proprietary computer noise modelling software CadnaA (Version 2023), using the CONCAWE noise prediction algorithms.

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

Construction noise impacts were predicted based on seven construction activity scenarios and associated plant and equipment. The scenarios modelled were:

- Scenario 1 – Site establishment and civil works.
- Scenario 2 – Piling and foundations.
- Scenario 3 – Assembly of all equipment (trackers, inverters, modules, balance of system).
- Scenario 4 – Underground cabling.
- Scenario 5 – Commissioning.
- Scenario 6 – Site rehabilitation, removal of temporary construction facilities.
- Scenario 7 – Primary access upgrade.

Noting that it is likely that some of these activities may occur simultaneously through the progression of the construction program. Further details for all modelling scenarios, including indicative equipment quantities and sound power levels, are provided in the NVIA in **Appendix 13**.

Operational noise impacts were predicted based on indicative sound power level data provided by Lightsource bp for individual plant and equipment and three BESS configurations (centralised AC BESS, decentralised DC BESS, combined centralised AC and decentralised DC BESS). Operational noise levels were modelled based on the inclusion of a comprehensive suite of noise control measures which include:

- The placement of 5.5 m high noise walls around the substation HV transformers, with the inside of the walls to be lined with acoustic absorption.
- For particular decentralised DC BESS PCS stations, the placement of 3 m high noise walls in close proximity to the condenser units.

Further details for all modelling scenarios, including indicative equipment quantities and sound power levels are provided in the NVIA in **Appendix 13**.

6.10.4 Assessment of Impacts

6.10.4.1 Construction Noise

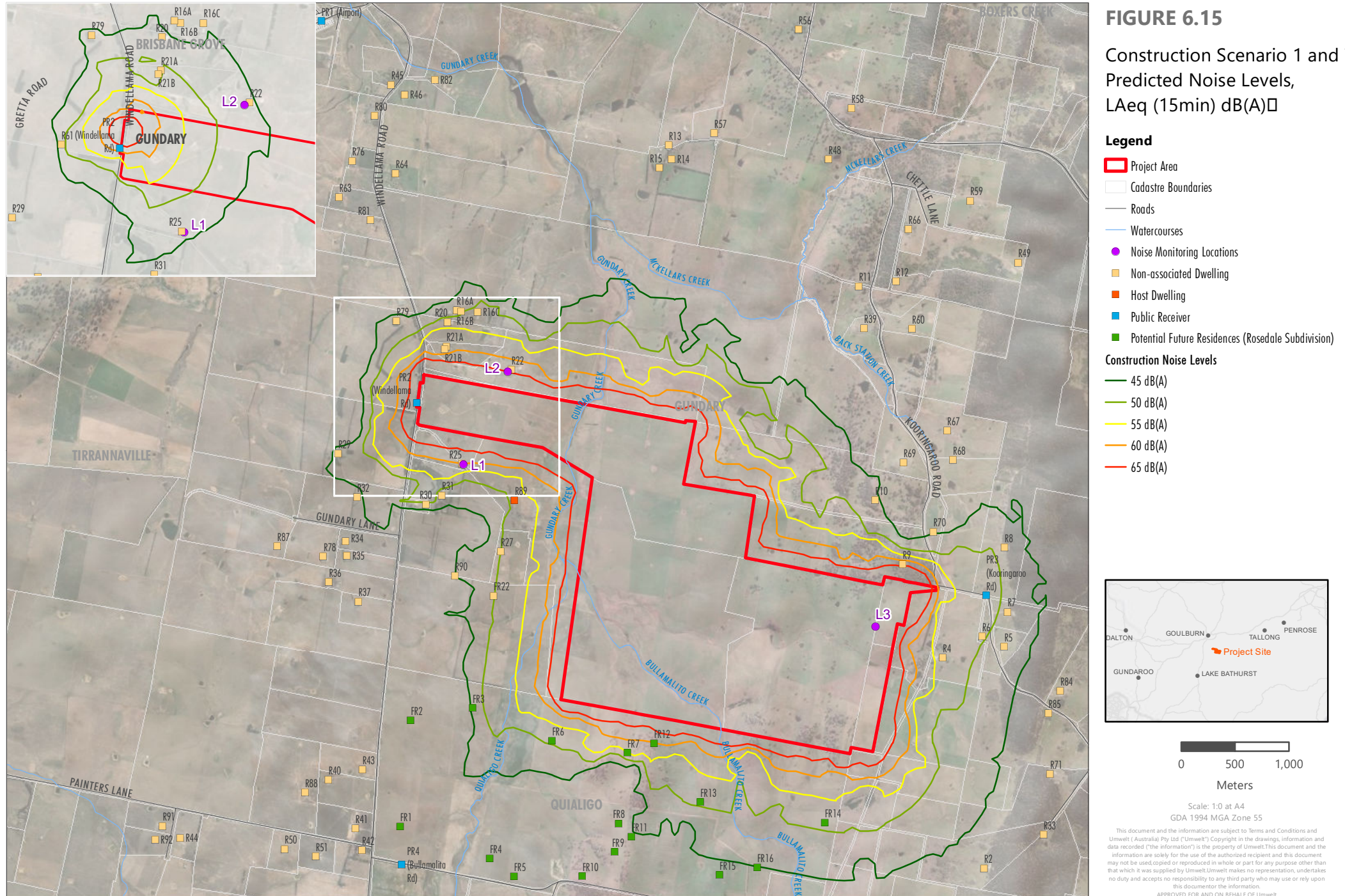
Construction noise levels were predicted for seven indicative construction scenarios (see **Section 6.10.3**) under default worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed) in accordance with the NPfl (refer to the NVIA in **Appendix 13** for detailed equipment schedules). The predicted noise levels are presented without any mitigation controls applied and represent a conservative worst-case scenario assuming all equipment associated with each scenario is operating simultaneously at the closest point within the Development Footprint to the respective receiver location. In reality, a receiver would experience a range of construction noise, dependent upon the number of plant items operating at any one time and their precise location on site.

Results for each construction scenario for those receivers where predicted noise levels are greater than the daytime NML of 45 dB(A) (as determined in **Section 6.10.2.1**) are provided in **Table 6.28**. The predicted noise level contours for the worst-case scenario (Scenario 1 and 7) are presented graphically in **Figure 6.15**.

Table 6.28 Receivers Exceeding Day Time Construction NML, LAeq (15min), dB(A)

Receiver	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
R4	53	48	46	43	43	43	<20
R5	48	43	41	38	38	38	<20
R6	51	46	44	41	41	41	<20
R7	49	44	42	39	39	39	<20
R8	49	44	42	39	39	39	21
R9	64	59	57	54	54	54	20
R10	47	42	40	37	37	37	27
R16A	49	44	42	39	39	39	41
R16B	49	44	42	39	39	39	41
R16C	51	46	44	41	41	41	40
R20	52	47	45	42	42	42	48
R21A	56	51	49	46	46	46	52
R21B	56	51	49	46	46	46	52
R22	64	59	57	54	54	54	46
R25	60	55	53	50	50	50	46
R27	50	45	43	40	40	40	28
R29	47	42	40	37	37	37	38
R30	48	43	41	38	38	38	44
R31	48	43	41	38	38	38	40
R79	46	41	39	36	36	36	48
R90	46	41	39	36	36	36	28

FIGURE 6.15
Construction Scenario 1 and 7
Predicted Noise Levels,
L_{Aeq} (15min) dB(A) □



The NVIA predicts that the construction NMLs at 21 receivers may be exceeded (>45 dB(A)) while the works are conducted at the Project Area. For the full tabulated results for each daytime construction scenario, refer to Table F.1 within Appendix F of the NVIA (see **Appendix 13**).

Lightsource bp is consulting with the affected landholders regarding the predicted impacts.

As noted earlier, the modelling results are conservative, as:

- Construction noise was modelled under default worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed or F class with 2 m/s windspeed) in accordance with the NPfI.
- Combined (worst case) sound power levels for each construction scenario were modelled, assuming all equipment nominated in each scenario would be operating at the same time, at the boundary of the Development Footprint.
- No mitigation controls were applied to the modelling.
- The location of the noise source was modelled at the Development Footprint boundary, therefore the shortest distance to the respective receiver location.

Whilst the NML at some receivers is predicted to be exceeded, no receiver is predicted to be 'highly noise affected' (i.e. in accordance with the ICNG, exposed to noise levels greater than 75 dB(A)). The locations of the receivers are presented in **Figure 2.4**.

As the predicted construction noise levels are above the NML for some receivers, reasonable and feasible noise mitigation and management strategies are recommended in **Section 6.10.5** to mitigate potential impacts on these receivers.

6.10.4.2 Construction Vibration

Vibration generating activities would occur during the construction phase. There are no vibration generating activities expected during the operational phase.

Construction vibration impacts have been assessed with reference to the criteria provided in **Table 6.26**, and using the recommended safe working distances provided in Table 2 of the *Construction Noise and Vibration Guideline* (TfNSW, 2023) as a guide.

Due to the separation distances between the Project Area boundary and the nearest sensitive receivers (over 130 m), vibration impacts from construction activities are anticipated to be negligible.

6.10.4.3 Operational Noise

Operational noise sources considered for the Project are presented in **Appendix 13**. In accordance with the NPfI, operational noise levels were predicted under default worst-case meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed). For a conservative assessment against the night-time noise goal, it was assumed that all plant and equipment would be operating concurrently at 100% capacity.

Results of the modelling indicate that all project noise trigger levels can be met for day, evening and night-time periods, with all sensitive receivers experiencing noise levels of 35 dB or lower, as illustrated on **Figure 6.16**. Results of the modelling are presented in Table E.1 within Appendix E of the NVIA (refer to **Appendix 13**). No operational management and mitigation strategies are required.

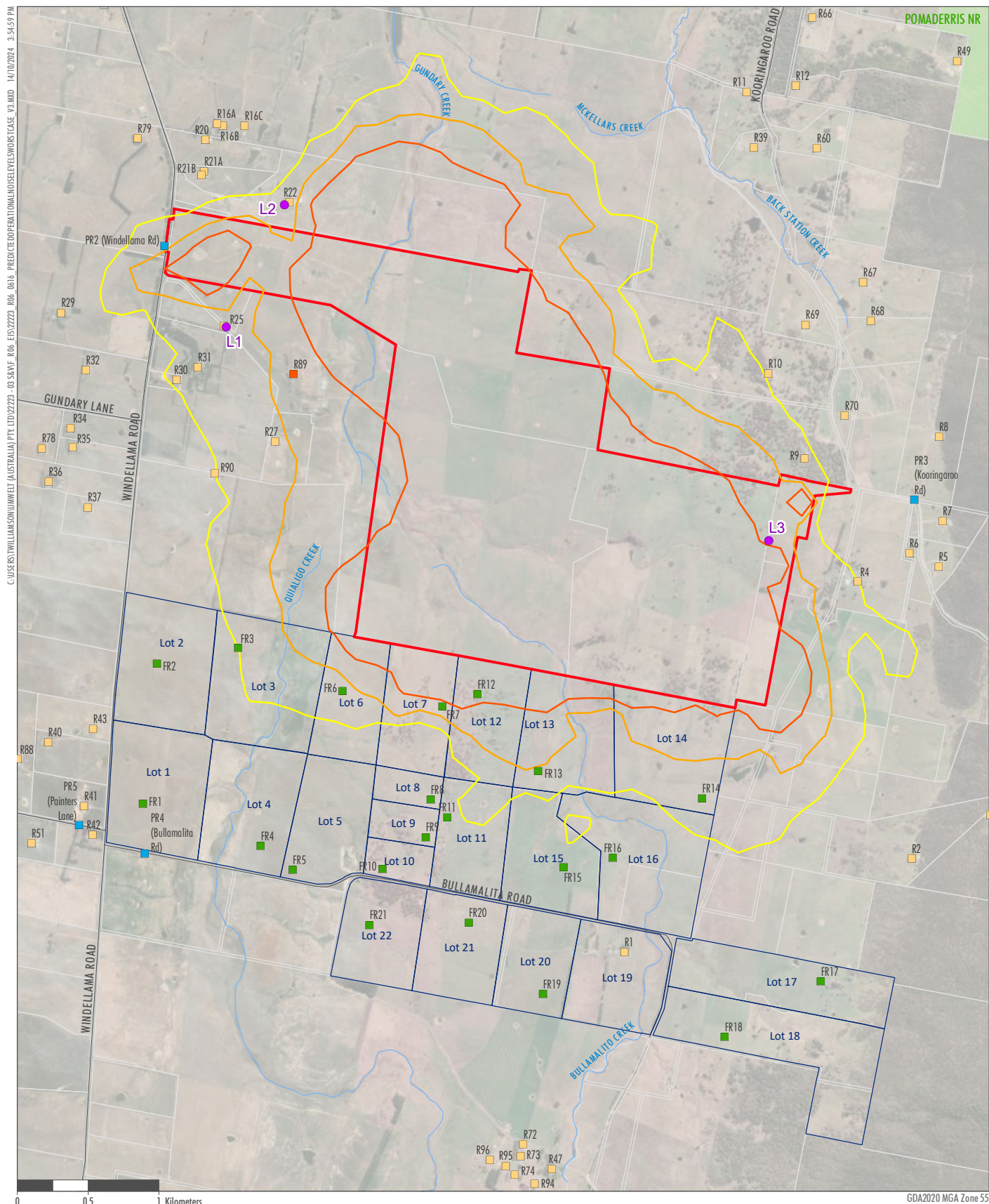
Exceedances are however predicted at two potential future receivers of the Rosedale subdivision for the decentralised BESS option and/or combined BESS option, illustrated on **Figure 6.16**. These are:

- FR7 – predicted to experience a noise level of 40 dB(A) i.e. 5 dB(A) exceedance
- FR12 – predicted to experience a noise level of 42 dB(A) i.e. 7 dB(A) exceedance.

As discussed in **Section 2.5.2**, the locations of the potential future receivers are only indicative at this stage and the final location would be subject to a separate local development application, should the subdivision be finalised. Considering other environmental and planning related site constraints applicable to Lot 7 and Lot 12, discussed in **Section 6.7.4.8** and illustrated on **Figure 6.9**, alternative siting options would be available should the landholder proceed with the subdivision development and wish to locate the residences outside the 35 dB(A) contour. The developable area outside the 35 dB(A) contour for Lot 7 and Lot 12 (taking other environmental and planning constraints into account as illustrated on **Figure 6.9**) are approximately 11 ha and approximately 7.5 ha respectively. In light of this, no mitigation is proposed for FR7 and FR12 at this stage. However, the landholder may be eligible in future for mitigation should the subdivision proceed, and residences be developed within the 35 dB(A) contour, subject to verification monitoring to confirm noise impacts. Lightsource bp has consulted with the landholder in this regard.

Furthermore, should only the centralised BESS option be developed, no operational noise exceedances are predicted to be experienced at any of the Rosedale future receivers based on the assumed locations as assessed in the NIA.

Lightsource bp is consulting with the affected landholder regarding the predicted impacts.



Legend

- Project Area
- Lot
- Rosedale Subdivision
- NPWS Estate
- Roads
- Watercourses
- Noise Monitoring Locations
- Public Receiver
- Non-associated Dwelling
- Host Dwelling
- Potential Future Residences (Rosedale Subdivision)
- Operational Noise Levels**
- 30 dB(A)
- 35 dB(A)
- 40 dB(A)

FIGURE 6.16

Predicted Centralised and Decentralised Operational Noise Levels under default Worst-case Meteorological Conditions, LAeq(15 min) dB(A)

Corona Discharge / Effect

During operation of the electricity transmission network, noise emission (hissing or cracking noise) associated with power lines and insulators within the proposed switching station can result from an effect called corona discharge (or corona effect). The intensity of the corona discharge and the resulting noise is dependent on meteorological conditions (such as humidity, rain, fog and wind), the concentration of airborne particles (dust, ash) and the state of the conductor surface.

Corona effects are relatively small in fair weather but can become evident during light rainfall and humid conditions as a consequence of water droplets mixing with dust on the conductor itself creating a migrating electricity leakage path. Corona effects can also become significant under electrically charged clouds.

Given the nearest non-involved receivers to the switching station (i.e. R21B and R25) are some distance (approximately 385 m) from the proposed switching station (see **Figure 1.2**), potential noise impacts from corona discharge are not anticipated. Further, existing power lines are already a feature of the area and are located closer to R21B than the proposed switching station.

6.10.4.4 Decommissioning Noise

The decommissioning of the Project would involve undertaking the construction activities in reverse. From a noise and vibration generating perspective, the decommissioning activities are not as intensive as with construction. The reason being that no piling or other noise intensive activities are involved. Noise emissions during decommissioning activities are therefore expected to be less than the construction activities and comply with the nominated noise management levels.

6.10.4.5 Road Traffic Noise

Noise Sources and Assumptions

Traffic volumes and trip distribution on the road network is discussed in **Section 6.11** of this EIS. The NVIA has reviewed traffic data provided in the TIA and has assumed:

- 50% of the daily Project-related light-vehicle movements will be on the roads travelling to the Project Area during the night period (i.e., prior to 7 am).
- 50% of the daily Project-related shuttle buses will be on the roads travelling to the Project Area during the night period (i.e., prior to 7 am). 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).
- All heavy vehicle transportation (including buses) will access the Project Area from the north via Windellama Road.
- 90% of light vehicle traffic would travel from the north. Potential traffic noise impacts south of Project Area is anticipated to be negligible and has not been assessed further.

Indicative construction-related traffic volumes adopted for the noise assessment are presented in Table 7.1 of the NVIA (refer to **Appendix 13**). Additionally, indicative construction-related traffic volumes for Merino Solar Farm are also presented in Table 7.1 of the NVIA for the consideration of potential cumulative road traffic noise impacts, as further discussed in **Section 6.18**.

Assessment of Road Traffic Impacts

The NVIA predicts that for receivers along Windellama Road located more than 30 m from the edge of the road there would be negligible elevated road traffic noise levels as a result of the Project. However, one receiver (R45) is located within 30 m and may experience an elevated road traffic noise level during the construction period. It is noted however that the predicted noise levels are conservative and is based on peak construction traffic movements. Management and mitigation measures are proposed in **Section 6.10.5** to mitigate and manage the construction road traffic noise impacts associated with the Project.

Operational Traffic

Operational traffic movements are expected to be in the order of up to 10 two-way light vehicles per day, therefore road traffic noise from operational traffic is anticipated to be negligible. No management and mitigation measures are recommended.

6.10.5 Management and Mitigation Measures

6.10.5.1 Construction Noise

As the construction noise levels are predicted to exceed the nominated NMLs at some sensitive receivers, a draft Construction Noise and Vibration Management Plan (CNVMP) has been prepared and is provided in Appendix G of the NVIA (refer to **Appendix 13**). Should the Project be approved, the draft CNVMP will be reviewed and updated. The CNVMP will be implemented as part of the CEMP.

Reasonable and feasible noise management and mitigation strategies will be implemented during the construction phase of the Project as part of the CNVMP to manage and mitigate construction noise impacts to nearby receivers, such as:

- All employees, contractors and subcontractors are to receive an environmental induction. The induction must include at a minimum, all applicable mitigation measures; hours of works; any limitations on high noise-generating activities; location of nearest sensitive receivers; designated parking areas; relevant approval conditions and incident procedures.
- Contractors should keep noise to a minimum, including limiting the use of loud stereos/radios, shouting on site and car door slams.
- Where practical, no dropping of materials from height or throwing of metal items.
- The noise levels of plant and equipment should have operating sound power levels consistent with those nominated in the NVIA.
- Noise emitting plant to be directed away from sensitive receivers and to be throttled down or shut down when not in use.

- Non-tonal reversing beepers could be fitted and used on construction vehicles and mobile plant used regularly on site and for any out of hours work.
- Limit the use of engine compression brakes.
- Where feasible and reasonable, work generating high noise and/or vibration should be scheduled during less sensitive time periods.
- The CEMP and CNVMP would be regularly updated to account for any changes in noise and vibration management of the Project.

The CNVMP outlines that, based on the predicted construction noise impacts, additional noise mitigation measures outlined below will be required for R21A, R21B and R25 during Scenario 1 as well as R9 and R22 during Scenarios 1, 2 and 3. Additional measures will include:

- **Period Notification** – Advanced warning of upcoming works and potential disruptions can assist in reducing the impact on the community. Typically distributed on a monthly basis, notifications may consist of a letterbox drop, and/or email mailing lists, and published on the website. Updates detail work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of seven days prior to the start of works. The approval conditions for projects may specify requirements for notification to the community about works that may impact on them.
- **Verification Monitoring** – Verification monitoring of noise and/or vibration levels during construction is in the form of routine checks of noise levels or following reasonable complaints, conducted at the affected receiver(s) or a nominated representative location. Where monitoring finds that the actual levels exceed those predicted in the assessment then immediate refinement of mitigation measures may be required and the management plan amended. Attended measurements are to be undertaken within a period of 14 days from the commencement of construction activities (or as agreed with the DPHI/EPA). For project durations greater than three months, attended measurements are to be repeated on a three-monthly basis, where reasonable and feasible, as part of the audit cycle. Where outside of standard work hour (OOWH) are required, attended measurements must be undertaken at the time intervals described in the management, OOWH assessment, approval and/or licence conditions.

6.10.5.2 Traffic Noise

Potential noise mitigation measures to reduce construction-related traffic noise may include the following:

- Car-pooling and the use of shuttle buses to reduce the total number of light vehicle movements.

6.10.5.3 Construction Vibration

If any vibration-generating equipment should be used within the recommended safe working distances nominated in the NVIA, 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.
- Pre-construction vibration monitoring to establish baseline vibration impacts induced on the structure from existing sources.
- Establish site specific vibration minimum working distances for the nominated equipment on site.
- Where appropriate, continuous vibration monitoring is conducted on the structure for the duration of the period of construction while vibration generating equipment is used. The vibration logger should be equipped with the facility to remotely alert the site to reduce or cease construction activities if vibration levels are approaching the criterion threshold.

6.10.5.4 Community Consultation

- All sensitive receivers likely to be affected will be notified at least seven days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact.

6.11 Traffic and Transport

Concerns regarding traffic impacts have been identified throughout the community and stakeholder consultation process (refer to **Section 5.5**). In particular, the increase in traffic volumes on local roads (such as the Windellama Road), road safety, safety of children waiting for school bus, and the condition of local roads were raised as concerns.

A Transport Impact Assessment (TIA) (refer to **Appendix 14**) has been prepared for the Project by The Transport Planning Partnership Pty Ltd (TTPP) to assess the existing transport network conditions and the anticipated Project impacts during construction, operation and decommissioning. The TIA addresses the requirements of the SEARs with respect to traffic and transport, as listed below:

- An assessment of the peak and average traffic generation, including over-dimensional vehicles/heavy vehicles requiring escort and construction worker transportation.
- An assessment of the likely transport impacts to the transport route(s), Project access points, any Crown land, particularly in relation to the capacity and conditions of the roads, road safety and intersection performance.
- A cumulative impact assessment of traffic from nearby developments, which is discussed in **Section 6.18**.
- 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.

The TIA also addresses the additional requirements of Goulburn Mulwaree Council (Council) and Transport for NSW (TfNSW), as detailed in **Appendix 14**. Key outcomes of the TIA in relation to the Project are summarised below, with cumulative traffic impacts discussed in **Section 6.18**.

6.11.1 Existing Transport Network

6.11.1.1 Roads

The Project Area is accessed from Windellama Road. Major solar and BESS components would be delivered to either Port Botany in Sydney (approximately 200 km northeast of the Project Area) or Port Kembla south of Wollongong (approximately 170 km northeast of the Project Area) and transported to the Project Area by truck via the Hume.

Two transport route options from the Hume Highway to the Project Area (refer **Figure 3.4**) have been considered, and are:

- Option 1: Hume Highway – Sydney Road – Reynolds Street – Grafton Street – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road.
- Option 2: Hume Highway – Hume Street – Garroorigang Road – Sloane Street – Braidwood Road – Bungonia Road – Windellama Road.

An emergency access is proposed on the eastern side of the Project Area via the existing access at 400 Koorringaroo Road. This access would only be used for emergencies.

A description of the major and minor roads near the Project Area is provided in **Table 6.29**.

Table 6.29 Road Network

Road	Discussion
Hume Highway (M31)	• A major inter-city national highway (M31), running between Melbourne in the southwest and Sydney in the northeast. • Two-lane, undivided sealed road with varying shoulder widths and formations. • Posted speed limit of 110 km/h. • Approved B-double route with restricted travel times for OSOM vehicles between the M5/M7 Interchange at Prestons and the Illawarra Highway (A48).
Braidwood Road	• A two-lane sealed road. • Posted speed limit ranges from 60 km/h (close to Goulburn) to 110 km/h. • Approved B-double route.
Bungonia Road	• A two-lane sealed rural residential road, that becomes a rural road with no kerb and gutter beyond Memorial Road towards the Project Area. • Posted speed limit is 60 km/h.
Garroorigang Road	• Two-lane sealed road with rural frontages. • Posted speed limit of 80 km/h. • Not approved B-double route.
Windellama Road	• Two-way sealed local road with a single travel lane in each direction, connecting Goulburn and Windellama. • Posted speed limit near Goulburn is 80 km/h, with 100 km/h south of the Hume Highway. • Provides direct access to the Project Area.

Road	Discussion
Kooringaroo Road	- Two-lane rural road. - At the northern end, Kooringaroo Road is sealed road with a sealed width of approximately 6 metres and unsealed shoulders. - At the southern end, near the Project Area, Kooringaroo Road is narrower (approximately 4 m wide) with additional shoulders and of gravel construction. - Kooringaroo Road is not a through road (ends in a dead end).

6.11.1.2 Traffic Flow Along Windellama Road

Traffic flows on Windellama Road at the proposed Project access were analysed in the TIA using automatic tube counts (**Appendix 14**). The results indicate that Windellama Road carries a maximum of 120 vehicle per hour at the Project access, on weekdays between 7 am and 8 am, and 3 pm and 4 pm. Weekend counts peak at approximately 100 vehicles per hour.

6.11.1.3 Intersections

The following intersections along the proposed transport route for the Project were assessed in the TIA:

- Braidwood Road/Bungonia Road.
- Braidwood Road/Sloane Street.
- Bungonia Road/Forbes Street.
- Bungonia Road/Memorial Road.
- Hume Street/Garroorigang Road/Mazamet Road.
- Sydney Road/Union Street/Lagoon Street.
- Sloane Street/Garroorigang Road.
- Windellama Road/Rifle Range Road.

