
STATEMENT OF ENVIRONMENTAL EFFECTS

Lot 494 DP 66672 and Lot 2 DP 569410
No 347 Dangarsleigh Road, Armidale NSW

Petersons Solar Farm

zenith
TOWN PLANNING

sustainable thinking

Zenith Town Planning Pty Ltd
PO Box 591 Moruya NSW 2537
0408 258 877|zenithplan@bigpond.com|www.zenithplan.com.au

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Attachment B: AHIMS Search Results

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Document Details & History

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1. INTRODUCTION

1.1 Overview

The purpose of this Statement of Environmental Effects is to support an application to Armidale Regional Council to develop a solar farm at Lot 494 DP 66672 and Lot 2 DP 569410, No 347 Dangarsleigh Road, Armidale, referred to as Petersons Solar Farm. The application is for regionally significant development that needs consent and is to be determined by the Northern Regional Planning Panel.

There are no other separate approvals required to be obtained under section 4.46 of the *Environmental Planning and Assessment Act 1979*. The application is therefore not integrated development.

This Statement has been prepared having regard to pre-lodgement advice provided by Armidale Regional Council during discussions held during 2019. Information has also been sourced from the Council's website, the NSW legislation website, SIX Maps, the website of the Office of Environment and Heritage, and the Department of Planning & Environment's Planning Portal. All information referenced in this Statement has been sourced from publicly available documents or websites and from expert reports produced to support the application.

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*.

1.3 The proponent

The proponent for the proposed Petersons Solar Farm is IT Power (Development) Pty Ltd. IT Power (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 Petersons 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 and assist to reduce reliance on these unsustainable means of supply.

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. Petersons Solar Farm will further the goals of sustainability, and the orderly and economic use of land.

2. SITE DESCRIPTION AND CONTEXT

2.1 Description

The site of the proposed Petersons Solar Farm is described as Lot 494 DP 66672 and Lot 2 DP 569410, No 347 Dangarsleigh Road, Armidale, NSW. It is located approximately 4 kilometres south-east of the town centre of Armidale and is an irregular shape with a total area of 100.5 hectares.

Adjoining Lot 192 DP 66672 is in the same ownership and is occupied by the historic Palmerston house, several outbuildings and a second dwelling. Palmerston house is now used for visitor accommodation and is known as Peterson's Guesthouse and Winery.

Access to the site is by way of an unsealed road which is lined with hawthorn trees. The distance between the intersection with Dangarsleigh Road and Palmerston house is approximately 750 metres. The second dwelling is located at the intersection of the primary access road and Dangarsleigh Road.

A secondary access point is located about 500 metres to the north. An 11kV power line runs east to west across the site parallel to the northern boundary.

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

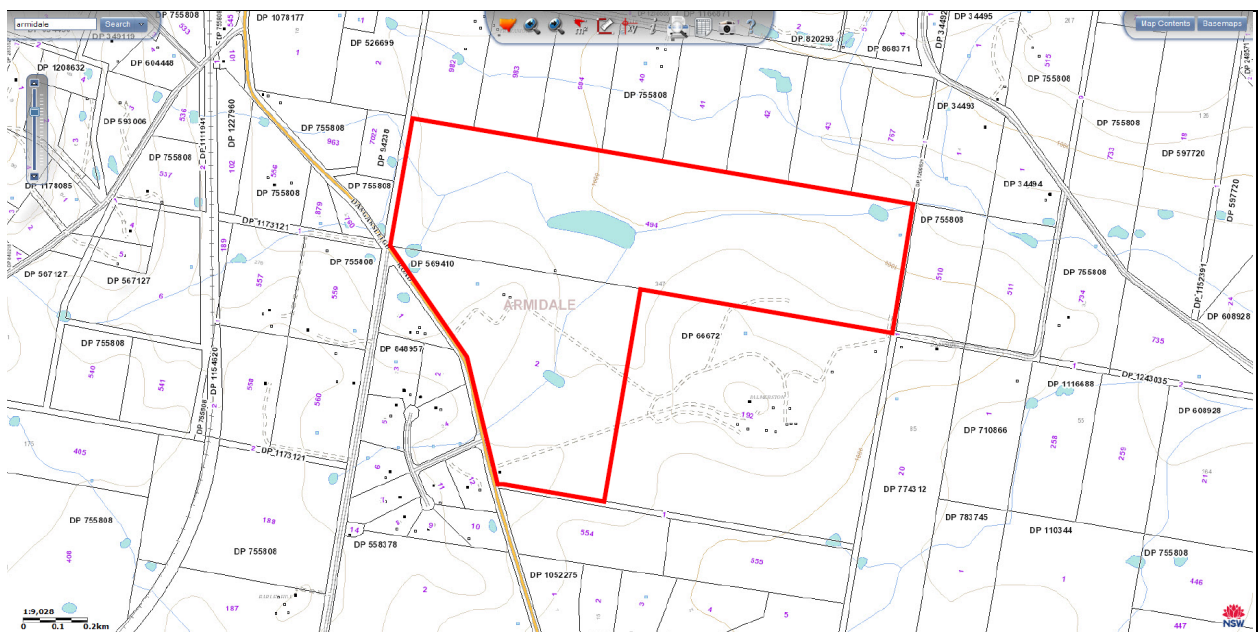


Figure 1: Locality map. Source: SIX Maps, 2019

The site has been cleared in the past for agricultural use other than eucalypt trees scattered across the paddocks and near a large dam. A larger stand of native trees has been retained in the vicinity of a wet area at the south-eastern corner of Lot 41. The land is generally flat in the vicinity of the proposed solar farm and slopes gently to the north from the southern boundary. Part of the site is used for viticulture and there are several structures associated with that use to the north-east of the house.

2.2 Context

The site and surrounding countryside is undulating with steeper country to the west. The majority of nearby land is used for agricultural purposes although rural lifestyle lots are gradually being developed on neighbouring land. Rural lifestyle lots are located to the south of the site, on the western side of Dangarsleigh Road and to the north along Roseneath Lane. The western boundary of the property adjoins Dangarsleigh Road. Land adjoining to the east is farmland. A waste management facility managed by Armidale Regional Council is located to the north approximately one kilometre from the historic house.

An aerial image of the site and surrounding land is shown in Figure 2 below. The site is edged red.

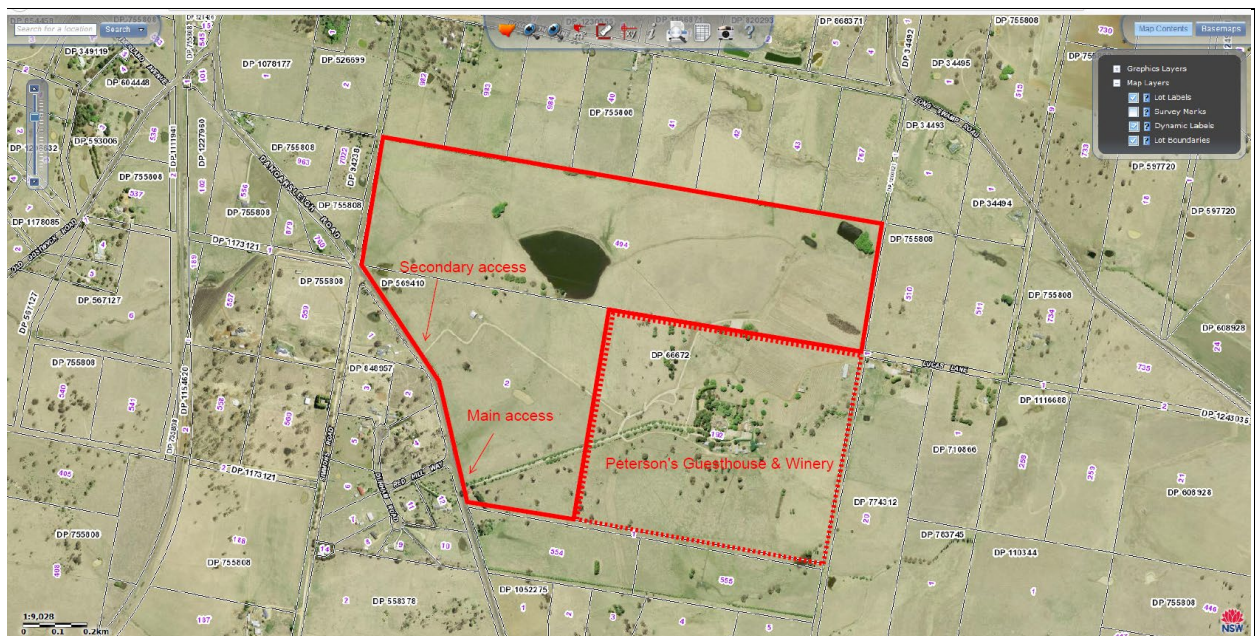


Figure 2: Aerial image with cadastre. Source: SIX Maps, 2019

Below is an extract from the topographic map for land in the vicinity of Armidale. This map shows the location of the settlement, services including transport infrastructure, dams, cadastre and waterways. The development site is 5.5 kilometres east-south-east of Armidale Regional Airport.

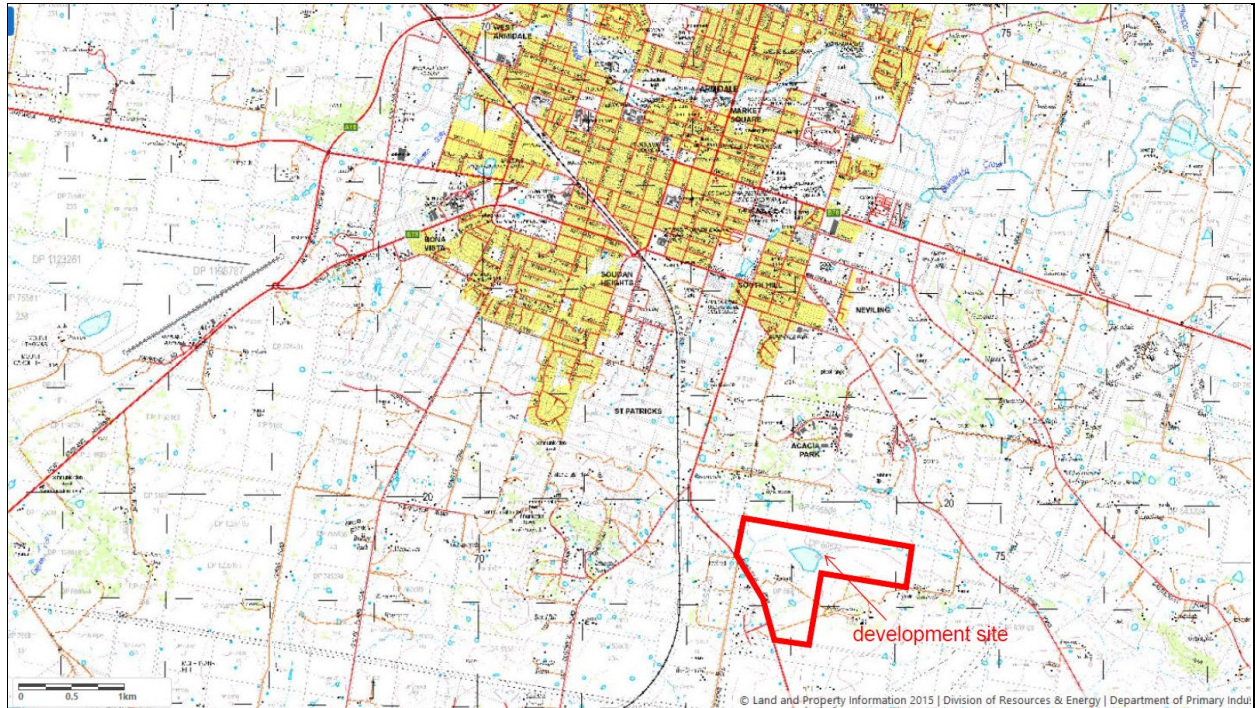


Figure 3: Extract from the topographic map. Source: Land & Property Information 2015

2.3 Climate

Global solar exposure is described on the Bureau of Meteorology website 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/m² (megajoules per square metre). The values are usually highest in clear sun conditions during the summer, and lowest during winter or very cloudy days.

Figure 4 below shows average daily solar exposure for the 12 month period 1 November 2018 to 30 October 2019. Armidale LGA has received an average of between 16 and 18 MJ/m² each day, placing it within the third highest area receiving solar radiation in New South Wales.

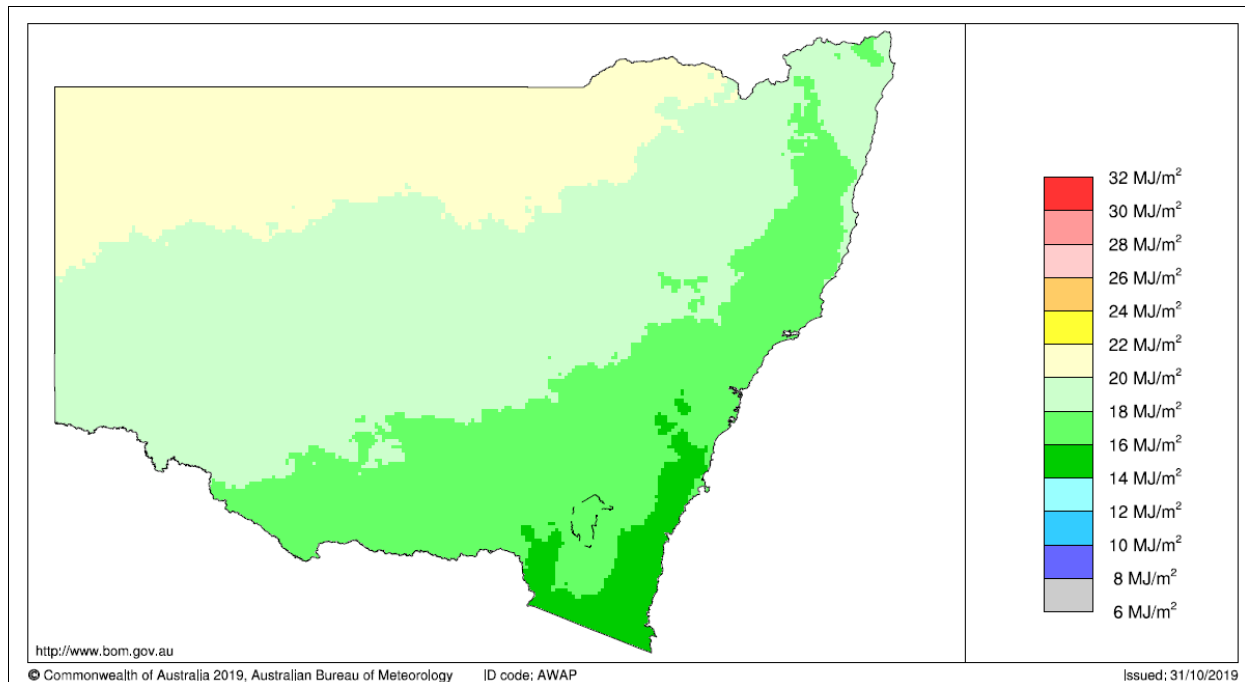


Figure 4: Average daily solar exposure. Source: Australian Bureau of Meteorology

The mean monthly global solar exposure measured at Armidale Airport (station number 56238), the closest measuring station to the Petersons Solar Farm, site, is given in Table 1 below. The annual mean for 2018 was 18.5MJ/m².

Table 1: Mean monthly global solar exposure at Armidale Airport, 2018

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly mean	26.9	20.9	18.5	16.0	12.4	10.7	11.8	15.0	18.2	20.4	24.6	27.0

The map below (Figure 5) shows the average daily hours of sunshine across Australia. Armidale LGA receives an average of 7 to 8 hours of sunshine each day.

