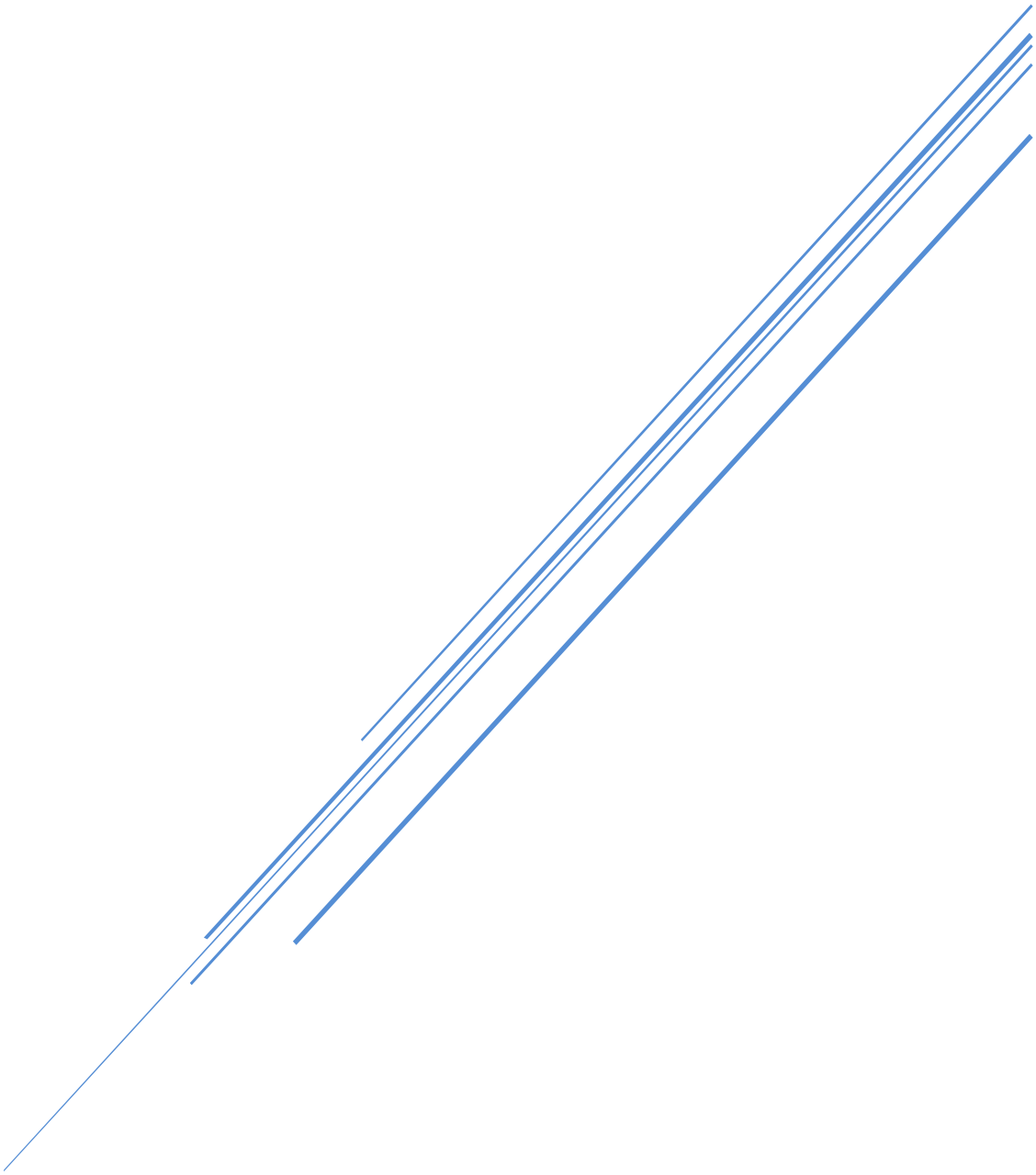
# STATEMENT OF ENVIRONMENTAL EFFECTS

## Narrabri 3A Solar Farm

1 April 2021



Zenith TOWN PLANNING

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**Document Details & History**

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| Project number | 2020 |
| Project title | Narrabri 3A Solar Farm |
| Document title | Statement of Environmental Effects |
| Client | ITP (Development) Pty Ltd |
| Author | Allen Grimwood, Director |
| ABN | Zenith Town Planning Pty Ltd<br>PO Box 591 Moruya NSW 2537<br>11 624 467 349 |
| Qualifications | Bachelor of Arts (Honours), UNSW<br>Master of Urban & Regional Planning, USyd<br>PIA Registered Planner — Planning Institute Australia |
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# EXECUTIVE SUMMARY

This Statement of Environmental Effects supports an application to Narrabri Shire Council to develop a solar farm at Lot 102 DP 579423 No 11498 Newell Highway, Narrabri, referred to as the Narrabri Solar Farm. The proponent is ITP (Development) Pty Ltd. The site is located 4.5 kilometres south-west of Narrabri township and occupies 11.32 hectares of the 62 hectare property. The application is for regionally significant development that needs consent and is to be determined by the Northern Regional Planning Panel.

The proposed development comprises the following:

- 12,100 solar modules ranging in height from 1.5 metres to 2.75 metres installed in 140 rows,
- Two 3MW inverter stations each mounted on a 12.2 metre long skid,
- A temporary car parking and materials laydown area,
- A security fence, and
- Perimeter landscaping on the outer side of the security fence.

The site selection process has involved liaison with Narrabri Shire Council officers; identification of environmental and topographical constraints; existence of necessary infrastructure including accessways, power lines and sub-stations; proximity to the settlement of Narrabri to enable supply of power direct to the township; sufficient cleared land area; willingness of the land owner to develop part of the property and enter lease arrangements to facilitate the solar farm; and the availability of solar resources.

Documentation is submitted in accordance with *Schedule 1 Forms Part 1 Development Applications* of the *Environmental Planning and Assessment Regulation 2000.* It is integrated development as a separate approval is required to be issued by Transport for NSW under the *Roads Act 1993* for works on a classified road.

The development is satisfactory to the objects of the *Environmental Planning & Assessment Act 1979* and applicable environmental planning instruments. The land is zoned RU1 Primary Production under *Narrabri LEP 2012*. The development is defined as *electricity generating works* which means a building or place used for the purpose of making or generating electricity. The proposed development of Narrabri Solar Farm is prohibited in zone RU1 but made permissible by provisions of *SEPP (Infrastructure) 2007*.

The proposed development is consistent with the strategic planning framework that applies to the local government area, the site itself and to the development of electricity generating works.

Goals, objectives and actions of the *New England North West Regional Plan 2036*, the *Narrabri Growth Management Strategy*, the *Narrabri Local Strategic Planning Statement 2040* and the *NSW Renewable Energy Action Plan* are satisfied.

Key issues are potential impacts on biodiversity, access to the site and traffic impacts, the effects of flooding and noise emissions, and impacts on cultural heritage, the rural landscape and scenic amenity. The likely impacts of the development have been considered and measures recommended to avoid, minimise or mitigate these impacts.

The solar farm is designed to generate in excess of 12.71GWh of energy annually which will offset almost 8.5 thousand tonnes of $CO^2$ equivalent emissions (Sources: *National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Schedule 1)* and Department of the Environment and Energy) and providing enough energy to power about 2,150 NSW homes. Electricity generated by the system will be directed to the settlement via existing electrical infrastructure to contribute to the supply of electricity for use by households and businesses in Narrabri town centre. The solar farm will generate community economic benefits through local employment opportunities during the planning and construction phases as well as maintenance and inspection jobs once operational. The land may continue to be used for agriculture and returned to its current condition once the facility is decommissioned.

The development of the solar farm will assist the transition of our economy from reliance on fossil fuels to renewable sources. It will assist Commonwealth and NSW Governments to achieve targets and objectives relating to emissions and addressing climate change.

# 1. INTRODUCTION

## 1.1 Overview

The purpose of this Statement of Environmental Effects is to support an application to Narrabri Shire Council to develop a solar farm at Lot 102 DP 579423 No 11498 Newell Highway, Narrabri, referred to as the Narrabri Solar Farm. The application is for regionally significant development that needs consent and is to be determined by the Northern Regional Planning Panel.

A separate approval is required to be obtained under section 4.46 of the *Environmental Planning and Assessment Act 1979* and is therefore integrated development. Works are proposed along a classified road, therefore, an approval is required to be issued by Transport for NSW under section 138 of the *Roads Act 1993*.

This Statement has been prepared having regard to advice provided by Narrabri Shire Council during a site visit in September 2020. Information has also been sourced from the Council's website, the NSW legislation website, SIX Maps, the website of the Department of Planning, Industry & Environment, the Planning Portal and SEED (Sharing and Enabling Environmental Data). All information referenced in this Statement has been sourced from publicly available documents or websites and from expert reports produced to support the application.

The methodology and findings of expert reports that accompany the application are summarised in this Statement. Further information about these matters should be sought from the original documents.

## 1.2 Scope of the report

The scope of this report is to describe the location and physical characteristics of the site on which the development is proposed, identify relevant provisions of plans and policies applying to the land, and to discuss any potential environmental impacts of the development and proposed servicing arrangements.

The purpose of this report is to assist Council's assessment of the proposal against the matters for consideration listed in section 4.15 of the *Environmental Planning and Assessment Act 1979*.

This statement is accompanied by the documents listed in Table 1 which support the development application and have been submitted under separate cover. This documentation is submitted in accordance with *Schedule 1 Forms Part 1 Development Applications* of the

*Environmental Planning and Assessment Regulation 2000.* Summaries of the findings of these studies and reports are provided in this Statement. Reference should be made to these documents for further details and information about methodology, findings and recommendations.

**Table 1: Development application documents**

| Plan/Doc No. | Plan/Doc Title | Prepared by | Issue | Date |
|---|---|---|---|---|
| NAR3A-G-0100 | Narrabri 3A 5MW Solar Farm Development Application | ITP Renewables | - | - |
| NAR3A-G-0400 | Location Plan, Site Plan | ITP Renewables | 1 | 23 /02/21 |
| NAR3A-G-2100 | General Arrangement Plan | ITP Renewables | 4 | 01/03/21 |
| NAR3A-G-2200 | Site Elevations | ITP Renewables | 1 | 01/03/21 |
| NAR3A-C-4300 | Inverter Footing Details | ITP Renewables | 1 | 09/02/21 |
| NAR3A-C-5300 | Fencing Detail | ITP Renewables | 1 | 25/01/21 |
| NAR3A-C-5301 | Gate Sections | ITP Renewables | 1 | 25/01/21 |
| NAR3A-C-6300 | Access Path Details | ITP Renewables | 1 | 01/02/21 |
| NAR3A-E-3400 | Nextracker Array Detail | ITP Renewables | 1 | 19/02/21 |
| NAR3A-E-4300 | Inverter Station Details | ITP Renewables | 1 | 10/02/21 |
| NAR3A-C-7300 | Landscape Details | ITP Renewables | 1 | 12/03/21 |
| MAC180781-14RP1 | Noise Assessment | Muller Acoustic Consulting Pty Ltd | - | 08/10/20 |
| F8619 | Traffic Impact Assessment Report | Price Merrett Consulting | Final | 15/01/21 |
| 18105488-021-Rev2-Narrabri3A-WaterAssess | Water Assessment | Golder Associates Pty Ltd | - | 31/03/21 |
| - | Glare and Glint Assessment | ITP Renewables | 1 | 23/09/20 |
| - | Waste Assessment | ITP Renewables | 1 | 11/09/20 |
| - | Decommissioning Assessment | ITP Renewables | 1 | 11/03/21 |
| - | Biodiversity Inspection Report | Red-Gum Environmental Consulting Pty Ltd | - | 12/03/21 |
| 2220 | Landscape Character and Visual Impact Assessment | Zenith Town Planning Pty Ltd | - | 30/03/21 |

## 1.3 The proponent

The proponent for the proposed solar farm is ITP (Development) Pty Ltd. ITP (Development) is a private sector organization based in Canberra and Sydney, which was established in 2003. It is part of the IT Power Group which was formed in 1981 in the UK to bring together specialists in renewable energy, energy efficiency and carbon markets. IT Power offers expertise in renewable energy and energy efficiency, including research, development and implementation, managing and reviewing government incentive programs, high level policy analysis (including carbon markets), engineering design and project management.

## 1.4 Justification

Solar energy is energy created by the heat and light of the sun. Solar power is produced when this energy is converted into electricity or used to heat air, water, or other substances. Australia has the highest average solar radiation per square metre of any continent in the world. Despite uncertainty regarding energy policy, the Commonwealth and NSW Governments have recognized the need to supplement energy derived from fossil fuels with energy generated from renewable sources. Alternative energy supply may be sourced from solar photovoltaic, geo-thermal, solar thermal, wave and tidal action, and wind.

The development of solar photovoltaic power is well underway in NSW and across Australia. This growth in the local solar PV sector continues to provide a significant boost for Australia's regional economy with renewable infrastructure development estimated to create upwards of 2,300 direct jobs plus indirect employment.

According to the Australian Renewable Energy Agency (ARENA), the deployment of household solar PV that generates about 5 kW is expected to continue and at the same time an increase in rooftop solar PV installations on commercial premises generating around (10-100 kW) is expected. Large scale solar PV is also rapidly expanding in Australia with several solar farms being constructed that will have the capacity to generate over 50MW. The proposed solar farm aims to fill the gap in the mid-sized plants. It will generate 5MW of AC power and contribute to renewable energy supply to supplement electricity generation from coal, oil and gas.

