Premise

METKA EGN

WAGGA WAGGA SOLAR FARM SOUTH

STATEMENT OF ENVIRONMENTAL EFFECTS

Report No: 220188
Rev: D
Date: 14 January 2020

ENGINEERING ENVIRONMENT AGRICULTURE WATER

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ABBREVIATIONS

Abbreviation	Meaning
Acronyms	
AEMO	Australian Energy Market Operator
ABS	Australian Bureau Statistics
AC	Alternating Currents
ACHAR	Aboriginal Cultural Heritage Assessment Report
AER	Australian Energy Regulator
AHIMS	Aboriginal Heritage Information Management System
ANL	Acceptable Noise Levels
ARENA	Australian Renewable Energy Agency
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BDAR	Biodiversity Assessment Report
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CC	Carbon Credit
CEMP	Construction Environmental Management Plan
CO_2e	Carbon Dioxide Equivalent
CRTN	Calculation of Road Traffic Noise
DA	Development Application
DC	Direct Current
DCP	Development Control Plan
DMP	Decommissioning Management Plan
DPIE	NSW Department of Planning, Industry and Environment
DPI	NSW Department of Primary Industries
EEC	Endangered Ecological Community
EMF	Electric and Magnetic Field
EPA	NSW Environment Protection Authority
ESD	Ecologically Sustainable Development
FRNSW	Fire and Rescue New South Wales
GHG	Greenhouse Gas
HV	High Voltage
ICNG	Interim Construction Noise Guideline
LEMC	Local Emergency Management Committee
LEP	Local Environmental Plan
LGA	Local Government Area
LGC	Large Generation Certificates
LV	Low Voltage
NEM	National Electricity Market
NERR	National Energy Retail Rules
NHMRC	National Health and Medical Research Council
NRAR	NSW Natural Resource Access Regulator
OEH	NSW Office Environment and Heritage
OEMP	Operational Environmental Management Plan
PCT	Plant Community Type
PV	Photovoltaic
RAP	Registered Aboriginal Parties
REAP	Renewable Energy Action Plan
RET	Renewable Energy Target
RFS	NSW Rural Fire Service
RMP	Recommissioning Management Plan
RMS	NSW Roads and Maritime Service
RNP	Road Noise Policy
SAT	Single-Axis Tracking System

Abbreviation	Meaning
SEAR	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TSR	Travelling Stock Reserve
Units of measure	
°C	degrees Celsius
dB(A)	A-weighted decibel
GW	Gigawatt
GWh	Gigawatt Hour
Ha	Hectare
kV	Kilovolt
kV/m	kilo Volts per metre
kW	Kilowatt
kWh	Kilowatt hour
m	Metres
m/s	Metres per second
ML	Megalitre
MW	Megawatt
MWh	Megawatt Hour
MWp	Megawatt Peak
µT	micro Teslas

1 INTRODUCTION

1.1 BACKGROUND

Premise has been commissioned by Metka EGN (Metka) to prepare a Statement of Environmental Effects (SEE) to accompany a Development Application (DA) for a proposed 18.7 megawatt $(MW)_{AC}$ electricity generating works (solar farm) to be developed on land at 157 Windmill Lane, Bomen (Lot 15 DP 1108798).

The external extent of proposed solar farm footprint is approximately 55 hectares (ha) and the extent of disturbance for the installation of infrastructure is approximately 47.7 ha.

1.2 SCOPE OF THIS REPORT

This SEE has been prepared pursuant to Clause 50 and Part 1 of Schedule 1 of the *Environmental Planning and Assessment Regulation 2000* and is provided in the following format.

- **Section 2** of this report provides a description of the subject site and its locality.
- **Section 3** outlines the proposed development.
- **Section 4** details the planning framework applicable to the subject site and proposed development.
- **Section 5** sets out the process of community engagement
- **Section 6** identifies the impacts of the proposed development.
- **Section 7** provides a conclusion to the SEE.

2 THE SITE & ITS LOCALITY

2.1 THE SITE

The host lot of the proposed development is 157 Windmill Lane, Bomen (Lot 15 DP 1108798). The site has an overall area of 267.4 hectares and frontages to East Bomen Road in the north and Windmill Lane in the east.

The site is located approximately 7 km north east of Wagga Wagga (refer **Figure 1**).

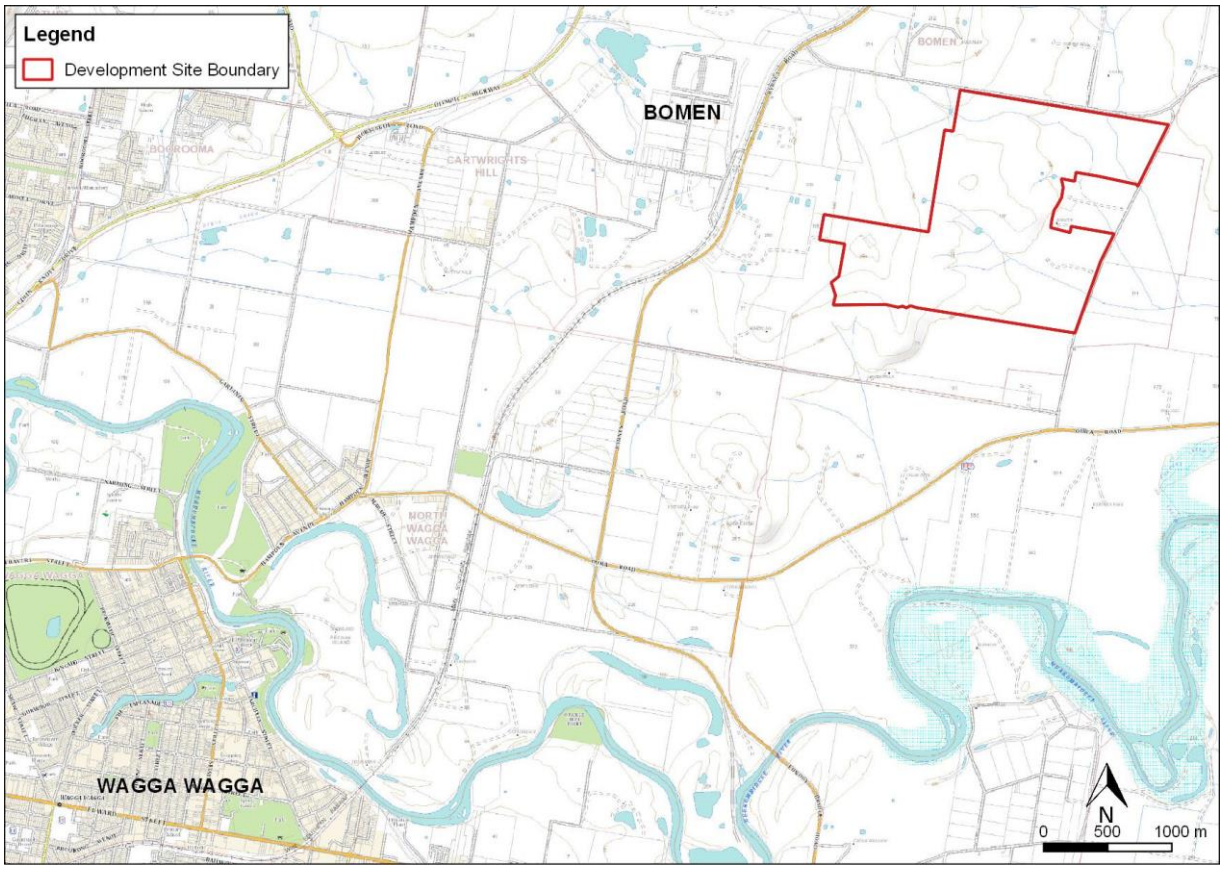
The development site within the host lot is formed of an area of approximately 55 ha of which approximately 47.7 ha would be developed with solar panel arrays and associated infrastructure – refer **Premise Drawing TP02_02D**.

The host lot currently benefits from an extant development consent issued by the Land and Environment Court (dated 9 January 2019) for a 30 megawatt solar farm (NSWLEC 1003), the Wagga Wagga Solar Farm, located in the northern extent of the site. For ease of reference, this approved solar farm is hereafter referred to as the Wagga Wagga Solar Farm North (WWSFN).

The proposed solar farm (hereafter referred to as the Wagga Wagga Solar Farm South) (WWSFS) would be located in the central portion of the site, to the south of the approved WWSFN.

The site features undulating slopes, with the flatter areas of the site located in the north and east, and the steeper areas in the south and west. Topography across the solar farm development site ranges from 256 m Average Height Datum (AHD) in the south-west to 192 m AHD in the south-east.

Figure 1 – Development Location



The site is traversed by a number of mapped waterways consisting of a mix of Strahler stream order 1 and 2 – refer **Figure 10 (page 67)**. As works are proposed within 40 metres of the waterways, a controlled activity approval from the NSW Natural Resource Access Regulator is required prior to works commencing – refer **Section 4.1.5**.

The site vegetation is characterised by agricultural grazing lands with scattered paddock trees. A Biodiversity Assessment prepared by NGH Environmental has confirmed that the majority of the site represents category 1 – excluded land for the purposes of the *Local Land Services Act 2013* and the *Biodiversity Conservation Act 2016* (BC Act). Approximately 0.475 hectares of native vegetation would be impacted by the proposed WWSFS footprint, including up to eight (8) isolated paddock trees.

An Aboriginal Cultural Heritage Assessment has concluded that the site contains 13 Aboriginal archaeological sites which would be impacted by the project. An Aboriginal Heritage Impact Permit (AHIP) must therefore be sought from the National Parks and Wildlife Service prior to any works commencing – refer **Section 4.1.5**. Subject to the gaining of the AHIP, the development may proceed with caution.

The local noise environment is influenced by a range of industrial and primary production land uses.

The local visual receiving environment is characterised as an area in transition, with two approved solar farms in the immediate locality, together with the proposed Special Activation Precinct (SAP), a strategic industrial zone being developed by the State Government. The precise location of the SAP boundary and the buffer to SAP are not yet known and it is possible that on confirmation of these areas, that the subject site would be within the SAP. If the subject site is located within the SAP, the draft planning framework associated with the SAP is 'turned on' prior to the application being determined, it is understood this application would be transferred to the NSW Government SAP team for determination.

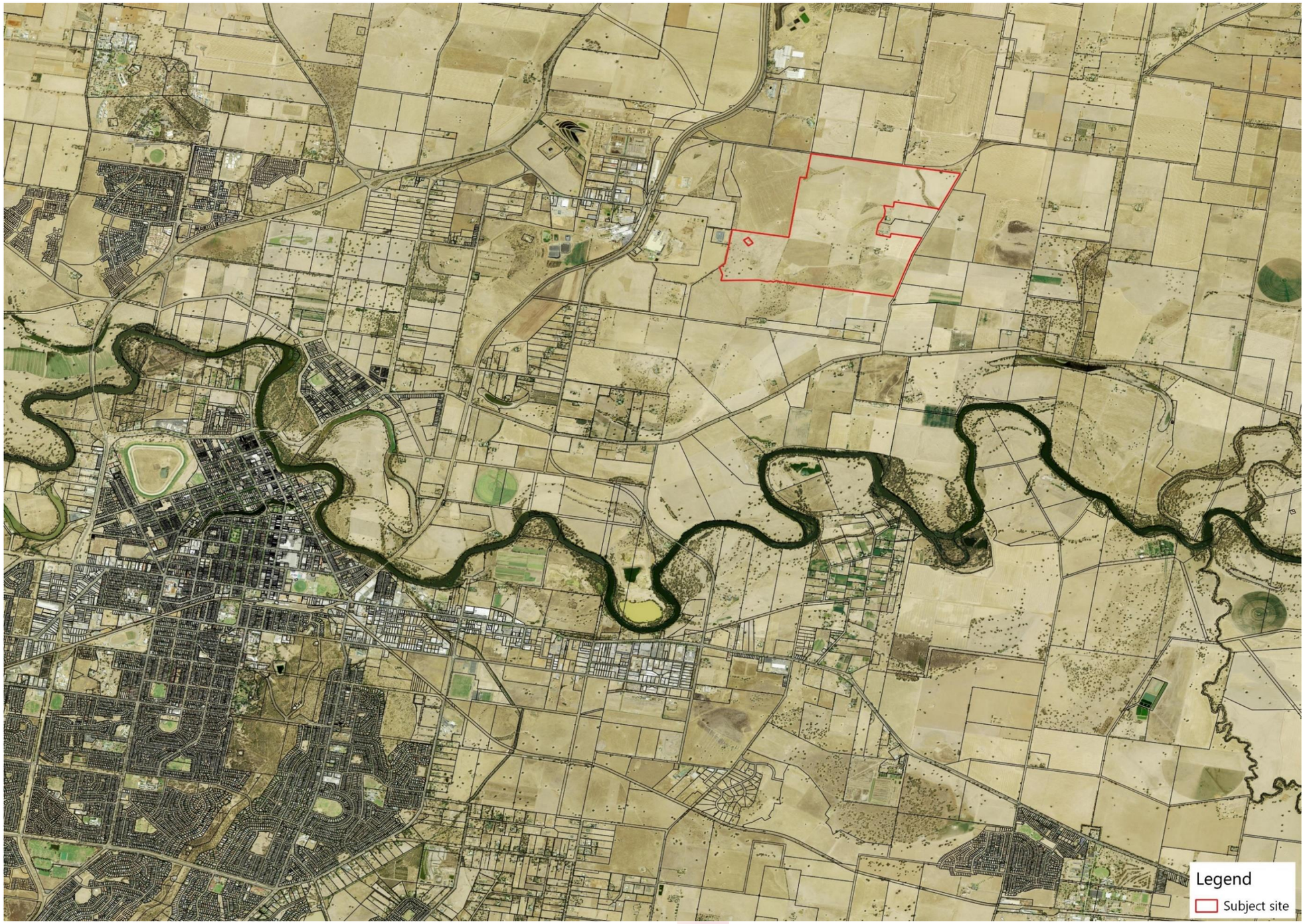
2.2 THE LOCALITY

Land to the south and west of the site is characterised as primary production land with scattered residential dwellings. The land is generally cleared of significant stands of remnant vegetation.

Land to the north of East Bomen Road is the Bomen Industrial Area, zoned IN1 – General Industrial via the LEP and approved for development of the Bomen Solar Farm, a 120-megawatt solar farm, consisting of approximately 400,000 photovoltaic solar modules. Land to the west consists of the Bomen Business Park, which is home to a varied number of industrial and commercial operations, including scheduled (ie. EPA licenced) premises for activities such as concrete works, general chemicals storage, recovery of hazardous and other waste, metal waste generation, non-ferrous metal production, general agricultural processing, waste storage (hazardous, restricted solid, liquid, clinical and related waste and asbestos waste), recovery of waste oil, petroleum products and fuel production, petroleum products storage, saleyards, sewage treatment processing, slaughtering and processing animals, and rendering and fat extraction.

As stated above, the general locality of the Bomen Business Park has also been identified by the Department Planning, Industry and Environment as the area of the future Wagga Wagga SAP. It is clear that the introduction of a supported and structured strategic vision for the locality would have the effect of promoting the development of an *'efficient transport and logistics hub'* (NSW Govt, 2019). This has the potential to create a lasting and significant impact on the character of the locality.

Figure 2 – Site locality



3 THE DEVELOPMENT

3.1 Development Objective

The proposed WWSFS seek to use solar photovoltaic modules to convert sunlight into clean electricity which will be sold in the National Electricity Market (NEM), create Large Generation Certificates (LGC's), which will be sold to liable entities under the *Renewable Energy Act 2000* and produce electricity that will contribute to the Federal Government's Renewable Energy Target (RET) of 33,000 gigawatt hours (GWh) by 2020.

3.1.1 Project conception

It has been noted via the community engagement process that the site of the proposed solar farm was previously excluded from consideration for hosting some of the approved WWSFN on the basis of the land slope and the added challenge this brings in developing the land for the purposes of a solar farm.

From discussions with the proponent of the WWSFN, it is understood that the primary challenge in developing the land was the costs associated with necessary site design and technology versus the benefits of the project. Put simply, to achieve the project objective of the WWSFN to develop a 30 MW solar farm, the site as eventually proposed and approved for WWSFN was more economically viable than utilising the more sloping land on which the WWSFS is now proposed.

In the context of the above, Premise note that the relative cost of developing the project is higher than the approved WWSFN development, attracting a capital investment value (CIV) of $26.8 million for the proposed 18.7 MW development compared to a CIV of approximately $30 million for the approved 30 MW WWSFN project. It is reasonable to conclude that these higher development costs were a factor in excluding this land from the approved WWSFN.

As the applicant for this project, Metka has a different perspective on the constructability and economic viability of the project as compared to the proponent of the approved DA. Metka has extensive experience constructing projects all around the world, including sites with varying slope and undulation, and, by reference to this experience, has determined that the project is viable, notwithstanding the additional anticipated land development costs.

It is also noted that there have been improvements in technology in the intervening period since the first DA was prepared and lodged, that make development on sloping land more viable. This includes tracker technology with greater tolerance for slope and undulation as well as improvements in photovoltaic module efficiency, which makes better use of the site's smaller pockets of suitable land for development.

3.1.2 Project description

The development proposal includes the construction, operation, upgrading and future decommissioning of an 18.7 MW_{AC} photovoltaic electricity generating works and associated infrastructure, including grid connection to the TransGrid zone substation. The proposed WWSFS would, once operational, have the capacity to generate approximately 48,430 megawatt hours of carbon free electricity annually.

In March 2015 the Australian Energy Regulator (AER) reported that the average annual household electricity usage in Australia in 2014 was 5,817 kilowatt hours (kWh) (ACIL, 2015). By reference to this level of consumption, the WWSFS would have the capacity to service approximately 6,950 home annually during the life of the farm.

Through a careful review of site constraints and opportunities, the design of the WWSFS has been refined to provide a development that is sustainable and buildable. This has included engagement with property owners and occupants near to the site together with members of the general public, Wagga Wagga City Council and relevant service providers. The details of the community engagement are discussed in **Section 5**.

As a result of both the engagement process and the progression of engineering design, the proposed solar footprint has been rationalised and refined to provide an overall development footprint of approximately 55 hectares. Opportunities for additional pockets of landscape plantings between the panel arrays have been identified and adopted.

Concept design of the proposed WWSFS is depicted in the project drawings and the figures throughout this statement. Whilst this concept design would be the subject of detailed design post grant of approval, the general footprint and key design parameters are considered to provide a sufficiently robust and conservation representation of the proposed development to enable an appropriate level of assessment to be completed.

3.1.3 Equipment

The proposal entails the installation of approximately 49,364 solar panel arrays, erected on a solar tracking system affixed to pile driven galvanised supports posts – refer **Section 3.1.4**. Panel arrays are aligned on rows or strings at a maximum length of 88.7 metres long and with an average spacing of 5-6 metres. The overall height of the structure is approximately 2.8 metres from finished ground level. Panels are connected via a DC collection system consisting of cables mounted on the module support structure.

In order to prepare the site to accommodate the 88.7 metre long strings, some earthworks are required to ensure the slope beneath the trackers does not exceed 8.5 degrees (14% slope). Panel arrays are arranged into module arrays designed to make best use of the uniform sections of the site. Concept bulk earthworks design has sought to ensure that the overall cut and fill required does not exceed more than 1.5 metres (with the majority less than 1 metre) and that no off-site disposal or no transport of fill from offsite is required (ie, an earthworks balance is achieved) – refer **Premise Civil Drawings C001-C003**.

Inverters convert the DC current to AC current and medium voltage transformers increase the voltage to the collection system rating. Contingent on detailed design and procurement, the WWSFS will have up to 5 inverter stations, each containing at least two but no more than three inverters, with a total maximum of 12 inverters expected across the site. These inverter stations will be positioned throughout the module arrays, with each power block of the solar farm corresponding to the capacity of the inverter station.

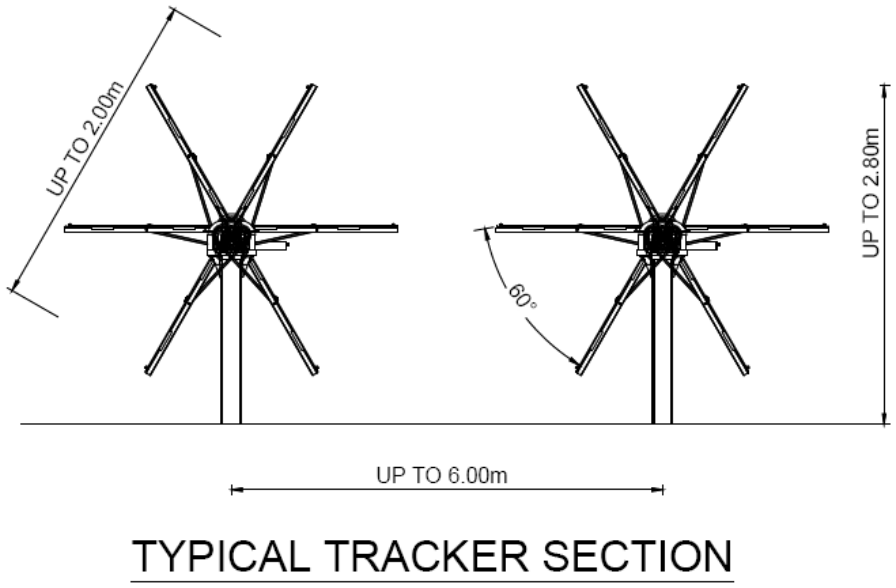
Inverters will convert the DC current to AC current and medium voltage transformers will increase the voltage to the collection system rating. Inverter and transformer assemblies are mounted on a steel platform (skid) or slab at ground level and are generally covered with an all-weather kiosk – refer **Section 3.1.5**.

The AC collection system will consist of cabling at 22 kilovolt (kV) or 33 kV which connects to each inverter station and delivers the electricity to the substation. Cables are laid underground and backfilled. Trench details are determined by local regulations and voltage specifications, but typically are approximately 1 m deep. It is proposed to connect to the approved WWSFN substation and ETL.

3.1.4 Trackers

The proposal would use tracked array solar with a maximum height as identified on **Drawing TP02** and **Figure 3**. The typical spacing between arrays would be up to 6 metres.

Figure 3 – Typical tracker section



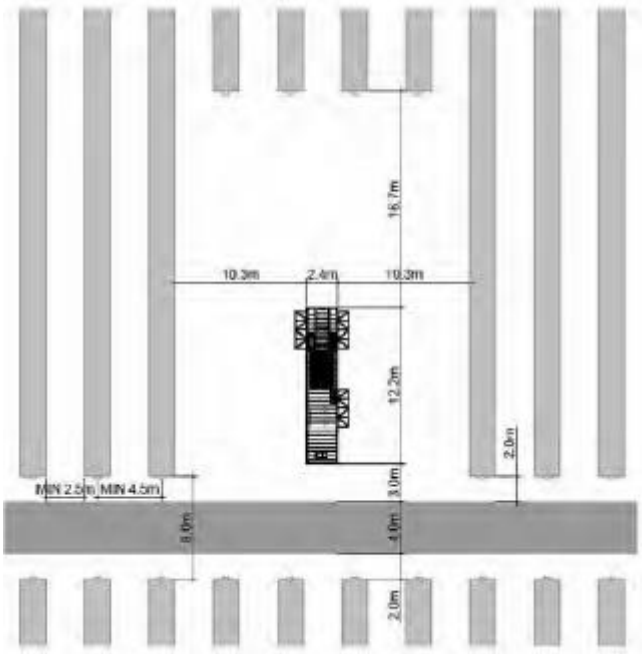
3.1.5 Inverters

The project would feature a maximum of 12 inverters on five inverter stations, to be installed in the locations identified on **Drawing TP02**. Dimensions are typically 2.59 m high, 6.05 m long and 2.43 m wide. These inverter stations will be positioned throughout the module arrays with each power block of the solar farm corresponding to the capacity of the inverter station.

The inverter stations are self-contained units comparable in appearance to a shipping container or open skid type structures on elevated platforms up to 3.5 m in total height. The location of these will be determined during detailed design but will essentially be evenly distributed throughout the arrays as depicted on **Drawing TP02**.

Figure 4 – Typical inverter assemblies

Figure 5 – Typical inverter block



3.1.6 Landscaping

Iris Visual has prepared a landscape plan for the site which provides:

- Supplementary planting – additional trees and shrubs within the corridors of existing trees where gaps exist;
- Compensatory plantings – additional trees within the undeveloped portion of the site at a ratio of 10 new trees for every tree removed at pre-development stage;
- Native revegetation - 10-metre wide corridor with a mix of locally native trees and shrubs which provide habitat for native wildlife, along the eastern, and western site boundaries; and

- Native screen planting, 10-metre wide corridor with a mix of trees and shrubs (up to 5 metres tall) along the southern site boundary.

Refer **Iris Visual Landscaping Plans in Appendix A**.

3.1.7 Materials and resources

3.1.7.1 Labour

Over the 9 month construction effort the demand for labour will vary depending on the site activities being undertaken. Installation and commissioning of modules is labour intensive. Employment is expected to peak at approximately 100 on-site workers involved directly in project construction. This peak period is expected to extend over a six month (26 week) period. Outside this peak the workforce would drop to 20 workers for the two 3-month shoulder periods. These jobs will include construction managers, electricians, fitters, plant operators, mechanics and other skilled labour.

3.1.7.2 Water

Water demand during construction would be limited to that required for dust mitigation and/or moisture conditioning of material, as well as a potable supply for construction staff. The former will be sourced from a legal supply source, including farm dams on-site (if available) and/or commercial water suppliers. The latter would be supplied via purchase of bottled and tanker water.

The quantity of water required for dust mitigation during construction can only be roughly estimated. Ultimately, it will be determined by the detailed design, the EPC contractor's approach to the construction program and the climatic conditions experienced at the time the works are undertaken. Assuming a maximum daily use, in excessively dry and windy conditions, would be 50 kL, and that these conditions are experienced 50% of the time during the six month peak construction peak, this equates to 3.5 ML. This requires approximately 135 x 27 kL bulk water tankers. By reference to the traffic assessment and the 39 week construction program, of which 26 weeks is peak construction, this equates to just under 5.5 trucks per week. This is approximately one per day.

There is no intent or need for any volumetric water licencing requirement. No water entitlement is needed or required to be purchased.

3.1.7.3 Sand and Gravel

The construction of all-weather access tracks and compacted hardstand for the inverter assemblies will require gravel, whilst sand will be required for the bedding of cabling in the trenches before backfilling. These materials will be sourced from local suppliers.

3.1.8 Decommissioning

Decommissioning of the facility would occur at the end of the useful life of the infrastructure, anticipated to be around 30 years from commencement of energy generation. At the end of the facilities life a decision on whether to upgrade or decommission the facility would be taken in recognition of the changing face of power generation in NSW and Australia.

To ensure that the land is left in a suitable state for a return to primary production purposes (based on the current zoning) it would be proposed that, not later than 12 months prior to the proposed cessation of operation, that a decommissioning plan would be prepared and supplied to WWCC for

review and approval. This decommissioning plan would include as a minimum, but would not be limited to, information on relation to expected timeline for the rehabilitation program, decommissioning of all solar panels, above and below the ground infrastructure, inverter stations, fencing and any other structures or infrastructure relating to the approved development and a programme of site restoration to return the land back into agricultural production. The objective of the decommissioning plan would be restore the land capability to its pre-existing agricultural value and use.