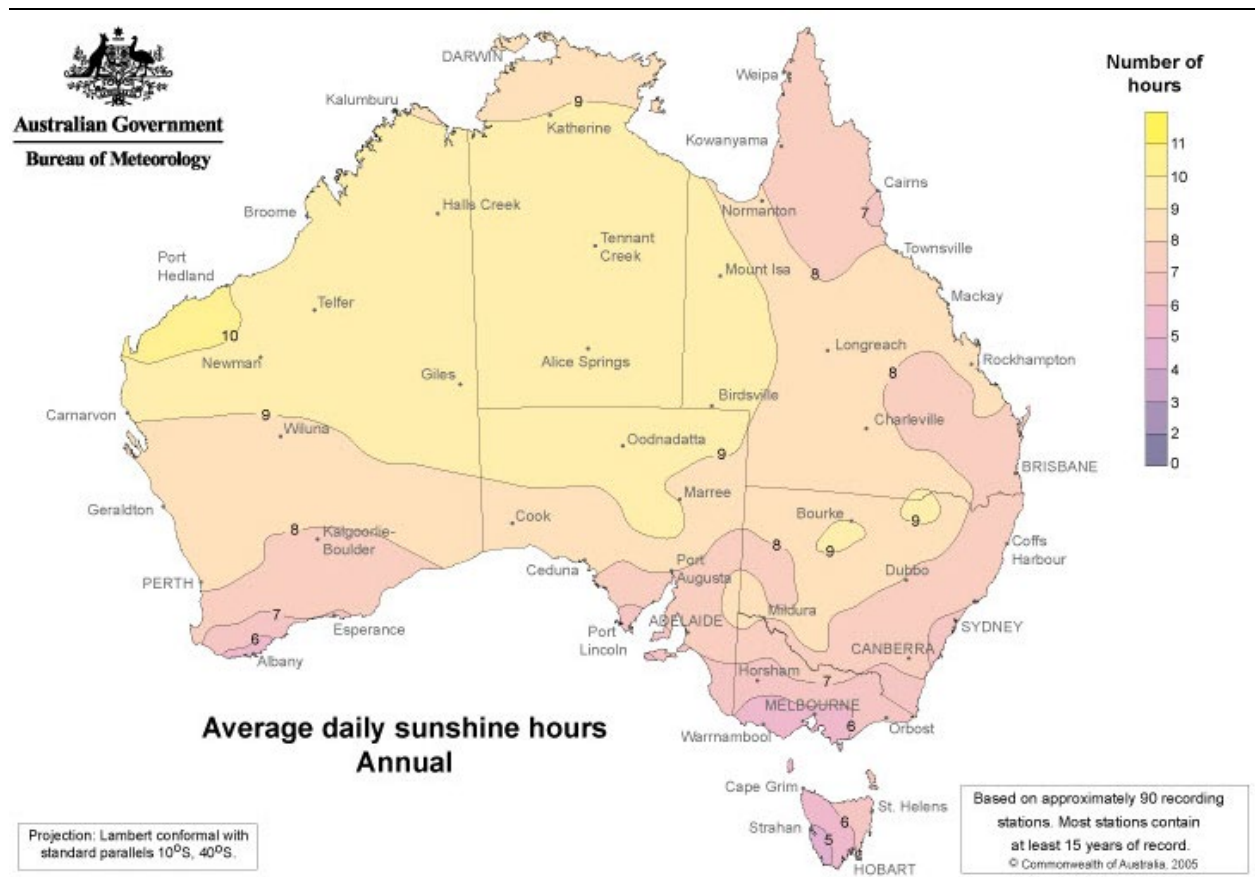


Figure 5: Average daily sunshine hours. Source: Australian Bureau of Meteorology

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 11kV power lines transecting the development site.

3. DETAILS OF THE PROPOSED DEVELOPMENT

3.1 Overview

The proposed development comprises a solar farm and ancillary facilities with a DC capacity of 6.05MWp and an AC output of 5.0MW on approximately 13.7 hectares of the total site. It would be capable of generating 12.98GWh annually. The array is proposed to be placed within a section along the northern edge of Lot 494.

3.2 Photovoltaic panels

There are proposed to be 16,000 solar modules installed in about 200 mounting structures running north to south. There is approximately 6 metres spacing between each row.

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 1.7 metres with the peak of the modules reaching an approximate height of 2.5 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 ARM1B-G-210).

3.3 Inverters and battery storage

Two 2.5 MW AC inverter stations and a transformer will be installed at the solar farm. These inverters are to be located within the array and are each mounted on a 6 metre long skid. Each of these inverter stations incorporate high and medium voltage switchgear. Each will connect by way of underground cables to connect to the a 11kV feeder line that transects the development site east-west within an easement to inject power to the electricity grid at Galloway Zone Substation. Dial-before-you-dig investigations would be carried out prior to commencing all subsurface work.

3.4 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.

There are two access entries to the site. The primary access is located near the south-western corner of Lot 2 and is used by the public to access Peterson's Guesthouse and Winery. The secondary access is located about 500 metres north of the primary access.

It is proposed to use both the primary and secondary access points during construction of the solar farm by splitting divisible loads arriving on B-Doubles or semi-trailers which are too large to negotiate the primary access. Such load-splitting could occur in Armidale or nearby, breaking down loads to vehicles such as a single-unit truck for site delivery. Some larger heavy vehicles including semi-trailers may exhibit better turning performance than the standard Austroads design vehicles and be able to negotiate the existing primary property access without requiring any access upgrades. Field trials could be conducted to determine suitable delivery vehicles. Cars and utilities could use the existing secondary access for site ingress, though would need to use the primary property access for right-turn site egress onto Dangarsleigh Road for the improved sight distances. Traffic control would be implemented for turning each movement to bring indivisible loads to the site, temporarily stopping traffic in each direction on Dangarsleigh Road while a heavy vehicle having appropriate swept path characteristics performed a wide swing off the western edge of Dangarsleigh Road before turning into the primary property access. Localised earthworks and pavement widening may be required to support heavy vehicle loadings off the existing carriageway.

During the initial site establishment phase it is estimated that there will be 6 to 8 light vehicle trips per day and an average 6 to 8 truck and trailer movements. During the construction stage there would be the equivalent of 45 B-Double loads of materials and equipment, with an expected daily maximum of 4 vehicles, accessing the site to deliver PV panels, mounting frame equipment and inverters plus construction machinery to grade the accessways and erect the mounting system.

Internal roads will be unsealed and 4 metres wide running north then west along the southern edge of the arrays. In addition, it is expected that car parking for up to 40 small vehicles will be needed to cater to the 50 construction workers at the rate of 1.2 spaces per vehicle. A temporary car parking and materials laydown area is to be sited at the south centre of the array of panels. A pedestrian emergency exit gate is to be located at the south-eastern corner of the arrays.

3.5 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 1.2 to 2.5 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.

3.6 Landscaping

The development site is ringed by a hawthorn hedge around the perimeter of the property which provides privacy screening from public places such as Dangarsleigh Road. The hedge varies from 3.5 metres to 8.0 metres in height. It is considered that landscaping of the site after installation of the panel arrays is not necessary as the planting of trees within the property would not provide any additional screening benefits. Adjoining properties to the north along Roseneath Road and rural lifestyle properties to the west overlook the development area from higher ground, however, additional landscaping plantings would not provide an enhanced visual screen to these properties.

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. 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.

3.7 Security

Petersons Solar Farm is to be enclosed within a 1.8 metre high security fence setback 23.2 metres from the northern boundary and 13.1 metres from the western boundary and surrounding the array. The hawthorn hedge will be on the outer side of the security fence, between the fence and property boundaries. Solar arrays are to be setback 10 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 2.1 metres similar to that shown in Plate 1 below.

Security lighting is not proposed to be installed.



Plate 1: Example of security fencing

3.8 Decommissioning

Petersons Solar Farm is intended to remain in operation indefinitely in order to contribute to the sustainable electricity power supply to the state of NSW. If, however, circumstances change and it is necessary to decommission the farm in around 20 to 25 years then all infrastructure, panels, mounting frames including footings, inverters, cabling and other sub-surface materials would be disassembled and removed from the site to enable the site to be re-cultivated for cropping or grazing purposes. All gravel surfacing of accessways would be removed unless required for a future use. If necessary, a condition of consent may be imposed that requires a decommissioning plan to be prepared and approved prior to the event.

4. STATUTORY FRAMEWORK

4.1 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.

4.2 State Environmental Planning Policies

4.2.1 State Environmental Planning Policy No 44 – Koala Habitat Protection

SEPP No 44 – Koala Habitat Protection aims to conserve and manage areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. Armidale LGA is listed in Schedule 1 to *SEPP 44* as land to which the policy applies. An assessment of the significance of land on which a development application is lodged will need to be carried out if the land contains any of the tree species listed in Schedule 2 of *SEPP 44*, any areas of land with a resident population of koalas evidenced by the presence of breeding females, recent sightings or historical records, or if the land constitutes potential koala habitat or core koala habitat as defined in the policy. This matter is addressed in section 5.1 *Biodiversity* of this Statement.

4.2.2 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.

The property has been cleared and farmed for many years and is not known to be listed on a Council register of potentially contaminated land. 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.

4.2.3 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 enables Development for the purpose of electricity generating works to be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Zone RU4 Primary Production Small Lots is a prescribed rural zone. Similarly, development for the purpose of a solar energy system may be carried out by any person with consent on any land, although this is limited to no more than 100kW in a prescribed residential zone. The proposed development is located in zone RU4 Primary Production Small Lots and is therefore permitted with consent by *SEPP (Infrastructure) 2007*.

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

This policy replaces four other SEPPs that apply to rural land including *SEPP (Rural Lands) 2008*. The purpose of providing this section is to update the Statement of Environmental Effects in relation to the legislative and policy framework applying to the development site and the proposed development.

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.

4.2.5 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. In this case the proposed development has a CIV of \$6.6 million and is regionally significant. The application will be determined by the Northern Regional Planning Panel.

4.3 Local Environmental Plan

4.3.1 Armidale Dumaresq Local Environmental Plan 2012

The property is zoned RU4 Primary Production Small Lots under *Armidale Dumaresq LEP 2012*. The objectives of zone RU4 are:

- *To enable sustainable primary industry and other compatible land uses.*

- *To encourage and promote diversity and employment opportunities in relation to primary industry enterprises; particularly those that require smaller lots or that are more intensive in nature.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

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 RU4. However, *SEPP (Infrastructure) 2007* prevails over *Armidale Dumaresq LEP 2012* to the extent of an inconsistency meaning that the use is permitted with consent in zone RU4 by way of *SEPP (Infrastructure)*.

The following clauses of *Armidale Dumaresq 2012* apply to the proposed development:

Clause 5.10 Heritage conservation

Clause 5.10 Heritage conservation of *Armidale Dumaresq LEP 2012* applies to items, buildings and structures within a conservation area and to development within the vicinity of a heritage item. The relevant objective of clause 5.10 is *to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views.*

The site is as a listed heritage item in *Schedule 5 Environmental heritage* of *Armidale Dumaresq 2012* and is mapped on the Heritage Map Sheet HER_002A. The heritage item is described as *House "Palmerston", including outbuildings and grounds* and is of local heritage significance. Roseneath house, located to the north of the development site, is also listed in *Armidale Dumaresq 2012* and on the State Heritage Register. This property is of state heritage significance. Statement of Heritage Impact has been prepared to assess the potential impacts of the development on the heritage values of these property. A summary of findings is provided in section 5.9 *Heritage* of this Statement.

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:

- the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,*
- the effect of the development on the likely future use or redevelopment of the land,*
- 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 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 is decommissioned, relics, the natural environment or adjoining developments.

Clause 6.6 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.

Adequate vehicular access is proposed by way of existing entrances to the site off Dangarsleigh Road.

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 Plan

Armidale Dumaresq DCP 2012 applies to all land in Armidale LGA. The objectives of DCP 2012 are to:

- Outline the controls required for development (including subdivision and construction) in specific land use zones.
- Encourage excellence in design to ensure buildings maximise solar access to living areas and private open space, and use any site to its best advantage.
- Promote health, safety and amenity in the planning, design, construction and performance of individual buildings and the built environment.
- Protect the environment, including the impacts on land, air and water, flora and fauna, habitats and biodiversity from the built environment.
- Promote sustainability in infrastructure provision, construction materials, waste minimisation, and energy and water saving products.
- Preserve and protect rural and scenic landscapes.
- Avoid land use conflict and protect amenity.
- Conserve and promote the heritage attributes.

The DCP contains specific objectives, guidance and controls relating to elements of a development proposal including European heritage, Aboriginal heritage, earthworks, geotechnical investigations, stormwater drainage, noise, parking, signage and engineering.

There are no specific development controls for solar farms, however, relevant aspects of the DCP are addressed in section 5. *Environmental Effects* of this Statement. It is recommended that Council impose conditions of consent where detailed design is required for a particular component of the solar farm and those details can be submitted with the application for a construction certificate.

4.5 Land use strategies

4.5.1 New England North West Regional Plan

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. Armidale LGA is located at the south-eastern corner 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 Petersons 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 Armidale in order to directly generate power for use by the local community. This complies with the local government narrative for Armidale Regional Council to *Identify and promote wind, solar and other renewable energy production opportunities*.

5. ENVIRONMENTAL EFFECTS

5.1 Biodiversity

5.1.1 Methodology

A desktop biodiversity assessment has been carried out to determine the potential impact on threatened species and endangered ecological communities. This is supported by a site inspection carried out in September 2019 and knowledge provided by the property manager.

The following sources of information and data have been used to determine whether any threatened species or endangered ecological communities are likely to occur on or near the site:

- SIX Maps aerial imagery,
- NSW BioNet Species Sightings records,
- Mapping by the NSW Office of Environment and Heritage (Lower North East vegetation mapping, Native Vegetation Regulatory Map, Biodiversity Values Map)
- Schedules to the *Biodiversity Conservation Act 2016*, and
- Protected Matters Report of the *Environment Protection and Biodiversity Act 1999*.

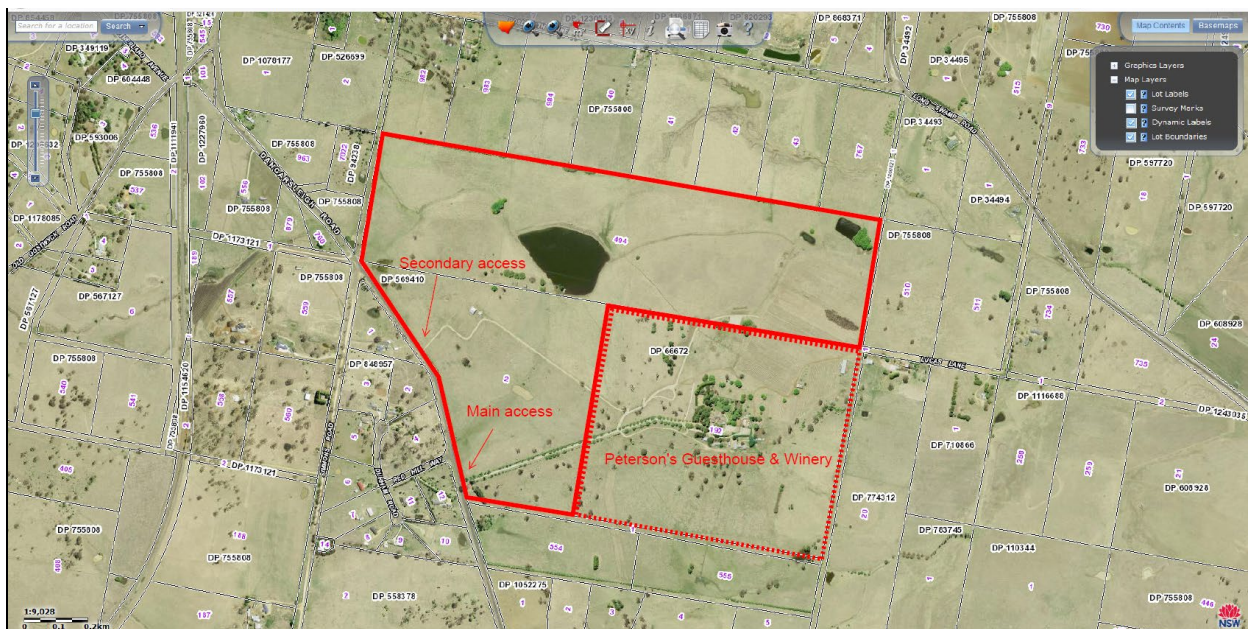


Figure 6: Aerial image of the development site. Source: SIX Maps

5.1.2 Significant flora

Native vegetation/ecological communities

The New England Tableland Bioregion is botanically significant due to its high plant species diversity and high level of endemism. More than 70 species of Eucalyptus occur on the tablelands, about a third of which are endemic or near endemic to the bioregion. The New England Tableland Bioregion provides habitat for 68 species listed in the schedules of the *Biodiversity Conservation Act 2016*. Thirty of these species are listed as endangered, 39 are listed as vulnerable and one species is considered extinct in the bioregion (NSW Department of Planning, Industry and Environment 2016).