The proposed development is in accordance with relevant objects of the *Environmental Planning and Assessment Act 1979* in that it will assist to generate power to be distributed to the residents of NSW thereby promoting the social and economic welfare of the community in a manner that manages and conserves natural resources. The Narrabri Solar Farm will further the goals of sustainability, and the orderly and economic use of land.

## 1.5 Electromagnetic radiation

The information presented in this section has been sourced from the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). It includes a description of the type of electromagnetic radiation that may be produced by the generation and distribution of electricity.

The generation, distribution and use of electricity can produce extremely low frequency (ELF) electromagnetic fields (EMF) from electrically charged particles. The electric field is produced by the voltage whereas the magnetic field is produced by the current. The strength of the electric field is measured in units of volts per metre whilst the strength of the magnetic field is expressed in units of tesla (T), microtesla (μT), gauss (G) or milligauss (mG).

ELF EMF is produced by both natural and artificial sources. Naturally occurring ELF EMF is associated with atmospheric processes such as ionospheric currents, thunderstorms and lightning. Artificial sources are the dominant sources of ELF EMF and are usually associated with the generation, distribution and use of electricity at the frequency of 50 or 60 Hz. The widespread use of electricity means that people are exposed to ELF electric and magnetic fields in the home, in the environment and in the workplace.

According to the Australian Radiation Protection and Nuclear Safety Agency, which maintains continual oversight of emerging research into the potential health effects of the EMF exposure, there is no established evidence of health effects from exposure to electric and magnetic fields from powerlines, substations, transformers or other electrical sources, regardless of proximity.

# 2. SITE DESCRIPTION AND CONTEXT

## 2.1 Description

The site of the proposed Narrabri Solar Farm is described as Lot 102 DP 579423 No. 11498 Newell Highway, Narrabri, NSW. It is located approximately 4.5 kilometres directly south-west of Narrabri township. It is a irregular shape with a total area of 62 hectares.

The location of the site is shown in Figure 1 below.

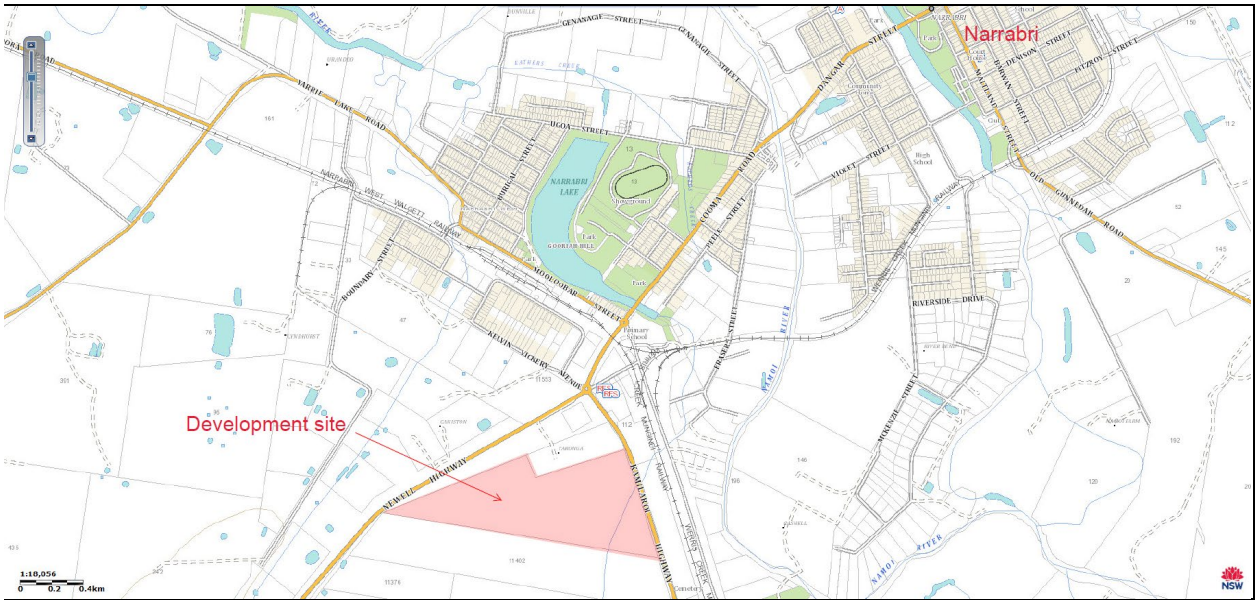


**Figure 1: Locality map. Source: SIX Maps, 2020**

The site is occupied by a dwelling and a number of farm sheds that are sited at the north-western corner of the property and enclosed within a wire fence. The topography of the site is flat with a very gentle crossfall to the south and west.

The property is farmland and has previously been used for livestock grazing and has been sown with wheat, barley and oats. The land owner is currently considering sowing indigenous food sources on eastern parts of the property. Existing ground vegetation comprises mostly exotic grasses and weeds with some shrubs and trees within the curtilage of the dwelling.

A second order (Strahler classification) watercourse cuts across the property at the south-eastern corner, flowing in a northerly direction for 1.5 kilometres before entering Narrabri Lake. There are no dams on the property.

Current access to the site is by way of an entrance off The Newell Highway which is located approximately half way along the western boundary. The access crosses a property described as Lot 7313 DP 1147165 which is the Newell Highway road reserve. The width of the road reserve is 160 metres at the northern corner of the development site tapering to 10 metres at the south-western corner. The road reserve is vegetated with native species to the edge of the verge with a narrow stretch of grass before the pavement.

## 2.2 Context

Narrabri local government area is located in the New England and North West region of NSW. It is roughly 13,000 square kilometres in area and includes the administrative centre of Narrabri and the towns of Wee Waa, Bellata and Boggabri. Narrabri township is located approximately at the intersection of the Newell Highway and the Kamilaroi Highway 533 kilometres north-west of Sydney GPO and 576 kilometres south-west of Brisbane GPO. The town is located on the floodplain of the Namoi River. The area has diversified from its traditional agricultural base of grain, cotton, wool, beef and prime lamb production to coal mining and gas extraction and exploration.

Land surrounding the development site is predominantly small acreages and large farm holdings zoned RU1 Primary Production. There are scattered remnant and regrowth native vegetation along road reserves, property boundaries and on distant hillsides. Industrial development is located to the north in zone IN1 General Industrial and north-east along the highways. An aerial image of the site and surrounding land is shown in Figure 2 below which is dated 26 April 2016.


**Figure 2: Aerial image. Source: SIX Maps, 2016**

Below is an extract from the topographic map for land in the vicinity of Narrabri that shows the location of the settlement, transport infrastructure, dams, cadastre and waterways. Narrabri Airport is located more than 7 kilometres north-west of the site and 3.5 kilometres from the centre of the township.

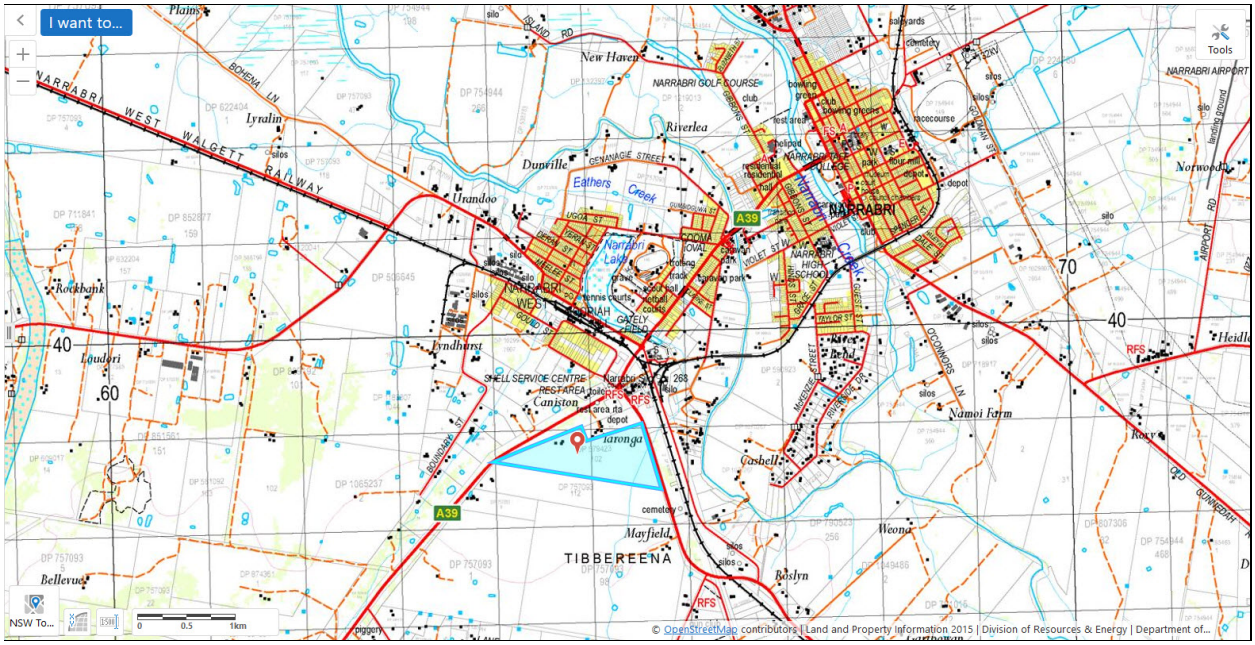


**Figure 3: Extract from the topographic map. Source: Land & Property Information 2015**

## 2.3 Climate

Global solar exposure is described by the Australian Bureau of Meteorology as being the total amount of solar energy falling on a horizontal surface. The daily global solar exposure is the total solar energy for a day. Typical values for daily global solar exposure range from 1 to 35 MJ/m$^2$ (megajoules per square metre). The values are usually highest in clear sun conditions during the summer, and lowest during winter or very cloudy days.

Global solar exposure coincides with seasons – the longer the daylight hours the greater the solar radiation due to the tilt of the earth during summer months. Rainfall is spread relatively evenly across the year and so does not appear to impact on the level of solar radiation.

Solar exposure estimates are important for a wide range of applications, including for agriculture, power generation and solar heating system design and use. This climatic information sourced from the Australian Bureau of Meteorology indicates that the global solar exposure, or solar radiation, is sufficient to support power generation in the proposed location which benefits from the presence of electricity power lines in the vicinity of the development site.

The map below (Figure 4) shows the average daily hours of sunshine across Australia. Narrabri LGA receives an average of between 8 and 9 hours of sunshine each day.

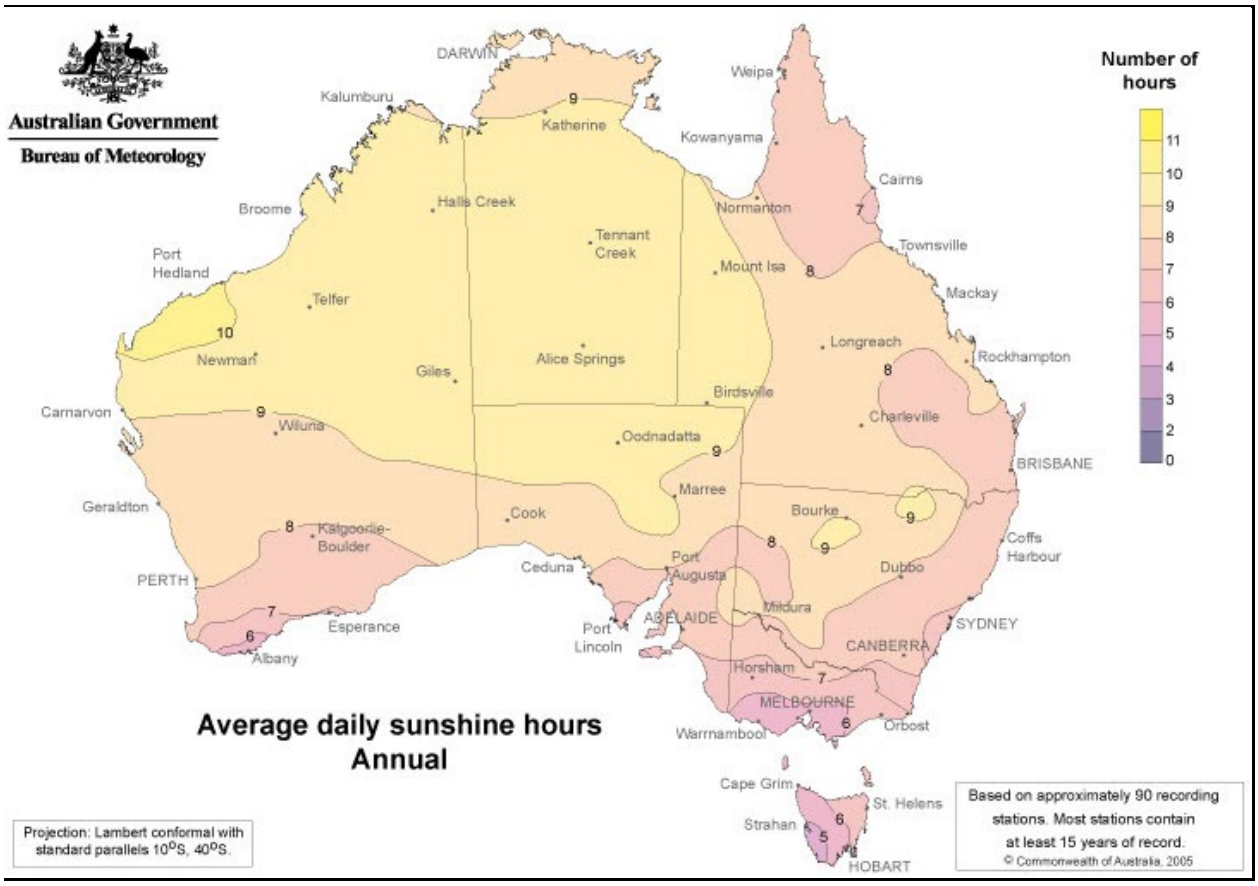


**Figure 4: Average daily sunshine hours. Source: Australian Bureau of Meteorology**

The mean monthly global solar exposure measured at Narrabri Airport (station number 054038), the closest measuring station to the solar farm, site, is given in Table 2 below. The annual mean daily global exposure for 2020 was 18.4MJ/m$^2$. Narrabri LGA receives an average of between 18 and 20 MJ/m$^2$ each day.