The assessment of intersection performance based on the criteria outlined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002) and using SIDRA Intersection modelling software indicate that the signalised intersection at Sydney Road/Reynolds Street/Lagoon Street/Union Street operate at a satisfactory level of service (LoS) 'C' during the weekday morning peak. However, on weekday afternoon peaks, the intersection experiences LoS 'D' (i.e. near capacity), which is associated with general traffic and pick up traffic related to Goulburn North Public School and St Joseph's Primary School.

All other intersections operate satisfactorily with LoS 'A' and LoS 'B'.

6.11.1.4 Road Safety

Historic crash data was sourced from the TfNSW Centre for Road Safety for the period between January 2018 to December 2022, in the vicinity of the Project Area including the proposed Project access on Windellama Road. The historic crash data showed three crashes in the assessed period near the Project Area. None of the crashes involved a fatality or a serious injury.

6.11.1.5 Public Transport and Active Transport

Public transport services within the immediate vicinity of the Project Area are limited. Goulburn railway station is located on Sloane Street on the southern edge of the main Goulburn commercial centre, providing railway connectivity to Sydney, Canberra and Melbourne.

There are no designated public bus routes operating near the Project Area and there is no active transport infrastructure (i.e., formal pedestrian or cyclist facilities) within the vicinity of the Project Area.

6.11.2 Methodology

The assessment approach for the TIA involved:

- Review of background information (refer to **Section 6.11.1** and **Appendix 14**).
- Consultation with TfNSW and Council (refer to **Appendix 14**).
- Inspections of the Project Area and surrounding road network, specifically inspections of the proposed transport route for travel between the Hume Highway and the Project access.
- Traffic surveys (2023) and SIDRA modelling of key intersections along the transport route (refer to **Appendix 14**).
- Estimating traffic generation and distribution of Project related traffic for construction, operation and decommissioning phases of the Project (refer to **Appendix 14**).
- Assessment of the potential traffic impacts, including cumulative impacts, to the surrounding road network associated with the Project, including both transport route options from the Hume Highway to the Project Area, and identification of measures to mitigate impacts (refer to **Section 6.11.3** and **Section 6.11.4**, and **Appendix 14**).

6.11.3 Assessment of Impacts

Traffic and transport impacts associated with the Project would primarily occur during the construction phase as a result of the increase in traffic movements associated with workforce mobilisation and delivery of materials and equipment. The Project proposes to utilise two transport route options from the Hume Highway to the Project Area. Both these routes have been assessed in the TIA. Impacts during the operational and decommissioning phases would be lower compared to the construction phase.

The following sections discuss assessment of traffic and transport impact relating to the Project. Cumulative traffic and transport impacts are discussed in **Section 6.18.3**.

6.11.3.1 Vehicle Types

Heavy vehicles (non-OSOM) to be utilised during the construction period would include the following type of vehicles:

- Semi-trailers (19 m) for the delivery of solar panels and associated components within shipping containers.

- Heavy Rigid Vehicles (HRV 12.5 m) or truck and dogs for delivery of building materials such gravel and building materials.
- Agitators (concrete trucks).
- Vans and utilities.

OSOM vehicles will be used to transport battery and substation components to the Project Area. The OSOM vehicles will essentially be low loader trailers with an overall length ranging between 30 m to 50 m.

Construction workforce vehicles will include shuttle busses and passenger vehicles (light vehicles).

6.11.3.2 Daily Traffic Generation

The estimated daily two-way traffic generation during peak construction is summarised in **Table 6.30**.

Table 6.30 Peak Construction Daily Traffic Generation

Traffic Generation by Vehicle Type	Total Trips per Day (Two-way Trips)	Daily Inbound Trips	Daily Outbound Trips
Light Vehicles (primarily for supervisors, engineers, specialized contractors and support staff)	250	125	125
Shuttle Buses (construction workforce)	60	30	30
Heavy Vehicles (Semi-Trailers and flat be trucks)	90	45	45
Single Unit Trucks	50	25	25
Total	450	225	225

With regard to OSOM vehicles, it is estimated that there will be a total of 10 OSOM vehicle deliveries to the Project Area over the entire construction of the Project (5 OSOM loaded inbound + 5 OSOM outbound empty vehicle trips).

Staff travelling to and from the site during operation of the Project would generate up to 10 light vehicle two-way movements per day. The operations phase would also see the occasional heavy vehicle movement for waste collection or general maintenance and deliveries.

The decommissioning phase is expected to generate approximately 30% less traffic compared to the peak construction period.

6.11.3.3 Swept Paths

Swept paths along the proposed Option 2 transport route from the Hume Highway to the proposed intersection at the Project's primary access from Windellama Road were assessed and details are provided in Appendix C of the TIA in **Appendix 14**. The swept path analysis includes assessment of the following vehicle sizes:

- 19 m semi-trailer
- 38 m OSOM vehicle (transformer transport)
- 50 m OSOM vehicle (transformer transport).

The swept path analysis indicated that the existing road geometry between the Hume Highway and the Project access on Windellama Road can adequately accommodate general construction heavy vehicles (19 m semi-trailers) and 38 m OSOM vehicles without the need for road upgrades. Noting this, Council indicated a preference for the construction traffic to utilise Option 2, specifically the southern Hume Highway exit and Garroorigang Road and Sloane Street (south) to access Bungonia Road and onto Windellama Road. Option 2 will avoid schools and a higher number of residential properties. Option 1 will provide an alternative route (outside school zone times) for delivery of large battery and substation components as it is a designated Oversize Over Mass (OSOM) route.

The swept path analysis for the largest OSOM vehicle (50 m) indicated that minor temporary works at Braidwood Road / Bungonia Road intersection and traffic control will be required to accommodate the OSOM vehicles. These works may include temporary removal of street furniture (such as signage), streetlights and/or medians. Lightsource bp has sought to consult with Council and will continue to consult with Council regarding the need for temporary road works along the transport route through Goulburn.

No Project related construction traffic (heavy) will utilise Option 1 during school zone hours of operation (8:00 am–9:30 am and 2:30 pm–4:00 pm on school days).

6.11.3.4 Project Access and Intersection Upgrade on Windellama Road

The Project would have a direct access from Windellama Road. As discussed in **Section 3.4.2**, intersection works are proposed on Windellama Road to upgrade the Project access to accommodate heavy vehicle access. The proposed upgrade will consist of a three-way intersection, with a connecting internal access road extending into the Project Area (refer to concept drawings and layout in **Appendix 4**). The intersection will provide an auxiliary and/or protected (channelised) turn lane intersection treatment to accommodate the swept path turning movement by the largest types of trucks (50 m) requiring access to the Project Area.

The Safe Intersection Sight Distance (SISD) was calculated for the proposed intersection on Windellama Road, based on Table 5.2 of the *Guide to Road Design Part 3: Geometric Design* (Austroads, 2021). Assuming a design vehicle speed of 110 km/h (representing the posted speed limit of 100 km/h plus 10 km/h) and a driver reaction time of 2.0 seconds, a SISD of 285 m is required. Site investigations confirmed that the available sight distance at both directions exceed 300 m. Thus, the proposed intersection will be located and constructed with adequate entering sight distance to traffic along Windellama Road.

An assessment of intersection performance based on criteria outlined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002) and using SIDRA Intersection modelling software indicates that the proposed intersection will perform acceptably with LoS 'A' during both the morning and afternoon peak periods.

6.11.3.5 Impacts on Road Network Capacity

Existing traffic flows (refer to **Section 6.11.1**) and traffic flows generated by the Project were analysed using SIDRA modelling. Results were compared to the 'Existing' scenario to determine the level of impact associated with the construction phase of the Project. The results show that the additional traffic associated with peak construction of the Project will not adversely impact on the operation or LoS at any of the key intersections along both Option 1 and Option 2 routes.

In summary, the road network can satisfactorily accommodate the peak construction period of the Project.

6.11.3.6 Oversize Overmass Vehicle Route

As discussed in **Section 6.11.3.3**, minor temporary works at the Braidwood Road / Bungonia Road intersection and traffic control will be required to accommodate the largest OSOM vehicles (50 m). These works may include temporary removal of street furniture (such as signage), streetlights and/or medians. Swept path drawings for 50 m OSOM vehicles are provided in **Appendix 4** and show the extent of temporary works that may be required. Lightsource bp has sought to consult with Council and will continue to consult with Council regarding the need for temporary road works along the transport route through Goulburn.

Option 1 between the Hume Highway and Bungonia Road is an approved and designated OSOM vehicle route. Option 1 would therefore be utilised for OSOM vehicle movements, namely 10 vehicle trips (two-way) throughout the construction phase of the Project. OSOM deliveries via Option 1 would be undertaken with appropriate traffic management measures, including but not limited to, the usage of pilot vehicles, warning signage, and/or lights.

Restricted Structure

Lansdowne Bridge on Bungonia Road has been identified as a restricted structure. Consultation with TfNSW has confirmed that Lansdowne Bridge was replaced in 2019 from a timber structure to a new concrete bridge. TfNSW also confirmed that Council was now the relevant road authority for the new bridge. Consultation with Council confirmed that:

- Lansdowne Bridge was designed to AS5100-2004 Bridge Design with a traffic loading of SM1600.
- The design traffic speed is 70 km/h, with a posted speed limit of 60 km/h.
- The bridge has been designed to a Heavy Load Platform Loading of HLP320, restricted to one vehicle at any one time.
- HLP320 Loading may be permitted up to +/- 1 m laterally in either direction from centre of carriageway, with vehicle speed restricted to 10 km/h.

The TIA concluded that subject to a detailed vehicle loading analysis for OSOM (to be completed by the EPC contractor once OSOM vehicle dimensions and loadings are confirmed) and implementation of the control measures highlighted by Council, the upgraded bridge can accommodate the Project's OSOM vehicles.

6.11.3.7 Road Safety

As stated in **Section 6.11.3.4**, the proposed Project access at Windellama Road meet the design requirements and SISD defined by Austroads.

The selection of Option 2 as the primary route for construction traffic will avoid potential conflicts with sensitive land uses including Goulburn North Primary School and St Joseph Primary School.

6.11.3.8 Internal Roads and Car Parking Arrangements

Suitable on-site manoeuvring areas will be available within the Project Area to allow larger vehicles to safely manoeuvre off the public road network, into and around the Project Area and exit the Project Area safely onto the public road network.

All vehicles would enter and exit the Project Area to / from the public road network in a forward direction only. All vehicles generated by construction staff would be accommodated within on-site parking areas.

6.11.3.9 Emergency Vehicle Access Arrangements

The internal access track network provided between the Project's primary access (on the west via Windellama Road) and Kooringaroo Road (on the east) will facilitate an alternative evacuation path for site personnel and the general community in the case of emergencies. In addition, the perimeter fencing will have up to 10 emergency gate accesses for emergencies.

Whilst a narrow road, the available width along Kooringaroo Road (4 m wide lanes plus shoulders, sealed and/or gravel) is considered satisfactory for the travel path of an emergency vehicle (including fire fighting vehicles). The available road shoulders will allow vehicles to pass an emergency vehicle travelling in the opposite direction.

6.11.3.10 Public Transport, Pedestrians and Cyclists

Given the proposed weekday construction hours are from 7 am to 6 pm, the construction workforce trips would typically occur before 7 am and after 6 pm, which would generally not coincide with school bus services. Heavy vehicles would arrive and depart throughout the day. Any potential interaction with school bus operations and stops would be considered in the Construction Traffic Management Plan (CTMP) to minimise any delays, disruptions, and safety risks.

Regarding pedestrians and cyclists, the rural nature of the Project Area implies that most pedestrian and cycling activity occur within Goulburn town where there are footpaths provided. Given that the proposed construction working hours are from 7 am to 6 pm, the workforce vehicle trips would be outside the normal peak period for walking and cycling activity in Goulburn. The distances between towns and other major centres in the area discourages casual cycling outside of the town areas.

It is considered that with the additional traffic management and mitigation measures proposed (refer to **Section 6.11.4**), the Project will have an acceptable impact in terms of pedestrian and cyclist safety.

6.11.4 Management and Mitigation Measures

The following management measures are recommended to minimise traffic and transport impacts associated with the construction, operation and decommissioning of the Project:

- Intersection works will be undertaken on Windellama Road to upgrade the Project access to accommodate heavy vehicle access. The upgraded intersection will provide an auxiliary and/or protected (channelised) turn lane intersection treatment to accommodate the swept path turning movement by the largest types of trucks (up to 50 m) requiring access to the Project Area.
- No Project related construction traffic (heavy) will utilise Option 1 during school zone hours of operation (8:00 am–9:30 am and 2:30 pm–4:00 pm on school days).
- Lightsource bp will continue to consult with Council regarding the extent and need for minor temporary road works at key intersections for the OSOM vehicles.

- 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, Goulburn Mulwaree Council 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.
- A detailed OSOM route assessment would be undertaken by the EPC contractor and detailed in a CTMP when OSOM vehicle dimensions and loadings are confirmed to determine traffic management requirements.
- OSOM vehicles will be governed by the CTMP that will be developed before approval for transport is granted. The CTMP will include, but will not be limited to, procedures for escorts of OSOM vehicles, traffic control plans, communications protocols to advise affected communities, consideration of cumulative impacts, etc.
- Deliveries to the Project Area (excluding OSOM) would be carried out by 19 m semi-trailers to comply with heavy vehicle restrictions on some parts of the proposed transport route for Option 2.
- The community would be notified in advance of proposed road and transport network changes through appropriate media and other forms of community liaison.
- 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.
- A shuttle bus service will be implemented to provide transportation to and from key worker accommodation sites, which will reduce the potential number of light vehicle movements associated with the Project.
- Lightsource bp will institute a program designed to educate site workers about safe driving and will implement a driver's code of conduct.
- To minimise impacts on schools, temporary road closures for OSOM movements will be avoided during peak school times. Vehicle layovers will be identified to allow vehicles to wait until appropriate times for travel.
- Dilapidation surveys covering pavement, drainage, and bridge structures will be undertaken in consultation with TfNSW and Council for the proposed transport routes before and after construction. Regular inspections and consultation with Council and Lightsource bp will be undertaken. Any damage resulting from construction traffic, excluding normal wear and tear, will be repaired.
- OSOM vehicles will secure the required permits from the National Heavy Vehicle Regulator (NHVR), effectively replacing approvals that were previously granted by TfNSW and councils. Applications will be submitted to the NHVR.

6.12 Water Resources

Impacts to water resources were identified as a key concern by the community throughout the stakeholder consultation process (refer to **Section 5.5**). Concern was raised regarding deterioration of water quality in receiving watercourses and the Sydney Drinking Water Catchment, increased erosion risk and stormwater runoff impacts, loss of water and impact to downstream water users.

Lightsource bp has sought to avoid and minimise potential water related impacts through the Project design. Specifically, the Project has been designed as follow to avoid and minimise impacts to water resources within and downstream of the Project Area:

- Avoiding placement of Project infrastructure within flood prone areas (1% Annual Exceedance Probability (AEP)).
- Designing solar panels with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event.
- Maintaining setback buffer of approximately 20 m to 40 m around second order and higher streams, in particular where these have biodiversity value.
- Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek.

A Water Resources Impact Assessment (WRIA) was prepared by Umwelt to assess the potential impacts of the Project on flooding, groundwater levels, erosion and sedimentation, water quality, downstream water users and water sourcing and licensing.

The WRIA is provided in full in **Appendix 15** and addresses the requirements of the SEARs with respect to water, as listed below:

- A detailed and consolidated site water balance and an assessment of the likely impacts of the development (including flooding) on surrounding watercourses (including their Strahler Stream Order) and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts including water management issues having regard to the Solar Guidelines.
- Details of water requirements and supply arrangements for construction and operation.
- An assessment of the potential impacts of the development on the Sydney drinking water catchment, including consideration of Water NSW's current recommended practices and standards, stormwater quality modelling (MUSIC), and whether the development can be constructed and operated to have a neutral or beneficial effect on water quality consistent with the provisions of *State Environmental Planning Policy (Biodiversity and Conservation) 2021*.
- Where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the NSW Government's *Controlled activities – Guidelines for riparian corridors on waterfront land* and (if necessary) *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*, and *Policy & Guidelines for Fish Habitat Conservation & Management*.
- A description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom, 2004).
- Assessing the impacts of the development, including any changes to flood risk and overland flows on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required.

6.12.1 Existing Environment

6.12.1.1 Hydrology

The Project Area is located within the Gundry Creek catchment which is within the Hawkesbury-Nepean catchment, part of the Sydney drinking water catchment. Elevations within the Project Area range between 710 m AHD from the ranges along the eastern boundary, to approximately 645 m AHD on the Gundry Creek floodplain at the northern boundary.

As shown in **Figure 6.17**, watercourses within the Project Area range from 1st to 6th order streams (based on the Strahler stream ordering system).

Gundry Creek (a 6th order perennial), Bullamalito Creek (a 5th order perennial) and an unnamed tributary of Bullamalito Creek (a 4th order non-perennial) traverse the Project Area, draining from south to north and east to west. Two unnamed 3rd order streams are also present in the Project Area, one draining from south to north across the northwestern extent of the Project Area and the other a southerly flowing tributary of the unnamed 4th order stream in the southeastern portion of the Project Area.

Gundry Creek is formed at the confluence Quialigo Creek (5th order) and Bullamalito Creek, immediately to the west of the Project Area, and drains in a northerly direction through the northern portion of the Project Area. Gundry Creek flows into the Mulwaree River approximately 10 km north-west of the Project Area at the southern outskirts of Goulburn.

In reviewing the site watercourse mapping, it became evident that some of the hydroline data was inconsistent with the watercourse alignments identified by aerial imagery and the topographical data. These inconsistencies are largely limited to a small number of 1st order watercourses.

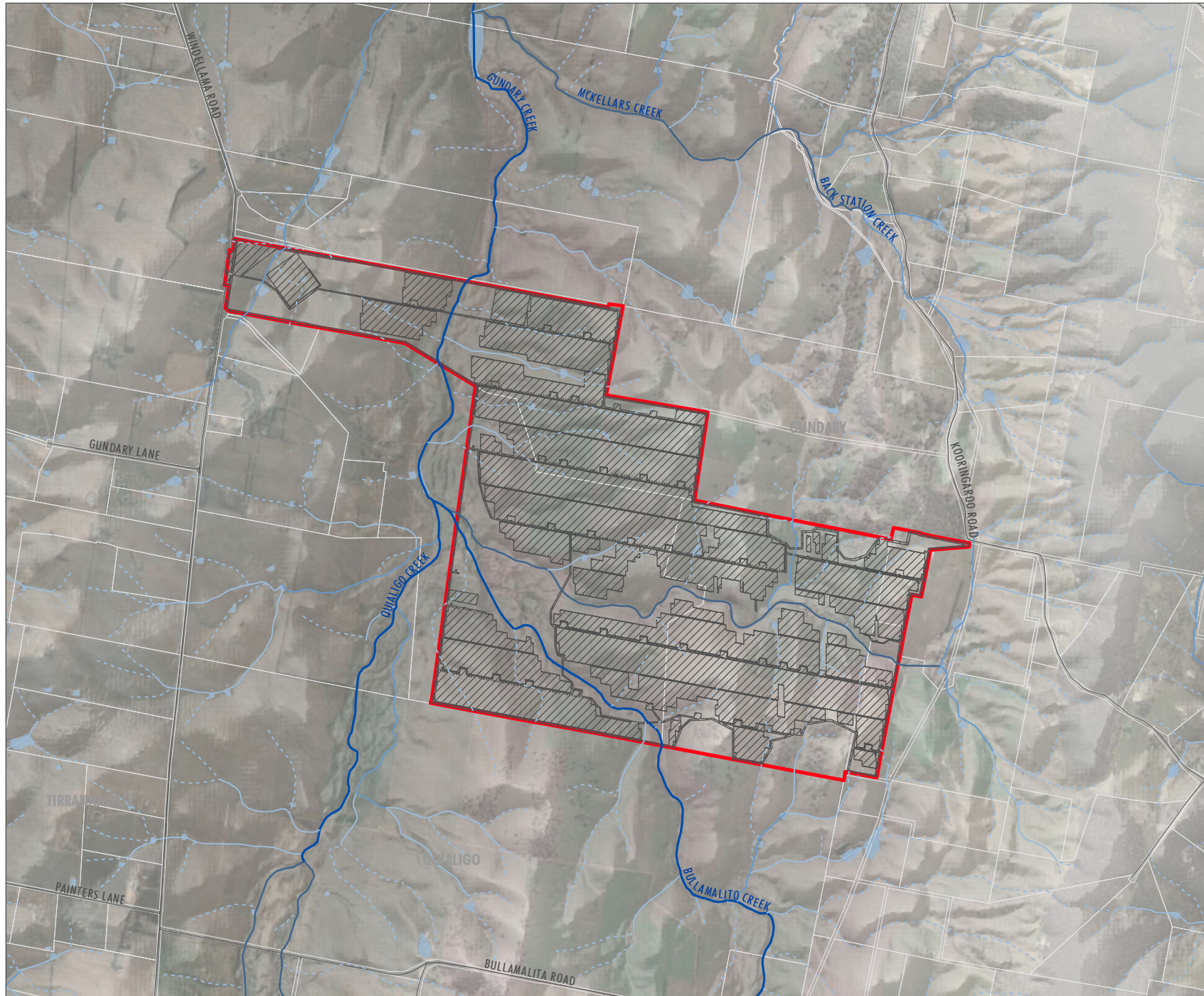
The alignments and Strahler stream orders of the mapped watercourses throughout the site have some significance with respect to potential development constraints and the requirement for appropriate riparian corridor widths to be maintained.

Therefore, baseline monitoring of the more significant watercourses within the Project Area was undertaken by Umwelt in April 2023 to establish the general condition of the watercourses and to ground truth the alignments and confluence locations of mapped 1st order watercourses draining to Bullamalito Creek and the 4th order unnamed tributary of Bullamalito Creek.

Surface water within the region of the Project Area is managed under the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2023 for the Mulwaree River Water Source, within the Upper Nepean and Upstream Warragamba Extraction Management Unit (DPE, 2023b).

A search of the NSW Water Register indicated that for the 2021/2022 financial year there were 27 Water Access Licences (WALs) with a total of 1,226 unit shares allocated in the Upper Nepean and Upstream Warragamba Management Area, for the Mulwaree River Water Source. There are no WALs allocated for the Mulwaree River Water Source within the Project Area or immediately downstream.

FIGURE 6.17
Hydrological Context



Legend

- Project Area
 - Development Footprint
 - Cadastre Boundaries
 - Waterbody
 - Roads
- Strahler Stream Order**
- 1st Order Stream
 - 2nd Order Stream
 - 3rd Order Stream
 - 4th Order Stream
 - 5th Order Stream or Higher



0 500 1,000
Meters

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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6.12.1.2 Groundwater

Groundwater within the region of the Project Area is managed under the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023* for the Lachlan Fold Belt Greater Metropolitan Groundwater Source (DPE, 2023b).

There is one WaterNSW registered groundwater bore (GW068697) within the southern part of the Project Area on Lot 1 DP 870101 (refer to **Figure 6.18**). The bore is described as being drilled to 30 m in depth with a standing water level of 21 m below ground level (mbgl), last recorded in 1990 and is used for domestic water supply purposes under the basic landholder rights works approval 10WA115059, for extraction of water from the Lachlan Fold Belt Greater Metropolitan Groundwater Source.

There are five groundwater bores within the vicinity of the Project Area, one to the east (GW115731) with a standing water level of 10 mbgl, and three to the southwest (GW037097, GW104082, GW110622), with drilled depths greater than 50 m (refer to **Figure 6.18**). The standing water level for GW110622 was last recorded as 22 mbgl in 2009. The purpose of these bores is indicated as for stock and domestic usage.

Groundwater Dependent Ecosystems (GDEs) are present within the channels of Bullamalito Creek and Gundry Creek, which flow through the Project Area. These are aquatic GDEs, recorded as high potential from a national assessment. A larger area of terrestrial GDE is located east of the Project Area, along and east of the ridge line, predominantly with a low potential to interact with groundwater, as shown on **Figure 6.18**.

Mapping provided by the NSW Government (via the SEED portal) was reviewed for groundwater vulnerability within and surrounding the Project Area and showed there are no groundwater vulnerability areas mapped for the Project Area.

FIGURE 6.18

Groundwater Dependent Ecosystems and Groundwater Bores

Legend

- Project Area
 - Development Footprint
 - Cadastre Boundaries
 - Waterbody
 - Watercourse (Perennial)
 - Watercourse (Non-perennial)
 - Roads
 - Groundwater Borehole
- Groundwater Dependant Ecosystem - Aquatic**
- High potential GDE - from national assessment
 - Moderate potential GDE - from national assessment
- Groundwater Dependant Ecosystem - Terrestrial**
- High potential GDE - from national assessment
 - Moderate potential GDE - from national assessment
 - Low potential GDE - from national assessment
 - High potential GDE - from regional studies
 - Moderate potential GDE - from regional studies
 - Low potential GDE - from regional studies



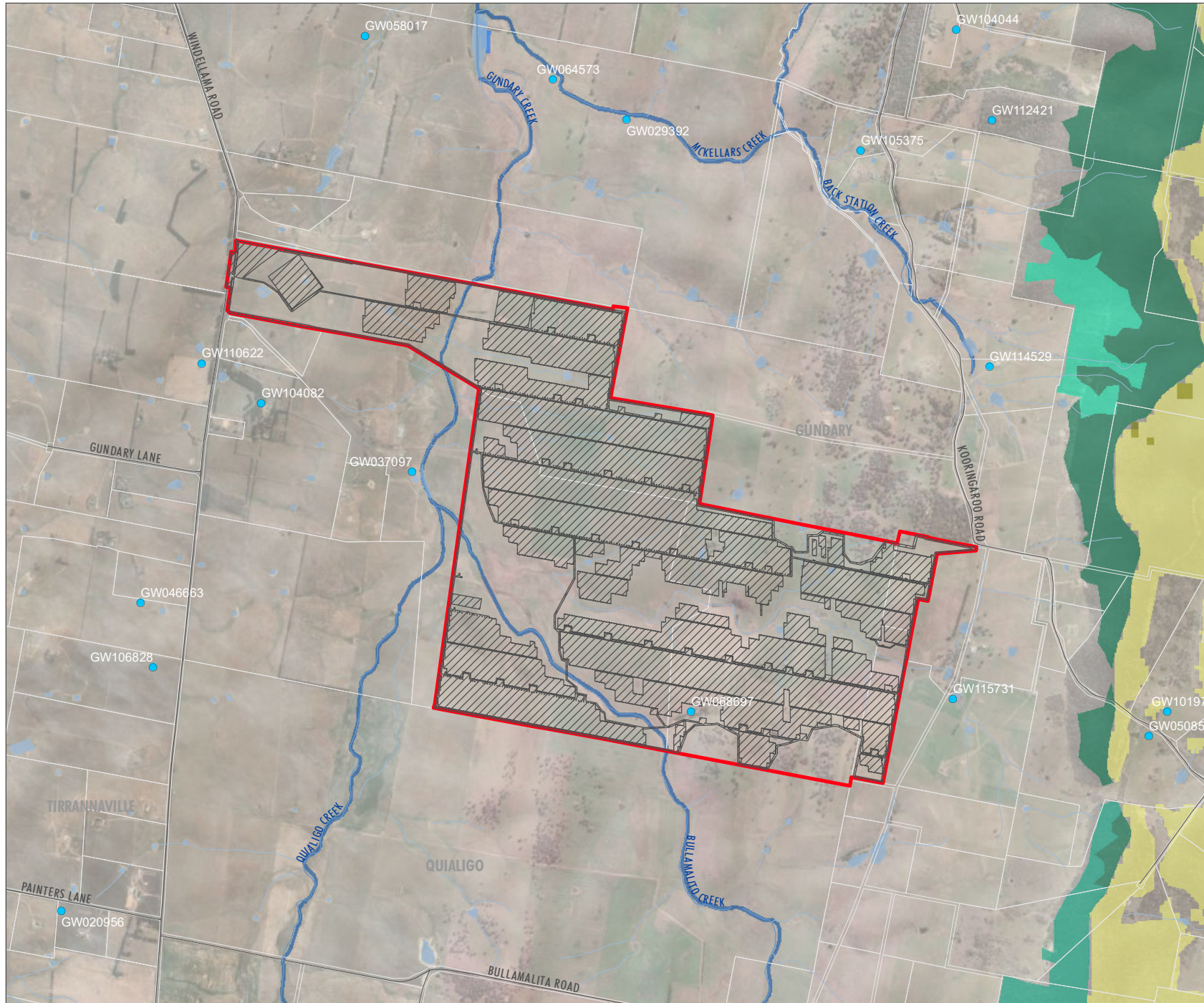
0 500 1,000

Meters

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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6.12.1.3 Flooding

Flooding within the Project Area is not recorded and no anecdotal information, such as surveyed flood debris marks on landmarks such as fencing, were available for this study. Gundry Creek, which drains in the Project Area, is a tributary of the Mulwaree River. Ground levels in the Project Area are about 15 m above the bank level of the Mulwaree River, at the Gundry Creek confluence and therefore, the Project Area would not be impacted by river flooding.

