

Preliminary Environmental Assessment

Gunnedah Solar Farm

transport | community | environment | industrial | food & beverage | energy



Prepared for:

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Date:

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Rev00

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Appendix A: Proposed Site layout

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1. Introduction

1.1 Overview of the Project

Photon Energy (Photon) propose to construct and operate a 155 megawatt (MW) photovoltaic solar (PV) farm (the “Proposal”). The Proposal would be located at 765 Orange Grove Road, Gunnedah, NSW, 2380 and contained within Lot 1 DP 1202625, Lot 153 DP 754954, Lot 264 DP 754954, Lot 2 DP 801762, Lot 151 DP 754954 and part of Lot 1 DP 186590 (the “Site”). The Site is approximately 692 hectares and is currently used for agriculture specifically cropping (irrigated cotton and chick pea). The preliminary design for the solar farm would occupy approximately 205 hectares out of the 692 hectares (equivalent to approximately 30%) with the remaining land retaining its existing agricultural use.

The Proposal includes installation of groups of north facing PV modules (approximately 2m x 1m) on mounting structures approximately 3m in height. An estimated 471,212 PV panels will be installed at a 25° angle. The PV mounting structure would comprise steel posts driven approximately 1.6m below ground using a pile driver. Additional support structures would be attached to the steel mounting structures and the PV modules would then be attached to the support structures.

Power generated by the facility will be transmitted via existing powerlines, in an easement owned by TransGrid, to the local energy grid via the Gunnedah substation on the Oxley Highway. Works are required to upgrade existing powerlines to support the energy generated from the Proposal. The existing powerlines will be upgraded by TransGrid. Assessment and approval of these works does not form part of this Proposal.

1.2 Purpose of this Report

The capital investment value of the proposed development is estimated at \$201 million. As such it is deemed as State Significant Development (SSD) and an Environmental Impact Statement (EIS) is therefore required.

This Preliminary Environmental Assessment (PEA) has been prepared to support a request to the Department of Planning and Environment (DPE) for Secretary’s Environmental Assessment Requirements (SEARs). The SEARs will be used to guide the preparation of an Environmental Impact Statement (EIS) for the Proposal under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The PEA provides the following:

- An overview of the relevant planning legislation and approvals process (Section 5)
- An outline of the Proposal justification and alternatives considered (Section 3)
- A description of the solar farm and its construction and operation (Section 2)
- An outline of the preliminary environmental assessment (Section 6)
- An outline of stakeholder consultation for the Proposal (Section 4)
- A proposed scope for the subsequent EIS (Section 7).

2. The Proposal

2.1 Site Location

The Site is located at 765 Orange Grove Road, Gunnedah, NSW, 2380, approximately 9km from Gunnedah town centre in the Gunnedah Shire Council Local Government Area (LGA) and approximately 2km north of the Oxley Highway (B56) as shown in Figure 2-1.

The Site is not located in close proximity to urban or dense residential areas. The Proposal would be contained within part of Lot 1 DP 186590 Lot 1 DP 1202625, Lot 153 DP 754954, Lot 264 DP 754954, Lot 2 DP 801762, Lot 151 DP 754954 and (refer Figure 2-2).

The proposed development footprint is anticipated to cover only a section of the area detailed above (refer to the proposed layout detailed in **Appendix A**) however this PEA has taken a conservative approach and has assessed the environmental constraints contained within the lot boundaries outlined in Figure 2-2.

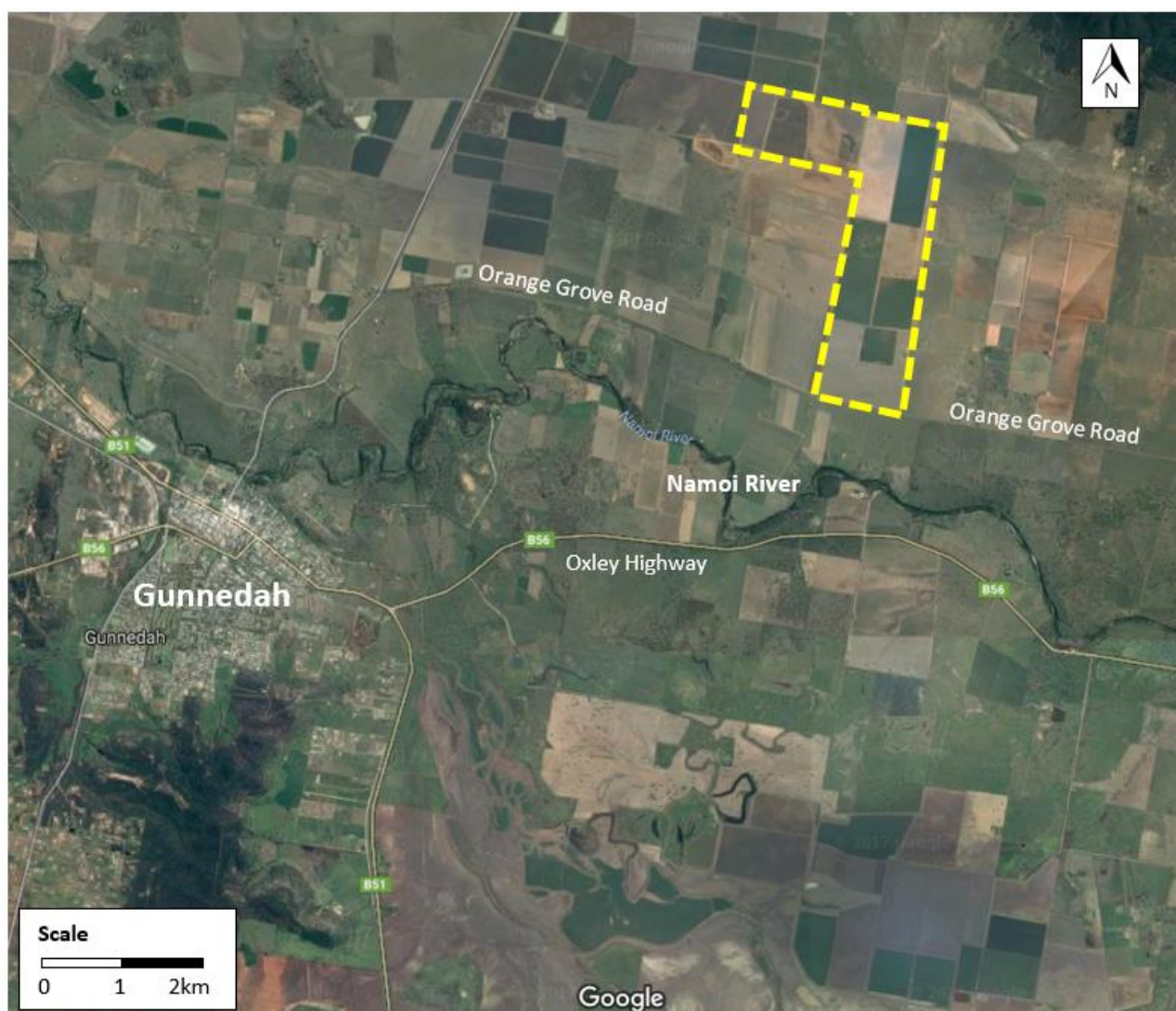


Figure 2-1: Location of the Proposed Site (Source: Google Maps)

