OVERLAND
SUN FARMING

Orange Grove Sun Farm

Request for Secretary's Environmental Assessment Requirements

Prepared for Overland Sun Farming Pty Ltd
on behalf of Orange Grove Sun Farm Pty Ltd

November 2017

Orange Grove Sun Farm

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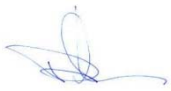
Signature			**Signature**	
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Table of contents

Table of contents *(Cont'd)*

Appendices

Figures

Photographs

1 Introduction

1.1 The project

OVERLAND Sun Farming Pty Ltd (OVERLAND) on behalf of Orange Grove Sun Farm Pty Ltd proposes to develop the Orange Grove Sun Farm, a large-scale solar photovoltaic (PV) generation facility and associated infrastructure near the township of Gunnedah, in the Brigalow Belt South Bioregion of northern NSW (Figure 1.1) (the project). The estimated capital investment for the project is $80 million.

The project is a State significant development (SSD) under the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). Therefore, a development application (DA) for the project is required to be submitted under Part 4, Division 4.1 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The NSW Minister for Planning, or the Minister's delegate, is the consent authority.

The project is intended to have benefits including:

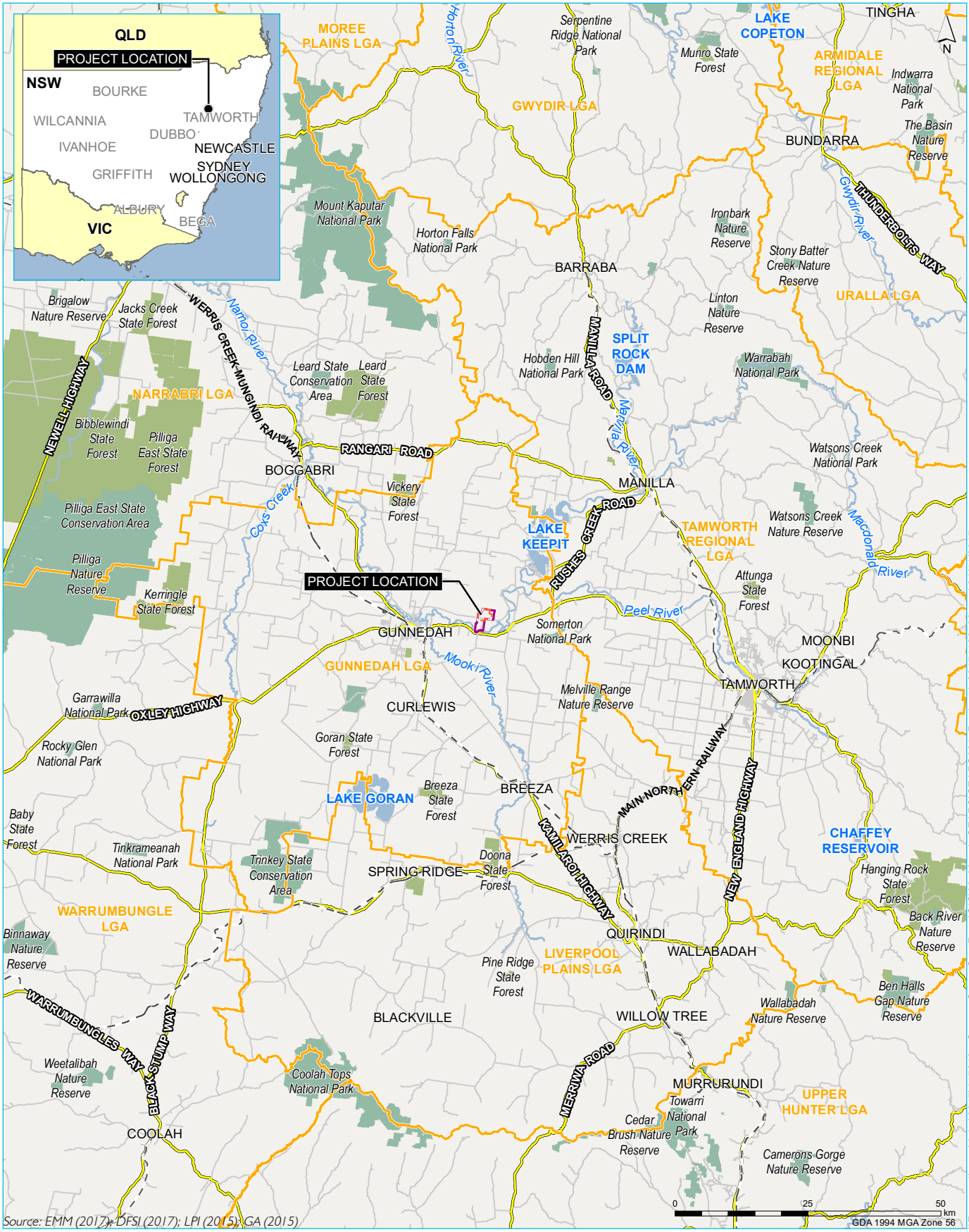
- production of renewable energy, directly contributing to the State's renewable energy targets and the objectives of the NSW Government's Renewable Energy Action Plan (REAP);
- creation of employment opportunities, including approximately 80 full-time equivalents (FTEs) during construction, and three FTEs during operations;
- direct and indirect benefits to the local economy during the life of the project;
- diversification of local revenue streams; and
- increased energy security through valuable contributions to a more diverse energy mix.

The project is consistent with the objectives of the NSW Government's REAP and will contribute to achieving the Commonwealth Government's National Renewable Energy Target of 33,000 gigawatt hours (GWh) of energy generated by renewable sources by 2020 (DoI DRE 2016), which the Australian Energy Regulator (2017) reports as requiring an additional 7,000 GWh of renewable energy to meet.

1.2 Site and surrounds

OVERLAND proposes to develop the project on a site within the Gunnedah Shire local government area (LGA), approximately 12 kilometres (km) east of the township of Gunnedah (Figure 1.1). The site encompasses an area of approximately 417 hectares (ha) and is adjacent to Orange Grove Road (Figure 1.2). The land is legally described as DP 945590 (Lots 1 and 2), DP 126183 (Lot 1), DP 1068518 (Lot 3), DP 754928 (Lot 27) and DP 1068520 (Lot 2) (Figure 1.3). During the preparation of the EIS, the development footprint within the site boundary will be selected on the basis of grid connection studies, environmental constraints identification, further engineering assessment and design of project infrastructure.

Elevation across the site is relatively uniform at approximately 273–278 m above sea level.



Source: EMM (2017); DFSI (2017); LPI (2015); GA (2015)

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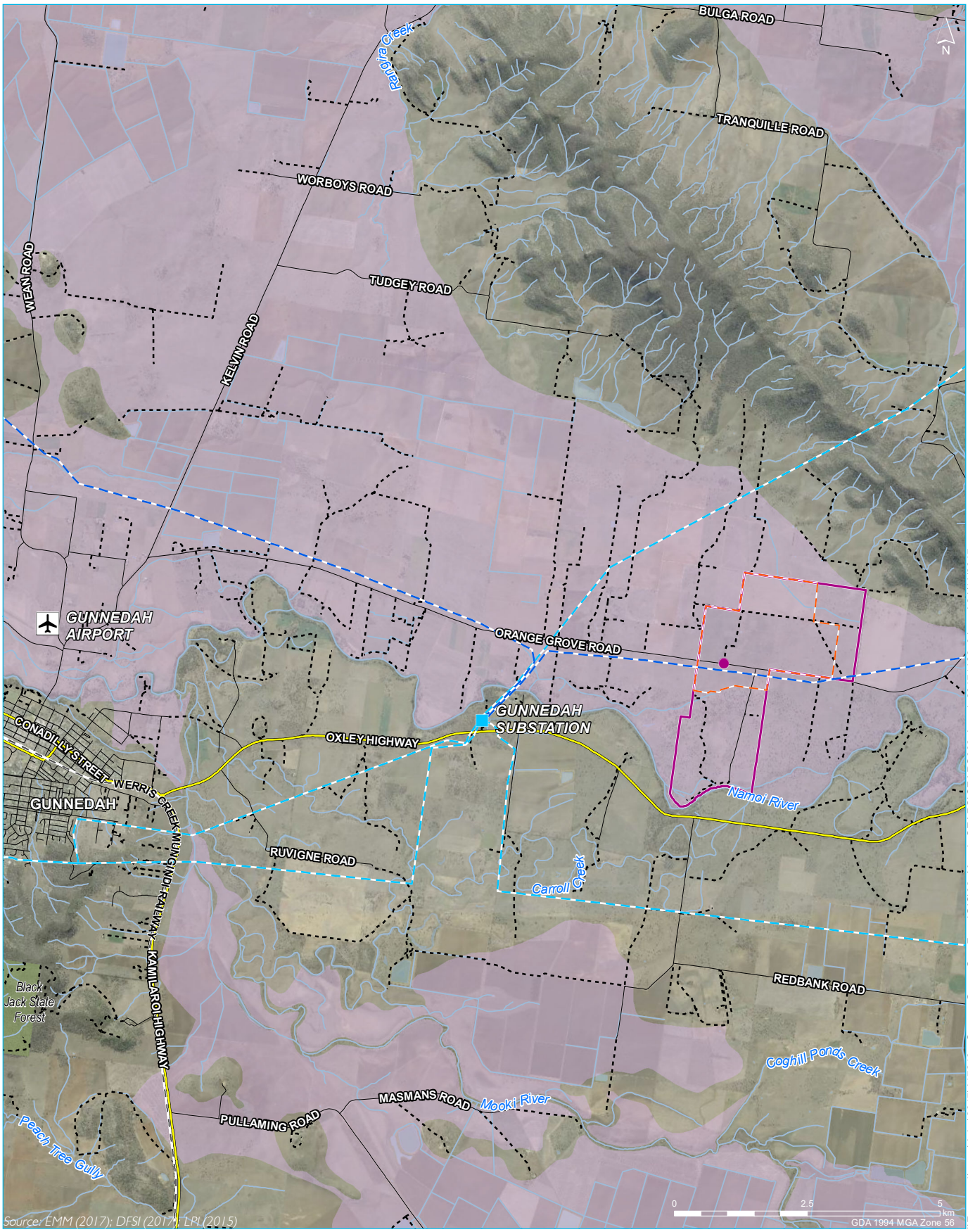
KEY