6.12.1.4 Aquatic Habitat

Aquatic habitats within the Project Area are associated with Gundry Creek and Bullamalito Creek, including their unnamed ephemeral tributaries and farm dams across the Project Area. The creeks throughout the Project Area are degraded as a result of the historical and current agricultural practices.

Under the fish habitat classes and types in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013), the habitat has been assessed as Type 3, Class 3 (minimal key fish habitat) as the creeks are ephemeral tributaries with intermittent flow and sporadic refuge for aquatic fauna.

Gundry Creek and Bullamalito Creek are mapped as Key Fish Habitat, with the fish status for Gundry Creek being mapped as 'poor' on the Fisheries NSW Spatial Data Portal (DPI, 2024).

6.12.2 Methodology

6.12.2.1 Surface Water Quality

The methodology for assessment of potential surface water quality impacts included:

- Desktop review and analysis of existing surface water quality information.
- A qualitative assessment of the quality and quantity of pollutants that may be introduced during construction and operation of the Project, and the impact that this may have on surface water quality.
- Recommendations for appropriate treatment measures to mitigate the impacts of construction and operation on surface water quality.

The methodology for assessing water quality impacts included:

- Collating existing water quality data.
- Undertaking a Neutral or Beneficial Effects (NorBe) assessment using the Model for Urban Catchment Improvement Conceptualisation (MUSIC) based on the *Neutral or Beneficial Effect on Water Quality Assessment Guideline* to estimate the pollutant loads and concentrations in stormwater runoff discharged from the Project catchment prior to and post Project development.
- Reporting the results of the MUSIC modelling.

6.12.2.2 Groundwater

The following tasks were completed as part of the groundwater impact assessment:

- A desktop study of existing hydrogeological conditions at the Project Area including:
 - Description of aquifers, depth to groundwater, groundwater quality and groundwater flow directions.
 - Existing groundwater users, groundwater dependent ecosystems and groundwater-surface water interaction.
 - Review of relevant previous investigations.
- A bore census was undertaken to confirm the location of the bores and associated details.
- Assess any potential dewatering requirements and associated drawdown impacts.

6.12.2.3 Hydrology

A site inspection of the Project Area was undertaken on 17 and 18 April 2023 by Umwelt to observe the baseline condition of the more significant watercourses within the Project Area, including the extent of existing erosion, vegetation type and cover, and structure of the watercourse channels. The site inspection was also undertaken to ground truth the mapped lower order hydrolines draining to Bullamalito Creek and the 4th order unnamed tributary of Bullamalito Creek and confirm the presence of a watercourse based on the presence of defined bed and banks.

6.12.2.4 Flooding

Flood modelling was undertaken as part of a Flood Impact and Risk Assessment by WRM Water and Environment (WRM) (provided in **Appendix 15**) as an input into the WRIA, to identify potential impacts on surface water resources and flood regimes associated with the Project.

The two-dimensional TUFLOW hydraulic model was used to simulate the flow behaviour through the Project Area. The hydraulic model was run for the 10%, 1%, 0.5%, and 0.2% AEP design events and PMF for their respective critical durations. The model results were used to assess flooding behaviour for the existing conditions (i.e. pre-development). The existing conditions model was then adapted to represent the proposed developed conditions (i.e. post-development), to assess the potential extent and magnitude of impacts of the Project. The modelling results are briefly discussed in **Section 6.12.3.3** with further detail including flood maps provided in **Appendix 15**.

6.12.3 Assessment of Impacts

6.12.3.1 Erosion and Sedimentation

During construction and decommissioning of the Project, soils would be subject to disturbance, during the removal of vegetation, excavation works and stockpiling of materials, leading to sediments and/or pollutants being entrained in rainfall runoff and entering local watercourses. Discharge of polluted rainfall runoff from the Project has the potential to result in the deterioration of environmental values and water quality objectives.

Throughout the construction phase of the Project, erosion and sediment controls (ESCs) will be established in general accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2C: Unsealed Roads* (DECC, 2008) (i.e. the 'Blue Book').

An erosion hazard assessment undertaken as part of the WRIA determined that the Project Area has a low erosion hazard, and as such standard erosion control measures will be applied during construction with no timing restrictions on works. This does not apply, however to waterfront land (i.e., land within 40 m of the top of a bank of a defined watercourse) as it is considered by the 'Blue Book' to have a very high erosion hazards and therefore timing restrictions apply to any works on these lands. While the Project design has aimed to avoid works close to or within watercourses, any works on waterfront land, including watercourse crossings, will be undertaken in accordance with the *Controlled activities – Guidelines for riparian corridors on waterfront land*. During detailed design, consultation will be undertaken with DPI Fisheries to determine if any of the proposed watercourse crossings require consideration of fish passage. For any crossings that do require consideration of fish passage, the relevant DPI Fisheries guidelines will be considered during the detailed design process.

All temporary drainage and sediment controls will be designed for a 10-year Average Recurrence Interval (ARI) critical duration storm event. For discrete works where an area greater than 2.19 ha is disturbed, sediment basins will be installed, subject to detailed design.

With the implementation of erosion and sediment control measures as well as appropriate measures to manage hazardous materials such as oils, fuels and other chemicals potential construction-related stormwater pollution impacts can be appropriately managed and are expected to be negligible.

6.12.3.2 Water Quality

As the Project is located within the Sydney drinking water catchment, it must be able to demonstrate a Neutral or Beneficial Effect (NorBE) on water quality in accordance with the WaterNSW guidelines (2022).

The water quality assessment for the Project was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) developed by the Cooperative Research Centre for Catchment Hydrology to estimate the pollutant loads and concentrations in stormwater runoff discharged from the Project catchment prior to and post Project development. Given the uncertainty in MUSIC modelling outcomes, WaterNSW requires modelling to aim for a 10% improvement in post-development pollutant (total suspended solids (TSS), total nitrogen (TN) and total phosphorus (TP)) loads on comparison of the pre- and post-development scenarios to demonstrate the NorBE on water quality can be met (WaterNSW, 2022). Further to the criteria relating to pollutant loads, TN and TP concentrations must be equal to or better compared to the pre-development case for between the 50th and 98th cumulative frequency percentiles over the five-year modelling period when runoff occurs.

For modelling purposes, the Project Area was divided into five catchment areas, corresponding with the drainage channels for Bullamalito Creek, Gundry Creek and tributaries. MUSIC modelling of the pre- and post-development scenarios was undertaken to estimate the discharged pollutant loads and stormwater discharge concentrations that would be produced from each of the five modelled catchments within the Project Area.

The post-development scenario included the Project infrastructure and the following stormwater treatment measures:

- Vegetated swales along the full length of downslope side of solar panel arrays.
- Bioretention basins (40 m², 0.8 m filter depth, no exfiltration) to treat runoff from the Centralised BESS compound and the sub-station/operations and maintenance facility compound with bioretention discharge draining to vegetated swales.

Table 6.31 presents a comparison of the modelled mean annual pollutant loads for the pre- and post-development (with treatment) scenarios and the estimated percentage reduction in pollutant loads discharged from the Project Area post-development.

Table 6.31 Mean Annual Water Pollutant Loads

Pollutant	Pre-development (kg/yr)	Post-development (kg/yr)	Load Reduction (%)
Total suspended solids	57,600	37,100	35.6
Total nitrogen	232	162	30.2
Total phosphorus	1,190	1,110	6.7

MUSIC modelling predicted reductions in all pollutants for the post-development scenario due to the implementation of stormwater treatment measures, however, the reduction associated with TP is less than the 10% which is required by WaterNSW to account for MUSIC modelling uncertainty and to demonstrate that a NorBE on water quality can be achieved (WaterNSW, 2022).

Additionally, post-development TN and TP concentrations do not achieve the NorBE criteria of being better than the pre-development scenario between the 50th and 98th cumulative frequency percentiles.

TN concentrations are better for the post-development scenario above the 82.5th percentile result and TP concentrations are better for the post-development scenario above the 95th percentile result.

While the water quality modelling indicates that WaterNSW NorBE criteria is not achieved for mean annual TP loads, TN concentrations and TP concentrations, the impacts to receiving water quality downstream of the Project are expected to be negligible provided effective rehabilitation of Project Area disturbance is undertaken post-construction. However, refinement of the MUSIC water quality model will be undertaken during the detailed design phase of the Project to ensure the model reflects the detailed design and to optimise the operational Project stormwater treatment train. An additional measure that will be considered as part of the Project detailed design is to identify eroding gullies within the Project Area and rehabilitating them as part of the Project which will improve post-development stormwater quality.

Other potential water quality impacts during the operational phase associated with the day-to-day activities during this phase would be limited to:

- Stormwater runoff from impervious surfaces resulting in localised erosion.
- Accidental spills or discharge through use and storage of chemicals such as fuel.

The potential for ongoing erosion post construction is considered to be low provided appropriate rehabilitation of disturbed areas is undertaken and any areas identified as exhibiting signs of erosion above expected background levels are addressed.

All hazardous materials and chemicals will be stored in accordance with relevant Australian standards and other state and local guidelines including the NSW EPA's *Storing and Handling Liquids: Environmental Protection – Participants Handbook*.

Based on the above, and with the implementation of management measures outlined in **Section 6.12.4**, water quality impacts during the operational phase are expected to be negligible.

6.12.3.3 Flooding

Impacts of the Project on flood depth, velocity and hazard for the 10%, 1%, 0.5%, 0.2%, and 0.05% AEP events and PMF event were assessed.

Flood Hazard and Risk

Flood hazard results for pre-developed (existing) and post-developed conditions show that high flood hazard is reached within the deeper central flow path locations in the Project Area, with shallower and overbank areas being considered low hazard.

There was minimal change in flood risk to the internal and external watercourse flows between pre-developed (existing) and post-developed conditions. Access points to the Project Area were predicted to be of low flood hazard.

Project fencing is likely to become a trap for loose vegetation in high flow events and may put an additional structural loading on the fence which may cause damage. To reduce the likelihood of debris loading, Lightsource bp is proposing to install riparian fencing, consisting of a flood permeable configuration (such as a latched tube watercourse crossing), at each watercourse crossing. This would allow low afflux at the fence and reduce the likelihood of increased upstream water levels. With the implementation of measures outlined in **Section 6.12.4**, it is expected that the fence would be of low flood hazard.

The results further show that the infrastructure and solar panels within the Project Area are located outside areas of major flood hazard. Peak stormwater discharges from the Project Area for impervious areas may increase slightly through the creation of compacted gravel roads and some small operational buildings. However, potential impacts to drainage features and downstream watercourses are likely to be minimal due to the relative size of the Project Area in relation to the size of the receiving catchments, and the distributed nature of minor impacts.

Flow Rates, Depth and Velocity Impacts Relating to Project Access, Solar Arrays, Substation and BESS

Additional runoff from solar panels is unlikely. While solar panels are wholly impervious, runoff from panels will drain onto the existing pervious landform and soils and is therefore not connected to the downstream drainage system.

Modelling results show that the location of the solar panels, substation, BESS and access from Windellama Road are outside of the flood extent and considered suitable in terms of flooding constraints. The panels have been designed with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event. Furthermore, areas where the overland flow path exceeds depth and velocity values expected to be high risk for Project infrastructure have been 'excluded' from the Development Footprint. For the remaining areas, the probability of erosion and scour is expected to be minimal.

Flow Rates, Depth and Velocity Impacts Relating to Other Infrastructure and Access Roads

Access tracks, watercourse crossings (i.e., culvert crossings or causeways) and buried cable reticulation are the only works proposed within or near to the watercourses. Peak flood velocities crossing access tracks will be managed during construction to ensure sediment is not mobilised in a significant rain event. Inspection after storm events will be required to ensure erosion does not impact the access roads through the life of the Project. Erosion and sediment controls will be implemented during construction in accordance with the *Guidelines for Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) that provide for industry to reduce the impacts of land disturbance activities on watercourses.

Security fencing around the perimeter of the Development Footprint has the potential to trap and accumulate flood debris and impede flows. This may result in minor increases in water level upstream of the blockage and potential redistribution of flow at the boundary. Given the local topography, the proposed fence design at watercourse crossings and measures outlined in **Section 6.12.4**, any redistribution of flow through fence blockage would be localised and the risk of any potential blockages is low. Any inundation outside of the mapped flood extents is predicted to be minor.

6.12.3.4 Water Supply

Water requirements for the Project are described in **Section 3.7**. Any water supplied to the Project from the existing on-site groundwater bore or farm dams will be sourced under agreement with relevant landholders while ensuring any licences and approvals are obtained.

There are a number of man-made farm dams within the Project Area, currently used for livestock watering. The aggregate capacity of the farm dams has been estimated to be approximately 48 ML using aerial imagery (to estimate aggregate farm dam surface area) and an assumed average depth of 1.2 m. Water from harvestable rights dams with a capacity of up to 10% of the average annual runoff for the landholding in coastal draining catchments may be used for any purpose (WaterNSW, 2023). The Maximum Harvestable Right Dam Capacity (MHRDC), from which water can be used for any purpose (i.e. MHRDC based on 10% of average annual runoff), for the Project Area landholding is 49.56 ML. As such, any water sourced from the existing harvestable rights dams within the Project Area will not require licensing unless the aggregate capacity of the dams is above 49.56 ML.

Water sources would be determined prior to the commencement of construction in consultation with suppliers and landholders. Town water supplies will generally be avoided for use in construction but may be used where appropriate and available.

As surface water or groundwater used by the Project will be sourced under agreement with the landholder and in accordance with the relevant water source WSP, no impacts to surface water or groundwater availability in the vicinity of the Project are anticipated.

Loss of catchment yield associated with containment of runoff from disturbed areas is expected to be negligible and will be temporary during the construction and decommissioning phases. As such, impacts on surface water availability to downstream water users are expected to be negligible.

6.12.3.5 Groundwater

Construction

Generally, impacts to groundwater resources, including GDEs, are not expected given the groundwater table is unlikely to be intercepted during Project construction. The fence to be constructed where Bullamalito Creek crosses the southern boundary of the Project Area will be a latched tube watercourse crossing, designed to avoid interference with Bullamalito Creek and the high potential aquatic GDE. Further, the anticipated depth to groundwater within the Project Area (at least 10 mbgl) reduces the likelihood of impacts on groundwater quality from surface hydrocarbon/chemical spills, noting that appropriate spill management measures will be implemented during all stages of the Project (refer to **Section 6.12.4**).

Should the final Project design identify that construction activities will result in the interception of the groundwater table, further assessment will be undertaken in accordance with the *NSW Aquifer Interference Policy* (NSW Government, 2012) and appropriate management measures be developed to mitigate any potential impacts.

Operation

Interactions with the groundwater table are not expected at the decommissioning phase of the Project. As such, no impacts to groundwater resources or Groundwater Dependent Ecosystems (GDEs) are expected during the operational phase of the Project.

6.12.3.6 Aquatic Habitat

Aquatic habitats within the Project Area have been degraded and impacted as a result of historical and current agricultural activities. Apart from a number of watercourse crossings required to facilitate access across the Project Area and potential closure of a number of manmade farm dams, no other disturbance is proposed to watercourses and the associated aquatic habitats. Watercourse crossings will be designed in consultation with the DPI Fisheries, to minimise impacts on stream stability and fish passage and with reference to the *Guidelines for Controlled Activities on Waterfront Land*. In light of this, it is not anticipated that the Project would impact the passage of fish over the long term nor obstruct the movement of fish or other aquatic species.

Furthermore, the Project layout incorporates riparian buffers of approximately 20 m to 40 m around all second order and higher creek lines to avoid and minimise impacts to the habitat associated with the riparian zone. The potential impacts on water quality are also anticipated to be limited due to the Project Layout and design avoiding tributaries of Gundary Creek and Bullamalito Creek.

With the implementation of management and mitigation measures outlined in **Section 6.12.4**, impacts to aquatic habitat within the Project Area is expected to be negligible.

6.12.4 Management and Mitigation Measures

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

- Project infrastructure, such as inverters, battery stations would be designed to provide a minimum of 300 mm freeboard with solar panels providing 500 mm freeboard for the lowest edge above the maximum 1% AEP flood level.
- Foundations for Project infrastructure would be located away from areas that exceed both flood depths of 0.3 m and flow velocities greater than 1.5 m/s.
- No sensitive infrastructure (such as battery stations, inverters, substation, etc.) will be placed within 20 m of any third order or higher streams.
- All waterway crossings will be designed and constructed in compliance with DPI Water Guidelines, including:
 - *Guidelines for Controlled Activities on Waterfront Land – Riparian Corridors.*
 - *Guidelines for Watercourse Crossings on Waterfront Land.*
 - *Guidelines for Laying Pipes and Cables in Watercourses on Waterfront Land.*
- Further flood investigations will be carried out where required during detailed design to confirm the flood immunity objectives and design criteria for the Project are met.
- A Construction Soil and Water Management Plan (CSWMP) will be prepared to outline measures to manage soil and water impacts associated with the construction works.
- Fencing will be designed to consider flood levels across the site through installation of riparian fencing, consisting of a flood permeable configuration (such as a latched tube watercourse crossing), at each watercourse crossing to reduce the likelihood of fence blockage due to loss of vegetation in storm events.
- Debris will be cleared from fencing following flood events.
- At the detailed design phase, further water quality modelling will be undertaken to inform Project design with respect to required stormwater treatment measures to ensure stormwater discharging from the Project Area post-development is acceptable for discharge to the Sydney Drinking Water Catchment.
- An OEMP will be developed for the Project to address potentially adverse impacts on the receiving environment surface water quality during the operational phase. This will include the development and appropriate maintenance of suitable ground cover around solar panels and the following stormwater treatment measures:
 - Vegetated swales along the full length of downslope side of solar panel arrays.
 - Bioretention basins (40 m², 0.8 m filter depth, no exfiltration) to treat runoff from the Centralised BESS compound and the sub-station/operations and maintenance facility compound with bioretention discharge draining to vegetated swales.

- Water sources would be confirmed during the detailed design phase and in consultation with suppliers and landholders and be subject to availability. A water sourcing strategy will be developed so that water used during the construction phase does not cause issues to adjacent landowners or other stakeholders. The use of any bore water during construction and decommissioning would be agreed with the landholder and Water Access Licences (WAL) would need to be confirmed and/or obtained.
- Post-construction, disturbed areas will be stabilised by the establishment and maintenance of a vegetated ground cover consisting of low-growing grasses.

6.13 Hazard, Risk and Bushfire Threat

Hazards and risks associated with the Project were identified as a key concern by the community during the stakeholder engagement process (refer to **Section 5.3**), especially for community members living in proximity to the Project. The main concerns related to exposure to hazardous materials, gasses and electromagnetic fields, increased bushfire risk, increased fire and explosion risks associated with the substation and batteries, rapid and effective response and control measures in the event of a bushfire starting at or near the Project Area.

The SEARs require the EIS to address the hazards associated with the Project. This includes:

- A preliminary risk screening completed in accordance with the *State Environmental Planning Policy (Resilience and Hazards)*.
- A Preliminary Hazard Analysis (PHA) prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (DoP, 2011d) and *Multi-Level Risk Assessment* (DoP, 2011b). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receivers to prevent fire propagation and compliance with *Hazardous Industry Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (DoP, 2011c).
- An assessment of potential hazards and risks including but not limited to fires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) *Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields* (ICNIRP, 2010).
- Identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with *Planning for Bush Fire Protection 2019*.

The following sections provide an overview of the outcomes of the relevant assessments undertaken to address the SEARs and community concerns.

6.13.1 Preliminary Hazard Analysis

Throughout the detailed assessment phase, Lightsource bp has sought to avoid and minimise potential hazard related impacts to nearby residences through Project redesign and layout refinements.

Specifically, the Project has been designed as follow to avoid and minimise hazards and risks to the nearby residences:

- The centralised BESS has been relocated approximately 1.2 km to the east, away from non-associated residences on the north-west, as illustrated on **Figure 2.5**.
- 20 decentralised BESS units located nearest to non-associated residences have been removed, as illustrated on **Figure 2.5**.

A Preliminary Hazard Analysis (PHA) was prepared by Umwelt (2024) to satisfy the SEARs and the additional requirements of DPHI Industry Assessments, as outlined in **Appendix 1**. A full copy of the PHA is contained in **Appendix 16** and a summary of key outcomes is provided below.

6.13.1.1 Methodology

The PHA considered the hazards and risks posed to off-site receivers and residences associated with the transport, storage and use of hazardous materials for the Project, including the batter storages, and was prepared in general accordance with and/or with reference to:

- *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP).
- *Applying SEPP 33* (Department of Planning (DoP), 2011a).
- *Multi-Level Risk Assessment* (DoP, 2011b).
- *Hazardous Industry Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (HIPAP 4) (DoP, 2011c).
- *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (HIPAP 6) (DoP, 2011d).

6.13.1.2 Preliminary Risk Screening

Preliminary risk screening is undertaken to determine the requirement for a PHA. The Resilience and Hazards SEPP contains a number of assessment criteria for the storage and transport of hazardous materials that have the potential to create off-site impacts.

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

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

Neither of these hazardous material types has a relevant screening threshold in the Resilience and Hazards SEPP. However, the rapid proliferation of LIBs in portable devices, electric vehicles, energy storage systems and a range of other applications in recent years, presents unique fire and explosion hazards. Research has shown that LIBs may present fire, explosion and toxic gas release hazards as a result of manufacturing faults or a range of battery abuse scenarios, where the accumulation of combustible gases and the potential for thermal runaway can pose significant safety risks.

In large grid-size BESS installations, the scale and complexity of the systems increase the potential hazards associated with LIBs. The larger number of cells and modules in large installations increases the potential for thermal runaway and the release of toxic and combustible gases. Additionally, the challenge of managing and suppressing a fire in a large system is more pronounced due to the complex geometry of the installations and the need for effective fire protection systems. Further, given the limited global experience with large capacity, grid connected LIB BESSs, and to maintain a conservative approach with respect to the assessment of hazards and risk, further assessment via a PHA was considered appropriate.

Multi-Level Risk Assessment (DoP, 2011b) sets out criteria for using the results of the risk screening, classification and prioritisation process to determine which of three levels of further analysis is appropriate. A Level 1 qualitative assessment is based on a comprehensive hazard identification process that is used to demonstrate that the activity does not pose a significant off-site risk. However, a higher level of analysis is required if the qualitative analysis cannot demonstrate there will be no significant risk of off-site consequences.

In the Project-specific meeting with DPHI Industry Assessments on 17 August 2023, DPHI indicated that the key consideration when determining the level of assessment for the PHA is the proximity to residences rather than the distance to the site boundary, and the key focus of the PHA should be to demonstrate the Project design can achieve adequate separation distances between BESS units to ensure non-propagation of hazardous events.

6.13.1.3 Assessment of Impacts

Level 1 Qualitative Analysis

The PHA included a Level 1 qualitative analysis which evaluated the Project against the HIPAP 4 qualitative criteria. Key outcomes of this evaluation were:

- The hazardous components of the Project are located at distances greater than the expected impacts of a credible hazard event from the nearest non-associated residences.
- It is considered that all 'avoidable' risks have been avoided and the Project location is appropriate.
- The Project will implement a range of technical and non-technical measures to minimise the likelihood of a hazardous event involving the BESS and substation and it is considered that they, as far as practicable, ensure that likelihood of hazardous events involving the BESS and substation are very low.
- There are no other high risk hazardous installations within the vicinity of the Project that would contribute to an increase in cumulative off-site risk, either now or in the future.
- Based on the locations of the centralised BESS, decentralised BESS battery stations and substation the Level 1 qualitative analysis could not demonstrate that there will be no off-site consequences that could impact sensitive adjoining land uses. As a result, a Level 2 semi-quantitative analysis was undertaken to assess the potential impacts associated with the release of toxic gases during a LIB thermal runaway event and a LIB fire.

Level 2 Semi-Quantitative Analysis

Toxic Gas Release

Hydrogen fluoride (HF) is the most toxic gas likely to be present in a significant release event during a LIB thermal runaway/fire event involving the type of cells that are likely to be used in the Project.

The consequence assessment for a toxic release scenario was therefore based on HF gas release.

For the worst-case scenario, the maximum distance at which an individual exposed to HF emissions from a battery storage facility toxic release event could experience an injury (i.e. exposure to the Acute Exposure Guideline Level (AEGL) Level 2 concentration of 24 ppm for 60 minutes) is estimated to be 57 m.