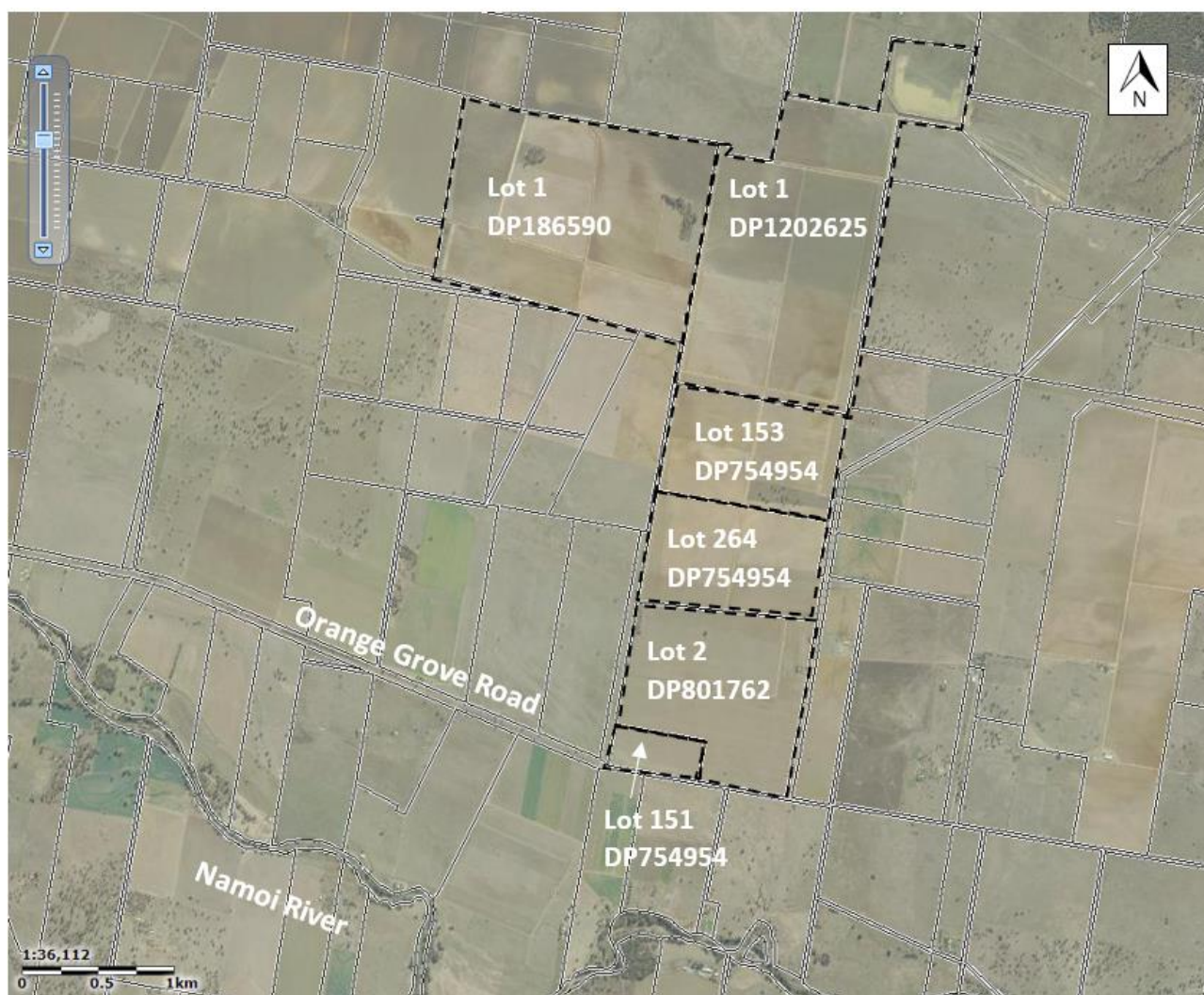


Figure 2-2: Locality map of the Proposal showing lot boundaries (Source: Six maps)

2.2 Site Description

The Site comprises a series of large fenced paddocks containing irrigated crops accessible via Orange Grove Road to the south. The paddocks have been levelled and largely cleared for agricultural purposes (specifically cropping – irrigated cotton and chickpea) and currently contains a number of built structures including agricultural sheds and a temporary residential dwelling. The crop vegetation is visible in some aerial photography however this vegetation is understood to have been cleared.

There are several clusters of native vegetation located in the Site. The largest two clusters are in lot 1 DP 186590 and are roughly 1.51 hectares and 2.96 hectares in area, respectively. Other vegetation on-site includes: a row of native trees along the boundary of the Site and Orange Grove Road; a row of native trees along the western boundary of Lot 151 DP 754954 and Lot 2 DP801762; a sparse group of trees located in lot 153 DP 754954; and other isolated trees scattered throughout the Site. The type and presence of vegetation on the site has been identified via aerial imagery and would be confirmed during field work as outlined in Section 6.2.1.

It is understood that the development footprint will avoid the majority of vegetation present on the site where possible and that any vegetation to be removed will be identified during field work and assessed as outlined in Section 5.4.1.

There is a large dam contained in the north-eastern corner of Lot 1 DP 1202625 which has an area of approximately 6.05 hectares. From a desktop review irrigation channels are present throughout the Site to

facilitate water movement. Surface hydrology, landform and soils have been heavily modified by the paddock development and irrigation works. Land use within the local area is dominated by rural activities and population density is low.

There is an existing TransGrid easement which runs along Orange Grove Road at the southern boundary of the Site. This easement contains existing powerlines that run to the Gunnedah substation approximately 1.6km to the south of the Site. Works are required to upgrade existing powerlines to support the energy generated from the Proposal. The existing powerlines will be upgraded by TransGrid. Assessment and approval of these works does not form part of this Proposal.

2.3 Site Locality

The Project is located in the Gunnedah LGA with good road access from the Oxley Highway which is 2km south of the Site and the Kamilaroi Highway, 6.8km to the south-west of the Site. Additionally, Gunnedah has its own small airport located approximately 8km west of the Site.

The Site is located in an agricultural region and is approximately 8km to the north-east from the town of Gunnedah. The majority of built structures in the region are in the town of Gunnedah which is mostly low density residential areas or large lot residences outside the town built structures include sparsely distributed rural-residences which are usually located some distance from roads.

There are two rural-residences located with 1km of the development footprint:

- Lot 1 DP801762, located approximately 770m east of the development footprint.
- Lot 12 DP835959, located approximately 800m south of the development footprint.

There are also several other properties within 2km of the development footprint that may be affected due to the flat nature of the landscape and the lack of vegetation screening:

- Lot 221 DP754954, located approximately 1.25km west of the development footprint.
- Lot 201 DP836983, located approximately 1.3km south of the development footprint.
- Lot 2 DP389164, located approximately 1.4km south of the development footprint.
- Lot 34 DP754928, located approximately 1.46km east of the development footprint.
- Lot 1 DP701489, located approximately 1.69km east of the development footprint.
- Lot 1 DP187347, located approximately 1.82km north-west of the development footprint.
- Lot 2 DP1202625, located approximately 1.90km north of the development footprint.
- Lot 2 DP 701489, located approximately 1.93km east of the development footprint.
- Lot 2 DP701489, located approximately 1.96km east of the development footprint.

Local topography is generally flat with some gentle rises and slopes. However, there are several highpoints in the area including town of Gunnedah which is located on a hilly region, Black Jack Mountain located south of Gunnedah town, and a large forested area located 2.7km to the north of the Site.

Nearby water courses include the Namoi River which is located approximately 1.2km south of the Proposal which is surrounded by scattered stands of native vegetation. Other natural water courses in the area include: Mooki River; Carroll Creek, Rangria Creek and Kibah Creek which are all tributaries of the Namoi River. There are also several man-made agricultural dams in neighbouring plots.

The environment around the Site is dominated by cleared agricultural land which is the dominant industry in the region. There are also several large mines in the region the nearest is the RocGlen Mine which is 17km to the north-west of the Site. It is not expected that the mines will use the same local roads.

2.4 Proposal Description

The Proposals development footprint would cover approximately 30% of the land available on the Site (refer **Appendix A**) and would consist of the following elements:

- 205 hectares of solar PV modules on mounting structures.
- Central inverters located within the Site.
- Underground cabling.
- A transformer kiosk to connect to existing electrical infrastructure.
- Two maintenance storage containers.
- Security fencing with 24/7 surveillance cameras.
- Maintenance and access tracks within the Site.

2.4.1 Construction

The construction phase of the Proposal is expected to take nine to 12 months and employ up to 60 people, using local labour and resources where possible.

It is anticipated that the solar farm would be constructed in one hectare stages – with up to 10 stages in construction at any one time.

Minor earthworks would be required for the preparation of the Site and in most cases a concrete slab would be required to support the ancillary infrastructure. Most of the auxiliary infrastructure would be pre-fabricated off-site, delivered and then assembled on-site. Further design of the auxiliary infrastructure would be outlined in the EIS.

The key infrastructure components and construction activities for the Proposal are shown in Table 2-1.