- Orange Grove Sun Farm site boundary
- Preliminary development footprint
- Local government area (LGA) boundary
- Rail line
- Main road
- Local road
- Major waterway
- Waterbody
- NPWS reserve
- State forest

Regional project location

Orange Grove Sun Farm
Request for SEARs
Figure 1.1

EMM



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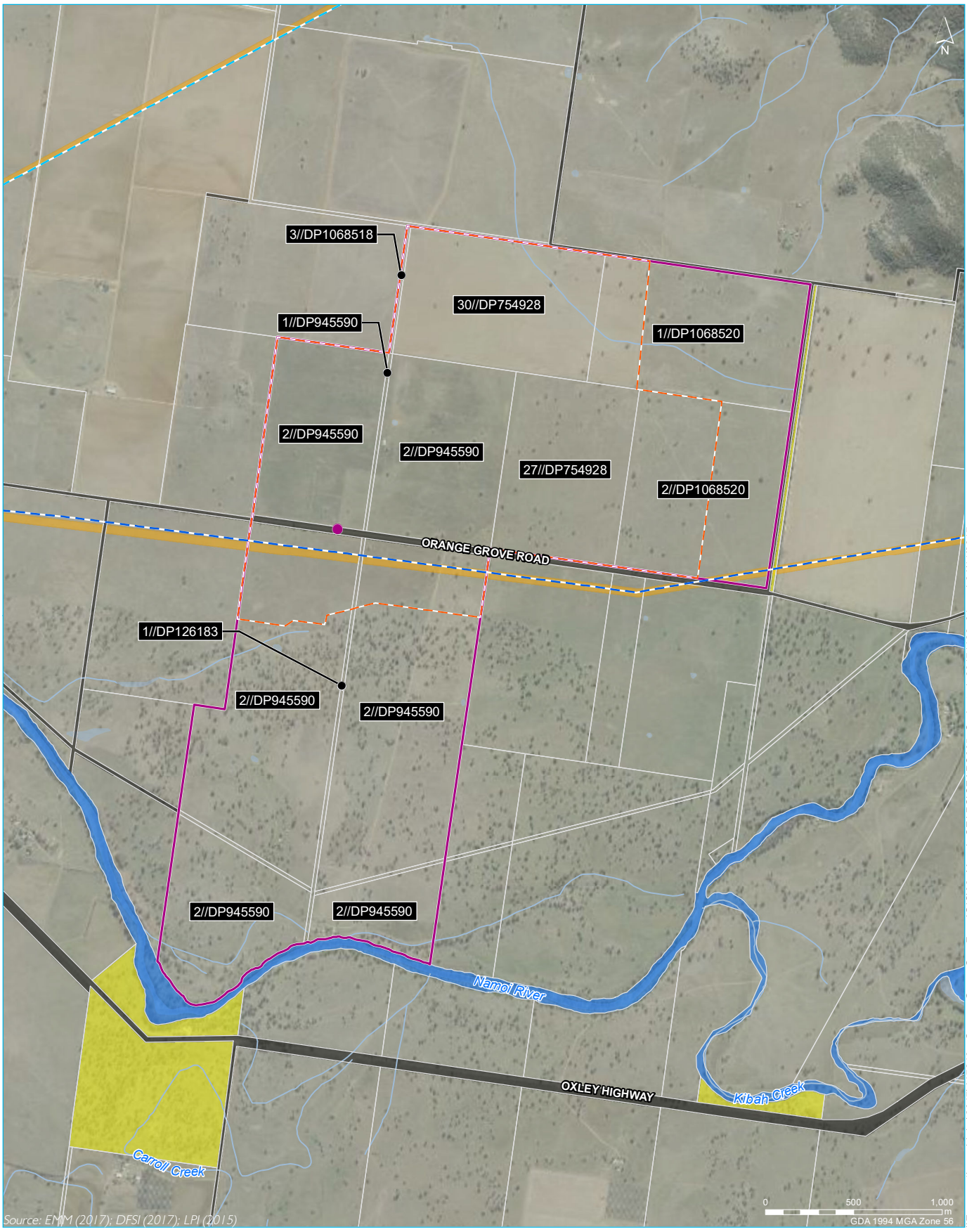
KEY

- Orange Grove Sun Farm site boundary
- Preliminary development footprint
- Indicative site access point
- 132 kV transmission line
- 66 kV transmission line
- Rail line
- Main road
- Local road
- Vehicular track
- Watercourse / drainage line
- Waterbody
- Biophysical Strategic Agricultural Land
- State forest

Location of the Orange Grove Sun Farm

Orange Grove Sun Farm
Request for SEARs
Figure 1.2

EMM



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KEY

- Orange Grove Sun Farm site boundary
- Preliminary development footprint
- Indicative site access point
- 132 kV transmission line
- 66 kV transmission line
- Watercourse / drainage line
- Waterbody
- Cadastral boundary
- Crown land
- Easement
- Water feature corridor
- Road corridor (public road in use)

Cadastral details

Orange Grove Sun Farm
Request for SEARs
Figure 1.3

EMM

The site is zoned RU1 Primary Production under the Gunnedah Local Environmental Plan 2012 (Gunnedah LEP). The site has been highly modified by past disturbances associated with land clearing, cropping, livestock grazing and weed invasion. It is currently used for livestock grazing and cropping.

The quality of native vegetation within the site boundary is tied to past land use. All areas have been subject to extensive clearing, with scattered trees or small clumps of timber interspersed through native and exotic grasslands.

The site is within the Namoi River catchment and is approximately 2.3 km north of the Namoi River at its closest point (see Figure 1.2). The site lies within Gunnedah Shire Council (GSC) flood planning area. Preliminary consideration of published Department of Natural Resources (DNR) and Department of Primary Industries Water (DPI Water) regional flooding information identified the site as within an area of the floodplain that may be subject to inundation during large floods.

The site is mapped as biophysical strategic agricultural land (BSAL) as defined by the Strategic Agricultural Land Map – New England North West regional mapping presented in State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP) (refer Figure 1.2). This is described further in Section 5.4.1.

At its closest point, the site is approximately 4.2 km north-east of TransGrid's Gunnedah Substation (refer Figure 1.2). TransGrid's 132 kilovolt (kV) transmission line traverses the landscape close to the south-eastern corner of the site before it crosses to the southern side of Orange Grove Road (refer Figure 1.2).

The site has suitable access to the local and regional road network including the Kamilaroi and Oxley highways, Orange Grove Road and Kelvin Road (refer Figure 1.1).

Climate data from the Bureau of Meteorology (BoM) indicates that the site's daily solar exposure ranges between 10.3-26.5 megajoules/m^2 (MJ/m^2), with an annual average of 16.8 MJ/m^2, which equates to approximately 4.7 kWh/m^2 with an average of 8-9 hours of sunshine per day (BoM 2017a; BoM 2017b). Annual cloud cover statistics over a 63 year period indicate that the site receives an average of 68.8 cloudy days per annum (BoM 2017c). The Gunnedah Shire region experiences a consistently high availability of solar radiation, and is therefore ideal for large-scale solar development.

Photographs 1.1 and 1.2 illustrate the general condition of the site.

Photograph 1.1 **General condition of the site looking south-east from the north-western corner**

Photograph 1.2 **General condition of the site looking south-west from the north-eastern corner**

1.3 Applicant

OVERLAND is the applicant for the project on behalf of Orange Grove Sun Farm Pty Ltd, a related company. OVERLAND is an Australian-owned and operated business engaged in the development of a portfolio of solar energy sun farms on land across regional Australia. Guided by direct experience in the development and commercial delivery of large-scale renewable projects, OVERLAND works closely with landowners, electricity supply companies, councils and governments to develop solar energy sun farms that bring both environmental and economic benefits to regional Australia consistent with the goals and objectives of both the Commonwealth and NSW governments.

OVERLAND's personnel have successfully led benchmark renewable energy and infrastructure projects from start to finish and have a sound record that traverses early stage site identification, working with landowners and communities, obtaining consents and licences from government to build and operate, securing energy and grid connection contracts, arranging financing and managing construction and ongoing operations and power generation.

This experience includes responsibility for the development, financing, construction and operation of over 350 megawatts (MW) of large-scale, grid connected renewable energy generation projects in the National Electricity Market.