Specific steps in the decommissioning plan would include the removal of fittings and fixtures on the landscaping including solar panels, support poles and footings, to a depth of 500 mm. Removal of underground cabling to a depth of between 500mm and 800mm. The materials from the solar arrays and foundation poles would be reused elsewhere or recycled where possible. Research studies currently show that a 96% recycling efficiency can be achieved with solar panels that have reached their end of life (Greenmatch, 2019). Fencing would be removed (unless the landowner requests its retention); if removed, it would be reused or recycled. Subject to the status of the WWSFN, the transmission line and substation would be removed in discussion and agreement with Council and the landowner. The final level of rehabilitation would be developed in consultation with the land owner to ensure it is fit for a future use.

In order to ensure that adequate funds are set aside for the decommissioning phase, a decommissioning financing arrangement is in place between the landholder and the project owner. The retrieval and reuse/recycling of key components (such as copper in electrical wiring) also provides sufficient revenue to assist in financing the decommissioning process.

Specific matters that would be addressed in the decommissioning plan would mirror those matters outlined in the CEMP applying to the site, including:

- Traffic Management including required access routes to and from the subject site, access and egress arrangements for all construction related vehicles to and from the site, deliveries of materials and parking arrangements for contractors.
- Details of, and vehicular movement diagrams for, the largest vehicle to access the site to show that such vehicles can enter and leave the site in a forward direction and details of the frequency and timing of vehicle movements to and from site.
- Timing for construction of the works across the site demonstrating any proposed staging of works across the site and including operational hours. Site layout during construction - including storage of materials, plant and equipment, site office and amenities, hoardings and any proposed traffic control devices,
- Waste management plan including the type and location of waste storage containers onsite and proposed method of removal and disposal.
- Tree Protection, habitat and species protection and methodology for vegetation removal including mitigation measures.
- Noise Management
- Aboriginal Heritage Management Bush Fire Management
- Dust Management
- Soil and Water Management including any required earthworks Integrated Site Restoration
- Any specified requirements and conditions of Transgrid and Essential Energy.
- Details of what method will be used to ensure that the plan is adhered to including appropriate signage and fencing is to be installed and maintained to affect the plan.

- Security Management including details of relevant project manager and/or site foreman contact details.

4 STATUTORY PLANNING FRAMEWORK

4.1 AIMS & OBJECTIVES

In New South Wales (NSW), the relevant planning legislation is the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EP&A Act instituted a system of environmental planning and assessment in NSW and is administered by the Department of Planning & Environment (DP&E). In 2017, the Act was amended to provide a range of updated objects. The objects of the EP&A Act are discussed in

Table 4.1 – Objects of the EP&A Act

Object	Project response
(a) 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,	This SEE provides a comprehensive review of the potential impacts associated with the proposed WWSFS
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	ESD is discussed in detail in **Section 4.1.1**;
(c) to promote the orderly and economic use and development of land,	Developing land for permitted purposes is in line with the strategic intent of the local planning authority and is consistent with the goal of achieving an orderly and economic use of the land.
(d) to promote the delivery and maintenance of affordable housing,	Not applicable to this DA.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	A detailed biodiversity assessment has been completed at **Appendix C** and summarised in **Section 6.12**. Significant or irreversible impacts to the environment are not anticipated.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	An Aboriginal Cultural Heritage Assessment has been prepared which determines the project may proceed without significant impact – refer **Appendix B** and **Section 6.7.**
(g) to promote good design and amenity of the built environment,	Not directly relevant to this DA.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	Buildings associated with the project are limited to temporary construction buildings, the solar infrastructure and worker offices; compliance with the relevant standards for these buildings is achievable;
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	Preparation of the SEE has involved consultation with various regulatory stakeholders in the process to ensure that all regulatory responsibilities are met;

(j) to provide increased opportunity for community participation in environmental planning and assessment.	The project has entailed significant pre-application community engagement as outlined in **Section 5**.

Source: Environmental Planning and Assessment Act 1979

On the basis of the above, the proposed development is not considered to be antipathetic to the above objects.

4.1.1 Ecologically Sustainable Development

The *National Strategy for Ecological Sustainable Development* (NSESD) (Department of Environment and Heritage 1992) defines Ecologically Sustainable Development (ESD) as:

> *using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (refer website)*

The concept of ESD gives formal recognition to environmental and social considerations in decision-making to ensure the current and future generations can enjoy an environment that functions as well as or better than the environment they inherit.

The core objectives of the NSESD are:

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- To provide for equity within and between generations; and
- To protect biological diversity and maintain essential ecological processes and life-support systems.

As outlined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000,* the four principles of ESC are listed below. These are discussed in the following sections.

- Precautionary principle;
- Intergenerational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation and pricing of environmental resources.

4.1.1.1 Precautionary principle

The precautionary principle states where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a justification for not implementing mitigation measures or strategies to avoid potential impact. This has been held in various decisions in the NSW Land and Environment Court to include considerations associated with climate change (impact of the development on climate change and impacts of climate change on development).

The potential impact from the proposal has been identified in the environmental assessment section of this report and all mitigation measures summarised in **Section 6.24**.

The proposal supports the development of sustainable forms of renewable energy, and in doing so reduces reliance on traditional forms of electricity generation, including the burning of fossil fuels. This assists in reducing the long term impacts of climate change and is therefore in the public interest. The potential outcome of climate change, being higher temperatures and greater periods of sunlight,

also suggests that increasing reliance of solar forms of energy generation is sustainable. This is discussed in further detail in **Section 7.2**.

4.1.1.2 Intergenerational equity

The second principle of ESD is intergenerational equity, such that the present generation should ensure the health, diversity and productivity of the environment are equal to or better for future generations.

All work would be carried out in accordance with the environmental safeguards in **Section 6.24** to mitigate potential impact associated with noise and vibration, socio-economic considerations, traffic and transport, drainage and water quality, air quality, greenhouse gas emissions, climate change, Aboriginal and non-Aboriginal heritage, topography, soils, waste and hazardous materials.

The proposal supports the development of sustainable forms of renewable energy, and in doing so reduces reliance on traditional forms of electricity generation, including the burning of fossil fuels. This assists in reducing the impacts of climate change and therefore assists in ensuring the health of future generations is protected; the development is therefore in the public interest. This is discussed in further detail in **Section 7.2**.

4.1.1.3 Conservation of biological diversity and ecological integrity

The third principle of ESD is conservation of biological diversity and ecological integrity such that ecosystems, species and genetic diversity within species are maintained.

The proposed development would not result in any significant impact to native vegetation by reference to **Appendix C**.

The mitigating measures for protecting biodiversity at the site are provided in **Section 6.12**.

4.1.1.4 Improved valuation, pricing and incentive mechanisms

The final principle of ESD is improved valuation and pricing of environmental resources which establishes the need to determine economic values for services provided by the natural environment such as the atmosphere's ability to receive gaseous emissions, cultural values and visual amenity. The principle is designed to improve methods of carrying out valuation of environmental costs and benefits and use this information when making decisions.

The development of policy to guide pricing and incentive mechanisms in delivering ecologically sustainable development is the responsibility of governments and regulatory stakeholders.

4.1.2 Section 1.7

Section 1.7 of the EP&A Act requires consideration of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act). Part 7 of the BC Act relates to an obligation to determine whether a proposal is likely to significantly affect threatened species. A development is considered to result in a significant impact in the following assessed circumstances:

Table 4.2 – Section 1.7

Test	Assessment
(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or	A biodiversity assessment (BA) has been completed in relation to the project by NGH Environmental – refer **Appendix C**. The BA confirms that the impacts of the development are not likely to significantly affect threatened species or ecological communities, or their habitats.
(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or	The proposal predominantly entails the clearing of non-native vegetation, and therefore the applicable clearing threshold is not exceeded – refer **Appendix C**.
(c) it is carried out in a declared area of outstanding biodiversity value	The subject site is not a declared area of outstanding biodiversity value.

Source: ***Environmental Planning and Assessment Act 1979***

4.1.3 Section 4.55

Section 4.55 of the EP&A Act provides a number of mechanisms for modifying a development consent. These are broadly described as:

- 4.55(1) – to correct an error or misdirection;
- 4.55(1A) – a modification involving minimal environmental impacts; and
- 4.55(2) – all other modifications.

Section 4.55 states inter alia:

> *(1) Modifications involving minor error, misdescription or miscalculation*
>
> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify a development consent granted by it to correct a minor error, misdescription or miscalculation. Subsections (1A), (2), (3), (5) and (6) and Part 8 do not apply to such a modification.*
>
> *Note.*
>
> *Section 380AA of the Mining Act 1992 provides that an application for modification of development consent to mine for coal can only be made by or with the consent of the holder of an authority under that Act in respect of coal and the land concerned.*
>
> *(1A) Modifications involving minimal environmental impact*
>
> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*
>
> *(a) it is satisfied that the proposed modification is of minimal environmental impact, and*
>
> *(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and*
>
> *(c) it has notified the application in accordance with:*
>
> *(i) the regulations, if the regulations so require, or*
>
> *(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*

(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

Subsections (1), (2) and (5) do not apply to such a modification.

(2) Other modifications

A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and

(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and

(c) it has notified the application in accordance with:

(i) the regulations, if the regulations so require, or

(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and

(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.

Subsections (1) and (1A) do not apply to such a modification.

At project conception, consideration was given to approaching the development of the WWSFS as a modification of the WWSFN approval. As the WWSFN was approved by the Land and Environment Court, a modification to the original consent could be sought from either the NSW LEC or the Southern Regional Planning Panel.

However, for a number of reasons, it is considered that the modification of the WWSFN to facilitate the WWSFS is not appropriate. These reasons include:

- The WWSFS is a distinct and independent development in the sense that it stands alone from the WWSFN. In the event the WWSFS were not to proceed, this would have no bearing on the WWSFN, which is expected to shortly commence the construction phase.
- Whilst the WWSFS seeks to utilise the approved substation and ETL associated with the WWSFN, these are not yet constructed;
- The WWSFS would represent a 60% increase in the capacity of the WWSFN. The quantum of this increase does not result in a development that is substantially the same as the approved development; and
- The WWSFS would represent a 68% increase in the footprint of the development (an additional 47.7 ha in addition to the approved 70 ha). The quantum of this increase does not result in a development that is substantially the same as the approved development.

On the basis of the above, a modification is not considered to be a lawful option and this application is therefore lodged as a new stand alone development application.

4.1.4 Subordinate Legislation

The EP&A Act facilitates the preparation of subordinate legislation, consisting of:

- Environmental Planning Instruments (EPIs) (including State Environmental Planning Policies (SEPP), Local Environmental Plans (LEP), and deemed EPIs); and
- Development Control Plans (DCP).

In relation to the proposed development, the relevant subordinate legislation includes:

- *Wagga Wagga Local Environmental Plan 2010;*
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection;*
- *State Environmental Planning Policy No. 55 – Remediation of Land;*
- *State Environmental Planning Policy (Primary Production and Rural Development) 2019*
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy (State and Regional Development) 2011; and*
- Wagga Wagga Development Control Plan 2010.

The requirements of these are discussed in the following sections.

4.1.5 Integrated Development

Section 4.46 of the EP&A Act states that development requiring consent and another activity approval is defined as Integrated Development. The proposed development is classified as Integrated Development by virtue of requiring:

- An approval under Section 91E of the *Water Management Act 2000* in relation to works on mapped waterfront land
- An Aboriginal Heritage Impact Permit is required in relation to the *National Parks and Wildlife Act 1974.*

No other forms of external approval or consent are required.

For the avoidance of doubt, a dredging or reclamation permit under Part of the *Fisheries Management Act 1994* is not required on the basis that the land is not mapped as key fish habitat.

Each of these matters is further discussed in **Section 6** of this report.

4.2 ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 Wagga Wagga Local Environmental Plan 2010

4.2.1.1 Introduction

The *Wagga Wagga Local Environmental Plan 2010* (WLEP) is the applicable local planning instrument applying to the site.

The objectives of the WLEP are outlined in **Table 4.3**.

Table 4.3 – WLEP Objectives

Objectives	Assessment
(1) This Plan aims to make local environmental planning provisions for	

land in Wagga Wagga in accordance with the relevant standard environmental planning instrument under section 33A of the Act.	
(2) The particular aims of this Plan are as follows:	
(a) to optimise the management and use of resources and ensure that choices and opportunities in relation to those resources remain for future generations,	This matter is addressed in **Section 6.8**. The proposal entails the medium-term use of land for a permissible electricity generating purpose, after which the land would be expected to revert to use for primary production purposes (subject to potential changes to strategic intent in the intervening period – noting the proposed SAP in the locality). The site has been subject to disturbance as a result of historic clearing, cultivation and pasture improvement. The proposal is not antipathic to this LEP aim as it does not inhibit the future use of the land for primary production purposes, and as discussed in **Section 6.13**, has the potential to bring about soil improvements that may benefit the land in the longer term.
(b) to promote development that is consistent with the principles of ecologically sustainable development and the management of climate change,	These matters are addressed in detail in **Sections 4.1.1 and 7.2.** The proposal is a sustainable form of energy production which reduces reliance on the burning of fossil fuel and is therefore in the public interest and consistent with the objectives of the ESD principles.
(c) to promote the sustainability of the natural attributes of Wagga Wagga, avoid or minimise impacts on environmental values and protect environmentally sensitive areas,	The assessment provided throughout **Section 6** of this assessment confirms that the development is not antipathetic to this aim
(d) to co-ordinate development with the provision of public infrastructure and services.	Locating this development is proximity to other similar developments, and close to industrial areas and the proposed SAP, represents a coordinated and logical approach to provision of essential infrastructure.

Source: Wagga Wagga Local Environmental Plan 2010

The proposed application is not antipathetic to the above objectives as discussed.

4.2.1.2 Mapping

A review of WLEP mapping identifies the following mapped constraints:

Table 4.4 – WLEP Objectives

Constraint	Relevance	Section of the report discussed
Floor Space Ratio Map	Not applicable	No discussion required
Land Application Map	The site is within the Wagga Wagga LGA	No discussion required
Land Zoning Map	The site is zoned RU1 – Primary Production	**Section 4.2.1.3**
Height of Buildings Map	Not applicable	No discussion required

Lot Size Map	200 ha	No subdivision proposed and therefore no discussion required
Heritage Map	The site is not within a Heritage Conservation Area and there are no heritage items mapped on the site	**Section 6.7**
Terrestrial Biodiversity Map	The site is mapped as containing a minor amount of terrestrial biodiversity	**Section 4.2.1.4**
Vulnerable Land Map	The site is not mapped as containing any vulnerable land	No discussion required
Water Resource Map	The site is not mapped as containing any water resources	**Section 6.9**
Urban Release Map	The site is not mapped as being within an urban release area	No discussion required
Natural Resources Sensitivity Map – Biodiversity	The host site contains very small areas of mapped sensitive biodiversity however this is not impacted by the proposed development.	**Section 4.2.1.4**
Natural Resources Sensitivity – Land	The site is not mapped as containing any sensitive land	**Section 6.10**
Natural Resources Sensitivity Map – Water	The site is not mapped as containing any sensitive water	**Section 6.9**

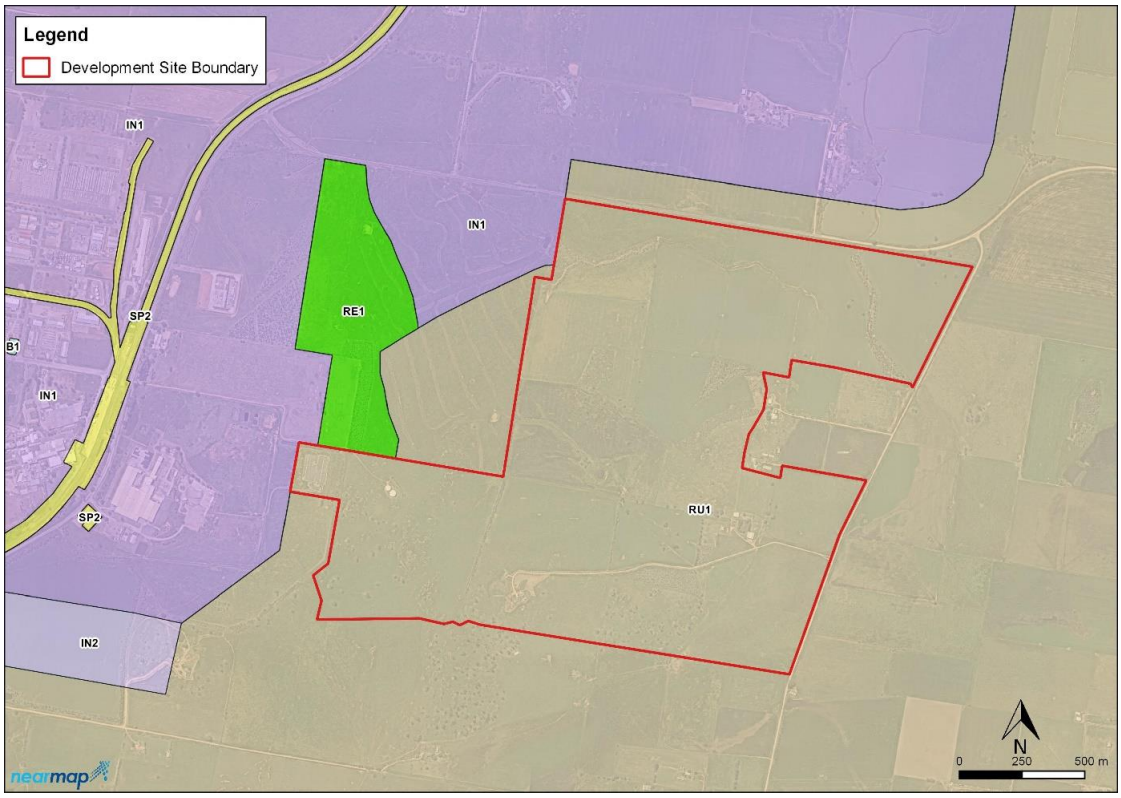
Source: NSW Planning Portal and Wagga Wagga Local Environmental Plan 2010

The above matters, where relevant, are discussed in the following sections of the report. Other relevant LEP clauses are also discussed below.

4.2.1.3 Land Use Zoning and Permissibility

The subject site is located within the RU1 – Primary Production zone – refer **Figure 6**.

Figure 6 – Land use zoning



The objectives of the zone are discussed in **Table 4.5**. Clause 2.3 of the WLEP outlines that the consent authority must have regard for the objectives of a zone when determining an application.

Table 4.5 – WLEP RU1 Zone Objectives

Objectives	Assessment
• *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*	The majority of the affected portion of the development site has a mapped land capability of class 5, with a smaller area mapped as class 3 – refer **Figure** 14 **(page 73)**. The land has marginal value for primary production and, as reflected by the biodiversity assessment, has limited natural ecological resources. The proposal entails the medium-term use of a permissible electricity generating purposes after which the land would be expected to revert to use for primary production purposes (subject to potential changes to strategic intent in the intervening period – noting the proposed SAP in the locality). The site has been subject to disturbance as a result of historic clearing, cultivation and pasture improvement. The proposal is not antipathic to this aim as it does not inhibit the future use of the land for primary production purposes, and as discussed in **Section 6.13**, has the potential to bring about soil improvements that may benefit the land in the longer term.
• *To encourage diversity in primary industry enterprises and systems appropriate for the area.*	The proposal provides for a permissible use in the zone but allows the current landowner to diversify from traditional forms of primary production. The proposal is consistent with this objective
• *To minimise the fragmentation and alienation of resource lands.*	No land fragmentation is considered to occur as no subdivision is proposed. The land would return for use for primary production purposes at the completion of the life of the project. Thus, no alienation is predicted.

• *To minimise conflict between land uses within this zone and land uses within adjoining zones.*	Subject to the implementation of recommended mitigation measures, the proposed use can operate without significant or detrimental impacts on surrounding land uses. The proposal is consistent with the approved use of the northern portion of the host lot and is a permissible use in the zone, both via the LEP and the ISEPP.
• *To foster strong, sustainable rural community lifestyles.*	The proposal provides for a sustainable form of energy production, which benefits the surrounding and broader communities. The primary production zone provides for a broad range of land uses to occur with consent, many of which generate the potential for impacts against traditional forms of primary production. Similarly, primary production can generate conflict with land uses occupying the primary production zone for quasi-large lot rural residential purposes. These conflicts are manageable subject to the implementation of effective mitigation measures, as discussed throughout this report. Key of the potential conflicts are expected to be the perceived visual impacts. The relatively protected visual setting and the carrying out of proposed landscaping assist to ameliorate these perceived impacts.
• *To maintain the rural landscape character of the land.*	The proposed landscaping of the site, including the inclusion of plantings in the open spaces between the panels as outlined in the plans included in **Appendix A**, would assist to soften the appearance of the proposed development and better integrate it into the locality.
• *To allow tourist and visitor accommodation only where it is in association with agricultural activities.*	Not applicable to this proposal.

Source: ***Wagga Wagga Local Environmental Plan 2010***

The proposed development is characterised as electricity generating works, which is defined as:

> *electricity generating works means a building or place used for the purpose of making or generating electricity.*

Electricity generating works are not listed in Part 4 of the RU1 Land Use Table and are therefore permitted with consent on the basis that Part 3 provides that any use not listed in either Part 2 or Part 4 is permitted with consent.

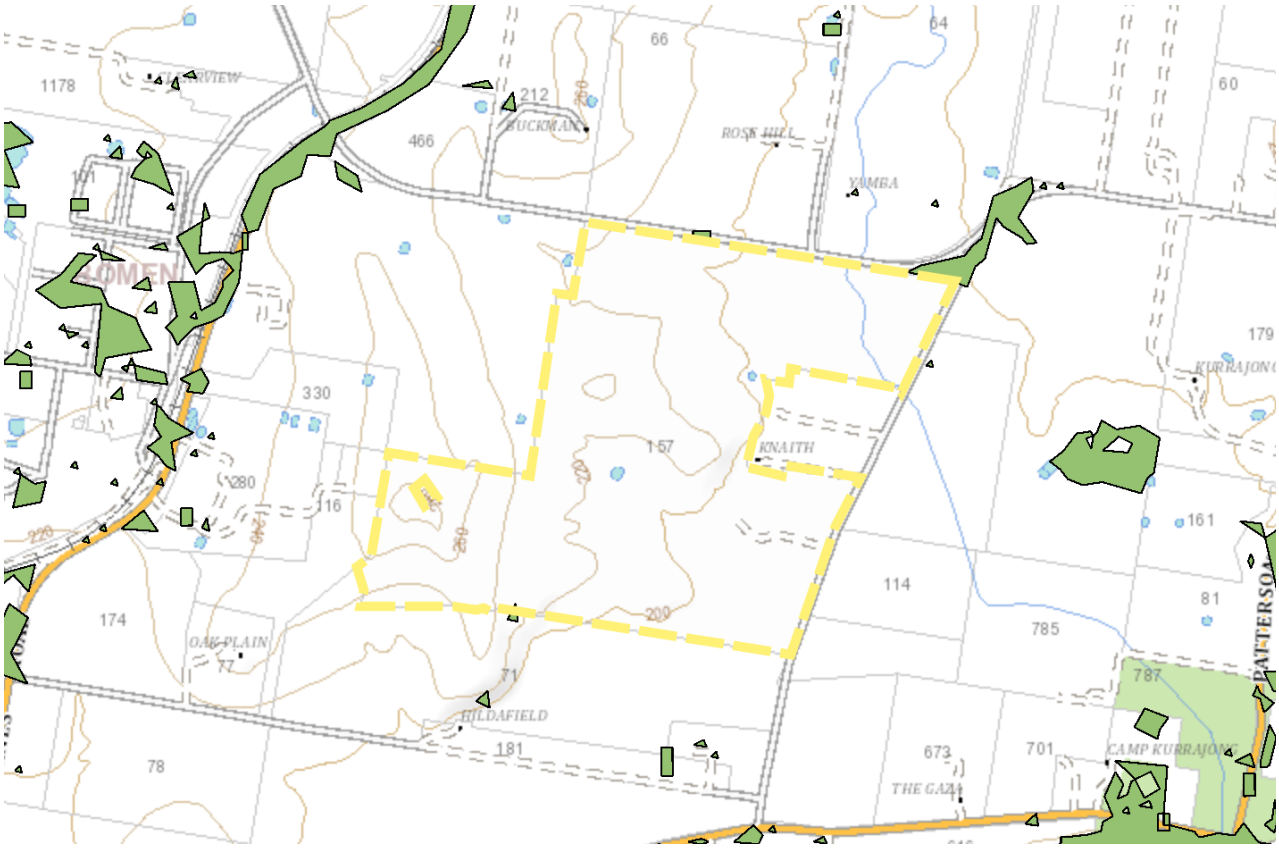
In addition, as discussed in **Section 4.2.2.4**, electricity generating works are permitted with consent on prescribed rural land pursuant to clause 34(1) of the *State Environmental Planning Policy (Infrastructure) 2007*. RU1 is prescribed rural land.

On the basis of the above, the proposal is both a permissible land use and is not antipathetic to the objectives of the zone

4.2.1.4 Biodiversity

Clause 7.3 of the LEP applies where land is mapped as containing sensitive biodiversity. By reference to the planning portal and the LEP maps, the land contains a small area of mapped sensitive biodiversity – refer **Figure 7**.

Figure 7 – Biodiversity



None of the areas identified as sensitive are affected by the proposal footprint or ancillary features.

A detailed Biodiversity Assessment has been completed by NGH Environmental – refer **Appendix C** and **Section 6.12**.

This assessment that the proposal is not predicted to result in any significant impact is unlikely. Therefore the provisions of Clause 7.3 are considered to be satisfied.

4.2.1.5 Earthworks

Clause 7.1A seeks:

> *(a) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land,*
>
> *(b) to allow earthworks of a minor nature without requiring separate development consent.*

Clause 7.1A(3) notes:

> *(3) Before granting development consent for earthworks, the consent authority must consider the following matters—*
>
> *(a) the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality,*
>
> *(b) the effect of the proposed development on the likely future use or redevelopment of the land,*
>
> *(c) the quality of the fill or the soil to be excavated, or both,*
>
> *(d) the effect of the proposed development on the existing and likely amenity of adjoining properties,*
>
> *(e) the source of any fill material and the destination of any excavated material,*
>
> *(f) the likelihood of disturbing relics,*

(g) the proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area.

A concept bulk earthworks plan and a hydraulic impact assessment have been prepared by Premise to consider the potential for impacts to the site as a result of required preparatory site earthworks.

The bulk earthworks plan indicates that the majority of the extent of earthworks requires less than 1 metre of cut and fill to provide suitable slopes for the proposal. In limited areas this is greater but does not exceed 1.5 metres in any area.

By reference to the concept earthworks, the hydraulic impact assessment concludes that the proposal would not result in adverse flood impacts to neighbouring properties and infrastructure. Increased roughness due to the installation of tracker posts over the site results in a reduction of peak flow rates from the site for all AEP events. No flood level increase was predicted on the neighbouring properties and infrastructure. Therefore, stormwater quantity/flood mitigation measures are not required.

On the basis of the assessment, it is considered that bulk earthworks are acceptable.