**Table 2: Mean monthly global solar exposure at Narrabri Airport, 2020**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly mean | 26.5 | 20.4 | 19.1 | 14.8 | 12.8 | 11.3 | 12.0 | 14.4 | 18.6 | 21.2 | 27.0 | 22.9 |

This data demonstrates that Narrabri LGA receives adequate solar energy to harness and convert to clean electricity and is eminently suitable for the development of a solar photovoltaic farm.

# 3. DETAILS OF THE PROPOSED DEVELOPMENT

## 3.1 Overview

The proposed development comprises a solar farm and ancillary facilities with an AC capacity of 5.0MW on approximately 11.32 hectares of the total site. The capital investment value of the solar farm is estimated to be $6.6 million.

## 3.2 The array

There are proposed to be 12,100 solar modules installed in 140 rows that are 103 metres long and 2 metres wide running east to west. There is approximately 6.25 metres spacing between each row. The array is proposed to be placed in the lower half of the property adjacent the southern boundary.

Each row of PV modules will rotate to track the sun across the sky from east to west each day. The hub height of each tracker is 1.5 metres with the peak of the modules reaching an approximate height of 2.75 metres when the array is fully tilted to 60 degrees from horizontal, i.e. in the early morning and late evening.

The layout of the solar farm is shown on General Arrangement Plan (Drawing No NAR3A-G-2100).

## 3.3 Inverters and ancillary items

Two 3MW AC inverter stations and a transformer will be installed at the solar farm. These inverters are to be located within the centre of the array and are each mounted on a 12.2 metre long skid. Each of these inverter stations incorporate high and medium voltage switchgear. Each will connect by way of underground cables to a 22kV feeder to inject power to the electricity grid at the Essential Energy Narrabri 66 Zone Substation. Dial-before-you-dig investigations would be carried out prior to commencing all subsurface work.

## 3.4 Construction

The mounting system for the PV panels is constructed on piles that are driven into the ground using a vibrating pile driver. The piles will be driven approximately 1.5 to 3.5 metres into the ground, as to be confirmed by a geotechnical and structural engineer.

During construction there is expected to be 50 personnel on site working from 7.00am – 4.00pm Monday to Friday. The construction is expected to take approximately three months. Should it be necessary to carry out work outside these hours then activities would be limited to those generating low noise emissions. Once operational the site will be unmanned. Maintenance is expected to be carried out quarterly by a crew of 2 to 3 people.

## 3.5 Services

Reticulated water and sewer services are not required to be provided to the solar farm as there are no permanent offices or amenities proposed on site. Portaloos for wastewater disposal (see https://www.kennards.com.au/site-equipment/showers-toilets.html ) and water supply by way of a portable tank or cart (see https://www.kennards.com.au/site-equipment/water-tank.html ) are proposed to be installed during the construction phase. Maintenance workers would not be required to remain on site. Cleaning of the PV panels would be carried out on an annual basis to maximise the performance of the system. This is done using water brought into the site and a sponge mop.

## 3.6 Access and car parking

Proposed access to the development site is off an existing secondary entry to the property off the Newell Highway. This is located at roughly the centre of the western boundary adjacent the main driveway entrance to the dwelling. A 4 metre wide internal road will connect to the centre of the array where the temporary materials laydown and car parking areas are to be located. It is expected that car parking for up to 40 small vehicles will be needed to cater for 50 construction workers at the rate of 0.8 spaces per worker. Traffic generation is given in Table 3 below. It is proposed that heavy vehicles only access the site between 10.00am and 2.00pm.

**Table 3: Expected traffic generation**

| Phase | Description of vehicles and movements |
|---|---|
| Establishment | 6 to 8 light vehicle two-way trips per day by earthworks contractor |
| | 10 to 15 truck and trailer loads to deliver gravel over approximately 2 to 3 days |
| Construction | 45 articulated trucks (maximum 19m length) to deliver equipment |
| | 40 light vehicle one-way trips for 50 construction workers |
| | Potential shuttle bus service to and from the site |
| Commissioning | Light or heavy rigid vehicles (maximum 12 metres length) by electrical contractor |

## 3.7 Landscaping

It is proposed to plant a vegetated screen around the perimeter of the array on the outer side of the security fence. A mix of native shrubs and ground covers that grow to a maximum height of 3 metres have been selected to ensure that overshadowing of panels does not occur. The plants would be spaced 3 metres apart to provide a continuous screen upon maturity.

Land that is disturbed during construction of the solar farm and not to be used for access or other maintenance purposes will be sown with grasses following completion of construction. Planting will also assist to minimise site disturbance and contribute to the rural landscape and character of the immediate area.

Plantings will be maintained and watered by maintenance crew on a regular basis. The planting will be carried out whilst construction takes place to enable use of the hired portable tank or cart that will provide water supply to the site. Construction will take approximately 3 months so regular watering during that period would ensure the establishment of plants. The use of native plants means that watering requirements once established would be minimal and would be done once every 2 or 3 months by the landowner. There would be nil impact on Council's infrastructure and no augmentation of services would be required. Bore water would be sourced to maintain the plants if available, otherwise water may be brought onto the site in tanks fixed to utility trays.

Regular inspections of the site will be carried out to ensure that grassland is managed to reduce the risk of bushfire to surrounding land and to control weeds. Mowing or slashing between rows of PV panels and in the area immediately surrounding the arrays would be carried out as required. Livestock grazing is being trialled elsewhere and may be carried out around and beneath panels in the future.

## 3.8 Security

The solar farm is to be enclosed within a 1.8 metre high security fence setback 103.2 m from the entrance of the property to the solar farm gate, 3 m from the southern boundary, 234.3 m from the security fence to the south western corner of the lot boundary and approximately 765.1 m from the security fence to Kamilaroi Highway on the eastern boundary. Solar arrays are to be setback 8 metres from the security fence. The proposed fence is to be chain mesh steel topped with three rows of barbed wire giving a total height of 2.3 metres similar to that shown in Plate 1 below.

Security lighting is not proposed to be installed.

**Plate 1: Example of security fencing**

## 3.9 Waste management

A *Waste Assessment* of the waste generated during construction and operation of the proposed solar farm has been carried out by ITP Renewables to determine the appropriate means of waste disposal and recycling. The findings of the assessment are summarized below. Reference should be made to the *Waste Assessment* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

The largest amount of waste will be generated during the construction phase and be classified as general solid waste (non-putrescible). Wastes would include wooden pallets, cardboard, plastics, green waste and domestic waste. Construction of a solar farm would not generate any putrescible waste products. Minimal waste would be generated when the farm is operational other than small amounts of replacement parts and packaging required for maintenance and repair works.

Local waste management facilities and capacities are identified in the assessment. Technology for recycling of PV panels is advancing rapidly worldwide and while recycling options currently

exist, they are likely to be more advanced and readily available at the time of decommissioning. Options for recycling of PV panels should be reviewed as the project progresses.

Estimates of waste materials and proposed management arrangements for each phase of the development project are provided in Table 4 below.

**Table 4: Estimated waste materials and waste management arrangements**

| Phase | Waste material | Proposed management |
|---|---|---|
| **Construction** | • Packaging waste such as cardboard, wood pallets, plastic wrap, scrap metal, general waste including approximately 810 wooden pallets and carboard packing boxes<br>• Concrete waste during setting of footings and mounts<br>• Electric cable waste and cable reels<br>• Plastic pipe offcuts/scrap<br>• Empty drums and containers (minimal quantities)<br>• Minimal used lubricating oil and filters<br>• Unused or spent chemicals | Waste products will be sorted and stored separately in skip bins located in the materials laydown area in accordance with EPA Waste Classification Guidelines. This will facilitate disposal through appropriate waste streams as follows:<br><br>Recycling:<br>• Steel and scrap metal (recycled)<br>• Timber/cardboard (recycled)<br>• Recyclable plastics<br><br>Landfill:<br>• General wastes and plastic (other than where recyclable)<br><br>All recycling and general waste would be collected and taken to off-site waste management facilities for disposal<br><br>Fluids would be recycled where possible or taken to off-site waste management facilities for disposal |
| **Operational** | • Minimal volumes of domestic wastes such as office consumables, paper, plastics and glass<br>• Waste resulting from maintenance or replacement of equipment | All waste materials would be taken to off-site waste management facilities for recycling or disposal |

| Phase | Waste material | Proposed management |
|---|---|---|
| **Decommissioning** | • PV modules (12,100 panels) and supporting poles and mounts<br>• Glass for panels (250 tonnes)<br>• Silicon for wafers (40 tonnes)<br>• Inverters / transformers / batteries<br>• PV boxes, skids, scrap metal (410 tonnes)<br>• Electrical cables<br>• Fencing<br>• Storage containers (two 20-foot containers) | The solar farm infrastructure would be dismantled into separate waste products such as metals, glass, plastics and concrete.<br><br>All products would be sorted on site into recyclable and general waste streams in accordance with the EPA Waste Classification Fencing and storage containers would be removed from the site and reused |

Waste management should be predicated on the international hierarchy of waste management to avoid/reduce, reuse, recycle, recover, treat and dispose of waste products to avoid or reduce waste materials where possible, and to re-use, recycle and recover the majority of waste materials generated during each of the construction, operational and decommissioning phases.
It is recommended that a waste management plan be developed to provide detailed procedures to manage the waste stream. The plan should contain:

- Strategies to reduce waste during all project phases,
- Recycling, re-use and recovery strategies and opportunities,
- Classification of all waste streams with a tracking register and details,
- On site recycling management,
- Allocation of responsibilities for recycling, re-use and disposal, and
- Reporting and notification procedures if a waste incident occurs and there is a threat to the environment.

## 3.10 Decommisioning

The expected life of the Narrabri Solar Farm is projected to be 35 years. Upon decommissioning all infrastructure, including cabling and panels and mounting frames including footings and inverters would be disassembled and removed from the site. The bulk of materials that are used in solar panel manufacturing include glass (75%), aluminum (8%), silicon (5%) and copper (1%). There are also small amounts of silver, tin and lead. These materials are recoverable.

Decommissioning will involve:

- Notification of stakeholders (e.g. Essential Energy, Narrabri Shire Council) of proposed de-energisation,
- De-energisation of the solar farm and disconnection of assets,
- Removal of PV modules and associated infrastructure,
- Removal of electrical wiring,
- Remediation of land.

Relevant equipment will be brought to site to facilitate decommissioning, including amenities for site crew for the duration of the works. This equipment may include mobile cranes, excavators, skid steers, loaders, rollers/compactors, pile drivers, telehandlers, skip bins, water carts, temporary shipping containers for storage, site office and site ablution blocks.

Full details of the process are provided in the *Decommissioning Plan* prepared by ITP Renewables. Reference should be made to that report for an explanation of each step in the decommissioning process.

# 4. STATUTORY FRAMEWORK

## 4.1 Legislation

### 4.1.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment (EPA) Act 1979* is the principal piece of legislation governing the use and development of land in NSW. The objects of the Act are:

*(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,*

*(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*

*(c) to promote the orderly and economic use and development of land,*

*(d) to promote the delivery and maintenance of affordable housing,*

*(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*

*(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*

*(g) to promote good design and amenity of the built environment,*

*(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*

*(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*

*(j) to provide increased opportunity for community participation in environmental planning and assessment.*

The objects of the EPA Act are intended to guide land planning and management. Section 4.15 of the Act lists matters for consideration when assessing and determining an application for development.

### 4.1.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* introduced the *Biodiversity Offsets Scheme* which is used to determine whether the *Biodiversity Assessment Method* is necessary to assess the impacts of a development proposal on threatened species, endangered ecological communities and habitats. Determining whether a *Biodiversity Development Assessment Report* is required under the

*Biodiversity Conservation Act 2016* and subsequently whether the *Biodiversity Offsets Scheme* would apply to the proposed works is subject to three steps.

- The first step is to identify whether the site is mapped on the *Biodiversity Values Map*.
- The second step is to estimate whether the extent of native vegetation to be cleared for the proposed development is above the threshold which in this case is 1 hectare.
- The third step is to carry out a test of significance to predict whether impacts on biodiversity are likely to be significant.