OVERLAND has completed the development and financing of 350 MW of large-scale solar and is continuing to develop a significant portfolio of solar energy sun farms throughout NSW and other National Electricity Market states. For example, the Limondale Sun Farm, a large-scale solar PV generation facility close to the township of Balranald in south-western NSW, which was approved by the Minister for Planning on 31 August 2017. In addition, OVERLAND proposes to develop the Hillston and Hay sun farms in south-western NSW, which are both currently under assessment by NSW Department of Planning and Environment (DPE).

1.4 Purpose of report

The purpose of this report is to request, and inform the content of, the Secretary's Environmental Assessment Requirements (SEARs) for the project. The SEARs will identify the requirements for the environmental impact statement (EIS) that will be prepared to accompany the DA for the project.

This report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of OVERLAND.

2 Planning framework

2.1 NSW Environmental Planning and Assessment Act 1979

2.1.1 Approval process

The EP&A Act and the NSW Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) provide the framework for environmental planning and assessment in NSW. Part 4 of the EP&A Act relates to development assessment; Part 4, Division 4.1 relates to the assessment of development deemed to be significant to the State (or SSD).

Section 89C(2) of the EP&A Act states that a:

> ... State environmental planning policy may declare any development, or any class or description of development, to be State significant development.

The SRD SEPP identifies development that is SSD. Clause 8 of the SRD SEPP states:

- (1) Development is declared to be State significant development for the purposes of the Act if:

  (a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and

  (b) the development is specified in Schedule 1 or 2.

The project meets both these requirements; it requires development consent, and is a development specified in Schedule 1 of the SRD SEPP. Permissibility of the project is described below.

Schedule 1 of the SRD SEPP defines the following as SSD:

> Electricity generating works and heat or co-generation
>
> Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:
>
> (a) has a capital investment value of more than $30 million.

The project is a development for the purpose of electricity generation and will have a capital investment value of more than $30 million. Consequently, the project is SSD.

2.1.2 Permissibility

The relevant local planning instrument is the Gunnedah LEP. Under the Gunnedah LEP, the site is zoned RU1 Primary Production. The objectives of this 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; and
- 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 project will harness a natural resource, namely solar energy. Whilst the development of this project will impact the availability of land for other primary production, it will allow for and encourage diversity in the area's land use and will provide economic stimulus and support to rural communities.

Development for the purpose of electricity generation is prohibited in the RU1 Zone as it is not specified in item 2 or 3 of the Gunnedah LEP. Notwithstanding, clause 34 (7) of State Environmental Planning Policy (Infrastructure) 2007 states that:

> ...development for the purpose of a solar energy system may be carried out by any person with consent on any land.

Therefore, development for the purpose of a solar energy system may be carried out on the site with development consent.

Section 78A (8A) of the EP&A Act requires a DA for SSD to be accompanied by an EIS. Schedule 2 of the EP&A Regulation requires an EIS to be prepared in accordance with the SEARs issued for the project.

2.2 Other State legislation

2.2.1 Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) is the principal NSW environmental protection legislation and is administered by the NSW Environment Protection Authority (EPA). Section 48 of the POEO Act requires an environment protection licence (EPL) to undertake scheduled activities at any premises. Scheduled activities are defined in Schedule 1 of the POEO Act and include the following premise-based activities that apply to the project:

> 17 Electricity generation
>
> (1) ...general electricity works, meaning the generation of electricity by means of electricity plant that, wherever situated, is based on, or uses, any energy source other than wind power or solar power.
>
> (2) Each activity referred to in Column 1 of the Table to this clause is declared to be a scheduled activity if it meets the criteria set out in Column 2 of that Table.

The table referred to in Schedule 1, clause 17 specifies 'general electricity works' with 'capacity to generate more than 30 megawatts of electrical power'. The project will have a capacity that is greater than 30 MW and therefore requires an EPL. Under the provisions of the EP&A Act, an EPL cannot be refused if it is necessary for carrying out a SSD authorised by a development consent (see Section 2.2.6).

2.2.2 Water Management Act 2000

The NSW *Water Management Act 2000* (WM Act) regulates the use and interference with surface and groundwater in NSW where a water sharing plan has been implemented. The Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources applies to the region in which the site is located and will be discussed in the EIS.

2.2.3 Biodiversity Conservation Act 2016

The NSW *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017, which repealed the following:

- NSW Threatened Species Conservation Act 1995;
- sections of the NSW National Parks and Wildlife Act 1974 (NPW Act); and
- NSW Native Vegetation Act 2003.

The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts for proposed developments. Where development consent is granted, the consent authority may impose as a condition of consent, an obligation to retire a number and type of biodiversity credits determined under the new Biodiversity Assessment Method (BAM).

The BC Act is also supported by the Biodiversity Conservation Regulation 2017 and the Biodiversity Conservation (Savings and Transitional) Regulation 2017, which outline the methods to be used in applying the BAM, and specific considerations for transitional projects immediately following commencement of the new framework.

Detailed ecological assessments have been undertaken by Biosis Pty Ltd (Biosis) and EMM between March and October 2017 in accordance with the Framework for Biodiversity Assessment (FBA) (OEH 2014) and Biodiversity Assessment Method (BAM) (OEH 2017). These assessments have included mapping of native vegetation, collection of plot/transect data and targeted threatened species surveys. This data has been used to refine the project boundary to avoid and minimise impacts to biodiversity.

The project will be assessed under the new BC Act and associated BAM.

2.2.4 Roads Act 1993

The NSW *Roads Act 1993* is administered by either Roads and Maritime Services (RMS), local government or NSW Land and Property Information (NSW LPI). The RMS has jurisdiction over major roads, local government over minor roads and NSW LPI over Crown roads. The NSW *Roads Act 1993* sets out the rights of the public in regard to access to public roads.

Under Section 138 or Part 9, Division 3 of the NSW *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either RMS or local council, depending upon classification of the road.

The interaction of the project with the local and regional road network will be addressed in the EIS. Under the provisions of the EP&A Act, an approval under Section 138 or Part 9, Division 3 of the NSW *Roads Act 1993* cannot be refused if it is necessary for carrying out a SSD authorised by a development consent (see Section 2.2.6).

2.2.5 Rural Fires Act 1997

The NSW *Rural Fires Act 1997* (RF Act) aims to prevent, mitigate, and suppress bush and other fires in local government areas of the State. Section 63(2) of the RF Act requires the owners of land to prevent the ignition and spread of bushfires on their land. Under Section 89J of the EP&A Act, a bush fire safety authority under Section 100B of the RF Act is not required for SSD that is authorised by a development consent.

The NSW Rural Fire Service (RFS) Bush Fire Prone Land online mapping tool indicates that the site is not bush fire prone.

2.2.6 Other State approvals required

Section 89J of the EP&A Act states that the following relevant authorisations are not required for SSD that is authorised by a development consent:

- an approval under Part 4, or an excavation permit under Section 139, of the NSW Heritage Act 1977 (Heritage Act);
- an Aboriginal heritage impact permit (AHIP) under Section 90 of the NPW Act;
- a bush fire safety authority under Section 100B of the NSW RF Act; and
- a water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the WM Act.

In addition, Section 89J states that Division 8 of Part 6 of the Heritage Act does not apply to, prevent or interfere with the carrying out of SSD authorised by a development consent.

Section 89K of the EP&A Act lists the authorisations that must be obtained but cannot be refused if they are necessary for carrying out SSD that is authorised by a development consent. These authorisations include (as relevant to the project):

- an EPL under the POEO Act; and
- a consent under Section 138 of the NSW Roads Act 1993 from the relevant road authority.

2.3 Commonwealth legislation

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters of national environmental significance (MNES) including:

- world heritage properties;
- national heritage places;
- Ramsar wetlands of international importance;
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;

- nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas development and large coal mining development.

A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National Heritage Places within the vicinity of the site. The Commonwealth Protected Matters Search Tool and detailed ecological investigations undertaken to date indicate that there is limited potential for listed threatened species and listed migratory species to occur within the vicinity of the site.

If an action would, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. To determine whether a proposed action will or is likely to be a controlled action, a Referral or Proposed Action is submitted to the Commonwealth Department of the Environment and Energy (DoEE).

Detailed ecological assessments indicate a referral is unlikely to be required.

3 Project description

3.1 Overview

The project includes the development, construction and operation of a solar PV electricity generation facility, which comprises the installation of PV solar panels and associated infrastructure on the site. Ultimately, the installed capacity will depend on the development footprint (determined during preparation of the EIS), the available grid capacity, the economics of scale and grid connection, and energy market demand.

As an indication of scale, based on current technologies, the estimated total installed capacity will be in the order of 110 MW, which would be generated by approximately 330,000 PV solar panels.

The project will connect to the TransGrid 132 kV electricity distribution network that originates at TransGrid's Gunnedah Substation (see Figure 1.2). The electricity and associated environmental products that are generated from the project will be sold to one or more of a registered energy retailing organisation, large energy user (governmental or private) or to the National Electricity Market that is managed by the Australian Energy Market Operator.

3.2 Project components

The project comprises a number of key components on the site, including:

- a network of PV solar panel arrays;
- electrical collection systems, switchyard and control room;
- energy storage and network support devices;
- a management hub, including demountable offices and amenities and equipment sheds; and
- parking and internal access roads.

