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Tallawang Solar Farm

ENVIRONMENTAL IMPACT STATEMENT

FINAL

AUGUST 2022

umwelt
Environmental & Social
Consultants

TALLAWANG SOLAR FARM

Environmental Impact Statement

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
RES Australia Pty Limited

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Cover Imagery courtesy of Lighthouse Photography

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

Acknowledgement of Country

RES Australia and Umwelt would like to acknowledge the traditional custodians of the Tallawang Solar Farm Project Area – the Wiradjuri people - 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 – for they hold the memories, traditions, culture and hopes of Aboriginal people in the area.

We thank the Registered Aboriginal Parties, their families and elders for their engagement in this project. Their willingness to participate in discussions during land visits and to contribute in a meaningful way during workshops is greatly appreciated.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Malinda Facey	11 August 2022	Malinda Facey	11 August 2022

Executive Summary

RES Australia Pty Ltd (RES) is proposing to develop the Tallawang Solar Farm (the Project) to generate solar renewable energy to supply the people of New South Wales (NSW). The Project is located within the Mid-Western Regional Local Government Area (LGA) of NSW, approximately 8 kilometres (km) northwest of Gulgong adjacent to the Castlereagh Highway. The Project's location and regional context is presented in **Figure E.1**. The Project is strategically situated within the Central West Orana Renewable Energy Zone, identified in the NSW Government's Electricity Strategy (2019) and Electricity Infrastructure Roadmap (2020). The Project is in an area with identified high solar energy source potential and would contribute to achieving State and Federal commitments for establishing renewable energy generation within NSW.

The Project

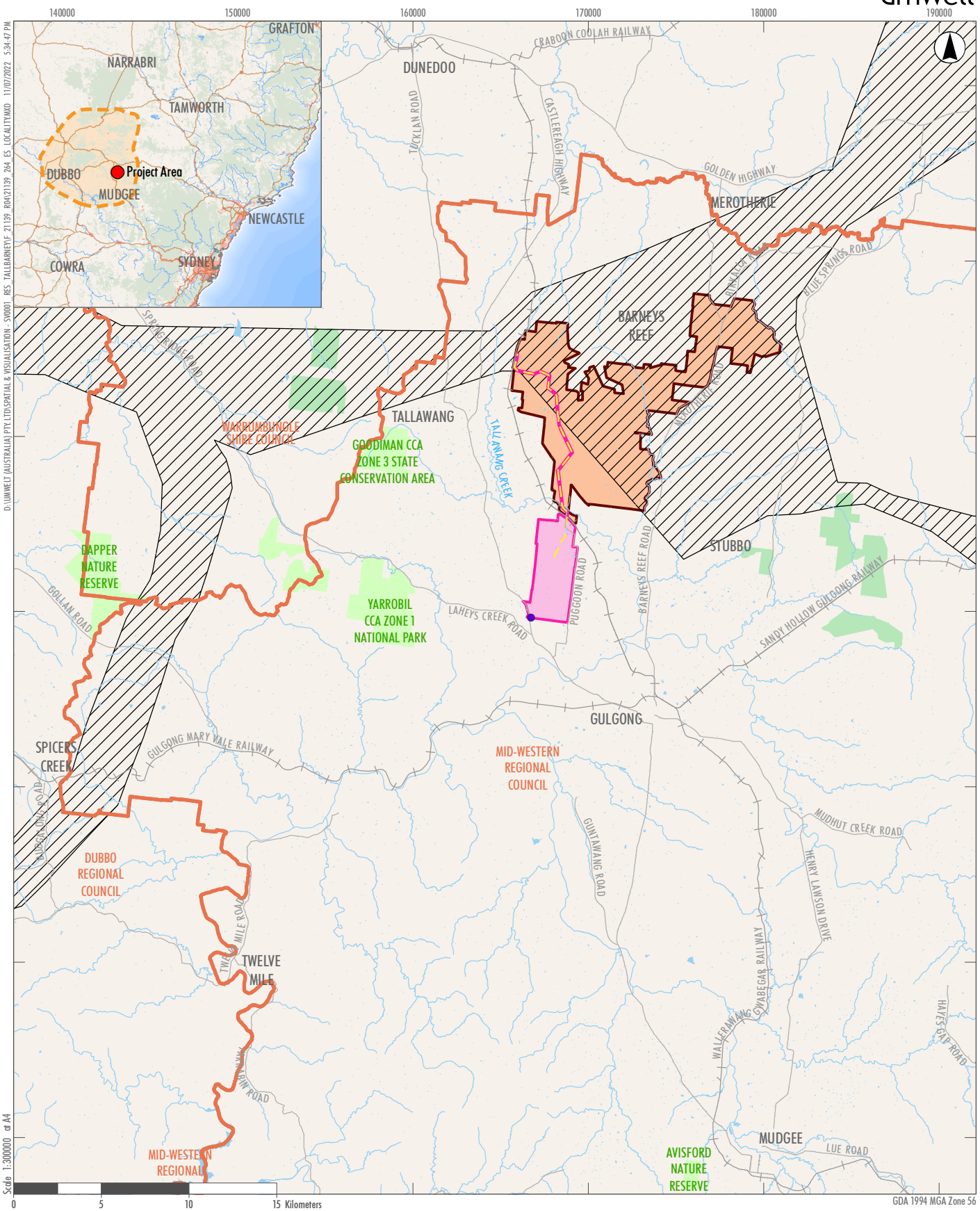
The Project will include the construction, operation and decommissioning of a 500 megawatt (MW) solar farm with a 200 MW Battery Energy Storage System and associated infrastructure, including temporary construction facilities, operations and maintenance buildings, internal access roads, civil works, electrical infrastructure required to connect to the electricity transmission network and intersection upgrade works on the Castlereagh Highway to allow for Project access. The Project's conceptual layout is provided in **Figure E.2**. A new overhead 330 kilovolt transmission line is intended to connect to the proposed Tallawang Solar Farm substation via the proposed NSW Government switching station planned as part of the Central West Orana Renewable Energy Zone transmission infrastructure project. The overhead transmission line is located on the proposed Barneys Reef Wind Farm project site directly to the north of Tallawang (shown on **Figure E.1**).

The Project Area includes eight freehold properties and some parcels of Crown Land ('paper roads'), covering an area of approximately 1,370 hectares (ha). These properties are primarily utilised for cropping and grazing activities. The Project will have a total development footprint of approximately 866 ha.

Project Objectives

The key objectives of the Project include:

- Increase renewable energy generation in NSW and contribute to strategic objectives and targets of the NSW and Commonwealth governments.
- Provide for cleaner reliable electricity generation and assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- Provide regional investment in the NSW renewable energy sectors.
- Support communities providing economic and employment benefits for regional NSW.
- Develop the Project in a manner which supports long-term productive relationships with the local community, Traditional Owners, regulators, and industry.
- Avoid and minimise environmental, cultural heritage, historic heritage, and social impacts where practical through careful design and best practice environmental protection and impact mitigation.



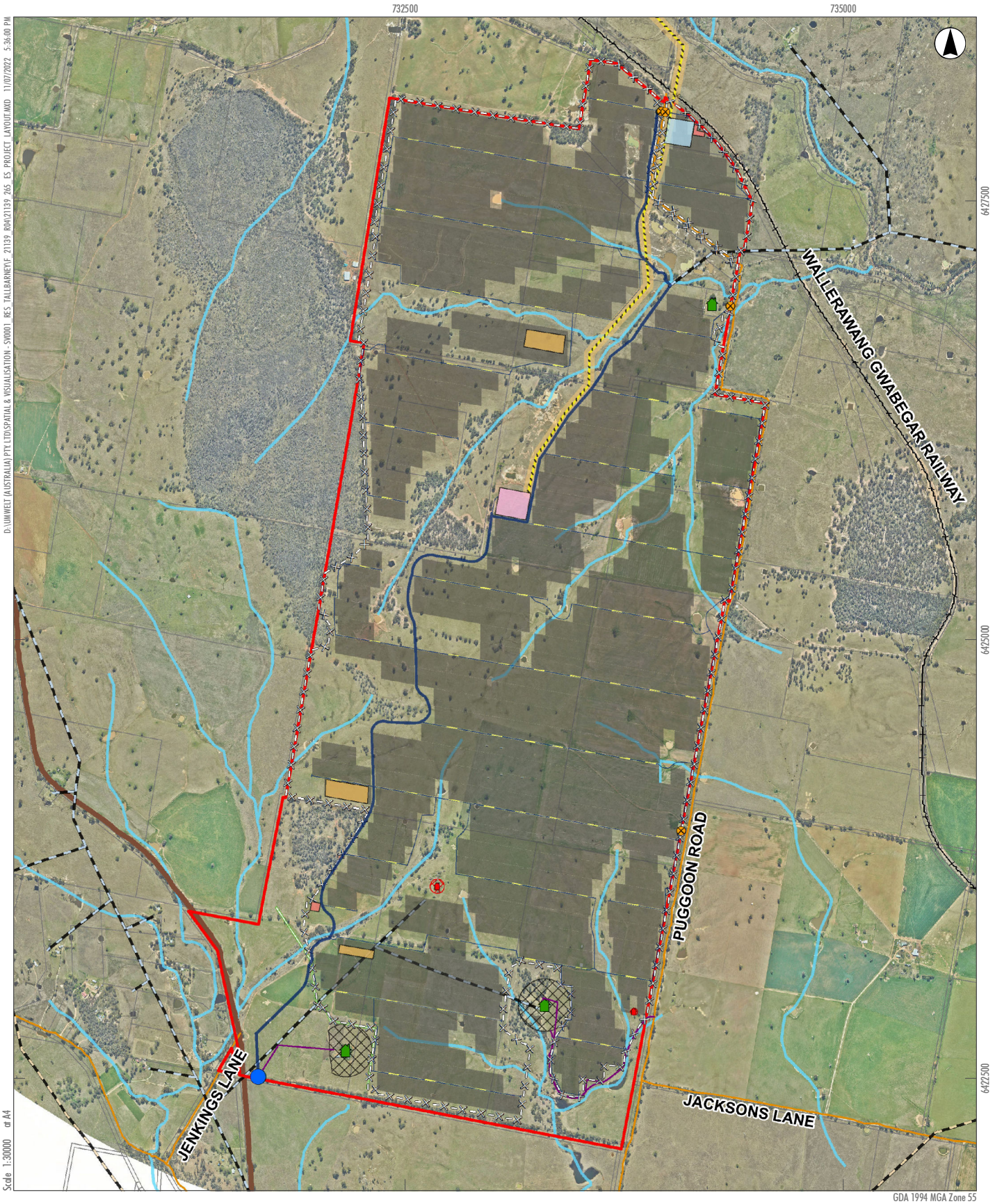
Legend

- Tallawang Solar Farm Project Area
- Barneys Reef Wind Farm Project Area
- Proposed HV Powerline
- Indicative Proposed Central West Orana REZ Transmission Corridor
- Indicative Central-West Orana Renewable Energy Zone
- Access Point
- National Parks (NPWS Estate)
- State Forest
- Road
- Drainage Line
- Railway Line

FIGURE E.1

Location and Regional Setting

Image Source: Data source: Geoscience Australia; Forestry Corporation of NSW (2019); DSFI (2017); NPWS Estate (2019)



Legend

- Primary Project Access
- Secondary Access
- Proposed Single Axis Tracker
- Bess and DC-DC Coupled PCs with Hardstanding
- Proposed Access Track
- Proposed O&M Facility
- Proposed Substation Central
- Proposed Substation North
- Temporary Construction Compound & Laydown
- Proposed Landowner Access Track
- Proposed Transmission Line
- Proposed Transmission Line Buffer, 30m
- Proposed Landscaping Area
- Involved Dwelling
- Dwelling Exclusion Zone
- Cultural Heritage Huts
- Cultural Heritage Huts Exclusion Zone
- Water Course
- State Road
- Local Road
- 22kV Distribution Line (To Be Rerouted Where Necessary)
- Security Fence
- Project Area Boundary
- NSW Cadastre (2021-11-02)

FIGURE E.2

Indicative Project Layout

Image Source: RES (2021)

Environmental Approval Process

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2021* (EPA 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.

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 in Q2 2021 that provided 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 Department of Planning and Environment (DPE) in July 2021, who, after engagement with relevant government agencies, issued the Secretary's Environmental Assessment Requirements (SEARs) on 26 November 2021 with Supplementary SEARS issued 20 June 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:

- Biodiversity
- Heritage – cultural and historic
- Land
- Visual
- Noise
- Transport
- Water
- Hazards and risks
- Social and economic
- Waste.

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 E.1** below.

Table E.1. Summary of environmental and social findings

Environmental/ Social Issue	Overview of Key Findings

Social Amenity	• Engagement with the community and key stakeholders regarding the Project has been undertaken by RES since 2020 and has been ongoing since this time. Outcomes from community consultation activities undertaken by RES have been reviewed and consolidated to inform the SIA and understand the range of community views, concerns, interests and feedback provided on the Project to date.
	• The RES engagement has been complimented by a targeted consultation program for the SIA specifically, undertaken between September 2021 and February 2022 by Umwelt in collaboration with RES. Engagement utilised in the SIA (undertaken by RES and Umwelt) has involved consultation with landholders and near neighbours, members of the wider community, community and special interest groups, local businesses and service providers, Aboriginal Stakeholders and government agencies.
	• Stakeholder engagement with the community, businesses, interest groups and other interested stakeholders have indicated that there is support for the Project and those not supportive or with concerns. In summary, community-identified impacts associated with the Project were most frequently associated with the perceived changes to local surroundings that the Project may bring, particularly changes to the aesthetic and social values associated with the rural landscape. Key community views are summarised in **Table E.2**.
	• To minimise potential impacts and enhance social benefits for the community, there have been a number of Project design changes and a range of management measures, these include:
	  ○ Designing the Project to seek to avoid and minimise impacts on environmental values and the surrounding community where practicable. Multiple design changes have been made to reduce impacts including through consideration of the findings of preliminary environmental studies and stakeholder feedback.
	  ○ A Social Impact Management Plan (SIMP) will be prepared for the Project to manage and enhance social impacts through each stage of the Project.
	  ○ A Community Engagement Strategy will be prepared for the Project to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development.
	  ○ An Accommodation, Employment and Procurement Strategy (AEPS) will be developed in collaboration with local Councils and stakeholders. The AEPS will include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as training, up-skilling and capacity building support, in collaboration with local stakeholders and training providers.
	  ○ A Community Shared Benefit Strategy will be designed and developed in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects and across the broader REZ. The strategy will include:
	  ▪ A Neighbour's Benefit Program, focussed on delivering benefits to the Project's closest neighbours and those most directly affected by Project activities.
	  ▪ A dedicated Community Enhancement Program, focussed on support and funding of broader community initiatives or programs at the local and regional level.
	• Collectively these measures provide a robust social impact management and mitigation plan for the Project that aims to enhance the positive social impacts and mitigate the potential negative impacts.

Economic	• The Project will have the capacity to supply sufficient clean energy to power the equivalent of approximately 330,000 homes per annum. • Overall, the Project will involve approximately $743 million in capital investment.

Environmental/ Social Issue	Overview of Key Findings
	• The Project will generate employment in the region, creating a total of 700 FTE employment opportunities (270 FTE direct and 430 FTRE indirect) during the construction phase with around 27 FTE employment opportunities (7 FTE direct and 20 FTE indirect) during the operational phase. • In the long term, the Project may provide opportunities to attract new visitors to the area. The benefits of attracting new visitors to the area in the long term include increased and more sustained expenditures on accommodation, food and beverage, fuel, retail, entertainment etc, all of which will support businesses and employment, especially in nearby townships such as Gulgong and Mudgee. • The total economic stimulus associated with the operation of the Project is estimated at approximately $196.2 million (over 35 years, 2021 dollars, Consumer Price Index (CPI) adjusted) relating to landowner returns, operational wage stimulus, community/neighbour benefit scheme and net land tax revenue to Council. It is considered this economic stimulus will also assist with supporting the ongoing agricultural land use within the region.
Land Resources and Land Use	• Agriculture (sheep grazing with cattle grazing and dryland cropping) is the primary land use in the Mid-Western Regional Local Government Area (LGA). Land within and surrounding the Project Area is associated with historic agricultural land uses and is predominantly utilised for grazing activities with some dryland cropping. Once construction has been completed, the Project would afford landholders the opportunity to continue to utilise their properties to be grazed by livestock, in particular sheep, allowing for a dual purpose for the Project Area. This has the potential to result in a number of agricultural benefits to the region. • Soil types within the Project Area are classified as Solodic Soils and Euchrozems with low to moderate fertility and moderate to high erodibility. • A soil survey program and verification assessment confirmed that the area mapped as Land Class 3 is classified as Class 4 and 6 land, while the Biophysical Strategic Agricultural Land (BSAL) area is classified as non-BSAL. • The Project has the potential to interact with surrounding land uses and impact on agricultural productivity for the area. With the effective implementation of measures outlined in the EIS it is considered that the potential land use conflicts on the surrounding land use and land users would be manageable and minor. • RES will develop a Construction Environmental Management Plan (CEMP) which will include relevant erosion and sediment control measures, in accordance with the Managing Urban Stormwater: Soils and Construction Volume 1 (NSW DPIE, 2004) "The Blue Book". • RES will further develop and implement an Operational Environmental Management Plan (OEMP) which will incorporate a Sheep Grazing Vegetation Management Plan (SGVMP) that will outline management measures for solar grazing in line with the *Agrisolar Guide 2021* as well as other animal health and welfare standards and guidelines. The OEMP will be developed in consultation with the host landholders and DPI Agriculture.
Traffic and Transport	• The Project will have primary access from the unnamed road off Castlereagh Highway. • 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. • Project components will be delivered to the Project Area via road. Imported materials (solar arrays, substation infrastructure) will be transported from the Port of Newcastle along the Golden Highway to the Castlereagh Highway. Other materials (such as concrete) will be locally sourced. Intersection works on the corner of the unnamed road and the Castlereagh Highway are proposed. • 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.

Environmental/ Social Issue	Overview of Key Findings
	• The traffic assessment concluded that the increase in traffic generation anticipated as a result of the construction, operation and decommissioning phases of the Project will have minimal impact on the safety and efficiency of the State and local road network. • RES will implement a range of measures to appropriately manage and mitigation traffic impacts. This will include the development of a Construction Traffic Management Plan in consultation with Mid-Western Regional Council and Transport for NSW.
Biodiversity	• Construction of the Project will result in some removal of vegetation and associated fauna habitat. However, the conceptual layout has been developed to maximise the use of historically cleared areas and avoid or minimise impact on identified biodiversity values. • Impacts are also minimised by the nature of the Project with most of the solar array panels being installed by pile driving and minimal ground disturbance. • Areas of the critically endangered ecological community White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland recorded during survey, have been avoided were practicable with only an area of 10.96 ha of moderate condition vegetation proposed to be removed and a further 17.11 ha of heavily grazed Derived Native Grassland, as well as an area of 1.39 ha of the endangered ecological community Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of moderate condition. • RES has committed to the design and implementation of a comprehensive biodiversity mitigation strategy to minimise the unavoidable direct and indirect impacts to biodiversity associated with the Project. Where areas cannot be avoided appropriate mitigation and management measures will be implemented by means of a Biodiversity Management Plan. • Impacts to the aquatic habitat within the Project Area will be minor and generally restricted to trucks crossing over the small tributaries. Impacts associated with construction and water quality will be controlled through the implementation of proposed erosion and sediment control mitigation measures. • A referral has been submitted to the Commonwealth Department of Agriculture, Water, and the Environment on 3 March 2022 to confirm whether the Project requires assessment and approval under the EPBC Act. The Project was determined to be a 'controlled action' under the EPBC Act in April 2022. The controlling provision was listed threatened species and communities. Supplementary SEARs were issued by DPE on 20 June 2022 and have been addressed in this EIS.
Water Resources	• The Project is within the Macquarie-Bogan Rivers System, in the lower catchment of Tallawang Creek. Slapdash Creek is located to the east, Wialdra Creek to the south and Tallawang Creek to the north of the Project Area. These waterways discharge to Cudgegong River, around 8 km southwest of the Project Area. • Unnamed first and second order watercourses traverse the Project Area. • Groundwater at the Project Area is managed under the *Water Sharing Plan NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011* (Lachlan Fold Belt Murray Darling Basin (Lachlan Fold Belt MDB) Groundwater Source) (DPIE, 2012). • Parts of the Project Area are prone to erosion particularly along water courses and erosion and sedimentation are considered the primary risk to soil and surface water resources for the Project during the construction phase. This risk can be managed through the implementation of appropriate erosion and sediment controls. • In general, results of flood modelling show that the Project Area is of low flood risk with minimal risk of changes to internal or external waterway flows. Due to the nature and extent of the proposed infrastructure and minimal changes to land topography, the ability of the soil to absorb water and subsequent and subsequent runoff and groundwater infiltration are expected to result in minor and manageable impacts on surface water and groundwater. • Detailed erosion and sediment control measures will be developed during the detailed design phase and implemented through the CEMP and OEMP.

Environmental/ Social Issue	Overview of Key Findings
Aboriginal Cultural Heritage	• An Aboriginal Cultural Heritage Assessment (ACHA) has been prepared for the Project in collaboration with the Registered Aboriginal Parties (RAPs) to assess the Aboriginal heritage values (cultural and archaeological) of the Project Area and surrounds. • The survey program identified nine areas of Potential Archaeological Deposits (PADs), 10 isolated finds (IFs) and 12 artefact scatter (AS) sites within the Project Area. • The conceptual layout has been developed to maximise the use of existing disturbed areas and avoid areas of PAD, riparian corridors (vegetation around waterways) and to minimise, where possible, impacts to identified surface sites. This redesign has allowed for areas of moderate to high archaeological/scientific and cultural significance (i.e. all PADs) to be avoided while allowing the development of appropriate management of areas of lower archaeological/scientific and cultural significance (i.e. some of the Artifact Scatters (AS) and Isolated Finds (IFs)). • During final design and construction planning, further consideration will be given to minimising impacts to these sites, however, for the purposes of the ACHA, it is assumed that partial or complete impact to all IF and AS sites/areas may occur. • RES will prepare and implement and Aboriginal Cultural Heritage Management Plan (ACHMP) for the Project in consultation with the RAPs. The ACHMP will outline the measures required to be implemented through all stages of the Project to manage Aboriginal cultural heritage values, including the protection of Aboriginal archaeological sites where impacts can be avoided and management methodologies for sites where impact cannot be avoided.
Historic Heritage	• The nearest listed heritage items to the Project Area are the Gulgong Railway Bridge and 'The Lagoon' residential property, which are approximate 6.4 km and 6.1 km away respectively. However, two potential heritage items (PHI 1 and 2) within the Project Area have been identified and assessed as meeting the threshold for local heritage significance. These are a c.1900 weatherboard cottage (PHI 1) and c.1870s hut (PHI 2). The Project layout incorporates a 40 m setback around PHI 1 and a 20 m setback around PHI 2. • With the implementation of the setbacks and other relevant management measures, impacts to PHI 1 and 2 during construction, including vibration- are considered to be minimal. • Unexpected finds will be managed through appropriate management measures incorporated into the proposed CEMP and OEMP.

Visual Amenity	• The Project Area is located within a rural setting with the predominant visual characteristics of the landscape being open undulating pastures; scattered trees; vegetated higher surrounding slopes; rural dwellings; dams, rural post-and-wire fencing; and unsealed access roads. The Project Area has an elevated, grassed hilltop which is prominent and visible from some viewpoints up to 10 km away.
	• The overall assessed impact of the Project on landscape character is low to moderate.
	• A total of 43 viewpoints were assessed as part of the Visual Impact Assessment, taken from varying distances and locations surrounding the Project Area. Of these:
	  ○ one public viewpoint and three private viewpoints will have a moderate visual impact.
	  ○ two public viewpoints and nine private viewpoints would have a low – moderate visual impact.
	  ○ all other viewpoints would have a low to negligible visual impact.
	  ○ no viewpoints would have a high visual impact.
	• Glare and reflectivity as a result of the Project is considered unlikely.
	• Night lighting from the Project is considered unlikely to result in a noticeable impact on the existing night-time landscape.
	• RES has developed a Draft Landscape Plan in consultation with the affected landholders, Dunedoo Landcare and the Mid Western Regional Council. This plan will be implemented to provide strategic planting to reduce visual impact. Additional management measures outlined

Environmental/ Social Issue	Overview of Key Findings
	in the EIS would further manage and mitigate potential visual impacts associated with the Project.
Noise and Vibration	• During operation and based on noise modelling, no noise exceedances are predicted at the non-associated dwellings in the vicinity of the Project Area. • Based on noise modelling, during construction, the relevant noise criteria can be achieved under worst case meteorological conditions at all non-associated dwellings with the implementation of relevant noise management measures outlined in the EIS. • RES will develop and implement a CEMP which will include all feasible and reasonable noise control strategies to manage noise associated with construction activities such as scheduling of construction activities and implementation of a noise management plan. Additionally, neighbouring residents will be informed regarding proposed construction work. • Given the significant distance to non-associated dwellings, vibration effects are not predicted at any non-associated dwellings during construction. • Noise associated with additional vehicle movements on the Castlereagh Highway associated with the Project are predicated to result in elevated road traffic noise during the construction period for seven receivers in Birriwa. Management and mitigation measures are proposed in the EIS to mitigate and manage the construction road traffic noise impacts associated with the Project.
Hazards, Risks and Bushfire	• The Electromagnetic Field (EMF) levels to be produced by the Project are predicted to be within the recommended exposure limits at all publicly accessible locations in and around the Project Area. The EMF assessment concludes that the risks to human health from EMF associated with the Project are low. • Results of the preliminary hazard analysis show that appropriate risk management measures can be applied to the Project to meet HIPAP 4 risk criteria for individual fatality, injury and propagation. • Through the development and implementation of relevant bushfire management measures and identified hazard safeguards and controls, it is considered that potential bushfire risk associated with the Project can be appropriately managed.
Waste Management	• The majority of Project waste would be generated during the construction stage with minor quantities of waste to be generated by the day-to-day operation of the Project. • RES will develop a Waste Management Plan which will outline the measures and strategies to be implemented during construction and operation to manage, reuse, recycle and safely dispose of waste.
Air Quality and Odour	• Air emissions from the Project Area would be predominately associated with the proposed construction activities which are temporary (34 months). The construction activities that may generate dust will be localised and small at any one time in the context of the overall scale of the Project Area. • The CEMP and OEMP will include relevant air quality management measure to avoid dust impacts outside of the Project Area.
Cumulative	• The NSW Government's Orana Renewable Energy Zone proposes a range of renewable energy infrastructure in one location to deliver affordable, reliable and clean energy to homes and businesses. While there are clear benefits to this approach, the cumulative impact of the potential volume of electricity generation proposed within the region, particularly during the construction phase, requires consideration in project planning and assessment. • Due to the separation distance between the Project Area and relevant Projects requiring cumulative assessment, impacts associated with the operations phase will be limited and predominately associated with visual impacts, while the majority of the potential impacts related to the construction phase are associated with traffic, noise and social/economic impacts.

Environmental/ Social Issue	Overview of Key Findings
	• An assessment of the cumulative traffic impacts found that operating conditions (levels of service) along the rural road network would generally be adequate with the addition of the cumulative traffic generation from a number of surrounding proposed / approved developments. • The cumulative noise assessment indicated that on the northern approach of the Castlereagh Highway, within the town of Birriwa, there is the potential for some residences within 25 m of the road edge to experience an elevated road traffic noise level during the daytime period associated with the cumulative traffic movements should the construction period for the Project and Barneys Reef Wind Farm project overlap (with approximately 6 months). • The cumulative visual assessment found that most viewpoints to the Tallawang Solar Farm would likely see the proposed Barneys Reef Wind Farm, with the number of turbines seen varying from around 10 to up to 60 turbines. Although some of the viewpoints would have views of the Project and one of the other solar farm projects in the proximity (Beryl Solar Farm, Birriwa Solar Farm and Stubbo Solar Farm), there is a large physical separation between the solar farms, and generally they would vary in distance from the viewer and appear different in scale. Given the visual characteristics of solar farms (being dark in colour, relatively low-profile, and the prevalence of intervening existing stands of vegetation), their combined effect is unlikely to significantly change the scenic quality of the view. • In relation to the social and economic impacts (workforce, accommodation, services) to the region, the potential cumulative impacts associated with the Project will be manageable through RES's commitment to the development and implementation of workforce, procurement and accommodation strategies. 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 Mid-Western Regional LGA and neighbouring LGAs.

Consultation

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

- Establishment of a Project website, community information line and Project email address, including a mechanism for stakeholders to provide feedback regarding the Project.
- Direct contact with host landholders followed by individual landholder briefings and ongoing contact.
- Local media release distributed in June and August 2021 to target information provision for the broader community.
- Formal briefings with relevant government agencies.
- Formal briefings with key stakeholders including Local Government agencies, and community, industry, and environmental groups or organisations, as well as traditional owners.
- Distribution of three separate project information sheets during the course of the Social Impact Assessment (SIA) process via mail drop and email distribution to provide updates on the Project to proximal residents and community members.
- Online and telephone surveys with local businesses and service providers to identify and assess potential social issues, impacts and opportunities relating to the Project.

- Consultation with interested Aboriginal Parties in accordance with the applicable laws and government guidelines.

- Two structured online information sessions following the issuance of SEARs to provide Project information and preliminary results of technical studies, and an opportunity for members of the community to pose questions to the Project team and provide feedback.

- Two informal drop-in sessions and one online semi-structured information session to provide feedback regarding the technical assessments of the Project, as well as articulate the proposed mitigation and enhancement measures under consideration to minimise negative and enhance positive impacts of the Project.

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). This process has also considered the interconnectivity of stakeholders with the proposed Barneys Reef Wind Farm Project, with some stakeholders having a mutual interest in both projects. Issues 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 E.2 provides a summary of the key community issues raised during the engagement process and how these have been responded to during the EIS phase.

Table E.2 Key community and landholder issues

Category	Issue	Response/Assessment outcome
Changes to community surroundings	Industrialisation of the landscape, reducing the natural amenity and rural character of the area.	The Project design incorporates a 500 m setback from the Castlereagh Highway and a 10 m setback around the perimeter of the solar farm site to reduce the Project's visibility from the highway and surrounding road network. In addition, targeted landscaping is proposed to reduce the impacts to key viewpoint locations.
Changes to community surroundings	Solar panel glare.	Solar panels are designed to absorb as much solar energy as possible and are known to reflect less than 3% of the sunlight falling upon them. Consequently, PV solar farms are known to produce less glare than other natural and man-made features. Furthermore, the Project is not located within the approach of a runway or within an airport's licenced boundary. Aerodrome operators within 15 km of the Project have been consulted as part of the Project's community engagement. In addition, targeted landscaping is proposed to reduce impacts to key viewpoint locations where landscaping will additionally mitigate the potential for glare. As a result, it unlikely that the Project would present a risk in terms of glare.
Changes to community surroundings	Noise and dust amenity impacts.	Noise and dust mitigation measures will be implemented throughout the construction of the Project to minimise noise and dust generation. Minimal noise and air emissions will occur during operations.
Changes to community surroundings	Displacement of locally important flora and fauna and intersecting of wildlife corridors.	The loss of biodiversity values associated with the natural environment due to the Projects' potential impact on environmental ecosystems is addressed as far as practicable by Project design and mitigation measures. The site selection and refinement of the Project layout has minimised impacts on natural habitat and native vegetation.

Category	Issue	Response/Assessment outcome
Changes to community surroundings	Conflicting land use changes.	A CEMP will be implemented to manage construction related impacts that would results in land use conflicts such as noise, dust, damage of local roads, visual impacts, erosion and sediment runoff and surface water impacts. Once construction has been completed, there would be an opportunity to offer a dual purpose for the Project Area, allowing the area to be grazed by livestock (sheep). The management of impacts to livestock and agricultural practices will be detailed in an OEMP in line with the Agrisolar Guide (2021). The OEMP will be developed in consultation with the host landholders and DPI Agriculture (as required) and implemented post construction. Extensive consultation with host landholders and neighbouring residences have been undertaken and will continue throughout the various stages of the Project. RES is committed to develop and implement Host Landholder Agreements and a Neighbours Benefit Program to minimise the impact of the Project on landholder activities and surrounding land use.
Changes to community surroundings	Infrastructure disposal and environmental rehabilitation at the end of Project life.	Once the Project reaches the end of its operational life, the Project would either be upgraded (pending any additional approval requirements) or decommissioned. Decommissioning would involve removing all above ground project infrastructure and returning the development footprint to its pre-existing land use, or another land use in consultation with the landholders, as far as practicable. RES or its contractors will seek to recycle all dismantled and decommissioned infrastructure and equipment, where feasible. Structures and equipment that cannot be recycled would be disposed of at an approved waste management facility in accordance with waste guidelines relevant at the time of decommissioning. Buildings and site features with ongoing value to agriculture, e.g. the warehouse, will be retained in consultation with the landowner and in accordance with an additional approval requirements. A Waste Management Plan will be developed and implemented for the Project to manage the waste generated by the Project.
Changes to community surroundings	Water use and sourcing.	The total water demand for the Project would be in the order of 206 ML for the 34-month construction period. Water supply through a local commercial supplier has been confirmed for the Project. Should any farm dams or licensed groundwater bores be needed for water supply, this will be done in consultation with landholders and be subject to availability. A water sourcing strategy will be developed so that water used during the construction phase does not cause and undue impact to adjacent landowners or other stakeholders.

Category	Issue	Response/Assessment outcome
Changes to community surroundings	Increase in traffic volumes and associated noise and road safety.	Key traffic impacts occur during the construction phase of the Project. The traffic assessment identified that the majority of the Project's transport route has sufficient spare capacity to accommodate the additional traffic generated by the Project and would remain operating at high levels of service. Intersection performance of the intersections in the vicinity of the Project Area are also anticipated to be insignificantly impacted by the addition of the Project's traffic generation. Disruptions to road infrastructure and traffic concerns (including safety issues) will be mitigated and managed through the implementation of a Construction Traffic Management Plan (CTMP). Further measures to reduce traffic impacts that are being considered include the implementation of a shuttle bus service/s to transport workforce to site each day in order to reduce number of vehicles on local roads. RES will continue to engage with relevant Council's and the local community to share information and generate awareness about construction activities and potential periods of disruption, including a responsive and easy-to-access community complaints line.
Changes to community surroundings	Cumulative impacts of other nearby projects, particularly increase in traffic on local roads.	A detailed cumulative impact assessment was undertaken during the preparation of the EIS. The assessment concluded that, with the exception of visual impacts (during operations of the Solar Farm), the potential cumulative impacts associated with the Project are expected to be limited to the construction phase of the Project associated with: • Traffic and Transport Impacts – associated with general construction traffic impacts in the locality due to movements to/from the Project Area and OSOM vehicle movements along the proposed traffic routes from Newcastle Port to the Project Area. • Noise – associated with general construction activities undertaken on the Project Area and road traffic noise associated with vehicle movements to and from the Project Area. • Social/Economic – including demand on accommodation, services and businesses (supply/demand for products and services).
Local livelihoods	Decrease in tourism opportunities.	RES is committed to develop and implement a Community Shared Benefit Strategy in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects and across the broader CWO REZ.
Local livelihoods	Population change due to the influx of construction workforce.	RES will develop and implement an Accommodation, Employment and Procurement Strategy (or equivalent) before construction commences in collaboration with local Council and stakeholders. This strategy will consider targeted initiatives to appropriately manage workforce during construction period in collaboration with local stakeholders to manage social changes caused by the incoming population. Multi-stakeholder liaison will form part of the development of this strategy to obtain widespread integration and prioritisation of social acceptance across various projects and to jointly develop or contribute to local benefit scheme across planning and delivery of the REZ.
Local livelihoods	Local employment and training.	
Local livelihoods	Effect on rural property values.	A Community Shared Benefit Strategy will be developed and implemented to target initiatives to those most affected by the Project or living nearest to the Project. Open and proactive engagement with nearby residents will continue to ensure understanding of Project impacts on a case-by-case basis.

Category	Issue	Response/Assessment outcome
Decision making systems	Community participation and information provision.	A Community Engagement Strategy to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development. Open and proactive engagement with nearby residents to ensure understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly.
Decision making systems	Stakeholder identification.	RES has extensively engaged with stakeholders and the community since landholder discussions commenced in 2020. In addition to community stakeholders, ongoing consultation has been undertaken with Council's (Mid-Western, Muswellbrook Shire and Warrumbungle Shire Council), government agencies, functional stakeholders (e.g. service providers), businesses and various non-government organisations and interest groups. RES is committed to continue to engage with the community throughout the construction, operation and decommissioning phases of the Project.
Decision making systems	Stakeholders do not have enough power in the decision-making process.	Engagement undertaken throughout the design of the Project has been open and transparent. RES is committed to continue to openly and proactively engage with neighbouring landholders to ensure understanding of Project impacts on a case-by-case basis and target the Neighbours Benefit Program accordingly. RES will continue to work with key stakeholders in developing the Community Shared Benefit Strategy to ensure targeting of investment to local priorities.
Accessibility	Pressure on short-term accommodation and existing housing markets.	RES will develop and implement an Accommodation, Employment and Procurement Strategy (or equivalent) in collaboration with local Council and stakeholders. RES is also committed to develop and implement a Community Shared Benefit Strategy to target initiatives to those most affected by the Project or living nearest to the Project. Open and proactive engagement with nearby residents will continue throughout the various phases of the Project to enable understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly.
Health and Wellbeing	Increased levels of stress and anxiety due to fear for unknown, uncertainty of impacts and feeling of losing control over the future and local surroundings.	The proposed Community Engagement Strategy would involve consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development. The Community Engagement Strategy will include information provision and awareness creation on the actual impacts of electrical infrastructure on human health. RES will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices. The design of the Project includes a 10 m Asset Protection Zone around the perimeter of the solar farm for managing bushfire risks. Additional access points are proposed to support livestock movement and emergency access during the operation of the Project. RES has consulted with and will continue to consult with Fire and Rescue NSW. RES will continue to work with neighbouring residences in developing the Community Shared Benefit Strategy to ensure targeting of investment to local priorities.

Category	Issue	Response/Assessment outcome
Culture	Need for traditional owner organisations and Aboriginal parties to be involved.	The Aboriginal community has been engaged during the EIS phase. The Community Shared Benefit Strategy will proactively target the interests and needs of local Aboriginal community.
Culture	Protection of sites of Aboriginal cultural significance.	The Project design has considered Aboriginal cultural values and heritage sites within the Project Area to avoid any disturbance to these areas. This has included avoiding PADs. The Community Shared Benefit Strategy will proactively target the interests and needs of local Aboriginal community.

Consultation will continue following the submission of the EIS, which will include public exhibition of the EIS for a minimum of 28 days. RES 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.

Changes to Design

Given the environmental, social, community and cultural constraints, the impacts of the Project have been minimised through refinement of the Project design and layout, including:

- Reducing the Project's disturbance footprint subsequent to the lodgement of the Scoping Report from 1,119 ha to 866 ha.
- Re-alignment of the transmission line alignment to move the line further to the east and away from residences to minimise visual impacts.
- Consideration of an alternative location for the solar farm substation, in a central location away from neighbouring residences.
- Relocation of temporary compound and laydown area outside the 500 m setback from Castlereagh Highway away from nearby receivers.
- Strategically locating the solar array layout and other infrastructure on Category 1 land as assessed under the Biodiversity Assessment Method.
- Altering the solar array layout to incorporate a 40 m setback from creek lines with biodiversity value.
- Altering the solar array layout to incorporate an additional setback around two potential historic items (PHIs) i.e. a 40 m setback is proposed around PHI1 and a 20 m setback around PHI2.
- Re-design of the project layout to avoid impacts to Potential Archaeological Deposits (PADs) identified through the Aboriginal Cultural Heritage Assessment process.

Project Justification and Need

The development of renewable energy generation aligns with both Federal and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australia.

The proposed location of the Project is within the Central West Orana Renewable Energy Zone (REZ), being an area identified by the NSW government to be targeted for renewable energy development. The NSW government has indicated that the REZ will play a vital role in delivering affordable energy generation to help prepare the State for the expected retirement of thermal power stations over the coming decades.

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 a number of 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 an area expressly designated for this use through the *Renewable Energy Zone (Central-West Orana) Order 2021* gazetted on 5 November 2021.
- 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 close proximity of transmission infrastructure proposed by the NSW Government 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.

RES 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

RES 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 RES 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.

Glossary & Abbreviations

Abbreviation	Definition
°C	Degrees Celsius
ABS	Australian Bureau of Statistics
AC	Alternating current
ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
BAM	Biodiversity Assessment Methodology
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BSAL	Biophysical Strategic Agricultural Land
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
CIV	Capital investment value
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CWO-REZ	Central West Orana Renewable Energy Zone
DECC	NSW Department of Environment and Climate Change (former)
DECCW	NSW Department of Environment, Climate Change and Water (former)
DPE	NSW Department of Planning and Environment (current)
DPI	NSW Department of Planning and Infrastructure (former)
DPIE	NSW Department of Planning, Industry and Environment (former)
EEAP	NSW Energy Efficiency Action Plan
EIS	Environmental Impact Statement
EMF	Electromagnetic field
EPA	Environment Protection Authority of NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2021* (NSW)
ESD	Ecologically sustainable development
FM Act	*Fisheries Management Act 1994* (NSW)
GW	Gigawatt
GWh	Gigawatt-hour
ha	Hectare
ICNIRP	International Commission on Non-Ionizing Radiation Protection
km	Kilometres
kV	Kilovolt
LALC	Local Aboriginal Land Council

Abbreviation	Definition
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	Local Land Services Act
LRET	Large-scale Renewable Energy Target
MDBA	Murray-Darling Basin Authority
MNES	Matter of National Environmental Significance
MW	Megawatt
NEM	National Electricity Market
NDC	Nationally Determined Contribution
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NVR Map	Native Vegetation Regulatory Map
OEH	NSW Office of Environment and Heritage (former)
PCS	Power Conversion System
PCT	Plant community type
PHA	Preliminary hazard analysis
PMST	Protected Matters Search Tool
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
REAP	Renewable Energy Action Plan
Roads Act	*Roads Act 1993* (NSW)
RES	RES Australia Pty Ltd (Proponent)
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RFS	NSW Rural Fire Service
RTA	NSW Roads and Traffic Authority (former)
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SSC	State Suburb (Census statistical unit)
SSD	State Significant Development
TEC	Threatened ecological community
TfNSW	Transport for New South Wales
TIA	Traffic Impact Assessment
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
WRIA	Water Resources Impact Assessment
WSP	Water Sharing Plan
WM Act	*Water Management Act 2000* (NSW)

Project Specific Glossary of Terms	Description
Alternate access	Access points proposed along Puggoon Road are to facilitate emergency vehicle access and stock (sheep) movement, these access points would not be utilised for the construction of the Project.
Associated landholder	These are non-host landholders that will have an agreement in place with RES to address the Project related impacts on these land holdings and residences. These agreements are proposed to be negotiated with relevant landholders should the project be approved.
Barneys Reef Wind Farm	A proposed wind farm development immediately north of the Tallawang Solar Farm which is subject to a separate development application. RES Australia Pty Ltd is the proponent for this wind farm project.
Battery Energy Storage System (BESS)	The entire battery system comprising of a power conversion system (battery storage units and inverters) distributed throughout the solar farm site.
Development footprint	The maximum extent of ground disturbance associated with construction and operation of the Tallawang Solar Farm Project i.e., approximately 866 ha.
Host landholder	A landholder whose property would have Project infrastructure located on it. While they are included in the assessment (ie noise, vibration, visual, traffic and other impacts) they are clearly denoted given their association with the Project. These landholders will have an agreement in place with RES for hosting the solar farm infrastructure on their properties as well as address the Project related impacts on these land holdings and residences.
Non-host landholder	Also referred to as non-associated landholder. A landholder whose property is located in proximity to the Project Area but would not have Project infrastructure located on it with no agreement in place, however, would be included in the Community Shared Benefit Strategy for the Project. Potential impacts to non-host landholders are investigated in the EIS.
Power Conversion System (PCS)	Skid-mounted battery infrastructure comprising battery storage units and inverters for storing and transporting electricity generated by the solar farm to the grid. Each power conversion system is expected to house four battery storage units and two DC-coupled inverters.
Primary access	The Project's main access from the Castlereagh Highway at a newly proposed access point via a local unserviced road directly south of the Project Area.
Project Area	The total area in which the Project would be developed. The Project Area covers approximately 1,370 ha and includes the solar farm site, the BESS development area, the area the subject of road works and the transmission line corridor.
Sensitive receiver	Non-host landholders' dwellings in proximity to the Project Area that may be sensitive to noise, vibration, visual, traffic and other impacts. Potential impacts to sensitive receivers are investigated in the EIS.
Solar farm site	The parcels of land where the solar panels and BESS would be located, covering an area of approximately 1,300 ha.
The Project	The proposed Tallawang Solar Farm. The Project includes the construction, operation and decommissioning of a solar farm with capacity of up to 500 MW, a 200 MW/400 MWh BESS and associated infrastructure. The Project further includes the construction and operation of the 330 kV Transmission Line located on the Barneys Reef Wind Farm.
Transmission line	The proposed 330 kV overhead transmission line that would connect the solar farm to the grid connection point into the National Energy Market network.
Transport route	The proposed route for transporting material and equipment via road to the Project Area during construction, being from the Port of Newcastle to the Golden Highway and then to the Castlereagh Highway.

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Appendices

1.0 Introduction

RES Australia Pty Ltd (RES) is seeking to develop the Tallawang Solar Farm in the Central West region of New South Wales (NSW), approximately 8 km northwest of Gulgong within the Mid-Western Regional Local Government Area (LGA).

The proposed Tallawang Solar Farm includes up to 500 megawatts (MW) of solar electricity generation with a Battery Energy Storage System (BESS) of approximately 200 MW/400 MW-hours and associated infrastructure and works (the Project). The Project's location and regional context is presented in **Figure 1.1**.

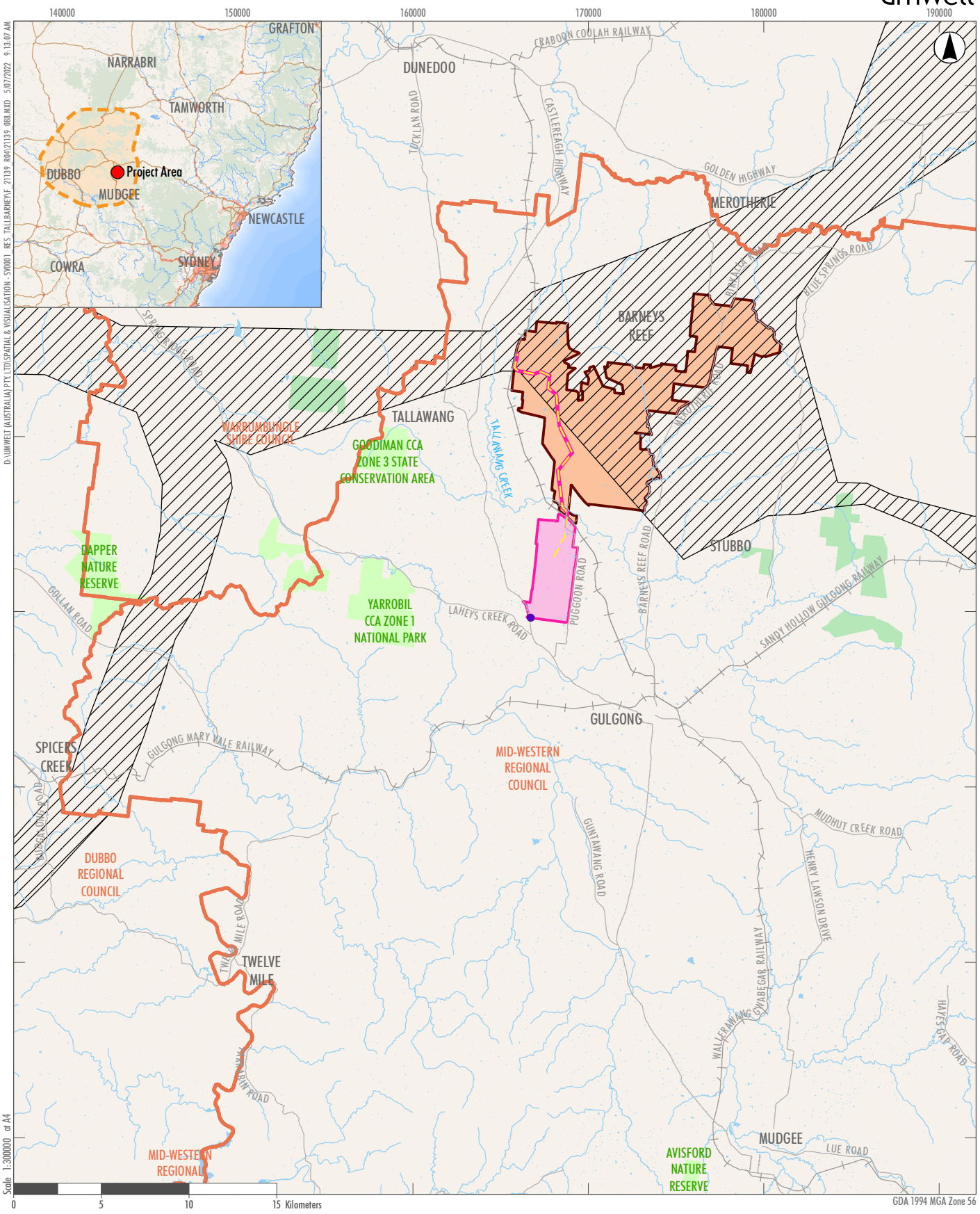
1.1 Background

The Project lies within the Central West Orana Renewable Energy Zone (CWO-REZ), established under the NSW Government's Electricity Strategy (2019) and Electricity Infrastructure Roadmap (2020) (refer to **Section 2.1.3.3**). The Project would contribute to achieving State and Federal commitments for establishing renewable energy generation within NSW.

The Project includes the construction, operation and decommissioning of the proposed solar farm, BESS, and associated infrastructure, such as temporary construction facilities, operations and maintenance buildings, civil works, and electrical infrastructure (including a new onsite substation and a new overhead transmission line) required to connect to the electricity transmission network. The Project will have access from the Castlereagh Highway, at a newly proposed access point via a local unserviced road directly south of the Project Area, locally known as Jacksons Lane (refer to **Figure 1.1**). After investigation of possible accesses, the final location of the access was determined in consultation with the road authority and Mid-Western Regional Council. Intersection works on the Castlereagh Highway are proposed as part of the Project to establish the Project access.

The Project will connect to the grid via the proposed CWO-REZ transmission corridor (as shown on **Figure 1.1**) currently being developed by the NSW Government to support the growth of the CWO-REZ. One new onsite substation is proposed, with two possible locations currently included in the conceptual layout as shown on **Figure 1.2**. A new overhead 330 kilovolt (kV) transmission line is proposed to connect the proposed Tallawang Solar Farm substation to the grid via the proposed NSW Government switching station planned as part of the CWO-REZ transmission infrastructure project. The overhead transmission line is located on the proposed Barneys Reef Wind Farm project site directly to the north (shown on **Figure 1.1**). The Barneys Reef Wind Farm project is proposed by RES and subject to a separate approvals process. The final location of the overhead transmission line from the Tallawang Solar Farm project will be subject to the final placement of the NSW Government switching station and the grid connection point; however, a 60 m corridor has been identified by RES to support access to the anticipated connection point which has been established by the Proponent utilising available information about the proposed assets. The Project's interaction with these developments is further discussed in **Section 1.6** .

The Project is expected to generate up to 270 Full Time Equivalent (FTE) direct jobs during construction and approximately 7 FTE direct jobs during the operation and ongoing maintenance of the Project. The Project would have an operational lifespan of 35 years and approximately 2 years to allow for completion of decommissioning works.



Legend

- Tallawang Solar Farm Project Area
- Barneys Reef Wind Farm Project Area
- Proposed HV Powerline
- Indicative Proposed Central West Orana REZ Transmission Corridor
- Indicative Central-West Orana Renewable Energy Zone
- Access Point
- National Parks (NPWS Estate)
- State Forest
- Road
- Drainage Line
- Railway Line

FIGURE 1.1

Location and Regional Setting

Image Source: Data source: Geoscience Australia; Forestry Corporation of NSW (2019); DSFI (2017); NPWS Estate (2019)

The Project is State Significant Development (SSD) under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) 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 *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Environmental Impact Statement (EIS) has been prepared in line with the *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPIE, 2021) and *Cumulative Impact Assessment Guidelines* (DPIE, 2021) and assesses the potential impacts associated with the Project in accordance with the Secretary's Environmental Assessment Requirements (SEARs), issued on 26 November 2021, with Supplementary SEARs issued on 20 June 2022. **Appendix 1** provides an outline of the SEARs and where these have been addressed in the EIS.

1.2 Proponent

The proponent for the development application for the Project is RES Australia Pty Ltd (RES) (ABN 55 106 637 754). RES is the world's largest independent renewable energy company active globally in both onshore and offshore wind, solar, energy storage, construction and asset management services, and transmission and distribution.

A family-owned business at the forefront of the industry for over 40 years, RES has delivered over 20 GW of renewable energy projects across the globe and supports an operational asset portfolio of 7 GW worldwide.

Since 2004, RES has a strong history of working with communities to develop projects in Australia, including the Taralga Wind Farm (NSW), Ararat Wind Farm (VIC), Murra Warra Wind Farm stage 1 and 2 (VIC), Emerald Solar Farm (QLD), and Dulacca Wind Farm (QLD). Additionally, through its actively expanding construction management and asset management business, RES is responsible for community engagement across a much wider suite of renewable energy projects both under active construction or in operation. The construction and asset management portfolio currently under management by RES in Australia is over 3 GW.

To achieve positive local and regional community outcomes, RES is committed to building strong relationships with key stakeholders and local communities. At the early development stage, emphasis is put on encouraging local participation and community input.

1.3 Project Overview

Key components of the Project would include, but not be limited to:

- Approximately 1,136,400 bifacial photovoltaic modules (solar panels) in an east-west single-axis tracking arrangement with a maximum height of 5 metres (m) above ground level.
- Approximately 200MW/400 MW-h of DC-coupled battery storage units distributed throughout the solar farm site, on hardstand areas adjacent to the onsite inverters. The battery storage units will have the following specifications:

- approximately 93 power conversion systems (PCSs) typically comprised of two DC-coupled inverters and four battery storage units per skid
- containerised battery storage units – Subject to final procurement, the dimensions of each battery storage unit will be approximately 12.2 m long, 2.5 m wide, and up to 3 m tall.

- Up to 186 inverters and voltage step-up transformers.
- One onsite switchyard and 330 kV solar farm substation, with underground electrical conduits and cabling, at two possible locations within the solar farm and BESS development area (see **Figure 1.1**), with approval being sought for both options. The final location of the onsite switchyard and substation will be determined during detailed design and notified to the Secretary prior to construction as part of the final layout plan.
- An overhead 330 kV transmission line of 13 km long, connecting the Project to the grid via the proposed NSW Government switching station (see **Figure 1.1**).
- Underground electrical cable reticulation within the solar farm component of the Project Area to transport power from the solar arrays to the onsite substation.
- Site office and operations and maintenance building (including warehousing) with parking for the operations team.
- Access from the Castlereagh Highway at a newly proposed access point via a local road directly south of the Project Area (see **Figure 1.1**). The final location of the access was determined in consultation with the road authority and Mid- Western Regional Council.
- Internal access tracks to allow for site maintenance and emergency response.
- Vegetation screening if and where required following consultation with surrounding landholders.
- Drainage line crossings if and where required to manage existing surface water flows (to be determined during further design development).
- Vegetation clearance associated with establishment of infrastructure.
- Perimeter security fencing and establishment of water tanks or dams.

Additionally, during the construction of the Project a temporary site compound and laydown area will be established to support the safe and efficient establishment of the facility. Temporary site compound and laydown areas will be located within the development footprint as illustrated on **Figure 3.1**.

The Project Area, illustrated on **Figure 1.1,** covers an area of approximately 1,370 ha and comprises:

- the solar farm and BESS development area (referred to as the solar farm site)
- transmission line corridor of 60 m wide and approximately 13 km long for the new overhead transmission line connecting the Project to the grid (referred to as the transmission line corridor).

No subdivision of land is proposed as part of the Project. Further detail regarding the Project is provided in **Section 3.0**.

1.4 Impact Avoidance and Mitigation

Following the lodgement of the scoping report to the Department of Planning and Environment (DPE) in July 2021, a number of project refinements were incorporated into the design and layout of the Project. These have been undertaken as an outcome of ongoing consultation with host 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.

Project refinements included the following:

- Reduction of the Project's disturbance footprint subsequent to the lodgement of the Scoping Report from 1,119 ha to 866 ha.
- Re-alignment of the transmission line alignment to move the line further to the east and away from residences.
- Consideration of an alternative location for the solar farm substation, in a central location away from neighbouring residences.
- Relocation of temporary compound and laydown area outside the 500 m setback from the highway away from nearby receivers.
- Strategically locating the solar array layout and other infrastructure on Category 1 land as discussed in **Section 6.7 .**
- Altering the solar array layout to incorporate a 40 m setback from creek lines that provide biodiversity value.
- Altering the solar array layout to incorporate a setback around two potential historic heritage sites, as described in **Section 6.10 .**
- Re-design of the project layout to avoid impacts to Potential Archaeological Deposits (PADs) identified through the Aboriginal Cultural Heritage Assessment process, as further discussed in **Section 6.9** .

Refinements have sought to:

- avoid and minimise vegetation clearance, particularly areas of intact vegetation along the transmission line corridor and other patches of vegetation of higher environmental value on the solar farm site
- minimise impacts to host landholders and neighbouring residences
- avoid impacts to PADs and minimise potential historic heritage sites
- minimise disturbance to agricultural operations
- minimise potential traffic impacts to local roads during construction.

To illustrate how the Project design has considered the key constraints identified during the EIS phase, refer to the constraints map overlain with the concept project layout provided in **Figure 1.2**, with detailed maps provided in **Appendix 2**.

1.5 Project Objectives

The key objectives of the Project include:

- Increase renewable energy generation in NSW and contribute to strategic objectives and targets of the NSW and Commonwealth governments.
- Provide for cleaner reliable electricity generation and assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- Provide regional investment in the NSW renewable energy sectors.
- Support communities by providing economic and employment benefits for regional NSW and to reinforce RES' commitments under the Clean Energy Council's 'Best Practice Charter' with respect to socially responsible development.
- Develop the Project in a manner which supports long-term productive relationships with the local community, Traditional Owners, regulators, and industry.
- Avoid and minimise environmental, cultural heritage, historic heritage, and social impacts where practical through careful design and best practice environmental protection and impact mitigation.

1.6 Related Development

As noted in **Section 1.1**, there are other proposed developments that will interrelate with the Project, namely the Barneys Reef Wind Farm (refer **Section 1.6.1**) and the NSW Government CWO-REZ Transmission Infrastructure Project (refer **Section 1.6.2**). In addition, there are several third-party renewable energy projects within and in the vicinity of the CWO-REZ, at different stages of the approval process as further outlined in **Section 1.6.3**.

1.6.1 Proposed Barneys Reef Wind Farm

RES is currently developing the proposed Barneys Reef Wind Farm, immediately north of the Project (see **Figure 1.1**). The Barneys Reef Wind Farm involves the construction and operation of up to 68 wind turbines and associated infrastructure, with a total nameplate capacity of approximately 476 MW (subject to final turbine selection). The Barneys Reef project area spans approximately 7,800 ha of land.

The two projects have a common connection point at the proposed NSW Government switching station which, as outlined within this document, is anticipated by the Proponent to be within the Barneys Reef Wind Farm project area. Both projects are designed to connect to the grid separately and respectively via independent onsite project substations and transmission infrastructure. The purpose of the proposed separate connection infrastructure is to enable the two projects to respectively connect to the grid, removing an outcome where the connection of one project is reliant on the other.

If RES determines at a later point in time that assets will be shared, the Secretary will be notified at that time, prior to the commencement of construction, as part of its resolution of the final site layout plan.

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GDA 1994 MGA Zone 55

Legend

- Primary Project Access
- Secondary Access
- Bess and DC-DC Coupled PCs with Har ing
- Proposed Access Track
- Proposed O&M Facility
- Proposed Substation Central
- Proposed Substation North
- Temporary Construction Compound & Laydown
- Proposed Single Axis Tracker
- Security Fence
- Proposed Landscaping Area
- Proposed Transmission Line
- Proposed Transmission Line Buffer, 30m
- Proposed Landowner Access Track
- Host Landholder Dwelling
- Dwelling Exclusion Zone
- Landowner Exclusion Zone
- Native Vegetation (Umwelt)
- Native Vegetation Buffer, 20m
- Rocky Outcrop
- Cultural Heritage Hut (Umwelt)
- Cultural Heritage Hut Buffer, 20m
- Cultural Heritage Hut Buffer, 40m
- Cultural Heritage Area (Umwelt)
- State Road
- Local Road
- State Road (Highway) Buffer, 500m
- 22kV Distribution Line (To Be Rerouted Where Necessary)
- Project Area Boundary
- NSW Cadastre (2021-11-02)

Flood Extent Depth 100yr Peak (10m Resolution) (Umwelt)

- < 30mm
- 30 - 230mm
- 230 - 500mm
- > 500mm

FIGURE 1.2

Constraints Map

Image Source: RES (2021)

Note: Not to Scale

Furthermore, the proposed 330 kV transmission line corridor for the Tallawang Solar Farm is located, in part, within the Barneys Reef project area to access the proposed NSW Government switching station. In this placement of the transmission line corridor, the two projects have four host landholders in common. The location of the transmission line corridor outlined within this document gives regard to the layout and constraints within the Barneys Reef project area. In all other aspects the two projects are independent of each other.

The two projects are being assessed separately under the NSW EP&A Act and is expected will be constructed and operated independently of each other. SEARs for the Barneys Reef Wind Farm project were, independent of the referred Project, issued in September 2021.

As outlined in **Section 5.0** , RES has undertaken a coordinated approach to community and stakeholder engagement for both projects noting their proximity and interrelatedness. This approach aimed to streamline the consultation programs for both projects and integrate a common approach to ensure the development and implementation of the engagement program is transparent and provides clear and consistent information on the two projects; to reduce social risks associated with either project, including stakeholder confusion or consultation fatigue and afford the opportunity for meaningful participation in the assessment phases for both projects.

Cumulative impacts due to the potential overlap and interaction with the construction and operation of these projects are further discussed in **Section 6.16** .

1.6.2 Proposed CWO-REZ Transmission Project

The importance of the Central-West Orana REZ was recognised in the Australian Energy Market Operator's 2020 Integrated System Plan as an actionable transmission project. As such, it is deemed to be a critical project to address cost, security and reliability issues across the entire National Electricity Market.

The area and infrastructure the subject of the CWO REZ was declared by way of the *Renewable Energy Zone (Central-West Orana) Order 2021* gazetted on 5 November 2021 under section 19(1) of the *Electricity Infrastructure Investment Act 2020* (NSW).

The proposed CWO-REZ Transmission Project (involving 500 kV and 330 kV transmission lines, substations and related infrastructure) is currently being developed by the NSW Government to support the growth of renewable energy development within the CWO-REZ.

The NSW Government has recently appointed the Energy Corporation of NSW (EnergyCo) as the Infrastructure Planner for the CWO-REZ. EnergyCo is leading the development process for that transmission project.

Stage 1 of the CWO-REZ is currently being planned, aimed at unlocking 3,000 MW of new network capacity by the mid-2020s. The following is proposed as part of Stage 1:

- Energy Hubs are proposed at three localities in proximity to major planned wind and solar developments to collect electricity from renewable energy generators in the surrounding area. Subject to landowner agreement, EnergyCo aims to secure suitable sites by mid 2022.

- New high voltage transmission lines (500 kV and 330 kV transmission lines) are proposed to transfer renewable energy from the Energy Hubs within the REZ to electricity consumers. Towers are expected to be between 45 and 70 m high and would generally be spaced 400 to 600 m apart. The transmission lines would have a minimum clearance of 7.5 m off the ground to allow farming and other activities to take place safely.

The proposed CWO-REZ transmission corridor is located to the north of the Project Area and traverses through the northern part of the Barneys Reef wind farm, as shown on **Figure 1.1**.

RES has been in ongoing consultation with NSW Government and EnergyCo regarding the location of the transmission corridor and the grid connection point. Based on the outcomes of this consultation, RES has been refining the design for the Project (as well as Barneys Reef wind farm project) with the grid connection point in mind. RES has confidence in the location of the grid connection point proposed for the purposes of this application, arising from the public commitments that have been made by NSW Government agencies in this regard.

If the location of the grid connection point, or construction of the transmission infrastructure, changes after the date of this application, RES will determine the impact on this application or the approval (as the case may be, depending on the timing) and will discuss with the Secretary any variations to this application, or modifications to the approval, that may need to be made to accommodate those changes to the CWO REZ infrastructure.

RES considers that this uncertainty is no different from the uncertainty regarding grid connection generally for renewable energy projects at the time of lodging an EIS. As such, RES considers this uncertainty to not be a relevant matter for consideration under section 4.15 of the EP&A Act in the determination of this application.

Cumulative impacts due to any potential overlap with the CWO-REZ Transmission Project and the proposed Barneys Reef Wind Farm project are further discussed in **Section 6.16**.

1.6.3 Other Developments

As discussed in **Section 1.1**, the Project is located within a REZ and there are several other existing, approved and proposed renewable energy projects within the region.

Based on available information at the time of writing this EIS, there are a total of 32 renewable energy projects within or in the vicinity of the REZ (19 within and 13 outside of the REZ). Of these, 6 are operational, 3 are under construction and 14 are approved but not yet commenced construction. Nine projects are at various stages of the assessment process. Of the projects currently under assessment, 5 are solar farm developments and 4 are wind farm developments.

The cumulative impacts associated with these projects and the proposed Tallawang Solar Farm project discussed further in **Section 6.16** .

2.0 Strategic Context

2.1 Renewables Context

This section outlines the State, Federal and international agreements and strategic planning policies that provide the context and support for why the development of the Project is justified.

2.1.1 Electricity Generation Market

NSW is currently in a transition to increased renewable electricity generation with the NSW Government committed to ensuring a transition to a reliable, affordable and modern energy future for NSW households and businesses (Energy NSW, 2021).

It is estimated that three-quarters of Australia's coal-fired power stations are operating beyond their original design life, with some receiving extensive 'life extension' re-fits (Department of Industry and Science, 2015) to continue operation. In NSW, all five of the coal-fired power stations are scheduled to retire between 2022 and 2043 (AEMO, 2019) beginning with the Liddell Power Station (Hunter Valley) in 2023, increasing the current demand for renewable energy. In Australia, the share of wind and solar energy generation tripled in the five years to 2019, with the share of renewable electricity generation expected to increase to 57% by 2030 and 84% by 2050 (Energy Networks Australia, 2019).

In Australia in 2020, fossil fuels contributed 76% of the total electricity generation, including coal (54%), gas (20%) and oil (2%). The share of coal in the electricity sector has continued to decline in contrast to 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 24% in 2021. In NSW in 2021, renewable energy (wind and solar) accounted for 21% of electricity generation (14,312 GWH) (energy.gov.au, 2021).

The Clean Energy Regulator estimates that a record 7 gigawatts (GW) of renewable capacity was installed during 2020, an increase of 11% from 2019. A record 53.6 terawatt hours of electricity was generated in the National Electricity Market, from renewables (including rooftop solar) during 2020, up 16% from 2019 (energy.gov.au, 2021).

NSW has a strong pipeline of renewable energy projects which will contribute to achieving the current transition targets. However, significant investment is required from the private sector to achieve sufficient renewable energy supply that will support NSW's transition to renewable energy and the retirement of the existing fossil fuel generated supply. The Tallawang Solar Farm project will fit within the current strategic direction of the 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.

2.1.2 National and International Commitments

2.1.2.1 UNFCC Paris Agreement

Australia is one of the 195 countries from around the world that have signed the Paris Agreement, which was made under the UNFCCC. 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.

Australia announced its ratification of the Paris Agreement on 10 November 2016. The obligations under the Paris Agreement will drive national greenhouse gas policy between 2020 and 2030. Australia's commitment to the Paris Agreement includes reducing greenhouse gas emissions by 26 - 28% on 2005 levels by 2030 (Commonwealth of Australia, 2015). 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.

There has been some debate as to whether Australia is on track to achieve its NDC with the Agreement while other authorities recommend suggestions to reduce emissions further by 2030 of 40-60% below 2000 levels.

As a generator of renewable sourced electricity, the Tallawang Solar Farm project would help contribute towards meeting Australia's commitment made under the Agreement. Once the Project is operational, it would contribute to 1,391,321 tonnes per annum in greenhouse gas emissions reductions in Australia and contribute towards wider international emission reduction goals.

2.1.2.2 Australian Renewable Energy Target (RET) scheme

The RET is an Australian Government scheme introduced in 2001 to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources (Australian Government Department of Industry, Science, Energy and Resources, 2018). The objectives of the RET are to:

- encourage the additional generation of electricity from renewable sources
- reduce emissions of greenhouse gases in the electricity sector, and
- ensure that renewable energy sources are ecologically sustainable.

The RET is achieving these objectives by stimulating investment in large-scale renewable energy projects through the Large-scale Renewable Energy Target (LRET) that creates a financial incentive for the installation of renewable energy power stations.

The LRET target of 33,000 GW hours of additional renewable electricity generation was met on a rolling 12-month basis at the end of January 2021 and this target will remain until the scheme ends in 2030.

The Project would have a maximum capacity to generate at 500 MW, producing approximately 1.3GWh of electricity annually, which would contribute to the RET meeting its objectives.

2.1.2.3 2020 Integrated Systems Plan (ISP)

The 2020 Integrates System Plan (ISP) is the second ISP prepared by the Australian Energy Market Operator (AEMO). The first ISP guided governments, industry, and consumers on the investments that are needed to achieve affordable, secure, and reliable energy future, while meeting required emissions trajectories. The second ISP responds to the latest technology and developments policy, system, and economy (AEMO, 2020).

According to the AEMO, the combined supply and network investments proposed in the ISP are anticipated to deliver around $11 billion in net profits to the National Energy Market (NEM). This will be achieved providing all transmission investments are timely and kept at an efficient level.

According to the ISP, augmentation of the transmission grid would be needed by 2040 to balance resources and unlock new REZs. The ISP further notes that strategically placed interconnectors, REZs, combined with energy storage, will be the most cost-effective way to supply capacity and balance resources across the NEM.

The 2020 ISP also identifies several actionable ISP projects, one being the CWO-REZ involving network augmentation to support the development of the CWO-REZ. This link would transfer capacity between the CWO-REZ and major load centres in NSW and is due to be completed in 2024-2025 (AEMO, 2020).

Variable renewable energy development in CWO-REZ has been identified as part of the first-priority phase of the ISP regarding REZ development. The first phase of the REZ development will help meet regional renewable energy targets and focus on areas where there is already good access to existing network capacity with good system strength.

The ISP highlights the appropriate choice of the Project's location within the CWO-REZ. The Project location aligns with AEMO's strategy for the likely location of new generation capacity.

2.1.2.4 Australian Energy Policy

The Australian Government's Energy Policy, '*A Fair Deal on Energy*', announced in 2019, aims to put downward pressure on electricity and gas prices, encourage new reliable supply and technology, and to invest in new ways to make the energy system cleaner and more efficient (Australian Government Department of Environment and Energy (DoEE), 2019). The policy is comprised of three major pillars:

- Delivering an affordable and reliable energy system.
- Putting energy consumers first.
- Taking real and practical action to reduce emissions and meet our international commitments.
- The first of these three pillars outline four key objectives, two of which directly support and underpin the justification for the Project:

- Maintaining and increasing the supply of reliable electricity – including underwriting the New Generation Investments program and supporting the Reliable Energy Infrastructure program.
- Promoting efficient investment in energy infrastructure.