Based on the dispersion modelling undertaken, the potential injurious impacts for the worst-case scenario are considered unlikely to extend to the nearest off-site dwelling. The nearest receiver to a battery storage unit is R4, located approximately 951 m to the north-east of the battery station in the south-east corner of the Project Area. The estimated maximum 1-hour concentration of HF under stability class F conditions with a 1.5 m/s south-westerly wind at dwelling R4 for the worst-case scenario would be less than 1 ppm (which is unlikely to result in irritation or discomfort as per the AEGL). In addition, the ongoing development and testing of BESS components is systematically reducing the likelihood of a thermal runaway event.

LIB Fire

Fire scenario modelling was undertaken to estimate the incident heat flux experienced by a receiver at varying distances from the BESS. Results indicated that the maximum distance at which an individual exposed to thermal radiation from a BESS fire could experience an injury based on HIPAP 4 injury criteria (4.7 kW/m²) is estimated to be 19 m, well within the Project boundary.

6.13.1.4 Hazard Management and Mitigation Measures

The Project will implement a range of technical and non-technical risk mitigation and management measures to eliminate or mitigate the level of risk associated with the operation of the Project.

These measures include:

- Rigorous design, construction and maintenance standards.
- Incorporation of adequate instrumentation, interlocks and alarms.
- Maintaining adequate separation distances between BESS containers.
- Implementation of an effective fire suppression plan.
- Incorporation of lightning protection at the Project Area.
- Ensuring the Project Area layout provides clear access and egress for emergency services.
- Incorporation of site security including perimeter fencing and CCTV monitoring.
- Maintenance of exclusion zones for combustible materials around all substation equipment and an Asset Protection Zone (APZ) around the site boundary.

- Personnel training and hot work/safe work procedures.
- Consultation with adjacent landholders to ensure awareness of hazards and emergency systems and protocols.

It is considered that, as far as practicable, the application of the risk mitigation and management measures will ensure that the likelihood of a hazardous event occurring is very low and compliance with HIPAP 4 criteria will be achieved.

A Final Hazard Analysis, Fire Safety Study and Emergency Plan will be developed in consultation with the RFS, Fire and Rescue NSW (FRNSW), NSW Ambulance and relevant local emergency management services 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 nearest residences are appropriate for the specific battery cell type (i.e., chemistry and capacity) to be used.

6.13.2 Bushfire

Lightsource bp has sought to avoid and minimise the potential bushfire risk associated with the Project through Project design. The Project has been designed to include:

- A 10 m APZ around the perimeter of the Project Area.
- Supplementary site access via Kooringaroo Road for emergency access only.
- Dedicated non-combustible water tanks throughout the Project Area with a combined capacity of 180,000 L, following advice from RFS and FRNSW.
- Additional emergency accesses via gates along the perimeter fencing to allow access points to the Project Area in case of an emergency, following advice from RFS and FRNSW.
- Access tracks on the Project Area would be designed with turning bays to provide safe access for emergency services personnel, following advice from RFS and FRNSW.

A bushfire threat assessment was prepared by Peak Land Management, which includes an assessment of potential bushfire hazards applicable to the Project Area and the proposed bushfire management for the Project. This assessment is attached as **Appendix 17** and summarised in the following sections.

6.13.2.1 Existing Environment

The Project Area is situated within an agricultural setting that has been subject to extensive clearing for livestock grazing purposes. This landscape is primarily managed grazed grassland with grass generally over 100 mm in height. There are pockets of remnant vegetation along the north-eastern Project boundary with trees up to 20 m high, and a shrub and grazed grass understorey. Additionally, there is a large patch of dense remnant vegetation approximately 700 m to the east of the Project Area boundary.

The slopes across the Project Area vary from flat to around 10 degrees up and downslopes, with the surrounding land being primarily undulating and cleared.

Due to the presence of grassland, the majority of the Project Area is identified as 'Category 3' bushfire prone land by the NSW RFS bushfire prone land mapping (RFS, 2021), as illustrated on **Figure 6.19**.

This category includes vegetation that pose a ‘medium’ bushfire risk, such as grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands. The pockets of remnant vegetation in the vicinity of the Project Area are classified as ‘Category 1’ bushfire prone land, which includes ‘high’ risk vegetation, such as forest, woodlands, heaths, forested wetlands and timber plantations. Category 1 vegetation has the highest combustibility and likelihood of forming fully developed fires.

6.13.2.2 Bushfire Threat Assessment

The bushfire threat assessment in **Appendix 17** evaluated the vegetation, topography, environmental features and Aboriginal features within the Project Area to determine the level of bushfire hazard for the Project.

The assessment concluded that the bushfire threat for the Project is considered low, as the landscape within the Project Area and surrounds is predominantly grazed agricultural land, which reduces the grassland fuel loads and bushfire potential. Bushfire risk is confined to along the north-eastern Project boundary, where remnant vegetation is present. However, the bushfire management and mitigation measures described below would provide adequate bushfire safety for this area.

6.13.2.3 Bushfire Management and Mitigation Measures

Lightsources bp will implement the following bushfire management and mitigation measures should the Project be approved:

- The Project design includes:
 - 10 m APZ around the perimeter of the Project Area.
 - Dedicated non-combustible water tanks located throughout the Project Area with a combined capacity of 180,000 L.
 - Supplementary site access via Koorngaroo Road for emergency access only.
 - Additional emergency accesses via gates along the perimeter fencing to allow access points to the Project Area in case of an emergency.
 - Access tracks on the Project Area to be designed with turning bays to provide safe access for emergency services personnel.
- Restriction on hot works in accordance with *Rural Fires Act 1997*.
- A Bushfire Emergency Management and Operations Plan will be developed and implemented for the Project in accordance with PBP 2019 and in consultation with DPHI Hazards, RFS and FRNSW. The plan will identify all relevant bushfire risks and mitigation measures associated with the construction and operation of the Project.
- Bushfire training day with RFS once the Project is commissioned.
- Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate.

FIGURE 6.19

Bushfire Prone Land

Legend

 Project Area

 Cadastre Boundaries

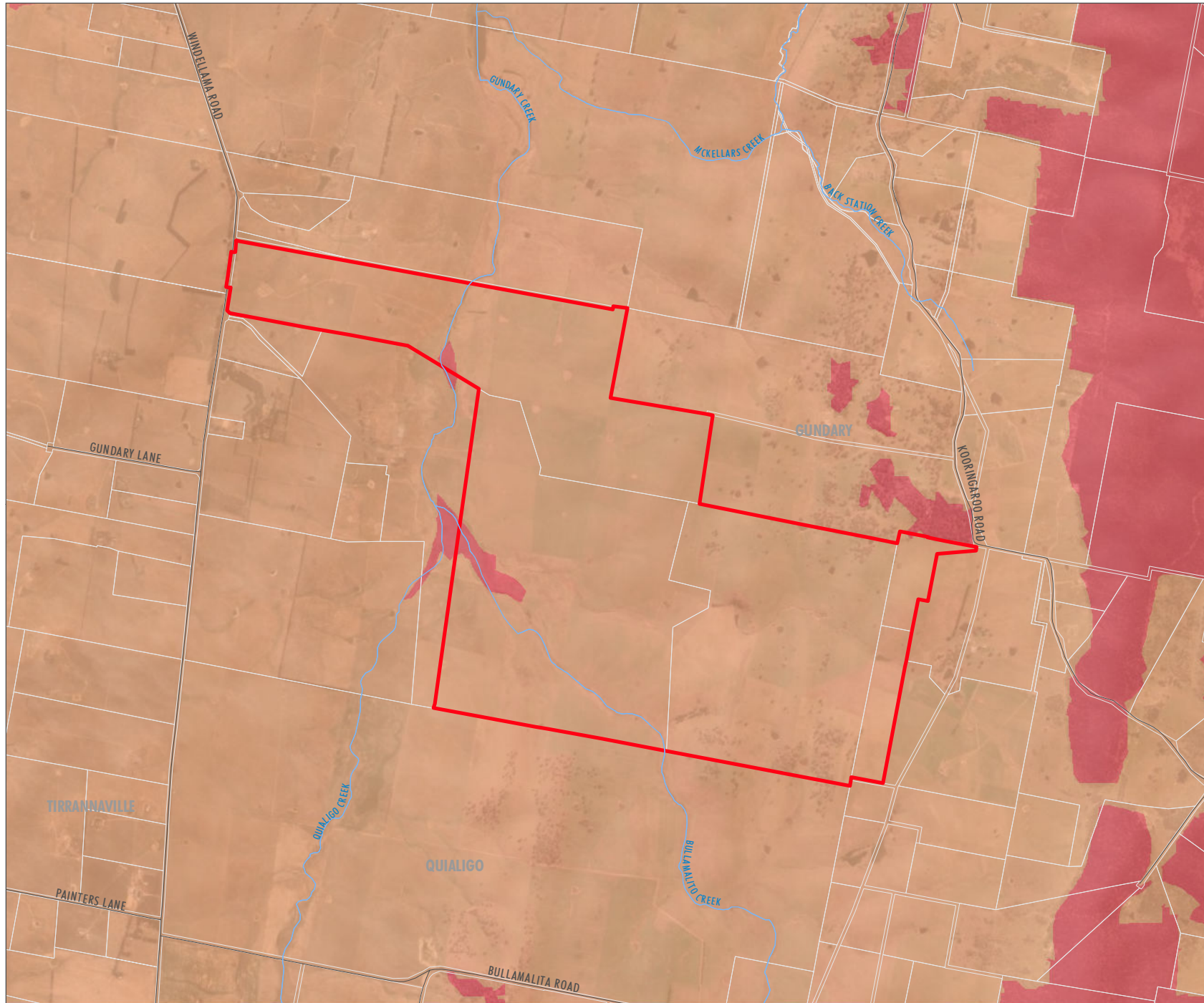
Roads

Watercourses

Bushfire Prone Land Vegetation Category Mapping

Vegetation Category 1 (High Risk)

Vegetation Category 3 (Low Risk)



Meters

Scale: 1:0 at A4
GDA 1994 MGA Zone 55

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6.13.3 EMF

In accordance with the SEARs requirements, a qualitative assessment of potential Electromagnetic Fields (EMF) risks associated with the Project has been undertaken and suitable safeguards and mitigation measures have been proposed to reduce any potential risks. The details and outcomes of this assessment are provided in full below.

6.13.3.1 Existing Environment

Electric and magnetic fields (EMF) occur wherever electricity flows and so are found commonly in everyday life situation. Given that the Project will include electrical infrastructure, EMF requires assessment as part of the Project.

Current sources of EMF on the Project Area and surrounds include:

- Existing 330 kV transmission line traversing the north west corner of the Project Area.
- House-hold items (such as televisions, microwave ovens, computers, Wi-Fi).
- Existing electrical wiring in residences.

6.13.3.2 Background and Guidelines

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

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

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

To prevent health-related interactions with ELF EMF, ICNIRP recommends limiting exposure so that the threshold at which adverse effects due to interactions between the body and the external EMF is never reached. The reference levels for occupational and general public exposure for EMF at 50 Hz are shown in **Table 6.32**. The guideline adopts more stringent exposure restrictions for the general public compared to occupational exposures, recognising that in many cases general public are unaware of their exposure to EMF.

Table 6.32 ICNIRP EMF Reference Levels at 50 Hz

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

Source: ICNIRP, 2010.

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

6.13.3.3 EMF Sources

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

Solar Arrays and Inverters

Research into EMF produced by commercial solar PV electricity-generating installations in Porterville and San Bernadino, California (Tell et al. 2015), identified that static magnetic fields were very small compared to exposure limits established by ICNIRP. The highest 60-Hz¹⁴ magnetic fields were measured adjacent to transformers and inverters. The fields measured complied in every case with ICNIRP occupational exposure limits. In all cases, electric fields were negligible compared to ICNIRP limits. Specific findings were as follows:

- There was no evidence of magnetic fields created from the PV modules.
- The highest AC and DC magnetic fields were measured adjacent to the inverter and transformer, and both were lower than ICNIRP's occupational exposure limit.
- The strength of the magnetic fields attenuated rapidly with distance (i.e. within 2–3 m the fields dropped to background levels).
- Electric fields were negligible to non-detectable, most likely due to the enclosures provided for the electricity generating equipment.

¹⁴ Note that US power supply operates at 60 Hz frequency, compared to 50 Hz in Australia.

BESS

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

Overhead Transmission Lines

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

Substations

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

Underground Cabling

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

6.13.3.4 Assessment of Impacts

EMF would be generated by Project via a number of EMF sources as detailed in **Section 6.13.3.3**.

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

The Project layout has been designed with the proximity of nearby sensitive receivers in mind to reduce EMF to negligible to nil levels. The closest sensitive receiver (R9) is approximately 137 m to the north of the Project Area, and approximately 272 m north of the nearest project infrastructure (i.e. solar panels).

Construction and Decommissioning

Staff involved in the construction and decommissioning of the Project would be exposed to EMF for the duration of the works. The general public would not have access to the Project Area as access is restricted.

As a result of the low EMF levels, temporary nature of the construction and decommissioning phases and the separation distances between EMF sources and receivers, exposure levels will be below the recommendations for general public and occupational exposure. It is therefore concluded that there will be low to negligible potential for EMF impacts upon human health throughout the construction and decommissioning of the Project.

With the implementation of management measures outlined in **Section 6.13.3.5**, it is considered that the EMF risk of the Project can be appropriately managed during the construction and decommissioning.

Operation

Given the low EFM levels associated with the operation of the Project and the separation distances between the EMF sources and sensitive receivers (more than 130 m), the expected EMF levels generated by the Project would be below the reference levels for occupational and general public exposure as defined in the ICNIRP Guidelines. It is therefore concluded that the risk of impacts from EMF generated during operation of the Project would be limited.

With the implementation of management measures outlined in **Section 6.13.3.5**, it is considered that the EMF exposure risk of the Project can be appropriately managed during operation.

6.13.3.5 Management and Mitigation Measures

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

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

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

6.14 Social Impacts

A Social Impact Assessment (SIA) was prepared for the Project by Umwelt in accordance with the *Social Impact Assessment Guideline* (SIA Guidelines) (DPE, 2023a), the *Undertaking Engagement Guidelines for State Significant Projects* (DPE, 2022d) and the Project SEARs. In particular, the SEARs required the EIS to include consideration of construction workforce accommodation, therefore an Accommodation and Employment Strategy (AES) was also developed as part of the SIA.

The SIA aimed to identify, predict and evaluate likely social impacts arising from the Project and proposed responses to reduce negative impacts and enhance positive impacts. A full copy of the SIA is provided in **Appendix 18** and a summary of methodology and assessment outcomes is provided below.

6.14.1 Methodology

Consistent with the SIA Guidelines requirements, the SIA process involves three key phases, as illustrated in **Figure 6.20** below.



Figure 6.20 SIA Program Phases

Source: Umwelt 2023, adapted from NSW SIA Guidelines, 2023.

SIA involves understanding impacts from the perspectives of those involved in a personal, community, social or cultural sense, therefore engagement is a key component of the SIA program. As discussed in **Section 5.0**, Lightsource bp has been engaging with the local and broader community since 2022, seeking to build relationships and understand stakeholder perspectives and needs in the region through meetings with proximal and neighbouring landholders, community/interest groups, service providers, Aboriginal stakeholder groups, Goulburn-Mulwaree Council and relevant local, State and Commonwealth government agencies. Concerns and feedback identified throughout the engagement process were considered by Lightsource bp and used to inform the refinement of the Project design and the development of this EIS, including the proposed management and mitigation measures.

The SIA process continued this consultation with a focus on sharing information about the Project and planning process, gathering insights into the social impacts of the proposed Project from the perspectives of those likely to be affected, and gathering community feedback on potential management measures (mitigation and enhancement) to address these social impacts. The SIA provides a consolidation of community consultation outcomes which have informed the assessment and evaluation of Project-related social impacts and opportunities, and social impact management planning.

6.14.2 Social Locality and Social Baseline Profile

The social locality for the Gundry Solar Farm has been defined to reflect a variety of geographies and communities of interest where social impacts from the Project may be experienced. In defining the social locality, statistical areas prescribed by the Australian Bureau of Statistics (ABS), land uses and transport routes and the land tenure composition of properties in, or nearby, the Project Area were used.

The social baseline profile is a foundational component of SIA, as it provides the basis from which social impacts associated with the Project may be predicted. The social profile developed for the SIA has defined the challenges and opportunities of the community across seven key areas (or capitals) – natural, human, social, economic, physical, cultural and political. A summary is provided in **Table 6.33**.

Table 6.33 Local Challenges and Opportunities

Challenges	Capital	Opportunities
- Extensively modified vegetation. - History of grass fires.	Natural	- History of productive agriculture and grazing. - Extensive cultivation of exotic pasture has resulted in lower biodiversity constraints. - Landscaping will aid in habitat creation.
- Mental health is a growing concern for the community. - Smaller proportion of population (compared to NSW) having completed Year 12, bachelor's degree level education and above, indicating possible future skills shortage. - Lack of access to internet at home (compared to NSW average).	Human	- Population growth and city-to-regional population trends. - Opportunities for local skills development as Goulburn is a regional centre with a Country University Centre and TAFE. - Growing population.
Community division over renewable energy projects in the region.	Social	- Strong community and social relationships. - Well-organised community groups with a strong interest in renewable energy.
- High demand for housing with limited rental availability and low rental stock. - Decreasing housing affordability. - Lower than state average labour force participation.	Economic	- Diversified economy. - Heritage values linked with tourism sector to promote economic benefits. - Supportive economic and business groups. - Resilient economy through COVID-19.
- Limited public transport accessibility. - Lack of access to internet at home (compared to NSW average). - Other proximal projects generating cumulative impacts (including the Merino Solar Farm). - Limited short-term accommodation in Goulburn.	Physical	- Strategic location and strong highway and rail freight linkages, providing access to proximal labour forces and products, particularly in Canberra. - Very well located in the energy network with strong transmission lines and grid stability. - Land for sheep grazing. - Access to a larger supply of short-term and rental housing in broader LGAs.

Challenges	Capital	Opportunities
Potential interruption to connection to country for indigenous peoples and/or traditional owners.	Cultural	- Community support for solar projects. - Presence of the Pejar LALC and Mulwaree Aboriginal Community Inc (MACI).
- Not part of a Renewable Energy Zone. - History of community opposition to development and renewable energy in the area.	Political	- Regional plan has a direction of positioning the region as a renewable energy hub. - Strong local, State and Federal community representation.

6.14.3 Assessment of Impacts

‘Social impacts’ generally refer to the consequences experienced by people when a new project brings change. Information collected through consultation activities was collated and analysed to inform the identification of potential social impacts, from the perspectives of affected stakeholders.

Social impacts were assessed and evaluated in relation to the likelihood and magnitude of the social impact occurring, considering the outcomes of engagement with key stakeholders, social research and expert assessment, and a review of outcomes of relevant technical studies. A social significance matrix was used to evaluate both the positive and negative impacts of the Project through the combination of likelihood and magnitude to produce an overall impact rating as ‘low’, ‘medium’, ‘high’ or ‘very high’, as described in the SIA Guidelines. Proposed mitigation and enhancement strategies were also considered in determining the residual social impact.

Table 6.34 presents a summary of the social impact evaluation.

Table 6.34 Summary of Social Impact Assessment and Management Measures

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Way of life / Community	Change in sense of place due to loss of visual amenity as a result of industrialisation of the landscape.	Proximal landholders with a view of the site	Very high	Very high	- Refinements to the Project layout have been made to reduce visual impacts to nearest residences (i.e. removal of panels). - Targeted on site visual screening through perimeter landscaping, with the draft landscape plan to be finalised in consultation with Goulburn Mulwaree Council, Greening Australia and Goulburn Landcare. - Visual screening on individual landholder's properties may also be appropriate for some residences, with some stakeholders requesting tree planting on their respective properties. However, the topography and view lines surrounding the Project may reduce the efficacy of this solution for some landholders. - One proximal landholder is subject to an impact agreement based on assessed level of visual impact (Moderate), developed in accordance with the Solar Guidelines and through agreement between Lightsource bp and the affected landholder.	High
Way of life / Community	Change in sense of place due to loss of visual amenity as a result of industrialisation of the landscape.	Broader community	Low	Medium	Targeted on site visual screening through perimeter landscaping, with the draft landscape plan to be finalised in consultation with Goulburn Mulwaree Council, Greening Australia and Goulburn Landcare.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Way of life / Community	Changes in sense of place due to loss of agricultural nature of land.	Proximal landowner / residents	High	High	- Potential establishment of agri-solar initiatives once construction has been completed, subject to further engagement with the landholders and / or regulatory authorities. It is Lightsource bp intention to have a local farmer run their sheep on the Project Area, as a means to coexist with the local agricultural farming sector. - Research opportunities to be potentially explored around agri-solar, and different ways for project to coexist with agriculture initiatives.	Medium
Way of life / Community	Changes in sense of place due to loss of agricultural nature of land.	Broader community	Low	Medium	- Potential establishment of agri-solar initiatives once construction has been completed, subject to further engagement with the landholders and / or regulatory authorities. It is Lightsource bp intention to have a local farmer run their sheep on the Project Area, as a means to coexist with the local agricultural farming sector. - Research opportunities to be potentially explored around agri-solar, and different ways for project to coexist with agriculture initiatives.	Low
Way of life / Community	Loss of agricultural productivity on the site during the Project life cycle.	Regional agriculture Industry	Low	Low	- Potential establishment of agri-solar initiatives once construction has been completed, subject to further engagement with the landholders and / or regulatory authorities. It is Lightsource bp intention to have a local farmer run their sheep on the Project Area, as a means to coexist with the local agricultural farming sector. - Research opportunities to be potentially explored around agri-solar, and different ways for project to coexist with agriculture initiatives.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Way of life / Community	Reduced sense of community and cohesion due to influx of transient construction workforce and change in population composition.	All stakeholders	Low	Medium	• Provision of accessible opportunities and working with relevant First Nations training and employment groups. • Targeted training opportunities for reskilling or upskilling local workforces. • Work with local service providers, education providers and procurement stakeholders. • Work with local emergency service providers, such as the police, during the construction period and as needed. • Implement a standardised workforce code of conduct, including all contractors. This includes expectations of workforce behaviour outside of work hours. • Provide traineeship opportunities. • Targeted female training opportunities.	Low
Way of life / Community	Reduced sense of community and cohesion due to differing attitudes and feelings towards renewable energy development in the local community and region.	All stakeholders	High	High	• Continued implementation of the CSEP for the Project during construction, operation, and decommissioning phases. • Lightsource bp to continue to proactively involve and collaborate in existing multi-stakeholder forums, state and federal government initiatives and engage with key representative groups relating to the energy transition, especially those within the vicinity of the Gundry Solar Project (Goulburn), and in relation to the Gundry Solar Project.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Way of life / Community	Increased conflict and reduced cohesion between neighbouring landholders given inequitable distribution of social impacts.	Proximal landholders	High	High	- One proximal landholder is subject to an impact agreement based on assessed level of visual impact (Moderate), developed in accordance with the Solar Guidelines and through agreement between Lightsource bp and the affected landholder. - Neighbourhood Benefit Sharing Program.	Medium
Way of life / Community	Increased conflict and reduced cohesion between neighbouring landholders given inequitable distribution of social impacts.	Community and special interest groups, Local Government the broader community	Medium	Medium	VPA to be negotiated with Council to facilitate social investment in the broader community.	Medium
Way of life / Community	Supply chain and human rights issues associated with solar energy infrastructure component sourcing and manufacture.	Overseas workforce sourcing and manufacturing solar infrastructure.	Low	Medium	Lightsource bp adheres to the relevant Human Rights Policy and supply chain standards.	Medium
Accessibility	Reduced access to affordable housing and accommodation due to construction workforce influx into the region.	Local businesses/ service providers (including accommodation providers, and emergency housing services)	Low	High	- Prioritise use of local service providers e.g. accommodation/housing, education, employment etc. - Operate a Housing and Accommodation Expression of Interest Register. - Implementation of recommendations and strategies in the Project AES, including distribution of workforce accommodation across the social locality to reduce impacts on vulnerable groups.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Provision of a Voluntary Planning Agreement to Goulburn Mulwaree Council to help fund social infrastructure and other community programs/initiatives. - Explore opportunities to partner with accommodation providers in the local area to minimise use of broader housing.	
Accessibility	Reduced access to affordable housing and accommodation due to construction workforce influx into the region.	Those accessing emergency / crisis accommodation	Low	High	- Prioritise use of local service providers e.g. accommodation/housing, education, employment etc. - Operate a Housing and Accommodation Expression of Interest Register. - Implementation of recommendations and strategies in the Project AES, including distribution of workforce accommodation across the social locality to reduce impacts on vulnerable groups. - Provision of a Voluntary Planning Agreement to Goulburn Mulwaree Council to help fund social infrastructure and other community programs/initiatives. - Explore opportunities to partner with accommodation providers in the local area to minimise use of broader housing.	Medium
Accessibility	Reduced access to affordable housing and accommodation due to construction workforce influx into the region.	Tourists visiting the area	Low	Medium	- Prioritise use of local service providers e.g. accommodation/housing, education, employment etc. - Operate a Housing and Accommodation Expression of Interest Register. - Implementation of recommendations and strategies in the Project AES, including distribution of workforce accommodation across the social locality to reduce impacts on vulnerable groups.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Provision of a Voluntary Planning Agreement to Goulburn Mulwaree Council to help fund social infrastructure and other community programs/initiatives. - Explore opportunities to partner with accommodation providers in the local area to minimise use of broader housing.	
Accessibility	Reduced access to affordable housing and accommodation due to construction workforce influx into the region.	Broader community	Low	Medium	- Prioritise use of local service providers e.g. accommodation/housing, education, employment etc. - Operate a Housing and Accommodation Expression of Interest Register. - Implementation of recommendations and strategies in the Project AES, including distribution of workforce accommodation across the social locality to reduce impacts on vulnerable groups. - Provision of a Voluntary Planning Agreement to Goulburn Mulwaree Council to help fund social infrastructure and other community programs/initiatives. - Explore opportunities to partner with accommodation providers in the local area to minimise use of broader housing.	Low
Accessibility	Increased pressure on local health care, facilities, and emergency services due to incoming construction workforce.	Goulburn health and emergency service users & providers	Low	Medium	- Appropriate First Aid qualified people on site during construction and operation. - Implementation of the Drivers Code of Conduct detailing expectations for driver behaviour for travel to and from the Project Area.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Livelihoods	Generation of local employment and procurement opportunities.	Broader community and local job seekers	Low	Low	- Establish and maintain an Expression of Interest (EOI) for contractors and services providers in the local area while in the Project planning and development phase (pre-construction). - Advertise and promote local employment and procurement opportunities through targeted engagement collateral, local procurement sources, industry engagement, and local media. - Collaborate with local employment providers to assist with the sourcing of local employment and procurement. - Establish and maintain working relationships with key industry and government stakeholders in the region. - Provision of accessible opportunities and working with relevant First Nations training and employment groups. - Incorporate additional weighting in tenders and EOIs to prioritise procurement from local companies. - Consideration of a local spend strategy, where local workforces are encouraged to access services such as food and recreational activities within the vicinity of the Project.	Medium
Livelihoods	Generation of local employment and procurement opportunities.	Local businesses	Medium	Medium	- Establish and maintain an EOI for contractors and services providers in the local area while in the Project planning and development phase (pre-construction). - Advertise and promote local employment and procurement opportunities through targeted engagement collateral, local procurement sources, industry engagement, and local media. - Collaborate with local employment providers to assist with the sourcing of local employment and procurement.	High