Under the *Biodiversity Offsets Scheme* offset obligations may apply whereby the biodiversity assessment finds that the removal of vegetation to facilitate the development will have significant impacts on flora. These offsets are in the form of credit obligations whereby payment is made to a biodiversity conservation fund which enable vegetation removal and provides funds to assists to preserve the same vegetation community elsewhere. Credit obligations also apply to fauna species where particular species are likely to be living in or frequenting the property. These matters are addressed in section *5.1 Biodiversity* of this Statement.

### 4.1.3 Water Management Act 2000

The *Water Management Act 2000* includes provisions to control or permit works near a watercourse or stream. Works within specified distances of the top of the bank of a watercourse may necessitate issue of a *controlled activity approval* by the Natural Resources Assessment Regulator. Impacts on surface and groundwaters are addressed in *5.3 Water resources* of this Statement.

### 4.1.4 Local Land Services Act 2013

The *Local Land Services Act 2013* regulates the clearing of native vegetation on rural land and where an activity is permitted without Council consent. There are two broad categories of land under the LLS Act - Category 1 (Exempt) land and Category 2 (Regulated, Vulnerable or Sensitive) land which are shown on the Native Vegetation Regulatory Map .

Clearing may be authorised on Category 1 (Exempt) Land but only where the activity is permitted without consent and when no other permit is required under other legislation. The onus is on the applicant to ensure they are not committing an offense under other legislation. If located on Category 2 (Regulated, Sensitive or Vulnerable) Land, the clearing may be authorised as an Allowable Activity or under the Land Management (native vegetation) Code within the *LLS Act*. If the clearing on Category 2 Land is not an Allowable Activity or is not authorised under the Land Management (native vegetation) Code, the clearing will need to be offset under the Biodiversity Offset Scheme. This means a Biodiversity Development Assessment Report is needed and the

clearing will need to be approved by the Native Vegetation Panel. The LLS Act does not apply to the proposed solar farm as development consent is required to be obtained to enable the works to proceed.

### 4.1.5 National Parks and Wildlife Act 1994

The objectives of the *National Parks and Wildlife Act 1974* are to conserve and protect habitat, ecosystems, biodiversity, landforms, landscapes and objects, places or features of cultural value in NSW. Under the NPW Act, it is an offence to knowingly harm or desecrate an Aboriginal object. Harm includes destroy, deface or damage an Aboriginal object or Aboriginal Place, and in relation to an object, move the object from the land on which it has been situated. Aboriginal objects include sites, relics or cultural material such as scar trees, middens and ancestral remains.

The NPW Act can also protect areas of land that have no Aboriginal objects, that is, they may have no physical evidence of Aboriginal occupation or use. These areas can be declared 'Aboriginal places' if they have spiritual, natural resource usage, historical, social, educational or other type of significance.

Anyone who exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution for the strict liability offence if they later harm an object. The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* provides a process whereby a reasonable determination can be made as to whether or not Aboriginal objects will be harmed by an activity, whether further investigation is warranted and whether the activity requires an application for an Aboriginal Heritage Impact Permit.

### 4.1.6 Heritage Act 1977

The aims of the *Heritage Act 1977* are to identify, protect and conserve items of State heritage significance. Provisions of the Heritage Act facilitate the establishment of a State Heritage Register for the listing of items of State significance and the preparation of conservation management plans for these items. The Heritage Act also sets out the procedures for the approval of works relating to items listed on the State Heritage Register. Impacts on listed heritage items are addressed in section *5.9 Heritage* of this Statement.

### 4.1.7 Noxious Weeds Act 1993

The aims of the *Noxious Weeds Act 1993* are to prevent the establishment, reduce the risk of spread and minimise the extent of noxious within NSW. The extent of noxious weeds and

procedures to eradicate weed infestation from the development site are addressed in section *3. Details of the proposed development* in this Statement.

### 4.1.8 Roads Act 1993

Under section 138 of the Roads Act 1993, consent is required to carry out works in, on or over a public road, remove or interfere with a structure, work or tree on a public road or connect a road to a classified road. The consent of Transport for NSW is required in the case of works relating to a classified road. Traffic impacts are addressed in section *5.7 Traffic* and access of this Statement.

### 4.1.9 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* aims to protect nationally and internationally important flora, fauna, ecological communities and heritage places. The approval of the Commonwealth Minister for the Environment is required for actions that may have a significant impact on matters of national environmental significance. The *EPBC Act* also requires Commonwealth approval for certain actions on Commonwealth land.

An assessment of the potential impact of the proposed works on any matters of national environmental significance under the *EPBC Act* and the need for referral to the Commonwealth is provided in section *5.1 Biodiversity* of this Statement.

## 4.2 State Environmental Planning Policies

### 4.2.1 State Environmental Planning Policy No 55 – Remediation of Land

*SEPP 55* requires Council to consider whether land is contaminated and to determine whether the proposed use is suitable with or without contamination. Council can require an applicant for development to conduct a preliminary investigation and a subsequent more detailed investigation if warranted. Where contamination exists and remediation is necessary, Council must be satisfied that the remediation will take place before the land is used for the proposed purpose. It is noted that should the preliminary investigation identify contamination on the site then the NSW *Contaminated Land Planning Guidelines* apply to subsequent investigations.

### 4.2.2 State Environmental Planning Policy (Infrastructure) 2007

The aims of *SEPP (Infrastructure) 2007* are to ensure a consistent and flexible planning system to facilitate the delivery of services. The policy identifies environmental assessment categories for types of infrastructure, matters to consider when assessing development adjacent to

infrastructure and provides for consultation with relevant public authorities. The policy applies to the whole of NSW.

*SEPP (Infrastructure)* contains provisions relating to approval processes and assessment requirements for infrastructure proposals according to the type or sector of infrastructure. It outlines land use zones where types of infrastructure are permissible with or without consent and identifies certain works as exempt and complying development.

Part 3 Division 4 of the policy relates to electricity generating works or solar energy systems. Section 34(7) enables development for the purpose of a solar energy system to be carried out by any person with consent on any land. The proposed development is permitted with consent by *SEPP (Infrastructure) 2007*.

Clause 45 of *SEPP (Infrastructure) 2007* requires the consent authority to consult with the electricity supply authority where development occurs near electricity infrastructure. If an electricity line runs within an easement on or near the development site, Council is to consult Essential Energy prior to determination of the application.

*Clause 104 - Traffic-generating development* also applies. Schedule 3 triggers a referral to Transport for NSW if the proposed development generates vehicle movements within a specified threshold.

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

The aims of *SEPP (Primary Production and Rural Development) 2019* are:

*(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.*

The policy applies to *State significant agricultural land,* farm dams and other artificial waterbodies, livestock industries and aquaculture. There is no *State significant agricultural land* listed in the schedule to the policy. It is noted that, separately, the Department of Primary Industries are in the process of preparing mapping of *Important Agricultural Land* in NSW to assist decision-making regarding development on rural land.

### 4.2.4 State Environmental Planning Policy (State and Regional Development) 2011

Development that is state and regionally significant is identified in *SEPP (State and Regional Development) 2011*. Electricity generating works including solar farms which have a capital investment value of more than $30 million, or a capital investment value of more than $10 million and are located in an environmentally sensitive area of State significance, are declared state significant development. Private infrastructure, including electricity generating stations, that have a capital investment value of over $5 million are declared regionally significant and are to be determined by a Regional Planning Panel.

### 4.2.5 State Environmental Planning Policy (Koala Habitat Protection) 2019

*SEPP (Koala Habitat Protection) 2019* commenced on 1 March 2020. This policy aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The new policy is implemented through the *Koala Habitat Protection Guideline*. The policy lists 123 feed tree species. Schedule 1 lists local government areas to which the policy applies, and for which a koala assessment report is required for development on rural properties greater than 1 hectare in area.

## 4.3 Local Environmental Plans

### 4.3.1 Narrabri Local Environmental Plan 2012

The property is zoned RU1 Primary Production under *Narrabri LEP 2012*. The objectives of zone RU1 are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*

- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To allow for non-agricultural land uses that will not restrict the use of other land for agricultural purposes.*

The development is defined as ***electricity generating works*** which means a building or place used for the purpose of making or generating electricity. This use is prohibited in zone RU1.

The following clauses of *Narrabri LEP 2012* apply to the proposed development:

*Clause 6.1 Earthworks*

The objective of this clause is 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.

Development consent is required for earthworks unless the earthworks are ancillary to development for which development consent has been given. In deciding whether to grant development consent for development involving ancillary earthworks, the consent authority must consider:

*(a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,*
*(b) the effect of the 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 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 waterway, drinking water catchment or environmentally sensitive area.*
*h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*

Earthworks associated with the development comprise minor excavation to 150mm to install road base for accessways, 750mm footings for the inverters and security fence strainer posts, 1,000mm footings for the access gate and 1,500mm to 3,500mm footings for the panel mounting

frames. Cable trenching of 600mm for low voltage cables and 1,200mm deep trenching is also to be carried out.

All of these earthworks are ancillary to the development of a solar farm and are not expected to impact adversely on drainage, future use of the land if the facility if decommissioned, relics, the natural environment or adjoining developments.

*Clause 6.2 Flood Planning*

The objectives of clause 6.2 are:

*(a) to minimise the flood risk to life and property associated with the use of land,*
*(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,*
*(c) to avoid significant adverse impacts on flood behaviour and the environment.*

The clause applies to land that identified on the Flood Planning Map accompanying *Narrabri LEP 2012* as a Flood Planning Area. The site is not mapped as a Flood Planning Area, however, the *Narrabri Flood Study* identified the site as being flood prone and recommended that the Flood Planning Map be amended to include the site within the Flood Planning Area. The planning portal maintained by DPIE erroneously records the site as being a Flood Planning Area.

The matter of flooding is addressed in section *5.3 Water resources* of this Statement.

*Clause 6.5 Essential services*

This clause requires a consent authority to be satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required:

*(a) the supply of water,*
*(b) the supply of electricity,*
*(c) the disposal and management of sewage,*
*(d) stormwater drainage or on-site conservation,*
*(e) suitable vehicular access.*

The supply of reticulated water and sewerage services is not required for the proposed development. However, portaloos for wastewater disposal (see https://www.kennards.com.au/site-equipment/showers-toilets.html ) and water supply by way

of a portable tank or cart (see https://www.kennards.com.au/site-equipment/water-tank.html ) are proposed to be installed during the construction phase.

Electrical services are available to the site. Stormwater management is proposed to be addressed by controls recommended in this Statement with full details to be provided with the application for a construction certificate. An existing access off the Newell Highway is proposed to provide access to the site.

There are no draft environmental planning instruments that are on exhibition or have been exhibited but not yet published that apply to the site, or that relate to the proposed development of electricity generating works.

## 4.4 Development Control Plans

### 4.4.1 Narrabri Development Control Plan 2000

*Narrabri DCP 2000* provides guidance for development, however, the DCP does not contain any provisions that applies to the development of a solar farm. The Industrial Development Code contains a list of suitable plant species which would assist in plant selection for landscape screening surrounding the solar farm

## 4.5 Land use strategies

### 4.5.1 New England North West Regional Plan 2036

The *New England North West Regional Plan 2036* was released in August 2017. It establishes a framework for growth over the next 20 years for the New England and North West Region. Narrabri LGA is located at the western edge of the region. Economic opportunities identified in the plan include a focus on renewable energy generation along with agriculture, horticulture, green industries and tourism.

A series of goals, directions and actions are to guide land use planning priorities and decision making. Direction 5 is to *grow New England North West as the renewable energy hub of NSW*. It is noted in the plan that the region receives 19 to 20 megajoules of solar exposure making it the second highest solar penetration region in the state and that a strategic and integrated approach will assist to achieve the NSW Government's goal of carbon neutrality by 2050.

Action 5.2 is to *facilitate appropriate smaller scale renewable energy projects using biowaste, solar, wind, hydro, geothermal or other innovative storage technologies*. In the case of the proposed Narrabri Solar Farm, ITP Development have identified the development site as being suitable in terms of existing power infrastructure to enable connection and proximity to the township of Narrabri in order to directly generate power for use by the local community. This complies with the local government narrative for Narrabri Shire Council to *Identify and promote wind, solar and other renewable energy production opportunities*.

### 4.5.2 Local Strategic Planning Statement 2040

The purpose of the *Narrabri Shire Local Strategic Planning Statement* is to outline economic, social and environmental land use needs for the next 20 years. The Statement sets out Narrabri Shire's strategic planning actions to achieve identified planning priorities.

Planning Priority 4 of the LSPS is to *Manage and support the transition to renewable energy*. It is noted in the statement that Narrabri Shire can lead the development of renewable energy as it is located within the second highest solar penetration region in NSW. Council's Community Strategic Plan 2018-19 is referenced as encouraging the establishment of a commercial solar power industry in the LGA and that there is widespread community support for renewable energy. Council is committed to proactively managing potential impacts on productive agricultural land and scenic landscapes and to promoting a planning framework that will facilitate the transition to renewables.

### 4.5.3 Narrabri Growth Management Strategy 2020

The Narrabri Growth Management Strategy (GMS, Strategy) has been prepared to guide growth and development in Narrabri Shire Council over the next 20 year period and to inform the Narrabri Local Strategic Planning Statement (LSPS). The aim of the strategy is to *provide direction for future growth in the right places, create a more diverse and prosperous economy and maintain a healthy environment and great places to live. The strategy identifies the drivers of change and opportunity in Narrabri and, consistent with the policy framework, makes recommendations that can guide amendments to planning instruments and local land use decision making.*

The strategy supports the goals of the *New England North West Regional Plan 2036* to promote development in the renewable energy sector and notes that at the time of writing that there was one approved and two proposed solar farms in Narrabri LGA. It is also noted that the Australian Energy Market Operator has identified the need to carry out immediate upgrades to interconnecting grids between Northern NSW and Queensland to facilitate increased mix of renewables in the grid. There are potential issues in attracting labour, particularly if construction

coincides with a major mining project in the LGA and the need to provide distance separation to avoid land uses conflict.