Further to this, on 15 September 2020, the Commonwealth Minster for Energy and Emissions Reduction and the Prime Minister issued a joint media release stating that the Government's aim is: *"Ensuring affordable, reliable and secure electricity supply".* This release supports the development of the Project by reiterating the need for a stronger Australian economy supported by a joint "*gas-fired recovery*" to assist the growing renewable capacity and delivering reliable and affordable energy to the Australian community.

The Project is aligned with the Australian Government's Energy Policy, through its key objectives of supporting the National Electricity Market (NEM) to provide reliable electricity, developing energy infrastructure that is efficient, and reduce emissions by 26-28% below 2005 levels by 2030.

2.1.3 State Commitments

2.1.3.1 NSW Net Zero Plan Stage 1: 2020-2030

The *Net Zero Plan Stage 1: 2020-2030* (the Plan) is for a key NSW Government plant that sets out action on climate change and a goal to reach net zero emissions by 2050. It outlines the NSW Government's plan to grow the economy, create jobs and reduce emissions over the next decade.

The Plan aims to fast-track emissions reduction over 10 years and prepare the State to take further action in the following decades (NSW Government Department of Planning, Industry and Environment, 2020). It is focused on the next decade because rapid changes in technology make identifying the lowest cost path to net zero difficult. Plans for second and third decades of the net zero path will be developed as needed closer to the 2030s and 2040s respectively.

The Plan sets out four key priorities to achieve its target. The most relevant to the Project is the State's priority to drive the uptake of proven emissions reduction technologies that grow the economy, create new jobs, and/or reduce the cost of living. This first priority will provide a pathway to deploy those technologies at scale over the next decade. The NSW Government will remove unnecessary barriers to entry for those technologies and make co-investments to address the high upfront capital costs that may stand in the way of their take-up.

The Plan outlines that, to meet its commitment to provide reliable and affordable electricity, the NSW and Commonwealth Governments are working to fast-track the delivery of NSW's first Renewable Energy Zone (REZ). The REZs will connect investors with communities that are looking to diversify their local industries into renewable energy. This will involve expanding transmission infrastructure into those regions to open new parts of the grid for renewable energy projects, like wind and solar farms.

The five REZs announced formally to date in the Central-West, New England, Hunter-Central Coast, Illawarra and South-West of NSW, will play a critical role in replacing retiring thermal generators in NSW over the next two decades and bringing up to 17,700 megawatts of cheaper, renewable power into the grid. The CWO-REZ that the Project is located in, will act as the 'pilot REZ'. This will be done by expanding transmission infrastructure into the regions to open new parts of the grid for energy projections. The Project will assist the goals of the REZs to replace retiring generators and drive up to $23 billion of private sector investment. Refer to **Section 2.3.3.3** for further detail on the CWO-REZ and relevance to the Project.

2.1.3.2 NSW 2021 Plan & Renewable Energy Action Plan Completion Report

The *NSW 2021 Plan* (2021 Plan) is a 10-year plan created in 2011 which sets state-wide priorities for action and also guides resource allocation (NSW Government, 2011). The 2021 Plan details 32 goals to implement and achieve the strategies set out in the 2021 Plan. Goal 22 of this plan seeks to protect the natural environment and includes a specific target to contribute to the national renewable energy target. The 2021 Plan states:

'We will contribute to the national renewable energy target by promoting energy security through a more diverse energy mix, reducing coal dependence, increasing energy efficiency, and moving to lower emission energy sources. Specific initiatives include:

- Establishing a Joint Industry Government Taskforce to develop a Renewable Energy Action Plan for NSW to identify opportunities for investment in renewable energy sources.'

Since the release of the 2021 Plan, the NSW Government has overseen the development of the *NSW Renewable Energy Action Plan* (REAP), released in September 2013. The vision of this plan is a 'secure, affordable and clean future for NSW' (NSW Government, 2013). Goal 1 of the REAP is to attract renewable energy investment, including to '*support mid-scale solar PV to enable an uptake of solar technologies where they are most cost effective'.*

The *NSW Renewable Energy Action Plan Completion Report* published in December 2018, identified that all 24 goals have been achieved. However, the NSW Government states that it will continue to promote the renewables boom into the future (NSW Government, 2018).

The Project aligns with these State-led objectives and is consistent with the goal and intent of the REAP.

2.1.3.3 NSW Electricity Strategy 2019

The *NSW Electricity Strategy 2019* (the Strategy) provides an overview of the current and projected electricity status in NSW and states the aims for the electricity system which is to provide reliable, affordable, and sustainable electricity. According to the NSW Government, the State's existing fleet of power stations are reaching the end of their operational lives, causing increasing reliability risks to be experienced by the transmission system (NSW Government , 2020). Meanwhile, other problems are arising from congestion in the system which is leading to a slowing of investments in new energy generation and consequently halting new projects which would reduce electricity prices, improve reliability, and protect the environment (DPIE, 2020).

The Strategy aims to invest approximately $8 billion of private investment into the NSW electricity system, which includes $5.6 billion investments into regional NSW, over a 10-year period (NSW Government , 2020). The Strategy also aims to provide 1,200 new jobs, mostly in regional NSW, and lead to a $3.4 billion net economic benefit for the entire State (NSW Government , 2020).

The Project Area is located wholly within the Central West-Orana (CWO) region which is identified as a REZ under the Strategy. A REZ involves the coordinated development of new grid infrastructure in renewable energy-rich area to connect multiple generators (such as solar and wind farms) in the same location. The designation of REZs is intended to result in the development of additional capacity of renewable electricity generation at a lower cost (DPIE, 2020). The REZs are expected to play a vital role in the delivery of affordable energy across NSW as that State's existing power stations close over the coming decades.

The CWO-REZ will be the State's first pilot REZ. This region benefits from relatively low transmission build costs due to its proximity to the existing backbone transmission network, a strong mix of energy resources and significant investor interest (DPIE, 2020). The NSW Government expects that the CWO-REZ will unlock up to 3,000 MW of new electricity capacity by the mid-2020's, providing up to 3,900 construction jobs at one time (DPIE, 2020).

The CWO-REZ Transmission Line corridor is proposed to transverse to the north of the Project Area, and the corridor will pass through the northwest and northeast portions of the Barneys Reef Wind Farm Project Area, as shown in **Figure 1.1**. The aim of this transmission line corridor will better connect the REZ with the broader NSW electricity network. The Project being located within the CWO-REZ would have a nameplate capacity of 500 MW (0.5 GW) to the NEM and contributing towards the targeted 3,000 MW for the CWO-REZ as identified in the Strategy.

2.1.3.4 NSW Electricity Infrastructure Roadmap 2020

The *NSW Electricity Infrastructure Roadmap 2020* (the Roadmap) outlines a number of new policy measures with the aim to drive the transition of the state's electricity sector to a system underpinned by wind and solar power. Its enabling legislation, the *Electricity Infrastructure Investment Act 2020* (NSW), passed both houses of NSW Parliament with strong bi-partisan support and was enacted into law on 2 December 2020 (NSW Government, 2020).

Together, the Roadmap and the accompanied Act outline several commitments for the NSW Government to keep. The most relevant to the Project is the commitment to declaring five REZs to deliver an intended capacity of 12 GW and the commitment to establish a Transmission Development Scheme that will de-risk REZ investments.

The Roadmap will introduce a wholesale power price underwriting mechanism called the Infrastructure Safeguard Scheme. This scheme would ensure that projects located in a REZ, such as the Project, would be able to sell power into the wholesale market at a minimum price guarantee by the NSW Government.

A contract for "firming" of renewable energy output provided by batteries, will also be implemented under Long Term Energy Services Agreements. These contracts would be entered into by the State if modelling suggests reliability standards under the Energy Security Target will be breached (e.g. as a result of coal plant retirements). The contracts are to be tendered for via a competitive process by the Consumer Trustee, an entity to be established by the State.

To fast-track the CWO-REZ, the Roadmap provides measures to deliver the REZ transmission infrastructure, including making declarations under the Act that a proposed line is a "declared REZ transmission line" and triggering the Independent Regulator to assess the level of cost recovery from consumers to fund the line. Access arrangements will also be developed for secure rights to connect to and deliver power through the REZ transmission infrastructure.

2.1.4 Local and Regional Context

2.1.4.1 Central West and Orana Regional Plan 2036

The *Central West and Orana Regional Plan 2036* (Regional Plan) is the NSW Government's strategic long-term plan for guiding planning and land use decisions for the Central West and Orana region until 2036. The Central West and Orana region is home to more than 300,000 people and continually attracting more with

its vibrant regional cities and centres (DPIE, 2017). The Regional Plan provides an overarching framework to guide land use plans, development proposals, and infrastructure funding to coincide with the future population and economic changes in the region.

The Regional Plan sets out four regionally focused goals for the region:

- The most diverse regional economy in NSW.
- A stronger, healthier environment and diverse heritage.
- Quality freight, transport, and infrastructure networks.
- Dynamic, vibrant, and healthy communities.

The Regional Plan aims to strengthen the region's diverse regional economy, improve transport connections with metropolitan cities to the east to provide capacity and connectivity and to foster greater market and industry diversification. In particular, the Regional Plan acknowledges that recent landmark solar, wind and bioenergy projects distinguish the region as a leader in renewable energy development.

The Project aligns with several 'directions' in the Regional Plan. As shown in **Table 2.1**, the Project will increase renewable energy generation and lead to a decreased reliance on fossil fuel power generation, while also protecting agricultural land through continued grazing activities. Environmental and Aboriginal cultural heritage assets will be protected and managed, a far as reasonably practicable, throughout all stages of the Project, including design, construction, operation, and decommissioning.

Table 2.1 Alignment of the Project with directions in the *Central West and Orana Regional Plan 2036* (adapted from DPIE, 2017).

Regional Plan direction	Project alignment with directions
1. Protect the region's diverse and productive agricultural land	The Project allows for ongoing agricultural activity through planned continued use of the Project Area for sheep grazing, preventing fragmentation of agricultural land in the region.
8. Sustainably manage mineral resources	Renewable energy developments, such as the Project, lead to reduced reliance on fossil fuels for power generation. In regional areas in NSW where mining is an important contributor to the economy, including the Central West, renewable energy projects also support communities to transition out of mining as mineral extraction diminishes.
9. Increase renewable energy generation	The Project is located within an identified REZ and will increase renewable energy generation in NSW. RES 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, RES 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.

Regional Plan direction	Project alignment with directions
13. Protect and manage environmental assets	The Project involves identification of environmental assets including Threatened Ecological Communities (TECs) and habitat for threatened species in the Project Area. The Project has been strategically designed to avoid impacts to TECs as far as reasonably practicable, while minimising the potential for impacts on others. Where impacts are unavoidable, the Project will mitigate and manage those impacts throughout construction, operation, and decommissioning. 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 10**, with the findings summarised in **Section 6.7** .
16. Respect and protect Aboriginal heritage assets	The Project involves identification of Aboriginal heritage assets in the Project Area. Public databases indicate that no Aboriginal heritage assets are recorded in the Project Area. An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken as part of the EIS, involving engagement with local Aboriginal stakeholders and a field survey in collaboration with the Registered Aboriginal Parties (RAPs), to confirm this. The ACHAR is provided in **Appendix 12** with the findings summarised in **Section 6.9** . Management plans to be implemented during construction and operation will include an unexpected finds protocol and continued engagement with registered Aboriginal parties.
24. Collaborate and partner with Aboriginal communities	Local Aboriginal stakeholders have been engaged as part of the EIS process to identify whether the Project Area contains any items of heritage value and appropriate measures for avoiding mistakes. RES has committed to ensuring the Project implements best practice community engagement to identify and implement opportunities for the community to benefit from the Project. This is discussed in **Section 5.0 .**

2.1.4.2 Our Place 2040 – Mid-Western Local Strategic Planning Statement 2020

The *Mid-Western Regional Local Strategic Planning Statement* (LSPS) outlines the 20-year vision for land use planning in the Mid-Western Regional LGA. The LSPS is aligned with the *Central West and Orana Regional Plan 2036* by setting out how directions and actions of the plan will be implemented at a local level. It does this through land use planning priorities and short, medium and long-term actions, along with the means for monitoring and reporting on the delivery of the actions (Mid-Western Regional Council, 2020).

Mid-Western Regional Council has identified 12 planning priorities to guide the future strategic planning work in the region. The most relevant Planning Priority for the Project is set out under Planning Priority 7 which aims to '*support the attractions and retention of a diverse range of business and industries*'. This includes land use action for considering renewable energy development in appropriate areas that avoids impacts of scenic rural landscapes and preserves valuable agricultural land.

The Project aligns with this priority as it involves renewable energy development in a 'primary production' land use zone, whilst maintaining the core landscape character of the area and would have a manageable visual impact on the surrounding visual landscape. A visual impact assessment (VIA) was undertaken for the Project and provided in full in **Appendix 14** with the key findings summarised in **Section 6.11**.

2.1.4.3 Mid-Western Regional Development Control Plan 2013

The *Mid-Western Regional Development Control Plan 2013* (the DCP) compliments the *Mid-Western Regional Local Environmental Plan 2012* (the LEP) and provides detailed requirements to guide development in the Mid-Western Regional Council LGA. The DCP was adopted by Mid-Western Regional Council on 6 February 2013 and commenced operation on 11 February 2013. Amendment 4 to the plan was adopted on the 19 June 2019 and commenced operation on 21 June 2019.

The DCP outlines objectives specifically for solar farms in the area. The objectives for solar farm developments as described by the DCP (Mid-Western Regional Council, 2020) are as follows:

- To minimise potential land use conflicts.
- To ensure that there is no unreasonable interference with the comfort or response of adjoining land users.
- To ensure that impacts on agricultural land, businesses and tourism are appropriately considered.
- To ensure road access, visual impacts, noise, health, waste, construction management and environmental constraints are identified, and sufficient information is included with each development application to enable proper assessment.
- To ensure that adequate provisions are made to restore developed land at the end of the life of the development.

A Land, Soils and Agriculture Impact Assessment was undertaken for the Project and considered the above outlined DCP objectives. A Land Use Conflict Risk Assessment (LUCRA) has also been undertaken for the Project in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide* (2011) and is provided in full in **Appendix 8** with the key findings summarised in **Section 6.5**. Impacts to agricultural land have been considered in the Land, Soils and Agriculture Impact Assessment which is included in **Appendix 9** and summarised in **Sections 6.4** and **6.5**. No subdivision of land is proposed as part of the Project.

As outlined in **Section 2.6**, project refinements in response to these assessments have included changes to the Project Area, development footprint and layout of infrastructure to minimise impacts to identified environmental constraints, impacts to neighbouring residences and in response to stakeholder engagement, particularly with local landholders.

Other environmental assessments on impacts to biodiversity, heritage, social, water, transport, visual, noise, health, waste, air quality, hazard and safety have also been included in this EIS in **Sections 6.2** to **6.16**.

2.2 Environmental and Social Context

The Project is located in a rural setting and falls within the Mid-Western Regional LGA, as shown on **Figure 1.1**. The Project Area covers approximately 1,370 ha and compromises (wholly or partly) 35 cadastral lots, listed in **Appendix 4**.

Gulgong is the nearest town to the Project, located approximately 8 km to the southeast, with the larger population centre of Mudgee located approximately 48 km to the south. The town of Dunedoo is

approximately 45 km to the northwest. Localities near the Project Area include Tallawang (to the northwest) and Beryl (to the southwest). The Project Area will have access from the Castlereagh Highway at a newly proposed access location via a local road directly south of the Project Area.

Land within and surrounding the Project Area has been subject to extensive vegetation clearing associated with historic agricultural land uses and is predominately utilised for grazing activities, with some discrete areas of cropping. Agriculture (primarily sheep grazing with some cattle grazing) is the main land use in the LGA. There are some areas of forestry, mining and nature conservation in proximity to the Project area.

Yarrobil National Park is the closest national park, located approximately 7 km west of the Project Area. Goodiman State Conservation Area is the closest State Conservation Area, located approximately 6.5 km northwest of the Project Area. The location of the Project Area in relation to these areas are shown on **Figure 2.1**. Ulan Coal Mine, Yancoal – Moolarben Coal Mine and Wilpinjong Coal Mine are approximately 25 to 35 km south of the Project Area.

The Project Area is zoned RU1 Primary Production under *the Mid-Western Regional Local Environmental Plan 2012* (Mid-Western Regional LEP). The proposed transmission line corridor for the Project crosses the Wallerawang Gwabegar Railway line, which is zoned SP2 Infrastructure. The LEP zone mapping and related land use is illustrated in **Figure 2.1**. No subdivision of land is proposed as part of the Project.

Approximately 1,145 ha of the Project Area is subject to mineral exploration licences (EL8160 and EL8405). No part of the Project Area is subject to a mining/production lease, as illustrated on **Figure 2.2**.

2.2.1 Topography and Hydrology

The Project is within the Macquarie-Bogan Rivers System, in the lower catchment of Tallawang Creek. Slapdash Creek is located to the east, Wialdra Creek to the south and Tallawang Creek to the north of the Project Area (refer to **Figure 2.3**). These waterways discharge to Cudgegong River, around 8 km southwest of the Project Area.

The topography of the Project Area (refer to **Figure 2.3**) is gently undulating with lower ground to the east rising from around 430 m AHD to higher ground to the west reaching above 520 m AHD.

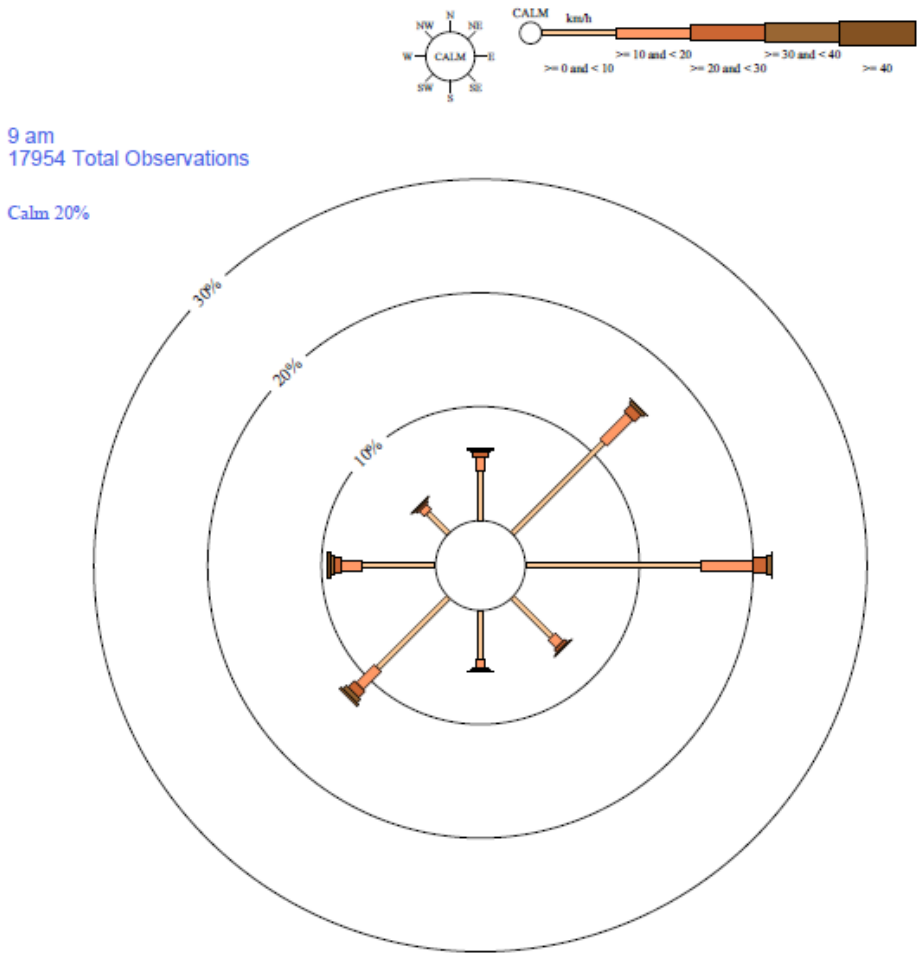
Watercourses within the Project Area are mainly first and second order watercourses. In the northern part of the Project Area watercourses discharge to Tallawang Creek (located to the north of the solar farm site), while watercourses in the southern part discharge to Wialdra Creek (to the south of the Project Area), as shown on **Figure 2.3**. Flow paths within the Project Area are unnamed with intermittent flows following rain events and generally without a well-defined drainage channel. There are around 35 small farm dams present within the Project Area. At the time of writing this EIS, no flood prone land mapping was available for the Project Area.

2.2.2 Climate and Wind Conditions

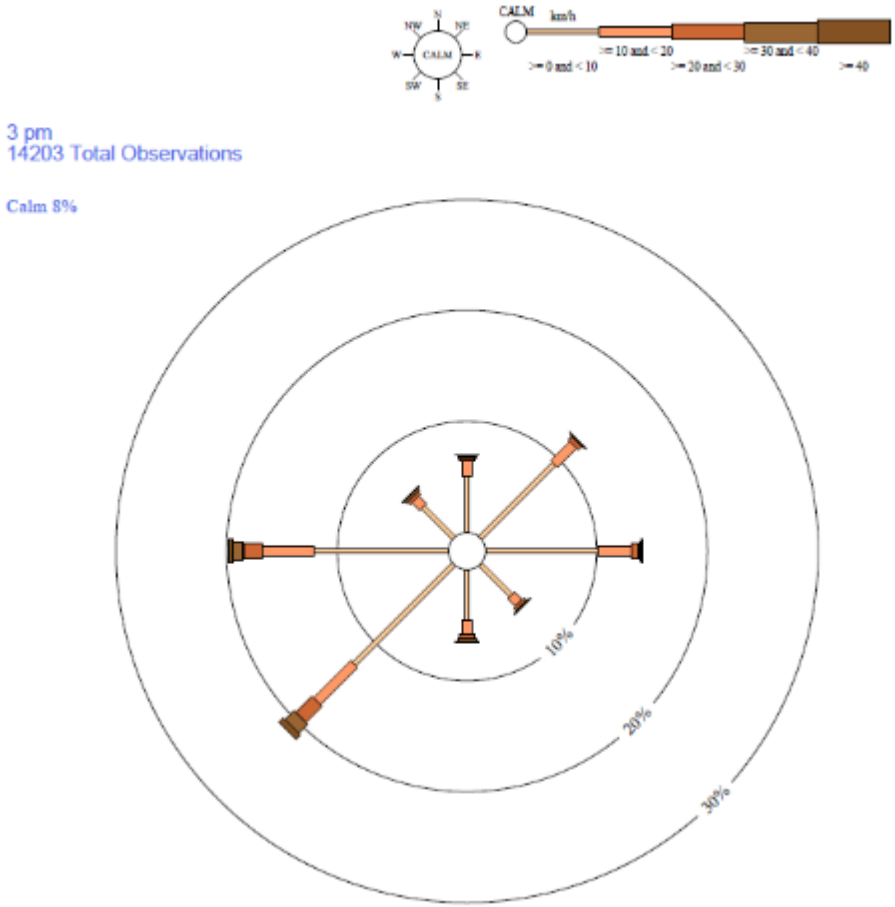
The closest located Bureau of Meteorology (BOM) meteorological station to the Project Area is at the Gulgong Post Office (station number 062013), located approximately 25 km southeast. Data from the Gulgong Post Office station indicates that temperatures are highest in January, with a mean maximum temperature of 31.4 degrees Celsius. Temperatures are lowest in July, with a mean minimum temperature of 2.6 degrees Celsius (Bureau of Meteorology, 2021a).

The average annual rainfall is 649.5 millimetres, with the highest mean monthly rainfall occurring in January (70.2 millimetres) and the lowest mean monthly rainfall occurring in April (43.9 millimetres) (Bureau of Meteorology, 2021).

Annual wind roses for 9am and 3pm wind conditions are shown in **Graph 2.1 and 2.2** respectively. The prevailing winds are generally from the east and northeast during the morning period and southwest to west during the afternoon period (Bureau of Meteorology, 2021b). Wind speed is generally lowest in the autumn and winter months and strongest in spring and summer months (Bureau of Meteorology, 2021).



Graph 2.1 Wind Rose – Morning wind conditions



Graph 2.2 Wind Rose – Afternoon wind conditions

2.2.3 Rainfall

The Gulgong Post Office gauge provides continuous rainfall data over 140 years from 1881 to 2021. The recorded annual average rainfall over this period is 650 mm, with 1950 providing for the highest annual total of some 1412 mm. The mean and median rainfalls are highest during Spring/Summer, with the highest monthly mean reaching 70.2 mm in January and is lowest in April at 43.9 mm. The highest daily rainfall values indicate storm events are most likely to occur during February and March with peak daily totals exceeding 120 mm.

2.2.4 Groundwater

Groundwater resources within the Project Area are managed under the *Water Sharing Plan NSW Murray Darling Basin Fractured Rock Groundwater Sources* (WSP) (DPIE, 2012). The Project Area is located within the Lachlan Fold Belt Murray Darling Basin (Lachlan Fold Belt MDB) Groundwater Source. Lachlan Fold Belt MDB is described as a fractured rock aquifer system where groundwater occurs mainly within the fractures and joints. Aquifer usage is relatively limited, however there are some areas of intense groundwater utilisation due to locally favourable groundwater availability and water quality. A total of 73,599 entitlement shares are managed under the WSP for the Lachlan Fold Belt with the majority used for irrigation purpose (DPIE, 2012).

Groundwater in the northern half of the Project Area and surrounding the Project Area creek systems are identified in the Mid-Western Regional LEP as 'Groundwater Vulnerability', as illustrated on **Figure 2.4**.

One groundwater bore (GW0805247) is located within the Project Area adjacent to and east of Castlereagh Highway. This is a stock and domestic water supply bore with a drilled depth of 42 m. The last recorded groundwater depth was recorded as 12 m below ground on 15/02/2013 (WaterNSW, 2021). Three additional bores (GW048979, GW053198, GW053197) are located immediately outside of the Project Area (adjacent to and west of Castlereagh Highway) and are either for irrigation or water supply purposes. The location of these bores is shown on **Figure 2.4**.

The Lachlan Belt MDB aquifer supports a number of identified high priority groundwater dependent ecosystems (GDEs) and springs (DPIE, 2019). High potential groundwater dependent ecosystems (GDEs) were identified approximately 400 m north of the Project Area (at the Tallawang Creek watercourse) and moderate-low potential GDEs were identified within the Project Area (BOM, 2017). The location of the GDEs in relation to the Project Area is illustrated on **Figure 2.5**. Impacts to GDEs are discussed further in **Section 6.8**.

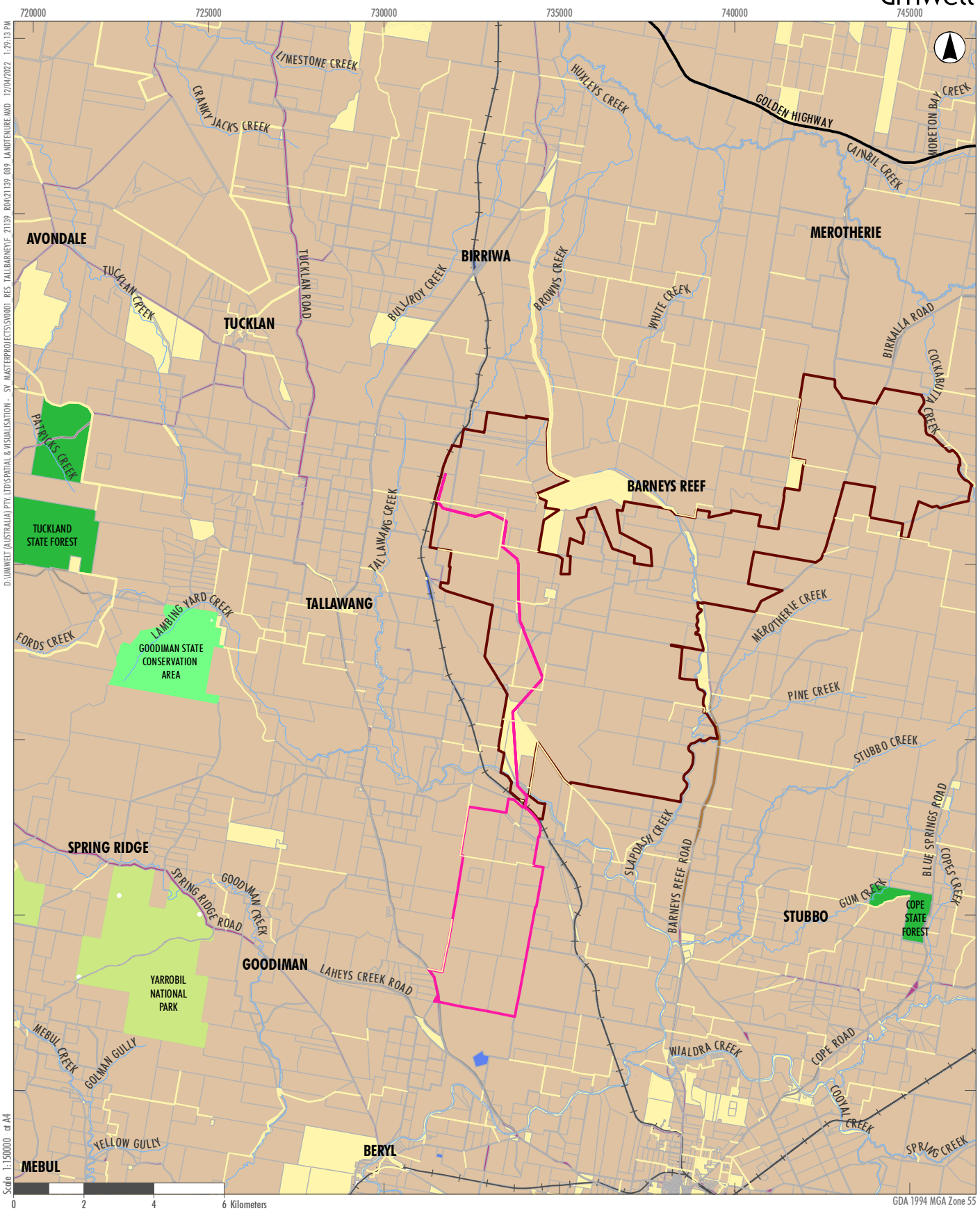
2.2.5 Land Ownership

The Project Area encompasses a total of eight freehold properties with the majority of land surrounding the Project Area in private ownership, as shown on **Figure 2.1**. The solar farm site is proposed to be located on four of these freehold properties, covering an area of approximately 1,300 ha. The properties are currently used for cropping and grazing activities.

Four dwellings exist within the Project Area (also referred to as host dwellings) in locations not forming part of the development footprint. This includes three occupied dwellings and one unoccupied dwelling. The conceptual layout provided in **Figure 3.1**, includes a setback area around two of host dwellings (i.e. R194 and R195 shown on **Figure 6.18**) and the derelict dwelling (i.e. R002 shown on **Figure 6.18**) which has been identified as a potential heritage item. The host dwelling to the north (i.e. R016 shown on **Figure 6.18**) is subject to an option to purchase agreement should the Project proceed, and therefore there is no setback area identified for this receiver. The solar farm site further includes two parcels of Crown Land (i.e. 'paper roads') as shown on **Figure 2.1**.

The preferred route for the transmission line corridor crosses four freehold properties in a corridor of 60 m wide and approximately 13 km long, covering an area of approximately 70 ha. The 60 m width adopted for the transmission line corridor has been adopted by the Proponent to align with TransGrid guidance. The transmission line corridor also crosses the Transport for NSW Wallerawang Gwabegar Railway line passing over the rail reserve (maintained by the Australian Rail Track Corporation (ARTC)) as shown on **Figure 2.1**.

For the purposes of this application, the Project Area also includes that portion of the Castlereagh Highway on which roadworks will be required for access to the Project.



D:\UMWELT (AUSTRALIA) PTY LTD\SPATIAL & VISUALISATION - _SV_MASTER\PROJECTS\SV0001_RES_TALLBARNEY\F_21139_R04\21139_089_LANDTENURE.MXD 12/04/2022 1:29:13 PM

Scale 1:150000 at A4

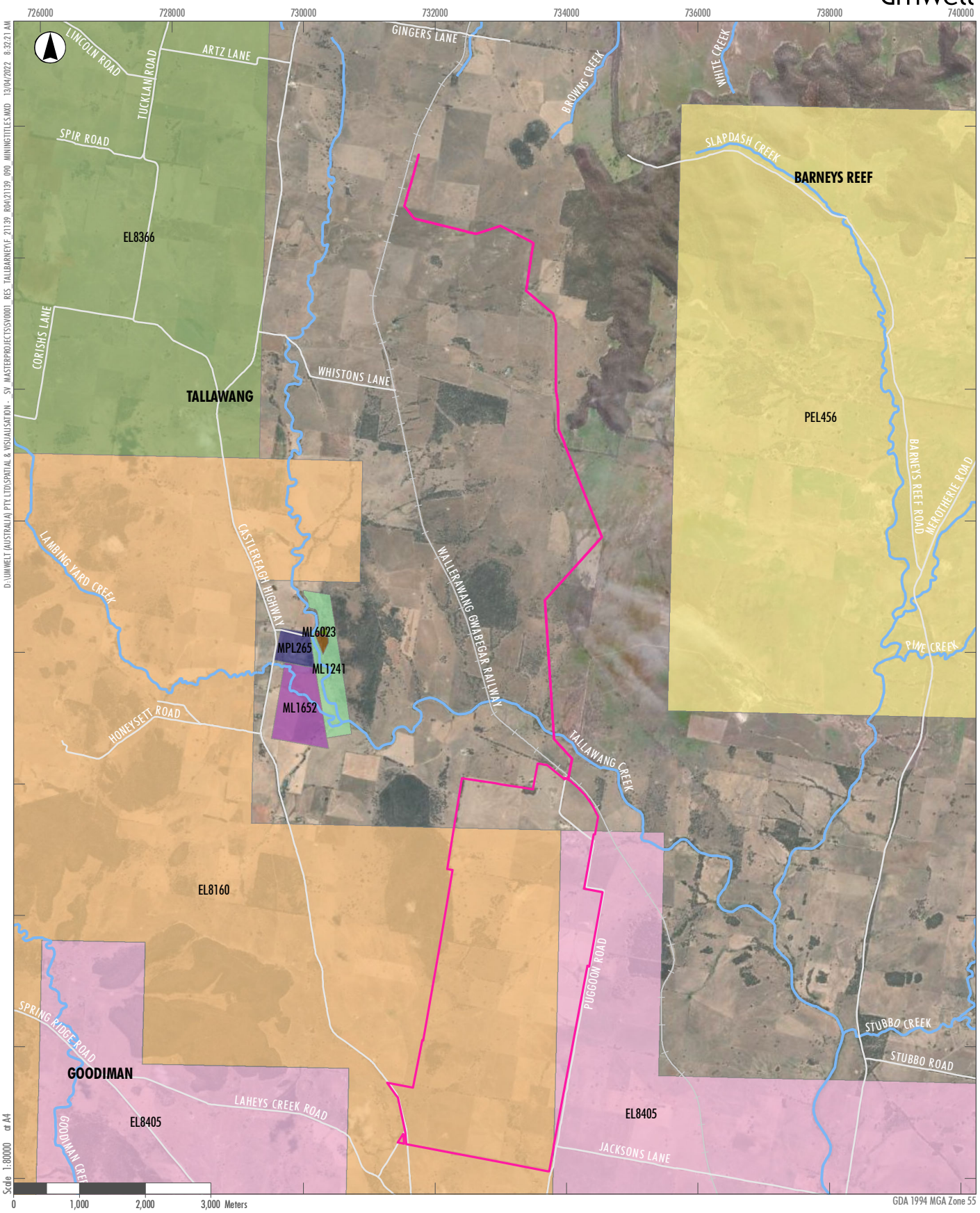
Legend

- Tallawang Solar Farm Project Area
- Barneys Reef Wind Farm Project Area
- Crown Land
- Private
- Local Government Authority
- NSW Government
- National Park
- State Conservation Area
- State Forest

FIGURE 2.1

Land Tenure

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

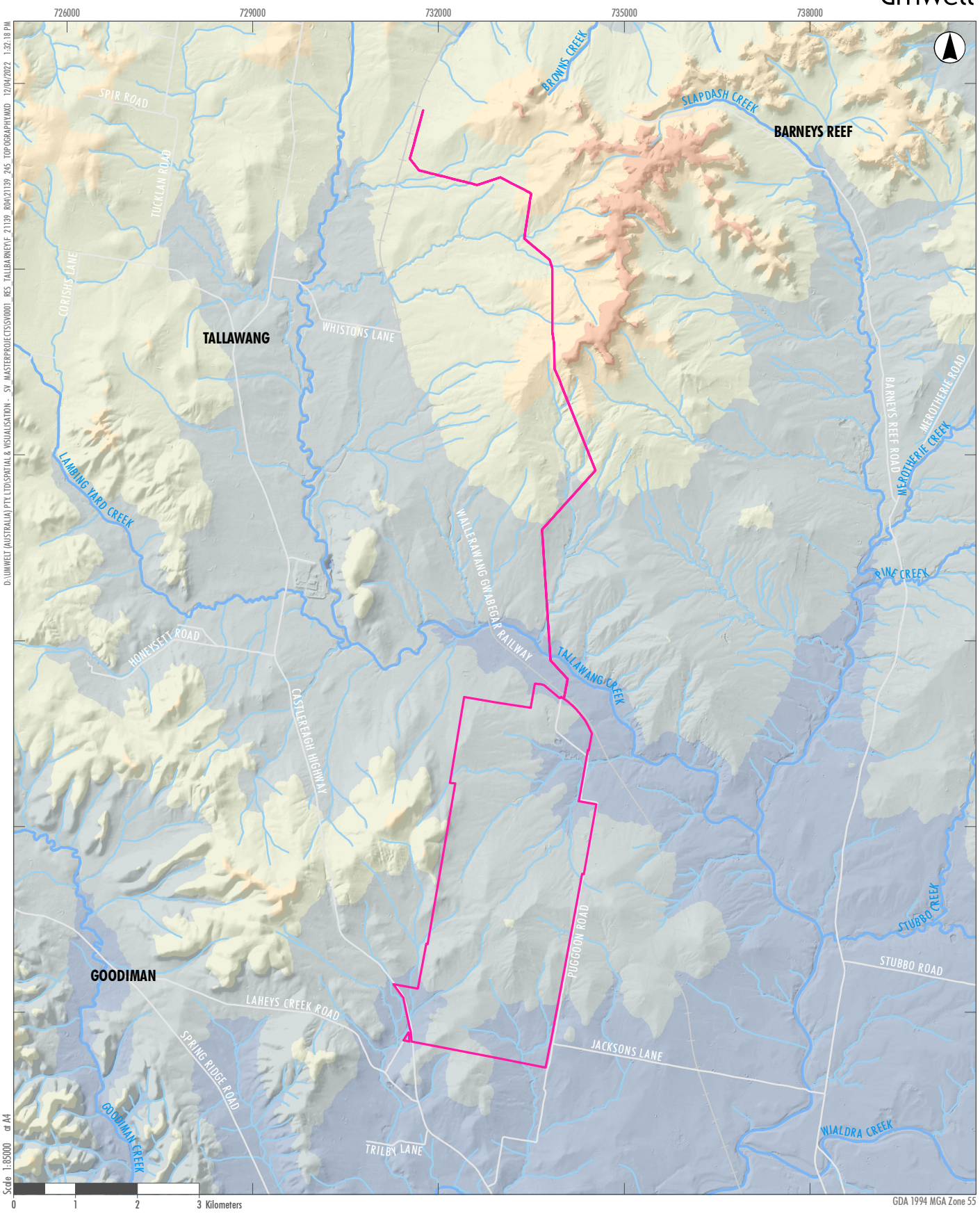
Mining Leases

- EL8160
- EL8366
- EL8405
- ML1241
- ML1652
- ML6023
- MPL265
- PEL456
- PLL1093
- PLL3610

FIGURE 2.2

Exploration and Mining Titles in the Project Area

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020), MinView (2021)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

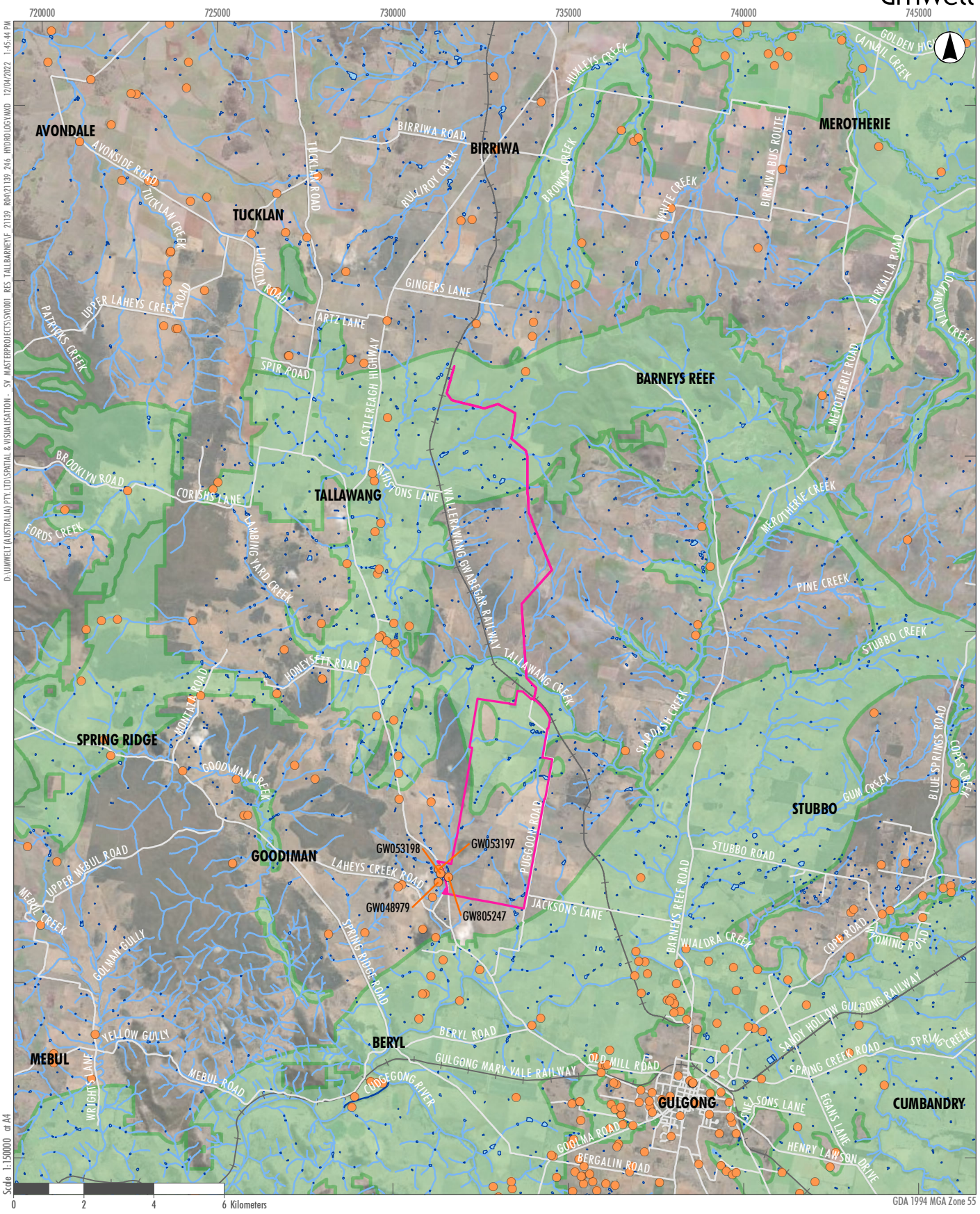
Elevation m(AHD)

- 350 - 400
- 400 - 450
- 450 - 500
- 500 - 550
- 550 - 600
- 600 - 650
- 650 - 700
- 700 - 750

FIGURE 2.3

Topography and Waterways

Image Source: ESR Basemap Data source: Umwelt (2021)



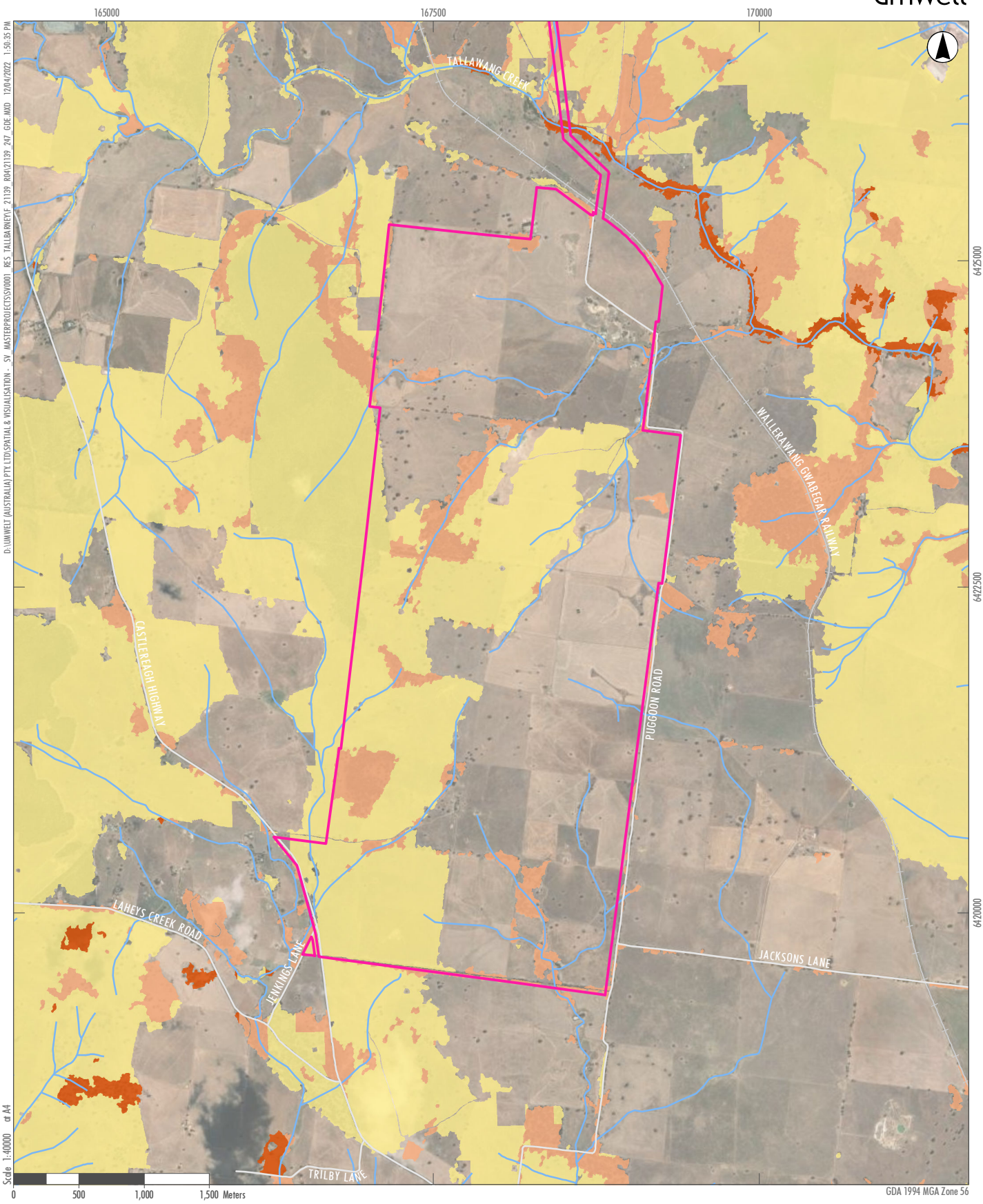
Legend

- Tallawang Solar Farm Project Area
- Groundwater Vulnerability
- Dam/Waterbody
- Groundwater Monitoring Bores
- Road
- Railway
- Watercourse

FIGURE 2.4

Groundwater Resources

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

Terrestrial GDEs

- High potential GDE - from regional studies
- Moderate potential GDE - from regional studies
- Low potential GDE - from regional studies

FIGURE 2.5

Groundwater Dependent Ecosystems (GDE)

Image Source: ESRI Basemap (2021) Data source: Bureau of Meteorology (2017); Umwelt (2021)

2.3 Cumulative Impacts

As discussed in **Section 1.6.3**, the Project Area is located within a REZ and there are 32 existing and proposed renewable energy projects within the CWO-REZ, including the proposed Barneys Reef Wind Farm project planned by RES directly north of the Project.

The *Large-scale Solar Energy Guideline* (DPE, 2018) and the *Cumulative Impact Assessment (CIA) Guidelines for State Significant Projects* (DPIE, 2021) require the consideration of a project together with the impacts of other relevant future and existing projects in order to determine the potential cumulative impacts.

The cumulative impact assessment prepared for the Project has predominately focused on the relevant existing and proposed projects currently under assessment as outlined in **Table 2.2**. The cumulative impact assessment of the Project, including the methodology for determining which projects are relevant for consideration in the cumulative impact assessment is presented in **Section 6.16** of this EIS.

Table 2.2 Renewable energy developments currently under assessment

Name (Development / Developer)	Project type	Location	Status
Bellambi Heights Solar Farm - Vena Energy	Solar	Directly south	SEARs issued
Birrawa Solar Farm and Batter Project - UPC	Solar	15 km northeast	SEARs issued
Mumbil Solar and Wind Farm - Ephron	Solar	60 km southwest	SEARs issued
Suntop Stage 2 Solar Farm - Photon Energy	Solar	70 km southwest	SEARS issued
Daroobalgie Solar Farm	Solar	120 km southwest	SEARS issued
Barneys Reef Wind Farm – RES (same proponent as Tallawang)	Wind	Directly north	SEARS issued
Valley of the Winds Wind Farm - UPC\AC Renewables	Wind	40 km northeast	Response to Submissions
Spicers Creek Wind Farm	Wind	40 km southwest	SEARs issued
Kerrs Creek Wind Farm	Wind	80 km south	Prepare Scoping Report
CWO-REZ transmission infrastructure - NSW Government	Other	10 km north	
Ulan Coal Mine Complex - Glencore	Other	25 km east	
Moolarben Coal Complex - Yancoal	Other	25 km southeast	

With the exception of visual impacts (during operations of the Solar Farm), the potential cumulative impacts associated with the Project are expected to be limited to the construction phase of the Project associated with:

- Traffic and Transport Impacts – associated with general construction traffic impacts in the locality due to movements to/from the Project Area and OSOM vehicle movements along the proposed traffic routes from Newcastle Port to the Project Area.
- Noise – associated with general construction activities undertaken on the Project Area and road traffic noise associated with vehicle movements to and from the Project Area.
- Social/Economic – including demand on accommodation, services and businesses (supply/demand for products and services).

2.4 Project Related Agreements and Programs

Through the development of the Project design and the stakeholder engagement process, RES has developed and implemented a number of project related agreements and benefit sharing programs.

2.4.1 Host Landholder Agreements

RES has entered into, or is in the process of entering into, options to lease or options to purchase agreements with the host landholders to grant propriety rights over the respective properties. Should the Project obtain planning approval, finance and connection to the CWO – REZ transmission lines the options to lease and options to purchase will be exercised.

Where land will be leased, host landowners will receive payments to host the solar farm infrastructure on their properties. These payments are confidential between RES and host landowners and address the Project related impacts on these land holdings and residences. Host landowners would continue to undertake agricultural activities on their land to the extent practicable and where these can be safely undertaken. The impacts of the Project on these host landholders whilst noted in the technical assessments as relevant, are addressed by the agreements in place.

The following lots will be subject to a purchase agreement should the Project be approved:

- lot 1 in DP 332044
- lot 101 in DP 1079036
- lot 105 in DP 750762
- lot 120 in DP 750762
- lot 193 in DP 750762
- lot 24 in DP 750767
- lot 61 in DP 750767
- lot 62 in DP 750767
- lot 68 in DP 750762
- lot 68 in DP 750767
- lot 74 in DP 750762
- lot 96 in DP 750762 and
- lot 97 in DP 750762.

2.4.2 Neighbour Shared Benefit Program

A Neighbour Shared Benefit Program is currently being developed for the Project which includes:

- Design in response to impacts and priorities as identified through consultation with the neighbouring families/property owners and to ensure understanding of personal issues and interests.
- Participation and input from neighbours to the project in identifying what is important and of value to them.
- Criteria-setting in agreement with neighbours, including consideration of 'out of the ordinary' cases.
- Ensure construction impacts are considered in program design.

Should the Project be approved, RES has committed to the implementation of a Neighbour Shared Benefit Scheme to provide direct payments to neighbours to the Project, to be provided to eligible property owners over the life of the Project. Eligibility for neighbours to participate in the Scheme is based on proximity of their property to the Project Area and the presence of a house/residential dwelling. Tiers of payment are three-fold and based on the proximity of the property to the boundary of the Project Area.

2.4.3 Negotiated Agreements

In addition to the Host Landholder Agreements (**Section 2.4.1**), RES is committed to entering into negotiated agreements with neighbouring landholders where there will be impacts associated with the Project specific to their dwellings in order to address these impacts. These specifically relate to visual impacts, as further discussed in **Section 6.11**. The agreements will be developed in accordance with the draft *Large-scale Solar Energy Guideline 2021.*

Some neighbouring landholders have been assessed as being visually impacted and have been identified as non-associated landholders in the Visual Impact Assessment. RES is currently seeking to enter negotiated agreements with these landholders and will continue to consult with them after the lodgement of the EIS with the view of entering the agreements prior to project approval. Once the negotiated agreements have been finalised, these landholders will become associated landholders. The extent of impact and proposed mitigation in this regard is further discussed in **Section 6.11.3**.

2.4.4 Community Shared Benefit Strategy

RES will be developing a community shared benefit strategy with Mid-Western Regional Council and the local community aimed to help build and support local projects and initiatives. The strategy will be based on successful models that have been implemented at progressed RES projects, incorporating current best practice principles for benefit sharing for renewables projects, and will consider community feedback in the final fund design. Examples of projects where community benefit sharing programs have been successfully developed and implemented include the Taralga Wind Farm (NSW), Emerald Solar Farm (QLD), Murra Wurra Wind Farm (Victoria), and Dulacca Wind Farm (QLD). RES is proposing a similar program for the Barneys Reef Wind Farm.

As part of the strategy, RES will provide ongoing financial assistance to ensure that there is a direct benefit from the Project to the local community. This could include support for local schools, training or education as well as grants or project support for local community, environmental, or sporting groups.

The final strategy will be developed in consultation with Mid-Western Regional Council and DPE and will be presented to all relevant stakeholders prior to commencement of construction.

2.4.5 Community Enhancement Program

As part of the community shared benefit strategy discussed above, RES will be developing a dedicated community enhancement program focussed on support and funding of broader community initiatives or programs at the local and regional level. This program will consider:

- The establishment of the REZ and other renewable energy developments active in the area, by coordinating community investment initiatives for greater strategic outcomes where feasible, in particular, coordination with the activities of the Barneys Reef Wind Farm Project.
- How the Project can make a positive contribution to Wiradjuri efforts toward self-determination and local Aboriginal interests more broadly, in consultation and partnership with local Aboriginal representatives, groups and organisations.

2.4.6 Voluntary Planning Agreement

At this stage it is not proposed for RES to enter into a Voluntary Planning Agreement (VPA) with Mid-Western Regional Council or Warrumbungle Shire Council. RES understands that alternate mechanisms for infrastructure management and/or community benefit may be established within the REZ. Once these mechanisms have been clarified, RES will determine the most appropriate form of agreement to enter into in conjunction with Mid-Western Regional Council and Warrumbungle Shire Council.

As outlined in **Section 2.4.4**, RES will be developing a community shared benefit strategy with Mid-Western Regional Council and the local community which will likely be administered outside of a VPA. Furthermore, RES will enter into the appropriate mechanism(s) to manage infrastructure requirements and maximise community benefit at a later stage of development once all requirements of the REZ are finalised.

2.5 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. RES 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, RES 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 1.3 GW-h of renewable electricity per year.
- Reduce greenhouse gas emissions by approximately 1,391,321 tonnes of CO2 equivalent per annum (based on 0.948t/MWh from fossil fuels). This is roughly equivalent to removing approximately 600,000 cars from the road.
- Generate a capital investment of approximately $743 million.
- Create up to 700 FTE employment opportunities (270 FTE direct and 430 FRE indirect) during the construction phase with around 27 FTE employment opportunities (7 FTE direct and 20 FTE indirect) during the operational phase.
- Generate enough electricity to supply approximately 330,000[1] 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 landholders with additional income (year on year) to supplement their agricultural practices.

[1] 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) {source AEMC- Australian Energy market Commission, report 2020).

- Provide ongoing financial assistance through the community shared benefit scheme to ensure direct benefit from the Project to the local community, including local schools, training or education as well as grants or project support for local community, environmental, or sporting groups.

2.6 Project Alternatives Considered

During the planning and design phase of the Project, a range of alternatives were considered by RES with the aim to minimise environmental, cultural and social impacts while maximising the potential for electricity generation. These include the 'do nothing option' (i.e., not developing the solar farm), alternative locations and different project layouts.

2.6.1 The 'Do-Nothing Option'

The Project Area is currently used for livestock 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 forgo the Project's identified benefits, namely:

- additional renewable energy supply to assist Australia in reaching the LRET
- move towards cleaner electricity generation
- 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.

Further, the 'do nothing option' would also result in a lost opportunity for the landholders to diversify their revenue streams.

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 considered to be manageable through the implementation of the management and mitigation measures outlined in **Section 8.0** and would not result in a significant impact to the environment and local communities.

Considering the benefits of the Project and that the Project satisfies the principles of ecologically sustainable development (ESD) (refer to **Section 9.1**), the 'do nothing option' is not considered to be a preferred option.

2.6.2 Alternative Site Locations

Throughout the site selection and design process, RES 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 region as well as investigation of alternative site locations within the local area. Managing environmental constraints and social aspects, improving infrastructure efficiency and matching localised energy demands were the major considerations in the evaluation of alternatives. The proposed Project Area was shown to be more suitable than alternatives considered as it provides the optimal combination of:

- Availability of land of a suitable scale for a viable commercial-scale solar farm project.
- Being located wholly within the CWO-REZ.
- Proximity to high voltage transmission network.
- High quality solar irradiance and ideal climatic conditions for a commercial-scale solar farm.
- Compatible land use zoning both on the Project Area and adjacent land holdings.
- Reduced environmental constraints linking to historic widespread clearing within the Project Area and ongoing use for agriculture, with potential environmental impacts that can be managed with appropriate mitigation and management.
- Relatively flat landscape reducing the risk of soil disturbance during earthworks.
- Access to the major transport network namely the Castlereagh Highway and the Golden Highway.
- Agreements with host landholders.

The *Central West and Orana Regional Plan* 2036 (discussed in **Section 2.1.4.1**) identifies the Project Area's location as being most suited to solar generation due to the access that can be provided by its large open plains with an average daily solar exposure of 18 MJ per square meter (NSW Government, 2017). Further justification behind site selection for the Project is presented in **Section 9.0**.

2.6.3 Alternative Technologies

During the planning and design phase, RES has considered a range of alternative technologies based on different solar farm designs using mature technology with a proven track record of large-scale implementation. **Table 2.3** outlines the technology options considered by RES and the reasoning behind the preferred technology.

Table 2.3 Alternative solar technologies and design considered and decision reasoning

Alternative technologies	Decision Reasoning
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.
Mono-facial 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 maximising land use. The distance between the rows of modules is also larger for bifacial modules, which assists in minimising environmental and visual impacts of the Project and facilitating ongoing land use for sheep grazing and the re-establishment of ground cover following construction.
AC versus DC battery technology	DC batteries were selected for the Project so that they can be distributed throughout the solar farm next to the PV modules rather than in a single centralised location, thereby minimising the visual bulk of the Project. The inclusion of batteries in the proposed development additionally seeks to maximise the land use by optimising the capture and use of energy generated by the Project.

Alternative technologies	Decision Reasoning
Dedicated versus shared grid connection with the proposed Barneys Reef Wind Farm	The Project will connect to the electricity grid via common connection with the Barneys Reef Wind Farm into the same NSW Government switching station and grid connection point. This has reduced the need for the duplication of electrical infrastructure, thereby minimising land use for the Project and the visual impact.

2.6.4 Alternative Project Layouts

During the early design stages of the development of the Project layout, RES considered the environmental, cultural and social constraints of the locality in order to minimise the potential environmental and social impacts of the Project. This included:

- Avoiding and minimising environmental constraints namely:
    - Avoiding dense native vegetation along the western boundary of the solar farm site.
    - Moving the western boundary of the solar farm site towards the east, away from the Castlereagh Highway, to reduce the Project's visibility from the highway.
    - Extending the southern boundary of the solar farm site to include two additional landholders, which are situated between the Project and the proposed Bellambi Heights Solar Farm project (proponent VENA).
    - Identifying and adjusting the layout to avoid Potential Archaeological Deposits within the Project Area.
    - Avoiding dense native vegetation along the transmission corridor reducing the potential for fragmentation of intact habitat.
    - Relocating the primary access to the Castlereagh Highway to avoid heavy vehicle movements along Puggoon Road.
- Implementing setback distances namely:
    - 10 m setback around the perimeter of the solar farm site
    - 20 m setback around first order streams, and 40 m around second order streams including some farm dams
    - 40 m setback around areas of treed vegetation
    - 500 m setback from the Castlereagh Highway
    - Setbacks around potential heritage items (PHIs) present on site i.e. 40 m setback around PHI 1 and 20 m setback around PHI 2
    - 150 m setback around host dwellings[2].

[2] It is noted that the northern host dwelling has no setback as this property has an option for purchase should the Project proceed

2.6.5 Alternative Project Access

Two Project access locations were investigated during the preparation of the EIS. These were:

- Option 1 – Project access via the current access location on Lot 112 DP750762.
- Option 2 – A newly proposed access via a local unserviced road directly south of the Project (locally known as Jacksons Lane).

During the preparation of the EIS, Transport for NSW and Mid Western Regional Council were consulted regarding the alternative Project access. Option 2 was selected as minimal intersections are required compared to Option 1.

2.7 Project Risks and Uncertainties

Table 2.4 provides an outline of the Project's key risks and uncertainties and how these have been considered in the development of the EIS and technical studies.

Table 2.4 Key Project Risks and Uncertainties

Risk/Uncertainty	Details
Grid connection	The Project's grid connection will be via the NSW Government's proposed CWO-REZ Transmission Infrastructure Project, which is currently undergoing a separate development application, as discussed in **Section 1.6.2** . The final location of the Project's overhead transmission line will be subject to the final placement of the NSW Government switching station and the grid connection point. However, a 60 m corridor has been identified by RES to support access to the anticipated connection point which has been established by the Proponent utilising available information about the proposed assets. The key uncertainties are in regard to: • The location of the grid connection point (switching station) has not been finalised by Energy Co (proponent for CWO-REZ). The final location of the Tallawang connection will be dependent on the CWO-REZ. • Delays in the CWO-REZ Transmission Infrastructure Project's development application may delay this Projects' connection to the grid. The following approach has been adopted in the planning and design of the Project to address and manage these risks: • RES has been in ongoing and regular discussions with the NSW Government agencies planning and designing the CWO-REZ Transmission Infrastructure Project and has continued to incorporate the outcomes of these discussions into the design of the Project, i.e. the alignment of the REZ transmission line has changed since the lodgement of the Scoping Report in June 2021 and the voltage has increased to a proposed 500kV. RES will continue to have discussions with the NSW Government and should a further amendment to the transmission line alignment be required post approval of the Project, RES will submit a modification to the DPE as required. • In developing the disturbance footprint for the transmission line corridor, RES has considered the maximum developable footprint in order to avoid and minimise impacts on key site constraints i.e. the biodiversity assessment assumed that the full width of the corridor will be impacted. Key constraints within the corridor (such as identified potential archaeological deposits (PADs)) have been considered and avoided as further discussed in **Section 6.9**. However, should the design for the transmission line corridor change, and partial impact is required, further assessment of the PADs will be undertaken.

Risk/Uncertainty	Details
	• Access to the transmission line corridor will be via the internal access tracks on the solar farm site. Impacts associated with the transmission line (i.e. new access tracks) will be within the 60 m wide corridor. If the transmission line alignment changes, RES will review and submit a modification to the DPE as required. • If the CWO-REZ Transmission Infrastructure Project does not proceed, RES will review the alternative options for connection and discuss with the Secretary the best options for the Tallawang Solar Farm application or approval (as the case may be) at that time. Further detail on this point is set out at **Section 1.6.2** above.

3.0 Project Description

This section describes the layout, location, and function of all infrastructure to be constructed and operated as part of the Project. Descriptions of the construction, operation and decommissioning phases of the Project are also provided.

3.1 Project Summary

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

Table 3.1 Project Summary

Key element	Description	Where addressed in EIS
The Project	The Project includes the construction, operation and decommissioning of the proposed 500 MW solar farm, 200 MW/400MWh BESS, and associated infrastructure (such as operations and maintenance buildings, temporary construction compound, security fencing), civil works (such as intersection works on the Castlereagh Highway, some vegetation clearing and drainage line crossings) and electrical infrastructure (including a new onsite substation and a new overhead transmission line) required to connect to the electricity transmission network. No subdivision of land is proposed as part of the Project. The Project's conceptual layout is provided in **Figure 3.1** with the proposed alignment of the transmission line corridor shown on **Figure 3.2**.	**Section 3.3, Figure 3.1 and 3.2** Detailed maps provided in **Appendix 2**
Location	The Project is located approximately 8 km northwest of Gulgong in the Mid-Western Regional LGA. The Project lies within the Central West Orana Renewable Energy Zone (CWO-REZ).	**Section 3.2, Figure 1.1**
Project area	Approximately 1,370 ha	**Section 3.2, Figure 3.1 and Figure 3.2**
Development footprint	Approximately 866 ha	**Section 3.2, Figure 3.1 and Figure 3.2**
Schedule of lands	The Project is located across 35 cadastral lots, with the Schedule of Lands included in **Appendix 4**.	**Section 3.2, Appendix 4**
Project access	From the Castlereagh Highway	**Section 3.3.4, Figure 3.1**
Temporary ancillary facilities	Temporary ancillary facilities required during construction would typically include: • site compound including storage area, offices and meeting room, ablution facilities, canteen and car parking • laydown areas involving areas suitable for storing plant and equipment, and deliveries including solar panels and cable drums, and areas to support waste management activities (e.g. cardboard and timber).	**Section 3.4.3, Figure 3.1**

Key element	Description	Where addressed in EIS
Construction water use and supply	Water would primarily be used during construction associated with the establishment of hard-standing areas (linking to compaction requirements) and dust suppression. The estimated water use would be in the order of 206 ML for the anticipated 34-month construction period.	**Section 3.7.1**
Construction hours	Construction activities would be undertaken during standard construction hours i.e.: • 7am to 6pm Monday to Friday • 8am to 1pm on Saturdays • No works on Sunday or public holidays. RES seeks approval to undertake the following outside of these hours: Activities which are inaudible at non-associated residences, emergency work, and deliveries and dispatches where requires by authorities for safety reasons.	**Section 3.4.6**
Construction duration	Anticipated to commence mid-2024 and take up to 34 months to be completed.	**Section 3.4.6**
Construction workforce	Approximately 270 direct FTE and 430 indirect FTE jobs (Ethos Urban, 2022). At the Project's peak construction (for up to 6 months) this is expected to increase to about 580 direct FTE jobs (Ethos Urban, 2022)	**Section 3.4.7**
Construction transport route	Project transport will be via road from the Port of Newcastle, via the Golden Highway and then the Castlereagh Highway to the Project Area.	**Figure 3.5**
Commencement of operations	Anticipated mid-2027	**Section 3.5**
Operation and Maintenance facilities	• Operations and Maintenance (O&M) facilities will consist of: ○ an onsite control building (control room and veranda/recreation area) ○ staff office, meeting room facilities, amenities (canteen and ablution facilities) and carparking ○ temperature-controlled spare parts storage facility ○ SCADA facilities ○ a workshop and associated infrastructure.	**Section 3.5, Figure 3.1**
Indicative height of infrastructure	• PV modules - 5 m at full tilt • On site substation - 3.5 m with ancillary components not greater than 10 m • Associated powerlines (<33 kV) - 3.5 m with ancillary components not greater than 10 m • BESS - 3.5 m with ancillary components not greater than 10 m • Transmission line (330 kV) - 35m • O&M facilities - 3.5 m with ancillary components not greater than 10 m.	**Section 3.0**
Operational water use	Approximately 3.4 ML per year would be required for ongoing maintenance activities such as washing of the PV solar panels, amenities and potable purposes by operational staff as well as for livestock grazing within the solar farm and BESS development area.	**Section 3.7.1**

Key element	Description	Where addressed in EIS
Operational lifespan	Approximately 35 years	**Section 3.5**
Operations workforce	Up to 7 direct FTE and 20 indirect FTE jobs	**Section 3.5**
Capital investment	Approximately $743 million	**Section 3.0**

3.2 Project Area

The Project Area is approximately 1,370 ha and will be accessed from the Castlereagh Highway at a newly proposed access point via the local unserviced road directly south of the Project Area, as shown on **Figure 3.1**, with detailed maps provided in **Appendix 2**. For the purposes of this assessment, the Project Area comprises:

- the solar farm and BESS development area (referred to as the solar farm site)
- transmission line corridor for the new overhead transmission line connecting the Project to the grid (referred to as the transmission line corridor).

The Project Area is bound on the south-west by the Castlereagh Highway and on the south and east by Puggoon Road. The Wallerawang Gwabegar Railway line traverses the proposed transmission line corridor directly north of the solar farm site (refer to **Figure 2.1**).

The Project Area comprises eight freehold properties and two parcels of Crown Land, covering a total of 35 parcels of land as listed in **Appendix 4**. These properties are primarily utilised for cropping and grazing activities.

The Project will have a total development footprint of approximately 866 ha within the broader Project Area.

3.3 Project Components

3.3.1 Photovoltaic Modules

The Project would involve the installation of approximately 1,136,400 bifacial solar PV solar panels arranged in a series of rows utilising east-west single-axis tracking to maximise the use of the solar resource available to the Project (refer to **Photo 3.1**). Spaces between rows (edges of panels) would be up to 12 m. The number of PV solar panels would be dependent on detailed design, available technology, and final capacity available at the time of finalising the connection agreement with NSW Government.

The panels will be fixed to, and supported by, ground-mounted framing. The support structure for mounting the PV solar panels will stand up to 2.5 m high with steel posts as foundations. Piles would be typically driven or screwed into the ground using pile drivers to a typical depth of 2.0 m to 3.5 m, depending on geological conditions. Bored piers may also be used if geological conditions do not allow for driven piles or screws.

Panels would consist of heterojunction or crystalline silicon (c-Si) based PV cells which are sandwiched between two thin transparent layers of vapour-proof encapsulation material. The PV cells are then typically sealed with a glass cover front and rear in an aluminium frame. The encapsulation layers provide weather protection and ensure that vapour does not reach the PV cell. Depending on the final design, each panel

would have a surface area of approximately 2.5 m^2 and contain many cells. When fully tilted, the top edge of the panel (2P configuration) would stand up to 5 m high with the lower each of the panel up to 0.5 m from the ground, allowing for sheep grazing around and underneath the photovoltaic modules.

Photo 3.1 Typical 2P solar panel mounting

© RES Australia, 2021

3.3.2 Onsite Electrical Reticulation Network, Inverters and Substation

Two possible locations for the proposed onsite substation have been considered and assessed as part of this EIS i.e. a northern and central location as shown on **Figure 3.1**. Consent is sought for both options. The final location of the onsite substation will be determined during detailed design and notified to the Secretary prior to the commencement of construction as part of the final site layout plan. Should the central location be preferred, the proposed transmission line would be extended further onto the solar farm site, as illustrated on **Figure 3.1** and **Figure 3.2**.

A series of cables would be installed underground to connect the PV solar panels in series. The electricity generated by the Project would be directed via this electrical collection system to the inverters. The number of inverters will be dependent on the final detailed design; however, it is estimated that approximately 186 inverters will be required. The dimensions for each inverter will be approximately 3.7 m wide by 2.3 m high by 2 m deep. The inverters will connect to the electrical switchyard and on-site substation. The dimensions of the electrical switchyard and on-site substation will be determined during detailed design. The anticipated footprint of the on-site substation is approximately 3 ha.