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Establish and maintain working relationships with key industry and government stakeholders in the region. - Provision of accessible opportunities and working with relevant First Nations training and employment groups. - Incorporate additional weighting in tenders and EOIs to prioritise procurement from local companies. - Consideration of a local spend strategy, where local workforces are encouraged to access services such as food and recreational activities within the vicinity of the Project.	
Livelihoods	Generation of local employment and procurement opportunities.	Broader community, local job seekers and local businesses	Low	Low	- Establish and maintain an EOI for contractors and services providers in the local area while in the Project planning and development phase (pre-construction). - Advertise and promote local employment and procurement opportunities through targeted engagement collateral, local procurement sources, industry engagement, and local media. - Collaborate with local employment providers to assist with the sourcing of local employment and procurement. - Establish and maintain working relationships with key industry and government stakeholders in the region. - Provision of accessible opportunities and working with relevant First Nations training and employment groups. - Incorporate additional weighting in tenders and EOIs to prioritise procurement from local companies. - Consideration of a local spend strategy, where local workforces are encouraged to access services such as food and recreational activities within the vicinity of the Project.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Livelihoods	Ability to enhance human and economic capital through skill development and training opportunities.	Unemployed residents looking for training opportunities (Underrepresented groups include women, young people, Aboriginal and/ or Torres Strait Islander peoples, people with a disability) and job seekers looking to work in the RE sector	Low	Low	- Partner with the local TAFE and other education providers to facilitate training in renewable energy employment opportunities. - Provide apprenticeships and trainee opportunities with ongoing work experience. - Employment of women and First Nations people will require specific engagement approaches and tailored training opportunities through dedicated resourcing and project prioritisation. - Develop and commit to clear pathways between training / upskilling and job opportunities on the Project. - Work with local service providers, education providers and procurement stakeholders. - Targeted female training opportunities.	Medium
Livelihoods	Ability to enhance human and economic capital through skill development and training opportunities.	Local businesses	Low	Medium	- Partner with the local TAFE and other education providers to facilitate training in renewable energy employment opportunities. - Provide apprenticeships and trainee opportunities with ongoing work experience. - Employment of women and First Nations people will require specific engagement approaches and tailored training opportunities through dedicated resourcing and project prioritisation. - Develop and commit to clear pathways between training / upskilling and job opportunities on the Project.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Work with local service providers, education providers and procurement stakeholders. - Targeted female training opportunities.	
Livelihoods	Skills drain from existing skilled workforce.	Broader community	Low	Low	- Develop and commit to clear pathways between training / upskilling and job opportunities on the Project. - Collaborate with local stakeholders including Council and local industry associations to manage any adverse effect on the local labour market.	Low
Livelihoods	Livelihood impact due to decreased property values and inability to sell proximal properties.	Proximal landowner / resident	Very High	High	- The implemented design changes to reduce the visual impact of the Project. - The implemented design changes to reduce noise impacts of the Project. - It is acknowledged that the NSW Government has noted that further information and analysis is needed to respond appropriately and is undertaking further analysis in consultation with the Australian Energy Infrastructure Commissioner, NSW Agriculture Commissioner and the Clean Energy Council.	Medium
Livelihoods	Livelihood impacts associated with potential contamination of land due to potential for damage to infrastructure.	Proximal landowners	Medium	Medium	- SWMP will be prepared to outline measures to manage soil and water impacts associated with the construction and decommissioning works. This would include regular water testing and communication with proximal landholders regarding results. - OEMP will be developed for the Project and will include measures to address potentially adverse impacts on the receiving environment surface water quality and flooding during the operational phase.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Livelihoods	Livelihood impacts associated with potential contamination of land due to potential for damage to infrastructure.	Broader community	Low	Low	- SWMP will be prepared to outline measures to manage soil and water impacts associated with the construction and decommissioning works. This would include regular water testing and communication with proximal landholders regarding results. - OEMP will be developed for the Project and will include measures to address potentially adverse impacts on the receiving environment surface water quality and flooding during the operational phase.	Low
Livelihoods	Livelihood impact due to increased insurance premiums for neighbouring agricultural properties.	Adjacent landowner / residents	High	Medium	- Implementation of a Bushfire Management Plan, and communication of the plan details to emergency service providers and the community. - Project design includes APZ, dedicated water supply (180,000l) for firefighting, emergency access points and internal access tracks with turning bays. - While there are no Project specific mitigation measures proposed to address potential increase in insurance, it is acknowledged that the NSW Government has noted that further information and analysis is needed to respond appropriately and is undertaking further analysis in consultation with the Australian Energy Infrastructure Commissioner, NSW Agriculture Commissioner and the Clean Energy Council.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Livelihoods	Improved social capital for local community infrastructure and initiatives associated with community benefit sharing programs i.e. VPA.	Local Government – Goulburn Mulwaree Council and communities	Low	Medium	• Lightsource bp will continue to implement the Community Shared Benefit Scheme (including both the Neighbourhood Benefit Sharing Program and the VPA) to ensure direct benefit from the Project is received by the local community. • Community investment initiatives to be targeted to community needs and priorities and developed in consultation with community groups. • Clear application process and publication of selection criteria for eligibility to community benefit programs/initiatives to be disseminated publicly.	High
Livelihoods	Increased economic activity and spend in local towns, benefiting local businesses and services.	Local business and service providers in Goulburn and surrounds	Low	Medium	• Consideration of a local spend strategy, where local workforces are encouraged to access services such as food and recreational activities within the vicinity of the Project. • Implement measures and recommendations within the AES, such as: ○ Incorporate additional weighting in tenders and EOIs to prioritise procurement from local companies. ○ A dedicated project member located within the local community who facilitates relationships with contractors, local workforces, and service providers to provide Project related opportunities.	Medium
Surroundings	Reduced public safety due to further deterioration of local roads and increased volume of traffic.	Proximal landowner / residents	Medium	High	• Project access intersection upgrade on Windellama Road to accommodate heavy vehicle turning movements into and out of the Project Area. • Notification and communication with community regarding traffic movement timing and key activities. • Construction vehicles not to utilise the northern route (Option 1) during School Zone times.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Implementation of appropriate traffic control measures and plans for OSOM vehicle movements. This shall include the movement of OSOM vehicles over the Lansdowne Bridge on Bungonia Road. - Implementation of the Drivers Code of Conduct detailing expectations for driver behaviour for travel to and from the Project Area. - Preparation and implementation of a detailed CTMP detailing how works to the site access and ongoing construction works will be undertaken. The CTMP shall be prepared by the proponent with the works contractor in consultation with Council. - Deliver a shuttle bus service from key population centres such as Yass and/or Goulburn to the site, where possible. It is expected that this will assist local residents engage in employment opportunities who otherwise would not be able to reach site, as mentioned in the AES. - Dilapidation surveys covering the pavement, drainage, and bridge structures will be undertaken in consultation with TfNSW and local Councils for the proposed transport routes before and after construction. Regular inspections and consultation with local Councils. It is expected that any damage resulting from construction traffic, except normal wear and tear, would be repaired.	
Surroundings	Reduced public safety due to further deterioration of local roads and increased volume of traffic.	Road users, School Bus users and those that live along the transport route.	Medium	High	- Project access intersection upgrade works on Windellama Road to accommodate heavy vehicle turning movements into and out of the Project Area. - Notification and communication with community regarding traffic movement timing and key activities.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Construction vehicles not to utilise the northern route (Option 1) during School Zone times. - Implementation of appropriate traffic control measures and plans for OSOM vehicle movements. This shall include the movement of OSOM vehicles over the Lansdowne Bridge on Bungonia Road. - Implementation of the Drivers Code of Conduct detailing expectations for driver behaviour for travel to and from the Project Area. - Preparation and implementation of a detailed CTMP detailing how works to the site access and ongoing construction works will be undertaken. The CTMP shall be prepared by the proponent with the works contractor in consultation with Council. - Deliver a shuttle bus service from key population centres such as Yass and/or Goulburn to the site, where possible. It is expected that this will assist local residents engage in employment opportunities who otherwise would not be able to reach site. - Dilapidation surveys covering the pavement, drainage, and bridge structures will be undertaken in consultation with TfNSW and local Councils for the proposed transport routes before and after construction. Regular inspections and consultation with local Councils. It is expected that any damage resulting from construction traffic, except normal wear and tear, would be repaired.	

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Surroundings	Safety concerns due to potential glint/glare from solar panels.	Road users of Windellama and Ringwood Roads	Low	Medium	- Trees planted for Visual Screening along Windellama Road. - Additional landscape screening will be established along the north-eastern boundary of the Project to further enhance screening and reduce potential glare towards Kooringaroo Road.	Low
Surroundings	Safety concerns due to potential glint/glare from solar panels.	Pilots on flight paths to/from Gundry Airport	Low	Low	Ongoing information sharing and engagement with Goulburn Airport about Project updates and plans.	Low
Surroundings	Reduced public safety due to increased bushfire risk and potential impacts to access roads and proximal properties.	Proximal landowner / residents, especially those residing on Kooringaroo Rd	Very High	High	- Project design to include: 10 m APZ around the perimeter of the Project Area. - Total of 180,000 L of water in tanks on the Project Area. This has been increased from a total of 2x 10,000 L tanks on site since the scoping phase in response to community and stakeholder feedback. - Supplementary site access via Kooringaroo Road for emergency access only, as well as emergency accesses along the perimeter fencing. - Access tracks on the Project Area to be designed to provide safe access for emergency services personnel. - A Bushfire Emergency Management and Operations Plan, as outlined in the EIS. - Intersection upgrade to improve access, as outlined in the CTMP. - Information sharing with surrounding community regarding bushfire management protocols, as per the CSEP.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Surroundings	Reduced public safety due to increased bushfire risk and potential impacts to access roads and proximal properties.	Broader community	Medium	Medium	- Project design to include: 10 m APZ around the perimeter of the Project Area. - Total of 180,000 L of water in tanks on the Project Area. This has been increased from a total of 2 x 10,000 L tanks on site since the scoping phase in response to community and stakeholder feedback. - Supplementary site access via Koorringaroo Road for emergency access only, as well as emergency accesses along the perimeter fencing. - Access tracks on the Project Area to be designed to provide safe access for emergency services personnel. - A Bushfire Emergency Management and Operations Plan, as outlined in the EIS. - Intersection upgrade to improve access, as outlined in the CTMP. - Information sharing with surrounding community regarding bushfire management protocols, as per the CSEP.	Low
Surroundings	Reduced public safety due to increased bushfire risk and potential impacts to access roads and proximal properties.	Emergency service workers	Medium	Medium	- Bushfire training and site familiarisation day with RFS and Fire and Rescue NSW once the Project is commissioned. - Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate. - Work with local emergency service providers.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Surroundings	Reduced levels of public safety due to potential for flooding and impacts to access roads and proximal properties.	Proximal landowner / residents	Medium	Low	- Project design to have project infrastructure to avoid impacts to main water courses, which have the potential to flood. - Development and implementation of relevant management plans SWMP, OEMP, and the Flood Emergency Management Plan (FEMP). - Fencing will be designed to consider flood levels across the site through construction of floodway to reduce the likelihood of fence blockage due to loss of vegetation in storm events.	Low
Surroundings	Reduced levels of public safety due to potential for flooding and impacts to access roads and proximal properties.	Windellama Road users	Low	Medium	- Project design to have project infrastructure to avoid impacts to main water courses, which have the potential to flood. - Development and implementation of relevant management plans including SWMP, OEMP, and the FEMP. - Fencing will be designed to consider flood levels across the site through construction of floodway to reduce the likelihood of fence blockage due to loss of vegetation in storm events.	Low
Surroundings	Reduced levels of public safety due to potential for flooding and impacts to access roads and proximal properties.	Broader community	Low	Low	- Project design to have project infrastructure to avoid impacts to main water courses, which have the potential to flood. - Development and implementation of relevant management plans including SWMP, OEMP, and the FEMP. - Fencing will be designed to consider flood levels across the site through construction of floodway to reduce the likelihood of fence blockage due to loss of vegetation in storm events.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Surroundings	Reduced levels of public safety due to potential for flooding and impacts to access roads and proximal properties.	Emergency service workers	Medium	Medium	Flood training and site familiarisation day with SES once the Project is commissioned & constructed.	Low
Surroundings	Decreased social amenity due to construction activities on site e.g. noise, dust, causing disturbance and irritation.	Proximal landholders/residents to the site, BESS and substation	High	High	- Implemented refinements to the layout and design, such as relocation of the centralised AC BESS, removal of some decentralised DC BESS units, and incorporation of noise walls/barriers. - Additional implementation of mitigation and management plans to control and minimise construction noise should these occur. - Preparation of a NVMP as part of the CEMP. - Where feasible and reasonable, construction to be carried out during the standard daytime working hours. Work generating high levels of noise will be scheduled during less sensitive time periods. - As part of the CEMP, protocols will be developed and implemented to minimise the air emissions during the construction, including: - 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 dust generating activities would be modified and limited during periods of dry and windy weather.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
					- Engines to switch off when not in use for prolonged periods. - Development of a complaints procedure to identify and respond to complaints. - Areas within the Project Area which have been temporarily disturbed by construction and operational activities will be rehabilitated. - Once construction has been completed, ground cover to be established and maintained in accordance with the OEMP. - Implementing the CSEP in communicating Project construction plans and timing with all relevant stakeholders.	
Surroundings	Decreased social amenity due to construction activities on site e.g. noise, dust, causing disturbance and irritation.	Landholders/residents located along the transport route and in proximity to the BESS and substation	Medium	High	Standard construction hours will apply.	Medium
Surroundings	Decreased social amenity due to construction activities on site e.g. noise, dust, causing disturbance and irritation.	Broader community	Medium	Medium	Standard construction hours will apply.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Surroundings	Intergenerational equity and improved liveability due to contribution of the Project to renewable energy generation.	All stakeholders	Medium	High	VPA and any other social investment initiatives under the AES could further fund development of renewable energy skills development in the Goulburn Mulwaree LGA. This could include sponsorship, training and education opportunities for local people wishing to work in the renewable energy sector, or students and young people.	High
Surroundings	Concern regarding ability to effectively rehabilitate land for agricultural use post solar farm use e.g. removal of all infrastructure.	Proximal landowner / residents	Very High	Medium	• Implementation of a Waste Management Plan (developed as part of the EIS). • Implementation of a DRMF. • CSEP to include communication and information regarding Lightsource bp's decommissioning commitments and plans with all stakeholders.	Low
Surroundings	Concern regarding ability to effectively rehabilitate land for agricultural use post solar farm use e.g. removal of all infrastructure.	Broader community	High	Medium	• Implementation of a Waste Management Plan (developed as part of the EIS). • Implementation of a DRMF. • CSEP to include communication and information regarding Lightsource bp's decommissioning commitments and plans with all stakeholders.	Low
Surroundings	Loss of environmental values e.g. flora and fauna.	All stakeholders	High	High	• Implementation of a biodiversity management plan to further reduce and mitigate impacts on biodiversity. • Workforce education and training in environmental management plan for construction. • Ecologist pre-clearance surveys and supervision of works. • Erosion and sedimentation control measures. • Weed management. • Fencing, access control and fauna exclusion measures.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Health and Wellbeing	Stress and anxiety due to cumulative impact of concurrent project development within the locality.	Proximal landowner / residents, community and special interest groups, Aboriginal stakeholders, Local Government the broader community	Medium	High	• Lightsource bp to collaborate with other local developers to minimise where possible cumulative social impacts associated with renewable energy development in the area. • Lightsource bp to continue to engage with local landowners and residents regarding Project implementation and information provision. • Share and connect people to local services to support mental health.	High
Health and Wellbeing	Stress and anxiety associated with the Project and uncertainty of the Project assessment process.	Proximal landowner / residents	Very High	High	• Lightsource bp to collaborate with other local developers to minimise where possible cumulative social impacts associated with renewable energy development in the area. • Lightsource bp to continue to engage with local landowners and residents regarding Project implementation and information provision. • Share and connect people to local services to support mental health.	High
Health and Wellbeing	Stress and anxiety associated with the Project and uncertainty of the Project assessment process.	Broader community and community and special interest groups	High	Medium	• Lightsource bp to collaborate with other local developers to minimise where possible cumulative social impacts associated with renewable energy development in the area. • Lightsource bp to continue to engage with local landowners and residents regarding Project implementation and information provision. • Share and connect people to local services to support mental health.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Health and Wellbeing	Physical health and wellbeing impacts as a result of potential exposure to electromagnetic radiation from Project infrastructure.	Proximal landowner / residents	Low	Low	- All project infrastructure will be designed in accordance with relevant industry standards. - All relevant procedures in relation to a high voltage installation will be adhered to throughout the life of the Project. - Public access will be restricted throughout the life of the Project.	Low
Health and Wellbeing	Physical health and wellbeing impacts as a result of potential exposure to electromagnetic radiation from Project infrastructure.	Project operational workers	Low	Low	- All project infrastructure will be designed in accordance with relevant industry standards. - All relevant procedures in relation to a high voltage installation will be adhered to throughout the life of the Project. - Public access will be restricted throughout the life of the Project.	Low
Health and Wellbeing	Health and wellbeing impacts associated with potential water contamination of neighbouring water sources, e.g. dams and bores.	Proximal landholders	Medium	Medium	- SWMP will be prepared to outline measures to manage soil and water impacts associated with the construction and decommissioning works. This would include regular water testing and communication with proximal landholders regarding results. - OEMP will be developed for the Project and will include measures to address potentially adverse impacts on the receiving environment surface water quality and flooding during the operational phase. - Operation maintenance on Project infrastructure.	Low

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Health and Wellbeing	Health and wellbeing impacts associated with potential water contamination of neighbouring water sources, e.g. dams and bores.	Broader community	Low	Low	- SWMP will be prepared to outline measures to manage soil and water impacts associated with the construction and decommissioning works. This would include regular water testing and communication with proximal landholders regarding results. - OEMP will be developed for the Project and will include measures to address potentially adverse impacts on the receiving environment surface water quality and flooding during the operational phase. - Operation maintenance on Project infrastructure.	Low
Culture	Reduced connection to Country and disruption to cultural values.	Traditional Owners and Aboriginal community	Medium	Medium	- Development of an ACHMP in consultation with the RAPs, DPHI and 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. - Aboriginal sites GSF-UMW-3, GSF-UMW-4 and GSF-UMW-5 to be fenced off prior to construction commencing. - Staged salvage excavation to occur prior to the construction of the Project for GSF-UMW-6 and GSF-UMW-9. - All sites with surface stone artefacts within the Development Footprint to be collected from the ground surface (including sites that will be subject to salvage excavation) by qualified archaeologists and RAP representatives. - Lightsource bp to continue preventative management measures for historic heritage as outlined in Section 6.6.3.	Medium

Social Impact Category	Social Impact	Affected Stakeholders	Perceived Significance	Significance Rating Pre-Mitigation	Refinements, Mitigation or Enhancement Measures	Residual Significance Rating
Decision-making systems	Heightened levels of community outrage associated with perceived inability to inform Project planning and decision-making processes.	Proximal landowner / residents.	Very High	High	- The CSEP will be reviewed and updated to addresses both construction and operational phases of Project, which would include information relating to the construction period, operational phase, the company, and decommissioning phase. - Lightsource bp have a contact phone number, which will continue to operate throughout the construction and operational phases. If necessary, appropriate contractor/s may have additional complaints and grievance mechanisms in place.	High
Decision-making systems	Heightened levels of community outrage associated with perceived inability to inform Project planning and decision-making processes.	Community and special interest groups, Aboriginal stakeholders, Local Government the broader community.	High	High	- The CSEP will be reviewed and updated to addresses both construction and operational phases of Project, which would include information relating to the construction period, operational phase, the company, and decommissioning phase. - Lightsource bp have a contact phone number, which will continue to operate throughout the construction and operational phases. If necessary, appropriate contractor/s may have additional complaints and grievance mechanisms in place.	High

6.14.3.1 Accommodation and Employment Strategy

The SEARs identified construction workforce accommodation as a key issue for consideration in the SIA, and this issue was also identified as a concern in stakeholder engagement, therefore a separate Accommodation and Employment Strategy (AES) was prepared and is appended to the SIA (refer to Appendix J of **Appendix 18**).

A common concern for the growing number of renewable energy projects under development in NSW at the present time is the potential for population change associated with incoming construction workforces and the subsequent strain on local services and infrastructure, particularly accommodation. As discussed in **Section 3.4.1**, the Project is expected to require a workforce of approximately 400 FTE employees (both direct and indirect) during the 18–24-month construction period with a peak direct workforce of 250 FTE required onsite.

Local Employment Strategy

The AES identified that while the Project workforce demand is expected to be relatively small compared to the labour pool of relevant LGAs, there are a range of factors that are expected to limit local employment opportunities for the Project. These include:

- A tight labour market: during stakeholder consultation, it was highlighted that local industries are struggling to fulfill workforce needs and therefore have been looking at sourcing skilled migrant workforces to meet current or existing employment needs.
- The low proportion of females employed as electricians and labourers in the social locality compared to males indicating likely barriers to entry into a male-dominated workforce. This may be further exacerbated due to limited training opportunities in the social locality.
- There are limited training facilities and courses available at TAFE within the social locality. It is unlikely that workforces could be upskilled for the Project within the social locality without targeted funding, programs and/or collaboration.
- There is likely to be four other SSD projects with construction timeframes occurring concurrently with the Project, indicating that there may be a strain to the local labour market and accommodation availability.
- Stakeholder consultation highlighted significant skills drain from the area, with local trade and construction workers delivering services in Canberra and other areas of regional NSW.

Based on the above, it is unlikely that a significant proportion of the workforce will be able to be sourced locally given current workforce constraints. Therefore, three local employment targets were considered:

- base case (5% local employment target)
- moderate (10% local employment target)
- aspirational (20% local employment target).

When tested with local Councils and key stakeholders, it was agreed that a 5% local employment target could be achievable based on current economic conditions. It was commented that anything more than 5% would require proactive recruitment and upskilling and/or training effort by Lightsource bp.

Under the base case, 5% of the Project workforce will be sourced locally, and a total of 95% of the workforce will travel to the area for the construction period, thus seeking accommodation within the region. This is considered the most likely scenario, and under peak construction workforce estimates would equate to approximately 13 workers sourced locally and 237 travelling to the area.

Population change estimates for the three local employment targets (based on the worst-case peak construction workforce of 250) have been calculated at an LGA level only, given there is insufficient data available to accurately model how the incoming workforce would be distributed within specific localities in each LGA. Results are shown in **Table 6.35** under the worst-case assumption that each LGA will host 100% of the incoming workforce, which is acknowledged as unlikely to occur.

Table 6.35 Construction Workforce Population Change Estimates

Scenario (% migration of construction workforce)	Population increase ¹⁵	Goulburn-Mulwaree LGA % increase in population	Wingecaribee LGA % increase in population	Yass Valley LGA % increase in population	Upper Lachlan LGA % increase in population	Queanbeyan-Palerang Regional LGA % increase in population
Base case (95%)	237	+0.7%	+0.4%	+1.4%	+2.8%	+0.4%
Moderate (90%)	225	+0.7%	+0.4%	+1.3%	+2.6%	+0.4%
Aspirational (80%)	200	+0.6%	+0.4%	+1.2%	+2.3%	+0.3%

Research suggests that any increase or decrease in population greater than 5% may be considered a significant population impact (Burdge, 2004). In the Goulburn-Mulwaree LGA, the highest impact scenario in which there is 95% workforce migration, would result in a population increase of 0.7%, although as noted above it is unlikely that the entire incoming workforce would be accommodated in one LGA. For the LGAs with smaller resident populations (Upper Lachlan and Yass Valley) temporary population changes would be greater (2.8% and 1.4% respectively) and are more likely to cause social impacts, such as changes in community cohesion and impacts to services.

To meet the base case target of 5% local employment, Lightsource bp and the Project EPC Contractor will adopt the following measures as appropriate to prioritise the employment of local workers where possible and to maximise benefits to the local community:

- Establishment and maintenance of relationships with local contractors and service providers through an EOI Register.
- Advertising Project-related opportunities to the local community through local media, community groups and regional procurement or industry stakeholders.
- Early consultation with local community groups and employment agencies to provide targeted and accessible advertisements and open tenders.

¹⁵ Calculations based on the following LGA population figures: Goulburn-Mulwaree LGA: 32,053, Wingecaribee LGA: 52,709, Yass Valley LGA: 17,281, Upper Lachlan LGA: 8,514 and Queanbeyan-Palerang Regional LGA: 3,304. Population increases assume workers would not be permanently relocating to the area and therefore do not consider the influx of families associated with the workforce.

To achieve the moderate (10%) and/or aspirational (20%) local employment targets, Lightsource bp and the EPC Contractor will also consider the following additional measures:

- Consult with local employment agencies to facilitate employment of local workers.
- Provide accessible opportunities for First Nations employment and training groups.
- Work with local stakeholders to understand workforce readiness in the area.
- Incorporate additional weighting in tenders and EOIs to prioritise procurement from local companies.
- Provide a shuttle bus service to the site from key population centres such as Yass or Goulburn.
- Provide local training opportunities.
- Provide a dedicated local employment and procurement officer to facilitate relationships with contractors, local workforces and service providers.

Accommodation Strategy

The AES identified the following challenges or constraints:

- A large proportion of the peak construction workforce will need to be sourced from outside the region and will need to be accommodated locally.
- There are current rental market constraints with extremely low vacancy rates.
- There is currently a limited supply of social and affordable housing within the social locality and increasing local demand.
- Short-term accommodation availability within a 1-hour drive is currently limited and competition for short-term accommodation in neighbouring LGAs is high.

The AES included an analysis of short-term accommodation supply and occupancy rates within a 1-hour driving distance from the Project and based on the local employment target of 5%. By spreading the incoming temporary workforce across LGAs the analysis confirmed that appropriate housing is available without causing significant strain on the current short-term accommodation and housing market. Canberra is also a 1-hour drive from the Project and could also be considered as another option for surplus demand which may occur during peak cumulative demand periods.