Table 2-1: Key Components of Proposal

Component	Details	Construction Activities	Image Reference
PV Panels (solar modules)	<p>Solar module consists of mounting system, the solar panels and cabling.</p> <p>Approximately 471,212 PV panels sized at approximately 2m x 1m with 72 cell panels. An indicative layout of the PV panels is shown in Appendix A.</p> <p>The static panel will be tilted at 25 degrees pointing north.</p> <p>Support structures for mounting the PV panels will stand up to 3m high</p>	<p>Excavate and install posts (pile driven).</p> <p>Attach support structures to posts.</p> <p>Mount panels on support structure (crane mounted).</p>	Refer Figure 2-3

Component	Details	Construction Activities	Image Reference
	with steel posts as foundations. The mounting system using pile drivers.		
Electrical connections/inverters	Wiring between PV panels and inverter systems. 26 x 4.92MW Ingeteam CON40 inverters each 12.2m (l) x 2.4m (w) x 2.9m (h).	Install/connect electrical wiring. Footings installed for inverters and transformers, mount inverters and transformers on footings. Connect inverters.	Refer Figure 2-4 and Figure 2-6
Collection circuits	Copper and Aluminium interconnection cabling.	Trenching, cable laying and backfill.	N/A
Transmission kiosk	The kiosk will be situated in a well-drained area clear of obstructions and away from any watercourses. The exact location will be determined and assessed within the EIS. The transmission kiosk is expected to be 30m x 30m in size. The kiosk would connect to existing TransGrid infrastructure	Kiosk foundations, cable laying.	N/A
Access works	Access tracks required for operations will be on undisturbed ground remaining between panel installations. These will be wide enough for maintenance vehicles to move through. The indicative layout is shown in Appendix A .		Refer to Appendix A
Maintenance	Two 40' shipping containers for storage of maintenance equipment.	Footings, install container.	N/A
Safety and Security	Security cyclone chain wire fencing bordering the entire Site. Fencing is expected to be between 2m to 2.4m high.	Excavate and form footings (concrete). Install posts and attach mesh.	N/A



Figure 2-3: Example of Solar PV Panels



Figure 2-4: Example Central Inverter



Figure 2-5: Example ground mounting arrangements



Figure 2-6: Example Transformer

2.4.2 Infrastructure Layout

PV infrastructure on Site will comprise of groups of PV panels located 3m above ground with a 10m set back from the Site boundaries. The PV infrastructure will be mounted on structures comprising galvanized steel posts driven 1.6m below ground using a pile driver (refer Figure 2-5). Support structures would be joined to the steel posts and the PV modules would be fixed to the support structures. Electrical cabling would be attached beneath the modules and would connect the individual PV modules to each other. Inverters will be located centrally to groups of PV panels and groups of panels will be connected to each other by underground cables. The PV modules are in a fixed position facing north.

The final infrastructure layout is yet to be finalised however a preliminary layout plan is included in **Appendix A** and the Proposal will be contained solely within the Site which includes areas required for stockpiling and materials laydown during construction.

2.4.3 Power generation

Energy generated by each PV module would be transferred via cables to central inverters. Central inverters collect electricity from an area of panels, convert it from direct current (DC) to alternating current (AC). The energy is conveyed from the central inverter to the site transmission kiosk. The kiosk will be located onsite and will increase the voltage to a level that can be transmitted via upgraded TransGrid powerlines. The power generated would be transmitted approximately 1.6km to the Gunnedah substation.

2.4.4 Transmission

The Proposal would require the installation of upgrade of electrical infrastructure within an existing TransGrid easement which is located to the south of the Site along Orange Grove Road. The upgraded powerlines run to the Gunnedah substation which is located approximately 1.6km south of the Proposal. Additional cabling will be required to connect the solar arrays to the new powerlines. Whether these powerlines will be underground or aerial has yet to be determined.

2.4.5 Access

Access to the Site will be via Orange Grove Road, which runs along the southern boundary of the Proposal and Kelvin Road which connects to O'Keefe Avenue and then onto The Kamilaroi Highway located 6.8km to the south-west of the Site. These roads and the Oxley Highway, 2km south of the Site would be the major transport routes for haulage and Site vehicles during construction and operation.

The Site will be secured by wire cyclone fencing and a locked gate off Orange Grove Road. The fencing is expected to be between 2 to 2.4m high.

During construction, traffic generated by the works would include construction worker vehicles and delivery vehicles. During the peak construction period, the traffic volume is expected to be 40 heavy vehicles mostly B-double trucks and 50 light commercial vehicles per day.

2.4.6 Operation

The Proposal would operate 24 hours a day, 7 days a week however this would not involve the presence of staff on-site or active operations. During operation, the PV panels would generate electricity which would be fed into the power grid via the substation.

Irregular maintenance activities will be undertaken during standard working hours (except in an emergency) and are expected to include:

- Panel cleaning
- Repairs or replacement of infrastructure, as required
- Mowing activities to control vegetation.

Minimal operational plant and equipment will be required for operation of the facility including ad hoc maintenance vehicles (Utility Vehicle Mazda BT-50 or similar) and other equipment associated with the activities outlined above.

The solar farm would generate limited noise during operations. Noise sources would include maintenance activities and associated vehicles and equipment and operational noise from the transformer. Maintenance activities would be undertaken during day light hours (except for emergencies).

There will be not be a permanent office building, no on-site amenities and no lighting during operation of the Proposal. The Site will be surrounded by Security cyclone chain wire fencing approximately 2m to 2.4m high with a secure gate on the southern end of the Site. Two shipping containers will be permanently located on a compacted hard stand on the Site and used for storage of maintenance equipment. The exact location will be determined and assessed within the EIS.

2.4.7 Decommissioning

The solar farm has an operational timeline of 25 years. After 25 years infrastructure would be updated for continued use or the plant will be permanently removed. Should the decision be made to remove the plant, then the Site would be returned as close as possible to its existing condition.

3. Proposal Justification and Need

3.1 Strategic Justification

Australia is a signatory to various international agreements, conventions and protocols. Some, including the United Nations Framework Convention on Climate Change, the Paris Agreement and the Kyoto Protocol, involve commitments requiring action relating to climate change and greenhouse gas emissions. Both the NSW and the Australian Government have developed renewable energy targets and strategies to meet these targets, reduce greenhouse gas emissions and provide reliable energy to the public through the acquisition of renewable energy certificates (REC) (DEE 2016).

3.1.1 The Australian Government's Renewable Energy Target (RET) scheme

In 2001, the Commonwealth Government introduced the Mandatory Renewable Energy Target (MRET) Scheme to increase the amount of renewable energy being used in Australia's electricity supply. A condition of the scheme is that energy retailers and businesses that use a large amount of energy must obtain a certain percentage of their energy from renewable sources.

Since January 2011 the RET scheme has been separated into two parts—the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET). Energy Proposals supported under LRET include utility-scale solar plants, wind farms, hydro-electric power stations and geothermal (DEE 2016).

The Proposal has a maximum power output up to 155MW and would produce an estimated 280GWh per year of renewable electricity which would assist in meeting the LRET.

3.2 Alternatives to the Proposal

The Proposal did not consider alternative infrastructure or infrastructure layouts but did consider alternative locations and the option of not completing the project.

3.2.1 Alternative locations

Photon understands that the Proposal meets the definition of State Significant Development under the *State Environmental Planning Policy (State and Regional Development)* (refer to section 5.1.2). Due to the minimum requirements of this planning process a desktop environmental site analysis was undertaken by KMH Environmental in May 2017. The desktop assessment aimed to identify environmental aspects that may require additional, detailed and/or specialist assessment or have the potential impact upon the scope, construction or operation of the Proposal. The environmental site assessment assessed nine sites across NSW and was designed to complement and inform Photon's own commercial / financial / site analysis to identify a suitable location for the solar farm.

The current location was considered a preferred location due to:

- The low environmental values of the land.
- Minimal clearing of trees is required.
- The rural environment with fewer neighbours overlooking the site leading to lower visual amenity impact.
- The proximity to transmission lines and access to electricity grid.
- Ease of access to and from the Kamilaroi and Oxley Highways.
- The topography of the site is relatively flat and requires minimal earthworks

3.2.2 The 'do nothing' option

The consequences of not proceeding with the Proposal would be to forgo the benefits of the Proposal, resulting in:

- The loss of a source of renewable energy that would assist the Australian and NSW Government to reach their targets such as 20% renewable energy by 2020, '*attract renewable energy investment and Proposals, build community support for renewable energy, and attract and grow expertise in renewable energy technology*' (DPI 2013).
- The loss of cleaner energy and reduced greenhouse gas emission.
- The loss of additional electricity generation and supply into the Australian grid.
- Loss of social and economic benefits through the provision of direct and indirect employment opportunities locally and regionally during construction and operation of the solar farm.

The ‘do nothing’ option may avoid any potential environmental impacts associated with the proposal however, as outlined in Section 6 no significant environmental impacts have been identified. It is considered the benefits of the Proposal significantly outweigh any potential environmental impacts whilst contributing to ecologically sustainable development.

3.3 Proposal benefits

The Proposal would provide the following benefits:

- Produce renewable energy that does not produce greenhouse gases.
- Assist in reducing the reliance on fossil fuels in Australia and provide a cleaner and sustainable substitute.
- Develop the solar power industry and supply chain in Australia.
- Develop Australian intellectual property and know-how in solar power.
- Assist with Australia’s commitments under national and international agreements.
- Generate local economic benefits by generating jobs, encouraging regional development and maximising the use of local contractors and equipment hire.
- Some materials during construction will be sourced locally through liaison with local industry representatives however most of the materials will be procured from Sydney or Melbourne due to the technical nature of the technology.