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

3.3.3 Battery Energy Storage System (BESS)

The Project would involve a BESS with a proposed capacity of up to 200MW/400 MW-hours. DC-coupled battery storage units will be distributed throughout the solar farm site, adjacent to the inverters. The BESS will be comprised of 93 power conversion system (PCS) skids located across the site and each skid will have two DC-coupled inverters and four battery storage units. Subject to detailed design, the dimensions of each battery storage unit will be approximately 12.2 m long, 2.5 m wide, and up to 3 m tall. The total length each battery storage unit will be approximately 60 m long.

Figure 3.1 shows where the 93 PCS skids associated with the BESS will be located throughout the Project Area and **Figure 3.3** gives an example of the layout of each battery storage unit at these locations.

3.3.4 Access, Parking and Security Fencing

The Project would gain access at a newly proposed access point off the Castlereagh Highway as shown in **Figure 3.1**.

Intersection works on the Castlereagh Highway and the local council road (directly south of the Project Area) will be required to establish the new access point and entrance to the Project Area. Concept drawings for the proposed works are provided in **Appendix 19**. The proposed intersection at the Castlereagh Highway will consist of a three-way intersection, with a connecting internal access road extending onto 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 types of trucks requiring access to the Project Area. The proposed access intersection requirements have been discussed with the Mid-Western Regional Council and Transport for NSW and agreed in principle. Mid-Western Regional Council and Transport for NSW will be consulted further in relation to the detailed design requirements for the intersection works prior to construction and for the purposes of securing approval under the Roads Act.

Four alternate access points along Puggoon Road are proposed as shown in **Figure 3.1** to allow for emergency vehicles and stock movements. The alternative accesses will only be utilised for the purposes of the Project in case of an emergency or to bring livestock in and out of the solar farm and BESS development area.

The Project would require access from Lot 105 DP 750762, across Puggoon Road to Lots 74, 96 and 105 of DP 750762. The design and final location of the Puggoon Road crossing will be finalised in consultation with Council during the detail design phase.

Internal access roads consisting of compacted gravel, approximately 6 m wide, would be constructed to accommodate construction and operational traffic movements throughout the Project Area. The indicative location of the access roads is illustrated in **Figure 3.1**.

During construction, a suitable number of parking spaces will be available within the temporary laydown areas. The indicative location of the laydown areas is illustrated in **Figure 3.1**.

The perimeter of the solar farm site will be enclosed by security fencing, consisting of a chain mesh fence approximately 2.3 m high, subject to final design (illustrated in **Photo 3.2**). The security fencing would involve casting concrete footings for posts and installing fencing mesh. Fencing will restrict public access to the development footprint and is required under *Australian Standard (AS) 1725.2010 Parts 1-5*.

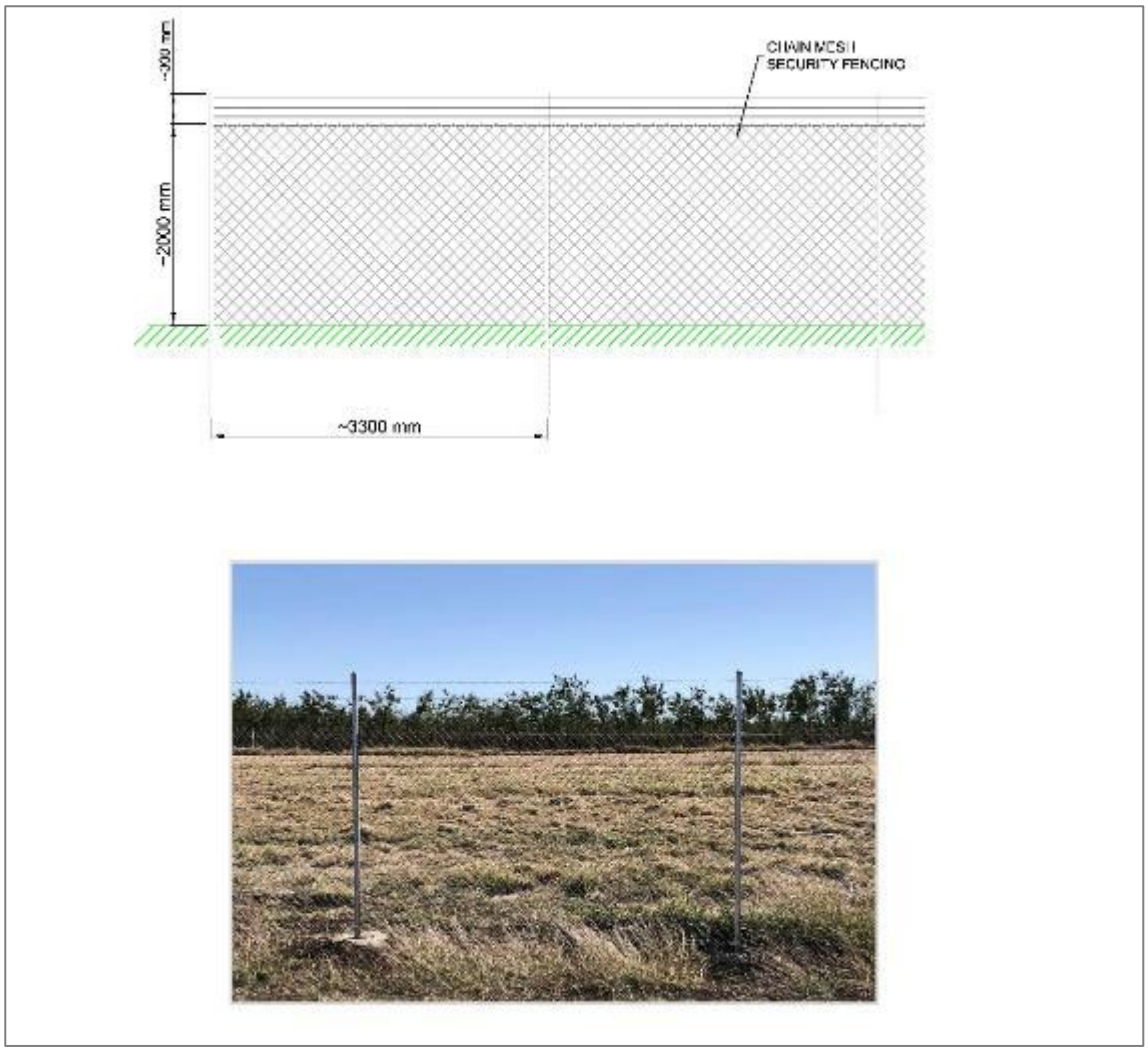


Photo 3.2 Chain mesh fencing

© RES Australia, 2021

3.3.5 Grid Connection Infrastructure

The Project would use the CWO-REZ transmission infrastructure anticipated to be located on the neighbouring proposed Barneys Reef Wind Farm (north of the Project). The Project will connect into the NSW Government switching station which will in turn connect in to the proposed CWO-REZ Transmission Line (**Figure 3.2**).

The connection infrastructure between the on-site switchyard/substation and the proposed NSW Government transmission line is anticipated to include a 330 kV overhead transmission line consisting of three electrical conductors, optical fibre communication cables and overhead earth wire (illustrated in **Photo 3.3**). The overhead transmission line will be approximately 13 km in length and will require the installation of approximately 32 pylons (constructed of steel) and up to 35 m in height, spaced at a range of 350 m to 480 m between pylons, and an access track, all of which will be contained within the transmission line corridor (**Figure 3.2**).

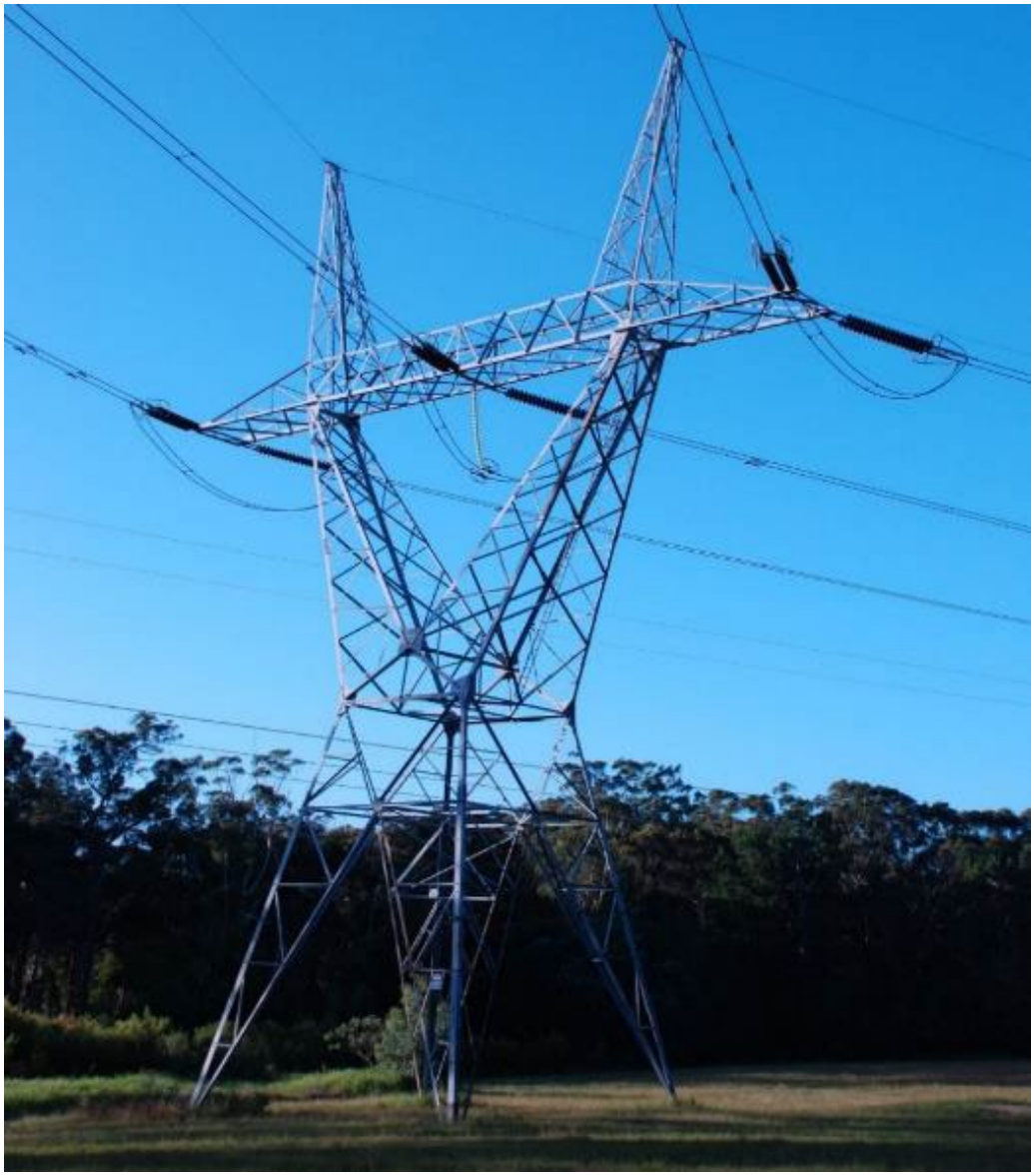


Photo 3.3 Typical 330 kV single circuit tower

© RES Australia, 2021

3.3.6 Operations and Maintenance (O&M) Facilities

Operations and Maintenance (O&M) facilities will consist of:

- an onsite control building: containing a control room and veranda/recreation area, totalling a footprint of approximately 100 m^2. A typical Storage shed has an approximate footprint of 300 m^2. Illustrations of a typical / indicative control room and storage shed are provided in **Photos 3.4 and 3.5** respectively.
- staff office, meeting facilities, amenities and carparking
    - a temperature-controlled spare parts storage facility
    - SCADA facilities
    - a workshop and associated infrastructure.

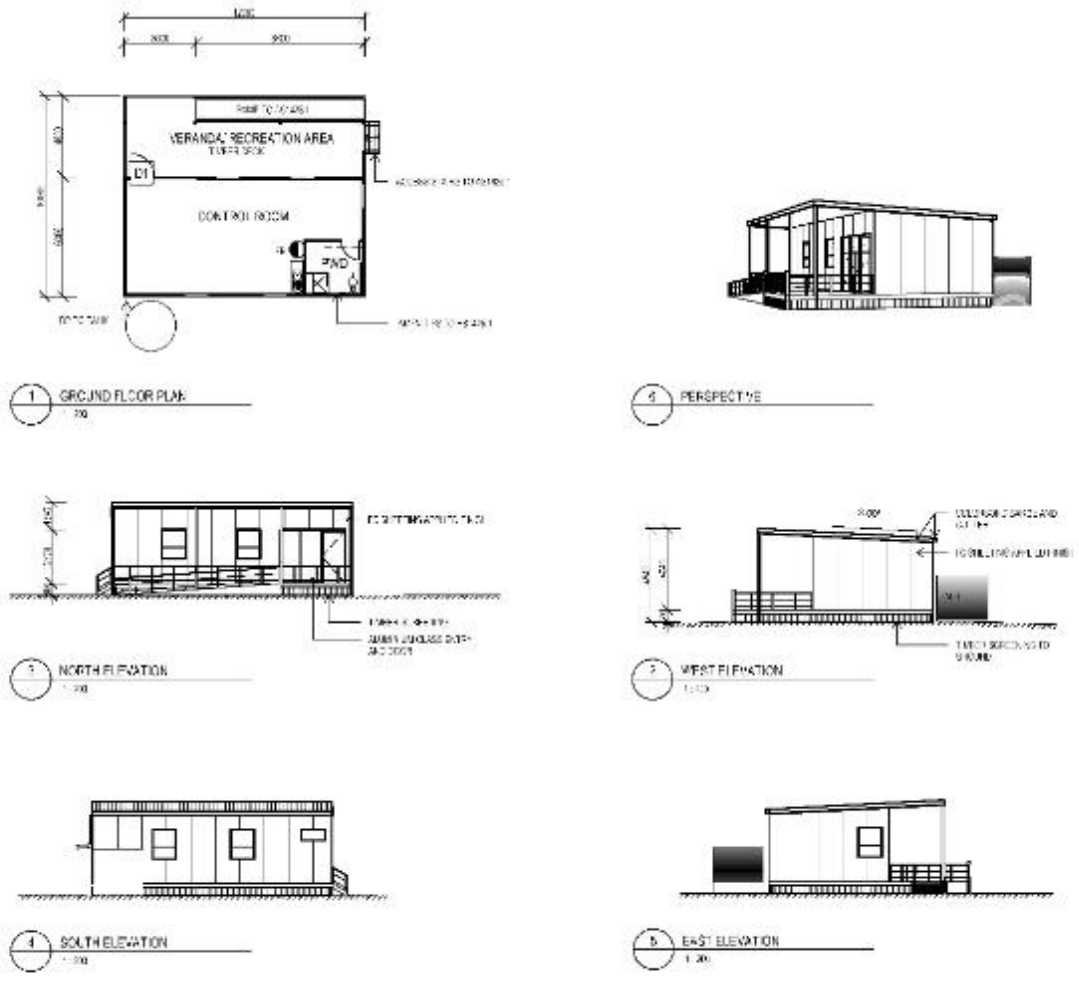


Photo 3.4 Typical control room

© RES Australia, 2021

The O&M facilities would be located along the main internal access road as shown on **Figure 3.1**, for ease of accessibility. The specific location for the O&M facilities would be confirmed during detailed design.

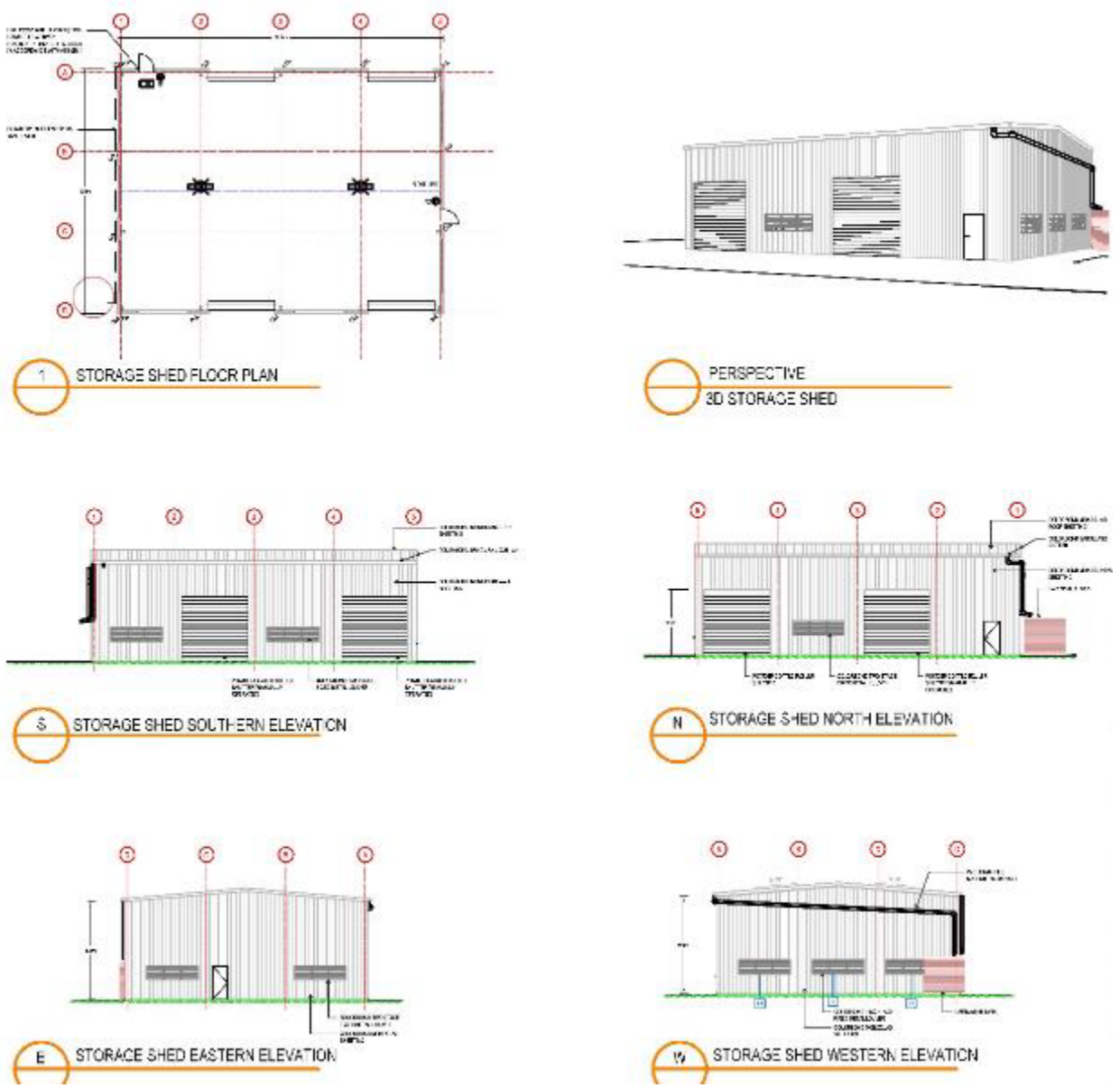


Photo 3.5 Typical storage shed

© RES Australia, 2021

3.4 Construction

3.4.1 Site Preparation

The following site preparation works would be undertaken to prepare the site for construction:

- site survey, based on initial geotechnical investigations and LIDAR data as part of the EIS, 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 site from the local road network and car parking, including creek crossings (i.e. small culverts and bed level crossings)
- installation of temporary construction fencing around work areas and boundary fencing
- establishment of temporary construction compounds and site facilities and laydown areas for construction materials and equipment
- preliminary earthworks and installation of environmental controls including erosion and sediment management structures
- identification and establishment of no-go zones around trees and vegetation to be retained
- felling of trees not required to be retained
- establishment of no-go zones around Potential Archaeological Deposits.

Earthworks would be required to prepare the site for the construction activities as outlined in **Section 3.3.2**. This would involve some grading and levelling (where required), and resurfacing activities for the temporary ancillary facilities and O&M facilities.

The need for heavy earthworks and compaction will be minimised as much as practicable.

3.4.2 Construction Activities

Construction-related jobs are expected to be associated with a wide range of on and off-site activities, including:

- installation of permanent fencing and security
- installation of steel piles, PV mounting system and solar panels
- foundations for the inverter blocks, buildings, switchgear and on-site substation will be prepared
- installation of on-site electrical reticulation system, including associated substation and switchyard, including trenching for cabling
- installation of PCSs on concrete pads or footings

- construction of permanent site office, amenities and workshop
- establishment of the BESS
- construction of the overhead transmission line, 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.

3.4.3 Temporary Ancillary Facilities

Temporary ancillary facilities would be required during construction, and would typically include:

- site compound – the construction compound would measure about 50 x 50 m and would include storage area, offices and meeting room, ablution facilities, canteen and parking.
- laydown areas involving areas suitable for storing plant and equipment.

These facilities would be compacted with gravel to allow for all weather access and would be located within the development footprint. Once construction is complete, these areas would be revegetated or have PV solar panels or other infrastructure installed on the area once construction is completed. Whilst the temporary construction ancillary facilities could be located anywhere within the development footprint, an indicative location is provided in **Figure 3.1.**

3.4.4 Plant and Equipment

The plant and equipment required for the construction of the Project would include:

- earthmoving machinery and equipment for site preparation (such as excavators, compactors, rollers and graders)
- cable trenching and laying equipment
- pile-driving equipment (piling rigs)
- assisted material handling equipment (forklifts and cranes)
- machinery and equipment for connection infrastructure establishment and installation of the BESS
- manual tools, including compressed air and electric tools
- heavy vehicles, utes and light vehicles
- water trucks for dust suppression
- diesel generator/s.

3.4.5 Transport Routes and Traffic Movements

Construction material and equipment would be transported via road from the Port of Newcastle, then the Golden Highway and then via the Castlereagh Highway to the Project Area. Refer to **Figure 3.4** for the Project's proposed transport route.

The predicted average daily traffic generated during the Project's construction phase is estimated at approximately 70 to 85 heavy vehicles (140 to 170 movements per day). During the peak of construction this may extend to 135 heavy vehicles per day (270 movements per day). In addition, it is estimated that approximately 300 light vehicles would access the Project Area per day. The number of light vehicle movements is based on the conservative assumption that no mini vans or shuttle buses would be used. As part of the construction traffic management plan (CTMP), the contractor may consider providing minivans for moving non-local workers to site from the more populated townships, thus reducing the number of light vehicle movements.

The delivery trucks will predominantly be Truck and Dog vehicles, with several concrete mixing trucks and Articulated Vehicles (AV as defined within AS 2890.2:2009). The AVs will occasionally be used to transport larger plant such as the PV panels.

An Oversize Overmass (OSOM) vehicle will be required to transport a substation transformer on a Drake trailer consisting of 16 axles and is approximately 30 x 4.3 m in length and width. This will be the largest vehicle for the Project. There are expected to be up to two transformers delivered to the Project Area via Restricted Access Vehicles (RAVs).

An assessment on the traffic movements and transport routes proposed for the Project is provided in **Section 6.6**.

3.4.6 Construction Staging, Duration and Hours

Construction activities would be undertaken during standard daytime construction hours consistent with the *Interim Construction Noise Guideline (Department of Environment and Climate Change 2009)* (ICNG) as follows:

- 7am to 6pm Monday to Friday
- 8am to 1pm 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 may occur however 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 Mid-Western Regional 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.

The construction phase is expected to be undertaken over approximately 34 months from the commencement of site establishment works. It is anticipated that construction works would commence June 2023.

3.4.7 Construction Workforce

The Project would generate approximately 270 direct and 430 indirect FTE jobs over the 34-month construction period. However, actual on-site workforce numbers would vary from month to month, depending on the intensity of the proposed works at the time. At the Project's peak, which may last up to six months, it is estimated that approximately 580 jobs would be generated (refer **Section 6.4**).

3.5 Operation and Maintenance

The operational lifespan of the Project is expected to be around 35 years, with operations commencing in April 2026. It is anticipated that up to 7 direct and 20 indirect FTE jobs would be required during operations.

Throughout operations, ongoing maintenance of the development footprint and project 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:

- Weekly and monthly inspections covering electrical, civil and environmental operational performance.
- Annual cleaning of modules and meteorological stations.
- Vegetation management in line with the Vegetation Management Plan (VMP). Sheep grazing may be retained within the Project to maintain undergrowth as well as to retain long term agricultural productivity of the land. Grazing would reduce fuel use and emissions associated with grass cutting, as well as lowering bushfire threat and maintaining habitat for threatened species.
- Preventative maintenance and other activities as defined in the operation and maintenance management plans.
- Corrective maintenance activities would include testing and replacing of faulty plant components such as modules, fuses and other corrective actions within operation and maintenance scope.
- Weed and pest control.

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

After the Project reaches the end of its operational life, the Project would either be upgraded (pending any additional approval requirements) or decommissioned. Decommissioning would involve removing project infrastructure and returning the development footprint to its pre-existing land use, or another land use in consultation with the landholders, as far as practicable. As agreed with the landholder some infrastructure may be retained (e.g. access tracks) where beneficial to the agreed land use.

RES or its contractors will seek to recycle all dismantled and decommissioned infrastructure and equipment, where feasible and practicable. Structures and equipment that cannot be recycled would be disposed of at an approved waste management facility in accordance with all statutory requirements.

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 Supply

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 206 megalitres (ML) for the 34-month construction period.

During operations, approximately 3.4 ML per year would be required for ongoing maintenance activities such as washing of the PV solar panels, amenities and potable purposes by operational staff as well as for livestock grazing within the solar farm and BESS development area. Washing of the panels would not require any detergent or cleaning agents.

Water for the Project would be sourced from commercial suppliers in the nearby region (via water trucks) and farm dams or licensed groundwater bores located within the Project Area or immediate locality, where appropriate and available. A local commercial supplier has been confirmed availability to supply the Project with water. Water will be transported from Gulgong to the Project Area with 14,000 or 18,000L trucks.

3.7.2 Electricity

Access to electricity during construction activities would be via the local distribution network where available and via diesel generation where access to the grid is unavailable.

Electricity requirements during operation would include lighting at ancillary infrastructure (office, workshop, amenities and parking), staff computers, domestic appliances and onsite security systems. Electricity generated by the solar farm would be used for most activities during operations, except for maintaining the inverters during the night which will involve a small amount of auxiliary load being supplied from the grid.

3.7.3 Telecommunications

The cellular network would be used during construction. During operations connection to telecommunications would be via optical fibre with cellular backup.

3.7.4 Sewer

There is no sewer access in the Project Area. Therefore, amenity facilities would be pumped out via tanker and delivered to the Gulgong sewage treatment facility, or as agreed with Mid-Western Regional Council during construction. RES or its contractors would consult with Mid-Western Regional Council prior to commencement of construction to reach an agreement.

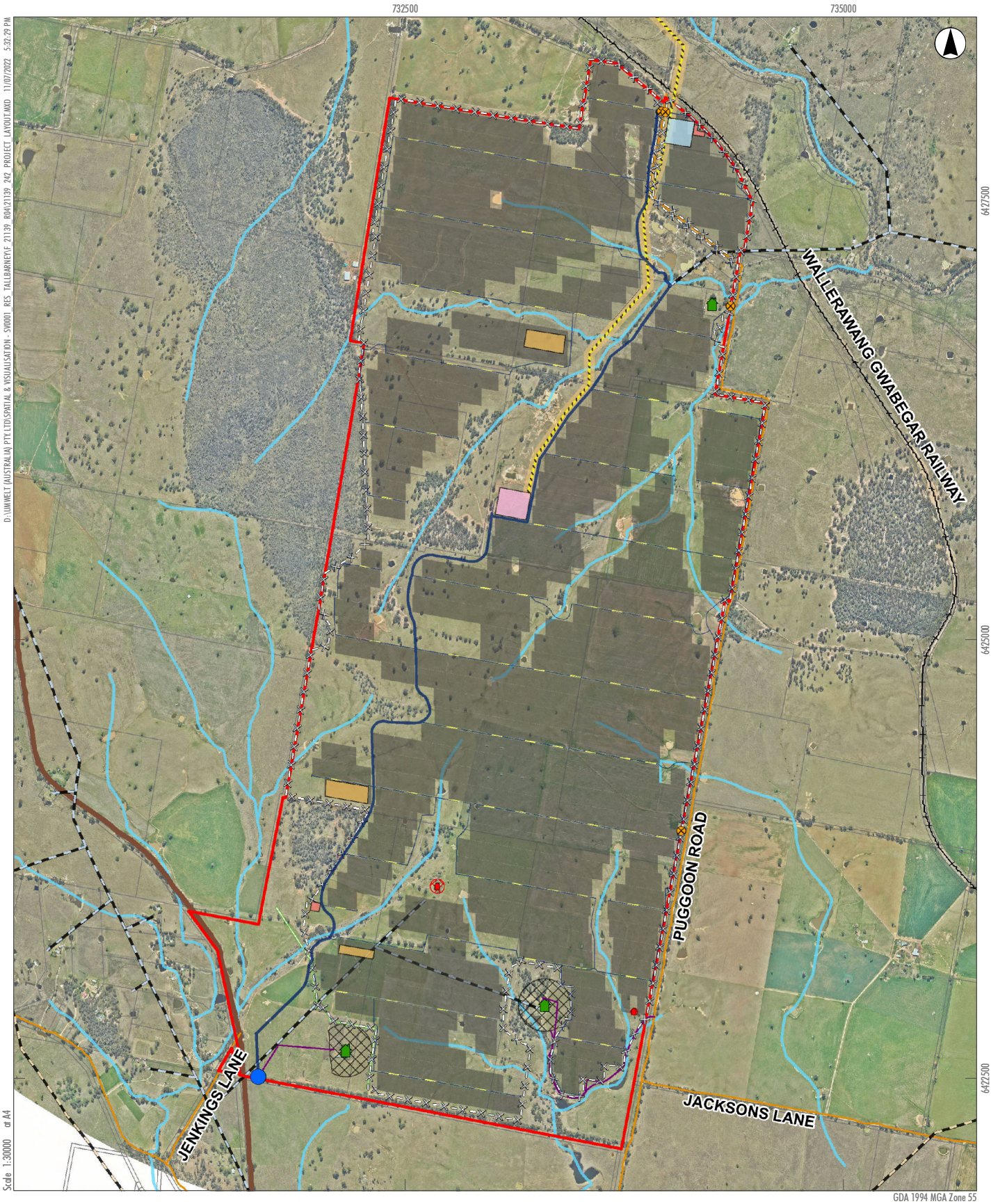
It is likely that a septic system would be installed for the operational amenities. This would be constructed and managed in accordance with the relevant Mid-Western Regional Council requirements.

3.8 Environmental Management

RES will 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) and operational environmental management plan (OEMP), including all required 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 operation and environmental performance of the Project
- establish procedures for handling of complaints, disputes, non-compliances and emergency response.

Section 8.0. 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.



Legend

- Primary Project Access
- Secondary Access
- Proposed Single Axis Tracker
- Bess and DC-DC Coupled PCs with Hardstanding
- Proposed Access Track
- Proposed O&M Facility
- Proposed Substation Central
- Proposed Substation North
- Temporary Construction Compound & Laydown
- Proposed Landowner Access Track
- Proposed Transmission Line
- Proposed Transmission Line Buffer, 30m
- Proposed Landscaping Area
- Involved Dwelling
- Dwelling Exclusion Zone
- Cultural Heritage Huts
- Cultural Heritage Huts Exclusion Zone
- Water Course
- State Road
- Local Road
- 22kV Distribution Line (To Be Rerouted Where Necessary)
- Security Fence
- Project Area Boundary
- NSW Cadastre (2021-11-02)

FIGURE 3.1

Indicative Project Layout

Image Source: RES (2021)

Legend

- Tallawang Solar Farm Project Area
- Proposed HV Powerline
- Road
- Railway
- Watercourse

Site Infrastructure

- Construction Compound/Laydown
- O&M Facility
- Proposed Substation (Central Option)
- Proposed Substation (Northern Option)

FIGURE 3.2

Indicative Transmission Line Alignment

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)

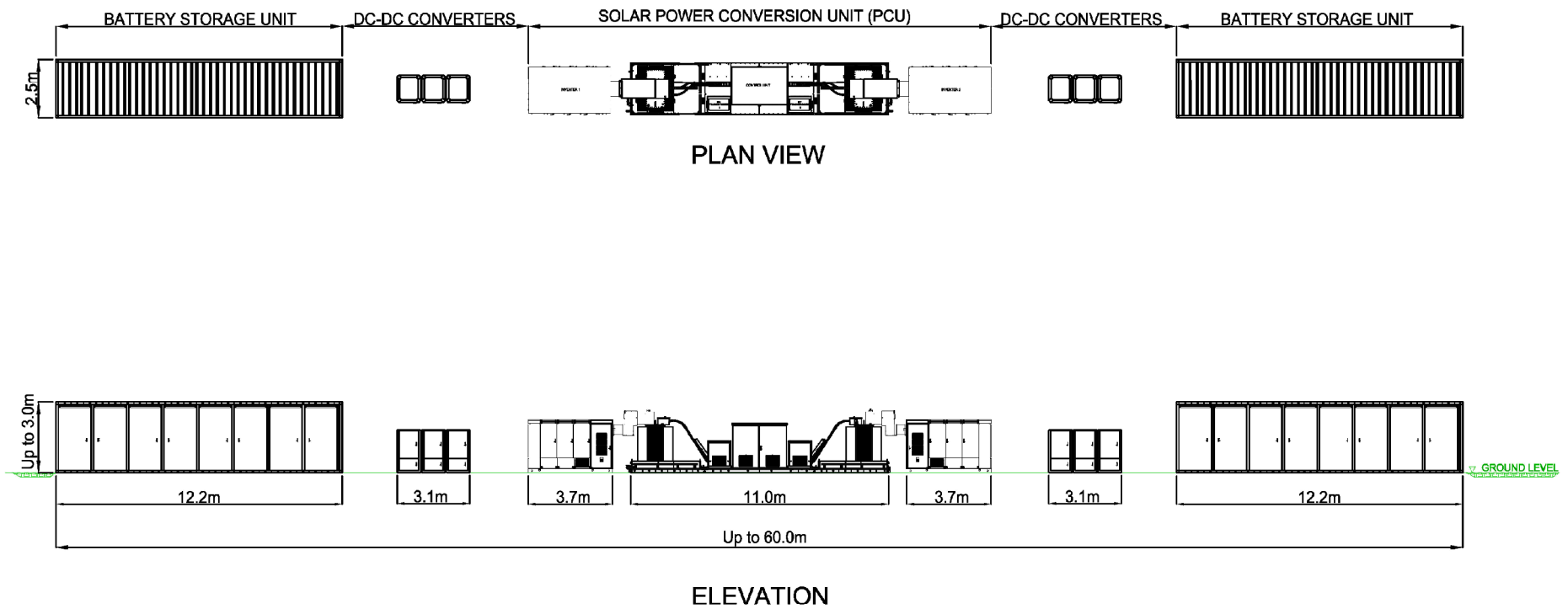
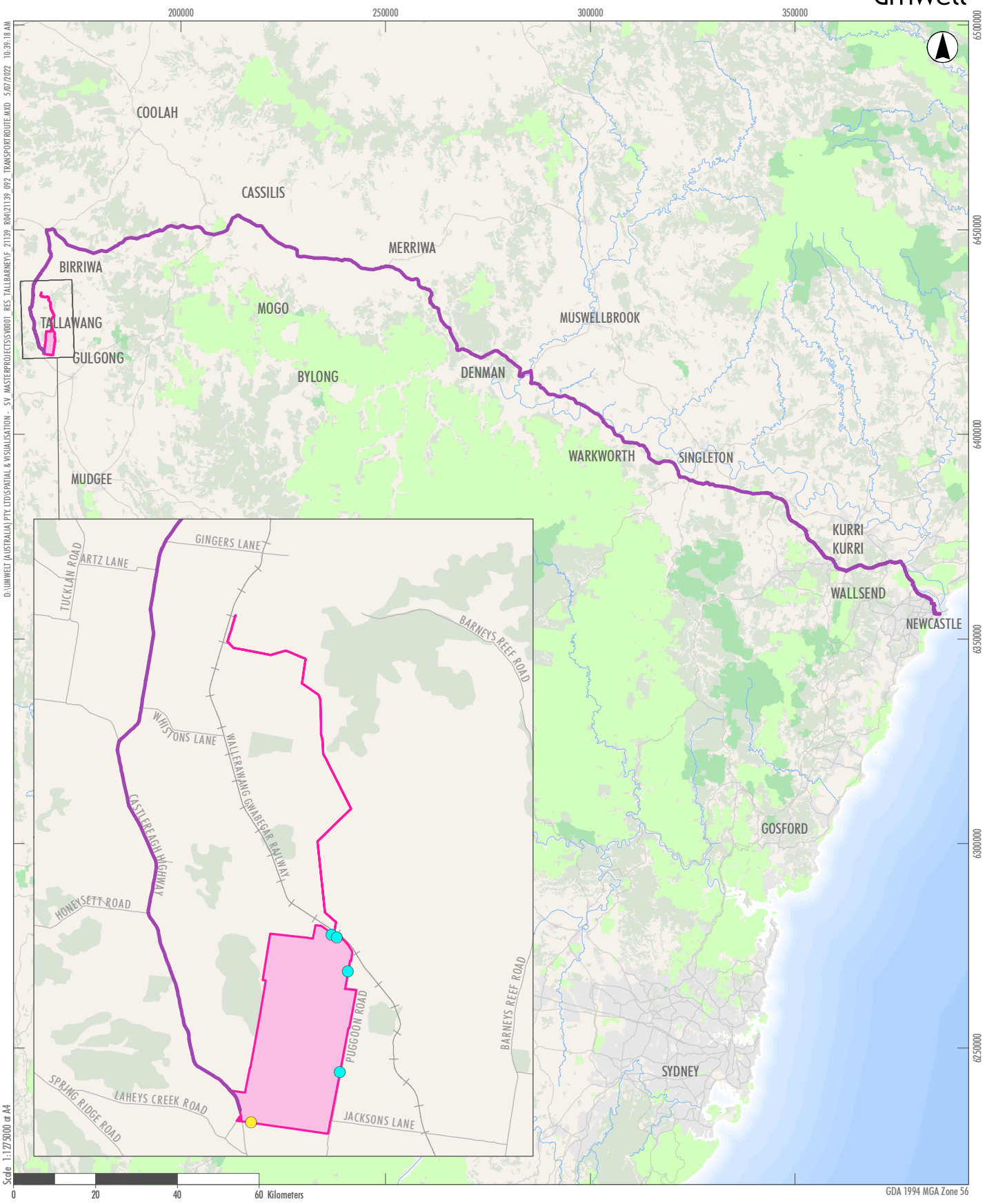


FIGURE 3.3

Typical DC-coupled Battery Storage Layout

Image Source: RES (2021)



Legend

- Tallawang Solar Farm Project Area
- Primary Project Access
- Secondary Access
- Transport Route
- National Parks (NPWS Estate)
- State Forest

FIGURE 3.4

Access and Transport Route

Image Source: Data source: Geoscience Australia; Forestry Corporation of NSW (2019); DSFI (2017); NPWS Estate (2019)

4.0 Statutory Context

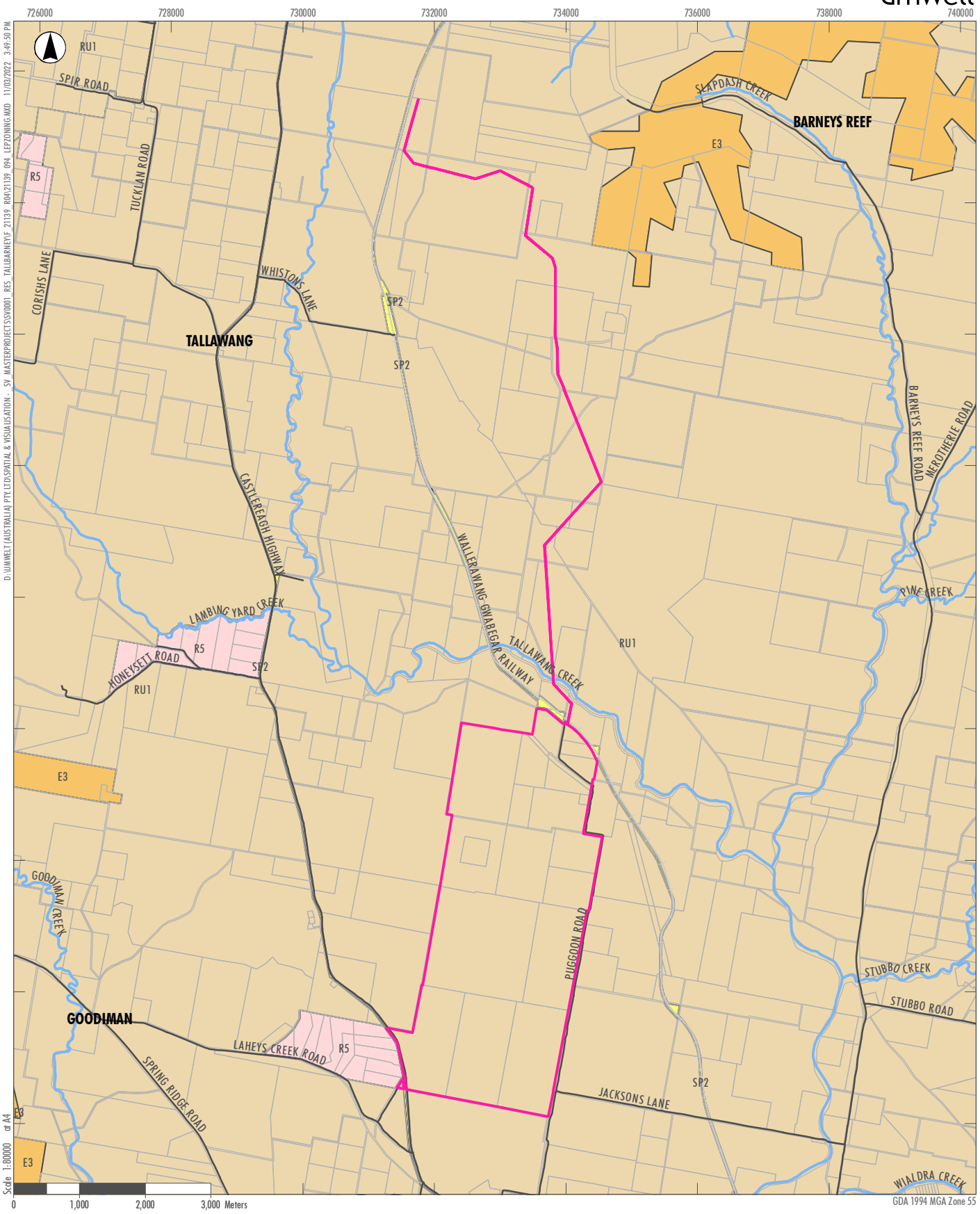
The statutory provisions applying to the Project with respect to environmental assessment and planning approval at Federal, State and local level, as well as the roles that these play in the Project's assessment and determination are outlined in **Table 4.1** below. In addition, details on the relevant 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	Section 4.36 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) provides for the declaration of a project as State Significant Development (SSD). Under the EP&A Act, the declaration of a project as SSD can be made by meeting the requirements of a SEPP or by the Minister for Planning and Public Spaces. Clause 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 Department of Planning and Environment (DPE). The consent authority will be the Minister for Planning and Homes or the Independent Planning Commission (IPC) if public objections to the Project exceed 50; any reportable political donations are made by the proponent; and/or the Local Council (Mid-Western Regional Council) object to the Project.
Permissibility	**State Environmental Planning Policy (Transport and Infrastructure) 2021** Clause 2.36(1) of the Transport and Infrastructure SEPP also provides that development for the purposes of *'electricity generating works'* (which includes battery storage) may be carried out by any person with development consent on a prescribed rural zone, which includes land zoned RU1 under a LEP. The Project, being located on land zoned as RU1 Primary Production, is therefore permissible with consent. **Mid-Western Regional Local Environmental Plan (LEP)** The Project is located within the Mid-Western Regional LGA; hence the *Mid-Western Regional Local Environmental Plan 2012* (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 2.1**. Under the 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**. No subdivision of land is proposed as part of the Project. Refer to **Appendix 5** for other relevant EPIs and how these have been considered in this EIS.
Commonwealth Approvals	***Environment Protection and Biodiversity Conservation Act 1999*** Under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), a referral is required to be submitted to the Department of Agriculture, Water and the Environment (DAWE) for any 'action' that is considered likely to have a significant impact on any Matter of National Environmental Significance (MNES). A referral has been submitted to the Commonwealth Department of Agriculture, Water, and the Environment (DAWE) on 3 March 2022. The Project was determined to be a 'controlled action' under the EPBC Act in April 2022. The controlling provision was listed threatened species and communities. The Project will be assessed under the Assessment Bilateral Agreement currently

Approval category	Discussion
	in place between the NSW and Commonwealth Governments, which allows assessment processes under the EP&A Act for certain developments, including SSD, to form the assessment for the EPBC Act to avoid duplication. Supplementary SEARs in relation to the MNES identified in the Commonwealth Minister's 'controlled action' decision were issued by the DPE on 20 June 2022. A copy of the supplementary SEARs and where these have been addressed in the EIS is included in **Appendix 1** of this EIS. A decision whether to approve the Project for the purposes of the EPBC Act will be made, based on this assessment documentation, by the Federal Minister for the Environment or their authorised delegate. **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, in July 2021 identified the Project Area is within the registered Warrabinga-Wiradjuri #7 native title claim. The location of the registered native title claim is illustrated in Figure 1.2 of the Aboriginal Cultural Heritage Assessment (AHCA) Report in **Appendix 12**. Historical title searches have confirmed that the land comprising the Solar Farm Site is freehold and that native title over those lots has been extinguished. Representatives of the claimant group have been consulted in the preparation of the EIS as outlined in **Section 6.9.1.1**. **Renewable Energy (Electricity) Act 2000** Solar energy is listed as an eligible renewable energy source under Section 17 of the *Renewable Energy (Electricity) Act.* The Project aligns with the aims of this Act, such that it will generate significant quantities of renewable energy, whilst emitting negligible greenhouse gas (GHG) emissions. The principles of Ecologically Sustainable Development have been addressed in **Section 9.2**.
Other State Approvals	**Approvals that are not required** Section 4.41 of the EP&A Act specifies authorisations which are not required for approved SSD. Those are listed below: • *Fisheries Management Act 1994* – A permit under section 201, 205 or 219. • *Heritage Act 1977* – An approval under Part 4, or an excavation permit under section 139. • *National Parks and Wildlife Act 1974* – An Aboriginal heritage impact permit under section 90. • *Rural Fires Act 1997* – A bushfire safety authority under section 100B. • *Water Management Act 2000* – 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. **Approvals that must be applied consistently** Section 4.42 of the EP&A Act requires that several approvals, if required for a SSD, cannot be refused if a development consent is granted and must be substantially consistent with the terms of any development consent granted for the development. These include • *Roads Act 1993* – A consent under section 138 for work within a public road i.e. Castlereagh Highway. Refer to **Appendix 5** for a summary of all relevant NSW statutory requirements for the Project and where these have been addressed in the EIS.

Approval category	Discussion
Pre-condition to exercise the power to grant approval	**Biodiversity Conservation Act 2016 (BC Act)** Under the BC Act, biodiversity assessment in accordance with the Biodiversity Assessment Method (BAM) is required for any SSD project. A Biodiversity Development Assessment Report (BDAR) in accordance with the BAM has been completed for the Project as discussed in **Section 6.7**. Consultation with the NSW Biodiversity, Conservation and Science (BSC) Division has also been undertaken during the preparation of the EIS, as further discussed in **Section 5.6**. **State Environmental Planning Policy (Transport and Infrastructure) 2021** Clause 2.96 of the Transport and Infrastructure SEPP provides for development involving access via level crossings and includes development that would significantly increase the total number of vehicles or number of trucks using a level crossing as a result of the development. The Project would require level crossing access at two locations on the Wallerawang Gwabegar Railway line during the construction phase. The Project would be located adjacent to an existing rail corridor, therefore clause 2.97 of the Transport and Infrastructure SEPP applies to the development application for the Project. *(2) Before determining a development application for development to which this section applies, the consent authority must—* *(a) within 7 days after the application is made, give written notice of the application to the rail authority for the rail corridor, and* *(b) take into consideration—* *(i) any response to the notice that is received within 21 days after the notice is given, and* *(ii) any guidelines that are issued by the Secretary for the purposes of this section and published in the Gazette.* *(3) Despite subsection (2), the consent authority is not required to comply with subsection (2)(a) and (b)(i) if the development application is for development on land that is in or adjacent to a rail corridor vested in or owned by ARTC or the subject of an ARTC arrangement.*
Mandatory matters for consideration	When assessing a DA for SSD, the consent authority is required to take into consideration the matters outlined in Section 4.15 of the EP&A Act. Refer to **Appendix 5** for an outline of where these matters have been addressed in this EIS.



Legend

Tallawang Solar Farm Project Area

Zoning

- E3 Environmental Management
- R5 Large Lot Residential
- RU1 Primary Production
- SP2 Infrastructure

FIGURE 4.1

LEP Zoning Map

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020), MinView (2021)

5.0 Engagement

RES recognises the importance of stakeholder engagement to the success of this Project and has been liaising with stakeholders since landholder discussions commenced in 2020. In addition to community stakeholders, ongoing consultation has been undertaken with the Mid-Western, Muswellbrook Shire and Warrumbungle Shire Council, government agencies, functional stakeholders (e.g. service providers), businesses and various non-government organisations and interest groups. This includes a comprehensive engagement process undertaken with the Aboriginal community in regard to the Project (set out in detail in **Section 5.3**). This engagement has 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.

In addition to the engagement undertaken by RES, further 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 *DPIE Social Impact Assessment Guideline for State Significant Projects* (2021) or 'the SIA Guideline', the *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021) and the SEARs.

An overview of the Stakeholder Engagement Program including the identified stakeholders, engagement undertaken, and the outcomes of the consultation process is provided below. Further detail is provided in the SIA (refer to **Appendix 6**). **Table 5.4** outlines the key issues that were raised during community engagement, how these have been responded to in the project design and how these issues have been addressed in the EIS.

5.1 Overview

A Community and Stakeholder Engagement Plan (CSEP) was developed during May 2021 in accordance with the SIA Guideline, the *Large-scale Solar Energy Guidelines for State Significant Development* (DPIE, 2018) and the *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021). The CSEP documented the objectives of engagement, identification of relevant stakeholders, as well as the community and potential issues associated with the development. 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 (**Appendix 6**).

5.2 Community Engagement

Community engagement for the Project was undertaken in a coordinated approach with the adjacent Barneys Reef Wind Farm which is also being developed by RES. This approach aimed to streamline the two projects' consultation programs and utilise a common approach to engagement, aiming to:

- Ensure the development and implementation of engagement is transparent and provides clear and consistent information on the two projects.
- Reduce social risks associated with either project, including stakeholder confusion or consultation fatigue.

- Establish and develop trust with key stakeholders.
- Afford the opportunity for meaningful participation in the assessment phases for both projects.

The outcomes of the engagement program have been used to inform various aspects of the Project and assessment including the comprehensive SIA (refer to **Section 6.2** and **Appendix 6**). A summary of the process of stakeholder engagement is outlined below, and further discussion of the key issues raised during the stakeholder engagement program is provided in **Section 5.7**.

5.2.1 Stakeholder Identification

The stakeholder identification process involved identifying stakeholders with an interest in the Project, or those directly and indirectly affected, including any potentially vulnerable or marginalised groups in the community. The identified stakeholders were grouped into three groupings according to the level of engagement needed for the Project:

- **Group 1: High priority** – stakeholders who require proactive and collaborative engagement
- **Group 2: Moderate priority** – stakeholders who require information provision and/or may be interested in the Project
- **Group 3: Low priority** – stakeholders who will be given the opportunity to participate but will not necessarily be engaged directly.

Key Group 1 and Group 2 stakeholders identified for the Project are shown in **Figure 5.1**.

Figure 5.1 Identification of Key Stakeholders

5.2.2 Consultation Activities

The engagement program was implemented in two phases, with the initial round of engagement during March to May 2021 while the Scoping Report was being developed, and the second round during September 2021 to February 2022 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 issues related to the Project issues and impacts, and during the draft environmental assessment to inform the technical studies and appropriate strategies to seek to further minimise the environment and community impacts.

Information provision and consultation activities undertaken during the stakeholder engagement program is presented in **Table 5.1**.

Table 5.1 Engagement Tools

Mechanism	Engagement type	Description
Website, community information line and email	Information Provision	Platforms and tools were established in March 2021 to provide opportunity for the broader community and members of the public to receive information on the projects and to have opportunity to make contact with the RES project team.
Local media release	Information Provision	A holding statement outlining key messages of the projects and the plans for community consultation was distributed to local media in June 2021 to target information provision for the broader community with local media adverts published in August 2021.
Project information sheets	Information Provision	Project information sheets have been distributed via mail drop and email distribution to provide updates on the projects to proximal residents and community members. No. 1 – Project introduction and overview was distributed in March 2021 No. 2 – Project update and outcomes of the scoping was distributed in August 2021 No. 3 – Project update and outcomes of impact assessment was distributed 7 February 2022
Project briefings	Consultation	Project briefing meetings with key stakeholders were held in March and April 2021, including with community, industry, and environmental groups or organisations, as well as with Local Government agencies and traditional owners.
Personal meetings or interviews	Consultation	One-on-one meetings with host landholders and neighbouring landholders took place in March and April 2021 and again between August and November 2021. These meetings were semi-structured discussions to listen to individual concerns, interests, issues, provide responses to queries, and to gather feedback on the Project, as well as to understand future engagement preferences.
Surveys	Consultation	An online and telephone survey was conducted with local businesses and service providers between August and October 2021 to identify and assess potential social issues, impacts and opportunities relating to the Project.
Community information sessions	Consultation	Two structured online information sessions were hosted in September 2021 following the issue of SEARs to provide Project information and preliminary results of technical studies, and an opportunity for members of the community to pose questions to the Project team and provide feedback. Two informal drop-in sessions at the local Dunedoo and Gulgong Shows (12 and 19 February 2022) and one online semi-structured information session (23 February 2022) were conducted to provide feedback regarding the technical assessments of the Project, as well as articulate the proposed mitigation and enhancement measures under consideration to minimise negative and enhance positive impacts of 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 5.7** and **Appendix 6**.

Table 5.2 Stakeholders consulted

Stakeholder group	Mechanism	Number contacted in Scoping phase	Number engaged in Scoping phase	Number contacted in EIS/SIA phase	Number engaged in EIS/SIA phase
Host Landholders	Written questionnaire	2	1	8	2
Proximal Landholders	Personal meeting	15	11	19	19 [3]
Traditional Owners	Project briefing	1	1	4	1
Local Government	Project briefing	2	2	4	2
Community Group	Project briefing and interview	8	4	20	28 [4]
Local Businesses and Service Providers	Personal meeting/interview	4	2	39	15
Local and Broader Community	Project information sheets [5]	1,788	-	1,774	-
Local and Broader Community	Media statement	4	2	4	3
Local and Broader Community	Online community information sessions (9 & 10 September 2021)	-	-	-	24
Local and Broader Community	Community information session – Dunedoo (12 February 2022)	-	-	-	49
Local and Broader Community	Community information session – Gulgong (19 February 2022)	-	-	-	73
Local and Broader Community	Online community information session (23 February 2022)	-	-	-	9
Local and Broader Community	Project website	-	630	-	1045
Local and Broader Community	Personal meting / interview	-	-	-	47 [6]
	Total	**1,824**	**653**	**1,868**	**1,317**

5.3 Aboriginal Community Engagement

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 6.9**.

Throughout the course of the Project consultation was undertaken with 11 Aboriginal parties who registered an interest in the Project. These are:

- Gallanggabang Aboriginal Corporation

[3] Proximal Landholders: 19 identified residences with 19 participants; some participants were from the same residence.
[4] Community groups: 14 groups engaged with 28 participants.
[5] Includes localities of Tallawang, Barneys Reef, Gulgong, Dunedoo, Goolma, Beryl, Leadville, Merotherie, Bungaba, Birrawa and Stubbo.
[6] Broader Community: 47 participants from 44 meetings undertaken; some from the same residence. Total number of broader community participants does not include media statement or project website traffic; rather only includes formal and informal statements collected via community information session feedback forms and discussions and personal meetings with residences determined to be outside of the proximal 4km radius, i.e., n=202. Note: stakeholders may have been consulted multiple times; where possible, data has been consolidated to reduce duplication.

- Corroboree Aboriginal Corporation
- AT Gomilaroi Cultural Consultancy
- Michael Long
- Murong Gialinga Aboriginal & Torres Strait Islander Corp
- Wellington Valley Wiradjuri Aboriginal Corporation (WVWAC)
- AGA Services
- Bawurra
- Cacatua General Service
- Warrabinga Native Title Claimants Aboriginal Corporation
- Mudgee Local Aboriginal Land Council (LALC).

Further discussion regarding the consultation process with the Registered Aboriginal Parties (RAPs) for the Project is included in **Section 6.9**. 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 6.2** and **Appendix 6**.

5.4 Infrastructure/Service Provider Consultation

Service providers that have infrastructure located within proximity to the Project Area, or who may provide services for the Project, have been consulted by RES during the project design and environmental assessment process. Consultation has been undertaken with these service providers so that relevant design or management issues could be identified and addressed proactively.

As detailed in **Table 5.2** and **Table 5.3**, the key service providers consulted include TransGrid, Telstra (telecommunications), ARTC, Crown Land and Transport for NSW. Further consultation will be required with these asset owners and managers as part of the detailed design and implementation phases of the Project. Water and sewer connections are not required for the Project (refer to **Section 3.0**).

The NSW Transmission Network Service Provider has been engaged by the proponent from a very early stage. The workstream of assessing the ability for the Project to connect to the future REZ transmission infrastructure, and the connection process for projects connecting to REZ infrastructure is ongoing. There is a formal process which is dictated by the NSW Government which must be followed in order to receive an offer to connect to the line. RES is continuing to engage with the NSW Government agencies responsible for the development of the CWO REZ transmission assets to ensure RES is best placed to submit its application for connection as soon as that process is available. In accordance with standard practice, final connection arrangements will be in place prior to commencement of construction.

5.5 Other Engagement

Engagement with the following stakeholders were also conducted during the development of the EIS:

- **Gulgong Aero Park** – Correspondence via emails and phone calls with the owner of the Gulgong Aero Park late October 2021 and early November 2021 to introduce the Project, discuss any concerns and provide additional information.
- **Wyaldra Airstrip** – Contact was attempted on 8 February 2022 but was unable to reach the airstrip owner.
- **Siding Spring Observatory** – Email correspondence on 8 February 2022 with project information sheet and invitation to attend online or in person community sessions planned for February. No response was received.
- **Bowdens Silver** – As the holder of the two exploration licences in the Project Area, Bowdens Silver were contacted via email correspondence in May 2021 and consultation is ongoing. Whilst almost the whole of the Project Area is subject to the Exploration Licences, Bowdens has indicated that potential areas of geological interest are located at the southern extent of the Project Area only i.e. only part of the Project Area might be affected and only if there is a viable resource. Furthermore, the area covered by the Exploration Licences is vast and the Project occupies a small proportion of the tenement area, so it would be unlikely to meaningfully impact on the overall exploration of mineral resources pursuant to the Exploration Licences. In initial correspondence Bowdens has advised that exploration in the Project Area and surrounds is a 'low priority'. Further correspondence from Bowdens in July 2022, indicated that:

  'In consultation with RES Australia Pty Ltd, Bowdens Silver is aware of the Tallawang Solar Farm development that is located on land near Gulgong. The proposed area of the Tallawang Solar Farm overlaps EL 8405 and EL 8160.

  Bowdens Silver is aware that RES intends to progress the project into the planning phase and supports the Tallawang Solar Farm development to co-exist with the mineral exploration licenses, provided that written consent under Section 31(1) of the Mining Act is provided to Bowdens Silver to conduct mineral exploration activities within the proposed site in both the planning phase of the Tallawang Solar Farm as well as throughout the project's life.

  It is submitted that there are areas of geological interest within the project's boundary that are overlapped by EL 8405 and EL 8160 which Bowdens Silver Pty intends to further explore.

  To date, Bowdens Silver has focused its main on-ground exploration activities at its proposed Bowdens Silver Project and tenements in the near vicinity. Our intention is to explore across our tenement range in the future, inclusive of EL 8405 and EL 8160, and would be pleased to cooperate with the proponents of the Tallawang Solar Farm to do this. Bowdens Silver would seek to conduct this activity prior to any approval of the Tallawang Solar Farm.'

5.6 Agency Engagement

RES has undertaken ongoing engagement with local, State and Federal government representatives throughout the planning and environmental assessment process for the Project. A summary of ongoing government consultation undertaken is provided in **Table 5.3** below.

Table 5.3 Summary of Agency Engagement during the preparation of the EIS

Agency name	Date	Purpose
DPE – Energy Assessment	6 May 2021	A scoping meeting was held to brief DPIE on the Project, including outcomes of the preliminary studies undertaken during the scoping phase and the proposed approach for further assessments during the EIS phase.
DPE – Energy Assessment	September 2021 to January 2022	Ongoing liaison with DPE via phone calls and emails to provide updates on the environmental assessment process and discuss delays to the program due to Covid-19.
DPE – Energy Assessment	17 May 2022	Meeting with DPE assessment officer to provide an update on project changes since the lodgement of the scoping report, and discussion the DPE's preliminary feedback on the draft EIS and technical reports.
DAWE	27 August 2021	Pre-referral meeting with DAWE to introduce the proponent, give a brief overview of the project, to discuss any concerns or feedback the Department may have in terms of the Project.
Mid-Western Regional Council – Planning Directorate	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Mid-Western Regional Council – Planning Directorate	Ongoing discussions during March to February 2022	Initial project briefing meeting with several project update meetings throughout the course of the planning process.
Mid-Western Regional Council – Planning Directorate	23 March 2022	Project update meeting, including a summary of the draft outcomes of the EIS process.
Transport for NSW	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Transport for NSW	6 December 2021	Project briefing meeting, to introduce proponent, provide an overview of the Project, discuss draft results from the traffic impact assessment and any questions, concerns or feedback Transport for NSW may have.
Transport for NSW	2 March 2022	Meeting to provide an update on the progress of the project and discuss access options to the site.
ARTC	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
ARTC	July to December 2021	Ongoing liaison with ARTC regarding level crossings at the Wallerawang Gwabegar Railway line. Draft agreement with design requirements received.

Agency name	Date	Purpose
TransGrid	Ongoing discussions via emails/phone calls and meetings	RES has been consulting with TransGrid regarding the location of future REZ transmission infrastructure, and the connection process for projects connecting to REZ infrastructure and would continue to consult with TransGrid throughout the EIS phase.
TransGrid	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Crown Lands	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Crown Lands	June to December 2021	Ongoing liaison with Crown Lands about the acquisition of the paper roads within the Project Area.
Fire and Rescue NSW	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Fire and Rescue NSW	18 November 2021	Project briefing meeting, to introduce proponent, provide an overview of the project, discuss the bushfire and hazards, present draft results and discuss any questions, concerns or feedback FRNSW may have.
BCD	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
BCD	18 March 2022	Letter describing the processes of mapping Category 1 and Category 2 land within the Tallawang Solar Farm Project Area and outlining the methodology used for the Category 1 mapping.
BCD	May to June 2022	Ongoing discussions with BCD assessment officer via email and telephone regarding the methodology used to assess and map Category 1 land, the Assessment of Serious and Irreversible Impacts (SAII) including the interaction with SAII and Category 1 land and the proposed scheduling of a site inspection.
BCD	10 June 2022	A site visit was conducted with representatives from RES, BCS, and Umwelt. Land mapped as Category 1 – Exempt Land, remnant woodland and derived native grassland were inspected and the biodiversity assessment process for the Project was discussed.
DPE Water	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
EPA	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
Heritage NSW	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
DPI Agriculture	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.

Agency name	Date	Purpose
DPI Agriculture	30 November 2021	Project briefing meeting, to introduce proponent, provide an overview of the project, discuss the soils and Land Use Conflict Risk Assessment (LUCRA) approach, present draft results and discuss any questions, concerns or feedback DPI Agriculture may have.
MEG	2 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
DPE Hazards	4 November 2021	Letter providing Project update, summary of draft outcomes of the EIS process, with offer for a meeting and requesting feedback into EIS development.
DPE Hazards	22 November 2021	Project briefing meeting, to introduce proponent, provide an overview of the project, discuss the hazards assessment methodology and inputs / assumptions built into the hazards model, present draft results and discuss any questions, concerns or feedback DPIE Hazards may have.
Upper Hunter Shire Council	4 November 2021	Letter introducing the Project and Barneys Reef Wind Farm project, with offer for a meeting and requesting feedback into EIS development.
Muswellbrook Shire Council	4 November 2021	Letter introducing the Project and Barneys Reef wind farm project, with offer for a meeting and requesting feedback into EIS development.
Muswellbrook Shire Council	12 January 2022	Project briefing meeting to discuss both the Tallawang Solar Farm and Barneys Reef Wind Farm projects, introduce the proponent, and discuss any questions, concerns or feedback Council may have. At this meeting concerns were raised from Council regarding the transport and traffic related issues along the transport route via the Muswellbrook Shire LGA.
Energy Co	Ongoing	Discussions to understand the nature of the REZ and the alignment of RES's proposed connection infrastructure to the potential location of REZ infrastructure.
Heritage NSW	5 and 8 August 2022	Telephone discussion and follow up letter providing background information to inform consultation with Heritage NSW regarding feedback received from registered Aboriginal Parties (RAPs) on the draft Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Project. A copy of the letter to Heritage NSW is included in the ACHAR provided in **Appendix 12**.

5.7 Key Community Issues

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.

Table 5.4 summarises the key community issues raised during the engagement process, how these have been responded to during the EIS phase and where these have been addressed in the EIS.

Table 5.4 Key community and landholder issues

Category	Issue	Response / Assessment outcome	Where addressed in the EIS
Changes to community surroundings	Industrialisation of the landscape, reducing the natural amenity and rural character of the area.	The Project design incorporates a 500 m setback from the Castlereagh Highway and a 10 m setback around the perimeter of the solar farm site to reduce the Project's visibility from the highway and surrounding road network. In addition, targeted landscaping is proposed to reduce the impacts to key viewpoint locations assessed to have a moderate visual impact.	**Section 6.5**
Changes to community surroundings	Production of glare.	Solar panels are designed to absorb as much solar energy as possible and are known to reflect less than 3% of the sunlight falling upon them. Consequently, PV solar farms are known to produce less glare than other natural and man-made features. Furthermore, the Project is not located within the approach of a runway or within an airport's licenced boundary. Aerodrome operators within 15km of the Project have been consulted as part of the Project's community engagement. In addition, targeted landscaping is proposed to reduce impacts to key viewpoint locations where landscaping will additionally mitigate the potential for glare. As a result, it unlikely that the Project would present a risk in terms of glare.	**Section 6.11**
Changes to community surroundings	Noise and dust amenity impacts.	Noise and dust mitigation measures will be implemented throughout the construction of the Project to minimise noise and dust generation. Minimal noise and air emissions will occur during operations.	**Sections 6.12 and 6.15**
Changes to community surroundings	Displacement of locally important flora and fauna and intersecting of wildlife corridors.	The social impact of loss of biodiversity values associated with the natural environment due to the Project's impact on environmental ecosystems is addressed as far as practicable by Project design and mitigation measures to reduce biodiversity impacts. As outlined in **Section 6.7**, the site selection and refinement of the Project layout has minimised impacts on natural habitat and native vegetation.	**Section 6.7**

Category	Issue	Response / Assessment outcome	Where addressed in the EIS
Changes to community surroundings	Conflicting land use changes.	A Construction Environmental Management Plan (CEMP) will be implemented to manage construction related impacts that would results in land use conflicts such as noise, dust, damage of local roads, visual impacts, erosion and sediment runoff and surface water impacts. Once construction has been completed, there would be an opportunity to offer a dual purpose for the Project Area, allowing the area to be grazed by livestock (sheep). The management of impacts to livestock and agricultural practices will be detailed in an Operational Environmental Management Plan (OEMP) in line with the Agrisolar Guide (2021). The OEMP will be developed in consultation with the host landholders and DPI Agriculture (as required) and implemented post construction. Extensive consultation with host landholders and neighbouring residences have been undertaken and will continue throughout the various stages of the Project. RES is committed to develop and implement Host Landholder Agreements and a Neighbours Benefit Program outlined in **Section 2.4**, to minimise the impact of the Project on landholder activities and surrounding land use.	**Section 6.5**
Changes to community surroundings	Infrastructure disposal and environmental rehabilitation at the end of Project life.	Once the Project reaches the end of its operational life, the Project would either be upgraded (pending any additional approval requirements) or decommissioned. Decommissioning would involve removing all above ground project infrastructure and returning the development footprint to its pre-existing land use, or another land use in consultation with the landholders, as far as practicable. RES or its contractors will seek to recycle all dismantled and decommissioned infrastructure and equipment, where feasible. Structures and equipment that cannot be recycled would be disposed of at an approved waste management facility in accordance with waste guidelines relevant at the time of decommissioning. Buildings and site features with ongoing value to agriculture, e.g. the warehouse, will be retained in consultation with the landowner and in accordance with an additional approval requirements. As outlined in Section 6.15, a Waste Management Plan will be developed and implemented for the Project to manage the waste generated by the Project.	**Section 6.14**
Changes to community surroundings	Water use and sourcing.	The total water demand for the Project would be in the order of 206 ML for the 34-month construction period. Water supply through a local commercial supplier has been confirmed for the Project. Should any farm dams or licensed groundwater bores be needed for water supply, this will be done in consultation with landholders and be subject to availability. A water sourcing strategy will be developed so that water used during the construction phase does not cause and undue impact to adjacent landowners or other stakeholders.	**Section 6.8**

Category	Issue	Response / Assessment outcome	Where addressed in the EIS
Changes to community surroundings	Increase in traffic volumes and associated noise and road safety.	Key traffic impacts occur during the construction phase of the Project. The traffic assessment identified that the majority of the Project's transport route has sufficient spare capacity to accommodate the additional traffic generated by the Project and would remain operating at high levels of service. Intersection performance of the intersections in the vicinity of the Project Area are also anticipated to be insignificantly impacted by the addition of the Project's traffic generation. Disruptions to road infrastructure and traffic concerns (including safety issues) will be mitigated and managed through the implementation of a Construction Traffic Management Plan (CTMP). Further measures to reduce traffic impacts that are being considered include the implementation of a shuttle bus service/s to transport workforce to site each day in order to reduce number of vehicles on local roads. RES will continue to engage with relevant Council's and the local community to share information and generate awareness about construction activities and potential periods of disruption, including a responsive and easy-to-access community complaints line.	**Section 6.6**
Changes to community surroundings	Cumulative impacts of other nearby projects, particularly increase in traffic on local roads.	See **Section 6.17** for a detailed discussion of cumulative impacts.	**Section 6.16**
Local livelihoods	Decrease in tourism opportunities.	RES is committed to develop and implement a Community Shared Benefit Strategy in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects and across the broader CWO REZ.	**Section 6.3 and 6.4**
Local livelihoods	Population change due to the influx of construction workforce.	RES will develop and implement an Accommodation, Employment and Procurement Strategy (or equivalent) before construction commences in collaboration with local Council and stakeholders. This strategy will consider targeted initiatives to appropriately manage workforce during construction period in collaboration with local stakeholders to manage social changes caused by the incoming population.	**Section 6.3**
Local livelihoods	Local employment and training.	Multi-stakeholder liaison will form part of the development of this strategy to obtain widespread integration and prioritisation of social acceptance across various projects and to jointly develop or contribute to local benefit scheme across planning and delivery of the REZ.	**Section 6.3**
Local livelihoods	Effect on rural property values.	A Community Shared Benefit Strategy will be developed and implemented to target initiatives to those most affected by the Project or living nearest to the Project Open and proactive engagement with nearby residents will continue to ensure understanding of Project impacts on a case-by-case basis.	**Section 6.3**

Category	Issue	Response / Assessment outcome	Where addressed in the EIS
Decision making systems	Community participation and information provision.	Community Engagement Strategy to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development Open and proactive engagement with nearby residents to ensure understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly.	**Section 5.0 and 6.3**
Decision making systems	Stakeholder identification.	As outlined in **Section 5.0**, RES has extensively engaged with stakeholders and the community since landholder discussions commenced in 2019. In addition to community stakeholders, ongoing consultation has been undertaken with Council's (Mid-Western, Muswellbrook Shire and Warrumbungle Shire Council), government agencies, functional stakeholders (e.g. service providers), businesses and various non-government organisations and interest groups. RES is committed to continue to engage with the community throughout the construction, operation and decommissioning phases of the Project.	**Section 5.0**
Decision making systems	Stakeholders do not have enough power in the decision-making process.	Engagement undertaken throughout the design of the Project as detailed in Section 5.0 has been open and transparent. RES is committed to continue to openly and proactively engage with neighbouring landholders to ensure understanding of Project impacts on a case-by-case basis and target the Neighbours Benefit Program accordingly. RES will continue to work with key stakeholders in developing the Community Shared Benefit Strategy to ensure targeting of investment to local priorities.	**Section 6.3 and 6.4**
Accessibility	Pressure on short-term accommodation and existing housing markets	RES will develop and implement an Accommodation, Employment and Procurement Strategy (or equivalent) in collaboration with local Council and stakeholders. RES is also committed to develop and implement a Community Shared Benefit Strategy to target initiatives to those most affected by the Project or living nearest to the Project. Open and proactive engagement with nearby residents will continue throughout the various phases of the Project to enable understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly.	**Section 6.3 and 6.4**

Category	Issue	Response / Assessment outcome	Where addressed in the EIS
Health and Wellbeing	Increased levels of stress and anxiety due to fear for unknown, uncertainty of impacts and feeling of losing control over the future and local surroundings.	The proposed Community Engagement Strategy would involve consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development. The Community Engagement Strategy will include information provision and awareness creation on the actual impacts of electrical infrastructure on human health. RES will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices (refer to **Section 6.14**). The design of the Project includes a 10 m Asset Protection Zone around the perimeter of the solar farm for managing bushfire risks. Additional access points are proposed to support livestock movement and emergency access during the operation of the Project. RES has consulted with and will continue to consult with Fire and Rescue NSW. RES will continue to work with neighbouring residences in developing the Community Shared Benefit Strategy to ensure targeting of investment to local priorities.	**Section 6.3** **Section 6.14**
Culture	Need for traditional owner organisations and Aboriginal parties to be involved.	The Aboriginal community has been engaged during the EIS phase as outlined in **Sections 5.2** and **5.3**. The Community Shared Benefit Strategy will proactively target the interests and needs of local Aboriginal community.	**Sections 6.3 and 6.9**
Culture	Protection of sites of Aboriginal cultural significance.	The Project design has considered Aboriginal cultural values and heritage sites within the Project Area to avoid any disturbance to these areas. The Community Shared Benefit Strategy will proactively target the interests and needs of local Aboriginal community.	**Section 6.9**

5.8 Ongoing Engagement

RES will continue to engage with the community throughout the construction, operation and decommissioning phases of the Project. Engagement activities would include:

- regular updates to the project website (http://www.tallawang-renewableenergy.com/)
- distribution of information sheets, fact sheets and/or FAQs to the local community
- letter box drops
- operation of the community enquiry line
- operation of a complaints line and recording in complaints register
- the project email address and hotline will remain in place, and RES representatives will continue to take responsibility for addressing feedback and concerns as and when they arise.