The following is noted with respect to the specific provisions of clause 7.1A(3):

(a) Disruption to drainage etc is addressed via the hydraulic impact assessment in **Appendix D**;

(b) The extent of change, in the context of the site, is relatively minor and would not lead to any alienation or detrimental impacts to the land. On the contrary, as discussed in **Section 6.13**, the project has the potential to bring about soil improvements that would be of benefit in the context of the future, post decommissioning primary production use of the land;

(c) All soil would be reused on site and is considered to be suitable for the proposed purpose with no off-site disposal required due to a earthworks balance being achieved;

(d) Hydrologic modelling demonstrates minor internal impacts as a result of the project but no change to off-site flows as a result of the proposed works – refer **Appendix D**;

(e) The concept earthworks demonstrate a cut/fill balance; no fill from off site is predicted to be required;

(f) An ACHA has been prepared to consider the likelihood of disturbing relics; this is provided in **Section 6.7.2**;

(g) The site contains a number of first and second order watercourses. Earthworks would occur within these areas. The site is not within a drinking water catchment or environmentally sensitive area.

On the basis of the above, the development is considered to be acceptable in the context of clause 7.1A.

4.2.1.6 Airspace operations

The objectives of clause 7.11 are:

(1) The objectives of this clause are as follows—

(a) to provide for the effective and ongoing operation of the Wagga Wagga Airport by ensuring that such operation is not compromised by proposed development that penetrates the Obstacle Limitation Surface for that airport,

(b) to protect the community from undue risk from such operation.

The proposal entails earthworks and panel installation. Panels would be a maximum height of 2.8 metres when measured from finished ground level. The extent of cutting and filling would be minimised and would not be expected to exceed 1-1.5 metres in any areas. Given the above, the maximum extent of development above or below existing levels on the site would be 4.3 metres. Given the site is well below the height of the ridge line running to the west, the proposal is not anticipated to result in development that would penetrate the obstacle limitation surface of the Wagga Wagga Airport.

4.2.2 State Environmental Planning Policy

4.2.2.1 State Environmental Planning Policy No. 44 – Koala Habitat Protection

The development site is located within the Wagga Wagga Local Government Area (LGA) and as such *State Environmental Planning Policy No. 44 - Koala Habitat Protection* (SEPP44) must be considered. SEPP 44 aims to:

...encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline...

The practical effect of SEPP 44 is that in consideration of a DA, the consent authority must ensure that approval is not issued without prior investigation of potential and core koala habitat.

This policy applies to all LGAs within the known state wide distribution of the Koala, including the Wagga Wagga LGA.

SEPP 44 defines 'potential koala habitat' as vegetation that incorporates a minimum of 15 percent of tree species in the 'upper or lower strata of the tree component' listed in Schedule 2 of SEPP 44. A person suitably qualified in tree identification (clause 7 (2)) must assess the identification of potential koala habitat. Identification of potential koala habitat requires further investigations to determine whether the site supports core habitat.

Core koala habitat is defined as:

...an area of land with a resident population of Koalas, evidenced by attributes such as breeding females. and recent sightings of and historical records of a Koala population...

If the area does not support 'core koala habitat', under clause 8 of the policy, the consent authority may determine the development application. If the site is determined to support 'core koala habitat', then a plan of management must be prepared and approved prior to granting development consent.

The NGH Biodiversity Assessment notes at Section 4.4.2:

There is one Koala record within 10 kilometres of the proposal area. Two records are from 2006, one record is from 1965. The 2006 records are between three to four km from the proposal area. The 1966 record was approximately eight km from the proposal area. No signs of Koalas (deep scratches on tree trunks) were observed during the survey. While suitable food trees are present, the structure of the potential habitat is not ideal. No Koala's were observed during the surveys.

On the basis of minimal habitat structure, no detectable signs during the field survey and no recent records, it is unlikely that the study area supports a resident Koala population and the site is not considered Core Koala Habitat.

By reference to the above conclusion, further consideration of SEPP44 is not required.

4.2.2.2 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55) provides a state-wide approach to remediation of contaminated land and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 7 of the SEPP No. 55 states that a consent authority must not consent to the carrying of development unless it has considered, among other things, whether the land is contaminated.

A search of the NSW EPA contaminated land record was undertaken for contaminated sites within the Wagga Wagga LGA on 21 November 2019. Three results were returned but none of these sites related to the subject site.

The online *List of NSW contaminated sites notified to EPA as of 16 December 2019* was searched for Bomen and Wagga Wagga suburbs. 1 site was found in Bomen and 15 sites were found in the Wagga Wagga area, however none related to the subject site.

The site has been historically used for primary production purposes. There is a risk that contamination associated with agricultural activities (e.g., pesticides) could be present on the site however, given no contaminated sites are recorded on or adjacent to the proposed development and that no evidence of contamination was observed during the site visit or mentioned during conversations with the land owner, it is considered highly unlikely that significant contamination exists in areas that would be affected by the proposal.

4.2.2.3 State Environmental Planning Policy (Primary Production and Rural Development) 2019

The *State Environmental Planning Policy (Primary Production and Rural Development) 2019* (Primary Production SEPP) aims to:

> *(a) to facilitate the orderly economic use and development of lands for primary production,*
>
> *(b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,*
>
> *(c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,*
>
> *(d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts,*
>
> *(e) to encourage sustainable agriculture, including sustainable aquaculture,*
>
> *(f) to require consideration of the effects of all proposed development in the State on oyster aquaculture,*
>
> *(g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.*

A review of the provisions of the Primary Production SEPP confirms there are no express provisions that apply to the proposed development. Further consideration is therefore not required.

4.2.2.4 State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) aims to facilitate the effective delivery of infrastructure through the state.

By virtue of Clause 34 of Division 4 of Part 3 of the ISEPP the development of electricity generating works are permitted with consent on prescribed land. Prescribed land includes land zoned RU1 – Primary Production. Electricity generating works as defined by the ISEPP has the same meaning as in the standard instrument, on which the LEP is based.

It is considered that as the proposed development satisfies the definition of an electricity generating works and is located on prescribed rural land; it is therefore permissible with the consent of the relevant consent authority, in this case the Southern Regional Planning Panel (SRPP).

Clause 45 of the ISEPP relates to the determination of a DA which has the potential to affect an electricity transmission line. Before determining a DA, which meets the relevant criteria provided by Clause 45, the consent authority must first notify the relevant electricity supply authority and take consideration of any comments made by this authority within 21 days of the notice.

Clause 104 of the ISEPP relates to development that constitutes traffic generating development. Schedule 3 of the ISEPP provides a list of developments that must be referred to the NSW Roads and Maritime Services (RMS). Electricity generating works are not listed as a development in Schedule 3. Section 104 also applies where a development has capacity to accommodate 200 or more vehicles. The development would not have capacity to accommodate 200 or more vehicles either during construction or operation and therefore the development does not represent traffic generating development.

4.2.2.5 State Environmental Planning Policy (State and Regional Development) 2011

The aims of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) are to identify development that is State Significant Development (SSD), State Significant Infrastructure, Critical State Significant Infrastructure and regionally significant development

Clause 8 of the SRD SEPP provides that development is declared to be State Significant Development for the purposes of the EP&A Act if:

- *The development is not permissible without consent under Part 4 of the EP&A Act; and*
- *The development is specified in Schedule 1 or 2.*

Clause 20 of Schedule 1 of the SRD SEPP provides:

> *"Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate and waste and hydro, wave, solar or wind power), being development that:*
>
> *(a) has a capital investment value of more than $30 million, or*
>
> *(b) has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance."*

The proposed solar farm is a development for the purpose of an electricity generating works but would not have a capital investment value in excess of $30 million, the estimated CIV is $26.8 million. The proposal is not located on an environmentally sensitive area of State significance. Accordingly, the proposed solar farm is not declared to be SSD for the purposes of the EP&A Act.

The development is however a private infrastructure facility (electricity generating works) with a CIV exceeding $5 million (pursuant to clause 5 of Schedule 7 of the SRD_SEPP) and therefore, by virtue of the provisions of clause 20 of the SRD SEPP, the development is regional development and the consent authority for the application is the SRPP.

4.2.3 Deemed Environmental Planning Instruments

There are no deemed environmental planning instruments known to affect the site.

4.3 STRATEGIC FRAMEWORK

4.3.1 Riverina Murray Regional Plan

The Riverina Murray Regional Plan 2036 (RM2036) provides a strategic framework for development within the Riverina Murray region. The vision for the RM2036 is:

> *A diversified economy founded on Australia's food bowl, iconic waterways and a network of vibrant connected communities*

The vision is supported by four regionally focussed goals:

- *A growing and diverse economy*
- *A healthy environment with pristine waterways*
- *Efficient transport and infrastructure networks*
- *Strong, connected and healthy communities*

These goals are in turn supported by a range of local directions that provide context and detail to the overarching goals.

Of particular relevance to the development of this project are the following directions, discussed in the context of the project in **Table 4.6**.

Table 4.6 – Riverina Murray Regional Plan

Direction	Assessment
1: Protect the region's diverse and productive agricultural land	The proposal represents a land use that is permissible within the zone and therefore is for a strategically supported purpose. Additionally, the proposed use is for a limited duration after which the land may return to a primary production use.
11. Promote the diversification of energy supplies through renewable energy generation	The proposal is directly consistent with this direction through the delivery of a sustainable form of renewable energy
12: Sustainably manage mineral resources	No mineral resources are impacted by the project.
13: Manage and conserve water resources for the environment	Hydraulic assessment determines that the proposal would not have any significant impacts to hydraulic function and would not have off site impacts.
15: Protect and manage the region's many environmental assets	Via the carrying out of a thorough environmental impact assessment within this document, the proposal seeks to ensure avoidance of areas of sensitivity
16: Increase resilience to natural hazards and climate change	The subject site is not mapped as affected by hazard, including bushfire or flooding.

Table 4.6 – Riverina Murray Regional Plan

Direction	Assessment
21: Align and protect utility infrastructure investment	Development of new infrastructure close to existing infrastructure minimising cost and maximises benefit to the broader community
29: Protect the region's Aboriginal and historic heritage	An ACHA has been prepared which demonstrates the development may proceed without significant impact.

On the basis of the above, it is concluded that the project is generally consistent with the vision of the RM2036.

4.3.2 Wagga Wagga Community Strategic Plan 2040

The Wagga Wagga Community Strategic Plan 2040 (CSP) has an overarching vision that states:

> *In 2040 Wagga Wagga will be a thriving, innovative, connected and inclusive community on the Murrumbidgee. Rich in opportunity, choice, learning and environment, Wagga is a place where paths cross and people meet.*

The four guiding principles identified by the community in delivering the CSP are:

1. Thriving
2. Innovative
3. Connected
4. Inclusive

One of the key objectives of the CSP is that '*we create a sustainable environment for future generations*'. This is delivered through an outcome of minimising our impact on the environment. A key strategy of this is *Implement renewable energy projects*.

This project aligns with these objectives and identified outcomes.

4.3.3 Wagga Wagga City Council Spatial Plan 2013/2043

The Wagga Wagga City Council Spatial Plan 2013/2043 is the *key strategic planning document for directing and managing urban growth and change*.

The Spatial Plan is set around a core vision, principles, goals and directions.

The vision is:

> *We are a thriving, innovative and connected community on the Murrumbidgee. We are rich in opportunity, choice, learning and environment. Wagga is a place where paths cross and people meet*

The principles are:

- *We are an engaged and involved community.*
- *We are a safe and healthy community.*
- *We have a sustainable natural and built environment.*
- *We have a growing economy.*

Relevant goals and directions are:

Goals

- *We look after and enhance our natural environment.*
- *We plan for resilient and sustainable built environments.*

Directions

- *We are provided the opportunity to be involved with decisions impacting us.*
- *We improve the quality of our environment.*
- *We plan for a growing community.*
- *We maintain our current and future infrastructure.*
- *There is growing business investment in our community.*

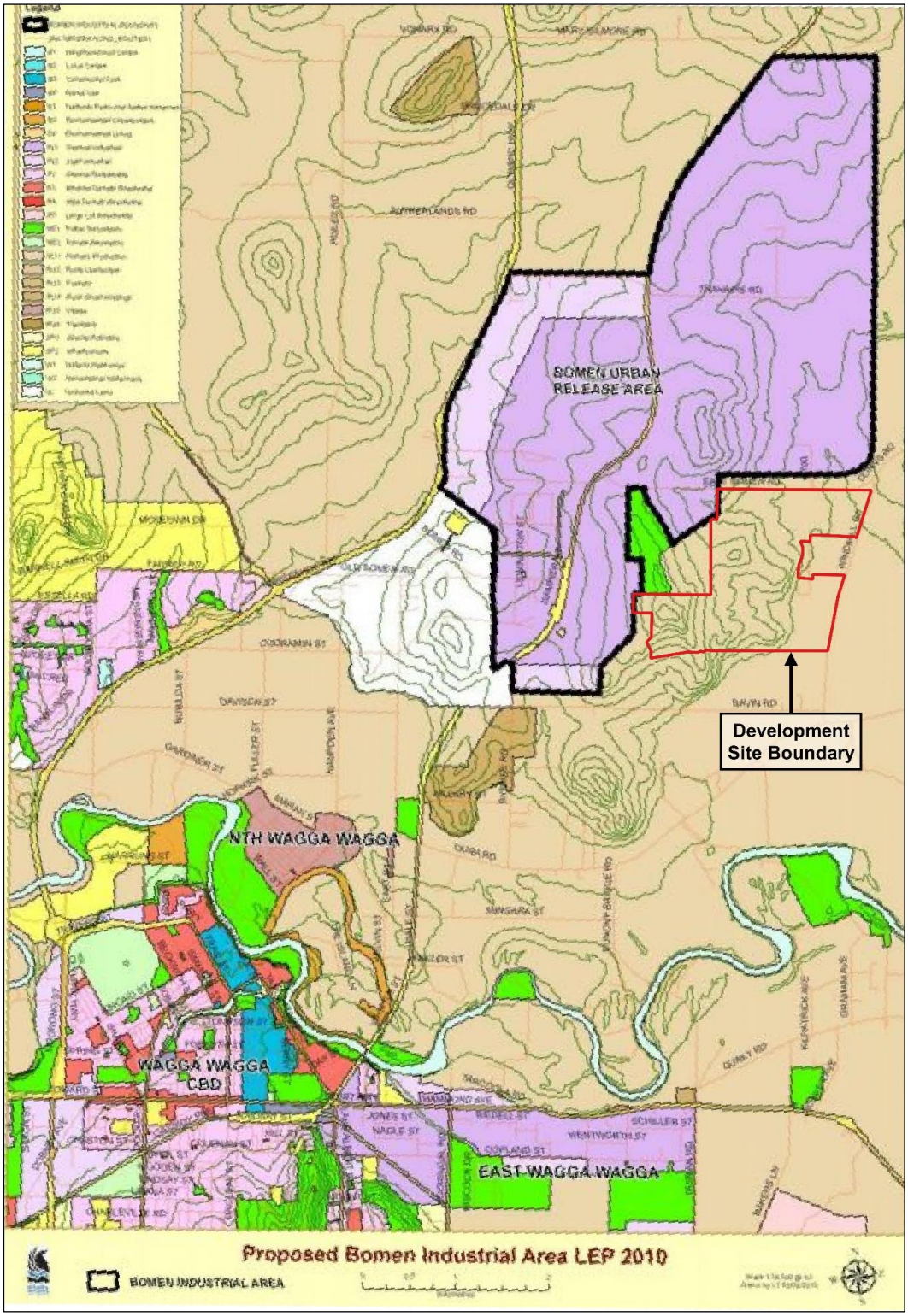
The proposal aligns with the vision and objectives of the Spatial Plan by providing sustainable form of renewable energy that assists to reduce reliance on traditional forms of electricity generation, including the burning of fossil fuels. This positively contributes to the ongoing to the challenge of reducing the impacts of climate change.

The applicant has engaged with the local community to develop a clear understanding of the position of the community with relation to the proposal and to ensure the opportunity for effective discussion and project refinement occurs. This is discussed further in **Section 5**.

4.3.4 Bomen

The development site is located adjacent to lands mapped as the Bomen Urban Release Area (BURA) (refer **Figure 8**). The development of land within the BURA is regulated through Clause 6.3 of the *Wagga Wagga Local Environmental Plan (LEP) 2010* and the *Wagga Wagga Development Control Plan 2010 (DCP).*

Figure 8 – Bomen urban release area



Land use developments within the BURA are managed strategically, and within the context of complementing Council's *Bomen Strategic Master Plan (2010)* (BSMP).

The BSMP states that the vision for Bomen's future is:

> *In 2030, the Southeast Australian Logistics hub (SEAL) is:*
> *1 The intermodal transport terminal of choice for industries and transport businesses across southeastern Australia.*

> *2 A well planned place of industry that takes full advantage of its location, accessibility and infrastructure; and an internationally renowned exemplar of ecologically sustainable development through deployment of the principles of industrial ecology.*
> *3 One of the most resource and energy efficient places of business nationally.*
> *4 Fully serviced by support businesses, providing services that foster economic development and sustained business and jobs growth.*
> *5 Supplied with infrastructure for transport, energy, communications and resource and materials sharing that is economically and environmentally effective.*

The DCP states that:

> *The vision for Bomen is for the Bomen Industrial Area to be a high-quality and nationally renowned place for transport and logistics based enterprises, well designed and integrated with existing industry that meets the requirements of a targeted range of businesses and supporting activities to complement and nurture a more sustainable City of Wagga Wagga and Riverina Region.*

The DCP notes that more than 4,000 employees are expected to work in Bomen once development is complete.

The long term vision of the DCP is supported by the emerging SAP for the Bomen area, as discussed in **Sections 2.2 and 6.2**.

4.4 DRAFT ENVIRONMENTAL PLANNING INSTRUMENTS

A review of the NSW Government online LEP tracking system reveals five planning proposals seeking to amend the LEP. A review of the content of these proposals confirms that they do not affect the subject site.

4.5 DEVELOPMENT CONTROL PLANS

The Wagga Wagga Development Control Plan 2010 (DCP) applies to development within the Wagga Wagga LGA. A review of the DCP confirms a number of relevant sections. These are discussed in **Table 4.7.** A review of the project against the relevant provisions of the DCP confirms general consistency.

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
CONTROLS APPLYING TO ALL DEVELOPMENTS			
Site Analysis Plan	A site analysis plan is required for applications that propose substantial new work or construction but may not be necessary for applications that only involve minor construction, work or changes to a building.	Provided as **Drawing TP01**.	Yes
2.1 Vehicle Access and Movements	Access should be from an alternative secondary frontage or other non-arterial road where possible.	Access to the site would be via the approved construction and operational accesses associated with the WWSFN, and thereby avoiding creating additional entries to the site.	Yes
	A Traffic Impact Study may be required where adverse local traffic impacts may result from the development. The traffic impact study is to include the suitability of the proposal in terms of the design and location of the proposed access, and the likely nature, volume or frequency of traffic to be generated by the development.	A traffic assessment is provided in **Section 6.4**. Given traffic impacts are limited to the construction period; a detailed study is not considered warranted.	N/A
	C3 Vehicles are to enter and leave in a forward direction unless it can be demonstrated that site conditions prevent it.	This is achievable.	Yes
	C4 Provide adequate areas for loading and unloading of goods on site. The loading space and facilities are to be appropriate to the scale of development.	This is achievable.	Yes
	C5 Access driveways are not to be located opposite T-intersections or within 7m of a break in a median strip or intersection.	This is achieved	Yes
	C6 Ensure adequate sight lines for proposed driveways	This is achievable.	Yes
2.2 Off-street parking	For uses not listed, similar land uses should be used as a guide in assessing car parking requirements.	There is ample room for on-site parking during construction. Extensive parking requirements during operation are not required.	Yes

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	The design and layout of parking is to be in accordance with the relevant Australian Standard at the time of lodgment of an application.	This is achievable.	Yes
	Parking spaces are to be provided for disabled persons. Accessible parking spaces to comply with the relevant Australian Standard at the time of lodgment of an application.	This is achievable.	Yes
	For mixed use developments, the parking required is the total of requirements for each use. Variations can be considered where it can be demonstrated that the peak demand for each land use component is staggered or that development as a whole generates less parking than separable parts.	N/A	N/A
	In the case of redevelopment or change of use (other than in the B3 zone) the parking requirements are to be calculated by: a. Determining the parking requirement of the current or previous use in accordance with the table, then b. Determining the parking requirement for the new use, then c. Subtracting the existing requirement from the requirement for the proposed use to determine the number of spaces required (i.e. a credit is provided for any shortfall that exists on the site for the current use).	N/A	N/A
	In the case of redevelopment or change of use within the B3 zone where there is no increase in gross floor area, no additional car parking spaces will be required, except in the following instances: a. Outbuildings are proposed to be used in association with the development, or b. A Traffic Impact Assessment (TIA) is required by Council for the development.	N/A	N/A
	Variations to the parking requirements may be considered where minor alterations and additions are proposed, and the changes do not encroach or reduce the current off-street parking spaces.	N/A	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	A traffic and parking study may be required for certain proposals, including but not limited to proposals for schools and other education uses including child care centres, business parks, hospitals, cinemas and gyms.	N/A	N/A
	Provide trees within the parking area at a rate of 1 tree per 5 spaces in a row. Each tree to have a minimum mature spread of 5m and to be located in a planting bed with minimum width of 1.5m (between back of kerbs) and minimum area of 3.5 m^2	N/A	N/A
	Planting beds located within a car park are to have a subsoil drainage system connected into the stormwater system of the site.	N/A	N/A
	To ensure sightlines are maintained for drivers and pedestrians, trees used within or adjacent to car parking areas shall have a minimum clear trunk height of 2.5 m, with shrubs and ground covers not to exceed 500 mm in height	N/A	N/A
2.3 Landscaping	A landscape plan is required for applications for Commercial and Industrial developments and Residential development (other than dwelling houses).	N/A	N/A
	Natural features at the site, such as trees, rock outcrops, cliffs, ledges and indigenous species and vegetation communities are to be retained and incorporated into the design of the development.	A detailed Landscaping Plan has been prepared that is not antipathetic to this intent – refer **Appendix A**.	Yes
	Use native and indigenous plants, especially low water consumption plants in preference to exotic species.	Species selected are consistent with the guidance within the DCP – refer **Appendix A**	Yes
	Trees should be planted at the front and rear of properties to provide tree canopy.	Plantings proposed as per the Landscaping Plan	Yes
	Provide landscaping in the front and side setback areas, and on other parts of the site to improve the streetscape, soften the appearance of buildings and paved areas, and to provide visual screening.	Plantings proposed as per the **Landscaping Plan – refer Appendix A**	Yes

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	Landscaping should provide shade in summer without reducing solar access in winter. Limited use of deciduous species is acceptable where used to achieve passive solar design	Plantings proposed as per the **Landscaping Plan – refer Appendix A**	N/A
2.4 Signage		Signage will be limited to a single pole sign at the entrance identifying the facility as the Wagga Wagga Solar Farm South and providing contact details.	Yes
2.5 Safety and Security	Use good site planning to clearly define public, semi-public and private areas.	Plantings proposed as per the **Landscaping Plan – refer Appendix A**	Yes
	Entries are to be clearly visible and identifiable from the street and are to give the resident/occupier a sense of personal address and shelter. For non-residential uses, administration offices or showroom are to be located at the front of the building.	The access would be marked by a discrete sign and gate.	Yes
	Minimise blank walls along street frontages.	No walls proposed.	N/A
	Avoid areas of potential concealment and 'blind' corners.	The site would be fenced to provide territorial reinforcement and access control. There would be limited opportunities for concealment. The site is well separated from the urban area, resulting in minimal opportunities for crime.	Yes
	Provide lighting to external entry areas, driveways and car parks in accordance with the relevant Australian Standards. The lighting is to be designed and sited to minimise spill and potential nuisance to adjoining properties.	This is achievable.	Yes
	Planting and fencing are not to reduce the safety of users or compromise areas of natural surveillance.	This is achievable.	Yes
	Where a site provides a pedestrian through route the access path is to be clearly defined and sign posted, appropriately lit, and have satisfactory visibility.	N/A	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	Locate public toilets and rest areas to promote their use, and maximise public surveillance without creating visual intrusion.	N/A	N/A
2.6 Erosion and Sediment Control Principles	Protect the environment against soil erosion and loss of soil from construction sites. Prevent the degradation of drainage systems, waterways and aquatic environments from deposition of soil and foreign material from construction sites. Prevent flood damage of individual properties caused by sediment reducing the flow capacity of the stormwater drainage system. Promote the implementation of erosion and sediment control measures by persons undertaking construction and earthworks activities to prevent the loss of soil from the site.	A Soil and Water Management Plan would be prepared and incorporated in the CEMP for the site. Refer **Section 6.24**	Yes
2.7 Development adjoin open space		The proposed development does not adjoin open space. A parcel of land north-west of the solar farm is zoned RE1 Public Recreation.	Yes
HERITAGE CONSERVATION			
Section 3		The development site is not located in the Wagga Wagga Heritage Conservation Area or in close proximity to any heritage item listed In Schedule 5 of the LEP – refer **Section 6.7**.	N/A
ENVIRONMENTAL HAZARDS AND MANAGEMENT			
4.1 Bushfire		The development footprint is not located on land identified as bush fire prone.	N/A
4.2 Flooding		The development footprint is not located on land identified as flood prone.	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
NATURAL RESOURCE AND LANDSCAPE MANAGEMENT			
5.1 Development on ridges and prominent hills	Maintain the visual and landscape setting of the entire local government area of Wagga Wagga.	The proposal ensures that all development is below the adjacent ridgeline to better integrate the development into the landscape.	Yes
5.2 Preservation of trees	The DCP seeks to ensure the protection of trees where possible.	Tree clearing has been minimised, with avoidance preferred. Compensatory plantings at a ratio of 10 to 1 are proposed.	Yes
5.3 Native vegetation cover		The development is not on land zoned RU2, RU4 or RU5, and does not include a sub-division.	N/A
5.4 Environmentally sensitive land	Development is to be consistent with any Conservation Management Plan prepared for land in the E2 zone.	Development is not within the E2 zone.	Yes
	An application for development consent on land identified as a "Sensitive area" on the Natural Resources Sensitivity Map – Biodiversity shall be accompanied by a report that addresses the following matters: (a) identification of any potential adverse impact of the proposed development on any of the following: (i) a native vegetation community, (ii) the habitat of any threatened species, population or ecological community, (iii) a regionally, state or nationally significant species of plant, animal or habitat, (iv) a habitat corridor, (v) a wetland, (vi) the biodiversity values within a reserve, including a road reserve or a stock route, and (b) a description of any proposed measures to be undertaken to ameliorate any such potential adverse impact.	The proposal does not affect any mapped areas of sensitive biodiversity	Yes