The project may include the installation of battery and energy storage devices within the development footprint. The rated capacity of the proposed battery and energy storage devices will be determined during the detailed design stage of the project and will be dependent on commercial considerations at the time of construction. The proposed battery and energy storage devices will be housed in a secure compound within the development footprint.

The purpose of the battery and energy storage devices will be to store energy on-site, which will allow energy to be released at specific times. The battery and energy storage devices will also provide a number of network services, including, frequency control integration and energy arbitrage, as well as improved reliability of electricity provision from the project. Energy arbitrage allows energy to be stored on-site during periods of low demand and then be discharged into the network during periods of greater demand.

The site boundary presented in Figure 1.2 is a broad footprint which has been identified during initial design and planning stages. During the preparation of the EIS, the development footprint within the site boundary will be refined on the basis of grid connection studies, environmental constraints identification and further engineering assessment and design of project infrastructure.

The project will also require the construction of connection infrastructure to deliver electricity produced at the site to the electricity grid. The point of connection to the electricity distribution network will be either Transgrid's 132 kV transmission line or the Gunnedah Substation (refer Figure 1.2).

3.2.1 PV solar panels

The project involves the installation of PV solar panels, arranged in a series of rows positioned to maximise the use of the solar resource available at the site. PV solar panels will be constructed in a fixed array or in a single axis tracking configuration, which will allow the PV solar panels to rotate from east to west during the day tracking the sun's movement. Panels will be fixed to and supported by ground-mounted framing. The average height of the PV solar panel rows will be approximately 1.2 m. During the early morning and late afternoon tracking periods, the maximum height of the PV solar panel rows will be approximately 2 m.

The typical dimensions of the PV solar panels are 1.7 m by 1 m, which provides a surface area of approximately 1.65 square metres (m^2) per PV solar panel. PV solar panels will be constructed of solar glass with an anti-reflective surface treatment.

Approximately 330,000 PV solar panels could be accommodated at the site, providing an estimated capacity in the order of 110 MW. The final number of PV solar panels within the development footprint will be dependent on detailed design, availability and commercial considerations at the time of construction.

3.2.2 Electrical collection system and switchyard

The PV solar panels will be connected in series and the electricity generated by the project will be directed via underground electrical collection systems to the inverters. The number of inverters required will be dependent on the final detailed design; however, it is anticipated that approximately 40 inverters will be required. The inverters will connect to a project electrical switchyard and onsite substation, which will use the connection infrastructure to export electricity to the grid network.

All electricity generated by the PV solar panels will pass through the Gunnedah Substation and then be transmitted into the grid network.

3.2.3 Management hub

The project includes the development of a management hub, from which operation of the infrastructure will be managed. Structures will include a demountable office control building, including staff amenities, and equipment storage sheds. This will be the receival point for all equipment delivery during construction and all management activities during the project's operational period.

3.3 Construction

Construction of the project will take approximately nine months from the commencement of site works. Due to the site's flat terrain and predominantly cleared landscape, minimal site preparation and civil works are anticipated prior to construction. During the peak construction period, a workforce of approximately 80 people will be required on-site. Construction activities will be undertaken during standard daytime construction hours.

3.4 Operation and decommissioning

Once operational, the project will require around three full-time equivalent employees. The primary operational activities conducted on-site will include day-to-day routine operations, maintenance of infrastructure, and general site maintenance and security.

The operational lifespan of the project will be in excess of 30 years, depending on the nature of solar PV technology and energy markets. Once the project reaches the end of its investment and operational life, the project infrastructure will be decommissioned and the site returned to its pre-existing land use, or other land use in consultation with the landowner, as far as practicable.

3.5 Network connection

The infrastructure required for connection to the local electricity distribution network between the site and TransGrid's 132 kV transmission line will be dependent on the requirements of the network service provider, outcomes of grid connection studies (which are currently in progress), transmission line route selection and engineering, environmental and landholder constraints.

As noted previously, at its closest point, the Gunnedah Substation is approximately 4.2 km south-west of the site. TransGrid's 132 kV transmission line crosses Orange Grove Road close to the south-east corner of the site (refer Figure 1.2). Route identification and assessment will be completed as part of the EIS.

4 Justification

4.1 Strategic context

4.1.1 National context

The Commonwealth Government Renewable Energy Target (RET) scheme is designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources. Since January 2011, the RET scheme has operated in two parts–the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET). The LRET includes legislated annual targets, which requires significant investment in new renewable energy generation capacity in coming years, with a target of 33,000 gigawatt-hours of renewable electricity generation by 2020 (DoI DRE 2016).

Further, the Commonwealth Government has signed and announced its intention to ratify the United Nations Paris Agreement on climate change, which incorporates review and ratchet mechanisms that mean Australia's interim emissions reduction targets are likely to become more ambitious over time. The current interim targets are:

- 5% below 2000 levels by 2020; and
- 26-28% below 2005 levels by 2030.

The 2030 target is equivalent to a 50-52% reduction in per capita emissions and a 64-65% reduction in the emissions intensity of the economy.

4.1.2 State context

The NSW Government's REAP was introduced to guide NSW's renewable energy development and to support the former national target of 20% renewable energy by 2020.

This is supported by the recently released NSW Climate Change Policy Framework (Office of Environment and Heritage 2016), the aim of which is to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate and current and emerging international and national policy settings and actions to address climate change, and which adopts aspirational long-term objectives to achieve net-zero emissions by 2050 and to make NSW more resilient to a changing climate.

4.1.3 Local context

The key economic driver underpinning the local economy of the Gunnedah Shire has traditionally been agriculture, however there has been recent strong growth in the mining and gas sectors, which is anticipated to continue into the near future. GSC's Economic Development Strategy (2014) identifies a need to diversify the economic base of the region to increase its resilience to the 'boom and bust' cycles that characterise both the agricultural and mining sectors, and identifies four priorities for economic development in the region, one of which is focussed at targeting new business and economic activities, with the aim to build and diversify the local economy by targeting new business and economic activities that will fill 'gaps' and strengthen and broaden existing sectors.

4.1.4 Project benefits

The project is consistent with the objectives of the NSW Government's REAP and will contribute to achieving the Commonwealth Government's National RET of 33,000 gigawatt hours (GWh) of energy generated by renewable sources by 2020 (DoI DRE 2016), which the Australian Energy Regulator (2017) reports as requiring an additional 7,000 GWh of renewable energy to meet.

The project is intended to have benefits including:

- production of renewable energy, directly contributing to the State's renewable energy targets and the objectives of the REAP;
- creation of employment opportunities, including approximately 80 full-time equivalents (FTEs) during construction, and three FTEs during operations;
- direct and indirect benefits to the local economy during the life of the project;
- diversification of local revenue streams; and
- increased energy security through valuable contributions to a more diverse energy mix.

The project is also consistent with GSC's aims to diversify the economic base of the region and to strengthen and broaden the existing agricultural sector.

4.2 Site Selection

The project site was selected in consideration of a range of commercial and environmental factors, with the aim to select a suitable site with attributes that maximise project design and efficient project delivery, whilst minimising commercial and environmental risks and potential environmental impacts. The following key factors contribute to the suitability of the site:

- it is located in close proximity to the existing electricity transmission network, which has sufficient capacity to accommodate the electricity generated by the project;
- it is ideally situated for large-scale solar development, having access to a solar resource that is consistently highly available;
- it is of suitable topography, being generally flat, and while it does lie within the GSC broad flood planning area for the Namoi River, it is classified in a management zone described as a secondary flood discharge area, and anecdotal evidence of landowners indicates that it is generally not subject to flooding unlike much of the surrounding area;
- it is agricultural land of generally lesser quality than other areas in the locality;
- it has been highly disturbed as a result of past land uses, is largely cleared of native vegetation, and has limited environmental value; and
- the site is well situated for access to the regional road network, and due to the nature of the site and surrounding environment and location of the nearest sensitive receptors, would result in limited and only localised impacts.

Whilst it is acknowledged that the development is prohibited in the RU1 Zone, it is permissible with consent under the provisions of the Infrastructure SEPP. Further, early consultation with GSC has identified that the project is consistent with GSC's priorities for economic development in the region, and is in support of the project.

Alternative sites were considered in the locality, but were discounted predominantly due to proximity to connection infrastructure, or being either flood prone, or of high agricultural value.

5 Stakeholder engagement

OVERLAND will engage with stakeholders during preparation of the EIS. Stakeholder groups, with an interest in the project, include:

- DPE;
- RMS;
- NSW Office of Environment and Heritage (OEH);
- EPA;
- Gunnedah Shire Council (GSC);
- NSW DPE – Division of Resources and Energy (DRE);
- NSW Department of Primary Industries (DPI);
- Civil Aviation Safety Authority (CASA);
- Transgrid;
- local landowners, farm managers and nearby residents; and
- Aboriginal stakeholders.

OVERLAND has developed a positive working relationship with GSC as part of the process to identify and secure a suitable site for the project. A letter of support for the project from GSC is included as Appendix A.

Engagement activities with the stakeholders identified above will be developed as part of a stakeholder engagement program that will be prepared following receipt of the SEARs. A number of different resources will be used to inform the development of the stakeholder engagement program, including the NSW Government's *Community Attitudes to Renewable Energy* report (OEH 2015). The results of surveys conducted as part of that report indicate high levels of support among communities for the construction of solar farms throughout NSW (OEH 2015).