4. Consultation

A Stakeholder and Community Engagement Plan will be prepared and implemented during preparation of the EIS. The plan will identify community, business and regulatory stakeholders and outline consultation activities to be undertaken.

The principal objectives and requirements of the consultation plan are to:

- Identify and engage with stakeholders (including government agencies) to notify them of the Proposal, the approvals process, and how they can engage with Photon.
- Determine the communication tools and methodology for consultation.
- Provide stakeholders with consistent and accurate information regarding the Proposal.
- Inform nearby communities to raise awareness of the Proposal, especially those who may potentially be affected by the Proposal.
- Provide directly affected stakeholders an opportunity to discuss the development and potential impacts.
- Implement a system to effectively record, consider, manage and respond to stakeholder feedback.
- Understand and address community concerns through consultation and the Environmental Impact Statement (EIS) process.
- Anticipate any issues and communicate these to stakeholders as early as possible.

5. Statutory and Planning Framework

5.1 NSW Legislation

5.1.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal piece of legislation covering assessment and determination of development proposals in NSW. It aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development. The development assessment and approval system in NSW is set out in Parts 4 and 5 of the EP&A Act.

The Proposal would be assessed under Part 4 of the EP&A Act.

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

Under Schedule 1, Part 20 of the *State Environmental Planning Policy (State and Regional Development) 2011* electricity generating works with a capital investment value of more than \$30million or a capital investment of more than \$10million and located in an environmentally sensitive area of State significance are deemed state significant developments.

The solar farm has an estimated capital investment value greater than \$30 million and is therefore classified as ‘*state significant development*’ under Part 4 of the EP&A Act. An Environmental Impact Statement (EIS) must be prepared and submitted to Department of Planning and Environment (DP&E) for approval. The EIS is to be prepared in accordance with the SEARs issued by DP&E.

5.1.3 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to enable the efficient delivery of infrastructure across NSW, provide a consistent planning regime for infrastructure, providing greater flexibility in the location of infrastructure and service facilities and identifying the environmental assessment category into which different types of infrastructure and services development fall.

Clause 34(7) of the SEPP provides that development for the purpose of ‘*solar energy systems*’ may be carried out with consent on any land, except as prescribed by sub clause 34(8). The solar farm is located within a Primary production (RU1) zone and is permissible with consent under the ISEPP.

Clause 45 of the ISEPP will also apply as the Site intends to connect with existing transmission lines that traverse the boundary of the Site and as such has the potential to affect an electricity transmission line.

Clause 104 of ISEPP refers to traffic generating developments. Schedule 3 lists the types of developments that must be referred to Roads and Maritime Services (Roads and Maritime).

Clause 104 also applies to developments that have the capacity to accommodate 200 or more vehicles. Clause 104 does not apply as traffic generated is below the trigger and Schedule 3 does not include electricity generating works.

5.1.4 Gunnedah Local Environment Plan 2012

The Proposal is located within the Gunnedah LGA and is subject to the Gunnedah Local Environment Plan 2012 (Gunnedah LEP). Under the Gunnedah LEP 2012 the Site is zoned as Primary Production (RU1).

The objectives of the zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- To encourage diversity in primary industry enterprises and systems appropriate for the area
- To minimise the fragmentation and alienation of resource lands
- To minimise conflict between land uses within this zone and land uses within adjoining zones
- To provide for a range of ecologically sustainable agricultural and rural land uses and development on broad acre rural lands
- To protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Gunnedah's longer term economic sustainability
- To conserve and enhance the quality of valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use.

The Proposal is generally compliant with these objectives as it:

- Can be considered a sustainable primary industry that extracts renewable energy (a natural resource)
- Is complementary to surrounding land uses
- Is highly reversible and will not impact the future productivity of the land.

Electricity generation is not listed among developments which are permitted consent for the zone however, under clause 34(7) of the ISEPP the Proposal is permissible with consent.

5.1.5 Other Relevant Legislation

Legislation	Relevance to Project
<i>Threatened Species Conservation Act 1995</i> (TSC Act) provides legal status for biota of conservation significance in NSW.	Biodiversity is addressed in section 6.2.1.
<i>Roads Act 1993</i> (Roads Act) provides for the classification of roads and for the declaration of the Roads and Maritime Services (Roads and Maritime) and other public authorities as roads authorities for both classified and unclassified roads. It also regulates the carrying out of various activities in, on and over public roads.	The Proposal does not involve works or activities in, on or over public roads therefore approval from the road authority for the works is not required.
<i>Protection of the Environment Operations Act 1997</i> (POEO Act) is administered by the Environmental Protection Authority and provides for a system of environmental protection licences for scheduled development work and activities, as well as the ability to issue environmental protection notices for pollution and waste management. Environmental offences are also described under the POEO Act.	The Proposal is not defined as a scheduled activity under this act; therefore, under section 48 of the POEO Act an Environment Protection Licence is not required.

Other NSW State legislation that may be relevant to the proposed Project includes the following:

- Contaminated Land Management Act 1997
- Fisheries Management Act 1994
- Heritage Act 1977
- National Parks and Wildlife Act 1974
- Native Title (New South Wales) Act 1994
- Native Vegetation Act 2003
- Noxious Weeds Act 1993
- Rural Fires Act 1997
- SEPP 33 – Hazardous and Offensive Development
- SEPP 44 – Koala Habitat Protection
- SEPP 55 – Remediation of land
- Waste Avoidance and Resource Recovery 2001
- Water Act 1912
- Water Management Act 2000.

The extent to which this legislation applies to the Proposal would be documented in the EIS.

5.2 Commonwealth Legislation

5.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment (DoE) and provides a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as ‘*matters of national environmental significance*’ (MNES).

An action that “*has, will have or is likely to have a significant impact on a matter of National Environmental Significance*” (MNES) may not be undertaken without prior approval from the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World heritage properties.
- National heritage places.
- Wetlands of International importance.
- Listed nationally threatened species and ecological communities.
- Listed migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions including uranium mining.
- Water resources in relation to coal seam gas or large mining development.

A search of the NSW Wildlife Atlas (10 July 2017) identified 7 listed threatened ecological communities and 2 listed threatened species within 10 km of the proposed project area.

A search of the EPBC Act Protected Matters (10 July 2017) identified 5 listed threatened ecological communities, 22 listed threatened species and 10 migratory species within 10km of the proposed project area. The EPBC Protected Matters search also identified 16 listed marine species and 26 invasive species.

The extent to which this legislation applies to the Proposal, and whether an EPBC referral is required, would be assessed in the flora and fauna impact assessment as part of the EIS.

5.2.2 Native Title Act 1993

The *Native Title Act* 1993 recognises that Aboriginal people have rights and interests to land and waters which derives from their traditional laws and customs. Native title may be recognised in places where Indigenous people continue to follow their traditional laws and customs and have maintained a link with their traditional country. It can be negotiated through a Native Title Claim, an Indigenous Land Use Agreement (ILUA) or future act agreements.

The *Native Title Act* 1993 administers processes relating to the recognition, protection and determination of native title and dealings with native title land.

A native title search was undertaken for the area potentially impacted by the proposed development in June 2017. The results identified a Native Title Claimant in the project area, being the Gomeroi People.

The land for the solar farm is privately owned and Photon plan to lease the land for the 25-year project duration. The Site was the subject of grants of freehold estate made before 1 January 1994. In accordance with the *Native Title Act* 1993, these grants have extinguished any native title that existed in relation to these properties. As such Native title does not apply.

6. Preliminary Environmental Assessment

6.1 Methodology

A broad preliminary risk analysis was carried out utilising desktop search results to identify key environmental issues for the Project.

Key issues were those identified as requiring further detailed or specialist assessment and investigation. It is likely that these issues may require specific Site management issues.

Other issues were those that are considered to require some further assessment but are likely to be managed by routine industry environmental management measures.

A detailed risk assessment would be conducted during preparation of the EIS.

6.2 Assessment of Key Issues

6.2.1 Biodiversity (Flora and fauna)

Existing Environment

The Site is currently used for agriculture specifically cropping (irrigated cotton and chick pea) and as such the Site has been subject to substantial disturbance. Potential fauna habitat may be limited by the previous disturbance caused by agricultural use.

A review of aerial photographs and site history has identified that the Site has been predominantly cleared of over-storey vegetation for the farming of irrigated crops however there are two patches of native vegetation are located on the north-western corner of the Site in lot 1 DP 186590 which are roughly 1.51 hectares and 2.96 hectares in area, respectively. These are the dominant vegetation features of the Site. Other vegetation on-site includes: a row of native trees along the boundary of the Site and Orange Grove Road; a row of native trees along the western boundary of Lot 151 DP 754954 and Lot 2 DP801762; a sparse group of trees located in lot 153 DP 754954; and other isolated trees scattered throughout the Site.