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	Damage to the Tree Protection Zone (TPZ) as specified in AS4970-2009 (Protection of trees on development sites - Australian Standard) is to be avoided. This includes both the cutting of roots and/or the compaction of soil within the TPZ.	This would be achieved with controls to be implemented via the CEMP	Yes
	Any soil disturbance within the E2 and E4 Zone or the biodiversity overlay area should be rehabilitated using native grasses and forbs.	Land is not within the E2 or E4 Zone	N/A
	To ensure that any native plantings are retained, or asset protection zones maintained the owner must apply a covenant to the land as part of the conditions of consent which would require native planting and/or asset protection zones to be retained.	N/A	N/A
	Fencing of native vegetation is not to include barbed wire and is to have a bottom strand no lower than 40 cm above the ground, unless rabbit proof fencing is being used	N/A	N/A
	An application for development consent on land identified as a "Sensitive area" on the Natural Resources Sensitivity Map – Land shall be accompanied by an environmental or geotechnical assessment that addresses the potential for any adverse impact on land: (a) with a slope greater than 25%, or (b) with a high proportion of rock outcropping, or (c) subject to high erosion potential, or (d) subject to soil salinity or impeded drainage, or (e) subject to regular or permanent inundation.	The proposal does not affect any mapped areas of sensitive land	Yes
	Ensure that the Guidelines for Managing Urban Stormwater - Soils and Construction Volume @ A Installation of Services are followed to imitate soil erosion.	This would be achieved by reference to the controls in **Section 6.10**	Yes
	Any soil disturbance within the E2 and the E4 Zones or "sensitive land - land" overlay area should be rehabilitated using native grasses and forbs.	Land is not zoned E2 or E4	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	Environmentally Sensitive Land – Waterways An application for development consent on land identified as a "Sensitive area" on the Natural Resources Sensitivity Map – Water or situated within 40m of the bank or shore (measured horizontally from the top of the bank or shore), of a waterway on land identified on the Natural Resources Sensitivity Map – Water shall be accompanied by a report that addresses the following: (a) identification of any potential adverse impact on any of the following: (i) water quality within the waterway, (ii) aquatic and riparian habitats and ecosystems, (iii) stability of the bed, shore and banks of the waterway, (iv) the free passage of fish and other aquatic organisms within or along the waterway, (v) habitat of any threatened species, population or ecological community, (b) the likelihood that the development will increase water extraction from the waterway for domestic or stock use and the potential impact of any extraction on the waterway, (c) a description of all proposed measures that may be undertaken to ameliorate any potential adverse impact.	The host lot is mapped as containing sensitive groundwater land, but the development footprint does not impact this land.	Yes
	Environmentally Sensitive Land – Groundwater An application for development consent on land identified as a "Sensitive area" on the Natural Resources Sensitivity Map – Water, for development specified in Clause 7.6 (4) of the LEP, shall be accompanied by a report or documentation that: (a) addresses potential impacts upon: i) existing groundwater sources, and ii) future extraction from groundwater sources for domestic and stock water supplies. (b) demonstrates that the development is designed to prevent adverse environmental impacts, including exacerbation of salinity and the risk of	Development footprint is not mapped as groundwater vulnerable.	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	contamination of groundwater sources from on-site storage or disposal facilities		
	The construction of septic systems should be consistent with the "Environment and Health Protection Guidelines – On-site Sewerage Management for Single Households", 1998.	Any effluent management system required to serve the office buildings would be installed in accordance with Council requirements	Yes
VILLAGES			
Section 6	The development is not located on land zoned RU5.	-	N/A
SUBDIVISION			
Section 7	The development does not include subdivision	-	N/A
RURAL DEVELOPMENT			
SEPP	The Rural Lands SEPP has been repealed by the introduction of the Primary Production and Rural Development SEPP. The PPRD_SEPP does not directly apply to the development.		N/A
8.1 Development in Rural Areas	Uses are to be compatible with the character of the locality in terms of buildings, structures and the nature of operations.	The development is a permitted use in the zone and there is therefore a legal presumption of acceptability subject to an assessment of impacts The assessment via this SEE concludes that the development would not be incompatible with the character of the area by reference to the nature of the proposal.	Yes
	Provide adequate buffer areas and setbacks to minimise potential conflicts with adjoining lawful land uses. Where there is potential for a conflict between land uses, priority will be given to the existing productive use.	Throughout the assessment contained in this SEE it is demonstrated that the development would effectively minimised potential conflicts	Yes
	Use landscaping and other screening options to help integrate new uses and developments into the rural landscape.	A detailed **Landscaping Plan** is provided – refer **Appendix A**	Yes

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	Uses must be capable of operating within capacities of available existing services	The proposal does not require servicing (water or sewerage).	Yes
	Provide adequate facilities for additional traffic in terms of vehicle access and movements, parking areas, and loading and unloading of goods.	There is adequate room within the site to provide this.	Yes
	In the case of larger projects Council may require the applicant to demonstrate that the roads in the locality are of satisfactory construction and condition to accommodate the size, weight and volume of vehicles that could be generated by the use, and that the local traffic conditions are suitable.	The proposal would make use of East Bomen Road, a local non-arterial road, which links to Byrnes Road. Both roads are capable of accommodating short term construction traffic.	Yes
	Provide satisfactory arrangements for storage and disposal of waste.	The operation of the proposed development would not generate a waste stream. A construction waste plan would be prepared and implemented to Council's satisfaction.	N/A
	Locate dwellings to minimise conflicts with activities associated with primary production, so as to not interfere with the ability to farm adjoining or adjacent land.	No dwelling proposed	
	A dwelling house and all ancillary development on a lot in the following zones must have a setback from the boundary with a primary road that is not a classified road of at least the following: (a) If the lot is in Zone RU1, RU2 or RU6 – 50m	No dwelling proposed	N/A
	A dwelling house and all ancillary development on a corner lot must have a setback from a boundary with a secondary road that is not a classified road of at least the following: (a) If the lot is in Zone RU1, RU2 or RU6 – 10m	No dwelling proposed	N/A
	A dwelling house or outbuilding must have a setback of at least 250m from a boundary with adjoining land being used for any of the following: (i) Forestry (ii) Intensive livestock agriculture (iii) Intensive plant	No dwelling proposed	N/A

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
	agriculture (iv) Mines and extractive industries (v) Railway lines (vi) Rural industries		
	Variations to the minimum setback can be considered where it can be shown that the agricultural potential of the land will be protected taking into account alternative measures such as landscaping or other relevant factors.	No dwelling proposed	Yes
8.2 Rural produce sales and ancillary tourism		The development does not entail the sale of rural produce or a tourism activity.	N/A
8.3 Rural Dwellings		The development does not include a dwelling.	N/A
RESIDENTIAL DEVELOPMENT			
Section 9	The development does not entail the carrying out of residential development and therefore the provisions of this section do not apply.	-	N/A
BUSINESS DEVELOPMENT			
Section 10	The development is not located on business zoned land and therefore development the provisions of this section do not apply	-	N/A
INDUSTRIAL DEVELOPMENT			
Section 11	The development site is not located on land zoned IN1 or IN2 and therefore the provisions of this section do not apply.	-	N/A
SPECIFIC USES AND DEVELOPMENTS			
Section 12	A solar farm is not identified as a specific use or development identified in Section 12.	-	N/A
BOMEN URBAN RELEASE AREA			

Table 4.7 – DCP Compliance

Section	Requirement	Assessment	Compliance
Section 13	The development site is not located in the Bomen Urban Release Area however the URA is located to the north of the site.	The URA contributes to the context and setting of the locality and therefore the assessment at **Section 6.2** provides consideration of the impact of the URA on the local context.	N/A
BOOROOMA URBAN RELEASE AREA			
Section 14	The development site is not located in the Boorooma Urban Release Area.	-	N/A
LLOYD URBAN RELEASE AREA			
Section 15	The development site is not located in the Lloyd Urban Release Area.	-	N/A
GOBBAGOMBALIN URBAN RELEASE AREA			
Section 16	The development site is not located in the Gobbagombalin Urban Release Area	-	N/A

5 COMMUNITY ENGAGEMENT

The *Large-Scale Solar Energy Guideline For State Significant Development* (DPIE, 2018) does not directly apply to the project, but provides some useful principles when undertaking the development of solar energy projects.

Community engagement is considered a critical aspect of any project, with the emphasis being on ensuring that engagement is meaningful, respectful and effective.

In preparing this Statement of Environmental Effects, Premise and Terrain Solar, on behalf of Metka, has conducted a range of methods of engagement with Council and the local community.

Initially, key stakeholders in the project were identified as per **Table 5.1**:

Table 5.1 – Stakeholders

Stakeholder		**Method of Identification**
Government – Local	Wagga Wagga City Council	Local plan mapping – *Wagga Wagga Local Environmental Plan 2010*
Government - Regional	Southern Regional Planning Panel	Schedule 7 of the *State Environmental Planning Policy (State and Regional Development) 2011*
NSW Government Agencies	Office of Environment and Heritage	Statutory obligations and approvals
	Natural Resource Access Regulator	
	National Parks and Wildlife	
	Department of Primary Industries (Fisheries)	
Commonwealth Government	Department of Environment and Energy	Significant impacts to commonwealth protected biodiversity
Community	Local Land Owners	Spatial mapping and title search
	Special Interest Groups	Direct engagement
	Aboriginal community members	Expressions of interest through the *NSW Office of Environment and Heritage's (OEH) Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.*
	Other potentially affected stakeholders (including owners of adjacent land and those in the vicinity of the development.	Premise propose to rely on information supplied by Terrain Solar and Iris Visual to identify those receivers who have the potential to view the project site and the proposed solar farm and who may be potentially affected.

Engagement has taken a number of forms, including:

- Directly contacting special interest groups and nearby residents via phone and email;
- Pre-application meeting with Wagga Wagga City Council planning staff (10 September 2019);
- A community meeting with representatives of the Eunony Valley Association (10 September 2019);

- Letter box drop to identified potentially affected residential receivers seeking written comments on the project (10 September 2019);
- Direct engagement with Registered Aboriginal Parties in relation to the preparation of the Aboriginal Cultural Heritage Assessment – refer **Section 6.7**;
- Conducting a three-hour public drop-in session at a public location for members of the public to attend to ask questions about the project and discuss the project with the project team (held on 14 November 2019);
- Providing draft copies of this statement to those members of the public who comment on the project, together with Wagga Wagga City Council and the EVA to seek their feedback prior to formal lodgment; and
- Review of the final document in light of submissions received.

Matters identified via the engagement process are discussed in **Table 5.2**.

Table 5.2 – Submissions/matters raised

Forum	No.	Submission	Response
Initial meeting with EVA (10/9/19	1	Not a separate development to approved WWSFN and should be assessed as a whole. Links to/integration with existing approved development	This is discussed in detail in **Sections 4.1.3 and 4.2.1.3**
	2	The need for intermediate planting of screening vegetation	Detailed landscaping plans are provided and details of timing and extent of proposed landscaping is discussed in **Section 6.3** and **Appendix A**
	3	The suitability of RU1 land for solar developments	This is discussed in detail in **Section 4.2.1.3**
	4	Impacts associated with the reflection from panels and poles	This is discussed in detail in **Appendix A** and **Section 6.3**
	5	Concerns about implementation, including construction impacts (noise, dust etc)	The measures to be adopted via a construction environmental management plan (CEMP) are discussed in detail in **Section 6.24**
	6	Suitability of this site – topography etc	This is discussed in detail in **Sections 3.1.1 and 7.1**
	7	Decommissioning – the need for a bond to ensure the community is protected if the operators abandon the site	Decommissioning is discussed in detail in **Section 3.1.4**
	8	Potential impacts to water line that traverses the site and the need for a formalised easement	This is discussed in detail in **Section 6.6**
	9	Whether the proposal was always intended to follow the approved development	This is discussed in detail in **Section 3.1**
	10	Information on technology to be used	Refer **Section 3**
	11	Request introduction with contractor/owner	A direct introduction for the EVA to the proponent (Metka) has been arranged and we understand ongoing contact is occurring.
	12	Any limits to the number of solar developments the area can sustain? Capacity of the grid to sustain generation levels.	Each individual substation has limits on input capacity. At the time of design of the WWSFN, the potential input capacity for input was 30 megawatts. On continued engagement with the electricity provider, this has now been confirmed as 48.7 MW. The capacity by reference

			to the current arrangement of the substation is greater than was originally expected, which has provided a further opportunity. Once the WWSFS is developed, no further capacity in the Transgrid Zone Substation is expected without significant upgrade (which is not known to be proposed).
	13	Timing for installation of landscaping	A detailed **Landscaping Plan** is provided. Timing for implementation of planting is discussed in detail in **Section 6.3**
	14	Any capacity to reduce the scale/footprint approved development as a result of the proposed development	As a result of initial discussions and meeting with the EVA, the footprint of the proposal has been refined and reduced from the initial concepts, including the concept plan tabled at the first meeting on 10 September. Whilst this does not translate to a reduction in the footprint of the approved WWSFN, it reflects on the genuine attempt by the proponent to engage with the community and respond to matters raised.
Direct Written submissions from letterbox drop	15	None received	None required.
Public drop-in session 14/11/19	16	Visual impacts	This is addressed in detail in **Section 6.3** and **Appendix A**
	17	Impacts of changes to the landscape in the context of erosion and changes to hydrology	Impacts to soils are discussed in **Sections 6.10 and 6.13**
	18	Impacts from dust during construction	Mitigation measures to manage dust is discussed in **Section 6.10**
	19	Confirmation of the number of panels proposed	Approximately 49,364 panels would be installed to generate the proposed 18.7 MW of energy
	20	Whether trees can be planted in the open areas of the site between the panels	Following the community meeting the landscaping plan has been updated to including plantings within the open areas between the proposed panel arrays

	21	Confirmation of why the development site is suitable now but was not suitable in relation to the approved development.	This is discussed in **Section 3.1.1**
	22	How many trees will be removed and how many replanted? Can loss of larger trees be avoided?	A maximum of 17 trees are to be removed and compensatory plantings are proposed at a rate of 10 replacement trees for every one tree removed. So, a minimum of 170 trees would be planted. Where tree removal can be avoided through detailed design, it would be. This assessment provides details on the worst-case removal scenario and assesses this accordingly. Any opportunity to reduce tree removal that can be realised would further reduce impacts.
	23	Loss of carbon storage from tree removal of older trees	Carbon constitutes approximately 50% the dry mass of trees and when wood from these trees is used to produce wood products the carbon is stored for life in that product. For framing in homes this carbon storage is life is around 100 years, around 30 years in furniture, 30 years in railroad ties and around 6 years in pallets and paper. Carbon stored in wood is only released back to the atmosphere when the wood product is burnt or decays. No burning of removed trees is proposed, as these would be retained on site to provide habitat. Any loss of carbon storage is therefore negligible, and the significant plantings associated with the proposed arrangement provides for additional carbon storage to offset any loss.
	24	Photomontages should include images from other vantage points, including those at higher elevations to provide an accurate picture of the impacts	The rationale for the locations adopted for the photomontages is discussed in **Section 6.3** of this SEE and in Section 5.1.3 of **Appendix A**
	25	Explanation was provided by Premise that part of the justification for the project was the greater capacity in the Transgrid substation available than was understood to be available when the approved development was proposed. The Bomen Solar Farm has since been approved. How do the two solar developments inter-relate? Where does the BSF power output go?	Bomen Solar Farm (along with other approved SF's in the region) transfer their generation capacity at the 132kV transmission node of Transgrid's Wagga Wagga North Substation. The approved WWSFN and WWSFS are both proposed to connect at the 66-kV voltage level (the same level that Essential Energy connects at). This means the approved WWSFN and WWSFS will more directly power Essential Energy's Bomen, Oura, Cartwrights Hill, Forest Hill (and other) distribution feeders, whereas the other solar farms will generally flow directly into the transmission system.

	26	Where is water going to be sourced from during construction for dust mitigation and establishment of landscaping?	Water would be sourced either from the farm dam on site or from a commercial water supplier. Specific details of the source of this water would be provided within the CEMP for the site.
	27	How much water would be necessary during construction?	This is discussed in **Section 3.1.7.2**. 3.5 ML of water is predicted to be required over the construction phase.
	28	Impact of noise during construction	Construction noise is assessed in detail in accordance with the applicable criteria in **Section 6.17** and in **Appendix E**
	29	Social impacts, including impacts to people's amenity and well-being as a result of the proposal	Social impacts are discussed in **Section 6.21**
	30	Include a photomontage from the east at a higher elevation and in the morning to provide a clear picture of the extent of glare and visual impacts	The rationale for the locations adopted for the photomontages is discussed in **Section 6.3** of this SEE and in Section 5.1.3 of **Appendix A**
	31	Support poles – why galvanised and why not less reflective materials/surfaces?	Galvanised poles are required to provide the necessary durability to last for 25-30 years. When exposed to the atmosphere, galvanized steel naturally develops a protective zinc patina on the surface which provides a uniform soft grey appearance. This patina takes around 6 months to form from installation and exposure to air. It is also notable that, once panels are installed and operational, they obstruct visibility of the posts; thereby limiting potential impacts from reflective glare.

	32	Adequacy and duration of fauna survey efforts	• The vast majority of the site is disturbed cropped land, so those parts of the site only require a small survey effort. • Survey effort was concentrated within areas that indicated habitat value (woodland cluster at the northern boundary, drainage line, etc), which is where the fauna or signs of fauna would be located. • All trees were individually inspected which indicates quite a substantial survey effort. Again, this is where you would see any fauna, if present, or the signs such as scratches, scats, nesting, etc. • The site is not overly large, the time spent on-site is reasonable. • NGH already has a very reasonable understanding of the site's habitat values from carrying out the assessment for the approved WWSFN (and several other assessments at Bomen) eg what species are likely to occur, where the evidence is likely to be, etc. • There were two ecologists on-site for one day, therefore the equivalent of two days.
	33	Decommissioning bond to protect against Metka walking away and not decommissioning the site adequately	The approach to decommissioning is discussed in **Section 3.1.8**
	34	Some of the creek alignment has been filled in and this may impact on buildability	This is noted and has been communicated to Metka in the context of geotechnical testing.
	35	Local input into planting species and recommendations – locals are happy to be help and provide advice but want to be appropriately reimbursed for their efforts	The species list for landscaping has been prepared by reference to Wagga DCP 2010, Section 5.3. A copy of the list has also been sent to the Wagga Landcare group for comment.
	36	Community expressed the view that the project does not provide any local benefits to them and only negative impacts. What positive benefits can be agreed on/offered?	The social impacts of the proposal are discussed in **Section 6.21.** The proposal would result in the provision of a sustainable form of energy, reducing reliance on fossil fuels, results in the planting of significant on-site plantings and would provide local employment and investment.
	37	What is the extent of significant Aboriginal heritage items on site?	This is discussed in **Section 6.7.2** and **Appendix B**
	38	What has been the extent of consultation/engagement with the local Aboriginal groups?	Refer **Appendix B** and **Section 6.7.2.** This document was circulated to RAPs as a draft for comment and sent with the draft SEE to surrounding neighbours to comment.

	39	Will the ecology report be circulated to residents?	Yes. The BA at **Appendix C** circulated to residents with the draft SEE for comment prior to finalising the DA for lodgment.
	40	Impacts associated with loss of larger trees	As a result of the community meeting, the plan has been reviewed and the number of trees to be removed has been reduced to 17 in total. As noted, additional plantings to compensate for this tree loss is proposed at a ratio of 10 trees for every one removed, resulting in at least 170 trees planted on site.
	41	Photomontages not a real or accurate enough reflection of an actual solar farm The photomontage locations are hiding the solar farm behind the landform, thinks it would be worse from more elevated locations, such as his home.	The rationale for the locations adopted for the photomontages is discussed in **Section 6.3** of this SEE and in Section 5.1.3 of **Appendix A.** The sites adopted are considered to be most representative of potentially affected viewpoints.
	42	Could a 3D model be created where each person's house could be included, and they could understand how the visual impact will be?	3D models are not considered a realistic method of assessing visual impact as they are more of an artistic creation and not sufficiently accurate. The visual assessment at **Appendix A** has been prepared in accordance with the adopted and accepted methodologies for assessing visual impacts, and in line with the planning principle delivered by the Land and Environment Court
	43	Impacts to private water line	This is depicted on **Drawing TP01** and would be affected by the proposed panel array locations. Discussions are ongoing with Metka to relocate and upgrade the pipe.
	44	How long are the trees and bushes expected to last?	They have different life expectancies, but species are selected to ensure that re-seeding occurs. Faster growing, shorter lifespan species are selected for quick establishment, to give the longer living, slower growing species time to establish.
	45	Timeframe for establishment of screening planting and landscaping	Faster growing species are expected to be established within 6-8 months, with slower growing species planted at the same time and taking a number of years to establish. The combination of species provides the best outcome for screening and landscaping.
	46	Has the superb parrot habitat been considered?	Yes – this is addressed in **Appendix C**

	47	In the stage 1 court hearing it was mentioned that this area of land wasn't feasible to construct a solar farm as the terrain did not suit it	This is discussed in **Section 3.1.1**
	48	In relation to the approved WWSFN it was mentioned that the capacity at the substation was 100% full.	The terms of the connection agreement are confidential but without an agreement in place, the project cannot proceed. An agreement would not be reached if capacity was not available.
	49	Too many acacias, too short lived, some species are a pest	The rationale for the planting regime is outlined in **Section 3.1.6 and Appendix A**
	50	Two rows of trees are not enough	The rationale for the planting regime is outlined in **Section 3.1.6 and Appendix A**
	51	10 metres of screening is not enough	The rationale for the planting regime is outlined in **Section 3.1.6 and Appendix A**
	52	Not enough copies of plans for everyone in the room.	Those who asked were posted copies of the plans after the meeting. Copies of all documents supplied as a draft for comment prior to submission.
	53	How will we manage stormwater during a rain event	A detailed assessment of hydrology shows stormwater flows off site would remain unchanged – refer **Appendix D**
	54	Renew Estate planting is dead / dying	Careful attention would be paid to planting regimes and timing, with details outlined in the CEMP.
	55	Asked if it would be tubestock	Tubestock would be used, as this has the best potential for successful establishment.
	56	Glare impact – mentioned glare hurts their eyes from Bomen	A detailed glare assessment is provided in **Appendix A**. Short-lived glare from galvanised posts during construction, and prior to panels being installed may occur, however this would not last long as the galvanised posts would patina (dull) once installed, taking around 6 months. Additionally, after panels are installed and become operational, impact would not be expected due to panels blocking sunlight to panels, thus avoiding any opportunity for glare.
	57	Is there any lighting on the solar farm at night?	None proposed

Draft SEE provided to Council and others on 16 December 2019	58	Letter response received dated 16 December 2019 seeking until 17th February 2020 to review and communicating the view that the timeframe offered suggests comments are not genuinely sought.	An email response was provided on the 20 December 2019 advising that it was not feasible to extend the review period for the draft SEE and lodgment to 17th of February and informing the EVA that the SEE would be lodged in early January (note: as of the 13th of January – the time to review and comment on draft SEE has been 17 business days or 28 calendar days). The information within cells 58 and 59 re Email response also made mention that the opportunity to formally comment on the DA via the Council's exhibition process remains.
	59	Phone call from EVA president to Premise objecting to the proponent failing to extend the review and response period.	Responded in line with the above.
	60	Discussion with Director Planning at WWCC on 10 January 2020	Council has not yet had time to conduct a meaningful review of the draft SEE and recommends proceeding to lodgment if that is the applicant's preference.

6 IMPACTS

6.1 INTRODUCTION

Pursuant to Schedule 1 of the EP&A Regulation, this section of the report outlines the environmental impacts of the proposed development and any measures required to protect the environment or lessen the harm to the environment.

The impacts have been identified through an assessment of the proposed development against the provisions of section 4.15(1)(b) and the former NSW Department of Urban Affairs and Planning's (nd) *Guide to Section 79C*.

6.2 CONTEXT AND SETTING

The site is located within a zoned primary production area (RU1) of the Eunony Valley; the valley is aligned generally in a north-south orientation with a higher bounding ridge line to the west.

The general locality features the Bomen Industrial Urban Release Area to the north, currently home to an approved 120 MW solar farm (BSF). Further north is the Riverina Oils facility. To the west is the Bomen Business Park featuring a range of industrial land uses.

In the locality, two solar developments have been approved. The BSF, as mentioned above, and the approved Wagga Wagga Solar Farm (WWSFN) to the north of the development site and located within the same lot.

The locality has also been identified by the Department Planning, Industry and Environment as the area of the future Wagga Wagga Special Activation Precinct (SAP). The specific implications of the SAP are not yet clear in the context of future development, however DPIE have advised that the SAP will be delivered through the following measures:

- Fast-tracking planning
- Developing tailored infrastructure investment support
- Conducting government-led studies - includes; environmental reports, master-planning and market analyses
- Leading development
- Providing a business concierge service to support development

By reference to information available on Council's website, it is understood the proposed SAP area currently under investigation affects an area of approximately 4,100 ha, including the 300 ha of the existing Bomen Business Park. The introduction of the SAP, in conjunction with approvals for solar developments in the locality all contribute to a change character of the locality. This changing character is considered to be a key consideration in assessing the context of the proposed development.

The development portion of the host lot, together with unrelated lands to the east, is currently in use for traditional forms of primary production. Smaller lots are scattered throughout the valley in use for quasi large lot residential purposes.

The proposed use of the site as an electricity generating works would not be anticipated to lead to any ongoing impacts that would detrimentally impact on the way of life or operations of nearby properties as demonstrated via the assessment of potential impacts throughout this SEE.

Assessments of potential impact to visual amenity including the potential impact of glare have been prepared to assess the extent, if any, of visual impacts associated with the proposed solar energy system. The assessment of potential impact to visual amenity concludes that the development would not result in any unreasonable impacts – refer **Section 6.3** and **Appendix A**.

The proposed electricity generating works land use is permissible within the primary production zone, has minimal ongoing impacts associated with it and does not preclude, following decommissioning, future use of the site for primary production purposes. The proposed electricity generating works would be generally low scale and would be in keeping with the transitional nature of the character of the land.

Impacts to adjacent land uses would be primarily related to the construction period. Impacts associated with this would be controlled via the methods identified through **Section 6** and would be contained within a CEMP. Subject to the implementation of these controls, it is considered that the development would not detrimentally impact adjacent properties. Due to the nature of the use, on-going operations are unlikely to lead to any detrimental impacts. On project completion, the site would be decommissioned and would be available for use for primary production purposes, with no on-going limitations.

The site is well placed to gain solar access and would not lead to any unreasonable shadowing of adjacent properties.

6.3 VISUAL IMPACTS

Iris Visual was engaged to prepare a visual impact assessment, including glare assessment – refer **Appendix A**.

The assessment has been prepared in accordance with the following guidelines:

- *EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment*, Roads and Maritime Services, 2018
- *Guidance Note for Landscape and Visual Assessment* (GNLVA), Australian Institute of Landscape Architects Queensland, 2018.

6.3.1 Landscape character

In defining the landscape character, Iris Visual note (at Section 4 of **Appendix A**):

> *Surrounding the heavy industrial areas of Bomen the landscape is predominantly rural with a mix of grazing and cropping uses. The landscape character of the areas surrounding Bomen are changing as areas of land zoned General Industrial (IN1) are being transformed from a rural landscape to general industrial development. This area has recently been identified as a Special Activation Precinct by the NSW Government Department of Planning, Industry & Environment. The intention of these precincts is to create jobs, attract investors, and fuel economic development.*
>
> *...*

The site is largely cleared and currently used for sheep grazing. There are some scattered trees across the north and south eastern fields. There are three north south oriented corridors of planted trees within the southern areas of the site. The western most corridor also extends north along the western site boundary.

6.3.2 Visual impact assessment

Seven (7) viewpoints were selected for detailed analysis in the context of visual impacts. The results of the assessment are summarised in **Table 6.1**.

Table 6.1 – Summary of visual impact

Viewing location	Sensitivity	Magnitude of change	Impact
1. View south from East Bomen Road	Low	Negligible	Negligible
2. View southwest from Dunns Road	Low	Low	Negligible
3. View west from Pattersons Road	Low	Medium	Minor adverse
4. View northwest from Oura Road	Low	Medium	Minor adverse
5. View northwest from Bavin Road	Low	Negligible	Negligible
6. View west from Windmill Road	Low	Low	Negligible
7. View southwest from Windmill Road	Low	Low	Negligible

Source: Iris Visual, 2019

Iris Visual note the following:

*In summary, there are several factors which contribute to the **negligible to minor overall visual impact** of the project, these include:*

• Intervening landform screens views from the north and south almost entirely, and northern areas of the solar farm in most views.