Development footprint

The development footprint comprises land that has been cleared and used for the grazing of livestock. The remnants of exotic pasture grasses and agricultural weeds provide sparse ground cover due to the drought currently being experienced in northern NSW. The site is heavily grazed, with the ground surface further exacerbated by dry conditions. There are no signs of recent cultivation, however, it is likely that pasture improvement has been undertaken in the past. The photographs below indicate the condition of the ground surface at the development area.



Plate 2: Looking north across the development area



Plate 3: Soil conditions at the development area

Off site

Cleared land on the remainder of the development site and on adjoining properties that are used for agricultural purposes is of similar cover, condition and land use to that within the development footprint. Remnant native vegetation in the vicinity of the proposal comprises an isolated tree to the south of the development footprint, about 16 metres from the development. The CRAFT Lower North East Vegetation Map indicates that the site has been cleared and is excluded from mapping. Remnant vegetation in the vicinity of the site on property to the north is described as grassy dry sclerophyll forest comprising bloodwood/apple-cold tablelands gums and separately, New England stringybark-yellow box/red gum/red box/apple box.

5.1.3 Significant fauna

The New England Tableland Bioregion supports a considerable proportion of the endangered regent honeyeater population in woodland fragments. Numbers of grassland and ground-feeding insectivorous birds have declined in the bioregion, as have some temperate woodland and forest species, mainly due to changes caused by land clearing and habitat fragmentation associated with agriculture. Ninety-two fauna species listed in the schedules of the Biodiversity Conservation Act have been recorded in the New England Tablelands Bioregion. Of these, 18 are listed as endangered, 72 are listed as vulnerable and a number of

species including two frog species are considered extinct in the bioregion (NSW Department of Planning, Industry and Environment 2016).

Figure 7 below shows the search results from the NSW Bionet Species Sightings map maintained by OEH. Species records of koalas, superb parrots and other general sightings were used. The map indicates that no vulnerable species have been recorded on the site. This is likely due to the extensive clearing and cultivation of crops that has fragmented the landscape.

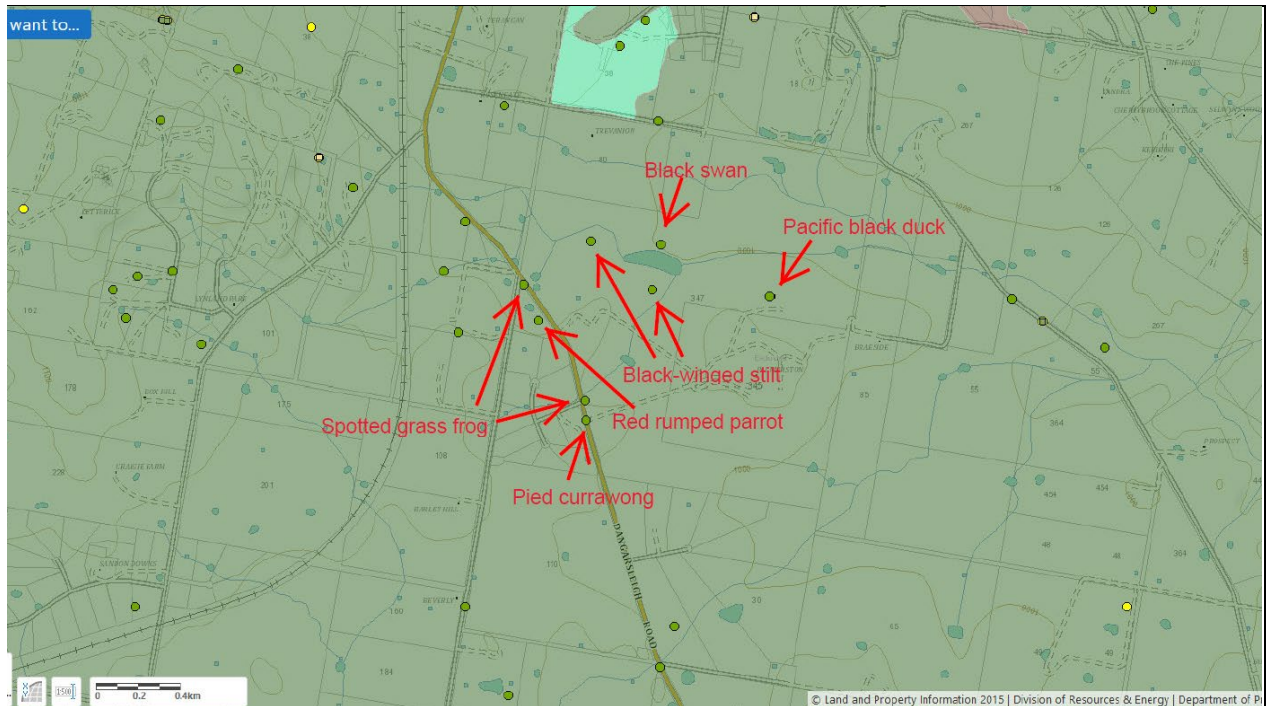


Figure 7: Species sightings and vegetation map. Source: OEH, 2019

A search of the BioNet Atlas of Living Australia has also been carried to determine the potential for endangered and vulnerable species to be present within a 100 square kilometre area surrounding the site. Three species listed as endangered and 23 listed as vulnerable have been recorded in the surrounding area. These species are listed in Table 2 below.

Table 2: Endangered and vulnerable species recorded near the site

Common name	Status
Bush stone curlew	Endangered
Swift Parrott	Endangered
Regent honeyeater	Endangered
Spotted harrier	Vulnerable
Little eagle	Vulnerable
Square-tailed kite	Vulnerable
Black falcon	Vulnerable

Common name	Status
Little Pied Bat	Vulnerable
Glossy black cockatoo	Vulnerable
Powerful owl	Vulnerable
Brown treecreeper	Vulnerable
Speckled warbler	Vulnerable
Painted honeyeater	Vulnerable
Black-chinned honeyeater	Vulnerable
Varied sittella	Vulnerable
Dusky woodswallow	Vulnerable
Hooded robin	Vulnerable
Scarlet robin	Vulnerable
Diamond firetail	Vulnerable
Spotted tailed quoll	Vulnerable
Koala	Vulnerable
Squirrel glider	Vulnerable
Grey-headed flying-fox	Vulnerable
Yellow-bellied sheath- tailed bat	Vulnerable
Eastern false pipistrelle	Vulnerable
Large bent-winged bat	Vulnerable

Given that the part of the site to be developed as a solar farm has been fully cleared and used for the cultivation of crops for many years it is not likely that any endangered, vulnerable or threatened species occur on the site. As shown in Figure 9 the map of the Bionet Atlas search indicates that no endangered, vulnerable or threatened species have been recorded on the site.

5.1.4 Likelihood of occurrence assessment

Potential direct impacts

The proposal, including access, requires no native vegetation or habitat clearing. The single remnant native tree is to be retained.

Potential indirect impacts

Access to the site will run parallel to Dangarsleigh Road and then across the southern edge of the panel arrays.

Typical potential indirect impacts include noise and light disturbance, introduction of weeds and soil compaction. These factors are already in existence due to ongoing agricultural land use.

5.1.5 Biodiversity Values Map

The Biodiversity Values Map is given in Figure 10 below. This map identifies land with high biodiversity value as defined by clause 7.3(3) of the *Biodiversity Conservation Regulation 2017*. The Biodiversity Offsets Scheme applies to all clearing of native vegetation and other biodiversity impacts prescribed by the regulation on land identified on the map.

The Biodiversity Offsets Scheme is used to determine whether the Biodiversity Assessment Method is to be used to assess the impacts of a development proposal and applies to local development. The scheme is triggered based on threshold levels of clearing comprising the land area to be cleared and whether the area is mapped on the Biodiversity Values Map. In this case the development site is not mapped as being of high biodiversity value.

A minimum lot size of 200 hectares applies to the development site. The threshold for clearing of native vegetation above which the Biodiversity Assessment Method applies is 1 hectare or more. It is not proposed to clear the land of any native vegetation, therefore, it is not necessary to engage an accredited assessor to determine the offsets required to enable the project to proceed.

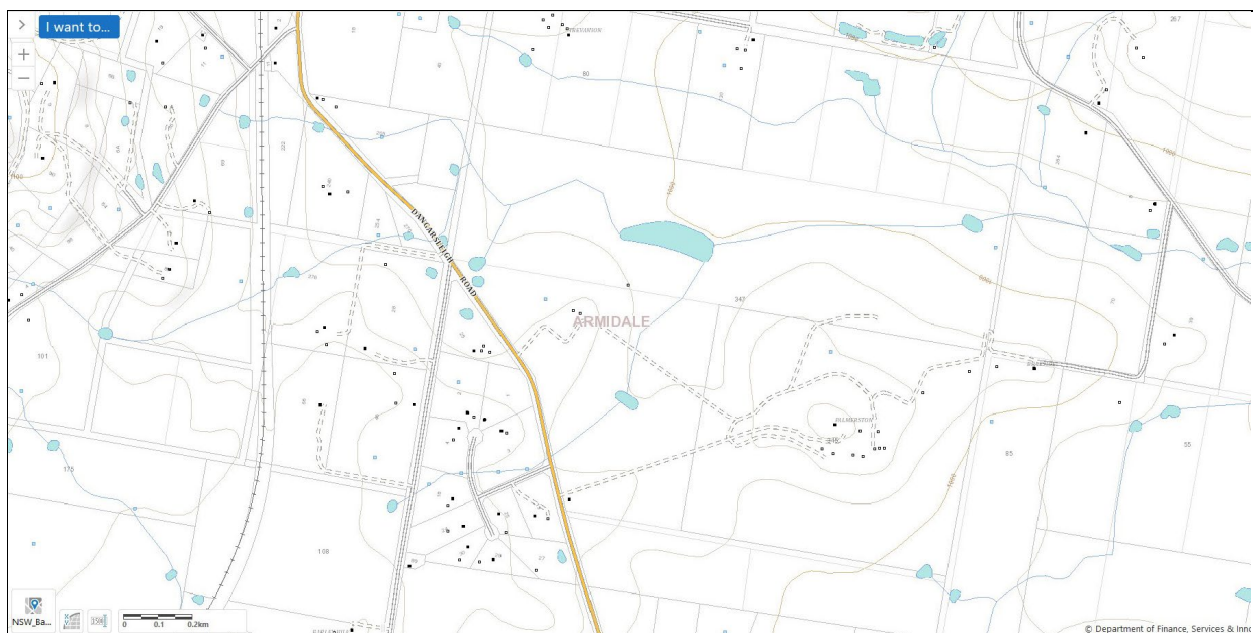


Figure 8: Biodiversity Values Map. Source: OEH, 2019

A test of significance under section 7.3 of the *Biodiversity Conservation Act 2016* may be carried out for local development proposals that do not exceed the Biodiversity Offsets Scheme threshold. This test determines whether the potential impacts of development are likely to significantly affect threatened species, ecological communities, and their habitats. As potential threats to biodiversity are already in existence due

to continuing agricultural land use and no threatened species or EECs have been recorded on the site, it is considered that a significance assessment is not required.

5.1.6 Native Vegetation Regulatory Map

The Native Vegetation Regulatory Map covers rural land in NSW and categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A Land Management (native vegetation) of the *Local Land Services Act 2013*.

The categories are Category 1 (unrestricted management where clearing is exempt from the *LLS Act*), Category 2 is regulated land where the *LLS Act* applies to clearing as either code based, vulnerable or sensitive, and Excluded Land which is not regulated by the *LLS Act*.

The Native Vegetation Regulatory Map for the development site is given as Figure 9 below. This land is not mapped as *sensitive regulated land* (shown in pink) or *vulnerable regulated land* (shown in yellow).

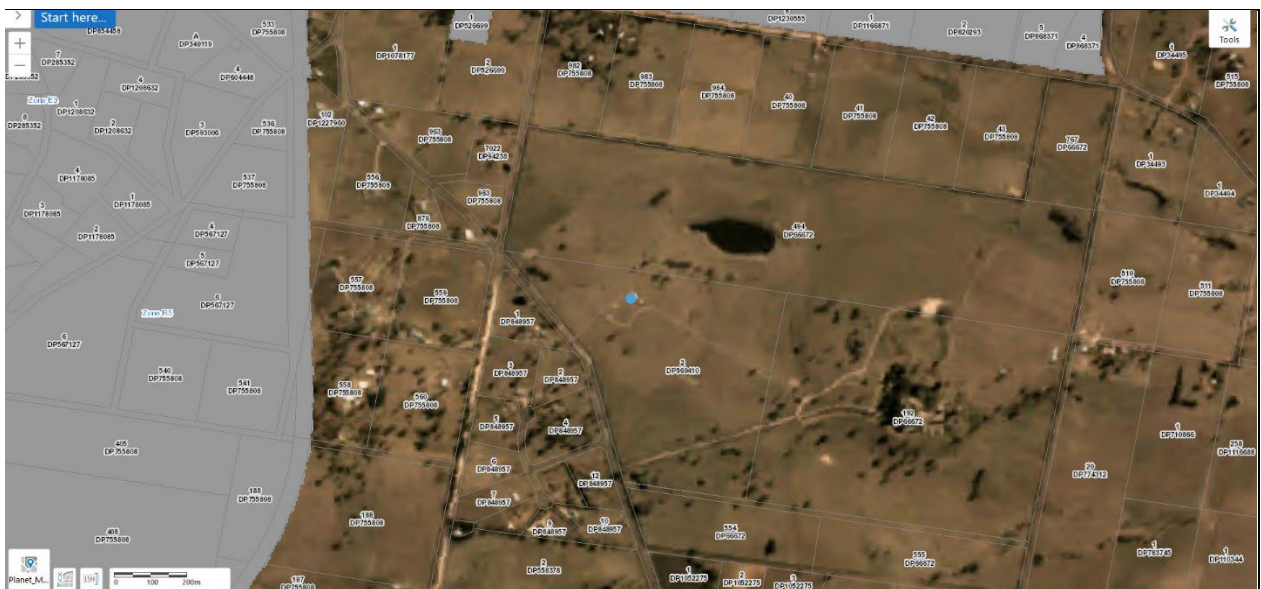


Figure 9: Native Vegetation Regulatory Map. Source: OEHL, 2019

5.1.7 Environment Protection & Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999* affords protection for seven matters of national environmental significance. These matters are world heritage properties, national heritage places, wetlands of national importance, listed threatened species and ecological communities, migratory species, commonwealth marine areas and nuclear actions including uranium mines. Actions that have, or are likely to have, a significant impact on a matter of national environmental significance require the approval of the Australian Government Minister for the Environment and Energy.

Actions include but are not limited to construction, expansion, alteration or demolition of buildings, structures, infrastructure or facilities; storage or transport of hazardous materials; waste disposal; earthworks; impoundment, extraction and diversion of water; research activities; vegetation clearance; military exercises and use of military equipment; and sale or lease of land.

It is the responsibility of the Minister to decide whether assessment and approval is required under the *EPBC Act*. There are potentially 2 listed threatened ecological communities, 25 listed threatened species of flora and fauna, and 13 listed migratory species of flora and fauna protected under the *EPBC Act* within the surrounding locality.

The provisions of the *Environment Protection and Biodiversity Conservation Act 1999* may apply to the development of a solar farm, however, the search of the NSW Bionet Species Sightings map indicates that there are no recorded threatened or migratory species, or threatened ecological communities on the development site. The EPBC Protect Matters Report is appended as Attachment A.

The area to be developed as solar farm is cleared and has been intensively used for the grazing of livestock. There are no wetlands, threatened ecological communities or threatened species listed under the EPBC Act likely to occur on the site. The development is not likely to have a significant impact on a matter of national environmental significance. Referral to the Commonwealth Government is not considered necessary.

5.1.8 Mitigation measures

In summary, the development site is not mapped on the biodiversity values map, the clearing of native vegetation is not above the threshold based on minimum lot size, and a test of significance is not necessary due to the condition of the land. A biodiversity development assessment report is not required and the biodiversity offsets scheme does not apply.