The type and presence of vegetation on the site has been identified via aerial imagery and would be confirmed during preparation of the EIS. It is understood that the development footprint will avoid the majority of vegetation present on the site where possible and that any vegetation to be removed will be identified during the EIS.

Nearby environmental features include the Namoi River located approximately 1.2km south of the Proposal which is surrounded by scattered stands of native vegetation. and a large forested area located 2.7km to the north of the Site.

A search of the NSW Wildlife Atlas (10 July 2017) identified 7 listed threatened ecological communities and 2 listed threatened species within 10 km of the proposed project area. A search of the EPBC Act Protected Matters (10 July 2017) identified 5 listed threatened ecological communities, 22 listed threatened species and 10 migratory species within 10km of the proposed project area. The EPBC Protected Matters search also identified 16 listed marine species and 26 invasive species.

Threatened Ecological Communities

- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions.
- Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes.
- Native Vegetation on Cracking Clay Soils of the Liverpool Plains.
- Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions.
- White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland.
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions.
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.
- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland.
- Weeping Myall Woodlands.

Threatened Flora

- Ooline (*Cadellia pentastylis*)
- Bluegrass (*Dichanthium setosum*)
- *Euphrasia arguta*
- *Philotheca ericifolia*
- Tarengo Leek Orchid (*Prasophyllum petilum*)
- A leek-orchid (*Prasophyllum sp. Wybong*)
- Slender darling-pea, Slender Swainson, Murray swainson-pea (*Swainsona murrayana*)
- *Tylophora linearis*

Threatened Fauna

Birds

- Regent Honeyeater (*Anthochaera phrygia*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Painted Honeyeater (*Grantiella picta*)
- Swift Parrot (*Lathamus discolor*)
- Australian Painted Snipe (*Rostratula australis*)

Fish

- Murray Cod (*Maccullochella peelii*)

Frogs

- Booroolong Frog (*Litoria booroolongensis*)

Mammals

- Little Eagle (*Hieraaetus morphnoides*)
- Koala (*Phascolarctos cinereus*)
- Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*)

- Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)
- Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)

Reptiles

- Pink-tailed Worm-lizard, Pink-tailed Legless Lizard (*Aprasia parapulchella*)
- Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko (*Uvidicolus sphyrurus*)

The initial list of subject species above does not include 'migratory species' listed under the EPBC as many of these would likely be assessed as unlikely possible occurrences within the proposed site given the absence of native vegetation. However, this would be assessed in the flora and fauna impact assessment as part of the EIS

Potential Impacts

The following impacts upon biodiversity have been considered as having potential to occur during construction of the Proposal:

- Clearing, removal and disturbance of vegetation.
- Clearing of habitat (such as food sources, foraging habitat, breeding habitat, tree hollows). Includes loss of habitat connectivity and nest sites.
- Introduction and spreads of invasive species and weeds.
- Disturbance to fauna.

The following impacts upon flora and fauna have been considered as having potential to occur during operation of the Proposal:

- Microclimate impacts under the PV array (shading, water availability, temperature and humidity).
- Weed growth and spread.
- Movement barrier and collision hazard created by perimeter fencing.
- Vehicle collision risks to fauna.

Further Assessment

A flora and fauna impact assessment (F&FIA) would be undertaken and would include:

- Detailed desktop review to identify threatened species, populations and ecological communities with potential to occur.
- Detailed flora and fauna surveys. This would include:
 - Targeted surveys of potentially occurring threatened species and endangered ecological communities.
 - Fauna habitat survey including paddock tree survey (identification of paddock tree species, hollows and nests) and water bird survey (dam) with descriptions of the fauna habitats occurring on-site.
 - Floristic survey of vegetation communities and descriptions of the vegetation communities occurring on-site.
 - Where appropriate habitat is identified anabat surveys and koala scat searches would be undertaken
- Investigate potential impacts of construction and operation of the Proposal on flora and fauna and provide project specific mitigation options.
- Recommendations regarding referral requirements under EPBC Act as required.

Preparation of assessments of significance for threatened species likely to occur on-site in accordance with Section 5A of the EP&A Act as required.

6.2.2 Noise

Existing Environment

The Site is located within an agricultural area on the outskirts of Gunnedah in a rural setting. Background noise levels are characterised by agricultural activities, local traffic and some wildlife noise. Current noise generating activities on the Site include the operation of machinery relating to crop cultivating and harvest. As such, background noise levels are likely to be low.

There are two rural-residences located with 1km of the Site:

- Lot 1 DP801762, located approximately 770m east of the Site.
- Lot 12 DP835959, located approximately 800m south of the Site.

Potential Impacts

The following noise impacts have been considered as having potential to occur during construction of the Proposal:

- Noise from fixed and mobile plant and equipment which includes:
 - Telehandlers.
 - Piledrivers.
 - Cable trenching equipment.
 - A mobile Crane.
 - Various delivery and utility vehicles.
- Noise from increased traffic along Orange Grove Road from worker vehicles and delivery trucks during construction.

The noisiest activity during construction will be pile driving however noise impacts will be limited to the construction period which is estimated to take (approximately nine to 12 months) and will only be conducted during standard construction hours.

The following noise impacts have been considered as having potential to occur during operation of the Proposal:

- Noise from vehicle movements and some maintenance equipment use.

However due to the limited activities and short duration of these activities during operation of the Proposal there will be negligible to no noise impacts during operation.

Further assessment

A noise and vibration impact assessment would be undertaken and include:

- Assessment of construction noise in accordance with the Department of Environment, Climate Change NSW (DECC) Interim Construction Noise Guidelines (ICNG), July 2009.
- Qualitative operational noise assessment.
- Identification of appropriate mitigation measures.

6.2.3 Visual Amenity and landscape character

Existing Environment

The Site is located within rural area with large lot agricultural production and sparsely distributed rural-residences usually located some distance from roads. The Site is surrounded by large fenced flat paddocks largely cleared of trees and sparsely distributed rural-residences. Local topography is generally flat, however, there are several elevated areas nearby including, the town of Gunnedah which is located on a hilly region, Black Jack Mountain located south of Gunnedah town approximately 15.5km south-west of the Site, and a large forested area located 2.7km to the north of the Site.

Nearby environmental features include the Namoi River located approximately 1.2km south of the Proposal which is surrounded by scattered stands of native vegetation. There are several other water courses in the area (Mooki River, Carroll Creek, Rangria Creek and Kibah Creek) as well as man-made dams in neighbouring plots. The environment around the Site is dominated by cleared agricultural land which is the dominant industry in the region. There are also several large mines within the Gunnedah LGA.

Major infrastructure in the area consist of the Oxley Highway which is 2km south of the Site the Kamilaroi Highway, 6.8km to the south-west of the Site. Directly south of the Site is Orange Grove Road which provides access to the Site. Electrical infrastructure consists of an existing TransGrid easement along Orange Grove Road which connects to the Gunnedah substation 1.6km south of the Site.

The Site is quite flat and has largely been cleared for cropping although there are small patches of native vegetation in the north-eastern corner and there is a large dam located in the north of the Site.

There are four (uninvolved) residences within 1km of the Site (listed below) and one residential dwelling on-site. The onsite residences own the land that will be leased for the Proposal. The closest residential dwelling is approximately 150m to the south-east on neighbouring property.

These two rural-residential dwellings have potentially sensitive private viewpoints of the development footprint:

- Lot 1 DP801762, located approximately 770m east of the development footprint.
- Lot 12 DP835959, located approximately 800m south of the development footprint.

There are also several other properties within 2km of the development footprint that may be affected due to the flat nature of the landscape and the lack of vegetation screening:

- Lot 221 DP754954, located approximately 1.25km west of the development footprint.
- Lot 201 DP836983, located approximately 1.3km south of the development footprint.
- Lot 2 DP389164, located approximately 1.4km south of the development footprint.
- Lot 34 DP754928, located approximately 1.46km east of the development footprint.
- Lot 1 DP701489, located approximately 1.69km east of the development footprint.
- Lot 1 DP187347, located approximately 1.82km north-west of the development footprint.
- Lot 2 DP1202625, located approximately 1.90km north of the development footprint.
- Lot 2 DP 701489, located approximately 1.93km east of the development footprint.
- Lot 2 DP701489, located approximately 1.96km east of the development footprint.

The majority of these residences have some localised vegetation screening around their properties.

The desktop assessment also identified two public viewpoints:

- Orange Grove Road, located along the southern boundary of the Site, as it is the nearest sealed, through road in the immediate area.
- Tudgey Road, located 1.6km north of the Site as it is a close sealed road in the immediate area.