The *Narrabri Growth Management Strategy* makes the following recommendations in relation to mining and renewable energy:

- *Identify renewable energy resource precincts and infrastructure corridors with access to the electricity network;*
- *Develop a strategic and integrated planning framework to encourage the alternative and renewable energy sector to invest in Narrabri LGA;*
- *Use DPIE's Large Scale Solar Energy Guideline to guide the location of new development;*
- *Review NLEP provisions, land use tables, mapping and minimum lot sizes and best practice guidelines to:*
  - *assess RU1 and RU4 zones as appropriate zones for large scale mining, infrastructure and renewable projects; then*
  - *ensure permissibility of appropriate employment generating development and ancillary industries;*
  - *reduce risk of encroachment and impediments to the expansion and intensification of mining and renewable energy generation from incompatible development though a suite of LEP provisions to manage holding size and the number and siting of dwellings;*
  - *ensure land uses adjacent to key infrastructure and facilities such as transport routes are appropriately zoned to prevent encroachment of incompatible urban development;*
- *Review the extent of undeveloped and unserviced R5 zoned land for potential impacts on mining, renewables and ancillary employment generating activities*

The strategy seeks to provide opportunities for renewable energy to support growing industries and villages through the following actions:

- *Use DPIE guidelines for larger solar farms.*
- *Review LEP controls to provide protections and buffers on land zoned RU1 Primary Production and RU4 Primary Production Small Lots.*
- *Review RU1 and RU4 minimum lot sizes to ensure future development will not be impacted by undersized lots with dwelling potential.*

The implications of Action 5.2 of the New England North West Regional Plan 2036 for growth management are to:

- *Identify renewable energy resource precincts and infrastructure corridors with access to the electricity network*
- *Develop a strategic and integrated planning framework to encourage the alternative and renewable energy sector to invest in Narrabri LGA*
- *Review the NLEP 2012 land use tables and rural minimum lot sizes to ensure appropriate separation distances from large scale renewable projects on rural land*
- *Use DPIE's Large scale solar energy guideline to guide the location of new development*

The responsibility for each of these tasks rests with Council and DPIE.

### 4.5.4 NSW Renewable Energy Action Plan

The *NSW Renewable Energy Action Plan* supports the achievement of the national target of 20% renewable energy by 2020. It aims to position NSW to increase the use of energy from renewable sources at least cost to the energy customer and with maximum benefits to NSW. The plan is predicated on the following three goals:

- Attract renewable energy investment and projects
- Build community support for renewable energy
- Attract and grow expertise in renewable energy technology

These goals are supported by 24 actions which include considering a more strategic and integrated approach to assessment of renewable energy projects and promoting NSW as a leader of research and innovation in renewable energy.

The plan notes that the NSW Government is in the process of streamlining the state planning system and advocates new planning legislation founded on the principle of sustainable development that meets the needs of the current generation without compromising the ability of future generations to meet their needs. Renewable energy projects are a good example of sustainable development in action. Streamlining will focus public participation on strategic planning in order to provide greater certainty for applications and the community in development assessment.

# 5. ENVIRONMENTAL EFFECTS

## 5.1 Biodiversity

### 5.1.1 Assessment of impacts

A biodiversity assessment has been carried out by Red-Gum Environmental Consulting Pty Ltd to determine the potential impact on any threatened species and endangered ecological communities that are present on the development site and in the vicinity of the site. The findings of the assessment are summarized below. Reference should be made to the *Biodiversity Inspection Report* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

Methodology for the biodiversity assessment involved desktop research and a site inspection. The assessment covered details of recorded sightings of threatened species including koalas and identification of vegetation communities in the vicinity of the development site. The *Biodiversity Inspection Report* provides a test of significance in accordance with requirements of the *Biodiversity Conservation Act 2016* and a Koala Assessment Report as required by *SEPP (Koala Habitat Protection) 2020*, and also satisfies requirements of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

### 5.1.2 Findings

The development requires less than 1 hectare clearance of native grass and zero remnant native trees. The proposed activities are unlikely to have an adverse effect on the foraging ability or the life cycle of threatened species that may be opportunistically using the site or surrounding areas.

The small amount of native grass that will be impacted by the development will not endanger or have a significant effect on any existing native vegetation, habitats within the site, or fauna species that may be using the site.

The development will not displace any rare or threatened species, however, it is likely that a number of threatened and declining bird species and koalas may be using the area to the south and along the heavily wooded road reserve along the western boundary, hence the construction activities may prove to disturb foraging activities for a short period.

The area assessed was largely exotic species and pasture grasses, with many species commonly regarded as 'highly invasive' in more natural woodland settings – like that to the west in the road reserve. While the proposed works are unlikely to introduce noxious weeds, vermin, feral species

or genetically modified organisms into an area, the movement of vehicles, plant, equipment and people on and off the development site has the potential to introduce such impacts. Wherever possible, removal of weeds should be undertaken prior to seed developing, which for most species occurs during summer months.

The typical home ranges of koalas are from 2 hectares of connected vegetation to hundreds of hectares. Koala feed almost exclusively on a few preferred tree species which are of primary and secondary importance. The occurrence of both primary and secondary tree species varies widely on a regional, local and even a seasonal basis, meaning that koalas are unevenly distributed across their range.

In the study area, primary food tree species are River red gum (*E. camaldulensis*) and Coolabah (*E. coolabah*) with secondary food tree species including Dirty (or Baradine) gum (*E. chloroclada*), Blakely's red gum (*E. blakelyi*), E. camaldulensis, Poplar or Bimble box (*E. populnea*), white box (*E. albens*), and *Callitris glaucophylla*.

No viable food sources are present in the development area. Importantly, there are numerous core vegetation areas surrounding the site which represent areas of viable Koala habitat. The site is highly unlikely to be traversed or used by the species who are much more likely to stay within the connected canopy of the roadside vegetation corridor.

The report concludes that the proposed development will not have a significant effect on any threatened species and ecological communities and/or their conservation. No vegetation would need to be removed to facilitate heavy vehicle access using the existing track.

### 5.1.3 Mitigation measures

By way of a clearing process that minimizes the risk to threatened species that may be opportunistically using the site, it is recommended that:

I. Construction limits and exclusion zones clearly identified prior to work;
II. A visual inspection is conducted by environmental staff before construction commences to identify any areas of site that might be supporting native fauna;
III. Vehicle movements around the site will be restricted to the construction footprint and away from any existing planted trees and flagging exclusion fencing to be installed.
IV. Soil disturbance by vehicle and pedestrian access is to be kept to a minimum outside the construction footprint.
V. Any weeds removed (particularly those bearing seeds) are to be disposed of appropriately at the nearest waste management facility.

## 5.2 Natural hazards

### 5.2.1 Flooding

The site is not mapped as being a Flood Planning Area in *Narrabri LEP 2012.* However, property information made available by the Department of Planning, Industry & Environment on the planning portal states that the site is designated a Flood Planning Area. Information provided by Narrabri Shire Council confirms that the site is flood prone and data has been supplied to assist with an analysis of flood potential and recommended mitigation measures that are summarised in section *5.3 Water resources* of this Statement.

### 5.2.2 Bushfire

The site is not mapped as being a bushfire buffer on the bushfire prone land map. Infrastructure comprising electricity generating works is not a habitable building and is not listed as a *special fire protection purpose* under section 100B of the *Rural Fires Act 1997*.

However, defendable space is available within the 8 metre setback between the array and the security fence. It is also proposed that a fire emergency management plan be prepared through liaison with Council, Essential Energy and the Rural Fire Service. That plan would establish procedures to respond to a fire event and other measures such as maintenance of ground fuels, access arrangements, on site fire-fighting equipment and isolation of electrical infrastructure.

### 5.2.3 Land contamination

The development site is not identified as contaminated land and is not listed on a register of contaminated land. The property has been cleared and farmed for many years. There has been no known historical usage that would cause the land to be contaminated. NSW Health advise that the use of farm chemicals such as pesticides and fertilisers is not considered to contaminate soils to the extent that mediation is required. It is considered that a preliminary investigation is not required for the development of a solar farm.

### 5.2.4 Mitigation measures

See section *5.3 Water resources* for recommended mitigation measures to address flooding.

Prepare a fire emergency management plan and include that plan in the environmental management plan.

There are no mitigation measures recommended in relation to land contamination.

## 5.3 Water resources

### 5.3.1 Assessment of impacts

A *Water Assessment* of potential impacts on groundwater and surface water flows and flooding has been carried out by Golder Associates Pty Ltd. The findings of the assessment are summarized below. Reference should be made to the *Water Assessment* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

### 5.3.2 Findings

The development site is not located within a mapped area in *Narrabri LEP 2012* that indicates groundwater sensitivity. There will be no extraction of groundwater or interference with the groundwater table and the works are not expected to contribute to any regional groundwater issues. The proposed depth of trenching to lay cables and install the supporting frames for panels is expected to be above the local groundwater level.

Potential adverse surface water-related impacts to the site relate to site accessibility and managing downstream sedimentation. As noted in section *4.3 Local environmental plans,* the site is not mapped as a Flood Planning Area, however, the *Narrabri Flood Study* identified the site as being flood prone and recommended that the Flood Planning Map be amended to include the site within the Flood Planning Area.

There is the potential for overland flows during rainfall events from the 2nd order watercourse located at the south-east corner of the development site. The overland flow would follow site topography which would direct flows to the Namoi River to the east.

In addition, the flood study identifies potential flood hazard areas along the Newell Highway. Heavy rainfall events may cause disruption during construction activities or for access to deliver materials and equipment.

There are two potential impacts that the solar farm could have on flooding and runoff external to the facility. These are impacts on riverine flood levels due to the facility obstructing flows and impacts on flood levels due to the impervious nature of development surfaces associated with the array causing more rapid runoff.

Given that modelled flood impacts are limited to a small area within the northern extent of the lot, potential impacts from runoff obstruction would be limited. Excavated areas around the site would be backfilled and cover reinstated following completion of construction.

Solar panels do not have a significant effect on runoff volumes, peaks, or times to peak for flood events unless the runoff characteristics of the final ground cover is increased. Potential impacts of the facility obstructing the relatively shallow overland flow observed in the catchment are considered negligible.

Similarly, the panel framing structures are designed to withstand impacts to the integrity and stability of the panels from any overland flow or inundation that may occur due to flooding. The panels will be elevated above modelled maximum flood levels and the pilings will be installed to sufficient depths and may be fitted with a 300mm concrete collar depending on soil type.

The development has the potential to alter existing water quality conditions within the site. The impervious area of solar facilities is typically only marginally increased owing to associated hardstand and building areas.

However, the panels may impact the nature of vegetation/grass coverage on the site, which has the potential to increase surface runoff and peak discharge. Increased flow concentration off the panels also has the potential to erode soil at the base of solar panels.

Furthermore, as the site has been historically used for farming there is very little natural ground cover vegetation. There is the potential that site runoff will contain sediments and increase turbidity or other water quality parameters in downstream water ways. The existing farm dam should capture surface flows from the site and reduce sedimentation downstream.

### 5.3.3 Mitigation measures

The following mitigation measures given in Table 5 are recommended to manage downstream sedimentation.

The potential for site accessibility and the potential for inundation issues during flood events should be reviewed and procedure developed to halt construction during heavy rainfall to reduce potential impacts to the development and to increases in downstream sedimentation.

**Table 5: Proposed mitigation measures to manage downstream sedimentation**

| Stage | Measure | Activities/approach |
|---|---|---|
| Design | Site drainage and water quality controls | Design Basis<br>• Undertake hydrological assessment of the site's catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff<br>• Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008).<br>• Develop a site erosion and sediment control plan in accordance with the Blue Book.<br>• Develop site drainage design incorporating detention basins and sedimentation management structures where relevant.<br>• Permanent site drainage should coincide with temporary arrangements where possible |
| Construction and/or demolition | Site drainage and water quality controls | General site works:<br>• Project construction period to occur entirely within the dry season to prevent flooding, sedimentation and water quality impacts to waterways.<br>• Catch drains to be located downslope of any proposed road works.<br>• Install location appropriate sediment fences or other applicable control measures depending on whether the feature is upstream or downstream of a disturbed part of the site or will need to be trafficable.<br>• All stormwater collection points need to have appropriate sedimentation and erosion controls.<br>• Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness.<br>• Vibration grids or wash bays at all construction exits.<br>• Level spreaders at locations where concentrated flow is |

| Stage | Measure | Activities/approach |
|---|---|---|
| | | discharged offsite to ensure sheet flow like conditions are maintained.<br>• Flat land erosion control options include erosion control blankets, gravelling, mulching, soil binder, turfing and revegetation |
| Construction and/or Demolition | Stormwater point source control | In the event of concrete works:<br>• Do not undertake works if chance of heavy rain.<br>• Store rinsate water, if applicable, separately to other water on site and dispose of offsite as appropriate.<br>• Block on site drains in the area of the works and remove any contaminated runoff.<br><br>In the event that dewatering practices are required:<br>• Elevate pump hose intakes for withdrawing water from excavations to minimise sediment pumping and direct hose to a containment area for settling prior to discharge of water.<br>• Limit direct discharge off site (consistent with the design requirements for sediment pond discharge).<br>• Stormwater collected on site should be reused where possible. Controls should be inspected and maintained on a regular basis. All water released from sediment basins should be clear or disposed of off site by vehicle.<br>• Material and waste storage areas should be designed and operated to minimise interaction with surface waters.<br>• Vehicle washdown areas should be located away from water courses |

## 5.4 Air quality

### 5.4.1 Assessment of impacts

The Department of Planning, Industry and Environment maintain air quality monitoring stations across rural NSW. The instruments used at most rural network sites are low cost indicative particulate monitors that respond to all aerosols including smoke and fog.