• Northern areas of the project would be screened by intervening landform.

• The existing corridors of vegetation extending through the southern and western areas of the site would be retained on the site and would provide some localised screening.

• Some scattered trees would be removed from within the site, however, these trees are not prominent in views from the surrounding areas as they are located mainly on the lower slopes of the site.

• The low-profile development form, visual merging of the panel arrays into blocks, and patches of field being retained. would assist in the visual integration of the project infrastructure.

• The upper fields and rocky outcrops, which are a local visual feature, would continue to be visible.

On the basis of the above, the visual impacts of the proposal are considered acceptable.

It is further noted that landscaping and compensatory planting would be completed to further minimise any residual impacts.

6.3.3 Visual impacts on private residential properties

The planning principles for 'view sharing' provided in the judgement of the NSW Planning Environment court in the *Tenacity Consulting V Warringah Coun*cil [2004}, NSWLEC 140 has been used as the basis for preparing this assessment in the context of visual impacts on private residential properties.

12 receivers within 3 km of the site were selected for detailed assessment. Table 8.1 of **Appendix A** provides a summary of the assessment of potential visual impacts to private residential properties.

In concluding the assessment, Iris Visual note the following:

> *Overall, due to the visual enclosure of the site there are few receptors that would have views to the project. Where a view is possible, the development type is considered to be reasonable in relation to visual compatibility and development expectations of the land uses in the area.*

On the basis of the above, the proposal is considered unlikely to lead to significant detrimental impacts to nearby residential receivers.

6.3.4 Glare Impact Assessment

To identify the risk of glare effects from the project, Iris Visual used the Solar Glare Hazard Analysis Tool (SGHAT 3.0) 'GlareGauge'. This is a glare impact assessment model specifically designed to identify the risk of glare caused by solar farms.

14 observation points were adopted and input into the GlareGauge model for assessment.

As outlined in Table 7-2 of **Appendix A**, all observation points are noted to have nil glare identified.

It has been noted as a result of the community engagement process that a number of receptors have identified glare from the installed galvanised support poles. Galvanised poles are widely used in the solar industry as they represent the most durable and effective form of support structure, with the least potential for degradation over the life of the development.

Discussions with a number of material providers, as well as the experiences of Iris Visual, confirm that galvanised poles patina over time once installed (usually around 6 months). Patina is caused on surfaces as a result of oxidation and results in the shiny appearance of the galvanised posts becoming dull.

The effects of this can be exacerbated in the short period between the installation of the poles and the subsequent installation of the panels (which shield the view of the poles).

Whilst it is accepted that there is the potential for short lived, and short duration periods of glare as a result of the use of galvanised poles, it is considered an acceptable trade off to ensure the durability of the materials adopted.

This short-term impact can be alleviated during construction by ensuring that panels are manually orientated to the west following installation and prior to alignment and commissioning, and away from all surrounding receptors. This would be addressed in the CEMP.

6.3.5 Cumulative Impacts

Iris Visual note with respect to cumulative impacts:

> *The addition of the Wagga Wagga Solar Farm South to views of the approved Wagga Wagga Solar Farm and Bomen Solar Farm would not result in solar farm development visually dominating or transforming the character of this landscape in a way that is not in-line with the planning intentions of the area. This change does not reach a threshold which would result in a cumulative visual impact that is unreasonable.*

6.3.6 Conclusion

On the basis of the analysis completed by Iris Visual at **Appendix A**, it is considered that the visual and glare impacts, and the cumulative visual and glare impacts associated with the development in the locality, is acceptable due to the negligible to low level of impact predicted.

Notably, it is concluded that the:

> *These visual impacts are not considered to be significant as the development type is consistent with planning intentions for this area of Wagga Wagga. These impacts are also expected to be experienced over the medium term and are reversable.* (Iris Visual, 2019, p. 44).

6.4 ACCESS, TRANSPORT AND TRAFFIC

6.4.1 Existing environment

To minimise impacts to the local traffic environment, arrangements would be established to provide legal access for construction traffic via the approved construction access on East Bomen Road associated with the WWSFN. This access was confirmed by the LEC as being an acceptable location, and by adopting this location local residents and road users can expect consistent management measures and impacts. It also reduces impacts to the site through avoiding the need to establish a separate access from Windmill Lane.

East Bomen Road is a local road for which WWCC is the roads authority. East Bomen Road links to Byrnes Road in the west. Byrnes Road provides a north-east/south-west route between Wagga Wagga and Junee. The speed limit along this portion of Byrnes Road is 100 km/hr.

The proposed site is located approximately 7 km north of Wagga Wagga.

Traffic volume data for East Bomen Road is not available.

It is predicted that construction of the WWSFS would occur after the peak construction period for the WWSFN has been completed, meaning that traffic volumes on the road would be consistent or less than those approved in relation to the WWSFN. Byrnes Road has been recently upgraded and has capacity to accommodate the volume of traffic predicted via this assessment in relation to the WWSFS.

6.4.2 Potential impacts

There is the potential for traffic and road safety impacts during the construction period of the solar farm including the following:

- Increased collision risks.
- Damage to road infrastructure.
- Reduction of the level of service of roads.

The construction program assumes 100 workers, attending the site 6 days per week for a total of 26 weeks, dropping to 20 workers for the three month shoulder periods either side.

It is expected that the EPC contractor will look to provide a shuttle bus service for workers. Notwithstanding, for assessment purposes it is assumed that a shuttle service is not provided and

only 30% of the 100 workers would participate in some form of carpooling; resulting in an estimated 70 private light vehicles travelling to and from the site daily for the six (6) month peak period.

An anticipated projection of heavy vehicles is provided in **Table 6.2**.

Table 6.2 – Heavy vehicle numbers

Plant/Equipment	Description	Heavy Vehicles
Modules	594 modules per container delivered on 84 semi-trailers	84
Trackers	3.6 containers per MWdc, inclusive of piles, torque tubes and all associated hardware, delivered on 73 semi-trailers	73
Skid Inverter Stations	5 Skid inverter stations, delivered one per semi-trailer	5
Concrete	Estimated 134 m^3 required for skid inverter based and security fence foundations, delivered in 13 x 11 m^3 concrete trucks	13
Gravel	Estimated 2,443 m^3 (3,176 tonne) required for internal access roads delivered in 42.5 tonne truck & dog trailers	75
Sand	Estimated 1,267 m^3 (2,027 tonne) of sand, delivered on 41 x 50 tonne truck & dog trailers	41
Fencing	Estimated 3,500 m of solar farm fencing, delivered on 3 semi-trailers	3
Miscellaneous	Provision for 4 miscellaneous deliveries (water for dust suppression, etc) per week during the 6-month peak period, dropping to 2 trucks a week for the 6-month shoulder periods	156
Total		**450**

Source: Metka

Heavy and light vehicles would be arriving and departing throughout the peak nine month construction period, with much lower volumes of vehicles during the three month pre and post shoulder periods and peak numbers in the central six month construction period. Construction plant and machinery would be brought to site at the beginning of the construction period and would then stay on site for the duration of construction.

In terms of peak daily vehicle numbers,

- the maximum number of heavy vehicles accessing the site daily, during the peak of the construction period, is not expected to exceed 20 (i.e. generating a total of 40 heavy vehicle movements in a day).
- the maximum number of light vehicles accessing the site daily, during the peak of the construction period, is not expected to exceed 70 (i.e. generating a total of 140 light vehicle movements a day during the six month peak).

Traffic impacts would be primarily limited to the pre-construction, construction and decommissioning periods, with peak periods being morning and afternoons as the construction workforce arrive and depart. Construction is anticipated to occur in one shift only between standard working hours, 7am to 6pm Monday to Friday, 7am to 3pm Saturday. No work would occur on Sundays or public holidays. The decommissioning program is proposed to follow the same general arrangement.

6.4.2.1 Increased collision risks

Heavy vehicle delivery traffic would be anticipated to travel to the site from Sydney in the east via the Hume and then Sturt Highways, before turning north towards the site via Eunony Bridge Road (noting the 54 tonne weight limit on the Eunony Bridge), west along Oura Road before turning north and travelling to the site via Byrnes Road. These roads are all approved for B-Doubles up to 25/26 metres in length.

Eunony Bridge Road intersection with the Sturt Highway features a roundabout and use of this intersection would not lead to any unreasonable increase in conflict due to good sightlines.

The Eunony Bridge Road/Oura Road intersection is a wide T-intersection with good sight lines in both directions. It is not anticipated that there would be any conflicts associated with construction or decommissioning traffic utilising this intersection.

The Oura Road/Byrnes Road intersection is also a wide T-intersection with good sight lines and capable of accommodating B-Doubles up to 25/26 metres. It is not anticipated that there would be any conflicts associated with construction or decommissioning traffic utilising this intersection.

A review of school bus routes confirms that Oura Road, Byrnes Road, Eunony Bridge Road and the Sturt Highway are all school bus routes. Construction traffic movements would be scheduled to occur outside of school bus hours. In addition to this all personnel driving construction vehicles to and from the site will undergo a project induction which will include information on the management of traffic related issues (including school buses and passengers) while travelling to and from the site. A log will be kept at the site entrance detailing all traffic movements to and from the site. A regular review of the log will be undertaken to identify any vehicle movements during school bus hours. These matters would be addressed in detail within the CEMP.

6.4.2.2 Damage to road infrastructure

The increase in traffic and heavy vehicle movement could impact the condition of roads on the haulage network. On the basis that all roads proposed to be used by haulage traffic are certified as b-double routes it is not anticipated that there would be any excessive impacts.

6.4.2.3 Reduction of the level of service of roads

There is the potential for a reduction of the level of service of roads due to 'platooning' of large delivery vehicles on the highways.

6.4.3 Site access

The proposed development seeks to utilise the approved construction access for the WWSFN to avoid providing a separate access location.

6.4.4 Mitigation measures

The CEMP would incorporate a Traffic Management Plan that would include as a minimum the following measures

- Assessment of road condition prior to construction on all local roads that would be utilised;
- Scheduling of deliveries;

- Consideration of bus schedules – i.e., Countrylink and school;
- Procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts;
- Provide a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures;
- Reinstatement of pre-existing conditions, where required;
- Assessment of road routes to minimise impacts on transport infrastructure;
- Scheduling of deliveries of major components to minimise safety risks (on other local traffic including buses);
- Community consultation regarding impacts to bus routes; and
- Traffic controls on site (signage and speed restrictions etc.).

6.5 PUBLIC DOMAIN

6.5.1 Existing environment

The public domain in the site locality is primarily related to the impact to the public roads systems as a result of construction traffic, together with the possibility of impacts to the visual environment.

An assessment of potential impact to visual amenity and glare of the proposed development has been completed and is provided at **Section 6.3** and **Appendix A**. The assessment of potential impact to visual amenity consists of a baseline study and an assessment of visual impact. The baseline study assesses the existing visual character of the area to be impacted, with reviews of the way in which views are experienced in the places from where the development will be visible. Key receptors are identified in this section.

The visual impact assessment defines the expected changes in visual amenity and landscape character for receptors. Consideration is given to:

- Identification of viewpoints where the landscape will be visually altered;
- The extent of the changes to the identified views;
- Sensitivity of viewers for the identified views;

6.5.2 Impacts

There are potential short term impacts to the public domain as a result of construction traffic.

From an operational perspective, impacts are likely to be limited to possible visual impacts associated with the installation of solar panels. The assessment of potential impact to visual amenity concludes that the proposed structures for the project and the changes to landscape character will be generally insignificant for major transport corridors, with transient, interrupted views of the project site.

Given the prevailing topography, a very limited number of residential receptors are expected to experience low visual impacts. This is based on the proportion of the landscape to be affected, vegetative screening, undulating terrain and the insignificance of the height of the proposed structures relative to existing industrial structures.

6.5.3 Mitigation measures

6.5.3.1 Construction

The mitigation measures identified within **Section 6.4.3** are considered sufficient to ensure that the impacts associated with the construction of the proposed plant are adequately mitigated.

6.5.3.2 Operation

Visual impacts associated with the proposed WWSFS are considered to be limited, however it is considered that the siting of the proposal panels together with the proposed landscaping outlined in the Iris Visual **Landscaping Plans** are sufficient to ensure any residual visual impacts are ameliorated.

6.6 SERVICING

6.6.1 Existing environment

6.6.1.1 Site Services

Via the approved WWSFN, the site has access to an approved 66 kV ETL, connecting the substation to the Transgrid Zone substation.

A private water line traverses the site and this would be impacted by the proposal. Realignment of this private line would be carried out in consultation with the line users as required.

6.6.1.2 City Services

The City of Wagga Wagga is a regional centre with the capacity and catchment to provide sufficient workforce numbers to enable the construction of the solar far with minimal likelihood of attracting large numbers of external workers. The range of solar projects approved in the city ensures that sufficient, appropriately trained workers are available to the site.

6.6.2 Impacts

Construction impacts associated with the proposed development would be short lived and would be managed as set down in **Section 6.24** to ensure impacts to services are minimised. Operationally, impacts and demand on services are anticipated to be minimal and can be comfortably accommodated within the capacity of the existing infrastructure on the subject site.

In the unlikely event that the project attracts itinerant workers to the region, there is the potential for additional pressure on services available within the town, including health services, accommodation, school and the like. The development would generate the need for approximately 100 workers for a period of 26-36 weeks.

6.6.3 Mitigation measures

A Construction Environmental Management Plan (CEMP) would be prepared providing detailed information on the mitigation of construction impacts. This would be provided to Council for approval prior to the commencement of any operations on site.

To minimise the likelihood of large numbers of construction workers being required from outside of the Wagga Wagga City catchment the proponent would undertake a local recruitment drive as the primary method of attracting workers, with out of city drives (advertising etc) only being considered in the unlikely event that the demand is not met in Wagga Wagga.

6.7 HERITAGE

6.7.1 Non-Aboriginal heritage

A review of the Wagga Wagga LEP and the state heritage register reveals no sites of non-indigenous heritage within the proposed development site area. **Figure 9** displays the closest mapped heritage items to the site. The nearest items to the site, as identified in Schedule 5 of the LEP include:

Table 6.3 – Nearby heritage items

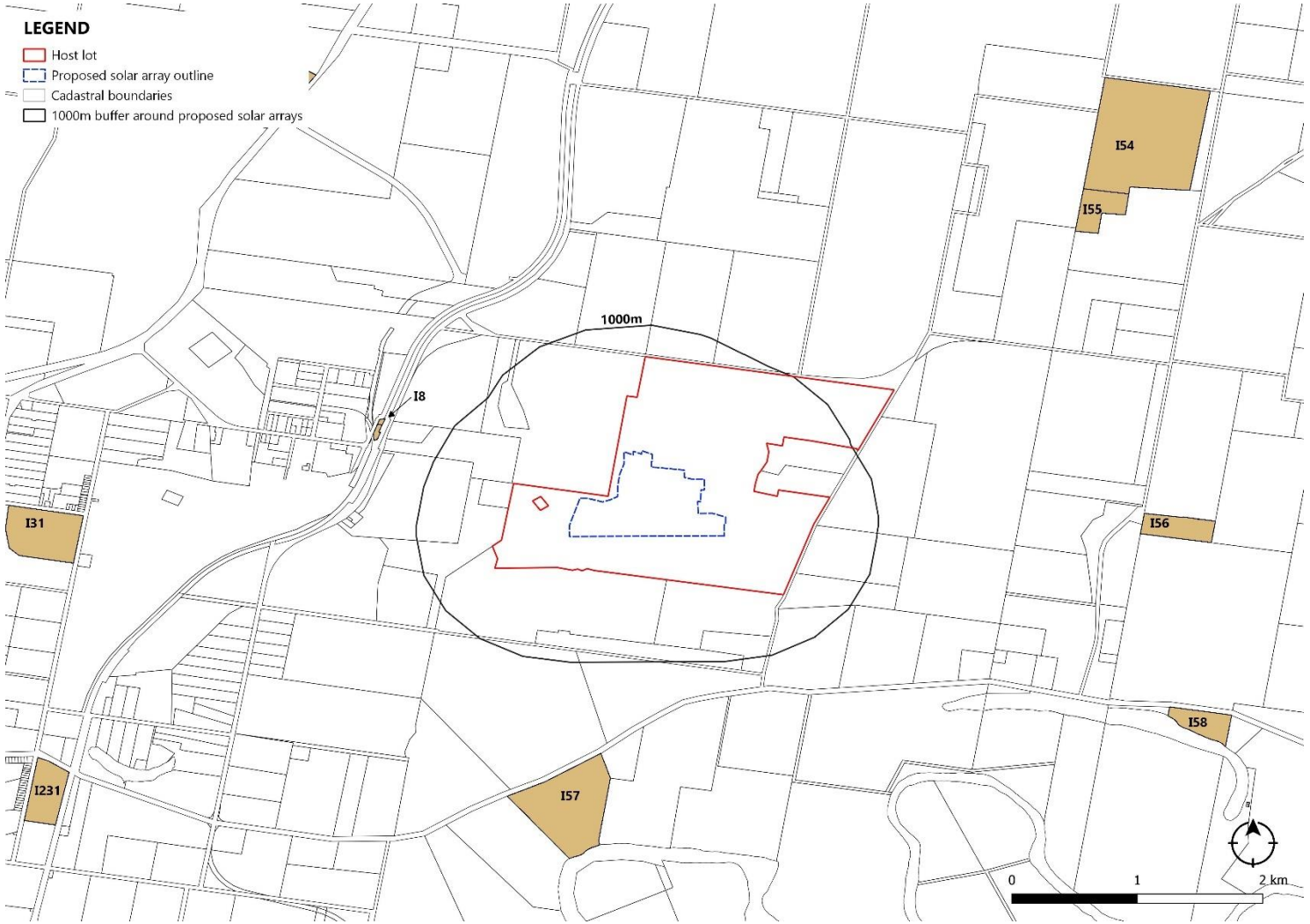
Item	Address	Significance	Distance from site
I8	The Rock-Collingullie Road Collingullie 2650	Local	1000 m west
I31	45 Cooramin St, Cartwrights Hill	Local	3000 m west
I55	47 Shepherds Siding Road, Eunanoreenya	Local	2000 m north-west
I58	158 Pattersons Road, Eunanoreenya	Local	2000 m east
I57	394 Oura Road, Eunanoreenya	Local	1500 m south

Source: Wagga Wagga Local Environmental Plan 2010

Notwithstanding that preliminary searches of the site have not revealed any indications of non-Aboriginal heritage, should any 'objects' or other European heritage features be identified during the course of constructions, work in that area should cease and be cordoned off and the Office of Environment and Heritage and/or a suitably qualified heritage specialist be contacted to discuss how to proceed.

There are no foreseeable adverse potential impacts on the non-indigenous heritage in the area, given the separation distance from the listed heritage items and the site, and therefore no further investigation is required.

Figure 9 – Historic heritage items in locality



6.7.2 Aboriginal heritage

NGH Environmental was engaged to complete an Aboriginal Cultural Heritage Assessment (ACHA) – refer **Appendix B**.

The assessment has been prepared in accordance with the following documents:

- Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW;
- Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW; and
- Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.

6.7.2.1 Archaeological context

NGH note:

> *Based on previous archaeological investigations in the region and knowledge of Wiradjuri cultural practices and traditional activities the proposal area has a possibility of containing archaeological sites, especially given that Aboriginal people have lived in the region for tens of thousands of years. This would most likely be in the form of quartz lithic scatters, isolated artefacts and scarred trees in remnant old growth vegetation areas bordering the proposal area and/or as isolated paddock trees.*

6.7.2.2 Survey and subsurface testing results

NGH note:

> *The results of this survey and subsurface testing program support the modelling for the region that there are sites and artefacts present throughout the landscape but are most common on level or gently sloping low elevations which are near ephemeral watercourses or finite resources. The low density of the surface and subsurface artefacts across the proposal area indicates the low density use of the area with a focus on the spurlines and resource areas, such as the Axe Quarry and the creekline. No direct evidence of longer-term base camps was identified within the proposal area, which is not unusual given the minor nature of the drainage lines within the proposal area compared with the more permanent nature of the creekline assessed in the 2018 ACHA and subsurface testing investigations.*

6.7.2.3 Potential impacts

NGH note:

> *The proposal involves the construction of a solar farm and includes connection to the nearby substation. The development will result in disturbance of approximately 47.7 ha of the 55-ha proposal area.*
>
> *All 13 stone artefact sites identified during this assessment are situated within the area of the proposed solar arrays, tracks and fencing and would be impacted by the proposed development. The impact to the sites with stone artefacts is likely to be most extensive where earthworks occur, such as the installation of cabling, which may involve the removal, breakage or displacement of artefacts. This is considered a direct impact on the sites and the Aboriginal objects by the development in its present form.*
>
> *While the majority of the stone artefact sites are rated as having total loss of scientific value it is argued that there are likely to be a number of similar sites in the local area and therefore the impact to the overall local archaeological record is considered to be low. The stone artefacts have little research value apart from what has already been gained from the information obtained during the present assessment.*
>
> *This information relates more to the presence of the artefacts and in the development of Aboriginal site modelling, which has largely now been realised by the recording. No other values have been identified that would be affected by the development proposal.*

6.7.2.4 Recommendations

NGH make the following recommendations:

1. A minimum 5 m buffer must be observed around the boundary extent of all sites prior to the achievement of the below recommendations.

2. The proponent applies to the Biodiversity and Conservation Division (BCD) within the Department of Planning, Industry and Environment (DPIE) and receives an Aboriginal Heritage Impact Permit (AHIP) to allow harm to the 13 Aboriginal archaeological sites within the additional proposal area for the Wagga Wagga Solar Farm South. The AHIP should be sought for the entire additional proposal area for the Wagga Wagga Solar Farm South.

3. Should the proponent seek to apply for an AHIP, this report must accompany the application, as outlined in the BCD document: Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants.

4. Once an AHIP has been issued the 13 sites within the development footprint, as approved by the AHIP, must be salvaged prior to the proposed work commencing and moved to a safe area within the property that will not be subject to any ground disturbance.

5. The collection and relocation of the artefacts should be undertaken by an archaeologist with representatives from the registered Aboriginal parties and be consistent with Requirement 26 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales. A site impact card will be submitted for each site salvaged and a new site card will need to be completed once the artefacts are buried to record their new location on the AHIMS database.

6. All artefacts recovered from the subsurface testing program currently in temporary care at NGH Wagga Wagga office must be reburied by an archaeologist with representatives from the registered Aboriginal parties and be consistent with Requirement 26 of the Code of practice for Archaeological Investigation of Aboriginal Objects in New South Wales. A new site card will need to be completed once the artefacts are reburied to record their new location on the AHIMS database.

7. No further archaeological investigation or salvage excavation program is warranted or required for the proposal area assessed in this report.

8. If any objects suspected of being Aboriginal in origin are located in areas outside a valid AHIP, work must stop and the BCD notified.

9. The proponent must prepare a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction work. The CHMP would outline an unexpected finds protocol to deal with construction activity. Preparation of the CHMP must be undertaken in consultation with the registered Aboriginal parties.

10. In the unlikely event that human remains are discovered during the development works, all work must cease in the immediate vicinity. BCD and the local police should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal. Should the remain be identified to be Aboriginal in origin BCD would advise the proponent and/or archaeologist on the appropriate Aboriginal parties to contact.

11. Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation. This would include consultation with the registered Aboriginal parties and may include further field survey.

12. The proponent is reminded that it is an offence under the National Parks and Wildlife Act to harm an Aboriginal object without a valid AHIP.

Subject to the above recommendations, it is considered that the proposal may proceed without the likelihood of significant impact.

6.8 OTHER LAND RESOURCES

A review of the Minview online database confirms that there are no mineral titles or exploration licenses affecting the subject land or land near to the site.

A review of the Biophysical Strategic Agricultural Land (BSAL) map confirms the development site is not BSAL land.

As outlined in **Section 6.10**, the development site has a land capability of predominantly class 5, with a small section of class 3. Class 5 land is land with *'severe limitations for high impact land*

management uses such as cropping'. The proposal would not therefore impact on high capability land. It is also noted that the site would return to an agricultural use post the decommissioning of the facility, expected to be at least 30 years from commencement of operation.

As discussed in **Section 6.13.1**, a secondary benefit of the establishment of solar farms on land relates to the carrying out of comprehensive soil testing for the upper 1 metre of the soil structure in relation to geotechnical testing for footing design and other electrical testing. This process is likely to identify soil constraints, which in turn enables application of techniques to ameliorate these impacts, such as lime application, gypsum spreading, deep loosening and nutrient application. An improvement in soil assessment and management following conversion to solar farms almost certainly will lead to an improvement in soil conditions for plant growth. The roots and fungi associated with diverse and vigorous pasture assist with soil aggregation and carbon sequestration.

On balance, the proposal would not result in the loss of any significant land resources, and the project has the potential to improve soil conditions on the site in the context of future primary production use of the land following decommissioning.

6.9 WATER

6.9.1 Existing environment

6.9.1.1 Surface Water

The site is traversed by a number of first and second Strahler stream order waterways and there is one farm dam within the development footprint – refer **Figure 10**.

The site lies in the Murrumbidgee Catchment Management Area, within which the Murrumbidgee River is the largest river. The site is located approximately 4 kilometres to the north of the river. The Murrumbidgee River flows from the Snowy Mountains in the East along a 1,600 kilometre length until joins with the Murray River near Balranald.

The City of Wagga Wagga is situated on the southern bank of the Murrumbidgee with North Wagga Wagga and Bomen on the northern side. The river, at its closest point, has an AHD of between 180-190 metres. Official records of river heights have been maintained since 1897 and estimated records of rivers over 8.23 metres are available since 1844.

Since the first records of rural settlements in the region, reports of flooding have been common.

After the 1956 floods Council developed levee bank protection of the City area on the south flood plain. The main commercial areas has seen levee production and upgrades in 1960s, 1970's and 1983. Temporary levees around North Wagga Wagga, first built in the 1930's, were formalised as a 1 in 20 year in 1990.

The Revised Murrumbidgee River Floodplain Risk Management Study and Plan 2018 provides flood mapping for a range of predicted flood events, including the 1% AEP event. This mapping confirms that the development site would not be impacted by inundation in the 1% event – refer **Figure 11**.