6.0 Assessment and Mitigation 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 environmental and strategic context for the locality (refer **Sections 1.0** and **2.0**)
- the SEARs, dated 26 November 2021, and supporting Agency advice issued for the Project (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 **Sections 6.3 to 6.16**).

The stakeholder engagement and Social Impact Assessment (SIA) processes undertaken for the Project (refer to **Section 5.2** and **Appendix 6**) identified the issues which stakeholders considered to be the key issues for the Project that require assessment as part of the EIS. The highest-ranking stakeholder issues (based on number of responses) and where they are addressed in the EIS are:

- social amenity and impacts to the community (refer to **Section 6.3**)
- economic contribution, including employment (refer to **Section 6.4**)
- land resources and land use (refer to **Section 6.5**)
- traffic and transport (refer to **Section 6.6**)
- biodiversity (refer to **Section 6.7**)
- water resources (refer to **Section 6.8**)
- Aboriginal and non-Aboriginal heritage (refer to **Sections 6.9 and 6.10** respectively)
- visual amenity (refer to **Section 6.11**)
- noise (refer to **Section 6.12**)
- hazard, risk and bushfire (refer to **Section 6.13**)
- waste management (refer to **Section 6.14**)
- air quality (refer to **Section 6.15**)

- cumulative impacts (refer to **Section 6.16**).

Further details of the issues raised by stakeholders are outlined in **Section 6.3** and **Appendix 6**.

6.2 Preliminary Environmental Risk Assessment

A preliminary environmental risk analysis was undertaken for the Project to identify the key issues requiring detailed assessment to 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?
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 DPIE guidelines. A detailed SIA was undertaken for the Project and is provided in full in **Appendix 6**, with the assessment results and social management and monitoring measures summarised in **Section 6.3**.	Yes, refer to **Section 6.3** **Appendix 6**
Economic Impacts	The Project has the potential to result in both positive and negative economic impacts due to the implementation of community and neighbour benefit programs, employment generation and use of services and the potential demand on the workforce and services in the region that might already be constrained. 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 6.4** The full report is provided as **Appendix 7**.	Yes, refer to **Section 6.4** **Appendix 7**
Soil and Land	The soil types within the Project Area are classified as Solodic Soils and Euchrozems (DPIE 2020) with low to moderate fertility and moderate to high erodibility. A detailed Soil, Land and Agriculture Impact Assessment was undertaken for the Project with the results relative to soil and land summarised in **Section 6.5**. The full report is provided in **Appendix 8**.	Yes, refer to **Section 6.5** **Appendix 8**
Agriculture and Land Use	Agriculture (primarily sheep grazing with some cattle grazing and dryland cropping) is the primary land use in the Mid-Western Regional Local Government Area (LGA). Land within and surrounding the Project Area is associated with historic agricultural land uses and is predominantly utilised for grazing activities with some dryland cropping. The Project has the potential to interact with surrounding land uses and impact on agricultural productivity for the area. An assessment of impacts on agricultural activities (including a Land Use Conflict Risk Assessment (LUCRA)) has been undertaken as part of the Soil, Land and Agriculture Impact Assessment and is summarised in **Section 6.5**. The full report is included in **Appendix 8**.	Yes, refer to **Section 6.5** **Appendix 8**

Aspect	Preliminary Environmental Assessment	Detailed Assessment Required?
Traffic and Transport	The Project will have primary access a newly proposed access point on the southwest corner of the Project Area from the Castlereagh Highway. 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 Port of Newcastle along the Golden Highway to the Castlereagh Highway. 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 9** with the outcomes of the assessment summarised in **Section 6.6**.	Yes, refer to **Section 6.6** **Appendix 9**
Biodiversity	The Project would result in direct impacts on biodiversity values to approximately 30.93 ha of native vegetation, including the loss of vegetation and fauna habitat due to Project establishment and construction activities. The Project Area generally contains a low abundance of important habitat features such as fallen logs and hollow-bearing trees, due to the majority of the Project Area being historically cleared and remaining subject to active agricultural use. A Biodiversity Development Assessment Report (BDAR) was completed in accordance with the Biodiversity Assessment Method (BAM). The key outcomes of the BDAR are summarised in **Section 6.7** with the full report available in **Appendix 10**.	Yes, refer to **Section 6.7** **Appendix 10**
Water Resources	The Project Area is located within the Macquarie-Bogan Rivers System, in the lower catchment of Tallawang Creek. There are a number of unnamed first and second order streams that traverse the Project Area. Watercourses in the northern portion of the Project Area discharge to Tallawang Creek (north of the solar farm site), and the southern watercourses discharge to Wialdra Creek (to the south of the Project Area). Several farm dams and drainage lines are also located in the Project Area. Groundwater at the Project Area is managed under the *Water Sharing Plan NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011* (Lachlan Fold Belt Murray Darling Basin (Lachlan Fold Belt MDB) Groundwater Source) (DPIE, 2012). A comprehensive water resources impact assessment was undertaken to assess the potential impacts of the Project on water resources in the vicinity of the Project Area. The full report is provided in **Appendix 11** with a summary of the assessment provided in **Section 6.8**.	Yes, refer to **Section 6.8** **Appendix 11**
Aboriginal Cultural Heritage	The Project Area is located within the traditional homelands of the Wiradjuri people, as well as being within the Native Title registered claim of the Warrabinga Native Title Claimants Aboriginal Corporation and the Mudgee Local Aboriginal Land Council (Mudgee LALC) boundary. 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. Outcomes of the ACHA as well as consultation with RAPs are summarised in **Section 6.9** with the full ACHA report (ACHAR) in **Appendix 12**.	Yes, refer to **Section 6.9** **Appendix 12**

Aspect	Preliminary Environmental Assessment	Detailed Assessment Required?
Historic heritage	The nearest listed heritage items to the Project Area are the Gulgong Railway Bridge and 'The Lagoon' residential property, which are approximate 6.4 km and 6.1 km away respectively. However, two potential heritage items within the Project Area have been identified and assessed as meeting the threshold for local heritage significance. These are a c.1900 weatherboard cottage (PHI1) and c.1870s hut (PHI2). A Historic Heritage Assessment was completed for the Project to assess the potential impact to these items and the listed items in accordance with the guidelines set out in the *NSW Heritage Manual 1996*. The outcomes of the HHA are summarised in **Section 6.10** with the report available in **Appendix 13**.	Yes, refer to **Section 6.10** **Appendix 13**
Visual	The Project Area is located within a rural setting with the predominant visual characteristics of the landscape being open undulating pastures; scattered trees; vegetated higher surrounding slopes; rural dwellings; dams, rural post-and-wire fencing; and unsealed access roads. The Project Area has an elevated, grassed hilltop which is prominent and visible from some viewpoints up to 10 km away. A Visual Impact Assessment (VIA) was undertaken for the Project which included a field assessment where 35 private viewpoints (VPs) and 8 public VPs within the study area for the VIA were identified that would potentially view some part of the Project. The key outcomes of the VIA are summarised in **Section 6.11** with the full report provided in **Appendix 14**.	Yes, refer to **Section 6.11** **Appendix 14**
Noise and Vibration	Potential noise impacts associated with the Project will be primarily associated with construction activities and will have the potential to affect rural properties located within the vicinity of the Project Area. The Noise and Vibration Assessment (NVA) undertaken for the Project is included in **Appendix 15** with a summary of the assessment provided in **Section 6.12.**	Yes, refer to **Section 6.12** **Appendix 15**
Hazard and Risk	In accordance with the SEARs, a preliminary hazard assessment (PHA) has been completed for the Project in accordance with *State Environment Planning Policy 33 – Hazardous and Offensive Development* (SEPP 33) and is included in **Appendix 16**, with a summary of the results in **Section 6.13.1**. In addition, a review and consideration of electromagnetic fields (EMFs) is provided in **Section 6.13.2** with a bush fire threat assessment in **Section 6.13.3**.	Yes, refer to **Section 6.13** **Appendix 16**
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. As outlined in **Section 6.14**, waste will be managed in accordance with a Waste Management Plan to be implemented as part of the CEMP to manage waste during construction.	No, refer to **Section 6.15**
Air Quality	Emissions to air as a result of the Project would include dust generation and exhaust emissions during construction and demolition activities. A desktop review of potential air quality impacts associated with the construction, operation and decommissioning of the Project has been undertaken, with the results summarised in **Section 6.15**. **Section 6.15.3** outlines the measures to manage and minimise air quality impacts.	No, refer to **Section 6.15**
Cumulative Impacts	The Project is located within a REZ and there are currently 32 renewable energy projects (existing, approved and proposed) within the region, including the proposed CWO-REZ Transmission Infrastructure Project and three operational open cut coal mines located between 25 km and 35 km to the southeast. The potential cumulative impacts of these developments and the Project were assessed as discussed in **Section 6.16**.	Yes, refer to **Section 6.16**

6.3 Social Amenity

The SEARs require the EIS to include an 'assessment of the social and economic impacts in accordance with Social Impact Assessment Guideline (DPIE, July 2021) (subject to transitional arrangements) and benefits of the project for the region and the State as a whole, including consideration of any increase in demand for community infrastructure services, assessment of impact on agricultural resources and agricultural production on the site and region'. The Social Impact Assessment (SIA) has been prepared by Umwelt, in line with the key principles and processes outlined in the NSW Government's Social Impact Assessment Guideline for State Significant Projects (SIA Guideline) (2021) to address the SEARs in combination with the Economic Assessment discussed in **Section 6.4**. The SIA further took consideration of the Undertaking Engagement Guidelines for State Significant Projects (2021) and the NSW Large Scale Solar Energy Guidelines 2018.

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

Potential social amenity impacts were identified as the most frequently raised issue of concern for the community during consultation undertaken by the RES. In particular, community members expressed concerns regarding the Project's potential impacts to the aesthetic and social values of the rural landscape. Impacts on personal livelihoods were also raised, with many stakeholders noting the potential positive impacts of employment generation and a boost to the local economy that the Project may provide.

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

The outcomes of the SIA are summarised in **Section 5.0** as well as in the following sections with the full SIA report contained in **Appendix 6**. Cumulative social impacts are further discussed in **Section 6.16**.

6.3.1 Methodology

As illustrated in **Figure 6.1**, and consistent with the SIA guideline, the SIA process involved three key phases. Full details regarding the SIA methodology are provided in **Appendix 6.**

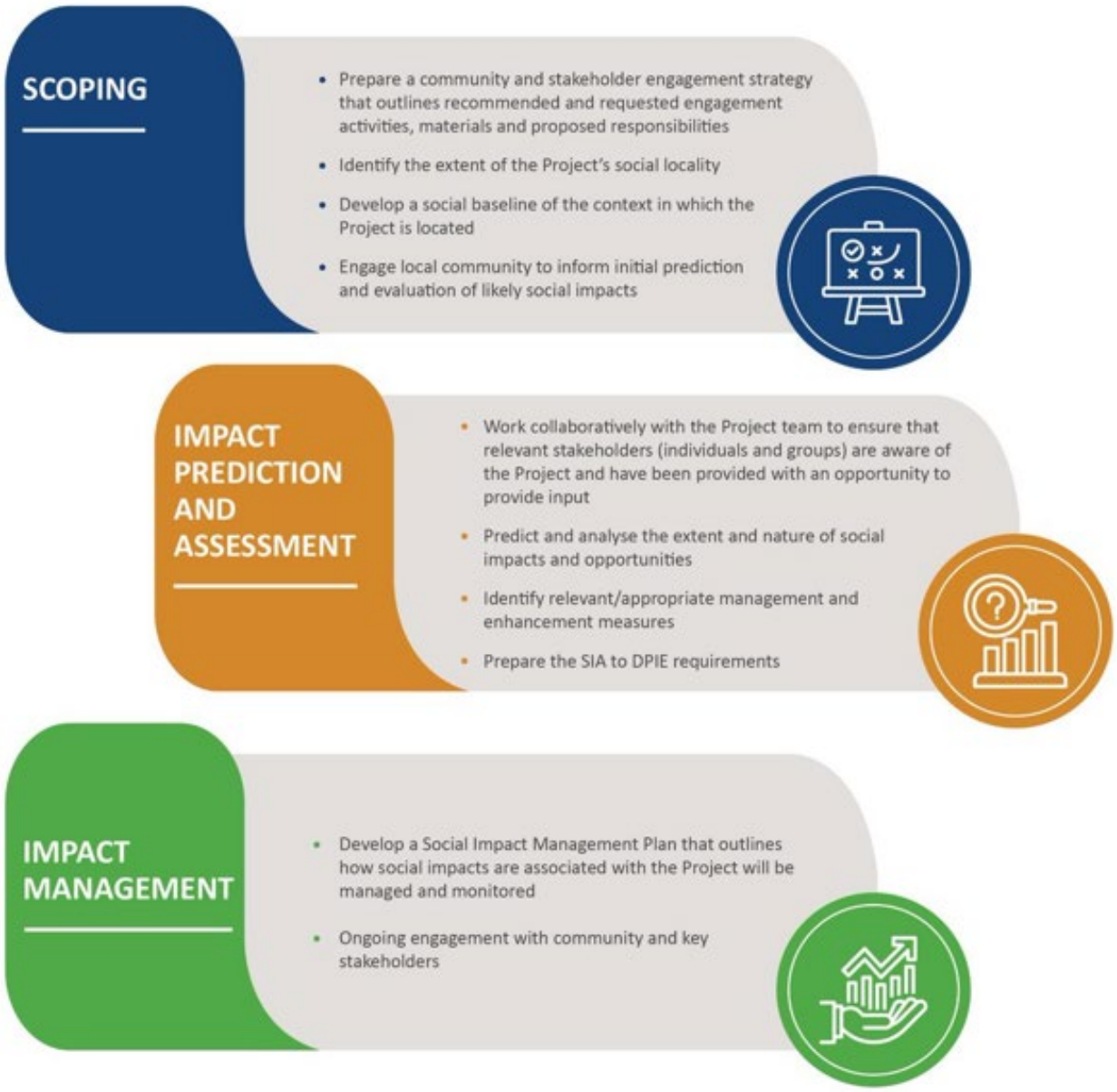


Figure 6.1 SIA Program Phases

6.3.2 Social Baseline

The Project's 'area of social influence' (or social impact assessment study area) comprises the Mid-Western Regional LGA (as host LGA) and Warrumbungle Shire LGA (as neighbouring LGA). Rural localities within these LGAs include Tallawang, Beryl, Mebul, Dunedoo, Birriwa, Stubbo, Gulgong and Merotherie.

Agriculture is the main land use across the Mid-Western Regional LGA, with smaller areas of forestry, mining, and conservation with primary agricultural industries being wool (worth $28.4 million), cereal crops (worth $27.4 million), and cattle and calves (worth $16.3 million). Key agricultural pursuits in the Warrumbungle Shire LGA are similar, with cattle and calves the largest industry ($46.2 million) followed by cereal crops ($23.5 million) and wool ($16.9 million).

The Mid-Western Regional LGA has a population of 25,158 (ABS, 2016) with the Warrumbungle LGA population being 9,187 (ABS, 2016). Both LGAs have a higher proportion of Aboriginal and Torres Strait Islander residents than the NSW average (Mid-Western Regional LGA 5%, Warrumbungle Shire LGA 10%, compared to 3% in NSW). The locality of Mebul has a significantly higher Aboriginal and Torres Strait Islander population (18%), whilst Tallawang and Merotherie recorded no Aboriginal-identifying residents within the population.

The majority of the population are family households, with very little presence of group households and less than a third of each community being lone person households. However, the number of lone person households is increasing whilst the number of family households is decreasing.

The median weekly household income across both LGAs has increased since 2006, however remains below the NSW average.

Social infrastructure, particularly the provision of health care, is a key challenge for the region. The town of Gulgong has been reliant on telehealth services since June 2020. The Mudgee Health Services (General Hospital) is the largest in the Mid-Western Regional LGA, providing acute care and general medicine.

Health care challenges within both LGAs are heightened for the vulnerable communities who may need to travel for access to health care but may not have the funds or infrastructure to do so. Additionally, the projected future demand of health services is recognised as an ongoing challenge within the region.

Key populations groups within the LGAs that are potentially vulnerable in regard to the Project include regular users of short-stay accommodation or tenants within the private rental market, the elderly, young people, local job seekers, Aboriginal and Torres Strait Islander residents.

The Project is located within the traditional lands of the Wiradjuri nation with the traditional lands of the Wailwan and Kamilaroi nations to the north and northwest. The Project is also within the Mudgee Local Aboriginal Land Council area.

The proportion of the labour force employed full-time in both LGAs has decreased since 2006. The unemployment rate has also decreased in both LGAs since 2006 but remains above the NSW average (6.5% in Mid-Western Regional LGA and 7.9% in Warrumbungle LGA, compared to 6.3% for NSW). The percentage of part-time workers is increasing within both LGAs, which likely reflective of the ageing population.

The cost of living within the area of the social influence is lower than the NSW average, with median monthly mortgage repayments in all localities being lower than the State average, with the exception of Tallawang.

6.3.3 Assessment of Social Impacts

Table 6.2 provides a summary of the significance of the Project's social impacts, following implementation of the proposed management and enhancement strategies detailed in **Section 6.3.4**. Positive and negative social impacts are differentiated in shades of blue and orange, respectively.

Further detail in relation to the issues raised and relevant perceived social impacts is provided in the SIA included in **Appendix 6**. It is important to note that unlike in the context of other technical studies undertaken to inform this EIS, there are no thresholds in the social space with the identification of possible consequences largely due to making a qualitative assessment. Therefore, the social risk assessment is also

informed by the socio-economic baseline data, outcomes of literature reviews and experiences with other projects, outcomes of consultation that reflect the felt or lived experiences of consulted stakeholders and findings of technical studies.

An important component of the SIA has been the integration of technical results with the risk ranking of a Project factor or impact as identified by consulted stakeholders i.e. the sensitivity/susceptibility/ vulnerability of people to adverse changes caused by the impact and/or the importance placed on the relevant social matter. Consequently, stakeholder ratings of risk were determined by assessing impacts identified through the consultation process. The resulting ranking (i.e. low, moderate and high) is determined by the frequency that an issue was raised by a particular stakeholder group in the engagement process. These views have been presented in **Table 6.2** as stakeholder perceived significance.

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

Table 6.2 Evaluation of Social Impacts

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
Way of Life Surroundings Community	Project establishment	Project development to effect community environmental values causing change over time in how people experience their surrounds	Construction and operational phases	Neighbouring landholders and residents Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community	H[9]	H	Explore options and formulate plans for future land use post-decommissioning Work with affected parties in development of Community Shared Benefit Strategy to ensure targeting of investment to local priorities Avoidance (as far as practicable) of higher environmental value areas within the Project Area. Adoption of mitigation measures, e.g. targeted vegetation screening and setbacks from public roads, to address potential impacts.	M

[7] Level of concern or interest from the perspective of the affected party: L = Low; M = Medium; H = High; VH = Very High
[8] Significance rating (L: Low, M: Medium, H: High, VH: Very High) ; P: indicates Positive Impact.
[9] Positive and negative impacts are differentiated in shades of blue and orange, respectively

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
Way of Life Surroundings Community Livelihoods	Project establishment	Cumulative reduction in agricultural production due to multiple project developments could reduce levels of social acceptance of the Project and alter people's attachment to place and sense of belonging	Construction and operational phases	Neighbouring landholders and residents Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers	H	M	Formulate plans for agri-solar initiatives (dual land uses such as sheep grazing under the solar panels) ahead of Project operations in consultation with host and neighbouring landholders Collaboration and coordination with local stakeholders including other developers, local and state government, community groups and service providers in responding to community issues relating to REZ establishment Consultation with DPI Agriculture ongoing throughout Project establishment	L
Livelihoods	Project establishment and operations	Income generation received by host landholders may provide dual sources of income, bringing about improved outcomes for household income and resilience	Construction and operational phases	Host landholders	L	M	Community Shared Benefit Strategy (including a Neighbour Benefit Program and Community Enhancement Program) to target initiatives to those most affected by the Project or living nearest to the Project	L
Livelihoods Accessibility	Construction of transmission	Potential fragmentation of properties	Construction and	Host and neighbouring landholders to transmission line	L	L	Open and proactive engagement with nearby residents to ensure	L

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
	line and switching station	and/or restricted access to sections of properties could cause personal disadvantage	operational phases	infrastructure and switching station			understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly.	
Surroundings Way of Life	Project establishment	Project's role in the energy transition could contribute to improved social wellbeing outcomes over time for the wider population	Operational phase	Community and Environmental Groups Broader community Population of NSW	H	VH	Community Shared Benefit Strategy to target community needs and priorities	VH
Surroundings Way of Life Community	Project construction and establishment of infrastructure	Visual changes to the rural landscape character may affect people's way of life and their sense of place	Construction and operational phases	Neighbouring landholders and residents	H	H	Targeted vegetation screening to be planned in collaboration with affected residents Project refinements and layout changes to be considered from perspective of those residential properties most sensitively affected by changes to the landscape such as layout buffers and setback from public roads	M
Surroundings Way of Life Health and Wellbeing	Production of noise and dust from construction activities	Increase in construction-generated noise and dust could cause disturbance and	Construction Phase	Neighbouring landholders and residents	L	M	Construction management plan to embed standard work hours, as well as noise and dust suppressant measures where feasible	L

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
		annoyance for nearby residents, affecting community or personal wellbeing					Open and proactive communication with nearby residents to share information and generate awareness about construction activities and potential periods of disruption, including a responsive and easy-to-access community grievance mechanism Setback and buffers of Project infrastructure from public roads	
Surroundings Way of Life Health and Wellbeing	Project construction	Construction-related traffic could cause an increase in personal disturbance caused by noise, a deterioration in road conditions, greater travel times, and heightened road safety risks, particularly when considered cumulatively with other major projects with overlapping	Construction phase	Neighbouring landholders and residents Broader Community	M	H	Traffic Management Plan to consider residents likely to experience direct effects, including vulnerable groups such as school children. Project to consider shuttle bus services to transport workforce to site each day in order to reduce number of vehicles on local roads. Coordination with Council, other nearby projects and other stakeholders to contribute to road improvement programs and jointly manage changes in road conditions caused by the Project such as through road improvements and upgrades to intersections at access point.	M

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
		construction activities					Open and proactive communication with nearby residents to share information and generate awareness about construction activities and potential periods of disruption, including a responsive and easy-to-access community grievance mechanism.	
Livelihoods Way of Life	Project construction	Project construction to contribute to increase in commercial activity for local communities and townships, increasing service capacity, economic, social and human capital for local communities	Construction phase	Special Interest Groups Broader Community Local Businesses and Service Providers Local Government	VH	H	Accommodation, Employment and Procurement Strategy to be developed prior to construction in consultation with local stakeholders and to target capacity-building and job-ready training	VH

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
Livelihoods Way of Life	Project establishment and operations	Community investment initiatives to improve social outcomes for beneficiaries and local communities	Operational phase	Neighbouring landholders and residents Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers Local Government	H	H	Ensure that Community Shared Benefit Strategy is designed and developed in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects and across the broader REZ	VH
Way of Life Community Accessibility	Construction workforce influx	Project construction will cause a temporary rise in the population which could cause an increase in pressure on local services and infrastructure and change the composition or character of the community	Construction Phase	Neighbouring landholders and residents Broader Community Local Businesses and Service Providers	H	H	Accommodation, Employment and Procurement Strategy to be in place pre-construction and to be developed in collaboration with local Council and stakeholders	M

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
Livelihoods	Project establishment	Project establishment could affect rural property valuation trends and the ability for private property owners to buy or sell, particularly when considered cumulatively with adjacent proposed projects	Construction and Operational Phases	Neighbouring landholders and residents	M	M	Community Shared Benefit Strategy to target initiatives to those most affected by the Project or living nearest to the Project Open and proactive engagement with nearby residents to ensure understanding of Project impacts on a case-by-case basis and target Neighbours Benefit Program accordingly	L
Livelihoods	Project Construction	Employment generation through the Project's construction can improve personal livelihoods and broader community's human and economic capital over time	Construction Phase	Special Interest Groups Broader Community Local Businesses and Service Providers Local Government	VH	H	Accommodation, Employment and Procurement Strategy to include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as through training, up-skilling and capacity building supports, in collaboration with local stakeholders and training providers, to improve job-readiness in the pre-construction phase of the Project	VH
Decision Making Systems	Project determination	Level of community acceptance of	Construction and	Neighbouring landholders and residents	H	M	Community Engagement Strategy to include consistent, transparent and proactive	L

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
	and establishment	the Project could decrease if community consultation is reduced following Project determination	operational phases	Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers			information provision and consultation with stakeholders throughout Project development	
Accessibility	Construction workforce influx	Incoming Project construction workforce accommodated locally providing economic stimulus to service providers	Construction phase	Local Businesses and Service Providers	H	H	Accommodation, Employment and Procurement Strategy to be developed in consultation with local providers and other stakeholders ahead of the construction phase commencing Community Shared Benefit Strategy to consider legacy initiatives targeting local housing provision	VH
Accessibility	Construction workforce influx	Incoming Project construction workforce may cause strain on accommodation and community services in local towns, affecting accessibility and affordability for other user groups and potentially	Construction phase	Neighbouring landholders and residents Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers Visitors / Tourists	H	H	Accommodation, Employment and Procurement Strategy to be developed in consultation with local providers and other stakeholders ahead of the construction phase commencing	M

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
		effect usability for other industry sectors of tourism and mining Cumulative impact?						
Health and Wellbeing	Project establishment	Project development may increase stress and anxiety for proximal residents who feel uncertain about their futures and changes to their way of life	Construction and operational phase	Neighbouring landholders and residents	M	M	Community Engagement Strategy to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development	L
Health and Wellbeing **Livelihoods** **Surroundings**	Project construction and establishment	Physical health and safety effects on proximal residents due to the increased risk of fire and perceived health consequences of living near to electrical infrastructure may contribute to people's	Construction and operational phase	Neighbouring landholders and residents Aboriginal Stakeholders Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers	M	L	Emergency Management Plan to be communicated to proximal residents Community Engagement Strategy to include information provision and awareness creation on the actual impacts of electrical infrastructure on human health Inclusion of 10 Asset Protection Zone around the perimeter of the solar farm	L

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
		stress and anxiety or reduce levels of community acceptance of the Project					Consultation with Fire and Rescue NSW	
Culture and Heritage	Project establishment and construction	Project construction and operation may disturb important Aboriginal artefacts and sites.	Construction and operation phase	Aboriginal Stakeholders	L	M	Protection of Aboriginal cultural values and heritage sites within and surrounding the Project Area to ensure ongoing cultural awareness and connection to Country for Aboriginal people Community Shared Benefit Strategy to proactively target interests and needs of local Aboriginal community	L
Culture and Heritage	Project establishment and construction	Disruption to buildings of local heritage significance, including a c.1900s weatherboard cottage and c.1870s hut	Construction and operation phase	Broader Community	L	M	Implementation of set backs and exclusion zones around the heritage buildings, management of construction activities to ensure equipment with high vibration rating are not used within exclusion zones, implementation of an unexpected heritage finds protocol as part of environmental management policies for the Project.	L
Community Livelihoods	Project establishment and construction	Historical connection to Gulgong and surrounding	Construction and operational phases	Neighbouring landholders and residents	M	M	Community Shared Benefit Strategy to consider proactive partnerships with local tourism providers and development of	L

Social impact category	Project aspect	Social impact description	Duration	Extent/affected parties	Perceived significance[7]	Significance rating[8]	Mitigation or enhancement	Residual significance
		localities could affect ongoing tourism trade and connection to place for residents		Special Interest Groups Community and Environmental Groups Broader Community Local Businesses and Service Providers Visitors / Tourists			tourism opportunities that the Project could generate or contribute to for the broader community Coordinated efforts with stakeholders across the REZ to support sustainable development of industry in co-existence with other key sectors	
Community	Project establishment	Incoming construction workforce may decrease levels of community cohesion in townships and alter local relations, with multiple concurrent and nearby major projects potentially causing greater levels of community division	Construction and operational phases	Broader community Special interest groups Neighbouring landholders and residents	M	M	Accommodation, Employment and Procurement Strategy to consider targeted initiatives to appropriately manage workforce during construction period in collaboration with local stakeholders to manage social changes caused by the incoming population Multi-stakeholder liaison to ensure widespread integration and prioritisation of social acceptance across various projects and to jointly develop or contribute to local benefit scheme across planning and delivery of the REZ.	L

6.3.4 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 and a range of management measures developed for the Project, these include:

- Designing the Project to seek to avoid and minimise impacts on environmental values and the surrounding community where practicable – multiple design changes have been made to reduce impacts including through consideration of the findings of detailed environmental studies and stakeholder feedback. In summary this included a 500 m set back from Castlereagh Highway to minimise visual impact, relocating the transmission line corridor to the east to be further away from residential dwellings and the Castlereagh Highway, amending the layout to avoid impacts to Potential Archaeological Deposits (PADs) identified on site during the Aboriginal Cultural Heritage surveys.
- A range of social mitigation and management measures outlined in detail in the SIA (refer to **Appendix 6**), including:
    - A Social Impact Management Plan (SIMP) will be prepared for the Project to management and enhance social impacts through each stage of the Project.
    - A Community Engagement Strategy will be prepared for the Project to include consistent, transparent and proactive information provision and consultation with stakeholders throughout Project development.
    - An Accommodation, Employment and Procurement Strategy (AEPS) will be developed in collaboration with local Councils and stakeholders. The AEPS will include targeted and proactive initiatives to maximise local employment and sourcing from local communities such as training, up-skilling and capacity building support, in collaboration with local stakeholders and training providers.
    - A Community Shared Benefit Strategy will be designed and developed in consultation with local stakeholders to target investment to local needs and priorities and cognisant of activities/efforts of adjacent projects and across the broader REZ. The strategy will include:
        - A Neighbour's Benefit Program, focussed on delivering benefits to the Project's closest neighbours and those most directly affected by Project activities.
        - A dedicated Community Enhancement Program, focussed on support and funding of broader community initiatives or programs at the local and regional level.

6.4 Economic

An Economic Assessment was completed by Ethos Urban for the Project in accordance with the SEARs and the *NSW Large Scale Solar Energy Guidelines 2018* to address the economic benefits and impacts associated with the Project. During the stakeholder engagement program, community responses regarding the economic impacts of the Project most frequently identified positive economic impacts, particularly relating to the provision of clean energy and employment/procurement (refer to **Section 5.7**).

However, community concerns raised in relation to negative economic impacts included:

- competing land use and displacement of agricultural production
- economic sustainability of surrounding towns within neighbouring LGAs
- decrease in tourism opportunities
- changes to availability and/or accessibility of community infrastructure and services.

These impacts and economic related concerns are addressed in the Economic Assessment, including the proposed management measures developed to address any potential impact. The results are summarised below, with further detail provided in **Appendix 7**.

6.4.1 Methodology

The Economic Assessment 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 Economic Assessment are provided in **Appendix 7**.

The Economic Assessment study area was defined in terms of the boundaries of the following Local Government Areas (LGAs):

- Mid-Western Regional Council, which is the LGA in which the Project is located
- Warrumbungle Shire Council
- Dubbo Regional Council.

The Economic Assessment includes the following summary of the Study Area:

- The population of the Study Area is projected to increase from 88,250 (in 2019) to 92,434 by 2036. This is an expected growth rate of about 0.3% per annum (p.a.) (or +246 persons p.a. over 17 years), compared to the Regional New South Wales growth rate of 0.5% p.a. While this level of growth is comparatively low, it is noted that Dubbo Regional Council is projected to experience an average population growth rate (+0.5%) similar to Regional NSW to 2036. As such, there has been a strong focus from the NSW Government to develop the Central West and Orana region into 'the most diverse regional economy in NSW with a vibrant network of centres leveraging the opportunities of being at the heart of NSW' (NSW Government, 2016). The projected decline in the population numbers for the Warrumbungle LGA highlights the need for local investment projects which provide new employment opportunities for residents and alternative income streams for local farmers.
- The Study Area generally has a lower unemployment rate (4% in June 2020) compared to the NSW average (6% in June 2020). ABS Census data for 2016 shows 34.6% of employed residents in the Study Area were occupied in activities generally associated with the types of skills required for the construction of a solar farm (e.g., technicians and trades workers, machinery operators and drivers, and labourers). The Study Area's representation in these occupations is well above the State average of 27.9%, indicating a generally suitable occupational base present in the region. In total, approximately 12,050 workers in the Study Area are occupied in construction-related activities.

- The Study Area has a mix of accommodation including motels, hotels, guest houses, caravan/holiday parks (including cabins). The majority of the accommodation options are located in Dubbo and Mudgee. Housing and private accommodation is provided through leasing of holiday homes and investment properties, either privately (including Airbnb), or through real estate agents. Warrumbungle and Mid-Western Regional LGAs have a significant share of unoccupied properties (760 and 1,660 properties respectively), which is likely related to the large number of holiday homes available in these LGAs due to tourism. Approximately 650 private short-term rentals were advertised within the Study Area on Airbnb and Vrbo Rentals during October 2021. These active rentals have an average of 2.6 bedrooms per rental.

6.4.2 Assessment of Economic Impacts

The net economic outcomes presented in the EIA are summaries in **Table 6.3**.

Table 6.3 Net Economic Outcomes

Factor	Positive or Negative Community Outcome	Value
Temporary loss of agricultural land (35 years)	Negative	Approximately 866 ha
Loss of employment (includes direct and indirect jobs)	Negative	0
Capital investment	Positive	+$ 742,8 million
Study Area investment (including wage stimulus)	Positive	+$ 111.4 million (assuming 15% of total investment)
Construction employment (direct plus indirect jobs)	Positive	700 FTE total jobs (over 34 months), including – study area jobs: • 190 FTE direct on-site • 85 FTE indirect off-site **Total: 275 FTE study area jobs**
Operational employment (direct and indirect jobs)	Positive	27 FTE total jobs (for 35 years), including – study area jobs: • 7 FTE direct on-site • 4 FTE indirect off-site **Total: 11 FTE study area jobs**
Operational Study Area Economic Stimulus (Total net local economic stimulus (host landowner returns, Community Shared Benefit Strategy payments, operational wage stimulus, Community Benefit Fund payments, increased Council land tax returns)	Positive	+$ 196.2 million (over 35 years)
Total Study Area Economic Benefits (Construction and Operational Phases)	Positive	+$ 307.6 million

Overall, the Project will involve approximately $743 million in investment and have the capacity to supply sufficient clean energy to power the equivalent of approximately 330,000 homes per annum, which represents approximately 7.5 times of the total annual residential requirements of the Study Area (43,300 dwellings). Further discussion of the key positive and negative community economic outcomes reported in the EIA are briefly discussed further below. Full details regarding the economic outcomes are provided in **Appendix 7**.

6.4.2.1 Direct and Indirect Economic Benefits

The Project represents a total investment of $743 million (rounded) and 270 FTE direct construction jobs generated over the construction period (34 months) with approximately seven FTE direct jobs during operation (35 years). In addition, the Project is estimated to generate an additional 430 FTE indirect jobs over the construction period (34 months).

Further to this, the direct Study Area (on-site) employment requirement for the Project is estimated to be approximately 190 FTE jobs (70% of the construction workforce) with a further 85 FTE jobs supported indirectly in the Study Area (off-site). The 275 FTE direct and indirect Study Area jobs represents only 2.3% of the Study Area's labour force occupied in construction-related activities (12,050 workers). Many of the indirect jobs will be supported in non-construction sectors (e.g., services sector). Generally, this workforce requirement should not present a constraint to labour supply for the Project; however, cumulative impacts of competing renewable infrastructure projects have been considered and are discussed further in **Section 6.16**.

As a result, the Project will diversify and strengthen the Mid-Western Regional LGA's economic base and benefit local businesses through direct expenditure and employment, as well as indirect benefits such as employee expenditure locally and use of local services and suppliers over the life of the Project (up to 37 years).

The Project will also contribute to the diversification of the energy sector in regional NSW and diversify the income stream of the host landholders.

To further enhance the economic benefits and resolve any potential conflicts that may be experienced as a result of the Project, the management and mitigation measures proposed in **Section 6.4.3** would be implemented as part of the Project.

6.4.2.2 Workforce Impacts

The occupational structure within the Study Area shows there is a good mix of services and skills available in the region, especially in Mudgee and Dubbo. It is expected that these centres are well positioned to provide the services and secure contracts during the construction of the Project.

It was assumed that 20% of indirect jobs or 200 jobs (rounded) would be supported by the Project in the Study Area, recognising the relative proximity of the major supply chains in Dubbo and Mudgee.

RES commits to honouring the Clean Energy Council's *Best Practice Charter for renewable energy developments and associated transmission infrastructure*. RES will support the local economy by providing local employment and procurement opportunities wherever possible. Once appointed, the Engineering Procurement Construction (EPC) contractor will organise contractors, suppliers and hire people in line with these local procurement commitments.

Management and mitigation measures proposed in **Section 6.4.3** would further enhance the economic benefits to result from the increase in employment opportunities as a result of the Project.

6.4.2.3 Impacts on Accommodation

It is estimated that 175 non-local employees would need accommodation during the Project's peak construction period (up to 6 months). These will include general managers, project managers and supervising engineers with varying contract lengths. This highlights the need for a range of accommodation types including higher-end options for professional staff on longer contracts, to convenient low-cost options for those on short-term contracts.

The Study Area has a capacity of approximately 1,930 rooms and cabins in commercial accommodation in locations within a 70-minute drive of the Project Area. Assuming each employee requires individual accommodation (175 rooms), 9% of this accommodation stock would be required at peak times to service the Project if all workers chose this type of accommodation. This requirement is likely to be much lower as many workers are likely to choose to be accommodated in caravan/holiday parks (powered sites), B&Bs, shared private rentals (e.g., holiday homes, Airbnb) or stay with family or friends (where possible) rather than in commercial accommodation. Additionally, other workers may share motel rooms/cabins etc to reduce personal costs. In October 2021 there were 650 private short-term rentals available in the Study Area, potentially yielding 1690 rooms; while an additional 4,540 unoccupied dwellings are recorded in the Study Area, some of which may be released to the market to support the Project.

Based on the above, it is considered that there is adequate capacity within the Study Area to accommodate the number of non-local employees expected at the peak of the construction period, even allowing for increased demand from other regional infrastructure projects and seasonal demands (holiday periods, agricultural activities etc) as further discussed in **Section 6.16**. Importantly, the influx of these workers will support higher occupancy rates and revenues for local accommodation operators, particularly during off-peak periods.

With the implementation of proposed management and mitigation measures detailed in **Section 6.4.3**, the Project is not expected to create conflicts or result in negative impacts in terms of available accommodation in the Study Area.

6.4.2.4 Agricultural Impacts

The Project allows for ongoing agricultural activity through continued use of the Project Area for sheep grazing, preventing fragmentation of agricultural land in the region. Impacts to agriculture have been considered in the Soil, Land and Agriculture Assessment provided in **Appendix 8** and addressed in further detail in **Section 6.5**.

Furthermore, no loss of employment associated with the existing agricultural land use of the Project Area is anticipated as a result of the Project, either directly (on-site) or through the supply chain, as the agricultural use of the host properties would continue.

6.4.2.5 Impacts on Tourism

In the long term, the Project may provide opportunities to attract new visitors to the area to view the facility and to be involved in educational and environmental activities. It is also noted that there are a number of existing and/or approved or planned large scale renewable energy projects in the broader

region, stimulated by developer interest in the Central-West Orana REZ, which may provide opportunities for linked tours to these facilities.

Benefits of attracting new visitors to the area in the long term include increased and more sustained expenditures on accommodation, food and beverage, fuel, retail, entertainment etc, all of which will support businesses and employment, especially in nearby townships such as Gulgong and Mudgee.

6.4.2.6 Ongoing Economic Stimulus

Landowners and the local community

Host landowners would benefit directly as a result of the Project and would be provided with an opportunity to diversity their income stream, while still being able to continue with sheep grazing on their land.

The local community would also benefit through a community benefit share fund that will be developed and implemented prior to construction commencing. Community projects needing funding will be identified and prioritised based on potential project impacts and in collaboration with representatives of the local community and Mid-Western Regional Council.

Land Tax Revenue to Council

Change in land use to facilitate the development of the Project will result in an increase in annual land tax revenue to Council, when compared with existing uses and land taxes. The amount payable will be subject to discussions between the Proponent and the Mid-Western Regional Council. However, based on observations from similar large scale solar farm developments in NSW, the net increase in annual revenue to Council is likely to be approximately $600,000 in Year 1 of operations.

Local Wage Stimulus

The Project will support 11 FTE jobs in the Study Area (direct and indirect). These jobs will provide an estimated stimulus within the Study Area of approximately $540,000 in Year 1 of operations.

Total Operational Stimulus

In summary, the total economic stimulus associated with the operation of the Project is estimated at approximately $196.2 million (over 35 years, CPI adjusted) relating to landowner returns, operational wage stimulus, community/neighbour benefit scheme and net land tax revenue to Council.

National Grid Supply Benefits

With an operational capacity of 500 MW, the Project has the potential to provide sufficient renewable energy to support the annual electricity needs of the equivalent of approximately 330,000 NSW households.

6.4.3 Management and Mitigation Measures

In order to manage potential cumulative impacts and maximise benefits to the local and regional economy and communities, the EIA includes the following mitigation measures:

- Prior to the commencement of construction, RES will prepare an Accommodation, Procurement and Employment Strategy in consultation with the Mid-Western Regional Council and relevant stakeholders. This strategy would include:
    - measures to ensure there is sufficient accommodation for the workforce associated with the construction phase of the Project
    - measures to address any specific cumulative impacts arising associated with other State significant development projects in the area
    - measures 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.
- RES has committed to develop and implement a Community Shared Benefit Strategy in collaboration with representatives of the local community and Mid-Western Regional Council. In addition, a Community Enhancement Program will be available to the wider community.

6.5 Land Resources and Land Use

A detailed Soil, Land and Agriculture Assessment has been prepared by Umwelt to address the SEARs requirements relating to land, as presented in **Appendix 1**. During the stakeholder engagement programme, community concerns regarding land use conflicts and impacts to agriculture were raised. The full report is provided in **Appendix 8** with the outcomes of the assessment summarised below.

6.5.1 Methodology

Broadly the assessment involved:

- Desktop review of regional mapping accessed using the NSW Government eSPADE information system and SEED web-based portals to assess soil and landscape baseline data relevant to the Project Area.
- A soil survey, including field sampling and in-situ soils classification, was conducted during August 2021 in reference to the *Australian Soil and Land Survey Field Handbook* (2009) and *The Australian Soil Classification* (Isbell, 2016). Samples were taken from twelve sampling locations shown in **Figure 6.2**. The survey included collection of GPS recordings and photographs of soil sampling sites and profiles, and slope and landforms of the sites, as shown in **Appendix 8**. Samples were submitted to the NATA accredited (No. 14960) Environmental Analysis Laboratory (EAL) for laboratory analysis.
- Land and Soil Capability (LSC) assessment was conducted in accordance with *The Land and Soil Capability Assessment Scheme; Second approximation* (DPIE, 2012) (the LSC Guideline) 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.

- Biophysical Strategic Agricultural Land (BSAL) verification assessment to verify the regional mapping of the identified BSAL area. This involved sampling from three sites (Sites 3, 5 and 7 shown on **Figure 6.2**) within the BSAL area, and for the remainder of the Project Area. The assessment was conducted in reference to the flow chart from the *Interim protocol for site verification and mapping of biophysical strategic agricultural land* (BSAL Guidelines – DPIE 2013).

- A Land Use Conflict Risk Assessment (LUCRA) was prepared in accordance with the *Land Use Conflict Risk Assessment Guide* (2011) fact sheet provided by the NSW DPI. The LUCRA is provided in Appendix D of the Soils, Land and Agriculture Assessment provided as **Appendix 8** of this EIS.

- Consultation with neighbouring landholders were undertaken as part of the LUCRA. In addition, a meeting was held with the Department of Primary Industry (DPI) – Agriculture on 30 November 2021 to introduce the Project and present the draft outcomes of the LUCRA.

Full details of the assessment approach and methodology are provided in **Appendix 8**.

6.5.2 Results Discussion

6.5.2.1 Survey Results

The following predominant soil types were identified within the Project Area following survey:

- Chromosols have a strong texture contrast between A and B horizons. There is a clear or abrupt textural B horizon in which the upper portion of the horizon (0.2m) is not strongly acid or sodic and can include vertic properties. These soils are the most commonly encountered soils under agricultural use in Australia.

- Sodosol are soils with strong texture contrast between A horizons and sodic B horizons which are not strongly acid and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2m thick) is sodic, that being soils with an Exchangeable Sodium Percentage (ESP) >6 %).

The locations of the identified soil types are shown in **Figure 6.3**. Physical soils descriptions and photographs of each sampling site and soil profile are provided in **Appendix 8.**

6.5.2.2 Laboratory Analysis

Laboratory analyses indicate:

- Soil Acidity and Salinity – Laboratory analysis determined that topsoil collected at the sampling sites was 'strongly acidic' to 'slightly acidic', and 'non-saline'. The subsoil ranged from 'moderately acidic' to 'moderately alkaline', and 'non-saline' to 'slightly saline. No acid sulfate soils were identified.

- Soil Erosion – A presence of sodic and slightly to moderately dispersive soils within the Project Area were identified. The results indicate that the soils have potential to erode.

- Soil Fertility – The results from both topsoil and subsoil analysis identified soils with low Effective Cation Exchange Capacity (ECEC), which indicates that the soils have a low resistance to changes in soil chemistry caused by land uses, particularly agriculture. Subsoil at all sites contained 'extremely low' levels of Colwell Phosphorus, indicating the natural / background level of plant available Phosphorus in the soils is 'extremely low' without ameliorants.

- Soil Compaction – Potential clay pans and compaction issues were identified that are likely associated with the long-term use of the Project Area for agriculture production.

6.5.2.3 Land and Soil Capability Assessment

The results of the LSC assessment, illustrated on **Figure 6.4,** indicate:

- The majority of sampling sites (11 of 12 sites) were classified as Class 4 land. Additionally, Sites 5 and 6 were considered as Class 4 as the chemical fertility status at these two sites is considered to be poor based on low Cation Exchange Capacity (CEC) and low Cowell P levels, and anecdotal evidence from the landholder of erosion and this are not being suitable for cropping. Cowell P levels are high in topsoil at Site 5 due to recent phosphorous fertilizer application, but extremely low in subsoils at >100 mm depth, indicating naturally occurring levels are low or depleted.

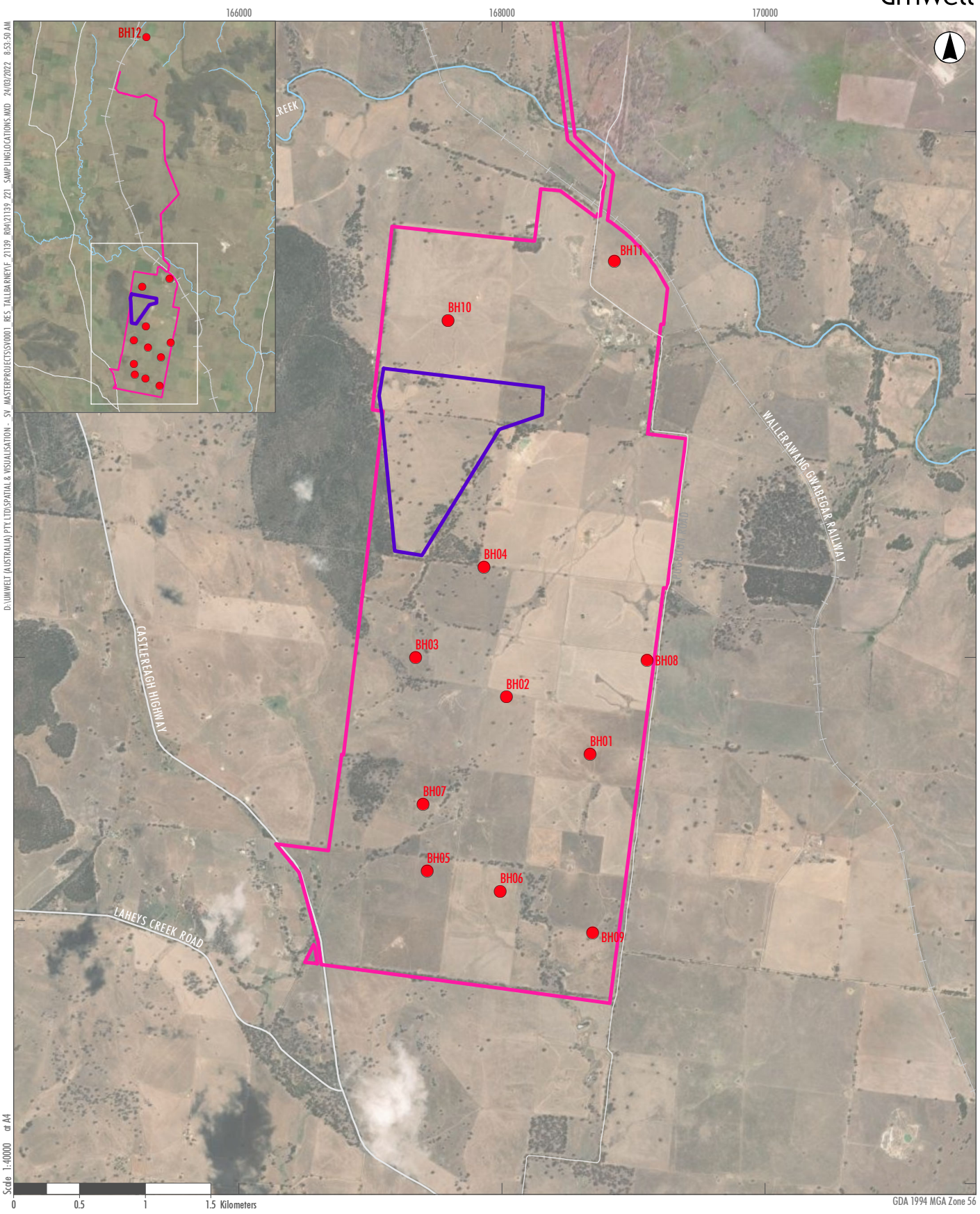
- One site (Site 3) was classified as Class 6 land. Additionally, areas within the Project containing rocky outcrops were not assessed, however, would meet the classification of Class 6 Land.

6.5.2.4 BSAL Verification Assessment Results

The assessment found that the mapped BSAL areas were verified as non-BSAL.

- Site 3 was verified non-BSAL due to the following:
    - Presence of >30% rocky outcrops
    - Distinct mottling above 750mm bgl (indicator of water logging of subsoil when wet), and
    - Low soil fertility and sodic soils:
        - laboratory analysis confirmed (extremely low plant available Colwell P and sodicity)
        - Identified as a Mottled-Subnatric Sodic Eutrophic Yellow Sodosol which has an inherently moderately low fertility.
- Sites 5 and 7 were verified as non-BSAL due to the following:
    - Low soil fertility – although being identified as a Mesotrophic Yellow Chromosol which has inherently a moderate to high soil fertility (BSAL Guidelines), laboratory analysis confirmed low soil fertility as shown by the low ECEC and Cowell P of soils at these sites.
    - A physical barrier to effective rooting depth was identified – a high gravel content within the soil profile and refusal of the hand auger in the clay stratum at 500mm bgl (Site 5 only), with the likely encounter of a clay pan. Both sites included mottling in the B2 horizon, evidence of water logging.

All remaining sites, those not mapped as BSAL, were verified as non-BSAL, predominately due to poor soil fertility, waterlogging (evidenced by mottling/gleying), and some sites being sodic soils.



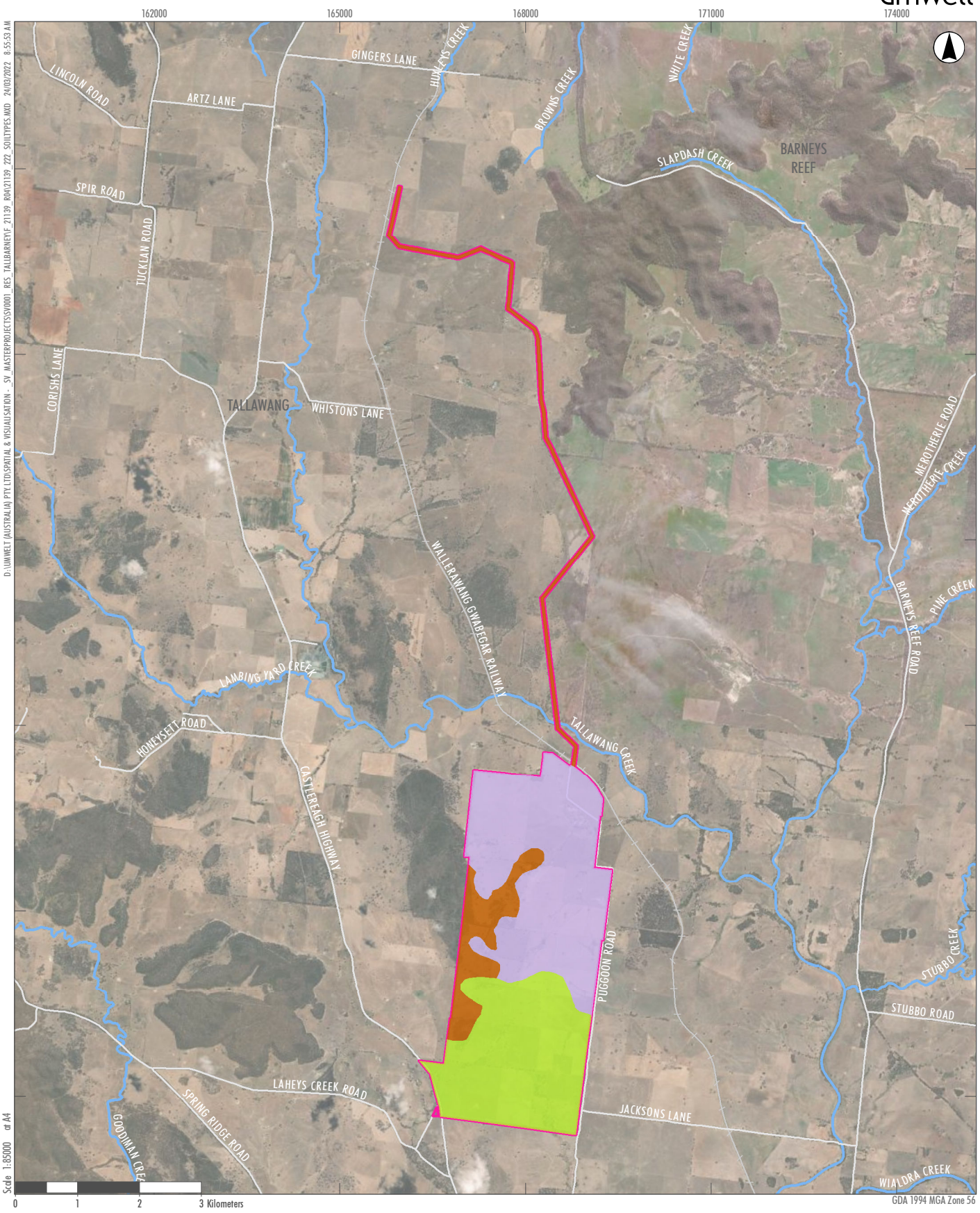
Legend

- Tallawang Solar Farm Project Area
- Inaccessible Area
- Sampling Locations
- Road
- Railway Line
- Watercourse

FIGURE 6.2

Soil Sampling Sites

Image Source: ESRI Basemap (2021) Data source: NSW DPIE (2020), Umwelt (2021)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

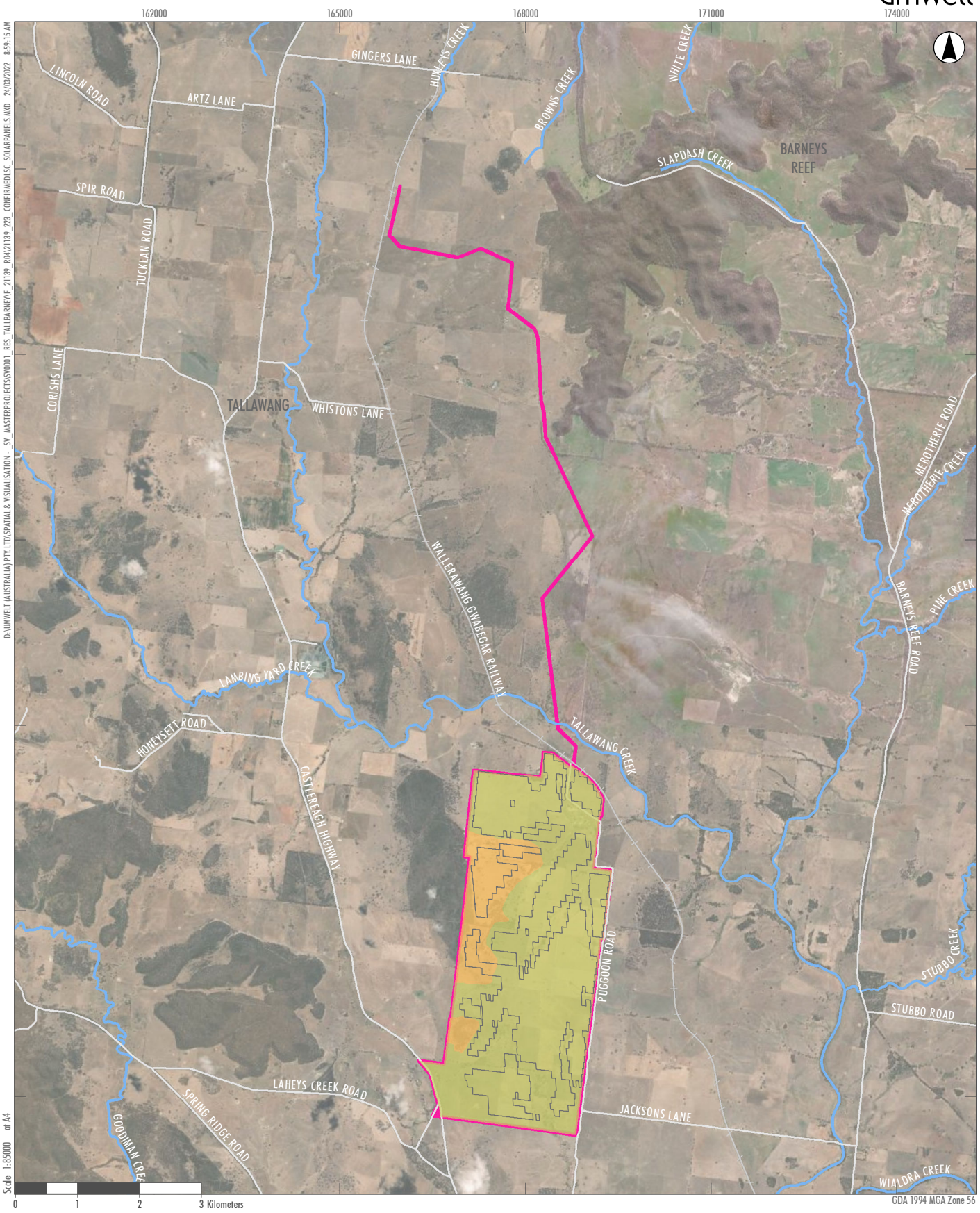
Soil Type

- Chromosol
- Sodosol
- Unknown - Not Assessed

FIGURE 6.3

Identified Soil Types

Image Source: ESRI Basemap (2021) Data source: Umwelt (2021)



Legend

- Tallawang Solar Farm Project Area
- Solar Farm Panel Layout
- Road
- Railway
- Watercourse

Land and Soil Capability

- 4
- 6

FIGURE 6.4

Confirmed Land and Soil Capability

Image Source: ESRI Basemap (2021) Data source: Umwelt (2021)

6.5.3 Assessment of Impacts

6.5.3.1 Loss of Agricultural Land

The Project proposes to lease up to 1,370 ha of mostly poor to moderate agricultural land from host landowners for up to 38 years (allowing for a 34-month construction period and 35-year operational life). During that period the current land use of the Project Area would change from agriculture to a dual use being electricity generation and agriculture (grazing only).

Once construction has been completed, the Project would afford landholders the opportunity to continue to utilize their properties to be grazed by livestock, in particular sheep, allowing for a dual purpose for the Project Area. This has the potential to result in a number of agricultural benefits as identified in the *Australian Guide to Agrisolar for Large-Scale Solar, for proponents and farmers* (Agrisolar Guide 2021). The Agrisolar Guide 2021 highlighted at least 13 large-scale solar farms that have successfully included sheep grazing (identified as 'solar grazing') in Australia in 2020 and identified a number of successfully trialled positive benefits include:

- Sheep help control vegetation growth within the Project Area, reducing the need for slashing or spraying, which will reduce grass fire risks in the area.
- Maintenance costs are reduced as result of vegetation being controlled by sheep.
- Animal welfare conditions are improved, with:
    - the solar panels providing shade and protection from strong winds for sheep resulting in higher quality wool
    - safety from predators is enhanced by the installation of secure boundary fencing
    - cover provided by the panels improves safety from wedge-tailed eagles.

The Agrisolar Guide 2021 provides a number of recommendations to ensure land sharing success, these recommendations will be incorporated into the OEMP to be prepared for the Project. As outlined in **Section 6.5.4,** this will include measures for managing stock (sheep), 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.

Furthermore, the LSC assessments verified that the area of mapped Class 3 land within the Project Area is poor in soil fertility with evidence of waterlogging (mottling / gleying) and some areas of sodic soils. In addition, the landholder of this land has indicated that during their ownership (since 2011) the area mapped as Class 3 land has not been cropped or cultivated as the size, terrain and higher erosion occurring is not in favour of cropping. The landholder further indicated that the property in its entirety is utilised for grazing, except for treed areas.

The Project would result in a temporary loss of agricultural land and disruption of agricultural activities while the Project is being constructed. However, the approach to allow solar grazing once the Project is operational, with the implementation of recommended measures to manage the dual use of the land, would see this impact minimised.

Furthermore, the Project is considered highly reversible and will not impact the future productivity of the land beyond the operational life of the Project. Once the Project has been decommissioned the land can be returned to agriculture.

6.5.3.2 Soil erosion

Due to the 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 subsoils should be limited where possible, and excavated subsoils should be stockpiled and contained to avoid potential dispersion and sediment transfer. Disturbance to ground cover should be limited where possible. Maintenance of ground cover will also aid in the prevention of topsoil losses from wind erosion.

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 6.8.4**. Post approval, a CEMP will be prepared by RES that identifies erosion and sediment control mitigation measures prior to works commencing.

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

6.5.3.3 Weeds, Pests and Farm Biosecurity

With appropriate mitigation measures in place, there is a low potential for weeds and invasive pests to spread or impact neighbouring land during construction and operation of the Project.

As detailed in **Section 6.5.4,** RES will prepare and implement an OEMP, which would outline appropriate measures to manage weeds, pests and farm biosecurity.

6.5.3.4 Aerial Spraying Impacts

Aerial spray drift due to weed spraying has the potential to impact neighbouring properties affecting nearby crops, livestock and human health. In accordance with the *Pesticides Act 1999* alongside advice provided by the EPA NSW, a variety of strategies outlined in **Section 6.5.4** would be implemented to minimise conflict and/or damage arising from spray drift.

6.5.3.5 Biophysical Strategic Agricultural Land

As discussed in **Section 6.5.2.4**, the BSAL mapped areas have been verified as being non-BSAL. It is therefore considered that the Project would not impact on areas that consist of high-quality soil and water resources capable of sustaining high levels of agricultural productivity.

6.5.3.6 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 DPI Guidelines (Date) and is presented in detail in **Appendix 8**.

Key risks identified during this process include noise generation, dust generation, erosion control and sediment runoff, increased traffic, and impact on visual amenity. With the effective implementation of measures outlined in **Section 6.5.4** it is considered that the potential land use conflicts on the surrounding land use and land users would be manageable and minor. Additionally, once decommissioned, the Project Area will be remediated to enable agricultural production including cropping and grazing.

6.5.3.7 Other Land Use Impacts

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

Crown lands

Some parcels of Crown Land (Paper Roads) within the Project Area are located within the area where solar array and associated infrastructure will be constructed. Consultation with Crown Land has been undertaken during the EIS process as outlined in **Section 5.6**. RES has made an application to purchase and close the Paper Roads and gift them to the adjoining landowners.

Mining, Quarries, Mineral or Petroleum Rights

Mineral exploration licences (EL8160 and EL8405) within the Project Area are shown in **Figure 2.2**. No part of the Project Area is subject to a mining/production lease. Bowdens Silver, the holder of the two exploration licences in the Project Area was also engaged in May 2021. Consultation with Bowdens Silver is ongoing. Outcomes of consultation with Bowdens is further discussed in **Section 5.5** .

6.5.4 Management and Mitigation Measures

Should the Project be approved, a CEMP will be developed and implemented for the construction phase of the Project including relevant erosion and sediment control measures, in accordance with the *Managing Urban Stormwater: Soils and Construction Volume 1* (NSW DPIE, 2004) "The Blue Book".

RES will further develop and implement an OEMP which will incorporate a Sheep Grazing Vegetation Management Plan (SGVMP) that will outline management measures for solar grazing in line with the Agrisolar Guide 2021 as well as other animal health 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 also detail requirements to manage erosion, soil fertility and compaction during the operation of the Project. The OEMP will be developed in consultation with the host landholders and DPI Agriculture.

RES will enter into a grazing agreement (agistment contract) with the relevant host landholders to allow the opportunity for dual use of the Project Area.

The rehabilitation of the Project Area will be conducted in accordance with the Rehabilitation Management Plan to be prepared as part of the OEMP for the Project.

6.6 Traffic and Transport

Concerns regarding traffic impacts have been identified throughout the community and stakeholder consultation process during the evolution of the Project. In particular, the increase in traffic volumes on local roads (such as the Mudgee-Gulgong and Gulgong-Ulan roads and Puggoon Road) and the condition of local roads were raised as concerns.

A Transport Impact Assessment (TIA) has been prepared by Samsa Consulting Pty Ltd (Samsa, 2022) to assess the potential traffic impacts associated with the Project. The TIA has been prepared to address the SEARs for the Project which required the EIS to include:

- an assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation
- an assessment of the likely transport impacts to the site access route, site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance
- a cumulative impact assessment of traffic from nearby developments including Barney's Reef Wind Farm
- 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 authority.

The TIA further considered the potential for cumulative traffic and transport impacts associated with the Project and other nearby developments such as the operational Beryl Solar farm, the approved Stubbo Solar Farm and Dunedoo Solar Farm as well as the proposed Barneys Reef Wind Farm project. The outcome of the cumulative traffic assessment is further discussed in **Section 6.16** of this EIS. The full TIA is provided in **Appendix 9** with the outcomes of the assessment summarised below.

6.6.1 Existing Environment

The Project Area is accessed from the Castlereagh Highway. The Project's proposed transport route is from the Port of Newcastle (approximately 230 km south-east of the Project area) via Industrial Drive, Pacific Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway and Castlereagh Highway to the Project's access via a local unserviced road directly south of the Project Area. The Project's proposed transport route is shown on **Figure 3.4**. A description of the major and minor roads near the Project Area is provided in **Table 6.4**.

Table 6.4 Road Network

Road	Discussion
Golden Highway	Golden Highway is a State Highway (B84) forming an arterial route from New England Highway between Branxton and Singleton to the Newell Highway at Dubbo, passing through Denman, Merriwa and Dunedoo. Golden Highway is generally a two-lane, undivided road with varying shoulder widths and formations. The pavement condition is generally good, appropriate with its status as a State Highway and its suitability as a route for larger heavy vehicles, i.e. B-doubles. The general road environment can be described as flat to gently rolling terrain with some moderate curved alignments requiring lower advisory speeds within the background 100 km/h speed zone. The road environment and alignment are generally conducive to OSOM and heavy vehicle transport.
Castlereagh Highway	Castlereagh Highway is a State Highway (B55) forming an arterial route from Great Western Highway near Lithgow in the south to Golden Highway (east of Dunedoo) in the north and extending through to the St George district in Queensland. Castlereagh Highway is generally a two-lane, undivided road with sections of overtaking lane and varying shoulder widths and formations. The pavement condition is generally good, commensurate with its status as a State Highway and its suitability as a route for larger heavy vehicles, e.g. B-doubles. The general road environment can be described as rolling / hilly terrain with some tighter curved alignments requiring lower advisory speeds within the background 100 km/h speed zone. The road environment and alignment are generally conducive to OSOM and heavy vehicle transport.