However, it is recommended that any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area. Access to the site is to be limited to that point shown on development plans and within the development area. Storage of materials is to be carried out wholly within the development area.

5.2 Natural hazards

5.2.1 Flooding

The site is not mapped as being flood prone in *Armidale Dumaresq LEP 2012*. Flood mitigation measures and stormwater management have been considered in section 4.3 *Water resources* of this Statement.

5.2.2 Bushfire

The development site is not mapped as being bushfire prone land. 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*.

5.2.3 Mitigation measures

There are no mitigation measures recommended in relation to flooding or bushfire protection.

5.3 Water resources

5.3.1 Assessment of impacts

A desktop assessment of potential impacts on groundwater and surface water flows has been carried out by ITP Renewables. The assessment examines:

- Local hydrology and catchment and water quality data,
- Surface and groundwater quality data,
- Flood-risk potential of the site,
- Hydraulic modelling,
- Impacts of the development against NSW policies and industry standards, and
- Management procedures and mitigation measures for construction and operation.

The development site is located in the Armidale Regional Council Area, 4 kilometres south-east of Armidale. According to spatial data from the Australian Hydrological Geospatial Fabric (Geofabric), the proposed facility is located within a sub-catchment that flows into the Commissioners Waters and Dumaresq Creek systems.

A minor drainage line flows through the site towards the Commissioners Waters located 4.5 kilometres to the east. Commissioners Waters then flow to the south-east away from the town of Armidale. The site is situated upon a relatively flat area, with a slightly sloping north-easterly aspect.

The centre of the site has an elevation of 1072 metres AHD, with the nearest intersecting stream in Commissioners Waters having an elevation of 948 metres AHD. The land is mostly cleared of native vegetation and is currently used for farming.

Maps provided by Armidale Regional Council show the 1% AEP Flood Extent and the Flood Planning Level. The development site is elevated in relation to the flood-prone areas and it seems highly unlikely that the site is vulnerable to flooding. However, heavy rainfall during storm events (or flash flooding) may cause

disruption during construction activities or for material suppliers. As a drainage line exists at the site there is potential for overland flow during rainfall. The water will flow into the existing tributaries towards the Commissioners Waters.

Groundwater data for Armidale Waste Management Facility were examined. Groundwater is present as a series of shallow perched aquifers within 5.0 metres from the surface and within a deeper regional aquifer. The presence of perched groundwater is likely to be intermittent following rainfall which may discharge to a nearby creek, seep into the deep aquifer or form pockets of groundwater above the regional water table.

Surface water conditions have also been monitored at the Armidale Waste Management Facility. Sampling locations were characterized by low and intermittent flows. Cattle grazing also influences surface water quality in local watercourses evidenced by the presence of elevated organic nitrogen in background samples.

5.3.2 Summary of impacts

As a drainage line exists at the site there is potential for overland flow during rainfall. The water will flow into the existing tributaries towards the Commissioners Waters.

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.

5.3.3 Mitigation measures

The following mitigation measures given in Table 3 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 3: Proposed mitigation measures to manage downstream sedimentation

Stage	Measure	Activities/approach
Design	Site drainage and water quality controls	Design Basis • Undertake hydrological assessment of the site's catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff • Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008). • Develop a site erosion and sediment control plan in accordance with the Blue Book. • Develop site drainage design incorporating detention basins and sedimentation management structures where relevant. • Permanent site drainage should coincide with temporary arrangements where possible
Construction and/or demolition	Site drainage and water quality controls	General site works: • Catch drains to be located downslope of any proposed road works. • 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. • All stormwater collection points need to have appropriate sedimentation and erosion controls. • Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness. • Vibration grids or wash bays at all construction exits. • Level spreaders at locations where concentrated flow is discharged offsite to ensure

Stage	Measure	Activities/approach
		sheet flow like conditions are maintained. 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: - Do not undertake works if chance of heavy rain. - Store rinsate water, if applicable, separately to other water on site and dispose of offsite as appropriate. - Block on site drains in the area of the works and remove any contaminated runoff. In the event that dewatering practices are required: - 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. - Limit direct discharge off site (consistent with the design requirements for sediment pond discharge). - 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. - Material and waste storage areas should be designed and operated to minimise interaction with surface waters. - Vehicle washdown areas should be located away from water courses

5.4 Air quality

5.4.1 Assessment of impacts

The Office of Environment and Heritage maintain air quality monitoring stations across rural NSW. The nearest monitoring station to the development site is located at Armidale. 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 (TSP) are measured at this station. Data is collected in 15 minute intervals and reported hourly on the OEH website. Total suspended particulates 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 in the climate of Armidale and can cause poor air quality.

Particles are measured as PM₁₀ and PM_{2.5}. PM₁₀ are particles less than 10 micrometres in diameter. Sources include crushing or grinding operations and dust stirred up by vehicles on roads. Particles less than 10 micrometres in diameter are measured as an hourly average reading of 18.5 at Armidale on Sunday 29 September 2019. 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.

Particles less than 2.5 micrometres in diameter are also measured as an hourly average reading at Armidale. Total suspended particles have an average hourly reading of 7.9 on 29 September 2019. This is a comparatively good to very good reading indicative of the spring climate of Armidale and the Northern Tablelands region. Smoke due to recent bushfires that have occurred in the vicinity of Armidale and consequent hazard reduction burns carried out by the NSW Rural Fire Service and other agencies that manage native bushland, seem to have cleared.

Activities that disturb the earth's surface and that is 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. The land has been modified for agriculture with the consequent loss of most native vegetation leading to exposed soil surfaces. Recent poor air quality is due in part to bushfires and to the effects of the drought causing loss of pasture coverage.

The construction of the solar farm will not involve extensive earthworks and only pile driving for footings for the array framework and excavation for 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 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

An assessment of the impacts of noise emissions has been carried out. 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 assessment includes the following key tasks:

- review construction and operating activities to identify key noise generating plant, equipment, machinery or activities proposed to be undertaken as part of the project;
- identify the closest and/or potentially most affected receptors situated within the area of influence to the project;
- establish existing noise levels to determine project-specific construction Noise Management Levels (NMLs), and operational noise criteria;

- undertake 3D noise modelling to predict levels that may occur as a result of the construction and operation of the project at the closest and/or potentially most affected receptors;
- provide a comparison of predicted noise levels against relevant construction NMLs and operational criteria;
- assess the potential noise impacts associated with construction and operational aspects of the project; and
- provide feasible and reasonable noise mitigation and management measures, and monitoring options, where NMLs or operational criteria may be exceeded.

The assessment has been conducted in accordance with the following key policy and guidelines where relevant:

- NSW Department of Environment and Climate Change, NSW Interim Construction Noise Guideline (ICNG), 2009,
- Environment Protection Authority's (EPA's), Noise Policy for Industry (NPI), 2017,
- NSW Department of Environment, Climate Change and Water (DECCW), NSW Road Noise Policy (RNP), 2011.
- Australian Standard AS 2436-2010 (R2016) (AS 2436) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance sites,
- Australian Standard AS 1055:2018 – Description and Measurement of Environmental Noise,
- Australian Standard AS IEC 61672.1-2004 (AS 61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring, and
- Australian Standard AS IEC 60942-2004 (AS 60942) – Electroacoustics – Sound Calibrators.

Several potential noise sensitive receptors were identified as shown in Figure 10 below. These receptors comprise residential properties and an industrial area. Construction and operational noise levels were predicted to each assessed receptor assuming receiver heights of 1.5m above ground level for typical construction activities and allowing for road traffic noise.

The results of the noise assessment demonstrate that construction noise levels are expected to satisfy the relevant construction noise management levels at all but 10 of the 53 receiver locations. Recommendations have been provided to minimise the potential noise impacts upon receivers for the three month construction period.

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.

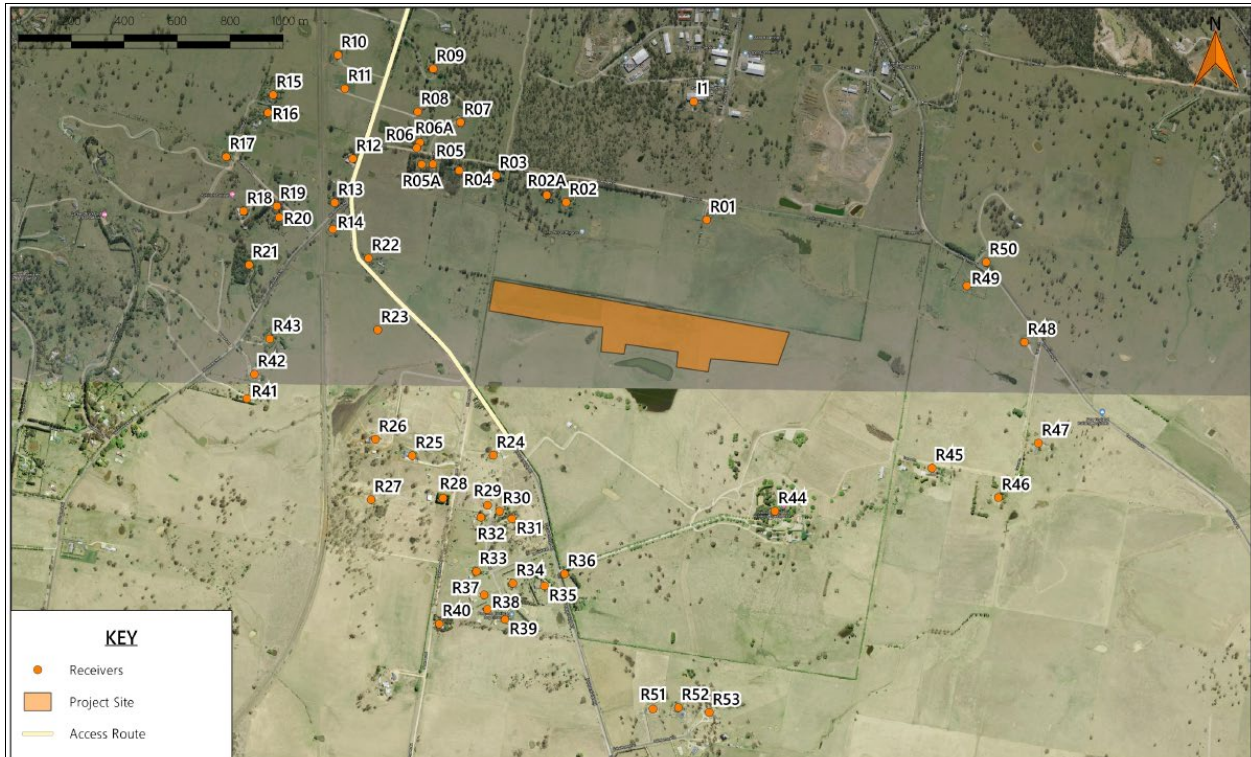


Figure 10: Location of noise sensitive receptors

5.5.2 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 Electromagnetic radiation

5.6.1 Potential radiation sources

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 (μ T), 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.

5.6.2 Mitigation measures

The location of the proposed Petersons Solar Farm and the distance separation between nearby dwellings and the site mean that any impacts on health are mitigated. No additional mitigation measures are proposed.

5.7 Traffic and access

5.7.1 Existing access arrangements and proposed movements

An assessment of the impacts on traffic and the adequacy of access arrangements has been carried out by New England Surveying & Engineering. The assessment includes a description of the existing road network and considers expected traffic generation during construction and operation, site access and intersection capacity.

Site access

The primary access to the development site is located near the south-western corner of Lot 2 and is used by the public to access Peterson's Guesthouse and Winery. The secondary access is located about 500 metres north of the primary access. It is approximately 4.5 metres wide and there is approximately 4.7 metres clearance between existing access gates which are setback about 8 metres from the edge line of Dangarsleigh Road.

Dangarsleigh Road runs in a north-south orientation and collects traffic from numerous smaller roads. Dangarsleigh Road past the subject property comprises a fully sealed two-lane, two-way road having two 3 metres wide traffic lanes in each direction. There are shoulders of width one metre on each side of the road, with a 0.5 metre sealed adjacent the carriageway. Edge lines are marked adjacent the northern part of the property frontage. The speed limit is 80km/h along Dangarsleigh Road, changing to 100km/h 150 metres south of the primary Petersons Winery and Guesthouse access.

It is proposed to gain access to the development area using both the primary and secondary access points. Access within the site is proposed by way of a new internal access track to be constructed from the existing internal roadway, approximately 45 metres east of the northern-most Dangarsleigh Road property entrance. A culvert will be constructed where the internal access track crosses the unnamed non-perennial watercourse. Using the existing primary access will minimise any impact to the existing hawthorn hedge inside the property perimeter.

A construction car park will be created east of the solar farm compound entrance, with capacity for 40 light vehicles, and a lay down area constructed within the fenced compound for the delivery and handling of source materials.

Traffic volumes

Traffic counts were taken by Armidale Regional Council on Dangarsleigh Road in September 2014. The Average Annual Daily Traffic (AADT) during this count was 341 vehicles per day in both north and south directions, including 8.5% heavy vehicles representing 27 heavy vehicle movements per day. The peak

morning traffic was 32 vehicles per hour between 8.00am and 9.00am, and peak evening traffic was 32 vehicles per hours between 4.30pm and 5.30pm.

Assuming a steady annual growth rate of 5% over the 5-year period since the traffic count was conducted, the 2019 AADT is estimated at up to 360 vehicles per day, suggesting peak morning and afternoon traffic of 34 vehicles per hour. There are an estimated 34 dwellings which may enter Dangarsleigh Road between where the traffic counts were taken and the development site. As the development is in a rural area, each dwelling is expected to generate 7 daily vehicle trips, and 0.7 peak hour vehicle trips. Accounting for these dwellings, the estimated 2019 AADT on Dangarsleigh Road at the site is 600 vehicles per day, and estimated peak traffic is 58 vehicles per hour. Given the large number of rural residential allotments on Dangarsleigh Road and with Armidale as the principal hub, it is assumed that northbound and southbound traffic is split 75:25 for AM peak hour and the reverse for PM peak hour.

5.7.2 Findings

Safe intersection sight distance

Safe intersection sight distance is available on the northern approach to the primary access. The design longitudinal section for Dangarsleigh Road indicates that vehicles may be temporarily unsighted on the southern approach to the primary access due to vertical geometry, though longer-range views to the next ridge allow motorists to egress safely after stopping at the intersection.

Intersection geometry

Vehicles having a larger swept path such as the 19m prime mover and semi-trailer, and the B-Double 25m in length having a desirable minimum turning radius of 15 metres to the outer wheel path, are constrained by both the existing timber paling entrance fencing and the width of pavement in the throat of the intersection at the primary access point, though even with if these constraints were moved these larger heavy vehicles would be required to briefly use the entire pavement width of Dangarsleigh Road for left-in, left-out turning manoeuvres. The Austroads 19m B-Double could perform left-in, left-out turning manoeuvres to and from Dangarsleigh Road with some more modest fencing and pavement improvements.

Localised earthworks and pavement widening would be required at the sharp corners inside the property to ensure that heavy vehicles on the primary access could manoeuvre onto the secondary access track.

Traffic generation

The estimated peak hour traffic generated during construction of the solar farm is 40 vehicles per hour, representing an increase in peak hour traffic of approximately 169% on Dangarsleigh Road adjoining the development. While this percentage increase appears high, most of the generated traffic will be travelling

in the opposite direction to the existing peak flows on Dangarsleigh Road, and the overall peak hour volume of less than 100 vehicles per hour is well within the capacity of the existing road. The functional classification of Dangarsleigh Road and surrounding public roads will not be altered by the development, and overall the impact of generated traffic is considered to be minor.

Conclusion

Traffic generation resulting from up to 50 staff being on site during the construction period can be readily accommodated by Dangarsleigh Road and surrounding roads and intersections;

There is adequate area within the site to design and construct internal circulation roads, parking and manoeuvring areas for predicted traffic volumes and loads in compliance with the provisions of AS2890.1 and Armidale Regional Council. The internal access should have well-spaced suitable for heavy vehicles to pass opposing traffic. Authority approvals may be required for any waterway crossings.

Localised access improvement works be undertaken in accordance with the recommendations contained within section 4.4 of the report, including those works specified in either section 4.4.1, 4.4.2 or 4.4.3, depending upon heritage constraints and Armidale Regional Council requirements.