Potential Impacts

The proposal has the potential to impact upon visual amenity and landscape character during construction and operation.

The following visual impacts have been considered as having potential to occur during construction of the Proposal:

- Construction facilities, including portable structures and laydown areas.
- Excavations and earthworks.
- Machinery present, including a mobile crane.
- Minor civil works to facilitate access.

These construction impacts would be temporary and limited to the length of the construction period. Therefore, they are not expected to have a long term visual impact.

The following visual impacts have been considered as having potential to occur during operation of the Proposal:

- Visual impact to existing public and private viewpoints.
- Sun-glitter and glare.

Further assessment

A visual and landscape character impact assessment, would be prepared as part of the EIS to investigate potential visual impacts of the Proposal and mitigation options. The impact assessment would include:

- Impact to landscape character of the site and the surrounding area.
- Visual impact to the surrounding viewpoints, both public and private.

6.2.4 Surface Water and Hydrology

Existing Environment

There are no natural waterways within or immediately adjacent to the Site. The nearest waterway is the Namoi River which is located approximately 1.2km south of the Site. Other natural water courses in the area include: Mooki River; Carroll Creek, Rangria Creek and Kibah Creek which are all tributaries of the Namoi River.

The Site contains man made waterways including a large dam and irrigation channels and is located on a Flood Planning Area as mapped in the Gunnedah LEP (2012).

A search of the Department of Primary Industries (Office of Water) water monitoring network found two groundwater bores near the Proposal Site. These identified groundwater depths of 6.7 to 7.6m in the area. The Site is not designated as groundwater vulnerable under the Gunnedah LEP.

Potential Impacts

The proposal has the potential to impact upon surface water and hydrology of the Site during construction and operation.

The following surface water and hydrology impacts have been considered as having potential to occur during construction of the Proposal:

- Accidental spill or discharge of chemicals or hydrocarbons, such as fuels and oils in vehicles and/or equipment.
- Erosion of soil and sedimentation through storm-water runoff and transport of eroded sediments to waterways (natural or man-made).
- Dewatering sediment laden water from excavations.
- Flooding during construction also has the potential to result in erosion as well as water quality impacts from items such as soil, gross-pollutants, chemicals and hydrocarbons. As the Site is mapped in a flood planning area this may be a potential constraint to the proposed works particularly stockpiling activities.

The following surface water and hydrology impacts have been considered as having potential to occur during operation of the Proposal:

- Accidental spill or discharge of chemicals or hydrocarbons, such as fuels and oils from operational vehicles and/or equipment.

Water demand for the project will be relatively small as the construction of the solar PV farm is not water intensive. If surface or groundwater extraction is required to meet the projects demand for water an assessment of impacts to water will be included in the EIS.

Construction and operation activities are not expected to impact on flooding behaviour in the area.

Further Assessment

Potential impacts to water quality and flooding on surrounding land, including impediments to the flow of water will be considered in the EIS. The impact assessment would include:

- A water quality assessment.
- A flood assessment.

6.2.5 Traffic

Existing Environment

Vehicle access to the Site will be via an unsealed private driveway on Orange Grove Road. There are no formal roads or car parking arrangements and pedestrian access is restricted.

Orange Grove Road runs along the southern boundary of the Site. Orange Grove Road intersects with Kelvin Road approximately 6.5km west of the Site. Both Orange Grove Road and Kelvin Road are sealed single lane roads that are owned by Gunnedah Shire Council. These two roads will be utilized for access to the Site.

The Oxley Highway is located 2km south of the Site and the Kamilaroi Highway is located 6.8km to the south-west of the Site. These two highways would be the major transport routes for haulage and Site vehicles during construction and operation.

Other transport infrastructure in the region includes Gunnedah Airport located approximately 8km west of the Site, and Gunnedah train station, located approximately 9km south-west of the Site

Potential Impacts

The proposal has the potential to impact upon traffic in the region during construction and operation. The following traffic and access impacts have been considered as having potential to occur during construction of the Proposal:

- Increased traffic generation. During the peak construction period, traffic is expected to be 40 heavy vehicles mostly B-double trucks and 50 light commercial vehicles per day.

The following traffic and access impacts have been considered as having potential to occur during operation of the Proposal:

- Increased traffic generation. Traffic generated by the operation of the solar farm would consist of worker's light vehicles and the occasional truck delivering maintenance materials.

At this stage, the Proposal does not involve works or activities in, on or over public roads therefore approval from the road authority for the works is not required.

Further Assessment

A Traffic Impact Assessment will be undertaken as part of the EIS.

As part of the EIS consultation will be undertaken with the Civil Aviation Safety Authority (CASA) and Gunnedah Airport.

6.3 Other Environmental Issues

Issue	Existing Environment	Potential Impacts	Mitigation Measures
Planning, Land Use and Property	The Site is contained within the Gunnedah LGA where the dominant land use is agriculture, forestry and fishing (16.9% in 2011) (<i>ABS, 2011</i>). The Site is currently used for cultivating irrigated crops. There are several patches of native vegetation however most plant communities have been disturbed due to the altered water regimes and physical disturbance of soil associated with cropping activities. The Site has several man-made drainage channels.	<p>The project will alter the land use of the Site from agricultural to electricity generating for the duration of the project life cycle. Although the Proposal has the potential to impact on agricultural use of the Site during construction and operation, the relatively small loss of productive land at a regional scale is not considered likely to have a significant impact on the overall agricultural productivity of the region.</p> <p>The solar farm would be decommissioned at the end of its operational life, removing all above ground infrastructure and returning the Site to its original use as a Primary Production area.</p> <p>Planning, land use and property impacts and risk would be assessed in the EIS.</p>	The EIS will assess the compatibility of the proposed land use with existing and adjacent land uses in the area.
Air quality	<p>The air quality in the study area is expected to be fair and typical of rural settings in NSW with low population density with limited industrial pollution sources (mainly mining)</p> <p>Namoi Region Air Quality Monitoring Project (NRAQMP) has four air quality monitoring stations within the Gunnedah local area. The Proposal is in between two of these (Breeza and</p>	<p>The construction of the Proposal is not anticipated to have a significant impact on air quality, and would mostly be related to dust during construction from activities such as:</p> <ul style="list-style-type: none"> • Movement of construction traffic on unsealed roads within the Site. • Vegetation removal. • Excavations for cabling. 	The mitigation measures would require a CEMP be prepared to manage air quality impacts during the construction phase.

Issue	Existing Environment	Potential Impacts	Mitigation Measures
	<p>Wil-gai monitoring stations) are relatively near the Proposal. The average PM_{2.5} (µg/m³) in Australia is 6 µg/m³ (Brauer, M. et al. 2016, for the Global Burden of Disease Study 2015). The average air quality reading at the Breeza monitoring facility in June 2017 was 7.27 µg/m³. The average air quality reading at the Wil-gai monitoring facility in June 2017 was 2.23 µg/m³.</p> <p>Existing sources of air pollution are expected to include vehicle emissions, dust from agricultural practices, smoke from post-harvest burnings and emissions from mining activities.</p> <p>During colder months, solid fuel heating may result in a localised reduction in air quality, particularly if temperature inversions operate overnight.</p>	<p>Air quality may be temporarily impacted by exhaust emissions from increased numbers of vehicles in the area during construction.</p> <p>No impacts to air quality are anticipated during operation.</p> <p>Air quality impacts and risk would be assessed in the EIS.</p>	
Non-Aboriginal Heritage	<p>A search of the NSW Heritage Register on 29 June 2017 for the Gunnedah LGA identified one item listed under the NSW Heritage Act, the Gunnedah Railway Station. The Gunnedah Railway Station is located approximately 10km south west of the Proposal.</p> <p>The search also had 33 items listed under the Gunnedah LEP. The closest local heritage item is the Frogmore Woolshed located at 6587 Oxley Highway approximately 2km south of the Proposal.</p>	<p>Given the distance of heritage items from the Site there is a low risk of impact to heritage items.</p> <p>Unexpected or unidentified non-Aboriginal heritage items may be uncovered during the construction of the Proposal however this is considered low risk given the Sites current level of disturbance.</p>	<p>The mitigation measures would require an unexpected finds procedure be prepared as part of the Construction Environmental Management Plan (CEMP) to manage potential heritage finds during the construction phase.</p> <p>In the event of an item of heritage significance being uncovered at the Site after works commence, the NSW Heritage Division should be contacted prior to further work being undertaken at the Site.</p>