Figure 10 – Surface water features

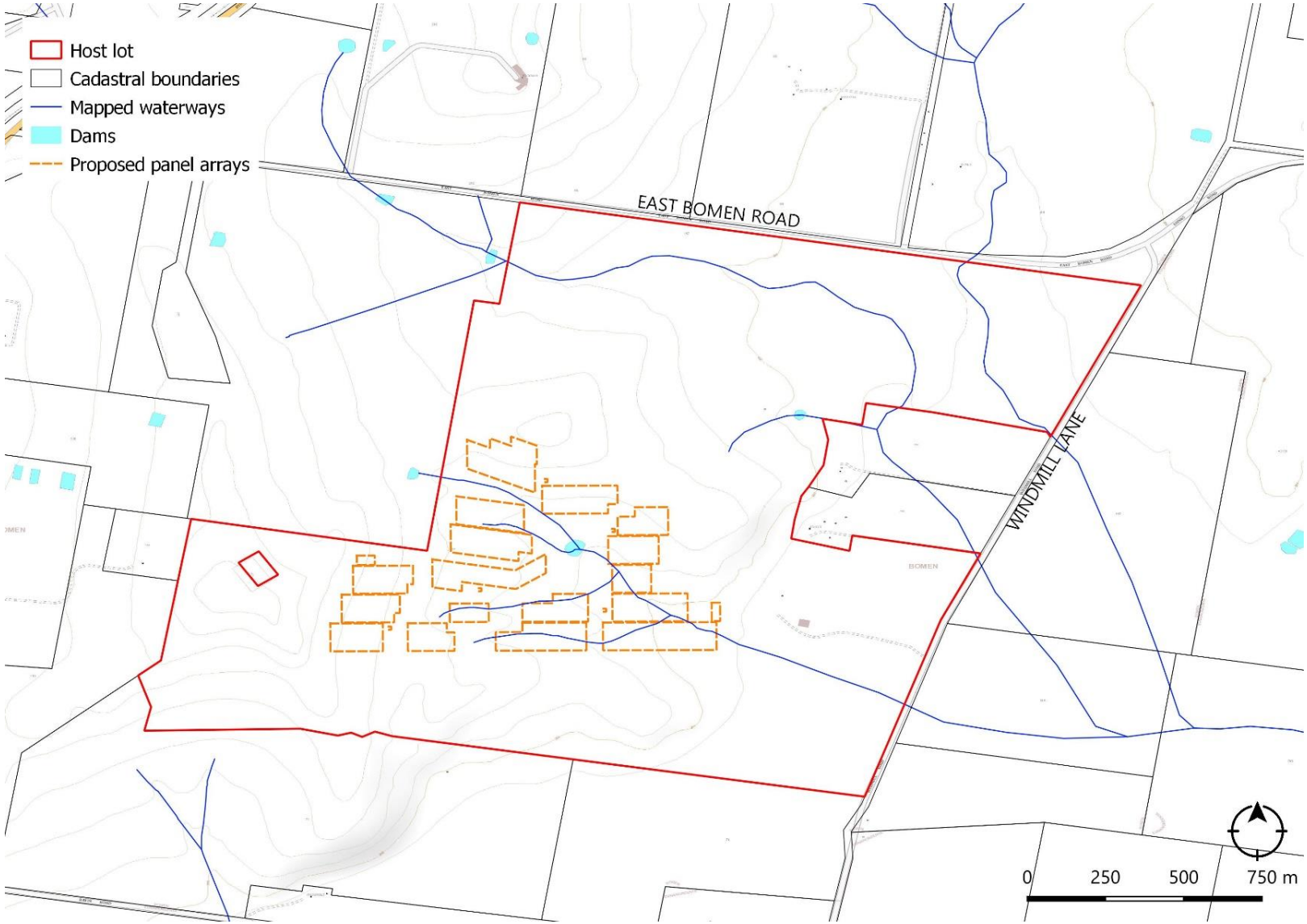
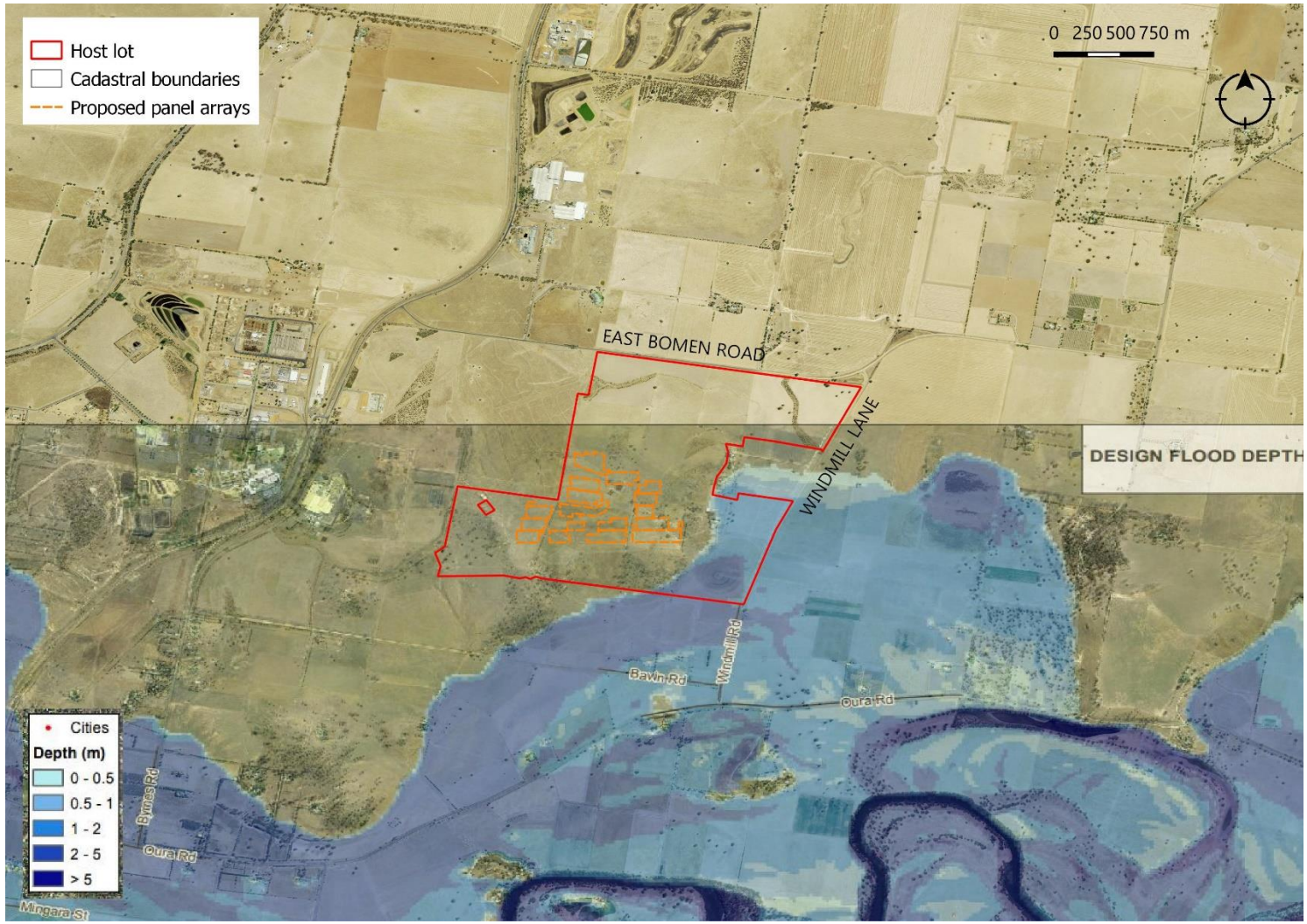


Figure 11 – Flooding – 1% AEP flood event



6.9.1.2 Groundwater

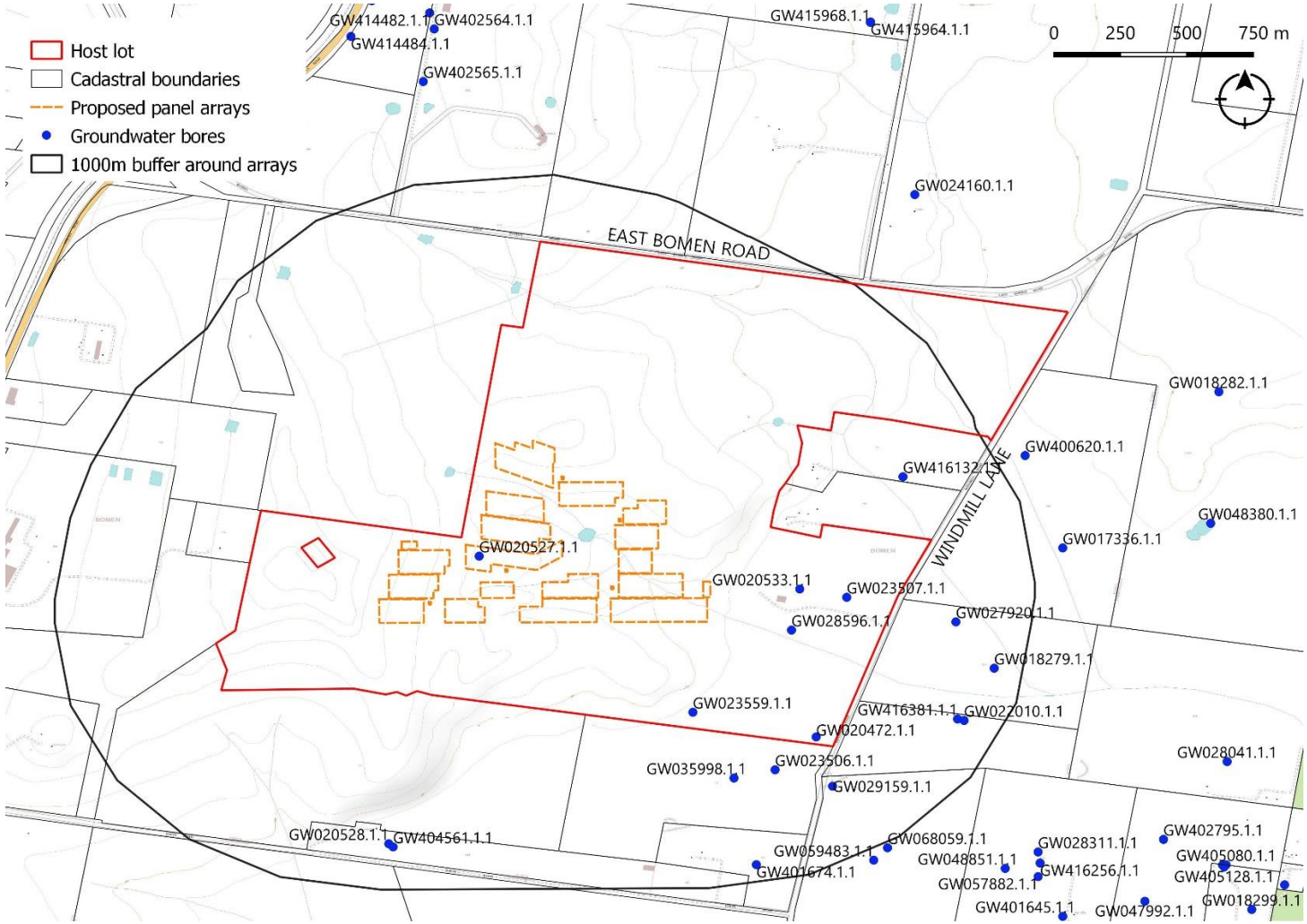
A review of the NSW Atlas data of Groundwater Bores for the site locality was undertaken and identified one bore with the development footprint and a further 5 bores within the host lot. Within 1,000 metres of the site there are a further 10 registered bores – refer **Figure 12**. The details of the bore logs are provided in **Table 6.4**.

Table 6.4 – Groundwater bores

Bore Number	Bore Function	Standing Water Level
GW020527	Stock	Unknown
GW020533	Stock	5.50
GW023507	Irrigation	6.70
GW028596	Irrigation	6.40
GW023559	Stock	4.90
GW020472	Stock	8.20
GW023506	Stock	7.00
GW035998	Stock, domestic	Unknown
GW029159	Stock	Unknown
GW401674	Stock, domestic	7.310
GW404561	Stock, domestic, farming	Unknown
GW020528	Stock	6.70
GW416381	Irrigation	4.20
GW022010	Stock, irrigation	6.10
GW018279	Stock, irrigation	5.20
GW027920	Stock, domestic	Unknown

Source: Water NSW: https://realtimedata.waternsw.com.au/

Figure 12 – Groundwater



6.9.2 Potential Impacts

Given the largely passive nature of operations, impacts to the local surface and groundwater environments in relation to ongoing operations is considered to be limited.

Construction impacts to surface waters are possible in relation to site clearing and levelling and development of the site have the potential to impact surface waters through sedimentation. These impacts are discussed in further detail in **Section 6.16** and in **Appendix D**.

The Premise hydraulic impact assessment concludes that the proposal would not result in adverse flood impacts to neighbouring properties and infrastructure.

Construction impacts to groundwater are possible but of a low likelihood; potential impacts would likely relate to spills of chemicals or fuels. Clearing of trees can impact groundwater via the rise of saline groundwater through the soil profile, however as compensatory plantings at a rate of 10 to 1 is proposed for the maximum 17 trees to be removed, it is not considered that this is likely for the subject site.

No water is proposed to be extracted from groundwater sources for construction purposes.

6.9.3 Mitigation Measures

A soil and water management plan would form part of any CEMP and would address practises around stockpiling and clearing measures. The SWMP would incorporate as a minimum the measures outlined in **Section 6.10**.

6.10 SOILS

6.10.1 Existing Environment

The site is located predominantly within the Glenmornon soil landscape, with a small area in the south-east of the development site within the East Bomen landscape – refer **Figure 13**. The Soil Landscapes of the Wagga Wagga 1:100,000 Sheet (DLWC, 1997) describes the soils of the Glenmornon as shallow to moderately deep (40-100 cm) Mesotrophic Red Kandosols. The East Bomen soil landscape is described as comprising shallow to moderately deep Eutrophic Red Dermosols on crests and ridges, deep Eutrophic Red Dermosols on slopes and moderately deep Eutrophic Brown Dermosols in drainage lines.

Soil fertility in both landscapes is noted to be low with soils in the unit being strong to slightly acid. Nutrient status is generally very low in top and subsoils.

The site is located within the Wantabadgery Granit geological landscape with Silurian to Llandovery (S-type, mafic, unfractionated) with granite and granodiorite.

The topography of the site is sloping with a generally south-easterly aspect.

Soil capability at the development site is predominantly class 5 with a small portion of class 3 – refer **Figure 14**.

Figure 13 – Soil landscape

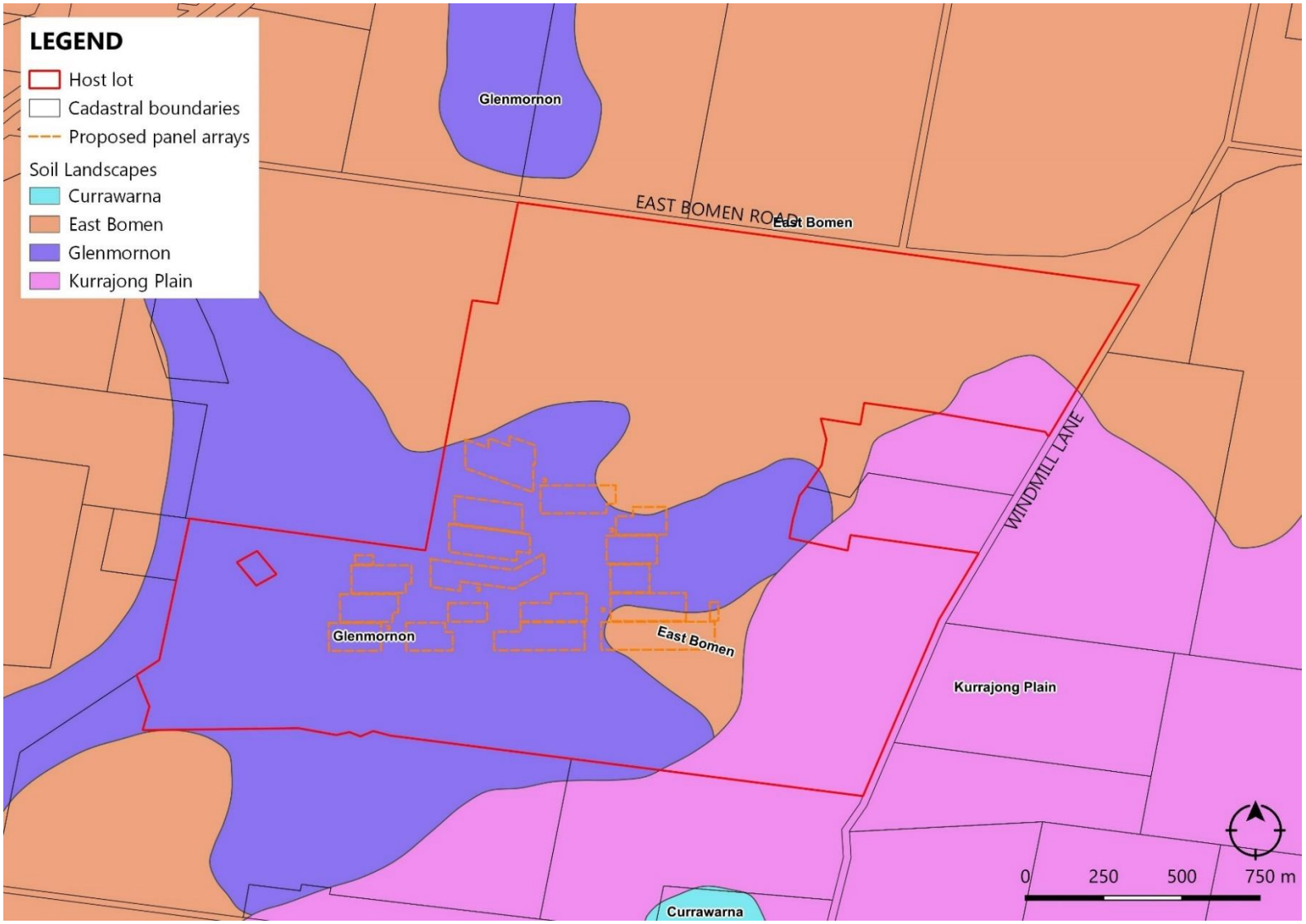


Figure 14 – Soil capability

6.10.2 Potential Impacts

Primary impacts to the soil environment are related to construction and decommissioning activities, which have the potential to cause soil erosion and the potential for sedimentation on site.

Soil erosion could potentially occurring during the shaping of the land to accommodate the solar arrays, the excavation of footings or trenching for underground cables. An analysis has been conducted of the extent of bulk earthworks necessary to facilitate the development – refer **Premise Civil Drawings C001-C003**. This has influenced the site layout design to avoid the more steep and undulating sections of the site. Across the site, disturbance of site is limited to a maximum extent of cut and fill of 1.5 metres, with this being the exception in a number of areas. For the majority of the site, cut and filling is limited to no more than 1 metre. Careful design has ensured that the carrying out of bulk earthworks ensures a balance of materials, meaning that the need to export excess cut off-site, or bring in fill from off site, is not required. This assists in minimising the number and frequency of vehicles needing to visit the site during the initial enabling works phase of the development.

Development of maintenance and access roads could lead to soil compaction, including decreasing permeability and increasing run-off. This has been assessed via a detailed hydraulic impact assessment, attached as **Appendix D**, and discussed in further detail in **Section 6.9**.

Driving support poles for the solar arrays could compact and disturb soils but in general footprints would be small and impacts minimal.

Dust is likely to be generated by on site activities and dust suppression measures would be necessary to minimise impacts associated with this.

Positive impacts associated with the proposal would be the capacity for the resting of the soil profile during the operation of the solar farm, with commensurate benefits to the local soil environment. this is further discussed in **Section 0**.

6.10.3 Mitigation Measures

A CEMP would be prepared and would incorporate, but not be limited to, the following specific mitigation measures:

- Dust would be minimised using the following means:
  - A water cart (truck) would be utilised routinely, wetting all access roads and exposed dusty surfaces as appropriate to the conditions of the project site.
  - Stockpiled topsoil and other materials that exhibit significant dust lift off would be wet down routinely, as required.
  - Stabilising techniques and/or environmentally acceptable dust palliatives would be utilised if the wetting down of surfaces prove to be ineffective.
  - A Trigger Action Response Plan (TARP) would be prepared as a component of the preparation of the CEMP, which would include management measures for normal, level 1 and level 2 weather conditions;

- Erosion and sedimentation impacts associated with soil disturbance from the above activities can be minimised by undertaking such works in accordance with provisions of the Managing Urban Stormwater: Soils and Construction series, in particular:
  - Managing Urban Stormwater: Soils and Construction, Volume 1, 4th edition (Landcom 2004), known as 'the Blue Book'.
  - Volume 2A Installation of Services (DECC 2008a).
  - Volume 2C Unsealed Roads (DECC 2008b).

6.11 AIR AND MICROCLIMATE

The subject site is located within the South Western Slopes Bioregion. The bioregion is dominated by a sub-humid climate characterised by hot summers and no dry season (environment, 2011).

Given the proximity to the city of Wagga Wagga air quality is expected to be impacted by traffic fumes, commercial and industrial practises, as well as agricultural practises from the surrounding region. Emissions from nearby operations such as the Riverina Oils and Bioenergy plant, located to the north of the site, as well as various industrial land uses in the existing Bomen Industrial Estate to the west, are anticipated. The nearby industrial estate is home to a number of varying industrial and commercial operations, including scheduled (ie. EPA licenced) premises for activities such as concrete works, general chemicals storage, recovery of hazardous and other waste, metal waste generation, non-ferrous metal production, general agricultural processing, waste storage (hazardous, restricted solid, liquid, clinical and related waste and asbestos waste), recovery of waste oil, petroleum products and fuel production, petroleum products storage, saleyards, sewage treatment processing, slaughtering and processing animals, and rendering and fat extraction.

A review of available climate information on the Australian Bureau of Meteorology website identifies that the locality receives an average of 571.5 mm of rainfall per year with the wettest months being July and October and the driest months being February and April.

The average hottest month is January with an average day time temperature of 31.9 degrees and the average coolest month is July with an average day time temperature of 12.8 degrees.

The closest weather station providing historical averages for wind direction is the Wagga Wagga AMO (Wagga Wagga Airport) site (Site number 072150) located at an elevation of 212 metres and approximately 9 kilometres south-east of the subject site.

9am and 3pm wind roses are provided as **Figure 15** and **Figure 16.**

Figure 15 – 9am Wind Rose

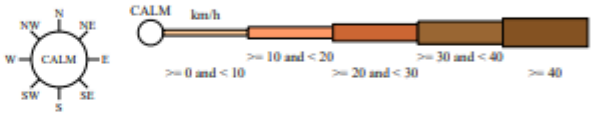
Rose of Wind direction versus Wind speed in km/h (18 Aug 1941 to 11 Aug 2019)

Custom times selected, refer to attached note for details

WAGGA WAGGA AMO

Site No: 072150 • Opened Jan 1941 • Still Open • Latitude: -35.1583° • Longitude: 147.4575° • Elevation 212m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
28230 Total Observations

Calm 20%

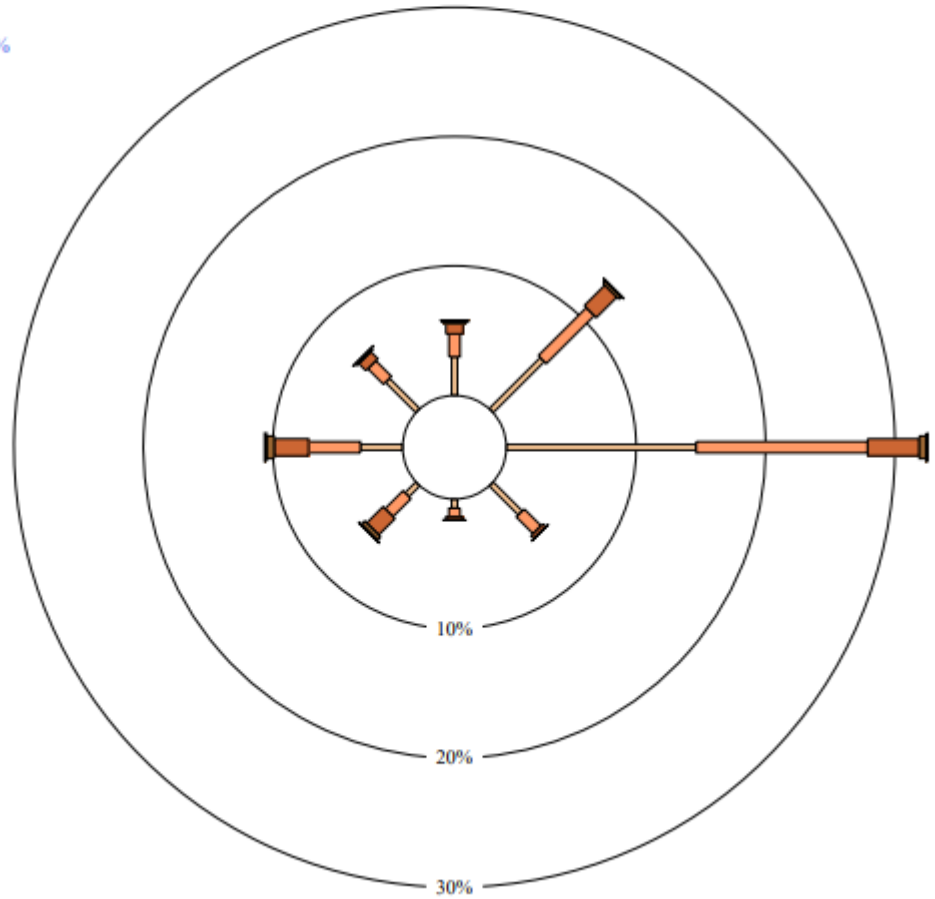
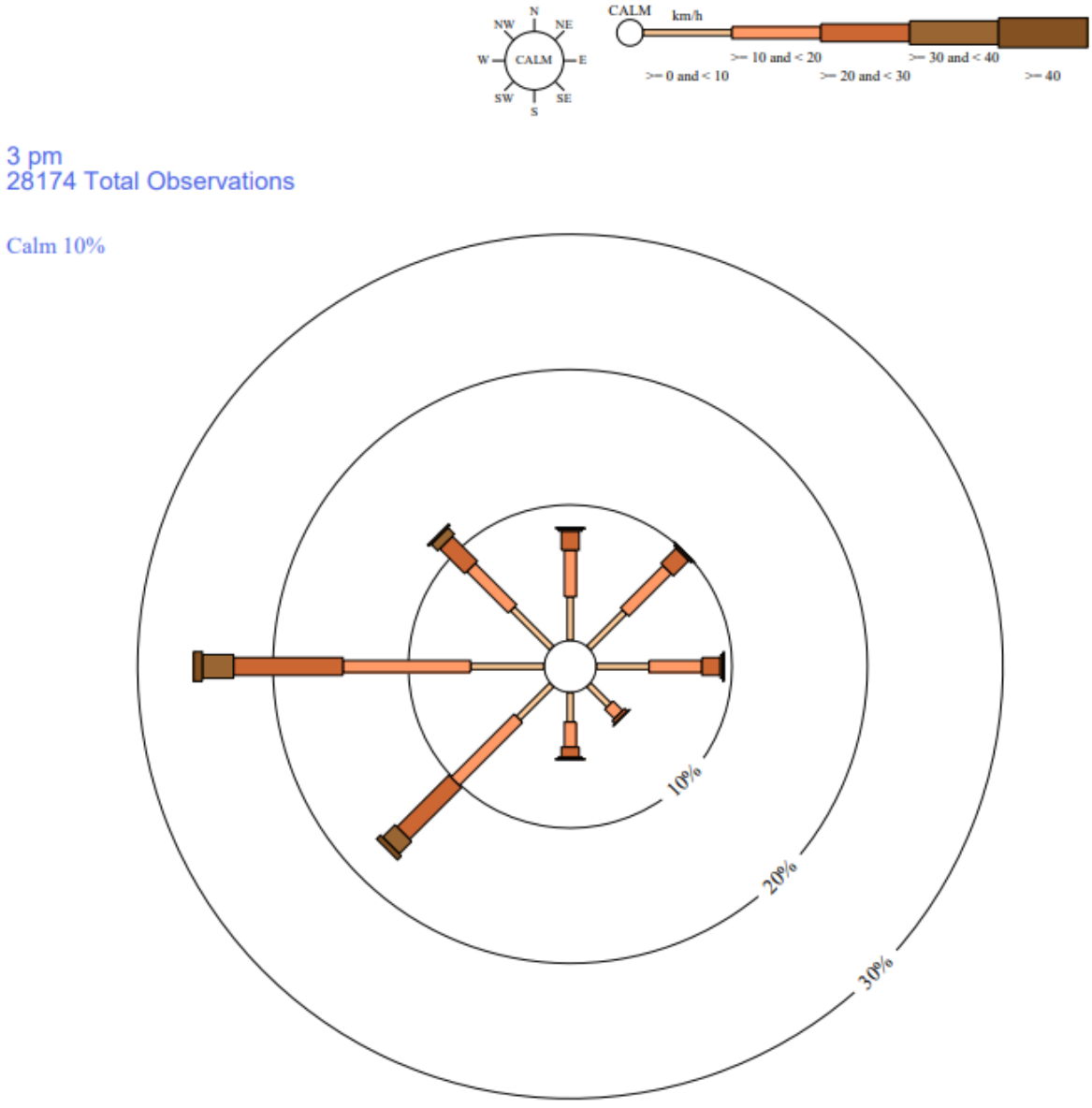


Figure 16 – 3pm wind rose

Rose of Wind direction versus Wind speed in km/h (18 Aug 1941 to 11 Aug 2019)
Custom times selected, refer to attached note for details
WAGGA WAGGA AMO
Site No: 072150 • Opened Jan 1941 • Still Open • Latitude: -35.1583° • Longitude: 147.4575° • Elevation 212m
An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



6.11.1 Potential impacts

Primary air quality impacts associated with the development relate to the construction and decommissioning phases of the solar farm, and would include dust generation resulting from excavation, earthworks and vehicle movements. Air quality impacts associated with construction and decommissioning of the development are considered manageable via the application of the mitigation measures provided in **Section 6.11.2**.