5.7.2 Mitigation measures

It is recommended that:

- all internal circulation roads, parking and manoeuvring areas are designed and constructed for the design number, dimension and mass of the design service vehicles, and in compliance with the provisions of AS/NZS2890.1 Off Street Parking and Armidale Regional Council. Internal roads should have regular hard-standing provision for heavy vehicles travelling in opposite directions to pass. Given the short-term nature of the traffic-generating works and the rural environs, it is considered that unsealed pavements would be suitable for all internal roads, parking and manoeuvring areas.
- upgrade the existing primary access to be suitable for B-Double access. The works would require removal of existing fencing and signage, minor trimming and removal of hedging/vegetation, protection for the electricity stay cable, and pavement widening. Additional earthworks and pavement construction would be required to improve tracks inside the property suitable for heavy vehicle manoeuvres. Suitable signage would be desirable to delineate the access in lieu of achieving Approach Sight Distance for drivers unfamiliar with the access location and arrangements. With any improvement of the existing primary property access it would be desirable to reshape the batter south of the driveway and east of Dangarsleigh Road.

5.8 The community and economy

5.8.1 The population

The population of Armidale state suburb in 2016, as defined by the Australian Bureau of Statistics and which includes the development site and rural land surrounding the Armidale settlement, was 23,352 persons of which over 78.3% were born in Australia. The total population of Armidale local government area in 2016 was 29,449 persons.

Occupied private dwellings accounted for 87.7% of dwellings in Armidale state suburb and 12.3% were unoccupied. Over 80% of dwellings were separate houses and 16% were medium density dwellings.

Unemployment at the time of the 2016 Census of Population and Housing was 8.3% of the labour force comprising persons aged 15 years and over in Armidale state suburb. More than a quarter of employed people were professionals with significant proportions employed as clerical and administrative workers, community and personal service workers, technicians and trade workers, managers, labourers and sales workers. The top industries of employment were higher education, hospitals, combined primary and secondary education, social assistance services and supermarket and grocery stores. Employment in the agriculture, forestry and fishing sector was 4.5% for Armidale state suburb and 10.8% for whole LGA.

5.8.2 Change of use of agricultural land

Armidale is located in the New England and North West region. According to the Commonwealth Department of Agriculture the gross value of agricultural production in the region in 2017-2018 was \$2.6 billion, which was 20 per cent of the total gross value of agricultural production in New South Wales of \$13 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 region.

The New England and North West region has a diverse agricultural sector. The most important commodities in the region based on the gross value of agricultural production were cotton (\$884 million), followed by cattle and calves (\$679 million) and wheat (\$215 million). These commodities together contributed 67 per cent of the total value of agricultural production in the region. ABS data indicates that in 2016–2017 there were 4,456 farms in the New England and North West region. Beef cattle farms (1,836 farms) were the most common, accounting for 41 per cent of all farms in the region, and 26 per cent of all beef cattle farms in New South Wales.

According to the demographic analysis firm .idcommunity which has been engaged by Armidale Regional Council to prepare an economic profile for the LGA, in 2015/16, the total value of agricultural output in the LGA was \$181 million. The largest commodity produced was livestock slaughterings, which accounted for \$110 million or 60.9% of the LGAs total agricultural output in value terms.

Figure 11 below shows land capability mapping for the development site and land to the south of Armidale. Land that is shaded green is class 3 land capability. The development site has a land capability class of 3. This indicates that the land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation. (*The land and soil capability assessment scheme – A general rural land evaluation scheme for NSW, 2nd Approximation, OEH*).

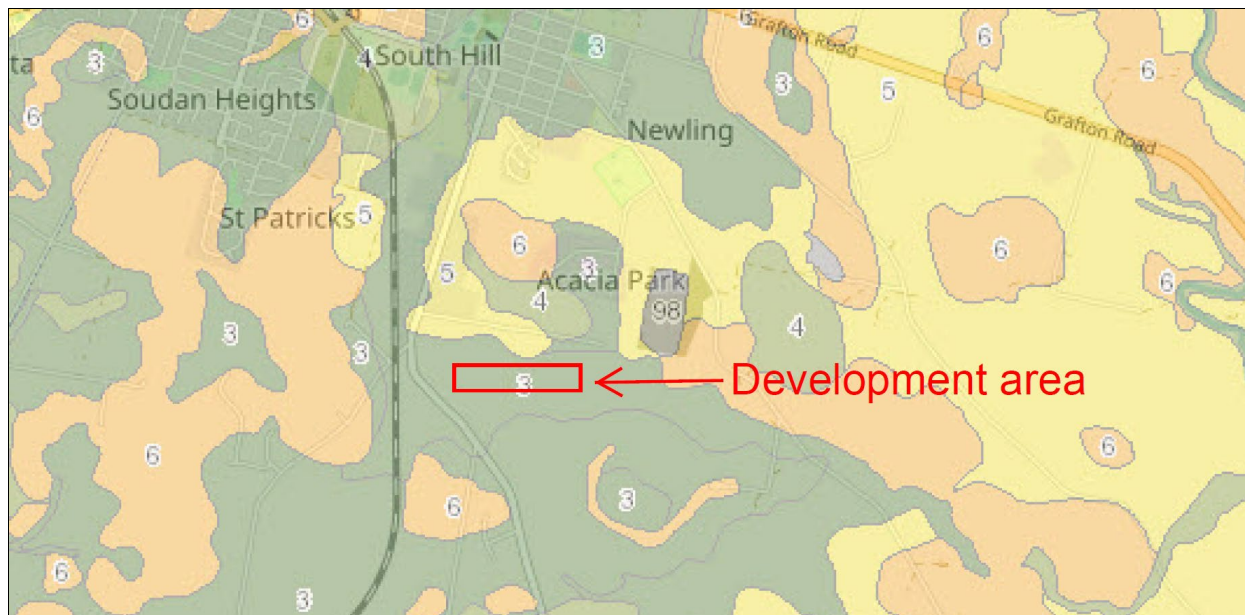


Figure 11: Land capability mapping. Source: OEH 2019

The development site is usually used to graze livestock, however, grazing has been suspended due to the severe drought that has affected water supplies and pasture growth. The loss of agricultural land due to the development of Petersons Solar Farm would be minimal and temporary. It 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 land area to be occupied by the solar farm represents a fraction of the total agricultural land used for livestock grazing.

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.

5.8.3 Employment

Petersons Solar Farm is designed to generate in excess of 12.71GWh of energy annually with the system offsetting almost 8.5 thousand tonnes of CO² 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.

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 New England and the North West region as the area gains a reputation as a suitable location for renewable energy and linked industries.

During the initial planning phase ITP (Development) Pty Ltd commissioned local professionals to carry out the land survey, traffic engineering and an indigenous cultural survey of the development site. This initial expenditure generates flow on effects throughout the local economy through income and employment.

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. This 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.

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 Petersons 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.

According to the most recent available visitor accommodation data made available by Destination NSW there were 17 hotels, motels and serviced apartments with 15 rooms or more in 2016 which provided 446 rooms in Armidale LGA. Occupancy rates ranged over the year from 55.3% in the September quarter to 58.7% in the June quarter.

In addition to these establishments there are bed and breakfasts, short term rentals, unoccupied private dwellings and unregulated accommodation places such as AirBnB and Stayz. It is considered that there is adequate accommodation available to cater to the expected number of construction workers even if all are sourced from outside the Armidale area.

5.8.4 Summary and mitigation measures

In summary:

- The development of a 5MW solar farm will contribute to the electricity grid in a sustainable manner that reduces greenhouse gas emissions and will assist the transition of our economy from reliance on fossil fuels to renewable sources to decarbonise electricity production
- The solar farm will assist Commonwealth and NSW Governments to achieve targets and objectives relating to emissions and addressing climate change
- 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 arrays of panels can be removed once the facility is decommissioned and the land can be returned to agricultural use
- 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 the grazing of sheep during the operation of the solar farm
- Any impacts on the natural environment including the scenic quality of the rural landscape are minimal and can be mitigated. Alternatively, the natural environment may benefit such as through the restoration of native grasses in and around panel arrays

It is recommended that labour to construct the solar farm and for ongoing maintenance be sourced from within Armidale LGA wherever possible. Where labour needs to be brought into the Armidale 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. Recent occupancy rates and the level of visitor accommodation available in the local government area suggests that there is adequate accommodation to cater to the volume of workers during the construction period.

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.

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 Armidale and surrounding districts to participate in the construction and ongoing maintenance activities.

5.9 Heritage

5.9.1 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 the Office of Environment and Heritage. The search is part of the due diligence process and remains valid for 12 months. The search results are appended as Attachment B.

A search of Lot 494 DP 66672 and Lot 2 DP 569410 was performed on 30 September 2019. 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 Monday 16 September 2019 and there was no evidence of any artefacts on the surface of the land.

5. *Further investigations and impact assessment*

Armidale Local Aboriginal Lands Council has been advised of the plans to develop the solar farm and a cultural site survey was undertaken by Iwatta Aboriginal Corporation on Friday 5 July 2019. Survey transects were completed in a north-south direction, beginning along the western margin and moving from west to east. Ground surface visibility in the study area was 80-90%. The report concludes:

The results of the field work completed for this cultural heritage assessment located no surface Artefacts, sites or places of Aboriginal Cultural significance across the study area. The environment across the study area is dominated by undulating plains, cleared of trees with dams placed in various locations across the landscape. Currently it is utilised as prime pastoral land for cattle grazing.

No further Archaeological investigation is required, if for any reason changes are made to the footprint outlined in this report, further Archaeological investigation will be required.

The report of the survey is appended as Attachment C.

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.

5.9.2 Non-indigenous heritage

There are many properties in and around the historic town of Armidale listed as heritage items in. Fourteen of these properties are. The House, "Palmerston", including outbuildings and grounds is listed as an item of local heritage significance in *Schedule 5 Environmental heritage of Armidale Dumaresq Local Environmental Plan 2012*. All three properties that make up the former Palmerston property are mapped as being a heritage item on Heritage Map Sheet HER_002A. Roseneath, located at 36 Roseneath Lane, Armidale, which is approximately 300 metres north-west of the development site at the closest point, is listed as being of state significance in the State Heritage Register.

Clause 5.10 Heritage conservation of *Armidale Dumaresq LEP 2012* applies to these items, buildings and structures within the conservation area and to development within the vicinity of a heritage item. The relevant objective of clause 5.10 is *to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views*. Clause 5.10 (5) enables a consent authority to require that a heritage management document be prepared for development in the vicinity of a heritage item or heritage conservation area, that assesses the extent of effects on heritage significance.

A Statement of Heritage Impact has been prepared in accordance with clause 5.10(5) to assess the extent to which the proposed development would affect the heritage significance of the Palmerston residence. Any impacts on the heritage values of Roseneath house are also assessed due to the proximity of the development area to that property and visual connections.

The findings of the assessment are that the impacts of the proposed Petersons Solar Farm on Palmerston house, outbuilding and grounds or Roseneath house are minimal. Any visual impacts on the grounds of Palmerston house are considered acceptable as they are mitigated by vegetation and topography. It is acknowledged that the outline and panels of the solar farm may be able to be seen from the outer edge of the vegetated curtilage of Palmerston house and possibly from Roseneath Lane during winter months when the exotic deciduous trees are devoid of leaf. However, vegetation within the curtilage of both houses and on intervening land in the case of Roseneath house will provide effective screening for most of the year and serve to distract the eye of viewers.

The design and placement of the proposed solar farm and the impact of the land use for renewable energy generation would not impact on the heritage significance of Palmerston house, any outbuildings or the grounds within the curtilage of the item. This is due to distance separation and the slope of the land away from the house to the north. Similarly, the solar farm would not impact on the heritage significance of Roseneath house due to distance separation and development on intervening land to the south of that item.

5.10.3 Mitigation measures

No mitigation measures are necessary in relation to indigenous or non-indigenous heritage.

5.10 Visual and scenic amenity

5.10.1 Methodology

Impacts on the visual and scenic amenity of the proposed Petersons 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 28 March 2013). Details of methodology are given below.

A site inspection of the location of the proposed works and the surrounding area took place in September 2019. The visual catchment, the context of the site of the proposed works and viewpoints were identified at this time. Land uses and characteristics of the environment such as topography, vegetation, architecture of neighbouring buildings and any heritage values of any significant sites in the vicinity of the proposed solar farm were noted and the capacity of the area to absorb physical change is assessed. Development plans for the solar farm have been reviewed and the likely impacts on landscape character identified. This is determined by the sensitivity of the landscape to physical change and the magnitude, or relative size and scale, of the works.

The visual significance of the site to viewpoints and receivers within the visual catchment is described in terms of proximity to the site, landscape character, the composition of views and the sensitivity to change that will affect scenic values. The visual impacts that will be experienced by each receiver are identified and evaluated in terms of the sensitivity of each receiver to change and the magnitude of that change in terms of the proposed works.

The impacts are calculated and ranked according to negligible, low, moderate or high impact based on the following matrix (sourced from the RMS *Guideline for Landscape Character and Visual Impact Assessment*).

Table 4: Landscape character and visual impact grading matrix. Source: RMS Guideline for Landscape Character and Visual Impact Assessment, 2013

Landscape character and visual impact grading matrix					
	Magnitude				
Sensitivity		High	Moderate	Low	Negligible
	High	High impact	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

The findings of the landscape character and visual impact assessments are summarised in the conclusion. Recommendations as to refinements of the development plans to avoid or mitigate significant landscape and visual impacts are made if necessary.

5.10.2 Description of the landscape

The character of the landscape near the site of Petersons Solar Farm is predominantly an open modified agricultural landscape that has been sculpted by farming. It is gently undulating with some remnant

vegetation along road reserves and steep sections of land. A number of creeks traverse the landscape that flow into Commissioners Waters and Dumaresq Creek.

The site itself is rural and located south-east of the township of Armidale. Structures within the vicinity of the site comprise scattered rural farm and rural lifestyle dwellings set within primary production land uses. Photographs provided below illustrate the site and surrounding area. The landscape is assessed to have medium sensitivity to change.

5.10.3 Assessment of impacts on landscape character

The proposed Petersons Solar Farm will comprise approximately 16,000 solar modules. These are to be placed within a confined area of about 13.7 hectares at the north-western corner of the property. The development site is ringed by a hawthorn hedge around the perimeter of the property. The hedge varies from 3.5 metres to 8.0 metres in height. Petersons Solar Farm is to be enclosed within a chain mesh steel security fence topped with three rows of barbed wire to a height of 2.1 metres. The fence is to be setback 23.2 metres from the northern boundary and 13.1 metres from the western boundary and surrounding the array. The hawthorn hedge will be on the outer side of the security fence, between the fence and property boundaries. Solar arrays are to be setback 10 metres from the security fence.

The sensitivity of private property and public roads to landscape change would be moderate to high given the predominantly agricultural landscape. The magnitude of the project and impact on landscape character is also considered to be moderate to high for private property and moderate for public roads.

5.10.4 The visual catchment

The visual catchment of the site of the proposed Petersons Solar Farm is defined by an area within 2 kilometres of the development site from which the works may be visible as shown on the visual catchment map below. This area is the same as that considered in the glare and glint analysis. 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.

The visual impact of solar farms depends on the scale and type of infrastructure, the prominence and topography of the site relative to the surrounding environment; vegetation; and any proposed or existing screening measures to reduce visibility of the site. Some potential viewpoints may not have a clear line of sight towards the solar farm because of significant existing features such as built structures and vegetation. The site itself is cleared and there are no existing structures in the development area that would screen the site. However, the undulating slope of neighbouring land and the hawthorn hedge along the northern and western boundaries provides screening from those directions.