Issue	Existing Environment	Potential Impacts	Mitigation Measures
		<p>The Proposal is unlikely to harm any known non-Aboriginal site or item. No further archaeological survey or testing is proposed.</p> <p>Should the site inspection for the EIS identify any old structures or items that would potentially have historic significance this will be reassessed.</p> <p>Non-Aboriginal heritage impacts and risk would be assessed in the EIS.</p>	<p>Do not recommence works in the area of the find until written approval is provided by a heritage consultant or archaeologist.</p>
Aboriginal heritage	<p>A search of the Office of Environment and Heritage's AHIMS database on 29 May 2017 indicated that there are no registered sites within 200 metres of the proposed works.</p> <p>Additionally, there are no landscape features that are likely to indicate the presence of Aboriginal objects within 200m of the Site.</p>	<p>There is a low risk of impact to heritage items.</p> <p>Unexpected or unidentified Aboriginal heritage items may be uncovered during the construction of the Proposal however this is considered low risk given the Sites current level of disturbance.</p> <p>The Proposal is unlikely to harm any known Aboriginal site or item. No further archaeological survey is proposed.</p> <p>Aboriginal heritage impacts and risk would be assessed in the EIS.</p>	<p>The mitigation measures would require an unexpected finds procedure be prepared as part of the CEMP to manage potential heritage finds during the construction phase.</p> <p>In the event of an item of heritage significance being uncovered at the Site after works commence, the NSW Office of Environment and Heritage (OEH) should be contacted prior to further work being undertaken at the Site.</p> <p>Do not recommence works in the area of the find until written approval is provided by NSW OEH.</p>

Issue	Existing Environment	Potential Impacts	Mitigation Measures
			If skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and OEH contacted.
Soils and Geology	<p>The Manilla 1:250,000 Geological Series Sheet (Department of Planning and Environment (DPE)) has marked the area as Qa – Steam alluvial deposits, including riverine plain deposits, sandy to silty, minor gravels.</p> <p>Soils at the Site have been extensively disturbed by agricultural activities such as paddock levelling, repeated cultivation and construction of irrigation channels.</p> <p>A review of the Gunnedah LEP 2012 did not indicate that the Site is at risk of acid sulphate soils or salinity.</p>	<p>Construction activities would include minor excavations and vegetation removal which have the potential to cause: soil erosion and sedimentation (including potential for sediment laden run-off); compaction; disturbance and dispersion of soil by vehicles; and dust generation.</p> <p>There will be minimal operational impacts to soil.</p> <p>Soil and geology impacts and risk would be assessed in the EIS.</p>	<p>An Erosion and Sediment (ERSED) Control Plan will be prepared and implemented as part of the CEMP. ERSED controls (e.g. silt curtains, sediment fences, booms etc.) will be designed, installed and maintained in accordance with Managing Urban Stormwater: soils and construction 4th Edition, (<i>Landcom, 2004</i>), aka the '<i>Blue Book</i>'.</p> <p>The EIS would provide thorough consideration of soil impacts and proposed mitigation measures during construction and operation.</p>
Contaminated Land	<p>A search of the NSW Environmental Protection Authority (NSW EPA) contaminated land records was undertaken on 1 June 2017. The results of the search illustrated that there are no records under Section 58 of the Contaminated Land Management Act 1997 of contaminated sites within 1km of the Site.</p> <p>There is potential for contamination to be present on site associated with former and</p>	<p>There is potential that contaminants may be uncovered during excavation activities at the Site.</p> <p>There would remain a minor risk of soil contamination in the event of a chemical spill (e.g. fuels) during construction and operation.</p>	<p>A CEMP will be prepared to include a unexpected finds procedure for any unexpected contamination identified during site construction.</p>

Issue	Existing Environment	Potential Impacts	Mitigation Measures
	current agricultural activities (e.g. pesticides or fuel spills).	<p>Risk associated with contamination at the Site is considered to be low and therefore no detailed investigation is likely to be required within the EIS.</p> <p>Contaminated land impacts and risk would be assessed in the EIS.</p>	
Socio economic	<p>The Proposal is in the Gunnedah LGA which has a population of 12,066 people (<i>ABS, 2011</i>) and covers an area of 500,083 square kilometres. The main town and rural centre is Gunnedah with a population of 7,888. Gunnedah is a commodity hub and major destination on the intersection of the Kamilaroi Highway Touring Route and Oxley Highway.</p> <p>The unemployment rate is approximately 4 per cent, compared to the national rate of 5.6 per cent. The main industry for employment in the Gunnedah district is agriculture, forestry and fishing (16.9 per cent in 2011), retail trade (9.8 per cent), health care and social assistance (9.4 per cent) and mining (7.5 per cent), (<i>ABS 2011</i>). The Proposal area is currently used for agriculture.</p>	<p>The Proposal would reduce the availability of agricultural land but would generate economic benefits during construction and operation, including local employment opportunities.</p> <p>The potential adverse social impacts associated with the Proposal relate to amenity aspects including, noise, air quality and traffic during construction and visual amenity during operation.</p> <p>The potential for other adverse social impacts are limited as:</p> <ul style="list-style-type: none"> • The Proposal is located a reasonable distance away from sensitive receivers with buffer distances exceeding 500m to neighbouring residences. • The PV panels are relatively close to the ground (3m). • The PV panels will absorb light rather than reflect it. <p>The EIS would assess potential social and economic impacts of the Proposal</p>	Employment opportunities for local sub-contractors should be maximised where possible.
Bushfire Risk	The Site has been predominantly cleared for agriculture and currently grow crops (cotton and chickpea).	The Proposal is unlikely to be affected by bushfire, or pose a significant bushfire risk.	All infrastructure would be installed in accordance with AS 3000:2007 Electrical installations.

Issue	Existing Environment	Potential Impacts	Mitigation Measures
	<p>A search of the Rural Fire Service (RFS) online search tool on 30 June 2017 did not identify the land as fire prone (<i>RFS 2017</i>).</p> <p>A review of the Gunnedah LEP 2012 did not identify any fire prone land associated with the Proposal.</p> <p>The frequency of fire on the Site and surrounding area is unknown.</p>	<p>Activities associated with construction of the Proposal that may cause or increase the risk of bush fire include:</p> <ul style="list-style-type: none"> • Site preparation activities such as mowing, slashing and use of other petrol-powered tools. • Operating a petrol, LPG or diesel-powered motor vehicle over land containing combustible material. • Operating plant fitted with power hydraulics on land containing combustible material. • Storage of fuel. • Bushfire impacts and risk would be assessed in the EIS. 	<p>Safe clearance distances would be defined and maintained.</p>
Waste Management	<p>The generation of waste currently on the site would be consistent with 'typical' agricultural activities.</p>	<p>The Proposal would generate several waste streams and utilise a variety of materials during the construction phase these include:</p> <ul style="list-style-type: none"> • Green waste. • Excavated material from localised cut and fill and trenching (although this is proposed to be used as backfill). • Packaging from transport of PV panels including wood/plastic pallets, cable drums, plastic wrapping, straps, paper and cardboard. • General rubbish including domestic waste from construction workers. • Biological waste (sewage) from construction amenities. 	<p>A Waste Management Plan would be incorporated into the CEMP, applying the principles to avoid, re-use and recycle to minimise wastes.</p> <p>All waste will be disposed by a licensed contractor to an appropriately licenced facility.</p> <p>All records demonstrating lawful disposal of waste are required to be kept for at least six years.</p>

Issue	Existing Environment	Potential Impacts	Mitigation Measures
		<p>Operational waste</p> <ul style="list-style-type: none"> • Repair, replacement or removal of infrastructure components (such as PV module, inverters and electrical cabling). • Green waste from mowing activities. 	
<p>Utilities (Electricity network)</p>	<p>TransGrid manages and operates the high voltage electricity transmission network in NSW. TransGrid has restrictions on development within powerline easements.</p> <p>TransGrid guidelines state that activities and encroachments are prohibited within a transmission line easement, including ‘the installation of fixed plant or equipment’, and ‘the placing of obstructions within 20 metres of any part of a transmission line structure or supporting guy wire’. Roads or tracks within 10 metres of the centre-line of a transmission line 132kV are prohibited although roads that cross the transmission line as a thoroughfare may be permitted.</p> <p>There is an existing TransGrid electrical easement running along the southern boundary of the Site.</p>	<p>The proposed works would involve works adjacent to these utilities. The Proposal will need to connect to the TransGrid electricity network.</p> <p>The EIS would assess potential impacts of the Proposal on utilities.</p>	<p>Consultation will occur with TransGrid as part of the EIS.</p>

6.4 Cumulative Impacts

6.4.1 Other Projects and developments

Cumulative impacts, for the purpose of this assessment, relate to the combined potential effects of different impact areas of the Proposal (i.e. construction traffic combined with visual impact) as well as the potential interaction with other Proposals in the local area (e.g. the combined effects of adjacent Proposals, during construction, operation and decommissioning).