Local workers already residing in the region will be employed where possible to reduce the demand for short-term accommodation. Where local accommodation is required for the incoming construction workforce, Lightsource bp and the EPC Contractor will adopt the following measures:

- Investigate and document accommodation options and explore potential accommodation partnerships in the local region.
- Operate a Housing and Accommodation Expression of Interest Register to enable local landowners, businesses and individuals to register their interest in providing accommodation services to the Project.

- Maintain and continue to explore potential partnerships with commercial service providers, property owners or property managers who have expressed an interest in entering into a contract with the Project and/or leasing dwellings in the local area.
- Contact local accommodation providers directly to disseminate details such as construction timing, workforce scheduling (once available) and accommodation requirements.
- Review workforce requirements regularly (e.g., monthly) during construction to ensure the objectives of the AES are being met.
- Consult with stakeholders to advise about the Project and potential opportunities for accommodation operators.

6.14.4 Management and Mitigation Measures

To minimise potential negative social impacts and enhance social benefits for the community, there have been a number of Project design changes as outlined in **Section 1.5**.

In addition, a range of strategies are to be implemented in response to the predicted social impacts associated with the Project, and include:

- **A Social Impact Management Plan (SIMP):** Should the Project be approved, Lightsource bp will develop and implement a SIMP. The SIMP will document the key mitigation and enhancement commitments for the Project and include a program to monitor, review and report on the effectiveness of these actions.
- **Community and Stakeholder Engagement Plan:** Lightsource bp will continue to implement the CSEP throughout the construction and operation of the Project, with regular evaluation to ensure it continues to meet its objectives. Consideration will be given to ongoing communication with host and proximal landholders and additional methods for enhancing community and connection within the locality, including the identification of new relevant stakeholders as the Project progresses.
- **Community Benefits Sharing Strategy:** Lightsource bp is aware of the importance of distributive equity and the initiatives that will deliver community benefits to those most impacted by the Project and will implement the Community Benefits Sharing Strategy that has been developed for the Project.
- **Neighbourhood Benefit Sharing Program:** Lightsource bp has developed a Neighbourhood Benefit Sharing Program which will be implemented should the Project be approved, and construction commences.
- **Accommodation and Employment Strategy (AES):** Lightsource bp is committed to monitoring and evaluating the effectiveness of the AES. During the Project's pre-construction and construction phases, the AES would be reviewed bi-annually by the EPC Contractor to assess the effectiveness of steps taken to secure sufficient accommodation for the workforce.

6.15 Economic

An Economic Impact Assessment (EIA) for the Project was prepared by Ethos Urban, in accordance with the SEARs and the Solar Guideline, to address the economic benefits and impacts of the Project for the region and the State as a whole and provide details of any proposed voluntary benefit sharing programs.

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

6.15.1 Methodology

The EIA includes an assessment of Project investment, employment, business and industry participation opportunities, agricultural impacts, accommodation and housing, economic stimulus and cumulative impacts. Full details regarding the methodology for the EIA are provided in **Appendix 19**.

The EIA study area was defined in terms of the boundaries of the following Local Government Areas (LGAs):

- Goulburn-Mulwaree (which is the host LGA).
- Wingecarribee.
- Queanbeyan-Palerang.
- Upper Lachlan Shire.
- Yass Valley.

The EIA includes the following summary of the Study Area:

- The population of the Study Area is estimated at 179,870 persons in 2024, with the population of the Goulburn Mulwaree LGA estimated at 33,130 persons. Population forecasts for the Study Area show an estimated increase of +45,840 residents between 2024 and 2041. This includes growth of +7,300 residents in Goulburn Mulwaree LGA. Goulburn Mulwaree LGA's growth is forecast to increase at an annual rate of +1.2% across the 17 years from 2024–2041, representing an additional +430 persons per annum on average. This growth rate is slightly less than the Study Area, estimated at +1.3% per annum over the same period.
- The Study Area generally has a lower unemployment rate (1.6% in September 2023) compared to the NSW average (3.2%). This reflects a tight regional labour market, with the total number of unemployed persons in the Study Area being 1,550 persons. ABS Census data for 2021 highlights that 35.6% of employed residents in Goulburn Mulwaree LGA and 28.6% of employed residents in the Study Area were occupied in activities generally sought for construction of major utility-scale renewable energy projects (e.g., technicians and trades workers, machinery operators and drivers, and labourers). Of importance, the representation of these occupations in Goulburn Mulwaree LGA is significantly above the State average (26%), indicating a generally suitable occupational base for the Project is present in the immediate region.

- ABS Business Count data (June 2023) show that the Study Area includes 4,367 construction related businesses, accounting for 23.8% of total businesses in the Study Area. This indicates a reasonable presence in the Study Area of the types of firms that have potential to directly service aspects of the Project. Goulburn Mulwaree LGA includes 624 construction and manufacturing businesses who may provide support for the Project. The LGA also supports a range of other businesses that may benefit from the Project, including businesses involved in retail trade, accommodation and food services.
- The Study Area has a mix of commercial accommodation including motels, hotels, guest houses, caravan/holiday parks (including cabins) with a total of approximately 2,328 rooms/cabins available. A large share of this accommodation is located in the Queanbeyan-Palerang, Goulburn Mulwaree and Wingecarribee LGAs. Private accommodation (short-term or long-term housing rentals) are also available within the Study Area with a total of 524 vacant dwellings. Of these, 164 are available within Goulburn Mulwaree LGA, and 264 in Wingecarribee LGA. The highest vacancy rate in the Study Area is 1.35% in Queanbeyan-Palerang LGA. Furthermore, the Study Area has a provision of unoccupied private dwellings at 7,754 dwellings. Notably Upper Lachlan LGA specifically has a high share of unoccupied private dwellings at 23.3%.

6.15.2 Assessment of Economic Impacts

The net economic impacts of the Project, as presented in the EIA, are shown in **Table 6.36**.

Table 6.36 Net Economic Outcomes

Factor	Value
Negative Economic Outcome: Temporary loss of agricultural land (40 years)	512 ha
Negative Economic Outcome: Loss of employment (direct and indirect)	0 jobs
Positive Economic Outcome – Construction phase: Capital investment	Approximately \$650 million
Positive Economic Outcome – Construction phase: Study Area investment (including wage stimulus)	+\$89.7 million (15% of total investment)
Positive Economic Outcome – Construction phase: Average construction employment (direct plus indirect jobs) ¹⁶	400 FTE total
Positive Economic Outcome – Construction phase: Average Study Area employment (direct and indirect jobs) ¹⁷	10 FTE direct on-site 50 FTE indirect off-site Total: 60 FTE
Positive Economic Outcome – Operational phase: Operational employment (direct and indirect) ¹⁸	14 FTE total
Positive Economic Outcome – Operational phase: Study Area operational employment (direct and indirect jobs) ¹⁹	4 FTE direct on-site 2 FTE indirect off-site Total: 6 FTE

¹⁶ Total Direct Construction workers assume 155 FTE direct jobs and 245 FTE indirect jobs based on an employment multiplier of 1.6.

¹⁷ Assumes 5% of direct FTE construction jobs and 20% of indirect FTE construction jobs are supported locally.

¹⁸ Assumes 4 direct FTE ongoing jobs, and 10 indirect FTE ongoing jobs based on a multiplier of 2.9.

¹⁹ Assumes 20% if indirect FTE ongoing jobs are supported locally.

Factor	Value
Positive Economic Outcome – Operational phase: Total net local economic stimulus (operational wage stimulus, community/neighbour payments, increased Council land tax returns)	\$113.8 million (over 40 years)
Total Economic Benefits for Study Area	\$203.5 million (construction period + 40 years operation)

6.15.2.1 Project Investment and Employment Impacts

Overall, the Project will involve approximately \$650 million in investment during the construction phase (of which approximately \$98 million (15%) will be retained in the Study Area during construction) and will support 400 Full Time Equivalent (FTE) positions in the national economy over the 24-month construction period (including an average of 155 direct FTE jobs and 245 indirect FTE jobs). At the Project's peak, which may last for several months, it is estimated that 250 FTE positions will be supported by on-site construction activities. Once operational, 14 FTE jobs will be supported nationally by the Project (4 direct FTE jobs and 10 indirect FTE jobs). Of this national total, the Study Area is expected to benefit from 60 FTE construction jobs and 6 FTE ongoing jobs associated with the Project.

The Study Area has capacity in terms of construction-related workers (24,625 workers) and construction-related businesses (4,367 businesses). As such, the Study Area may have the capacity to manage both the requirements of the Project and concurrent infrastructure projects (subject to careful management). The Project will provide new participation opportunities for businesses and workers located in the Study Area, having regard for the good match of skills and resources available.

6.15.2.2 Accommodation and Local Wage Spending Stimulus Impacts

The Project's labour requirements would be expected to generate an accommodation need for 237 non-local FTE workers at the peak of the Project construction. This calculation is based on 95% of the 250 peak on-site FTE workers and represents workers coming from outside the Study Area and requiring accommodation. This level of accommodation relates to the Project's peak only. The average number of non-local staff requiring accommodation across the 24-month construction phase is estimated at 145 FTE workers (noting this number will be much lower during periods of low site activity).

The AES (refer **Section 6.14.3.1**) indicates that 313 rooms and 13 established rental properties are likely to be available in the Study Area to accommodate the Project's workforce. This estimate factors in ongoing demand and demand generated from the concurrent construction of major infrastructure projects in the region. Specifically, the AES recommends the following mix and uptake of available accommodation for Project workers:

- 30% of available temporary accommodation (hotels, motels, caravan park cabins) – equating to 189 rooms.
- 30% of available Airbnb properties – equating to 124 Airbnb rooms.
- 2.5% of available rental stock – equating to 13 rental properties.

The allocation of accommodation across the Study Area shows that Wingecarribee, Queanbeyan-Palerang, and Goulburn Mulwaree LGAs can support the largest provision of accommodation and housing requirements.

Construction workers relocating to the region would be expected to inject approximately \$11 million (2024 dollars) in new spending into the economy over the construction phase, supporting approximately 28 FTE jobs in the service sector in the Study Area over this time.

The Project will further generate new revenues for commercial accommodation providers and also private property owners over the construction phase (especially in off-peak seasons) across the Study Area.

6.15.2.3 Agricultural Impacts

Once operational, the Project has been designed to be compatible with agricultural activity through the ability for continued use of the Project Area to occur through sheep grazing.

No net loss of employment associated with the existing agricultural land use of the Project Area is anticipated as a result of the Project, as the Project will support 6 FTE jobs (direct and indirect) in the regional economy through renewable energy generation, which is higher than the existing number of jobs supported from the land through agricultural activities.

As outlined in **Section 6.7.4.1**, it is estimated that the Project will result in a loss to primary productivity of up to \$280,624 per year and represents 0.6% of total agricultural productivity value in Goulburn Mulwaree LGA. This level of economic impact is negligible and is outweighed by the economic benefits including ongoing jobs and economic stimulus that will be generated by the Project over its operational as detailed in the section below.

6.15.2.4 Ongoing Economic Stimulus

Ongoing economic stimulus associated with the operation of the Project is estimated at approximately \$113.8 million over 40 years (2024 dollars, Consumer Price Index (CPI) adjusted), relating to host landowner payments, financial returns to the community, financial returns to Council and operational wage stimulus. Further details on each of these elements are provided in the EIA in **Appendix 19**.

6.15.2.5 Estimated State Benefits

In addition to supporting the NSW State policy directions and national grid supply benefits outlined above, the Project will deliver the following key State-wide economic benefits:

- **Capital investment:** \$162.5 million or 25% of the total project CIV. The remaining 60% is attributed to imports, and 15% to other states and territories.
- **Construction employment:** 300 FTE direct and indirect construction jobs, or 75% of total construction employment. The remaining 25% is attributed to other states or territories.
- **Ongoing employment:** 13 FTE direct and indirect jobs, or 90% of the total operating employment. The remaining 10% is attributed to other states and territories.
- Supporting diversification of the economy through investment in the renewable energy sector.

6.15.2.6 Decommissioning

Decommissioning of the Project is likely to support significant employment generation, new business contracts and provide a spending stimulus to the Study Area over the decommissioning period. However, given decommissioning will not occur for at least 40 years after the operation of the Project commences,

it is not possible to estimate potential impacts and benefits at this stage noting economic, technological, environmental factors may change considerably over this period.

6.15.3 Management and Mitigation Measures

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

- Should the Project be approved, the Accommodation and Employment Strategy (AES) for the Project be reviewed and updated, to confirm:
 - There is sufficient accommodation for the workforce associated with the construction phase of the Project.
 - Measures to address any specific cumulative impacts arising associated with other State significant development projects in the area.
 - Measure to prioritise the employment of local workers and the procurement of local businesses for the construction and operation of the Project.
 - A program to monitor and review the effectiveness of the strategy over the life of the Project.
- To ensure the broader community benefits from the construction and operation of the Project, a Community Shared Benefit Strategy including a Community Fund will be developed in consultation with local stakeholders and Council to be available to the wider community.

6.16 Waste Management

The SEARs require the EIS to identify, quantify and classify the likely waste streams to be generated throughout all stages of the Project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste; and provide a Waste Management Plan (WMP) prepared in accordance with the Solar Guidelines. The Solar Guidelines also state that the EIS must include evidence from local councils or facilities that the identified waste classifications and volume can be accepted at the appropriate stage of the Project's life cycle.

A qualitative waste assessment was undertaken for the Project in accordance with the Solar Guidelines, as presented in this section, which involved:

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

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

- *NSW Protection of the Environment Operations Act 1997 (POEO Act).*
- *NSW Protection of the Environment Operations (Waste) Regulation 2014.*
- *NSW Waste Avoidance and Resource Recovery Act 2001 (WARR Act).*
- *Commonwealth Recycling and Waste Reduction Act 2020.*

The *NSW Waste Avoidance and Resource Recovery Strategy 2014–2021* (EPA, 2014a) outlines the requirements for best practice waste management, which combines the principles of ecologically sustainable development with the implementation of resource management hierarchy principles as specified in the WARR Act (refer to **Figure 6.21**), which include:

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

A draft WMP has been prepared for the Project and is included in **Appendix 20** of this EIS. The WMP also details consultation undertaken with Council regarding identified waste streams and where these can be disposed.

6.16.1 Existing Environment

Operating waste management facilities located closest to the Project include:

- **Veolia’s Woodlawn Bioreactor Landfill** (approximately 50 km southwest of the Project) – waste accepted at this facility includes only General Solid Waste (putrescible) and (non-putrescible).
- **Tarago Waste Transfer Station** (approximately 55 km south of the Project) – waste accepted at this facility includes clean steel, organic waste (FOGO), recycling, polystyrene, car batteries, motor oil and general waste.
- **Marulan Waste Management Centre** (approximately 30 km northeast of the Project) – waste accepted at this facility includes clean steel, organic waste (FOGO), recycling, polystyrene, car batteries, motor oil, tyres, clean fill and dead animals.
- **Goulburn Waste Management Centre and Endeavour Industries Goulburn** (approximately 15 km north of the Project) is the LGAs primary facility – waste accepted at this facility includes general solid waste, recycling, clean steel, e-waste, tyres, and asbestos.

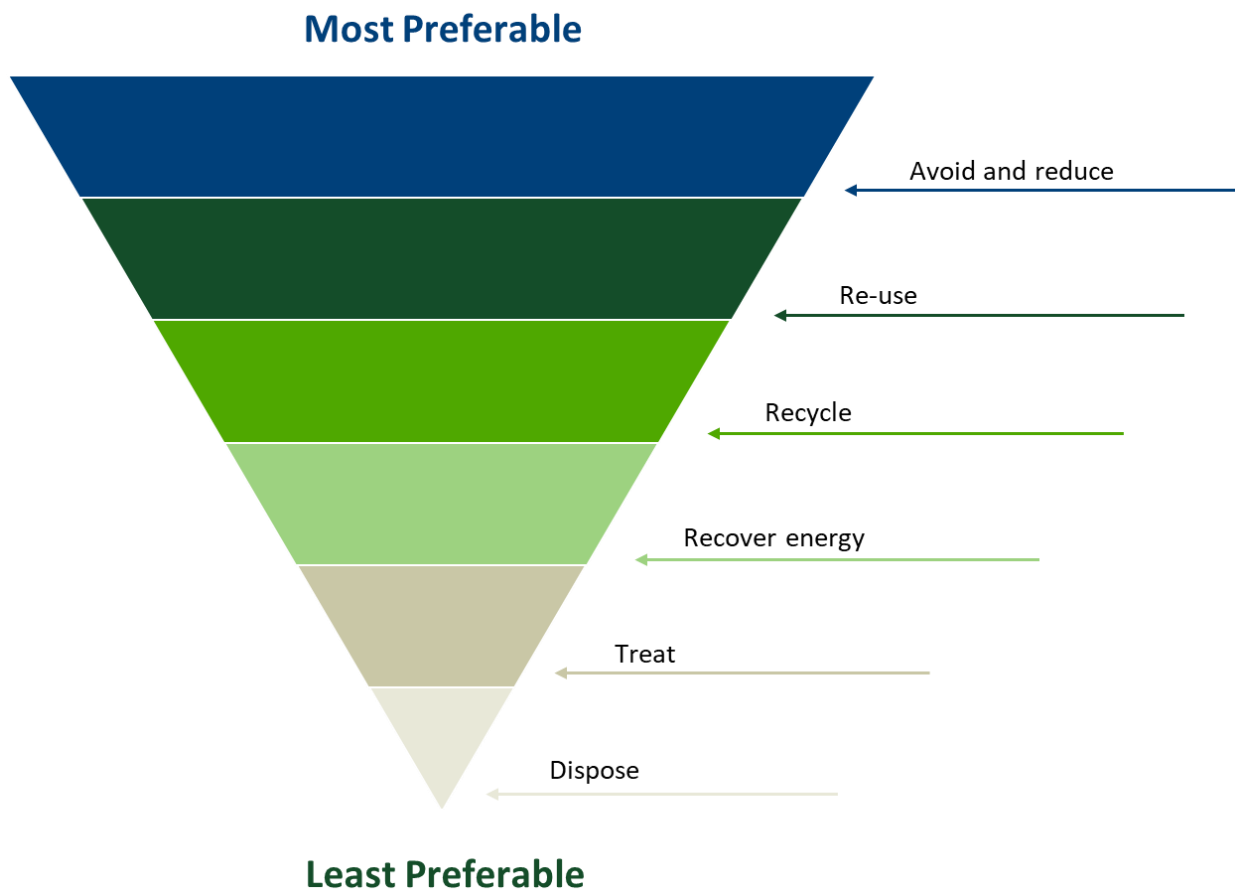


Figure 6.21 NSW EPA Waste Hierarchy (EPA, 2014a)

In accordance with the requirements of the Solar Guidelines, Goulburn Mulwaree Council has been consulted about waste management related to the Project during the preparation of this EIS and related WMP.

Council has confirmed that Goulburn Waste Management Centre and Endeavour Industries Goulburn have the capacity to accommodate expected waste types and quantities generated by the Project. Lightsource bp will continue to consult with Council and the waste management facilities throughout development and operation of the Project with regard to waste management and disposal. Evidence of consultation with Council regarding waste management appears in the WMP (refer to **Appendix 20**).

6.16.2 Predicted Waste Streams

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

- Special waste – asbestos, waste tyres and clinical wastes.
- Liquid waste – wastewater effluent, fuels and lubricants.
- Hazardous waste – contaminated soils.
- Restricted solid waste.

- General solid waste (putrescible) – food waste, organics and animal wastes.
- General solid waste (non-putrescible) – glass, plastic, rubber, bricks, concrete, metal, paper, cardboard and other domestic waste.

Identified waste types expected to be generated by the Project during the construction, operation and decommissioning phases, assessed in the context of the above guidelines, appear in the WMP prepared for the Project (refer to **Appendix 20**).

6.16.3 Assessment of Impacts

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

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

Measures outlined in **Section 6.16.4** and **Appendix 20** would be implemented during the construction of the Project to suitably manage these waste impacts.

6.16.4 Management and Mitigation Measures

6.16.4.1 Construction

Should the Project be approved, the draft WMP will be reviewed and updated with a detailed breakdown of the waste types and quantities in accordance with relevant legislation and guidelines as part of the detailed design and construction phase. Lightsource bp is committed to ensuring waste generated by the Project is able to be reused and recycled in accordance with the waste management hierarchy. Lightsource bp will continue to consult with Council regarding waste management.

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

6.16.4.2 Operation

Waste generated during the operational phase of the Project will be limited to those generated by operational maintenance activities and operational staff. Volumes are anticipated to be significantly less than those produced during construction and decommissioning. Management of waste will occur in accordance with an operational WMP prepared for the OEMP.

6.16.4.3 Decommissioning

A Decommissioning and Rehabilitation Management Framework (DRMF) will be developed for the Project, which will include processes for the decommissioning works outlined in **Section 3.6**. This Framework will demonstrate a commitment to ensuring appropriate environmental management is undertaken during the decommissioning and rehabilitation phase of the Project in accordance with legislative requirements, conditions of consent, stakeholder interest and industry best practice.

6.17 Air Quality

The SEARs do not require the assessment of air quality as part of the EIS. Nonetheless, a qualitative assessment of the Project's potential air quality impacts has been undertaken to address concerns raised by the community in relation to dust generated during construction. This involved:

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

6.17.1 Existing Air Quality

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

- Dust and vehicle and machinery exhaust emissions associated with agricultural production.
- Vehicle emissions from motors traveling on Windellama Road and Kooringaroo Road.
- Use of wood burners in residential properties during winter months.
- Bushfires.

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

The closest located air quality monitoring station is within the township of Goulburn, on the corner of Howard Street and McDermott Street (coordinates 34°44'4"S, 149°43'27"E), approximately 12 km north of the Project Area. Due to its proximity to the Project Area, this weather station is considered representative of the local air quality. The following air pollutants are measured at Goulburn:

- Fine particles as PM₁₀.
- Fine particles as PM_{2.5}.
- Ozone (O₃).
- Oxides of nitrogen (NO, NO₂ and NO_x).
- Visibility using nephelometry.
- Wind speed, wind direction and sigma theta.
- Ambient temperature.
- Relative humidity.
- Precipitation.

A search of the NSW DPHI Air Quality Concentration Data webpage on 11 March 2024 identified that the air quality for Goulburn is 'good'.

A review of the Commonwealth DCCEEW National Pollution Inventory (NPI) (DCCEEW, 2024) identified seven scheduled facilities that operate within the vicinity of the Project (20 km radius) and may also contribute to the local air shed, including:

- Aero Refuellers Goulburn, Goulburn (approximately 4 km north-west).
- Kel Campbell – Goulburn Petroleum Depot, Goulburn (approximately 8 km north-west).
- Southern Meats Goulburn Abattoir, Goulburn (approximately 9 km north-west).
- Hill & Co Goulburn Depot, Goulburn (approximately 9 km north-west).
- Goulburn Mulwaree Council Landfill, Goulburn (approximately 9 km north).
- Goulburn Wastewater Treatment System, Kenmore (approximately 13 km north).
- Goulburn Meter Station, Kenmore (approximately 15 km north).

6.17.2 Assessment of Impacts

6.17.2.1 Construction and Decommissioning

The main source of emissions to the air during construction would involve dust and air borne particles generated from construction activities, including site preparations (construction) or demolition work, as well as vehicle, plant and equipment and exhaust emissions. These emission sources are temporary in nature for the duration of the construction and decommissioning phases.

Exhaust emissions from vehicles and machinery have the potential to impact on human health, as well as contribute to greenhouse emissions and leave residues on private properties. The use of heavy vehicles, equipment and machinery would be largely limited to the construction period and emissions would be localised.

As discussed in **Section 2.5.2**, the nearest non-associated receiver is over 130 m north of the Project Area. Given the temporary nature of the construction activities, it is expected that any impacts from dust and exhaust emissions would be minimal to surrounding sensitive receivers.

With the implementation of air quality controls and mitigation measures proposed in **Section 6.17.3**, it is expected that the construction and decommissioning activities would have a negligible impact on local air quality.

6.17.2.2 Operation

Once the Project is operational, agricultural activities may continue across the Project Area (subject to further consultation with the landholder and regulatory authorities). In addition to this, ongoing maintenance of the Project Area and infrastructure will be required, as outlined in **Section 3.4.8**. The maintenance activities would result in minor, localised vehicle emissions and generation of dust from vehicles travelling along the internal, unsealed access roads.

With the implementation of the management and mitigation measures proposed in **Section 6.17.3**, the predicted air quality impacts during the operation of the Project can be adequately managed.

6.17.3 Management and Mitigation Measures

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

- As part of the CEMP, protocols will be developed and implemented to minimise the air emissions during the construction, including:
 - Water suppression on all exposed areas, unsealed roads and stockpile areas when required (i.e. if visible dust emissions are observed).
 - The location and scale of dust generating activities 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.
- Areas within the Project Area which have been temporarily disturbed by construction and operational activities will be rehabilitated.
- Once construction has been completed, establish and maintain ground cover in accordance with the OEMP.

6.18 Cumulative Impacts

When considered in isolation, the environmental, social and economic impacts associated with a development may be considered minor. However, these minor impacts may be more substantial when the impacts of multiple developments on the same receivers, communities and environments are considered. As discussed in **Section 2.6**, there are 23 approved and proposed projects within 100 km from the Project.

The SEARs require the EIS to include an assessment of the likely impacts of all stages of development, including any cumulative impacts of the Project and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice.

This section presents an assessment of the potential cumulative impacts associated with the construction, operation and decommissioning of the Project, in conjunction with other developments and activities occurring near the Project. It also provides an approach for the management of any identified potential cumulative impacts. This assessment was undertaken in accordance with the requirements of the SEARs, the Solar Guidelines and the CIA Guidelines.

6.18.1 Assessment Methodology

The CIA guidelines indicate the following future projects should be considered in the cumulative impact assessment:

- Changes to existing projects (expansion, modification, closure).
- Approved projects (approved but construction has not commenced).
- Projects under assessment (application for the project has been exhibited and is currently under assessment).
- Related development (development that is required for the project but subject to separate assessment).

In accordance with the CIA Guidelines, a scoping summary was prepared to identify the potential for cumulative impacts to occur as a result of the Project (refer to **Appendix 21**). Nearby developments with the potential to result in cumulative impacts with, or as a result of, the Project were identified using the following sources:

- NSW DPHI Major Projects website, including renewable and other projects in the area.
- Transport for NSW current projects register (relative to transport routes).
- Goulburn-Mulwaree Council development application register.

Developments were selected based on the following screening criteria:

- **Location** – proximity to areas and activities assessed as part of each staged assessment.
- **Timeframe** – relevant projects recently completed or likely to be carried out at some point during the construction, operation and/or decommissioning of, and would interact with, the project.
- **Scale** – potential impacts of a scale that could cause cumulative impacts with each staged assessment.
- **Status** – the stage of the project at the time of each staged assessment (including forecast timeframes for construction and operation). Stages includes approved projects, proposed projects and local strategic plans.