Outcomes of engagement activities will be addressed in the EIS and relevant technical studies.

6 Preliminary environmental impact assessment

6.1 Issues identification

An initial review of environmental constraints has been undertaken to identify the issues which require detailed consideration as part of the project design process and technical studies supporting the EIS for the project.

6.2 Biodiversity

6.2.1 Existing environment

Detailed ecological assessments have been undertaken by Biosis and EMM between March and October 2017 in accordance with the FBA (OEH 2014) and BAM (OEH 2017). These assessments have included mapping of native vegetation, collection of plot/transect data and targeted threatened species surveys.

Soil and vegetation within the Brigalow Belt South Bioregion is highly variable and is dependent on the local rock type or sediment source. In the study area adopted as part of the ecological assessments (refer Figure 5.1), soils consist of vertic brown chromosols. The quality of native vegetation is tied to past land use. All areas have been subject to extensive clearing, with scattered trees or small clumps of timber interspersed through native and exotic grasslands. The quality of the underlying groundcover is dependent on grazing pressure, with areas subject to heavy grazing pressure dominated by exotic grasses, while areas subject to low to moderate grazing pressure retain a much higher cover of native species.

Roadside vegetation along Orange Grove Road is similar to that found on-site, with scattered trees over a largely exotic grassy groundcover. Land in the north is cropped and supports minimal biodiversity value.

Two plant community types (PCT), have been identified within the study area. PCT 101 Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion occurs across the majority of the study area largely as a derived grassland. The condition of this PCT within the study area is variable, depending on past land use. Where there has been more sustainable, low intensity, grazing this community has been mapped in moderate/good condition. These areas have a high cover of exotic plant species (50-72%) along with a high cover of native groundcover species (34-92%). Where higher intensity grazing has been undertaken this community is mapped as being in low condition. These areas have a high cover of exotic plant species (50-60%) along with a low cover of native groundcover species (2-8%). It appears these areas may meet the definition of Category 1 – Exempt Land under the Local Land Services Act 2013 (LLS Act) and may not require assessment under the BAM (OEH 2017).

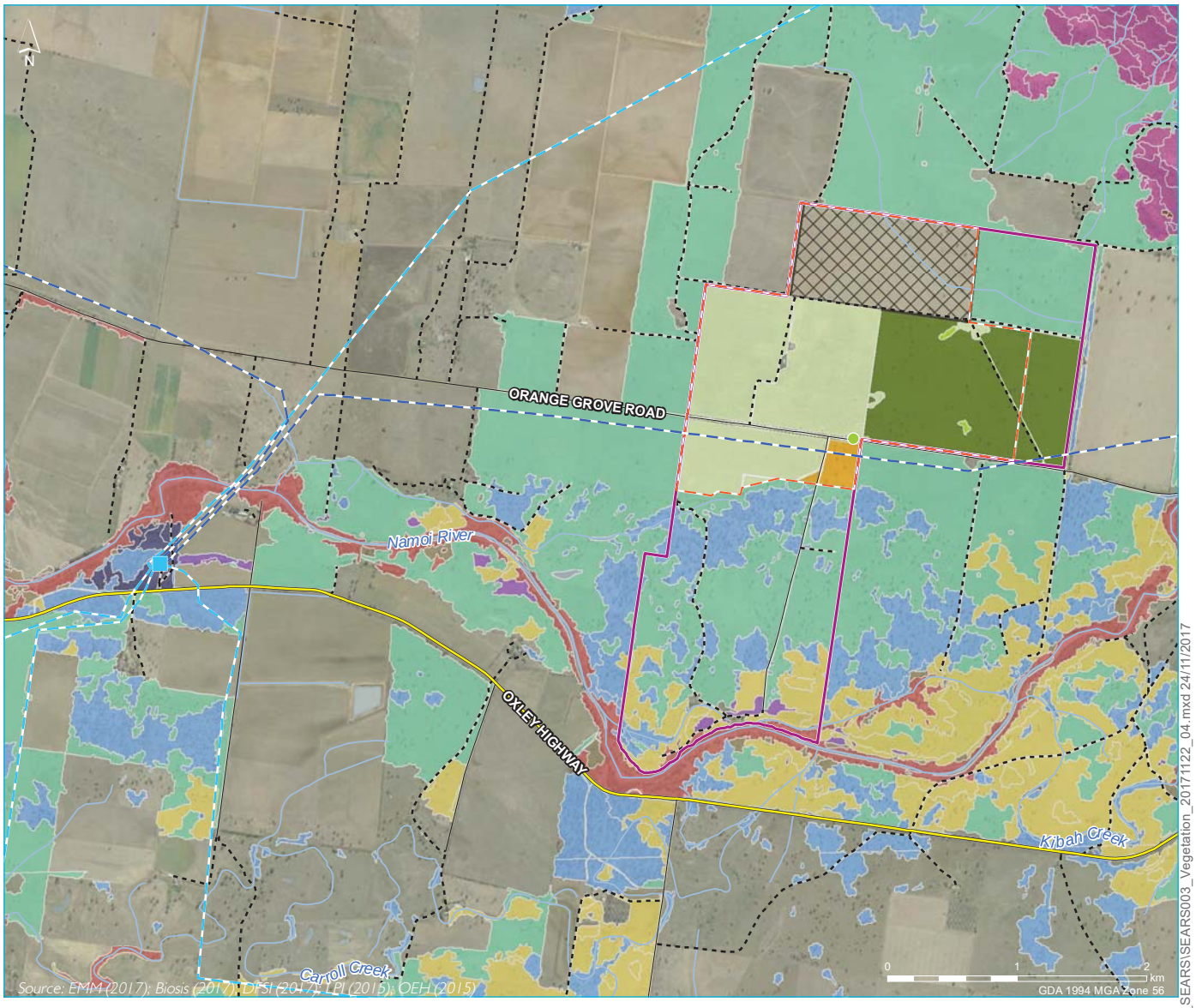
A small patch of PCT 281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion is mapped in the south-east corner of the site boundary. This vegetation was conservatively deemed to be consistent with White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community (EEC) as listed under the BC Act, but did not meet condition thresholds for the community as listed under the EPBC Act (Biosis 2017). No other threatened ecological communities (TECs) have been identified as part of the ecological assessments undertaken to date.

Threatened species assessments, including targeted surveys, have been undertaken in accordance with NSW and Commonwealth survey guidelines. These surveys identified a number of threatened fauna species in areas to the south of Orange Grove Road, which have since been excluded from the potential project footprint to avoid potential impacts. One threatened flora species Finger Panic Grass (*Digitaria porrecta*) was recorded in disturbed roadside vegetation along Orange Grove Road. This species, along with a number of other flora species able to occur in disturbed environments, may occur within areas subject to low to moderate grazing pressure. No other threatened species are considered likely to occur within the site boundary.

6.2.2 Assessment approach

As noted in Section 2.2.3, the project be assessed under the BC Act and associated BAM The majority of the fieldwork has been completed, including mapping of native vegetation, collection of plot/transect data to determine vegetation condition and substantial threatened species surveys. As part of the EIS, a biodiversity development assessment report (BDAR) will be prepared in accordance with the reporting requirements of the BAM.

The EIS and BDAR will include constraints mapping to demonstrate the biodiversity values on the site and will demonstrate how impacts to biodiversity have been avoided, mitigated and, if required, offset. Based on detailed ecological assessments undertaken to date, substantial work has already been undertaken to avoid and minimise impacts to biodiversity, largely by restricting the development to areas of lower quality and avoiding impacts to identified EECs.



Plant community types (EMM, 2017; Biosis, 2017; OEH, 2015)

- 1 - Candidate Native Grasslands
- 53 - Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains
- 78 - River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
- 101 - Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion - Moderate/good (poor)
- 101 - Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion - Low (grazed)
- 101 - Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
- 101 - Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion - Moderate/good (derived grassland)
- 102 - Liverpool Plains grassland mainly on basaltic black earth soils, Brigalow Belt South Bioregion
- 112 - Black Tea-tree - River Oak - Wilga riparian low forest/shrubland wetland of rich soil depressions in the Brigalow Belt South Bioregion
- 147 - Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
- 202 - Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregions
- 241 - River Coobah swamp wetland on the floodplains of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- 281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
- 435 - White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
- 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
- 592 - Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest in the Brigalow Belt South Bioregion and Nandewar Bioregion
- Cropped/disturbed land

KEY

- Orange Grove Sun Farm site boundary
- Preliminary development footprint
- Gunnedah Substation
- 132 kV transmission line
- 66 kV transmission line
- Main road
- Local road
- Vehicular track
- Watercourse / drainage line
- Waterbody
- Threatened flora - Finger Panic Gass

Vegetation communities at the site

Orange Grove Sun Farm
Request for SEARs
Figure 6.1

EMM

\\Emmsvr1\emmJobs\2017\J117210 - Orange Grove Sun Farm\GIS\02_Maps_SEARS\SEARS003_Vegetation_20171122_04.mxd 24/11/2017

6.3 Aboriginal cultural heritage

6.3.1 Existing environment

i Overview

The site falls within the Aboriginal language group boundary of the Kamilaroi people (Tindale 1974). The Kamilaroi language group boundary was recorded as covering one of the largest geographic areas in NSW, roughly spanning from Walgett in the west, north into Queensland, Tamworth in the east and south to the headwaters of the Hunter River. The site is within the boundary of the Red Chief Local Aboriginal Land Council.