An assessment of cumulative impacts in the EIS will include a review of the Department of Planning's Major Projects Register (July 2017) and a review of the Gunnedah Shire Councils development applications tracker.

6.4.2 Further Assessment

Potential cumulative impacts will be considered in the EIS via a Cumulative Impact Assessment. The assessment would include:

- Combined potential effects of different impact areas of the Proposal.
- Potential interaction with other Proposals in the local area.
- Identification of recommended mitigation measures to minimise any potential impacts.

7. Summary of proposed EIS scope

7.1 Proposed EIS Scope for Key Issues

Table 7-1 provides a summary of the proposed EIS assessment scope for key environmental issues. This scope would be refined (if necessary) following receipt of the SEARs for the project.

Table 7-1: Proposed EIS Scope for Key Issues

Issue	Proposed Environmental Impact Statement Scope
Biodiversity	<p>A flora and fauna impact assessment (F&FIA) would be undertaken and would include:</p> <ul style="list-style-type: none"> Detailed desktop review to identify threatened species, populations and ecological communities with potential to occur. Detailed flora and fauna surveys. This would include: <ul style="list-style-type: none"> Targeted surveys of potentially occurring threatened species and endangered ecological communities Fauna habitat survey including paddock tree survey (identification of paddock tree species, hollows and nests) and water bird survey (dam) with descriptions of the fauna habitats occurring on-site Floristic survey of vegetation communities and descriptions of the vegetation communities occurring on-site. Where appropriate habitat is identified anabat surveys and koala scat searches would be undertaken Investigate potential impacts of construction and operation of the Proposal on flora and fauna and provide project specific mitigation options. Recommendations regarding referral requirements under EPBC Act as required. Preparation of assessments of significance for threatened species likely to occur on-site in accordance with Section 5A of the EP&A Act as required.
Noise	<p>A noise and vibration impact assessment would be undertaken and include:</p> <ul style="list-style-type: none"> Assessment of construction noise in accordance with the Department of Environment, Climate Change NSW (DECC) Interim Construction Noise Guidelines (ICNG), July 2009. Qualitative operational noise assessment. Identification of appropriate mitigation measures.
Visual Impact Assessment	<p>A visual and landscape character impact assessment, would be prepared as part of the EIS to investigate potential visual impacts of the Proposal and mitigation options. The impact assessment would include:</p> <ul style="list-style-type: none"> Impact to landscape character of the site and the surrounding area. Visual impact to the surrounding viewpoints, both public and private.
Surface Water and Hydrology	<p>Potential impacts to water quality and flooding on surrounding land, including impediments to the flow of water will be considered in the EIS. The impact assessment would include:</p> <ul style="list-style-type: none"> A water quality assessment. A flood assessment.
Traffic	<p>A Traffic Impact Assessment will be undertaken as part of the EIS.</p> <p>As part of the EIS consultation will be undertaken with the Civil Aviation Safety Authority (CASA) and Gunnedah Airport.</p>

7.2 Proposed EIS Scope for Other Environmental Issues

Table 7-2 provides a summary of the proposed EIS assessment scope for other environmental issues. This scope would be refined (if necessary) following receipt of the SEARs for the project.

Table 7-2: Proposed EIS Scope for Other Issues

Issue	Proposed Environmental Impact Statement Scope
Planning, Land Use and Property	The EIS will assess the compatibility of the proposed land use with existing and adjacent land uses in the area.
Air	The mitigation measures would require a CEMP be prepared to manage air quality impacts during the construction phase.
Non-Aboriginal Heritage	<p>The mitigation measures would require an unexpected finds procedure be prepared as part of the CEMP to manage potential heritage finds during the construction phase.</p> <p>In the event of an item of heritage significance being uncovered at the Site after works commence, the NSW Heritage Division should be contacted prior to further work being undertaken at the Site.</p> <p>Do not recommence works in the area of the find until written approval is provided by a heritage consultant or archaeologist.</p>
Aboriginal Heritage	<p>The mitigation measures would require an unexpected finds procedure be prepared as part of the CEMP to manage potential heritage finds during the construction phase.</p> <p>In the event of an item of heritage significance being uncovered at the Site after works commence, the NSW Office of Environment and Heritage (OEH) should be contacted prior to further work being undertaken at the Site.</p> <p>Works are not to recommence in the area of the find until written approval is provided by NSW OEH.</p> <p>If skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and OEH contacted.</p>
Soils	<p>An Erosion and Sediment (ERSED) Control Plan will be prepared and implemented as part of the CEMP. ERSED controls (e.g. silt curtains, sediment fences, booms etc.) will be designed, installed and maintained in accordance with Managing Urban Stormwater: soils and construction 4th Edition, (<i>Landcom, 2004</i>), aka the 'Blue Book'.</p> <p>The EIS would provide thorough consideration of soil impacts and proposed mitigation measures during construction and operation.</p>
Contaminated Land	A CEMP will be prepared to include an unexpected finds procedure for any unexpected contamination identified during site construction.
Socio-economic	Employment opportunities for local sub-contractors should be maximised where possible
Bushfire	<p>All infrastructure would be installed in accordance with AS 3000:2007 Electrical installations.</p> <p>Safe clearance distances would be defined and maintained.</p>
Waste Management	<p>A Waste Management Plan would be incorporated into the CEMP, applying the principles to avoid, re-use and recycle to minimise wastes.</p> <p>All waste will be disposed by a licensed contractor to an appropriately licenced facility.</p> <p>All records demonstrating lawful disposal of waste are required to be kept for at least six years.</p>

Issue	Proposed Environmental Impact Statement Scope
Utilities	Consultation will occur with TransGrid as part of the EIS.
Cumulative Impacts	<p>Potential cumulative impacts will be considered in the EIS via a cumulative Impact Assessment. The assessment would include:</p> <ul style="list-style-type: none"> • An assessment of spatial and temporal environmental effects resulting from the above projects. • Identification of recommended mitigation measures to minimise any potential impacts, where possible.

8. Conclusion

Photon Energy proposes to construct and operate a 155 MW solar farm using photovoltaic technology at 765 Orange Grove Road, Gunnedah, NSW, 2380. The proposed Site is approximately 692 ha and covers several lots however the initial design for the solar farm is 205 ha. The remaining land will retain its existing agricultural use.

The solar farm at Gunnedah has an estimated capital investment value of \$201 million this exceeds the \$30 million limit and is therefore classified as ‘*state significant development*’ under Part 4 of the EP&A Act. An Environmental Impact Statement (EIS) must be prepared and submitted to Department of Planning and Environment (DP&E) for approval. The EIS is to be prepared in accordance with the SEARs issued by Department of Planning and Environment (DP&E).

The project components, location and design may be subject to further changes as part of the ongoing design development and community consultation and clarifications may be made during the EIS process.

The following have been identified as key environmental aspects:

- Biodiversity.
- Noise.
- Visual Impact Assessment.
- Surface Water and Hydrology.
- Traffic.

A PEA of the project’s potential impact has confirmed that the above aspects have the potential to result in impact to the environment (without the adoption of adequate environmental mitigation measures). Detailed assessment of these issues, and other potential environmental issues, would be undertaken as part of an EIS.

Following the receipt of the SEARs an EIS would be prepared and publicly exhibited, in accordance with the requirements of Part 4.1 of the EP&A Act. The EIS would include:

- A description of the project, including its components and construction activities (including ancillary components and activities if required).
- A statement of the objectives of the project.
- A summary of the strategic need for the project with regard to its critical State significance and relevant State Government policy.
- An analysis of any feasible alternatives to the project.
- A description of feasible options within the project.

- A description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative/option.
- A concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts).
- A demonstration of how the project design has been developed to avoid or minimise likely adverse impacts.
- The identification and assessment of key issues.
- A statement of the outcome(s) the proponent would achieve for each key issue.
- Consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts.
- An assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed; and
- Statutory context of the project as a whole.

9. References

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- Roads and Maritime Services (Roads and Maritime) 2013, Environmental Impact Assessment Guidance Note: Guidelines for landscape character and visual impact assessment
- Rural Fire Service (RFS) (2017) Check if you're in bush fire prone land. <<http://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl>>

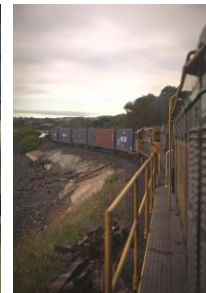
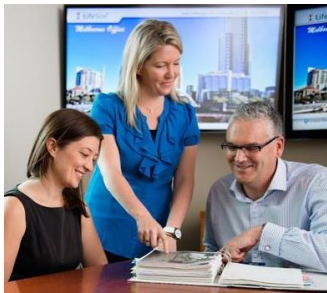
Appendix A

Proposal layout

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