Historical traffic data (2009) for the major rural road network obtained from Transport for NSW was extrapolated to current (2021) traffic volumes by adopting a traffic growth of 25% over the 12-year period, equivalent to an approximate 1.9% per annum (compounded) growth rate. The existing rural road network is considered to operate at high levels of service (LoS) and therefore have adequate capacity to cater for current (2021) traffic volumes. In particular:

- Golden Highway, operating at LoS A, has a capacity of up to 1,800 vehicles per day (vpd) to cater for current traffic volumes of 780 vpd.
- Castlereagh Highway, operating at LoS A, has a capacity of up to 1,900 vpd to cater for current traffic volumes of 1,540 vpd.

The approach of the Project access point have no designated turn lane or access treatments provided on either approach on the Castlereagh Highway. Suitable sight distances are available in both directions to/from both access points.

The TIA does not estimate the current operation of the transport route associated with the movement of heavy vehicles and Oversize Overmass (OSOM) vehicles from the Port of Newcastle to the New England Highway as these routes have previously been used for delivery of nearby wind farm project components and thus, would be suitable (more conducive) for delivering generally smaller and lighter solar farm components.

The interactive crash statistic data available from the Transport for NSW's Centre for Road Safety database for the period between 2016 to 2019 (inclusive) indicates there are 11 recorded crashes along the Castlereagh Highway between Golden Highway in the north and the outskirts of the Gulgong urban area in the south including Gingers Lane and Puggoon Road. These were spread relatively evenly over the recording period – a single incident in 2019, two in both 2016 and 2017 and three in both 2015 and 2018.

No crashes have been recorded in the vicinity (within 250 m) of the proposed access points off Castlereagh Highway. The crash rate for the subject section of road network is approximately 5.7 per 100 million-vehicle-kilometres travelled (100 mvkt), which is considered to be low to average for a rural highway area.

The Wallerawang Gwabegar Railway line (owned by ARTC) rail network is located to the north of the Project, and crosses Gingers Lane and Puggoon Road at level crossings. There are no regular train services along the railway line and primary traffic is currently coal trains with heritage (tourist) train services operating intermittently.

There is limited public transport in the vicinity of the Project area. An intermittent school bus service (operated by Eastend Bus Services at Gulgong) runs between Tucklan and Gulgong along Castlereagh Highway that passes the proposed primary site access location. There is no rail station nearby that serves as public transport. There are no formal pedestrian or cyclist facilities (pedestrian footpaths, shared paths or on-road cycleways) in the vicinity of the Project Area.

6.6.2 Assessment of Impacts

The Project's traffic and transport impacts would primarily occur during the construction phase as a result of the increase in traffic movements associated with the workforce arrangements to and from the Project Area and delivery of materials and equipment to establish the solar farm and associated infrastructure.

The TIA provides the forecast traffic volumes on the Golden Highway and Castlereagh Highway for the Project's peak construction (as a worst case). These volumes were then utilised to assess the potential impacts associated with Project Area access, road capacity, road safety and cumulative impacts. The outcomes of the TIA are summarised below, with further detail provided in **Appendix 9.**

6.6.2.1 Construction Phase

Daily Traffic Generation

The Project would generate the following traffic demand during construction:

- up to 85 heavy vehicles per day (170 heavy vehicle trips per day) with a maximum of 135 heavy vehicles per day (270 heavy vehicle trips) during peak construction (four months) (including all heavy vehicle movements relative to the Project i.e. delivery of equipment, infrastructure and materials such as gravel, sand, concrete, water trucks) – these will be predominately truck and dog vehicles, including some concrete mixing trucks and Articulated Vehicles (AV)

- up to 300 light vehicles per day (600 light vehicle trips per day) during peak for workforce movements to the Project Area, assuming an average of 1.8 persons per vehicle for a conservative 'worse case' scenario

- one OSOM vehicle per day (two OSOM vehicle trips per day) on a designated day, with a maximum of four OSOM vehicles (eight OSOM vehicle trips) over the 34-month construction period.

Vehicle movements would peak during four months of the 34-month construction phase, when most of the photovoltaic modules, BESS and ancillary infrastructure are being delivered to the Project Area and the peak workforce numbers are reached. These traffic generation numbers also include other construction materials such as gravel, sand, concrete, water trucks, etc. On either side of this peak period, the vehicle movements would scale up / down. The assessment was based on the peak heavy vehicle generation and

therefore considers the worst-case scenario. For the majority of the construction phase (up to 30 months), reduced traffic generation would occur.

Peak traffic generation is shown in **Table 6.5** below and has been classified into total daily trips (i,e. two-way trips), shown as vehicles per day (vpd); and peak hour trips are shown as vehicles per hour (vph).

Table 6.5 Project Traffic Generation

Traffic Generating Activity	Golden Hwy vpd	Golden Hwy vph	Castlereagh Hwy (north) vpd	Castlereagh Hwy (north) vph	Castlereagh Hwy (south) vpd	Castlereagh Hwy (south) vph
Standard heavy vehicles	270	30	270	30	270	30
Light vehicles	300	150	300	150	300	150
OSOM vehicles	2	1	2	1	0	0

The estimated peak hour trips presented above are based on the following assumptions:

- General heavy vehicle transport could travel from any direction along the surrounding road network depending on origin of the deliveries, i.e. from the south (Gulgong-Mudgee area), west (Dubbo area), north (Dunedoo area) and east (Merriwa area). As a worst-case scenario it has been assumed that all heavy vehicle trips could travel from a single direction on any given day, resulting in a maximum of some 270 heavy vehicle trip movements per day from either direction along Castlereagh Highway to the Project.
- Workforce travelling by private vehicles will arrive between 6 am and 7 am, before the background morning peak period of 7 am to 8 am, and depart between 6 pm and 7 pm, during the background afternoon peak period.
- 10% of the daily heavy vehicle trips are made in the peak hour periods.

Road Capacity

To assess the potential impacts on the road capacity, the Project's traffic generation (presented in **Table 6.5**) have been added to current daily and peak hour traffic flows to obtain future traffic flows along the affected road network. The future traffic volumes are presented in detail in **Appendix 9**.

The results of the TIA show that with the addition of the Project generated traffic (assuming the worst-case maximum peak scenario), the operating conditions (LoS) along the rural road network would change marginally from LoS A to LoS A/B. It is therefore considered that the majority of the Project's transport route has sufficient spare capacity to accommodate the additional traffic generated by the Project and would remain operating at high levels of service. Intersection performance of the intersections in the vicinity of the Project Area are also anticipated to be insignificantly impacted by the addition of the Project's traffic generation.

With the implementation of the management and mitigation measures outlined in **Section 6.7.3**, the traffic generated by the Project would have minimal effects on the future traffic operations and LoS of the transport route.

Project Access and Road Safety

The Project would have a dedicated access off the Castlereagh Highway at a newly proposed access point on the southwest corner of the Project Area. This access will be via an un-serviced council road directly south of the Project Area (locally known as Jacksons Lane). Internal access to the two host landowners on the south will be provided via separate tracks as shown on **Figure 3.1**. These dwellings will not be occupied during the construction phase.

Four alternate access points along Puggoon Road are proposed to allow for emergency vehicles and stock movements.

Available sight distances at the Project access on the Castlereagh Highway are considered to be satisfactory for the 100 km/h speed limit.

Local intersection widening will be required at the primary access off Castlereagh Highway to allow for a three-way intersection, with a connecting internal access road extending onto the Project Area. The proposed intersection would warrant auxiliary and/or protected (channelised) turn lane intersection treatments. The concept design for the proposed intersection work is included in **Appendix 19**. The design for the intersection widening has made allowance for relevant construction vehicles (including OSOM vehicles) to safely exit from and re-enter the Castlereagh Highway whilst minimising disruption to traffic and maintaining road safety.

The proposed access intersection requirements have been discussed with the Mid-Western Regional Council and Transport for NSW and agreed in principle. Mid-Western Regional Council and Transport for NSW will be consulted further in relation to the detailed design requirements for the intersection works prior to construction and for the purposes of securing approval under the Roads Act.

The Project would have an internal road network consisting of compacted gravel, approximately 6 m wide, to accommodate construction and operational traffic movements throughout the Project Area. Parking for the project construction and operations workforces will be provided on-site in gravel surfaced parking areas with appropriate dimensions to accommodate the number and size of vehicles.

Rail Network

The Project would require access over two railway level crossings along the Wallerawang Gwabegar Railway line (maintained by ARTC). Any upgrade works across the rail crossings would be developed and finalised in conjunction with and to the satisfaction of ARTC. RES has been in ongoing discussions with ARTC in this regard. A draft agreement with design requirements has been received.

Given the low frequency of rail service and associated low probability of delay, no impact on the rail corridor and level crossings is anticipated during construction.

Public Transport, Pedestrians and Cyclists

Given the proposed weekday construction hours are from 7am to 6pm, the construction workforce trips would typically occur before 7am and after 6pm, 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 Gulgong town where there are footpaths provided. Given that the proposed construction working hours are from 7am to 6pm, the workforce vehicle trips would be outside the normal peak period for walking and cycling activity in Gulgong. The rural location together with 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 6.7.3**), the Project will have an acceptable impact in terms of pedestrian and cyclist safety.

6.6.2.2 Operational Phase

Traffic generation during operations would be minor. It is proposed that up to seven operational / maintenance staff would service the Project, likely to be based in the surrounding and local areas.

Operational traffic would consist of 4WD-type vehicles travelling within the Project's internal access track network after gaining access off the Castlereagh Highway. It is envisaged that with journey-to-work and home trips, this would amount to a maximum of 20 trips per day, which would occur during peak maintenance periods and on an intermittent basis. This maximum traffic generation would readily be absorbed into the spare capacity of the existing road network.

It is considered unlikely that the low levels of operational traffic would obstruct public or private local access. Additional risks to road safety from operational traffic would be minimal.

6.6.2.3 Decommissioning Phase

Decommissioning impacts are likely to follow a similar pattern as construction, as the project infrastructure would be dismantled and removed. It is therefore considered that the traffic generated during decommissioning would consist of less daily vehicular movements than the construction of the Project.

Traffic generation during decommissioning is estimated to be approximately 30% less than the traffic generation during construction (refer to traffic volumes shown in **Table 6.5**).

Based on the assessment of the road capacity during the construction phase, traffic and road network impacts would be minimal with only marginal changes from existing conditions.

Although the road network conditions at the end of the Project's life in 35 years is unknown, it is considered that based on current conditions, the road network would have significant spare capacity and be able to accommodate the necessary heavy vehicles to be used during the decommissioning.

As per the construction phase, a comprehensive CTMP would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

6.6.3 Management and Mitigation Measures

The TIA concludes that the increase in traffic generation anticipated as a result of the construction, operation and decommissioning phases of the Project will have minimal impact on the safety and efficiency of the State and local road network. RES proposes the following mitigation measures to appropriately manage and mitigate any potential traffic impacts associated with the Project:

- Intersection works at the Project access to provide basic left/right turn or auxiliary left/right turn treatments on the Castlereagh Highway approaches (refer to **Appendix 19**) as per Austroads standards. Works will be subject to further detailed design prior to construction and in consultation with Mid-Western Regional Council and Transport for NSW.

- Preparation of a CTMP outlining proposed traffic and transport management measures and processes for the construction phase of the Project in consultation with the Mid-Western Regional Council and Transport for NSW. The CTMP will include a Drivers Code of Conduct and will be designed to minimise the impact of Project construction traffic (including OSOM vehicles) on the external road network.

- Provision of suitable parking arrangements within the Project Area for the construction and operation workforce to avoid parking on the public roads adjacent to the Project Area.

- Preparation of road dilapidation reports covering pavement, drainage and bridge structures in consultation with Transport for NSW and the local Councils for the proposed transport routes before and after construction. Regular inspection regimes undertaken in consultation between local Councils and the Proponent would be developed. Any damage resulting from construction traffic, except that resulting from normal wear and tear, would be repaired to pre-existing conditions.

- Consider establishing a 'carpool' initiative or providing bus services for construction staff from nearby centres to minimise construction staff trips.

- For decommissioning, similar general measures would be necessary as those detailed for construction. The CTMP for decommissioning would need to be revised to address traffic operation and volume changes in the future years during the decommissioning phase.

6.7 Biodiversity

A detailed assessment of the impacts of the Project has been completed and a Biodiversity Development Assessment Report (BDAR) has been prepared by Umwelt. During the stakeholder engagement process impacts to biodiversity associated with the displacement of locally important flora and fauna and intersecting of wildlife corridors were raised as concerns by the community (refer to **Section 5.7**).

RES has sought to avoid, minimise and mitigate biodiversity impacts in the first instance as part of the Project design and has preferentially utilised already cleared and/or disturbed vegetation within the solar farm site instead of impacting intact patches of native vegetation. Furthermore, the BDAR includes the assessment of the transmission line corridor assuming disturbance of the 60 m wide and 13 km long corridor, however, full disturbance of the corridor will not occur. This was done to provide a conservative assessment of potential impacts on biodiversity along the transmission line corridor. The predicted impacts associated with the transmission line represent worst-case conservative estimates and opportunities to further reduce biodiversity impacts will be explored during detailed design. RES is committed to managing biodiversity impacts during the construction and operations phase of the Project through implementation of management plans that will include controls to minimise impacts on biodiversity, refer to **Section 6.7.3**.

The findings of the BDAR (including proposed mitigation and offsetting strategies) are summarised in the following sections with the full report attached (refer to **Appendix 10**).

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

6.7.1 Methodology

The BDAR included a detailed biodiversity field survey across the Project Area. The progressive results of the surveys and the vegetation mapping were used by RES to assist in designing the Project to minimise impacts on biodiversity.

Targeted and opportunistic surveys for threatened species were undertaken across the Project Area during 2020 to 2022. **Table 6.6** outlines the dates, methods and species targeted during the surveys.

Table 6.6 Biodiversity Survey Overview

Survey Date	Method	Species Targeted
19/10/2020 – 23/10/2020	Searches performed in suitable rocky habitat. Searches for large stick nests Searches for suitable hollows Searches for suitable bat- breeding structures Searches for breeding camps	*Aprasia parapulchella* (Pink-tailed Worm Lizard) *Haliaeetus lecogaster* (white- bellied sea- eagle) Hieraaetus morphnoides (little eagle) *Lophoictinia isura* (square- tailed kite) *Lophochroa leadbeateri* (major Mitchell's cockatoo) *Miniopterus orianae oceanensis (large bentwing-bat)* *Polytelis swainsonii* (superb parrot) *Pteropus poliocephalus* (Grey- headed flying- fox)

Survey Date	Method	Species Targeted
19/10/2020 – 23/10/2020	Targeted floristic searches	*Acacia ausfeldii* (Ausfeld's wattle) *Diuris tricolor* (pine donkey orchid) *Leucochrysum albicans var. tricolor* (hoary sunray) H*omoranthus darwinioides* *Prostanthera discolor* *Prasophyllum petilum* *Prasophyllum sp. Wybong* *Pultenaea glabra* *Swainsona recta* (small purple- pea) *Swainsona sericea* (sikly swainson- pea) *Thesium uculla* *Tylophora linearis* *Zieria ingramii* *Dichanthium setosum* (Queensland bluegrass) *Commersonia procumbens* *Euphrasia arguta*
15/02/2021 – 19/02/2021	BAM Floristic Plots	
15/02/2021 – 19/02/2021	Spotlighting targeted in remnant woodland and forest. Spot Assessment Technique (SAT) Call playback Searches for suitable bat- breeding structures	*Burhinus grallarius* (Bush- stone curlew) *Phascolarctos cinereus* (Koala) *Miniopterus orianae oceanensis* (large bentwing-bat)
15/02/2021 – 19/02/2021	Targeted floristic searches	*Dichanthium setosum* (Queensland bluegrass) *Euphrasia arguta* *Leucochrysum albicans* (hoary sunray) *Thesium uculla* *Tylophora linearis* *Zieria ingramii*
7/06/2021 – 9/06/2021	BAM Floristic Plots	
7/06/2021 – 9/06/2021	Call playback and spotlighting (one night only) Searches for large hollows	*Ninox connivens* (Barking owl) *Ninox strenua* (Powerful owl) *Tyto novaehollandiae* (Masked owl)
5/08/2021 – 8/08/2021	BAM Floristic Plots	
5/08/2021 – 8/08/2021	Searches for suitable hollows Call playback and spotlighting Searches for suitable bat- breeding structures	*Calyptorhynchus lathami* (glossy- black cockatoo) Ninox connivens (Barking owl) *Ninox strenua* (Powerful owl) *Tyto novaehollandiae* (Masked owl) Sloane's froglet *Phascolarctos cinereus* (koala) *Miniopterus orianae oceanensis* (large bentwing-bat)
5/08/2021 – 20/08/2021	Remote- sensor cameras	*Petaurus norfolcensis* (Squirrel glider) *Phascogale tapoatafa* (Brush- tailed phascogale)

Survey Date	Method	Species Targeted
27/09/2021 - 30/09/2021	Targeted floristic searches	*Acacia ausfeldii* (Ausfeld's wattle) *Diuris tricolor* (pine donkey orchid) *Leucochrysum albicans var. tricolor* (hoary sunray) *Homoranthus darwinioides* *Prostanthera discolor* *Prasophyllum petilum* *Prasophyllum sp. Wybong* *Pultenaea glabra* *Swainsona recta* (small purple- pea) *Swainsona sericea* (sikly swainson- pea) *Thesium uculla* *Tylophora linearis* *Zieria ingramii* *Dichanthium setosum* (Queensland bluegrass) *Commersonia procumbens* *Euphrasia arguta*
17/01/2022 – 20/01/2022	Targeted floristic searches	*Dichanthium setosum* (Queensland bluegrass) *Euphrasia arguta* *Leucochrysum albicans* (hoary sunray) *Thesium uculla* *Tylophora linearis* *Zieria ingramii*

6.7.2 Biodiversity Assessment Results

6.7.2.1 Plant Community Types

Surveys identified three Plant Community Types (PCTs) in two condition types, as well as exotic vegetation. These are listed below and illustrated on **Figure 6.5.**

- PCT 81 Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *moderate condition* (1.39 hectares)
- PCT 281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *moderate condition* (10.96 hectares)
- PCT 318 Mugga Ironbark -Tumbledown Red Gum – Red Box – Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *moderate condition* (1.47 hectares)
- PCT 281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *derived native grassland* (17.11 hectares).

Detailed descriptions of the vegetation zones are outlined in the BDAR (refer to **Appendix 10**).

6.7.2.2 Threatened Ecological Communities (TECs)

Two vegetation zones mapped within the Project Area conform to Commonwealth listed Threatened Ecological Communities (TECs). Two State listed (BC Act) TECs occur within the Project Area. **Table 6.7** identifies the TECs, the corresponding PCT and area of impact of each TEC. The decision-making process for each TEC is detailed in **Appendix 10**. The TEC mapping is provided in **Figure 6.6.**

Table 6.7 Summary of TECs within the Project Area

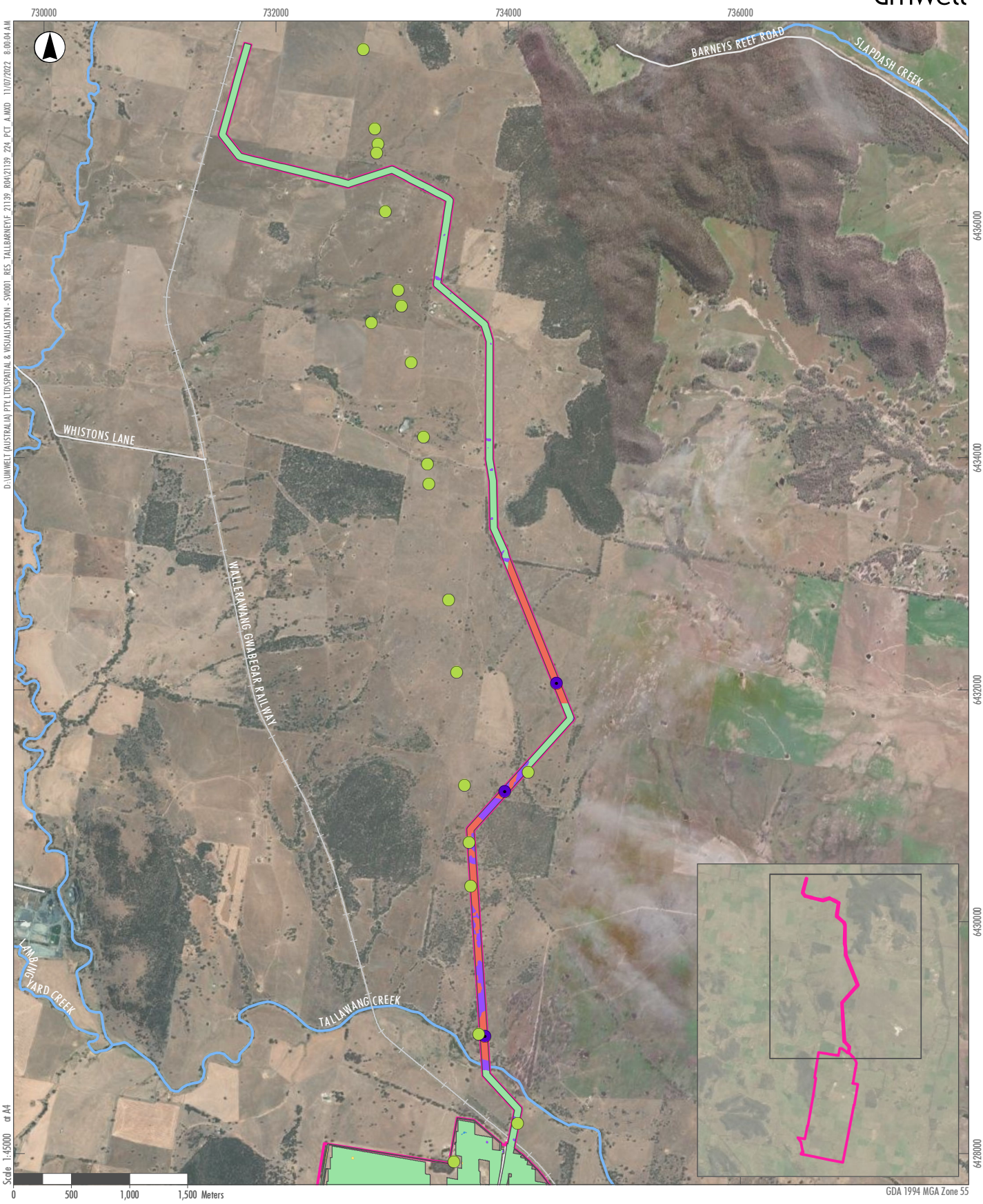
Threatened Ecological Community	Act listed under	Vegetation Zone	Area (ha)
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions CEEC	NSW BC Act	Zone 2 – PCT 281 moderate condition i.e.: • Within Solar farm/BESS area • Within transmission line corridor	10.96 ha - • 2.63 ha • 8.33 ha
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	NSW BC Act	Zone 4 – PCT 281 *DNG* (within transmission line corridor only)	17.11
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community EEC	NSW BC Act	Zone 1 – PCT 81 *moderate condition* (within Solar farm/BESS only)	1.39
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC	Commonwealth EPBC Act	Zone 2 – PCT 281 moderate condition i.e.: • Within Solar farm/BESS area • Within transmission line corridor	10.96 ha - • 2.63 ha • 8.33 ha
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC	Commonwealth EPBC Act	Zone 4 – PCT 281 *DNG* (within transmission line corridor only)	17.11
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia EEC	Commonwealth EPBC Act	Zone 1 – PCT 81 *moderate condition* (within Solar farm/BESS only)	1.39

6.7.2.3 Threatened Species within the Project Area

Ecosystem-credit Species

Ecosystem- credit species that are considered to have potential to occur in the Project Area comprise glossy black- cockatoo (*Calyptorhynchus lathami*), little lorikeet (*Glossopsitta pusilla*), hooded robin (*Melanodryas cucullata cucullata*), scarlet robin *(Petroica boodang*) and flame robin (*Petroica phoenicea*). Breeding habitat for these species is fairly limited in the Project Area. Some hollows are present though these exist in relatively small, fragmented patches and woodland.

A list of the ecosystem-credit species predicted to occur by the BAM Calculator and/or the literature review and whether they are considered likely to occur in the vegetation zones within the Project Area is provided in Appendix D of the BDAR (provided in **Appendix 10**).



Legend

- Tallawang Solar Farm Project Area
- Subject Land
- Rapid Assessment Point
- Flora Plot Location

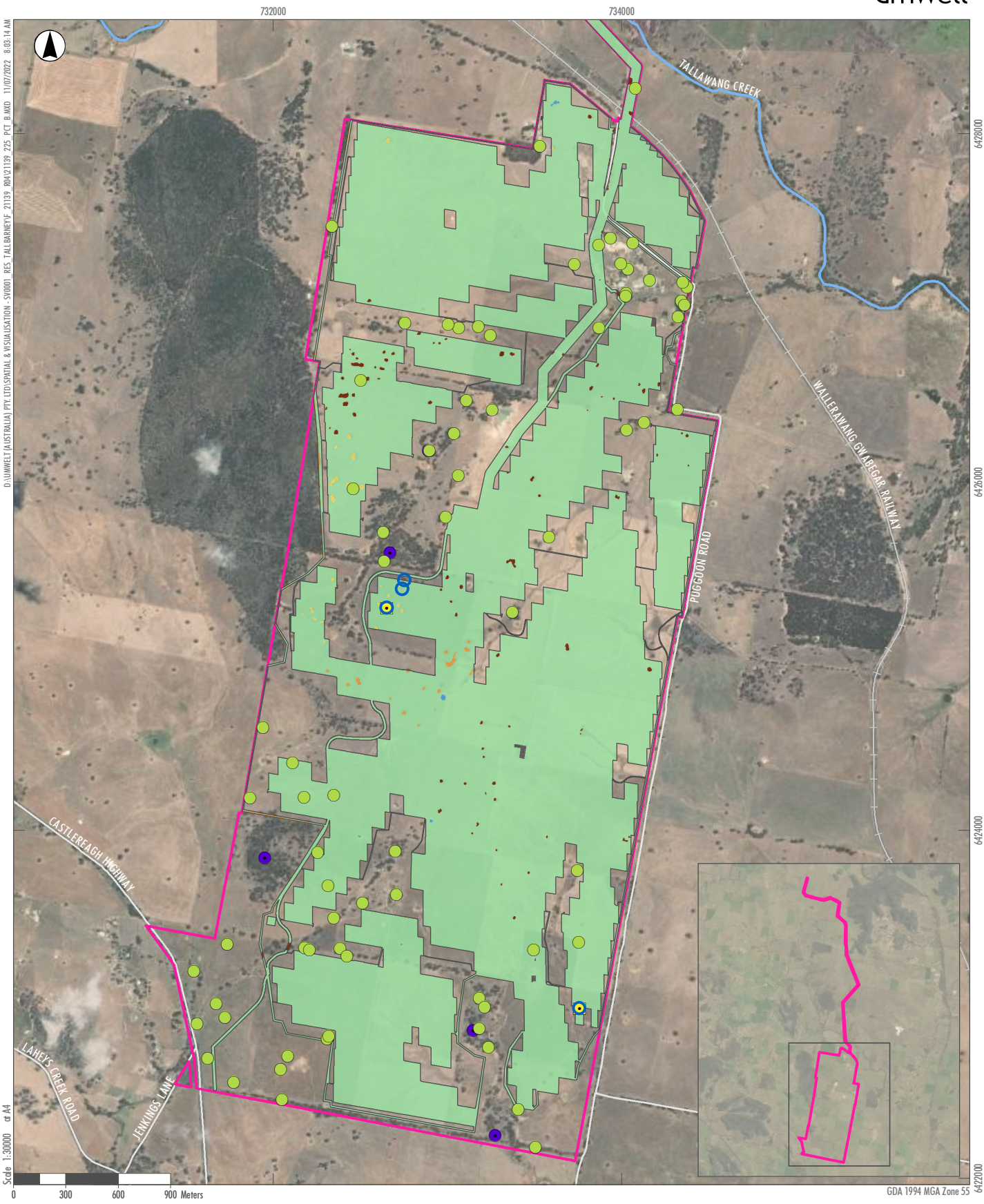
PCT

- 81 - Western Grey Box - cypress pine shrub grass shrub tall woodland Moderate Condition
- 281 - Rough-Barked Apple - red gum - Yellow Box woodland Derived Native Grassland
- 281 - Rough-Barked Apple - red gum - Yellow Box woodland Moderate Condition
- Dam
- Category 1 - Exempt Land

FIGURE 6.5A

Plant Community Types, Threatened Species and Habitat Features in the Development Footprint

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Subject Land
- Rapid Assessment Point
- Large HBTs
- Extra-large HBTs
- Flora Plot Location

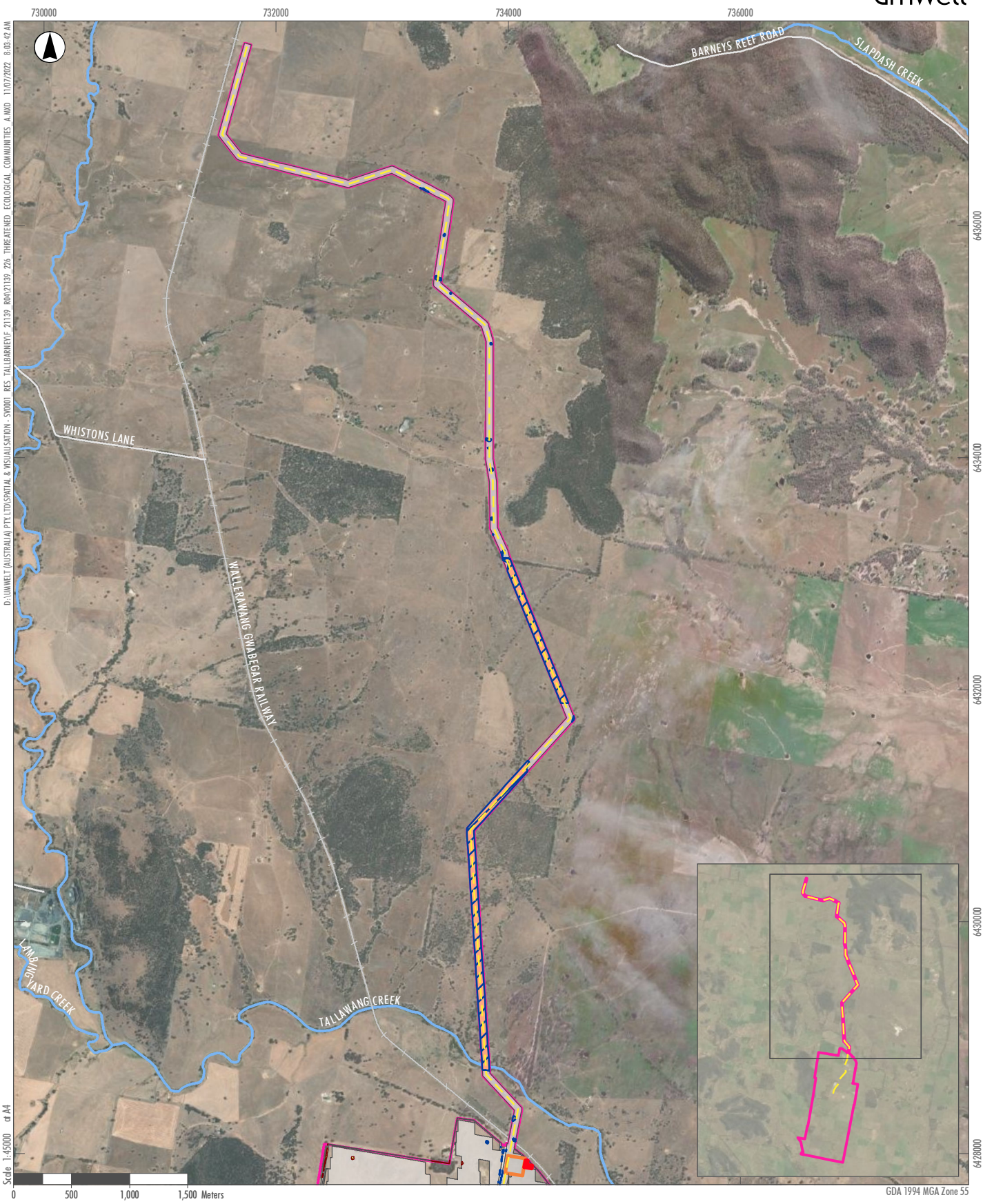
PCT

- 81 - Western Grey Box - cypress pine shrub grass shrub tall woodland Moderate Condition
- 281 - Rough-Barked Apple - red gum - Yellow Box woodland Moderate Condition
- 318 - Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest Moderate Condition
- Dam
- Structure
- Category 1 - Exempt Land

FIGURE 6.5B

Plant Community Types, Threatened Species and Habitat Features in the Development Footprint

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Subject Land
- Proposed HV Powerline

Site Infrastructure

- O&M Facility
- Proposed Substation (Northern Option)

Federally Listed TECs

- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

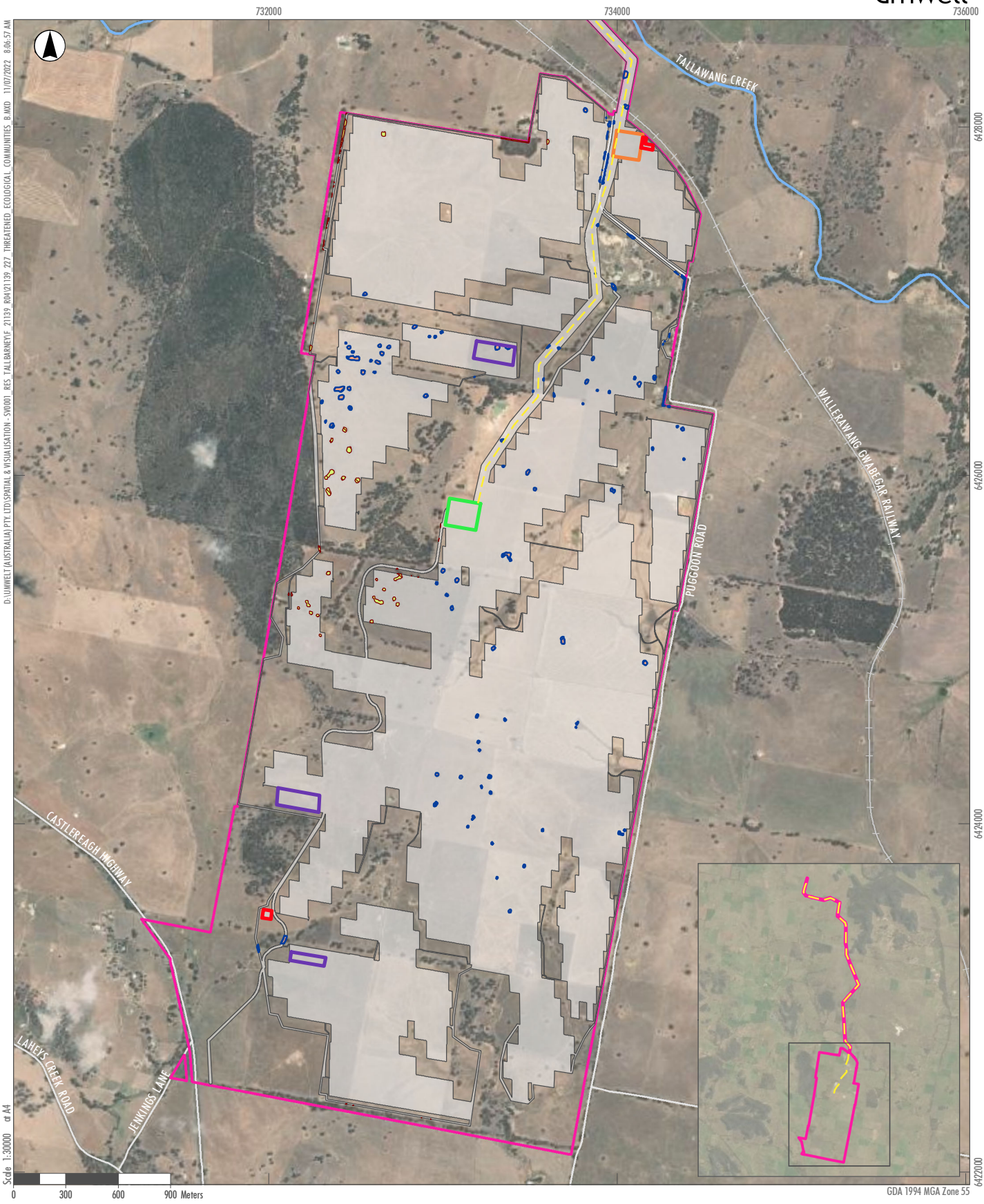
State Listed TECs

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Inland Grey Box Woodland

FIGURE 6.6A

Threatened Ecological Communities

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Subject Land
- Proposed HV Powerline

Site Infrastructure

- Construction Compound/Laydown
- O&M Facility
- Proposed Substation (Central Option)
- Proposed Substation (Northern Option)

Federally Listed TECs

- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

State Listed TECs

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Inland Grey Box Woodland

FIGURE 6.6B

Threatened Ecological Communities

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)

Species-credit Species

No species-credit species were detected during any surveys within the Project Area. Two species-credit species were detected outside of the Project Area. These were *Diuris tricolor* and *Swainsona sericea*. As mentioned earlier, these areas have been avoided in design of the Project layout.

A list of the species-credit species predicted to occur by the BAM Calculator and/or the literature review and whether they are considered likely to occur in the vegetation zones within the Project Area is provided in Appendix D of the BDAR (provided in **Appendix 10**).

6.7.2.4 Aquatic Habitats

Several degraded, un-named, ephemeral, first- order tributaries occur within the Project Area. These were typically devoid of riparian vegetation as a result of historical agricultural and grazing practices. These areas are considered unlikely to provide any habitat for threatened species, due to their highly degraded nature and history of disturbance.

Tallawang Creek runs north of the solar farm site and traverses the transmission line corridor.

The Project Area does not support aquatic habitat identified as threatened Freshwater Fish Communities, Key Fish Habitat or Species Habitat as listed and mapped by the Department of Primary Industries (DPI).

6.7.3 Avoidance and Mitigation of Impacts

The biodiversity assessment commenced early in the design process, which has allowed initial ecological survey works to inform the conceptual layout of the Project. To avoid impacts on native vegetation the Project layout and design has focused on locating as much of the solar farm infrastructure and temporary construction areas within exotic and/or previously cleared grassland areas (some of which is derived native grassland) with low biodiversity value. This method has resulted in the majority of the associated impacts being within these areas.

Remnant vegetation on the western boundary, which provides connectivity with a much larger area of remnant vegetation off site, is being retained. Similarly, creeks and major drainage lines on the Project Area providing biodiversity value are avoided with a setback buffer of up to 40 m as part of the design and will therefore continue to provide some form of habitat corridor, however degraded they may be at present.

Two threatened forb species were detected during threatened species surveys. One individual of *Diuris tricolor* was detected in the southern remnant of the Project Area and two individual *Swainsona sericea* were detected adjacent to the creek line in the south west of the Project Area. All threatened species locations have been avoided in the Project layout and design.

In terms of the loss of habitat, the grassland areas where the solar array will be located typically only provide foraging habitat for more mobile threatened species of bird and bat. This aerial foraging habitat will still be present upon installation of the solar farm, and therefore, the general removal of threatened species habitat is also being minimised, due to the nature of the Project.

Overall, within the solar farm site, the Project layout and design has resulted in the avoidance of direct impacts on approximately 100.95 ha of remnant woodland and derived native grassland which equates to 94.2% of remnant woodland and derived native grassland being retained within the Project Area.

6.7.3.1 Avoidance of Prescribed Impacts

The following impacts are considered 'prescribed impacts' under the *Biodiversity Conservation Regulation 2017*:

- impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other geological features of significance, rocks, human-made structures or non-native vegetation
- impacts on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range
- impacts on movement of threatened species that maintains their life cycle
- impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities
- impacts of wind turbine strikes on protected animals, and
- impacts of vehicle strikes on threatened species or on animals that are part of a TEC.

As discussed above, RES sought to avoid and minimise the potential impacts on the ecological values of the Project Area primarily through general avoidance of remnant vegetation and careful placement of the solar farm. The Project Area has been located in an area of relatively low biodiversity value, resulting in a small area of disturbance to native vegetation or fauna habitats.

Further detail on the assessment of prescribed impacts is outlined in Section 5.2 of the BDAR (included in **Appendix 10** of this EIS).

6.7.3.2 Minimisation and Management of Impacts

The following specific control measures will be implemented to minimise the impacts of the Project:

- salvage of biodiversity features, including habitat resources (e.g., hollow logs, tree hollows, fallen timber and rocks/boulders)
- a pre-clearing procedure will be implemented to minimise the potential for impacts on native fauna species (focusing on threatened species) as a result of the clearing of hollow-bearing trees. The pre-clearing procedure is designed to minimise impacts to hollow-dependent and ground-dwelling fauna
- weed management
- fencing and access control
- bushfire management
- erosion and sedimentation control
- workforce education and training.

Each of these minimisation measures will be included in a CEMP and OEMP. Further detail is provided in **Appendix 10**.

6.7.4 Assessment of Impacts

6.7.4.1 Direct Impacts

The Project would result in direct impacts on native vegetation which totals approximately 30.93 ha as outlined in **Table 6.8**.

Table 6.8 Direct Impacts on Biodiversity Features

PCT	Solar farm/BESS area (ha)	Transmission line corridor (ha)	Total area within the Project Area (ha)
81 Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *moderate condition*	1.39	0	1.39
281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *moderate condition*	2.63	8.33	10.96
318 Mugga Ironbark -Tumbledown Red Gum – Red Box – Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *moderate condition*	1.47	0	1.47
281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion DNG	0	17.11	17.11
Category 1 – Exempt Land	787.75	46.11	833.86

6.7.4.2 Indirect Impacts

Regarding potential impacts on biodiversity, there will be little substantial change to water, noise, weed species, pest animal, lighting or air quality related impacts given that the land is already highly disturbed and is adjacent to existing land uses that are highly modified for agricultural use, as well as main roads. While the solar farm itself is long term, construction is a short term and temporary activity. Any additional impact resulting from the Project is not expected to be of any level of significance in relation to threatened species, populations, and communities, given that the Project Area will occur in an already disturbed area surrounded by tracks, roads and the cleared areas currently used for agricultural purposes.

However, the construction of the security fence has the potential to cause indirect impact to biodiversity. The following indirect impacts have been identified and discussed in the BDAR (**Appendix 10**):

- **Noise impacts** - Construction noise may disrupt the roosting and foraging behaviour of fauna species and reduce the occupancy of areas of suitable habitat within the Project Area. Regarding potential impacts on biodiversity, there will be no substantial change to noise impacts given that the Project, when operational, will not generate any noise exceedances beyond the Project Area. Any additional impacts resulting from noise emissions are not expected to be of any level of significance in relation to threatened species, populations and communities.

- **Light** - Light emissions resulting from security lighting may result in adverse impacts on adjacent habitats and, particularly nocturnal birds and bats. Behavioural changes in animals can occur in response to the physical presence of a development and include changes in foraging locations and mating behaviour. Research into the impacts of altered lighting indicates that it can trigger behavioural and physiological responses including changes in foraging behaviour, disruptions of seasonal day length trigger cues for critical behaviour, disorientation and temporary blindness and interference with predator prey relationships. Appropriate lighting controls to minimise impacts will be implemented as part of the operation of the solar farm including minimisation of lighting emissions following Australian Standards. All lighting will be shrouded and aimed towards the ground. The proposed impact from lighting is unlikely to have a significant impact to threatened species or populations across the broader landscape.

- **Weed and pest management** - Weed species could be inadvertently brought into the Project Area with imported materials, on vehicles or mobile plant, or could invade naturally through removal of native vegetation. Populations of feral fauna species such as foxes, rabbits and cats can increase and quickly populate new areas as a result of disturbance. Mitigation measures outlined in **Section 6.7.3** will be implemented to minimise the potential for weed encroachment and feral animal spread into areas surrounding the Project Area.

- **Connectivity** – Although the Project is not directly impacting the large remnant areas present in the Project Area, the construction of the security fence would remove the ability for non-avian fauna to access these remnants. This change in connectivity may impact fauna movement across the landscape. Fragmentation of remnant areas reduces species ability to recover from unplanned events such as bushfire, drought, and disease. Large remnants occur on either side of the solar farm/ BESS development area, surrounded by degraded grasslands. They are connected through remnant vegetation along Tallawang Creek and the small remnant patches within the solar farm/BESS development area. While the majority of native fauna species would prefer to use woodland to navigate through their landscape, some species are able to use a matrix of vegetation types to disperse. Species sensitive to changes in genetic assemblage are likely to be species that rely on a corridor of woody vegetation to traverse their landscape. These woodland reliant species may experience changes to connectivity.

- **Changes in fauna movements** – The security fence is likely to act as a barrier to movement which will change the way fauna species move through the landscape in this area. The security fence is planned to be placed around the solar farm/ BESS development area and therefore will be placed 500 m east of the Castlereagh Highway and 60 m to the railway line. As such, it may direct more fauna to the highway or railway line. It is hard to quantify the potential impacts in relation to changes in fauna movement patterns however there is the potential that the establishment of the fence could increase the occurrence of road/rail kill.

- **Entrapment** – The security fence has the potential to entrap fauna within the areas of the solar farm where the risk is not appropriately managed during construction or during maintenance activities. Mitigation measures outlined in **Section 6.7.3.2** will minimise the potential for feral animal spread and impacts into surrounding areas around the Project Area.

- **Increased feral predator predation** – As discussed above this project has the potential to increase feral predator abundance. The security fence may act as a structure to 'funnel' native fauna to areas where they are easily predated by feral fauna. Alternatively feral predators, such as the cat (*Felis catus*) and fox (*Vulpes vulpes*), may use the fence as a tool to more successfully predate on native fauna.

6.7.4.3 Prescribed Impacts

No threatened entities are considered likely to be dependent upon or may use habitat features associated with any of the prescribed impacts.

6.7.4.4 Serious and Irreversible Impacts

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.

Six species-credit species predicted by the BAM calculator to occur within the Development Corridor are also listed as Serious And Irreversible Impact (SAII) entities in the *Guidance to Assist a Decision-Maker to Determine a Serious and Irreversible Impact* (DPIE 2019a). For five of these species the Project is not expected to have an impact that is serious and irreversible and further assessment against the principles is therefore not required.

However, in relation to the Box-Gum Woodland CEEC, none of the principles prescribed in the BC Regulation are considered likely to occur as a result of the Project. Notwithstanding, an assessment in accordance with Section 9.1.1 of the BAM was completed and is provided in full in **Appendix 10**.

The SAII Assessment concluded that:

- Current estimated extent in NSW is 250,729 ha. The total area of Box Gum Woodland within the development area is 25.6 ha (8.4 ha of woodland and 17.2 ha of DNG). This is equivalent to the removal of 0.1% of the estimated current extent in NSW.

- Less than 10% of the original distribution of the CEEC is likely to have avoided structural changes (TSSC 2020). As such, the CEEC now occurs in a heavily fragmented and isolated form.

- A total of 28.07 ha of the Box Gum Woodland CEEC was identified within the Project's development footprint. Of the 28.07 ha of the Box Gum Woodland CEEC estimated to be impacted by the Project, only 10.96 ha (39.05%) is in moderate to good condition woodland, with the remaining 17.11 ha (60.95%) being derived native grasslands.

- It is unlikely that the Project will remove entire patches of Box Gum Woodland, but rather will impact on part of already fragmented patches. It is recognised that this will lead to an increased fragmentation of remaining vegetation. This could increase the distances between patches of woodland and open woodland, remnant trees in derived native grassland.

6.7.4.5 Aquatic Impacts

Impacts to the creeks and drainage lines within the Project Area will be minor and generally restricted to impacts associated with the construction of crossings over the creeks. It is anticipated that water quality

will be temporarily affected at these locations during construction and impacts will be controlled through the implementation of proposed erosion and sediment control mitigation measures (refer to **Section 6.8.4**).

6.7.5 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 then offset these credits as part of progressing the development if it is approved.

The biodiversity credits generated by Project impacts are provided in **Table 6.9**. These credits will require offsetting under the BAM as part of the implementation of the Project. A full Biodiversity Credit Report is included in **Appendix 10**.

Table 6.9 Credits Required to Offset the Proposed Development

PCT/Species-credit	Credit Type	Credits required for Solar farm/ BESS	Credits required for transmission line
81 Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	Ecosystem credits	45	0
281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	Ecosystem credits	146	463
318 Mugga Ironbark -Tumbledown Red Gum – Red Box – Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	Ecosystem credits	47	0
281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion DNG	Ecosystem credits	0	423
	Total	**238**	**886**

6.7.6 Biodiversity Offset Strategy

RES is committed to delivering a biodiversity offset strategy that appropriately compensates for the unavoidable loss of biodiversity values as a result of the Project. The biodiversity offset strategy will be developed during the assessment process in consultation with BCD, DPE and DAWE; and based on the credits required to be retired to offset the impacts of the Project and the offset options available under the BC Act and BC Regulation including:

- land based offsets through the establishment of new Stewardship Sites (and subsequent retirement of credits) or by retiring credits from existing Stewardship Sites
- securing (purchasing) credits through the open credit market, and/or
- paying into to the Biodiversity Conservation Fund (BCF).

6.8 Water Resources

A Water Resources Impact Assessment (WRIA) was prepared by Umwelt to assess the potential flooding, surface water and groundwater impacts as a result of the Project. The WRIA has been undertaken in accordance with the SEARs relating to water as presented in **Appendix 1** and relevant guidelines and legislative requirements. Furthermore, community concerns regarding water use and sourcing were raised during the stakeholder engagement. The full report is provided in **Appendix 11** with the outcomes of the assessment summarised below.

6.8.1 Methodology

Broadly the methodology for the assessment involved:

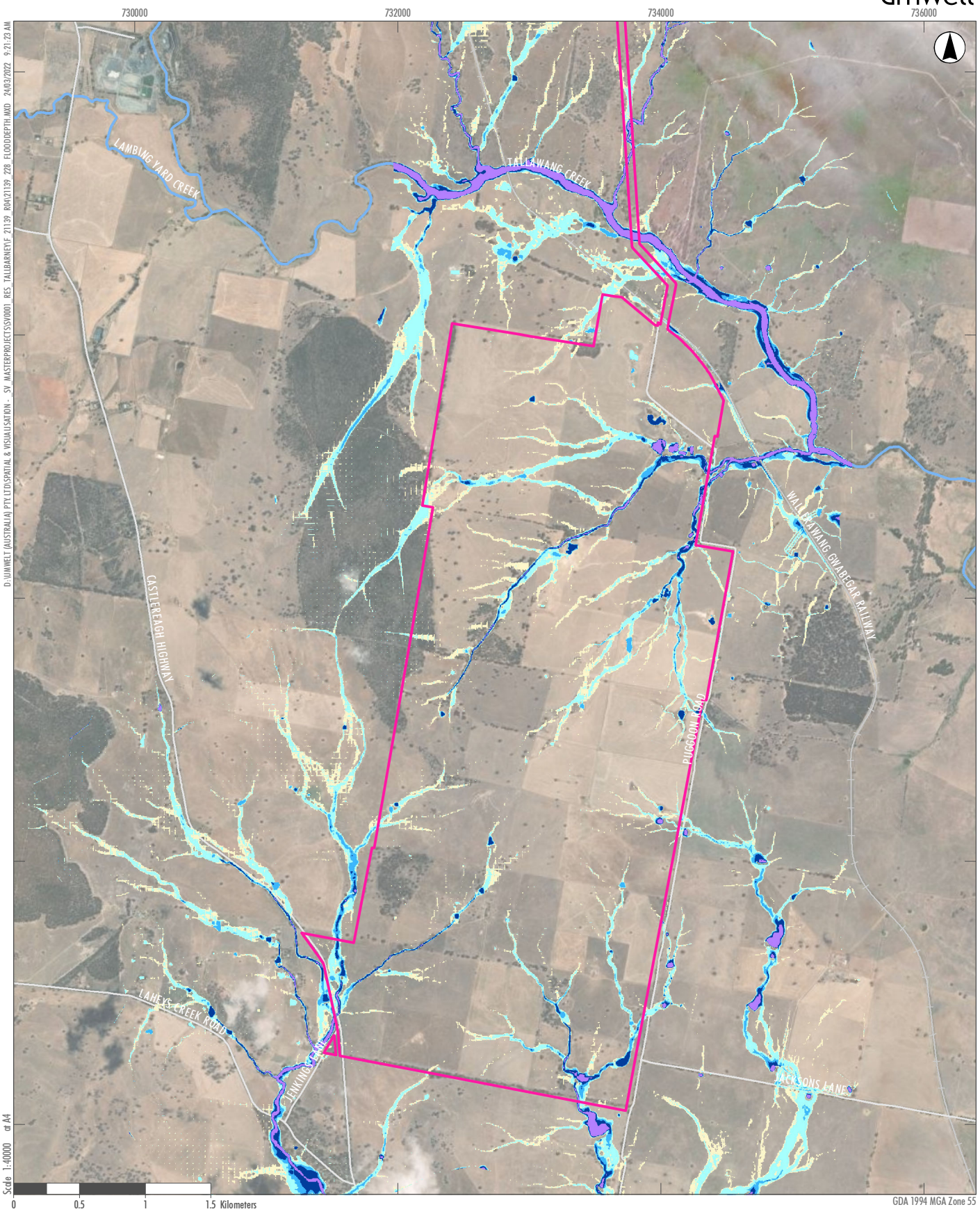
- Desktop review and analysis of existing information to enable an understanding of the current surface water and groundwater environment and to identify potential risks, within the context of existing statutory procedures and protocols that may influence the project design, construction and operation.
- Flood investigation was undertaken for 5%, 1%, 0.5% and 0.2% Annual Exceedance Probability (AEP) events and the Probable Maximum Flood (PMF).
- Hydraulic modelling of the Project Area was completed using a two-dimensional (2D) TUFLOW flood model. The model topography was developed from the LiDAR data available for the site.
- Climate change modelling was undertaken using the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.
- Qualitative assessment of potential impacts to surface water quality and quantity, groundwater as well as flooding and hydrology as a result of construction, operation and decommissioning of the Project.
- Recommendations for appropriate mitigation and management measures.

Further detail regarding the methodology can be found in **Appendix 11**.

6.8.2 Modelling Results

The flood model results provide the distribution of peak flood level, depth, velocity and hazard across the Project Area under existing conditions for the 5%, 1%, 0.5% and 0.2% AEP events and the PMF. The flood modelling results are presented in **Appendix 11** and the key findings are summarised below.

Modelled flood depth, velocity and flood hazard for the 1% AEP event are shown in **Figure 6.7**, **Figure 6.8** and **Figure 6.9**. This represents the principal flood planning event for the Project.



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

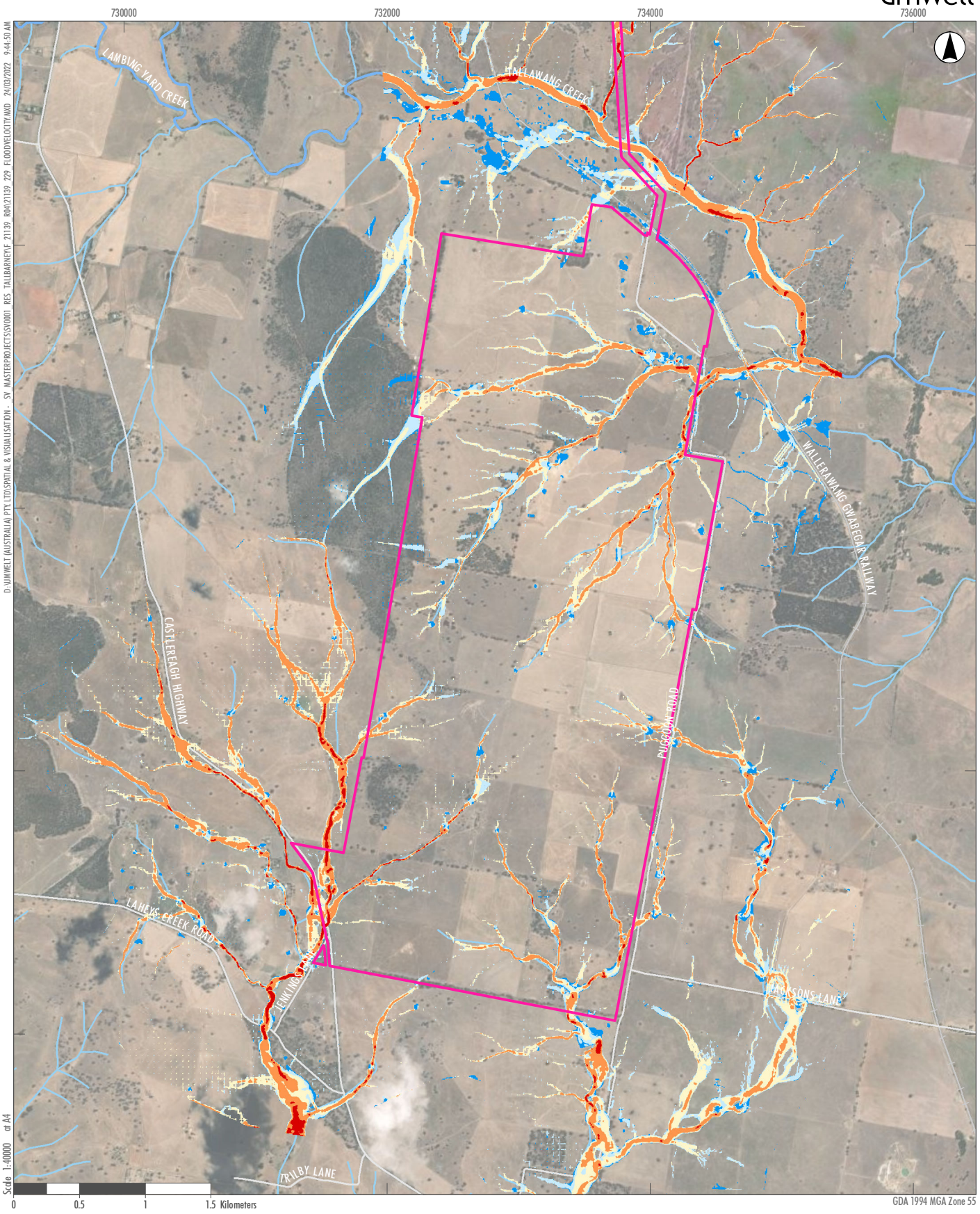
Water Depth (m)

- < 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- > 1.0

FIGURE 6.7

1% AEP Flood Depth for Existing Conditions

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

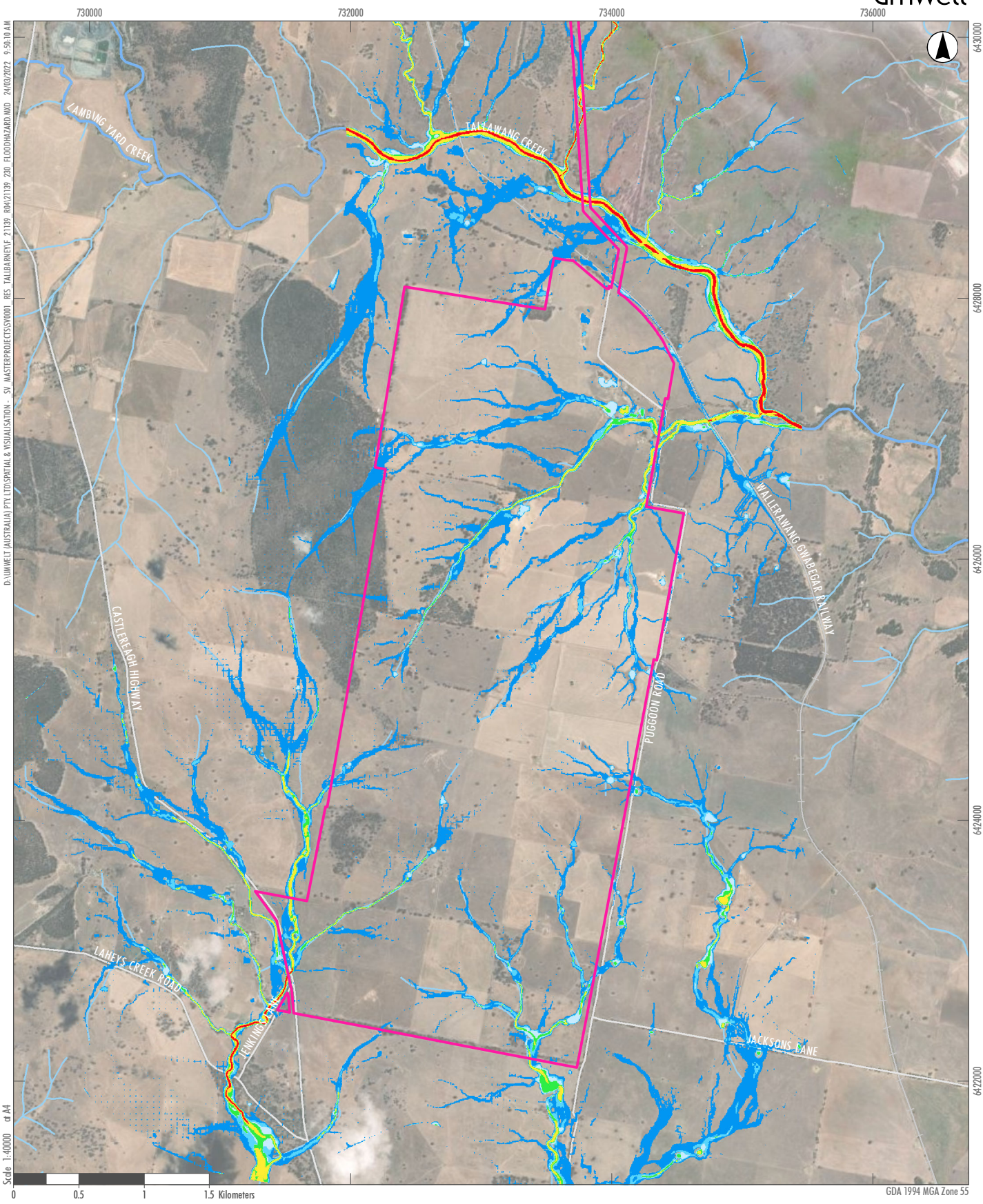
Water Velocity (m/s)

- < 0.3
- 0.3 - 0.6
- 0.6 - 1.0
- 1.0 - 2.0
- > 2.0

FIGURE 6.8

1% AEP Flood Velocity for Existing Conditions

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Road
- Railway
- Watercourse

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

FIGURE 6.9

1% AEP Flood Hazard for Existing Conditions

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)

Flood Depth

The existing conditions of flood depths showed that, in general, the flows are concentrated and confined to the watercourses and local depressions with enough terrain relief to limit the amount of sheet flow. General overland flood flow depths outside of the main waterway alignments are typically shallow at less than 0.3 m for both the 5% AEP and 1% AEP events. The minor watercourses within the Project Area have flood depths generally less than a 1 m with some higher depths observed at farm dam locations and some localised higher depths along the reaches in the 1% AEP scenario. Higher flood depths exceeding 1 m are observed for both 5% and 1% AEP along the main Tallawang Creek channel alignment but remain relatively confined.

Flow Velocity

Velocities within the Project Area along overland flow alignments in a 5% AEP model are typically less than 1 m/s. Within defined drainage lines or waterways, peak velocities may reach 1-2 m/s depending on the local channel slopes and overall flow accumulation concentrating in the lower reaches of the channels. For 1% AEP modelling the overland flow velocities within the Project Area remain generally less than 0.3 m/s and only exceed 0.6 m/s within the waterways. Within the defined drainage lines, velocities reach between 2.0 and 2.5 m/s in the lower reaches.

Flood Hazard

Flood hazard was assessed using the six hazard vulnerability classifications set out in the ARR 2019. The flood hazard within the site for both 5% AEP and 1% AEP flood event is mostly characterised as H1: 'Generally safe for vehicles, people and buildings' and only reaches above this in the waterways and defined drainage lines.

Climate Change

The 0.5% and 0.2% AEP year flood events were used as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change. The 0.5% and 0.2% AEP design rainfalls for the Project Area represent general increases of 10% and 25% in rainfall respectively above the 1% AEP design rainfall. Accordingly, these are within the 10-30% range typically adopted for climate change allowance on design rainfall.

The flood inundation patterns and extents for these events are generally similar to the 1% AEP design results. The modelling shows no activation of additional flow paths or extended inundation areas that materially impact on the development, indicating the inundation impact of climate change is unlikely to pose a significant risk for the Project.

PMF Results

Modelled PMF depths, velocities and flood hazard represents an overall increase in mapped flood extent (relative to other modelled events) although a significant proportion of this area is in overland flow areas with flow depth remaining less than 0.3 m. Flood extents along the defined watercourses within the Project Area have flood depths up to 4 m and velocities that reach between 2.0 and 3.0 m/s in the lower reaches. A similar flood depth range is observed within the Project Area's dams.

The PMF flood hazard within the site mostly remains characterised as H1 and only reaches above this in the waterways and defined drainage lines. Within some of the watercourse alignments, flood hazard is classified as H5 and H6 ('Unsafe for vehicles and people'). Accordingly, infrastructure should be avoided in these areas.

6.8.3 Assessment of Impacts

6.8.3.1 Flooding

Solar Farm Site

The results of flood modelling show, in general, the Project Area is of low flood risk with minimal risk of changes to internal or external waterway flows (discussed further in **Appendix 11**). Due to the nature and extent of the proposed infrastructure and minimal changes to land topography, impervious fraction and subsequent runoff and groundwater infiltration are expected to result in minor and manageable impacts on surface water and groundwater.

Peak stormwater discharges from the Project Area may increase slightly through the increase of impervious surfaces, such as compacted gravel roads and small operational buildings. The potential impacts of this increase 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. It is expected that vegetated buffers strips alongside roads and other infrastructure, and grassed table drains would attenuate any localised increases in peak flows.

Any fill or levelling for the construction of PV arrays and/or ancillary infrastructure conducted in areas of flood inundation will require individual or collective assessments included as part of the Soil and Water Management Plan developed as part of the CEMP.

The OEMP and decommissioning and rehabilitation strategy will also include relevant surface water and erosion sediment control management measures. The erosion and sediment control measures are to be prepared by a suitably qualified soil and water specialist, e.g., a Certified Professional in Erosion and Sediment Control.

Transmission Line Corridor

The proposed transmission line corridor traverses several watercourses, including Tallawang Creek. The estimated 1% AEP flood depth where the transmission line crosses Tallawang Creek is approximately 4 m. The 1% AEP flood depth at the other locations along the alignment range between 0.2 m and 2 m.

Onsite Substation

The flood modelling results show that both the substations within the Project Area are predicted to be free from flooding up to and including the 0.2% AEP flood event.

Project Access

The modelling shows that the access via Castlereagh Highway is relatively flood free making the Project compatible with the Flood Hazard of the land. Castlereagh Highway to the north of the Jenkings Lane access point may experience flooding during a 1% AEP event with a flooding depth of up to 0.3m. The alternate access points off Puggoon Road are generally not inundated up to a 1% AEP event with up to 0.3m flood depths predicted at the waterway crossings.

Farm Dams

Farm dams in the Project Area do not appear to hold significant volumes of water as per the 1% AEP flood depths (refer to **Figure 6.7**). Even in the event the dams were filled, it is unlikely to cause any significant adverse impacts to flood behaviour but may increase general day to day flows within receiving waterways due to a decrease in catchment storage. The extent of potential impacts will be considered further as part of a detailed Soil and Water Management Plan (refer to **Section 6.8.4**).

Fencing

A chain wire fence around the perimeter of the Project Area could potentially trap and accumulate flood debris and impede flows which may result in minor increases in water level upstream of the blockage and potential redistribution of flow at the boundary. Given the local topography and minor nature of the identified watercourses in the Project Area, any redistribution of flow from fence blockage would be localised and unlikely to cause any significant inundation outside of the mapped flood extents. Fence maintenance and clearing of debris after each flood event will further minimise any potential impacts.

6.8.3.2 Surface Water Quality

Water quality impacts are most likely to be experienced during construction (and decommissioning) with limited operational impact.

Construction and Decommissioning

During construction and decommissioning of the Project, soils would be subject to disturbance, involving minor vegetation removal, excavation works and stockpiling of materials, which can potentially lead to sediments and/or pollutants mobilising in runoff and flowing into Tallawang Creek and the tributaries which discharge to Wialdra Creek. The key factor influencing the extent of sediment runoff and storm water pollution is likely to be weather events. The occurrence of a major storm event at a critical phase of the construction period could potentially result in higher levels of turbid run-off. With the implementation of erosion and sediment control measures outlined in **Section 6.8.4**, potential construction related erosion and sedimentation impacts would be appropriately managed and are expected to be minor.

In addition, the potential exists for spills (such as hydraulic oil and fuels from equipment or vehicles as well as concrete spills, building materials and chemicals) to be washed into waterways. With the implementation of the control measures outlined in **Section 6.8.4**, potential surface water runoff, soil contamination would be appropriately managed, and associated impacts are expected to be minor.

During the construction phase, there may be a requirement to construct waterway crossings within the Project Area to allow for access tracks to be constructed. Detailed design will be undertaken prior to any works commencing. Where waterway crossings (i.e. culvert crossings or causeways) are required, these would be designed and constructed in compliance with the Department of Primary Industries (Office of Water) *Guidelines for riparian corridors on waterfront land (2012) and Guidelines for watercourse crossings on waterfront land* (2012). For the creeks in the Project Area providing biodiversity value, a setback of 40 metres has been adopted in the design layout to minimise potential impacts.

Operation

Potential water quality impacts during the operational phase would be minimal, as the day-to-day activities during this phase would be limited to routine maintenance and monitoring. There is the potential for:

- stormwater runoff from impervious surfaces such as the base of PV panels resulting in localised erosion
- accidental spills or discharge through use and storage of chemicals such as fuel
- use of herbicides for vegetation control
- discharges from on-site wastewater facility within the operations and maintenance facility.

With the implementation of operational management measures outlined in **Section 6.8.4**, water quality impacts during the operational phase are expected to be negligible.

6.8.3.3 Water Supply

Construction and Decommissioning

The Project would require a water supply during the construction and decommissioning phases, as discussed in **Section 3.3** and **Section 3.5.** The total water demand for the Project would be in the order of 206 megalitres (ML) for the 34-month construction period.

Water supply for the Project through a commercial supplier (via water trucks) has been confirmed. Water may also be sourced from farm dams or licensed groundwater bores located within the development footprint, where appropriate and available. 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 farm dams during construction and decommissioning would be agreed with the landholder. The estimated maximum harvestable right dam capacity would not be exceeded.

A desktop review of water access licenses on the NSW Water Register undertaken during June 2022 indicated that there are no existing groundwater access licenses for the Project Area (WaterNSW, 2022). Should the Project use water from groundwater bores, approval for Water Access Licences (WAL) would be required under the NSW *Water Management Act 2000*, and groundwater use will need to be within licensing requirements. Furthermore, the use of any bore water during construction and decommissioning would be agreed with the landholder. The licensed water use (if applicable) would not be exceeded.

Based on the above, it is anticipated that the Project's proposed water use during construction and decommissioning would not have a negative impact on water supply to the Project Area and the region.

Operation

During the operational phase, approximately 3.4 ML of water per year would be required for ongoing maintenance activities (including washing of the PV solar panels) and staff amenities. Water supply options for operation will be similar to the construction water supply options and will be reviewed and confirmed during the detailed design phase ensure the Project's water usage does not adversely impact adjacent landowners or other stakeholders.

6.8.3.4 Groundwater Resources

Construction and Decommissioning

As discussed in **Section 2.2**, the latest recorded groundwater depth recorded adjacent the Project area is at 12 m. The Project is anticipated to result in pile driving of up to 3.5 m deep, cabling trenches of up to 0.6 m deep and foundations for the substation and associated infrastructure of up to 2 m deep.