The site is within the Brigalow Belt South Bioregion. Locally, the site is on an extensive, broad and flat alluvial plain landform pattern within the catchment of the Namoi River, which, at its closest point, is approximately 1.3 km east of the site and dominates the drainage of the local area. The site is part of the Burburgate Soil Landscape which has unique drainage features; drainage is generally by sheet flow with few, very widely spaced incised channels.

A search of the Aboriginal Heritage Information Management System (AHIMS) identified eight Aboriginal sites within a 20 km x 20 km area centred on the site. No Aboriginal sites have been registered within the site boundary or along the easement options currently being considered. The closest Aboriginal site is an artefact scatter almost 8 km west of the site. Most of the Aboriginal sites have been recorded close to the major water systems of the area including the Namoi River and Mooki River. Based on an initial desktop review, Aboriginal sites in the area generally occur on landforms associated with low-lying alluvial plains, such as those found within the site boundaries. Of the 1,100 sites recorded, 668 (60%) were identified on alluvial landforms with most sites within 50 m of water sources, while overall approximately 90% of sites were recorded within 200–300 m of water sources (RACAC 2002).

ii Implications for archaeological material at the site

The desktop review of the site and surrounds indicates that the site is not within a particularly archaeologically sensitive landscape – it is over 1 km from reliable water and on a continuous landscape element with no remarkable features. However, the surrounding landscape elements of mountains, swamps and the Namoi River make the site an interesting area which may have experienced Aboriginal occupation through transitory movement. The most likely Aboriginal sites to occur would be open campsites expressed as stone artefacts. Any stone artefacts originally deposited at the site are likely to have been locally displaced through clearing and ploughing but may still survive on or below the ground surface.

Modified trees have been identified in the local area; however, they are unlikely to occur within the site boundary because it has been largely cleared of native vegetation. Notwithstanding, remnant mature trees should be inspected for signs of scarring or carving.

6.3.2 Assessment approach

The Aboriginal Cultural Heritage Assessment (ACHA) will be guided by the following best practice documents, acknowledging that some of the requirements cannot be met because an Aboriginal Heritage Impact Permit (AHIP) does not apply for SSD:

- Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010); and
- Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011).

The following will be undertaken as part of the ACHA:

- review of OEH databases (including those for historical sites) and any relevant literature;
- field survey of the site to identify places or items of Aboriginal cultural heritage significance;
- an assessment of Aboriginal cultural heritage items or places identified during the field survey;
- a cultural assessment to investigate whether there are any living cultural knowledge holders who may have cultural knowledge relevant to the assessment;
- consultation with Aboriginal stakeholders with guidance from the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010); and
- development of measures to avoid and mitigate potential impacts to Aboriginal cultural heritage, if required.

6.4 Land use

6.4.1 Existing environment

The project is within the Gunnedah Shire LGA, which covers an area of 4,994 km^2 in north-western NSW. The site is part of the Namoi River catchment. Land use within this catchment is dominated by extensive agricultural operations with grazing occupying 61.2% of the total catchment area (Office of Water 2011). Dryland cropping and horticulture (16.2%), forestry (10.3%), native landscapes (5.1%), conservation (3.2%) and irrigation (3.0%) are also prevalent across the catchment area (Office of Water 2011).

The site is part of the Burburgate soil landscape, described as mixed stagnant alluvial plains and floodplains of the Namoi River on the Liverpool Plains, characterised by a complex distribution of soils, consisting of moderately drained brown clays, and poorly drained red-brown earths, with smaller areas of high floodplain often consisting of solodic soils (OEH 2011). Within the Land and Soil Capability (LSC) mapping for NSW, the site is mapped as LSC Class 2. Land identified under this classification is recognised as having slight limitations, which can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation limitations (OEH 2013).

The site is mapped as BSAL as defined by the Strategic Agricultural Land Map – New England North West regional mapping presented in the Mining SEPP (refer Figure 1.2). A total of 2.8 million ha of BSAL has been identified and mapped at a regional scale across NSW and includes land capable of sustaining high levels of productivity (NSW Government 2012).

While the site is mapped as BSAL, during consultation with the project landholders it was noted that dryland crop production ceased on a significant portion of the eastern part of the site during the 1970's due to economic constraints associated with the localised soil type. Further, irrigated crop production ceased on the western part of the site during the 1990's due to significant reductions in the availability of a reliable supply of irrigation water from the Namoi River. Subsequently, irrigated crop production became uneconomic on this land parcel.

The site has been highly modified by past disturbances associated with livestock grazing, weed invasion, land clearing and cropping. Surrounding land uses include both dryland and irrigated broad acre crop production and livestock grazing.

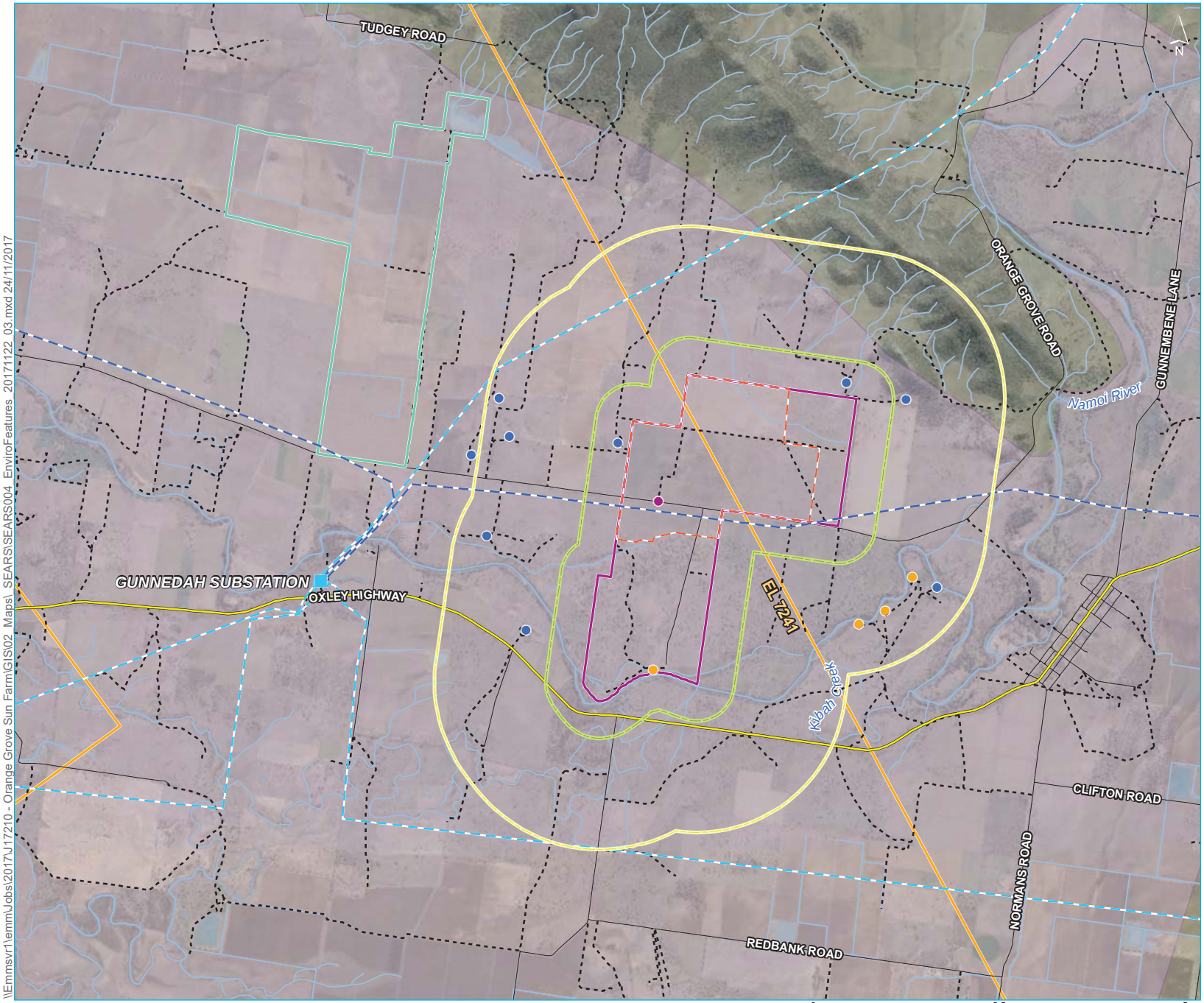
One mineral tenement which encompasses the site was identified in a search of the NSW Department of Industry – Resources and Energy DIGS database, an exploration licence (EL) issued under the NSW *Mining Act 1992* (EL7241) held by the Secretary of DPE. EL7241 covers an area of 2,575 square kilometres (km^2) in north-western NSW (refer Figure 5.2).

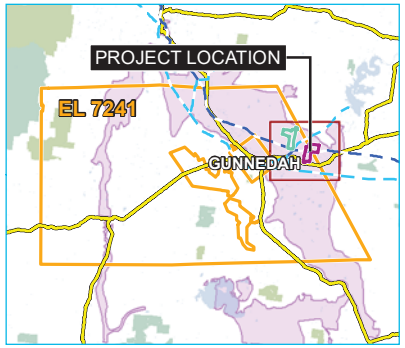
Somerton National Park is approximately 11 km south-east of the site and covers an area of 759 ha. Melville Range Nature Reserve is approximately 22.5 km south-east of the site and covers an area of 843 ha.