Total Suspended Particles are measured at this station. Total suspended particles are solid particles and liquid droplets 100 micrometres or less in diameter. They come from natural and human-made sources, such as pollen, bushfires and motor vehicle emissions. Dust emissions are also a source of air pollution and can cause poor air quality. The pollutants measured by the Department are nitrogen dioxide, sulphur dioxide and ammonia.

Particles are also measured as $PM_{10}$ and $PM_{2.5}$. $PM_{10}$ are particles less than 10 micrometres in diameter. Sources include crushing or grinding operations and dust stirred up by vehicles on roads. $PM_{2.5}$ are fine particles less than 2.5 micrometres in diameter. Sources include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes.

Table 6 gives average hourly readings of total suspended particles, $PM_{10}$ particles, $PM_{2.5}$ particles and the DPIE rating for the nearest monitoring station to the development site.

**Table 6: Average hourly air quality readings**

| **Monitoring station** | **Narrabri** | |
|---|---|---|
| Period | 12 March 2021, 6am-7am | |
| Particles | Reading | Rating |
| Total suspended particles | n/a | n/a |
| $PM_{10}$ | 5.2 | Good |
| $PM_{2.5}$ | 4.3 | Good |

Activities that disturb the earth's surface and that are carried out with the use of machinery have the potential to generate dust emissions. This may be exacerbated by wind exposure to an exposed ground surface. The previous use of the land for farming may have involved regular tilling, sowing and harvesting that may create dust and impact on air quality. Similarly, grazing would generate dust as animals trample the ground surface. The land has been modified for agriculture with the consequent loss of most native vegetation leading to exposed soil surfaces.

The construction of the solar farm will not involve extensive earthworks. Pile driving for footings for the array framework and excavation for roads and ancillary structures will be carried out.

Along with the delivery of materials using heavy vehicles, these construction works may generate dust, however, once operational the change of use of the land from agricultural to solar photovoltaic electricity generation is expected to reduce particulate emissions and lead to an improvement in local air quality. Vehicle movements would be restricted to internal access roads and the majority of the site would be revegetated with native or pasture grasses.

### 5.4.2 Mitigation measures

To minimize dust generation during the construction and operational phases the following mitigation measures are proposed:

During construction:

- Limit vehicle movements to areas necessary to deliver panels, ancillary structures and equipment
- Suppress dust emissions using watering and cease works during dry and windy conditions
- Ensure ground disturbance is limited to areas necessary to place footings or to be used for access
- Ensure minimal handling of excavated materials
- Ensure stockpiles of excavated material is bunded and protected from wind and vehicle movements

During operation:

- Grade and add road base to internal accessways
- Revegetate the site with suitable endemic native groundcover immediately construction works are completed
- Ensure all plant and equipment operates in accordance with specifications

## 5.5 Noise

### 5.5.1 Assessment of impacts

A *Noise Assessment* of the impacts of noise emissions has been carried out by Muller Acoustic Consulting. The findings of the assessment are summarized below. Reference should be made to the *Noise Assessment* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

The purpose of the *Noise Assessment* is to quantify potential environmental noise emissions associated with the construction and operation of the project. Where impacts are identified, recommendations are made to mitigate and manage noise. The location of noise sensitive receptors are shown in Figure 5.


**Figure 5: Location of noise sensitive receptors. Source: Muller Acoustic Consulting**

### 5.5.2 Findings

Predicted construction noise levels are expected to exceed the NMLs by up to 5dB at six receivers when works are nearest to those locations. These receivers are R02, R03, RO4, RO5, R06 and R06A. The exceedances would be temporary and of short duration. The exceedances would be due primarily to piling and earthworks. Operational noise levels satisfy the management levels for all assessed receivers. However, recommendations to ensure noise levels are verified have been provided in this report. Additionally, the noise assessment demonstrates that road noise

criteria will be satisfied at all receivers on the proposed transport route during the construction phase.

### 5.5.3 Mitigation measures

The following mitigation measures are recommended to address noise emissions during the construction phase:

- a construction noise management protocol to minimise noise emissions, manage out of hours (minor) works to be inaudible, and to respond to potential concerns from the community,
- where possible use localised mobile screens or construction hoarding around plant to act as barriers between construction works and receivers, particularly where equipment is near the site boundary and/or a residential receiver including areas in constant or regular use (e.g. unloading and laydown areas),
- operating plant in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations,
- selection of the quietest suitable machinery available for each activity,
- avoidance of noisy plant/machinery working simultaneously where practicable,
- minimise impact noise wherever possible,
- utilise a broadband reverse alarm in lieu of the traditional high frequency type reverse alarm,
- provide toolbox meetings, training and education to drivers and contractors visiting the site during construction so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities,
- signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site, and
- utilise project related community consultation forums to notify residences within close proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.

It is recommended that noise emissions from the solar farm be minimised when operational.

To assist in noise management, it is recommended that a one-off noise validation monitoring assessment be completed to quantify emissions from the site and to confirm that relevant criteria are satisfied.

## 5.6 Traffic and access

### 5.6.1 Assessment of impacts

A *Traffic Impact Assessment Report* of the impacts on traffic and the adequacy of access arrangements has been carried out by Price Merrett Consulting. The findings of the assessment are summarized below. Reference should be made to the *Traffic Impact Assessment Report* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

The traffic assessment includes a description of the existing road network and considers expected traffic generation during site establishment, construction and operation. Site access arrangements and intersection capacity are also considered.

### 5.6.2 Findings

During the three month construction period 45 heavy vehicles will access the site with an expected daily maximum of 4 trucks. Access to the site for heavy vehicles will be limited to between 10.00am and 2.00pm.

Approximately 90% of light vehicle movements transporting construction workers are expected to originate in Narrabri township causing predominantly left turns in to the site during the morning peak period and right turns out of the site during the afternoon peak period.

The traffic assessment concludes that heavy vehicle movements would not contribute to morning or afternoon peak hour traffic volumes on the Newell Highway. Light vehicle turning movements for construction workers are assessed to be very low and therefore impacts will be minimal.

The proposed access for the development has been located on an existing access point to the property to minimise vegetation removal and limit earthworks. This location is on a straight section of the Newell Highway and 960 metres from the junction of the Newell and Kamilaroi Highways. This existing access point is proposed for use during construction and ongoing operation and is considered a suitable location without major geometry issues. The access would need minor pavement improvements to accommodate heavy vehicles. No vegetation would need to be removed to facilitate heavy vehicle access using the existing track.

The speed limit on the Newell Highway fronting the site is within a 110km/hr zone in both directions and reduces to 80km/hr approximately 380 metres towards the township. Lane widths on the Newell Highway near the access are approximately 3.5 metres with 1.0 metre

sealed shoulders. Safe intersection sight distances for the proposed access are required to be 285 metres and are more than 300 metres.

### 5.6.3 Mitigation measures

It is recommended that:

- The existing access point be upgraded to accommodate B-Double turn safety during the construction phase
- Undertake a dilapidation survey prior to construction works
- Gravel pavement improvements to the existing access to accommodate construction vehicle movements
- Truck entering signs (W5-22) to be erected either side of the access during the construction phase to notify motorists of trucks accessing the site

## 5.7 The community and economy

### 5.7.1 Population and accommodation

The population of Narrabri state suburb in 2016, as defined by the Australian Bureau of Statistics and which includes the development site, the town of Narrabri and rural land surrounding the settlement, was 7,606 persons. The total population of Narrabri local government area in 2016 was 13,084 persons. The median age of people in Narrabri state suburb in 2016 was 39 years compared to 40 for the LGA.

Unemployment at the time of the 2016 Census of Population and Housing was 5.7% of the labour force comprising persons aged 15 years and over in Narrabri state suburb. The labour force participation rate in 2016 was 47.5%. The top three occupations were professionals, technicians and trade workers, and managers. The top three industries of employment were coal mining, supermarket and grocery stores, and local government administration.

Occupied private dwellings accounted for 88.4% of dwellings in Narrabri state suburb and 11.6% or 356 dwellings were unoccupied. 87.1% of dwellings were separate houses and the remainder were medium density dwellings.
There are 31 establishments offering accommodation for visitors to Narrabri and the surrounding district listed on the NSW Government's VisitNSW website. These include holiday parks, motor inns, bed and breakfasts, serviced apartments and hotels. In addition to these establishments there are 356 unoccupied private dwellings some of which may be available as short term rentals, and unregulated accommodation places such as AirBnB and Stayz.

**Table 7: Key demographic statistics. Source: ABS Census of Population and Housing 2016**

| Sector | Characteristic | Narrabri (state suburb) | Narrabri LGA | NSW |
|---|---|---|---|---|
| Population | Total persons | 7,606 | 13,084 | 7,480,228 |
| | Median age | 39 | 40 | 38 |
| Employment | Labour force participation rate | 47.5% | 46.0% | 48.2% |
| | Unemployment rate | 5.7% | 6.0% | 6.3% |
| Housing | Occupied private dwellings | 88.4% | 86.3% | 90.1% |
| | Unoccupied private dwellings | 11.6% | 13.7% | 9.9% |
| | Total private dwellings | 3,071 | 5370 | 2,889,061 |
| | Average occupancy rate | 2.5 | 2.5 | 2.6 |
| | Median monthly mortgate repayment | $1,517 | $1,395 | $1,986 |
| | Median weekly rent | $220 | $200 | $380 |
| | Proportion separate houses | 87.1% | 89.0% | 66.4% |

### 5.7.2 Agriculture and land capability

Narrabri is located in the New England and North West region of NSW. According to the Commonwealth Department of Agriculture the gross value of agricultural production in the region in 2018-2019 was $1.8 billion, which was 15 per cent of the total gross value of agricultural production in New South Wales of $11.7 billion. Agricultural land in the region occupies 79,400 square kilometres, or 80 per cent of the region. The most common land use by area is grazing modified pastures, which occupies 39,200 square kilometres or 40 per cent of the New England and North West region (https://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-new-england#regional-overview).

The region has a diverse agricultural sector. The most important commodities in the region based on the gross value of agricultural production were cattle and calves ($611 million), followed by cotton ($390 million) and wool ($115 million). These commodities together contributed 64 per cent of the total value of agricultural production in the region. ABS data indicates that in 2018–2019 there were 4,023 farms in the New England and North West region. Beef cattle farms (1,736 farms) were the most common, accounting for 43 per cent of all farms in the region, and 25 per cent of all beef cattle farms in New South Wales (https://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-new-england#agricultural-sector).

DPI Agriculture uses the land and soil capability mapping scheme as the preferred methodology for the classification of agricultural land. Eight classes of rural land are mapped plus flood irrigation, and mining and quarrying land. Figure 6 below shows land capability mapping for the development site and surrounding land. The development site, including the development footprint, has a land capability of class 3 with a small intrusion of class 2 land near the eastern boundary which is proposed remain under agricultural use. Class 3 indicates that the land has moderate limitations and is capable of sustaining high-impact land uses, however, careful management is required for cropping and intensive grazing to avoid land and environmental

degradation (*The land and soil capability assessment scheme – A general rural land evaluation scheme for NSW, 2nd Approximation*, OEH).

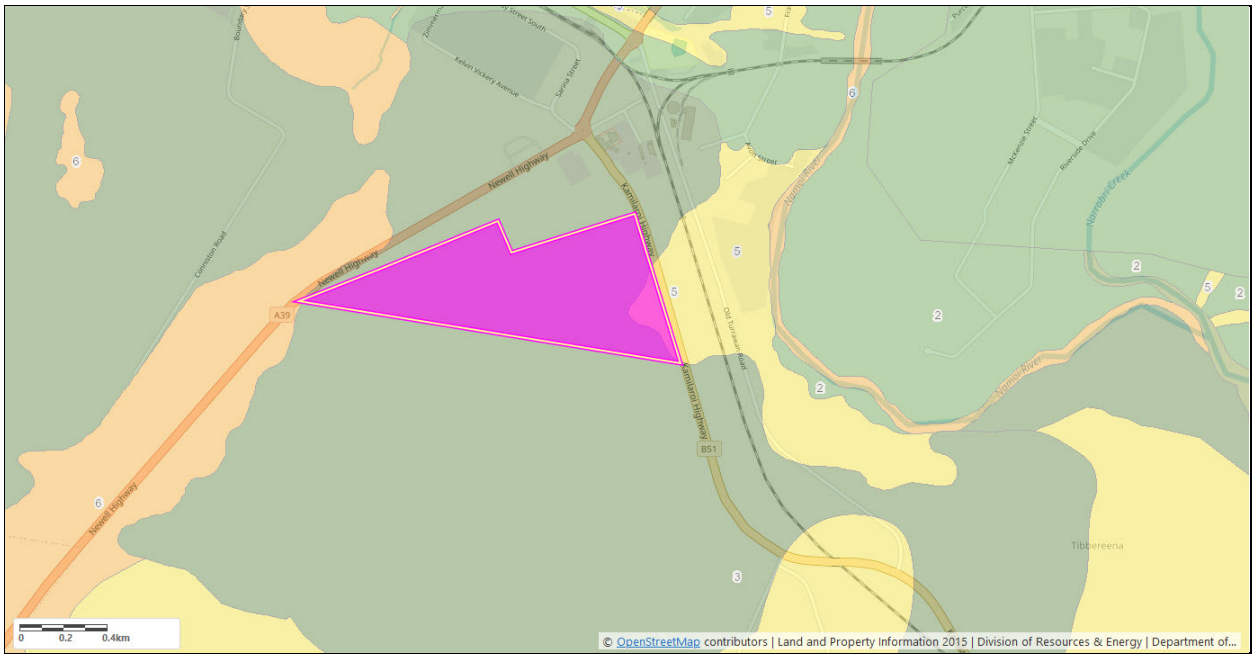


**Figure 6: Land capability mapping. Source: OEH 2021**

### 5.7.3 Potential socio-economic impacts

The benefit to the community of the solar farm will be through an understanding of sustainable development and by gaining a commitment to greater reliance on renewable energy. Similarly, the clustering of solar power generation would bring regional economic development benefits to the New England and North West region as the area gains a reputation as a suitable location for renewable energy and linked industries.