The development is not anticipated to result in any negative air quality impacts during the operational phase. Minor impacts associated with movement of maintenance vehicles would be negligible.

Via the reduction in greenhouse emissions relating to the adoption of the solar energy generating source, overall air quality impacts associated with the development would therefore be positive.

There is the potential for cumulative impacts associated with air quality, primarily associated with the construction of the approved WWSFN and the approved Renew Estate Bomen Solar Farm to the north of East Bomen Road.

The WWSFN is due to commence construction in early 2020, while the Bomen Solar Farm is currently under construction with an anticipated construction completion date in 2020.

Based on the current known schedule of construction associated with these developments, there is considered to be a low likelihood of construction for all three, or even two of the, operations occurring at the same time. As a result, cumulative impacts to air quality associated with the construction of these three developments is unlikely to result in a significant detrimental impact to the air quality in the locality and region.

6.11.2 Mitigation Measures

The CEMP would incorporate measures and protocols to minimise dust generation during the construction period. Specific measures would include but not be limited to:

During construction and decommissioning

- A water cart (truck) would be utilised routinely, wetting all access roads and exposed dusty surfaces as appropriate to the conditions of the site.
- Stockpiled topsoil and other materials that exhibit significant dust lift off would be wet down routinely and as appropriate.
- Stabilising techniques and/or environmentally acceptable dust palliatives will be utilised if the wetting down of surfaces prove to be ineffective.

During operation

- Any area that was temporarily used during construction would be restored back to original condition or re-vegetated with native plants.
- Areas that may not have been hard packed but have been disturbed in some form would be vegetated with seeds native to the area.

6.12 FLORA AND FAUNA

6.12.1 Introduction

NGH Environmental was engaged to prepare a biodiversity assessment – refer **Appendix C**.

The assessment has been prepared by reference to the statutory obligations of the *Biodiversity Conservation Act 2016* (BC Act).

6.12.2 Background review

NGH completed database searches to identify threatened species, populations and ecological communities known to occur, with the potential occur, within 10 km of the site. The following tools were used:

- *NSW Bionet Atlas database for species, populations and communities listed under the NSW BC Act and Commonwealth EPBC Act.*
- *Commonwealth Protected Matters Search Tool for threatened species and communities listed under the EPBC Act.*
- *Office of Environment and Heritage Interim Biogeographic Regionalisation (IBRA) search by region (Inland Slopes and Lower Slopes) and habitat (Western Slopes Grassy Woodlands) for threatened species and communities listed under the BC Act.*
- *Other background searches undertaken were:*
    - *NSW Government Biodiversity Values Map and Threshold Tool*

A full list of species considered to have the potential to occur on the site or within 10 km are outlined in Section 4.1.1 of **Appendix C**.

6.12.3 Field survey

Two NGH ecologists completed field survey of the site on the 5 April 2019, to assess the biodiversity values of the site.

During field survey, a total of 40 flora species were recorded, comprising 15 native and 25 exotic species. A full list of species is provided in Appendix D.2 of **Appendix C**.

One Plant Community Type (PCT) was identified, being PCT 277: Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion. PCT277 is listed as endangered under the BC Act.

No priority weeds were noted as occurring within the site.

Thirty-four hollow bearing trees were identified, five of which are stags.

No threatened fauna was identified via the field survey.

6.12.4 Existing Environment

6.12.4.1 Flora

NGH note:

> *Remnant vegetation remaining in the locality is comprised of scattered and isolated paddock trees. The native vegetation communities remaining are isolated patches of open grassy woodlands. This vegetation type largely reflects the underlying geology and land use of the region. Open, grassy woodlands occur across a diversity of geologies however are usually found on the slopes or valleys of more deep and fertile soils.*
>
> *The proposal area occurs in an undulating terrain which has been heavily cleared for agricultural purposes. Narrow linear plantings of native species occur along paddock boundaries. The proposal area has been largely cultivated or has experienced pasture improvement.*

In the context of the BC Act, Section 6.8(3) notes that the impacts of clearing of category 1 – exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013*) are excluded from any

assessment. NGH provided an assessment of the land to the Biodiversity Conservation Division who agreed that a significant portion of the affected site is category 1 – exempt land, refer Figure 4-2 of **Appendix C**, reproduced below as **Figure 17**.

The site accommodates 1.46 ha of PCT277 (remnant) and 1.8 ha of planted PCT277. The majority of this would not be impacted by the application, with clearing impacts limited to 0.475 ha.

Figure 17 – Category 1 – exempt land within the development site

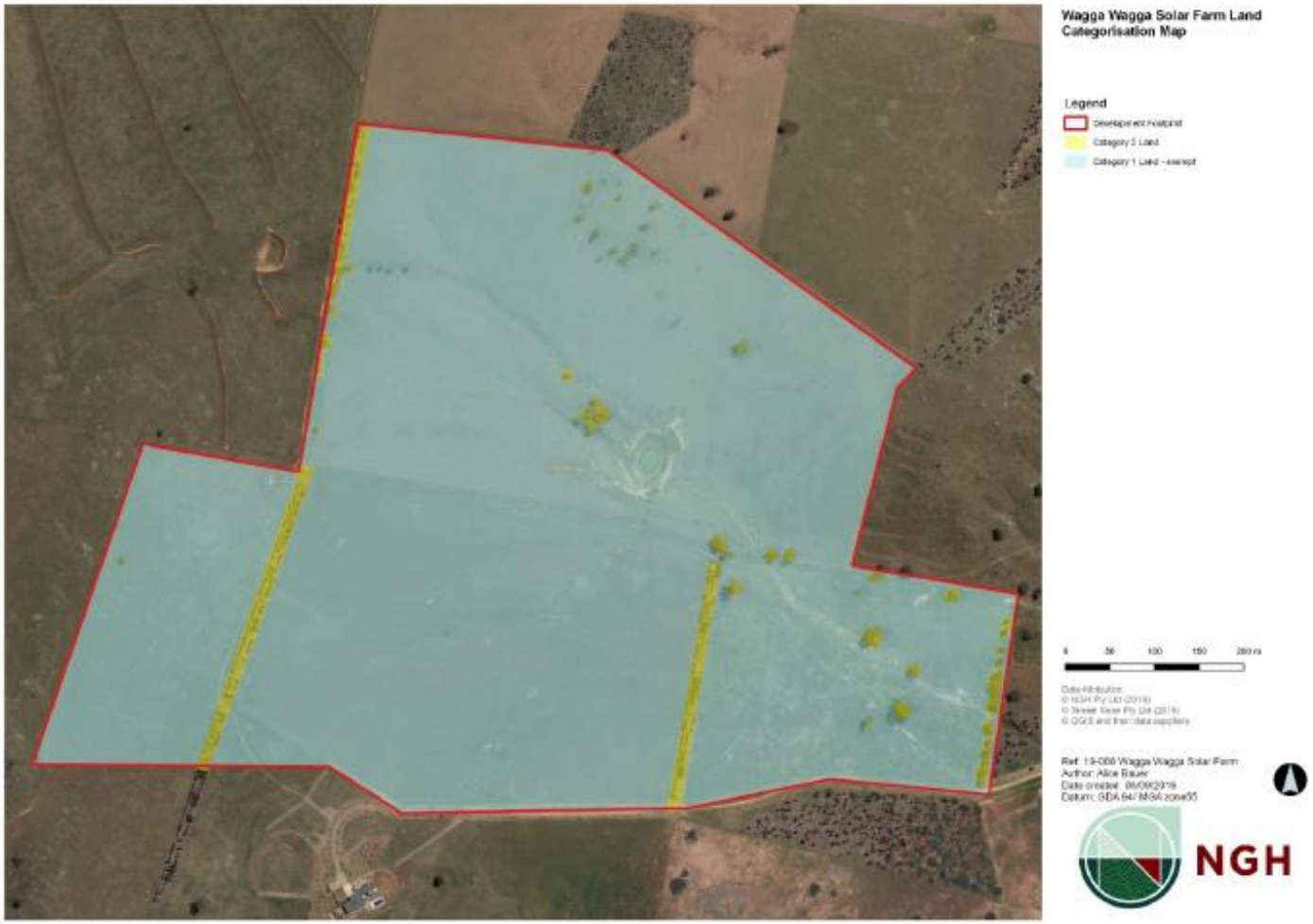


Figure 4-2 Land categorisation map.

6.12.4.2 Fauna

Whilst no listed fauna was detected during the field survey, 19 fauna species and one endangered ecological population listed under the BC Act have the potential to occur within the proposal area.

A full list of the threatened species identified through these searches with further description is available in Appendix B1 and Appendix B2 of **Appendix C**.

6.12.5 Impact assessment

The proposal would result in the loss of 0.475 hectares of vegetation, including six trees, together with additional 8 isolated native paddock trees (two stags and six living trees). It is noted that the NGH assessment identifies a total of 17 trees to be removed, however as design has been refined, three stags (dead trees) in the northern extent of the site have since been identified for retention. This reduces the number of isolated trees to be removed to eight and total trees to 14. To be conservative, the assessment retains the maximum figure of 17 trees however, as noted, this is expected to be reduced to 14 as a result of the project refinement.

No impacts to aquatic habitat are predicted.

Assessments of significance have been completed for a range of threatened species, ecological communities and populations due to impacts on potential habitat including foraging, roosting and nesting habitat, provided in Appendix C of **Appendix C**. The assessments of significance conclude that a significant impact is unlikely.

As the extent of clearing of native vegetation is less than the applicable clearing threshold (in this case 1 hectare by reference to the 100 ha mapped minimum lot size) a Biodiversity Assessment Report (BDAR) is not required.

6.12.6 Mitigation measures

A range of mitigation measures are recommended by NGH at Section 6 of **Appendix C**. These safeguards are a tool to assist with minimising the impacts on biodiversity during operation and construction. These matters would be incorporated into a construction and operational management plans.

In addition to the mitigation measures recommended by NGH, it is also proposed to provide on-site landscaping at a ratio of 10 trees for every one tree removed – refer **Landscaping Plans at Appendix A**.

6.13 MICROCLIMATE

In addition to the detailed assessment set out in **Section 6.12,** which considers the impacts of the proposed development in the context of the provisions of the *Biodiversity Conservation Act 2016*, we note that the question of the potential for the proposed development to impact on the microclimate of the site has arisen during community and Council engagement.

The substance of the matter is whether the change to shading conditions as a result of the introduction of the panels impacts on the types of species making up groundcover and whether the extent of groundcover is impacted.

The second aspect of the question with respect to microclimate is whether the introduction of the panels result in changes to local ambient temperatures.

These two matters are discussed below.

6.13.1 Groundcover

Subject to appropriate controls and revegetation as part of the construction program there is the ability to establish and retain a healthy groundcover under a solar farm. Provided below are photos illustrating the presence of groundcover under the panels of solar farms in Australia.

Plate 1: Mount Majura Solar Farm, near Canberra, operational since October 2016.

Plate 2: Mount Majura Solar Farm.

Plate 3: Mount Majura Solar Farm: note provision of stock trough (foreground left) to enable grazing for groundcover management.

Plate 4: Clare Solar Farm, immediately post construction.

Plate 5: University of Queensland's Gatton Solar Farm. Sheep graze full time. Operational since March 2015.

Plate 6: Manildra Solar Farm

A healthy groundcover provides competition for weeds. With the financial return on the land linked to passive solar generation rather than grazing or cropping, there will be an enhanced capacity to retain groundcover at all times. Similarly, in comparative terms, a solar farm has less recurring soil disturbance than cropping.

The nature of the tracking technology adopted, being the use of moving solar panels, means that as the tracking technology rotates from east to west during the day, a band of sunlight moves across the entire surface area of the site. This shading is considered to provide benefits to groundcover including less water loss via evaporation and a reduction in soil carbon loss; the rate at which soil organic matter decomposes and releases CO_2 declines as soil temperature is lowered. It is considered likely that, in years with favourable soil moisture conditions in Spring, the shading from panels may slow down plant growth, relative to unshaded pasture. However, the stored soil water not used at that time would allow pasture to continue to grow strongly in early summer when the soil usually is too dry for optimal plant growth. The overall impact is therefore negligible.

A secondary benefit of the establishment of solar farms on land relates to the carrying out of comprehensive soil testing for the upper 1 metre of the soil structure in relation to geotechnical testing for footing design and other electrical testing. This process is likely to identify soil constraints, which in turn enables application of techniques to ameliorate these impacts, such as lime application, gypsum spreading, deep loosening and nutrient application. An improvement in soil assessment and management following conversion to solar farms almost certainly will lead to an improvement in soil conditions for plant growth. The roots and fungi associated with diverse and vigorous pasture assist with soil aggregation and carbon sequestration.

6.13.2 Temperatures

There have been a range of studies completed around the world to investigate the claim that the installation of solar farms result in changes to the microclimate around developed solar farms.

In Australia this included unattended monitoring completed by Assured Monitoring Group at a constructed solar farm operating in regional Queensland – refer **Appendix F**. This entailed the taking measurements at distances of 1 m, 10 m, 30 m and 100 m from the outer most edge of the solar farm. Two alternate monitoring instruments were utilised. Each temperature sensor consisted of a calibrated thermocouple connected to a data logging system with measurements set to be taken at 5-minute intervals.

Analysis of the two monitoring instruments demonstrated no statistically significant difference in temperature variance from 1 m to 30 m from the solar farm.

Research was conducted reviewed to determine whether there was any evidence to support a theory that the development of a solar farm would result in the increase in ambient temperatures, sometimes referred to as the photovoltaic heat island effect (PVHI). In Australia, a detailed assessment was completed by Greg Barron-Gafford on behalf of Neon Australia Pty Ltd relation to consideration of proposed solar farms in Greater Shepparton by the Victoria Planning Panel – refer **Appendix F**. The report entitled *Statement of Evidence by Greg Barron-Gafford* concluded that while solar farms can create a PVHI, that effect is spatially constrained and can be effectively addressed through the co-location of vegetation and the installation of landscaping around the site. The assessment found that beyond a distance of 30 metres from the panels, negligible impacts to local ambient temperatures were noted. This was accepted by the Victorian Planning Panel Report.

The measures outlined via the proposed Landscaping Plans at **Appendix A** provide sufficient levels of landscaping to assist in ameliorating minor residual impacts.

6.14 WASTE

6.14.1 Solid Waste

Solid waste is one of the key outputs of construction. The following solid waste types are likely to be generated by construction activities:

- Packaging materials;
- Building materials;
- Scrap metal;
- Excess soil;
- Plastic and masonry products;
- Vegetation from clearing.

Waste generated through the construction phase would be removed from the site and either recycled or disposed of at an appropriate waste disposal facility.

6.14.2 Mitigation Measures

A waste management plan would form part of the CEMP and would seek to minimise waste and maximise opportunities for recover and reuse.

- solid, liquid and gaseous wastes and litter?
- the generation, collection, storage and disposal of waste?
- recycling and composting waste?
- vermin controls and contaminants such as pathogens and bacteria?

6.15 EFFLUENT DISPOSAL

Effluent disposal would be limited to provision of short term services to service the construction workforce. Transportable services would be provided and emptied by suitable contractors. These would be removed at the completion of the construction period.

6.16 STORMWATER

Premise has prepared a hydraulic impact assessment of the site to determine the likely impact associated with the development of the site for the purposes of a solar farm in the context of site hydrology. Specifically, the parameters of the assessment are to determine whether the proposed changes to the site levels to accommodate the solar farm, the proposed introduction of site infrastructure and the proposed changes to groundcover by comparison to the current primary production use of the land would impact on site hydrology and off site flows.

The analysis confirms that some impacts to hydrology are likely to occur but that these would not result in off-site impacts and would in fact reduce the impact of flooding in relation to current site infrastructure; modelled flows would have an increased separation to site buildings to the south-east of the proposed solar farm development site.

6.17 NOISE & VIBRATION

Assured Environmental were engaged to complete an operational and construction noise and vibration impact assessment – refer **Appendix E**.

The assessment has been prepared by reference to the following applicable NSW policies and guidelines:

- NSW Noise Policy for Industry (NPfI) (EPA, 2017)
- NSW Assessing Vibration: a technical guideline (DEC, 2006);
- NSW Road Noise Policy (DECCW, 2011); and
- Interim Construction Noise Guideline (DECCW, 2009).

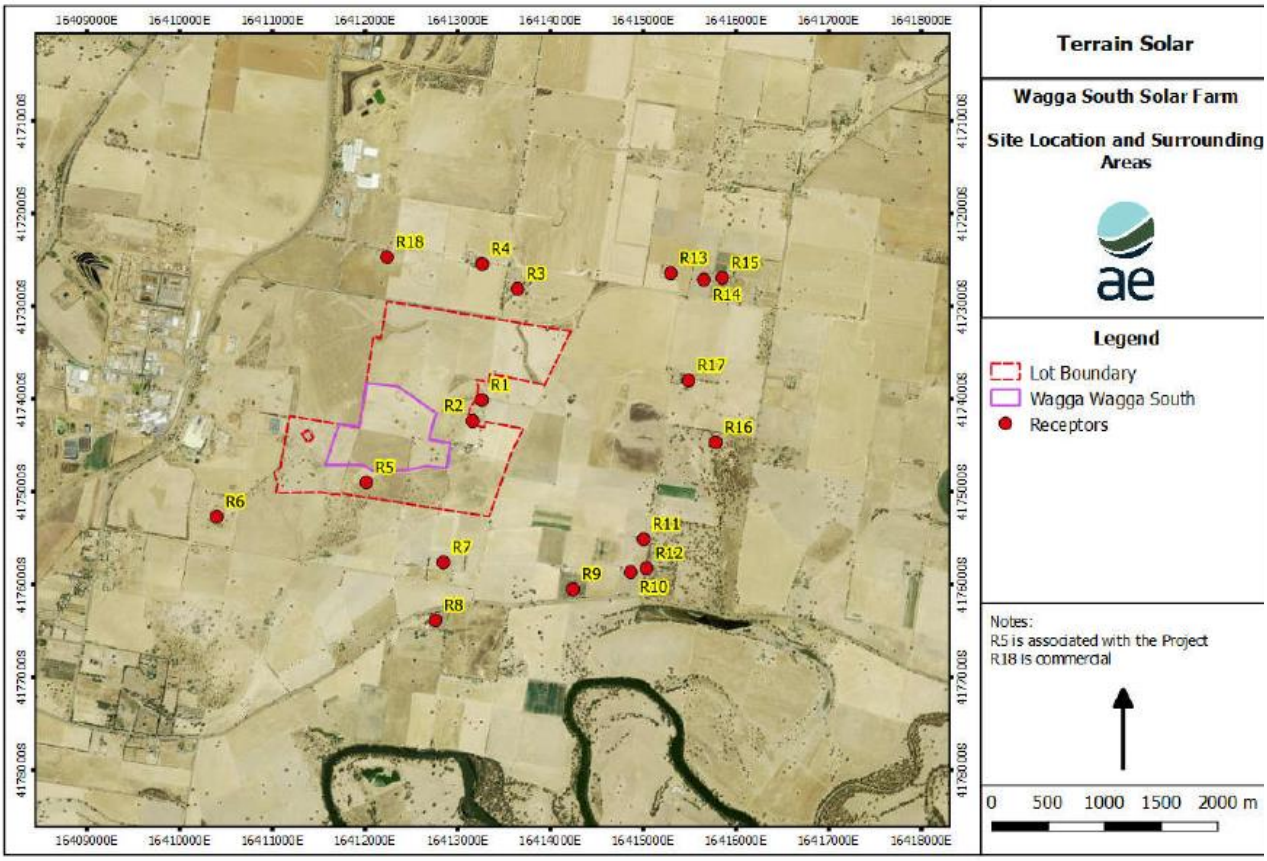
6.17.1 Existing noise environment

There are 17 potentially sensitive receptors located within 3 kilometres of the project that are considered to have the potential to be impacted. One of these 17 receptors (R5) is located on the subject site and is related to the project. There is also one commercial receptor.

Table 3 of **Appendix E** provides a summary of the distance of each receptor from the proposed solar panel arrays and the proposed inverter locations. The closest dwelling is R5 (the related receptor), at a distance of 170 metres from the closest panel array and 290 metres from the closets proposed inverter. The next closest receptors are R1 and R2, at 450 and 360 metres respectively from the panel arrays and 620 and 510 metres from the nearest proposed inverter. The next closest receptor to the panels and inverters is R7 at a distance of 880 metres from the proposed panel arrays and 1,020

metres from the closest proposed inverter. Receptor locations are reflected in Figure 1 of **Appendix E**, reproduced below as **Figure 18**.

Figure 18 –Receptor locations



6.17.2 Applicable Criteria

For the purposes of the construction phase, the applicable noise criteria adopted for the project is as per the EPA *Noise Policy for Industry 2017* (NPfI), being the rating background level (RBL) plus 10 dB during recommended standard hours (Table 5 of **Appendix E**). Outside of standard hours, the criteria is the RBL plus 5 dB. The RBL for the project is determined by reference to the NPfI as being 40 dB(A) during the daytime, 35 dB(A) during the evening and 30 dB(A) during the night time period.

Vibration during construction is assessed the criteria identified by the DECCW *Assessing Vibration: A Technical Guide (2006)* and is outlined in Tables 19 and 20 of **Appendix E** and reproduced below as **Figure 19**.

Figure 19 – Vibration criteria

Table 19: Continuous & Impulsive Vibration Criteria for Residences – Peak Velocity

Location	Vibration Type	Preferred Limit (mm/s)	Maximum Limit (mm/s)
Residences	Continuous	0.28	0.56
Residences	Impulsive	8.6	17

Table 20: Intermittent Vibration Criteria for Residences

Location	Assessment Period	Preferred Value ($m/s^{1.75}$)	Maximum Value ($m/s^{1.75}$)
Residences	Day-time	0.20	0.40

Road traffic noise during construction is assessed against the criteria outlined in the NSW Road Noise Policy (RNP). This is outlined in Table 17 of **Appendix E** and reproduced in **Figure 20**.

Figure 20 – Road traffic noise criteria

Table 17: Applicable Road Traffic Noise Criteria

Road Category	Type of Project & Land Use	Assessment Criteria
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	Day: $L_{Aeq,1\ hour}$ 55 dB(A) Night: $L_{Aeq,1\ hour}$ 50 dB(A) (external)
Freeway / arterial / sub-arterial road	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	Day: $L_{Aeq,15\ hour}$ 60 dB(A) Night: $L_{Aeq,9\ hour}$ 55 dB(A) (external)

For the purposes of the assessment of operational impacts, the applicable noise criteria (described as the project trigger level) is outlined in Table 11 of **Appendix E**, reproduced below as **Figure 21**.

Figure 21 – Project trigger level

Table 11: Determining Project Trigger Level

Type of Receiver	Time of Day	Standardised $L_{Aeq,\ 15\ min}$ Noise Level (dB)		
		Intrusiveness Criteria	Project Specific ANL	Project Trigger Level
Residential	Day	40	45 + 3 = 48	40
	Evening	35	40 + 3 = 43	35
	Night	35	35 + 3 = 38	35
Industrial	Day	- a)	65 + 3 = 68	68
	Evening	- a)	65 + 3 = 68	68
	Night	- a)	65 + 3 = 68	68

a) Intrusive Nosie levels are only applied to residential receivers. For all other types ANL are used.

6.17.3 Assessment

6.17.3.1 Construction

An assessment of construction impacts has been completed for all residential receivers, including the related received at R5. Subject to the adoption of standard construction hours, all receivers are compliant with the adopted criteria.

A range of available mitigation measures are also recommended to further reduce any residual risks. These would be adapted into the CEMP.

6.17.3.2 Vibration

The predicted vibration levels in relation to construction demonstrate compliance with the adopted criteria for locations at a separation distance of 50-60 metres. All nearby residential receivers are greater than 60 metres from the proposal and would therefore be unaffected by vibration impacts.

6.17.3.3 Road traffic noise

Based on the modelled assessment within **Appendix E**, compliance is predicted at the nearest residential receivers with respect to the adopted road traffic noise criteria.

6.17.3.4 Operation

Modelling of the proposed operation of the solar farm has been conducted in relation to 16 nearby, unrelated residential receivers. The modelling indicates compliance with the adopted criteria for all residences. It is noted that non-compliance is predicted for R5, being the land owner of the property. As they are related to the project and agreement is in place relating to operational noise, it is not considered that this non-compliance is problematic.

6.17.3.5 Cumulative impacts

The noise modelling assessed the cumulative impact of site preparation and installation works are occurring at the same time.