Generally, cumulative impacts have been qualitatively assessed, based on the perceived likelihood of impact and scales of interaction between the Project and nearby developments. In some cases, a detailed assessment (traffic, visual, noise and social) was carried out to identify and assess the cumulative impacts of the Project.

6.18.2 Identified Developments

As outlined in the cumulative scoping summary provided in **Appendix 21**, impacts associated with the operations phase of the Project and other renewable energy developments within the area will be limited, with the majority of the potential impacts associated with the construction phase. Therefore, renewables projects that are already operational or currently under construction are considered unlikely to result in cumulative impacts with the Project as there would be limited or no overlap of construction or decommissioning activities.

In some instances, sufficient detail relating to nearby projects is not currently available to inform a detailed assessment. Where construction timeframes are not known, predictions have been made about the likelihood of overlapping construction periods, based on the most current and publicly available information at the time of writing this EIS.

There are several development projects that may contribute to the cumulative impacts of the Project, assuming that construction will occur at the same time as the Project, which are summarised in **Table 6.37** and detailed in **Appendix 21**.

Table 6.37 Cumulative Impact Summary

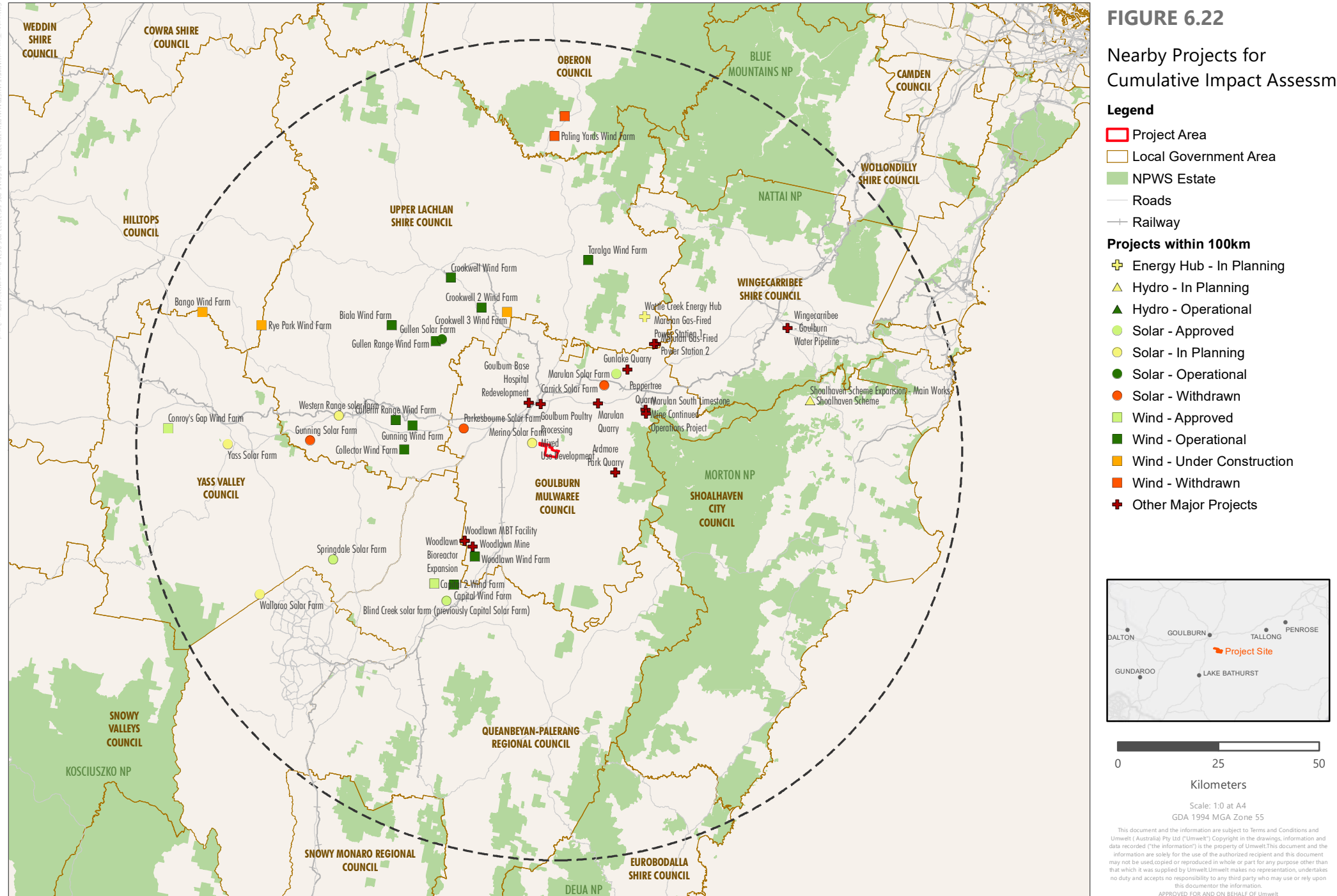
Project	Detail	Potential Cumulative Impact
Merino Solar Farm	1 km west of Project Area. In Planning – Prepare EIS. A 450 MW proposed solar farm with energy storage and associated infrastructure. Construction expected to commence (but not approved) in early-mid 2025 to mid-late 2026, with a duration of 12 to 18 months. Project is expected to generate up to 200 to 300 FTE jobs during construction, with four FTE jobs during operation, as well as 50 casual staff. Access to the northern site is expected to be provided via a new access driveway linking to Braidwood Road but could potentially utilise existing arrangements from Windellama Road or Gundry Lane. The southern site is expected to be accessed either directly from Braidwood Road or from Painters Lane.	• Biodiversity. • Agriculture. • Visual. • Noise and vibration. • Traffic and transport. • Socio-economic. • Waste.
Marulan Solar Farm	23 km northeast of Project Area. Approved – construction to commence. A 100 MW solar farm with energy storage and associated infrastructure. Construction is expected to commence in 2024 and last for approximately 18 months. Project will employ approximately 300 people during the peak construction period, with around five FTE operational workers and the potential to employ up to 50 casual workers during maintenance periods. Approximately 13 heavy vehicle trips per day (maximum 28 trips per day) are expected, along with 100 light vehicle trips per day (maximum 160 trips per day). The Hume Highway and Munro Road will be the primary access roads to the site.	• Agriculture. • Waste.
HumeLink	26 km north of Project Area. In planning – Under assessment. Proposed 500 kV transmission line which will connect Wagga Wagga, Bannaby and Maragle. Transmission line proposed to be approximately 360 km long with a 60 m to 70 m wide easement. Construction is expected to last approximately two years and is expected to commence in 2025. The project will employ approximately 400 to 1,000 people during the peak of construction. Expected traffic movements are unknown, however the Hume Highway will be one of the primary roads used to access the site.	• Socio-economic.

Project	Detail	Potential Cumulative Impact
Blind Creek Solar Farm	43 km southwest of Project Area. Approved – construction to commence. A 350 MW solar farm with battery storage and associated infrastructure. Construction expected to take 12–18 months, with unknown start or finish dates. As a conservative scenario, assumption has been made that construction period overlaps with Gundry Solar Farm. Project is expected to employ approximately 300 people during peak of construction period and five FTE operational workers. Project is anticipated to generate an average of 62 vehicle trips (48 of which are light vehicles), and a maximum of 170 vehicle trips will be undertaken during construction (100 of which are light vehicles). The project proposes to use Braidwood Road as part of the transport route to site.	• Agriculture.
Wattle Creek Solar Farm	50 km northeast of Project Area. In planning – Prepare EIS. A 265 MW proposed renewable energy generation project with associated BESS. A 265 MW solar farm with energy storage and associated infrastructure. Construction expected to be undertaken during 2025 and 2026. The project will employ approximately 200 people during the peak of construction and 7 FTE operational workers. It is unknown what the expected traffic movements will be, however Hume Highway will likely be the primary road used to access the site.	• Agriculture. • Socio-economic.
Wattle Creek BESS	50 km northeast of Project Area. In planning – Prepare EIS. An 800 MW/1600 MWh battery energy storage facility with associated infrastructure. Construction expected to be undertaken during 2025 and 2026. The project will employ approximately 150 people during the peak of construction and 7 FTE operational workers. It is unknown what the expected traffic movements will be, however Hume Highway will likely be the primary road used to access the site.	• Socio-economic.
Capital Solar Farm	55 km south west of the Project Area. Operational. A 50 MW solar farm which has been operational since 2018. Linked to Capital Wind Farm substation.	• Agriculture.
Gunning Solar Farm	56 km west of Project Area. In planning – Response to Submissions. Proposed 250 MW solar farm and associated infrastructure, including battery storage and grid connection. Construction anticipated to commence in 2024 and expected to be undertaken for 18 months. Local employment opportunities of approximately 200+ jobs during 18-month construction period and approximately 5 to 6 FTE jobs during the 35-year operational life. Temporary construction access to the site would be from the Hume Highway via Lade Vale Road or Hillgrove Road.	• Agriculture.

Project	Detail	Potential Cumulative Impact
Springdale Solar Farm	58 km southwest of Project Area. Approved – construction to commence. 100 MW proposed solar farm and associated infrastructure. Construction period to last for approximately 10 months, with unknown start and finish dates. As a conservative scenario, assumption has been made that construction period overlaps with Gundry Solar Farm. Project will employ approximately 200 people during the peak construction and five FTE operational workers. Up to approximately 400 light vehicle movements are expected per day during peak construction, with up to approximately 75 heavy vehicle movements per day during the peak delivery period, and up to approximately 16 oversized vehicle movements in total throughout construction. The Federal Highway will be the primary road used to access the site.	• Agriculture.
Western Range Solar Farm	60 km west of Project Area. In planning – Prepare EIS. A 175 MW proposed solar farm and ancillary BESS. Construction is expected to take 18 months; however, it is unknown when construction will commence. As a conservative scenario, assumption has been made that construction period overlaps with Gundry Solar Farm. Project is expected to employ approximately 100 people during peak construction and eight FTE operational workers. Expected traffic movements are unknown, however the Hume Highway will be the primary road used to access the site.	• Agriculture.
Yass Solar Farm	77 km west of Project Area. In planning – Prepare EIS. 100 MW proposed solar photovoltaic energy generating facility with an associated battery energy storage system. Construction is expected to commence in 2025 for a period of approximately 24 months and will require up to 150 people during the peak period. The Hume Highway will be used to transport construction materials to the site.	• Agriculture.
Walleroo Solar Farm	78 km southwest of Project Area. In planning – Under Assessment. 100 MW proposed solar farm and associated infrastructure, including battery storage facility. Although the construction phase is expected to last approximately nine to 12 months, the construction start, and finish dates are unknown. As a conservative scenario, assumption has been made that construction period overlaps with Gundry Solar Farm. Access is proposed via Gooroomon Ponds Road via Wallaroo Road. The nearest major road is the Barton Highway.	• Agriculture.

Project	Detail	Potential Cumulative Impact
Woodlawn Advanced Energy Recovery Centre	29 km south of Project Area. In Planning – Response to Submissions. Proposed energy recovery facility for the thermal treatment of up to 380,000 tpa of residual waste feedstock, and a power plant with a nominal capacity of 30 MWh to generate up to 240,000 MW of electricity per annum. Construction is expected to take 36 months, commencing in 2024. The project will employ approximately 300 people during peak construction and 40 full FTE operational workers. It is expected that 25 light vehicle trips, 20 heavy vehicle trips and 25 bus trips will be required during peak construction. The Hume Highway, Braidwood Road, Goulburn Street, Bungendore Road and Collector Road will be primarily used for access to the site.	Socio-economic.

FIGURE 6.22
Nearby Projects for Cumulative Impact Assessment



6.18.3 Assessment of Cumulative Impacts

A detailed cumulative assessment has been undertaken where potential for impact has been identified through the cumulative scoping assessment (refer to **Appendix 21**) relevant to the Project. As summarised in **Table 6.37**, this assessment was focused on identified projects and relevant impacts, including the potential biodiversity, agriculture, visual, glint and glare, noise and vibration, transport, hazards and risks, and social and economic cumulative impacts.

Cumulative impacts related to Aboriginal cultural heritage, historical heritage, water resources, waste management, and air quality were also considered in the assessment, however the isolated nature of the Project Area and the minor nature of such impacts did not warrant additional assessment from a cumulative perspective. Further detail is available in the relevant specialist assessments.

6.18.3.1 Biodiversity

There is potential for cumulative biodiversity impacts to the availability of habitat in the region, including loss of habitat connectivity, removal of hollow-containing trees and clearing of vegetation used for shelter or food resources.

The potential cumulative impact to availability of habitat would typically be associated with developments within 1 km of the Project, which includes the Merino Solar Farm.

However, habitat availability for highly mobile species may be affected for proposed developments located further from the Project. Any contributions of the Project to cumulative biodiversity impacts are expected to be minimal, as the vegetation to be cleared for the Project primarily consist of native vegetation composed of scattered canopy trees, as well as areas of low-quality native pasture composed of highly disturbed agricultural land. Additionally, areas of remnant vegetation within the Project Area will be avoided by the Project to enable the persistence of habitat connectivity.

There may be cumulative impacts associated with the dispersal of weeds and invasive pests for proposed developments within 1 km of the Project, which includes the Merino Solar Farm. With the implementation of management and mitigation measures in **Section 7.0**, the potential cumulative impact to biosecurity would be minimised.

6.18.3.2 Agriculture

Cumulative impacts to agriculture, such as changes to land used for agricultural land, reduced primary productivity and loss of agricultural support services, are anticipated as a result of the Project, due to the number of proposed solar farm developments in the region (assuming all projects are approved for construction and operation), as identified in **Table 6.37**.

Table 6.38 summarises the cumulative loss of agricultural land and productivity associated with approved and proposed solar farm developments in proximity to the Project. Conservatively, the CIA assumed that none of these developments are implementing agrisolar as part of the development.

Table 6.38 Cumulative Loss of Agricultural Land and Productivity

Project Name	LGA	Project Area (ha)	Estimated Loss in Primary Productivity Per Year ²⁰
Gundry Solar Farm (the Project)	Goulburn Mulwaree	702	\$280,624
Capital Solar Farm	Goulburn Mulwaree	100	\$39,975
Marulan Solar Farm	Goulburn Mulwaree	406	\$162,299
Merino Solar Farm	Goulburn Mulwaree	760	\$303,810
Subtotal		1,968	\$786,708
Springdale Solar Farm	Yass Valley	370	\$39,975
Western Range Solar Farm	Upper Lachlan Shire	420	\$162,299
Gunning Solar Farm	Upper Lachlan Shire	676	\$303,810
Wattle Creek Solar Farm	Upper Lachlan Shire	614	\$245,446
Blind Creek Solar Farm	Palerang	1,026	\$39,975
Walleroo Solar Farm	Yass Valley	391	\$162,299
Yass Solar Farm	Yass Valley	600	\$239,850
Total		6,065	\$2,424,484

As presented in **Table 6.38**, the cumulative assessment showed that:

- The Goulburn Mulwaree LGA could experience up to 1,968 ha of land subject to potential cessation of agricultural land use. Measured against a total agricultural land use of 116,771 ha (refer **Section 6.7.4.1**), this represents an estimated 1.7% of agricultural land in the LGA.
- The cumulative loss of primary production per year within the Goulburn Mulwaree LGA is estimated at \$786,708. Measured against a total agricultural commodities gross value for the LGA of \$51,097,547 (refer **Section 6.7.4.1**), this represents an estimated 1.5% of agriculture productivity value within the LGA.
- A potential loss of up to 6,065 ha of agricultural land within the region with an associated estimated potential productivity loss of \$2,424,484 per year.

However, the suitability of agrisolar is especially relevant to the Goulburn Mulwaree LGA and the wider region given the suitable conditions for sheep grazing and the established sheep and lambing industries. Where agrisolar is implemented, the cumulative impact on agricultural for the LGA and the wider region would be considered to be low given changes to agricultural land use and agricultural productivity are anticipated to be minor for each respective Project.

²⁰ Conservatively assumes no agrisolar implemented. Primary productivity is based on assumption of cattle grazing as existing land use, using Merino Ewes (20 micron) – Merino Rams (399.75 \$/ha/year) DPI Gross Margin Budgets for Livestock as per Section 3.1.1 of **Appendix 9**.

On a broader scale, the cumulative risk to agricultural land and productivity across NSW because of large-scale solar development is estimated to be very low (DPE, 2022e). The Australian Energy Market Operator estimates that NSW will need approximately 20,000 MW of large-scale solar generation by 2050. This would require approximately 40,000 ha of land or only 0.06% of rural land in NSW. Even in the highly unlikely scenario that all of NSW's solar generation were located on important agricultural land (this land covers around 13.8% of the state and is 6 to 7 times more agriculturally productive than the remaining 86.2% of the state) only 0.4% of this land would be required (DPE, 2022b).

Overall, with or without the implementation of agrisolar at the above listed proposed solar farm developments, given the nature and scale of the established agricultural industries within the region and wider state, significant impacts to critical mass thresholds and regional and state agricultural infrastructure are unlikely to occur.

6.18.3.3 Visual

Cumulative visual impacts were assessed as part of the LVIA completed for the Project. There are two key aspects of this assessment, being cumulative impacts on views from viewpoints such as local residences and public viewing locations and the broader impacts on the landscape character of the area.

The study area for the cumulative visual impact assessment has been defined as follow, in line with the Technical Supplement:

- 4 km radius from the Project Area boundary for impact to viewpoints
- 5 km radius from the Project Area boundary for impact to landscape character.

Based on the above, the LVIA identified that the proposed Merino Solar Farm (approximately 1 km west of the Project Area) is the only relevant project to consider for cumulative visual impacts. All other developments will be over 20 km away from the Project Area and are therefore not anticipated to result in cumulative visual impacts. The Merino Solar Farm Preliminary Landscape and Visual Impact Assessment (Premise, 2022) was used to determine whether any Gundary Solar Farm Project receivers would have potential visibility of the Merino Solar Farm.

Cumulative Impact to Viewpoints

Based on the viewshed presented in the Merino Solar Farm Preliminary Landscape and Visual Impact Assessment, seven of the Gundary Solar Farm Project's assessed residential viewpoints (six existing receivers and one potential future receiver) were identified that could potentially view both the Project and the proposed Merino Solar Farm as outlined in **Table 6.39**.

As shown in **Table 6.39**, the assessed visual impact of the Gundary Solar Farm Project (only) on the seven viewpoints was low or very low. The potential cumulative visual impact on the same viewpoints as a result of the proposed Merino Solar Farm and the Project, is anticipated to be minimal. This is because:

- the view to either the Project or the proposed Merino Solar Farm (or in most cases both) was secondary from all existing viewpoints
- no viewpoint would see both solar farms within the same field of view
- all viewpoints have limitations to their view, due to intervening vegetation and/or buildings.

With the implementation of management and mitigation measures discussed in **Section 6.8.5**, the potential cumulative impacts on viewpoints would be minimised. It has also been assumed that should the proposed Merino Solar Farm be approved and constructed, that landscape screening would form part of that project, and over time also reduce views of that solar farm.

Cumulative Landscape Character Impact

The assessment of cumulative impact to landscape character considered the combined effect of the two projects to public views when on short journeys, where both developments could be seen by an observer moving through the landscape. The assessment found:

- it is very likely that when travelling through the landscape character study area (a journey of at least 10 km), on surrounding local roads, one or both projects would be seen
- Windellama Road and Painters Lane would experience the greatest cumulative impacts (as the viewer would experience the shortest time interval between views of more than one solar project)
- other roads within the study area would most likely provide views of a single project at a time, while moving, along a relatively short section of the road.

With the implementation of management and mitigation measures discussed in **Section 6.8.5**, the potential cumulative landscape character impacts would be minimised. It has also been assumed that should the proposed Merino Solar Farm be approved and constructed, that landscape screening would form part of that project, and over time also reduce views of that solar farm.

Table 6.39 Summary of Cumulative Impact to Viewpoints

Receiver ID	Viewpoint classification for Gundry Solar Farm	Viewpoints classification for Merino Solar Farm	Visual obstructions for Gundry Solar Farm	Visual obstructions for Gundry Solar Farm	Visual impact for Gundry Solar Farm	Cumulative Visual Impact
R30	Secondary view – from the side of the dwelling	Primary view	Buildings in foreground limit view.	Dense rows of trees along Windellama Road, and within private properties between dwelling and proposal.	Low	There would be very limited views to either solar farm. There would be minimal cumulative visible impact.
R31	Primary view	Secondary view	Trees limit the extent of view.	Dense rows of trees surround the dwelling and prevent a view west toward the proposal.	Low	Merino Solar Farm is very unlikely to be visible. There would be minimal visual impact, if any.
R36	Primary view	Secondary view	Trees along Windellama Road would limit the view.	Trees surround the dwelling that would limit the view.	Low	Due to proximity to Merino Solar Farm, there could be potential, limited views to both solar farms.
R77	Primary view	Secondary view	Trees along Windellama Road would limit the view.	Rows of trees along property boundaries would limit the view.	Low	Due to proximity to Merino Solar Farm, there could be potential, limited views to both solar farms.
R78	Secondary view – from side of the dwelling	Secondary view	Row of pine trees between dwelling and Project.	Rows of trees along property boundaries would limit the view.	Low	Due to proximity to Merino Solar Farm, there could be potential limited, views to both solar farms.
R79	Secondary view – from side of the dwelling	Secondary view	Buildings and vegetation near dwelling limit the view.	Trees surround the dwelling and prevent a view west toward the proposal.	Very low	Due to proximity to Merino Solar Farm, there could be potential, limited views to both solar farms.
FR41	Not applicable: no dwelling	Not applicable: no dwelling	Not applicable: no dwelling.	Not applicable: no dwelling.	Very low	Due to proximity to Merino Solar Farm, there could be potential, limited views to both solar farms.

6.18.3.4 Noise and Vibration

The NVIA considered cumulative noise and vibration impacts from the nearby existing, approved and proposed developments, including the existing quarries and mines located between 25 km and 35 km from the Project Area.

The assessment indicated that apart from the Merino Solar Farm project, the other developments are located at significant distances (greater than 3.5 km) from the Project Area and do not use the same local traffic route. These large separation distances mean that these other projects do not contribute acoustically to the sensitive receivers near the Gundry Solar Farm. Therefore, the assessment of cumulative impacts as presented in the NVIA focused on the potential contribution from the Merino Solar Farm project.

Construction Noise

It is assumed that the construction phase of the Gundry Solar Farm and Merino Solar Farm project would occur concurrently, should the projects proceed as proposed. Therefore, there is potential for cumulative construction noise at receivers located between both project areas, near Windellama Road. These would include R16A, R16B, R16C, R20, R21A, R21B, R22, R25, R27, R29, R30, R31, R79 and R90 shown on **Figure 2.4**.

The reasonable and feasible management and mitigation strategies discussed in **Section 6.10.5** are applicable to the cumulative construction noise impacts. A collaborative approach with other proponents to managing potential construction noise impacts may be necessary at times to minimise potential noise impacts at the sensitive receivers nearest to both projects.

Operational Noise

Regarding operational noise, as specified in the NPfI, where a PANL which is set 5 dB below the recommended amenity noise level can be met, no additional consideration of cumulative industrial noise is required.

Based on the noise predictions, the Project can readily achieve the PANL therefore, no cumulative noise impact is anticipated due to the combined impact of the construction and operation of the Project and any surrounding developments.

Road Traffic Noise

The cumulative traffic noise levels considering the simultaneous construction traffic from Merino Solar Farm on Windellama Road are presented in **Table 6.40**.

The predicted road traffic noise levels for Windellama Road, Bungonia Road and Braidwood Road indicate that:

- Potential traffic noise level is predicted to comply with the daytime noise limit of 60 dB(A) LAeq(15hr) at 30 m from the road edge and comply with the night-time noise limit of 55 dB(A) LAeq(9hr) at 40 m from the road edge. Within these distances, exceedance of the limits is predicted, as additional Project traffic exceeds the 2 dB(A) allowance.

- Two receivers are located within 40 m of the road edge and may be impacted by road traffic noise. However, typically, the sensitive receivers located in the vicinity of the Project Area are located at a distance greater than 40 m from the road edge and therefore the additional road traffic noise is likely to be negligible for the majority of sensitive receivers in the area. Further, the predicted noise levels are conservative and assume that peak construction traffic movements for both projects, are occurring simultaneously, which is unlikely to occur.

Additionally, the Project has committed to using buses to reduce the total number of light vehicles movements. It is possible that a similar approach may be adopted by the Merino Solar Farm project.

Regarding potential traffic noise impacts on the remaining sections of the two transport routes (i.e. from Sloane Street to the Hume Highway) the peak hour traffic surveys with Appendix A of the TIA were referred to. Given existing traffic volumes along these roads are substantially higher than Windellama Road (at least double), heavy vehicle movements for the two Projects may be split between the two transport routes, and light vehicles and shuttle buses will travel through Goulburn from multiple directions, traffic noise impacts whilst possible are not anticipated.

Table 6.40 Windellama Rd / Bungonia Rd / Braidwood Rd Predicted Cumulative Construction Traffic Noise levels, LAeq, dB(A)

Time Period	Receiver / Distance from road edge	Existing traffic noise levels, dB(A)	Cumulative (existing + Project + external projects) traffic noise levels, dB(A)	Noise Limit, dB(A)	Noise Level Change due to Project + external projects, dB(A)	Comply/Exceed
Day (7 am–10 pm) LAeq(15 hour)	10 m	62	66	60	3.4	Exceeds – limit exceeded & change > 2 dB
Day (7 am–10 pm) LAeq(15 hour)	20 m	59	62	60	3.4	Exceeds – limit exceeded & change > 2 dB
Day (7 am–10 pm) LAeq(15 hour)	30 m	57	60	60	N/A ²¹	Complies – limit not exceeded
Day (7 am–10 pm) LAeq(15 hour)	40 m	55	58	60	N/A ²¹	Complies – limit not exceeded
Night (10 pm–7 am) LAeq(9 hour)	10 m	56	62	55	6.0	Exceeds – limit exceeded & change > 2 dB
Night (10 pm–7 am) LAeq(9 hour)	20 m	52	58	55	6.0	Exceeds – limit exceeded & change > 2 dB
Night (10 pm–7 am) LAeq(9 hour)	30 m	50	56	55	6.0	Exceeds – limit exceeded & change > 2 dB
Night (10 pm–7 am) LAeq(9 hour)	40 m	48	54	55	N/A ²¹	Complies – limit not exceeded

²¹ Change in noise level assessment is not applicable if the predicted noise level is below the noise limit.