It is anticipated that there will be 50 personnel directly involved in construction on site which is expected to take approximately three months. Varying levels of expertise will be required ranging from labourers to qualified electricians and project managers. In addition, personnel would be involved in transport and delivery of materials to the site. Some of this employment is to be sourced locally. Once operational the site will be unmanned, however, two to three personnel will be necessary to carry out maintenance every quarter or as required. The skills required to be involved in the construction and ongoing maintenance of the solar farm may require some personnel to undergo further training and education, leading to an upskilling of the local workforce and enhanced employment opportunities generally.

Employment and education will bring direct economic benefits to the local economy through wages and salaries and indirect benefits through the need for accommodation and sustenance in the area for non-local employees. Restaurants, cafes, bakeries, supermarkets, pubs, newsagents would all benefit from the additional custom this will bring.

During the initial planning phase ITP (Development) Pty Ltd commissioned local professionals to carry out the land survey of the development site. This initial expenditure generates flow on effects throughout the local economy through income and employment. If necessary, sites officers employed by the Local Aboriginal Land Council will be engaged to carry out a cultural survey prior to commencement of works to identify any Indigenous items or places present on the development site.

It is considered that there is adequate accommodation available to cater to the 50 construction workers given the number of visitor accommodation establishments in the area plus short term rentals and unregulated accommodation providers. It is understood that approximately. There is likely to be negligible effects on the availability of affordable rental over the short construction period as it is not expected that landlords would evict long-term tenants in preference of short term workers. Workers coming to the area would be likely to take up tourist accommodation similar to mine workers across country NSW, however, construction may be limited to the off-peak tourist season if necessary.

The loss of agricultural land due to the development of the solar farm would be minimal – less than a quarter of the entire property and a fraction of agricultural land in the region. The loss of agricultural land would be offset by the contribution that the solar farm will make to the local economy through direct and indirect employment and expenditure over the short term and through the benefits that renewable energy power supply will bring to the region. The landowner may also choose to continue to graze livestock within and around the array, activities that do not require consent, and the additional lease income may be put to improvements elsewhere on the property.

If necessary and practical in terms of security, the land surrounding panel arrays can continue to be used for farming purposes such as the cultivation of vegetables or flowers, or potentially livestock grazing during the operation of the solar farm. The arrays of panels can be removed once the facility is decommissioned and the land can be returned to agricultural use. It is considered that the impact in terms of loss of productive agricultural land should be seen in the context of the impacts on farmland of other forms of power generation, for example, fracking for coal seam gas, and mining for coal and uranium as well as the infrastructure to support the processing of coal and gas.

In summary:

- The solar farm will generate community economic benefits through local employment opportunities during the planning and construction phases as well as limited maintenance and inspection jobs once operational. The development of a solar farm will create a new market for local contractors and expand diversity of income for the land holder
- The loss of productive agricultural land is minimal and temporary. The array of panels can be removed once the facility is decommissioned and the land can be fully returned to agricultural use
- If necessary and practical in terms of security, the land can continue to be used for farming purposes such as the cultivation of vegetables or flowers, or the grazing of sheep during the operation of the solar farm

**Plate 2: Sheep grazing amongst a PV array. Source: Sydney Morning Herald 17 February 2021**

### 5.7.6 Mitigation measures

It is recommended that labour to construct the solar farm and for ongoing maintenance be sourced from within Narrabri LGA wherever possible. Where labour needs to be brought into the

area, it is considered that there would be sufficient accommodation options for employees in the LGA for the estimated 50 workers engaged during the three month construction phase.

It is recommended that advertising be placed in local media and to approach local businesses to determine whether there is the capacity and expertise available in Narrabri and surrounding districts to participate in the construction and ongoing maintenance activities.

## 5.8 Heritage

### 5.8.1 Indigenous heritage

The generic due diligence process outlined in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* was implemented to ensure that an adequate due diligence process that addresses Aboriginal cultural heritage issues has been carried out. This process follows the following five steps:

*1. Will the activity disturb the ground surface?*

Earthworks will involve trenching which is required for cabling of each PV array/module to inverters and a substation. Other earthworks would be pile-driving to support module frames, and to enable the placement of concrete slabs and gravel accessways. Most of the infrastructure would be pre-fabricated off-site, delivered and assembled on-site.

*2a. Search the AHIMS database*

In accordance with the code, an on-line search was carried out of the *Aboriginal Heritage Information Management Service (AHIMS)* that is maintained by Heritage NSW. The search is part of the due diligence process and remains valid for 12 months.

A search of Lot 102 DP 579423 was performed on 10 March 2021. The search results are:

- There are no Aboriginal sites recorded in or near the selected location, and
- There are no Aboriginal places that have been declared in or near the selected location.

It is noted that surveys for Aboriginal objects have not been carried out in all parts of NSW and Aboriginal objects may exist on a parcel of land even though they have not been recorded in *AHIMS*. Further, not all known Aboriginal sites are registered on the *AHIMS* database and not all sites consist of physical evidence or remains, e.g. dreaming and ceremonial sites.

*2b. Activities in areas where landscape features indicate the presence of Aboriginal objects*

The development area does not possess landscape features that indicate the presence of Aboriginal objects.

*3. Can you avoid harm to the object or disturbance of the landscape features*

Not applicable as the development area has been disturbed and farmed, does not possess significant landscape features and no known Aboriginal objects are listed in *AHIMS*.

*4. Desktop assessment and visual inspection*

The desktop assessment found that no known Aboriginal objects are listed in *AHIMS*. A site inspection was made on 12 November 2020 and there was no obvious evidence of any artefacts or items of cultural significance on the surface of the land.

*5. Further investigations and impact assessment*

An extensive search of *AHIMS* records, is not necessary given that there are no Aboriginal sites or places that have been recorded on the development site.

The property lies within the area managed by Narrabri Local Aboriginal Lands Council. The LALC has been advised of the plans to develop the solar farm by email. As not all culturally significant items or places are made public and listed on AHIMS, a request was forwarded to the LALC enquiring as to whether the organization has any knowledge of Indigenous items or places of significance on the property and whether a sites officer should conduct a site survey prior to commencement of works.

It is acknowledged that a condition of consent may be imposed to require a site survey to be carried out by an LALC sites officer either before any work commences or prior to the issue of a construction certificate.

Council may also recommend a condition of consent to comply with provisions of the *National Parks and Wildlife Act 1974* should any evidence of Aboriginal occupation be found during site works. An *Aboriginal Heritage Impact Permit* may be required to be obtained if indigenous heritage objects are found during ground disturbance.

### 5.8.2 Non-indigenous heritage

The development site is not listed as a heritage item in Schedule 5 Environmental heritage of *Narrabri LEP 2012*. The closest listed items to the site are I035 Railway Station Precinct located

at Buri and Mooloobar Streets and I036 War Memorial, Narrabri West located at 37 Mooloobar Street.

Each of these properties is listed as being of local heritage significance. These properties are located in close proximity to each other and are more than 1.5 kilometres north of the development site at the closest point. There is no visual or physical connection between the development site and either of these items. It is considered that a heritage management document is not required.

### 5.8.3 Mitigation measures

Council may recommend that a condition of consent be imposed to require a site survey be carried out by an LALC sites officer either before any work commences or prior to the issue of a construction certificate.

Council may also recommend a condition of consent to comply with provisions of the *National Parks and Wildlife Act 1974* should any evidence of Aboriginal occupation be found during site works. An *Aboriginal Heritage Impact Permit* may be required to be obtained if indigenous heritage objects are found during ground disturbance.

There are no recommendations in relation to non-Indigenous heritage.

## 5.9 Glare and glint

### 5.9.1 Assessment of impacts

A *Glint and Glare Assessment* has been carried out using the Solar Glare Hazard Analysis Tool by ITP Renewables. The findings of the assessment are summarized below. Reference should be made to the *Glint and Glare Assessment* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

The assessment is based on identifying the potential sensitive receptors in close proximity to the development site having regard to the elevation of the site relative to surrounding land and structures or vegetation that would act as visual barriers. Potential glare and glint impacts are assessed and if necessary mitigation measure are recommended to reduce potential impacts to an acceptable level.

### 5.9.2 Findings

As a result 11 residential premises, two commercial premises, and two arterial road routes were identified as potential visual receptors. The results of the analysis indicate that persons occupying the selected properties are unlikely to be affected as a result of the proposed solar farm. Many residences will also not have direct view of the solar farm due to visual obstruction from trees and other structures.

Existing roadside vegetation and the proposed landscape screening on all sides of the array are expected to provide a physical obstruction between the solar farm and road users of the Newell Highway and the Kamilaroi Highway. Road users along other local roads in the vicinity of the site are also not likely to be affected.

### 5.9.2 Mitigation measures

No mitigation measures are necessary in relation to glare and glint.

## 5.10 Landscape character and visual amenity

### 5.10.1 Assessment of impacts

Impacts on landscape character and visual amenity of the proposed solar farm have been assessed by Zenith Town Planning Pty Ltd using the RMS guideline *Environmental Impact Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment* (EIA-N04 Version 2-0 released on 14 December 2018). The findings of the assessment are summarized below. Reference should be made to the *Landscape Character and Visual Amenity Impact Assessment* that is submitted with the development application for further information or clarification of any matter concerning the assessment and recommendations.

The assessment estimates the likely impacts on landscape character and viewpoints based on the sensitivity to physical change and the magnitude, or relative size and scale, of the works and then applies an impact ranking. The methodology included a site inspection of the location of the proposed works and the surrounding area to identify observation points and the visual catchment, land uses and characteristics of the surrounding area. The greater the distance from the development site the less clear is the view of the solar farm. The ability to distinguish the type of land use and the actual composition of materials diminishes with distance. Planning principles established by the NSW Land and Environment Court were also considered as a check on the findings of the landscape character and visual assessment. The observation points located within the visual catchment of the site of the proposed solar farm are shown in Figure 7 below.

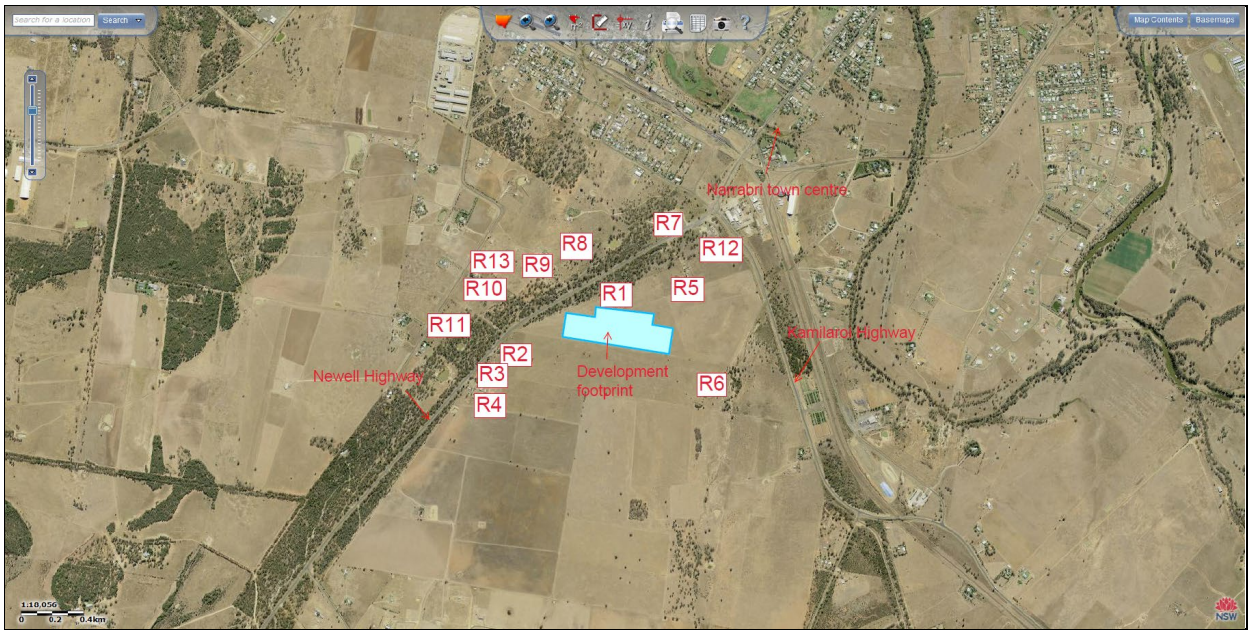


**Figure 7: Observation points in the visual catchment. Source: SIX Maps**

### 5.10.2 Findings

The rural landscape in the vicinity of the development site has been modified by the agricultural industry. It is characterised by a mix of farming, rural uses including rural industrial facilities, rural living dwellings and scattered remnant native vegetation along boundaries, road reserves and patches within private property.