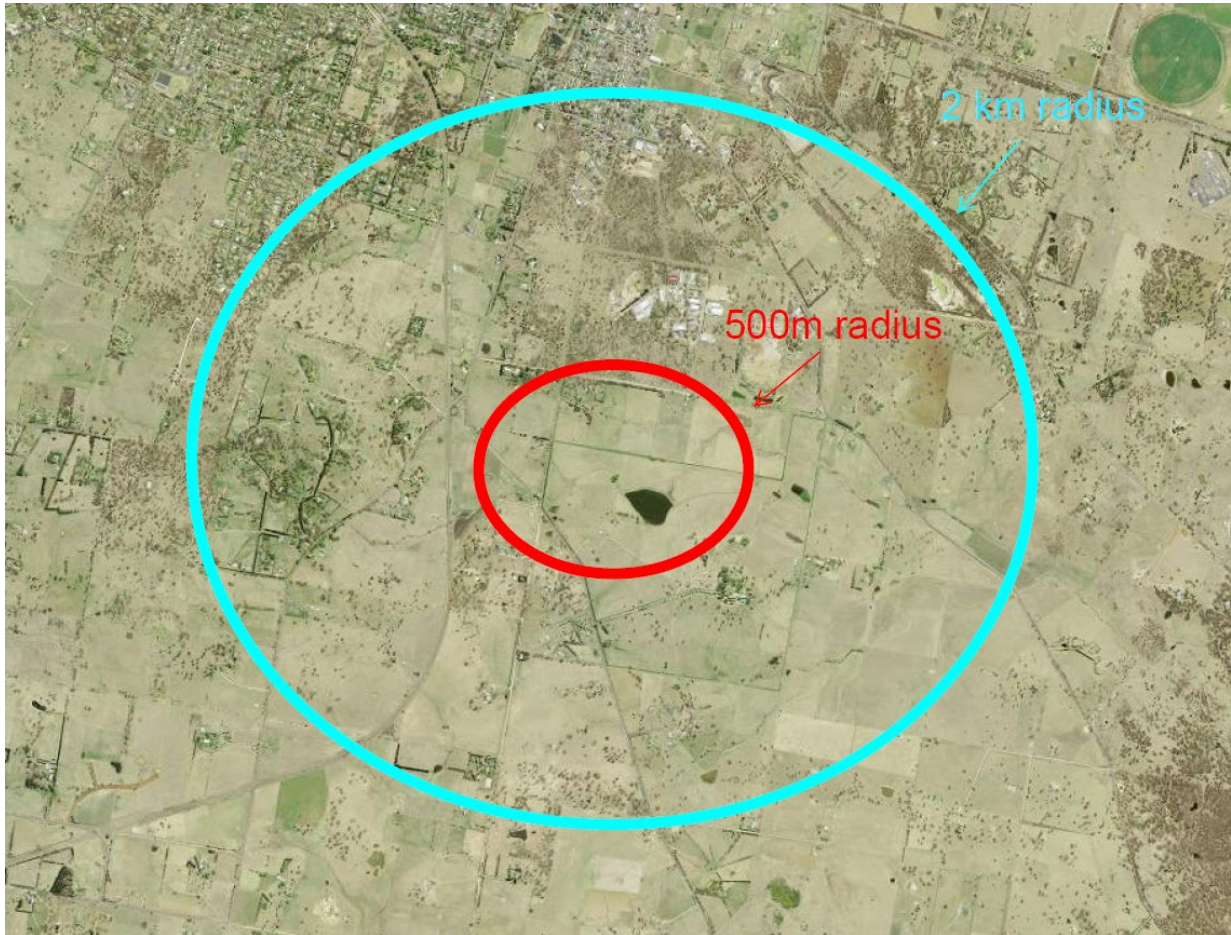


Figure 12: The visual catchment. Source: SIX Maps

There are 41 dwellings and commercial properties as well as five public roads and a railway line within the 2 kilometre radius of the development area. There is one dwelling within a 500 metre radius of the development area which is (OP1) to the north of the development area. The separation distances from each dwelling to the nearest point of the development area are given in Table 5. The solar panels would be visible from public roads such as Roseneath Lane, Seaton Street, Simmons Road and Old Gostwyck Road and the railway line but screened by the hawthorn hedge from Dangarsleigh Road, and topography from Lucas Lane and Old Swamp Road. Visual impacts on commercial properties are generally considered negligible.

The sensitivity of the neighbouring dwellings to landscape change is moderate to high given the existing modified landscape, distance separation of the development area and topography. The sensitivity would decrease with distance so that visibility of the solar farm to dwellings and other structures beyond 2 kilometres outside the visual catchment would be negligible. The sensitivity of public places to landscape change would be high where the place is elevated such as Simmons Road and Old Gostwyck Road and there are unobstructed views of the development area. Distance separation, vegetation on intervening land and topography mitigates that sensitivity for other road routes which are assessed to be low to negligible.

Below are photographs of the development site and neighbouring land. All photographs were taken by Zenith Town Planning Pty Ltd at the time of the site inspection.



Plate 4: Looking towards the west from the development area towards elevated viewpoints



Plate 5: Looking south-east from the development area towards Palmerston house



Plate 6: Looking north-east from the development area towards the north-east and Council's landfill



Plate 7: Looking south-west from the development area



Plate 8: Looking north towards the development area from the grounds of Palmerston house



Plate 9: Looking towards the development area from



Plate 10: Looking east towards the development area from Old Gostwyck Road



Plate 11: Looking south towards the development area from Roseneath Lane

5.10.5 Assessment of visual impacts

Table 5 below indicates the magnitude of the proposed solar farm in terms of the visual change in the landscape and proximity to the viewpoint, and the degree of sensitivity based on the quality of the view, whether the site is clearly visible or obscured by landform or vegetation, the direction and composition of the view, and how sensitive the view is to changes in the landscape that will result from the proposed development.

A rating is then given based on magnitude and sensitivity using the landscape character and visual impact grading matrix.

Table 5: Viewpoint impacts

Viewpoint	Location relative to solar farm	Comment	Magnitude	Sensitivity	Rating
OP1 Residence	500 north	Partially screened by private and roadside vegetation	Moderate	High	High-moderate
OP2 Commercial	890m north	Partially screened by private and roadside vegetation	Negligible	Negligible	Negligible
OP3 Commercial	900m north	Partially screened by private and roadside vegetation	Negligible	Negligible	Negligible
OP4 Commercial	970m north	Partially screened by private and roadside vegetation	Negligible	Negligible	Negligible
OP5 Residence	1.6km north	Screened by vegetation and distance separation	Low	Low	Low
OP6 Residence	1.8km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP7 Residence	1.5km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP8 Residence	1.3km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP9 Residence	880m north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP10 Residence	750m north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP11 Residence	510m north	Partially screened by private and roadside vegetation	Moderate	High	High-moderate
OP12 Residence	2km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP13 Residence	1.4km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP14 Residence	1.2km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low

Viewpoint	Location relative to solar farm	Comment	Magnitude	Sensitivity	Rating
OP15 Residence	1.6km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP16 Residence	1.2km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP17 Residence	1.2km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP18 Residence	1.1km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP19 Residence	1km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP20 Residence	1.4km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP21 Residence	1.7km north-west	Remotely visible but obscured by distance separation	Low	Moderate	Moderate-Low
OP22 Residence	1.4km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP23 Residence	1.5km west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP24 Residence	960m west	Visible due to elevated position but some obscurity due to distance separation	Moderate	High	High-moderate
OP25 Residence	830m west	Visible due to elevated position but some obscurity due to distance separation	Moderate	High	High-moderate
OP26 Residence	710m south-west	Partially visible but screened by hawthorn hedge and topography	Low	Moderate	Moderate-Low
OP27 Residence	1.1km south-west	Visible due to elevated position but significant distance separation	Moderate	Moderate	Moderate
OP28 Residence	960m south-west	Partially visible but screened by hawthorn hedge and topography	Low	Moderate	Moderate-Low
OP29 Residence	1.2km east	Not visible due to topography	Low	Low	Low
OP30 Residence	720m south	Significant screening by mature vegetation and outbuildings, in same ownership	Low	High	Moderate
OP31 Residence	850m south	Not visible due to topography	Negligible	Low	Negligible
OP32 Residence	1km south	Not visible due to topography	Negligible	Low	Negligible
OP33 Residence	900m south-east	Not visible due to topography	Negligible	Low	Negligible
OP34 Residence, commercial	1.2km east	Not visible due to topography	Negligible	Low	Negligible
OP35 Residence	1.5km south	Not visible due to topography	Negligible	Low	Negligible
OP36 Residence	1.5km south	Not visible due to topography	Negligible	Low	Negligible

Viewpoint	Location relative to solar farm	Comment	Magnitude	Sensitivity	Rating
OP37 Residence	1.5km east	Not visible due to topography	Negligible	Low	Negligible
OP38 Residence	1.6km east	Not visible due to topography	Negligible	Low	Negligible
OP39 Residence	1.5km east	Not visible due to topography	Negligible	Low	Negligible
OP40 Residence	1.3km east	Not visible due to topography	Negligible	Low	Negligible
OP41 Commercial	1.2km north-east	Partially visible from landfill site	Negligible	Negligible	Negligible
Dangarsleigh Road	west	Effective screening by hawthorn hedge	Moderate	High	High-moderate
Long Swamp Road	east	Not visible due to topography	Negligible	Negligible	Negligible
Railway	west	Glimpses from moving trains amongst a diversified environment	Low	Low	Low
Roseneath Lane	north	Partially screened by hawthorn hedge and private vegetation	Moderate	Moderate	Moderate
Seaton Street	North	Partially screened by hawthorn hedge, roadside vegetation and topography	Low	Low	Low
Simmons Road & Old Gostwyck Road	South-east	Overlooks the development from elevated positions	Moderate	Moderate	Moderate
Lucas Lane	East	Not visible due to topography	Negligible	Negligible	Negligible

5.10.6 Summary of impacts

The landscape to the south-east of Armidale is one that has been modified by human activity associated with the agricultural industry. It is characterised by a mix of farming, rural uses, rural lifestyle properties, a waste management facility and public roads.

The impact of the proposed Petersons Solar Farm on landscape character has been assessed to be moderate based on magnitude of works and the sensitivity to change of surrounding properties. The works would be partially visible to motorists travelling along Dangarsleigh Road northbound on approach from the south but the hawthorn hedge would provide effective screening particularly during spring and summer when in leaf. There are also distant views towards the site from elevated positions along Simmons Road and Old Gostwyck Road and from the railway. The diversified character of the landscape would go some way towards distracting motorists and train passengers, and roadside vegetation would provide effective screening at lower levels along these roads. There would be views across the development from roads to the north, Roseneath Lane and Seaton Street, but roadside vegetation and landscaping on private properties would provide partial screening. Undulating topography would screen the development to roads to the east and south.

The visual impact of the proposed works is assessed to range from negligible to high-moderate for the residential viewpoints identified in this assessment. The solar farm would be marginally visible to dwellings in close proximity along Roseneath Lane due to the presence of mature vegetation and the hawthorn hedge, and there would be distant views of the development from elevated viewpoints along Simmons Road and Old Gostwyck Road. Distance separation, topography and the effective screening provided by the hawthorn hedge and roadside vegetation would assist to mitigate the impact on dwellings to the east, south, south-west, south-east and north-west. Generally, roadside vegetation and the sloping undulating topography of the land within a two kilometre radius would serve to minimize or mitigate visual impacts to most observation points.

These impacts are considered acceptable given the nature of the proposed development and that it will contribute to renewable energy generation. It is expected that acceptance of and adaptation to change will occur within a relatively short space of time following completion of works. The rural landscape to the south-east of Armidale has already been compromised by subdivision and development of rural lifestyle dwellings and, significantly, the waste management facility which is located on an elevated south-facing site in the vicinity of the development area.

The development site is ringed by a hawthorn hedge around the perimeter of the property. The hedge varies from 3.5 metres to 8.0 metres in height. It is considered that landscaping of the site after installation of the panel arrays is not necessary as the planting of trees within the property would not provide any additional screening benefits. Adjoining properties to the north along Roseneath Road and rural lifestyle properties to the west overlook the development area from higher ground, however, additional landscaping plantings would not provide an enhanced visual screen to these properties due to their elevation.

5.10.7 Mitigation measures

No mitigation measures are recommended.

5.11 Glare and glint

5.11.1 Potential glare and glint

Glare is defined as a continuous source of excessive brightness relative to ambient lighting. Glint is defined as a momentary flash of bright light. Solar photovoltaic (PV) panels are constructed of dark, light-absorbing material and covered with anti-reflective coating. In order to maximise the efficiency, the panels are designed to limit reflection and to absorb around 98% of the light received. The glare generated from solar panels is significantly lower than many other surfaces, including water, however, the glass panels and metal frames have the potential to generate glare and glint. An assessment of the potential glare and glint generated by the proposed solar farm is necessary to ensure visual receptors such as road users, air traffic control towers and pilots are not impacted by the development of solar farms.

In a fixed PV solar array, the angle of incidence varies as the sun moves across the sky, that is, the angle of incidence is at its lowest around noon where the sun is directly overhead and increases in the early mornings and late evenings as the incidence angles increase. The variation of the angle is reduced where the PV array is mounted on a single axis tracking system whereby the panels rotate to remain perpendicular to the sun as proposed in Petersons Solar Farm. Therefore, an array mounted on a tracking system has less potential to cause glare whilst it tracks the sun.

A desktop assessment has been carried out using the Solar Glare Hazard Analysis Tool by ITP Renewables. The assessment is based on identifying the potential sensitive receptors and then assessing the potential glare and glint hazard and impacts on those receptors using the tool. Glare resulting from PV solar farms is analysed at different viewpoints based on the location, orientation and specifications of the solar panels. Mitigation measures are recommended to reduce potential impacts to an acceptable level. This tool is used by the United States Federal Aviation Administration for glare hazard analysis near airports and is also recognised by the Australian Government Civil Aviation Safety Authority (CASA).

The analysis estimates green glare and yellow glare received at each identified potential receptor. Green glare is glare with low potential to cause an after-image when observed prior to typical blink response time, and yellow glare has a higher potential to cause an after-image when observed prior to a typical blink response time. The analysis is on a minute-by-minute basis because sun reflections from solar panels are likely to last at least one minute. Glint is a short-term flash which lasts for less than a minute is therefore unlikely to occur from the sun, due to the pace at which the sun and panels move. Glint is not considered to be a factor affecting motorists or pilots and is not considered further in this assessment.

Potential visual receptors within 2 kilometres of the development site were identified and are shown in Figure 13 below. A 2 kilometre radius from the site was considered appropriate based on it being highly unlikely for glint and glare impacts at distances greater than this. The heights of the observation points were assumed to be 1.5 m for a motorist and 1.65 m for a standing person. Existing vegetation or structures can affect visual connectivity with solar panels. Similarly, atmospheric conditions such as cloud cover can influence light reflection and the resulting impact on visual receptors. Varying atmospheric conditions have not been accounted for in the analysis.

Observation points were identified as follows:

- Considering the elevation of the site relative to surrounding land to determine land potentially affected,
- Including residential properties and public roads within a 2 km radius of the site. Properties located at greater distances are unlikely to be affected, and
- Excluding any properties where existing structures would act as visual barriers.

As a result 41 residential observation routes and six road observation points were identified as potential visual receptors. Armidale Regional Airport, which is located approximately 5.5 kilometres north-west of the

site, was not considered a potential visual receptor of the site due to relative elevation and distance. The analysis was run on the flight paths to the runway, and there is not expected to be any glare visible from aircraft approaching or taking off.



Figure 13: Potential visual receptors

The results of the analysis indicate that persons occupying the selected properties are unlikely to be affected by either green or yellow glare 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. Motorists approaching the solar farm along road routes in the vicinity of the development site are also not expected to experience any glare.

5.11.2 Mitigation measures

No mitigation measures are considered necessary.

5.12 Waste management

5.12.1 Waste materials and management

Life Cycle Analysis considers the total energy input and annual energy output of the project. This is termed the energy payback time and varies depending upon the project's design and geographic location. For solar projects the general timeframe for energy payback is achieved in less than four years for projects with a 25-30 year operating period (Bhandari et al., 2015; Department of Industry, Resources and Energy NSW, 2016). Alsema et al (2006) found that PV modules have an energy payback of 1.5-2 years in southern Europe and 2.7–3.5 years for central Europe. Due to the greater solar resource in Australia the energy payback for this project is expected to be at the lower end of these ranges.

The Fraunhofer Institute for Solar Energy Systems (2015) considered the ratio of energy produced by a solar photovoltaic module compared to the energy used to create the module. It was estimated that the PV modules would provide more than 10 times the amount of energy used to make the system.

A desktop assessment of the waste generated during construction and operation of the proposed Petersons Solar Farm has been carried out to determine the appropriate means of waste disposal and recycling. The assessment takes into account the requirements of relevant legislation and policy including the Protection of the Environment Operations (POEO) Act 1997, POEO (Waste) Regulation 2014 and the Waste Avoidance and Resource Recovery Act 2001.