6.4.2 Assessment approach

The project will alter the current land use of the site, being agriculture, to electricity generation. At the end of the project's operational life, project infrastructure will be decommissioned and the site may be returned to its pre-existing agricultural land use. As the site will not require significant civil works (such as bulk earthworks and re-shaping), the integrity of the land and soil capability is expected to be retained through appropriate land management practises. In order to establish the relevant land and soil capability, a desktop baseline assessment of land and soil capability will be undertaken in the EIS. The EIS for the project will also include an assessment of the impact of the project on agricultural land identified as BSAL. As part of this assessment, OVERLAND will engage in consultation with DPI.

As noted above, a total of 2.8 million ha of BSAL has been identified and mapped at a regional scale across NSW, including over 1.5 million ha within the New England North West Region. Given the relatively small size of the site (256 ha) in the regional context, the loss of agricultural land from the project will only result in a temporary negligible reduction in the overall agricultural productivity of the region.





KEY

- Orange Grove Sun Farm site boundary
- Preliminary development footprint
- Indicative site access point
- 500 m buffer
- 2 km buffer
- Gunnedah Solar Farm (SSD 8658 - proposed by Photon Energy Generation Pty Ltd)*
- 132 kV transmission line
- 66 kV transmission line
- Main road
- Local road
- Vehicular track
- Watercourse / drainage line
- Waterbody
- Flood planning area
- EL 7241
- NPWS reserve
- State forest

Receptors

- Sensitive receptor
- Project-related receptor

Preliminary environmental features

Orange Grove Sun Farm
Request for SEARs
Figure 6.2

EMM

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Source: EMM (2017); DFSI (2017); LPI (2015); GA (2015); LPMA (2011)

** DPE 2017, Gunnedah Solar Farm, viewed 11 October 2017, http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8658*

6.5 Water resources

6.5.1 Existing environment

The site is within the Brigalow Belt South Bioregion, which extends from south of Dubbo in central-western NSW to the mid-Queensland coast. Several major rivers flow through this bioregion with their catchments forming an integral part of the Murray-Darling river system.

The site is part of the Namoi catchment and is approximately 2.3 km north of the Namoi River at its closest point (see Figure 1.2). The Namoi catchment covers an area of 42,000 km^2 and supports a population of approximately 100,000 people, which includes a number of rural townships, such as Tamworth, Gunnedah and Narrabri (Office of Water 2011). Within the catchment, the Namoi River stretches over 700 km, beginning in the Great Dividing Range and flowing across much of north-western NSW through to its junction with the Barwon River near Walgett. The highest daily mean flow of the Namoi River is experienced at Gunnedah, close to the site, with a flow of 1,922 ML (Office of Water 2011). Streamflow declines downstream due to significant irrigation extractions and diversions into effluent channels (Office of Water 2011).

The Namoi catchment does not contain any extensive wetland complexes.

The site lies within the GSC flood planning area as mapped under the Gunnedah LEP (refer Figure 5.2).

The site is within the floodplain of the Namoi River. The *Carroll-Boggabri Floodplain Management Plan* (the FMP) (Department of Natural Resources (DNR) 2006) commences at the village of Carroll, downstream of the confluence of the Peel and Namoi Rivers, and extends north and west, past Gunnedah, to the town of Boggabri. This floodplain supports successful irrigation and dryland agricultural industries. The FMP primarily applies to land within the Gunnedah Shire LGA, including the site.

The site is identified as part of the proposed Upper Namoi Valley Floodplain within the Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain (DPI Water 2016). Under the Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain (DPI Water 2016), the site is mapped as part of the Upper Management Zone BL, which covers a significant portion of the catchment. This management zone is described as 'flood storage and secondary flood discharge areas', with proposed controls and rules associated with this zone supporting the maintenance of flow paths and temporary storage of floodwaters while allowing for appropriate development.

The site is within the Upper Namoi Alluvium groundwater management area which is characterised by an inland alluvial aquifer. Groundwater at the site is of fresh to moderate quality (0-1,500 TDS mg/L) and is suitable for domestic, stock and some irrigation purposes (Office of Water 2011). There is a groundwater monitoring bore adjacent to the western boundary of the site that is listed on the DPI Water database (GW036237). The latest values indicate that the depth to groundwater at this location is approximately 12.35 m. In addition, there are two licensed groundwater bores on-site (GW901524 and GW969196), which are authorised for stock use.

6.5.2 Assessment approach

Potential impacts to water resources from the project are expected to include demand for water during the construction of the project, as well as for land management during operation. Water demands will be relatively small, as the construction and operation of a solar PV electricity generation facility are non-water intensive. If surface water or groundwater extraction is required to meet the project's demand for water, an assessment of impacts to these water sources will be included in the EIS.

Modelling of overland flowpaths and flood behaviour will be completed as part of project design and included the EIS. A surface water assessment will be prepared for inclusion in the EIS and will include an assessment of the existing surface water environment and a desktop assessment of flood risk of the project. The project will be designed to avoid significant adverse impacts on flood behaviour.

6.6 Traffic and transport

6.6.1 Existing environment

The primary road transport route in the vicinity of the site is Orange Grove Road (see Figure 1.2). Orange Grove Road is a GSC rural road that traverses the landscape between Kelvin Road in the west and Keepit Dam Road in the east. Orange Grove Road primarily services local traffic and agricultural operations. At the site, Orange Grove Road is a single carriageway with an unsealed surface. Kelvin Road, which connects to O'Keefe Avenue, will provide access from the site to the town of Gunnedah and the Kamilaroi and Oxley highways. The Kamilaroi and Oxley highways will be the major transport routes for haulage during the construction stage of the project.

The Kamilaroi Highway, approximately 10.5 km south-west of the site, is 605 km in length and is a NSW State highway extending from Bourke to Willow Tree. The highway is a significant freight corridor and connects a number of north-western NSW's major settlements including Brewarrina, Walgett, Narrabri and Gunnedah. The majority of the Kamilaroi Highway is a sealed single carriageway. The Kamilaroi Highway also connects the Mitchell and New England highways. It is a designated B-Double route.

The Oxley Highway, south of the Namoi River, is 656 km in length and is a State-owned rural highway extending from the Mitchell Highway at Nevertire to the Pacific Highway at Port Macquarie. The highway connects a number of northern NSW's major settlements including Gilgandra Coonabarabran, Gunnedah, Tamworth, Wauchope and Port Macquarie. The majority of the Oxley Highway is a sealed single carriageway. It is a designated B-Double route.

6.6.2 Assessment approach

Traffic generation is predominantly restricted to the construction stage of the project, with the site establishment and delivery of infrastructure likely to generate the greatest number of traffic movements during the life of the project. During operation, traffic is predicted to be limited to employee vehicle movements for in the order of three employees, plus a small number of daily vehicle movements associated with ongoing maintenance and associated activities.

A traffic assessment will be undertaken to assess potential impacts associated with traffic generation from the construction of the project in accordance with the relevant guideline *Guide to Traffic Generating Developments* (RTA 2002). It will include:

- existing traffic levels on transport routes and intersections likely to be used by the project;
- predicted traffic generation during construction;
- potential impacts to road and intersection capacity during construction; and
- potential road and rail safety issues.

As traffic generation during operation will be minimal, a detailed assessment of operational traffic impacts is not considered to be required.

6.7 Air quality

6.7.1 Existing environment

The site is in a rural setting approximately 12 km east of the township of Gunnedah. The Gunnedah Shire LGA is an area heavily dependent on agricultural activities, which is likely to influence local and regional air quality. The area surrounding the site is sparsely populated. In 2016, the population density within the Gunnedah Shire LGA was approximately 2.4 persons/km^2, which was significantly lower than the NSW average (9.6 people/km^2) (ABS 2017a). Consequently, existing sources of air pollution within the area are limited and are primarily comprised of dust and vehicle and machinery exhaust emissions associated with transportation and agricultural activities. Bushfires are also a source of seasonal dust generation.

Emissions to the atmosphere from the project will largely be associated with dust and vehicle and machinery exhaust emissions during construction, and the maintenance of plant and equipment on-site. The project will be approximately 12 km east of the township of Gunnedah and approximately 4.4 km north-west of the village of Carroll, which are the nearest considerable concentrations of sensitive receptors. There is a sensitive receptor approximately 150 m west of the western boundary of the site (refer Figure 5.2). In addition, a further five dwellings are between approximately 500 m and 2 km from the site boundary, and the Namoi Pistol Club is located approximately 630 m from the north eastern corner of the site boundary.

6.7.2 Assessment approach

The project is not anticipated to generate significant air quality impacts during construction or operation. Mitigation measures to manage dust generation on-site would be required during construction activities and as part of regular land management activities during operation. The EIS will detail measures to be implemented during the life of the project to minimise dust emissions. As impacts during construction would not be significant, and would be temporary in nature, a detailed air quality assessment is not considered to be required as part of the EIS.

6.8 Noise and vibration

6.8.1 Existing environment

Land use in the site's surrounding area is predominantly agricultural. Given the project's rural setting, background noise is likely to be low and characterised by agricultural activities and associated machinery, with minimal background wildlife noise also expected. Residential dwellings close to Orange Grove Road would likely be subject to some road noise.