High potential GDEs were identified approximately 400 m north of the Project Area, near Tallawang Creek, with moderate-low potential GDEs within the Project Area.

Impacts to groundwater resources, including GDEs and bore users, are not expected given the groundwater table is unlikely to be intercepted during Project construction. Additionally, given the depth to groundwater within the Project Area (refer to **Section 2.2.4**) hydrocarbon/chemical spills are unlikely to infiltrate to the groundwater table.

Should the final Project design identify that construction/decommissioning activities will result in the interception of the groundwater table, an assessment of impacts will be undertaken, and appropriate management measures be developed to mitigate any potential impacts.

Operation

There will be no impacts to groundwater resources, including GDEs and bore users, during operation on the basis that the groundwater table will not be intercepted.

6.8.4 Management and Mitigation Measures

Water sources would be confirmed during 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.

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, including contaminated land. The CSWMP will provide:

- Measures to minimise/manage erosion and sediment transport both within the construction footprint and offsite including requirements for the preparation of erosion and sediment control plans (ESCP) for all progressive stages of construction, Measures to manage waste including the classification and handling of spoil.
- Procedures to manage unexpected, contaminated finds.
- Measures to manage stockpiles including locations, separation of waste types, sediment controls and stabilisation.
- Measures to manage accidental spills including the requirement to maintain materials such as spill kits.
- Controls for receiving waterways which may include:
    - Designation of 'no go' zones for construction plant and equipment.
    - Creation of catch/diversion drains and sediment fences at the downstream boundary of construction activities where practicable to support containment of sediment-laden runoff.

- Erosion and sediment control measures will be implemented and maintained at all work site in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008b), commonly referred to as the "Blue Book".

An OEMP will be developed for the Project to address potentially adverse impacts on the receiving environment surface water quality during the operational phase. This will include the development and appropriate maintenance of suitable ground cover around solar panels, and grassed table drains near access tracks to minimize the potential for erosion and export of sediment. Additional measures for the treatment of stormwater quality are not considered necessary.

6.9 Aboriginal Cultural Heritage

The Project Area is located within the traditional homelands of the Wiradjuri people, whose history extends from the present day back many thousands of years. The Project Area is also within the Native Title registered claim of the Warrabinga Native Title Claimants Aboriginal Corporation and is also within the Mudgee Local Aboriginal Land Council (Mudgee LALC) boundary. Representatives of the claimant group have been consulted in the preparation of the EIS as outlined in **Section 6.9.1.1**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been prepared for the Project by Umwelt in collaboration with the Registered Aboriginal Parties (RAPs) to assess the Aboriginal heritage values (cultural and archaeological) of the Project Area and surrounds (refer to **Appendix 12**), in accordance with the SEARs.

6.9.1 Methodology

The ACHA Report (ACHAR) has been prepared to satisfy the requirements of the:

- SEARs for the Project (refer to **Appendix 1**)
- *National Parks and Wildlife Act 1974* (NPW Act)
- National Parks and Wildlife Regulation 2009 (NPW Regulation)
- principles of *The Burra Charter* (Australia ICOMOS 2013)
- Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005)
- Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010)
- key elements of the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010).

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

The objective of the ACHAR was to ensure that Aboriginal people have the opportunity to participate in and improve the outcomes of the assessment by:

- providing relevant information about the cultural significance and values of the Aboriginal objects and/or places within the Project Area
- influencing the design of the method to assess cultural and scientific significance of Aboriginal objects and/or places within the Project Area
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal objects and/or places within the Project Area
- being provided with a draft of the assessment reports and inviting comment on the drafts before they are finalised and submitted as part of this EIS.

6.9.1.1 Consultation Process

As a result of the Project Notification process, 11 RAPs registered an interest in the Project and have been part of an active consultation process in relation to 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.

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. The understanding of significance and the management recommendations provided by the RAPs have informed RES in its development of cultural heritage management measures for the Project.

Consultation with the Aboriginal community was undertaken in accordance with the NPW Act and NPW Regulation, with reference to the Guide to investigating assessing and reporting on Aboriginal Cultural Heritage in NSW.

The consultation involved:

- **Stage 1 – Notification and Registration of Aboriginal Parties.** Notifications were developed and the registration of Aboriginal parties was completed in accordance with Part 5, Division 2 Clause 60 of the NPW Regulation. Public notification was given in the Mudgee Guardian on 30 March 2021.
- **Stage 2 and 3 – Presenting Information and Gathering Information About Cultural Significance.** Correspondence providing information about the proposed Project and requesting information about cultural significance was provided to all RAPs. A letter providing information regarding the Project and incorporating a draft methodology for the assessment was provided to all RAPs on 2 July 2021. It was requested that all Aboriginal parties provide comment on the proposed assessment methodology. Infield consultation involving a site walk over with representatives of four RAP groups was conducted during November 2021. Following the completion of this survey, the alignment of the overhead transmission line corridor was modified. The RAPs were advised of this change and the requirement to undertake additional survey (consistent with the previous survey methodology) was identified. Further infield consultation involving a second survey undertaken in January 2022.

- **Stage 4 – Review of the Draft ACHAR** - A copy of the draft ACHAR was provided to all registered Aboriginal parties in April 2022 with an invitation to review and comment on all aspects of the document. The RAPs were invited to comment on any aspect of the ACHAR, noting that information on cultural significance and any recommendations provided from an Aboriginal cultural perspective would be documented in the final ACHAR. The comments received from the RAPs are included in Appendix 1 of the ACHAR (refer to **Appendix 12**). The feedback from the RAPs on the draft ACHAR has been incorporated into the ACHAR, as summarised in **Section 6.9.4**.

Full details of the consultation process undertaken in relation to the ACHAR are contained in **Appendix 12**.

Consultation with the Native Title Claimant Group

The Warrabinga Native Title Claimants Aboriginal Corporation was one of the RAPs consulted as part of the AHCA process. Consultation with the claimant group involved:

- 17 May 2021 – Umwelt sent letter to invite registrations of interest in the Project (by post) – registration of interest received verbally (by phone) and confirmed by email.
- 11 August 2021 – RAP provide expression of interest to participate in fieldwork.
- 1 – 3, 5 November 2021 – Representative of RAP participated in fieldwork.
- 11 January 2022 - Representative of RAP participated in fieldwork.
- 8 April to 25 May 2022 – Draft ACHAR provided to RAP for review and feedback. RAP provided no response was received after a two follow ups.

6.9.1.2 Field Survey Strategy

The survey focussed on the portions of the Project Area considered most likely to contain archaeological evidence (such as slopes bordering watercourses and areas of high surface visibility such as exposures along fence lines, paddock gates, beneath mature vegetation, dams, erosion scours and along unsealed vehicle tracks), however, a representative sample of other landforms was also undertaken. Where vehicle tracks were present, pedestrian survey was undertaken to take advantage of increased visibility and exposure. All efforts were made to achieve maximum survey coverage via pedestrian survey. The survey was undertaken to ensure a representative sample of all landforms within the Project Area was obtained, in compliance with the Code of Practice.

In accordance with the Code of Practice, the survey coverage description includes landform unit, the total area surveyed within the landform unit and the quantification of the level of ground surface visibility and exposure.

The survey of the Project Area was conducted by the RAPs and two Umwelt archaeologists over the course of two survey periods. The first survey period extended from 1 November to 9 November 2021 and the second survey extended from 10 to 11 January 2022.

6.9.2 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 12** with a summary provided below.

The Project Area largely comprises low inclinations slopes that provided access to ephemeral water resources, with more permanent water resources available on Tallawang Creek. These landforms would have provided areas suitable for occupation by Aboriginal people, however the likely duration of any occupation was probably limited based on water availability. In this way, people may have camped for periods following rainfall and/or moved through the area as they transitioned between the key water courses in the region.

In terms of other resources, prior to historical landscape modification, the area would have been relatively well resourced with an array of plant and animal species. However, the majority of the Project Area, including the lower slopes bordering watercourses has been subject to extensive modification because of historical vegetation clearance, cultivation and pastoral use. The relatively shallow topsoils within the area (generally less than 50cm in depth) are likely to have been subject to increased erosion as a result of vegetation clearance and grazing, thereby reducing further the depth of the already shallow soil profiles in these areas.

As discussed earlier, the Project Area is covered by a single registered native title claim made by Warrabinga-Wiradjuri. However, it is generally understood that the boundary between the Wiradjuri and Gomeroi people is located relatively close to the Project Area.

The country of the Wiradjuri is reported to have stretched over a very large area, encompassing a substantial portion of inland NSW associated with the catchments of the Macquarie, Lachlan and Murrumbidgee Rivers. They are reported to have been one of the largest tribal groupings in Australia, with the Wiradjuri language believed to have been the most widely spoken in New South Wales.

Following the movement into the area of non-Aboriginal people, conflict occurred with Aboriginal people in the local area from the 1820s, peaking between 1824 and 1826 (refer to Haglund 1999). The impacts of non-Aboriginal occupation on the Wiradjuri were exacerbated from 1850 as the non-Aboriginal population in the area swelled during the gold rush (South-East Archaeology 2009:72). As with the Gomeroi, Wiradjuri people remain strongly linked to their culture and connected to this area.

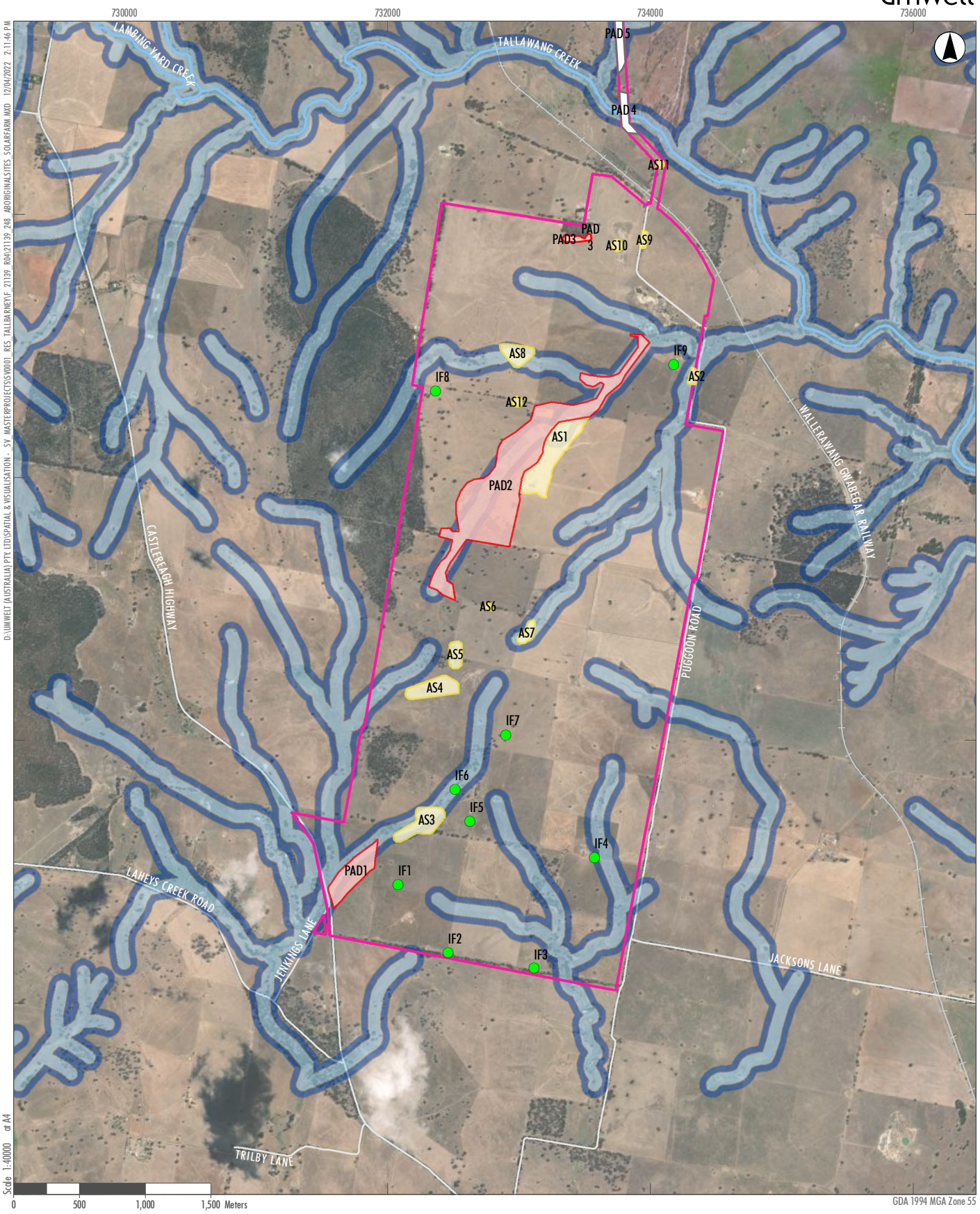
6.9.3 Assessment of Impacts

6.9.3.1 Survey Results

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

- Nine potential archaeological deposit (PAD) areas
- Ten isolated finds (IS) sites
- Twelve artefact scatters (AS) sites.

Figures 6.10 and 6.11 illustrate where these sites are located within the Project Area.



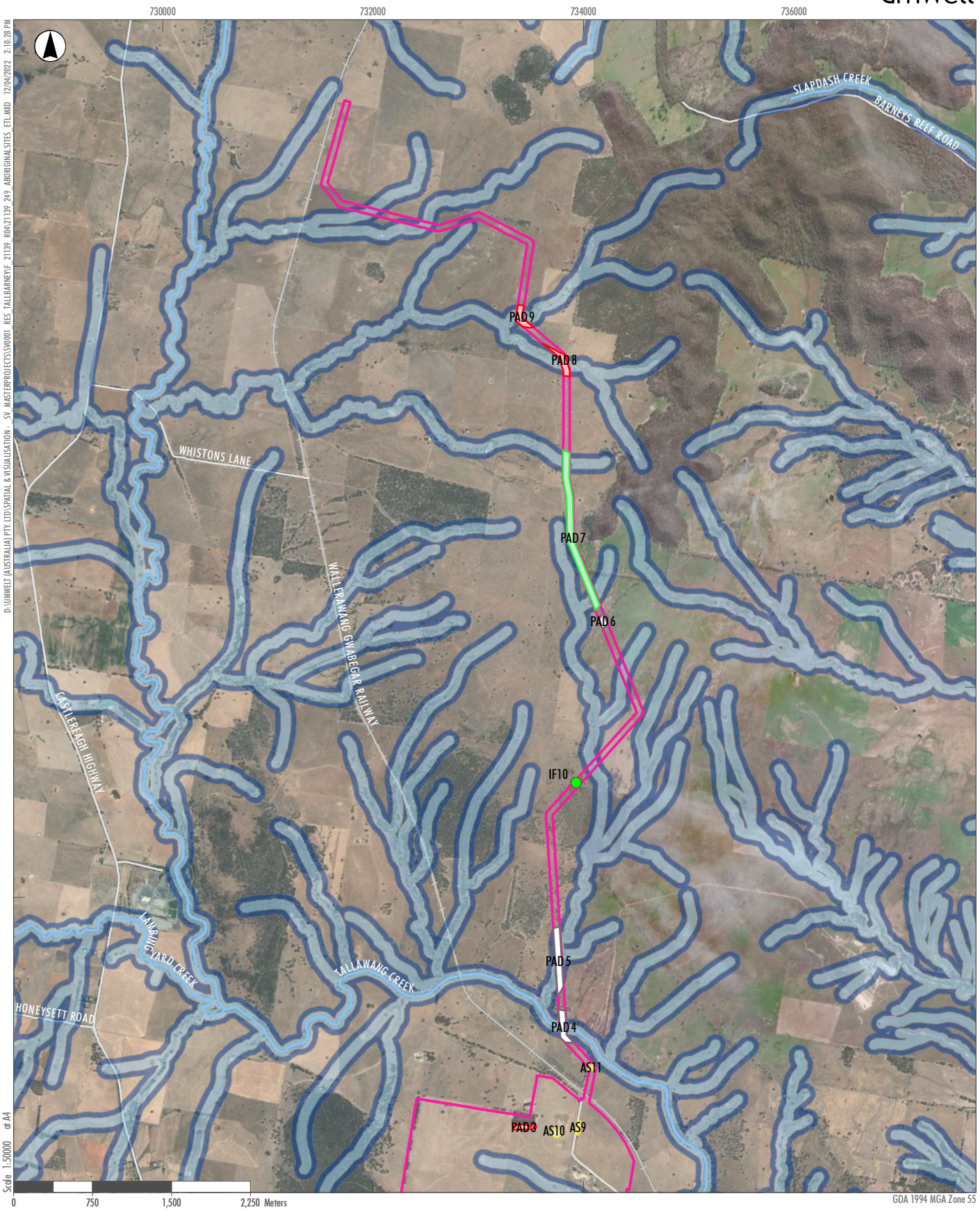
Legend

- Tallawang Solar Farm Project Area
- Potential Archaeological Deposit
- Potential Archaeological Deposit with Artefact Scatter
- Artefact Scatter
- Isolated Find
- 50m Watercourse Buffer
- 100m Watercourse Buffer
- Road
- Railway

FIGURE 6.10

Location of Newly Recorded Aboriginal Sites - Solar Farm

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020), NSW DPIE (2020)



Legend

- Tallawang Solar Farm Project Area
- Potential Archaeological Deposit
- Potential Archaeological Deposit with Artefact Scatter
- Potential Archaeological Deposit with Isolated Find
- Artefact Scatter
- Isolated Find
- 50m Watercourse Buffer
- 100m Watercourse Buffer
- Road
- Railway
- Watercourse

FIGURE 6.11

Location of Newly Recorded Aboriginal Sites - ETL

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)

6.9.3.2 Assessment of Impacts

Impact to Archaeological Values

The Project was subject to significant redesign to avoid areas of the PADs as well as riparian corridors and to minimise impacts to identified surface sites (where possible). This redesign has allowed for areas of moderate to high archaeological/scientific and cultural significance (such as the PADs) to be avoided while allowing the development of appropriate management of areas of low archaeological/scientific and cultural significance (such as the AS and IFs).

Based on the above, it is concluded that the Project will have the following impact in relation to the sites identified during the assessment:

Solar Farm and BESS development area

- Impacts to all PADs (i.e PAD1 to PAD3) can be avoided during works with no ground disturbance works proposed within the mapped extent of these areas. This includes impacts to PAD2 AS that is proposed to be spanned by the transmission line corridor within the solar farm site, therefore no ground disturbance will be required within the mapped area of PAD2 AS for the construction of the transmission line corridor.

- Sites IF1 - IF9, AS6 and AS12 would be subject to impact either as a result of the Project or ongoing agricultural use due to solar grazing during the operational life of the Project. These sites are currently located in disturbed areas (being access roads, dam walls and cleared, cultivated or heavily grazed paddocks) where ongoing disturbance is required as part of land management and farming activities. Impacts to these sites can be mitigated by the collection of surface artefacts. This strategy is appropriate from an archaeological perspective and was preliminarily found acceptable to the RAPs during field discussions. The mitigation strategy will allow for the collection and interpretation of a representative sample of the assemblage from each site/area and may inform some understanding (albeit potentially limited) of how Aboriginal people accessed resources, manufactured stone artefacts and travelled through the local area.

Transmission Line Corridor

- Sites AS11 and IF10 will be subject to complete impact as a result of the Project.

- Confirmation of the location of the CWO REZ Transmission Line and Project connection point as well as final design of the Barneys Reef Wind Farm Project will determine the final design of the transmission line easement. The objective is to avoid the PADs (i.e. PAD4 to PAD9) within the transmission line easement. However, should the design for the transmission line corridor change, and partial impact is required, further assessment will be undertaken, such as test excavation.

Impact to Aboriginal Cultural Values

Based on engagement with the RAPs, it was confirmed that regardless of the level of archaeological significance placed on artefacts/sites, the RAPs consider all sites to be of high cultural value.

6.9.4 Management and Mitigation Measures

The following archaeological management and mitigation measures will be implemented should the Project be approved:

- The Proponent would ensure that all employees and contractors are aware that it is an offence under Section 86 of the NPW Act to harm or desecrate an Aboriginal object unless that harm has been subject to approval as part of the necessary approvals process.
- An Aboriginal Cultural Heritage Management Plan (ACHMP) would be developed for the Project, as a condition of consent, in consultation with the registered Aboriginal parties and should include measures that will be implemented for:
    - Ensuring the registered Aboriginal parties continue to be consulted appropriately with regards to the Project and the activities to be conducted within the Project Area.
    - Protecting the Aboriginal archaeological sites and areas of archaeological potential identified in row 1 of **Table 6.10** including establishing appropriate fencing/site demarcation prior to the commencement of construction and ensure ongoing protection during construction and operation. This will include provision for consultation with the RAPs regarding the establishment of site fencing and any associated signage. Surface collection of isolated artefact and additional inspection of surrounding area (10 m radius) to identify whether additional artefacts have become exposed/visible and can be collected. Fencing is to be carried out in consultation with RAPs, with wording of any signage to be subject to RAP review.
    - Managing impacts to sites identified in row 2 of **Table 6.10**. This will include the provision of methodologies for surface collection and for fencing/site demarcation (where impact is partial only). Surface collection of isolated artefact and additional inspection of surrounding area (10m radius) to identify whether additional artefacts have become exposed/visible and can be collected. Fencing is to be carried out in consultation with RAPs, with wording of any signage to be subject to RAP review.
    - Protocols to be followed in the instance that additional ground disturbance works are required outside the assessed areas. This will include requirements for further survey and assessment of any such works.
    - Development of appropriate management, storage, and eventual repatriation of collected archaeological material from the Project Area in consultation with the RAPs.
    - The management of any new Aboriginal archaeological sites (Unexpected Finds Protocol) that may be identified during these inspections or over the course of construction or operational activities.
    - The management of Aboriginal skeletal remains should any be identified within the construction or operational activities for the Project, and the involvement of the RAPs in this process.
    - Monitoring and reporting on the effectiveness of these measures and to report on the outcomes of any approved mitigation works.
    - Providing Aboriginal cultural heritage awareness training to all staff and contractors working on the Project, including the requirement to avoid impacts to PADs and specified sites.

Table 6.10 Recommendations by site/area of archaeological potential

Sites/PADs	Proposed Management Strategy	Requirements
PADs1-9 (with associated artefacts)	Avoid impacts	Establish appropriate fencing/site demarcation prior to the commencement of construction and ensure ongoing protection during construction and operation. If design changes and partial impact is required, further assessment will be undertaken.
AS1-12 IF1-10	Impacts to sites cannot be fully or partially avoided (either because of the Project or ongoing agricultural land use occurring concurrently with the Project)	Where site is subject to partial impact only, for the portion of the site not subject to impact, establish appropriate fencing/site demarcation prior to the commencement of construction and ensure ongoing protection during construction and operation. Where impacts will occur, undertake surface collection of identified surface artefacts within the area of impact including inspection and collection within a buffer around the identified site boundary (allowance of 10 m from recorded site boundary).

6.10 Historic Heritage

An Historical Heritage Assessment (HHA) has been prepared by Umwelt. The SEARs require the EIS to *'assess the impact to historic heritage having regard to the NSW Heritage Manual'*.

The HHA 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 HHA is provided below with the full report available in **Appendix 13**.

6.10.1 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 Area is included in **Appendix 13** with a summary included below.

The first European exploration of the Gulgong area was undertaken in the early 1820s. Land grants were acquired from 1828 through grazing licences, with settlement of the area spreading by both legal and illegal means. This area was known as Tallawang by the 1930s, with many people raising sheep.

Settlement in the Gulgong area was slow, with large swathes of agricultural land gradually opening. It was not until the discovery of gold in Red Hill during April 1870 that development of the area began in earnest (Mudgee Region). The Town of Gulgong was surveyed in August of 1870, with over 800 people reported to be on the gold fields by the end of that year. The population had grown to 12,000 by October 1871. In 1876, Gulgong became a municipality.

The Project Area is situated within the Tallawang Gold Field, proclaimed in August 1870, with some private landholders in the north of the Project Area. As the area opened up with the possibility of gold, the Project Area was divided up further into private land holdings.

With the Gold Rush ending in 1881, wheat and wool production, boosted by the arrival of the railway in 1909, continued to sustain the town. In 1910, a railway station was opened at Puggoon, similar to the nearby Tallawang Station. The Puggoon Station likely consisted of a platform, platform building and siding and would have serviced the agricultural properties and mining tenants in the areas north of Gulgong.

The Puggoon and Tallawang Stations ceased operating in the 1970s and the platform buildings and other associated structures appear to have been demolished.

Miners who stayed on in the area turned to farming, with such agricultural properties making up much of the landscape today. Three possible residential structures were located within the Project Area by 1964, visible on historical aerial imagery provided in **Appendix 13**.

6.10.2 Assessment of Impacts

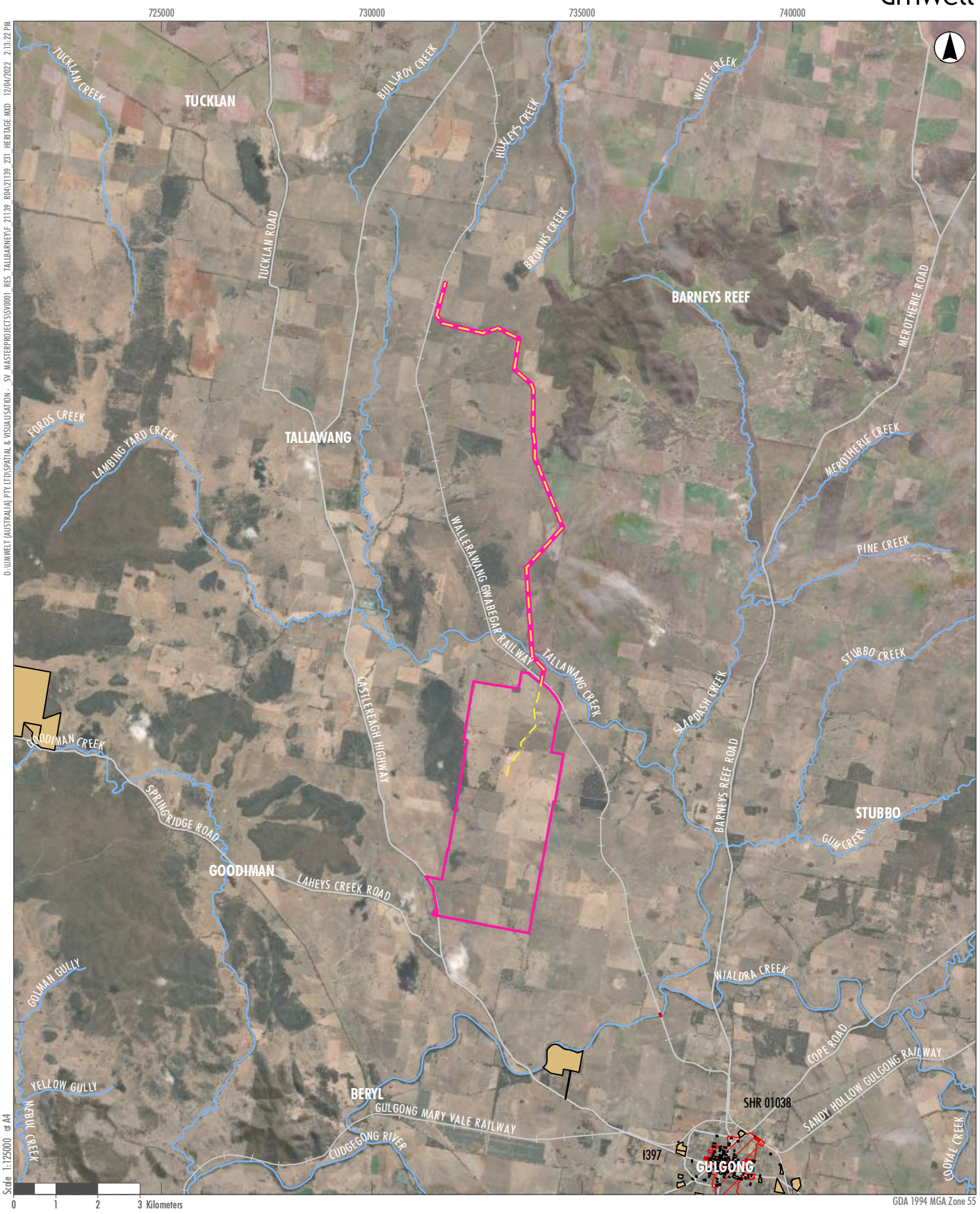
6.10.2.1 Impacts to Heritage Items

There are no listed historic heritage items within the Project Area. The nearest listed items, Gulgong Railway Bridge and 'The Lagoon' residential property, are located approximate 6.4 km and 6.1 km respectively from the Project Area. Refer to **Figure 6.12** for the location of these sites. As such, the Project will have no physical impacts to the heritage items in the vicinity. However, two potential heritage items (PHI) within the Project Area were identified and assessed as meeting the threshold for local heritage significance. The location of these is shown on **Figure 6.13** and include:

- the c.1900 weatherboard cottage (PHI1)
- the c.1870s hut (PHI2).

The Project would not result in any physical impacts to these potential heritage items as both will be retained within the Project layout. Furthermore, the layout incorporates a 40 m setback around PHI1 and a 20 m setback around PHI2. There is however potential for construction activities to result in vibration impacts to PHI1 and PHI2. Recommended safe working distances for vibration generating equipment from sensitive receivers would be met with the proposed setbacks for PHI1 and PHI2.

With the implementation of management and mitigation measures presented in **Section 6.11.3**, impacts to PHI1 and PHI2 during construction, including vibration-associated impacts are considered to be unlikely.



Legend

- Tallawang Solar Farm Project Area
- Proposed HV Powerline
- State Heritage Register

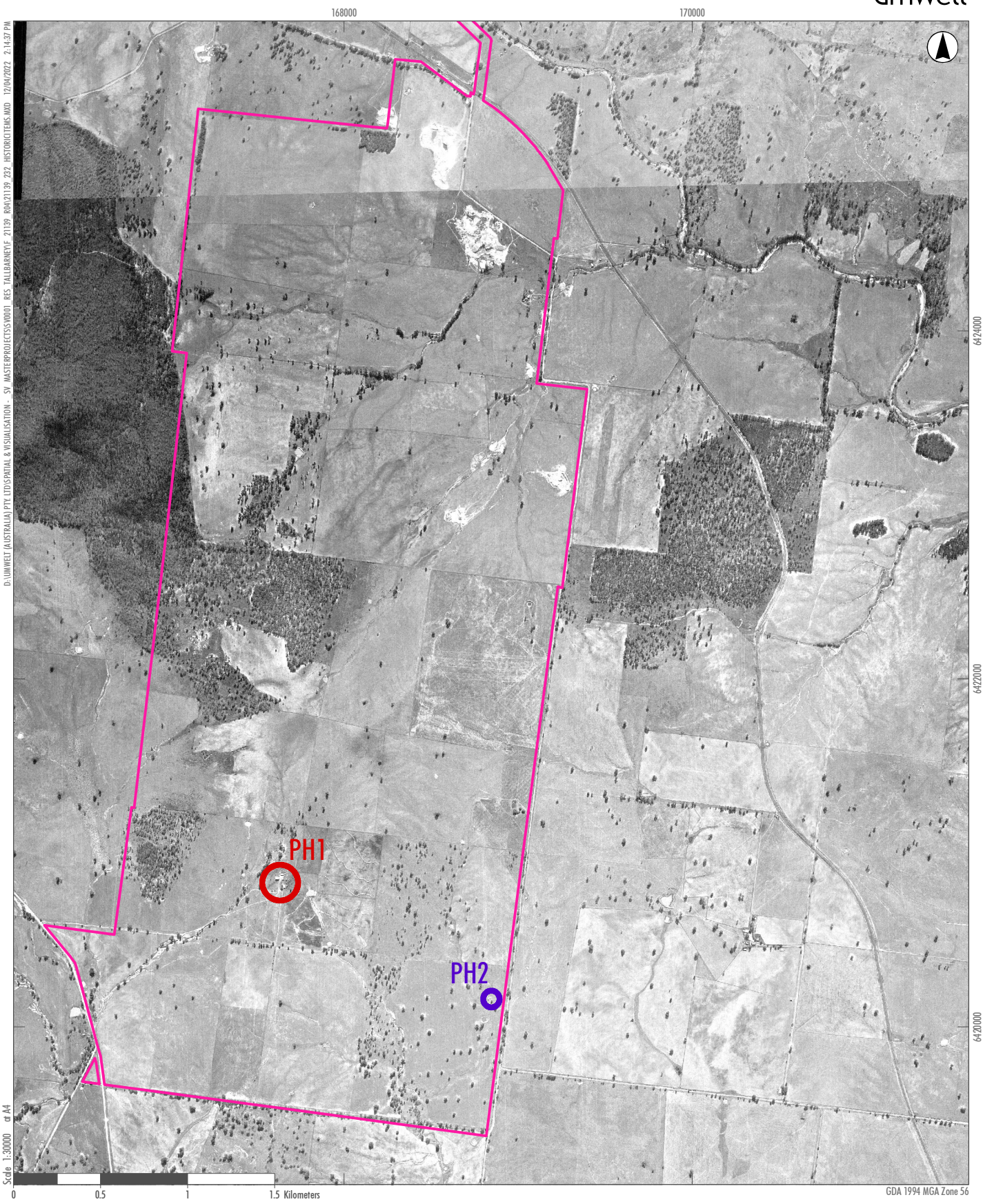
Environmental Planning Instrument - Heritage

- Conservation Area - General
- Item - General

FIGURE 6.12

Recorded Heritage Items in Proximity to the Project Area

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020), NSW Department of Premier and Cabinet (2021), NSW Government (2021)



Legend

- c. 1900 Cottage
- c. 1880 Hut

FIGURE 6.13

Identified Potential Heritage Item

Image Source: Data source: Geoscience Australia; Forestry Corporation of NSW (2019); DSFI (2017); NPWS Estate (2019)

6.10.2.2 Visual Impacts to Heritage Items

The Project would introduce a range of new structures into the landscape which is currently dominated by fields, remnant vegetation and limited structures such as rural dwellings. This will substantially alter the setting of the area and the views across the landscape in the part of the region, particularly for PHI1 and PHI2.

The listed heritage items in the vicinity of the Project Area are concentrated in or near Gulgong, including the Gulgong Heritage Conservation Area (HCA). The Project Area will be physically and visually separated from these heritage items, with the proposed solar panels set back from the Castlereagh Highway (500 m setback) to minimise their visibility from the road and the wider landscape.

The VIA for the Project (as discussed in **Section 6.12** and provided in **Appendix 14** of this EIS) has identified that the changes would largely be to the immediate landscape character of the vicinity when viewed from the proximity of Puggoon Road. This is located some distance (>2 km) from the listed heritage items. From more distant viewpoints, including from Gulgong HCA, the solar panels would appear as a dark colour over the slopes, located between existing stands of vegetation, and have little impact on the wider landscape character of the area. This is of importance to note for the heritage items in the vicinity, particularly the Gulgong HCA, which includes the vistas of rolling countryside as a component of its heritage significance (NSW SHI). Although the solar panel structures may be noticeable in some views from the heritage items, this would be at a great distance and set within the wider rural landscape.

The Project will not result in the loss or substantial modification to these landscape views from the HCA, nor other listed heritage items within the area. The Project is unlikely to result in any adverse visual impacts on the listed heritage items in the vicinity of the Project Area.

Overall, the Project would not have an adverse impact on significant fabric, views to or the setting of any places of heritage significance within the Project Area or within the vicinity.

6.10.2.3 Impacts to Historical Archaeology

The HHA indicates that the archaeological potential of the Project Area is generally low, with low to moderate potential for remains of the former Puggoon railway station platform and building.

Due to the land use history, any archaeological remains are likely to be fragmented or previously disturbed. It is therefore unlikely that the Project would impact on or remove any historical archaeological remains. This includes any evidence of goldmining and associated settlement. Truncated or fragmented remains are unlikely to provide new information about the history of the Project Area, except confirm that gold mining occurred as indicated by other documentary sources.

The area of low to moderate archaeological potential is limited to the rail corridor and is visible on history aerials of the area. It is located outside of the Project Area and is unlikely to be impacted by the Project.

Overall, the Project has little potential to impact on historical archaeological remains.

6.10.3 Management and Mitigation Measures

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

- An unexpected finds protocol will be developed and followed in the event that any unexpected historical archaeological material or any buildings, sites or structures of potential heritage significance are identified. This will include ceasing all work in the area and consulting a suitably qualified archaeologist to determine an appropriate course of action. Depending on the extent and significance of the archaeological remains encountered, Heritage NSW may require consultation prior to the commencement of works.
- Relevant employees, contractors and subcontractors will be made aware of their obligations and requirements in relation to the relevant provisions of the *Heritage Act 1977*. This information will be most effectively provided within mandatory site inductions provided to employees, contractors and sub-contractors working on the Project in accordance with the CEMP.
- To avoid the potential for harm to historic objects on unassessed adjacent landforms, all ground surface disturbing activities will be confined to the development footprint.

6.11 Visual Amenity

A detailed Visual Impact Assessment (VIA) was undertaken by Envisage Consulting Pty Ltd (Envisage, 2022) to assess the visual impacts associated with the Project in accordance with the SEARs as presented in **Appendix 1** and relevant visual assessment guidelines. During the stakeholder engagement, concerns regarding the visibility of the Project, glare and the industrialisation of the landscape, reducing the natural amenity and rural character of the area were raised by the community. The key outcomes of the VIA are summarised below and provided in full in **Appendix 14**. The VIA included an assessment of the visual cumulative impacts associated with the Project and other nearby projects, as further discussed in **Section 6.16** .

The VIA considered the general principles for better site selection, including consideration of site visibility and visual impacts as set out in the *Large-Scale Solar Energy Guideline* (2018). Visual issues referred to in the Guideline and how they have been considered in the VIA are presented in Table 11.3 of the VIA (in **Appendix 14**).

6.11.1 Assessment Approach

The scope of works for the VIA included:

- identification of the likely visual effects of the Project, including potential cumulative impacts in respect to any nearby projects
- valuation of the magnitude of the effects
- assessment of the nature and significance of these effects and
- identification of measures to avoid, reduce or compensate for those effects.

The VIA further included a consideration of reflectivity and glare as well as night lighting impacts, a consideration of the *Dark Sky Planning Guideline 2016* and a draft landscape plan.

6.11.1.1 Zone of Theoretical Visibility (ZTV)

The study area for the Project was established by preparing a Zone of Theoretical Visibility (ZTV). A ZTV is determined entirely by landform (digital terrain models) and presents the potential maximum area of visibility. A site inspection (discussed in **Section 6.11.1.2**) was undertaken to verify the extent of visibility.

Solar Farm Site

Figure 6.14 shows the ZTV projected to 8 km from the solar farm boundary, highlighting the areas with potential views of the Project (also called the visual catchment or viewshed). Solar farm visibility generally becomes minimal beyond 5 km; however, the radius was extended to 8 km to include Gulgong.

Transmission Line

The study area for the transmission line (shown on **Figure 6.15**) was determined via aerial photography, contour data and field assessment. The transmission line study area was limited to 3 km, as from greater distances the visibility of individual transmission towers is generally minimal. The outcomes of the ZTV analysis are discussed in **Section 6.11.3** .

6.11.1.2 Site Inspection

A site inspection was carried out during August 2021, involving a walk over across parts of the Project Area, surrounding publicly accessible areas (including villages in the vicinity and the outskirts of Beryl Solar Farm), public roads (Castlereagh Highway, Puggoon Road, Whiston Lane, Jenkings Lane, Jacksons Lane, Laheys Creek Road and Gingers Lane) and five private properties (i.e. Viewpoint 1 (VP1), VP24, VP40, VP60 and VP213). These properties were identified as being representative of the range of views available. Attempts were made to gain access to an additional four properties; however, contact was unable to be established.

Contact was made with an additional private property (VP206) following the site inspection and the resident provided photographs of their view for this assessment. During the site inspection, viewpoints were selected for photomontages (as discussed below) to illustrate the predicted view.

6.11.1.3 Photomontages

Photomontages illustrate the predicted view of the Project at a momentary point in time. The panel rotation shown in the photomontage is the 'worst case' - that is, with the highest rotation of panels toward the viewpoint.

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 our wider (unfocussed) peripheral vision. Photomontages have been prepared by Cambium Group and are included in **Appendix 14**.

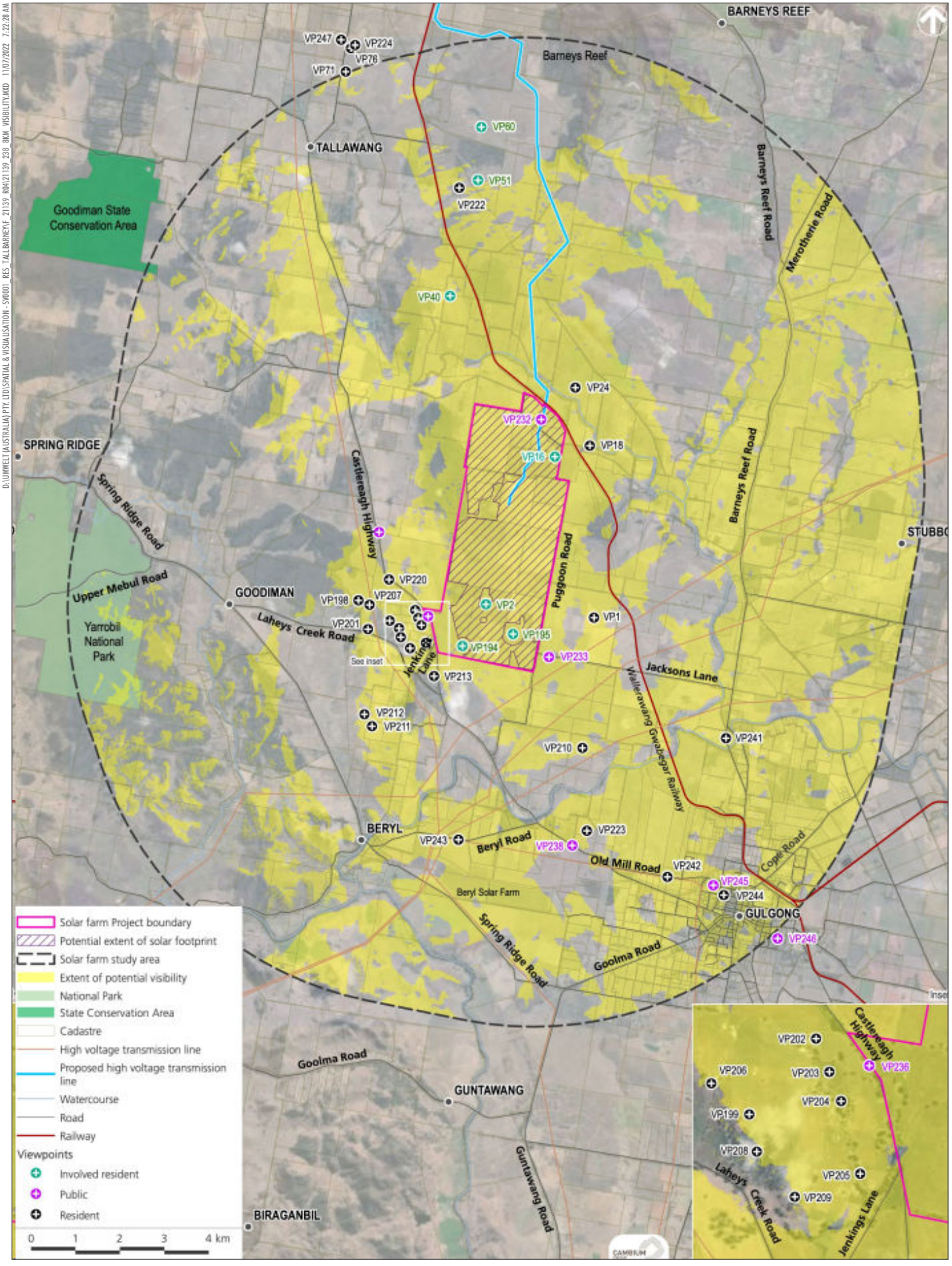


FIGURE 6.14

Zone of Theoretical Visibility to 8 km for the Solar Farm Site

Image Source: Envisage (2022)

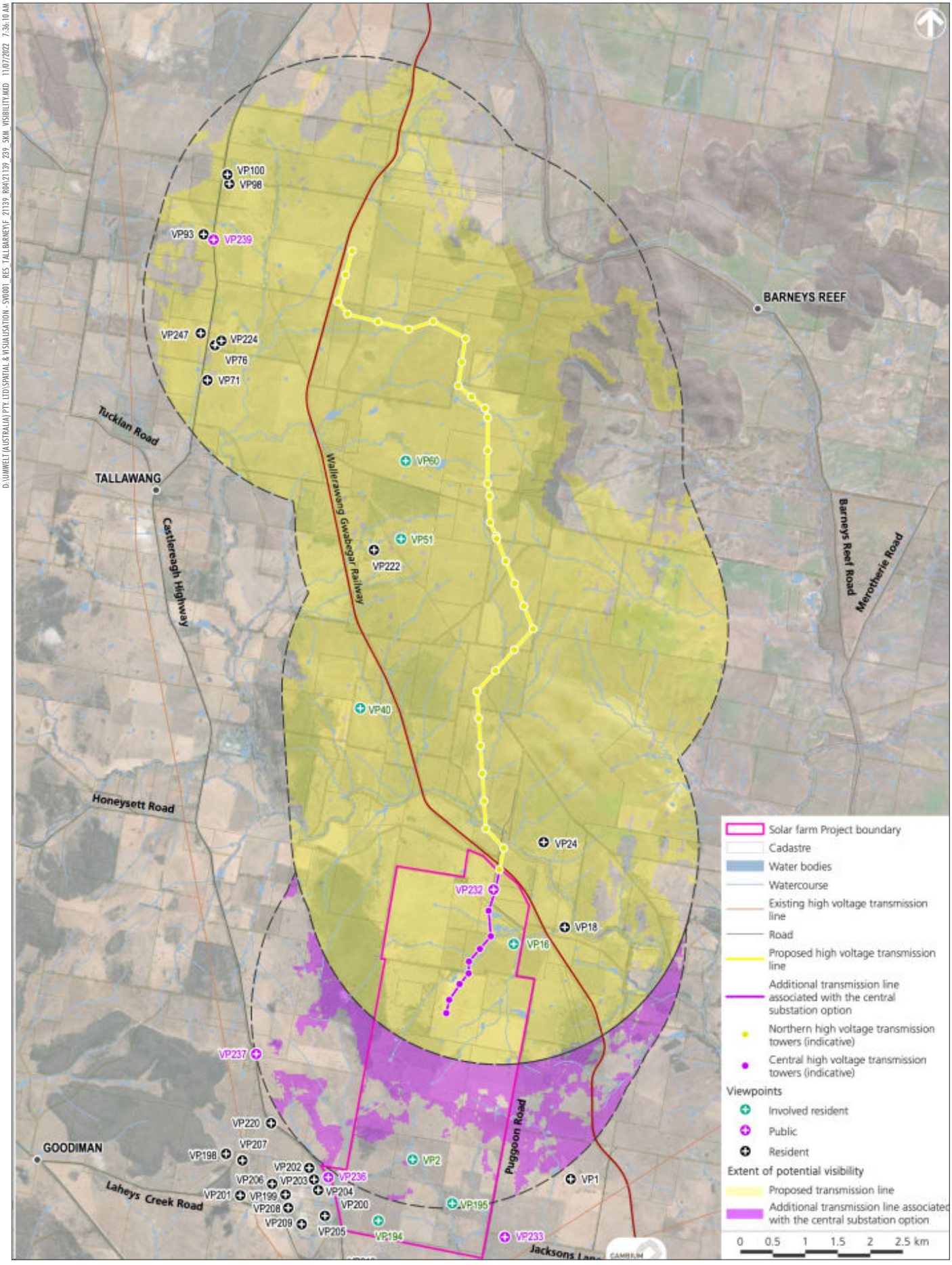


FIGURE 6.15

Zone of Theoretical Visibility to 5 km for the Transmission Line

Image Source: Envisage (2022)

Ten photomontage viewpoints were selected based on the viewpoints that will have the most prominent view of the Project or will be representative of the variety of locations with views of the Project. The location of these photomontage viewpoints is shown in **Figure 6.16** and include:

- VP232 (Puggoon Road) - the closest public viewpoint
- VP246 (Flirtation Hill) - a popular lookout in Gulgong
- three locations along the Castlereagh Highway, i.e.:
    - VP236 - closest to the Project Area
    - VP238 - travelling north
    - VP239 – closest to the transmission line
- five private viewpoints, being:
    - VP1 (340 Jacksons Lane)
    - VP24 (980 Puggoon Road)
    - VP 40 (1716 Castlereagh Highway)
    - VP 206 (186 Laheys Creek Road) and
    - VP 213 (727 Castlereagh Highway).

Photomontages include the following images for each viewpoint:

- the existing view towards the Project
- an analytical view showing the existing view with the location of the Project in pink (pink is used to highlight the extent of panels in view - the solar PV panels would be dark in colour, not pink)
- photomontage showing the likely view following construction of the Project, and
- where relevant, mitigation landscape planting 3 to 5 years following construction.

6.11.1.4 Visual impact definition

The significance of a visual effect (the predicted level of impact) is determined by combining:

- the existing 'sensitivity' of the landscape or view
- the anticipated 'magnitude' of the change that would result from the Project.

The level of 'sensitivity' and 'magnitude of change' is rated from 'High' to 'Negligible'. The combined evaluation of 'sensitivity' and 'magnitude of change' results in the predicted level of impact (refer to **Table 6.11**). A general description of each level of impact is provided in **Appendix 14**.

Table 6.11 Level of impact rating

	High magnitude of change	Moderate magnitude of change	Low magnitude of change	Negligible magnitude of change
High sensitivity	High	Moderate-high	Moderate	Negligible
Moderate sensitivity	Moderate-high	Moderate	Low-moderate	Negligible
Low sensitivity	Moderate	Low-moderate	Low	Negligible
Negligible sensitivity	Negligible	Negligible	Negligible	Negligible

6.11.2 Results

6.11.2.1 Visual Catchment of the Project

As illustrated in **Figure 6.14**, the visual catchment for the solar farm site extends over a wide rural area including residences, local roads, the Castlereagh Highway, the Wallerawang to Gwebgar railway, the heritage town of Gulgong, a lookout (Flirtation Hill, Gulgong), playground (Peoples Park, Gulgong), and a National Park (Yarrobil). The visual catchment for the transmission line, as shown in **Figure 6.15,** includes Puggoon Road, the Castlereagh Highway, and rural residences east of the Castlereagh Highway.

6.11.2.2 Viewpoint Analysis

During the site inspection, 31 private viewpoints (VPs) and 8 public VPs were identified within 5 km of the Project, with a further four clusters of residents beyond 5 km having the potential to view part of the Project. These VPs, their relative distance from the Project, and likely Project elements in view, are shown in Table 5-1 of the VIA (refer to **Appendix 14**). No single viewpoint would view all of the Project elements. The VP locations are shown on **Figure 6.14** and **Figure 6.15**. These VPs were assessed to determine the visual impact of the Project, as discussed in **Section 6.11.4**.

6.11.3 Assessment of Impacts

6.11.3.1 Impact on Landscape Character

The predominant visual characteristics of the landscape are open undulating pastures; scattered trees; vegetated higher surrounding slopes; rural dwellings; dams, rural post-and-wire fencing; and unsealed access roads. The Project Area has a prominent elevated, grassy hilltop. Nearby are distinctive natural features including Barneys Reef. The visual amenity value of the rural landscape is noted in the *Mid-Western Regional Local Environmental Plan 2012*. The landscape is also designated by the State Government as a renewable energy zone.

The overall assessed impact of the Project on landscape character is ***low to moderate***. The characteristics of the solar farm allow it to generally 'fit' within the existing landscape, requiring minimal landform change and retaining vegetation along creek lines and in larger stands of vegetation across the Project Area. Regardless, the extensive area of solar panels would change landscape character somewhat by covering large areas of open, grassed paddocks with structural/built elements up to 5 m high.

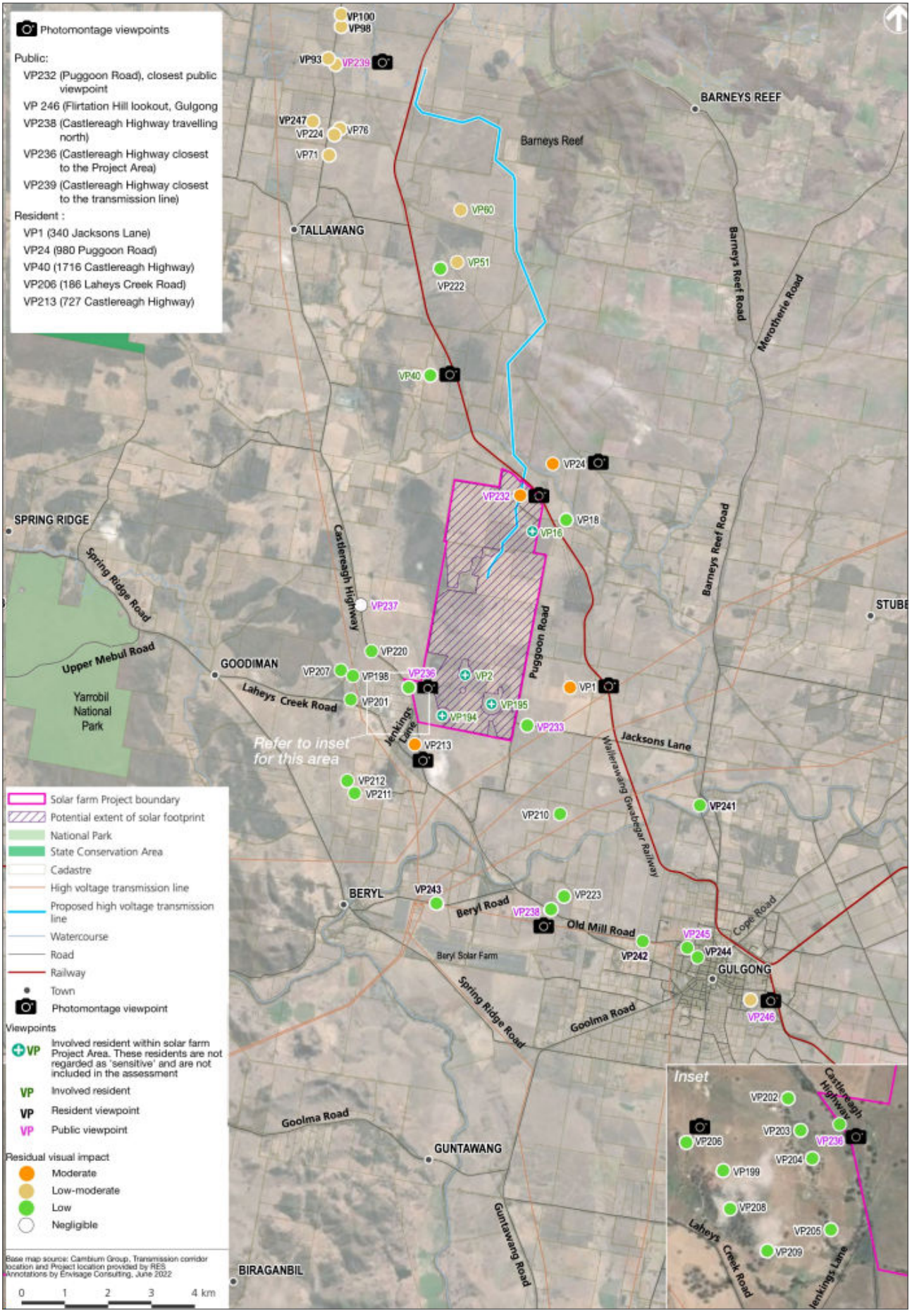


FIGURE 6.16

Viewpoint Visual Impact Ratings

Image Source: Envisage (2022)

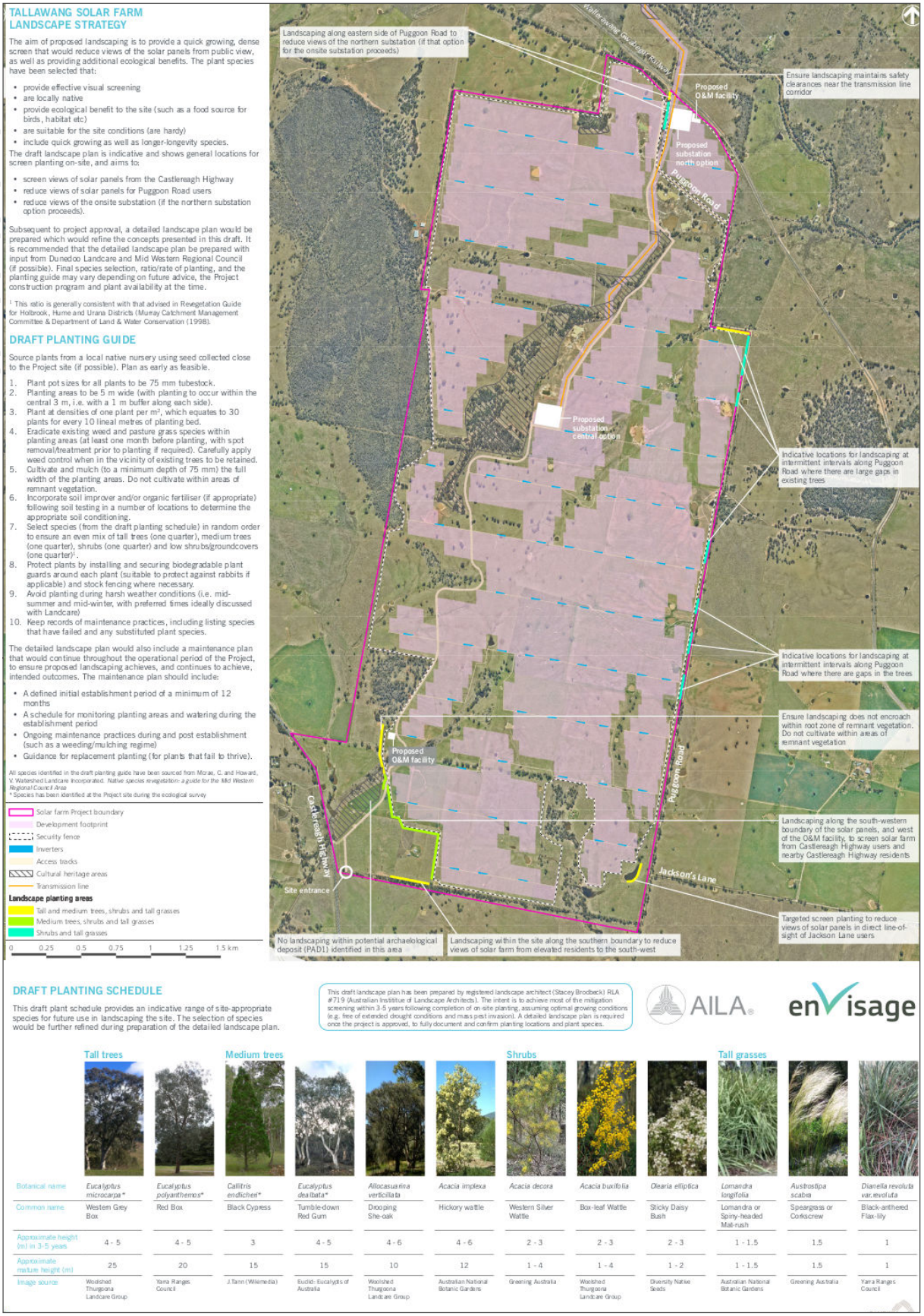


FIGURE 6.17

Draft Landscaping Plan

Image Source: Envisage (2022)

The transmission line would also alter landscape character by introducing a new line of transmission towers (taller than surrounding trees) across open paddocks and traversing near a locally distinctive ridgeline. However, there are existing transmission lines in the landscape - the nearest around 5 km away. If selected, the central substation option would result in a longer transmission line, and consequently, more towers would be installed in the landscape.

6.11.3.2 Impact to Viewpoints

Visibility of the Project, in particular the solar farm site, is limited by the surrounding undulating landform and vegetation, although there is an elevated, grassed hilltop within the Project Area that is visible from some viewpoints up to 10 km away.

A total of 43 viewpoints were assessed as part of the VIA, taken from varying distances and locations surrounding the Project Area. Photomontages have been prepared from ten viewpoints to illustrate the potential visual impacts associated with the Project, included as Appendix C in the VIA (provided in **Appendix 14**).

Following the implementation of mitigation measures outlined in **Section 6.11.4**, the VIA predicted the following **residual visual impacts** will be experienced as a result of the Project:

- ***Moderate impact*** to one public viewpoint (VP232 Puggoon Road) and three private viewpoints (VP1, VP24 and VP213).
- ***Low – moderate impact*** to two public viewpoints (VP239 Castlereagh Highway and VP246 Flirtation Hill) and 9 private viewpoints (VP51, VP60, VP71, VP76, VP93, VP98, VP100, VP224 and VP247).
- ***Low or negligible 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 6.16**. Further detail regarding the assessment of visual impacts before and after mitigation to viewpoints is provided in the VIA (refer to **Appendix 14**).

Measures to reduce the visibility of the Project outlined in **Section 6.11.4** 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 6.11.4.1.**

Furthermore, the VIA identified additional screen planting as a potential mitigation measure for three non-host landholders (namely VP1, VP24 and VP213) to further reduce the ***moderate residual visual impact*** to these receivers. RES has been in consultation with these landholders regarding the proposed screen planting on their properties and is seeking to enter negotiated agreements with each landholder, as outlined in **Section 2.4.3**. RES will continue to consult with the landholders with the view of entering the agreements prior to project approval. Once the negotiated agreements have been finalised, these landholders will become associated landholders.

Photomontages with mitigation landscape planting 3 to 5 years following construction have been prepared for VP1, VP24 and VP213 to illustrate the effect of screen planting on their properties (refer to Appendix C of the VIA in **Appendix 14**). RES is seeking to enter into negotiated agreements with these landholders in

order to address the moderate visual impacts specific to their dwellings. These agreements will be developed in accordance with the *draft Large-scale Solar Energy Guideline 2021*.

6.11.3.3 Impact on Aerial Viewpoint

The Project Area is large, and from aircraft flying at lower altitudes, views of the Project would be possible. Light aircraft can potentially fly as low as approximately 150 m over non-built-up areas. The existing solar farm at Beryl would already be in view, approximately 4.5 km to the south of the Project. The Project would be approximately five times larger in area compared to the Beryl solar farm.

From a higher elevation, the proposed solar farm views 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.

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, 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, and the Project would not include reflective surfaces. Therefore, motion and reflectivity would not be a distraction to aviation.

6.11.3.4 Impact of Glare and Reflectivity

The amount of light reflected off a solar panel surface depends on the amount of sunlight hitting the surface, its surface reflectivity, geographic location, time of year, cloud cover, and solar panel orientation. Comparatively, PV solar panels reflect a very low percentage of sunlight

Solar PV facilities located away from the vicinity of airfields are unlikely to present problems of glare to pilots for the following reasons:

- dazzle/glare is likely to present a hazard only during critical phases of flight, especially approach and landing; the flying/transit phase is not normally a critical phase
- dazzle/glare occurs almost exclusively at low angles of elevation; aircraft in the *en route* phase of flight will be at higher angles of elevation
- pilots in the in-transit phase are already subjected to glare from a number of existing sources such as large assemblies of parked cars, major glasshouse facilities and large bodies of water; these are not considered to require analysis and mitigation despite having potentially much higher luminosity values than PV panels
- the pilot view from most cockpits, particularly in the forward direction, is severely limited in the downward direction by the aircraft structure, thus blocking the line of sight to any source of glare on the ground.

The proposed solar farm would not be located within the approach of a runway and would not be within an airport's licenced boundary. Aerodrome operators within 15 km of the Project would continue to be consulted as part of the Project's ongoing community engagement.

6.11.3.5 Night lighting

There is minimal lighting associated with the Project. During commissioning of the inverters, targeted lighting would be used, but it would not light the whole site. During operation, the solar farm would not be lit at night and workers would not attend the site at night except in emergency or security situations. There would be no permanent night lighting installed within the solar array.

Lighting would be installed at each inverter station but would not be in use at night, unless required for emergency purposes. Inverter maintenance would occur during the day.

Lighting would be installed at the onsite substation for security and maintenance purposes. The lighting is expected to only be used during emergencies, or for security purposes.

Lighting is not proposed to be installed in association with the transmission line.

If lighting was in use during an emergency, it would be unlikely to disturb neighbours as lighting fixtures would be designed to reduce disturbance to neighbouring properties.

The Project is located within 200 km of the Siding Spring Observatory and within the Dark Sky Region of NSW. The *NSW Dark Sky Planning Guidelines* (Department of Planning and Environment, 2016) provides guidance to manage light in the Dark Sky Region and is a matter for consideration for all development under the EP&A Act. The Guidelines provide technical information on good lighting design, use of shielded, downward facing and site appropriate lighting. Lighting design principles that are applicable to the Project are included in mitigation measures in **Section 6.11.4**.

Based on the above, it is considered unlikely that the proposed night lighting from the Project would create a noticeable impact on the existing night-time landscape.

6.11.4 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 VIA to screen views of the Project through strategic planting. The Draft Landscape Plan is further discussed in **Section 6.11.4.1.**

- RES is seeking to enter into negotiated agreements with affected landholders (VP1, VP24 and VP213) in order to address the visual impacts specific to their dwellings. Once the negotiated agreements have been finalised, these landholders will become associated landholders. These agreements will be developed in accordance with the *draft Large-scale Solar Energy Guideline 2021*.

- Lighting will be installed in accordance with *AS4228-1997 - Control of Obtrusive Effects of Outdoor Lighting* and will be designed and installed to follow best practice lighting principles identified within the *Dark Sky Planning Guidelines*. 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. Dark grey is generally considered a good colour for ancillary infrastructure.

6.11.4.1 Draft Landscape Plan

The Draft Landscape Plan, provided in **Figure 6.17**, indicates general locations for strategic screen planting on-site, a planting guide, and preliminary planting schedule. It is the intent that proposed landscaping is site-appropriate, and that proposed planting species:

- provide effective visual mitigation, screening or reducing views of:
    - solar panels from the Castlereagh Highway (including nearest residents)
    - solar panels in direct line-of-sight of Puggoon Road users, and
    - the northern substation (if that substation option proceeds)
- 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.

Dunedoo Landcare Group and Mid Western Regional Council were consulted during the preparation of the draft landscape plan. Council advised (via email on 20 June 2022) that the draft species are a very good base list for planting in that area.

On-site landscape planting aims to screen, or to reduce, views of:

- solar panels from the Castlereagh Highway
- solar panels in direct line-of-sight of Puggoon Road users
- the onsite substation (if the northern substation option proceeds).

Screen planting is identified as a potential mitigation measure for three non-host landholders (namely VP1, VP24 and VP213) to reduce the residual visual impact to these receivers. Should the Project be approved, RES is seeking to enter into negotiated agreements with affected landholders in order to address the visual impacts specific to their dwellings. RES will continue to consult with the landholders with the view of entering the agreements prior to project approval. Once the negotiated agreements have been finalised, these landholders will become associated landholders. These agreements will be developed in accordance with the *draft Large-scale Solar Energy Guideline 2021*.

Further to this, RES is committed to prepare a Detailed Landscape Plan during detail design and once the Engineering, Procurement and Construction (EPC) contractor is finalising the Project layout. The Detailed Landscape Plan would be prepared prior to landscape implementation which would refine the concepts presented in the draft.

6.12 Noise and Vibration

A Noise and Vibration Assessment (NVA) has been prepared by Umwelt to assess the potential noise and vibration impacts associated with the Project in accordance with the SEARs as presented in **Appendix 1**. The NVA was also prepared in accordance with the:

- Noise Policy for Industry (NPfI)
- Interim Construction Noise Guideline (ICNG)
- Road Noise Policy (RNP)
- Assessing Vibration: A Technical Guideline (the vibration guideline).

Potential social amenity impacts associated with noise and vibration were raised as a concern by some members of the community during the stakeholder engagement process. The NVA addresses potential noise impacts associated with the construction and operation of the Project with particular focus on potential noise impacts to non-associated dwellings surrounding the Project Area. The outcomes of the assessment are summarised below and provided in full in **Appendix 15**. Cumulative noise impacts considered in the NVA are further discussed in **Section 6.16**.

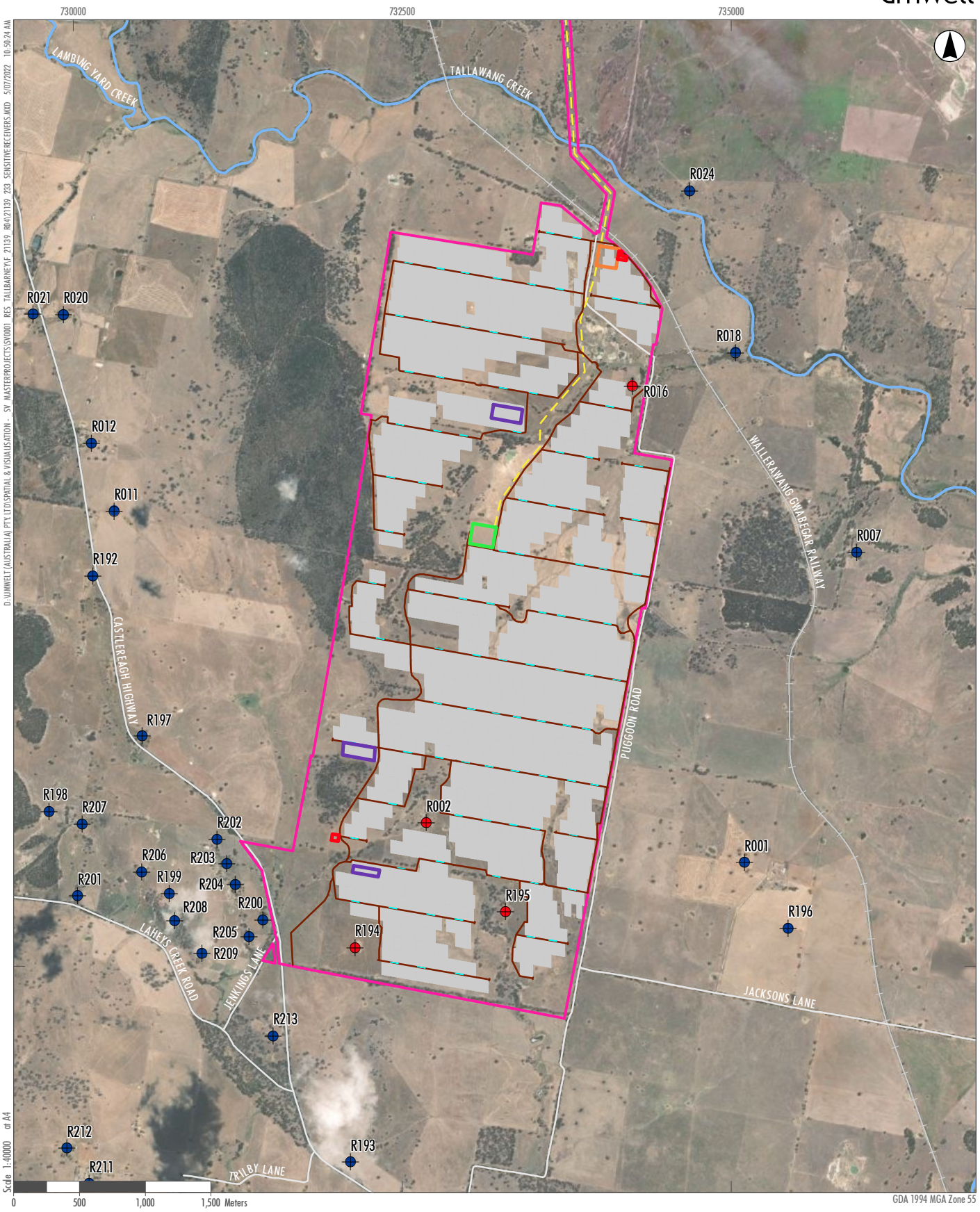
6.12.1 Existing Environment

6.12.1.1 Sensitive Receivers

The Project Area is located within a rural setting with several rural residential receivers distributed throughout the surrounding area. Sensitive noise receivers that could potentially be impacted by the Project have been identified as shown on **Figure 6.18**.