The overall impact on landscape character in relation to private property is assessed to be moderate-high. The overall impact on landscape character in relation to the public domain is also assessed to be moderate-high particularly where there is an uninterrupted line of sight to the facility. The visual impact of the proposed works is assessed to range from low to high for the 11 residential observation points identified in this assessment, depending upon whether there is any roadside vegetation or within private property that interfere with a direct visual connection with the facility. It is assessed to be low for motorists using the Kamilaroi Highway due to the flat topography and presence of industrial development on approach to the township, and moderate for the Newell Highway due to gaps in roadside vegetation which allow full visibility of the site particularly when approaching from the south.

The findings of the assessment acknowledge that there will be impacts on the landscape and visual amenity as there are with any type of development. However, there is no view loss; the impact is a change to the view – a new element within the landscape. Impacts are greatest in close proximity to the solar farm as the further the distance a viewpoint is from the site the less the overall visual impact as the development occupies a lesser proportion of the total view.

The potential impacts of the proposed solar farm on views from both private property and the public domain affect only a minor proportion of the total landscape views. Impacts would be greatest during construction when there will be traffic movements into and out of the site and the temporary car parking and materials laydown areas are installed. Once operational, the proposed landscaping will provide effective screening of the fence, array and inverters over time as vegetation matures.

On balance and having regard to other matters for consideration under section *4.15 Evaluation* of the *Environmental Planning and Assessment Act 1979*, the impacts are considered acceptable given that:

- the solar farm will contribute to renewable energy generation and provide a source of electricity for local domestic and commercial use whilst at the same time assisting to reduce greenhouse gas emissions and our reliance on fossil fuels,
- It will also generate employment opportunities during the construction phase and once operational will provide employment for maintenance crews,
- The placement of the array within the property downslope has been chosen to maximise distance separation from neighbouring dwellings,
- Existing vegetation along road reserves and property boundaries is to be maintained,
- The proposed landscaping surrounding all sides of the array will grow to a height that will screen the facility from observation points including public roads that are on level ground with the development site and elsewhere will soften the visual impact from land that is slightly elevated above the development site.

### 5.10.3 Mitigation measures

It is recommended that native plants that are endemic to the district be selected for the vegetation screen that is proposed to be planted around all sides of the array. Plants should be selected from the list of suitable species contained in the *Narrabri Shire Council Industrial Development Code*.

# 6. CONCLUSION

## 6.1 Findings

The site is considered suitable for the proposed development of the Narrabri Solar Farm. A 22kV feeder is available to connect to the Essential Energy Narrabri 66/11 zone substation to transfer power generated by the solar panels to the township and on to the grid.

The development area is relatively flat, is free of constraints and is accessible to large delivery vehicles during the construction phase and utility vehicles for ongoing maintenance.

The likely impacts of the development have been considered in this Statement and supporting documents. Considerations include impacts on biodiversity, natural hazards, visual and scenic amenity, glare and glint, traffic, noise, air quality, water resources, indigenous and non-indigenous heritage, the community and the local economy. Any impacts on these interests have been found to be acceptable and mitigation measures have been recommended where necessary.

According to the Australian Radiation Protection and Nuclear Safety Agency, which maintains continual oversight of emerging research into the potential health effects of the EMF exposure, there is no established evidence of health effects from exposure to electric and magnetic fields from powerlines, substations, transformers or other electrical sources, regardless of the proximity, causes any health effects. The location of the solar farm and the distance separation between nearby dwellings and the site mean that any potential impacts on health are mitigated.

The solar farm is designed to generate in excess of 12.71GWh of energy annually which will offset almost 8.5 thousand tonnes of $CO^2$ equivalent emissions (Sources: *National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Schedule 1)* and Department of the Environment and Energy) and providing enough energy to power about 2,150 NSW homes.

Electricity generated by the system will be directed to the settlement via existing electrical infrastructure to contribute to the supply of electricity for use by households and businesses in the town centre. Any surplus electricity will be sent to the grid and any deficit will be drawn from the grid. As well as the potential to utilize local contractors to construct the facility, the township will benefit through the ability to provide clean energy that is generated adjacent the settlement.

The cumulative impacts of the proposed development are minor. There are no other electricity generating works in the immediate area and the use is suited to a rural location due to the need for a large land area. The addition of a solar farm to that rural area would not detract unreasonably from local amenity or the natural environment.

The proposed development is consistent with the strategic planning framework that applies to the local government area, the site itself and to the development of electricity generating works. The solar farm is permissible with consent under provisions of *SEPP (Infrastructure) 2007* which prevails over provisions of the local environmental plan and is satisfactory to other applicable SEPPs.

The proposed rural location implements the planning priorities, goals and actions of the *New England North West Regional Plan 2036*, the *Narrabri Growth Management Strategy*, the *Narrabri Local Strategic Planning Statement 2040* and the *NSW Renewable Energy Action Plan*. These objectives seek to capitalize on solar energy resources to increase the provision of renewable energy using rural land in locations that will not cause land use conflict.

The development of the solar farm will assist the transition of our economy from reliance on fossil fuels to renewable sources. It will assist Commonwealth and NSW Governments to achieve targets and objectives relating to emissions and addressing climate change.

Given these local, regional and national benefits of renewable energy generation and based on implementation of the recommended mitigation measures to avoid, minimize or mitigate impacts to the existing natural and built environment, the development is considered to be in the public interest.

### 6.2 Summary of mitigation measures

Table 8 provides a summary of mitigation measures. It is recommended that an environmental management plan be prepared to cover the construction and operational phases.

Where necessary Table 8 includes a recommendation as to whether the mitigation measure should be included in the management plan.

In addition to the mitigation measures detailed below, it is recommended that a waste management plan be prepared for inclusion in an environmental management plan.

**Table 8: Summary of mitigation measures**

| Consideration | Mitigation measures | Environmental Management Plan |
|---|---|---|
| Biodiversity | By way of a clearing process that minimizes the risk to threatened species that may be opportunistically using the site, it is recommended that:<br><br>I. Construction limits and exclusion zones clearly identified prior to work;<br>II. A visual inspection is conducted by environmental staff before construction commences to identify any areas of site that might be supporting native fauna;<br>III. Vehicle movements around the site will be restricted to the construction footprint and away from any existing planted trees and flagging exclusion fencing to be installed.<br>IV. Soil disturbance by vehicle and pedestrian access is to be kept to a minimum outside the construction footprint.<br>V. Any weeds removed (particularly those bearing seeds) are to be disposed of appropriately at the nearest waste management facility. | Yes, with reference to ongoing site access during both construction and operational phases, and to the storage of materials within the site |
| Natural hazards | Prepare a fire emergency management plan and include that plan in the environmental management plan | Yes, for construction and operational phases |
| Water resources | Design – site drainage and water quality controls:<br>• Undertake hydrological assessment of the sites catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff.<br>• Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008).<br>• Develop a site erosion and sediment control plan in accordance with the Blue Book.<br>• Develop site drainage design incorporating detention basins and sedimentation management structures where relevant.<br>• Permanent site drainage should coincide with temporary arrangements where possible | Yes, for construction and operational phases. Include an erosion & sediment control plan or soil and water management plan |
| | Construction and/or demolition – site drainage and water quality controls:<br>• Project construction period to occur entirely within the dry season to prevent flooding<br>• Catch drains to be located downslope of any proposed road works.<br>• Install location appropriate sediment fences or other applicable control measures depending on whether the feature is upstream or downstream of a disturbed part of the site or will need to be trafficable.<br>• All stormwater collection points need to have appropriate sedimentation and erosion controls. | |

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| | • Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness.<br>• Vibration grids or wash bays at all construction exits.<br>• Level spreaders at locations where concentrated flow is discharged offsite to ensure sheet flow like conditions are maintained.<br>• Flat land erosion control options include erosion control blankets, gravelling, mulching, soil binder, turfing and revegetation | |
| | Construction and/or demolition – stormwater point source control:<br><br>In the event of concrete works:<br>• Do not undertake works if chance of heavy rain.<br>• Store rinsate5 water, if applicable, separately to other water on site and dispose of offsite as appropriate.<br>• Block on site drains in the area of the works and remove any contaminated runoff.<br><br>In the event that dewatering practices are required:<br>• Pump hose intakes for withdrawing water from excavations will be elevated to minimise sediment pumping and directed to a containment area for settling prior to discharge.<br>• Limit direct discharge off site (consistent with the design requirements for sediment pond discharge).<br>• Stormwater collected on site should be reused where possible. Controls should be inspected and maintained on a regular basis. All water released from sediment basins should be clear or disposed off site by vehicle.<br>• Material and waste storage areas should be designed and operated to minimise interaction with surface waters.<br>• Vehicle washdown areas should be located away from water courses | |
| Air quality | During construction:<br>• Limit vehicle movements to areas necessary to deliver panels, ancillary structures and equipment<br>• Suppress dust emissions using watering and cease works during dry and windy conditions<br>• Ensure ground disturbance is limited to areas necessary to place footings or to be used for access<br>• Ensure minimal handling of excavated materials<br>• Ensure stockpiles of excavated material is bunded and protected from wind and vehicle movements<br><br>During operation:<br>• Grade and add road base to internal accessways | Yes, for construction and operational phases |

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| | • Revegetate the site with suitable groundcover immediately construction works are completed<br>• Ensure all plant and equipment operates in accordance with specifications | |
| Noise | The following mitigation measures are recommended to address noise emissions during the construction phase:<br>• a construction noise management protocol to minimise noise emissions, manage out of hours (minor) works to be inaudible, and to respond to potential concerns from the community,<br>• where possible use localised mobile screens or construction hoarding around plant to act as barriers between construction works and receivers, particularly where equipment is near the site boundary and/or a residential receiver including areas in constant or regular use (e.g. unloading and laydown areas),<br>• operating plant in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations,<br>• selection of the quietest suitable machinery available for each activity,<br>• avoidance of noisy plant/machinery working simultaneously where practicable,<br>• minimise impact noise wherever possible,<br>• utilise a broadband reverse alarm in lieu of the traditional high frequency type reverse alarm,<br>• provide toolbox meetings, training and education to drivers and contractors visiting the site during construction so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities,<br>• signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site, and<br>• utilise project related community consultation forums to notify residences within close proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.<br><br>It is recommended that the noise emissions from the solar farm be minimised when operational. To assist in noise management, it is recommended that a one-off noise validation monitoring assessment be completed to quantify emissions from site and to confirm emissions relevant criteria are satisfied. | Yes, for construction and operational phases |
| Traffic | It is recommended that:<br>• The existing access point be upgraded to accommodate B-Double turn safety during the construction phase<br>• Undertake a dilapidation survey prior to construction works | Yes, with reference to site access during the establishment and construction phases |

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| | • Gravel pavement improvements to the existing access to accommodate construction vehicle movements<br>• Truck entering signs (W5-22) to be erected either side of the access during the construction phase to notify motorists of trucks accessing the site | |
| The community & local economy | • labour to construct and maintain the solar farm be sourced from within the local government area wherever possible<br>• advertising be placed in local media and local businesses contacted to determine whether there is the capacity and expertise available to participate in the construction and ongoing maintenance activities | n/a |
| Heritage | Council may recommend that a condition of consent be imposed to require a site survey be carried out by an LALC sites officer either before any work commences or prior to the issue of a construction certificate.<br><br>Council may also recommend a condition of consent to comply with provisions of the *National Parks and Wildlife Act 1974* should any evidence of Aboriginal occupation be found during site works. An *Aboriginal Heritage Impact Permit* may be required to be obtained if indigenous heritage objects are found during ground disturbance.<br><br>There are no recommendations in relation to non-Indigenous heritage. | n/a |
| Landscape character & visual amenity | It is recommended that native plants that are endemic to the district be selected for the vegetation screen that is proposed to be planted around all sides of the array. Plants should be selected from the list of suitable species contained in the *Narrabri Shire Council Industrial Development Code*. | n/a |
| Glare and glint | No mitigation measures are proposed. | n/a |

Attachment A

# AHIMS Web Services (AWS)
## Search Result

Purchase Order/Reference : 2020

Client Service ID : 575196

Zenith Town Planning

P O Box 591
Moruya New South Wales 2537
Attention: Allen Grimwood

Email: zenithplan@bigpond.com

Date: 10 March 2021

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 102, DP:DP579423 with a Buffer of 0 meters, conducted by Allen Grimwood on 10 March 2021.**

**The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.**


A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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| 0 | Aboriginal sites are recorded in or near the above location. |
| 0 | Aboriginal places have been declared in or near the above location. * |

**If your search shows Aboriginal sites or places what should you do?**

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

**Important information about your AHIMS search**

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au