There is a section of Garroorigang Road (south of Finlay Road), where existing traffic volumes are approximately 30% lower than Windellama Road. However, the nearest residential receiver is located a substantial distance (230 m) from the carriageway, so noise impacts are not anticipated.

6.18.3.5 Traffic and Transport

The cumulative traffic assessment undertaken as part of the Transport Impact Assessment (TIA) (refer to **Appendix 14**) acknowledges that there are several proposed renewable energy projects in the region that will utilise the Hume Highway for the transportation of construction materials to other project sites. Notwithstanding, the cumulative traffic assessment notes that the Hume Highway has sufficient capacity to accommodate significant increases in traffic flows.

Conservatively assuming that both the proposed Merino Solar Farm and Gundry Solar Farm have simultaneous peak construction periods, a cumulative assessment of the road network operation for both transport route options (i.e. Option 1 and Option 2) was undertaken as part of the TIA.

The TIA assumed that the Merino Solar Farm will generate 12.5% more construction traffic than the Gundry Solar Farm Project, due to the proposed capacity. The traffic generation potential of the Merino Solar Farm project has been added to the 'Existing + Project Construction Traffic' scenario as assessed in **Section 6.11.3**. The key intersections along the transport route have then been assessed using SIDRA intersection analysis.

The cumulative traffic assessment determined that, considering these potential increased traffic movements, all key intersections along both transport routes for construction vehicles will continue to operate satisfactorily with acceptable Level of Service (LoS).

However, the cumulative traffic assessment identified a noticeable change to the LoS at the Sloane Street/Braidwood Road intersection if all construction traffic for both projects were to use the Option 1 transport route, as illustrated in **Table 6.41**. If both projects undertake peak construction simultaneously, the Option 2 route will be the recommended route for Gundry Solar Farm, to reduce potential congestion at the Sloane Street/Braidwood Road intersection, as illustrated in **Table 6.42**.

Table 6.41 Cumulative Traffic (Existing + Gundry Solar Farm + Merino Solar Farm) – Option 1 only

Intersection Name	AM peak hour delay (sec)	AM peak hour LOS	PM peak hour delay (sec)	PM peak hour LOS	Saturday peak Hour delay (sec)	Saturday peak hour LOS
Braidwood-Bungonia	11	A	13	A	10	A
Sloane-Braidwood	50	D	466	F	145	F
Bungonia-Forbes	12	A	13	A	11	A
Bungonia-Memorial	10	A	9	A	8	A
Hume-Garroorigang	6	A	6	A	6	A
Lagoon-Union	32	C	44	D	31	C
Sloane-Garroorigang	6	A	6	A	6	A
Windellama-Rifle Range	9	A	10	A	10	A
Windellama-Site Access	25	C	17	B	19	B

Table 6.42 Cumulative Traffic (Existing + Gundary Solar Farm + Merino Solar Farm) – Both Routes

Intersection Name	AM peak hour delay (sec)	AM peak hour LOS	PM peak hour delay (sec)	PM peak hour LOS	Saturday peak Hour delay (sec)	Saturday peak hour LOS
Braidwood-Bungonia	11	A	13	A	10	A
Sloane-Braidwood	29	C	44	D	27	B
Bungonia-Forbes	12	A	13	A	11	A
Bungonia-Memorial	10	A	9	A	12	A
Hume-Garoorigang	7	A	9	A	9	A
Lagoon-Union	35	C	49	D	35	C
Sloane-Garoorigang	7	A	8	A	7	A
Windellama-Rifle Range	9	A	10	A	10	A
Windellama-Site Access	26	B	17	B	19	B

Cumulative Traffic Management and Mitigation Measures

Based on the above, Lightsource bp is committed to consider and use Option 2 as the preferred transport route should the peak construction periods for Gundary Solar Farm and Merino Solar Farm overlap.

6.18.3.6 Social and Economic

Both the SIA/AES and EIA considered cumulative social and economic impacts of the Project and other developments that may interact, as detailed in **Table 6.34** and identified in **Table 6.37**. Key cumulative social and economic impacts include:

- Competition for construction aligned services and labour resulting in a shortage of workers in the regional area.
- A shortage of available commercial and private accommodation due to the demand from multiple infrastructure projects, resulting in a lack of available rooms to service other sectors (i.e. tourism, visitation, business etc) and lack of available rental housing for local communities in a very tight rental market (especially in Goulburn).
- Demands to other services in key townships e.g. health, food services/ facilities and education facilities. With several possible concurrent construction phases for just renewable energy projects in the region there may be a strain on current services to meet the demands of large population influxes causing significant strain on the availability of services for those communities. This can also enhance economic outcomes for local businesses due to the increased commercial activity, spending and revenue generation from workforces accessing and utilising these businesses or services within the townships.

Projects identified to potentially have overlapped construction timeframes with Gundary Solar Farm are:

- Humelink.
- Merino Solar Farm.
- Wattle Creek Solar Farm and BESS (previously Wattle Creek Energy Hub).
- Woodlawn Advance Recovery Centre.

The Gundry Solar Farm Project's peak period is largely outside of and /or following that of the other major projects, however there may be some months of overlap, in particular with the HumeLink Project. HumeLink Project proposes to accommodate its workers in accommodation facilities, with the closest proposed near Crookwell, however, the project footprint is largely covering areas further south-west of the Project's social locality. Based on this, it is not expected that the overlapping construction timeframes will add cumulative strain on the local housing and accommodation market.

The AES indicated (refer to **Section 6.15**) there is surplus accommodation available within a 1-hour drive from the Project Area, and across the Goulburn-Mulwaree, Yass Valley, Queanbeyan-Palerang Regional, Upper Lachlan Shire and Wingecarribee LGAs to support the non-local workforce for multiple projects (2,328 short term accommodation, 124 rooms with Airbnb, 524 rentals across the 5 LGAs).

In consideration of the likelihood of the construction phase of the identified developments overlapping with the construction phase of the Project and the economic capacity of the region, the SIA considers that the potential cumulative impacts associated with the Project will be manageable. The SIMP that will be developed and implemented for the Project will include measures to address potential cumulative impacts (both positive and negative) and provide an appropriate platform for Lightsource bp to manage the contribution of the Project to the relevant cumulative issues.

Lightsource bp is committed to monitoring and evaluating the effectiveness of the AES, which will assist in the management of the cumulative social and economic impacts. These strategies will be developed in the lead up to the construction phase of the Project to reflect and respond to actual regional demand conditions at that time, especially in relation to concurrent projects within the Goulburn Mulwaree LGA and neighbouring LGAs. During the Project's pre-construction and construction phases, the AES would be reviewed bi-annually by the EPC Contractor to assess the effectiveness of steps taken to secure sufficient accommodation for the workforce.

6.18.3.7 Waste Management

Noting that several renewable projects are proposed within the region, it is anticipated that these projects will generate similar or more waste quantities and streams. The capacity of waste recycling facilities within the region as mentioned in **Section 6.16.1** are dynamic and as such are unable to be confirmed at this stage.

Lightsource bp will continue to be in contact with Goulburn-Mulwaree Council during construction of the Project to ensure waste is transported to a facility which has capacity to process waste.

6.18.4 Management and Mitigation Measures

As noted above, Lightsource bp is committed to consider and use Option 2 as the preferred transport route should the peak construction periods for Gundry Solar Farm and Merino Solar Farm overlap to manage and mitigate any potential cumulative traffic impacts.

In addition, the environmental management measures for key issues outlined throughout **Section 6.0** and summarised in **Section 7.0** will be implemented to minimise the cumulative impacts of the Project. These measures are considered adequate to address both the individual Project impacts and any cumulative impacts.

7.0 Environmental Management and Mitigation Measures

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

7.1 Environmental Management Framework

Environmental, social and cultural impacts associated with the Project would be managed through the implementation of a project-specific suite of management measures detailed in **Section 6.0** and summarised below.

All commitments and mitigation measures would be managed through the implementation of a Project Environmental Management Strategy (EMS). The establishment of the EMS would seek:

- to prevent and/or minimise any adverse environmental impacts of the Project
- to set standards and performance measures for acceptable environmental performance
- to provide for the ongoing environmental management of the Project.

The EMS would comprise a Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP). The following standalone subplans would be incorporated into the CEMP and OEMP:

- Social Impact Management Plan, including:
 - Accommodation and Employment Strategy.
 - Community Engagement Strategy.
 - Community Shared Benefit Strategy.
- Biodiversity Management Plan.
- Sheep Grazing Vegetation Management Plan (if required).
- Cultural Heritage Management Plan (including Aboriginal and non-Aboriginal Heritage).
- Noise and Vibration Management Plan.
- Soil and Water Management Plan.
- Traffic Management Plan.
- Waste Management Plan.

- Emergency Management Plan, including Bushfire and Hazards.
- Rehabilitation Management Plan.

7.2 Summary of Management Measures

A consolidated summary of management measures is provided in **Appendix 2**.

8.0 Project Justification

The SEARs require the EIS to provide both a ‘*strategic justification for the development focusing on site selection and suitability of the proposed site*’. This section addresses this requirement and provides a conclusion discussing the justification for the Project (**Section 8.1**), taking into consideration the Project’s ability to contribute to the security and reliability of the electricity network (**Section 8.1.1**), the suitability of the Project Area (**Section 8.1.2**), outlining the design refinement process and environmental, cultural, social, economic and cumulative impacts associated with the Project (**Section 8.2**).

Section 8.3 discusses the principles of Ecologically Sustainable Development (ESD) as defined in Division 5, Section 193 (1) of the EP&A Regulation 2021, and in **Section 8.4** the Project is considered in the context of the objects of the EP&A Act.

8.1 Project Justification

As discussed in **Section 2.1**, the Project is a direct response to the NSW Government’s commitment to Australia’s transition to renewable electricity generation as part of the global transition away from fossil fuels to reduce greenhouse gas emissions and address climate change impacts. Furthermore, the Project is in line with the principal within Council’s LSPS to promote renewable energy projects within the LGA.

The Project would provide several benefits at Federal, State, regional and local levels, including:

- Generating enough electricity to supply approximately 133,000 households on an annual basis in NSW.
- Avoiding approximately 670,000 tonnes of CO₂ emissions each year.
- Designing the Project with the potential for dual land use operation with approximately sheep grazing to be retained onsite while the Project is operational (secured by security fencing and managed through a Sheep Grazing Management Plan and Vegetation Management Plan).
- Diversifying land use and economic activity in regional NSW.
- Generating a capital investment of approximately \$650 million, including \$98 million in local investment during construction and \$113.8 million during operations over the course of the 40-year operating life.
- Providing 400 FTE jobs (155 direct and 245 indirect) during the construction phase and 14 FTE jobs (4 direct and 10 indirect) nationally during the operational phase.
- The Project is justified and of interest to the public as:
 - The Project Area has access to existing transmission line infrastructure that has capacity to transport the electricity to the grid. This minimises the need for construction works and disturbance associated with additional infrastructure often required to connect large-scale renewable energy projects to the electricity market and maximises capacity in existing infrastructure.
 - It is situated on and adjacent to agricultural land uses that are compatible with large-scale solar energy generation.

- It contains suitable terrain and topography to support large-scale solar energy infrastructure.
- Detailed environmental assessment confirmed environmental constraints present within the Project Area can be avoided by the Project design and layout, and residual impacts can be acceptably managed with appropriate mitigation and management.
- The size of the Project Area (approximately 702 ha) has provided flexibility in design to prioritise avoidance of high value biodiversity areas. Following the application of avoidance and mitigation, the biodiversity assessment concluded that there are no biodiversity credits required to offset the biodiversity impacts of the Project.
- It has potential to create employment opportunities and benefits to the local and regional economy.

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

- Loss of additional renewable energy supply to assist Australia in reaching the Large-scale Renewable Energy Target (LRET).
- Loss of opportunity to move towards cleaner electricity generation.
- Loss of increased energy security and supply to the Australian grid.
- Loss of significant social and economic benefits created through capital investment and provision of direct and indirect employment opportunities during the construction and operation of the Project. The Community Shared Benefit Strategy developed for the Project will also not be implemented.

8.1.1 Contribution to Security and Reliability of the Electricity System

The Project will connect to the existing 330 kV transmission line (Yass to Marulan), owned and operated by TransGrid, that traverses through the Project Area. To enable this connection, a new switching station will be established at the Project's proposed substation that will loop into the existing line, approximately 38 km from the Marulan substation.

The following key design features of the proposed switching station will support the Project's contribution to improving the electricity system's security and reliability:

- The switching station will be equipped with a Power Plant Controller (PPC). The PPC can control the network frequency and voltages at the Project's point of connection within pre-defined droop values under normal operating conditions. This will assist the network operator in managing the network frequency and voltages within normal operating bands as required by the National Electricity Rules (NER).
- The PPC is also capable of controlling the active power dispatch in terms of MW values and ramp rates during normal operating conditions as per AEMO's dispatch signal subject to energy resources availability.

- The switching station's control system will be appropriately tuned to ride successfully through any fault in the system as required by the NER by providing an adequate amount of reactive current (injection and absorption of approximately 1.8%) during the fault ride through (FRT) event. It would also be able to ride through multiple faults as required by the NER. This fault ride-through capability will assist in the system recovery during and following any fault events in the system.
- The switching station's control system can be tuned to achieve satisfactory operation under very low silicon-controlled rectifiers (SCR) conditions.
- The switching station will be equipped with all necessary remote monitoring and measuring equipment that provides sufficient visibility of the Project's operation to the NSP and AEMO.
- Lightsource bp is proposing the installation of an AC and/or DC-coupled BESS at its connection point. The additional BESS will enhance the Project's capability to support the network in managing network demands by providing additional frequency and voltage control capabilities. This will further provide additional capabilities to supply power to the grid during low or no-irradiance periods, such as evening peaks.

8.1.2 Suitability of the Site

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

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

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

- A strong electricity network with multiple high voltage (HV) transmission lines passing through the area, providing good system strength. A strong point of connection to the existing transmission network is available, making it an ideal site for increasing generation capacity on NEM with minimal requirements for additional transmission infrastructure. Moreover, the proximity of load centres means that less energy is lost in the transportation of the generated energy so more can be used rather than wasted.
- The availability of renewable resources, including solar and wind.
- Availability of land of a suitable scale for a viable commercial-scale solar farm, with one host landholder.
- Proximity to high population and electrical load (demand) centres of Canberra, Sydney, Goulburn and other towns in the region.

- Existing agricultural land use within and surrounding the Project Area, which is compatible with large scale solar energy generation, and potential to implement sheep grazing. As discussed in **Section 6.7.4.7**, potential for land use conflicts were identified and assessed as part of the LUCRA. The LUCRA indicated that these risks can be managed effectively through mitigation and management measures and that the Project is considered to be compatible to coexist with the existing land uses within and surrounding the Project Area which are primarily agriculture. Furthermore, as outlined in **Section 6.7.4.8**, the Project is not expected to result in potential land use conflicts with the potential future residential land use associated with the Rosedale subdivision, directly south of the Project Area.
- The Project Area is not mapped as either Biophysical Strategic Agricultural Land (BSAL) or Class 1 or 2 under the LSC Mapping for NSW. A small area of mapped Class 3 LSC is present within the Project Area, however, impacts on LSC are expected to be minor as discussed in **Section 6.7.4**.
- The Project Area has been cultivated for agricultural production and is relatively flat minimising land clearing and earthworks through construction.
- Preliminary environmental assessment indicated environmental constraints can be managed with appropriate mitigation and management.
- The Project Area has access from Windellama Road via the Hume Highway.

For these reasons, the Project Area was considered suitable for the proposed solar farm development.

8.2 Environmental, Cultural, Social, Economic and Cumulative Impacts

As detailed in **Section 1.5**, the Project has undergone an iterative design process. The conceptual layout for the solar arrays, BESS, connection to existing transmission line infrastructure, internal access tracks and other supporting infrastructure has been subject to ongoing refinement with the aim of minimising associated environmental, cultural, social and cumulative impacts. These refinements include:

- Consideration of environmental and social constraints, namely:
 - Avoiding 27.89 ha NSW listed threatened ecological communities and 37.96 ha Commonwealth listed ecological communities by altering the solar array layout in the central and southern parts to avoid habitat for threatened species identified during targeted surveys, and strategically locating the majority of the Development Footprint (97%) within Category 1 exempt land.
 - Removal of approximately 50 ha of solar array in the north-west corner of the Project Area, to minimise noise and visual impacts to sensitive receivers.
 - Relocation of the centralised BESS approximately 1.2 km to the east, and away from sensitive receivers located on the northwest, to reduce noise and visual impacts.
 - Removal of 20 decentralised BESS units located nearest to sensitive receivers, to reduce noise and visual impacts.
 - Strategically locating noise attenuation around noisy equipment to reduce operational noise impacts.

- Strategically located landscape screening to minimise glint and glare and visual impacts.
- Avoiding placement of project infrastructure within flood prone areas and designing solar panels with a 500 mm freeboard for the lowest edge above the maximum 1% AEP flood event.
- Installation of riparian fencing (such as a latched tube watercourse crossing) where the security fence crosses a watercourse or creek.
- Inclusion of a secondary access point via Koorringaroo Road as well as additional emergency access points along the perimeter fencing via gates for emergency access and egress.
- Inclusion of dedicated non-combustible water tanks with a combined capacity of 180,000 L distributed throughout the Project Area.
- Implementing setback distances, namely:
 - 10 m APZ around the perimeter of the Project, within the security fencing.
 - Approximately 20 m to 40 m setbacks around second order and higher streams, in particular where these have biodiversity value.
- Implementing exclusion zones, including:
 - Areas with TECs and habitat for threatened species, as identified in **Section 6.4**.
 - Areas prone to flooding (1% Annual Exceedance Probability (AEP)), as identified in **Section 6.12**.

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

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

The key issues identified, including those specified in the SEARs, were subject to comprehensive specialist assessment to identify the potential impacts of the Project on the existing environment. These assessments are detailed in **Section 6.0** and the appendices to this EIS. A summary of the overall outcome of the specialist assessments conducted as part of the EIS is provided in **Appendix 22**.

Detailed cumulative assessment has been undertaken where potential for impact has been identified through the cumulative scoping assessment (refer to **Appendix 21**) relevant to the Project. These are discussed in **Section 6.18**, which focused on developments within 100 km of the Project which have potential to have overlapping construction and operational timeframes. Potential cumulative impacts may involve biodiversity, agricultural impacts, visual, traffic and transport, noise and vibration, waste, social and economic impacts.

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

- Obtaining a detailed understanding of the issues and impacts by scientific evaluation and stakeholder engagement.
- Undertaking detailed Project planning considering the environmental, social and cultural constraints of the locality and investigation of various project alternatives which resulted in changes to the Project that reduced impacts.
- Active engagement with key stakeholders, including proximal landholders, to identify key concerns and issues and to allow these to be considered in the Project design process.
- Commitment to proactive and appropriate strategies to avoid, minimise, mitigate, offset or manage a range of potential environmental impacts (refer to **Section 6.0** and **Section 7.0**).
- Consideration of potential cumulative impact associated with the Project and its interaction with other similar developments (type and scale) within the region. Consideration of cumulative impacts has been undertaken in specialist assessments for biodiversity, land, visual amenity, noise and vibration, traffic and transport, social amenity and economic matters. The cumulative impacts of waste management have been assessed through a qualitative assessment. Cumulative impacts have been considered in accordance with the CIA Guidelines. Further details on cumulative impacts are provided in **Appendix 21**.

As outlined in **Section 6.0**, the potential environmental, cultural, social and economic impacts associated with the Project can be managed through the implementation of appropriate management, mitigation and monitoring measures. A consolidated list of the proposed management and mitigation measures is provided in **Appendix 2**. Should the Project be approved, compliance will be monitored through the implementation of the EMS outlined in **Section 7.0**.

8.3 Ecologically Sustainable Development

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

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

The principles of ESD encompass the following:

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

8.3.1 The Precautionary Principle

The EP&A Reg defines the precautionary principle as:

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

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

The assessment process has involved a detailed study of the existing environment and where applicable the use of scientific modelling and surveys to assess and determine potential impacts as a result of the Project. To this end, there has been careful evaluation as part of the project design and assessment process to avoid where possible, irreversible damage to the environment. Specialist studies have been undertaken to provide accurate information to assist with evaluation and development of the Project. Mitigation measures are summarised in **Section 7.0**.

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

- Government authorities, landholders potentially affected by the Project, the local community, the Aboriginal community and other stakeholders were consulted during preparation of this EIS (refer to **Section 5.0**). This enabled comment and discussion regarding potential environmental impacts and proposed environmental management procedures.
- The community has been engaged throughout the development and assessment of the Project through a range of mechanisms including one-on-one meetings, community information sessions to inform project design and management of key issues, and community information sheets, amongst other mechanisms (refer to **Section 5.0**) which provided landholders and stakeholders with both information and the opportunity to influence Project outcomes.
- Lightsource bp will develop and implement a CEMP, OEMP and DREMP, which will implement best practice management and will incorporate all identified mitigation and management measures identified in this EIS. Additionally, the Project will be subject to an independent auditing and verification process consistent with relevant requirements for SSD projects. The CEMP, OEMP and DREMP will incorporate the additional controls committed to in this EIS (refer to **Section 7.0**).

8.3.2 Intergenerational Equity

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

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

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

The objectives of the Project are outlined in **Section 1.4** and in relation to intergenerational equity, they include to:

- Implement the Project in an environmentally responsible manner to minimise project specific and cumulative environmental and social impacts.
- Minimise additional disturbance by maximising the use of disturbed area (due to historical and current and grazing activities) within the Project Area.
- Generate local and regional employment opportunities as well as potential for training and upskilling opportunities.
- Develop comprehensive mitigation and management strategies to mitigate and offset predicted impacts associated with the Project.
- Further to the Project objectives, a range of environmental management measures discussed in **Section 6.0** and **Section 7.0** have been developed and evaluated to minimise the impact on the environment to the greatest extent reasonably possible.
- The Project would benefit future generations by reducing the reliance on energy sources derived from non-renewable resources, which produce greenhouse gas emissions. During the operation both sheep grazing and solar energy will operate in conjunction with each other, both of which would provide benefits for future generations. Once decommissioned, the land within the development footprint will continue to be used for sheep grazing if deemed viable.
- The EP&A Act requires consent authority to consider matters of relevance to the public interest. Intergenerational equity is a matter of public interest and will be achieved by the Project through the conservative approach taken in the assessment and mitigation of impacts, the implementation of renewable energy, increased employment across the operational lifespan of the Project and providing options to return the Project Area to pre-existing agricultural conditions.

8.3.3 Conservation of Biological Diversity

The EP&A Regulation identifies that the principle of conservation of biological diversity and ecological integrity should be a fundamental consideration in the decision-making process. The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them.

All environmental components, ecosystems and habitat values potentially affected by the Project have been assessed in the BDAR (refer to **Appendix 7**). Potential biodiversity related impacts are outlined in this EIS (refer to **Section 6.4**) and measures to ameliorate any negative impact are outlined in **Section 7.0**.

The layout of the solar arrays across the Project Area has been developed to minimise disturbance to areas of high biodiversity value and ensure ecological connectivity. Following the application of appropriate avoidance and mitigation measures, the BAM assessment identified there are no biodiversity credits required to offset the biodiversity impacts of the Project. The principle of Conservation of Biological Diversity is considered to be satisfied.

8.3.4 Valuation Principle

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

that environmental factors should be included in the valuation of assets and services, such as:

- (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement.*
- (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and*
- (iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The environmental consequences of the Project have been assessed in this EIS (refer to **Section 6.0**) and mitigation measures identified for factors with potential for adverse impact (**Section 7.0**). Implementing the mitigation measures would impose an economic cost on the proponent, increasing both the capital and operating costs of the Project. This signifies those environmental resources have been given appropriate valuation.

As highlighted through this EIS, the Project has been developed and designed with the objective of minimising potential impacts on the environment and communities. This indicates that the design of the Project has been developed with the environmental objective in mind.

The aims, structure and content of this EIS have incorporated these ESD principles. The mitigation measures in **Section 7.0** provide an auditable environmental management commitment to these parameters. The Project aligns with the principals of ESD and is considered to be satisfied, due to the social, economic and environmental benefits provided in **Section 1.3**, and the mitigation measures put in place to protect from adverse impacts on the environment.

8.4 Objects of the EP&A Act

The objects of the EP&A Act, and how these are addressed in relation to the Project, are presented in **Table 8.1**. It shows that the Project is justified on the basis of its consistency with the EP&A Act.

Table 8.1 Objects of the EP&A Act

Object	Response
To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The Project Area can continue to be used for grazing agriculture (sheep). The Project would not result in the sterilisation of natural resources including mineral resources. There are no existing exploration or mineral licences in the Project Area. The Project has been designed and located to avoid native vegetation, heritage items and sensitive environments (i.e. watercourses) as much as possible and to minimise the use of natural and artificial resources while considering the social and economic welfare of the local community.
To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is considered in Section 8.3 .
To promote the orderly and economic use and development of land.	The Project aims to promote the orderly and economic use of the land through the diversification of agricultural land with renewable electricity generation. The Project is also connecting into existing transmission infrastructure, maximising the economic potential of the infrastructure.
To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The Project's planning and design process has considered environmental impacts and has incorporated several mitigation and management measures to reduce further impacts.
To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The Project will not impact upon any significant or listed areas of built and cultural heritage (including Aboriginal heritage). However, an Unexpected (heritage) Finds Protocol will be developed prior to construction.
To provide increased opportunity for community participation in environmental planning and assessment.	Engagement activities undertaken during the development of the EIS are outlined in Section 5.0 . Lightsource bp would continue to consult with the local community and key stakeholders during the Project's development.

8.5 Conclusion

As outlined in **Section 8.3**, the Project has been assessed against the principles of ESD as required by the EP&A Act and EP&A Regulation. This assessment has indicated that while the Project would have some potential impacts, these impacts can be effectively avoided, managed and mitigated and the Project will result in environmental, social and economic benefits. The assessment therefore concludes that the Project is consistent with the principles of ESD.

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

- Renewable energy supply to assist with fulfilling the current obligations under State and Federal renewable energy targets.
- Providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- The Project will also provide direct financial benefits to the regional and local community, including:
 - A capital investment of approximately \$650 million of which approximately \$98 million will be retained in the local region during construction, with \$113.8 million during operations over the course of the 40-year operating life.
- Employment generation creating up to 155 direct and 245 indirect jobs during the approximate 18-to-24-month construction phase with around 14 FTE jobs (4 direct and 10 indirect) created during the operational phase.
- Indirect benefits to local services through the construction and operation phases.
- Community Benefit Fund payments and increased Council land tax returns from the Project Area. It is considered this economic stimulus will also assist with supporting the ongoing agricultural land use within the Region.

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

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