A full list of the sensitive receivers along with their distance from the Project Area are provided in Appendix A of the NVA (refer to **Appendix 15**). This list includes host receivers and non-host receivers. The closest non-host receiver (R200) is located approximately 600 m west of the Project infrastructure along the Castlereagh Highway.

Other noise sensitive (non-residential) receivers are defined in the ICNG as including classrooms and other educational institutions, hospitals, places of worship, active or passive recreational areas, or community centres, industrial premises, offices and retail outlets. No non-residential sensitive receivers were identified within or surrounding the Project Area.



Legend

- Tallawang Solar Farm Project Area
- Non-associated Dwelling
- Host Landholder Dwelling
- Proposed HV Powerline
- Road
- Railway
- Watercourse

Site Infrastructure

- Construction Compound/Laydown
- O&M Facility
- Proposed Substation (Central Option)
- Proposed Substation (Northern Option)
- Inverter Buildings and Hardstanding
- Solar Panels
- Access Tracks

FIGURE 6.18

Sensitive Receivers Surrounding the Indicative Solar Farm Project Area

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)

6.12.1.2 Existing Background and Ambient Noise

Given the rural environment, background noise level monitoring was not undertaken, and minimum background noise levels have been adopted in accordance with the NPfI.

As the Project is in a rural region, it is assumed that the Rating Background Level (RBL) at all receivers during the day will be less than 35 dB(A) and less than 30 dB(A) during the evening and night periods. The minimum RBLs of 35 dB(A) for the day and 30 dB(A) for the evening and night periods are set in accordance with the requirements of the NPfI. The adopted background noise levels are presented in **Table 6.12**.

Table 6.12 Adopted Background Noise Levels

Receiver Category/Land-use	RBLs7F[10], dB(A) Day 7 am – 6 pm	RBLs7F[11], dB(A) Evening 6 pm – 10 pm	RBLs7F[12], dB(A) Night 10 pm – 7 am
Rural Residential: • **RU1 – primary production** • **R5 – large lot residential**	35	30	30

6.12.2 Methodology

The NVA involved:

- Establishing the relevant levels of background noise using minimum noise levels specified in the Noise Policy for Industry (NPfI).
- Identifying the primary noise sources for construction and operation, and their associated noise levels.
- Undertaking predictive noise modelling of the Project's construction and operation activities with the proprietary computer noise modelling software SoundPLAN version 8.2, using the CONCAWE noise prediction algorithms.
- Assessing the potential noise and vibration impacts at sensitive receivers as a result of the construction, operation and decommissioning of the Project.
- Assessing the road traffic noise during construction activities.
- Assessing the cumulative noise impacts of the Project and other nearby projects that may overlap as outlined in **Section 6.16** of this EIS.
- Providing reasonable and feasible mitigation and management measures to reduce noise impacts.

Full details regarding the methodology for the NVA are provided in **Appendix 15**.

[10] Values shown represent the minimum RBLs, for day in accordance with the NPfI
[11] Values shown represent the minimum RBLs, for evening in accordance with the NPfI
[12] Values shown represent the minimum RBLs, for each night in accordance with the NPfI

6.12.3 Noise Criteria

Noise criteria has been established in NSW to assist in minimising the noise impacts of development. By meeting the criteria, it is not intended that people will not hear any noise from a development but that the noise is not intrusive. The Project has been assessed against the relevant criteria as outlined in **Table 6.13** as part of the NVA. Full details of the NVA criteria and how these have been derived are provided in **Appendix 15**.

Table 6.13 Noise Criteria

Aspect	Criteria

Construction noise	The Interim Construction Noise Guideline (ICNG) (Department of Environment & Climate Change) provides an emphasis on implementing "feasible" and "reasonable" noise reduction measures and does not establish mandatory objective criteria. However, the Construction Noise Guideline does establish different "management levels" based on the existing RBL including:
	• Within Standard hours:
	  ○ Noise Affected – RBL (35 dB(A)) + 10 dB(A) = 45 dB(A)
	  ○ Highly Affected = 75 dB(A)
	• Outside Standard hours:
	  ○ Noise Affected – RBL (30 dB(A)) + 5 dB(A) = 35 dB(A).

Construction sleep disturbance	The 52 dB(A) LA1(1 min) parameter has been adopted to assess the potential for sleep disturbance from the construction noise during the night-time period.

Operational noise	The operational noise criteria applicable to the Project has been derived in accordance with the Noise Policy for Industry (NPfI). The NPfI sets out two noise criteria to assess the potential noise impacts resulting from industrial activity i.e. project intrusiveness noise level and the project amenity noise level. The derived project noise trigger level for the Project is the lower or most stringent value, i.e.
	• Rural residential:
	  ○ Day time – 40 dB(A)
	  ○ Evening - 35 dB(A)
	  ○ Night time - 35 dB(A).

Road traffic noise	Freeway/arterial/sub-arterial road: • Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments = 60 dB(A) LAeq (15 hr) (external). The traffic impacts associated with the Project will predominantly occur during construction. However, it should be noted that the NSW Road Noise Policy criterion/classification applies to an ongoing operation, as distinct to a temporary process and as such provides a conservative criterion for comparison with the predicted noise levels during construction.

6.12.4 Assessment of Impacts

The key findings of the NVA are summarised in the following sections, further detailed is provided in **Appendix 15**.

6.12.4.1 Construction Noise Impacts

Noise Sources and Assumptions

As outlined in **Section 3.4.6**, works would typically be carried out during standard construction hours in accordance with the ICNG.

A list of the typical construction plant and equipment adopted in the noise modelling for each construction stage, their associated sound power levels, and combined sound power level over a 15-minute period are presented in Table 5.1 of **Appendix 15**. Six indicative construction scenarios have been modelled to resemble the construction stages, and are:

1. site establishment
2. piling and foundations
3. assembly of all equipment (trackers, inverters, modules)
4. underground cabling
5. commissioning
6. site rehabilitation, removing of temporary construction facilities.

Assessment of Construction Noise Impacts

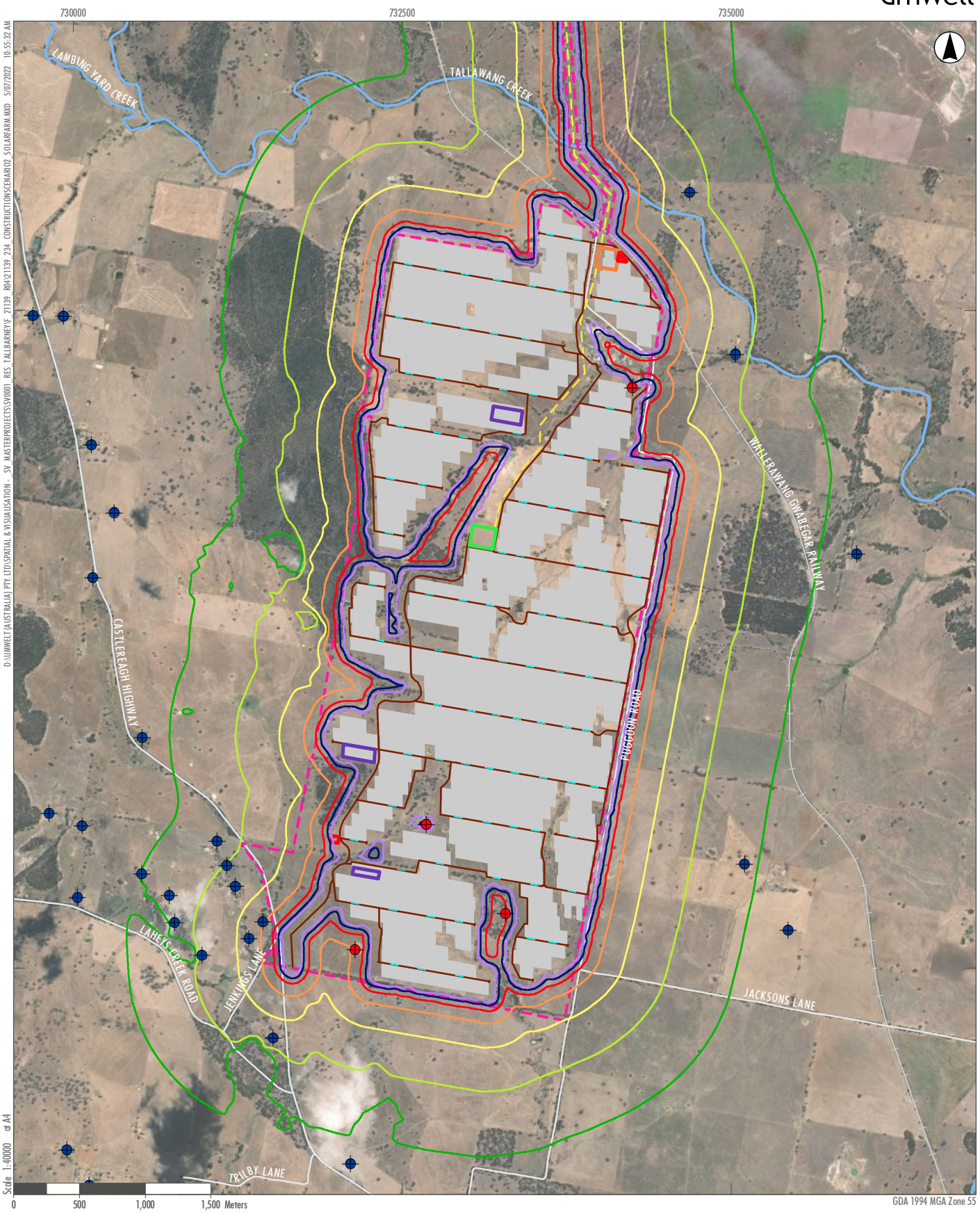
The NVA predicts that the construction NMLs at 18 receivers (of which four are host landholders and not considered sensitive) may be exceeded (>45 dB(A)) while the works are conducted at the Project Area. These are presented without any mitigation controls applied. The predicted noise level contours for Scenario 2 (worst-case) are presented in **Figure 6.19** and **Figure 6.20**. For the full tabulated results for each daytime construction scenario, refer to Table B.1 within Appendix B of the NVA (see **Appendix 15**).

As the predicted construction noise levels are above the NML, reasonable and feasible noise mitigation and management strategies are recommended in **Section 6.13.5** to mitigate potential impacts on these receivers.

6.12.4.2 Operational Noise Impacts

Operational noise sources considered for the Project are presented in **Appendix 15**. The operational noise levels for the Project have been predicted under default worst-case meteorological conditions (D-class with 3m/s windspeed or F-class with 2m/s windspeed) in accordance with the NPfI.

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 below 35 dB, as illustrated on **Figure 6.21.** Results of the modelling are presented in Table C.1 within Appendix C of the NVA (refer to **Appendix 15**). No operational mitigation and management strategies are required.



Legend

- Tallawang Solar Farm Project Area
- Non-associated Dwelling
- Host Landholder Dwelling
- Proposed HV Powerline
- Road
- Railway
- Watercourse

Site Infrastructure

- Construction Compound/Laydown
- O&M Facility
- Proposed Substation (Central Option)
- Proposed Substation (Northern Option)
- Inverter Buildings and Hardstanding
- Solar Panels
- Access Tracks

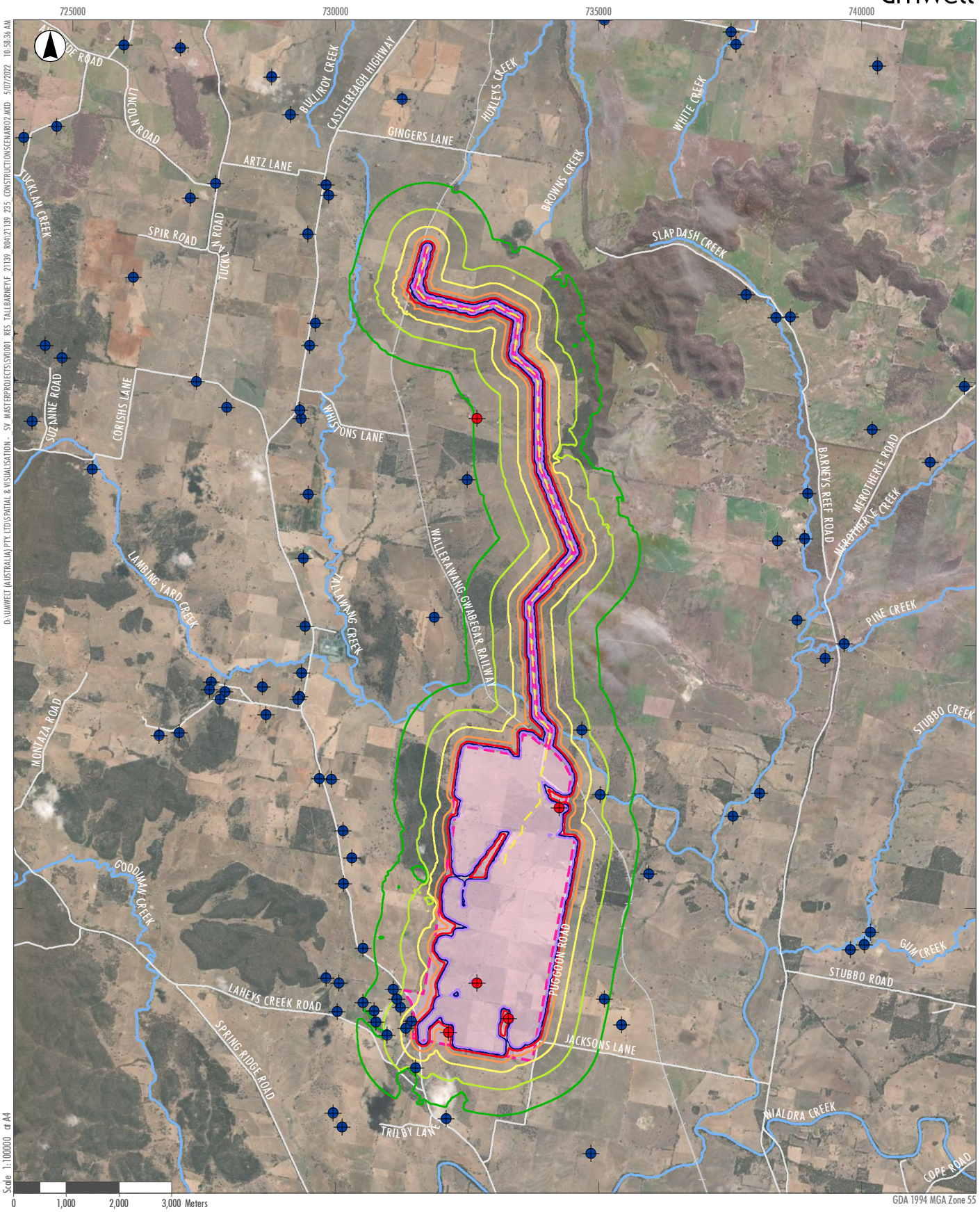
Predicted Noise Levels

- Noise Contour Level 45 dB(A)
- Noise Contour Level 50 dB(A)
- Noise Contour Level 55 dB(A)
- Noise Contour Level 60 dB(A)
- Noise Contour Level 65 dB(A)
- Noise Contour Level 70 dB(A)
- Noise Contour Level 75 dB(A)

FIGURE 6.19

Construction Scenario 2 Predicted Noise Levels (Solar Farm) Under Enhanced Meteorological Conditions, LAeq(15 min) dB(A)

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)



Legend

- Tallawang Solar Farm Project Area
- Non-associated Dwelling
- Host Landholder Dwelling
- Proposed HV Powerline
- Road
- Railway
- Watercourse

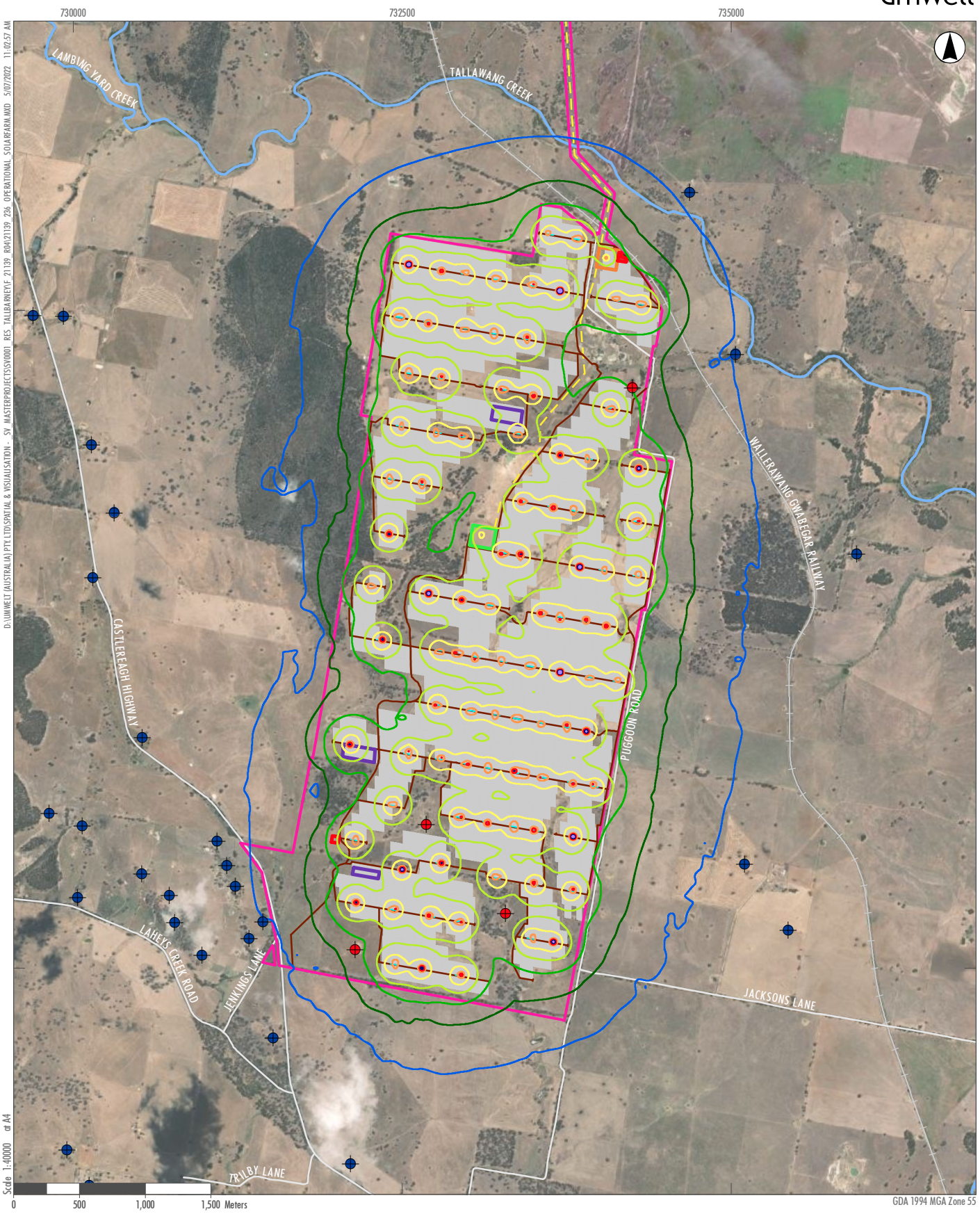
Predicted Noise Levels

- Noise Contour Level 45 dB(A)
- Noise Contour Level 50 dB(A)
- Noise Contour Level 55 dB(A)
- Noise Contour Level 60 dB(A)
- Noise Contour Level 65 dB(A)
- Noise Contour Level 70 dB(A)
- Noise Contour Level 75 dB(A)

FIGURE 6.20

Construction Scenario 2
Predicted Noise Levels Under Enhanced Meteorological Conditions, LAeq(15 min) dB(A)

Image Source: ESR Basemap Data source: RES Australia (2021), NSW DFSI (2020)



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- Proposed Substation (Central Option)
- Proposed Substation (Northern Option)
- Inverter Buildings and Hardstanding
- Solar Panels
- Access Tracks

Predicted Noise Levels

- Noise Contour Level 35 dB(A)
- Noise Contour Level 40 dB(A)
- Noise Contour Level 45 dB(A)
- Noise Contour Level 50 dB(A)
- Noise Contour Level 55 dB(A)
- Noise Contour Level 60 dB(A)
- Noise Contour Level 65 dB(A)
- Noise Contour Level 70 dB(A)
- Noise Contour Level 75 dB(A)

FIGURE 6.21

Predicted Operational Noise Levels (Solar Farm) Under Enhanced Meteorological Conditions, LAeq(15 min) dB(A)

Image Source: ESRI Basemap Data source: RES Australia (2021), NSW DFSI (2020)

6.12.4.3 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 emanating from decommissioning is therefore expected to be less than the construction activities.

Reasonable and feasible management and mitigation strategies are recommended in **Section 6.13.5** to minimise potential decommissioning-related noise impacts at the sensitive receivers.

6.12.4.4 Road Traffic Noise Impacts

Noise Sources and Assumptions

Traffic volumes and trip distribution on the road network is discussed in **Section 6.7** of this EIS. The NVA has reviewed traffic data provided in the TIA and has assumed that 50% of the light vehicles would travel to the Project Area from either direction of the Castlereagh Highway, while the heavy vehicles are more likely to travel to the Project Area from the north. Further assumptions applied in the NVA for the assessment of the potential traffic noise impacts are detailed in Section 7.1 of **Appendix 15**.

Indicative construction-related traffic volumes adopted for the noise assessment are presented in Table 7.1 of the NVA (refer to **Appendix 15**). Additionally, indicative construction-related traffic volumes for the Barneys Reef Wind Farm project are also presented in Table 7.1 of the NVA for the consideration of potential cumulative road traffic noise impacts, as further discussed in **Section 6.17**.

Assessment of Road Traffic Impacts

The NVA predicts that for receivers along the Castlereagh Highway located more than 40 m from the edge of the road there would be negligible elevated road traffic noise levels as a result of the Project. However, a small pocket of residences in the township of Birriwa are within 25 m of the road edge and may experience an elevated road traffic noise level during the construction period. These are represented by following seven receivers R138, R139, R140, R141, R145, R146, R214.

Management and mitigation measures are proposed in **Section 6.12.5** 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 vehicles per day, therefore road traffic noise from operational traffic is anticipated to be negligible. No management and mitigation measures are recommended.

6.12.4.5 Vibration Impacts

Vibration generating activities would occur during the construction phase. There are no vibration generating activities expected during the operational phase.

The types of vibration-sensitive receivers in and around the Project Area include:

- Residential dwellings (occupants).
- Residential dwellings (structures).

- Commercial/agricultural buildings (sheds etc).

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 *NSW Construction Noise and Vibration Guideline (CNVG)* (RMS, 2016) and are provided in Table 5.4 of **Appendix 15**.

Due to the large separation distances between the Project and the sensitive receivers, vibration impacts from construction activities are anticipated to be negligible.

6.12.5 Management and Mitigation Measures

Based on the NVA predictions, the relevant construction noise criteria can be achieved under worst case meteorological conditions at all dwellings with the implementation of relevant noise management measures. The proposed mitigation and management measures are summarised below:

Scheduling of Construction works

- Construction works will generally be undertaken during standard construction hours between 7 am and 6 pm Monday to Friday, and between 8 am and 1 pm on Saturdays. Works carried out outside of the hours will be limited to activities with low noise generation where practicable.

Construction Noise

- Should the Project be approved, RES will update the draft Noise and Vibration Management Plan (NVMP) included in **Appendix 15**. The NVMP will be implemented as part of the CEMP.
- All employees, contractors and subcontractors will receive an environmental induction.
- The noise levels of plant and equipment will have operating Sound Power or Sound Pressure Levels consistent with those nominated in the NVA.
- Non-tonal reversing beepers would be fitted and used on all construction vehicles and mobile plant used regularly on site and for any out of hours work.
- The CEMP and NVMP would be regularly updated to account for any changes in noise and vibration management of the Project.

Traffic Noise

Potential noise mitigation measures to reduce construction-related traffic noise may include the following:

- Slowing the speed of the heavy vehicles as they pass through the Birriwa township from the sign-posted speed of 80 km/h to a nominal speed of 60 km/h.
- Car-pooling and the use of buses/mini vans to reduce the total number of light vehicle movements.

Construction Vibration

- Vibration generating plant not listed in Table 5.4 of the NVA (included in **Appendix 15**) should not be used within the identified safe working distances (≤ 100 m). If vibratory rollers or other vibration inducing construction sources are required within the safe working distances (≤ 100 m) for residential nominated in Table 5.4 of the NVA, 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 road traffic
    - 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
    - stationary noise sources should be enclosed or shielded where feasible or reasonable.

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.

6.13 Hazard, Risk and Bushfire Threat

In regard to considering hazard and risk, the SEARs require the EIS to include:

- a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011)
- a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-level Risk Assessment* (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation
- an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields.

The hazard and risk assessment to address the SEARs is provided in the following sections.

6.13.1 Preliminary Hazard Analysis

A Preliminary Hazard Analysis (PHA) was prepared by Umwelt in accordance with the SEARs for the Project and relevant guidelines and legislative requirements. The following section contains a summary of the key outcomes of the PHA, while a full copy of the report is provided in **Appendix 16**.

6.13.1.1 Assessment Methodology

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

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

The detailed methodology and calculations used to identify and assess the potential hazards and respective failure scenarios that have the potential for off-site impact is outlined in **Appendix 16** with results detailed in the sections below.

6.13.1.2 Assessment of Impacts

The PHA prepared for the Project identified a number of hazard events involving lithium ion batteries (LIBs) and electrical transformers with the potential for harmful off-site impacts. Other than LIBs and transformer oil, there will be no hazardous materials stored at, or transported to, the Project in significant quantities.

Consequence modelling of thermal radiation, explosion overpressure and toxic gas dispersion was undertaken for a LIB fire/thermal runaway scenario resulting in either a fire, explosion or toxic gas release. The modelling estimated the distances to fatal, injurious, irritation, property damage and accident propagation impacts. An estimate of the likelihood of a LIB fire/thermal runaway scenario resulting in either a fire, explosion or toxic gas release was semi-quantitatively estimated.

The semi quantitative analysis undertaken estimated that the greatest distance from a BESS container at which an individual could be subject to injurious impact is 86 m as a consequence of a BESS explosion scenario at a frequency of less than 10^{-5} events per year. Given RES will locate all BESS containers at least 86 m from the site boundary and host dwellings, no off-site impacts with the potential to cause injury or fatality are predicted.

A risk assessment considering the results of the consequence modelling and the estimated likelihood of a LIB fire/thermal runaway scenario resulting in either a fire, explosion or toxic gas release indicated that the Project would comply with Hazardous Industry Planning and Advisory Paper 4 – Risk Criteria for Land Use Safety Planning, NSW Department of Planning, 2011 (HIPAP 4) risk criteria for land use planning provided adequate separation distances between BESS containers and the site boundary/host dwellings are maintained. RES will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices (refer to **Section 6.13.1.3**). Compliance with HIPAP 4 criteria is conditional on these technical and non-technical risk mitigation and management measures being implemented.

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

A Final Hazard Analysis and Fire Safety Study will be undertaken as the Project design progresses toward completion to ensure the final Project design adheres to the risk management measures outlined in **Section 6.13.1.3** and that the separation distances to the site boundary/host dwellings are appropriate for the specific battery cell type (i.e. chemistry and capacity) to be used at the Project.

6.13.1.3 Hazard Management and Mitigation Measures

RES will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices (refer to Section 7.0 of the PHA in **Appendix 16**). Compliance with HIPAP 4 criteria is conditional on these technical and non-technical risk mitigation and management measures being implemented.

A comprehensive Emergency Management Plan (EMP) and detailed emergency procedures consistent with *Hazardous Industry Planning and Advisory Paper No. 1 Emergency Planning* (HIPAP 1) and the RFS *Planning for Bushfire Protection* (or equivalent) will be developed and implemented should the project be approved. Reference will also be made to *Australian Standard AS 3745-2010 Planning for emergencies in facilities* for the preparation of the EMP. A draft outline for the EMP is provided in the PHA in **Appendix 16**.

Prior to preparation of a draft EMP, consultation will be undertaken with RFS, FRNSW and the LEMC to determine any specific issues that the RFS, FRNSW and LEMC would like addressed in the EMP and establish key contacts for ongoing consultation.

6.13.2 Electromagnetic Fields

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.

6.13.2.1 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 330kV transmission line south of the Project Area
- house-hold items (such as televisions, microwave ovens, computers, Wi-Fi)
- existing electrical wiring in residences.

6.13.2.2 Assessment Approach

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is the Australian Government's primary authority on radiation protection and nuclear safety. Hence, one of the key objectives of the ARPANSA is to protect the health and safety of Australians from radiation exposure. 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 magnetic fields and for substations magnetic field levels at distances of 5 to 10 m away are no higher than background levels in a typical home.

In Australia, electrical devices and infrastructure such as transmission lines and substations, operate at a frequency of 50 Hz. This frequency falls within the Extremely Low Frequency (ELF) range of 0-300 Hz (ARPANSA, 2015). Subsequently, power lines, substations, transformers and other electrical sources all emit ELF EMFs (ARPANSA 2015).

The *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (100 GHz to 300 GHz)* (ICNIRP, 2010) (the Guidelines) define reference levels for occupational and general public exposure to prevent potential adverse health effects from exposure to EMFs. The reference levels for occupational and general public exposure are shown in **Table 6.14**.

Table 6.14 ICNIRP reference levels for occupational and general public exposure

Exposure characteristic	Electric Field (kilo volts per metre (kV/m))	Magnetic Field (µT)
Occupational	10	1,000
General public	5	200

Human responses to EMFs depend on the field strength, ambient environmental conditions, and individual sensitivity. The strengths of the fields 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 electric fields.

6.13.2.3 Assessment of Impacts

EMF would be generated during the construction and operational of the Project via a number of EMF sources, such as solar PV panels, inverters, PCSs, overhead transmission lines, substations as well as cabling (underground) and collection circuits. 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 utilized to eliminate exposure of the general public from these sources.

The layout of the Project has been designed, considering exclusion zones around the host dwellings (approximately 150 to 200 m) which would create a suitable buffer to reduce EMF to negligible levels. The nearest sensitive receiver (R200) is approximately 600 m west of the nearest project infrastructure.

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. Although host landholders would retain access to their properties, this would be controlled via security fencing and having a separate access track to their property.

As a result of the low EMF levels, temporary nature of the construction and decommissioning phases and the buffer distance 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 6.13.2.4**, 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 buffer distances between the EMF sources and sensitive receivers, 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.

6.13.2.4 EMF Management and Mitigation Measures

The layout of the Project has been designed considering buffer distances between the EMF sources and sensitive receivers, road users and the general public.

In addition, 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.

6.13.3 Bushfire Threat

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

The Project Area is not currently identified as bushfire prone land by the NSW Rural Fire Service (RFS) bushfire prone land mapping (NSW RFS, 2021) however the SEARs require an assessment of hazards and risk associated with bushfire. To meet the requirements of the SEARs an assessment against the requirements of PBP 2019 has been undertaken, as detailed in **Section 6.13.3.2**.

6.13.3.1 Existing Environment

Land within and surrounding the Project Area is predominately cleared agricultural land with vegetated land adjoining the western boundary. However, larger remnant vegetated areas identified as bushfire prone land located to the west and southwest of the Project Area represent a potential bushfire threat to the Project.

6.13.3.2 Bushfire Assessment

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

As discussed in **Section 6.13.1**, the PHA indicates that appropriate risk management measures can be applied to the Project to meet HIPAP 4 risk criteria for individual fatality, injury and propagation. Appropriate hazard safeguards and controls have been identified to be applied to the Project through the development and implementation of the Emergency Management Plan which will assist with the management of bushfire.

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

Asset Protection Zones

The design of the solar farm includes a 10 m setback line around the perimeter of the Project along the fence line with an additional 40 m setback around vegetated areas within the Project Area. These setbacks provide for sufficient separation distances to limit the spread of bushfire and to provide an adequate defendable space for firefighting. The solar farm will be appropriately maintained over the life of the Project and all vegetation maintenance and management will be undertaken in accordance with a VMP.

Access

Primary access to the Project Area is provided from the Castlereagh Highway as shown in **Figure 3.1**. Four alternate access points are also proposed along Puggoon Road to allow additional access for emergency vehicles. Internal access roads consisting of compacted gravel, approximately 6 m wide, would be constructed to accommodate construction, operational traffic movements and emergency access throughout the Project Area. The indicative location of the access roads is illustrated in the infrastructure layout plan (refer to **Figure 3.4**).

Water Supply

An appropriate dedicated water supply for bushfire protection will be provided on site. Water supply for the Project will be sourced from commercial suppliers in the nearby region (via water trucks). Where appropriate and available water may also be sourced from farm dams or licensed groundwater bores located within the Project Area.

6.13.3.3 Bushfire Management and Mitigation Measures

- A Bushfire Emergency Management Plan will be developed and implemented for the Project in accordance with PBP 2019 and in consultation with the RFS and FRNSW. The plan will identify all relevant bushfire risks and mitigation measures associated with the construction and operation of the Project.
- Roads will be maintained in the Project Area to allow for safe and accessible travel of emergency vehicles (if required).
- 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.
- 10 m setback line around the perimeter of the Project along the fence line with an additional 40 m setback around vegetated areas within the Project Area.

6.14 Waste Management

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

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

RES is committed to the management of waste streams in accordance with the principles of the waste hierarchy, where emphasis is placed upon reduce, reuse, recycle prior to disposal of its wastes. Appropriate and best-practice waste management will be implemented as part of the Project in accordance with the following legislation and guidelines:

- *Protection of the Environment Operations Act 1997* (POEO Act)
- Protection of the Environment Operations (Waste) Regulation 2014
- *Waste Avoidance and Resource Recovery Act 2001* (WARR Act)
- *Recycling and Waste Reduction Act 2020*.

The *Waste Classification Guidelines* (EPA, 2014) have also been referred to in the preparation of this assessment. Best practice waste management involves implementation of resource management hierarchy principles as specified in the WARR Act, and the principles of ecologically sustainable development, which include:

- avoidance of unnecessary resource consumption
- resource recovery (including reuse, reprocessing, recycling and energy recovery)
- disposal.

6.14.1 Existing Environment

Waste generated by the Project that cannot be reused or recycled would be disposed of at suitable waste management facilities within the Mid-Western Regional LGA. A review of operating waste management facilities within the LGA was undertaken to determine suitability to take waste generated by the Project. The facilities located closest from the Project are:

- Gulgong Waste Facility (approximately 25 km east of the Project) – waste accepted at this facility includes general waste, recycling, green waste, scrap metal and e-waste.
- Mudgee Waste Facility (approximately 80 km south of the Project) is the LGAs primary facility for receiving commercial and building waste – other waste accepted at this facility includes general waste, recycling, green waste, scrap metal, e-waste, tyres, mine waste, dead animals (by appointment) and asbestos (by appointment).
- Kandos Waste Facility (approximately 100 km southeast of the Project) - waste accepted at this facility includes general waste, recycling, green waste, scrap metal and e-waste.

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

6.14.2 Predicted Waste Streams

Under the *Waste Classification Guidelines – Part 1: Classification of waste* (EPA, 2014), waste can be classified into 6 different classes based on risks to the environment and human health. These are:

- special waste - asbestos, waste tyres, clinical wastes

- liquid waste - wastewater effluent and 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.

The potential waste types expected to be generated by the Project during the construction and operations phase are included in **Table 6.15**.

Table 6.15 Waste Generation Activities, Classification and Expected Waste Types

Activity	Waste Classification	Expected Waste Type	End use
Construction	Green waste	Green waste from site establishment and clearing of ground cover, spoil from site earthworks	Reuse on-site where appropriate or recycled
Construction	Hazardous waste	Waste oils, lubricants and liquids and paint	Hazardous waste at licenced facility
Construction	Liquid Waste	Sewage ablutions or portaloos	Trucked to licenced facility
Construction	General Solid Waste (Non-Putrescible)	Concrete, footings and laydown area waste, timber and packaging (including pallets), plastic packaging, other plastics (PET), cardboard packaging, paper, glass, empty chemical drums, oil spill clean-up material, metal offcuts and damaged metal (ferrous and non-ferrous), electronics and electrical infrastructure, recyclable domestic waste, and PPE	Recycle/recycle If not possible, dispose at suitable land fill facility
Construction	General Solid Waste (Putrescible)	Domestic waste	Recycle/recycle If not possible, dispose at suitable land fill facility
Operations	Hazardous waste	Waste oils, lubricants and liquids and paint	Hazardous waste at licenced facility
Operations	Liquid Waste	Sewage ablutions or portaloos	Trucked to licenced facility
Operations	General Solid Waste (Non-Putrescible)	Timber and packaging (including pallets), plastic packaging, other plastics (PET), cardboard packaging, paper, glass, empty chemical drums, paint, oil spill clean-up material, metal offcuts and damaged metal (ferrous and non-ferrous), electronics and electrical infrastructure, recyclable domestic waste, and PPE.	Recycle/recycle If not possible, dispose at suitable land fill facility
Operations	General Solid Waste (Putrescible)	Domestic waste	Recycle/recycle If not possible, dispose at suitable land fill facility

6.14.3 Impact Assessment

The majority of Project waste would be generated during the construction stage with minor quantities of waste to be generated by the day-to-day operation of the Project.

Potential impacts from waste generation during construction may include:

- The reduction of aesthetic quality and visual amenity of the construction area, and water quality of local watercourses and drainage lines if wastes are not effectively controlled. This is particularly relevant for gross pollutants (litter) that may become wind borne and enter any watercourses during constructions.
- Health and safety of workers and other visitors to the Project Area.
- Waste disposed from the Project to local landfill would reduce their respective landfill volume available for other waste generators.
- Waste produced during construction could cause a reduction in land capability if not appropriately stored and handled.

Measures outlined in **Section 6.14.4** would be implemented during the construction of the Project to suitably manage these waste impacts.

6.14.4 Management and Mitigation Measures

To manage waste generated by the Project, RES will prepare and implement a Waste Management Plan (WMP) as part of the CEMP to manage any construction waste. The WMP will include but not be limited to:

- a summary of the waste types, classification and estimated annual quantities of wastes produced during the construction of the Project
- measures to managed waste disposal in accordance with the principles of the waste hierarchy, with emphasis on reduce, reuse, recycle prior to disposal of its wastes
- the procedure for assessing, classifying and storing waste in accordance with the EPA's Waste Classification Guidelines (EPA, 2014) and management options
- procedures for storage, transport and disposal of waste
- monitoring, record keeping and reporting, such as waste tracking data demonstrating the lawful disposal of contaminated products, waste or residues generated at the facility.

6.15 Air Quality

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.

6.15.1 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 Castlereagh Highway and Puggoon Road
- locomotive emissions from trains on the Wallerawang Gwabegar Railway line
- use of wood burners in residential properties during winter months
- bushfires.

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

The closest located air quality monitoring station is approximately 8 km north-east of Merriwa, on the Merriwa Scone Road (coordinates 32°7'6"S, 150°26'26"E), about 100 km northeast of the Project Area. This station is situated within in a rural setting, approximately 170 m away from Scone Road, similar to the Project Area and is therefore considered representative. The following air pollutants are measured at Merriwa (DPIE, 2021a):

- Nitrogen dioxide (NO2)
- Sulfur dioxide (SO2)
- Fine particles as PM10
- Fine particles as PM2.5.

A search of the most recent air quality concentration data – updated hourly - on 27 August 2021 for Merriwa stated that air quality 'good' (DPIE, 2021b).

A review of the National Pollution Inventory (NPI) (Commonwealth Department of Environment and Energy, 2021) identified five scheduled facilities that operate within the vicinity of the project (30 km radius) and may also contribute to the local air shed, including:

- Oilsplus Gulgong Depot in Industrial Avenue, Gulgong (approximately 7 km southeast)
- Ulan Coal Mine at Ulan Road, Ulan (approximately 26 km east)
- Yancoal – Moolarben at Ulan Road, Ulan (approximately 26 km east)
- Wilpinjong Coal Mine at Ulan Wollar Road, Ulan (approximately 35 km south-east)

- Elgas Limited Mudgee in Sydney Road, Mudgee (approximately 35 km south).

6.15.2 Assessment of Impacts

6.15.2.1 Construction and Decommissioning

Emissions to the air during construction would involve dust generated during ground disturbance and site preparation (construction) or demolition work and vehicle, plant and equipment exhaust emissions. These emission sources would be temporary in nature for the duration of the construction and decommissioning phases.

The Project Area is susceptible to easterly winds in the morning and south-westerly winds in the afternoon which can be problematic for wind erosion. Soils would be prone to wind erosion if left exposed and disturbed. Furthermore, the rainfall in the area is relatively low, which implies there is a higher potential for dust generation, particularly in the autumn and winter months when rainfall is at its lowest. This has the potential to result in nuisance impacts (dust soiling) and impacts to human health. Dust emissions are typically manageable through standard management measures such as the application of water and minimising the dust generating work during adverse weather conditions (such as dry windy days). These measures will be further outlined and implemented as part of the CEMP, as outlined in **Section 6.15.3.**

Exhaust emissions have the potential to impact on human health as well as contribute to greenhouse emissions and leave residues on private properties. The use of heavy vehicles, equipment and machinery would be largely limited to the construction period and emissions would be localised. Given the buffer distances between host dwellings, the public road and the distance to the nearest sensitive receiver (R200, approximately 200 m west) any impacts from exhaust emissions are expected to be minimal and temporary in nature.

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

6.15.2.2 Operation

Agricultural activities (mainly grazing) would continue during the operation of the Project. In addition, ongoing maintenance of the development footprint and project infrastructure will be required, as outlined in **Section 3.4**. The infrastructure maintenance activities would result in minor, localised vehicle emissions and generation of dust from vehicles travelling along the internal, unsealed access roads.

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

6.15.3 Management and Mitigation Measures

Measures outlined below would be implemented as part of the Project to effectively manage air quality impacts associated with the Project.

- As part of the CEMP, develop and implement protocols to minimise the air emissions during construction, including:

- water suppression on all exposed areas, unsealed roads and stockpile areas when required (i.e. if visible dust emissions are observed)
- the location and scale of activities which generate dust emissions would be modified and limited during periods of dry and windy weather
- engines to switch off when not in use for prolonged periods
- development of a complaints procedure to promptly identify and respond to complaints.

- Once construction has been completed, establish and maintain ground cover in accordance with the OEMP.

6.16 Cumulative Impacts

As discussed in **Section 2.3**, there are currently 32 existing and proposed renewable energy projects within the CWO-REZ, including the proposed Barneys Reef Wind Farm project planned directly north of the Project. When considered in isolation, the environmental, social, economic and other impacts associated with a development may be considered minor. However, these minor impacts may be more substantial when the impact of multiple developments on the same receivers are considered.

The SEARs require the EIS to include an assessment of the likely impacts of all stages of the development, including any cumulative impacts of the site and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the *Large-scale Solar Energy Guideline (DPIE 2018)* and the *Cumulative Impact Assessment Guideline (DPIE, July 2021)* (subject to transitional arrangements) including the approved Stubbo Solar Farm and Dunedoo Solar Farm, operational Beryl Solar Farm and the proposed Barneys Reef Wind Farm.

This section presents an assessment of the potential cumulative impacts associated with the construction and operation of the Project when considered together with other developments and activities occurring near the Project and presents the approach to the management of these impacts. This assessment was conducted in accordance with the requirements the SEARs, the *Large-scale Solar Energy Guideline* (DPE, 2018) and the NSW *Cumulative Impact Assessment Guidelines for State Significant Projects 2021* (CIA Guidelines).

6.16.1 Assessment Methodology

In accordance with the CIA Guidelines a cumulative scoping assessment was undertaken to identify the potential for cumulative impacts to occur as a result of the Project (refer to **Appendix 18**). The methodology used in the scoping summary is outlined below.

Nearby developments with the potential to result in cumulative impacts with or as a result of the development were identified using the following sources:

- NSW DPE Major Projects website including renewable and other projects in the area
- Google Maps
- Mid-Western Regional Council development application register

- Transport for NSW current projects register (relative to transport routes).

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, with the expected cumulative impacts determined based on the perceived likelihood of impact and scale of interaction between the Project and those identified for the cumulative assessment (refer to **Table 6.16**). In some cases, a detailed assessment (traffic, visual, noise and social) was carried out to identify and assess the potential cumulative impacts of the project.

6.16.2 Identified Developments

Developments that may contribute to the cumulative impacts of the Project are summarised in **Table 6.16**.

As outlined in the cumulative scoping summary provided in **Appendix 18**, 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 (particularly traffic, noise and social impacts). Therefore, developments that are already operational or currently under construction are considered unlikely to result in cumulative impacts as a result of the Project as there would be limited or no overlap of construction activities.

In some instances, sufficient detail relating to the developments is not currently available to inform a detailed assessment. However, 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.

The developments identified in **Table 6.16** are in various stages of delivery and planning, with a number of developments yet to be approved by the relevant authority. The likely impacts of these developments will be assessed by the relevant approval authority as part of the development consent process for each individual development.

Table 6.16 Cumulative Impact Summary

Project	Detail	Potential Cumulative Impact
Bellambi Heights Solar Farm	**Directly south of the Project Area.** Under assessment – Prepare EIS. Due to proximity to Project Area cumulative visual impacts are likely. Unable to assess any other cumulative impacts due to limited information available.	Visual

Project	Detail	Potential Cumulative Impact
Beryl Solar Farm	**5 km away from the Project Area.** Operational. Due to proximity to Project Area, cumulative visual impacts are possible. All other operational impacts would be minimal.	Visual
Stubbo Solar Farm	**7 km away from the Project Area.** Approved. Construction to commence in early to mid-2022 and expected to last for 2 years. Construction likely to overlap with Tallawang for an estimated 6 months.	Traffic and transport Visual Social / Economic
Birrawa Solar Farm and Battery Project	**15 km north east of the Project Area.** Under assessment – Prepare EIS. Construction period anticipated to be up to 3 years. No information available on construction timing. No detail regarding traffic volumes is available. Possible visual impacts due to proximity to Project Area. No other information available to assess other cumulative impacts.	Visual
Dunedoo Solar Farm	**30 km from the Project Area.** Approved. Construction is planned for late 2022. Construction likely to overlap with Tallawang should project proceed for an estimated 6 months	Traffic and transport Visual Social / Economic
Barneys Reef Wind Farm	**Directly north of the Project Area.** Under assessment – Prepare EIS. Construction to commence Q4 2023, construction phase would be approximately 28 months with the peak construction in months 7 to 14. Negligible overlapping impacts during operations.	Traffic and transport Social / Economic Noise Visual
CWO REZ transmission infrastructure	**Directly north of the Project Area.** Under assessment – Request SEARs. Limited information available about the timing of construction.	Visual
Ulan Coal Mine Complex, Moolarben Coal Complex and Wilpinjong Mine	**Approximately 25 km to 35 km southeast of the Project Area.** Operational.	Traffic and transport Noise

6.16.3 Assessment of Cumulative Impacts

Detailed cumulative assessment has been undertaken where potential for impact has been identified through the cumulative scoping assessment (refer to **Appendix 18**) relevant to the Project. As summarised in **Table 6.16**, this assessment has focused on particular identified projects and relevant impacts, this includes the potential traffic and transport, visual, noise, social impacts, the cumulative impacts are discussed below.

6.16.3.1 Traffic and Transport

The TIA considered the cumulative traffic impacts from the nearby existing, approved and proposed developments, including the three open cut coal mines located between 25 km and 35 km to the southeast.

Cumulative traffic from the currently operating mining ventures have been allowed for and incorporated into the existing background traffic.

With respect to a possible, worst-case scenario of cumulative traffic generation from proposed / approved developments, **Table 6.17** shows potential total daily traffic generated along the relevant, surrounding road network as well as a corresponding level of service for each applicable road section (peak hourly traffic and corresponding LoS in brackets).

Table 6.17 Potential Cumulative Traffic Generation

Road Section	Current Traffic	Tallawang Solar Farm	Barneys Reef WF	Stubbo Solar Farm	Dunedoo Solar Farm	Total Traffic	Future LoS
Golden Highway	780 (100)	572 (181)	506 (231)	562 (181)	562 (181)	2,982 (874)	B (D)
Castlereagh Hwy (sth)	1,540 (200)	572 (181)	0	0	0	2,112 (381)	B
Castlereagh Hwy (nth)	820 (100)	572 (181)	290 (145)	0	0	1,682 (426)	A (B)

The total cumulative traffic flows shown in **Table 6.17** above, indicate that operating conditions (levels of service) along the rural road network would generally be adequate with the addition of the cumulative traffic generation from a number of surrounding proposed / approved developments.

It should be noted that the above total cumulative traffic suggests the potential for the total cumulative traffic to occur. However, it is considered that this worst-case scenario is unlikely to occur due to a number of factors including staff / material resourcing and component manufacture as well as collaboration between projects to avoid transport scheduling conflicts.

Once the construction dates / timetables are finalised for the Tallawang Solar Farm Project (currently anticipated to start in June 2023 for a period of approximately 34 months) as well as for the above projects, the cumulative impact of all concurrent projects (including any other potential future projects) would need to be considered with respect to transport and traffic operations.

Generally, any transport-related impacts would initially need to be considered as part of a CTMP to minimise cumulative construction impacts. This is particularly relevant for wind farm projects such as Barneys Reef, which generate the great majority of their transport impacts during the construction phase. Typical mitigation measures would include:

- Independent scheduling of construction activities and deliveries for each project so that they do not overlap in order to minimise road transport movements.
- Region-wide traffic management.
- Shared road infrastructure upgrade works.
- Targeted dilapidation and reinstatement programs.
- Collective community consultation programs.

6.16.3.2 Noise

The NVA considered cumulative noise and vibration impacts from the nearby existing, approved and proposed developments, including the three open cut coal mines located between 25 km and 35 km to the southeast.

The assessment indicated that apart from the Barneys Reef Wind Farm project, the other projects are located at significant distances (> 5km) from the Tallawang Project Area. These large separation distances mean that these other projects do not contribute acoustically to the sensitive receivers in close proximity to the Tallawang Project Area. Therefore, the assessment of cumulative impacts as presented in the NVA focused on the potential contribution from the Barneys Reef Wind Farm project.

Construction Noise

There is potential for the construction periods to overlap with up to 29 months. However cumulative noise and vibration impacts from the concurrent construction of the Barneys Reef Wind Farm and the Project would be minimal given that the predicted noise levels associated with the Tallawang Solar Farm on the northern extend of the Project Area would be within the noise management levels, as further discussed in **Section 6.12.4.1**. These impacts would be dependent on the final timing and duration of construction activities associated with both projects.

Operational Noise

Once operational, it is anticipated that there would be no cumulative noise impacts due to the operation of the Project adjacent the Barneys Reef Wind Farm project, as further discussed in **Section 6.12.4.2**.

Road Traffic Noise

The cumulative traffic noise levels considering the simultaneous construction traffic from Barneys Reef Windfarm on Castlereagh Highway are presented in **Table 6.17**. The assessment predicts that for the northern approach of the Castlereagh Highway to the Project Area:

- The potential cumulative traffic noise level exceeds the daytime noise limit of 60 dB(A) LAeq(9hr) and the increase due to the additional project traffic exceeds the 2dB(A) allowance within 25 m of the road edge during the daytime period.
- The potential cumulative traffic noise level is predicted to comply with the night-time noise limit of 55 dB(A) LAeq(9hr) at 10 m from the road edge including the additional project traffic during the night-time period.

Typically, the sensitive receivers located in the vicinity of the Project Area are located at a distance greater than 40 m from the edge of the Castlereagh Highway and therefore the additional road traffic noise is likely to be negligible for the majority of sensitive receivers in the area. However, a small pocket of dwellings in the township of Birriwa are located within 25 m of the road edge and are represented by receivers R138, R139, R140, R141, R145, R146, R214. These receivers in Birriwa may experience an elevated road traffic noise level during the construction period.

Where reasonable and feasible, RES will coordinate and/or stage the arrival and departure times of construction-related traffic between the Tallawang Solar Farm and Barneys Reef Wind Farm projects.

6.16.3.3 Visual

The VIA considered cumulative visual impacts from the nearby developments within 35 km of the Project Area as wind farms can be visible up to 35 km away. The approved Dunedoo Solar Farm is too distant to be visible to viewpoints identified in the assessment and was therefore not considered.

The cumulative visual impact would involve:

- Most viewpoints to the Tallawang Solar Farm would likely see the proposed Barneys Reef Wind Farm, with the number of turbines seen varying from around 10 to up to 50. The turbines would be tall, distinctive, and may affect views toward the natural formation of Barneys Reef. Barneys Reef Wind Farm would be the only renewable energy development of its type seen from viewpoints identified for this assessment. The turbines of the proposed Barneys Reef Windfarm would draw more visual attention compared to the solar farm and transmission line and have greater potential to dominate local landscape character.

- Nine private viewpoints (Flirtation Hill (VP246), Castlereagh Highway travelling north (VP238), Castlereagh Highway travelling south (VP237), higher elevated residences of Laheys Creek Road (VP199, VP206, VP208, VP209), 727 Castlereagh Road (VP213), and Beryl Road and residences within the vicinity (VP243)) that currently have views of Beryl Solar Farm, would also potentially see part of the Tallawang Solar Farm.

- Six viewpoints (312 Castlereagh Highway, Gulgong (VP223), Flirtation Hill (VP246) and higher elevated residences of Laheys Creek Road (VP199, VP206, VP208, VP209)) would potentially see part of Tallawang Solar Farm and Stubbo Solar Farm. From these viewpoints the solar farms would be at least 2 km away and occupy a very small proportion of the view.

- Bellambi Heights Solar Farm would be located to the south of the Tallawang solar farm and opposite VP213. The visual impact to VP213 would increase and include three solar farms: the existing Beryl Solar Farm (to the south), proposed Tallawang Solar Farm (over 1 km to the north-east), and the proposed Bellambi Heights Solar Farm (potentially around 250 m away, depending on the Castlereagh Highway setback). Public viewpoint VP232 would also be adversely visually affected. Road users (including residents that access their property via the local road) would travel past an additional 2.5 km of solar panels, around 9 km of solar panels in total along Puggoon Road between the Castlereagh Highway and the Wallerawang to Gwabegar railway.

- From Flirtation Hill (VP46), Beryl, Stubbo and Tallawang solar farms would potentially be in view however, the three would not be visible from the same viewing position. There is a large physical separation between the solar farms, and generally they would vary in distance from the viewer and appear different in scale. Given the visual characteristics of solar farms (being dark in colour, relatively low-profile, and the prevalence of intervening existing stands of vegetation), their combined effect is unlikely to significantly change the scenic quality of the view.

The VIA indicated that the Stubbo Solar Farm, Birriwa Solar Farm, Bellambi Heights Solar Farm and the Project are sited in generally low visibility locations. Should all four solar farms be constructed, the rural character should continue to dominate the landscape.

6.16.3.4 Social / Economic

Both the SIA and Economic Assessment considered cumulative social and/or economic impacts of the Project and other developments that may interact, as detailed in **Table 6.2** and identified in **Table 6.16**.

As discussed in **Section 6.4**, there is sufficient accommodation to support the non-local workforce for multiple projects (650 private short-term rentals, 4,540 unoccupied dwellings and 1,930 rooms and cabins available). However, it is noted that at certain times accommodation can be less available and measures to manage these impacts are appropriate.

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. RES acknowledges that the cumulative social impacts of development on local communities within the region, particularly impacts associated with the influx of construction workers, subsequent impacts on local community services, as well as impacts associated with construction related activities, will remain a key challenge for the development and growth of the REZ for all developers, and other key stakeholders (Government, local businesses and service providers, community groups and landholders/residents).

Such impacts will require proactive engagement and effective collaboration, to ensure appropriate social and environmental impact management, and the enhancement and augmentation of benefits for local communities. The SIMP that will be developed and implemented by RES for the Project will include measures to address potential cumulative impacts (both positive and negative) and provide an appropriate platform for RES to manage the contribution of the Project to the relevant cumulative issues.

RES has committed to the development and implementation of workforce, procurement and accommodation strategies identified by the SIA and Economic Assessment, 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 Mid-Western Regional LGA and neighbouring LGAs.

6.16.4 Management and Mitigation Measures

The environmental management measures for key issues outlined throughout **Section 6.0** and summarised in **Section 8.0** will be implemented to minimise the cumulative impacts of the Project.

7.0 Matters of National Environmental Significance

On 27 April 2022, the Department of Agriculture, Water and Environment (DAWE) confirmed the Tallawang Solar Farm (referred to in this section as the proposed action) constitutes a controlled action under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions under the EPBC Act for the proposed action are:

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

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

Specifically, DAWE considered the Project is likely to have a significant impact on:

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived native grassland – Critically Endangered
- Koala (combined populations of QLD, NSW and the ACT) (*Phascolarctos cinereus*) – Endangered
- Spotted-tail Quoll (south-east mainland population) (*Dasyurus maculatus maculatus*) – Endangered
- Regent Honeyeater (*Anthocaera phrygia*) – Critically Endangered
- Large-eared Pied Bat (*Chalinobilus dwyeri*) – Vulnerable
- Corben's Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable
- Grey Box Grassy Woodland and Derived Native Grassland of south-east Australia – Endangered Ecological Community (EEC).

The assessment of the Matters of National Environmental Significance including the additional information outlined above is provided in Appendix H of the Biodiversity Development Assessment Report (BDAR) (provided in **Appendix 10**) and should be read in conjunction with the BDAR. **Section 7.1** below provides a summary of the key findings of the assessment of the MNES.

7.1 Summary of MNES Impacts

The direct impacts of the Project, as they relate to the clearing of EPBC Act-listed CEEC and threatened species habitat, as summarised in **Table 7.1**, are predicted to be long-term or permanent. Further avoidance and minimisation measures are proposed and a detailed biodiversity offset program will be prepared as part of the Project in order to compensate for the residual impacts of habitat loss that cannot be adequately avoided or minimised. The Project is not expected to result in any substantial indirect impacts on the biodiversity values of surrounding lands. However, some minor indirect impacts associated with habitat connectivity, dust, noise, weeds, feral animals, and construction of a security fence may occur

during the Project. These impacts are further discussed in Appendix H of the BDAR provided in **Appendix 10**.

Table 7.1 Predicted Impacts from the Project on EPBC Act listed threatened species and communities

Impact Type	MNES	Description	Nature of Impact	Direct Impact Area (ha)	Offsetting Required?
Direct	Box Gum Woodland CEEC	Loss of 28.07 ha of woodland through clearing.	Permanent	28.07	Yes, see **Table 7.2**
Direct	Koala (*Phascolarctos cinereus*)	Removal of potential foraging habitat containing key feed trees. Including removal of access to foraging habitat that will be contained within a security fence.	Permanent	61.37	Yes, see **Table 7.2**
Direct	Spotted-tailed quoll (*Dasyurus maculatus maculatus*)	Removal of potential foraging habitat.	Permanent / Long Term	1213.07	Yes, see **Table 7.2**
Direct	Regent Honeyeater (*Anthocaera phrygia*)	Removal of potential foraging habitat. No removal of Important Areas Mapping.	Permanent	13.82 ha	Yes, see **Table 7.2**
Direct	Large-eared Pied Bat (*Chalinobilus dwyeri*)	Potential roost habitat has not been identified within the Project Area or in the surrounds	Permanent	13.82 ha	Yes, see **Table 7.2**
Direct	Corben's Long-eared Bat (*Nyctophilus corbeni*)	Removal of potential foraging habitat.	Permanent	13.82 ha	Yes, see **Table 7.2**
Direct	Grey Box Grassy Woodland and Derived Native Grassland EEC	Loss of 1.39 ha of grey box woodland through clearing.	Permanent	1.39 ha	Yes, see **Table 7.2**

7.2 Impact Avoidance Strategies

The biodiversity assessment commenced early in the design process which has allowed the Proponent to utilise ecological survey works to inform the progression of the Project layout. To avoid impacts on native vegetation, the current design has focused on locating as much of the Project infrastructure and construction footprint within exotic and/or previously cleared grassland areas (some of which is derived native grassland) with low biodiversity value. This method has resulted in the majority of the associated impacts being within these lower value areas.

In its entirety, the Project's development footprint is extremely degraded and consists largely of cultivated or otherwise disturbed grasslands, and areas of derived native grassland. The solar arrays, BESS, substation and associated infrastructure has been placed predominately in disturbed or other degraded areas, with only marginal stands of isolated remnant vegetation to be cleared. As previously mentioned, the only vegetation which is connected to intact remnant vegetation off site, is to be retained.

In terms of the loss of habitat, the grassland areas where the solar arrays and BESS development will be, typically only provide foraging habitat for more mobile threatened species of bird and bat. This aerial

foraging habitat will still be present upon installation of the solar farm, and therefore, the general removal of threatened species habitat is also being minimised, due to the nature of the project.

Two NSW listed threatened forb species were detected during threatened species surveys. One individual of *Diuris tricolor* was detected in the southern remnant of the Project Area and two individual *Swainsona sericea* were detected adjacent to the creek line in the south west of the Project Area. All threatened species locations have been avoided in the Project layout.

Overall, within the solar farm site, Project placement and design has resulted in the avoidance of direct impacts on approximately 100.95 ha of remnant woodland and derived native grassland which equates to 94.2% of remnant woodland and derived native grassland being retained within the Project Area.

7.3 Proposed Biodiversity Offset Strategy

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

To meet offsets required for Commonwealth listed entities for controlled actions under the NSW BOS, RES retains the ability to:

- retire biodiversity credits based on the like-for-like provisions in the Biodiversity Conservation Regulation 2017
- fund biodiversity conservation actions that are listed in the Ancillary rules: Biodiversity conservation actions and directly benefit the threatened entity impacted
- pay into the Biodiversity Conservation Fund, noting it is the proponent's responsibility to notify the Biodiversity Conservation Trust that their payment is for a controlled action.

The Biodiversity Conservation Trust is required to meet the Commonwealth offset requirement component in a like-for-like manner. This is by retiring like-for-like credits, by funding conservation actions that are listed in the Ancillary rules: Biodiversity conservation actions and benefit the threatened entity impacted or by funding other conservation measures approved by the NSW Minister for Energy and Environment that directly benefit the entity impacted. **Table 7.2** outlines the credit requirement for the relevant habitat areas for impacted MNES outlined in **Section 7.1**, as calculated by the BAM.

It is noted that **Table 7.2** displays areas of impact for the koala and spotted-tailed quoll that do not have credits generated for them. For both species this is due to the construction of a security fence that does not involve direct clearing of vegetation, but exclusion of the species to the enclosed vegetation. This has been identified as an indirect impact in **Section 5.0** of the BDAR. Additionally, for the spotted-tailed quoll, areas of Category 1-Exempt Land have been determined as potential (low quality) foraging habitat. Category 1-Exempt Land is exempt from assessment under BAM 2020.

Table 7.2 Ecosystem and Species-credit Species credits Relevant for Impacted MNES

MNES	PCTs and Habitats	Credits Required
Box gum woodland CEEC	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Box gum woodland CEEC	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion DNG	423
TOTAL		**1032**
Koala	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
Koala	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Koala	318 Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	47
Koala	Additional Area excluded due to security fence (indirect impact)	0
TOTAL		**1124**
Spotted-tailed quoll	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
Spotted-tailed quoll	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Spotted-tailed quoll	318 Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	47
Spotted-tailed quoll	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion DNG	423
Spotted-tailed quoll	Category 1 exempt Land	0
Spotted-tailed quoll	Retained native vegetation excluded due to security fence (indirect impact)	0
TOTAL		**1124**
Regent Honeyeater	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
Regent Honeyeater	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Regent Honeyeater	318 Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	47

MNES	PCTs and Habitats	Credits Required
TOTAL		**701**
Large-eared Pied Bat	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
Large-eared Pied Bat	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Large-eared Pied Bat	318 Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	47
TOTAL		**701**
Corben's Long-eared bat	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
Corben's Long-eared bat	281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion *Moderate Condition*	609
Corben's Long-eared bat	318 Mugga Ironbark -Tumbledown Red Gum - Red Box - Black Cypress Pine open forest on shallow stony soils on hills in the NSW South Western Slopes Bioregion *Moderate Condition*	47
TOTAL		**701**
Grey Box Grassy Woodland	81 Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion *Moderate Condition*	45
TOTAL		**45**

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

The Biodiversity Offset Strategy will be developed with consideration of the need to compensate for residual significant impacts to box gum woodland CEEC, the koala, and spotted-tailed quoll with the aim to maintain or improve the biodiversity values of the surrounding region in the medium to long term. This aim will be delivered through the securing of in-perpetuity 'like-for-like' land-based offsets and in conjunction with the various impact mitigation and offset strategies that are proposed to be employed as part of the Project. Further details regarding the proposed biodiversity offset strategy is discussed in **Section 6.7.6** .

8.0 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 of 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.

8.1 Environmental Management Framework

The environmental impacts associated with the proposed Tallawang Solar Plant 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, Employment and Procurement Strategy
    - Community Engagement Strategy
    - Community Shared Benefit Strategy, including a Neighbours Benefit Program and Community Enhancement Program
- Biodiversity Management Plan
- Sheep Grazing Vegetation Management Plan
- 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.

8.2 Summary of Management Measures

A consolidated summary of management measures is provided in **Appendix 18**.

9.0 Justification of the Project

The SEARs require the EIS to provide both a *'strategic justification for the development focusing on site selection and the suitability of the proposed site'*. This section addresses this requirement and provides a conclusion discussing the justification for the Project, taking into consideration the biophysical, social and economic impacts, the suitability of the Project Area and whether or not the Project is in the public interest. **Section 9.4** discusses the principals of ecologically sustainable development (ESD) as defined in Division 5, Section 193 of the *EP&A Regulation 2021*, and In **Section 9.5** the Project is considered in the context of the objects of the EP&A Act 1979.

9.1 Project Justification

The development 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.

The proposed location of this Project is within the Central West Orana Renewable Energy Zone. The CWO REZ is one of the renewable energy zones identified by the NSW government to be targeted for renewable energy development and designated as such through the *Renewable Energy Zone (Central-West Orana) Order 2021* gazetted on 5 November 2021. The NSW government has indicated that the designated Renewable Energy Zones will play a vital role in delivering affordable energy generation to help prepare the State for the expected retirement of thermal power stations over the coming decades. 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 Project would provide a number of benefits at Federal, State, regional and local levels, including:

- Generating approximately 1.3 GW-h of renewable electricity per year.
- Reducing the greenhouse gas emissions for this generation capacity by approximately 1 million tonnes of CO2 equivalent per annum (based on 0.948t/MWh from fossil fuels). This is roughly equivalent to removing approximately 600,000 cars from the road.
- Generating a capital investment of approximately $743 million.
- Create up to 700 FTE employment opportunities (270 FTE direct and 430 FTE indirect) during the construction phase with around 27 FTE employment opportunities (7 FTE direct and 20 FTE indirect) during the operational phase.
- Generating enough electricity to supply approximately 330,000 households on an annual basis in NSW.
- Establishing indirect benefits to local services through the construction and operation phases.
- Diversifying land use and economic activity in regional NSW.
- Providing direct benefits to the local community through community fund and benefit sharing programs in the construction and operation phases.

- Providing ongoing financial assistance through the community shared benefit scheme to ensure direct benefit from the Project to the local community, including local schools, training or education as well as grants or project support for local community, environmental, or sporting groups.

The location of the Project including the design, technology, layout and size of the Project have been developed through consideration of a number of alternatives (as outlined in **Section 2.7**) 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 its construction, operation and decommissioning. The Project is considered to be justified and in the public interest because:

- it is suitably located in an area expressly designated for this use through the *Renewable Energy Zone (Central-West Orana) Order 2021* gazetted on 5 November 2021
- 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 close proximity of transmission infrastructure proposed by the NSW Government 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.

RES 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 (LRET)
- loss of opportunity to 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.

9.2 Suitability of the Site

The Project Area is strategically located within the CWO-REZ in an area with identified high solar energy source potential.

The Castlereagh Highway extends along the southwest boundary of the Project Area providing access to the Project Area from Dunedoo to the north and Mudgee to the south (regional service centres) and the Port of Newcastle. The Castlereagh Highway has sufficient operating capacity to support the Project. The Port of Newcastle is located approximately 230 km southeast of the Project Area.

The Project Area largely comprises areas that have previously been disturbed and/or historically cleared associated with the agricultural land use. The Project will provide for a compatible land use and support the potential ongoing agricultural use of the Project Area for livestock (sheep) grazing. The conceptual layout has been developed to maximise the use of existing disturbed areas and avoid and minimise impact to identified biodiversity and Aboriginal cultural heritage values on the Project Area.

The Project Area also provides for sufficient separation distances to non-associated dwellings to minimise noise impacts associated with the construction and operation of the Project. Key factors which form a part of the existing landscape character surrounding the Project Area include large areas of vegetation, undulating topography, roadside vegetation and riparian vegetation associated with creek lines which will assist in reducing the potential for viewing the proposed infrastructure and reduce the associated visual impact.

9.3 Environmental, Social and Economic Impacts

As highlighted throughout the EIS, the Project has been designed using an iterative approach. The conceptual layout for the solar arrays, transmission line corridor, Project access, internal access roads and other supporting infrastructure has been subject to ongoing refinement with the aim of minimising associated environmental, cultural and social impacts.

The environmental, cultural, social and economic impacts of the Project have been identified and were subject to a detailed environmental assessment based on:

- assessment of the site characteristics (existing environment)
- focused 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.

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

The impacts of the Project have been kept to a minimum through:

- obtaining a detailed understanding of the issues and impacts by scientific evaluation and stakeholder engagement
- detailed project planning considering the environmental, social and cultural constraints of the locality and investigated 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
- a commitment to proactive and appropriate strategies to avoid, minimise, mitigate, offset or manage a range of potential environmental impacts (refer to **Section 6.0** and **Section 8.0**).

9.4 Ecologically Sustainable Development

An object of the EP&A Act is to encourage Ecological Sustainable Development (ESD) within NSW. As noted in **Section 4.1**, the Project is classified as SSD in accordance with the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and has been subject to an environmental impact assessment under Part 4, section 4.1 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.

Essentially, ESD requires that current and future generations should live in an environment that is of the same or improved quality than the one that is inherited.

9.4.1 The Precautionary Principle

The EP&A Regulation defines the precautionary principle as:

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

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

The assessment process has involved a detailed study of the existing environment (refer to **Section 6.0**), and where applicable the use of scientific modelling to assess and determine potential impacts as a result of the Project (such as noise and flooding). 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. The Project has been designed and located to avoid native vegetation, PADs and sensitive environments (i.e. waterways) as much as possible and to minimise the use of natural and artificial resources while considering the social and economic welfare of the local community. Specialist studies were undertaken to provide accurate information to assist with the evaluation and development of the Project. Mitigation measures are provided in **Section 8.0**.

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

- 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.

- RES will develop and implement a CEMP and OEMP, 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 and OEMP will incorporate the additional controls committed to in this EIS (refer to **Section 8.0**).

9.4.2 Intergenerational Equity

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

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

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

The objectives of the Project are outlined in **Section 1.3** 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 areas (due to historical and current cropping 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 **Sections 6.0** and **8.0** have been developed and evaluated to minimise the impact on the environment to the greatest extent reasonably possible.

Although the Project would result in amenity impacts (such as noise and air (dust) emissions, visual impacts and social amenity impacts), the Project would not result in any impacts that are likely to adversely impact on the health, diversity or productivity of the environment for future generations. The Project would benefit future generations by reducing the reliance on energy sources derived from non-renewable resources, which produce GHG emissions. Once decommissioned, the land within the development footprint can be rehabilitated to its current use if required thereby allowing for either continuation of renewable energy generation or a return to agricultural production, both of which would provide benefits for future generations.