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.

It is expected that the solar farm will be operational for at least 20 to 25 years. Upon decommissioning all infrastructure, including cabling and panels and mounting frames including footings and inverters would be disassembled and removed from the site. There are currently limited opportunities to recycle the components of solar panels, however, it is anticipated that the waste recycling industry will expand and develop new technologies and uses for those components by the time decommissioning occurs.

The Armidale waste management facility is operated by Armidale Regional Council and is located approximately 3.5 kilometres south-east of Armidale and about 1 kilometre north-east of the development site. It is open 7.30am to 5.00pm all days Monday to Friday and 12.00pm to 5.00pm on weekends and public holidays.

Paper and cardboard, plastics, aluminium and steel, and aerosols can be recycled at the Armidale Recycling Centre located within the Waste Management Facility. It is expected that the following types of

waste can be disposed of at the Armidale Waste Management Facility (to be confirmed prior to construction):

- Green waste that can be turned into compost and mulch
- Electronic e-waste such as old electrical and computer equipment
- Scrap steel such as car bodies, corrugated iron and fencing wire
- Batteries, including car batteries
- Oils including cooking oil, motor oil and heating oil
- Gas cylinders
- Paint

Estimates of waste materials and proposed management arrangements for each phase of the development project are provided in Table 6 below.

Table 6: 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 820 wooden pallets and cardboard packing boxes • Concrete waste during setting of footings and mounts • Electric cable waste and cable reels • Plastic pipe offcuts/scrap • Empty drums and containers (minimal quantities) • Minimal used lubricating oil and filters • 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: Recycling: • Steel and scrap metal (recycled) • Timber/cardboard (recycled) • Recyclable plastics Landfill: • General wastes and plastic (other than where recyclable) All recycling and general waste would be collected and taken to off-site waste management facilities for disposal Fluids would be recycled where possible or taken to off-site waste management facilities for disposal

Phase	Waste material	Proposed management
Operational	- Minimal volumes of domestic wastes such as office consumables, paper, plastics and glass - Waste resulting from maintenance or replacement of equipment	All waste materials would be taken to off-site waste management facilities for recycling or disposal
Decommissioning	- PV modules (16,000 panels) and supporting poles and mounts - Glass for panels (250 tonnes) - Silicon for wafers (40 tonnes) - Inverters / transformers / batteries - PV boxes, skids, scrap metal (820 tonnes) - Electrical cables - Fencing - Storage containers (two 40-foot containers)	The solar farm infrastructure would be dismantled into separate waste products such as metals, glass, plastics and concrete. All products would be sorted on site into recyclable and general waste streams in accordance with the EPA Waste Classification Guidelines and taken to Council's Waste Management Facility for recycling or disposal. It is expected that the waste recycling industry will expand and develop new technologies and uses for those components by the time decommissioning occurs. At the present time only a single company in South Australia has the capacity to recycle specific materials

It is recommended that a waste management plan be prepared following approval and prior to construction to specify precise volumes of each waste material, classify that waste material and identify appropriate management procedures including means of transport and the destination. 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.

5.12.2 Mitigation measures

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,
- Tracking register and details,

- On site recycling management,
- Allocation of responsibilities for recycling, re-use and disposal,
- Reporting and notification procedures if a waste incident occurs and there is a threat to the environment.

6. CONCLUSION

The site is considered suitable for the proposed development of the Petersons Solar Farm. An 11kV power line runs through an easement on the development site enabling connection to the Essential Energy Galloway Zone Sub-station to transfer power generated by the solar PV panels 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, waste management, 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 impacts on health are mitigated.

Below is 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 7 includes a recommendation as to whether the mitigation measure should be included in the management plan.

Table 7: Summary of mitigation measures

Consideration	Mitigation measures	Environmental Management Plan
Biodiversity	any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area. Access to the site is to be limited to that point shown on development plans and within the development area. Storage of materials is to be carried out wholly within the development area	Yes, with reference to ongoing site access during both construction and operational phases, and to the storage of materials within the site
Natural hazards	No mitigation measures are proposed	n/a
Water resources	Design – site drainage and water quality controls: - Undertake hydrological assessment of the sites catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff. - Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008).	Yes, for construction and operational phases. Include an erosion & sediment control plan or soil and water management plan

	• Develop a site erosion and sediment control plan in accordance with the Blue Book. • Develop site drainage design incorporating detention basins and sedimentation management structures where relevant. • Permanent site drainage should coincide with temporary arrangements where possible	
	Construction and/or demolition – site drainage and water quality controls: • Catch drains to be located downslope of any proposed road works. • 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. • All stormwater collection points need to have appropriate sedimentation and erosion controls. • Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness. • Vibration grids or wash bays at all construction exits. • Level spreaders at locations where concentrated flow is discharged offsite to ensure sheet flow like conditions are maintained. • 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: • Do not undertake works if chance of heavy rain. • Store rinsate water, if applicable, separately to other water on site and dispose of offsite as appropriate. • Block on site drains in the area of the works and remove any contaminated runoff. In the event that dewatering practices are required: • 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. • Limit direct discharge off site (consistent with the design requirements for sediment pond discharge). • 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. • Material and waste storage areas should be designed and operated to minimise interaction with surface waters. • Vehicle washdown areas should be located away from water courses	
Air quality	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	Yes, for construction and operational phases

	• 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 groundcover immediately construction works are completed • 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: • 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 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

Electromagnetic radiation	No mitigation measures are proposed.	n/a
Traffic	- all internal circulation roads, parking and manoeuvring areas are designed and constructed for the design number, dimension and mass of the design service vehicles, and in compliance with the provisions of AS/NZS2890.1 Off Street Parking and Armidale Regional Council. Internal roads should have regular hard-standing provision for heavy vehicles travelling in opposite directions to pass. Given the short-term nature of the traffic-generating works and the rural environs, it is considered that unsealed pavements would be suitable for all internal roads, parking and manoeuvring areas. - upgrade the existing primary access to be suitable for B-Double access. The works would require removal of existing fencing and signage, trimming and removal of hedging/vegetation, protection for the electricity stay cable, and pavement widening. Additional earthworks and pavement construction would be required to improve tracks inside the property suitable for heavy vehicle manoeuvres. Suitable signage would be desirable to delineate the access in lieu of achieving Approach Sight Distance for drivers unfamiliar with the access location and arrangements. With any improvement of the existing primary property access it would be desirable to reshape the batter south of the driveway and east of Dangarsleigh Road	Yes, with reference to site access during the establishment and construction phases
The community & local economy	- labour to construct and maintain the solar farm be sourced from within Armidale LGA wherever possible - advertising be placed in local media and local businesses contacted to determine whether there is the capacity and expertise available in Armidale and surrounding districts to participate in the construction and ongoing maintenance activities.	n/a
Heritage	No mitigation measures are proposed.	n/a
Visual & scenic amenity	No mitigation measures are proposed.	n/a
Glare and glint	No mitigation measures are proposed.	n/a
Waste management	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, - Tracking register and details, - On site recycling management, - Allocation of responsibilities for recycling, re-use and disposal, - Reporting and notification procedures if a waste incident occur.	Yes, for construction phase

The proposed development of the Petersons Solar Farm is permissible under provisions of *SEPP (Infrastructure) 2007* and would assist to generate electricity and at the same time contribute to reducing greenhouse gas emissions and achieving the national targets.

The system is designed to generate in excess of 12.9GWh of energy annually with the system offsetting almost 8.5 thousand tonnes of CO² 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.

Given the regional benefits of renewable energy generation and based on implementation of the recommended mitigation measures to minimize disruption to the existing natural and built environment, the development is considered to be in the public interest.



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

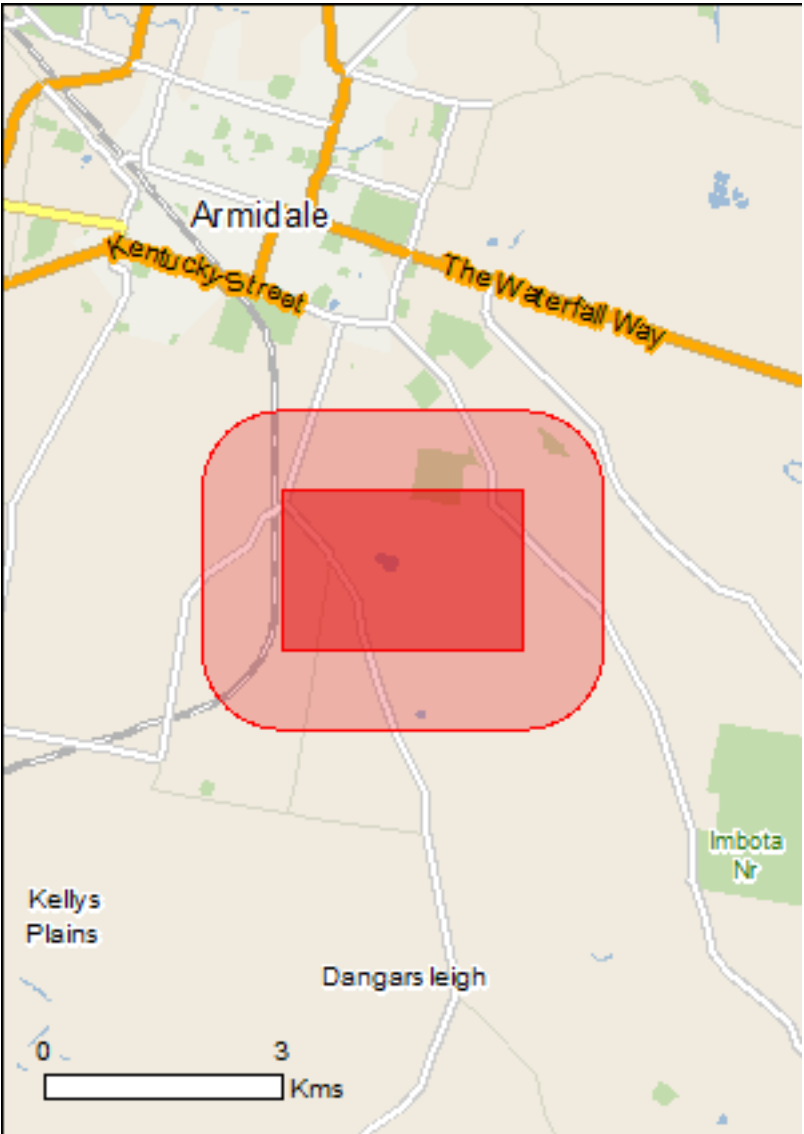
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 12/10/19 11:12:35

- [Summary](#)
- [Details](#)

[Matters of NES](#)[Other Matters Protected by the EPBC Act](#)[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	25
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	30
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythroriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Frogs		
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species

Name	Status	Type of Presence
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Callistemon pungens		
[55581]	Vulnerable	Species or species habitat may occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Diuris pedunculata		
Small Snake Orchid, Two-leaved Golden Moths, Golden Moths, Cowslip Orchid, Snake Orchid [18325]	Endangered	Species or species habitat likely to occur within area
Eucalyptus nicholii		
Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus rubida subsp. barbigerorum		
Blackbutt Candlebark [64618]	Vulnerable	Species or species habitat may occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Haloragis exalata subsp. velutina		
Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Uvidicolus sphyrurus		
Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat may occur within area
Wollumbinia belli		
Bell's Turtle, Western Sawshelled Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle [86071]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Corporation

Listed Marine Species	[Resource Information]
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* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
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Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Tringa nebularia		Species or species habitat may occur within area
Common Greenshank, Greenshank [832]		

Extra Information

Regional Forest Agreements	[Resource Information]
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Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]
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Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		

Name	Status	Type of Presence
Rhinella marina Cane Toad [83218]		Species or species habitat may occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within

Name	Status	Type of Presence area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-30.54354 151.6654,-30.54354 151.69269,-30.55906 151.69269,-30.55906 151.6654,-30.54354 151.6654

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

Zenith Town Planning
P O Box 591
Moruya New South Wales 2537
Attention: Allen Grimwood
Email: zenithplan@bigpond.com

Date: 30 September 2019

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 494, DP:DP66672 with a Buffer of 0 meters,
conducted by Allen Grimwood on 30 September 2019.**

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:

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 \(http://www.nsw.gov.au/gazette\)](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.

Zenith Town Planning
P O Box 591
Moruya New South Wales 2537
Attention: Allen Grimwood
Email: zenithplan@bigpond.com

Date: 30 September 2019

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 2, DP:DP569410 with a Buffer of 0 meters,
conducted by Allen Grimwood on 30 September 2019.**

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:

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 \(http://www.nsw.gov.au/gazette\)](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

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- 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.

Iwatta Aboriginal Corporation

8 Morson Ave
Armidale, NSW 2350
0413990868

Dangarsleigh Solar Farm

5th November 2019

- A CULTURAL HERITAGE ASSESSMENT - Dangarsleigh Solar Farm on “Petersons winery”,
Dangarsleigh Road, VIA ARMIDALE. ARMIDALE REGIONAL COUNCIL LOCAL
GOVERNMENT AREA, NEW SOUTH WALES

A Report To: ITP Development: 05-November-2019 Prepared For: Zenith Town Planning, Po
Box 591 Moruya NSW 2537, Prepared By: Steven Ahoy

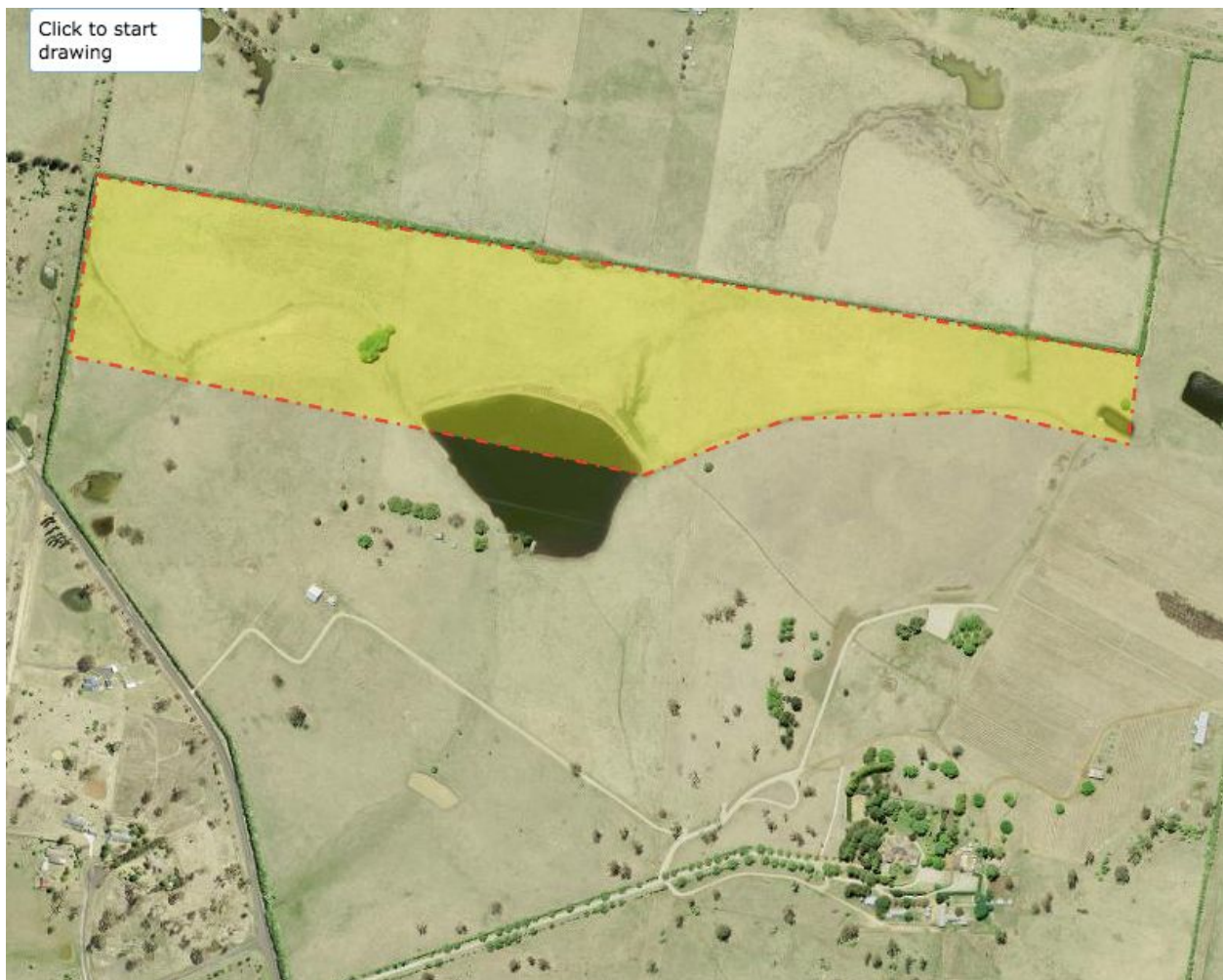


Image source: Google Earth pro 2019



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In preparing this report, IWATTA Aboriginal Corporation has relied upon information, data, surveys and/or site inspection results taken at the time and under the conditions specified herein. Iwatta Aboriginal Corporation has also relied on verbal information and documentation provided by the Proponent/Client and/or third parties representing the Proponent/Client, but has not attempted to [independently] verify the accuracy or completeness of that information. To the extent the conclusions and recommendations in this report are based in whole [or in part] on such information, they are also [therefore] based upon the validity of that information. Iwatta Aboriginal Corporation assumes no responsibility for any consequences arising from the information or condition(s) concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Iwatta Aboriginal Corporation. The findings contained in this report are the result of methodologies used in accordance with normal practices and standards. To the best of my knowledge, they represent a reasonable interpretation of the condition of the site in question. Under no circumstances, however, can it be considered that these findings represent the actual state of the site/sites at all points in space and time. Given the changing nature of the landscape in response to processes including erosion/weathering from wind and rain, and the erosive nature of current and/or past farming and grazing activities, the circumstances reported herein may alter. As such Iwatta Aboriginal Corporation places a shelf life of [no more than] four years on its reports. The formulation of any Indigenous archaeological heritage management strategy or cultural heritage management plan (CHMP) based upon the information provided in this report beyond that time (four years), must be viewed with caution and is NOT recommended. Any representation, statement, opinion or advice, expressed or implied in this report is made in good faith but on the basis that Iwatta Aboriginal Corporation is not liable (whether because of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking (or not taking) action in respect of any recommendation, statement, or advice referred to above. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Proponent/Client. Iwatta Aboriginal Corporation accepts no responsibility for the use of this report by parties other than the Proponent/Client for which it was written. Iwatta Aboriginal Corporation accepts no responsibility for use of this report beyond its shelf life.