Noise generated from the project will include construction noise, and noise generated by increased traffic along Orange Grove Road during the construction period, which will be the main transport route to and from the site. As stated previously, there is a sensitive receptor within 150 m of the site's western boundary (see Figure 5.2).

6.8.2 Assessment approach

Noise impacts on-site during construction and operation are not expected to be significant; however, given the distance to the nearest sensitive receptor, consideration of noise management and mitigation measures may be required to ensure there are minimal exceedances of the relevant criteria at this receptor. Noise during construction will be limited to a period of approximately nine months, while operational noise sources over the life of the project will be limited. The EIS will detail measures to be implemented during construction and operations to minimise noise impacts.

The project will generate traffic movements during the construction stage, which will require vehicles to access the site from Orange Grove Road and Kelvin Road, which connects to O'Keefe Avenue and then on to the Kamilaroi and Oxley highways. A traffic noise assessment will be included in the EIS to assess noise impacts associated with traffic along Orange Grove Road during construction. Traffic movements during operation are expected to be minimal.

6.9 Visual

6.9.1 Existing environment

As previously discussed, the site is within the Namoi catchment, north of the Namoi River. Elevation across the site is relatively uniform ranging between 273–278 m above sea level.

The site is visible from Orange Grove Road. As stated previously, there is a sensitive receptor within approximately 150 m of the site's western boundary (see Figure 5.2). Visibility of project infrastructure from other sensitive receptors in the surrounding landscape will be dependent on distance and the presence of vegetation which would screen views from the majority of these locations.

Gunnedah Airport is approximately 12 km west of the site.

6.9.2 Assessment approach

Solar panels absorb sunlight and are designed to reflect only a small percentage of the sunlight that they receive. Consequently, glare is not anticipated to be a significant visual impact associated with the project. The EIS will consider likely visual impacts of the project infrastructure from sensitive receptors and nearby road corridors, as well as visibility of lighting during the night time.

6.10 Hazards and risks

6.10.1 Existing environment

As noted in Section 1.2, at its closest point, the site is approximately 4.2 km north-east of the Gunnedah Substation. TransGrid's 132 kV transmission line (refer Figure 1.2). TransGrid's 132 kV transmission line crosses Orange Grove Road close to the south-east corner of the site (refer Figure 1.2).

The infrastructure required for connection to the local electricity distribution network between the site and TransGrid's 132 kV transmission line will be dependent on the requirements of the network service provider, outcomes of grid connection studies (which are currently in progress), transmission line route selection and engineering, environmental and landholder constraints.

As noted in Section 2.2.5, the site is not identified as bushfire prone land in the NSW RFS online tool and the project is unlikely to pose a significant bushfire risk.

6.10.2 Assessment approach

The EIS will include a preliminary risk screening in accordance with State Environmental Planning Policy No 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP 2011a). Should the preliminary risk screening indicate that the project is 'potentially hazardous', a preliminary hazard analysis will be prepared in accordance with Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP 2011b) and Multi-Level Risk Assessment (DoP 2011c).

6.11 Socio-economics

6.11.1 Existing environment

The population of the Gunnedah Shire LGA in 2016 was 12,215 compared to 12,066 in 2011, which reflects an increase of 149 people (or 1.2%) residing in the area (ABS 2013a; ABS 2017a). Similarly, the township of Gunnedah and the village of Carroll both experienced increases in population over this period from 9,340 and 176 in 2011 to 9,726 and 337 in 2016, respectively (ABS 2013b; ABS 2013c; ABS 2017b; ABS 2017c). The percentage of the population who identify themselves as Aboriginal and Torres Strait Islander people within the Gunnedah Shire LGA (12.8% in 2016) is significantly higher than the State and national average (ABS 2017a).

The economy within the Gunnedah Shire LGA is relatively diverse with the primary economic activities being agriculture and coal mining (GSC 2014). Agriculture is the predominant employing industry within the Gunnedah Shire LGA, with sheep, beef cattle and grain farming the area's primary employer (12.2%) (ABS 2013a). The geography, climate, and environment within the Gunnedah Shire LGA are favourable for a variety of agricultural activities including the production of a variety of summer and winter crops (GSC 2014).

Coal mining is the area's second largest employer, accounting for 6.3% of the region's employment in 2011 (ABS 2013a). The Gunnedah Shire LGA is within the Gunnedah Basin, which contains more than 11% of the estimated recoverable coal reserves in NSW (GSC 2014). Within the township of Gunnedah, coal mining accounts for more than 7% of the town's employment and is the town's predominant employing industry (ABS 2013b). Other mining activities within the Gunnedah Shire LGA include coal seam gas exploration and hard rock quarrying. Within the Gunnedah Shire LGA, the unemployment rate is 6.8%, which is higher than both the NSW (5.1%) and Australian (5.7%) unemployment rates (DoE 2017).

Gunnedah is the largest town in the Gunnedah Shire LGA with a population of 9,726 and is the area's commercial and administrative centre (GSC 2014). There are a range of retail, commercial, professional and personal services available within the town, as well as a number of accommodation options, which support the Gunnedah Shire LGA's strong visitor economy. As noted above, coal mining is the dominant industry of employment for the town of Gunnedah's population.

6.11.2 Assessment approach

The EIS will include consideration of the socio-economic impacts and benefits of the project, including direct and indirect benefits to the economy during construction and operation.

6.12 Cumulative impacts

Photon Energy Generation Pty Ltd (Photon Energy) propose to construct the Gunnedah Solar Farm, a 155 MW PV solar farm approximately 3 km west of the site (refer Figure 5.2), SEARs for which were issued by DPE on 25 August 2017. There is potential for cumulative impacts including traffic generation on the local road network (especially Orange Grove Road and Kelvin Road), as well as visual and socio-economic impacts in the locality. The EIS for this project will consider potential cumulative impacts with the Gunnedah Solar Farm proposed by Photon Energy.

7 Conclusion

OVERLAND proposes to develop a large scale PV solar generation facility, on behalf of related company Orange Grove Sun Farm Pty Ltd, near the town of Gunnedah in the Gunnedah Shire LGA, with an estimated generation capacity in the order of 110 MW. A detailed analysis of environmental, infrastructure and socio-economic constraints and opportunities will be undertaken during the design phase and preparation of the EIS. OVERLAND is committed to engaging with GSC, NSW regulators, landowners, Aboriginal stakeholders and the community and will develop and implement a program for stakeholder consultation during the preparation of the EIS.

Abbreviations

ACHA	Aboriginal cultural heritage assessment
BC Act	NSW *Biodiversity Conservation Act 2016*
BAM	biodiversity assessment method
BAR	biodiversity assessment report
BoM	Bureau of Meteorology
CL Act	NSW *Crown Land Act 1989*
DA	development application
DoEE	Commonwealth Department of Environment and Energy
DPE	NSW Department of Planning and Environment
DRE	NSW Department Planning and Environment – Division of Resources and Energy
EIS	environmental impact statement
EMM	EMM Consulting Pty Limited
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EP&A Regulation	NSW Environmental Planning and Assessment Regulation 2000
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	environment protection licence
FBA	*Framework for Biodiversity Assessment*
GSC	Gunnedah Shire Council
Gunnedah LEP	Gunnedah Local Environmental Plan 2012
GWh	gigawatt hours
ha	hectares
IBRA	Interim Biogeographic Regionalisation for Australia
kW	kilowatt
LGA	local government area
LPI	NSW Land and Property Information
MNES	matters of national environmental significance

MW	megawatt
MWh	megawatt hours
NPW Act	NSW *National Parks and Wildlife Act 1974*
OEH	NSW Office of Environment and Heritage
OVERLAND	OVERLAND Sun Farming Pty Ltd
PCT	plant community type
POEO Act	NSW *Protection of the Environment Operations Act 1997*
PV	photovoltaic
REAP	Renewable Energy Action Plan
RF Act	NSW *Rural Fires Act 1997*
RFS	NSW Rural Fire Service
RMS	NSW Roads and Maritime Services
SEARs	Secretary's environmental assessment requirements
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2011
SSD	State significant development
TDS	total dissolved solids
TSR	travelling stock reserve
WM Act	NSW *Water Management Act 2000*

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Appendix A

Letter of support from Gunnedah Shire Council

Shire of
Gunnedah
Land of Opportunity

Mr Sten Fraser
Land Development Manager
Overland Sun Farming
PO Box 318
WELLERS HILL QLD 4121

24 October 2017

Dear Mr Fraser

Orange Grove 110MW Sun Farm Project

I refer to the above and your meeting with Council's General Manager and myself today.

Council writes to provide in principle support for the proposed solar farm on the Orange Grove Road near Gunnedah. Council understands that this is State Significant Development and that the NSW Department of Planning and Environment is the determining authority and that the Department will undertake a thorough assessment of the proposal including the requisite public consultation.

I understand that the proposed development will see a $120m investment into the Gunnedah community and that 80 construction workers and 3 permanent employees will be required. This investment into our Shire is welcomed.

Should you wish to discuss this matter further, please contact me on 02 67 40 2100.

Yours faithfully

Andrew Johns
DIRECTOR PLANNING & ENVIRONMENTAL SERVICES

Contact: 02 6740 2100
Reference:aj:vg

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