Cumulative noise impacts associated with external noise sources the project are considered to primarily relate to impacts during the construction phase in association with the development of the BSF and the approved WWSFN. It is

6.17.4 Conclusion

AE make the following conclusions and recommendations with respect to noise and vibration impacts associated with the project:

> *Metka propose to construct a the WWSFS on one land parcel (Lot 15 in DP1108978). The impact assessment has considered the potential for adverse impacts resulting from noise (site clearing and installation construction phases, road traffic and operational) and vibration (construction) emissions on nearby residential uses.*
>
> *The assessment of potential noise impacts has considered both construction during standard hours and outside standard hours. Based on the results of the assessment, acceptable noise amenity impacts can be achieved throughout the construction works where appropriate management controls are implemented including:*
>
> *• Limiting noise generating construction activities to standard construction hours except where an acceptable acoustic solution can be identified to minimise adverse amenity impacts on Receptors R1, R2, R5 and R7;*
>
> *• To manage noise levels from the mulching machine, it is recommended that the mulcher is located as far away from receptors as possible and shielded by a temporary noise barrier if practical.*
>
> *• High noise levels at R5 are predicted to occur during the installation phase are driven by the piling activities. It should be noted that the sound power level used for the piling activities is 107 dB(A) excluding a tonality correction. Receptor R5 is located approximately 170 m from the development boundary. As noted previously, this receptor is associated with the Project, despite this it is recommended that prior to piling activities consultation with the residents should be undertaken.*
>
> *• If possible, procure piling rigs with a maximum SWL of 107 dB(A), however if this is not possible and consultation with receptor R5, which is associated with the Project) confirms unacceptable noise levels, piling activities should be managed such that when piling within 500 m of the boundary, only one rig is operational at any one time and piling must not occur for more than three (3) hours at any one time, with a minimum of one (1) hour break during standard construction hours.*
>
> *• Consultation with landholders throughout the construction process to inform them on the duration and timing of potentially noisy activities;*
>
> *• Using broad-band reversing alarms on all mobile plant and equipment;*
>
> *• Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine;*
>
> *• Select quieter items of plant and equipment where feasible and reasonable.;*
>
> *• Operating plant in a quiet and efficient manner;*
>
> *• Reduce throttle setting and turn off equipment when not being used; and*
>
> *• Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.*
>
> *For the operational phase of the project, adverse amenity impacts are considered unlikely given the proposed layout and design of the facility.*
>
> *Overall, based on the results of the assessment, the risk of adverse impacts as a result of the proposed WWSFS is considered to be low and complies with all applicable criteria. Hence, from an acoustic perspective, the proposed development site is considered acceptable for the proposed use.*

6.18 NATURAL HAZARDS

6.18.1 Bushfire

The site is not mapped as bush fire prone via the Council's bush fire prone land map.

A detailed discussion of managing fire risk is provided in **Section 6.18.1.1**.

6.18.1.1 Mitigation Measures

Introduction

Measures to be implemented to avoid, minimise and be in a position to effectively and safely manage potential risks and hazards associated with the development include consultation with both the NSW Rural Fire Service (RFS) and Fire and Rescue NSW (FRNSW):

- during detailed design;
- during construction; and
- prior to commencement of operations (ie. export of electricity into the grid);
- during operations.

Detail on the intent, scope and outcomes of these consultations is provided below.

Detailed Design

As detailed design progresses, equipment suppliers selected, and the solar farm infrastructure layout is refined, it is proposed to consult with both the RFS and FRNSW. The intention of this consultation will be twofold.

1. To provide detail on the technology proposed and the proposed farm layout to allow (if necessary) design refinement to incorporate any specific requirements the RFS/FRNSW may have.
2. To provide the requisite information that will be needed to prepare an Emergency Response Plan (ERP).

In terms of design principles to minimise risk, the farm layout will be designed to:

- provide a defendable space around infrastructure;
- ensure that appropriate access, egress and manoeuvrability within the solar farm is provided for first responders;
- provide for ongoing management and maintenance of bush fire protection measures; and
- ensure that services are adequate to meet the needs of firefighters.

Construction

- Prior to construction commencing contact will be made with the Local Brigade of the RFS and details about the construction schedule, contact numbers and site access arrangements will be shared.
- Two (2) 10 kL tanks, being Static Water Supplies dedicated exclusively for fire-fighting purposes, will be located strategically around the site and appropriately plumbed for the duration of construction.
- The fuel load over the site prior to and during construction will be monitored and reduction measures implemented as required. These measures will be restricted to mechanical slashing or stock crash grazing.
- The following work practices would be implemented throughout construction:
  - No burning of vegetation or any waste material would take place on site;

- Fire extinguishers will be available in all vehicles;
- During the bushfire season (October to March) the fire danger status would be monitored daily (through the RFS website *http://www.rfs.nsw.gov.au*) and communicated to personnel;
- Total Fire Ban rules will be adhered to. That is, Metka (and any of its contractors) will not:
    - (in any grass, crop or stubble land) drive or use any motorised machine unless the machine is constructed so that any heated areas will not come into contact with combustible matter;
    - carry out Hot Works (eg. welding operations or use an angle grinder or any other implement that is likely to generate sparks), unless the necessary exemption from the RFS Commissioner has been obtained and work complies with all requirements specified in the exemption; and

- Any fuel or flammable liquid would be stored in a designated area and will be sign posted "Fuel Storage Area."
- A register will be maintained that confirms the quantities and location of any flammable material stored on-site.

Prior to Operations

The WWSFS is located within an RFS Fire District. Notwithstanding, in the event of a significant fire event (either within the WWSFS site or in close proximity to the solar farm), FRNSW will either assist the RFS or fulfil the role of designated combat agency. Either the RFS and/or FRNSW would be first responders.

Should a fire occur during the operational life of the WWSFS it is recognized as important that the first responders have ready access to information which enables effective and safe control measures to be rapidly implemented.

Given the potential for electrical hazards associated with an energy generating facility, and potential risks to firefighters, both FRNSW and the RFS must be able to implement effective and appropriate risk control measures when managing an emergency incident in order to safely mitigate potential risks (including electrical hazards and venting electrolyte) to firefighters.

The detail required to prepare this plan will be contingent on the equipment proposed and the farm layout and services. These features would have been communicated to and refined in consultation with both RFS and FRNSW during detailed design. As such, the operator of the WWSFS will have had the information required to prepare an Emergency Response Plan (ERP) prior to commencement of operations (ie. export of electricity into the grid).

Emergency Response Plan

The ERP will address foreseeable on-site and off-site fire events and other emergency incidents (eg. fires involving solar farm infrastructure and equipment, bushfires in the immediate vicinity).

The ERP will detail the appropriate risk control measures that would need to be implemented in order to safely mitigate potential risks to the health and safety of firefighters, including electrical hazards. These measures would include the level of personal protective clothing required to be worn, the

minimum level of respiratory protection required, minimum evacuation zone distances and a safe method of shutting down and isolating the solar farm (either in its entirety or partially, as determined by risk assessment). The ERP would also include any other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the farm.

Two copies of the ERP would be stored in a prominent *Emergency Information Cabinet* located in a position directly adjacent to the site's main entry.

The operator of the WWSFS would then make contact with the relevant local emergency management committee (LEMC) and provide a copy of the ERP.

During Operations

Unmanaged grasslands can create a bushfire risk hazard. The performance measure for managing the bushfire risk will be to operate the WWSFS and maintain the site in such a manner that no grass fire originates from within the WWSFS site, and/or any approaching bushfire does not intensify as a consequence of entering the WWSFS site because of excessive fuel loads.

The fuel load over the WWSFS property will be constantly monitored and fuel load reduction measures implemented as required. These measures will be either mechanical slashing or crash grazing (sheep). Procedures for ensuring this outcome and demonstrating active management of the fuel load will be specified in the OEMP.

Hazard reduction burning is not proposed.

6.18.2 Flooding

The south-east corner of the host lot is mapped as being impacted by the 1% AEP flood (refer **Figure** 11) however the proposed development site is not within this mapped area.

A hydraulic impact assessment of the development of the proposed solar farm is provided at **Appendix D** and confirms that changes to off-site flows as a result of the project are not anticipated.

6.19 TECHNOLOGICAL HAZARDS

No significant quantities of dangerous goods are proposed to be stored at the WWSFS site during operation. There is the potential for holding small quantities of various products (pesticides, hydrocarbons etc) during construction, however these quantities would be very low and would be appropriately managed and stored to mitigate risk. Spill kits would be kept on site and spill management protocol incorporated into the CEMP.

6.19.1 Electromagnetic radiation

Electric and magnetic fields (EMF) are produced naturally as well as by human activity. The earth has both a magnetic field, produced in the earth's core, and an electric field, produced by electrical activity like storms in the atmosphere. Electrical equipment of all sizes and voltages produces EMF. Both fields drop away rapidly with distance from the source, or due to shielding by insulation or earth (in the case of buried installations).

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has issued *Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields*. The relevant authority in Australia

is the Australian Radiation Protection and Nuclear Safety Agency (ARPNSA) and they refer to the ICNIRP guidelines. These supersede earlier guidelines published by National Health and Medical Research Council (NHMRC).

The ICNIRP EMF guidelines provide relevant limits for the general public for 50 Hz sources as follows:

- Electrical Field Strength (E): 5 kilo Volts per metre (kV/m)
- Magnetic Flux Density (B): 200 micro Teslas (μT)

EMF increases with voltage and proximity to the apparatus producing, transmitting or consuming electricity. EMF varies according to specific design and construction parameters such as conductor height, electrical load and phasing, and most importantly, whether the conductors are overhead or buried.

On the site of the WWSFS the various EMF generating components would be the PV panels (1000-1500 V DC), the interconnecting buried cables (400 V), the direct to AC inverters (1000 V DC to 400 V AC), step up transformers to 33 kV AC and the buried 33 kV cables in the collection system.

The WWSFS would propose to connect to the already approved substation in the WWSFN. Utilising the existing substation rather than building a new facility would ensure that there would not be any significant change in EMF generation levels in the local environment than already approved. Whilst the substation is already approved, it is noted that the substation will not produce a significant electric field outside its boundary because of screening provided by the perimeter fence. Equipment inside the substation will produce magnetic fields, however the field falls with distance quite rapidly, and at the perimeter fence or a few metres outside it, the magnetic field from inside the substation is usually approaching background levels. The largest magnetic fields round the perimeter of the substation almost certainly come from the overhead lines and underground cables entering it[1].

Similarly, the ETL connecting to the TransGrid substation would be utilised. Again, this ensures that levels of EMF emanating from the site are minimised rather than adding further infrastructure and generating additional levels of EMF.

Underground cables produce magnetic fields only as the electric field is shielded by the earth and is not detected at ground level. Above ground equipment will produce both magnetic and electric fields.

UK National Grid demonstrate that the magnetic field levels emitted from a 66 kV substation are well below the relevant limit identified above at all locations in and around the substation.

Figure 22 shows typical electric fields emitted by a 66 kV overhead line. The figure shows that even the maximum magnetic field level is less than 3 kV/m immediately under the line which is well under the ICNIRP EMF guideline limit of 5 kV/m.

Figure 23 show the range of comparative magnetic field levels measured by the ARPANSA around powerlines compared to inside homes. The existing and proposed overhead powerlines are less than the recommended 200μT limit even if directly underneath the powerline.

[1] http://www.emfs.info/sources/substations/substations-ng

Figure 22 – Typical Electric Field Limits (EMF, 2017)

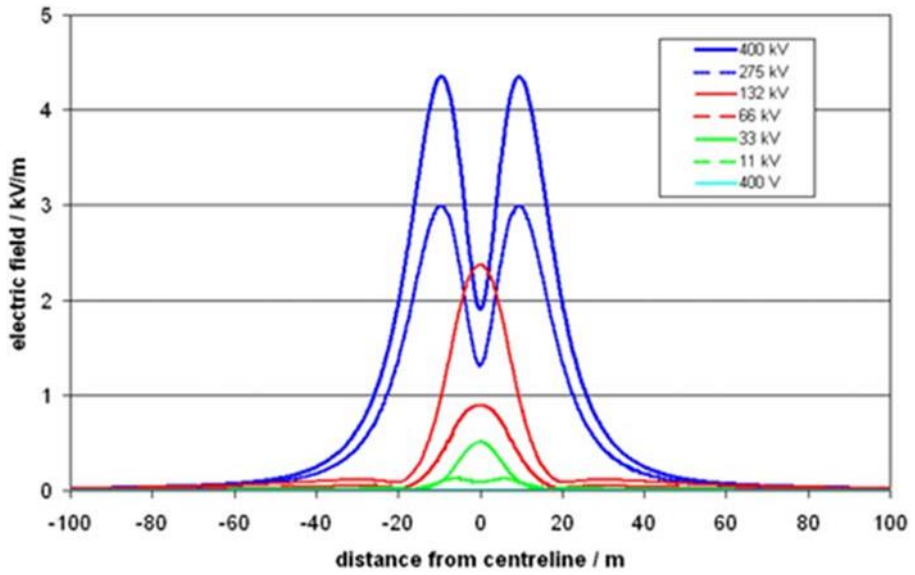
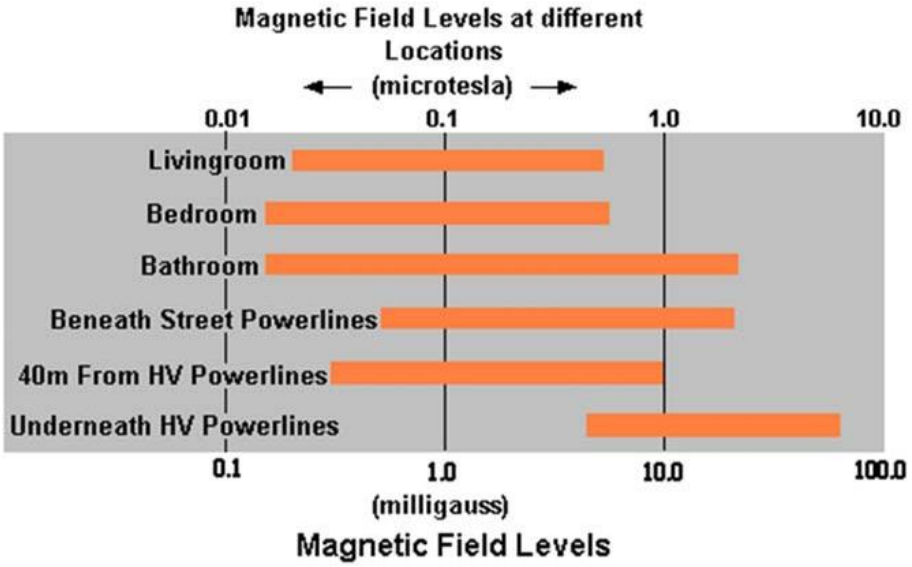


Figure 23 – Typical Magnetic Field Levels (ARPANSA, 2015)



The WWSFS will be operated as a commercial power generation facility. It will not be open to the general public. The closest unrelated house is located in excess of 500 m distant from the electrical equipment, and at that distance EMF emission levels will be no higher than what currently exist. Workers on the site will be appropriately trained notwithstanding that emission levels are extremely low.

6.20 SAFETY, SECURITY AND CRIME PREVENTION

The guidelines prepared by the NSW Department of Urban Affairs and Planning (DUAP 2001) identify four (4) Crime Prevention Through Environmental Design (CPTED) principles to be considered in a Development Application to ensure developments do not create or exacerbate crime risk. These principles are discussed below in relation to the proposed development and include: surveillance, access control, territorial reinforcement, and space management.

6.20.1 Surveillance

The site would be largely passive with minimal on-going operational works necessary. The site would be monitored from a security perspective via regular site visits and maintenance undertaken as required.

6.20.2 Access Control

The site would be externally fenced including locked gates to limit access.

6.20.3 Territorial Reinforcement

The use of the space would be telegraphed via minimal on site signage to ensure that the use of the site is clearly understandable to the public.

6.20.4 Space Management

The site would be regularly inspected and maintained to ensure that any degradation of facilities is corrected in a timely fashion.

6.21 SOCIAL IMPACT

As defined by the NSW Government Office on Social Policy, social impacts are significant events experienced by people as changes in one or more of the following are experienced:

- peoples' way of life (how they live, work or play and interact with one another on a day-to-day basis);
- their culture (shared beliefs, customs and values); or
- their community (its cohesion, stability, character, services and facilities).

6.21.1 Existing Environment

At the 2016 census the population of Bomen was listed as 25 people and formed of 11 private dwellings. Conversely the population of Wagga Wagga (Urban Centre) was listed as 48,263, while the LGA has a population of 62,385.

The median age is slightly lower than for the state of NSW (35 v 38) and is very similar to the whole of NSW in terms of its breakdown between male and female. The most common ancestries are Australian 31.7%, English 29.2%, Irish 10.5%, Scottish 7.9% and German 3.9%.

Of the employed people in Wagga Wagga, the largest proportion (4.6%) worked in Defence. Other major industries of employment included Hospitals 4.5%., Higher Education (3.1%), social assistance services (2.4%) and Secondary Education 2.4%.

Unemployment is below the state average of 6.3% and the national average of 6.9% at 5.5%.

6.21.2 Potential Impacts

The potential social impacts of the development have been considered in terms of the social characteristics of the area based on available statistical data, and qualitative assessment of how many people may be impacted by the development.

Of the 16 potentially sensitive unrelated residential receivers within 2 km of the subject site, the sites located closest are approximately 510 and 620 metres from the site; all other sites are ≥ 1 km from the site.

Through carrying out community engagement, it is clear that the perceived social impacts to nearby residents include visual, traffic and noise among others (refer **Section 5**). There matters are addressed in **Sections 6.3, 6.4 and 6.17**. Via those assessments it is demonstrated that these impacts are limited and manageable. All matters raised during community engagement are directly addressed in **Table** 5.2.

6.22 ECONOMIC IMPACT

Economic benefits associated with the development would be the generally positive through encouraging development in the locality, including supplying local employment opportunities.

6.23 SITE DESIGN AND INTERNAL DESIGN

The design and layout of the site has been carefully considered taking account of existing on site constraints, site attributes and opportunities offered by the existing infrastructure.

The lack of opportunities for overlooking minimise the likelihood of visual impacts to the public domain and surrounding properties.

Landscaping would form an important part of the overall development (refer **Landscaping Drawings at Appendix A**).

6.24 CONSTRUCTION IMPACTS

Construction activities associated with the proposed development are not perceived to have any adverse impact on the environmental quality of the land by way of land degradation, soil quality or natural water bodies. Other negative externalities such as noise, traffic and material impacts on adjoining land.

A summary of controls and mitigation measures outlined throughout Section 5 are provided in **Table** 6.5. These measures would be incorporated into a CEMP.

Table 6.5 – Summary of Construction Impacts and Mitigation Measures

Impacts	Mitigation Measures	Reference
Access, Transport and Traffic: - Increased collision risks. - Damage to road infrastructure. - Reduction of the level of service of roads.	- Assessment of road condition prior to construction. - Traffic controls. - Scheduling of deliveries. - Consideration of bus schedules. - Implement procedures to monitor traffic impacts and adapt controls. - Community consultation. - Reinstatement of pre-existing conditions where required. - Provision of appropriate contact details to rapidly identify issues.	**Section 6.4**

Table 6.5 – Summary of Construction Impacts and Mitigation Measures

Impacts	Mitigation Measures	Reference
Public Domain: Potential short-term impacts to the public domain as a result of construction traffic.	Mitigation measures for *Access, Transport and Traffic* as detailed in **Section 6.4.3** are considered sufficient to ensure that impacts associated with the construction are adequately mitigated.	**Section 6.5**
Servicing: Construction impacts would be short lived and may include: - Increased pressure on services; and - Disruption of services.	- Provision of a Construction Environmental Management Plan (CEMP) with detailed information on the mitigation of construction impacts. To be approved by Council before construction. - Local recruitment drive undertaken by the proponent as the primary method of attracting workers.	**Section 6.6**
Historic Heritage: No direct or likely impacts to non-Aboriginal heritage were identified.	Despite no direct or likely impacts to heritage, if a heritage item is discovered during construction, work must cease and mitigation measures as detailed in **Section 6.7.1** must be adhered to.	**Section 6.7**
Other Land Resources: The loss of primary production land or land for potential mineral extraction has been considered and accepted by Council, therefore impacts have been assessed and no further consideration is required.	Not applicable.	**Section 6.7**
Water: - Potential impacts to surface water through sedimentation from site clearing and levelling. - Potential impacts to groundwater due to chemical/fuel spills and clearing of trees.	Implementation of a Soil and Water Management Plan (part of the CEMP) to address practices around stockpiling and clearing.	**Section 6.9**
Soils: - Soil erosion during excavation or trenching. - Soil disturbance and compaction during development of maintenance and access roads and driving support poles. - Dust generation.	Measures would be detailed in the CEMP and would incorporate, but not be limited to, the following: - Dust suppression of roads and stockpiles where required. - Stabilising techniques may be applied where required. - Managing erosion and sedimentation impacts in accordance with provisions of the Urban Stormwater: Soils and Construction series.	**Section 6.10**

Table 6.5 – Summary of Construction Impacts and Mitigation Measures

Impacts	Mitigation Measures	Reference
Air and Microclimate: Air quality construction impacts are limited to dust generation.	**During construction and decommissioning** • A water cart (truck) would be utilised routinely, wetting all access roads and exposed dusty surfaces as appropriate to the conditions of the site. • Stockpiled topsoil and other materials that exhibit significant dust lift off would be wet down routinely and as appropriate. • Stabilising techniques and/or environmentally acceptable dust palliatives will be utilised if the wetting down of surfaces prove to be ineffective. **During operation** • Any area that was temporarily used during construction would be restored back to original condition or re-vegetated with native plants. • Areas that may not have been hard packed but have been disturbed in some form would be vegetated with seeds native to the area.	**Section 6.11**
Flora and Fauna: - Clearing of former cropping land. - Potential weed introduction.	As per Section 6 of **Appendix C**	**Section 6.12**
Microclimate	None	**Section 6.13**
Waste: Waste generated through the construction phase will be removed from the site and either recycled or disposed of at an appropriate waste disposal facility. Waste is not anticipated to generate adverse impacts at the site.	A waste management plan forms part of the CEMP and would seek to minimise waste and maximise opportunities for recover and reuse.	**Section 6.14**
Stormwater:	As per the measures outlined in **Sections 6.9 and 6.10**	**Section 6.16**

Table 6.5 – Summary of Construction Impacts and Mitigation Measures

Impacts	Mitigation Measures	Reference
Noise and Vibration: - Noise and vibration generated by machinery on site during site levelling and array installation. - Noise generated from increased traffic levels during mobilisation and demobilisation periods.	• Limiting noise generating construction activities to standard construction hours except where an acceptable acoustic solution can be identified to minimise adverse amenity impacts on Receptors R1, R2, R5 and R7; • Consultation with landholders throughout the construction process to inform them of the duration and timing of potentially noisy activities; Using broad band reversing alarms on all mobile plant and equipment; Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine; Select quieter items of plant and equipment where feasible and reasonable; Operating plant in a quiet and efficient manner; Reduce throttle setting and turn off equipment when not being used; and Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.	**Section 6.17**
Natural Hazards	Controls as outlined in **Section 6.18.1**	**Section 6.18**
Technological Hazards	None	**Section 6.19**
Safety, security and crime	None	**Section 6.20**
Social Impact: - the potential for visual, noise and traffic impacts are assessed elsewhere	Controls as outlined in **Sections 6.3, 6.17 and 6.4.**	**Section 6.21**
Economic Impact: - Employment generation during construction. - Potential positive and negative effects on property value.	No specific controls required.	**Section 6.22**

6.25 CUMULATIVE IMPACTS

Cumulative impacts associated with the project could include the following types of impacts:

- individual impacts so close in time that the effects of one are not dissipated before the next (time crowded effects);
- individual impacts so close in space that the effects overlap (space crowded effects);
- repetitive, often minor impacts eroding environmental conditions (nibbling effects); or
- different types of disturbances interacting to produce an effect which is greater or different than the sum of the separate effects (synergistic effects).

The primary potential causes of cumulative impact include:

- cumulative visual impacts associated with the development of multiple solar developments in the general locality (including impacts of glare);
- cumulative noise impacts associated with construction;
- cumulative air quality impacts associated with construction; and
- cumulative impacts associated with transport during construction.

Appendix A and **Section 6.3** addresses the potential for cumulative visual impacts and forms the conclusion that cumulative impacts are unlikely.

Section 6.11 addresses the potential for cumulative air quality impacts and forms the conclusion that cumulative impacts are unlikely.

Section 6.17 addresses the potential for cumulative noise impacts and forms the conclusion that cumulative impacts are unlikely, on the basis that the three solar projects in the locality are not anticipated to be built simultaneously.

Section 6.4 addresses the potential for cumulative traffic impacts and forms the conclusion that cumulative impacts are unlikely.

On the basis of the above, cumulative impacts associated with the project are not anticipated.

7 CONCLUSION

7.1 SUITABILITY OF THE SITE

The subject site is considered suitable for the proposed development for the following reasons:

- The proposed development is compatible with the surrounding and future use and character of the area for industrial purposes and is permissible within the zone by reference to the LEP and ISEPP;
- The project is strategically justified through consistency with applicable regional and local adopted strategy;
- The site is ideally located within close proximity to existing electricity infrastructure to enable the efficient delivery of the electricity generating works;
- The site is not unduly restricted by nearby sensitive uses or natural or cultural attributes such as soil characteristics, flora and fauna or heritage items;
- The site well absorbed into the visual receiving environment without significant impact; and
- The existing external infrastructure is sufficient to accommodate the needs of the development without the need for significant upgrade.

7.2 PUBLIC INTEREST

The public interest may be determined by consideration of relevant national, state and local government goals, as well as community priorities, which are expressed through a range of documentation. Relevant strategic documents are considered in **Section 4.3**. It also requires the consideration of the principles of ecologically sustainable development, discussed in **Section 4.1.1** of this SEE. It has been consistent held through a range of determinations in the NSW Land and Environment Court that the ESD precautionary intergenerational equity principles include considerations associated with climate change (impact of the development on climate change and impacts of climate change on development).

Mostly recently, the LEC held that the downstream impacts of mining projects, including the burning of fossil fuels for energy production, is a public interest consideration. Namely, in Gloucester Resources Limited v Minister for Planning [2019] NSWLEC 7, Preston J stated at 499:

> *Many courts have held that indirect, downstream GHG* (greenhouse gas) *emissions are a relevant consideration to take into account in determining applications for activities involving fossil fuel extraction or combustion or electricity generated by fossil fuel combustion.*

In summing up, Preston noted that the impacts associated with climate change, among others, were sufficient to justify refusal of the project.

It follows that a project that seeks to provide for sustainable electricity generation through the use of renewable forms of energy is in the public interest as it reduces the reliance on forms of electricity generation that rely on the consumption and burning of fossil fuels and that negatively contribute to the impacts of climate change as a result. Adoption of forms of development that counter the need for these high impact uses is therefore positive in the context of the ESD principles and in the public interest.

The proposed development is considered to be in the public interest on the basis that it:

- Offers an opportunity for productive and sustainable economic activity within the area;
- Presents an excellent opportunity to the local region to provide local employment opportunities;
- Has been designed with appropriate to the consideration to social, environmental and sustainability interests of the community;
- Aims to minimises impacts to natural resources through development of a sustainable form of energy production;
- Assists to achieve Australia's targets with respect to provision of renewable energy resources; and
- Assists to reduce reliance on traditional, fossil fuel burning forms of electricity generation, thereby assisting in curbing the long term impacts of climate change.

It reduces the reliance of other forms of electricity generation that are reliant on the burning of fossil fuels and that negatively contribute to climate change among others.

7.3 CONCLUSION

This Statement of Environmental Effects identifies and assesses the environmental issues associated with the construction, operation and decommissioning of a proposed 18.7 MW_{AC} electricity

generating works (solar farm). The development has been assessed in accordance with the Part 4 of the *Environmental Planning and Assessment Act 1979* and the *State Environmental Planning Policy (State and Regional Development) 2011*.

The proposal would comply with relevant state and local planning requirements.

Specific controls are identified to minimise or ameliorate the potential impacts associated with the development and, subject to their successful implementation, would ensure the development operates with minimal risk of harm to the environment. The applicant confirms that these measures are both practical and achievable.

Key benefits of the proposal include:

- Reduction in greenhouse gas emissions through adoption of renewable energy sources and a move toward cleaner electricity generation, thereby serving the public interest;
- Development of a project that would assist the state government in achieving the targets set down in the NSW 2021 plan and the Renewable Action Plan;
- Provision of electricity supply to the grid; and
- Benefits to the City of Wagga Wagga and the wider region through development and investment.

In view of the above, the development is considered to be acceptable.

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