IAC

Zenith town planning, representing IT Power Renewable Energy Consulting, commissioned Iwatta Aboriginal Corporation to carry out a cultural heritage assessment on a portion of “Peterson winery”, a property approximately 3.46 kilometres south-east of Armidale in the Armidale Regional Council local government area, on the Dangarsleigh road, New South Wales, in preparation for the proposed Dangarsleigh solar farm. Zenith and ITP Renewables have targeted an area on “Peterson winery” as most interest for development and the area identified throughout this report as the Study Area.

The purpose of the Aboriginal cultural heritage investigation reported in this document was to carry out the required statutory cultural heritage assessment. Searches of the OEH Aboriginal Heritage Information Management System (AHIMS) database located 1 Aboriginal site within 800 meters and 1 Aboriginal Place 2.43kms of the “Petersons winery” study area.

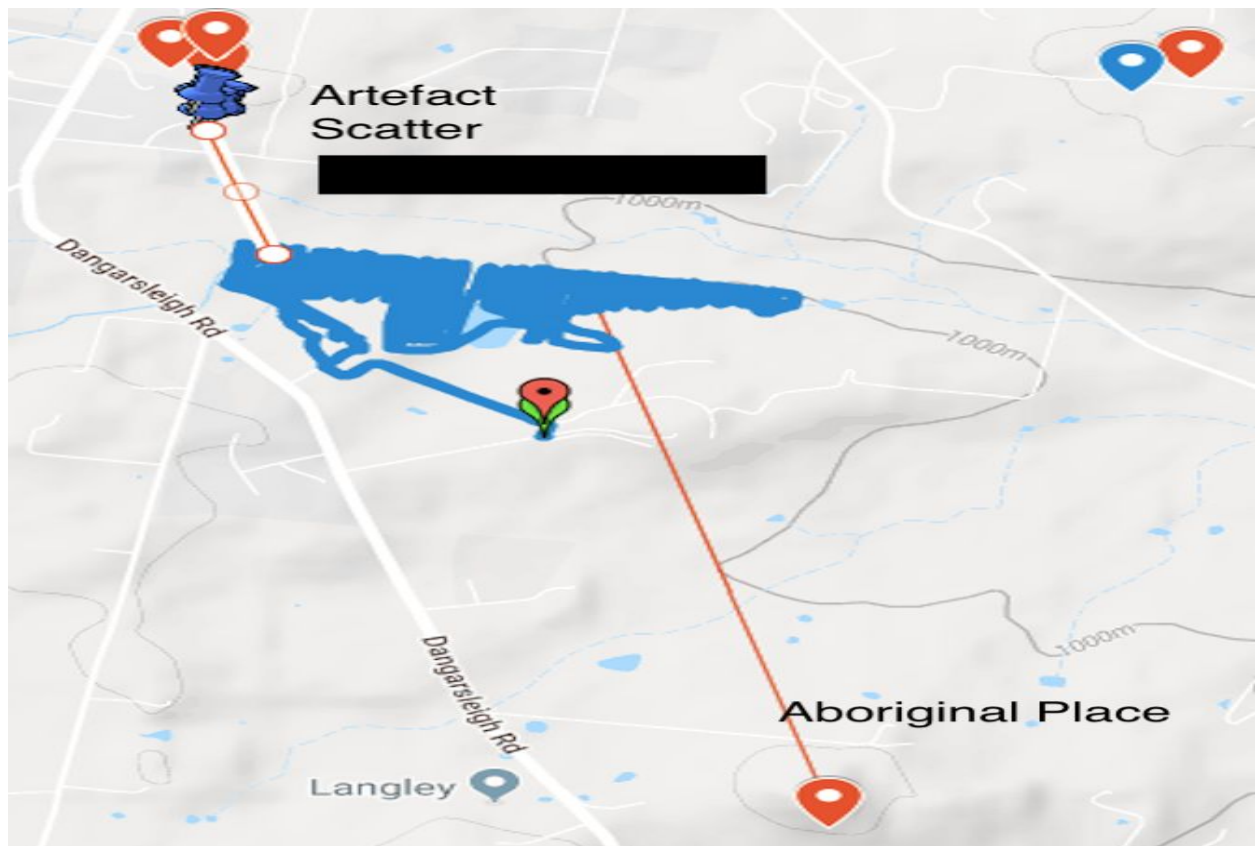


Image source: Google Earth pro 2019



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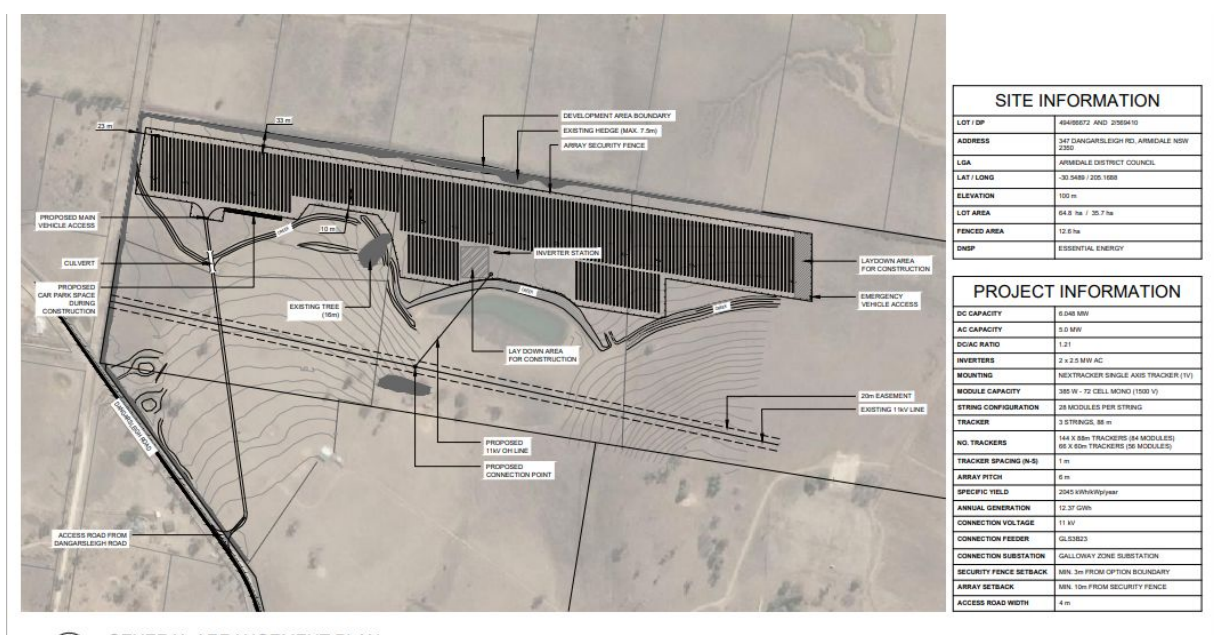


Figure 1 – Lot 494 DP 66672 and Lot 2 DP 569410, The “Petersons winery” project area identified by ITP Renewables as of most interest to their proposed solar farm project.

The results of the field work completed for this cultural heritage assessment located no surface Artefacts, sites or places of Aboriginal Cultural significance across the study area. The environment across the study area is dominated by undulating plains, cleared of trees with dams placed in various locations across the landscape. Currently it is utilised as prime pastoral land for cattle grazing.

No further Archaeological investigation is required, if for any reason changes are made to the footprint outlined in this report, further Archaeological investigation will be required.



IAC

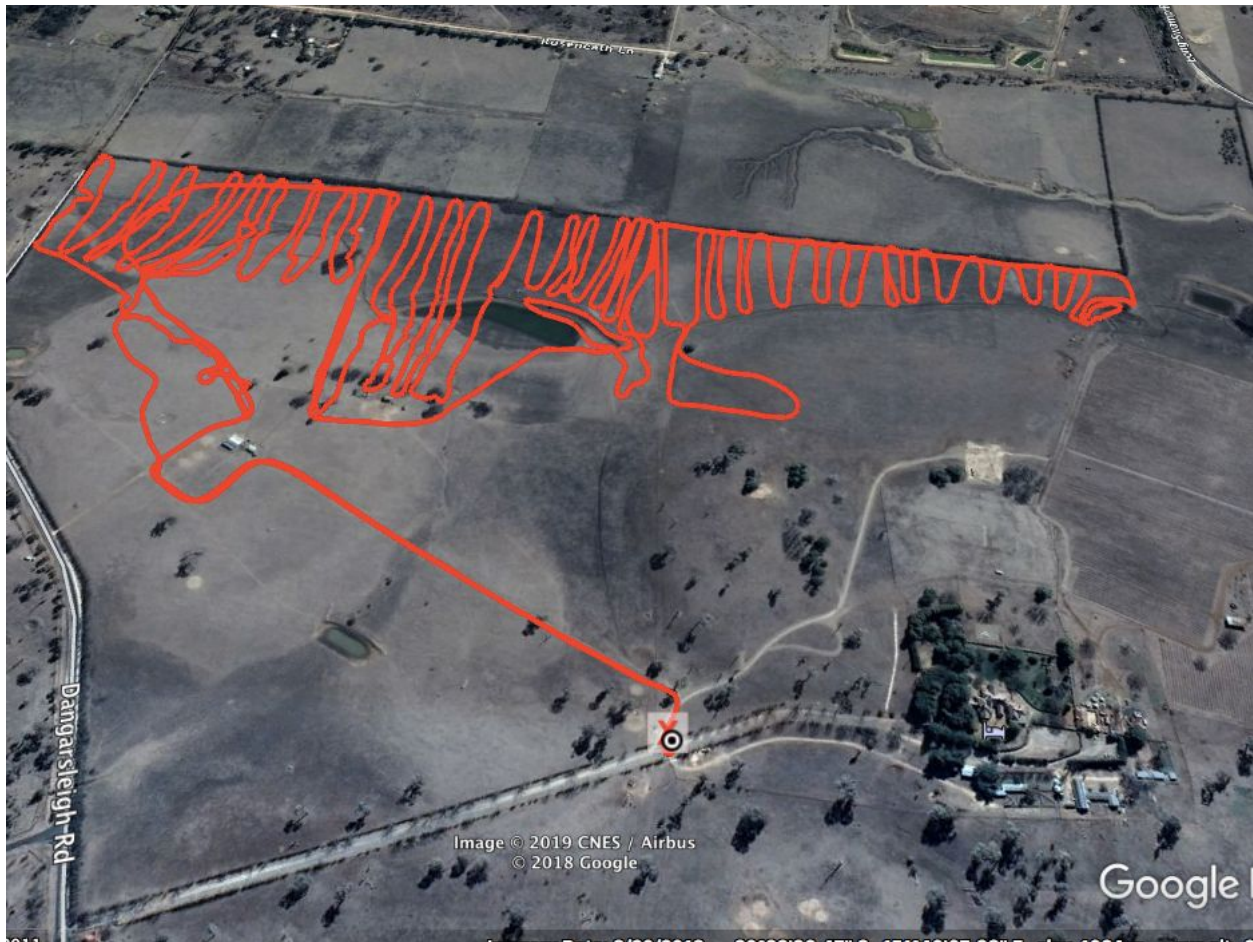


Figure 2– The environment across the study area is dominated by undulating plains, cleared of trees with dams placed in various locations across the landscape. Currently it is utilised as prime pastoral land for cattle grazing.

Survey transects were completed in a north-south direction, beginning along the western margin and moving from west to east. Ground surface visibility in the study area was 80-90%.

Image source: Google Earth pro 2019



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2 THE LEGISLATIVE CONTEXT

The NSW National Parks and Wildlife Act 1974 The NSW National Parks and Wildlife Act 1974 (the 'NPW Act') provides protection for all Aboriginal cultural heritage (ACH) sites and objects in New South Wales and promotes the conservation of Aboriginal cultural heritage objects and places that are of high cultural significance. Sections 84, 86, and 87 of the Act provide protection for Aboriginal places (S84), describe that it is an offence to harm or desecrate and Aboriginal object or declared Aboriginal place (S86) and set out defences and exemptions available for activities that have the potential to result in harm and/or desecration (S87) to Aboriginal cultural heritage objects and/or places. Section 86 also sets out the penalties and regulations as defined in the National Parks and Wildlife Regulations, Part 8A.

The NPW Act 1974 (the 'NPW Act') is the primary piece of legislation for the protection of Aboriginal cultural heritage in New South Wales. The Office of Environment and Heritage (OEH) administer the NPW Act and it provides statutory protection for Aboriginal objects by making it illegal to harm them (Aboriginal objects) and Aboriginal places, and by providing two tiers of offence against which individuals or corporations who harm Aboriginal objects or Aboriginal places can be prosecuted. The NPW Act defines Aboriginal objects and Aboriginal places thus: Aboriginal object means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

Aboriginal place means any place declared to be an Aboriginal place under section 84. If Aboriginal cultural heritage objects and/or places are present or are likely to be present and the proposed activity will harm those objects and/or places then Sections 90-90R of the NPW Act outline the permit process that must be followed prior to the commencement of that activity. These sections provide details of the Aboriginal Heritage Impact Permit (AHIP) system as regulated by the Director-General of the Office of Environment and Heritage (OEH) and describe the Aboriginal Heritage Information Management System (AHIMS), the database of registered Aboriginal site information across New South Wales.



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In 2010 the Department of Environment, Climate Change and Water (DECCW, precursor to the OEH) introduced a range of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales including the;

- o Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010a).
- o Code of Practice for Archaeological Investigation of Archaeological Objects (2010b).
- o Due Diligence Code Of Practice for the Protection of Aboriginal Objects (2010c).
- o Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage (2011).

The highest tier offences under the NPW Act are reserved for knowledgeable harm of Aboriginal objects or knowledgeable desecration of Aboriginal places. Second tier offences are strict liability offences—that is, offences regardless of whether or not the offender knows they are harming an Aboriginal object or desecrating an Aboriginal place—against which defences may be established under the NSW National Parks and Wildlife Regulation 2009.