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

9.4.3 Conservation of Biological Diversity

The EP&A Regulation identifies that the principle of conservation of biological diversity and ecological integrity should be a fundamental consideration in the decision-making process. The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. All environmental components, ecosystems and habitat values potentially affected by the Project have been assessed in the BDAR (refer to **Appendix 3**). Potential biodiversity related impacts are outlined in this EIS (refer to **Section 6.2**) and measures to ameliorate any negative impact are outlined in **Section 8.0**.

The conceptual layout has been developed to maximise the use of existing disturbed areas and avoid and minimise impact to identified biodiversity. Following the application of avoidance and mitigation measures, the BAM assessment has identified the biodiversity credit requirement to offset the impacts of the residual impacts of the Project and the required management and mitigation measures to be implemented. The principle of Conservation of Biological Diversity is considered to be satisfied.

9.4.4 Valuation Principle

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

that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and

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

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

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

The aims, structure and content of this EIS have incorporated these ESD principles. The mitigation measures in **Section 8.0** provide an auditable environmental management commitment to these parameters. The Project would be considered ecologically sustainable, due to the social, economic and environmental benefits provided in **Section 2.2**, and the mitigation measures put in place to protect from adverse impacts on the environment.

9.5 Objects of the EP&A Act

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

Table 9.1 Objects of the EP&A Act

Object	Response
To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The Project would result in the loss of cropping within the small amount of agricultural land currently used for this purpose. This activity would be restricted for a period of approximately 39 years (35 lifetime of the Project years and 4 years of construction and decommissioning activities) however in the meantime, the Project Area can be used for grazing agriculture (sheep) and can be returned to cropping agricultural use upon decommissioning. The Project would not result in the sterilisation of natural resources including mineral resources. The Project has been designed and located to avoid native vegetation, PADs and sensitive environments (i.e. waterways) as much as possible and to minimise the use of natural and artificial resources while considering the social and economic welfare of the local community.
To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is considered in **Section 9.4**.

Object	Response
To promote the orderly and economic use and development of land.	The Project aims to promote the orderly and economic use of the land through the provision of utility services (power generation) and diversifying sources of income for the agricultural sector.
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, including site selection (see **Section 9.4**) has taken into account all potential impacts and incorporates measures to avoid, minimise or compensate for these impacts.
To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The Project will not impact upon any 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**. RES would continue to consult with the local community and key stakeholders during the Project's development.

9.6 Conclusion

As outlined in **Section 9.4**, 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, like any large-scale development, would have impacts, these impacts can be effectively managed, mitigated and offset and the development will result in significant economic benefits. The assessment therefore concludes that the Project is consistent with the principles of ESD.

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

- renewable energy supply to assist with fulfilling the current obligations under State and Federal renewable energy targets
- providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change
- The Project will also provide direct financial benefits to the regional and local community, including:
    - capital investment of approximately $743 million of which approximately $110 million will be retained in the region
    - employment generation creating up to 700 FTE jobs (270 FTE direct and 430 FRE indirect) during the 34 month construction phase with around 27 FTE jobs (7 FTE direct and 20 FTE indirect) created during the operational phase
    - indirect benefits to local services through the construction and operation phases
    - additional landowner income to host landowners resulting in financial contributions to the local community
    - Neighbour Benefit payments, 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.

RES 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 RES 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.

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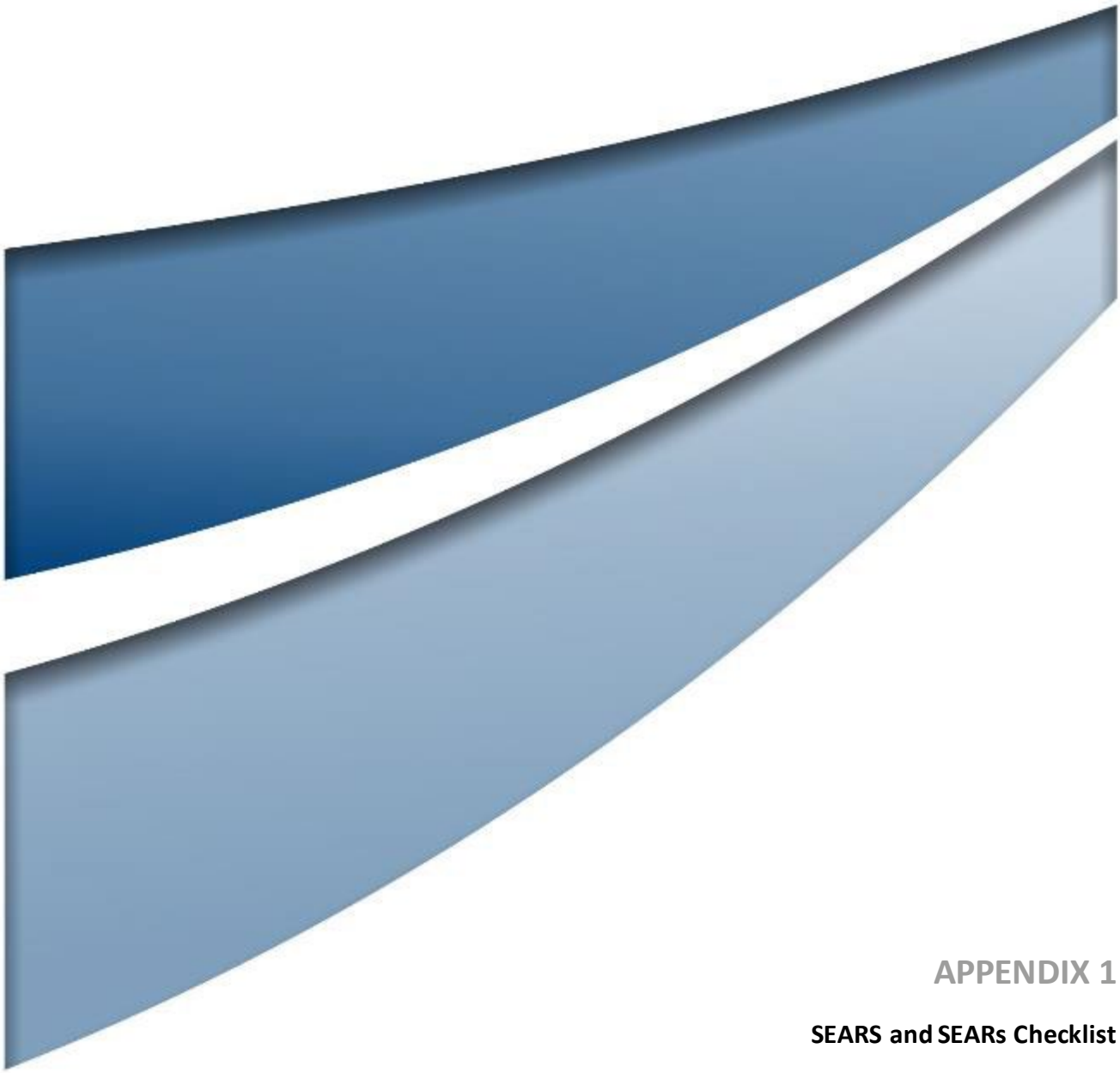
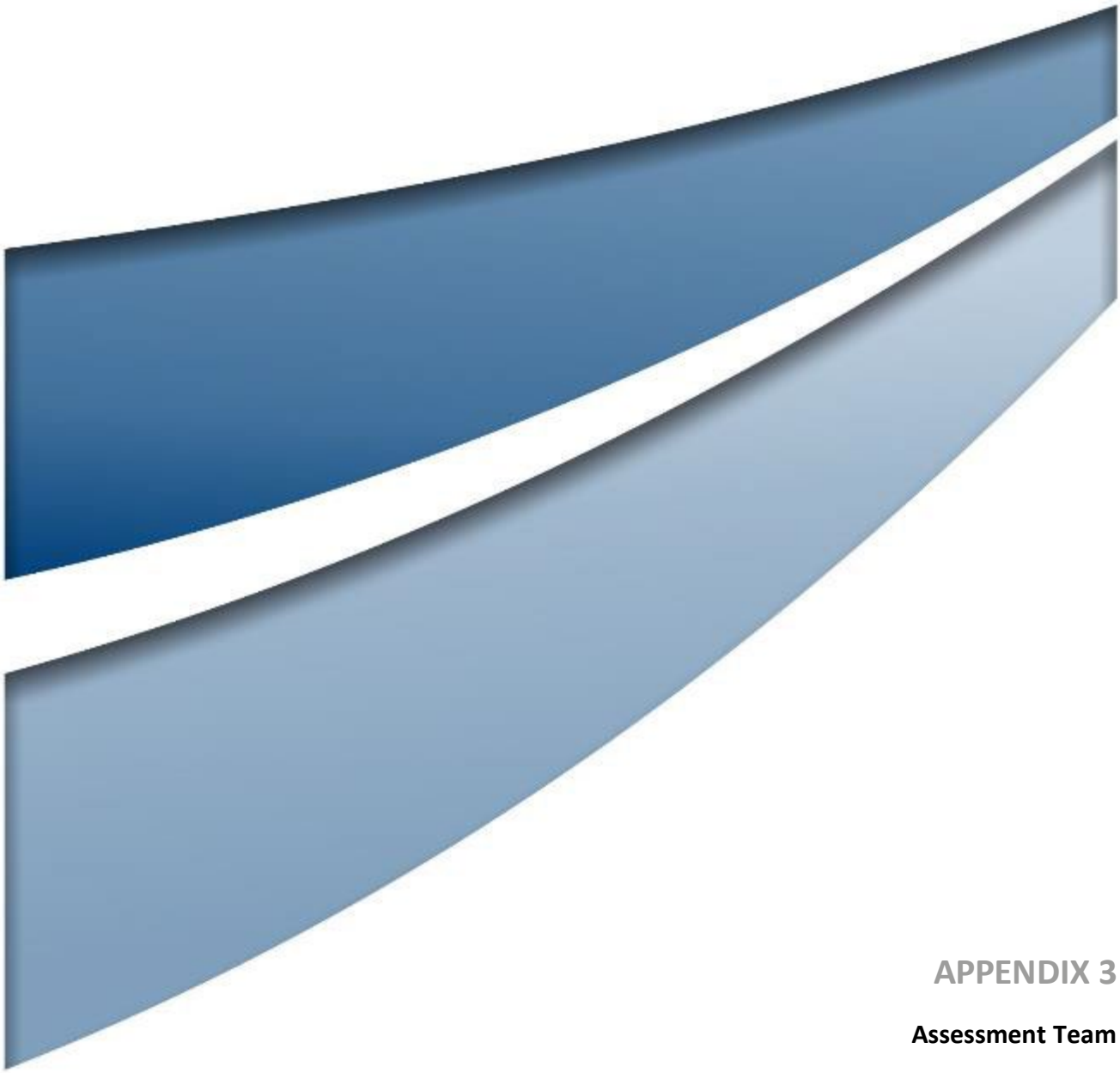


APPENDIX 1

SEARS and SEARs Checklist

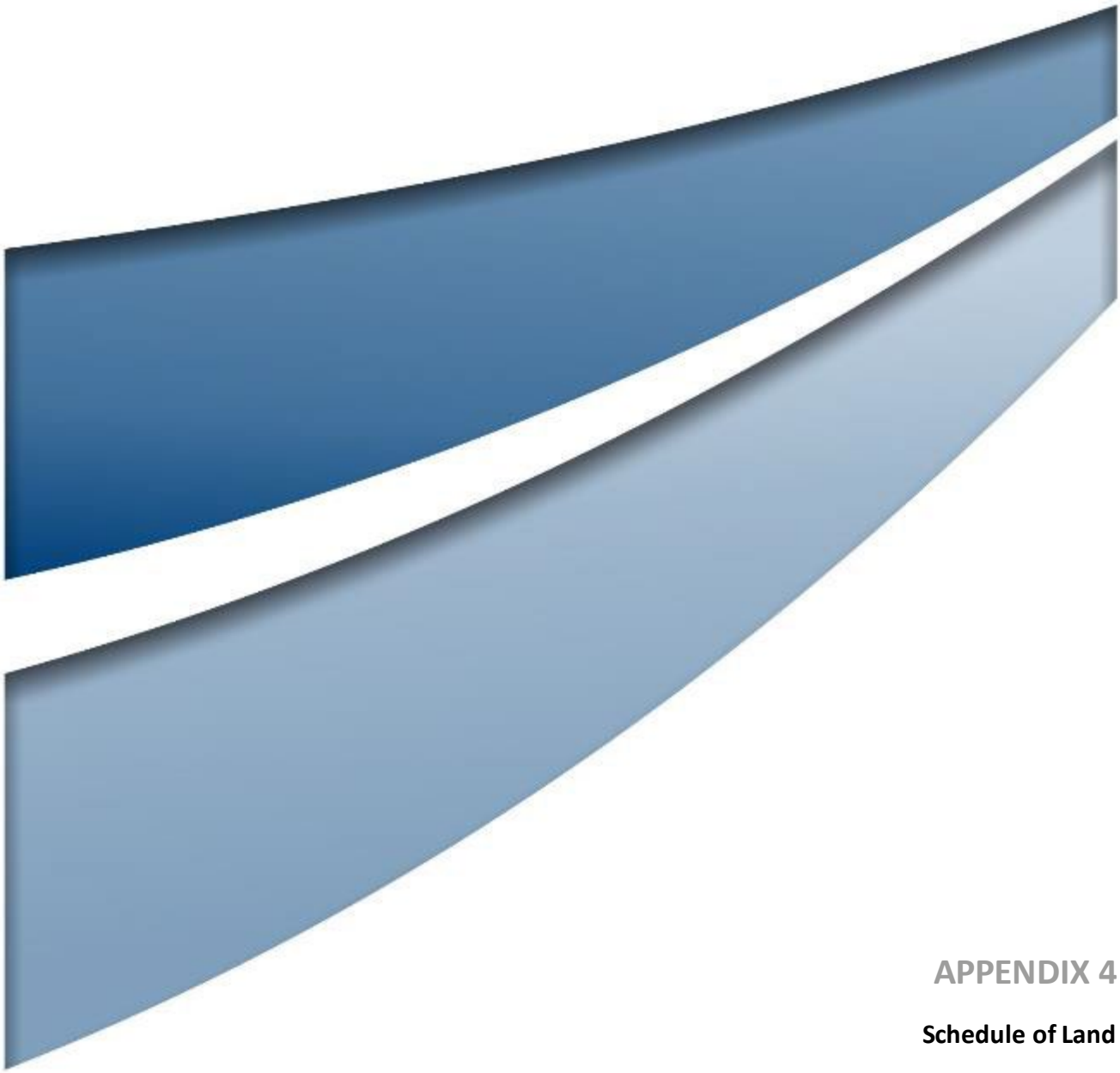
APPENDIX 2

Detailed Maps and Figures



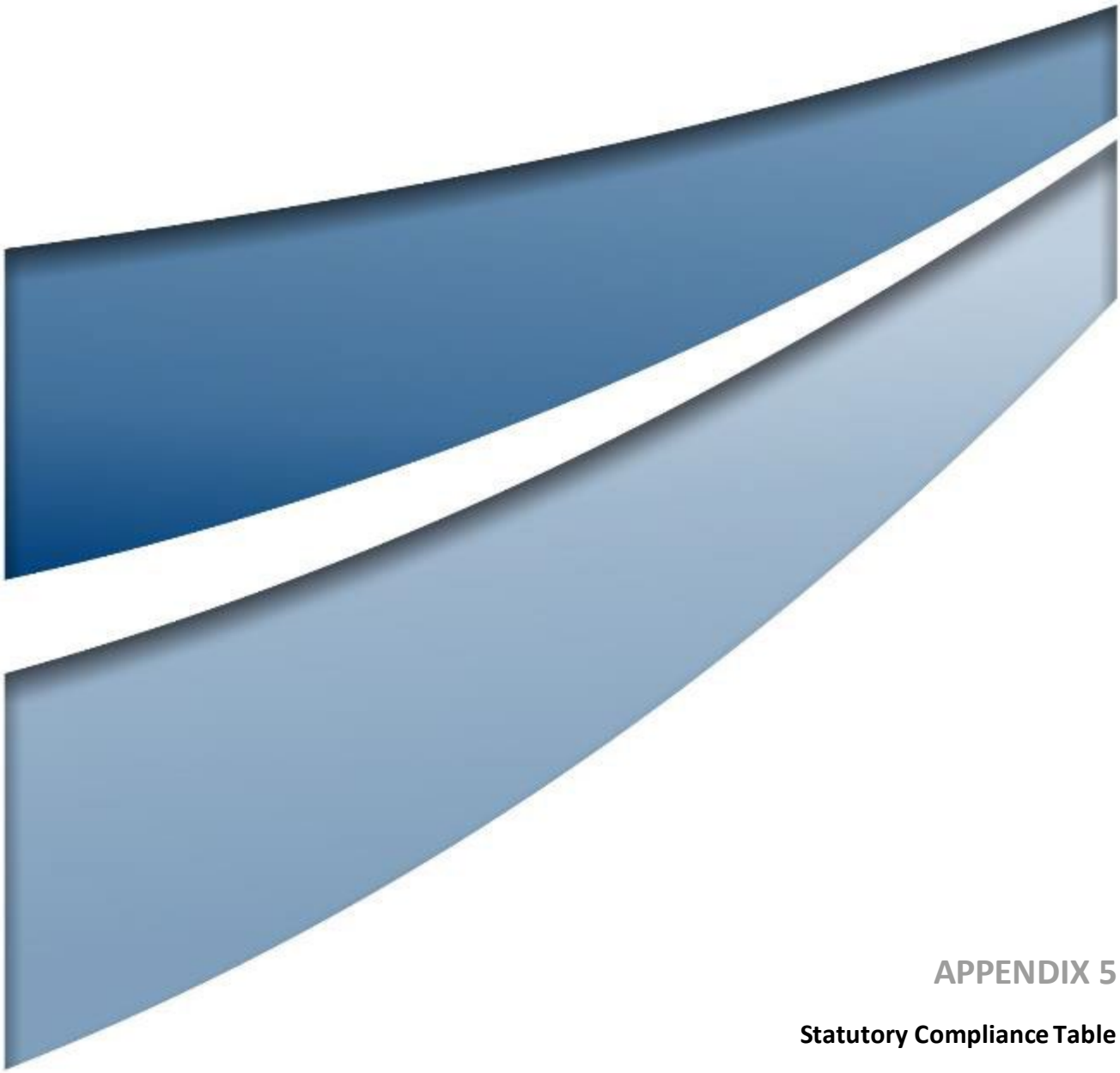
APPENDIX 3

Assessment Team



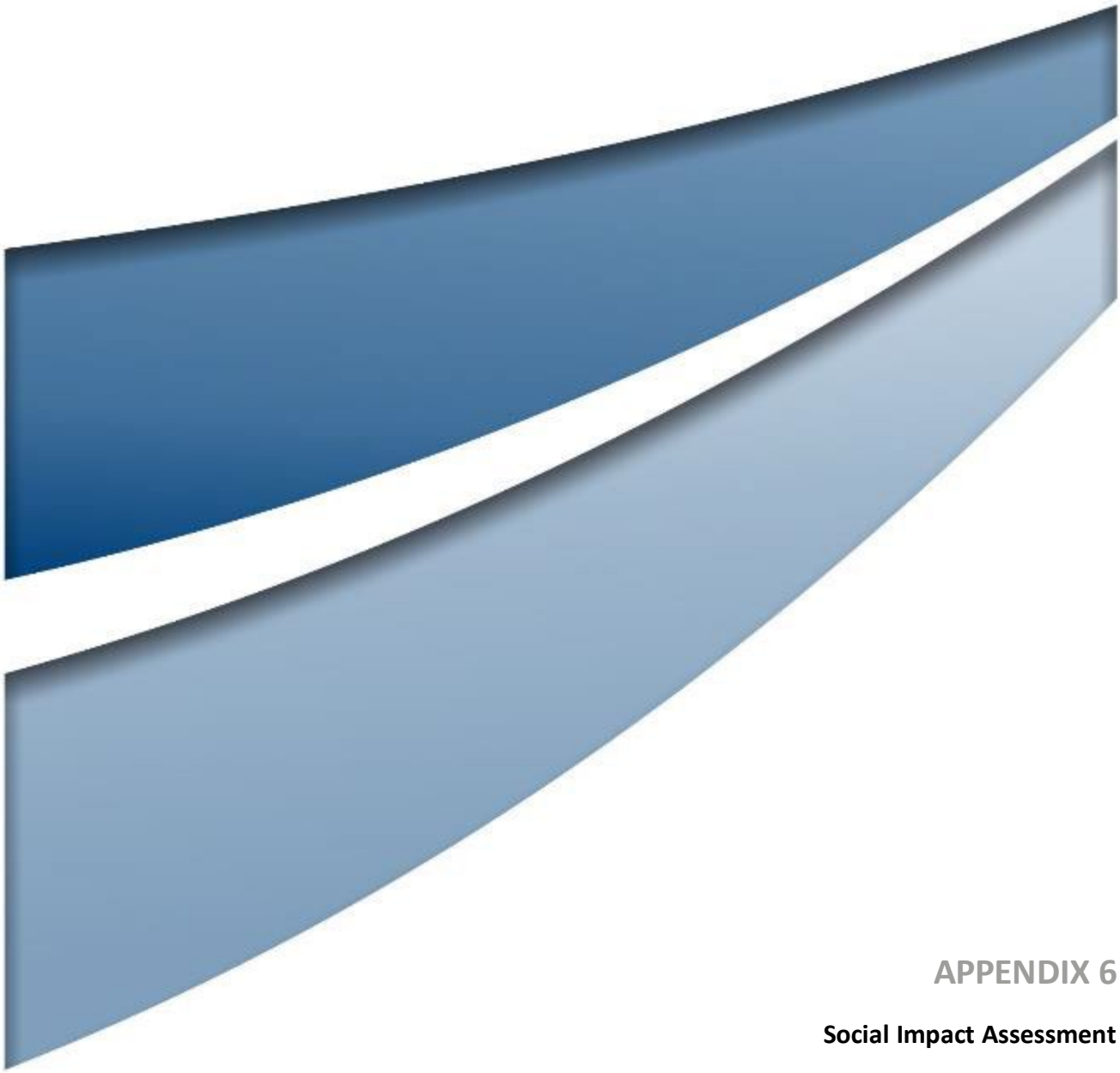
APPENDIX 4

Schedule of Land



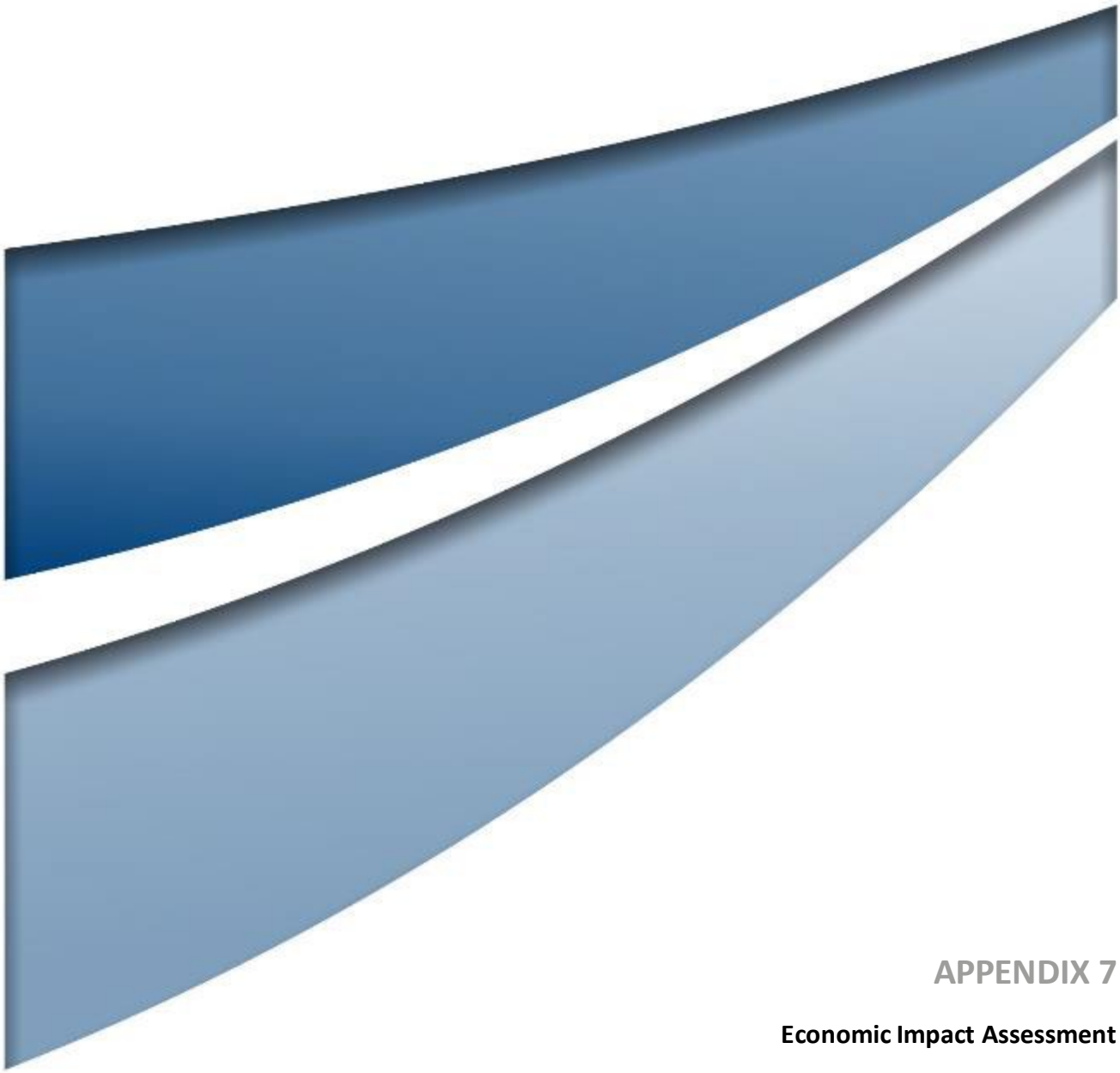
APPENDIX 5

Statutory Compliance Table



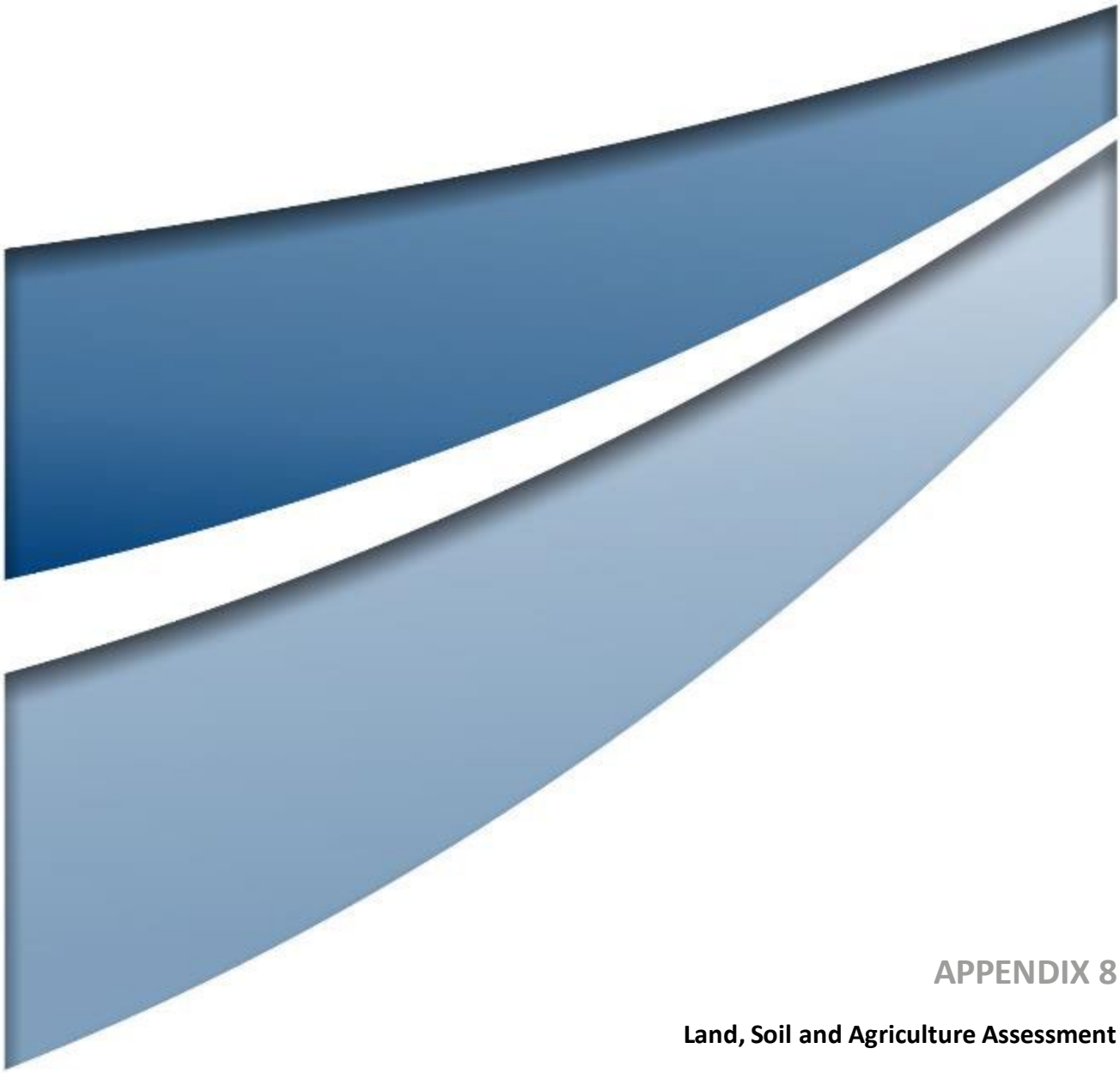
APPENDIX 6

Social Impact Assessment



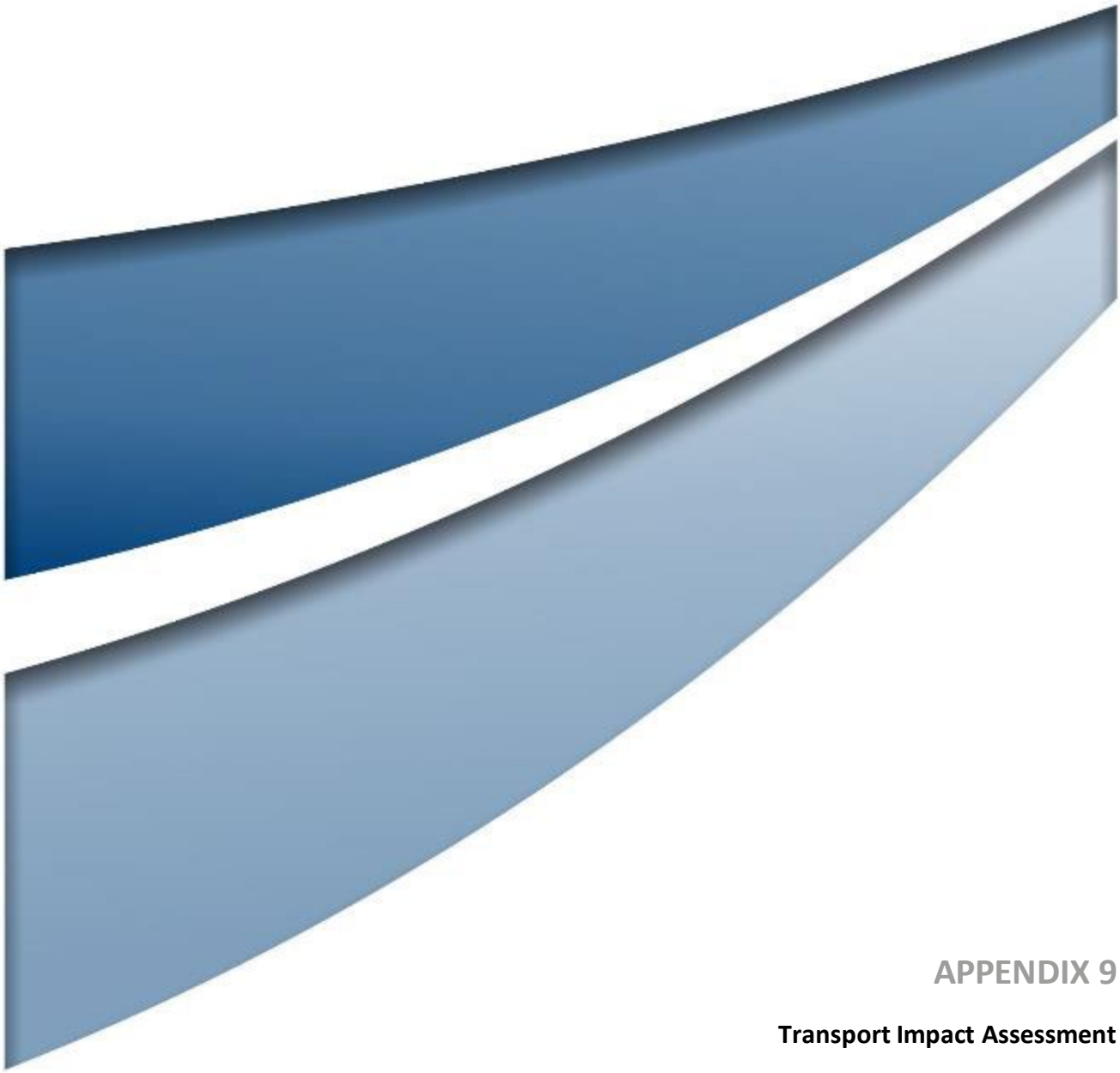
APPENDIX 7

Economic Impact Assessment



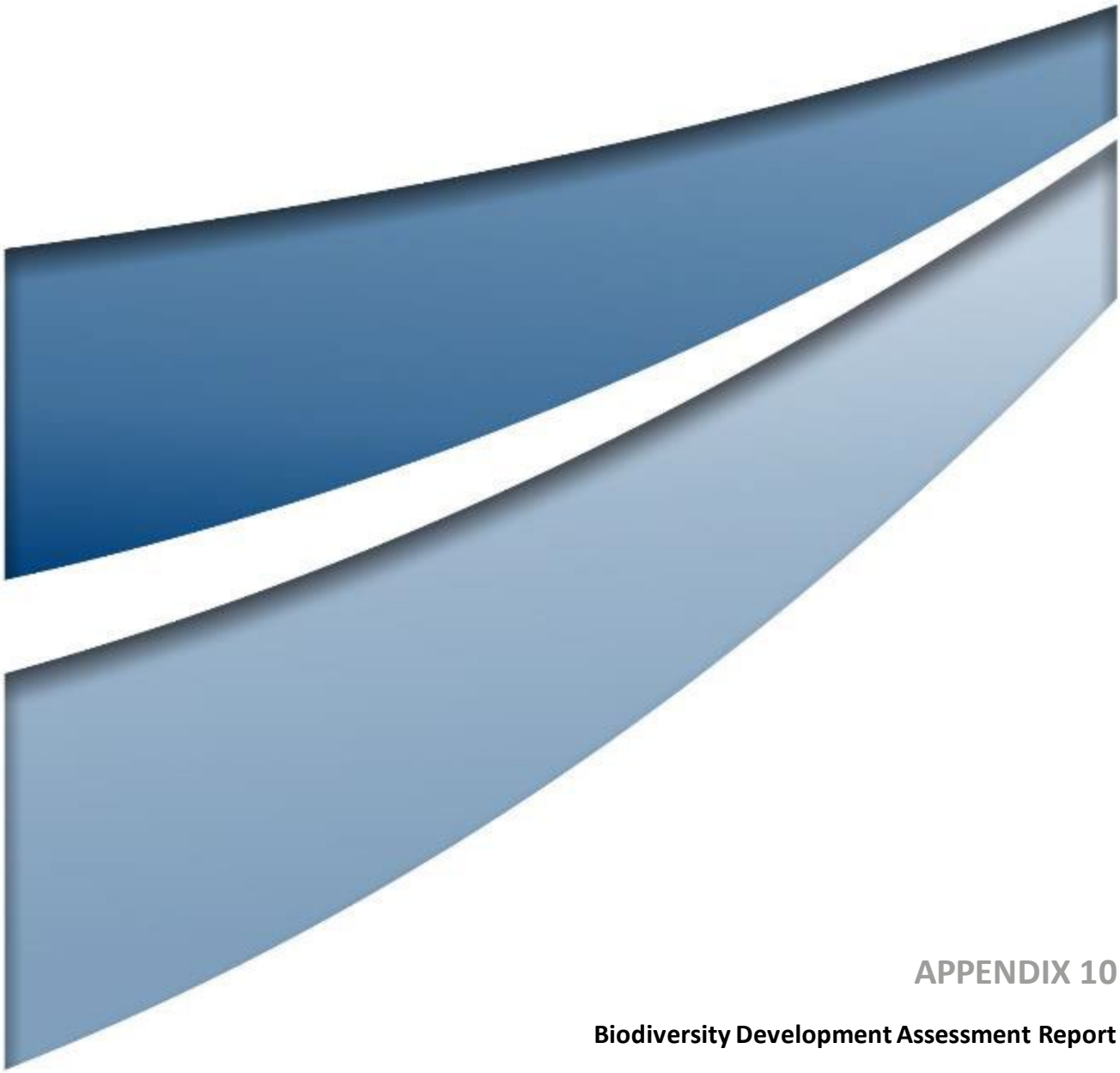
APPENDIX 8

Land, Soil and Agriculture Assessment



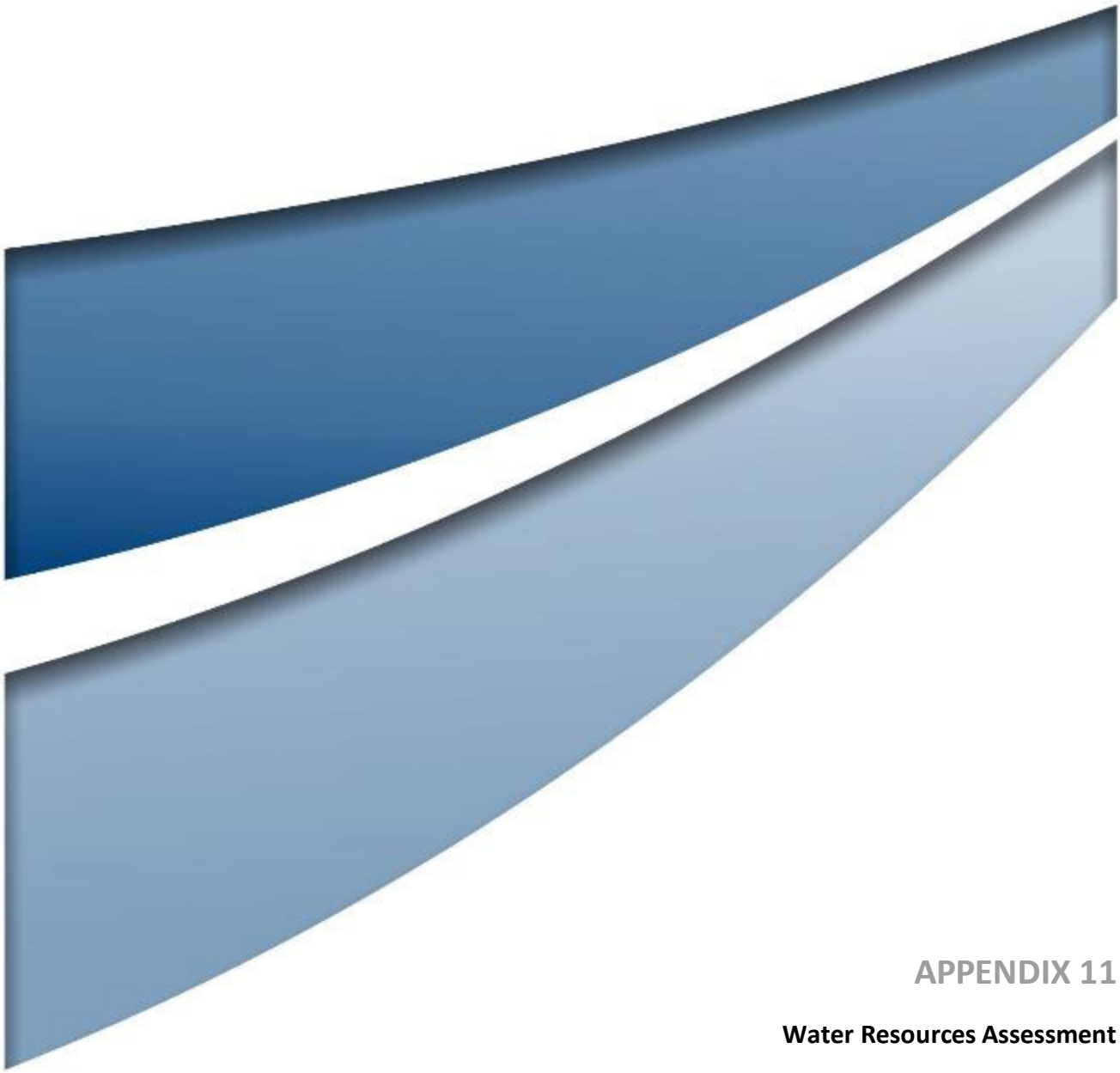
APPENDIX 9

Transport Impact Assessment



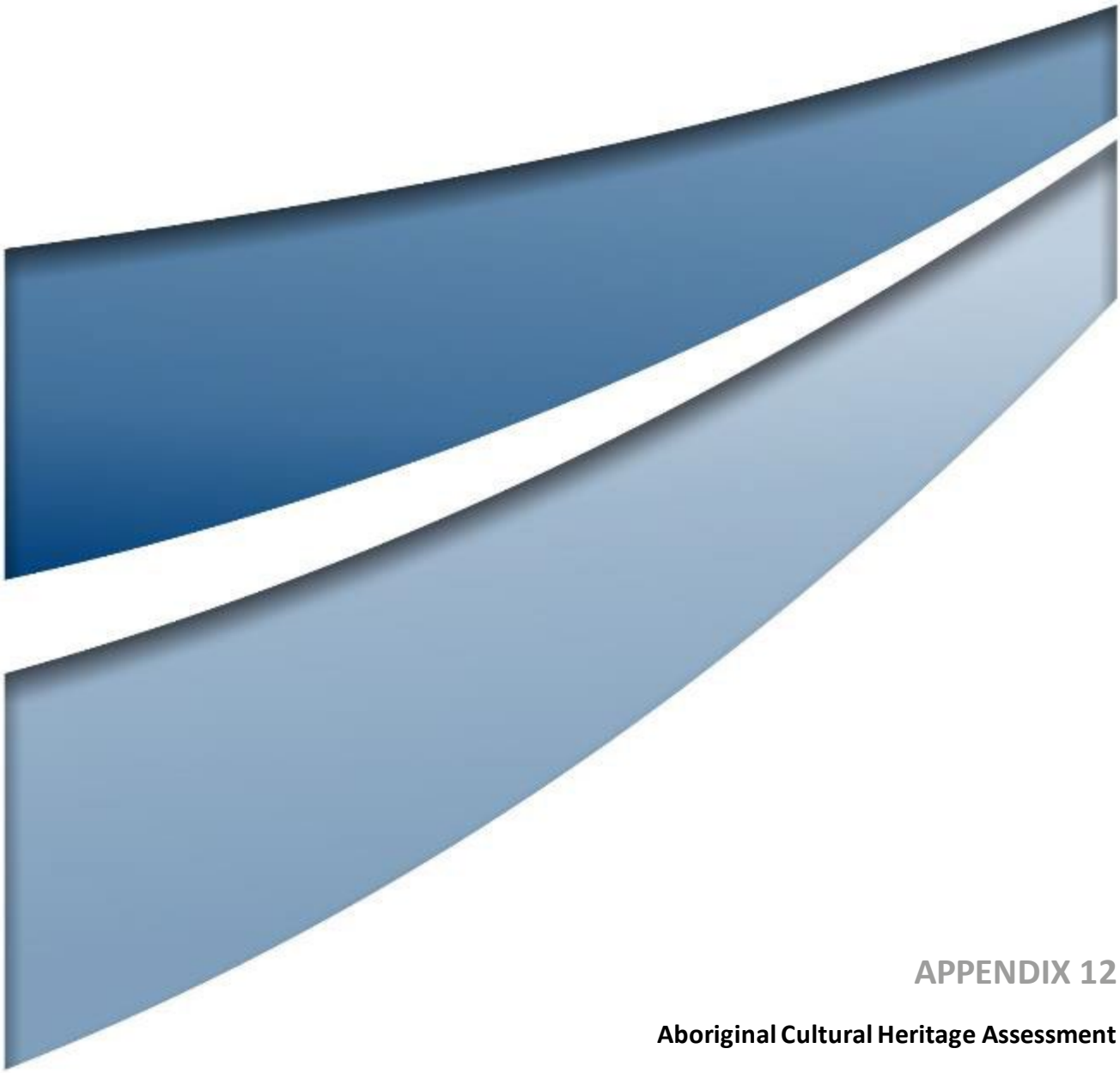
APPENDIX 10

Biodiversity Development Assessment Report



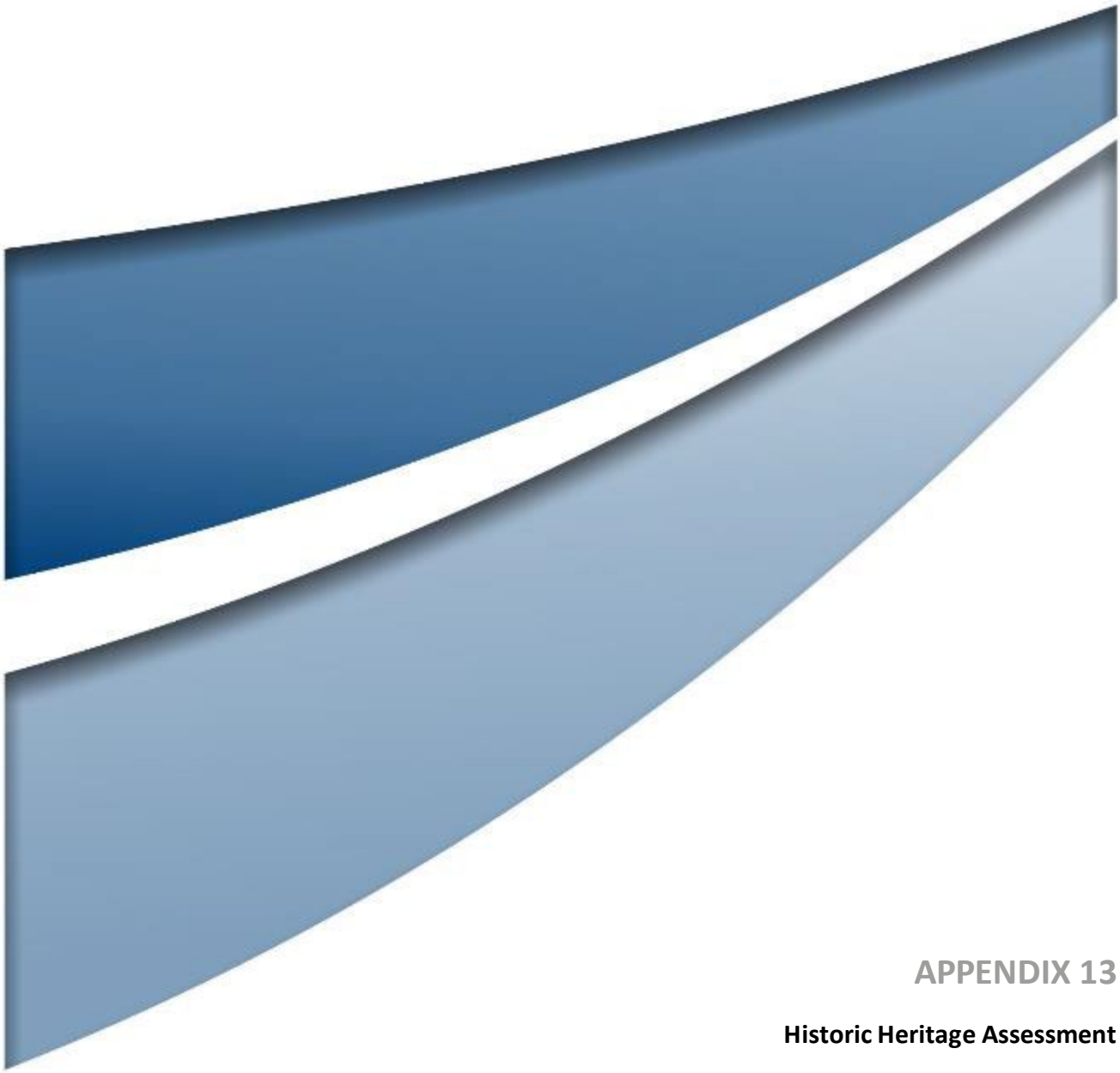
APPENDIX 11

Water Resources Assessment



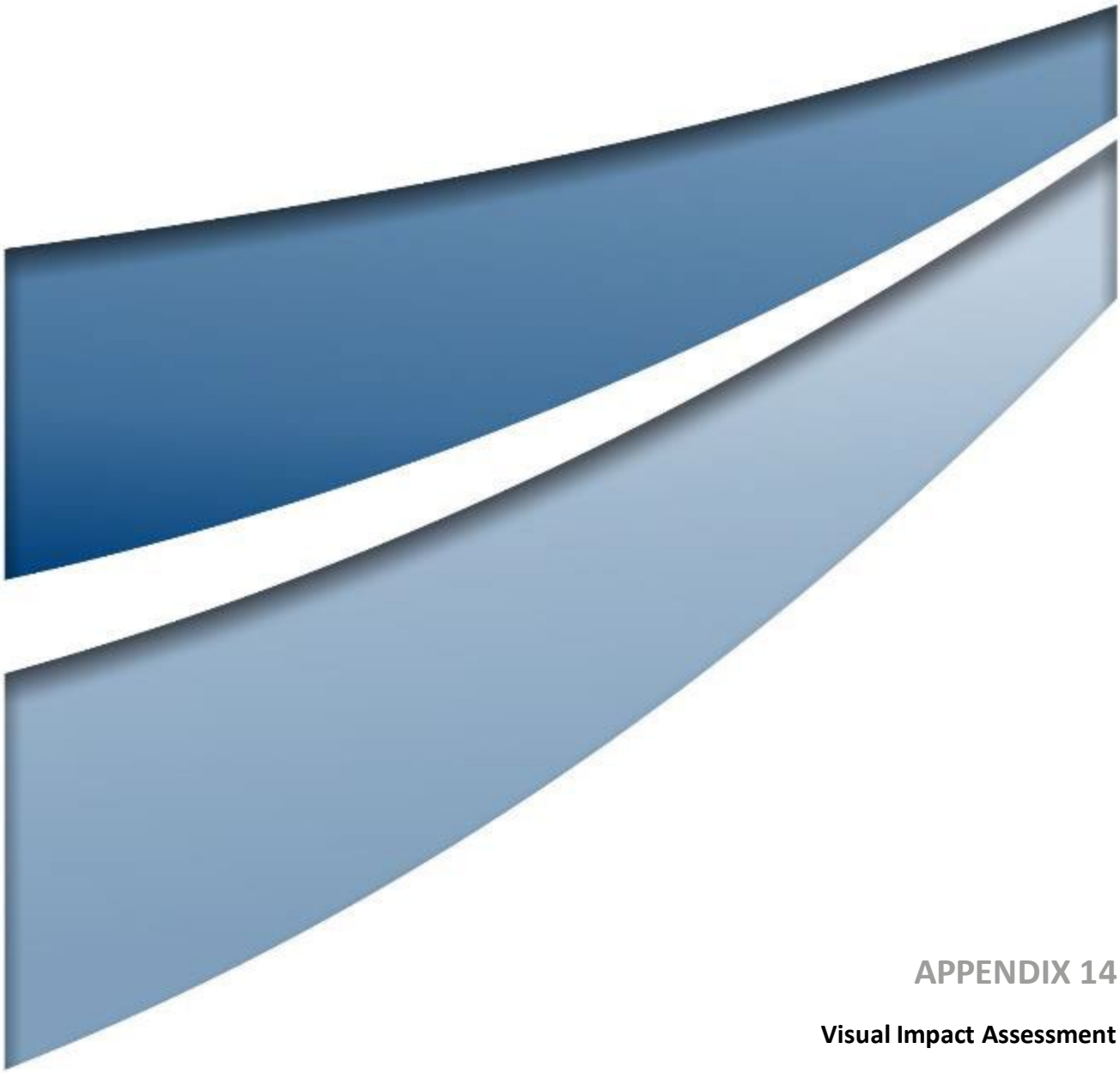
APPENDIX 12

Aboriginal Cultural Heritage Assessment



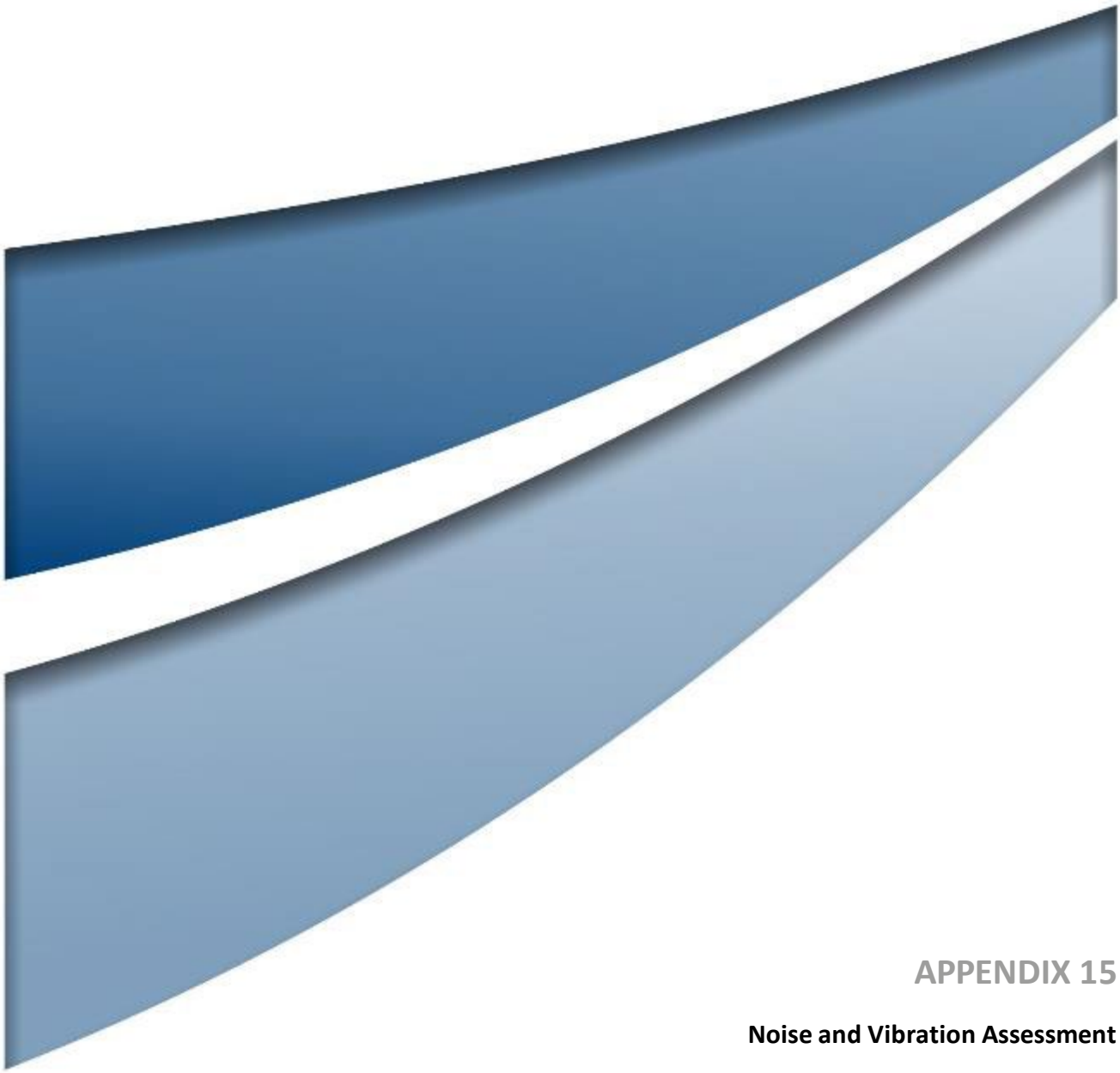
APPENDIX 13

Historic Heritage Assessment



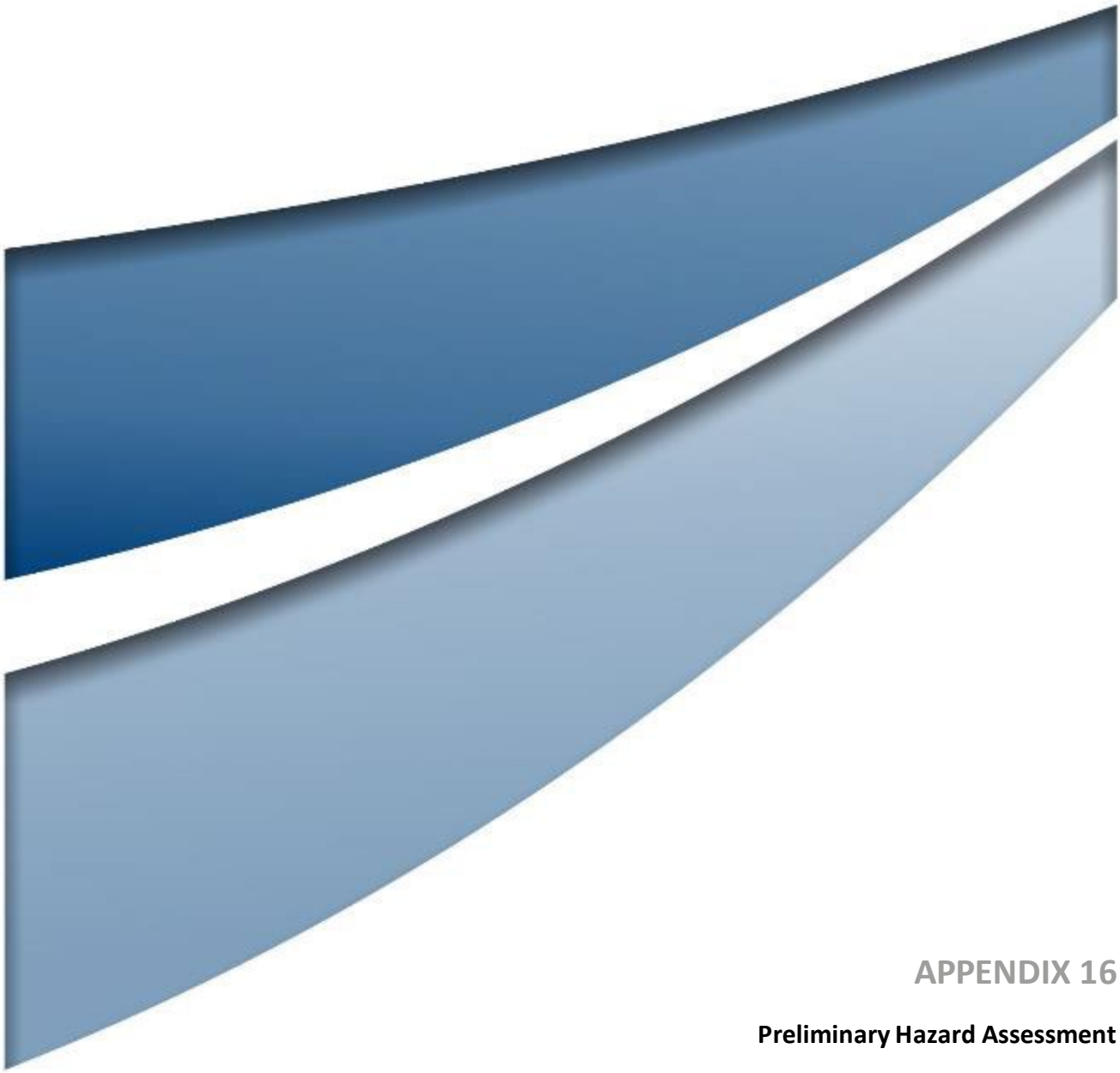
APPENDIX 14

Visual Impact Assessment



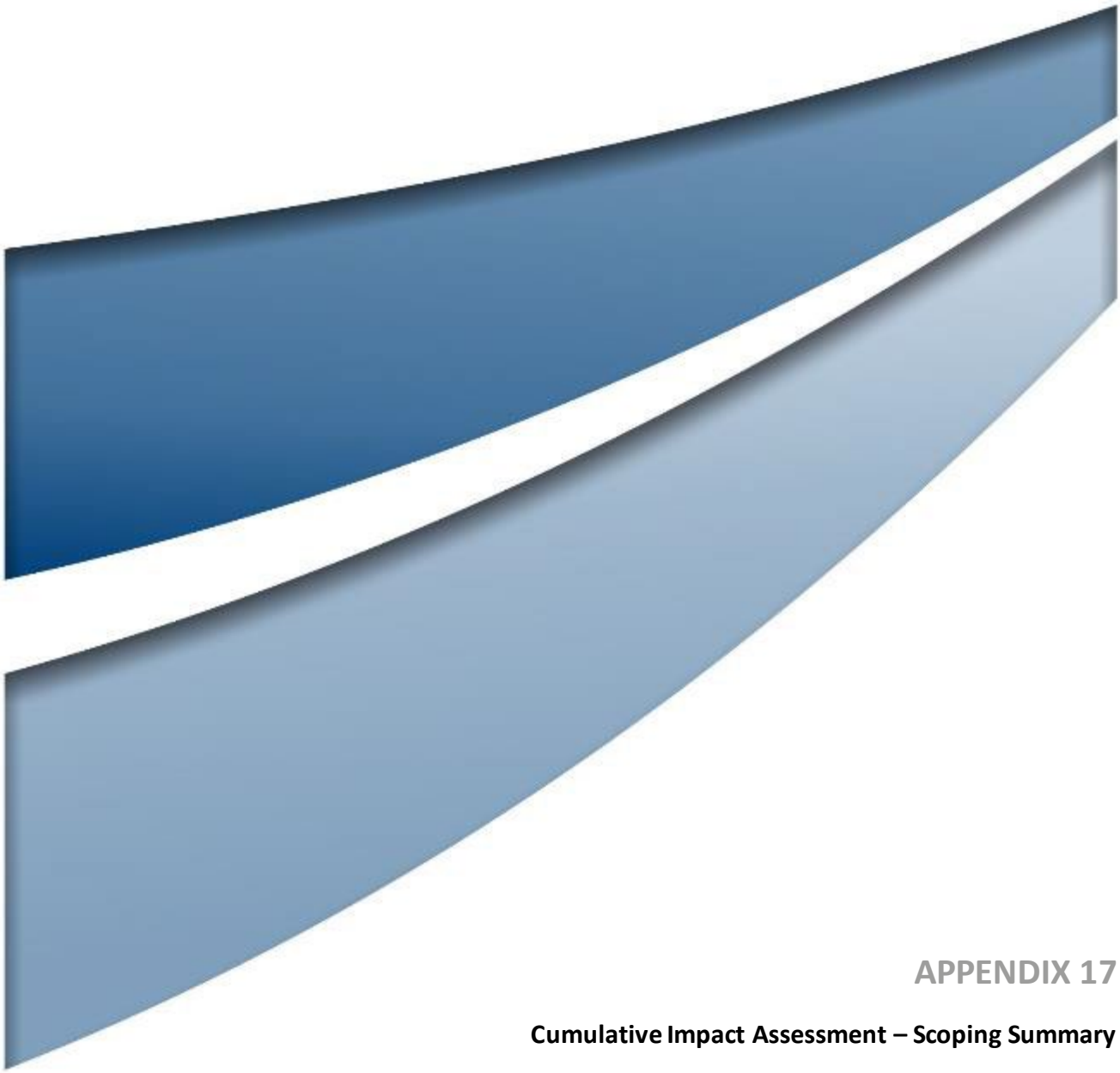
APPENDIX 15

Noise and Vibration Assessment



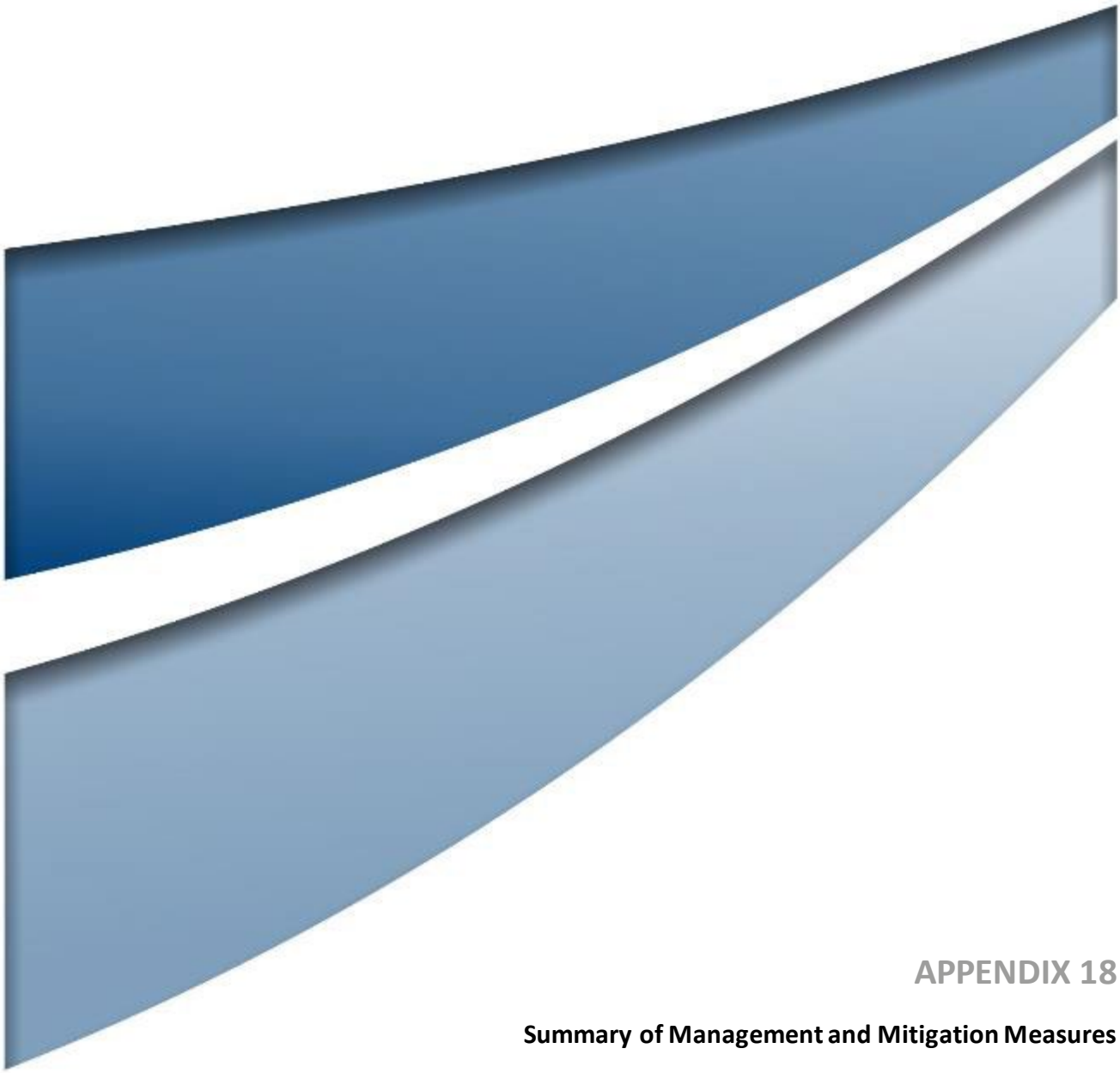
APPENDIX 16

Preliminary Hazard Assessment



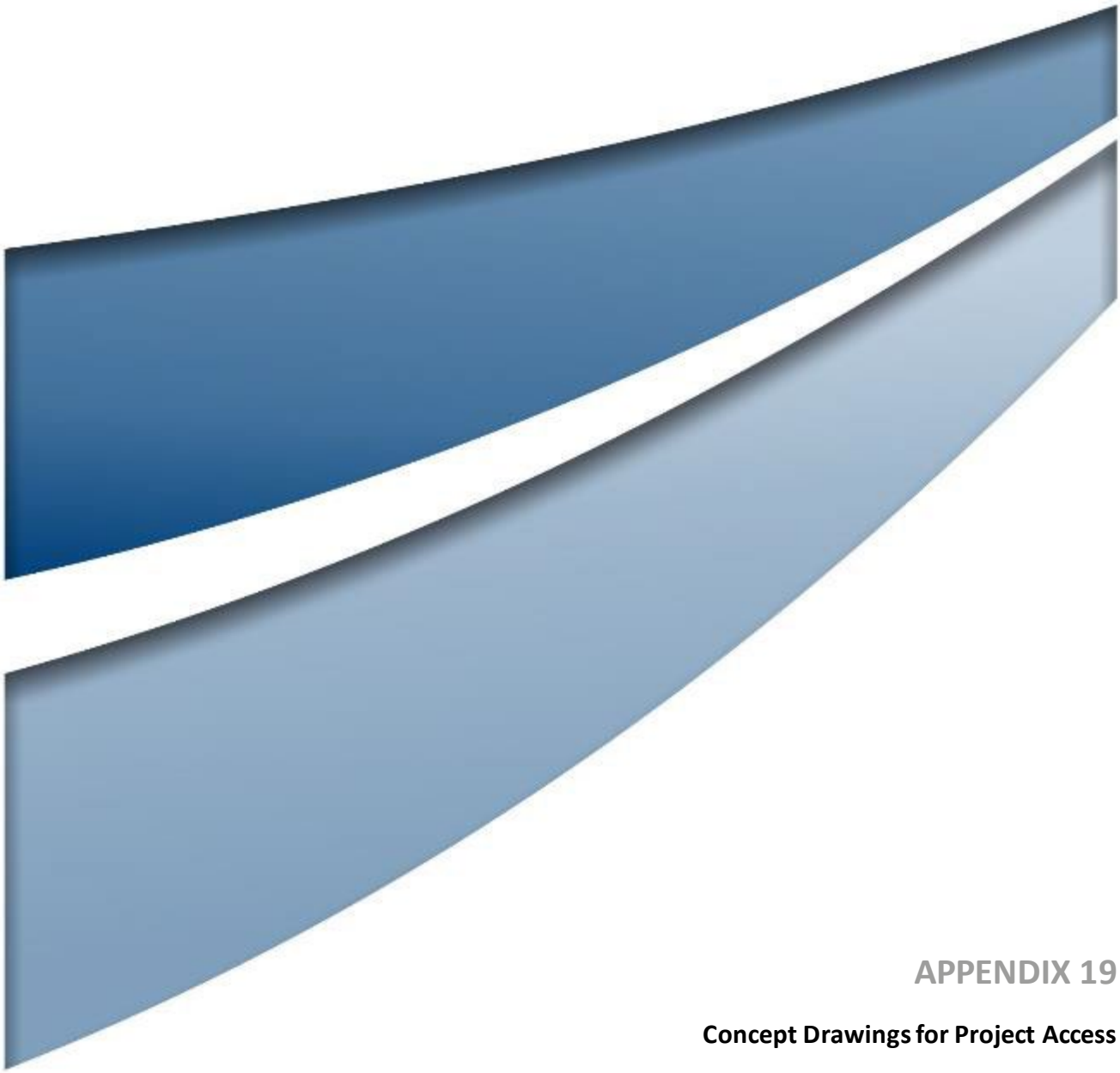
APPENDIX 17

Cumulative Impact Assessment – Scoping Summary



APPENDIX 18

Summary of Management and Mitigation Measures



APPENDIX 19

Concept Drawings for Project Access

power for good

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